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Translation

EARTHQUAKES IN THE USSR IN 1975

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EARTHQUAKES IN THE USSR IN 1975

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INTRODUCTION

A large part of the territory of the USSR, particularly its southern and eastern margins, is subject to earthquakes. Over 200 permanent seismological stations of the USSR Unified System of Seismic Observations (YeSSN) register these earthquakes in order to obtain observational material to study the seismic danger of individual regions, the depth structure of the earth, signs of strong earthquakes, etc.

The initial processing is carried out at the stations in accordance with standardized programs. The consolidated interpretation, which is constantly improved, is made at the union and regional (zonal) YeSSN centers. In the process, there is consistent determination and more precise definition of the basic parameters of the focal points (coordinates of the seismological centers, magnitude) on the basis of the YeSSN stations and some foreign stations. The results are published in operational seismological bulletins that come out every 10 days, and in quarterly seismological bulletins.

The next stage is a more detailed analysis of the observational data of all the seismoactive zones of the USSR, further precise definition of the data from the instruments and their synoptic analysis with macroseismic data, and determination of the additional parameters of the focal points of the earthquakes which make it possible to extent our concepts of both the process at the focus itself and of the special features of the propagation of seismic waves within the earth.

All the earthquakes that have occurred during the year are analyzed in accordance with unified methodology, with particular attention paid to strong earthquakes, as well as earthquakes originating on the boundaries of several major regions, when it is necessary to take into account the special features of the recording of the earthquakes by the seismological stations located under different seismotectonic conditions.

As a result, every year in the collection, "Zemletryaseniya v SSSR" [Earthquakes in the USSR], survey articles are published which describe individual strong earthquakes of the continental part of the USSR with an intensity of 6 points and over at the epicenter, as well as catalogs of earthquakes, which constitute the basis for the collection's

publications: the Basic Catalog of Strong Earthquakes on the Territory of the USSR, regional catalogs, a catalog of strong earthquakes in the world and a catalog of additional parameters of the focal points of strong earthquakes.

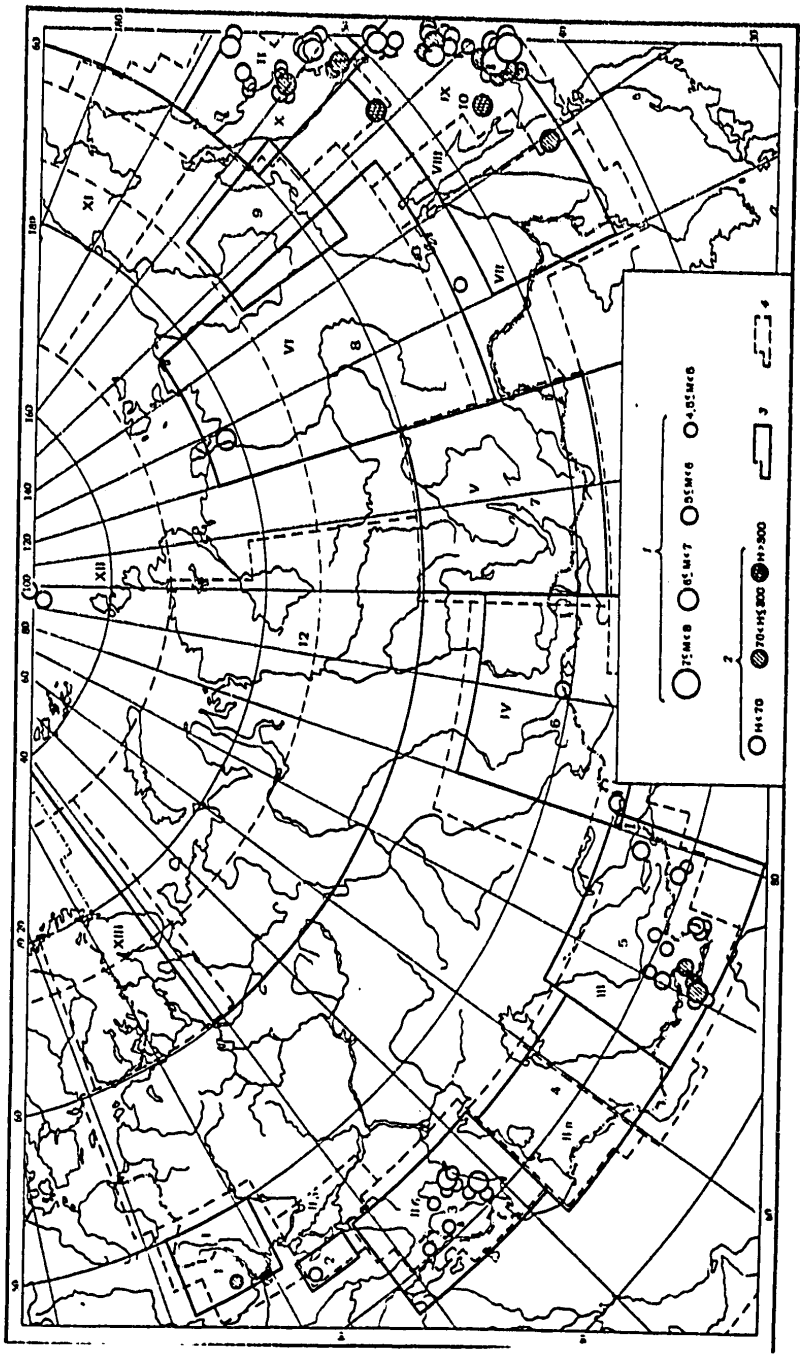
The Basic Catalog of Strong Earthquakes contains information on the basic parameters of strong earthquakes on the territory of the USSR. These parameters (time at the focus, coordinates of the epicenter, depth of the focus, magnitude along the surfaces and volumetric waves) are determined at the Institute of Earth Physics of the USSR Academy of Sciences from data from the regional and teleseismic stations of the Unified System of Seismic Observations of the USSR and the data from the world system. The basic catalog is compiled (since 1975) in the form of a New Catalog [1] and contains information on earthquakes with a certain level of magnitude, M_{LH}. If there is no data to determine M_{LH}, its value may be estimated from the formulas:

where m_{pv} is the magnitude, determined from $(A/T)_m$ in the group of P-waves (component Z), recorded by average-period apparatus, and m_{pv}^{*} — is the short-period apparatus (designated in the catalogs by an asterisk). The magnitudes M_{LH} and m_{pv}^{*} are determined according to the instructions [2].

Beginning with 1977, the Basic Catalog and the regional catalogs of earthquakes have been compiled on the basis of new regionalization of the seismic activity of the USSR territory [1] (see diagram, table).

Given below are the lower boundary values of M_{LH} and the intensities I_0 for new regions and subregions of the USSR:

	M_{LH}	I_0
1. Carpathians: focal points in crust	4.5	5
deep earthquakes		
2. Crimea--Nizhnyaya Kuban	4.0	6
3. Caucausus	4.5	5
4. Western Turkmeniya	4.5	6
5. Central Asia and Kazakhstan	5	6
6. Altay and Sayan	5	6
7. Baykal Region	5	6
8. Yakutiya, Northeast	5	6
9. Amur Region and Sea region	5	5
10. Sakhalin	4.5	5
11. Kurily	6	5
12. Kamchatka:		
continental part of coastal region,	5	5
Komandor Islands	6	-
13. Chukotka and Arctic basin	5	-
14. Baltic Shield	4.5	
15. European part of USSR territory, Urals and Western Siberia	4.5	



Map of the Epicenters of Earthquakes on USSR Territory with $M \sim 4.25$

[Key on Following Page]

Key: 1--magnitude; 2--depth of focus in kilometers. Figures on map--number of earthquakes with M 5.5 (according to the catalog); 3--boundaries of seismoactive zones up to 1975; 4--new boundaries of seismoactive zones; I--Carpathians; II--Caucasus: a--Crimea--Lower Kuban, b--Caucasus, c--Western Turkmeniya; II Central Asia; IV--Altay and Sayan; V--Baykal region; VI--Yakutiya and Northeast; VII--Primor'ye [coastal] and Amur regions; VIII--Sakhalin; IX--Kuril; X--Kamchatka; XI--Chukotka; XII--Arctic; XIII--Baltic shield

The catalog also includes earthquakes of lesser magnitude that caused a considerable surface effect (in points of the MSK-64 scale).

The macroseismic data of the Basic Catalog are taken from the regional articles and catalogs. They include an estimate of the intensity at the epicenter and the average radii of the isoseismic lines, with an indication of the number of points with a known intensity within the given isoseismic lines.

The regional catalogs contain information on the basic parameters of the earthquakes that have occurred in the regions. These parameters are mainly determined on the basis of regional observations.

For regions in the regional catalogs with a relatively low level of seismicity or a small number of seismological stations (Carpathians, Crimea and Lower Kuban, Western Turkmeniya), all the earthquakes are included for which it proved possible to determine the parameters of the hypocenters; for other regions and subregions this level is restricted according to the energy class K [2] as follows:

Caucasus	9	Yakutiya, Northeast	8
Central Asia and Kazakhstan	9	Sakhalin	8
Baykal region	9	Kuril	9
		Kamchatka	9

The regional catalogs are compiled in accordance with the form adopted earlier, and contain the time when the earthquake occurred (mean Greenwich time), the coordinates of the epicenter, the depth of the focus (without parentheses--according to instrument data, in parentheses--according to macroseismic data), the class of accuracy (A--the error does not exceed 25 kilometers, B--same, 50 kilometers, a--same, 5--kilometers, b--same, 10 kilometers; for classes A and B the coordinates are given with an accuracy to tenths of a degree, for a and b--to hundredths). If the error in determining the coordinates of the epicenter exceeds $\pm$ 50 kilometers, the accuracy is not indicated. For relatively strong earthquakes, numbers are given in the catalogs according to which they can be easily found on the map of the epicenters. For the Carpathians, Caucasus, Altay, Yakutiya and Sakhalin the numbers are given for earthquakes with $K \geqslant 11$, for Central Asia and Kazakhstan, the Baykal region and Kamchatka--with $K \geqslant 12$, for the Kuril Islands--with $M \geqslant 5.5$.

Boundaries of Seismoactive Regions on the Territory of the USSR

(1) Регионы					Границы регионов с 1975 г. (φ°N и λ° E, W для угловых точек контура ломаной, ограничивающей регион)* (5)
(2) До 1974 г.	№ региона (3)	$\varphi^\circ - \lambda^\circ$	(4) 1975 г.	№ региона	
Carpathians	1	45–50 22–31	Carpathians	I	51–21; 51–32; 44–32; 44–24; 47–24; 47–21
Crimea	2	43–45 32–37	Crimea, West Kuban	IIa	48–32; 48–42; 46–42; 46–40; 45–40; 45–38; 43–38; 43–32
Caucasus	3	38–45 37–52	Caucasus	IIб	46–40; 46–52; 38–52; 38–44; 39–44; 39–42; 40–42; 40–40; 42–40; 42–38; 45–38; 45–40
Kopetdag	4	36–44; 52–65	Western Turkmeniya	IIв	45–52; 45–60; 35–60; 35–58; 36–58; 36–52
Central Asia	5	36–46 65–81	Centr. Asia, Kazakhstan	III	45–60; 45–75; 47–75; 47–84; 44–84; 44–83; 41–83; 41–80; 39–80; 39–76; 36–76; 36–74; 35–74; 35–66; 34–66; 34–60
Altay, Sayan	6	45–56 80–100	Altay, Sayany	IV	57–75; 57–99; 48–99; 48–93; 47–93; 47–90; 45–90; 45–87; 44–87; 47–84; 47–75
Baykal	7	48–60 100–120	Baykal region	V	60–99; 60–120; 48–120; 48–99
Yakutiya, Northeast	8 9	54–72 120–148 58–66 144–158	Yakutiya, Northeast	VI	76–102; 76–164; 62–164; 62–163; 61–163; 61–161; 60–161; 60–158; 59–158; 59–156; 58–156; 58–153; 55–153; 55–120; 60–120; 60–108; 71–108; 71–102
Far East	10	43–52 130–157	Coastal, Amur region	VII	55–120; 55–141; 48–141; 48–140; 45–140; 45–139; 42–139; 42–135; 41–135, 41–129; 48–129; 48–120
				VIII	55–141; 55–146; 48–146; 48–144; 45–144; 45–140; 48–140; 48–141
				IX	55–146; 55–151; 51–151; 51–161; 49–161; 49–159; 47–159; 47–156; 46–156; 46–154; 42–154; 42–139; 45–139; 45–144; 48–144; 48–146
Kamchatka, Komandorskiye Islands	11	50–60 156–168	Kamchatka	X	62–163E; 62–177W; 60–177W; 60–177E; 59–177; 59–174; 58–174; 58–170; 53–170; 53–165; 51–165; 51–151; 55–151; 55–153; 58–153; 58–156; 59–156; 59–158; 60–158; 60–161; 61–161; 61–163
			Chukotka	XI	76–164; 76–168W; 62–168W; 62–164

* Points on boundaries of regions included in regions lying east and north of this boundary.

Continuation

(1) Регионы					
(2) До 1974 г.	(3) № региона	$\varphi^\circ - \lambda^\circ$	(4) С 1975 г.	(3) № региона	Границы регионов с 1975 г. (φ° N и λ°E, W для угловых точек контура ломаной, ограничивающей регион)* (5)
Artic	12	60–90 38–169	Artic basin	XII	76–30; 76–168W; 90
			Baltic shield	XIII	76–21; 76–42; 60–42; 60–21
			European pt. of USSR Urals, W. Siberia	XIV	76–42; 76–102; 71–102; 71–108; 60–108; 60–99; 57–99; 57–45; 45–75; 45–52; 46–52; 46–42; 48–42; 48–32; 51–32; 51–19; 60–19; 60–42

Key:

1. Regions
2. Up to 1974
3. Number of region
4. Since 1975
5. Boundaries of regions since 1975, (φ°N and λ°E, W, for points of inflection of contour of broken line demarcating region)*

The scheme adopted earlier for dividing regions into separate rayons in regional catalogs is retained. The boundaries of these regions were published periodically in preceding collections, and their numbers are entered on a special graph. Individual macroseismic data are placed in the catalog.

The compilation of the catalogs by regions and subregions is performed at republic and peripheral institutions.

Institutions Responsible for Compiling Catalogs of Earthquakes and Writing Survey Articles

1.	Basic Catalog of Strong Earthquakes on USSR Territory	Institute of Earth Physics of USSR Academy of Sciences from instrument data of YeSSN and macroseismic data from region
2.	Regional Catalog of Earthquakes in Carpathians	Seismic Station of L'vov Institute of Geophysics of UkSSR Academy of Sciences
3.	Regional Catalog of Earthquakes in the Crimea and Western Kuban	Division of Seismology of Institute of Geophysics of UkSSR Academy of Sciences
4.	Regional Catalog of Earthquakes in the Caucasus	Institute of Geophysics of Georgian SSR Academy of Sciences (responsible) Institute of Geology imeni I. M. Gubkin of Azerbaijan SSR Academy of Sciences

		Institute of Geophysics and Engineering Seismology of Armenian SSR Academy of Sciences, Northern Caucasus Observatory of Institute of Physics of the Earth imeni O. Yu. Shmidt of the USSR Academy of Sciences)
5.	Regional Catalog of Earthquakes in Western Turkmeniya	Institute of Physics of the Earth and Atmosphere of the Turkmen SSR Academy of Sciences
6.	Regional Catalog of Earthquakes in Central Asia and Kazakhstan	Institute of Seismology of the Uzbek SSR Academy of Sciences (responsible). Institute of Earthquakeproof Construction and Seismology of the Tadzhik SSR Academy of Sciences, Institute of Seismology of the Kirgiz SSR Academy of Sciences, Institute of Seismology of the Kazakh SSR Academy of Sciences
7.	Regional Catalog of Earthquakes in Altay and Sayan	Institute of Geology and Geophysics of the Siberian Department of the USSR Academy of Sciences
8.	Regional Catalog of the Baykal Region	Institute of the Earth's Crust of the Siberian Department of the USSR Academy of Sciences
9.	Regional Catalog of Yakutiya and Northeastern USSR	Yakutsk Branch of the Siberian Department of the USSR Academy of Sciences, Northeastern Comprehensive Scientific Research Institute of the Far Eastern Science Center of the USSR Academy of Sciences
10.	Regional Catalogs of the Coast, Amur Region, Sakhalin and Kuril	Sakhalin Comprehensive Scientific Research Institute of the Far Eastern Science Center of the USSR Academy of Sciences
11.	Regional Catalog of Kamchatka	Institute of Volcanology of the Far Eastern Science Center of the USSR Academy of Sciences
12.	Regional Catalog of Chukotka and the Arctic Basin	Central Seismic Station at Pulkovo Institute of Physics of the Earth of the USSR Academy of Sciences
13.	Catalog of Additional Parameters of Focal Points of Strong Earthquakes	Institute of Physics of the Earth of USSR Academy of Sciences from data of YeSSN and regions
14.	Catalog of Strong Earthquakes in the World	Central Seismological Observatory at Obninsk Institute of Earth Physics of the USSR Academy of Sciences

The "Catalogue of Strong Earthquakes of the World" contains information on all the earthquakes in the world with $M \geq 6$. The parameters of these epicenters are determined at the Institute of Physics of the Earth of the USSR

Academy of Sciences on the basis of data from the supporting network of YeSSN and world network of stations.

The "Catalog of Additional Parameters of Focal Points of Strong Earthquakes" contains data on the "mechanism" of the focal points of the earthquakes in cases when it proved possible to determine it.

In 1975 there was not a single occurrence on the territory of the USSR on the level of maximum magnitude for each region. The survey articles for the regions contain a description of the manifestations of seismicity in the current year.

In this edition, in addition to articles devoted to individual strong earthquakes in 1975, articles are also published that were not included in the preceding collection.

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2. "Instruktsiya o poryadke proizvodstva i obrabotki nablyudeniy na seysmicheskikh stantsiyakh Yedinoy sistemy seysmicheskikh nablyudeniy SSSR" [Instructions on the Procedure for Performing and Processing Observations at Seismic Stations of the Unified System of Seismic Observations of the USSR], Moscow, IFZ of the USSR Academy of Sciences, 1966.

EARTHQUAKES IN THE CARPATHIANS

O. P. Kostyuk

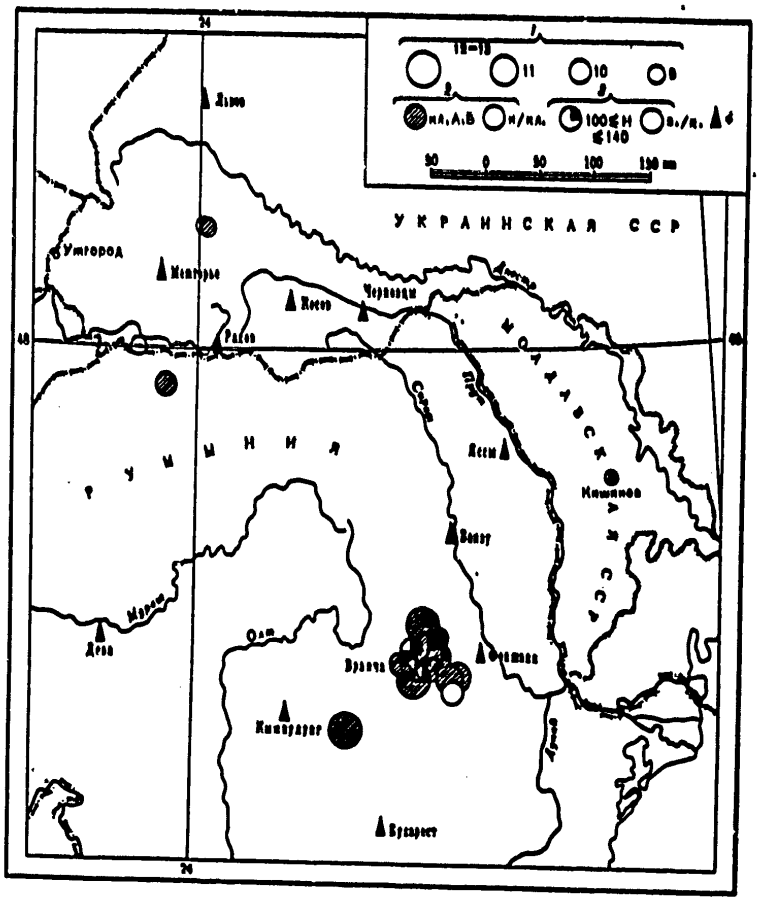
In 1975 observations were made at five seismic stations in the Carpathian network of the Ukrainian SSR: L'vov, Uzhgorod (key stations), Rakhov, Mezhgor'ye and Kosov (regional stations). At the key station at Uzhgorod and the regional stations the earthquakes were registered by highly sensitive (SKM-3) and broadband (SKD) instruments. The basic parameters of the instruments are given in the table.

Parameters of Seismic Instruments

	(1) Станция	(2) Тип аппаратуры	V_m Z	V_m E - W	V_m N - S	T_m
(3)	Львов	СКД (8)	1 060	1 090	1 090	0,5-20,0
(4)	Ужгород	СКД	1 000	1 000	1 000	0,3-20,0
(4)	Ужгород павильон*	СКМ-3(9)	41 000	43 000	43 000	0,2-0,8
(5)	Рахов	СКМ-3	54 000	41 000	41 000	0,2-0,8
(6)	Межгорье	СКМ-3	25 000	31 000	28 000	0,2-0,8
		СКД	1 000	1 000	1 000	0,3-20,0
(7)	Косов	СКМ-3	9 000	9 950	9 800	0,2-1,2

* At Uzhgorod the SKM-3 instruments were installed in a pavilion 6 km to the northeast of the station

Key:
1. Station
2. Type of instrument
3. L'vov
4. Uzhgorod; Uzhgorod pavilion*
5. Rakhov
6. Mezhgor'ye
7. Kosov
8. SKD
9. SKM-3



Map of the Epicenters of Earthquakes in the Carpathians

1--energy class K; 2--accuracy of determining epicenter; 3--depth of focus in kilometers; 4--seismic stations

The seismic stations at Uzhgorod, Rakhov and Mezhgor'ye are located in the main seismoactive region of the Carpathian zone of the Ukrainian SSR--in Transcarpathia--and at L'vov and Kosov--in Ciscarpathia. There are not enough of these stations to obtain reliable data in comprehensive processing of all the Carpathian earthquakes. Therefore, used in addition are the data from the bulletins of the seismic stations of Kishinev in the Moldavian SSR, Chernovtsy, of the Chernovitsy University, stations of the Crimean network and foreign seismic stations: Bulgaria, Hungary, Poland, Romania and Czechoslovakia.

As the result of processing the instrument data in 1975, information was obtained on the basic parameters of the focal points for 18 earthquakes. These parameters are given in the catalog, and the location of the epicenters is shown on the map (see diagram).

According to the conditional division of the "Carpathian" region into five districts, the epicenters of the earthquakes in that year were concentrated in two main seismoactive regions: Northwest (No 1)--4 earthquakes--and Vrancha (No 2)--14 earthquakes.

Depending on the positioning of the seismological stations and the sensitivity of the recording instruments, for the earthquakes in the Northwest region the coordinates of the epicenters were determined beginning with 8, and for the Vrancha region, with 10 energy classes.

The seismic activity of the Northwest region was low in 1975. In Transcarpathia, at the very boundary with Romania, there was one earthquake on 6 November at 10:17 (K = 9). The epicenter of the earthquake on 8 June at 06:00 is on Romanian territory in the Marmarosh-Sigeta region (K = 10). Two earthquakes--on 22 January at 16:48 and on 27 January at 14:26 (K 9), the epicenters of which are in Ciscarpathia in the region of Dolina in Ivano-Frankovskaya Oblast are possibly included among technogenic earthquakes caused by extracting petroleum by forcing water into oil-bearing beds. It should be noted that this region was up to now regarded as aseismic. The first earthquake in the Dolina region was registered on 14 May 1974 at 08:30 and was felt by the population with an intensity of 4 points [1].

In the Vrancha region there were 14 earthquakes, of which 10 were deep in the fold of the Carpathian arc, 3 in the Rumnikul-Serat region and 1 in the Ployeshti region. The focal points of the latter earthquakes are in the earth's crust.

The strongest were the deep-seated earthquakes in the region of the Vrancha mountains on 7 March at 04:13 (K = 13) (in Kishinev it was felt with an intensity of 2 points) and on 31 March at 08:28 (K = 12). The shallow earthquake on 8 February at 08:21 with the epicenter in the Ployeshti region was of the same energy class.

The depth of the seismic centers was determined only for the deep-seated earthquakes of the Vrancha region according to the Jeffreys-Bullen travel-time curve. S. V. Yevseyev's method of epicenters was used to find the coordinates of the epicenters.

In determining the coordinates of the epicenters of the earthquakes in the Vrancha region, use was made of data from both domestic and foreign stations located up to 700 kilometers from the epicenter. In most cases the stations surrounded the epicenter quite uniformly, and the accuracy of determining the coordinates of the epicenters thus achieved class A.

The coordinates of the epicenters of the earthquakes in Ciscarpathia and Transcarpathia were determined mainly from the materials of the Carpathian Soviet seismic stations. When the coordinates of the earthquake in the Marmarosh-Siget region were determined there were additional data from most of the Romanian seismic stations and the accuracy of their determination also corresponded to class A.

The energy class was computed according to the maximum amplitudes in the bodily waves from Rautian's nomogram for both the earthquakes with focal points in the earth's crust and for the deep-focus earthquakes. For the latter the energy classification was also made according to the distance of the recording. The results turned out to be approximately identical.

It is somewhat more complex when the earthquakes are classified with respect to magnitude, since for the Carpathian earthquakes there are no regional scales, and the results obtained for maximum amplitudes in the latitudinal waves from the formula $M = \lg A_S + 1.32\Delta$ kilometers, are understated for close earthquakes. Therefore, the catalog gives only the data on the magnitudes taken from international summaries and determined from more remote stations. In the rest of the cases the magnitude is taken from the 10-day bulletins of the seismic station at Kishinev, where the method from [2] is used.

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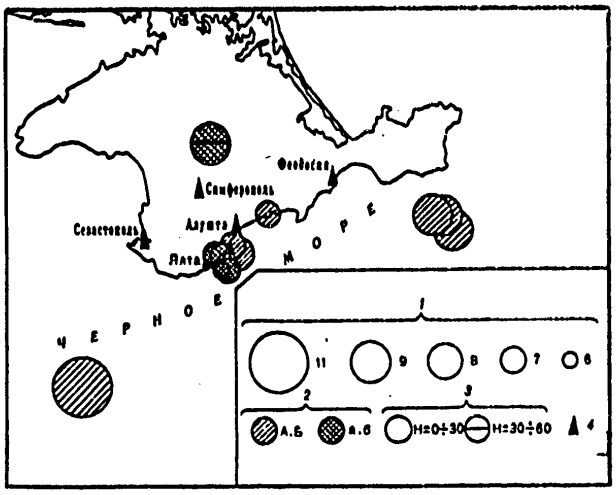
EARTHQUAKES IN THE CRIMEA AND LOWER KUBAN REGION

I. I. Popov

The Crimean network of seismological stations in 1975 was made up of the permanent seismological stations at Simferopol', Yalta, Alushta, Sevastopol' and Feodosia.



Map of Epicenters in the Crimea and Black Sea in 1975

1. energy class K; 2--accuracy of determining epicenters; 3--focal depth, in kilometers; 4--seismological stations

The coordinates of the epicenters were determined by Wadati's methods, and the intersections with the use, as before, of Levitska's Crimean travel time curve; the energy class was estimated from the nomogram of Kul'chintskiy and Pustovitenko [1].

The Jeffreys-Bullen travel time curve and Rautian's nomogram were used in analyzing the earthquakes in the Black Sea and southeastern Feodosia [2].

In 1975 the Crimean region was characterized by weak seismic activity. In the Yalta-Alushta zone, six earthquakes with K = 6-7 were recorded. Three earthquakes with K = 9 were registered on the boundary of the Crimean and Anapskiy regions.

On 17 April there was an earthquake with K = 11 in the deep-water trough of the Black Sea, southwest of Sevastopol'.

Unusual for the Crimean region was the earthquake with K = 9 on 7 August at 22:47, with the epicenter located almost in the center of the peninsula between the Krasnogvardeyskiy and Oktyabr'skiy settlements, north of Simferopol'. The macroseismic data from the region was not obtained, apparently as the result of the relatively great depth of the focus (over 15-20 kilometers).

The parameters of the earthquakes observed are given in the catalog of earthquakes, and the epicenters are shown in the diagram.

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EARTHQUAKES IN THE CAUCASUS

V. G. Papalashvili, A. Kh. Bagramyan, R. A. Levkovich, R. A. Agamirzoyev

This year on the territory of the Caucasus, observations were made at 40 permanent seismological stations, 28 of which were equipped with instruments with increased sensitivity. The list of seismological stations in the Caucasus region, with specification of the instruments and basic stable performance of these instruments is given in [1,2]. The increase curves of the instruments at the seismological stations in the Caucasus in 1975 are given in [2].

The coordinates of the hypocenters of the earthquakes were mainly determined by the cross bearing method, using travel time curves, plotted for the Caucasus and the Dzhavakhetskiy upland. The coordinates of the hypocenters of the Turkish and Iranian earthquakes, located farther than 100 kilometers from the state border, were found with the aid of the Jeffreys-Bullen travel time curves. In some cases, methods of epicentrals, isochrones and mean lines were used. In preparing the consolidated bulletin, in addition to the observations of the Caucasus stations, data from the Operations Seismological Bulletin of the IFZ [Institute of Physics of the Earth imeni O. Yu. Shmidt] of the USSR Academy of Sciences were used.

This year in the Caucasus a total of 1,030 epicenters were determined, the distribution of which by regions and energy classes is given below:

K	5	6	7	8	9	10	11	12	13
Caucasus	4	64	282	349	220	67	32	11	1
Dzhavakhetskiy upland	4	51	153	73	23	9	-	-	-
Eastern Caucasus	-	1	17	101	86	31	14	6	1

The basic data on earthquakes with $K \geqslant 9$ are given in the regional catalog. The numbers of the regions are indicated in accordance with the division of the territory of the Caucasus [1]. In order to study the characteristics of the distribution of the focal points of the earthquakes, two charts of epicenters were plotted: on the first were plotted the epicenters of

earthquakes with K ≥ 9 (Fig. 1), and on the second--epicenters with K = = 6-8 (Fig. 2). As can be seen from the maps, this year a high concentration of epicenters is observed on the territory of the Dzhavakhetskiy upland and the Eastern Caucasus.

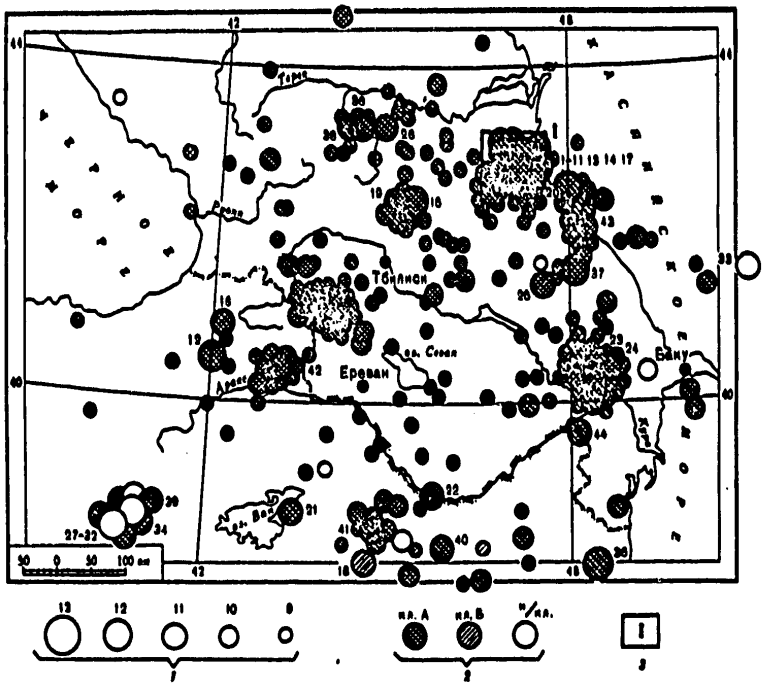

Figure 1. Map of Epicenters of Earthquakes in the Caucasus in 1975 with K ≥ 9

1--energy class K; 2--accuracy of determining epicenters; 3--area in which a number of earthquakes is indicated: 47 with K = 9, 15 with K = 10 and 9 with K = 11.

The most drastic were the earthquakes on 9 January at 23:09 (No 1) (force at the epicenter up to 8 points) in Buynakskiy Rayon in the Dagestan ASSR, and several 6-point earthquakes: the Spitak [3] on 21 March at 02:59, the Izerbash on 20 June at 13:53 (No 20) (see separate article in this issue), the Shemakha [3] on 6 August at 00:54 (No 24), the Kurakhskiy on 10 August at 03:17 (No 25) and the Karibokiy [3] on 20 October at 03:19 (No 37). Therefore, the majority of relatively strong earthquakes in 1975 occurred in the eastern part of the Greater Caucasus.

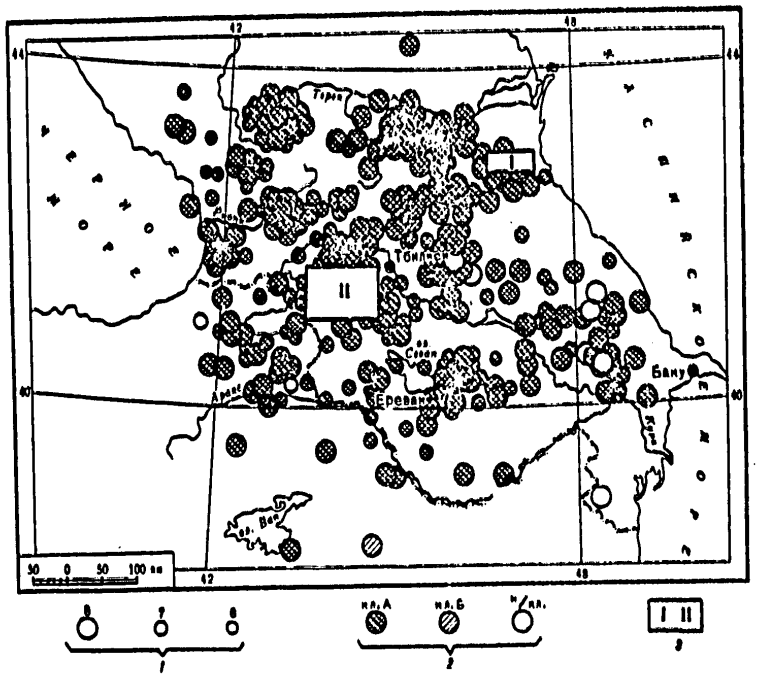

Figure 2. Map of Epicenters of Earthquakes in Caucasus in 1975 with K = 6-8

1--energy class K; 2--accuracy of determining epicenters; 3--area in which number of earthquakes is indicated: I--51 with K = 6, 153 with K = 7; 73 with K = 8; II--1 with K = 7; 30 with K = 8

The earthquake on 21 March caused considerable damage in the villages and population centers of Spitakskiy Rayon (Table 1). It was investigated by a commission of the Institute of Geophysics and Engineering Seismology of the Armenian SSR Academy of Sciences, headed by Z. Kh. Bagramyan. In the epicentral zone the earthquake was felt by everyone, and people ran from their homes. The vibration was accompanied by a rumble. The earthquake developed with a maximum intensity of 6 points on the MSK-64 scale at the population centers of Shenavan, Saraart and Gogaran. Here the houses were mainly old structures, one-story, sometimes with a basement and semi-basement floor, made from roughly hewn tufa, mostly using sand mortar (type A). The houses constructed in the past 10 years were built mainly from smoothly hewn tufa using lime mortar (type B) with a concrete chord beneath the ceiling floor and the ceiling floor made of concrete slabs. The walling of both types of houses was of the "midis" system.

The village of Saraart is located on a shallow slope. One part of the houses was constructed using basalt deposits, and the other, located lower down the slope (northeastern part of the village)--using loamy deposits. In most of the houses having northeast-southwest course of the longitudinal walls, cracks appeared, and large chunks of plaster broke off. The cross walls received only hairline cracks. Of 19 houses (type A) examined, 12 received second degree damage (small cracks in the walls and chunks of plaster broke off), and 4 houses--third degree damage (large, deep cracks in the walls and at the joinings of the walls). Eight type B houses (out of the 12 examined) sustained first-second degree damage.

In a stone apartment house, located in the upper part of the village (built in 1962), chunks of plaster fell at the joints of the walls, and cracks went completely through walls 50 centimeters thick. A network of cracks appeared in the partition. There were large crosswise cracks in the walls in a type B house (clay mortar). In a cobblestone house (lime mortar) the southern wall was greatly damaged, with partial tumbling of the stones (Fig. 3).

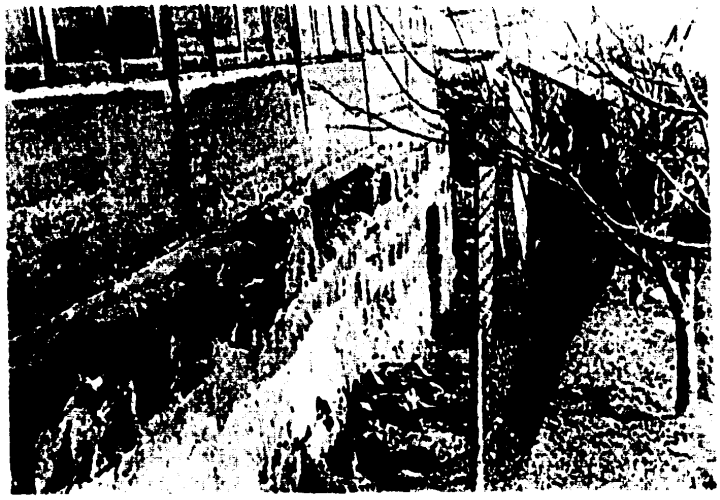

Figure 3. Destruction of an Apartment House in the Village of Saraart in the Earthquake on 21 March 1975

In the village of Shenavan, 9 houses of type A (out of the 16 examined) sustained moderate damage (second degree), 3 houses of type A--heavy damage (third degree) and 5 out of the 6 type B houses examined--first-second degree damage.

Table 1. Macroseismic Information on the Spitak Earthquake on 21 March 1975

Locality	Points	Distance to macroseismic epicenter, in kilometers	Locality	Points	Distance to macroseismic epicenter, in kilometers
Saraart	6	1	Lernantsk	3	16
Shenavan	6	2	Dzhrashen	3-4	10
Gogaran	5-6	3	Dzhadzhur	3	23
Chikdaman	5	4.5	Kuybyshev	2-3	18
Nalband	4-5	6	Stenanavan	3	20
Spitak	4	6.5	Kirovakan	3	23
M. Parni	4	11	Gekharot	2-3	19
Kursali	4	11	Alagyaz	not felt	23
Lusakhpyur	4	14	Leninakan	"	33
Dzorashen	4	14	Gukasyan	"	32
Artagyukh	3	16	Saratovka	"	25

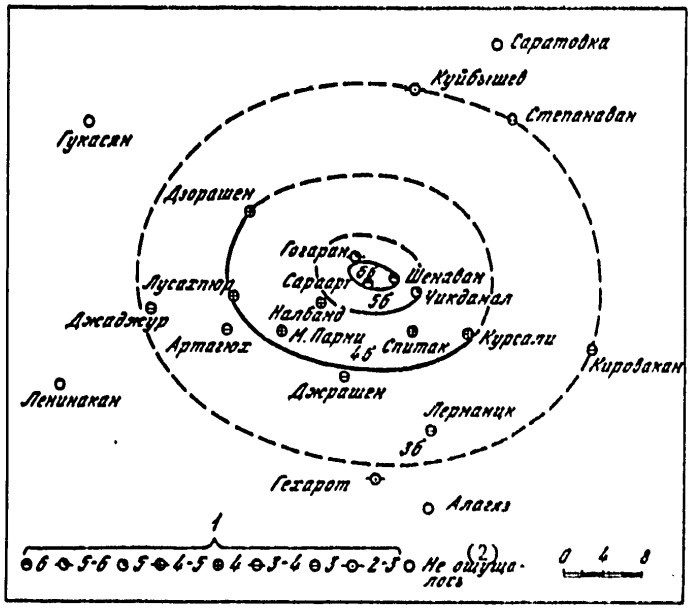

Figure 4. Map of the Isoseismal Lines of the Spitak Earthquake on 21 March 1975

1--intensity 2. Not felt

Table 2. Macroseismic Information on Shemakha Earthquakes on 4-6 August 1975

No, in order	Locality	Δ, km	No, in order	Locality	Δ, km
	6 points				
1	Shaumyan	1	33	Nuran	13
			34	Kyrlar	13
	5-6 points		35	Navagi	13
			36	Mel'kham	14
2	Kerkench	2	37	Angekharan	14
3	Alpout	4	38	Aratkend	14
4	Marty	5	39	Melik-Chobany	15
			40	Pirgasanly	15
	5 points		41	Bagurly	15
			42	Dedegyunyash	15
5	Matrasa	5	43	Chirakhly	16
6	Akhtachi	6	44	Yenikend	16
7	Gegeli	6	45	Ovchulu	16
8	Kelekhana	6	46	Chagan	16
9	Karavelli	6	47	Chukhuryurd	16
10	Mel'dzhan	6	48	Dzerzhinovka	16
11	Sagiyan	7	49	Marazandigyakh	16
12	Shiradil'	7	50	Geglyardag	16
13	Bagirovka	7	51	Muradly	17
14	Adnaly	7	52	Gyurdzhivan	17
15	Mirikend	8	53	Dil'man	17
16	Bidzhov	8	54	Kalva	17
17	Muganly	9	55	Chayly	17
18	Talysh	9	56	Khashiman	18
19	Keshtimaz	9	57	Amgali	18
20	Meysary	9	58	Nyuydi	18
21	Charkhan	10	59	Ingar	19
22	Agabeyli	10	60	Gadzhiman	19
23	Beyuk Khnys	10	61	Kaleybrut	19
24	Dere Khnys	11	62	Kirovka	19
25	Shemakha	11	63	Arab-Shalabash	19
26	Nyugdi	11	64	Sarsura	20
27	Keshad	11	65	Sist	20
			66	Pirabil'kasum	20
	4 points		67	Sulut	21
			68	Zeyva	22
28	Novodmitrovka	11	69	Khankendi	22
29	Akhsu	11	70	Pirkuli	22
30	Lengebiz	12	71	Geyvendi	23
31	Arab Ashaga	12	72	Baskal	23
32	Zarnava	13	73	Avakhyl	23

Table 2 (cont'd)

74	Mincha	24
75	Tiridzhan	24
76	Shablyan	25
77	Mykhtekyan	25
78	Myudzhu	29
79	Zargava	29
80	Yeniyel	29
81	Tazakend	19
	3 points	
82	Geglyarchel'	19
83	Arab-Chaltykchi	19
84	Konakhkend	20
85	Chayly Nizhnyaya	21
86	Ragimli	21
87	Arab-Gadzhiman	21
88	Kendoba	21
89	Chukhanly	22
90	Teklya	23
91	Kengerli	24
92	Abaskhanly	28
93	Demirchi	29
94	Zarat	32
95	Lagich	33
96	Khimran	33
97	Gendob	34
98	Zarat-Kheyberi	34
99	Koydan	35
100	Gavtaskyab	36
101	Dvor'yan	36
102	Myudryu	38
103	Varna	38
104	Zarat-Babaderen	40
105	Kendakhar	40
106	Bruydan	42
	2-3 points	
107	Akhmedly	22
108	Godzhaly	23
109	Archiman	27
110	Ismailly	39
	Not registered	
111	Karakoyunly	20
112	Nemirli	21
113	Kalabeyli	21
114	Talyshnuri	23
115	Lala-zar	23
116	Bilistan	24
117	Kushi	24
118	Syundyu	25
119	Pabar	26
120	Novoastrakhanka	27
121	Astrakhanka	27
122	Dzhagirli	28
123	Dzhanly	28
124	Akbulag	28
125	Chalov	29
126	Karasakal	29
127	Khalili	29
128	Koshakend	30
129	Marazy	31
130	Dadaly	31
131	Dakhar	31
132	Khilmilli	31
133	Arab-Mykhtybey	32
134	Diyaly	33
135	Nabur	33
136	Keorlar	36
137	Shakhsevan	37
138	Kurbanchi	37
139	Kel'vend	37
140	Arab-Shakhverdi	38
141	Kirk	38
142	Kushendzhe	39
143	Talystan	39
144	Dzhul'yan	39
145	Yekekhana	41
146	Kyurdamir	42
147	Karamar'yam	44
148	Kyurdmashi	44
149	Ivanovka	46

Table 3. Macroseismic Information on the Kurakhskiy Earthquake on 10 August 1975

No, in order	Locality	Δ, km	No, in order	Locality	Δ, km
	6 points			4-5 points	
1	Kurakh	0	12	Shimikhyur	9
2	Khyurekkhyur	4	13	Gel'khen	15
3	Kimikhyur	6			
4	Kyukvaz	7		4 points	
	5-6 points		14	Usug	16
			15	Icha	20
5	Ashur	9	16	Shtul	20
			17	Akhty	15
	5 points				
6	Yalak	13		3 points	
7	Usur	9			
8	Khpech'	12	18	Ikra	20
9	Lutkun	12	19	Duldug	21
10	Kyuchkhur	12			
11	Khkem	11			

In a type B house with good masonry (built in 1973), cracks 1-2 cm wide were formed in the plastering on the walls of the southeast course. Small chunks of the plaster fell off. The mortar filling in the interstices in the masonry of the cornice crumbled away. The masonry of the northwest wall shifted and caused cracks 1-2 cm wide along the height of the entire wall.

In the villages of Gogaran and Chikdaman, most of the type A houses sustained first-second degree damage. In type B houses built in the last few years with earthquakeproof measures, slight damage and hairline cracks appeared and small chunks of plaster fell out. In Gogaran, in a type B house (1950, using argillaceous sediments made of ashlar using lime) cracks 2-5 cm wide were formed along the entire height of the wall, chunks of plaster fell out and the doors jammed. In a house made of ashlar using lime, type B (1957), a shift of the southern part of the wall of the house of 2-4 cm was noted, on the outer wall of the house cracks formed along the height of the entire wall and the stones of the upper exterior part of the house fell out.

The perceptibility area of the earthquake was small: the area mapped by an isoseismal line of 4 points did not exceed 260 square kilometers (Fig. 4).

The focal depth of the earthquake was determined according to the method in [4]: with an intensity at the epicenter of I_e = 6-7 and a magnitude of M = 3.8 h_{sr} = 7 kilometers, for isoseismal lines h_i = 2 kilometers.

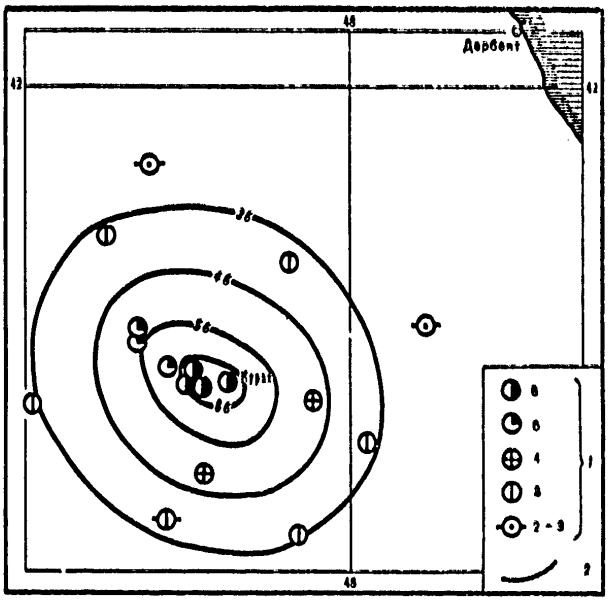

Figure 5. Map of the Isoseismal Lines of the Kurakh Earthquake

1--intensity; 2--isolines

At the beginning of August a series of perceptible earthquakes occurred in Shemakha, accompanied by a long cluster of weaker aftershocks. According to the macroseismic data, the coordinates of the epicenter were φ = = 40.6° N, λ = 48.4° E and the maximum magnitude was 6 points. The macroseismic information does not make it possible to separate the effects of the consecutive shocks. It is most probable that they should be related to the extremely strong shock of 6 August (M = 4.0).

A group including R. A. Agamirzoyev, I. A. Kasumov, E. K. Gyul', T. A. Zolotovitskaya, S. R. Agamizoyev, Ch. S. Aliyev and Yu. A. Bayramov studied 110 population centers in which the tremors were felt with varying force, and 40 population centers where the earthquakes were not felt (Table 1). The earthquakes encompassed an area of about 4,000 square kilometers.

The earthquake had a maximum intensity of 6 points in the village of Shaumyan in Shemakhinskiy Rayon. Here over 50 percent of the houses showed cracks in the plaster and there was one instance of chunks of plaster falling out, as well as separation of the masonry. At almost each shock on 6 August the people ran outside, movement was made difficult, people sitting down were swinging back and forth and many people felt dizzy. The

ground conditions in the settlement of Shauman were favorable for earthquakeproof construction. The 10-meter cross section was made up of dry dense clay.

Earthquakes with an intensity of 5-6 points were felt at the population centers of Kerkench, Alpout and Myrty, which are also noted for favorable aseismic conditions. In these population centers, cracks in the walls of the buildings were noted, the whitewashing crumbled and objects fell from shelves and tables.

At population centers 5-27 (Table 2) hairline cracks in the plaster appeared in places in the houses. Panic occurred almost everywhere, and the inhabitants fled their homes and spent the night outdoors for one or two weeks.

The depth of the focus with respect to intensity at the epicenter was I_0, the magnitude M [4] h_{IM} = 8 km and with respect to the isoseismal lines h_i = 4 km (average damping coefficient ν = 3.9).

The earthquake on 10 August 1975 was felt on a limited territory of Southern Dagestan in a radius of 35-40 kilometers from the epicenter. It was studied by R. A. Levkovich, O. A. Asmanov, S. S. Aref'yev and Z. A. Musalayeva. The small-area pleistoseismic zone (7 X 10 km) includes the population centers of Kurakh, Kavkaz, Kimekhyur and Khyurekkhyur, where the magnitude of the earthquake is estimated at 6 points. The villages are built up of one-and two-story buildings made of the rubble of dry masonry or using clay mortar and adobe, with considerably fewer buildings built of brick and ashlar, using cement mortar. The earthquake was felt in the form of strong vertical shocks, accompanied by a rumble. In many structures of type A cracks that went clear through were formed, particularly near the window apertures, where the cracks were up to 5 mm wide and up to 1 meter long. Cracks and the falling of large chunks of plaster at the corners of the building were noted in type B buildings.

Table 3 gives an estimate of the magnitude of the earthquake on the MSK-64 scale for the villages studied.

The macroseismic epicenter was shifted by 12 kilometers to the east from the instrument epicenter (Fig. 5). The depth of the focus with respect to intensity at the epicenter and magnitude [4] was h_{IM} = 6 km, and for the isoseismic lines—h_I = 6 km.

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IZERBASH EARTHQUAKE ON 20 JUNE 1975

R. A. Levkovich, O. A. Asmanov

In the coastal belt of the Dagestan ASSR from Makhachkala to Dagestanskiye Ogni, on 20 June 1975, an earthquake was felt that showed an intensity of up to 6 points near the epicenter.

According to the data of the Unified System of Seismic Observations, the focus was located in the Caspian Sea, approximately 35-40 kilometers from the shore (see the Basic Catalog). According to the data of nearby regional and traverse seismic stations at Derbent, Akhty, Buynaksk, Karanay, Dubki and Dylym, and the key Unified System of Seismic Observations station at Makhachkala, the focus was located in the sea 10 kilometers from the shore, and the coordinates of the epicenter were: φ = 42.36° N, λ = 48.0°E. Just before the earthquake a foreshock was noted on 7 June at 0006:05, φ = 42.7°N, λ = 46.8°E, K = 11.

During macroseismic observations of over 30 population centers, carried out on 20-22 June 1975, it was established that the pleistoseismic area was localized near the city of Izberbash and the villages of Karanayaul, Pervomayskoye and, apparently, extended toward the sea.

Macroseismic information on the Izberbash earthquake is given in Table 1. The magnitude of the earthquake was estimated according to the MSK-64 scale.

The earthquake developed at Karanayaul with a maximum intensity of 5-6 points. During the earthquake the inhabitants were working in the fields near the mountain village. They noted strong vibrations of the soil in a north-south direction, accompanied by a rumble. The people who were not working perceived the earthquake as a sharp vertical shock with subsequent swaying. Many inhabitants ran from their homes and after the earthquake slept outdoors.

The village of Karanayaul is mainly built up with adobe houses with traditional architecture. After the earthquake, fine cracks in the plaster appeared in many of the houses, and in two cases it was noted that brick had fallen from the chimneys.

Table 1. Macroseismic Information on the Izberbash Earthquake

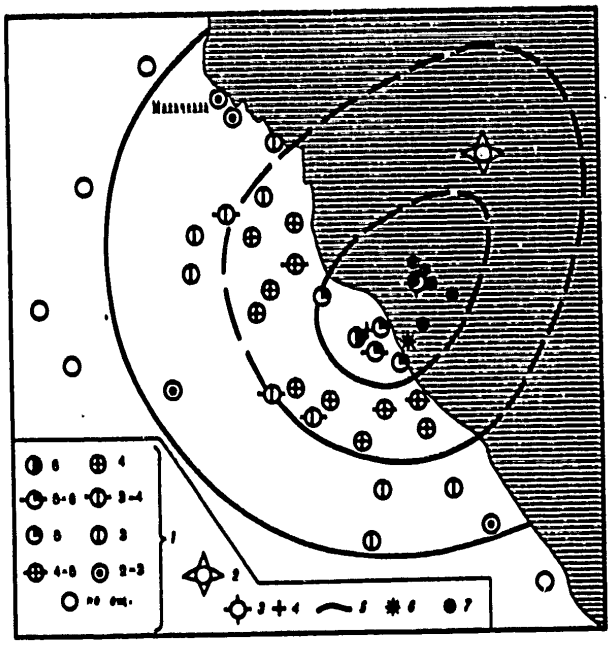
Locality	Magnitude I, points	Distance from center of isoseismal lines, in Δ, km	Locality	Magnitude I, points	Distance from center of isoseismal lines, in Δ, km
Izberbash	5-6	5	Adanak	3-4	40
Karanayaul	5-6	10	Berikey	3	40
Pervomayskoye	5-6	10	Bashlikent	3	35
Ulubiyaul	5	15	Madzhalis	3	45
Inchkhe sta.	5	18	Kakashura	3	40
Achi-Su	4-5	22	Gelli	3	45
Kayakent	4-5	22	Zelikala	3	35
Novokayakent	4-5	24	Kaspiysk	3	45
Utamysh	4-5	20	Duzlak	2-3	55
Sergokala	4	20	Akusha	2-3	55
Gublen	4	25	Levashi	2-3	45
Urbuke	4	25	Tarki	2-3	55
Karabudakhkent	4	30	Makhachkala	2-3	55
Manas	4	28	Buynaksk	2-3	70
Gerga	4	30	Derbent	not felt	70
Alkhadzhikent	4	25	Gergebel'	"	65
Myurego	3-4	25	Arakany	"	75
Vanashimakhi	3-4	25	Shamkhal	"	75

In the city of Izberbash, extended along the sea for up to 10 kilometers, the earthquake was felt more strongly in its northern section. Here, in individual cases in type B buildings plaster fell and fine cracks were formed, and in many houses--the whitewash was shed and there were fine cracks in the ceilings. Most of those questioned noted swaying in the north-south direction, and some persons mentioned a vertical jolt. In particular this sort of jolt during the earthquake was alluded to by the attendant at a gas station, who was thrown from his chair to the floor when the earthquake hit.

Within the southern section of the city of Izberbash and the settlement of Pervomayskoye, in some houses fine cracks appeared in the plaster, the whitewash was shed, books were thrown from the shelves and the furniture shifted. Many people compared the earthquake on 20 June 1975 with the sensation in Izerbash in the earthquake on 14 May 1970.

Outside the pleistoseistic area, the estimate of the intensity was made only from questioning the population in accordance with the MSK-64 scale. It was noted that more complete information was obtained from the mountain villages and towns located near the focal points of the Dagestan earthquake on 14 May 1970 and the Buynaksk earthquake on 9 August 1975 than from the

more remote regions, for example, south of Izberbash, which was scantier. The lack of equivalence in the perception of the earthquakes by the people who had recently felt the strong earthquake and by those who had not felt it had a certain effect on producing the minimum isoseismal lines (see diagram).



Isoseismal Lines of Earthquake on 20 June 1975

1--intensity; 2--epicenter according to YeSSN data; 3--epicenter according to data from regional and traverse stations; 4--approximate position of epicenter according to macroseismic data; 5--isoseismal lines; 6--foreshock on 7 June; 7--aftershocks

Judging from the measurements of the pleistoseismal area, the theoretical intensity at epicenter I_0 is not over 6 points. By using the known ratio between the magnitude, depth of the focus and intensity at the epicenter [1], the depth of the focus of the Izberbash earthquake is $h_{k.n}$ = 10 km, and for the isoseismal lines h_I = 8 km, with the damping coefficient γ = 3.4.

The pleistoseismic area adjoins the Karanayaul depression, which fixes the major superimposed trough in the zone of foreward folding of Dagestan with present-day activation. Judging from the thickness of the sedimentary mass

In this region (8-10 kilometers), the focus is located closer to the Paleozoic substratum and gravitates spatially toward the zone of the regional Pshekish-Tyrnauzskiy plutonic fault.

The main jolt of the Izberbash earthquake was accompanied by a series of aftershocks (Table 2).

Table 2. Basic Parameters of Aftershocks of Izberbash Earthquake

Дата (1)	Время в очаге, ч м с (2)	(3) Координаты эпицентра		Энергетический класс K (4)
		φ°N	λ°E	
7.VI	05 59 01,2	42,30	47,58	11,0
20.VI	14 01 43	42,38	48,00	10,2
20.VI	19 59 49	42,32	48,00	10,4
28.VI	01 42 02,8	42,37	48,00	10,0
28.VI	04 45 41,8	42,37	48,00	10,0
28.VI	05 17 39,4	42,36	48,01	10,4
14.VIII	03 38 49,4	42,35	48,06	10,0

Key:
1. Date
2. Time at focus (hour:minute:second)
3. Coordinates of epicenter
4. Energy class K

The uniformity of the aftershocks with respect to the energy class draws attention. A careful review of the seismograms during this period did not detect any earthquakes transmitted from the area of the Izberbash earthquake. Given the existing distribution of seismic stations in Dagestan and their increase in the Izberbash region, the coordinates of earthquakes with K = = 8-9 should be reliably determined. Not one of the seismic stations, however, registered other earthquakes which could be related to the focal zone of the Izberbash earthquake.

With respect to the nature of the energy release from the focus, the aftershock activity of the Izberbash earthquake is a seismological phenomenon related to the atypical mechanism of the earthquake.

A query of the Izberbash inhabitants after the earthquake on 7 June 1975 (foreshock), made on 8-10 June, revealed that most of those questioned mentioned a sharp vertical jolt with a rumble resembling an explosion. There were people near the gushing gryphon of a well (at the site of well No 46 in Izberbash) in tents at the moment of the earthquake who testify that at the moment of the earthquake, a gas-water column up to 20-30 meters in height burst from the well, and the well increased the

yield and the temperature of the water rose to 38-42°C. Some of those questioned claimed that the spout arose 10-15 seconds before the earthquake, and others--that the spout arose during the earthquake. There are also discrepancies in the description of this phenomenon: some attest to an ejection, and others--to a cloud resembling a mushroom. It may therefore be concluded that most probably the ejection originated before the jolt or at its initial moment. In addition, immediately after the main jolt on 20 June the temperature of the water in this gryphon rose sharply from 40 to 62°C (measurements of A. A. Levkovich). It is obvious that in the future serious attention should be paid to the study of natural floods in connection with preparation for strong earthquakes.

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SHAKHNAZAR EARTHQUAKE ON 30 MARCH 1974

A. Kh. Bagramyan, E. G. Geodakyan, S. Gormachadze, L. N. Makhatadze, V. G. Papalashvili, S. S. Simonyan

The earthquake occurred on 30 March at 00:34:58 Greenwich time in the Dzhavakhetskiy upland area, on the border between the Armenian SSR and the Georgian SSR. According to the data from the Seismological Bulletin of the network of key seismological stations in the USSR, M_{PSKM} = 4.5 (determined from two stations, the coordinates: φ = 41.5° N lat, λ = = 44.0° E long, and the focus--surface. The earthquake was registered by 39 seismological stations, and the maximum distance of recording was 2,600 kilometers. According to the instrumental data of the Caucasian network, the coordinates of the epicenter were 41.4° N lat, 44.0° E long, M = 3.9 (for 2 stations), K = 11.4 (for 22 stations) and the focus--surface.

The main jolt of the earthquake was preceded by a foreshock on 21 March at 09:27:22, with K = 8.5; a series of aftershocks was observed for a month, beginning on 30 March (Table 1).

According to the historical information, in this region earthquakes occurred with a maximum intensity of 6-7 points [1, 2], and according to the seismic regionalization map it is included in the 8-point zone [3]. In the last two decades, three strong earthquakes have occurred here: on 30 May 1958 at 05:16, with I_0 = 5.6 points, on 31 May, at 09:31, with I_0 = 6-7 points, and on 29 June 1967 at 08:22, with I_0 = 6-7 points.

An expedition including scientific associates of the IGIS of the Armenian SSR Academy of Sciences, the Institute of Geophysics and the Institute of Building Materials and Structures of the Georgian SSR Academy of Sciences traveled out to investigate the aftereffects of the Shakhnazar earthquake in the epicentral zone.

The earthquake had a maximum intensity of 6 points in the Kalinino region of the Armenian SSR, especially in the villages of Shakhnazar, Evlu and Kazaldash. At the population centers located in the epicentral zone of this earthquake, the buildings were mainly one- and two-story, and some of them had a ground floor. The walls of a large number of the buildings were

built of rubble, using mud, light lime mortar and less often, using cement-lime mortars with a strength of 10-15 kg/cm^2 without earthquakeproofing measures (Figure 1).

Figure 1. Cracks in Walls Made of Rubble, Using Mud, Light Lime Mortar, in an Apartment House in Shakhnazar

There were also buildings with the walls of the traditional "midis" masonry, sometimes with a facing layer made of Arctic rose-colored tufa, cleanly cut, using a lime-cement mortar with a strength of 15-20 kg/cm^2 (Fig. 2).

The walls of most of the buildings were about 50 cm thick, and were built on continuous footings with the depth of the foundation 0.6-1.0 meters. The ceiling floors had wooden beams, and the roofs were pyramidal, with tile or shingle roofing.

During the earthquake, in many buildings, in the walls, partitions and sections of the masonry above the apertures, cracks open to 1-3 mm, diagonal and close to the vertical, appeared (Fig. 1, a). Outlining cracks appeared along the perimeter of the apertures sealed off by masonry. The cracks originating from settling or shifting formed earlier were particularly activated, and were revealed considerably more and somewhat developed (Fig. 2).

Separation and buckling of the walls from the plane was observed during the earthquake in the walls of a number of buildings with inadequate transverse bonding.

Figure 2. Post Office Building in the Village of Shakhnazar. Cracks in the Walls With "Midis" Masonry

Particularly to be noted is the more frequent appearance of cracks in places where stresses were concentrated before the earthquake, mainly due to uneven settling. The existence of a prestressed condition in a number of cases contributed to increasing the effect of the earthquake manifestation. Figure 3 shows a crack of a settling-separation nature that originated where the longitudinal and transverse walls came together.

Many stoves and chimneys were considerably damaged during the earthquake.

On the basis of an analysis of the materials collected in the study, the magnitude of this earthquake at the epicentral zone slightly exceeded 6 points.

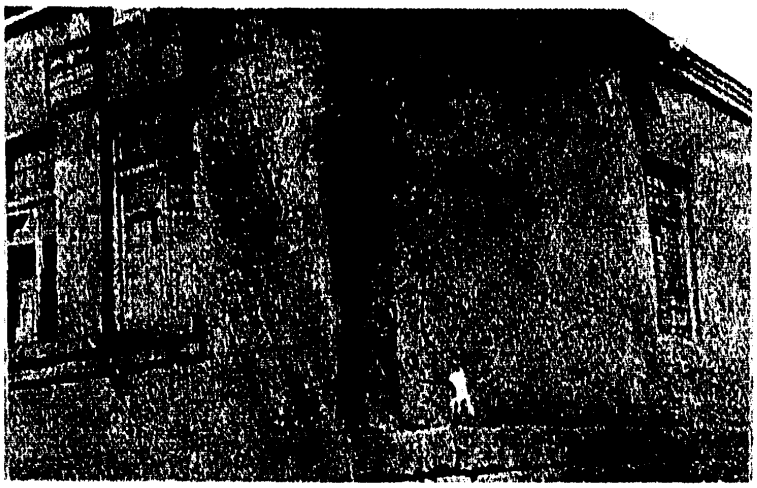
Table 2. Macroseismic Information on the Shakhnazar Earthquake on 30 March 1974

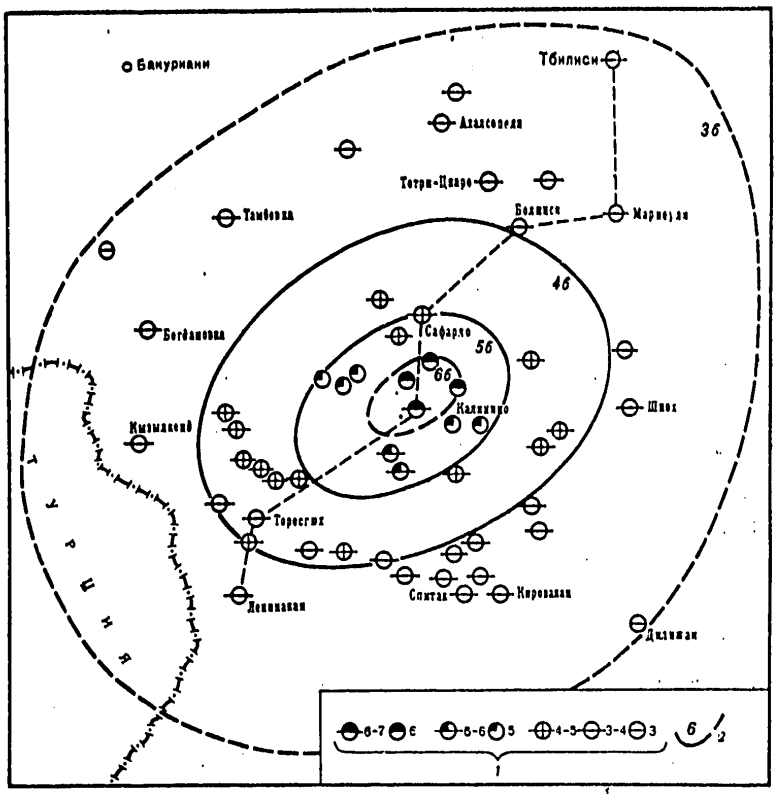
Locality	Δ, km	Locality	Δ, km	Locality	Δ, km
6 points					
Kalinino	6	Safarlo	24	Karaberd	46
Kazaldash	12	Stepanavan	30	Kizilkend	42
Shakhnazar	6			Manglisi	66
Evlu	8	4 points		Marneuli	60
				Maisyan	50
5 points		Atsik	42	Spitak	40
		Dzhadzhur	33	Tambovka	54
Irganchay	18	Keti	36	Tbilisi	84
Karakilisa	30	Saraard	30	Tetritskaro	52
Katnakhpor	12	Shirak	36	Torosgyukh	42
Kizilshafak	15			Tsintskaro	66
Kuybyshev	18	3-4 points		Tsalka	54
Lorplemsovkhoz	16			Shnokh	48
Medovka	20	Amasiya	42		
Privolynoye	22	Akhalsopeli	60	3 points	
		Bogdanovka	54		
4-5 points		Bolnisi	46	Dilizhan	63
		Dzhoradzor	54	Akhalkalaki	72
Gukasyan	36	Lambalu	32		
Dmanisi	26	Leninakan	52	Not felt	
		Kirovakan	42		
				Bakuriani	90

The earthquake on 30 March was felt with less force at many centers in the territory of the Armenian and Georgian SSR's in an area of about 500 square kilometers (Table 2). According to the macroseismic data, the pattern of isoseismal lines was plotted (Fig. 4); the average radii of the corresponding isoseismic lines were equal to (in km): 6-13, 5-33, 4-65, 3-125.

The formulas of the macroseismic field [4, 5] were used to calculate the basic parameters of the focus. The damping coefficient for the Trans-Caucasus was adopted by us as $\gamma = 3.5$.

The coordinates of the epicenter according to the macroseismic data were 41.1° N lat. and 44.2° E long., 5-7 kilometers northeast of Shakhnazar. With the magnitude at the epicenter I_0 = 6-7 points, the depth of the focus was h_2 = 9 km according to the isoseismic lines, and according to the ratio I_0 and Mh_{IM} = 8 kilometers. The coincidence of these values and the regular nature of the isoseismic lines indicate the relatively simple structure of the focus.





[Captions on following page]

[Captions to illustrations on preceding page]

Figure 3. Cracks of a Settling-Separation Nature

Figure 4. Diagram of Isoseismal Lines of Shakhnazar Earthquake
1--intensity; 2--isoseismal lines

Apparently the focus of the Shakhnazar earthquake is located in the zone of the Dzhavakhetskiy fault [6], deeper than the roof of the crystalline substructure.

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BEZHTINSK EARTHQUAKE ON 4 AUGUST 1974

O. A. Asmanov, S. S. Aref'yev, Sh. G. Idarmachev, L. A. Kakhiani, R. A. Levkovich, V. G. Papalashvili, N. V. Shebalin

The earthquake occurred on 4 August at 15:06 in the southwestern part of the Greater Caucasus Range, on the border of the Georgian SSR and the Dagestan ASSR. It was registered by 83 seismic stations in the Soviet Union (see [1]).

According to the instrument data of the Caucasian network, the coordinates of the epicenter were 42.4° N lat., and 45.9° E long., K = 13 (11), and the depth of the focus was 5 kilometers.

The earthquake was investigated by associates of the Institute of Geophysics of the Georgian SSR Academy of Sciences (V. G. Papalashvili), the Institute of Geology of the Dagestan Branch of the USSR Academy of Sciences (R. A. Levkovich) and the Institute of Physics of the Earth of the USSR Academy of Sciences (N. V. Shebalin).

The historical information on the earthquakes felt in the epicentral part of the Bezhtinsk earthquake and the adjacent regions are given below [2, 3].

In the village of Tlyarata, the Dagestan (Zakataly) earthquake on 29 June 1948 was felt with an intensity of 7 points. A 6-7 point earthquake was registered in Zakataly on 2 September 1936. An earthquake with an intensity of 6-7 points was felt in Napareuli on 20 April 1928. An earthquake with an intensity of 6-7 points was noted in Kvareli on 17 October 1902; there was a vibration with an intensity of 6 points with the earthquakes on 3 October 1902 and 2 November 1951 (Mtatushenskoye earthquake); with an intensity of 5-6 points on 20 April 1928 and 25 August 1930; with an intensity of 5 points on 26 November 1958, 26 February and 4 July 1961.

Table 1 gives information on the earthquakes that have occurred on the territory of the southwestern part of the Greater Caucasus [1].

Table 1. Historical Information on Strong Earthquakes in the Southwest Part of the Greater Caucasus

(1) Дата	Время в очаге, (2) ч м с	Координаты эпицентра (3) φ°N	λ°E	(4) Глубина очага h, км	(5) Магнитуда M	Интенсивность в эпицентре I_0 (6)	Примечание (7)
24.VII 1742		(42,1)	(45,2)	(14)	6,0 (0)	8–9	Алавердское (8)
1756		(41,9)	(45,3)	(10)	4,7 (0)	7	Кахетинское (9)
11.I 1811	05 00	(41,8)	(45,2)	(7)	4,2 (0)	7	
3.X 1902	23 05 43	41,8	45,6	(6)	4,4 (1)	7	
17.X 1902	07 21	42,1	45,8	(6)	4,5 (1)	7	
10.III 1914	18 44	(41,6)	(46,7)	(7)	3,9 (0)	6	
16.IV 1924	04 21	(41,7)	(46,5)	(10)	4,6 (0)	6–7	
20.IV 1928	08 16 30	(42,1)	45,5	18	4,6 (5)	6	
25.VIII 1930	22	42,0	45,6	15	4,0 (1)	5–6	
2.IX 1936	10 01 03	41,7	46,5	17	4,7 (3)	6–7	Закатальское (10)
	13 12 25	41,5	46,6	22	5,3 (8)	6	"
19.V 1947	17 18 39	42,6	44,7	14	4,3 (2)	6	Гудамакарское (11)
25.XII 1947	21 22 07	42,5	45,0	30	4,7 (3)	5–6	"
8.V 1948	21 30	42,5	44,6	5	2,9 (0)	5	
29.VI 1948	16 06 29	41,6	46,4	48	6,2 (5)	7	Закатальское (12) (Дагестанское)
16.XI 1949	18 59 17	42,4	45,3	12	4,4 (1)	(6–7)	
2.IX 1950	04 19 32	41,7	46,2	16	4,6 (4)	6	
2.XI 1951	21 55 42	42,3	45,3	20	5,5 (10)	7	Мтатушетское (13)
22.I 1953	05 53 47	41,8	45,1	5	3,6 (0)	6	Хашминское (14)
28.III 1955	19 42 09	42,4	44,9	9	4,5 (1)	6–7	Барисахойское (15)
30.IV 1956	12 14 21	42,5	44,9	8	4,6 (1)	7	
26.XI 1958	00 12 07	41,6	45,9	19	4,6 (2)	6	
26.II 1961	21 11 06	41,8	45,9	13	3,5 (1)	5	
4.VII 1961	19 25 19	42,0	45,8	15	4,2 (1)	5–6	
23.VIII 1962	02 18 51	42,1	45,9	22	4,2 (2)	5	
11.III 1964	00 08 58	42,4	44,9	23	4,5 (7)	5–6	
17.VI 1967	09 56 04	41,7	45,3	7	4,0 (4)	6	Хашминское (16)
22.V 1968	10 49 22	41,8	45,9	20	4,2 (2)	4–5	
28.I 1969	04 27 00	42,3	45,0	9	3,5 (1)	5	
19.V 1973	21 50 33	42,6	45,4	30	4,4 (2)	5	
4.VIII 1974	15 06 13	42,1	45,8	25	5,2 (8)	6–7	Бежтинское (17)

Key:

1. Date
2. Time at focus (hrs, min, sec)
3. Coordinates of epicenter
4. Depth of focus, h, km
5. Magnitude
6. Intensity at epicenter
7. Comment
8. Alaverdskoye
9. Kakhetinskoye
10. Zakatal'skoye
11. Gudamakarskoye
12. Zakatal'skoye (Dagestan)
13. Mtatushetskoye
14. Khashminskoye
15. Barisakhoyskoye
16. Khashminskoye
17. Bezhtinskoye

According to the map of the seismic regionalization, this region belongs to the 8-point zone [3].

A macroseismic description of the manifestations of this earthquake in the epicentral area is given below.

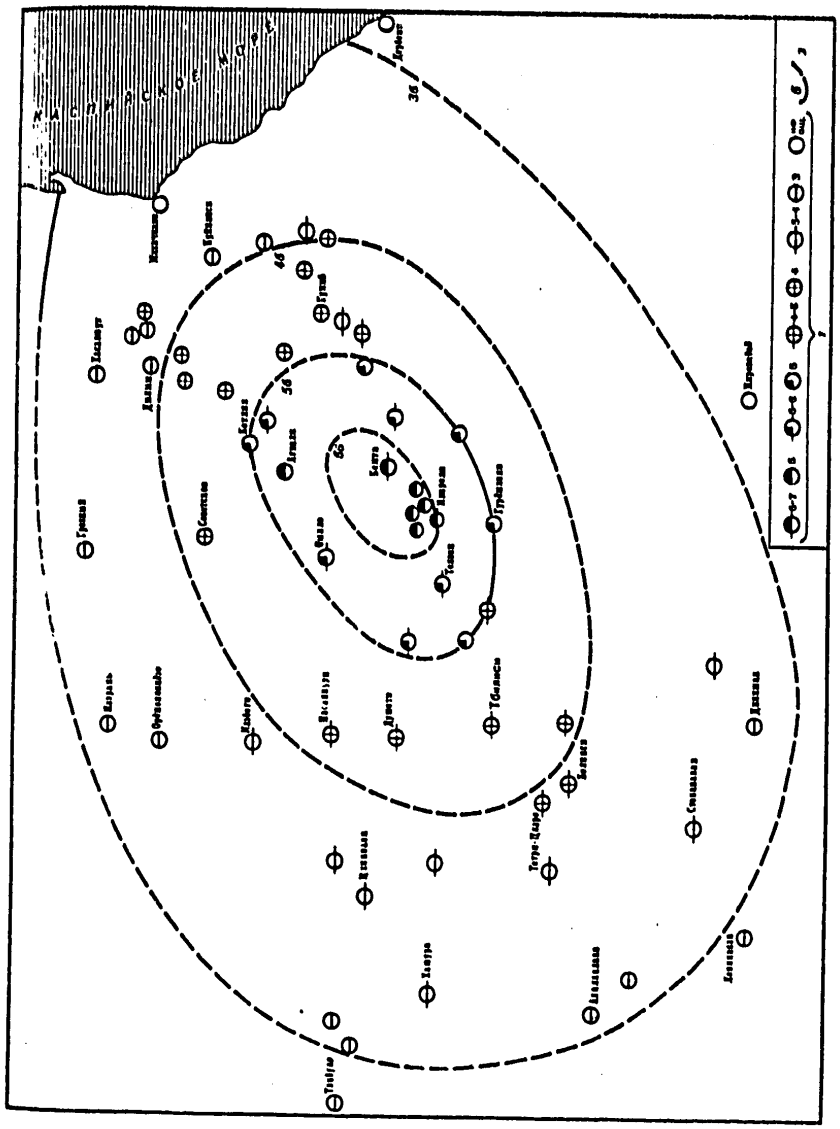

Figure 1. Diagram of the Isoseismal Lines of the Bezhtinsk Earthquake, Compiled by R. A. Levkovich, V. G. Papalashvili and N. V. Shebalin

1--Intensity; 2--isoseismal lines

Table 2. Macroseismic Data on the Earthquake on 4 August

Locality	Δ, km	Locality	Δ, km	Locality	Δ, km
6-7 points		4-5 points			
Bezhta	20	Bolnisi	135	Stepanavan	185
		Dusheti	92	Khashuri	200
6 points		Marneuli	115	Tskhinvali	158
		Pasanauri	95	Tsalka	165
Almati	25	Sagaredzho	65		
Agvali	45	Tbilisi	100	3 points	
Gremi	20	Tetritskaro	135		
Kvareli	20	Tsurib	75	Akhalkalaki	225
Sabuye	15			Bogdanovka	220
Shakriani	18	4 points		Buynaksk	130
				Groznyy	125
5-6 points		Almok	100	Inchkhe	130
		Burtunay	125	Dilizhan	180
Akhmeta	55	Gunib	85	Leninakan	235
Botlikh	65	Kulla	105	Miatly	130
Karata	65	Mikhelta	105	Nazran'	145
Omalo	30	Sovetskoye	75	Ordzhonikidze	135
Telavi	40	Khodzhalmakhi	115	Tkibuli	245
Tlyarata	38	Khunzakh	80	Sachkhere	210
		Kubor	105	Chiatura	220
5 points				Khasavyurt	135
		3-4 points		Urma	125
Gagob	62				
Gombori	52	Batseda	85	Not felt	
Gurdzhaani	48	Dzhaava	145		
Lagodekhi	45	Dilym	115	Yerevan	
		Gori	145	Kirovabad	
		Idzhevan	150	Kutaisi	
		Levashi	120	Oni	
		Kazbegi	110		

Bezhta. According to the report of A. M. Abdulayev, the earthquake was felt much more strongly than in 1970 during the Dagestan earthquake. The hospital building was damaged, several chimneys were destroyed, in most of the buildings there were small cracks, and in the rest of the buildings--cracks that went clear through.

Kvareli. In most of the buildings fine cracks appeared, and in some stone houses with concrete chords--cracks going clear through; tile roofs collapsed. There was great panic and the people fled from the houses. The picture is similar in the villages of Gremi, Almati, Sabuye and Shakriani in Kvarel'skiy Rayon. In the village of Almati two houses suffered severe damage.

Agvali. There was no extensive damage. Small cracks formed in the walls. People felt strong tremors and were afraid to be in the houses. Those who were asleep woke up.

Telavi, Tlyarata. No extensive damage was noted. Here and there cracks in the plaster appeared in the houses. The people woke up and ran out into the streets.

Gombori, Gurdzhaani. Almost everyone felt the earthquake and there was panic, but no damage.

Khasavyurt, Kazbegi, Nazran'. The earthquake was noticed by individual persons, primarily on the upper stories, and some of the people went outside. Many people who were in houses did not notice the earthquake.

The rest of the information on the perceptibility of the earthquakes was gathered from data from questionnaires sent out by the Division of Regional Seismology of the Institute of Geophysics of the Georgian SSR Academy of Sciences and the Sector of Geophysics of the Institute of Physics of the Dagestan Branch of the USSR Academy of Sciences.

The earthquake on 4 August was felt with less intensity on the territory of the Northern Caucasus and the Armenian SSR in an area of about 2,000 square kilometers (Table 2).

The pattern of the isoseismal lines was plotted from the macroseismic data (Fig. 1), with epicenters at 42.1° N, 45.9° E, which coincides well with the instrument determination.

In processing the macroseismic material, the average radii of the corresponding isoseismal lines (in km) were used: 6-35, 5-105, 4-215, 3-260, for calculations of the focus--formulas of the macroseismic field [4]; the damping coefficient ν for the Greater Caucasus we took as 3.1.

By taking the magnitude at the epicenter as equal to I_0 = 6-7 points, we obtain for the radii of the isoseismal lines h_z = 25 km, and for the ratio M and I_0 $h_{I,M}$ = 25. The coinciding of these estimates indicates the relatively simple structure of the focus and agrees well with the result of the instrument determination. The macroseismic field is completely regular in nature, which makes it impossible to estimate the extent of the focus.

Therefore, the focus of the Bezhtinsk earthquake is located in the area of the Greater Caucasus fault [5], noticeably below the roof of the crystalline foundation.

The mechanism of the focus of this earthquake, determined by S. S. Aref'yev (Fig. 2), is characterized by the following parameters. The first variant (preferable from the standpoint of the tectonic situation): the strike

azimuth of the plane of the fault, φ_1 = 121 ± 10°; the plane of the fault drops steeply to the northeast at an angle of δ_1 = 62 ± 10° to the horizon; the shift is a type of right-side strike fault, in which the southern side experiences a relative movement downward and to the west, with the components of the shift on the plane of the fault along a course of 0.73 and along a drop of 0.67.

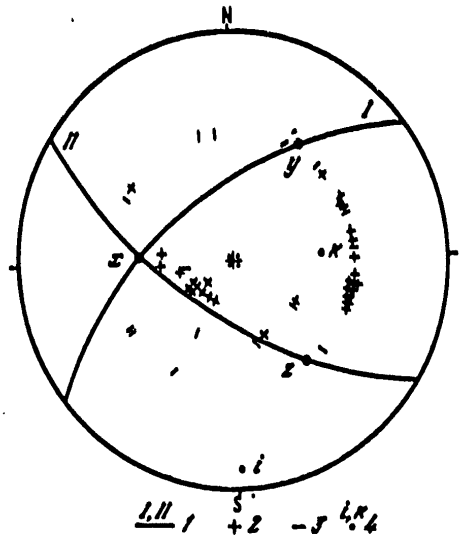

Figure 2. Diagram To Determine the Mechanism of the Focus for the Bezhtinsk Earthquake

1--nodal lines of the P-waves; 2--compression wave; 4--axes of compression and contraction stress

Second variant: azimuth of the strike φ_2 = 52 ± 10°; plane of the fault drops to the southeast at an angle of δ_2 = 56 ± 10° to the horizon; the shift is a type of left-side strike-slip thrust fault, in which the southern side experiences relative movement to the east and downward, with the component of shift on the plane of the fault along a course of 0.83 and along a dip of 0.56. The solution was based on the signs of the first arrivals of the P-waves at 47 stations in the USSR, and of them--31 arrivals with a plus sign (including 1 contradicting one) and 16 arrivals with a minus sign (including 6 contradicting ones). The solution cannot be considered adequately reliable, but the number of contradicting signs (14%) does not exceed the essentially permissible limits.

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KILYATL' EARTHQUAKE ON 13 NOVEMBER 1974 IN DAGESTAN

O. A. Asmanov, S. S. Aref'yev, S. A. Kasparov, R. A. Levkovich, V. I. Shchukin

An earthquake with a magnitude at the epicenter of 7 points occurred in mountainous Dagestan on 13 November 1974 at 02:36 Greenwich time. According to the data from the nearest permanent and field seismological stations at Makhachkala, Dylym, Buynaksk, Dubki and Akhty, the coordinates of the epicenter were: φ = 42°48', λ = 46°30'; the focal depth was 5 kilometers. According to the data of the regional network of seismological stations in the Caucasus, K = 13, M = 4.7.

The main shock was preceded by a series of foreshocks on 25-27 July 1974, of which the strongest occurred on 27 July at 05:50 (energy class K = 10.4) and caused a 5-6-point tremor in the village of Kilyatl' (in some houses, to the extent of the collapse of the roof, and the walls falling in). Characteristic of this foreshock was rapid diminishing of the strength of the effect with distance, so that in the villages of Inkho and Igali, 4-7 kilometers from Kilyatl', it had already reduced to an intensity of 3-4 points, which indicates the shallow depth of the focus of this earthquake (1-1.5 km). In the period of the foreshocks, the inhabitants of Kilyatl' repeatedly noted underground shocks accompanied by a rumble, which were not registered by instruments. The possibility is not ruled out that they were related to a local process of the cave-in of the karst holes near the surface on the Kil'dimeerskoye plateau, induced by the foreshocks.

After the main shock, in the period from 13 to 18 November, a macroseismic investigation of 42 population centers was made. An analysis of the preliminary data showed that the direction of the area of the aftershocks and the direction of the axes of the macroseismic field did not coincide. A second investigation including additional localities did not introduce substantial changes into the map of the isoseismal lines.

The main results of the macroseismic investigation are given in Table 1. In estimating the magnitude on the MSK-64 scale, the greatest attention was paid to modern structures made of brick and rubble using cement mortar, as well as adobe houses constructed since 1970.

Table 1. Macroseismic Data on the Earthquake on 13 November 1974

Locality	Δ, km	Locality	Δ, km	Locality	Δ, km
7 points		5 points		4 points	
Kilyatl'	3	Irganay	33	Buynaksk	51
Shabdukh	4	Untsukul'	26	Nizhniy Dzhengutay	59
		Karata	23	Urma	63
6-7 points		Andi	18	Gunib	52
		Tanda	25	Vedeno	39
Inkho	3	Shadrara	32	Kenkhi	42
Kizhali	8	Burtunay	30		
Tlyarata	7	Tindi	41	3-4 points	
Mekhel'ta	7	Khunzakh	29		
Igali	10			Levashi	71
		4-5 points		Khadzhalmakhi	62
6 points				Sil'di	54
		Gergebil'	50	Khasavyurt	58
Kakhabrosa	17	Echeda	50	Makhachkala	88
Chirkata	20	Ansalta	31	Kizilyurt	63
Tlokh	9	Dylym	39	Kosob	52
		Tsurib	60	Durgeli	58
5-6 points		Oroto	48		
		Charada	56	Not felt	
Agvali	39	Korodi	42		
Khushdada	35	Novolaksk	39	Groznyy	90
Botlikh	26			Derbent	165
Gagatl'	34			Kasumkent	180
Rikvani	14				
Muni	16				
Akhvakh	23				

In the pleistoseismal area, ground deformations in the form of a crack in the primary rocks with an opening 2-3 mm wide, earth creeps in the talus deposits and rock falls were observed. In the villages of Kilyatl' and Shabdukh, the magnitude of the tremors reached 7 points: in structures made of rubble using clay bonding, considerable structural damage was observed everywhere--wide cracks going clear through, walls breaking away when they were not bonded, etc. (Fig. 1, a) and in some buildings the roofs collapsed and the outer walls fell in (Fig. 1, b). The village of Kilyatl' is located under unfavorable ground conditions, on a thick proluvial cone, which somewhat intensified the local effect.

In the villages of Inkho, Kizhali, Tlyarata (Gumbetovskiy Rayon), Mekhel'ta and Igali, the magnitude of the earthquake was estimated at 6-7 points. Ground deformations in the form of cracks in the roads with the opening 2-5 mm wide, rock falls and seismogravitational deformations in the moist free-flowing soils were noted here.

Figure 1. Typical Damage to Structures in Kilyatl'

The people ran out of the buildings in alarm. Of the structures in this area, damage was suffered by public buildings made of brick and rubble using cement mortar, which sustained slight structural damage (cracks in partitions and above the door and window apertures, fine cracks in the main walls, etc.).

Ten villages in the 5-6 point area were studied. The most characteristic damages were: cracks in the plaster, and objects falling from walls and shelves. The people were frightened. The schools suspended classes.

According to the macroseismic data, the epicenter of the earthquake, determined as the center of gravity of the pleistoseismal zone, was located near Kilyatl' (φ = 42°43', λ = 46°28'), which coincides with the instrument coordinates of the main foreshock on 27 July 1974. The depth of the focus, with respect to the macroseismic field, was in the order of 5-10 kilometers, with the damping coefficient ν = 5.0. The pleistoseismic area (Fig. 2), bounded by a 7-point isoseismal line, is an ellipse extended 12-15 kilometers in a northeasterly direction, up to 5 kilometers along the minor axis. The rest of the isoseismal lines are oriented along the major axis in the same direction, almost perpendicular to the major axis

of the aftershock zone. This makes it possible to assume that the seismic energy of the main shock was to some degree concentrated along the anti-Caucasus fault, which played the role of waveguide. A similar intensity in the sections above the fault was also noted for the macroseismic field of the Dagestan earthquake on 14 May 1970.

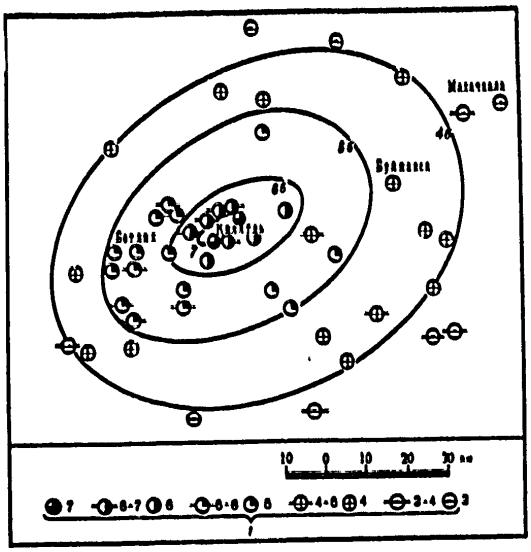

Figure 2. Diagram of the Isoseismal Lines of the Kilyatmenskoye Earthquake

1--Intensity

The focal mechanism of this earthquake, determined by S. S. Aref'yevyy, is characterized by the following parameters (Fig. 3). The first variant: the strike azimuth of the fault plane, Az_1 = 6.5 ± 10°; the dip of the fault plane toward the north-northwest at an angle of α_1 = 65 ± 10° toward the horizon; the movement of the type of a right-side shift with the components for the course 0.90 and for the dip 0.42. The second variant: the strike azimuth of the fault plane, Az_2 = 148 ± 10°; the dip of the fault plane to the west-northwest at an angle of α_2 = 67 ± 10° toward the horizon; the movement of the type of a left-side shift with components for the strike 0.86 and for the dip 0.50. The solution is given for 38 marks, of which there are 20 pluses (including 5 contradicting the solution) and 18 minuses (including 4 contradicting the solution). The number of contradictory marks (24%) is close to the permissible limit, which indicates the low reliability of the solution. The earthquake on 13 November was accompanied by a series of aftershocks, traced up to 28 December. A substantial new earthquake (see following article) occurred on 23 December 45 kilometers to the northeast of its epicenter.

The instrument data for the preliminary, main and repeated shocks of the earthquake on 13 November are given in Table 2.

Table 2. Foreshocks and Aftershocks of the Earthquakes on 13 November

(1) № п/п	(2) Дата	Момент возникновения, (3) ч м с	Координаты эпицентра (4) φ N	λ E	K	Точность определения эпицентра (5)
1	25.VII	23 54 10,4	42°38′	46°30′	10	a
2	26.VII	21 32 47,7	42 30	46 30	10	c
3	27.VII	05 50 53,5	42 43	46 28	10	a
4	22.X	06 42 55,5	42 43	46 28	10	a
5	13.XI	02 36 21,9	42 41	46 33	14	a
6	13.XI	02 43 26,0	42 45	46 30	11	c
7	13.XI	03 15 14,1	42 47	46 25	8	c
8	13.XI	03 23 59,9	42 45	46 28	8	a
9	13.XI	04 01 14,4	42 41	46 30	11	b
10	13.XI	04 09 33,3	42 40	46 32	9	c
11	13.XI	04 26 07,1	42 45	46 29	9	c
12	13.XI	12 14 23,0	42 41	46 28	9	c
13	13.XI	18 05 03,4	42 42	46 32	9	a
14	13.XI	23 48 51,2	42 43	46 31	8	b
15	13.XI	23 52 45,5	42 44	46 33	8	a
16	14.XI	19 08 48,1	42 48	46 18	8	c
17	15.XI	00 39 56,1	42 43	46 34	8	a
18	16.XI	09 21 57,1	42 44	46 27	8	c
19	16.XI	20 43 52,6	42 40	46 33	8	c
20	18.XI	10 04 05,8	42 42	46 28	9	a
21	18.XI	11 13 37,1	42 40	46 40	11	c
22	20.XI	02 42 22,2	42 44	46 27	10	c
23	21.XI	14 41 44,7	42 53	46 18	10	c
24	23.XI	0,7 51 38,4	42 44	46 25	9	c
25	24.XI	06 54 56,5	42 37	46 46	9	c
26	6.XII	18 19 59,4	42 38	46 36	10	c
27	14.XII	05 40 02,8	42 50	46 35	9	c
28	28.XII	01 36 27,9	42 38	46 36	11	c

Key:

1. No, in order
2. Date
3. Moment of origin (hrs, mins, secs)
4. Coordinates of epicenter
5. Accuracy of determining epicenter

The intersection method was used to determine the epicenters; the reliability of the coordinates is characterized by a class of accuracy: $\alpha = \pm 3$ km, $\delta = \pm 5$ km, $\varepsilon = \pm 7$ km. Figure 4 shows the distribution pattern of the epicenters of the Kilyatl earthquake. The dimensions of the aftershock area are 40 X 80 km, and accordingly the area of the surface is $S = 320$ km^2.

As can be seen from Table 2, for the foreshock period, earthquakes with K = 10 are noted, and for the aftershock period--with $K \geq 8$. Earthquakes with $K \geq 9$ were considered representative for the zone under discussion (aftershock area), and their reliable registering was ensured by the network of seismological stations in Dagestan.

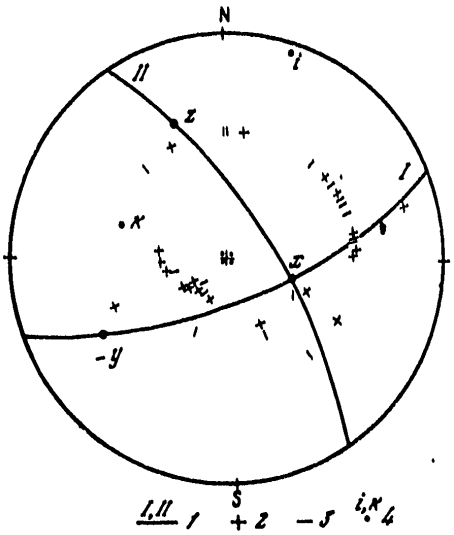

Figure 3. Diagram To Determine the Mechanism of the Focus for the Kilyatl Earthquake

1--nodal lines of the P -waves; 2--compression wave; 3--rarefaction wave; 4--axes of compression and contraction stress

The distribution of the number of earthquakes with respect to energy classes is given below, where N_1 is the number of shocks for the entire time interval under discussion (July-November 1974), N_2 --during the period of aftershock activity (November-December 1974):

K	8	9	10	11	14
	8	8	7	4	1
	8	8	4	3	

For both time segments the values of the angular coefficients $\gamma_1 = 0.20$ and $\gamma_2 = 0.23$ are considerably less than the average value for Dagestan, $\gamma' = 0.58$ [1]. Following [2, 3], it may be assumed that the quasi-viscosity of the environment in this area is relatively high; the environment itself is slightly fissured (relatively uniform). It would seem that all of this pertains only to the time interval under discussion and the depth at which the hypocenters of the earthquakes were located.

A graph of the change in time of the seismic activity A_c (Fig. 5) was plotted to analyze the seismic conditions of the period of activation of the zone under discussion. The average interval was chosen as 10 days;

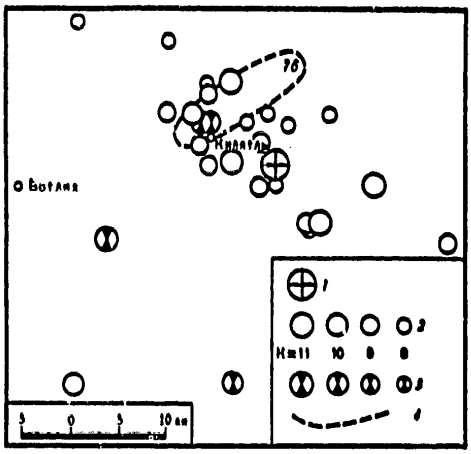

Figure 4. Pattern of Distribution of Epicenters of Kilyatl Earthquake

1--epicenter of the main shock according to instrument data; 2--aftershocks; 3--foreshocks; 4--7-point isoseismal line

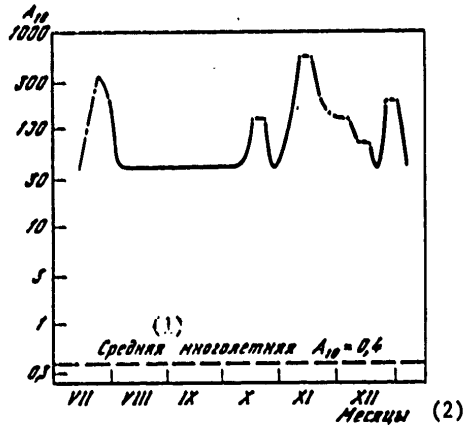

Figure 5. Graph of the Change in Time of Seismic Activity (July-December 1974)

Key:
1. Average over many years 2. Months

with a spacing of 5 days (a moving 10-day period at 5-day intervals), the magnitude of the seismic activity was calculated according to the formula

$$A_{10} = \frac{1000}{ST} \sum_{K_{min}}^{K_{max}} \left[10\gamma^{(K-10)} N_k / K_{max} - K_{min} + 1\right].$$

In our case S = 320 km^2, T = 0.027 years.

For the intervals of time when no earthquakes were noted, the valuation of the activity was taken as equal to the average for the entire interval being considered (T = 0.5 years, A_{10} = 40). This clearly overstated the estimate, but the overall picture of the change in activity is scarcely distorted.

As can be seen from Figure 5, after considerable activation in July there was an almost three-month lull. The main shock was preceded by a small flare-up with a subsequent abatement. The aftershock period is characterized by the usual stagelike drop in the activity, which at the end of December was disrupted by a new upsurge. It is possible that this is the resonance for the shifts in the focus of the nearby Salatau earthquake on 23 December 1974. It can also be seen from the sketch that in the period of seismic activity under discussion, A_{10}, exceeds the average for many years by two or three orders of magnitude, which for this region is 0.4 [1].

From the distribution of the epicenters (Fig. 4), it follows that the aftershock area is oriented mainly in the southeast-southwest direction, and the foreshocks are few and scattered with respect to area, so that it is difficult to single out the predominant direction.

It may, however, be assumed that the first two earthquakes in this zone (25-26 July), regarded as foreshocks of the main shock, were actually connected with a different focus. The orientation of the main geological structures is an argument in favor of this assumption. In the geological respect the focal points of these earthquakes were located within the limits of calcareous Dagestan, which on the modern structural plane is complex-structured synclinal, complicated by three anticlinal zones: exterior, central and interior. The aftershock area of the Kilyatl earthquake was confined to the central anticlinal zone in the area of the joint of the Arakmeerskiy and Tlokhskiy anticlines, and the epicenter of the main shock was confined to the pereclinal trough of the Arakmeerskiy anticline and to the orographically marked Kil'dimeerskiy Upper Cretaceous plateau. In the spatial respect, the earthquakes on 25-26 July were connected with the interior anticlinal zone. The Kimmeriyskiy substratum and the sedimentary cover in the stratigraphic interval--Lower Jurassic-Upper Cretaceous--are part of the region's geological structure. The sedimentary covering is 5-7 kilometers thick. In turn, the fault tectonics of the area of the earthquake on 13 November 1974 are controlled by two systems: the sub-Caucasus--along the axis of the central anticlinal zone, which is the structure above the fault, and the anti-Caucasus, which coincides in this

section with the Andiyskoye Koysu River valley. The deep fault areas in the sedimentary covering are manifested in the form of flexures and fault irregularities that complicate the folding. The spatial position of the focus of the main shock corresponds approximately to the boundary of the substratum and the sedimentary covering in the area where these deep faults intersect.

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SALA TAU EARTHQUAKE ON 23 DECEMBER 1974 in DAGESTAN

O. A. Asmanov, S. S. Aref'yev, Sh. G. Ilarmachev, S. A. Kasparov, P. P. Kramynin, R. A. Levkovich, V. I. Shchukin

The earthquake occurred on 23 December at 05:22 in the Dagestan foothills with a magnitude of 7 points at the epicenter. According to the data of the field seismological stations at Dubki, Karnay, Dylym and Buynaksk, located at epicentral distances of from 7 to 30 kilometers, the coordinates of the main shock were: $\varphi = 42.3°$, $\lambda = 46.9°$; the accuracy of determining the epicenter was $\pm$ 2 km; the depth of the focus--13 km; the energy class--K = 13.6.

The epicenter of the earthquake was located in the central part of the Sala-Tau plateau, 40 kilometers northeast of the Kilyatl' earthquake on 13 November 1974 (see separate article in this collection).

In the geological respect the focal area is located within the Khadumskiy dome, which is a large transverse uplift complicating the southern rim of the Tersko-Caspian marginal trough. According to the existing concepts, the geological structure of the Khadmskiy dome is caused by the presence of cryptolaccolite with the depth of the occurrence of the peak of the magmatogenic body in the order of 5 kilometers.

On the geological plane the region consists of terrigennous-carbonaceous Meso-Cenozoic deposits in the stratigraphic interval--Jurassic-Paleogene. A characteristic feature of the cross section is the development of subvertical zones of quartzification within the Khadumskiy dome, which proves the presence of a magmatic body in the core of the dome. The hypocenter of the main shock was located at the boundary between the sedimentary covering and the consolidated substratum, and the aftershock area, with an extent of 15 kilometers, intersected the sedimentary covering of the central part of the Khadumskiy dome parallel to the zone of the deep anti-Caucasus faults of the northeast strike. On the plane the aftershock area has two orthogonal branches, coinciding with the fault tectonics of the Khadumskiy dome.

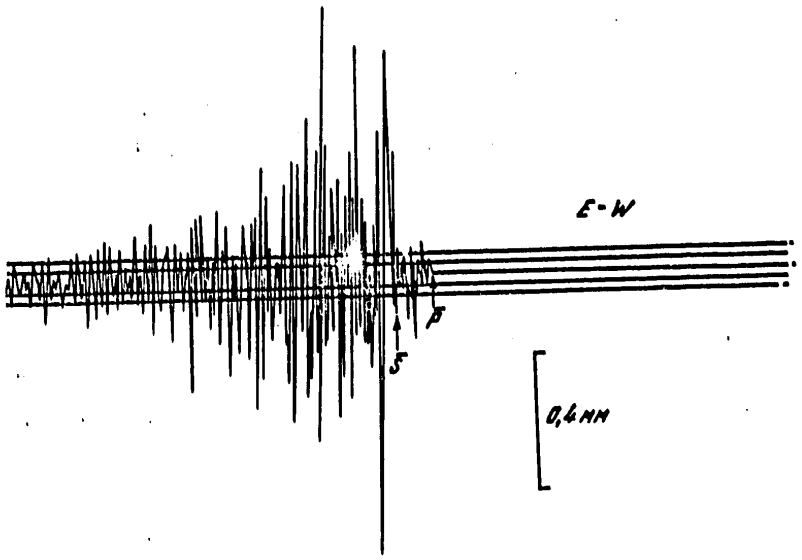

Figure 1. A Copy of the Seismogram of the Main Shock, Recorded by the Seismological Station at Buynaksk

The coordinates of the hypocenters of the main shock and aftershocks were determined by Wadati's method or the isochronal method, using the recordings of the seismological stations at Makhachkala, Buynaksk,* Dylym,* Karanay* and Druzhba.*

Of the nearby stations, the main shock was most clearly registered by the seismological station at Buynaksk (SKM + GB-III and ISO-2 + S5S), located 30 kilometers from the earthquake's epicenter (Fig. 1). The seismological station at Dylym (SKM + GK-VII) was located even closer to the epicenter, and the recording of the main shock here was almost unreadable, but the series of shocks immediately following the main one, when eight earthquakes occurred in the course of 8 minutes, one of which was with K = 11, two with K = 10, two with K = 9 and three with K = 8, were clearly singled out.

The maximum dislocation in the main shock, at the seismological station at Buynaksk, was 0.73 mm in a period T_S = 1.3-1.5 sec, which corresponds on the MSK-64 scale to a magnitude of I_c = 5 points. The build-up time of the amplitude of the vibrations from the moment of arrival of the longitudinal wave P to the maximum value A_{max} of the transverse wave S was t_1 = 6 sec. The time of drop in amplitude from the value A_{max} to 1/3 A_{max} τ_2 = 13.5 sec.

* Field station.

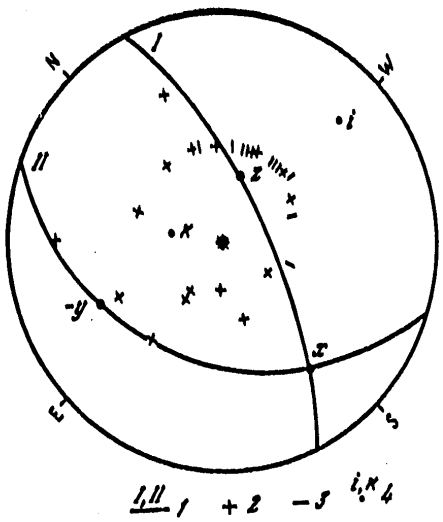

Figure 2. Diagram To Determine the Mechanism of the Focus for the Sala-Tau Earthquake

1--nodal lines of P-waves; 2--compression wave; 3--rarefaction wave; 4--axes of stress, compression and contraction

The mechanism of the focus of the earthquake on 23 December (Fig. 2), determined by S. S. Aref'yevyy, is characterized by the following parameters. The first variant: strike azimuth of the plane of the fault $Az_1 = 18 \pm 10$; dip in the fault plane to the west at an angle of $\varepsilon_1 = 66 \pm 10°$ toward the horizon; movement of the type of a fault with a relative sinking of the eastern limb and components along the strike 0.36 and along the dip 0.93. Second variant: strike azimuth of the fault plane $Az_2 = 153 \pm 10°$; dip of the fault plane toward the east-northeast at an angle of $\varepsilon_2 = 32 \pm 10°$ toward the horizon; movement of the thrust type with components along the strike 0.41 and along the dip 0.91. The solution was given from 27 signs, of which 17 were pluses (including 4 contradicting the solution) and 10 minuses (including 1 contradicting it). The number of contradictory signs (18%) does not exceed the permissible level.

A macroseismic investigation of the consequences of the earthquake was made during the period from 23-29 December 1974. Some 47 population centers in the neearby zone were studied. The intensity was estimated according to the MSK-64 scale and the main results are reflected in Table 1 and in the diagram of the isoseismal lines (Fig. 3).

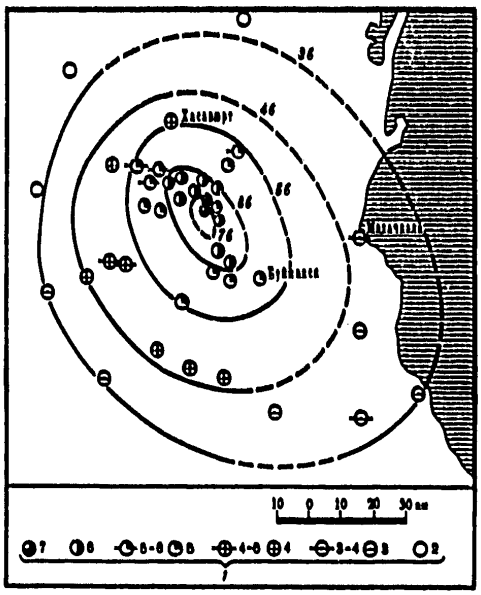

Figure 3. Diagram of Isoseismal Lines of the Sala-Tau Earthquake on 23 December

1--intensity

The pleistoseismal area, with an elliptical shape (6 X 12 km) is located in a sparsely populated locality and includes two population centers--Zubutl' and Ikho, completely destroyed earlier by the Dagestan earthquake of 1970, and moved to the plains. Therefore, we are giving the estimate of the magnitude of the earthquake according to the numerous ground deformations and sensations of individual inhabitants remaining on farms.

During the investigation of the earlier destroyed village of Zubtl', newly formed extended cracks were noted everywhere: in the rock (limestones and clay of the Neocomian period) with the opening up to 1 centimeter wide. Rock falls and waste were observed at the canyon rims of the Sulak River. Noted in this same village was the interesting fact that during the earthquake the top of a walnut tree was sheared off--this took place before the eyes of a local inhabitant who was gathering wood in the abandoned orchards at the time of the shock.

According to the observations of a cowherd, A. Magomedov, in the village of Ikho at the moment of the earthquake on 23 December 1974 the eastern rim of the Sulak River canyon tilted, after which the shepherd was thrown off his feet by a strong vertical shock. The cows that he was herding lay down on the ground directly before the shock.

Table 1. Macroseismic Data on the Earthquake on 23 December

Locality	Δ, km	Locality	Δ, km	Locality	Δ, km
7 points				Kizhani	50
				Nozhay-yurt	
Zubtl'	2	Miatly	8		
Ikho	3	Novyy Chirkey	15	3-4 points	
		Verkhniy Karanay	22		
6-7 points		Buynaksk	30	Makhachkala	55
		Erpeli	25	Sergokala	88
Dubki	5			Gergebil'	58
GES	6	5 points			
				3 points	
6 points		Artlukh	21		
		Burtunay	14	Levashi	72
Inchkhe	9	Almak	19	Kakhib	68
Dylym	15	Chiryurt	16	Karabudakhkent	67
Gostala	14	Kizilyurt	23	Botlikh	65
Guni	8				
Khubar	6	4-5 points		2-3 points	
Akhatly	16				
Nizhniy Ishkarty	21	Untskul'	32	Izberbash	100
		Mekhel'ta	37		
5-6 points		Tlyarata	34	2 points	
Kizilyurt	23	4 points		Babayurt	64
Bavtugay	16			Gudermes	64
Novolakskoye	27	Khasavyurt	30	Sovetskoye (Checheno-Ingush ASSR)	90
Kalininaul	20	Khunzakh	53		
Leninaul	19	Gotsatl'	54		
				Vedeno	59

Close to the instrument epicenter (Akhsu ravine) there were fresh separations from the scarps of the Upper Cretaceous limestones, steplike subsidences on the talus slopes and also cracks running parallel to the rims of the ravine. The above features were taken as the basis for singling out the 7-point pleistoseismal zone from the instrument epicenter to the village of Ikho.

Nine population centers were investigated within the 6-7-point zone. In the area of the section line of the Chirkeyskaya GES, during the main shock, workers at the seismological station observed surface "earth" waves. Those working at the GES construction project took the main shock as a powerful explosion. According to their sensations the shock was vertical. Only after the beginning of the strong rock slide from the canyon rims did it become clear that it was an earthquake. The metal structures and reinforced concrete structures at the section line of the Chirkeyskaya GES dam had no visible damage.

Figure 4. Separation of Masonry in a School Building in Inchkhe

Figure 5. Copy of the Seismogram from the Station at Druzhba With Unusual Microseismic Background, Beginning 19 Hours Before the Main Shock

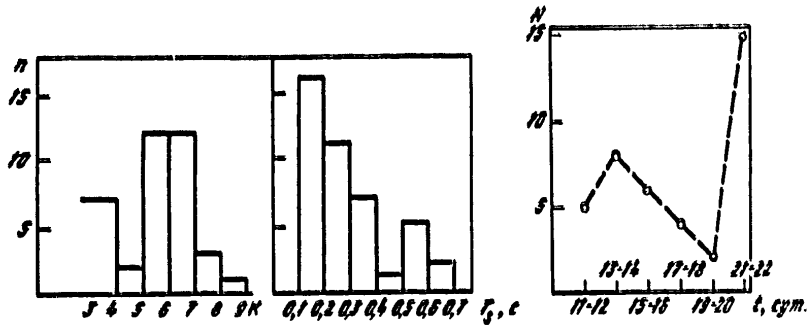

Figure 6. Distribution of Number of Foreshocks of Earthquake on 23 December With Respect to Energy Classes K and Periods in Accordance With the Maximum Amplitude of the Transverse Wave

Figure 7. Change in the Number of Foreshocks in Time--Each Point on the Graph Corresponds to the Number of Shocks in the Two Days

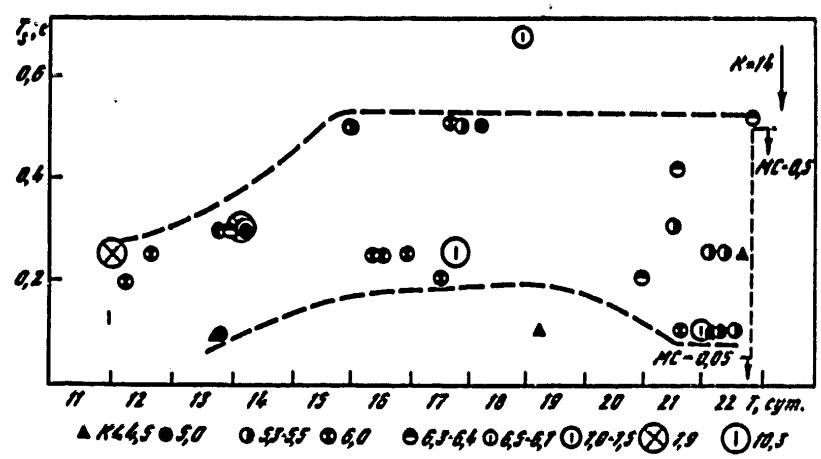

Figure 8. Graph of the Change in the Period $\bar{T}_S$ in Time for Various K--the horizontal segments of the lines show the length of the microseisms MS-0.05 with a period of 0.05 sec., MS-0.5 with 0.5 sec.

Table 2. Aftershocks of the Sala Tau Earthquake on 23 December 1974

(1) Дата	Момент возникновения, (2) ч м с	Координаты эпицентра (3) φ N	λ E	Точность определения эпицентров, ±км (4)	Глубина H, км (5)	Точность определения глубины, ±км (6)	Энергетический класс K (7)
23.XII 1974	05 22 05,8	42°57'	46°49'	2	5,5	1,5	13,6
	05 27 08,3	42 59	46 49	4	-	-	9
	05 28 34,9	42 58	46 49	4	-	-	8
	05 30 00,5	42 57	46 49	2	4	1,5	9
	05 31 22,5	42 59	46 52	4	-	-	8
	05 33 06,3	43 02	46 52	3	5	2	8
	05 38 42,7	42 58	46 50	4	-	-	8
	05 44 20,4	42 58	46 50	4	-	-	7
	05 49 42,0	42 56	46 47	4	-	-	7
	06 55 45,1	43 02	46 52	4	-	-	8
	07 02 44,9	42 57	46 49	4	-	-	8
	07 05 38,7	43 02	46 52	4	-	-	7
	08 19 31,7	43 02	46 52	4	-	-	8
	08 59 39,6	42 59	46 47	3	3	2	10
	09 28 17,5	43 02	46 52	4	-	-	8
	09 55 23,5	42 57	46 54	4	-	-	7
	10 24 39,4	43 00	46 51	3	4	2	8
	12 43 07,3	43 01	46 52	3	4	2	8
	13 12 30,3	43 01	46 52	4	-	-	7
	13 41 30,4	43 01	46 51	3	4	2	8
	16 43 36,3	43 01	46 54	3	5	2	8
	17 59 50,6	43 00	46 50	3	4	2	8
	17 17 17,1	43 00	46 00	3	4	2	8
	19 14 13,3	42 59	46 48	3	4-5	2	8
	22 28 06,8	42 58	46 48	3	4	2	8
24.XII 1974	00 39 13,7	42 59	46 49	3	6	2	8
	01 33 56,3	42 58	46 49	4	-	-	7
	01 47 54,2	42 59	46 50	3	4	2	7
	02 34 55,9	42 59	46 49	4	4,5	3	7
	03 23 28,4	42 58	46 49	3	4	2	7
	17 20 48,1	42 59	46 50	4	3	2	7
	17 48 19,5	43 00	46 47	3	4-5	2	8
	18 39 40,0	42 58	46 50	3	4,5	2	11
	19 44 34,0	43 01	46 52	3	4-5	2	10
	19 46 35,4	43 00	46 50	4	4	3	6
	20 37 16,5	42 58	46 48	2	6	1,5	8
	21 29 37,5	42 58	46 50	2	5	1,5	10
	21 55 11,2	42 59	46 49	3	4-5	2	8,5
	21 56 07,7	42 59	46 50	2	4,5	1,5	8
	22 17 31,5	43 01	46 53	3	6-7	2	8
25.XII 1974	03 33 49,3	42 59	46 50	3	4	2	10
	03 34 03,8	42 59	46 50	4	4	3	10
	05 34 22,1	43 00	46 48	3	3	2	9
28.XII 1974	06 01 06,5	43 00	46 49	3	6	2	9
29.XII 1974	14 00 49,2	42 59	46 50	4	-	-	7
	14 45 18,8	42 59	46 50	2	5	1,5	9
	15 02 56,9	42 58	46 49	3	3	2	11
	23 17 29,9	42 58	46 50	2	4	1,5	8
1.I 1975	09 09 52,1	42 58	46 50	4	-	-	8
2.I 1975	22 37 54,7	42 56	46 53	4	-	-	7,5
6.I 1975	12 35 01,1	42 57,4	46 49,6	3	6-7	2	10
	23 45 05,6	42 59	46 49,5	4	-	-	8,5
7.I 1975	11 12 18,1	42 57	46 52	4	-	-	8
9.I 1975	01 39 39,8	42 59,5	46 52,2	2	5	1,5	8,5
	04 59 30,1	42 59,4	46 52,3	2	6	1,5	8

[Key on Following Page]

Key:

1. Date
2. Moment of occurrence, hrs, mins, secs
3. Coordinates of epicenter
4. Accuracy of determining epicenters, ± km
5. Depth H, in km
6. Accuracy of determining depth, ± km
7. Energy class, K

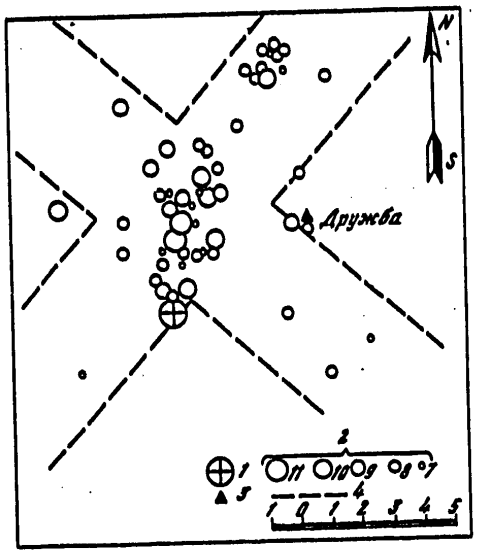

Figure 9. Aftershocks of the Sala Tau Earthquake on 23 December

1-- main shock according to instrument data; 2—aftershocks; 3--seismological station; 4--boundary of aftershock area

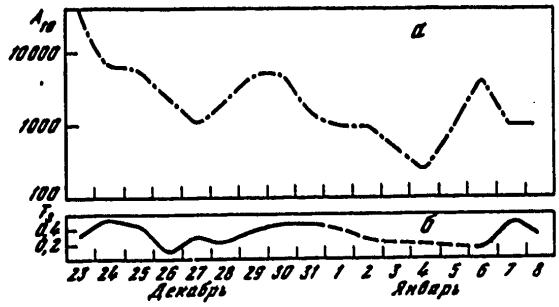

Figure 10. Graph of Change in Time of Seismic Activity (a) and Predominant Periods of Transverse Waves (b) From 23 December 1974 to 9 January 1975

At the settlement of Dubki in a brick building of the Chirkeyskaya GES Administration of Construction, cracks were formed in the partitions and in the joints between the panel ceiling floors. Fine cracks were noted in many brick houses.

In the villages of Dylym, Khubar, Guni, Gostala and others, the priority study was made of capital structures made of brick in which cracks were observed in the partitions everywhere. In some cases (schools in Inchkhe and Gostala) staggered cracks were noted along the masonry (Fig. 4), and at a school in Dylym, built of brick--cracks going clear through in a main wall on the third floor.

At all the population centers in this zone hanging objects fell from walls and cupboards. The population abandoned the buildings in fright, and many spent the following night outdoors. Near Dylym a fresh slide appeared in the talus deposits.

The 6-point isoseismal line has an elliptical shape (40 X 20 km), the macro-axis of which extends to the northwest, forming a right angle with the aftershock area. The intensification of the effect in the northwest-southeast direction from the focus we explained by the existence of a weakened zone above the fault along the line from Buynaksk to Dylym, along which, during the earthquake on 14 May 1970, intensification of the seismic effect on the ground had also been noted (Sulak breakaway slides and Achinsk cave-in).

In the zone with the intensity of the action from 5 to 6 points, 16 population centers were studied that made it possible to produce the 5-point isoseismal line with certainty. The most characteristic damage for the brick and stone structures in this zone were cracks going clear through in the partitions, cracks in the joints of the buildings, hairline cracks in the foundations of the building, plaster crumbling and objects falling. In some houses in Novyy Chirkey brick ovens were damaged.

In Dylym, Guni, Khubar, Gostala and other villages schoolchildren ran out of the buildings in panic. There were cases of objects falling from the cupboards in the schools.

In the 4-5-point zone (Mekhel'ta, Untsukul', Gotsatl', etc.), hairline cracks in the partitions and joints were noted in buildings made from rubble using cement mortar. Most of the inhabitants did not leave the buildings after the shock.

Preliminary processing of the instrument data obtained at the seismological station at Druzhba OSB-VI oscillograph, SM-2 seismic detectors and GB-IV galvanometers with an increase in seismic channels: north-south, V = 500, Z-V = 1500; east-west, V = 1500), which proved to be almost at the epicenter of the earthquake, made it possible to single out a series of

43 forewarning shocks from 11 to 23 December. The energy classes of these earthquakes were from 4.5 to 7.5, and the epicentral distances varied from 3 to 15 kilometers.

Some 19 hours before the main shock, according to the seismograms at the seismological station at Druzhba, unusual short-period microseisms with a period of $T_{\mu} = 0.05$ sec (the microseismic period was determined as the average for 10 vibrations), which were observed during approximately 3 hours. Then they were replaced by ones of a longer period ($T_{\mu}^2 = 0.5$ sec), which continued up to the moment when the main shock occurred.

Figure 5 shows a copy of the seismograms, where the microseismic background usual for the seismological station at Druzhba (5-6 upper lines) were gradually replaced by the unusual vibrations mentioned (center lines).

Figure 6 shows the distribution of a number of foreshocks with respect to the energy classes K and predominant periods T_S, corresponding to the maximum amplitude of the transverse waves (T_S singled out in visual processing of the seismograms). It can be seen from the diagram that most of the forewarning shocks lie in the interval $4.5 \leq K \leq 7$, and the distribution is close to normal and the greatest number of waves has a period from 0.1 to 0.4 sec.

From Figure 7, where the distribution of the number of foreshocks in time is shown, one can see the substantial increase in the number of shocks for the 48 hours just before the main earthquake. Figure 8 shows the change in time of the periods T_S and the periods of the microseisms from 11 to 23 December.

The earthquake on 23 December was accompanied by a series of aftershocks (Table 2, Figure 9).

It was not possible to trace the aftershock activity of the Sala-Tau earthquake fully enough, since on 10 January 1975 the Buynaksk earthquake occurred ($I = 7$-8 points), the aftershock area of which was propagated far to the northwest, as the result of which it proved to be practically impossible to single out the feeble aftershocks of the Sala-Tau earthquake. From 23 December 1974 to 9 January 1975, 155 aftershocks were registered, and 54 of them occurred during the first 2 days after the main shock.

Figure 10 shows the graphs of the change in time of the seismic activity and the predominant periods, T_S, of the transverse waves of the aftershocks.

The seismic activity A_{10} was estimated according to the formula

$$A_{10} = \frac{1000}{ST} \cdot \frac{\sum_{K=K_{min}}^{K=K_{max}} 10^{\gamma(K-10)} W_k}{K_{max} - K_{min} + 1}$$

for the moving time intervals in a 24-hour period. The value of the moving interval was chosen as varying (from one to four 24-hour periods), with the preference given to the lowest value and, only if not a single earthquake occurred in it were the sizes of the interval increased. The area occupied by the aftershocks was assumed to be equal to 80 square kilometers. The magnitudes of the "local" activity during the time interval under discussion proved to be two-three orders of magnitude higher than the average for a period of many years .

The periods of the transverse waves, $\bar{\tau}_s$, were determined from the recordings of the seismological station at Druzhba. By using the periods $\bar{\tau}_s$, measured for earthquakes with an energy class $4.5 \leqslant K \leqslant 9$, a mean curve was plotted that reflected the change in the predominant periods τ in the time t (see Fig. 10). The averaging was performed for the earthquakes of the entire measured range of classes. The time relation for individual energy classes was not examined because of the insufficient number of earthquakes corresponding to the given class. The dotted part of the curve in the diagram depicts the section plotted according to the small number of points, and may be considered sufficiently reliable.

The combined analysis of the above described graphs shows that the relation between the seismic activity and the predominant period $\bar{\tau}_s$ is complex in its nature. In most cases, however, the reduction in the activity coincides with the increase in the period $\bar{\tau}_s$.

The Sala-Tau earthquake on 23 December 1974 may obviously be included among the so-called "multiple" earthquakes, in which the earthquake occurs as the result of several consecutive jolts. Of greatest interest from our standpoint is the foreshock activity just before the main earthquake. The increase in the number of foreshocks during the two 24-hour periods before the main earthquake (Fig. 7), the reduction in their periods to 0.1-0.25, the predominance of the energy class of 5.0-6.0 (Fig. 6) and the manifestation of specific microseisms 19 hours before the main shock (Fig. 5) may in aggregate definitely characterize the process of the preparation of the focal area for the earthquake.

EARTHQUAKES IN WESTERN TURKMENIYA

G. L. Golinskiy, T. N. Gorodkova, A. R. Rakhimov

In 1975, two key seismic stations recorded earthquakes in Turkmeniya--Ashkhabad and Kyzyl-Arvat--and six regional stations--Vannovskaya, Nebit-Dag, Krasnovodsk, Kara-Kala, Kizyl-Atrek and Kaakhka. The stations' instrument equipment and the basic parameters of it are given in [1]. The methodology of the data processing is described in detail in this work.

In 1975 there were about 600 earthquakes, which, with respect to quantity, almost reaches 1974. The epicenters of the focal points could be determined for 565 earthquakes. Their distribution by regions and energy classes is given in Table 1.

Table 1. Distribution of Earthquakes in Western Turkmeniya by Regions and Energy Classes

(1) Район	(2) Класс энергии K									(3) Всего
	4	5	6	7	8	9	10	11	12	
(4) Ашхабадский	4	19	34	48	51	37	5	1	–	199
(5) Западно-Туркменский	–	1	6	12	10	18	11	4	1	63
(6) Иранский	1	–	–	38	122	81	47	10	4	303
(7) Итого	5	20	40	98	183	136	63	15	5	565

Key:

1. Region
2. Energy class, K
3. Total
4. Ashkhabad
5. Western Turkmeniya
6. Iran
7. Total

In 1975 the seismic energy released as the result of the earthquakes proved to be lower than in the preceding year (Table 2).

Table 2. Number and Energy of Earthquakes in Turkmeniya in 1974 and 1975

(1) Год	(2) Число землетрясений										(3) Всего за год	Общая сейсмическая энергия (4)
	4	5	6	7	8	9	10	11	12	13		
1974	4	13	48	90	165	172	87	31	5	2	617	$2{,}9 \cdot 10^{13}$
1975	6	20	40	98	183	135	63	15	5	–	566	$7{,}2 \cdot 10^{12}$

Key:

1. Year
2. Number of earthquakes
3. Total for year
4. Total seismic energy

The quantitative distribution of earthquakes by years, given in Table 2, shows graphically the stability of the manifestation of feeble earthquakes with $K \leqslant 9$: in 1974 there were 492 earthquakes with K = 4-9, and in 1975--483. The strong earthquakes with $K \geqslant 10$ decreased considerably, however: from 125 in 1974 to 83 in 1975.

The characteristic feature of the manifestation of seismicity this year is the absence of perceptible earthquakes within the territory of the Turkmen SSR. Five quite strong earthquakes (four with K = 11 and one with m_{Lg} = 4.8*) had focal points probably at a great depth, and therefore could not evoke the effect of surface shocks. No similar picture has been observed in the entire last 30 years [2, 3] that have passed since the Ashkhabad earthquake of 1948.

By comparing the data from Table 2 with the spatial distribution of the focal points (figs. 1, 2, see insert), recorded in 1975, groups of earthquakes with $K \leqslant 9$ can be noted in new places: they are located to the northeast, east and southeast of Ashkhabad and the pleistoseismic zone of the Ashkhabad earthquake of 1948. Most of them occurred in the Cis-Kopetdag depression and only a small number--in the mountainous structures of Eastern Kopetdag.

In the seismic history of Turkmeniya, the Eastern Kochetdag region is characterized by meager information on earthquakes [2, 4]. At the same time, it is known that in 1904 two destructive earthquakes occurred here: the strong foreshock on 20 March and the main jolt on 9 November. According to the estimate of G. L. Golinskiy [4, 5], the first earthquake had M = 5.7, I_0 = 8 points, and the second-- M = 6.3, I_0 = 8-9 points. The later Meshkhedskoye earthquake (incorrectly named in the literature as the Kaakhkinskoye earthquake [6-8; and others] was accompanied by strong tremors on the territory of Turkmeniya as well: in the regional center of Kaakhka, Ashkhabad and other villages.

In 1912 another earthquake occurred, the focus of which was north of the first two, i.e., closer to Turkmeniya. The magnitude of the earthquake was M = 5.5 [4, 5].

On 24 October 1966 there was quite a strong earthquake in Kaakhka, the focus of which was located in the vicinity of Kaakhka. The parameters of the earthquake, preliminarily discussed in [2, 9-11], were subsequently defined more precisely by G. L. Golinskiy [4, 5]. They indicate that the 1966 focus is included in a zone potentially active in the seismic respect. The seismotectonic conditions of this region are characterized by quite a complex system of lateral and longitudinal faults faults, formed during various geological ages. The intensive reciprocating motions of the most recent time regenerated the ancient faults of the Gyaursdagskiy and Kelatskiy anticlinal folds, having caused a system of secondary faults that intersect Eastern Kopetdag in different directions. The differentiated motion along the faults split the basic structures of Eastern Kopetdag into a series of individual large and small blocks, the slightest shifts of which cause earthquakes here.

In the opinion of G. L. Golinskiy [12], one of the conditions accelerating the process of build-up of elastic energy in the Eastern Kopetdag region is, possibly, the presence of the Kaakhka depression. It breaks up the structure of Eastern Kopetdag into two separate uplifts--the Gyaursdagskiy range, adjacent to the depression from the northwest, and the Kelatskiy range, abutting the same depression from the southeast. Probably in this zone of separation of the mountain ranges vertical and tangential movements occur that cause the accumulation of energy and intensification of the tectonic deformation.

In 1970, within the region described, the Eastern Kopetdag earthquake was recorded, with a magnitude at the epicenter of I_0 = 7 points [4, 5]. This fact indicates that during the Kaakhka earthquake of 1966, not only did no relieving of the elastic deformations occur in the region, and not only were no tectonic stresses removed, but conditions were created for a new concentration of stresses in the zone located only 30-40 kilometers south of the 1966 focus.

Subsequent events showed that the level of seismic activity in Eastern Kopetdag was not reduced: in 1974, right here, southeast of the Gyaurskiy phase, in the Kaakhka depression, again a quite strong (M 4) earthquake occurred, which was felt in a number of the foothill villages of Turkmeniya with a magnitude of up to 4-5 points [1].

In accordance with the above information, the concentration of epicenters observed in 1975 (see Fig. 1) is probably the result of an intensification of seismic activity in the Eastern Kopetdag area. Unfortunately, because of the lack of seismological stations in this region, it is impossible to determine accurately enough the coordinates of the epicenters, to register the feeble ($K < 9$) shocks and to map the zones of increased activation.

Almost no essential changes in the spatial distribution of strong earthquakes ($K \geq 10$) were observed in 1975, as compared with 1974. As before, the strongest earthquakes (K = 12) occurred in Iran: one on the southern coast of the Caspian Sea, two in a region located south of the Turkmenian settlement

of Kara-Kala, and one between the large Iranian cities of Kuchan, Nishapur and Sebzevar. The weakest jolts (K = 10-11) were concentrated in the intermediate zone between the focal points of the strong earthquakes.

One earthquake with K = 12 was noted within Soviet Turkmenistan. Its focus was located in the Caspian Sea at a depth of over 40 kilometers. The settlement closest to the epicenter of the earthquake was Gasan-Kuli.

Southwest of Krasnovodsk, two earthquakes with K = 11 were registered. Their focus was also located in the Caspian Sea--in the fracture zone of the Kopetdag fault. There were also two earthquakes with K = 10 east of Krasnovodsk. As before, the earthquakes were noted in the vicinity of the city, but were weaker, with energy in the order of K = 4-8 (see inset map in Fig. 2), probably caused by secondary phenomena and the accompanying process of the release of the stresses that was begun by the earthquakes with K = 10-11.

Several earthquakes also occurred in the Nebit-Dag region, with one of them having an energy of K = 11, and three--K = 10. It should be noted that there were no earthquakes last year in this region with this great a magnitude.

We see a completely different picture in the distribution of earthquakes with K = 4-8: they are concentrated in the vicinity of Ashkhabad, mainly occupying the southern and western areas of the region. This corresponds to a situation that has lasted for many years, observed in the dislocation of the epicenters. This tradition too, however, proved to be disturbed: If one tracks the axial line of the spatial distribution of the cloud of points--the epicenters with K = 4-8, it is revealed that it passes through the Iranian city of Bodzhnurd and has an azimuthal span of about 30-40°, i.e., cuts almost perpendicularly the entire zone of the ancient dislocations of Kopetdag--the Kuchano-Meshkhedskiy and Vnutri-Kopetdag and Cis-Kopetdag faults. The dip of the axis was formerly in a sharply opposite direction. It passed through Kuchan and was in line with the expanse of the basic structures of Kopetdag--from the southeast to the northwest.

S. Atabayeva, K. D. Lagutochkina, N. A. Makarenko and A. Kh. Musayeva helped to process the data.

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EARTHQUAKES IN CENTRAL ASIA AND KAZAKHSTAN

V. I. Ulomov, M. G. Flenova, M. P. Fadina, A. P. Katok, K. D. Dzhanuzakov, V. K. Iodko, T. A. Kinyanina, A. A. Kon'kov

Earthquakes in Central Asia and Kazakhstan were recorded by 56 permanent seismological stations and partially by the network of highly sensitive seismological stations of the field type, affiliated with the seismological institutions of the republics of Central Asia and Kazakhstan. There were no essential changes in the location of the seismological stations and their provision with instruments in the republics of Central Asia. There were some changes in the network of seismological stations located on the territory of Kazakhstan. Here, because of transfer to a different location these seismological stations were not in operation: Kurty, from the end of August and to the end of the year, Alma-Ata from March to October, Chimkent from January to May. At the last two stations there was additional installation of SKM -3 instruments with an increase respectively of 10,000 and 1,000 and at the Fabrichnaya seismological station--with an increase of 30,000.

A new seismological station was opened at Taldy-Kurgan in August, where three units are in operation: SKM-3 + GK-7, V = 10,000, SK = GK-7, V = 1,000; SMTR and SBM.

Special Features of the Manifestation of Seismicity in Central Asia and Kazakhstan

This year 1,910 earthquakes with K 9 were registered on the territory of Central Asia and Kazakhstan, of which 960 were located within the earth's crust and 950--beneath its base.

Two maps of the epicenters of these earthquakes are given in figures 1 and 2. On one of them are plotted the epicenters of earthquakes with K = 9, and on the other--with K $\geqslant$ 10.

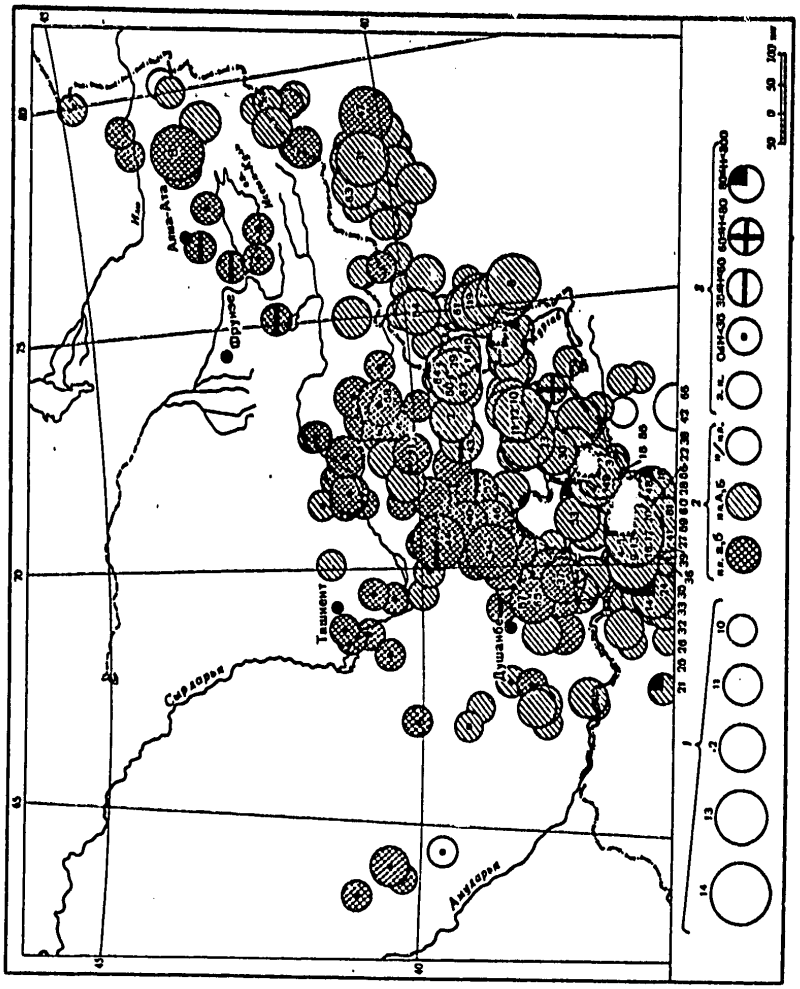

Figure 1. Map of the Epicenter of Earthquakes in Central Asia with K $\geqslant$ 10 in 1975

1--energy class, K; 2--accuracy of determining epicenter; 3--depth of focus in km

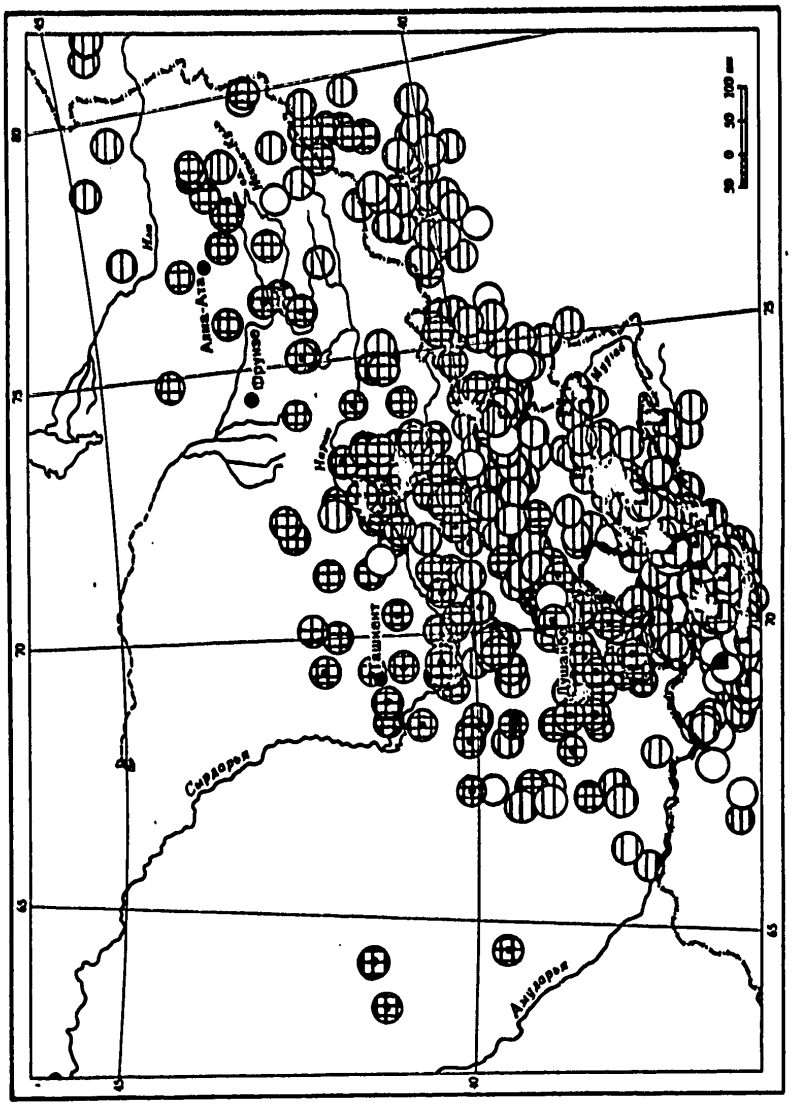

Figure 2. Map of Epicenters of Earthquakes in Central Asia With K = 9 in 1975
Symbols the same as in Figure 1.

Table 1. Distribution of Earthquakes by Energy Classes and Amount of Total Seismic Energy Released for Major Seismic Zones

Крупные сейсмогенные зоны (1)	(2) Количество землетрясений разных классов энергий							ΣE, Дж
	9	10	11	12	13	14	Всего (3)	
I. Северный Тянь-Шань (4)	36	12	2	-	1	-	51	$1{,}04 \cdot 10^{13}$
II. Центральный Тянь-Шань (5)	86	23	8	-	-	-	117	$0{,}11 \cdot 10^{13}$
III. Южный Тянь-Шань (6)	129	49	16	3	2	-	199	$2{,}52 \cdot 10^{13}$
IV. Памиро-Гиндукуш (всего коровых землетрясений) (7)	355 606	157 241	57 83	17 20	7 10	- -	593 960	$9{,}46 \cdot 10^{13}$ $1{,}31 \cdot 10^{14}$
V. Памиро-Гиндукуш (глубокие) (8)	544	285	85	31	3	2	950	$2{,}73 \cdot 10^{14}$

Key:

1. Major seismic zones
2. Number of earthquakes of varying energy classes
3. Total
4. Northern Tian Shan
5. Central Tian Shan
6. Southern Tian Shan
7. Pamir-Hindukush (total of crust earthquakes)
8. Pamir-Hindukush (deep)

By analyzing these maps we see that, just as in the preceding years, the majority of the weak earthquakes were confined to the Pamir-Hindukush zone and to the system of ranges of Central and Southern Tian Shan. In Northern Tian Shan the number of earthquakes noticeably decreased. The distribution of the epicenters of the earthquakes forms a belt extended in the northeast direction. A concentration of earthquakes is noted in the Sarykol'skiy range, formed by the repeated shocks of the Sarykol'skiy earthquake on 11 August 1974 with M = 7.3, and by a cluster of weak earthquakes in the region of the Petr Perviy range.

The epicenters of the strong earthquakes are confined to the same extended zones, which are singled out for weak earthquakes. The principal part of them is located in the Sarykol'skiy, Petr Pervyy, Kun'lun' ranges and also on the southwest slope of the Zaalayskiy range.

Table 2. Number of Earthquakes, Their Representativeness by Energy Classes and Amount of Total Seismic Energy

No, in order	Name of region and its number	Number of earthquakes		Representative level, K	ΣE, J
		Total	from K ⩾ 12		
	1. Northern Tian Shan				
1	Northern Tian Shan (No 7)	37	1	9	$1.03 \cdot 10^{13}$
2	Dzhungarskiy Alatau system (No 13)	9	-	9	$3.60 \cdot 10^{10}$
3	Ishikotrau sands (No 14)	3	-	10	$3.00 \cdot 10^{10}$
4	Taukum sands (No 15)	1	-	10	$1.00 \cdot 10^{9}$
5	Chu-Iliyskiy Mts (No 15)	1	-	9	$1.00 \cdot 10^{9}$
6	Vetpak-Dala desert (No 17)	-	-	11	-
7	Muyunkum sands (No 18)	-	-	9	-
8	Karatau range (No 19)	-	-	10	-
	2. Central Tian Shan				
9	Central Tian Shan (No 6)	25	-	9	$1.54 \cdot 10^{11}$
10	Ferganskaya valley (No 8)	63	-	9	$8.74 \cdot 10^{11}$
11	Chatkal'skiy range system (No 9)	11	-	9	$3.60 \cdot 10^{10}$
12	Tashkent region (No 10)	9	-	9	$3.60 \cdot 10^{10}$
13	Kyzyl Kum sands (No 20)	7	-	9	$1.26 \cdot 10^{11}$
14	Iuratau range (No 21)	2	-	9	$1.00 \cdot 10^{10}$
15	Kara Kum sands	-	-	10	-
	3. Southern Tian Shan				
16	Tadzhik depression (No 4)	42	-	9	$8.34 \cdot 10^{11}$
17	Southern Tian Shan (No 5)	156	5	9	$2.44 \cdot 10^{13}$
18	Baysuntau Mts (No 23	1	-	9	$1.00 \cdot 10^{9}$
	4. Pamir-Hindukush (crust)				
19	Hindukush (No 1)	111	2	10	$1.29 \cdot 10^{13}$
20	Southern Pamir (No 2)	78	5	10	$1.51 \cdot 10^{13}$
21	Northern Pamir (No 3)	289	7	9	$1.91 \cdot 10^{13}$
22	Western Kun'lun (No 11)	94	9	11	$3.73 \cdot 10^{13}$
23	Takla Makan desert	21	1	11	$1.03 \cdot 10^{13}$

Table 2. (cont'd)

No, in order	Name of region and its number	Number of earthquakes		Representative level, K	ΣE, J
		Total	from K 12		
	5. Pamir-Hindukush (deep)				
24	Hindukush	671	29	9	$2.53 \cdot 10^{14}$
25	Southern Pamir (No 2)	274	29	9	$2.53 \cdot 10^{13}$
26	Northern Pamir (No 3)	4	-	9	$1.21 \cdot 10^{11}$
27	Western Kun'lun (No 11)	1	-	9	$1.00 \cdot 10^{9}$

The entire territory of Central Asia and Kazakhstan had earlier been divided according to seismotectonic features into 23 seismoactive regions [1], which were subsequently combined into 4 major seismogenic zones (Fig. 1). An analysis of the seismic conditions in Central Asia and Kazakhstan is made henceforth according to these major seismoactive zones, and of more detailed seismicity--according to the smallest regions. The quantitative parameters of the seismicity are calculated according to these zones and regions. The deep earthquakes of Pamir-Hindukush are examined separately and form zone 5.

The distribution of earthquakes by major seismogenic zones is given in Table 1. Information is given here on the amount of total seismic energy released.

It can be seen from tables 1 and 2 that the greatest number of earthquakes were registered in the territory of Pamir-Hindukush (zone 4) and Southern Tian Shan (3), and Northern (1) and Central (2) Tian Shan were less active.

The largest amount of total seismic energy was released in the Pamir-Hindukush zone.

The deep earthquakes, just as in the preceding years, are concentrated in the regions of Hindukush and Southern Pamir. They form somewhat extended local areas, just as the belts that appear as the result of crust earthquakes, in the northeast direction.

The seismicity of individual seismoactive regions, just as of the seismogenic zones, is characterized by the total number of earthquakes that occurred in each region and by the amount of total seismic energy, the data on which is given in Table 2.

In the most seismically active Pamir-Hindukush zone, the main part of the strong earthquakes is concentrated in the spurs of the Kun'lun and the Sarykol'skiy ranges, as well as in the area of concentration of the deep earthquakes--in Hindukush and Pamir.

Two earthquakes with K = 13 were recorded in the southern spurs of the Kunlun range on 11 February (Nos 6, 7) and two with K = 12, on 18 March and 16 November (Nos 19, 61). To the west of this group of earthquakes, between the Kunlun and Sarykol'skiy ranges, four strong earthquakes with K = 12 were recorded (Nos 1, 29, 43, 45) and one earthquake with K = 13, which occurred in the region of the Sarykol'skiy earthquake on 11 August 1974.

There were two earthquakes (Nos 62, 64) with K = 12 in November and December directly in the Sarykol'skiy range. Also worthy of noting is a group of three strong earthquakes with K = 13 (No 10) and 12 (Nos 11, 12) on 25 February in Southern Pamir, which were perceptible and on which macroseismic information is given below.

Strong earthquakes were also recorded in Northern Pamir (No 2), on the southwestern slopes of the Zaalayskiy range (No 52), in the region of the Petr Pervyy range (No 46) and Kokshaal-Tau (No 47) and in Pamir-Hindukush (Nos 27, 34, 49, 56). One of them was recorded on 9 July (No 34) in the village of Chil-Dar, located 40 kilometers from the epicenter, and was felt with an intensity of 5 points (see catalog). Still another earthquake with K = 12 (No 37) occurred on 26 June in Southern Pamir, not far from Kulyab, and caused 5-point tremors in the village of Sary-Chashma 11 kilometers from the epicenter.

Four strong earthquakes immediately in the territory of Southern Tian Shan were recorded in the Southern Tian Shan zone. Two of them--on 26 May, with K = 13 (No 31) and on 10 December, with K = 12 (No 63)--originated on the southern slope of the Kokshaal-Tau range, and the other two--on 2 July, with K = 12 (No 40) and 31 July with K = 13 (No 44)--were confined to the juncture of the Zeravshanskiy and Alayskiy ranges. Another two earthquakes occurred in the foothills of the Alayskiy range: on 11 November, with K = 12 (No 58) and on 12 August with K = 11, information on the manifestation of which is given in the macroseismic section of this article and in the catalog.

There were no earthquakes in Central Tian Shan with K 12. Of the weaker ones, we may note four earthquakes, three of which--on 30 October, 10 December and 27 November--occurred in the northern and eastern foothills of the Alayskiy range, and the fourth--on 5 December--in the Kuraminskiy range. The energy class of these earthquakes did not exceed K = 11.

Characteristics of the Seismicity of the Quantitative Parameters

In order to trace the change in seismicity for the area and in time, the quantitative parameters of the seismic conditions were determined--the slope of the frequency graph (γ) and the average level of seismic activity ($\bar{A}_{10}$) for the individual seismoactive zones and regions, when the statistics were sufficient.

Table 3. Distribution of Earthquakes by Classes K for Seismoactive Regions, Values of and A_{10}

	(1) № района и название	Количество землетрясений разных классов энергии (2)					Пло-(3) щадь S, км^2	γ	σ_γ	$\bar{A}_{10}$
		9	10	11	12	13				
(4)	I. Северный Тянь-Шань	36	12	2	–		287 000	–0,62	±0,03	0,08
(5)	II. Центральный Тянь-Шань	86	23	8	–	–	320 250	–0,49	±0,01	0,08
(6)	III. Южный Тянь-Шань	129	49	16	3	2	255 000	–0,45	±0,02	0,20
(7)	IV. Памиро-Гиндукуш	355	157	57	17	7	350 000	–0,36	±0,01	0,50
		(4) I. Северный Тянь-Шань								
(4)	Северный Тянь-Шань (№ 7)	25	9	2	–	–	104 000	–0,55	±0,03	0,08
		(5) II. Центральный Тянь-Шань								
(5)	Центральный Тянь-Шань (№ 6)	21	3	1	–	–	35 000	–0,66	±0,02	0,09
(8)	Ферганская долина (№ 8)	44	13	7	–	–	26 000	–0,40	±0,09	0,56
		(6) III. Южный Тянь-Шань								
(9)	Таджикская депрессия (№ 4)	24	11	7	–	–	32 500	–0,27	±0,06	0,38
(6)	Южный Тянь-Шань (№ 5)	104	39	9	–	–	227 500	–0,53	±0,03	0,18
		(7) IV. Памиро-Гиндукуш								
(10)	Гиндукуш (№ 1)	67	26	16	–	–	75 000	–0,31	±0,09	0,30

Key:

1. Number of region and name
2. Number of earthquakes of various energy classes
3. Area S, km^2
4. Northern Tian Shan
5. Central Tian Shan
6. Southern Tian Shan
7. Pamir-Hindukush
8. Fergana Valley
9. Tadzhik depression
10. Hindukush

The frequency graphs (Fig. 3) were plotted in consideration of the earthquakes in the range of representative energy classes for individual regions for the larger seismogenic zones and for the entire region of Central Asia and Kazakhstan. The representativeness of each energy class was established on the basis of the pattern of zones of representative energy classes K for Central Asia, plotted on the basis of experimental material in 1970 and the preceding years [2-4].

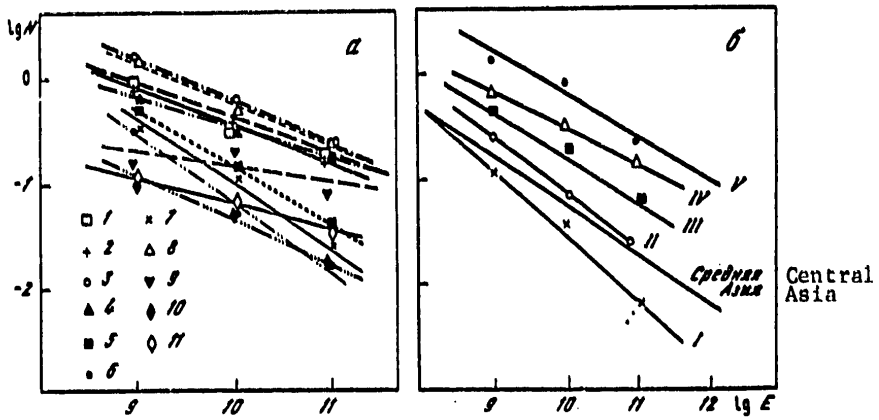

Figure 3. Graphs of Frequency of Earthquakes in Seismoactive Regions (a) and in seismogenic zones (b)

1--Hindukush; 2--Southern Pamir; 3--Northern Pamir; 4--Tadzhik depression; 5--Southern Tian Shan; 6--Central Tian Shan; 7--Northern Tian Shan; 8--Fergana Valley; 9--Western Kunlun; 10--Takla-Makan desert; 11--Karakum

The pitch angle of the frequency graph was found with the aid of the method of least squares, and the root-mean-square error was computed in the same way. Information on the distribution of earthquakes according to energy classes in the zones and regions and on the parameters and A_{10} are given in Table 3. Figure 3 gives the frequency charts plotted individually for the entire Central Asian region, for the major seismogenic zones and for certain seismoactive regions.

Figure 3, a gives the frequency graphs plotted for individual seismic regions. These graphs may be combined into three groups for similar values of γ and $\bar{A}_{10}$.

The first group is made up of regions Nos 1, 2 and 3, included in the Pamir-Hindukush seismic zone, region No 4--in Southern TianShan and region No 8--in Central Tian Shan. The value varies in ranges of values (-0.27)--(-0.43), A_{10} = 0.3-0.63. Included in the second group are the regions of Southern, Central and Northern Tian Shan (Nos 5, 6, 7), in which the values of γ change within a range of (-0.46)-(-0.66), with a very low level of seismic activity $\bar{A}_{10}$ = 0.08-0.18. Regions Nos 11, 22 and 12, for which changes within a range of (-0.22)-(0.39) and $\bar{A}_{10}$ = 0.05-0.15, may be included in the third group.

Combined graphs for all the crustal and subcrustal (zone 5) earthquakes are given in Figure 3, b, and the pattern shows the change in the value of and in the average level of seismic activity from the lower values in Northern Tian Shan to the greater values in the Pamir-Hindukush zone of crustal and subcrustal earthquakes.

On the whole, the seismicity of the territory of Central Asia and Kazakhstan differs from the preceding year in its relative lull.

Macroseismic Description of Earthquakes

Macroseismic information on the occurrence of earthquakes is given in the tables and diagrams of the isoseismal lines only for earthquakes in Central and Southern Tian Shan.

An earthquake, the macroseismic data for which is given in Table 4, occurred in the territory of Central Tian Shan in the spurs of the Kuraminskiy range on 5 December.

These data are contradictory: for K = 11 the area of perceptibility is exceedingly large and the area of maximum tremors does not coincide with the instrumental epicenter. The coordinates according to the macroseismic data are: φ = 41.2°N, λ = 72.0°E; M ~ 4.6, h_I = 20 km, Kh_{IM} = 12 km.

In Southern Tian Shan an earthquake occurred on 31 July, the isoseismal line pattern of which is given in Figure 4; information on the localities in which it was felt and the magnitude are given in Table 5.

Judging from the data in the table, the focal depth with respect to the isoseismal lines is h_I = 20 km, and for the ratio $\frac{I_0}{M}$ and Kh_{IM} = 12 km.

Another strong earthquake with K = 12 occurred on 11 November (No 58) northeast of the preceding group in the foothills of the Alayskiy range. It began with a strong shock, accompanied by an underground rumbling. The greatest intensity of the tremor, equal to 5-6 points, was recorded in the settlement of Leninsk. Here a rumbling like thunder was heard, which was caused by the movement of avalanches or rock falls from the mountains. In many residential buildings and structures the plaster crumbled, and in some buildings fine hairline cracks appeared in the corner junctures of the walls. Cracks from 1 to 2 mm wide and 10-20 cm long were discovered in the plaster of a number of old structures. A beam broke in a stable with an earthen ceiling. Within the epicentral zone the inhabitants felt a strong vertical shock. Hanging objects swayed wildly, ceilings and doors creaked, window panes rattled and furniture shook. Information on the perceptibility of this earthquake is given in Table 6 and Figure 5.

The depth of the focus according to the macroseismic data was h_I = 15 km and h_{IM} = 22 km.

Table 4. Macroseismic Data on the Earthquake on 5 December

No in order	Locality	Δ, km	No, in order	Locality	Δ, km
	5 points				
1	Kok Tash	8	26	Uygur	-
			27	Karavan	65
	4-5 points		28	Chadak	140
			29	Uchkurgan	25
2	Khilya	(12)	30	Chapchama	146
3	Mayli Say	20	31	Aflatun	63
4	Madaniyat	(30)	32	Khakkulabad	34
	4 points			3 points	
5	Zarbdor	57	33	Sumsar	90
6	Ala Buka	82	34	Chust	98
7	Yangikurgan	52	35	Gava	105
8	Chartak	48	36	Uygursay	116
9	Terek Say	110	37	Khodzhibad	60
10	Uychi	45	38	Khamza Khakimzade	110
11	Uspenovka	65	39	Arkit	-
12	Tash Kumyr	25	40	Yaypan	160
13	Butaraka	20	41	Angren	190
14	Dzhangi-Dzhol	52	42	Kokankishlak	33
15	Andizhan	43	43	Bulakbashi	57
16	Leninsk	60	44	Bazarkurgan	39
17	Kochkor-Ata		45	Suzak	62
18	Khayrabad	-	46	Osh	84
19	Sakaldy	34	47	Eski Naukat	105
20	Sufikishlak	52	48	Leninabad	254
21	Kara-Su	75			
22	Yangi-Aryk	-		2 points	
	3-4 points		49	Ak Terek Gava	90
			50	Batken	182
23	Kasansay	73	51	Pokrovka	-
24	Namangan	62			
25	Alikhan	-			

Table 5. Macroseismic Data on Earthquakes on 31 July

No, in order	Locality	Δ, km	No, in order	Locality	Δ, km
	5-6 points			3-4 points	
1	Vorukh	18	13	Dekhauz	40
			14	Garm	90
	5 points				
				3 points	
2	Tangi Vorukh	18			
3	Gumbaz	33	15	Kanibadam	60
4	Kim	50	16	Kayrakkum	98
			17	Proletarsk	100
	4-5 points		18	Shakhimardan	105
			19	Fergana	105
5	Chorku	24	20	Kansay	115
6	Kul'kent	36	21	Ura-Tyube	136
7	Chil'gazy	40	22	Iski-Naukat	165
			23	Andizhan	170
	4 points		24	Tashkent	205
			25	Chimgan	205
8	Isfara	36	26	Brichmulla	205
9	Khanabad	43			
10	Nefteabad	47		2 points	
	3-4 points		27	Dushanbe	215
11	Batken	30			
12	Shurab	32			

Table 6. Macroseismic Information on the Earthquake on 11 November

No, in order	Locality	Δ, km	No, in order	Locality	Δ, km
	5-6 points			4-5 points	
1	Leninskoye	15	4	Sadyrbay	6
			5	Yangi-Aryk	7
	5 points		6	Karatas	12
			7	Otuz-Adyr	12
2	Kara-Taryk	23	8	Kolkhoz imeni Frunze	15
3	Sheraly	23	9	Village of Frunze	15
			10	Lyangar	18

Table 6. (cont'd)

No, in order	Locality	Δ, km	No, in order	Locality	Δ, km
11	Uzgen	23		3 points	
12	Kashgarkishlak	24			
13	Kara-Su	24	51	Kyrgyzchek	23
14	Bekdzhor	25	52	Karasugat	24
15	Kaarman	25	53	Tatar	28
16	Nariman	26	54	Boru	29
17	Osh	27	55	Papan	32
18	Tadlyk	33	56	Aim	40
19	Kara-Dzhigach	37	57	Kara-Kul'dzhi	42
			58	Lay-Tala	43
	4 points		59	Chan-Girtash	43
			60	Kairma	52
20	Savay	21	61	Iski Naukat	54
21	Kampirravat	22	62	Teshiktash	54
22	Sovetabad (Khanabad)	28	63	Bazakurgan	57
23	Dekhkanchek	30	64	Saydakum	57
24	Keshka-Dzhol	30	65	Sayragach	60
25	Yapolak	31	66	Tadzhikkishlak	60
26	Mirzaaki	33	67	Uygur	60
27	Kendzhilga	34	68	Sovkhoz imeni Fedorova	60
28	Chigirchik pass	41	69	Bel'-Oruk	64
29	Gul'bar	42	70	Dzhida	65
30	Gul'cha	43	71	Nayman	65
31	Sary-Bulak	47	72	Pakhta-Abad	65
			73	Sakaldy	65
	3-4 points		74	Andizhan	68
			75	Pravda Kolkhoz	70
32	Bekabal	32	76	Uch-Kuza	70
33	Kyzyl-Mekhnat Kolkhoz	32	77	Kok-Dzhar	73
34	Kurgantepa	32	78	Leninsk	73
35	Kara-Kochkor	37	79	Charvak	74
36	Suzak	38	80	Achi	75
37	Sernoye	38	81	Medrese	79
38	Kok-Bel'	39	82	Karavan	84
39	Dzhalal-Abad	40	83	Kyzyl-Kiya	90
40	Rossiya Kolkhoz	43	84	Kara-Tepa	94
41	Sufikishlak	43	85	Uchkorgon	97
42	Beshi	46	86	Gul'pion	101
43	Khodzhiabad	48	87	Markaz	113
44	Dzhosholu	50			
45	Aravan	51		2-3 points	
46	Bulak Bashi	51	88	Sovetskoye	62
47	Kyzylkurgan	55	89	Lenin-Dzhol	65
48	Usmat	55	90	Naukent	68
49	Tepekurgan	57	91	Kochkor-Ata	72
50	Kulla	63	92	Sufikurgan	72
			93	Izbaskent	81

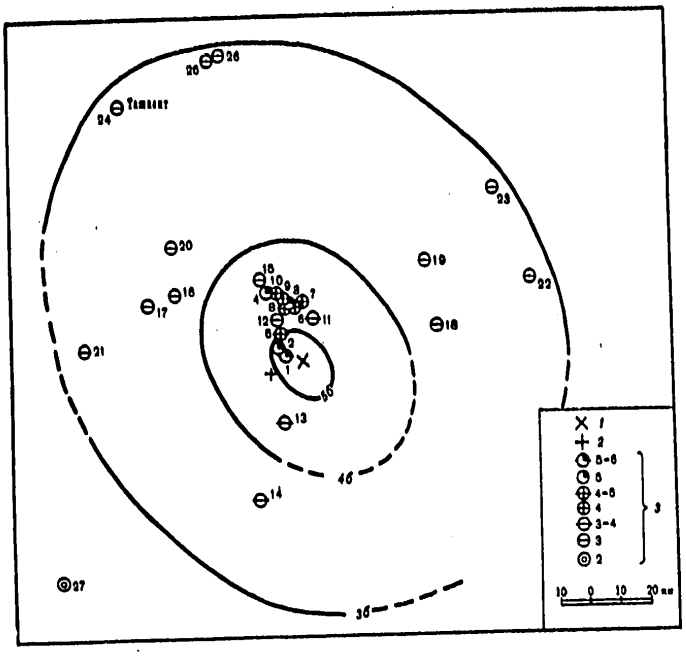

Figure 4. Diagram of Isoseismal Lines of Earthquake on 31 July. Drawn Up by V. K. Iodko and A. F. Krasnov

1--epicenter according to macroseismic data; 2--epicenter according to instrument data; 3--intensity

In the zone of the deep Pamir-Hindukush earthquakes this year data are known concerning two strong earthquakes. The list of localities in which they were felt is given below. The earthquake on 3 March (No 17) was felt at Khorog (125 km): Kokul (136), Kyzylsu (149), Gissar, Parkhar (150), Kulyab (165), Kitab (435)--3-4 points; at the population centers: Dakhan (135), Dzharayly, Kalaypushtak (150), Sovetskoye (189), Nurek (238), Dushanbe (274), Miraki (413), Pedzhikent (420) and Samarkand (470)--3 points; Chubek (140), Leninabad (417), Tashkent (535)--2-3 points. The earthquake on 9 April (No 23) with K = 13, which occurred in the Yazgulemskiy range, was felt at Obigarm (240 km) with an intensity of 3-4 points, Tokhtamysh (200), Kulyab (232), Andizhan (236), Sumokt (310)--3 points; at Khorog (107), Nurek (267), Dushanbe (313), Kurgashtep (315), Tashkent (433) and Samarkand (495)--2-3 points.

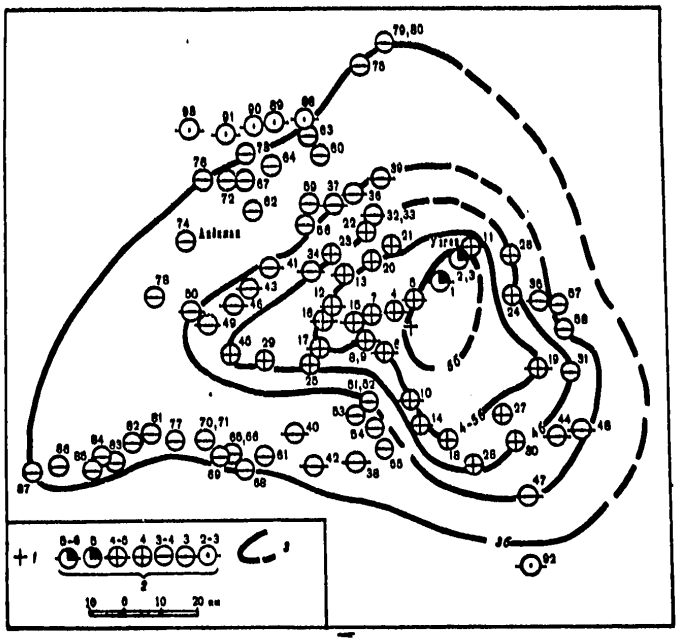

Figure 5. Diagram of Isoseismal Lines of Earthquake on 11 November. Drawn Up by K. D. Dzhanuzakov, A. T. Mamatkulov, V. K. Iodko and A. F. Krasnova

1--epicenter according to instrument data; 2--intensity; 3--isolines of intensity

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EARTHQUAKES IN NORTHERN TIAN-SHAN

A. B. Ospanov

In 1975 in the Northern Tian-Shan zone, 11 seismological stations made observations: Alma-Ata, the Central Seismological Station, Kurmenty, Chilik, Kzyl-Agach, Taldy-Kurgan, Ili, Fabrichnaya, Kurty, Dzhambul and Chimkent.

The seismological station at Kurty was closed in August 1975 because of the transfer to a new location. The Alma-Ata station was transferred to a different building, because of which it did not operate from March to October 1975. At the station, the SK + GK-7 unit was replaced with an SKM-3 + + GB-3 unit with an increase of 10,000 for all the components. The width of the tabular part of the performance curve is worked out in the same manner as on analogous units at other stations, 0.2-1.8 seconds.

In May 1975 the seismological station at Chimkent was newly opened. Instead of a single set, SK + GK-7, SKM-3 + M-31 and SKD + GK-7 sets with an identical increase of 1000 were installed. The width of the tabular part of the performance curve is 0.2-1.8 and 1.2-18 seconds respectively.

Beginning on 1 August 1975 the new seismological station at Taldy-Kurgan' was opened, where three units are in operation: the SKM-3 + GK=7 with an increase of 10,000 for recording local earthquakes, SKD + GK-7 with an increase of 1000 for distant and SMTR, SBM for strong and destructive earthquakes. The instruments were installed at sandy-argillaceous deposits [1].

At the Fabrichnaya station, beginning in July 1975, the increase in all the components was raised to 30,000. At other seismological stations the basic parameters of the operating equipment were not changed.

Regularly involved in the processing were the data from the stations at Talgar, Naryn, Przheval'sk and Kadzhi-Say, which, in the aggregate with the materials from the observations of the above network of regional stations, ensured representative recording of earthquakes of energy class 8 for the entire territory being studied.

The coordinates of the epicenters were determined by using master curves of the isochrones, and for some sections Wadati's and Isikawa's methods were used, making it possible to determine the depth of the focuses at the same time as the coordinates of the epicenter. The accuracy of determination of the depths is different for different epicentral zones: for the central part of the Zailiyskiy Alatau ± 3 km, for the eastern dip of the Zailiyskiy and Kyungey-Ala-too ranges--± 5-6 km.

The energy classification with respect to K was carried out according to Rautian's nomogram [2].

The basic parameters for 140 earthquakes were determined within the zone studied this year. Their energy class distribution is given below:

K	7	8	9	10	11	12	13
N	32	72	24	8	3	-	1

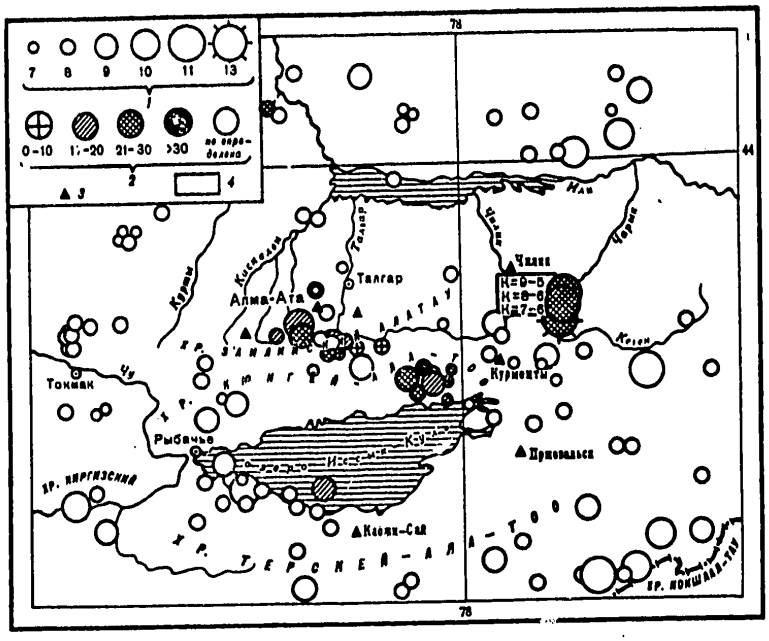

Figure 1. Map of the Epicenters of Northern Tian-Shan Earthquakes in 1975

1--energy class, K; 2--depth of the focuses in km; 3--seismological stations; 4--area on which the indicated number of earthquakes of a certain energy class occurred

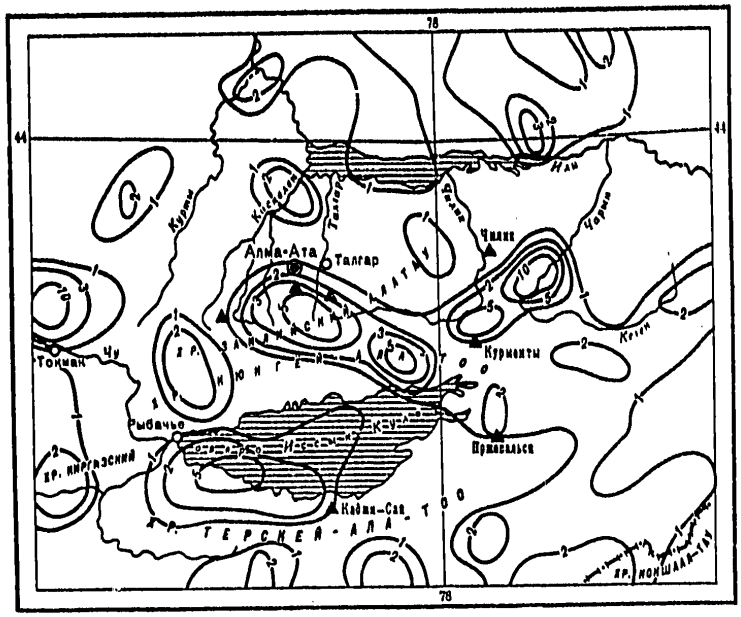

Figure 2. Map of the Density of Earthquake Epicenters During 1973-1975

The total number of earthquakes in 1975 was 54% greater than in 1974, which is related to the increased number of earthquakes registered with K = 7 and 8.

Figure 1 shows the map of the earthquake epicenters where three zones of increased seismic activity may be singled out. The first active zone is the eastern termination of the Zailiyskiy Alatau Range, where an earthquake of the 13th energy class occurred. Its epicenter was confined to the Toraygyr Mountains, because of which we will call this earthquake the Toraygyr earthquake. The epicentral zone of this earthquake coincided with the epicentral zone of the strong, destructive Chilikskiy earthquake in 1889 [3] (I = 9-10 points). In 1971-1974 this zone was not singled out for high seismic activity. For example, in 1973 there was not a single earthquake here with $K \geqslant 7$, in 1974 two earthquakes with K = 7 and 9 occurred, with the latter being almost six months before the Toraygyr Earthquake [4]. During 1975 21 earthquakes were noted here, including the main shock.

The second active zone is the central part of the Zailiyskiy Alatau Range, south of Alma-Ata. In 1968-1972 this section was aseismic. In 1973 there were five earthquakes here. In 1974 11 earthquakes with K = 7-9 had already been recorded in this section. In 1975, 15 earthquakes were recorded, the strongest of which was with K = 10, which occurred on 4 January 1975 and

was felt in Alma-Ata with a magnitude of 3-4 points. The group of epicenters of the 1975 earthquakes is characterized by quite clearly marked tendencies toward concentration of the epicenters along the belt of the northwestern-southeastern strike, intersecting the Zailiyskiy Altau Range. The northern part of the belt extends into the focal zone of the catastrophic 9-point Vernenskiy earthquake of 1887. The epicenters of the earthquakes that occurred in the Kyungey-Ala-too Range "continue" southeast of this belt. Also noted here is clear-cut grouping of epicenters of the local area, located on the northern shore of Lake Issyk-Kul'.

The third active zone is the southwestern shore of Lake Issyk-Kul' (14 epicenters with K = 8-10). Several earthquakes with K - 10-11 were recorded in the Kokshaal-Tau Range. Several earthquakes with K = 9-10 were also noted in the Dzhungarskiy Alatau zone.

Figure 2 shows a map of the density of the epicenters at which the area of greatest concentration of epicenters in the region of the Zailiyskiy and Kyungey-Ala-too ranges, extending across the ranges and to the southwestern shore of the Issyk-Kul' are well singled out.

On the whole, the study of the seismicity of the Northern Tian-Shan area in 1975 makes it possible to indicate a certain revival of its seismic activity.

We will discuss in more detail the Toraygyr earthquake on 12 February 1975. A macroseismic study was made of its aftereffects, as well as a study of the spatial-temporal conformances to principle of its aftershock activity.

A. D. Dosymov, A. B. Ospanov, B. D. Dzhumagaliyev and A. S. Nurmagambetov participated in the macroseismal investigation.

There were no large population points in the vicinity of the epicenter. The winter shelters for shepherds were located closest to it. For example, chimneys fell down at the winter quarters at Tasbazy. A brick chimney made a hole in the roofing slate of one roof and the inhabitants of the winter quarters fled their houses. A sharp jolt with a rumble was noted from the north. In houses made of rubble concrete, cracks going clear through were formed in the walls, and in a frame house--cracks up to 3 mm in the plaster. According to the shepherds' accounts, in the Turaygyr Mountains there were rock falls and in some places slides, which covered the roads to the winter quarters. In the settlements of Bartogay and Saty a strong rumble was heard, with a sharp shock. Everyone felt the earthquake. Small cracks appeared in the plastering in the adobe houses. During the earthquake the floors and doors creaked and rattling of the window panes and dishes was heard. In the settlement of Zhalanash they heard a rumbling. All the inhabitants felt the earthquake. Many log houses creaked and some inhabitants ran out their houses in fright. Swaying of heavy objects and clinking of window panes and dishes were noted everywhere. Cracks in the plaster were also observed.

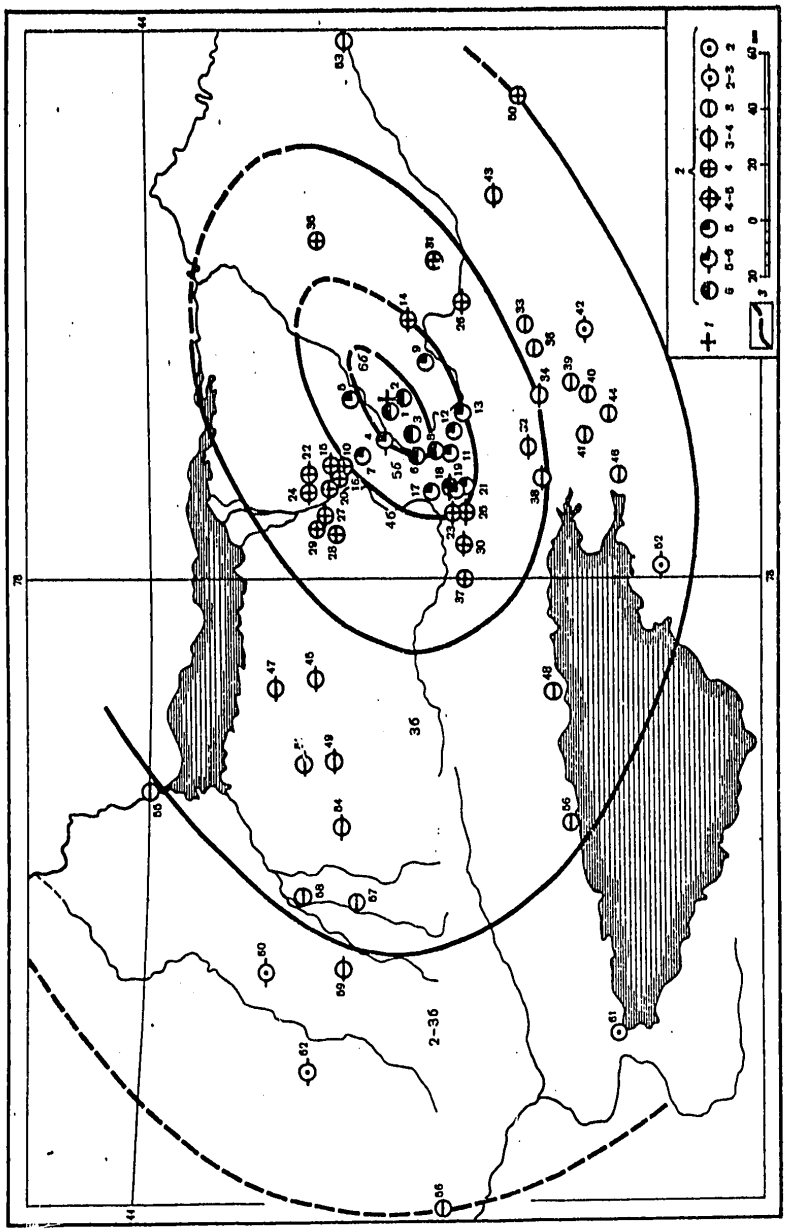

Figure 3. Map of the Isoseismal Lines of the Turaygyr Earthquake on 12 February 1975.
Compiled by A. D. Dosymov and A. B. Ospanov

1--epicenter; 2--intensity; 3--isoseismal lines

The table gives data on the magnitude of the earthquake at the population centers studied.

Macroseismic Data on the Earthquake on 12 February

Locality	Conventional number	Epicentral distance
6 points		
Undesignated winter quarters in north		
Tasbazy	1	5
Tasbazy winter quarters	2	10
Turaygyr winter quarters	3	15
Algabas	6	22
Karasay winter quarters	8	28
5-6 points		
Bartogay	4	18
Saty	18	39
5 points		
Kokpek	5	20
Gidropost	7	28
Uzunbulak	9	28
Karabulak	11	34
Zhalanash	12	34
Togyzbulak	13	35
Zhinishke	17	39
Koby	19	42
Tomarsaz winter quarters	21	44
4-5 points		
Malybay	10	32
Aksay	14	35
Oktyabr'	15	38
Gayrat	16	38
Masak	22	45
Kurmenty	23	46
Chilik	24	50
Kurmenty station	25	50
Kegen'	26	52
Kuram	27	53
Karaturuk	29	59
Kuturga	30	59
Tyup	38	71
4 points		
Vinsovkhoz	20	43
Tausugurskiy	28	56
Tuyuk	31	59
Chundzha	35	65
Uryukty	37	69
Tekes	50	121
3-4 points		
Taldy-Su	32	62
Kensu	34	64
Sarydzhaz	43	84
Turgen'	45	92
Baltabay	47	98
Talgar	49	121
Novoalekseyevka	51	123
Bol'shoy Ketmen'	53	132
Alma-Ata	54	144
Uzun-Agach	59	194
3 points		
Kirgizskiy	33	64
Aul	36	65
Sokolovka	39	74
Novoznesenovka	40	81
Orlinoye	41	81
Sarykamysh	44	89
Przheval'sk	46	96
Anan'yevo	48	108
Kapchagay	55	149
Cholpon-Ata	56	151

Table (cont'd)

3 points		
Kaskelen	57	170
Chemolgan station	58	170
2-3 points		
Dzhergalan	42	83
Pokrovka	52	125
Aksengir	60	196
Targap	62	234
2 points		
Rybach'ye	61	225

A map of the isoseismal lines (Fig. 3) was drawn up from the data in the table. The depth of the focus, estimated from the macroseismic data, is 12 kilometers.

In studying the aftershocks of this earthquake the coordinates were determined by Wadati's and Isikawa's methods. As the result of combining these, as well as other methods, the accuracy of determining the epicenters in some cases reached $\pm$ 2-3. The maximum error was $\pm$5-6 km. A similar error is observed in determining the depth of the focus.

Figure 4, a shows the temporal course of the aftershock activity and the energy of the shocks, and Figure 4, b--the epicenters of the main shock and its aftershocks, as well as their depths. The numbering was performed in accordance with the order of their appearance.

With respect to the temporal course, four groups of shocks can be singled out, classified by varying time intervals--lulls--during which aftershocks with $K \geqslant 7$ were not recorded.

The first group includes shocks that occurred in the first four days after the main shock. The second group may be divided into two subgroups, namely: 10-12 and 13-15. The aftershocks of the third group are separated from each other by considerable time intervals. The fourth group seemingly begins a new yearly cycle.

On the map of the epicenters of the aftershocks, four "spatial" zones of their appearance are singled out. The "spatial" zones correspond to the "temporal" groups of aftershock activity. The exception was constituted by

the earthquakes No 7 and 18, which "jumped out" to the northwest from zones I and III respectively. These two shocks are also characterized by great depths: h = 38 and 30 km. Earthquake No 10 "left" zone II for the south.

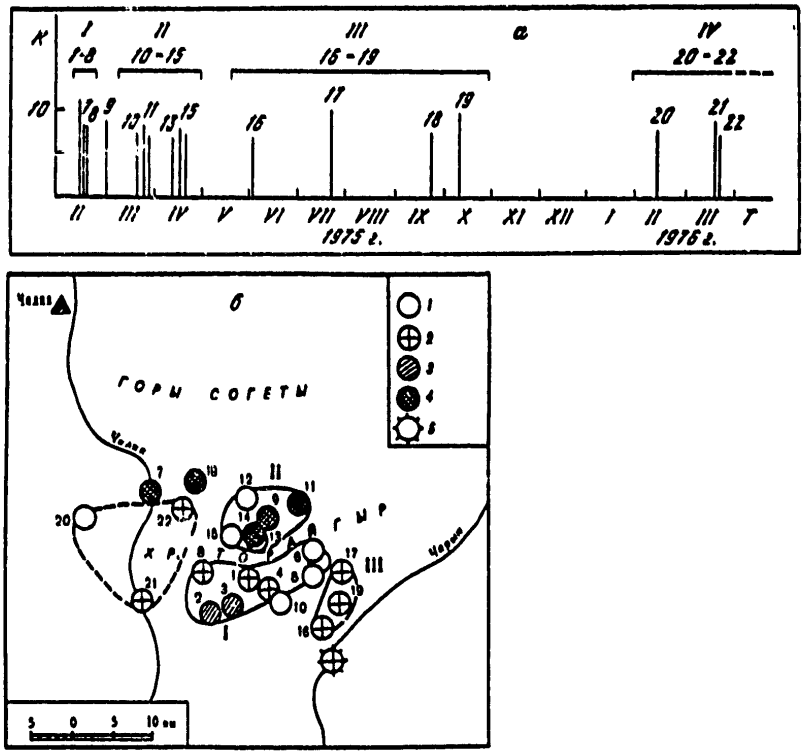

Figure 4. Spatial-Temporal Distribution of Aftershocks of the Turaygyr Earthquake

а--temporal course of aftershock activity; b--map of the epicenters of the Turaygyr earthquake and its aftershocks. Depth of the focal points, h, in km: 1--15-20; 2--21-25; 3--26-30; 4-- > 30; 5--main shock

Each zone may be characterized by the primary depth of the focal points. For example, for zone I it is 21-25 km, for zone II--26 km and over and for zone III--the depth of the focal points is similar to that for the main shock. This zone is spatially located closest of all to its epicenter. The characteristics of zone IV are not well-defined, since the processes in it at the time of writing this work have not yet been completed.

The strongest of the aftershocks were shocks No 17 (K = 11) and No 19 (K = 10). They occurred in the marginal eastern part of the entire zone of aftershocks--in zone III--and were final in the first "year's cycle."

It is interesting to note that the line of migration of the aftershocks always goes counterclockwise. A similar picture was also noted for the aftershocks of the Tashkent earthquake of 1966.

The clear differentiation described of the appearance of the aftershocks in time and their spatial differentiation corresponding to it, the conformances to principle of the migration of the aftershocks and the possibility of a yearly cycle for the time dependence are of definite interest for the study of the processes in the earthquake focus.

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EARTHQUAKES IN ALTAY AND SAYAN

A. G. Filina

Seismic observations were made in 1975 in Altaye-Sayanskaya Oblast with the aid of the same seismological network as in 1974. The processing method also remained the same as before.

The total number of earthquakes is 886 and their distribution with respect to energy classes was as follows:

K	5-7	8	9	10	11	12	13
Number of earthquakes	389	347	102	30	11	3	4

This number includes the aftershocks of the Ureg-Nurskiy earthquake on 15 May 1970 (K = 16) and the earthquake on 29 November 1974 (K = 14).

It can be seen from Figure 1 that this year the principle seismicity zones were retained that were characteristic for the region for a number of years.

The seismic activity of the Ureg-Nurskiy earthquake region is not dying down. A series of aftershocks of this earthquake continues here, the distribution of which with respect to energy classes is given below:

K	6-7	8	9	10	11	12	13
Number of aftershocks	116	64	16	5	2	-	2

The aftershock seismic activity of the region is somewhat higher than last year, and considerably higher than during the seven years before the earthquake (in 1974 A_K = 0.11, in 1975 A_K = 0.14, from 1963 to 1969 A_K is at a level of 0.04 [1]).

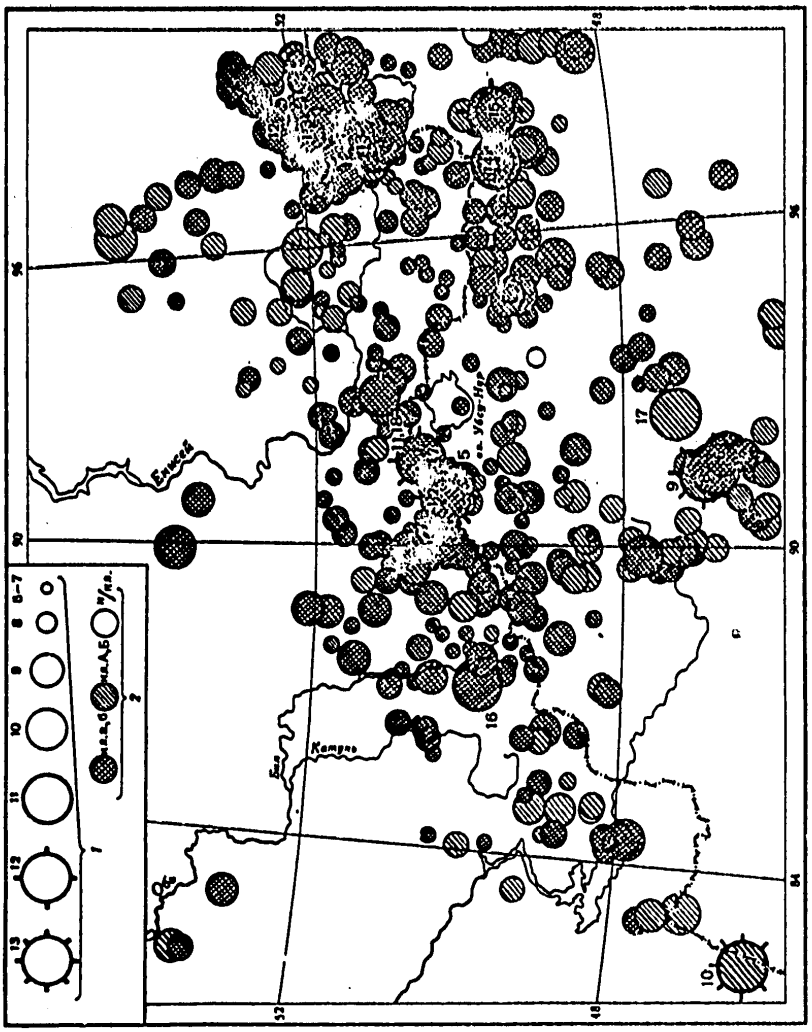

Figure 1. Map of the Epicenters of Earthquakes in the Altay-Sayan Region

1--energy classes; 2--classes of accuracy

Apparently, a substantial contribution to the activity in this region was made by two earthquakes in the 13th energy class; since 1970, an aftershock of the 13th energy class was observed here only in 1974.

The series of aftershocks of the earthquake on 29 November 1974, which occurred in the region of the northeastern boundary of Tuva and Mongolia, continued. We also have so far included in the aftershocks all the earthquakes in 1975 in this region, since so far it does not appear possible to demarcate them more clearly in time, without having observations for the following years.

The aftershocks of the earthquake on 29 November were distributed, with respect to energy classes, as follows:

K	5-7	8	9	10	11
Number of aftershocks	37	36	9	6	2

The region of the Shapshal'skoye earthquakes (30 April 1973, K = 12, and 5 September 1974, K = 12) was active, as formerly. In this case the epicenters within the region examined in 1974 with coordinates φ = 50.5--52.0° N, λ = 88, 5-90.5°E in 1975 are localized in the southeastern part, adjacent to the area of the Ureg-Nurskiy earthquake aftershock area.

Last year we noted activation of the region of the catastrophic Mongolian-Altay earthquake of 1931 (M=8). In 1975 this area of activity expanded. In its southeastern section an earthquake occurred in the 13th energy class, preceded by foreshocks with K = 11 and 12.

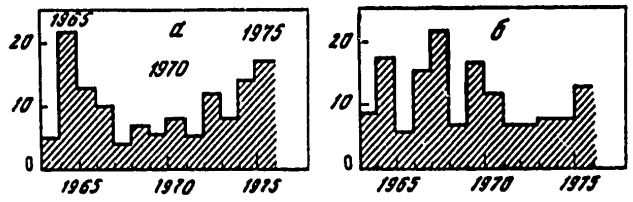

Figure 2. Change in the Average Annual Number of Earthquakes During the Period From 1963-1975

а--in the section bounded by the coordinates: φ = 46.0° N-48.3°N; λ = 88.5°N-91.7°E (region of the catastrophic Mongolian-Altay earthquake of 1931, M = 8); b--in the section bounded by the coordinates: φ = 48.0°N-99.0°E; λ = 95.7°N-99.0°E (region of the catastrophic Tannu-Ol'skiy earthquakes of 1905, M = 8.2).

It can be clearly seen in Figure 2, a that the average annual number of earthquakes in this region, while decreasing after 1964, again begins to increase starting with 1972, and in 1974-1975 remains at a high level. The mechanisms of the focal points were determined for the earthquake on 31 March (K = 13) and its strongest foreshock on 28 March (K = 12). The parameters of the mechanisms were presented in the catalog of additional parameters.

As can be seen, in both cases the directions of the strikes of all three axes of the main stresses remained unchanged: the compression has a northwest course, the interstitial stress--south-southwest and the tension--close to latitudinal. It should be noted that the course of the axes of the compressing stresses at the focal points of the earthquakes under discussion is directed, not to cross the course, but parallel to the structures of the Mongolian-Altay mountain system.

In the interval of time (three days) between the foreshocks and the main shock, the axes of the main stresses, while retaining the directions of the strikes, change the slope toward the horizon. The greatest change was undergone by the axis of compression. It became close to horizontal, from close to vertical. The axis of the interstitial stresses, both with respect to the strike and to the slope, remained virtually unchanged.

The earthquakes under discussion occurred near the angle of intersection of the Turengol'skiy (northwest strike), Bulganskiy (close to latitudinal) and Barunkhurayskiy (northeast strike) deep faults, which experienced recent movements and were accompanied by seismic dislocations [2]. All three faults have their own analogs on the nodal planes, and it is impossible to establish a connection between the shifts in the focal points and the movements with respect to any of them without additional data. Attention should, however, be turned to the fact that the nodal plane I retains its direction during both shocks. In addition, in a case when the data on the nodal plane as the fault plane is selected, the movement in the focal points of both earthquakes will retain a primarily vertical component, and in both cases the northwest limb will drop in relation to the southeastern limb, and the shift component will retain a left-side shift nature.

This year two earthquakes of the 12th energy class occurred in the region of the catastrophic Tannu-Ol'skiy earthquakes of 1905. Figure 2, b it can be clearly seen that the peaks of seismicity here were in 1964, 1966, 1967 and 1969, and then after a period of relative lull in 1974 and 1975 a certain upsurge in activity is observed.

It is interesting to note that weak activity is constantly observed in the region of the earthquakes in Kamne-na-Obi (1964-1965). In this respect 1975 is no exception: there were earthquakes with K = 8 and 9 in this region.

A strong earthquake (K = 13) was registered this year in Dzhungarskiy Alatau. The seismic activity in the area of Lake Zaysan remained essentially unchanged.

On the whole, participation in the seismic process of all the areas active in the former years is characteristic for the Altay-Sayan region.

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EARTHQUAKES IN THE BAYKAL REGION

S. I. Golenetskiy

The source of the actual material for the study of the seismicity of the Baykal region consisted of observations of 18 seismological stations of the Institute of the Earth's Crust of the Siberian Department of the USSR Academy of Sciences. The changes in the network of stations amounted only to transferring the instruments from the settlement of Uakit to the settlement of Tsipikan, located approximately 60 kilometers south-southwest of it. Therefore, since April 1975, instead of the Uakit station, the Tsipikan station, with essentially the same frequency responses has begun operation. The method of processing the seismic observations and analyzing the data obtained remained as before [1-5]. The results of the processing agreed with the seismic observations in the neighboring Yakutsk and Altay-Sayan zones. The total number of earthquakes recorded for which the epicenters were determined was 2,609 in 1975. Their distribution with respect to energy classes and regions is given in Table 1. The accompanying catalog of earthquakes with $K \geqslant 9$ contains information on 322 epicenters. The parameters of earthquakes with $K \geqslant 12$ are given in Table 2. On the whole, the distribution of earthquakes by energy classes resembles the distribution in the preceding years. At the same time, the results of the calculations of the frequency charts for the Baykal rift area from this data prove to be somewhat unusual. The modulus of the slope of the frequency chart γ is increased, and its value for the southwestern part of the rift is higher than for the northeastern part.

Earlier, in the southwestern part of the rift, as a rule (with the exception of 1974) a lowered value of this parameter was noted, true, with a low accuracy of its determination. One may therefore draw the conclusion that there is a possibility of considerable temporal deviations of γ from the average.

The distinguishing characteristic of the epicentral field of 1975 is the greater dispersion of epicenters of feeble earthquakes throughout the areas where they were not observed earlier. In particular, mention should be made of the appearance of feeble earthquakes in the region, usually quite passive from the seismic standpoint, directly adjacent to the

southwest tip of Lake Baykal (figs. 1, 2, see insert). As follows from the map of the seismic activity (Fig. 3, see insert), charted according to the same method as in the Baykal region seismicity surveys in preceding years, the level of activity here reached a value of ~ 0.2. The chart of the spatial-temporal distribution of the earthquakes in the projection for the conventional axis of the rift system [1, 3] is shown in Figure 4. The following characteristics of the Baykal zone seismicity in 1975 may be noted.

Table 1. Distribution of Earthquakes in the Baykal Region According to Energy K

K	(1) Число землетрясений			
	(2) Вся зона	(3) Рифт	Северо-восточная часть рифта I (4)	Юго-западная часть рифта II (5)
13	3	1	1	–
12	6	3	1	2
11	18	10	9	1
10	78	45	34	11
9	219	152	114	38
8	840	556	386	170
7	1204	969	771	198
6	226	213	160	53
5	12	10	6	4
4	3	3	3	–
Общее число землетрясений (6)	2609	1962	1485	477
γ	$-0,50 \pm 0,02$	$-0,57 \pm 0,01$	$-0,54 \pm 0,01$	$-0,59 \pm 0,03$
Интервал классов энергии K (7)	8–13	8–12	8–11	8–10

Key.

1. Number of earthquakes
2. Entire zone
3. Rift
4. Northeastern part of rift I
5. Southwestern part of rift II
6. Total number of earthquakes
7. Range of K energy classes

In two regions--the Udokanskiy in the northeast of the zone and the northern part of the meridional boundary belt between eastern Tuva and Mongolia at the far southwest--the activation of the seismic process begun in 1974 was observed.

In 1974, at the northeastern side of the rift system within the limits of the Dovachanskiy block, an earthquake, the strongest during the whole time of instrumental seismological registration, of the 14th energy class,

occurred, accompanied by a series of aftershocks. In 1975 (on 6 February), a class 13 shock was noted here. Its epicenter is located somewhat to the east of the epicenter of 21 June 1974, where the seismicity in the last few years had been reduced as compared with the adjacent regions to the west and east. After this earthquake, only a small number of repeated shocks were recorded, and from March to April the number of earthquakes in this region diminished noticeably. The region is characterized by a seismic activity of A/c = 10-0.5.

Table 2. List of Earthquakes With K $\geqslant$ 12

(1) № п/п	(2) Дата	Время возникновения землетрясений, (3) ч м с	(4) Координаты эпицентра		K
			φ°N	λ°E	
1	6.II	21 26 38,7	56,41	117,89	13
2	21.VIII	18 42 35,0	49,63	97,38	12
3	12.IX	22 02 14,9	49,07	103,41	12
4	24.IX	17 40 14,4	53,85	109,13	12
5	25.IX	14 29 29,0	49,57	98,35	12
6	4.X	16 39 58,0	53,84	109,12	12
7	27.X	16 18 40,5	47,83	102,90	13
8	9.XI	17 33 43,1	55,34	111,17	12
9	9.XI	17 44 42,7	47,72	103,00	13

Key:

1. Number, in order
2. Date
3. Time when earthquake occurred, hours, minutes, seconds
4. Coordinates of the epicenter

In the northern part of the seismically active belt on the border between eastern Tuva and Mongolia, there was a dying down of the bursts of seismic activity after the class 14 earthquake in November 1974 observed in the first half of 1975. No earlier shocks with such energy had been recorded in this locality. In the region bounded by the coordinates 51.7-51.9°N, 98.3-98.7°E, a total of 65 earthquakes with K = 90 and 2 shocks with K = 11 was recorded. The seismic activity reaches a value of 2.0 here.

In the region adjacent to the southern part of this zone, in August and September two earthquakes with K = 12 were recorded, and the value of the activity was A/c = 0.2-0.5.

The large cluster of earthquakes in the Barguzinskiy Range occupies a particular place in the seismicity manifestations.

As far as is known, the local epicentral area of the cluster is not singled out among the surrounding territory by any substantial structural features, but it is part of the seismoactive belt marked out earlier that intersects obliquely the northern part of the Bagruzinskiy Range from Lake Baykal in the direction of the Verkhna-Angarskaya basin [6]. Recorded in the cluster

were up to 300 shocks, the epicenters of which were located in a small area bounded by the coordinates 55.0-55.2°N and 110.0-110.4°E. Four earthquakes with K = 11, 12 with K = 10 and 43 with K = 9 were noted among them.

The development of the cluster began in January. In April a drop-off followed the first burst of activity and then, beginning in May, came the onset of the greatest activation, which reached its maximum in the days from 20-30 June, when all the earthquakes of the 11th energy class and half of the total number of shocks of the 10th class occurred. In July, August and September the activity proceeded to die down, and in October not a single earthquake was recorded in the epicentral area of the cluster. Subsequently, only in the last five days of December, several shocks with K = 7.8 were noted here. The chart for the distribution of the shocks in the cluster in time and with respect to energy is shown in Figure 5. The value of the seismic activity in the epicentral area of the cluster is A_{11} = 10.

We will note that the epicentral area of the earlier described [7] major cluster of earthquakes from the end of 1966 to the beginning of 1967 gravitates toward the seismoactive belt mentioned with a northeastern orientation--farther toward the northeast. With respect to the number of shocks recorded, we compare this cluster with the cluster studied in 1975. The epicentral region of the cluster was quiescent beginning with July 1973 after a cluster of 27 weak earthquakes had occurred here (7-18 July 1973) with 3 maximum shocks of the 9th energy class. The adjacent part of the belt directly to the northeast of the epicentral area of the 1975 cluster was activated in 1969 and 1971 [8, 5]. Therefore, the cluster of 1975 earthquakes was located in the zone where clusters constitute a quite common phenomenon and where, in contrast to some other parts of the Baykal region, there are apparently favorable conditions for their formation.

The epicenters of the earthquakes were also concentrated in the northeast part of the Barguzinskiy Range, adjacent to the region where the Barguzin River in its upper reaches sharply changes the direction of its course from the northwest to the southwest. The periods of intensification and weakening of the seismic activity alternated here throughout a year (increase in activity in January-February-March, weakening in April-May, new increase in June, weakening in July-August, slight increase in September, quiescent period in October, new activation in November when the strongest earthquake with K = 12 occurred in this local region, and a reduction in activity in December). The seismic activity reached a value of 2.0.

In the area of the mountainous ridge between the Upper Angarsk and Muysk basins, the region of the Muyakanskiy range and particularly the region of the ridge between the Muyakanskiy and Upper-Muyakanskiy basins was distinguished by the greatest activity (concentration of epicenters of weak earthquakes). The seismic activity of the region was characterized by values of A_{1c} up to 2.0 and slightly higher.

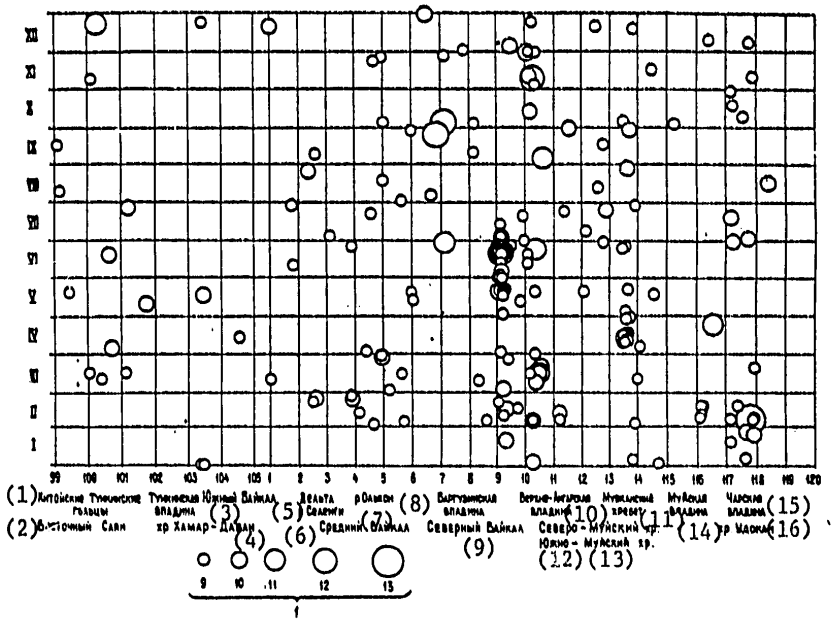

Figure 4. Distribution of Earthquakes With K ≥ 9 in Time in Projection Along Conditional Axis of Baykal Rift System. Method of Plotting Chart Is Described in [1, 3].

I--energy class K

Key:

1. Chinese Tunkinskiy bald peaks
2. Eastern Sayan
3. Tunkinskiy Southern Baykal basin
4. Khamar-Daban range
5. Selengi River delta
6. Central Baykal
7. Ol'khon River
8. Barguzinskiy basin
9. Northern Baykal
10. Upper Angarskiy basin
11. Muyakanskiy range
12. Northern Muyskiy range
13. Southern Muyskiy range
14. Muyskiy basin
15. Charskiy basin
16. Chdokan range

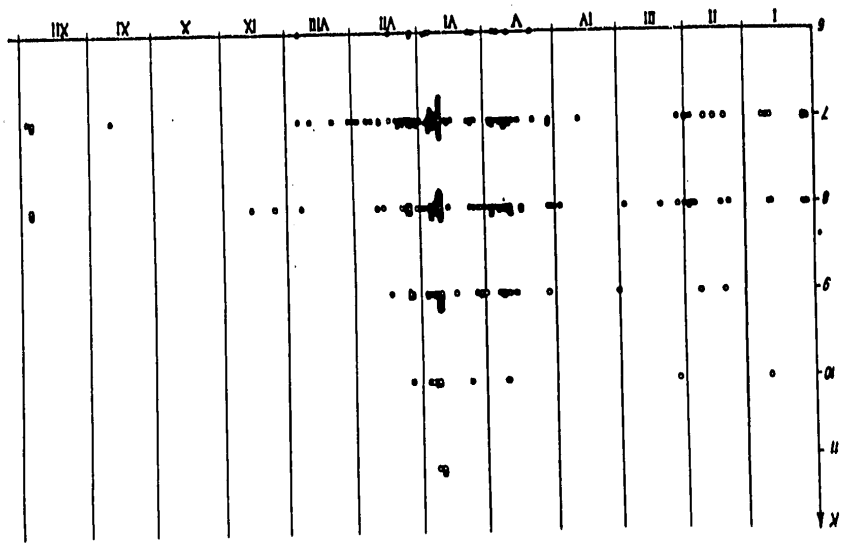

Figure 5. Distribution of Shocks in Barguzinskiy Cluster of Earthquakes in Time According to Energy Classes

Table 3. Earthquakes in Regions of Constantly Increased Seismicity

(1) № п/п	(2) Район	Число землетрясений (3)	K_{max}	A_{10}
1	55,9–56,3°N 116,1–117,1°E	98 78*	11	До 0,5
2	56,3–56,7°N 120,5–121,5°E	28 16**	10	0,5
3	47,9–48,7°N 102,5–103,5°E	43 33**	11	0,5–1,0

(4) * Число толчков с $K \geqslant 7$. ** То же, с $K \geqslant 8$. (5)

Key:

1. Number, in order
2. Region
3. Number of earthquakes
4. Number of shocks with $K \geqslant 7$.
5. Same, with $K \geqslant 8$

Some revival of activity in the central Baykal region was observed in February. Southeast and east of Ol'khon Island it even continued in March-April. The activity here did not usually exceed 0.5.

As compared with 1974, in the region of the Tunkinskiy basins and the northern part of Lake Kosogol the activity in the area to the west of the settlement of Mondy increased (more than up to 0.2) and decreased in the region to the east (up to 0.1 with A_{10}= 0.5 in 1974).

The grouping of weak earthquakes (about 15 shocks up to the 10th energy class, $A_{10} \sim$ 0.5-1.0) was unusual in August in the region of the eastern part of the Amazarskiy range near the eastern border of the zone. The largest number of these shocks was recorded on 18 August. Usually a few earthquakes occur here, but it is known that there was a class 12 shock somewhat to the east in 1968. In 1970 several weak earthquakes were recorded in the nearby region.

Table 3 gives the data on the earthquakes in regions with constantly increased seismicity, where strong earthquakes occurred in a nearby fault.

In the first region the number of shocks in 1975, as compared with the preceding years, was essentially unchanged, and in the second--considerably decreased, and in the third was negligibly reduced. It should be taken into consideration, however, that near the southern boundary of the zone, yet beyond the boundary of the region, in October-November two earthquakes with K = 13 occurred (entered in the nature of an exception in the catalog of earthquakes and in Table 2).

Despite the substantial dying down of the burst of seismic activity in the region of the northeast of the Tsipikanskiy basin noted in the seismicity survey in 1974, the number of weak earthquakes here in 1975 still remained increased. In the area bounded by the coordinates 54.7-55.1°N and 112.5-113.1°E, 45 earthquakes were recorded with $K \geqslant 7$, with the strongest shock in the 10th energy class. The seismic activity reached magnitudes of 0.2.

Two shocks in the 12th class (on 24 September and 4 October) in the region of Chivyrkuyskiy Bay in Baykal between the northeastern tip of Svyatoy Nos peninsula and the eastern shore of the lake are of considerable interest. Two similar shocks occurred in the same place in 1974, as well (22 August and 10 October) and one shock, also class 12, only slightly to the northeast--in 1969 (on 14 September).

The distinguishing feature of this local epicentral region lay in the fact that these quite strong shocks were accompanied by only a small number of weaker earthquakes or none at all. The epicentral region was located in the zone of quite a large fault that passed in a northeast direction from the Svyatoy Nos peninsula (and bordering the peninsula from the southeast) through Chivyrkuyskiy Bay into the bottom of the Barguzinskiy range [9].

The rectilinear contour of the shoreline in Chivyrkuyskiy Bay is caused by this fault, since the territory located to the northwest drops beneath the waters of Baykal.

The results of determining the mechanism of the focal points of the earthquakes in Chivyrkuyskiy Bay are contained in the catalog of additional parameters. As can be seen, the mechanisms of the focal points of these earthquakes, which have epicenters that are very close, proved to be different. It must, however, be borne in mind that as the result of the insufficient clarity of the initial data, this conclusion still cannot be regarded as completely unquestionable.

The mechanism of the focus of the earthquake on 24 September is very close to the mechanism of the above-mentioned shock on 14 September 1969 [3]. When either of the two possible planes permitted by the solution is taken as the plane of the fault (one of them falls to the northwest, the other--to the southeast), the movement in both cases should be of the fault type (upper limb dropped down).

The solution for the shock on 4 October, along with the fault, is characterized (also with a selection of any plane) by a substantial component of shift movement. It is possible that the mechanisms of the focal points of this same local region during the above-noted earthquakes of 1974 were of a similar type.

It should be noted that when determining the mechanism of the focal points described in both this survey and in the surveys of the seismicity of the Baykal region in preceding years, the graphic plottings were made in the projection of the upper hemispheres. Therefore, the orientation of the axes of stresses is indicated everywhere in the surveys according to the points where the axes intersect with the upper hemisphere. Adopted for the planes for A_z are their strike azimuths (not the azimuths of the direction of the dip), α , e --the angles with the horizon.

A special feature of the seismicity of the Baykal zone in 1975 lay in the absence of sufficiently strong earthquakes accompanied by a macroseismic effect. Individual macroseismic manifestations of weak earthquakes noted are given in the regional catalog of the Baykal region. One may note the existence of information on the perceptibility in some cases for earthquakes of only the 10th energy class. The most complete information on the earthquake on 17 May was gathered by the key seismological station at Zakamensk by N. I. Shemetovyy. This earthquake--according to the determination of the network of seismological stations of the Baykal region of the 10th energy class--was felt with an intensity of up to 4 points in Zakamensk and was located south-southeast of it less than 10 kilometers away from the settlement of Kholtoson. In settlements only 5 kilometers (and farther) away from Zakamensk to the northeast and northwest, however, it was not felt, i.e., the area of perceptible tremors was small.

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EARTHQUAKES IN YAKUTIYA AND THE NORTHEASTERN USSR

B. M. Koz'min, T. A. Andreyev

In 1975, instrument observations of the local earthquakes were made at 13 regional seismological stations, 7 of which are located on the territory of Yakutiya and 6--in Magadanskaya Oblast. The parameters of the recording instruments of the stations are given in Table 1.

The location of the epicenters of the earthquakes was determined by cross bearings for the transit time of the forward-traveling transverse waves, the velocity of which for Yakutiya was taken as 3.6 km/sec, and for the territory of Magadanskaya Oblast--3.5 km/sec. If there were shocks with an energy at the focus of 10^{12} J or higher, cross bearings of the leading and forward traveling seismic waves were used. The moment of origin of the earthquake was calculated according to the former methodology [1].

When data for the south of Yakutiya was processed, seismogram materials from observation points at Chara, Sredniy Kalar, Tupik (Institute of the Earth's Crust of the Siberian Department of the USSR Academy of Sciences) and the bulletin of the Kirovskiy seismological station (Sakhalin Complex Scientific Research Institute of the Far Eastern Scientific Center of the USSR Academy of Sciences) were drawn into use. The epicenters of the earthquakes in the northern and northeastern parts of the territory were found from the recordings of the Yakutiya network of seismological stations, as well as seismograms and bulletins of the stations in Magadanskaya Oblast affiliated with the SVKNII [Scientific Research Institute of the Vertical Seismograph designed by Kirnos] of the Far Eastern Science Center of the USSR Academy of Sciences and the bulletin of the seismological station at Tiksi (Institute of Physics of the Earth of the USSR Academy of Sciences).

The coordinates of the epicenters were determined with greatest certainty in the south of the region, on the sections bordering the Baykal region. Similar classes of accuracy were established for individual shocks, the accuracy of which corresponded to classes *а* and *б* in the south of Magadanskaya Oblast. In most of the cases, however, the coordinates of the epicenters of the earthquake were included in classes *А* and *Б* with respect to accuracy [2].

Table 1. Parameters of the Instruments of Seismological Stations in Yakutiya and the Northeast

(1) Станция	Тип аппаратуры (2)	Z		E-W		N-S	
		V_m	T_m	V_m	T_m	V_m	T_m
(3) Якутия							
Багатай (4)	СКМ-3	32 900	0,2-1,1	36 200	0,2-1,1	37 100	0,2-1,1
Усть-Нера (5)	СКМ-3	28 100	0,2-1,1	30 800	0,2-1,1	31 900	0,2-1,1
Усть-Нюкжа (6)	СКМ-3	38 100	0,3-1,2	46 700	0,3-0,9	38 500	0,3-0,9
Хандыга (7)	СКМ-3	25 600	0,2-1,0	29 100	0,2-1,0	22 700	0,2-1,0
Чагда (8)	СКМ-3	41 600	0,4-1,2	50 200	0,4-1,2	45 400	0,4-1,2
Чульман (9)	СКМ-3	36 700	0,3-0,9	45 400	0,3-0,9	46 200	0,3-0,9
Якутск (10)	СК	760	0,4-10	1 840	0,4-11	1 940	0,4-11
	СКМ-3	50 600	0,3-1,1	37 900	0,7-1,4	29 100	0,7-1,4
(11) Северо-Восток							
Магадан (12)	СК	200	1-10	760	1-10	720	1-10
Магадан-I (13)	СКМ-3	19 500	0,9-1,2	18 900	0,9-1,2	23 000	0,9-1,2
Омсукчан (14)	СКМ-3	12 500	0,8-1,2	20 000	0,2-0,6	20 000	0,2-0,6
Сеймчан (15)	СКМ-3	48 000	0,2-0,8	47 500	0,2-0,8	48 000	0,2-0,8
Сусуман (16)	СКМ-3	18 000	0,6-1,0	15 500	0,6-1,0	18 000	0,6-1,0
Усть-Омчуг (17)	СКМ-3	20 000	0,1-0,6	20 000	0,2-0,6	20 000	0,2-0,6

Key:

1. Station
2. Type of instrument
3. Yakutiya
4. Bagatay
5. Ust'-Nera
6. Ust'-Nyuzhka
7. Khandyga
8. Chagda
9. Chul'man
10. Yakutsk
11. Northeast
12. Magadan
13. Magadan-I
14. Omsukchan
15. Seymchan
16. Susuman
17. Ust'-Omchug

The depth of the hypocenters was calculated from the equation of the hyperbolic travel time curve from the observations of the stations that were no farther than 50 kilometers away from the epicenter. The energy class K was estimated according to Rautian's nomogram. There was no change in the representative nature of the earthquakes from 1974.

Data on a total of 306 shocks are given in the catalog of earthquakes.

Table 2 shows the distribution of the number of earthquakes according to energy for various areas of the region and calculates the total seismic energy released in each of these areas. The distribution of earthquakes with respect to area is shown on the map of the epicenters (see diagram, insert).

Table 2. Distribution of Earthquakes in Yakutiya and Northeast By Energy Classes and Regions

(1) № района	(2) Название района	(3) Энергетический класс					(4) Итого по районам	$\Sigma E \cdot 10^{12}$ Дж
		8	9	10	11	12		
1(5)	Олекминский	32	7	3	–	–	42	0,04
2(6)	Становой хребет	40	7	2	–	–	49	0,03
3(7)	Алданское нагорье	24	4	3	–	–	31	0,036
4(8)	Учурский	10	3	1	–	–	14	0,01
5(9)	хр. Джугджур и побережье Охотского моря	41	18	6	2	1	68	1,28
6(10)	хр. Сетте-Дабан	3	1	–	–	–	4	0,001
7(11)	Верхоянский хребет	7	11	1	1	2	22	2,12
8(12)	Яно-Оймяконское нагорье	5	3	–	–	–	8	0,004
9(13)	хр. Черского	38	16	2	1	–	57	0,14
10(14)	Яно-Индигиро-Колымская низменность	2	3	–	–	–	5	0,003
11(15)	Море Лаптевых	–	1	4	–	1	6	1,04
Всего по зоне (16)		202	74	22	4	4	306	4,8

Key:

1. Number of region
2. Name of region
3. Energy class
4. Total by regions
5. Olekminskiy
6. Stanovoy Range
7. Aldanskoye upland
8. Churskiy
9. Dzhugdzhur Range, Okhotsk Sea coastal area
10. Sette-Daban range
11. Verkhoyanskiy range
12. Yano-Oymyakonskoye upland
13. Cherskiy range
14. Yano-Indigiro-Kolymskaya lowland
15. Laptevykh Sea
16. Total by zone

As can be seen, the northern areas of the region were most seismically active in this year. The Verkhoyanskiy range should be considered the most active of them. The amount of energy released here is $2.12 \cdot 10^{12}$ J, which is 44 percent of the entire year's total seismic energy for the whole region. A significant seismic occurrence in this region was the earthquake on 12 August at 1500 hours Greenwich Time, the epicenter of which coincides with the Chekanovskiy ridge, adjacent on the northwest to the Verkhoyanskiy range and gravitating toward the Leno-Anabarskiy marginal seam of the Siberian platform [3].

An underground shock was felt at the population centers of Chekurovka and Kyusyur. In Chekurovka the earthquake was registered with an intensity of 5 points: floors and ceilings creaked, window panes rattled, hanging objects swayed and in some houses objects fell off tables and shelves, and a dull rumbling was heard. Tremors up to 3 points were registered at Kyusyur: the earthquake was felt by people who were not moving around, and dishes rattled slightly. Small rock falls and slides were noted 75 kilometers from the epicenter in the upper reaches of the Eyekit River (left tributary of the Lena River). The possible intensity of the seismic shock at the epicenter is 6 points.

Increased seismicity was noted in the estuary sections of the Lena and Yana rivers, as well as in the upper reaches of the tributaries of the Yana River, originating from the eastern spurs of the central part of the Verkhoyanskiy range. The energy range of the earthquakes recorded here is 10^8-10^{12} J.

There was slightly weaker seismic activity in the water area of the Laptevykh Sea, where on 19 November a strong earthquake was recorded near Bol'shoy Lyakhovskiy Island. According to the information of the chief of the hydrometeorological station of the Tiksinskoye Administration of Hydrometeorological Services, on Kotel'nyy Island at the moment of the shock a strong rumbling was heard, hanging objects swayed and glass rattled. The clear moment of arrival of the wave originating during the seaquake was recorded on the tape of the depth gage.

The seismic activity in the region of the Dzhugdzhur range and the coastal area of the Okhotsk Sea appeared quite differently. The sum of the energy released here is $1.28 \cdot 10^{12}$ J, or 27 percent of the entire yearly seismic energy of the zone. Most active are the upper reaches of the Kolyma and Severnoye Priokhot'ye rivers, where in December two earthquakes with energy at the focus of 10^{11} J were recorded.

Just as in 1974, the Cherskiy range system was seismically active, where chains of earthquake epicenters with K = 8-11 extend along the subparallel faults of the northwest strike. The Darpirskiy and In'yali-Debinskiy faults are the most seismogenic [4]. In 1975, in the area of the 9-point Artyk earthquake of 1971, aftershocks continued to be recorded. The energy at the focus of one of them (16 March 1975, at 0800 hours Greenwich Time) was 10^{11} J.

The southern areas of the zone are less active. Only 3 percent of the total amount of seismic energy was released here. No earthquakes higher than K = 10 were registered in the south. The sections in the central course of the Olekma River in the area of the 9-point shock of 1967, in Zapadniy Stanovik, the Aldan upland (right bank of the Timpton River) and in the Uchur River basin were the most revived.

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EARTHQUAKES IN THE AMUR REGION AND PRIMOR'YE [COASTAL REGION]

L. S. Oskorbin

Instrumental observations of earthquakes in the Amur region, including the territory of Amurskaya Oblast and the regions of Khabarovskiy Kray adjacent to it, were made in 1975 at field type seismological stations at Kirovskiy, Bomnak, Yasnyy (opened at the end of January 1975), Nikolayevsk-na-Amure and Ust'-Nyukzha (Yakutsk branch of the Siberian Department of the USSR Academy of Sciences). When the stronger earthquakes were processed, data from the Chul'man station (Yakutsk branch of the Siberian Department of the USSR Academy of Sciences) and of other remote stations in Siberia and the Far East were included. The parameters of the seismic instruments at the stations listed are given in [1], and the seismological station at the settlement of Yasnyy is equipped with similar seismographs with the same parameters as the stations at Kirovskiy and Bomnak.

The existing network of regional seismological stations, taking into account the stations at Tupik of the Institute of the Earth's Crust of the Siberian Department of the USSR Academy of Sciences and at Chul'man, ensures the recording on the Amur region territory without omissions of earthquakes with $K = 7$ for Zeyskiy Rayon and with $K = 8$-9 for the rest of Amurskaya Oblast, excluding its southern regions. Earthquakes with $K > 10$ are representative for other areas of the Amur region.

The coordinates of the epicenters were determined for all the earthquakes registered by several stations, and as much as possible for weaker underground shocks recorded by only one station. In the first case, standard methods of cross bearings according to t_0 and isochrones or mean lines were used: in this case the time at the focus was computed from the difference in S-P for the stations closest to the epicenter. The position of the epicenter, according to the data of one station, was located according to the azimuth for the epicenter and according to the epicentral interval computed on the basis of the travel time curve S-P. In view of the lack of a special travel time curve for the Amur region, we used the Jeffreys-Bullen travel time curve, and to process the earthquakes recorded by one or two stations, it was used for a focal depth of $h = 10$ kilometers. The accuracy of the coordinates of the centers was accomplished according to

the Atlas classification of USSR earthquakes [2]. For epicenters determined from the data of only one station, it was considered that their mean error was equal to approximately 20-25 kilometers at a distance of up to 150 kilometers, and 30-60 kilometers--at a distance of up to 300 kilometers. The accuracy of most of the epicenters is included in class A or B, which reflects the unfavorable conditions of their determination: the small number of seismic stations and their unidirectional position in relation to the epicenters, the considerable epicentral distances to the nearest stations, etc.

The depth of the focal points was determined primarily by selecting the travel time curves of the longitudinal waves on condition of the best convergence of the moments when the earthquakes occurred, obtained for individual stations. For several earthquakes the depth of the hypocenter was found by means of the difference in the arrivals of the sP and P waves. On the whole, the distribution of the focal points of earthquakes within the earth's crust (with an assumed thickness of 33-35 km) is more reliable than their distribution according to specific amounts of depths. The energy classification of the Amur region earthquakes for K was made in accordance with Rautian's nomogram [3].

The basic parameters of earthquakes with $K \geqslant 8$ in 1975 were given in the catalog, and the territorial distribution of the epicenters of all the underground shocks (including those with $K < 8$) is shown in Figure 1 (see insert). In all, the position of the epicenters of 453 earthquakes was determined. The distribution of the underground shocks with respect to the energy classes K for 1974 and 1975 is as follows:

K	13	12	11	10	9	8	7	6	Total
1974 г.	0	1	0	14	21	60	38	12	146
1975 г.	1	0	4	5	23	93	283	44	453

The seismicity of the Amur region in 1975 was somewhat higher than in 1974, but the considerable increase in 1975 in the number of earthquakes with K = 6-8 is mainly connected with the improvement in the conditions of registering the underground shocks through developing the network of seismic stations in Zeyskiy Rayon.

On the basis of the data from the catalog of earthquakes in 1975, for the representative underground shocks, a frequency graph was plotted (Fig. 2), and the tangent of its pitch angle was $\gamma = 0.37 \pm 0.07$.

The strongest earthquake in 1975 occurred in a little-studied region on 29 June at 12:25 Greenwich time. It was registered by stations in Bomnak, Kirovskiy and Yasnyy as well as by many other seismic stations in Siberia and the Far East. Since the epicenter of this earthquake (see the Basic Catalog) was confined to the Selemdzhinskiy range, in the future we will call it the Selemdzhinskiy earthquake.

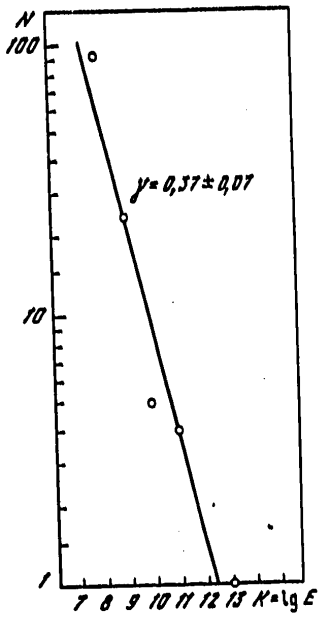

Figure 2. Graph of the Frequency of Earthquakes in 1975.

The Selemdzhinskiy earthquake should have been felt by the inhabitants of the nearest population centers, but this information was not received; in addition, it had no special macroseismic investigation. Three hours after the main jolt, there was an aftershock with K = 9, but at a depth of h = = 10 km; two more aftershocks were noted on 2 July with K = 8.5 and on 15 July with K = 7, but no other repeated jolts were registered in the second half of 1975. When the mechanism of the focus of the Selemdzhinskiy earthquake was determined from the data of 20 seismic stations, two nodal planes were obtained (mechanism according to the method of N. V. Vvedenskiy was determined by M. I. Rudik): the first, near-vertical (dip of 10° to the northeast), with a strike of 143°, and the second, with a strike of 41° and a dip of 35° to the northwest. In both cases of identification of the nodal planes with the displacer of the earthquake, shift faults with a predominance of horizontal component of the shift are obtained. In the second case, the southeast (spur) part of the Selemdzhinskiy range should shift to the northeast and upwards, relative to the axial part of the range; in the first, the spur southwest side should shift to the northwest and upwards relative to the axial side.

The distribution of the epicenters of earthquakes along the Selemdzhi River is of such a type that before the occurrence of the Selemdzhinskiy earthquake, all the underground jolts occurred southwest of its epicenter. In this series of earthquakes the earthquake on 27 March (see catalog), with

h = 30 km, is in the highest energy class, K = 10. All the epicenters of the earthquakes that occurred after 29 June are located to the northeast. An earthquake with K = 8 was noted on 6 January in this same direction, near the Okhotsk coast (Al'skiy range region).

A substantial number of earthquake epicenters were recorded in the region formed by the Mayskiy, Dzhugdyr, Atagskiy, Tokinskiy, Stanovik and Stanov ranges (eastern part). We above all note the cluster of earthquakes with energy classes of K = 7-9, the epicenters of which were located in the interfluvial area of the Zeya and Kupur' (southwest spurs of the Dzhugdyr Range). Three earthquakes ($K \leqslant 8$) occurred at the juncture of the Dzhugdyr and Mayskiy ranges. The epicenters of the three earthquakes were confined to the spurs of the Atagskiy Range: on 19 March with K = 9.5 (φ = 55.5° N, λ = 132.3°E), on 11 February with K = 9 and on 4 February with K = 8.

Several earthquakes were recorded in the southern spurs of the Stanovoy Range, north of the settlement of Bomnak and along the Zeya River, between the centers of Kirovskiy and Bomnak. The underground shock on 14 March at 17:41 had the highest magnitude, K = 9.

In the Tukuringro-Soktakhansk region, a large number of earthquakes were noted with energy classes not exceeding a magnitude of K = 9. The seismicity of this region in 1975 was somewhat lower than in 1974. Here the group of epicenters was located in the interfluvial area of the Zeya and the Gilyuy, where in 1974 three earthquakes with K = 10 were recorded [1]. In this same district, directly adjacent to the Zeya reservoir, stronger earthquakes with K = 11 ($M \approx 4.0$) also occurred in 1889, 1964 and 1967 [4].

Seismic activity continued in the focal area of the Gilyuy earthquake on 13 June 1972 and in the section between the epicenters of the latter and the Yuzhno-Tukuringrskoye (2 November 1973) earthquakes [4]. Here, two earthquakes on 3 and 23 February--had an energy class of K = 9. A group of epicenters of feeble earthquakes ($K \leqslant 7$) was recorded 10-40 kilometers northwest of the Zeya River. In the Soktakhansk part of the region under discussion, the underground shocks form a narrow belt in the southwest-northeast direction, going outside the confines of the Verkhnezeyskaya lowland. In this belt there only two earthquakes--on 6 and 26 February--with K = 9.

Southwest of the Zeya River, as far as the Amur River, three groups of earthquakes with a varying energy level may be noted. One of them was located 30-50 kilometers northwest of the Magdagachi River, where the strongest was the underground shock on 10 December with K = 9.5 and h = 30 kilometers. Before it, here in 1974-1975 earthquakes were recorded with only $K \leqslant 8$, but, according to the data from instrument observations, a considerable number of earthquakes with $K \leqslant 9$ were noted up to 1974 in this region [4]. The second group of epicenters of earthquakes with $K \leqslant 8$ is located northeast and southwest of the settlement of Tygda from the Zeya River to the Amur River. Several weaker earthquakes ($K \leqslant 8$) were confined to the epicenter of the earthquake on 21 September 1929, with M = 4.4 [4].

A dense belt (up to 50 km in width) of epicenters of earthquakes with K 9 is located west of Amurskaya Oblast, stretching from the Stanovoy Range in a southerly direction to the Amur River. South of this river it goes away, apparently, to the territory of China, to the Great Ankang Range. The epicenters of the earthquakes in this belt are primarily confined to the Yankan and Chernyshev ranges and the southern spurs of the Stanovoy Range. Stronger earthquakes in this region were noted on 2 September 1962 (M = 4, Chernyshev Range), on 29 September 1964 (M = 4.5, southern spurs of the Stanovoy Range), 23 April 1966 (K = 10, east of Skovorodino), on 30 January and 13 May 1972 (K = 10, southern spurs of the Stanovoy Range) [4] and on 21 November 1974 (K = 12, north of Skovorodino) [1].

This year several earthquakes were recorded on the boundary of Amurskaya and Chitinskaya oblasts in the region of the Kitemu-Yunkal, Dzheltulinskiy Stanovik and Urushinskiy ranges, two of which--on 13 October and 20 December --had respectively K = 10 and 9.5. The epicenters of two earthquakes with K - 11, which occurred on 21 September, were located in the area of the Amazarskiy and Borshchovochniy ranges (west of Amurskaya Oblast).

The epicenters of separate earthquakes were recorded in the rest of the territory of the Amur region. We will note some of them. First of all, the earthquake with K = 11.5 ($M \approx 4.2$), which occurred on 7 October 1975 in the region of the Bureinskiy Range (according to the instrument data, no earthquakes had been noted here before), and the earthquakes with K = 8-9 on 17 May near the Amur River (east of the Amur region) and on 25 September in the region of the Yasnyy seismic station and 24 October north of the Turana Range.

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EARTHQUAKES IN SAKHALIN

L. S. Oskorbin

This article describes the earthquakes in Sakhalin and the adjacent sections of Khabarovskiy Kray that were recorded by permanent and temporary seismological stations at Yuzhno-Sakhalinsk, Uglegorsk, Tymovskoye, Okha and Nikolayevsk-na-Amur (Khabarovskiy Kray). When earthquakes with M 4 were processed, data from stations in the Far East and the Base Network of the USSR Unified System of Seismic Observations, which recorded these earthquakes, were also drawn into use. The main parameters of the seismographs of the permanent seismological stations are given in [1], where the areas of representativeness of the earthquakes of varying energy level in this region are also presented.

The basic parameters of the earthquakes were determined in 1975 by the same methods as in 1969-1974 [1, 2]. Figures 1 and 2 show the boundaries between the conventional regions and their numbering, and the designation of the regions is given in [2].

The basic parameters for 80 earthquakes were determined from the results of the observations. Information is put in the catalogs on the parameters of only 30 earthquakes with $K \geqslant 8$. Underground shocks, the focal points of which lie beneath the earth's crust, with an assumed thickness equal to 33 kilometers are not included in the catalog. The distribution of earthquakes, including earthquakes with $K \leqslant 8$, with respect to the energy level in 1974 and 1975 is given in the table. Maps of the epicenters with $K \geqslant 8$ and $K < 8$ (figs. 1, 2) give an idea of the territorial distribution of the earthquakes.

A frequency chart (Fig. 3) was plotted for representative earthquakes in Sakhalin, which is approximated by the ratio

$$\lg N = 4.4 - 0.42\ (\pm 0.05)\ K.$$

Here N is the number of earthquakes with $K = \pm 1.0$, occuring in the zone during the year. The slope of the frequency graph is $\gamma = 0.42$, which is somewhat greater than the value $\gamma = 0.38$ for the Sakhalin earthquakes in 1974 [3].

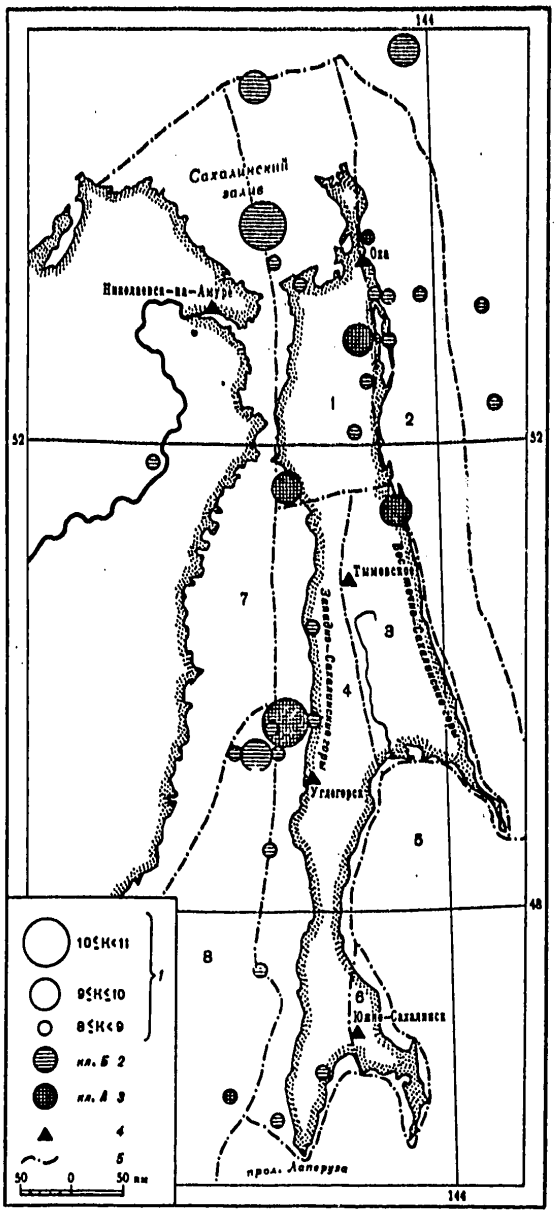

Figure 1. Epicenters of Earthquakes in the Sakhalin Zone in 1975 With $K \geqslant 8$

1--energy class K; 2, 3--accuracy of determining the epicenter; 4--permanent seismological stations; 5--boundaries of the seismoactive regions

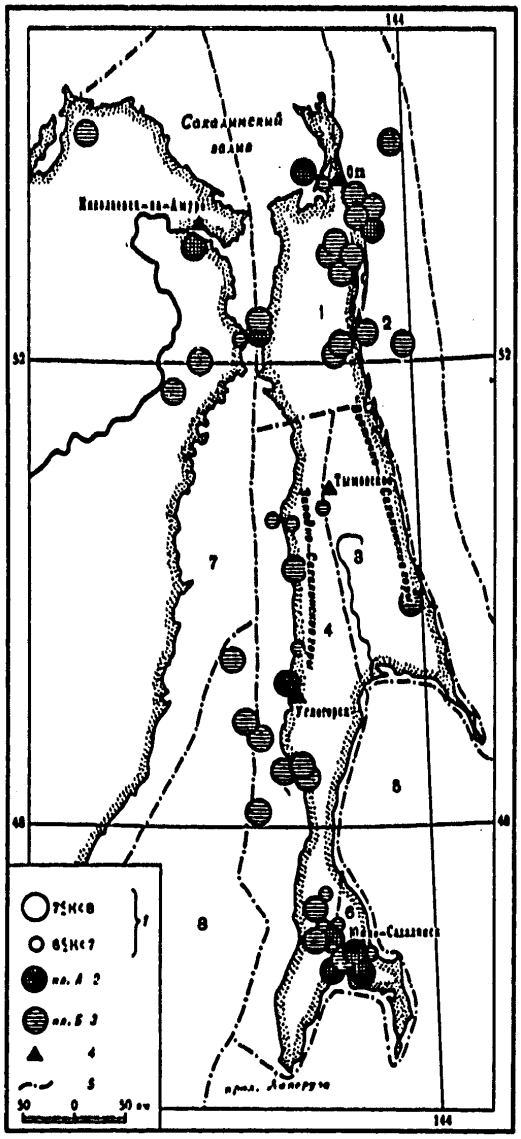

Figure 2. Epicenters of Earthquakes in the Sakhalin Zone With K < 8 in 1975

For conventional symbols, see Figure 1.

Distribution of Sakhalin Earthquakes in 1974 and 1975 According to Magnitudes, Energy Classes and Regions

(1) № района	(2) Год	6>M>5	11>K>10	10>K>9	9>K>8	8>K>7	K>7	(3) Всего
1	1974	0	0	4	4	12	7	27
	1975	0	2	2	3	7	3	17
2	1974	1	1	0	7	4	2	15
	1975	0	0	1	8	10	0	19
3	1974	0	0	0	1	5	2	8
	1975	0	0	1	0	1	0	2
4	1974	0	0	0	7	14	15	36
	1975	0	1	0	5	11	6	23
5	1974	0	0	0	0	0	0	0
	1975	0	0	0	0	0	0	0
6	1974	0	0	0	0	1	5	6
	1975	0	0	0	0	4	3	7
7	1974	0	0	0	1	5	3	9
	1975	0	0	0	1	3	0	4
8	1974	0	0	0	5	5	3	13
	1975	0	0	1	5	2	0	8
(3) Всего	1974	1	1	4	6	46	37	115
	1975	0	3	5	22	38	12	80

Key:

1. Number of region
2. Year
3. Total

A further reduction in the overall level of seismic activity is observed as compared with 1973-1974. Only three earthquakes with M = 4.3-4.6 were recorded. With respect to the number of earthquakes registered with maximum magnitude, the seismicity levels in 1972 and 1975 are comparable, but the total number of underground shocks in 1975 was less. If one compares the seismic activity in 1974 and 1975 for the conventional regions, it follows from Table 1 and figures 1 and 2 that the seismicity in regions Nos 1, 4 and 8 this year were higher than in 1974; a reduction in the seismic activity was noted in regions Nos 2 and 7; approximately identical activity in the east of South Sakhalin (No 6) and in region No 3; just as in 1971-1974, not even weak underground shocks were registered in the conventional region No 5.

The strongest earthquake (M = 4.6) occurred on 25 October 1975, approximately 50 kilometers northwest of the city of Uglegorsk (region No 4), where it was felt with an intensity of 2-3 points. The depth of the focus of this earthquake according to the instrument data was h = 10-20 km; if its perceptibility is taken into account, then according to the equations of the macroseismic field [4], the depth of the focus should be at least 20 km. The epicenters of the preceding (in 1974 and 1975) earthquakes surround the focal area of this earthquake on all sides; the strongest, with K = 9.5 ($M \sim 4.1$) occurred on 6 March 1975 at a depth of up to 10 kilometers.

Repeated shocks of the earthquake under discussion were recorded to be only two with $K \leq 8$. The seismic activity of the Uglegorsk part of region No 4 increased in 1975, just as in 1968, 1970 and 1973.

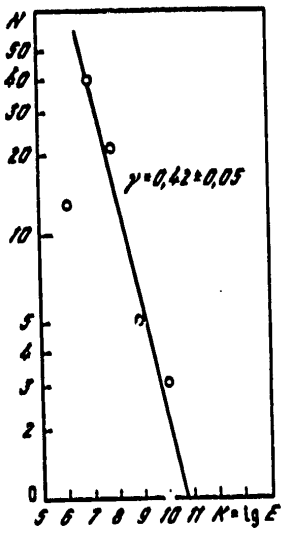

Figure 3. Graph of the Frequency of Sakhalin Earthquakes in 1975

In other sections of region No 4 (see figs. 1 and 2) both groups of earthquakes and individual underground shocks were registered. Among them are: groups of epicenters with K = 6-8 to the southwest of the settlement of Tymovskoye, in the Krasnogorsk region, and northwest of the city of Yuzhno-Sakhalinsk, and individual epicenters in the region of the Aniva River, west of Shebunino and the isthmus of Poyasok.

Two earthquakes with M = 4.3-4.5 were registered in the North Sakhalin region (No 1). One of them occurred on 16 January (h = 10-30 km, M = 4.5) with an epicenter 40 kilometers southeast of the epicenter of the November earthquake in 1973, with M = 5. Not even weak underground shocks were recorded in the vicinity of the epicenter of the earthquake on 16 January.

The second earthquake, with M = 4.3, was recorded on 8 April 1975, with its epicenter located near the settlement of Neftegorsk (approximately 80 km south of the Okha River). Information on this earthquake was gathered by head seismological station at Okha by P. Ye. Chegodayevyy. It was established that the intensity of the earthquake in this settlement, located in the plains area (soil--clayey sand), was 3-4 points. Most of the settlement's inhabitants felt it in approximately the same way and noted even rolling, dishes clanging, slight shifts of light objects, swinging of half-opened doors and hinged ventilation panes and the duration of the vibration for several seconds. In other population points (Paromay, Sabo,

Pil'tun and Kydylan'i), the earthquake was not felt. The depth of the focus is estimated from the instrument data at 10-30 kilometers. With the magnitude of the tremors at 3-4 points, at a distance of 15 kilometers from the epicenter, according to the equations of the seismic field [4], the depth of the focus was h = 30 km.

During 1975 four repeated shocks (K = 7) of this earthquake were recorded. On 4 January at 07:45 another earthquake occurred in the southwest of the North Sakhalin region, the epicenter of which, determined at a point with coordinates--φ = 51.6°N, λ = 141.9°E, was located near the settlement of Viakhtu, where it was felt with an intensity of 4-5 points. The energy class of the earthquake was K = 9 (M$\sim$ 3.4), and the depth of the focus, according to the instrument data, was h = 10 km.

Taking into consideration the intensity of the earthquake at 4-5 points, the distance to the epicenter Δ = 10 km and the magnitude M = 3.4, we obtain, accordingly [4], h = 5 km for the depth of the focus. This was the first time that an earthquake of such intensity had been recorded in the region of the settlement of Viakhtu in the last decade; before this there had been a few underground shocks here with only K$\leqslant$ 7.

In other parts of conventional region No 1, individual earthquakes with K$\leqslant$ 9 were recorded northwest of the Shmidt Peninsula and west of the Okha River, in the region of the settlements of Pogib' and Rybnovsk.

The seismic activity in the region of the Eastern Sakhalin assumedly deep fault (region No 2) in 1975 was expressed both by groups and by individual epicenters of earthquakes with K$\leqslant$ 9.5. Among them are: the group of epicenters southeast of the Okha River and in the region of the Dagi gulf, and individual earthquakes northeast of the Okha River and near the border of the region of northeast Northern Sakhalin. The earthquake on 30 January with K = 9.5 and epicenter with coordinates φ = 55.4°N and λ = 143.7°E was the strongest in region No 2.

The earthquake that occurred on 4 January at 03:59, with the epicenter in the region of the Lun'skiy gulf (northeast of the settlement of Tymovskoye) had the highest energy class (K = 9) in the Eastern Sakhalin range (region No 3). In addition, one more earthquake in the south of the Eastern Sakhalin range was recorded.

In the territory of region No 6, weak earthquakes were recorded only in the region of Yuzhno-Sakhalinsk and southeast of it.

The seismicity of the territory of Khabarovskiy Kray, adjacent to Sakhalin (region No 7) was weak. Only three earthquakes with K$<$ 8 were recorded here in the region of the Amur River. The epicenters of the weaker individual earthquakes (K$<$ 8) were recorded in the vicinity of Nikolayevska-na-Amure and northwest of it.

In addition to the earthquakes mentioned when describing the seismic activity of the Uglegorsk part of the Western Sakhalin (No 4) region, one earthquake with the epicenter northwest of Moneron Island was recorded in region No 8.

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EARTHQUAKES IN KURIL

L. N. Poplavskaya, A. N. Boychuk, M. I. Rudik

The central event in the seismic life of the Kuril region in 1975 was the series of five strong ($M \geqslant 6.8$) underground shocks in the south of the insular arc. This event determined the high level of seismic activity in the south of the Kuril islands and the entire epicentral zone as a whole. Out of the 1,130 earthquakes with $M \geqslant 4.0$, for which it was possible to determine the basic parameters, 750 were aftershocks of the earthquakes mentioned (Table 1).

The frequency chart, calculated for all the earthquakes with a focal depth of $0 < H \leqslant 80$ km, has the form

$$\lg n = 6.57-1.00M(\pm 0.16), \quad (1)$$

where n is the number of earthquakes of a given magnitude M, which changed from 4.5 to 6 with a spacing of $\Delta M = 0.25$.

An analogous chart, calculated without taking into consideration the aftershocks, has values of the parameters close to those obtained in (1):

$$\lg n = 6.34-1.07M(\pm 0.37) \quad (2)$$

This makes it possible to state that the seismic conditions of the Kurilo-Okhotsk epicentral zone in 1975 were determined by the conditions in the south of the Kuril islands.

From an analysis of the equation (2), it can be seen that a certain number of the earthquakes with $M = 4.0$-4.25 were omitted by the recording, which can apparently be explained by the lack of seismological stations on the islands of Matua and Onekotan in 1975.

An overwhelming number of seismic shocks were recorded in the range of depths from 0-80 km, where the main part of the seismic energy was released. At great depths the maximum magnitude observed was $M = 6.25$, and the amount of energy released was less by two orders of magnitude.

Table 1. Distribution of the Kurile-Okhotsk Earthquakes by Magnitude and Focal Depth

Магнитуда M (1)	Интервал глубин залегания очагов Δ, км (2)		
	1-80	81-300	301-350
4,0	455	13	2
4,25	299	11	1
4,50	178	11	2
4,75	48	4	1
5,0	37	1	1
5,25	16	2	1
5,5	16	2	2
5,75	4	1	1
6,0	6	4	0
6,25	1	1	1
6,5	3	0	0
6,75	2	0	0
7,0	3	0	0
(3) Всего толчков в интервале	1068	50	12
(4) Количество высвобожденной энергии, эрг	$1,1 \cdot 10^{23}$	$4,7 \cdot 10^{21}$	$1,7 \cdot 10^{21}$

Key:
1. Magnitude M
2. Spacing of depths of occurrence of focal points, Δ, km
3. Total shocks in interval
4. Amount of energy released, in ergs

Of the 1,130 earthquakes in the Kuril-Okhotsk region, 80 had a noticeable macroseismic effect. The distribution of perceptible shocks with respect to the epicentral zone presented in Table 2 shows that most often the coastal area of the Southern Kuril islands was subjected to macroseismic effect, and the maximum effect, equal to 6 points, was observed here.

We will discuss in detail the manifestations of seismic activity in each of the seismoactive regions singled out in Figure 1.

The overwhelming number of epicenters of the earthquakes of the Paramushir region were concentrated in the area occupied in 1973 by the epicentral zone of aftershocks of the earthquake on 28 February. On 11 May, at 06:56, in the southern section of this zone an earthquake was recorded with M = 6.1, at a depth of H = 60 km (No 4). This was the strongest shock in the region. Its macroseismic effect on Paramushir Island was estimated at 4 points. A series of shocks with hypocenters at depths of H = 30-45 km, which followed this earthquake, formed a chain of epicenters extended in a southeastern direction. The maximum magnitude of the aftershocks was not over M = 5.5. Therefore, in 1975, the southern section of the hypocentral zone of the earthquake on 28 February 1973 was the most active in the Paramushir region.

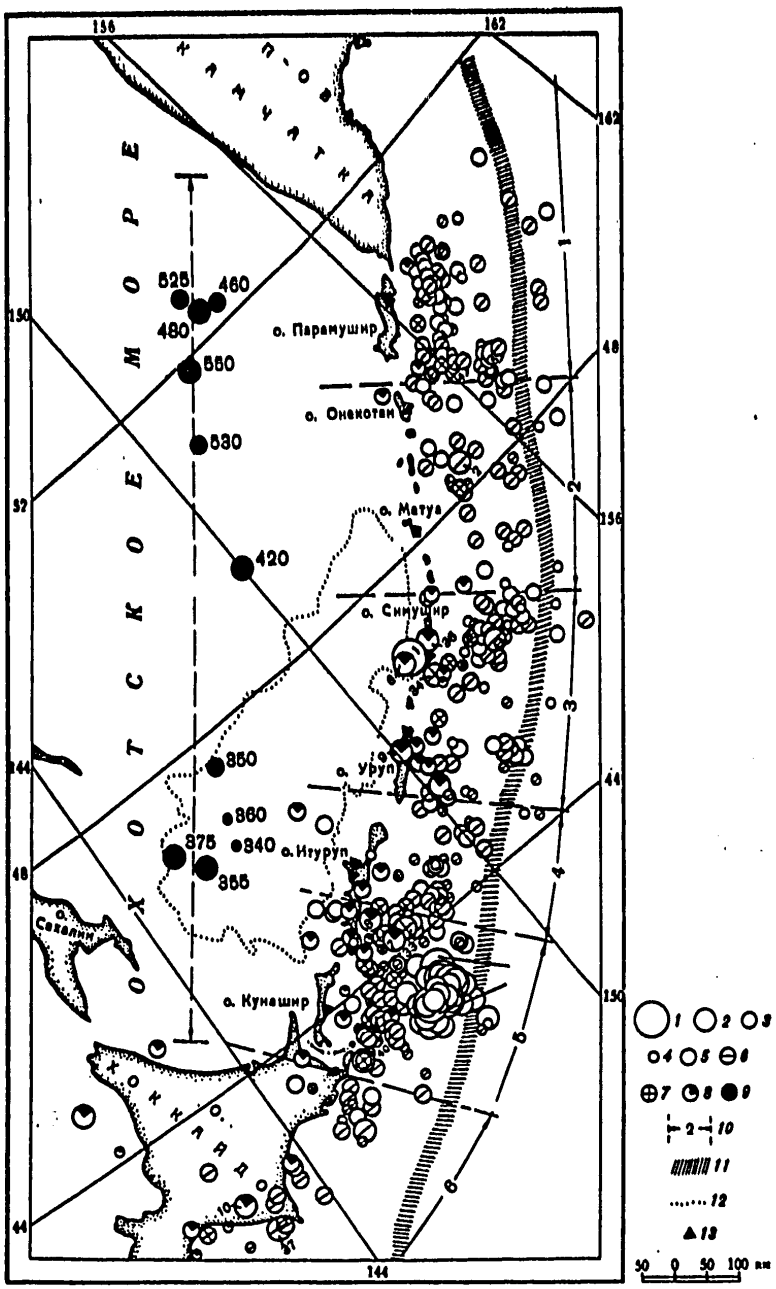

Figure 1. Map of Epicenters of the Kuril-Kamchatka Earthquakes in 1975 With $K \geqslant 9$ ($M \geqslant 4$)

[Key on Following Page]

Magnitude and energy class: 1--$6.5 \leq M < 7.5$; 2--$5.25 \leq M < 6.5$; 11$\leq K \leq 14$; 3--$4.25 \leq M \leq 5.25$; $9 < K \leq 11$; 4--K = 9. Depth of focus 6 km; 5--$0 \leq H \leq 30$; 6--$30 < H \leq 60$; 7--$60 < H \leq 90$; 8--$90 < H \leq 300$; 9--$H > 300$; 10--boundaries of seismoactive regions of Kuril islands; 11--axis of bathypelagic Kurilo-Kamchatka channel; 12--outline of the bathypelagic Yuzhno-Okhotsk trough; 13--seismological stations

Table 2. Distribution of the Number of Perceptible Earthquakes by Individual Seismoactive Regions

№ рисунка* (1)	Общее число землетрясений (2)	Число ощутимых землетрясений (3)	Максимальный балл (4)
1	77	7	4,5
2	45	2	2,5
3	72	6	5
4	56	2	3,5
5	828	62	6
6	30	1	2,5
7	7	-	-
8	18	-	-

(5) * Нумерация районов соответствует рис. 1.

Key:
1. Number of diagram
2. Total number of earthquakes
3. Number of perceptible earthquakes
4. Maximum point
5. Numbering of regions corresponds to Fig. 1.

From an analysis of the mechanism of the focal points of nine earthquakes in this region (see here and further the catalog of additional parameters of focal points of earthquakes), it can be seen that the stress field was not essentially changed in 1975 [1]. The focal mechanism of the southern group of shocks is analogous to the mechanism of the focal points of the Paramushir earthquakes in 1973. They are characterized by a strike-slip normal fault movement. The axis of the main tension stress is almost horizontal and extends transversely to the strike of the structures of the insular arc. The axis of the main compression stress is close to horizontal and is directed at a certain angle to the islands.

The course of the seismic process in time (Fig. 2) was irregular. The greatest activity was observed in May, and at the end of the year seismic occurrences in the region were very rarely registered.

A total of 45 shocks at depths of up to 175 kilometers was recorded in the Onekotan-Matuanskiy region during the year. This is almost a decrease to half the level of the preceding year. The maximum magnitude M = 5.8 was registered for the earthquake on 16 April at 21:33, the macroseismic effect of which was estimated at 3 points on Matua Island.

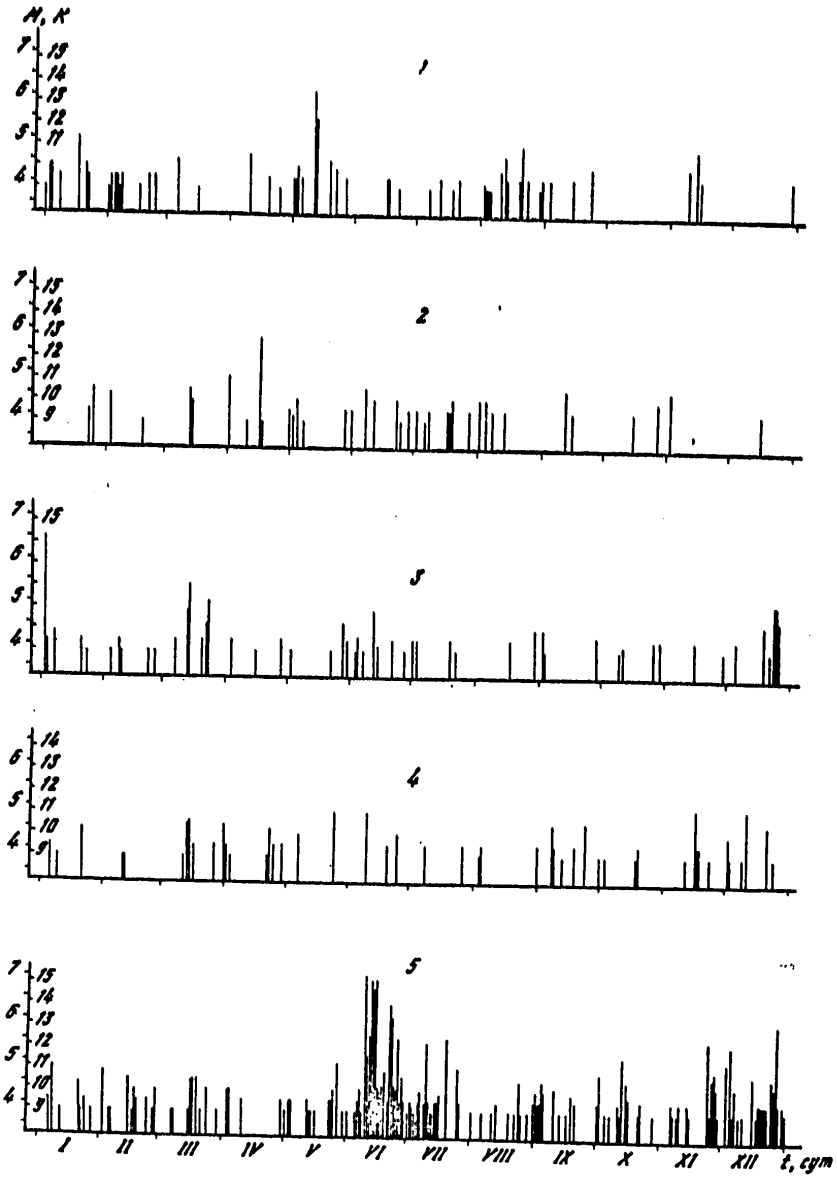

Figure 2. Graphs of the Time Dependence of the Seismic Process for Regions 1-5, Singled Out in Figure 1.

The results of determining the focal mechanism of the earthquake on 16 April indicate that it occurred under conditions in which the compression stresses directed close to the horizontal were maximum. Strike-slip thrust fault dislocations with a predominance of the vertical component of movement were characteristic for this focus.

In the Onekotan-Matuanskiy region, just as in the Paramushirskiy, the seismic activity was irregularly displayed in time. Its maximum falls in April, and beginning with August and until the end of the year the seismic activity in the region was exceedingly weak.

The Simushir-Urupskiy region was less active than in 1974 [2]. The epicenters of the earthquakes were located in groups. The aggregate of epicenters east of Simushir Island may be regarded as aftershocks of the Simushir earthquake of 1974. The epicenters were extended latitudinally, and the magnitude of the strongest shock was M = 5.4.

Another separate group of earthquakes was observed on the western slope of the deep-water depression basin. The cluster of shocks in the region east of Urup Island includes focal points with hypocenters at a depth of H = = 120-170 km.

The shallow-focus earthquake west of Simushir Island was the most substantial. The occurrence of shallow-focus shocks on the Okhotsk Sea shelf of the Kuril islands is a rare, but not unique phenomenon. There is information on a similar shock on 18 September 1938 at 01:29, with M = 5. The strongest earthquake--the Western Simushir earthquake--occurred on 2 January at 08:58, 30 kilometers from the island at a depth of H = 0.5 km (No 1), with M = 6.5. The macroseismic effect on Simushir Island was estimated at 5 points, and on Urup Island--at 2-3 points. The earthquake was not accompanied by aftershocks.

There is a solution to the mechanism of the earthquake focus, obtained on a computer. Both axes of the main stresses were close to horizontal, and movements on the vertical plane were observed at the focus. At the same time, one of the possible fault planes extended in a submeridional direction, and the second had an almost latitudinal strike.

Several strong shocks with the focal points at a depth of over 80 kilometers occurred in the vicinity of Simushir Island. Two of them, recorded at depths of H = 100 and 120 km, were felt on the coastal area of nearby islands.

The data from the region shows that these earthquakes are characterized by strike-slip normal fault dislocations at the focal points with a predominance of the shift component of movement. The axes of the interstitial stresses in effect at these focal points slope steeply (50-55°) to the Yuzhno-Okhotsk trough.

The irregularity of the display of seismic activity is illustrated in Figure 2. In the second half of the year the activity in the region was very weak, and only at the end of December was it somewhat revived.

The Northern Iturupskiy region is usually characterized by background activity. Not a single shock with a magnitude of $M \geq 5$ was registered. Most of the earthquakes were observed in a range of depths of H = 10-60 km. Two shocks at depths of H = 150-160 km occurred in the coastal zone of the northern tip of Iturup Island.

The focal mechanism was determined for eight earthquakes in the region. The majority of the focal points are characterized by strike-slip thrust fault dislocations. The main axes of the compression and tension stresses are transverse to the strike of the main structures.

During the course of the year the earthquakes occur rarely, with a lull period of approximately one month (Fig. 2).

In 1975 the Kunashir-Shikotansk region continued to be the most active. Toward the east, 135 kilometers from the hypocenter of the very strong earthquake in 1973, on 10 July at 13:47 and on 14 July at 18: 08, earthquakes were recorded with a magnitude of M = 7.1 and 7 respectively [3]. The depths of these focal points were H = 20-30. With a negligible difference in magnitudes, the macroseismic manifestation of the first earthquake at the Southern Kuril islands was 1-2 points weaker than the second.

The tectonic earthquake on 10 July was accompanied by a tsunami, registered by tide gages at a series of points in the Kuril islands. A detailed description of extremely strong shocks in the region east of Shikotan Island is given in the article, "Strong Earthquakes in the Malaya Kuril'skaya Ridge Region," in this collection.

A representative group of epicenters of earthquakes with the focal depth H = 90 km was located in the coastal zone of the Southern Kuril islands. The deep-focus shocks in the Iturup Island region preceded the Shikotanskiy earthquakes in June in time. The two strong ones of them (Fig. 1, Nos 7, 8) occurred in May at depths of H = 105 and 130 km, and had a magnitude of M = 6. Dynamic parameters of the focal mechanism were found for the first shock on 18 May at 22:34 on a computer and manually. The two solutions were close. Strike-slip normal fault shifts along both possible fault planes were characteristic of the focus. The steeply directed nodal planes had a submeridional and near-latitudinal strike.

The time dependence of the seismic process (Fig. 2) was irregular. The maximum amount of energy was released in June and July. A certain increase in activity was also observed in the last few months of the year.

The Hokkaydo Island region (Fig. 1, region No 6) was the quietest as compared with the above-described regions. The tectonic earthquakes were distributed irregularly in the spatial respect. One group of epicenters with H = 30-60 km is adjacent on the south to the focal points of the Shikotansk earthquakes in 1973. The strongest earthquake in this group was the shock on 17 October at 17:58 at a depth of H = 40 km, with a magnitude of M = 5.3. According to the data on the focal mechanism, the focus is characterized by strike-slip normal fault dislocation. In this case one of the possible fault planes extended in a meridional direction, and the other--in a sublatitudinal direction.

The southern aggregate of shocks has a broad range of depths. The earthquakes under the continental part of the island reached a depth of H = = 175 km. The strongest earthquake was on 30 October at 01:41, with a magnitude of M = 6 at a depth of H = 60 km. The depth of occurrence of the hypocenter was determined from the difference in time of arrival of the reflected waves pP and sP in relation to the P-wave. A strike-slip thrust fault shift was observed at the focus of the earthquake, with the maximum being the main compression stresses. The direction of the main axis of tension stress almost coincides with the orientation of the axis of the intermediate stresses, which has a submeridional course.

In the Sea of Japan, six shocks were recorded in this year. Their hypocenters were located at depths of H = 200-270 km. Only two shocks northwest of Hokkaydo Island were plotted on the map of the epicenters, and the other earthquakes and shocks on 23 April in the coastal region are outside the limits of the map (see the catalog, region No 7).

The earthquake on 6 August at 21:37 was small in magnitude in this region, M = 6.2. Its focus was located at a depth of H = 230 km. A month later, a second shock was recorded here with a magnitude of M = 5.0 at a depth of 200 km. The data on the focal mechanism of these two earthquakes are similar. The focal points were under the influence of tension stresses close to horizontal and the compression stresses directed more steeply toward the horizon. The fault component of shift at the focus predominated for both possible fault planes.

The nodal plane I has a northwest-southeast strike, and plane II is directed submeridionally.

The earthquake on 23 April at 00:17 occurred at a depth of H = 495 km, with a magnitude of M = 5.4. The shifts at the focus of this shock were of a strike-slip thrust fault nature. The possible steep fault planes extended in close to meridional and sublatitudinal directions.

In the Sea of Okhotsk the earthquakes with hypocenters at a depth of $\sim$ 300 km extended in a rare chain from the western margin of the Southern Okhotsk trough to Kamchatka.

There were absolutely no deep-focus shocks in the Anivsk Bay in 1975.

The strongest of the Okhotsk Sea earthquakes was observed in its central region at a depth of H = 550 km, with a magnitude of M = 6.2. The shift at the focus, according to the instrument data, is of a strike-slip normal fault nature. The conditions under which the tension stresses are close to horizontal and the compression stresses are steeply directed, are characteristic for the central section of the Okhotsk Sea.

A series of shallow-focus shocks was observed in this region west of Iturup Island. Two of them, with a focal depth of H = 20 km, were confined to the eastern slope of the deep-sea trough. Two other shocks, located closer to Iturup Island, had a focal depth of occurrence of H = 10. The shallow-focus earthquakes did not exceed a magnitude of M = 5. The data for determining the focal mechanism of these earthquakes was unfortunately insufficient.

Therefore, for the Kuril-Okhotsk region, 1975 was a year of high seismic activity, which was greatest for earthquakes with a normal focal depth. At depths of H = 81-300 km, the seismic activity was low as compared with preceding years, and only 12 deep-focus earthquakes with $H \geq$ 300 km were recorded.

This ratio of activity of various deep layers of the focal zone is unusual for the Kuril-Okhotsk region, in which a considerable increase in activity in the stratum of 0-80 km is as a rule accompanied by a noticeable reviving of seismic activity of the deeper strata of the upper mantle.

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STRONG EARTHQUAKES IN THE REGION OF THE LESSER KURIL RIDGE

L. N. Poplavskaya, A. N. Boychuk, Go Chan Nam, N. D. Zhigulina, V. M. Zhak, N. A. Kleshenko, B. N. Naumenko, A. F. Osipov, M. I. Rudik, A. V. Skripnik, V. M. Skripnik, A. A. Kharlamov, G. N. Khristoforov

On 10-15 June 1975, east of the islands of the Lesser Kuril ridge, a series of five strong earthquakes occurred (M = 6.8-7.1), accompanied by a considerable macroseismic effect. The basic parameters of the focal points of these earthquakes, according to the data in the SEISMOLOGICAL BULLETIN OF THE FAR EAST, are given in Table 1.

Table 1. Basic Data on the Strongest Earthquakes on 10-15 June

(1) Число	Время возникновения, (2) ч м с	Координаты эпицентра (3) φ° N	λ° E	H, км	M_{LH}
10	13 47 20	43,2	147,5	30	7,1
13	18 08 11	43,3	148,0	20	7,0
14	17 37 12	43,1	147,8	24	6,8
14	18 38 02	43,5	148,0	30	6,8
15	00 19 30	43,2	148,0	30	7,0

Key:
1. Number
2. Time of occurrence, hrs, mins, secs.
3. Coordinates of epicenter

The epicentral area of these earthquakes extended along the strike of the Lesser Kuril ridge, and the area of their aftershocks extended primarily toward the south (Fig. 1), toward the deep-water trough, reaching its eastern slope. The epicentral zone mapped for the area of the greatest density of aftershocks encompasses an area of $S = 2 \cdot 10^4$ km^2. The hypocenters of the overwhelming number ($\sim$ 80%) of repeated shocks were located at depths of $H \leqslant 30$ kilometers, and the main shocks were also recorded at these same depths (Table 1).

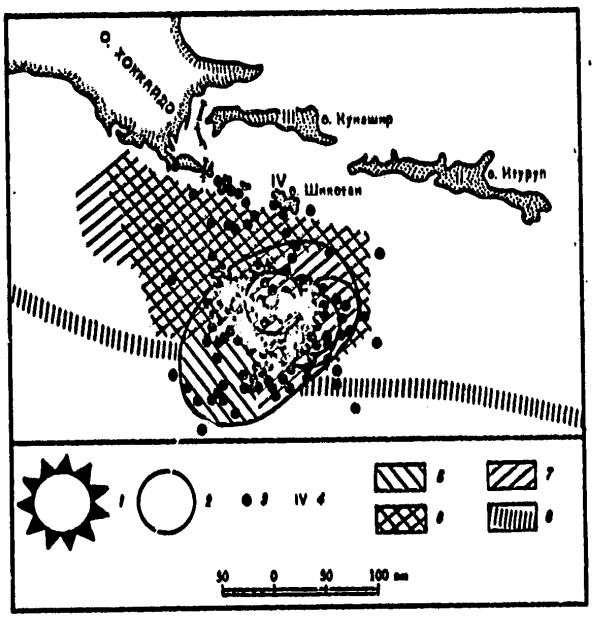

Figure 1. Epicentral Area of Earthquakes on 10-15 June 1975 and Their Repeated Shocks

Classification of earthquakes according to magnitude: 1--tsunamigenic earthquake on 10 June at 13:47; 2--$7.5 > M > 6.5$; 3--$4 \leqslant M < 6.5$; 4--macroseismic effect of earthquake on 10 June at 13:47. Basic types of dislocations: 5--strike-slip normal fault; 6--strike-slip thrust fault; 7--no data on type of dislocations; 8--axis of deep-water Kuril trough

The frequency graph of the series of earthquakes studied, calculated for a range of magnitude of $M = 4.5$-6.0 with a spacing of $\Delta M = 0.25$, has the form

$$\lg n = 6{,}17 - 0{,}95M\ (\pm 0{,}17), \qquad (1)$$

where n is the number of shocks of the given magnitude M.

An analysis of this equation gives grounds for stating that all the earthquakes in the series being studied were registered without omissions.

Preliminary information on the focal mechanism of the main shocks and aftershocks, also given in the Catalog of Additional Parameters, makes it possible to establish that the hypocentral area being studied was under the effect of the maximum,, almost horizontally directed tensile stresses and

more steeply directed compression stresses. Strike-slip normal fault shifts were characteristic of the earthquakes described, and at the focal points of the shocks the fault component of movement predominated.

Table 2. Instrument Data on Tsunami on 10 June 1975 on USSR Coast

(1) Пункт	(2) Первая волна					(7) Максимальная волна				Время добегания, (8) ч м
	Приход, (3) ч м	Подъем (+) (4) спад (–)	(5) Период T, м	Амплитуда, см (6)		Приход, (3) ч м	(5) Период T, м	(6) Амплитуда, см		
(9) Малокурильское	14 23	–	1,7	58		16 35	3,5	60		00 36
(10) Курильск	14 50	+								01 03
(11) Южно-Курильск	14 58	–	2,2	47		15 29	1,5	55		01 11
(12) Буревестник	14 33	+	2,0	45		14 10	1,0	44		00 46
(13) Матуа	14 50	–	0,5	10		16 35,2	1,0	19		01 03

Key:

1. Locality
2. First wave
3. Arrival
4. Rise (+), fall (-)
5. Period
6. Amplitude
7. Maximum wave
8. Lag time
9. Malokuril'skoye
10. Kuril'sk
11. Yuzhno-Kuril'sk
12. Burevestnik
13. Matua

According to the data on the mechanism of the gocal points of the strongest earthquakes at the Lesser Kuril ridge in 1969-1975 [1, 2] and their aftershocks, this section of the Kuril'skaya epicentral zone may in the first approximation be regionalized according to the type of dislocations (Fig. 1). As we can see, the hypocentral area of the earthquakes in 1975 was essentially completely located in the area with primarily strike-slip normal fault dislocations. Only its western and northwestern margins, adjacent to the area of aftershocks of the earthquakes in 1973 [2], were characterized by strike-slip thrust fault movements at the focal points of the repeated shocks.

The axes of the main tensile stresses, in effect at the focal points of the main shocks of the Lesser Kuril earthquakes in 1975, ran mainly transversely and the axes of the main compression and interstitial stresses--along the strike of the insular arc.

Because of the sparse population density of the Kuril islands, the information on the nature of the manifestation of the earthquakes studied was extremely meager. It was possible to establish, however, that at least 40 shocks in this series were felt on the coastal area of the islands of the Lesser and Greater Kuril ridges with an intensity of from 3 to 6 points.

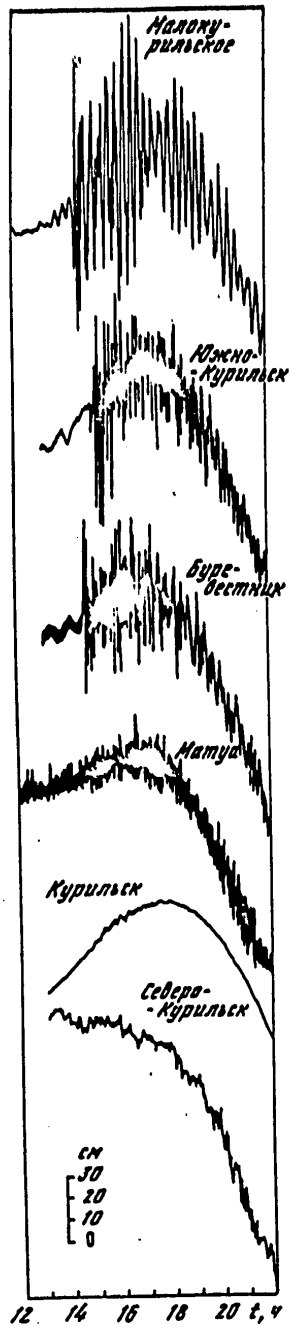

Figure 2. Tide Gages With a Recording of the Tsunami on 10 June 1975 in the Kuril Islands

Table 3. Instrument Data on the Tsunami on 10 June 1975 in the Coastal Area of Japan

(1) Пункт	(2) Первая волна		(5) Максимальная волна			
	Время пробега, (3) ч м	(4) Подъем, см	(6) Период, м	Двойная амплитуда, см (7)	τ, (8) ч м	H, см
Hokkaydo island:						
Wakkanai	2 52	6	23			
Abasiri	1 27	4	12	25	1 40	15
Hanasaki	43	72	13	182	23	96
Kusiro	48	8	24	23	3 55	14
Hiro	58	33	12	50	4 18	26
Urakawa	59	6	15	68	3 10	42
Tomakomai	1 30	5	20	24	4 50	7
Hakodate	1 15	7	25	12	3 40	5
Sanriku island						
Same	1 12	4	18			
Hatinohe	1 16	14	8	30	20	22
Miyako	1 02	16	10	23	1 52	16
Kamaisi	1 05	13	15	26	58	14
Ofunato	1 12	12	13	34	9 00	20
Ayukawa	1 24	12	8	24	8 00	12
Other islands						
Matsukawaura	1 42	5	12	20	6 10	11
Onahama	1 38	6	8	26	10 10	13
Hitachi	1 50	6	8	23	8 38	14
Osarai	1 40	4	10	24	11 35	15
Kusimoto	2 23	8	12	18	5 20	10
Hatidze	2 03	7	8	15	5 35	8
Ogasawara	1 51	5	15	22	42	12

Symbols: τ --the difference in time of arrival of the first and maximum waves, H --the height of the tsunami.

Key:

1. Locality
2. First wave
3. Transit time
4. Rise, cm
5. Maximum wave
6. Period, M
7. Double amplitude, cm
8. τ, hrs, mins.

The shock on 10 June at 13:47 caused a marked tsunami wave which was recorded by tide gage units in the coastal region of the Kuril islands and Japan, the data on the manifestation of which are given in tables 2, 3.

A. A. Kharlamov and A. V. Skripnik, associates of the Tsunami Divison of the Sakhalin Complex Scientific Research Institute of the Far East Scientific Center of the USSR Academy of Sciences, inspected the coastal area and questioned the population of Iturup and Kunashir islands. The islands of the Lesser Kuril ridge were inspected by G. N. Khristoforoviy and I. I. Nechayeviy, associates of the Geophysical Observatory at Shikotan, and A. F. Osipovyy, head of the seismological station at Shikotan. Also taking

Table 4. Visual Data on the Manifestation of the Tsunami on 10 June 1975 in the Coastal Region of the Kurile Islands

Locality	Maximum rise (+), fall (-)	Flooding (+) or dessication (-) M	Period, M
Shikotan Island:			
Malokuril'skaya Bay	+(0.5-0.6)	No data	2-3
Krabozavodskaya Bay	+(1.5)	"	
Otradnaya Bay	+(1.5-2)	Bottomland flooding of Matakutan R.	
Mayachnaya Bay	+(3.5)	+(100-120)	
Sennaya Bay	+(3.5-4)	+(250)	
Nepokornyy shallows	+(5.5)	-	
Polonskiy Island	+(2-3)	+(40)	
Zelenyy Island	+(1)	+(1.5-2)	0.6
Yuriy Island:			
Shirokaya Bay· ocean side of island	No traces of tsunami detected +(0.7-1)		
Tanfil'yeva Island	No traces of tsunami detected		
Kunashir Island:			
Yuzhno-Kuril'sk Island	+(1.3-1.8)	+(30-100)	15-20
Serebryanka R. (estuary)	+(2-3)	+(200-300)	
Otradnoye	+2	+40	
Vinay R.	+(2.5-3)	+150	
Chayka	+2	+20	
Goryachiy Plyazh R.	+(2-3)	+60	
Iturup Island:			
Burevstnik Bay	+(0.7-1)	+30	

part in the investigation were O. N. Likhacheva, engineer at the Laboratory of Physics of the Ocean of the Sakhalin Complex Scientific Research Institute, and B. N. Naumenko, head of the sector. The data from the visual observations are given in Table 4.

The aftereffects of the tsunami in the coastal region of Kunashir and Iturup islands, as well as the islands of the Lesser Kuril ridge, were studied in great detail. This made it possible to establish the following:

1. Tsunami occurred everywhere against the background of a high tide, which is explained by the coastal flooding zone of considerable width (Fig. 4).

2. Most highly susceptible to the action of even weak tsunami, similar to the one described, are the floodplains of rivers and lowlands of the coastal area adjacent to the bays, where the flooding zones, according to the data from the questioning, reached 250-300 meters. Tide gages with a recording of the tsunami on 10 June 1975 at the Kuril Islands are given in Fig. 2.

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EARTHQUAKES IN KAMCHATKA

S. A. Fedotov, I. G. Simbireva, V. D. Feofilaktov, A. A. Gusev,
V. I. Gorel'chik, V. V. Stepanov

In 1975 detailed seismological observations at Kamchatka and the Komandorskiy islands were continued by the Institute of Volcanology of the Far Eastern Scientific Center of the USSR Academy of Sciences, where the equipment of the seismological stations at Kamchatka with modern instruments had, in general, been completed. Instead of the obsolete units, KRP boards, automatic recording control panels and control pulse receiver operating posts were installed, and the block diagrams of the stations were standardized. Great attention was paid to the quality of the installation and the reliability of the cable lines of communication.

As the result of a detailed study of the microseismic interference at the stations and the basic characteristics of the storm source of the microseisms, a map was drawn up to predict the average noise level for Kamchatka. Recommendations were worked out to optimize the magnification of the regional seismographs.

It turned out that the maximum realizable coefficient of magnification on the peninsula was about 40,000.

The Esso seismological station began work in a new building. The soils under the station were boulder-pebble with a sand filler. The station carries out three-component recording through SKM-III-GB-IV channels with standard regional performance and a magnification of 4,000.

The horizontal (V-Z) channel with reduced sensitivity has a magnification of 4,000.

In 1975 the proving ground for recording strong earthquakes on Kamchatka continued to be equipped. In addition to the network of SSRZ seismographs, including Kamchatka earthquakes from 5-6 points, more sensitive standard Japanese SMAS-Q accelerographs (three sets on the territory of Petropavlovsk) and S5S-ISO-II velosigraphs (two sets at the stations at Kronoki and Bering) were installed.

The methods of processing the observations in 1975 remained the same [1]. The energy class $K = K^{\phi 68}$ was determined according to the transverse waves recorded by the VEGIK $S_{1,2}$ seismograph in a period of 1.2 seconds, in accordance with Fedotov's nomogram [2].

The seismicity of the region in 1975 was reflected in the catalog of earthquakes with $K \geq 10$. Detailed data on earthquakes with $K \geqslant 9$ are given in the Seismological Bulletin of the Far East [3]. Figures 1 and 2 (see insert) give maps of the epicenters of earthquakes with $K \geqslant 9$ and $K = 8$, and Figure 3 (see insert)--a map of the seismic activity. In 1975 the network recorded and processed a total of 1,411 earthquakes with $K \geqslant 8$, which were distributed, with respect to energy, as follows:

K	8	9	10	11	12	13	14	15
N	480	537	262	79	35	11	6	1

1975 was a quiet year. The greatest magnitude achieved was 7.0 for Kamchatka and 6.9 for the Komandorskiy islands, and there were no destructive earthquakes and tsunami. In the south of the region, in the area of the focus of the earthquake on 28 February 1973 ($M_{LH} = 7.4$), the aftershock process slowly decreased. The area of increased activity and the epicenter of this earthquake can be clearly seen on the chart of the activity.

In the area of the underwater Shatskiy range, opposite Avachinskaya Bay, a series of earthquakes occurred in April. The two strongest of them, on 6 April at 09:55 ($M_{LH} = 7.9$) and at 10:35 ($M_{LH} = 6.8$), should be regarded as a single occurrence. Judging from the extent of the cluster of aftershocks, the size of the focus of this double earthquake is about 60 km. It began with a relatively weak foreshock on 5 April at 16:52 ($K = 10$). After 40 seconds a powerful foreshock (No 11) occurred with $M_{LH} = 6.0$, and 1 hour later--another one with $M_{LH} = 6.1$, $K = 13.8$. The main shock occurred 16 hours later against a background of strong activity in the area of the foreshocks. Then followed a powerful aftershock cluster, including 7 earthquakes with $K = 12$ and about 100 with $K \geqslant 9$. The strongest occurrence of this cluster, with M_{LH}, occurred on 20 April, essentially completing the cluster.

A somewhat unusual cluster of weak ($K \leqslant 12$) earthquakes occurred on the bottom of the Bering Sea in the Kamchatka Strait. The linear zone of the epicenters of the cluster has an almost meridional orientation and a length of about 60 kilometers. The development of the cluster took the entire first half of 1975. A strong, deep earthquake with $m_{pv} = 6.7$ occurred on 21 December at a depth of 550 km in the Okhotsk Sea. Figure 1 gives its displaced position--actually it is outside the scope of the map. The hypocenter of this earthquake is 50-80 kilometers from the hypocenter of another similar earthquake with $m_{pv} = 6.8$ which occurred on 29 January 1971 and preceded the strong Kamchatka earthquakes on 25 February and 15 December 1971. In contrast to the preceding one, the new earthquake was not accompanied by aftershocks.

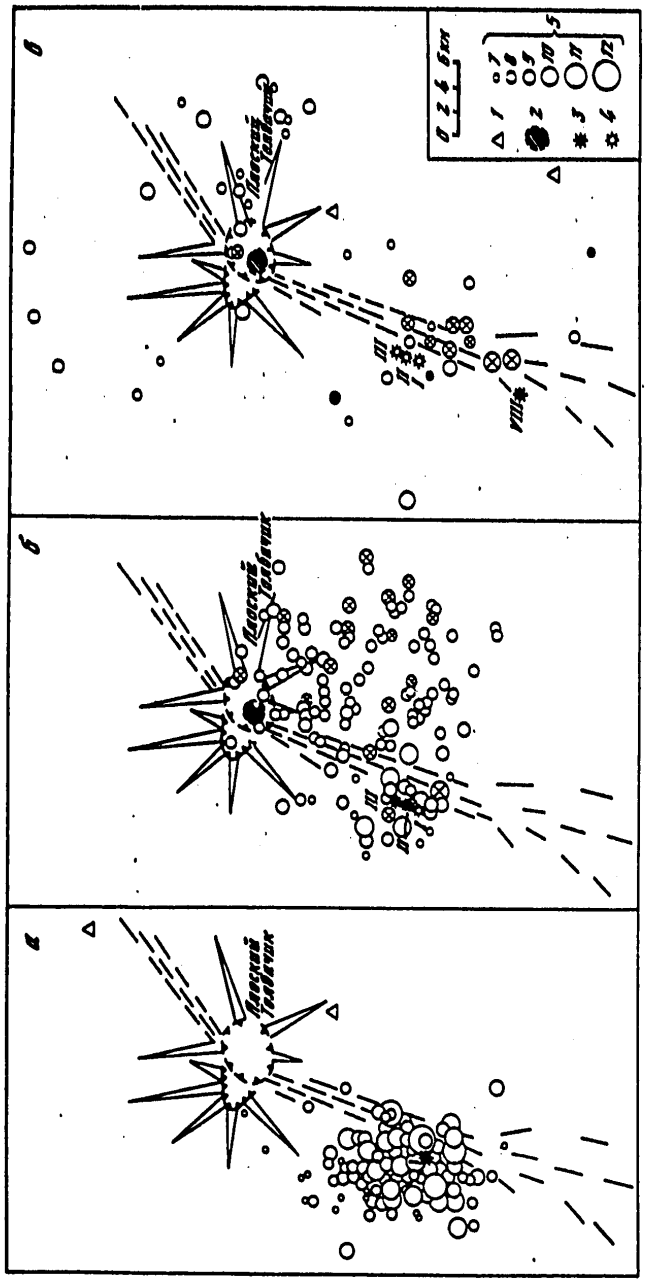

Figure 4. Epicenters of Earthquakes Related to the Great Tolbachik Fissure Eruption

a--earthquakes preceding the rupture (from 27 June to 5 July); b--those accompanying appearance of Cone I and preceding the appearance of cones II and III (from 6 July to 17 August); c--those preceding the formation of cone VIII and accompanying its eruption to the end of 1975. In Fig. 5, b, the diagonal cross indicates the epicenters of the preceding cluster from 3 to 17 August, and in Fig. 5, c--all the epicenters from 1 to 16 September. 1--temporary seismological stations; 2--sliding of part of the apical crater of the Ploskiy Tolbachik volcano, which occurred in August-September; 3--cone, preparation for the eruption of which is reflected in this chart; 4--already emerged cone; 5--energy class of the earthquakes

On the territory of the peninsula there was a small cluster of surface earthquakes in the region of the Krutoberegovyy seismological station (Kamchatka Cape peninsula, near the mouth of the Kamchatka River). This cluster may be related to the active fault separating the rising block of mountains of the Kamchatka Cape from the Lake Nerpich'ye depression. This is new confirmation of the underestimation of the seismicity of the region of the Ust'-Kamchatsk-Ozernoy Gulf on the existing map of seismic regionalization.

Macroseismic Information

Macroseismic data are given for some earthquakes.

The earthquake on 2 January at 19:32, in the city of Petropavlovsk, 4-5 points. Many inhabitants were awakened. The vibrations lasted 15-20 seconds. Dishes rattled, lamps swayed, glass rattled and the walls of wooden houses creaked.

On 6 April, 19:55, in Petropavlovsk, 4-5 points. In some large-panel buildings rumbling and grinding were heard, and the folds of cupboards and doors opened. Small objects shifted, and lamps and lights swayed.

On 1 August, 02:14, in the settlement of Krutoberegovo, 5-6 points. The floors and ceilings creaked and doors opened and closed. Fine cracks were formed in the plaster. Putty crumbled and fine cracks appeared in some brick ovens. There was an underground rumbling. Report by L. A. Sokurenko.

On 24 September, 17:54, in the settlement of Kronoki, 5 points. Hanging objects swayed, doors opened and closed and houses made of logs creaked.

In the region of the settlement of Pauzhetka, just as in past years, a series of weak (2-3 points) earthquakes were recorded with $S - P = 1.5$-1.8 seconds at the Pauzhetka seismological station.

Earthquakes Preceding and Accompanying the Great Tolbachik Fissure Eruption

In June-September 1975, three large clusters of earthquakes occurred in connection with the eruption that had taken place at that time in the region of the Tolbachik volcano, within the fault zone that passes through the region of the areal volcanism to the south-southwest of the volcano. The fracture basalt eruption began on 6 July and was still continuing by the end of the year. A more detailed report on the seismicity accompanying the eruption was published in [4]. The surface earthquakes of the eruption region were recorded by stations in the regional network, as well as by four temporary stations in the region of the eruption. The coordinates of the focal points were determined according to an improved time travel curve, based on the results of deep seismic sounding.

The first, most powerful cluster of earthquakes occurred from 27 June to 5 July and included two earthquakes with $M_{LH} \geq 5$. It preceded the first phase of the eruption and made it possible to predict it. The slag cone I with a height of 330 meters (Fig. 4, a) appeared in this phase. Weaker clusters of earthquakes preceded the appearance of cracks from which slag cones II and III later appeared (Fig. 4, b) and VIII (Fig. 4, b). The clustered appeared 7-10 days before the burst of gases and magma to the surface. The burst occurred at the drop of the number and energy of the earthquakes in the clusters.

The location of the epicenters and cones can be seen in Fig. 4. The earthquakes that preceded the formation of cone I (Fig. 4, a) orinigated in its vicinity at depths of up to 15-30 kilometers. The epicenters of the second cluster (cones II and III, 3-17 August) were in the same place as the first, as well as in the broad zone to the east of the fault zone, seen in Fig. 5, at depths of 5-10 kilometers.

The third cluster (cone VIII, 5-17 September) was located between the group of cones I, II, III and the not yet existent cone VIII at depths of 0-5 kilometers. After cone VIII was formed, the seismic activity decreased, and was moved to the area of the crater of the Ploskiy Tolbachik volcano, and also encompassed a broad zone to the north, east and southeast of it.

In addition to the seismic activity, the eruption was accompanied by strong volcanic vibration. An amplitude of 2-5 μm was observed at frequencies of about 1 Hz 10-15 kilometers from the bursts.

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EARTHQUAKES IN CHUKOTKA AND THE ARCTIC BASIN

A. P. Lazareva

Permanent seismic observations have been made in the Arctic by a network of stations, a description of which is given in work [1]. Information on the equipment operating at the Arctic stations, their parameters, amplitude-frequency and phase responses are published in the yearly appendices to the Seismological Bulletin of the Network of Key Seismological Stations in the USSR [2].

The basic parameters (φ, λ, h_0, M) of the focal points of the arctic earthquakes are given in the Catalog on Data of the Operational Seismological Bulletin [3]. In some cases magnitudes M are given according to materials from individual Arctic stations, when their values were not given in the Operational Bulletin.

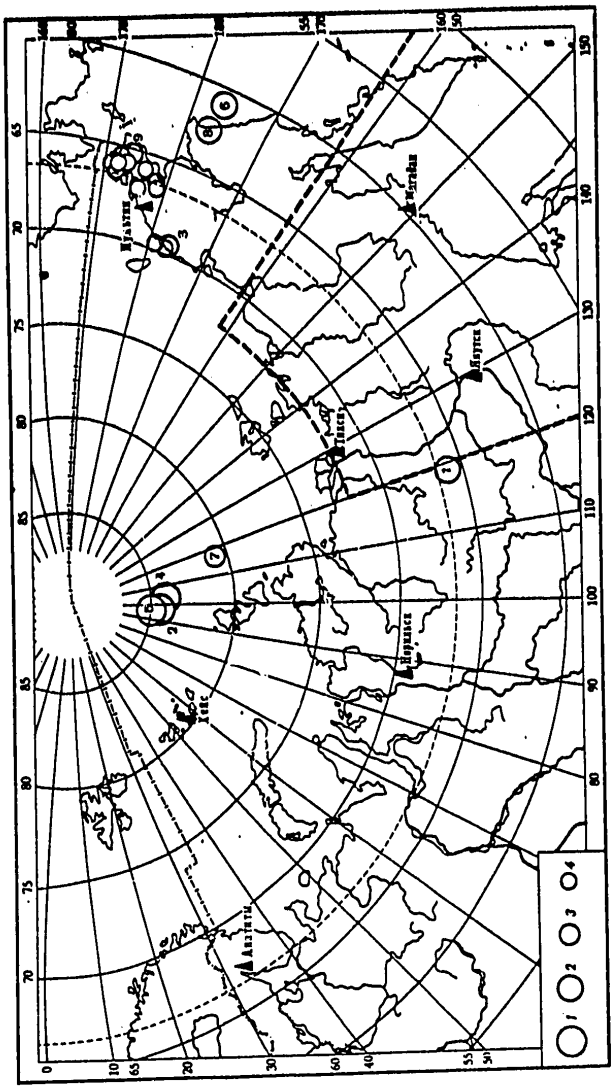
Direct materials from observations (seismograms, bulletins) from seismological stations at Kheys, Noril'sk, Tiksi, Iul'tin, Seymchan and Pulkovo are also used to single out Arctic earthquakes.

Earthquakes with a magnitude of $M < 4$ are usually recorded only by a single nearby station, and for some of them the coordinates of the hypocenter can be determined only according to the data from this station. One of these earthquakes was felt in Iul'tin with an intensity of 3-4 points.

Just as in the preceding years, the seismic activity of the Arctic zone was low. The total seismic energy released in 1975 did not exceed 10^{21} ergs. All the earthquakes for which the basic parameters (φ, λ, h_0, M) were determined are shown on the accompanying map of the epicenters.

Of the four earthquakes with $M > 4$ that occurred in the zone, three were confined to the underwater Gakkelya ridge, and to the precise part of it that passes through the Central Arctic basin.

In addition to the earthquakes included in the catalog, the table gives data on weak earthquakes recorded by only one station, for which it was impossible to determine the coordinates of the hypocenter [4].



Map of Epicenters of Earthquakes in the Arctic Zone in 1975

1--5 ≦ M < 6.2; 2--4 ≦ M < 5; 3--3 < M < 4; 4--K = 8-10

Distribution of Weak Earthquakes ($K \leq 10$) According to Distance of Recording and Energy Classes K

(1) Станция	Число землетрясений (2)		K				
	$\Delta \leq 100$ км	$100 < \Delta \leq 200$ км	6	7	8	9	10
(3) Иультин	7	129	76	42	15	2	1
(4) Тикси	30	22	-	-	-	-	-

(5) Примечание. В Тикси работает только вертикальный канал СКМ-3.

Key:

1. Station
2. Number of earthquakes
3. Iul'tin
4. Tiksi
5. Note. Only an SKM-3 uptake is in operation at Tiksi

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ANTARCTIC EARTHQUAKE ON 15 OCTOBER 1974

S. F. Oborina

During the International Geophysical Year and after it, a number of states, including the Soviet Union, organized 23 seismological stations in Antarctica. The observations of these stations, however, up to 1974 had not revealed a single earthquake on the continent of Antarctica for which the coordinates of the epicenters and other parameters had been determined with certainty. Only very weak shocks were recorded [1-3].

On 15 October 1974 in Antarctica, in the region of the Ots coast there was an earthquake which was registered by many stations in the world, including the stations located in the northern hemisphere. For example, phase of this earthquake was recorded by stations at Iul'tin, Kollmberg, Uzhgorod and others. Stations in New Zealand, South America and South Africa, as well as Australia were drawn in, in addition to the antarctic stations, to determine the coordinates of the epicenter.

The instrumental parameters of the earthquake were: time of occurrence, 07:31:42; coordinates of the epicenter: φ = 70,52°S $\pm$ 7.3 km, λ = = 161.53°C $\pm$ 10.8 km; h = 33 km; m_b = 4.9 [4].

The earthquake occurred south of the seismic loop (south of Macquarie Island), where the Pacific Ocean seismic belt adjoins the seismic belt of the Indian Ocean. The location of this earthquake, just as the location of earthquakes registered in the Balleny Island region [2, 5, 6], confirms the assumption concerning the possible continuation of the Pacific Ocean fold ring from New Zealand to Western Antarctica [7]. The earthquake registered, however, does not remove the question of the low seismicity of the zone of high present-day tectonic activity in Western Antarctica, since the earthquake on 15 October 1974 is the only earthquake of such intensity registered in the entire history of instrument observations in Antarctica.

In 1974 there were two Soviet seismological stations in operation in Antarctica: Mirnyy and Novolazarevskaya. The Mirny station was equipped with a set of SK and SVKM-3 instruments, and the Novolazarevskaya station--with a set of USF , SVKD and SGK instruments [8].

The distance to the epicenter of the earthquake under discussion was 22.6° for the Mirnyy station and 37.6° for the Novolazarevskiy station. Unfortunately, the recording of the bodily waves at Mirnyy was complicated by the superimposing of oscillations connected with the ice pushes in the vicinity of the station. The P-wave was well recorded at the station at Novolazarevskaya. Magnitudes of m_{PV} = 5.2 m_{PH} = 4.9 were determined from the USF equipment. L_g-waves (with a velocity of 3.51 km/sec) and R_g-waves (with a velocity of 3.01 km/sec) were clearly recorded by all the available instruments at both stations. The arrival of a wave at 07:42:06 [4] with a velocity of 3.49 km/sec was singled out at the South Pole station, which makes it possible also to identify it with the L_g-wave. The earthquake on 15 October 1974 is the first earthquake in Antarctica for which short-period waves were registered. The paths from the epicenter to the stations at Mirnyy, Novolazarevskaya and the South Pole encompass the entire territory of Eastern Antarctica, and the presence of the L_g and R_g waves on the recordings of these stations again confirms its continental structure.

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STRONG EARTHQUAKES IN THE WORLD

N. V. Shatornaya

A survey was made, with respect to the strong earthquakes in the world ($M_{LH} \geqslant 6.0$, $m_{pv} \geqslant 6.0$) of the geographical position of the epicenters and the distribution of the amount of seismic energy for the main seismoactive zones, and the available macroseismic information was given for certain earthquakes.

Included in the category of strong earthquakes are the seismic occurrences with a magnitude of surface waves of $M_{LH} \geqslant 6.0$ with the focal depth of the earthquake $h < 100$ km and with the magnitude of the bodily waves $m_{pv} \geqslant 6.0$ with a depth of $h \geqslant 100$ km.

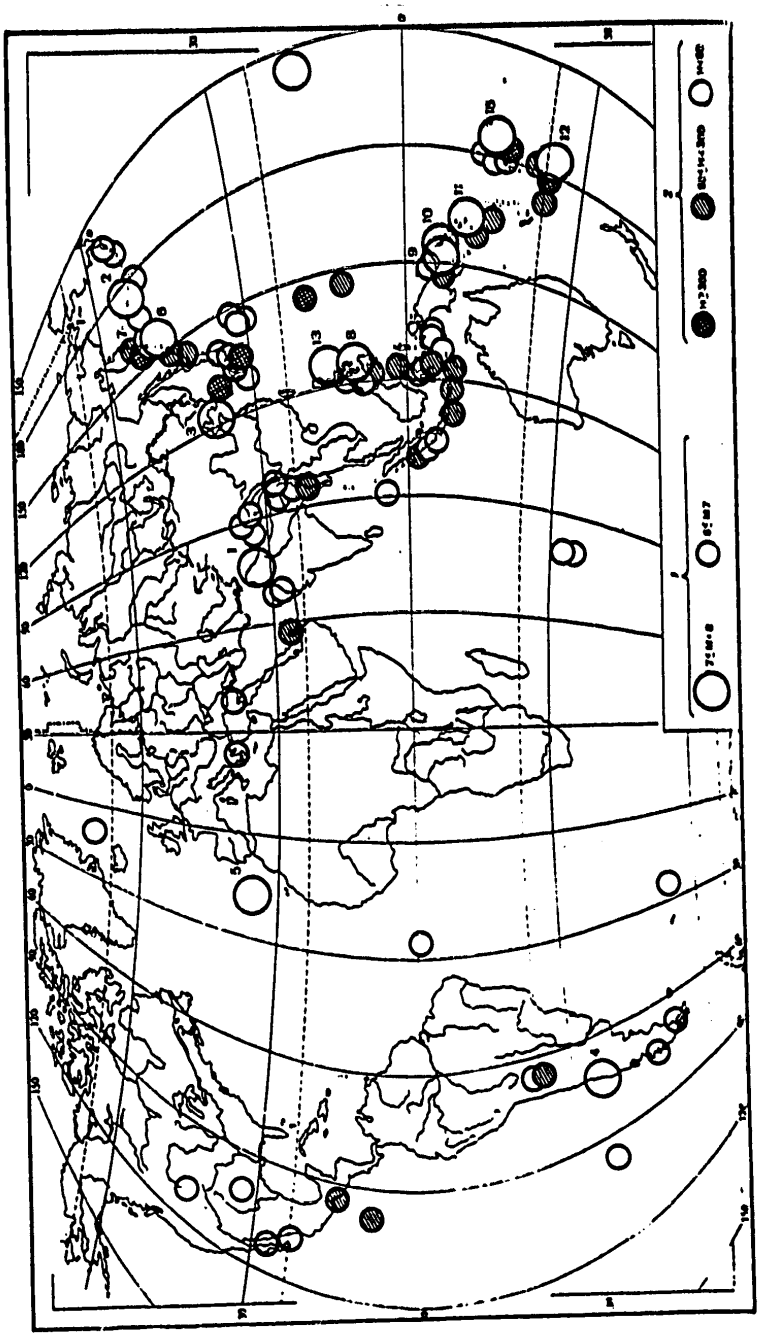
The survey of strong earthquakes in the world in 1975 was made in accordance with materials from the Operational Bulletin of the Unified System of Seismic Observations of the USSR.

The catalog gives the basic parameters of the focal points of the strong earthquakes.

The distribution of the number of strong earthquakes in the world, depending on the value of their magnitude, is given in Table 1, where the 1975 data are compared with the corresponding average values for the preceding 10 years.

It can be seen from Table 1 that in 1975 the frequency of earthquakes with varying magnitude does not exceed the limits of standard errors of the average annual frequency of strong earthquakes.

The geographical position of the epicenters of strong earthquakes in the world in 1975 is shown in the diagram. As can be seen, it does not essentially differ from that for the preceding years: the overwhelming number of earthquakes (85%) occurs in the Pacific Ocean seismic belt, 11 percent--in the Eurasian, and the remaining occurrences (4%) in the Atlantic, Indian and Arctic belts.



Map of Epicenters of World Earthquakes With M (m_b) = 6 in 1975

1--magnitude; 2--depth of focus, in km

Table 1.

(1) Год	Число землетрясений в интервале M (2)			(3) Всего
	$6,0 \leqslant M < 6,8$	$6,8 \leqslant M < 7,8$	$M \geqslant 7,8$	
1965	87	46	1	134
1966	74	11	2	87
1967	79	13	-	92
1968	125	26	1	152
1969	100	23	2	125
1970	105	30	-	135
1971	99	19	3	121
1972	108	20	2	130
1973	142	9	2	153
1974	211	25	1	237
(4) Среднее за 10 лет	112,1±33,0	22,2±8,9	1,4±0,5	136,6±36,1
1975	101	26	1	128

Key:

1. Year
2. Number of earthquakes in interval M
3. Total
4. Average in 10 years

The seismic energy released from the focal points of the strong earthquakes was estimated for the earthquakes under discussion according to the formula [1-3]

$$\lg E = 11.8 + 1.5\, M_{LH} = 5.8 + 2.5\, m_{pV} \text{ erg.} \qquad (1)$$

The distribution of total energy for the seismoactive zones of the world, shown in Table 2, corresponds in general to the distribution of the number of earthquakes for these zones.

For example, the greatest amount of energy (68%) falls in the Pacific Ocean seismic belt, and the least--in the Arctic (less than 0.1). The exception is the Atlantic belt, where 14 percent of the energy goes to two earthquakes, which is commensurable with the energy released in the Eurasian belt (17.9%) with a much greater number of earthquakes. This large amount of energy in the Atlantic belt is connected with the earthquake on 26 May with $M_{LH} = 7.9$. It was the strongest occurrence of the year. We do not have the data on the perceptible quality of this earthquake, since its epicenter was located in the Atlantic Ocean, north of the Madeira islands.

Some of the 1975 earthquakes were destructive. The earthquake on 19 January at 08:02, which occurred on the border of India and China, was felt with an intensity of 7 points at the epicenter. In a number of northern cities in India buildings were demolished and people were killed. The shocks from the earthquake were felt even in Delhi. (PRAVDA, 21 January 1975, MOSKOVSKIY KOMSOMOLETS, 21 January 1975).

Table 2. Spatial Distribution of Total Seismic Energy in 1975

(1) Сейсмический пояс	(2) Число землетрясений (N)			$\frac{N}{N_{общ}}$, %	$E \cdot 10^{22}$, эрг	Количество (3) энергии, %
	$6,0 \leqslant M < 6,8$	$6,8 \leqslant M < 7,8$	$M \geqslant 7,8$			
(4)Тихоокеанский	88	21	-	85	215,5	68,0
(5)Евроазиатский	11	3	-	11	56,6	17,9
(6)Атлантический	1	-	1	1,6	44,2	14,0
(7)Индийский	2	-	-	1,6	0,2	~0,1
(8)Арктический	1	-	-	0,8	0,5	

Key:

1. Seismic belt
2. Number of earthquakes (N)
3. Amount of energy, %
4. Pacific Ocean
5. Eurasian
6. Atlantic Ocean
7. Indian Ocean
8. Arctic Ocean

Several famous Buddhist monasteries were damaged in the north of India, 10 villages were completely destroyed and 2,500 persons were left homeless (BULL. SIESM. SOC. AMER., No 5, 1975).

The earthquake on 23 January at 14:19 (Japan) was felt at the Kumamoto prefecture with an intensity of 4 points and at the Miyadzaki prefecture--with an intensity of 3 points according to the 7-point scale adopted in Japan (SOVETSKAYA ROSSIYA, 25 January 1975). There were 15 landslides and many roads were damaged (BULL. SEISM. SOC. AMER. No 5, 1975).

The earthquake on 2 February at 08:43 at the Andreanov islands of the Aleutian arc, with M = 7.3, had a maximum magnitude at the epicenter of 9 points. Most of the roads were destroyed. The formation of sand spouts was observed. The aftershock of this earthquake, which occurred on 9 February at 11:01, was also strong (M = 5.6), as the result of which new cracks were formed and some old ones, formed as the result of the main shock, were closed (BULL. SEISM. SOC. AMER., No 5, 1975).

The earthquake on 4 February at 11:36 in China, with M = 7.7, had a magnitude of 8 points at the epicenter, and in the coastal area of the USSR--up to 6 points (PRAVDA, 6 February 1975;TRUD, 6 February 1975; KOMSOMOL'SKAYA PRAVDA, 6 February 1975). Negligible destruction was noted at Seoul (South Korea), and the earthquake was recorded in Japan. The shocks were felt even in Beijing, 570 kilometers away from the disaster area. As a correspondent of the London newspaper, DELHI-TELEGRAPH, reported from Beijing, the main railroad line was destroyed and the petroleum pipeline was considerably damaged (ZA RUBEZHOM, No 8, 1975).

As the result of the earthquake on 13 March at 15:26, in La Serena, 400 kilometers north of Santiago, there was destruction and death (PRAVDA, 15 March 1975).

On 5-6 April, four underground shocks in the course of 24 hours (on 5 April at 16:52, with M = 6.0, at 17:50, with M = 6.1; on 6 April at 09:55, with M = 7.0, at 10:34, with M = 6.8) were felt in the southern part of the Kamchatka peninsula. The intensity of the underground shocks at the epicenter reached 6 points (southeast of Petropavlovsk-Kamchatka). There was no destruction (SOVETSKAYA ROSSIYA, 8 April 1975).

The earthquake on 10 June at 13:47, southeast of Kunashir Island (Kuril islands) was underwater (M = 7.3). Approximately 2.5 hours later, a sea level rise up to 90 cm was recorded on the coast of Kunashir Island. The destructive aftereffects of the earthquake and tsunami on the Kuril islands was not noted (SOVETSKAYA ROSSIYA, 12 April 1975).

The province of Diyarbakir suffered particularly in an earthquake on 6 September at 0900 hours (Turkey). Over 14,000 structures were destroyed or partially damaged, and of them about 7,000 were completely demolished (SOVETSKAYA ROSSIYA, 29 September 1975). In the province's regional center --Lidje--about 3,000 persons died (PRAVDA, 8 and 11 September 1975).

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ADDITIONAL PARAMETERS OF FOCAL POINTS OF STRONG EARTHQUAKES

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1. Observations With Standard Equipment

The Obninsk Central Seismological Division calculated the spectrums of Ω-waves for five strong earthquakes on USSR territory and boundary areas in a range of magnitude of M = 6.7-7.3, and five strong earthquakes in the world, with $M \geqslant 7.0$ from recordings on standard instruments. On the basis of this, an analysis was made according to the method described in [1-5], and additional parameters of the focus were obtained (M_0 --the seismic moment, L--the length of the fault, $\bar{U}$--the amount of shift, $\Delta\sigma$--the faulted stress). The main information on these earthquakes is given in the Basic Catalog and Catalog of Strong Earthquakes in the World.

Figures 1 and 2 give examples of the recordings and experimental spectrums. The spectrums have common features: sharply increasing amplitude in the range $T > 100$ sec, comparatively even long-period maximum (in the range of $T \sim 30$-40 sec) and an uneven, rapidly dropping short-period branch.

The level of the spectral density Ω_0 corresponds to a horizontal straight line, approximating the long-period, relatively even part of the spectrum. The frequency corresponding to the start of the decay in amplitude of the spectrum (f_1) was taken as the angular frequency f_1 .

The rising branch in the range of periods of about 100 seconds and more (Fig. 1, a, 2, b) was not taken into account, since it is related to the long-period noises of the seismic equipment.

Table 1 shows the values of the parameters of the computed spectrums Ω_0, and the results of determining the parameters of the focal points, and the amounts of energy E, calculated according to the magnitude M_{LH} and E_S, computed according to the formula of B. V. Kostorov [6], allowing for dislocation at the focus U and the faulted stress $\Delta\sigma$:

$$E_S = \frac{1}{2}\,\Delta\sigma\,\bar{U}A.$$

Table 1. Additional Parameters of Focal Points of Earthquakes

Date	Region	Time at focus, hr m s	M_{LH}	m_{PV}	Δ^0	τ, c
1 Jan	India-China	08 02 03	7,0	7,0	36,9	80
2 Feb	Aleutian islands	08 43 39	7,3	6,8	67,8	147
4 Feb	China	11 36 07	7,7	7,0	55,7	125
6 Mar	Kamchatka pen.	09 55 18	6,8	6,3	63,0	140
10 Jun	Kuril islands	13 47 15	7,3	6,4	65,9	151
13 Jun	Same	18 08 14	7,2	7,1	64,8	136
22 Jun	"	22 44 11	6,7	6,5	65,5	140
10 Jul	Phillipines	18 29 11	7,0	6,8	84,8	180
15 Aug	Komandorskiy isl.	07 28 22	6,9	6,9	63,2	139
31 Oct	Phillipines	08 28,03	7,6	7,6	79,3	181

Note. Here and elsewhere in the tables the values E and E_s are in ergs.

This table gives the epicentral distances to Obninsk and the ranges τ of digitizing the recordings of the P-waves, which change according to the epicentral distances within a range of 80-180 seconds.

We will discuss the special characteristics of the recordings of the spectrums and the results of their analysis for various regions.

The earthquakes on 10, 13 and 22 June occurred in the same focal zone and had similar depths (30-45 km). The nature of the recordings and type of spectrums for them is different, however. The recordings of the -waves and spectrums for 13 and 22 June are identical. On the recordings of the SKM and SD instruments, a sharp build-up in amplitude is observed in the course of the first 3-5 sec, and then the build-up nature of the recording is retained up to 20 sec from the beginning of the appearance. The spectrums for these earthquakes are identical in shape, and the level for the on 13 June is an order higher than for 22 June, as would be expected for earthquakes with a sharp difference in magnitudes. Apparently the earthquake on 22 June is an aftershock of the earthquake on 13 June.

For the earthquake on 10 June, the onset time of the maximum phase on the SKM recording falls at the 45th second from the beginning of the recording; at the same time, a series of individual wave groups with clear-cut onsets, preceding the maximum phase, is noted. On the SD instrument this tendency is also maintained, the recording is irregular and the long-period maximum is noticeably complicated by the high-frequency oscillations. The long-period maximum of the spectrum for this earthquake was shifted toward the larger T (T = 62 sec) as compared with the earthquake on 13 June, where

Ω_0, 10^2 см/с	f_0, 10^2 Гц	M_0^*, 10^{26}, дин · см	r, км	$\Delta\sigma$, бар	l, см	lg E	lg E_S
1,6	4,6	2,1	53	0,6	8	22,3	20,4
1,9	3,3	4,8	68	0,7	11	22,8	20,7
1,3	4,0	2,2	56	0,6	7	23,4	20,3
0,4	5,6	1,0	44	5,1	5	22,0	20,9
2,6	2,6	10,0	112	0,3	9	22,8	20,7
3,6	6,9	13,5	42	8,0	90	22,6	22,3
0,3	8,7	1,1	33	1,3	11	21,9	20,4
2,3	4,6	11,6	63	2,0	31	22,3	20,6
0,4	9,5	1,5	31	2,2	17	22,2	20,8
10,0	8,0	44,0	36	41	360	23,2	23,5

T_{max} is K-25 sec. For the earthquake on 10 June, in addition to the basic maximum, two additional ones were observed with periods of T = 23 and 14 sec, the amplitudes of which were similar to the amplitude of the longest-period maximum. The value of the level of spectral density for the earthquake on 10 June is commensurate with that for the earthquake on 13 June.

On the basis of the analysis, it may be assumed that, despite the proximity of the spatial-temporal coordinates of the earthquakes on 10 and 13 June, they are independent events.

With respect to the nature of the recordings and spectrums, the earthquakes on 6 June, 13 and 22 June are similar, even though these events are confined to different regions (Kuril and Kamchatka).

The earthquake on 2 February (Aleutians) resembles the earthquake on 10 June in the shape of the recording and spectrum: both are characterized by a gradual increase in amplitude on the SKM and irregularity of the recording on the SD; their spectrums in the long-period range are also similar. In the short-period range, however, the characteristic slope of the spectrums differs--the spectrum of the earthquake on 10 June drops more sharply.

The spectrum of the earthquake on 15 August (Komandorskiy islands) is highly uneven, both in the short- and long-period ranges, and has a very low value of spectral density and high value of angular frequency as compared with the other earthquakes with similar magnitude. This type of spectrum and complex nature of the SKM recording--the presence of a clear-cut second group of waves with amplitudes considerably exceeding those of the first group--apparently reflects the complex process of the fault formation at the focus of this earthquake.

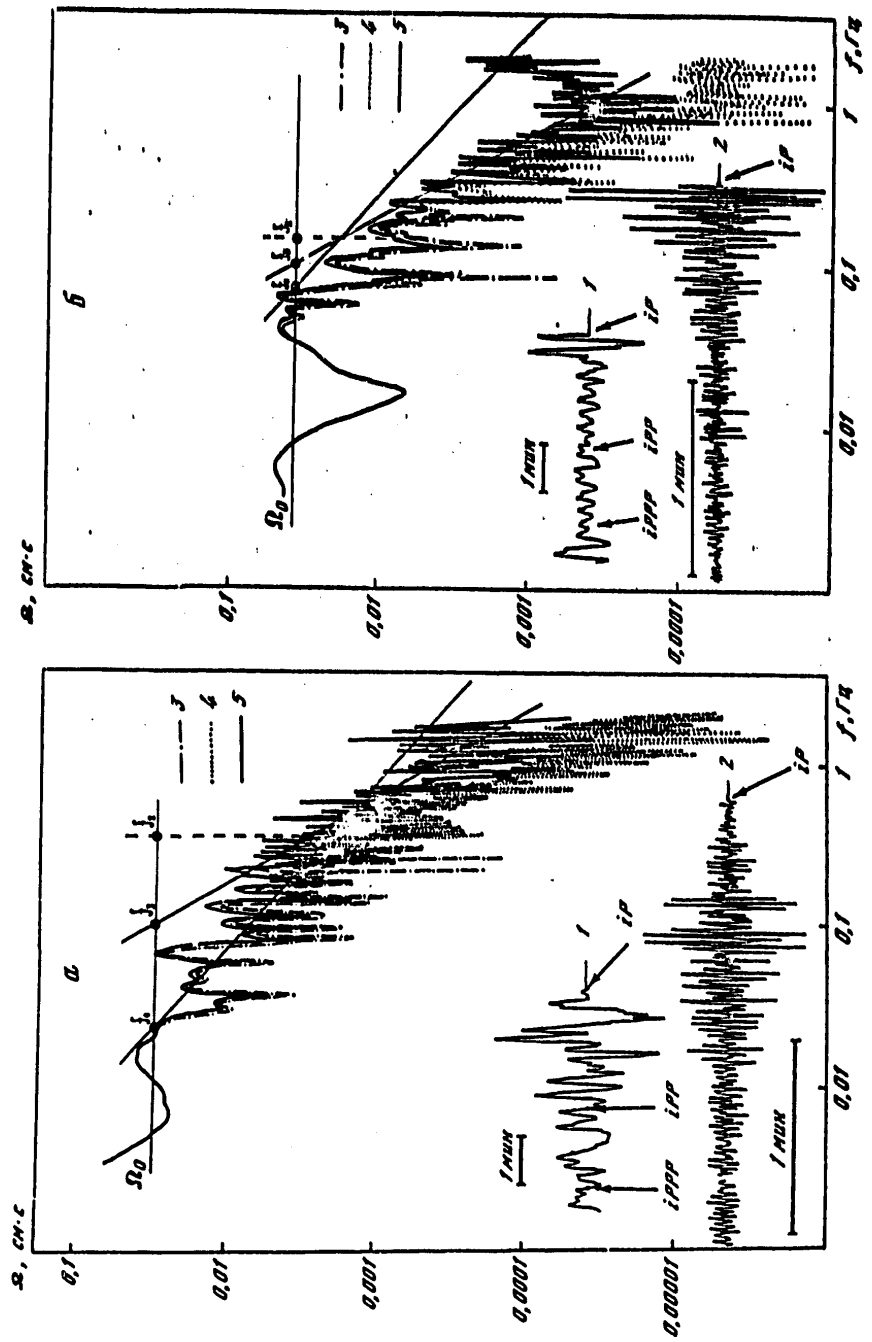

Figure 1., a and b [Key on following page]

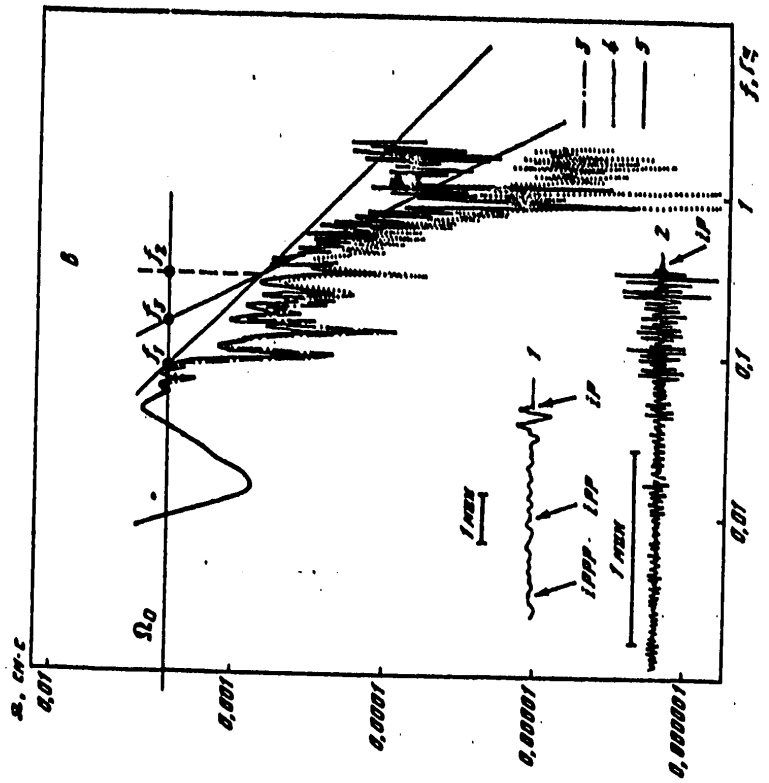

Figure 1. Recordings (1, 2) and Amplitude Spectrums (3-5) of P-waves for Earthquakes

a--10 June, with M = 7.3, Δ = 66.4°;
b--13 June, with M = 7.2, Δ = 65.4°;
c--22 June, with M = 6.7, Δ = 65.5°;
1, 3--SD (П-10); 2, 4--SKM; 5--combined spectrum, corrected for absorption

Figure 1, c.

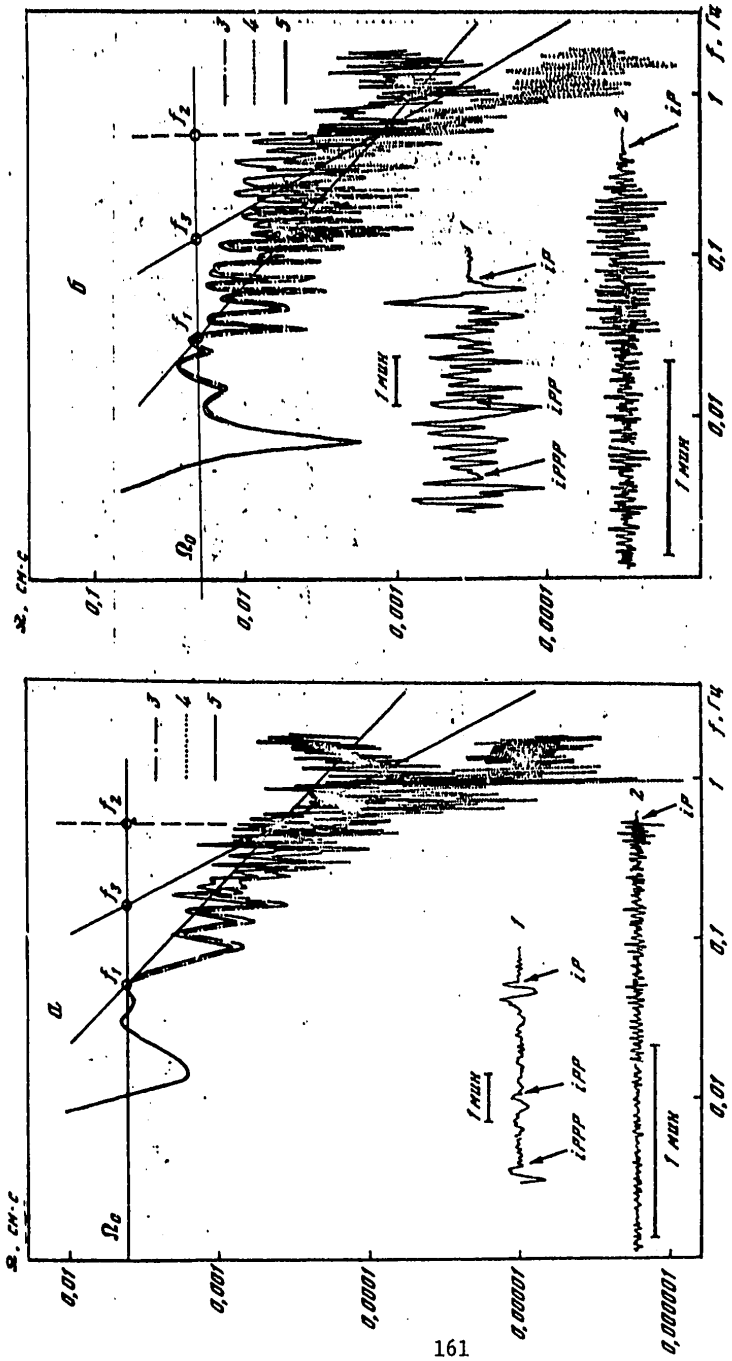

Figure 2. Recordings (1, 2) and Amplitude Spectrums (3-5) of P-Waves for Earthquakes

a--2 February with M = 7.3, Δ = 67.8°; b--6 April, with M = 6.8, Δ = 63.0°; 1, 3--SD (Ш-10); 2. 4--SKM; 5--combined spectrum allowing for absorption

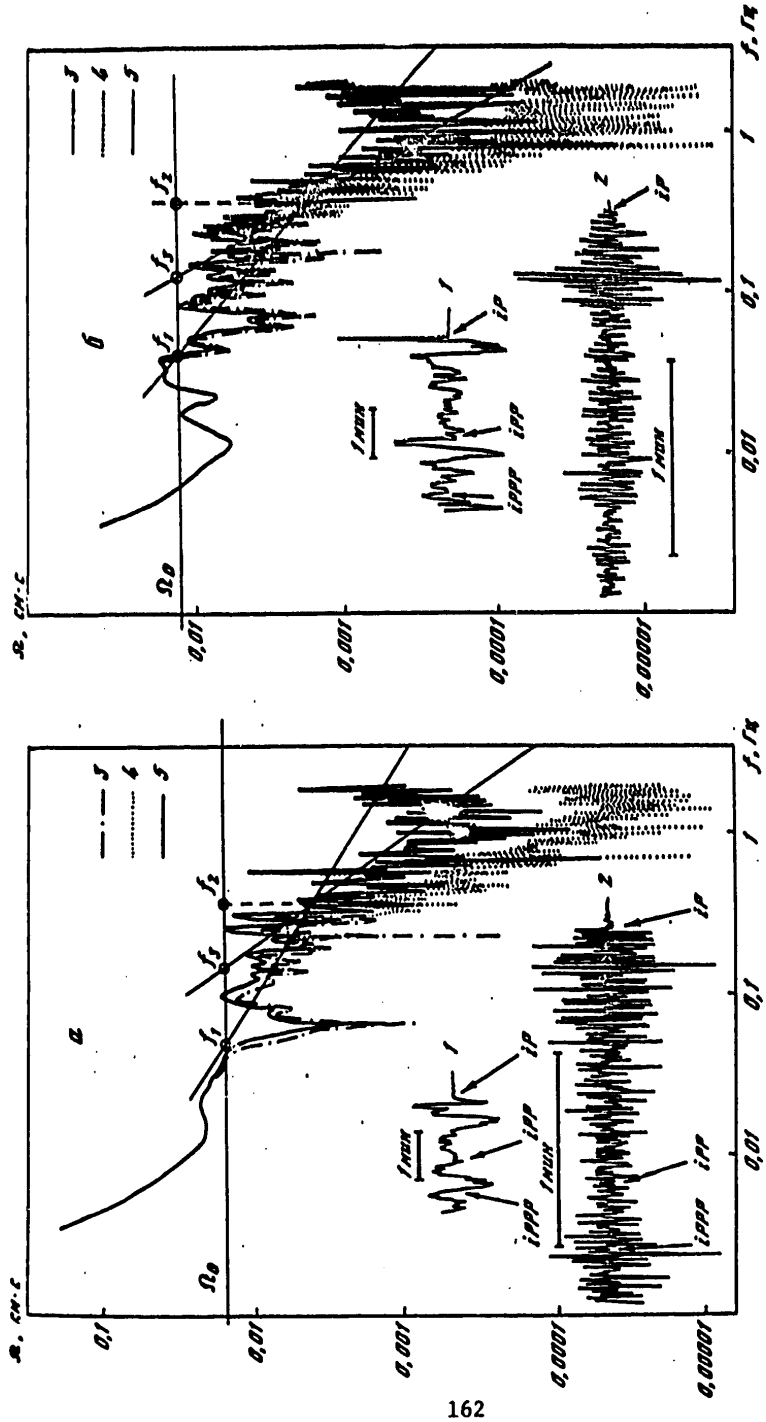

Figure 3. Recordings (1, 2) and Amplitude Spectrums (3-5) of P-Waves for Earthquakes

a--19 January with M = 7.0, Δ = 36.9°; b--4 February, with M = 7.7, Δ = 55.7°; 1, 3--(SD) (П-10); 2, 4--SKM; 5--combined spectrum, allowing for absorption

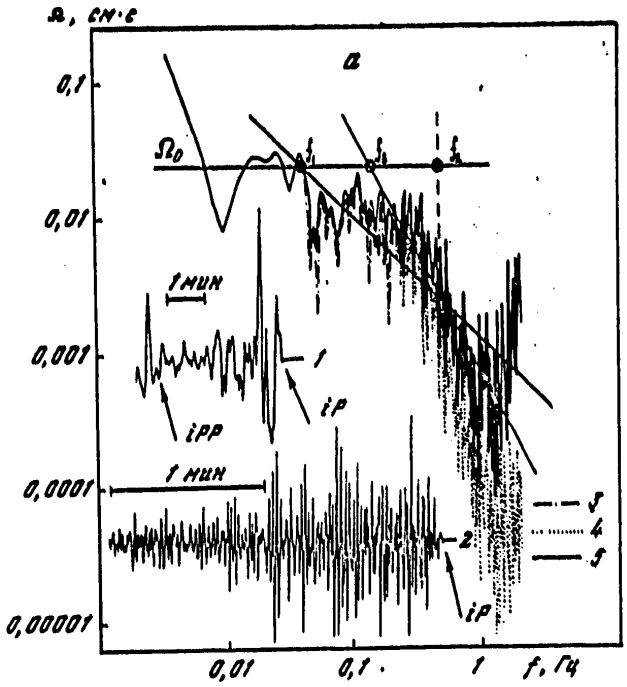

Figure 4. Recordings (1, 2) and Amplitude Spectrums (3-5) of P-Waves for Earthquakes

a--10 July with M = 7.0, Δ= 84.8°; b--31 October with M = 7.6, Δ = 79.3°; 1, 3--SD (П-10); 2, 4--SKM; 5--combined spectrum allowing for absorption [Figure 4, a on following page]

The earthquakes from the regions of India on 19 January and China on 4 February have identical magnitudes m_{pv} (7.0) and different M_{LH} (7.7 and 7.0) with similar values for the depths of the focal points. The recordings of the P-waves on the SD instrument are similar in shape and the maximum amplitudes fall in the first visible period. On the SKM instrument they differ to a greater extent; a build-up in the amplitude of the oscillations is characteristic of the earthquake on 4 February, in contrast to the one on 19 January, where a whole group of oscillations is observed, the amplitude of which is commensurable with the maximum (Fig. 3). The spectrums of the P-waves for these events are close to each other in the range of the short periods; in the long-period range, the spectrum of the earthquake on 4 February has a sharply marked dome-shaped maximum, while this part of the spectrum for the earthquake on 19 January has the shape of steps. The levels of their Ω_0 and frequency f_0 are almost identical.

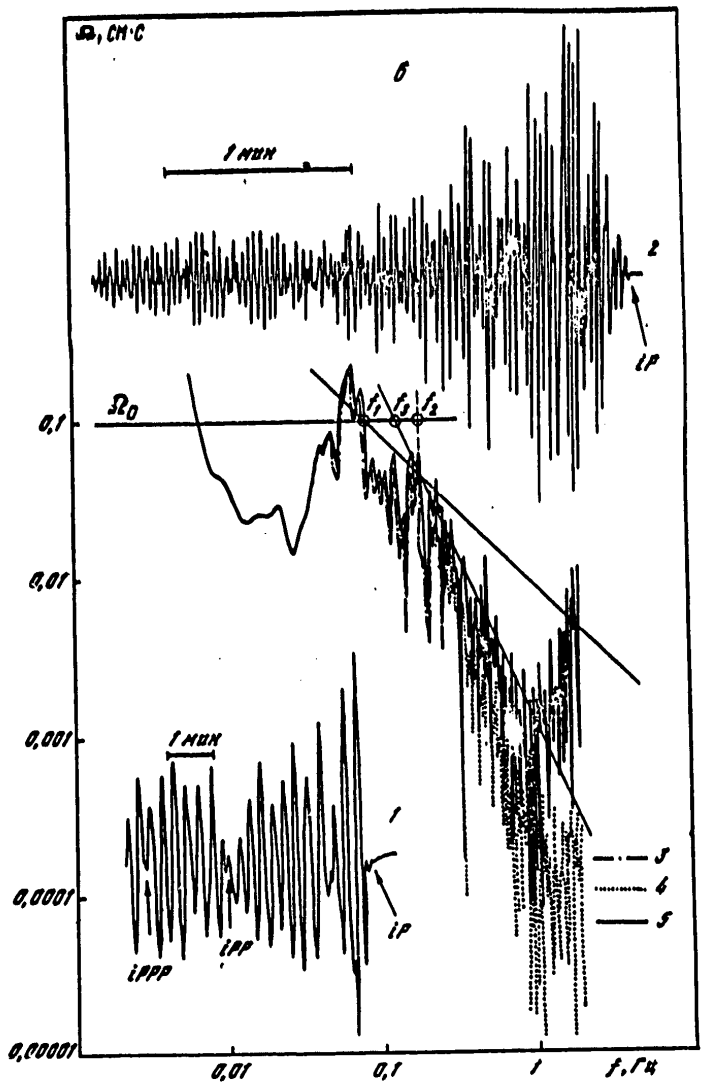

Figure 4, b [Description on preceding page]

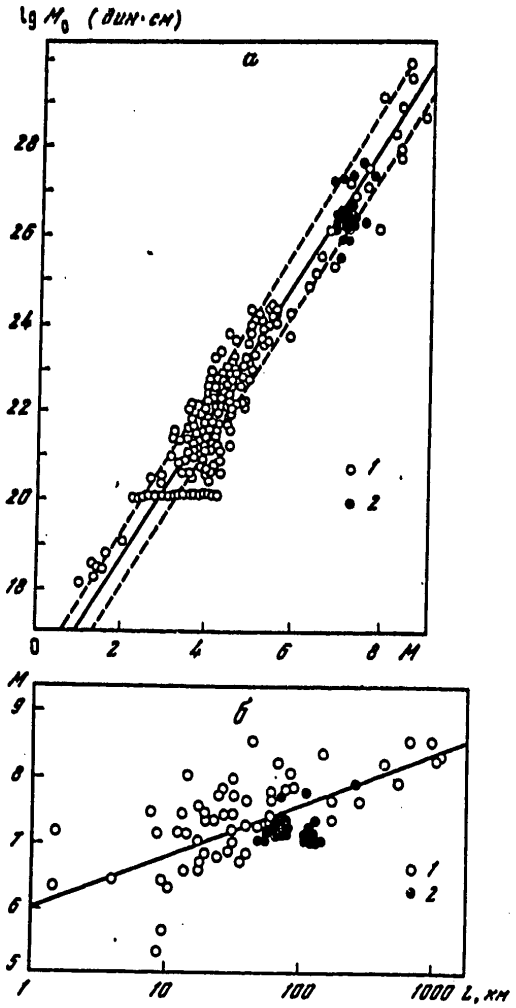

Figure 5. Graphs of the Relation of the Seismic Moment M_0 and Length of the Fault L to the Magnitude of the Earthquake M

a--$M_0 = f(M)$: 1--data [7],]--our determinations, b--$M = f(L)$: 1--data [8], 2--our determinations

The earthquakes from the region of the Philippines on 10 July and 31 October are characterized by different magnitudes m_{PV} (6.8 and 7.6) and M_{LH} (7.0 and 7.6), with an identical focal depth. The recordings of the P-waves on SKM instruments and short-period parts of the spectrums with $T < 5$ sec are similar for these earthquakes, while on the SD instruments, both the recordings and spectrums corresponding to them differ sharply (Fig. 4). For the earthquake on 10 July the maximum amplitude of the recording is located within the first visible period ($T \sim 30$ sec) of oscillations, complicated by high frequency, and the remaining part of the recording up to the waves is characterized by much lesser amplitude. For the earthquake on 31 October, all the oscillations in the P wave have the same period--~ 16 sec, with amplitudes similar in value. The long-period parts of the spectrums also differ from each other: for the earthquake on 10 July the maximum spectral amplitude falls at 40 sec, for the earthquake on 31 October--at 16 sec, and it is more sharply marked. Therefore we have for the stronger earthquake an unusually high value of angular frequency f_0, while the levels of the spectral densities Ω_0 correspond to their magnitudes.

It can be seen from Table 1 that for earthquakes in the range of magnitudes of 6.7-7.7, the values of the seismic moment vary from $1.0 \cdot 10^{26}$ to $44 \cdot 10^{26}$ dynes·cm, the lengths of the fault $L = 2r$ --from 62 to 190 km, of the faulted stress $\Delta\sigma$ --from 0.3 to 41 bars, the shifts along the fault $\bar{U}$--from 5 to 360 cm. The amounts of energies E and E_S differ on the average by two orders of magnitude.

It should be noted that individual estimates of the values $\Delta\sigma$ and $\bar{U}$ have a reliability, since the value r enters the calculation formulas in the second and third degree; therefore, even small variations in the r may lead to a substantial difference in the individual values of $\Delta\sigma$ and $\bar{U}$.

Figure 5, a shows the values that we obtained for the seismic moment M_0 for strong earthquakes in 1974 and 1975, depending on the magnitude M. Here the straight line represents the mean correlational relationship of the form [7]

$$\lg M_0 \pm 0.7 = 25.0 \pm 1.6 \cdot (M-6)$$

As can be seen from the diagram, our results are within the confidence intervals of the average straight line.

Figure 5, b gives the values of L in relation to M for the same earthquakes. It can be seen that the estimated values mainly satisfy the straight line equation $M = 6.04 \pm 0.79 \lg L$ [8].

Therefore, the estimative values of the dynamic parameters of M_0 and L, obtained for the range of magnitudes 6.7-7.8 according to the observations of the Obninsk station are in satisfactory conformity with the literary data.

2. Observations by a Frequency-Selective Seismological Station (ChISS)

The spectrums of 11 strong earthquakes were examined. According to the data from the equipment of the frequency-selective seismological station, the magnitude m_{max}^{ChISS} and the period T_{max}^{ChISS} were determined, to which this magnitude corresponded. The results of the determinations are given in Table 2.

Table 2. Magnitudes According to Data of Frequency-Selective Seismological Station and Corresponding Periods

№ (1) п/п	Дата (2)	(3) Время в очаге, ч м	Δ обн.	$m_{max}^{ЧИСС}$	$T_{max}^{ЧИСС}$
1	6.IV	09 55	63,0	6,4	2,4
2	6.IV	10 34	63,1	6,5	1,3
3	10.VI	13 47	65,9	7,1	2,6
4	10.VI	14 37	66	6,8	1,3
5	10.VI	14 58	65,9	6,9	1,3
6	10.VI	15 21	65,8	7,0	1,3
7	13.VI	18 08	64,8	7,2	1,3
8	15.VI	00 19	64,8	7,2	2,8
9	23.VIII	13 51	61,1	6,3	2,8
10	15.VIII	07 28	63,2	7,2	2,8
11	21.XII	10 54	60,6	6,8	1,3

Key:
1. No, in order
2. Date
3. Time at focus, hrs, min

The values of the oscillatory velocity A/T in the corresponding periods according to the data of the frequency-selective seismological station at Obninsk are given in Table 3. In the graph, T_1-T_2 place the boundary periods of the active band of the spectrum at a level of 0.5 from $(A/T)_{max}$, and in the graph for τ , data are given on the duration of formation of the maximum of the p-wave for each filter channel.

The series of Kuril earthquakes that began with a strong shock on 10 June at 1300 hours arouses great interest. Among the subsequent shocks of this series were two earthquakes of essentially the same magnitude as the main shock, but in contrast to the first (main) one, they were not accompanied by tsunami. The ChISS spectrums of the P-waves of the earthquake on 10 June (No 3) and its five aftershocks (No 4-5) are shown in Figure 6 and in Table 3.

The changes in the ChISS-spectrums of the Kuril earthquakes, depending on the magnitude of the earthquake and the depth of the focus, fit into the same conformances to principle that were noted for earthquakes in this zone earlier. For example, the ShISS spectrums of the weaker aftershocks (No 4-6) are triangular, and the spectrums of the main shock and the two

strong aftershocks (No 3, 7, 8)--trapezoidal. The spectrums of the earthquakes Nos 7, 8 coincide, and therefore, in Figure 6 the spectrum of aftershock No 7 is not plotted. The active band of the spectrums T_1 and T_2 for the aftershocks expands in proportion to the increase in magnitude of the earthquakes toward the long periods. For the relatively weak shocks (No 4-6), the period T_2 changes from 2.2 to 3.8 sec, for the strong ones (7,8) it increases to 6.2). The ChISS spectrum of the earthquake on 10 June differs from the ChISS-spectrums of its aftershocks Nos 7 and 8 in that its active band is substantially broader (T_1-T_2 = 0.8-15 sec).

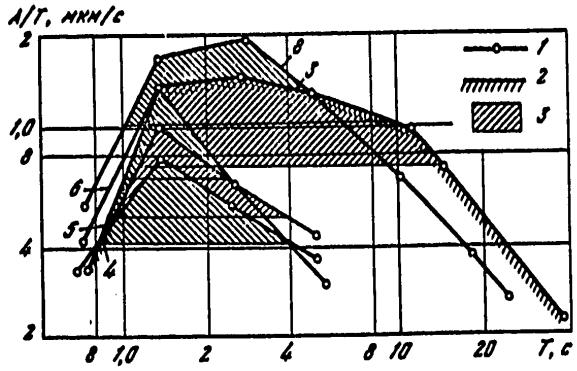

Figure 6. ChISS-Spectrums of the P-waves of the Kuril Earthquakes

1--spectrums of the non-tsunamigenic earthquakes; 2--tsunamigenic earthquake; 3--active band of the spectrum at a level of 0.5 of the maximum. Figures near the curves--number of the earthquakes

The reflection of the spectral and temporal parameters of the seismic waves is given by the time-and-frequency field of intensity of the type $\dot{A} = \dot{A}(\tau, t)$, the method of plotting of which is described in works [9-11]. These fields for earthquakes Nos 3 and 8 are shown in figures 7 and 8, where along the horizontal axis the time τ is set down alongside the seismogram, and along the vertical axis--the period T, in seconds. The isolines $\dot{A} = \dot{A}/T$ = const are made every 0.25 units of magnitude. Table 4 gives the parameters of the time-and-frequency fields of these earthquakes; $4\tau_{A_1}$ is the build-up time of the maximum; T_1, T_2--the boundary periods of the isoline at the level of 0.5 of the maximum; t_1, t_2--the temporal boundaries of the isoline at the level of 0.5 of the maximum; S--the conditional area outlined by isolines 0.5 A; $S = (t_2 - t_1)(\lg T_2 - \lg T_1)K$, where K is the coefficient of charge.

It can be seen from figures 7 and 8 that the nature of the time-and-frequency fields of earthquakes Nos 3 and 8 are different. In the time-and-frequency field of the aftershock on 15 June (Fig. 8) a single energy burst is noted, which may indicate that the main energy with the earthquake was released at

Table 3. Spectral Distribution of Oscillation Velocity $(A/T)_{max}$

(1) № п/п	1			2			3			4		
	t	T	A/T	t	T	A/T	t	T	A/T	t	T	A/T
1	3	0,7	0,34	4	1,3	0,82	4	2,4	0,55	4	5,0	0,42
2	3	0,7	0,36	3	1,3	1,0	3	2,4	0,66	5	5,0	0,44
3	2	0,7	0,41	2	1,3	1,14	3	2,4	0,66	7,0	5,2	0,30
4	6	0,7	0,88	6	1,3	2,08	7	2,8	2,06	8,0	4,8	1,11
5	7	0,7	0,55	7	1,3	1,75	7	2,8	1,98	9,0	4,8	1,22
6	1	0,7	0,18	1	1,3	0,26	3	2,4	0,36	4	4,0	0,31
7	2	0,7	0,17	2	1,3	0,42	4	2,4	0,32	8	6,0	0,22
8	4	0,7	0,16	4	1,5	0,29	6	2,8	0,32	7	4,8	0,20
9	6	0,7	0,23	14	1,3	0,90	16	2,8	1,88	18	5,6	0,83
10	5	0,7	3,08	7	1,3	3,22	7	2,4	1,92	8	5,2	0,94
11	13	0,7	0,09	17	2,0	0,25	23	2,4	0,26	25	4,5	0,12

Symbols: T--period in sec; A/T--in μm/sec; t--in sec; 1,2,...--number of

* Additional points

an interval of from 4 to 9 sec from the beginning of the onset of the P wave in periods of 1.0-6.0 sec. The maximum value $(A/T_{max} = 1.96 \mu m/sec$ is reached by the oscillatory velocity at the 7th second.

The time-and-frequency field of the tsunamigenic earthquake on 10 June was of a complex form. Four power flash-ups are recorded on it, with the first, comparatively weak and brief, being released only at the 25th second from the beginning of the onset of the P wave. The second flash-up, observed from the 31st to the 55th seconds in a range of periods of 1.1-8.0 sec, has the highest value of oscillatory velocity $(A/T_{max} = 1.50 \mu m/sec$. The time-and-frequency field terminates in two flash-ups, approximately equal in intensity and duration, with one of them being formed in short periods of 1.1-3.3 sec, and the second limited to periods of 9-15 sec.

Additional parameters of the focus were determined for the three earthquakes from the observations of the ChISS. The ChISS-spectrums, consisting in general of three branches, are similar in form to the theoretical spectrums for Brune's model [1], calculated for oscillatory velocity. Therefore, in determining the parameters of the focus, Brune's formulas were used, modernized for the instance of P-waves by Wyss and Hanks [2, 3].

When comparing the data from a time-and-frequency analysis using the ChISS instruments with the data from the traditional Fourier analysis, one must bear in mind the differences between these two approaches, pertaining not only to the methods of analysis, but also to the temporal interval of the

5			6			7			8			$T_1 - T_2$
t	T	A/T	t	T	A/T	t	T	A/T	t	T	A/T	
												0,7–3,8
												0,8–3,6
												0,9–2,2
12	10	0,76	29	20	0,46	33	28	0,26				0,8–6,2
							40°	0,16				
15	10	0,66	25	18	0,36	33	24	0,25				1,0–6,0
							40°	0,12				
11	10	0,19	27	20	0,12	33	28	0,09				0,7–11
							40°	0,05				
12	12	0,13										0,8–6,3
10	3,7	0,09										0,7–5,7
18	10	0,54	19	17	0,22	22	24	0,11				1,4–5,2
							40°	0,06				
13	12	0,50	15	19	0,32	31	26	0,22	35	42	0,14	28
							40°	0,12		75°	0,06	
27	28	0,06										1,0–4,2

T_1-T_2--active band of the spectrum

wave being analyzed. The ChISS spectrum pertains to the part of the focal emission maximum with respect to energy. First the ChISS-spectrums A(T), which characterize the frequency distribution of the maximum values of oscillatory velocity in the wave, were rearranged into spectrums of the average values of oscillatory velocities $A_c(T)$, characterizing the spectral density [12]. For this the ChISS-spectrum was multiplied by the frequency-dependent coefficient $T^{0.27}$ [13], which on the graphs in the logarithmic scale is equivalent to a shift in the levels of the points of the ChISS-spectrum to a value of 0.27 lgT (Fig. 9, a, b).

Table 4. Parameters of the Time-and-Frequency Fields

(1) Дата	(2) m_{max} чисс	$\tau_м$	T_1	T_2	t_1	t_2	K	S
10.VI	7,1	44	1,0	15	22	72	0,42	26
15.VI	7,2	7,0	1,0	6,0	4,0	9,0	0,8	3,1

Key:
1. Date
2. m^{ChISS}_{max}

According to the method suggested by K. K. Zapol'skiy [14], the seismic moment M_o is regarded as the focal parameter, depending on the magnitude m^{ChISS}_{max} and the corner period of the spectrum T_o. This relation follows

from a comparison of the theoretical spectrums of displacements and velocities, as well as from the relation M_0 with the maximum levels of displacements and velocities respectively. In this case the point of the spectrum with the period T_0 remains the corner point for both the spectrum of velocity and the spectrum of displacements; its level for the spectrum of displacements, however, with an accuracy up to a constant factor proves to be T_0 times higher. In logarithmic form the ratio between $m_{max}^{ЧИСС}$, the period T_0 and the seismic moment M_0, proportional to the level of the branch of zero frequencies, is recorded in the form

$$\lg M_0 = m_{max}^{ЧИСС} + \lg T_0 + K.$$

The value K was found by using the data from detailed determinations of M_0, made by American seismologists for the reference magnitude M = 6 [8], in which $M_0 = 10^{25}$ dynes·cm. On the basis of these comparisons, K was taken as equal to 18.5 (in the future the value of K is to be more precisely defined).

Table 5. Additional Parameters of the Focal Points of Earthquakes According to the ChISS Instruments

Дата (1)	T_2	T_0	M_0, 10^{26} дин · см	r, км	$\Delta\sigma$, бар	$\bar{u}$, см	$\lg E_{\varphi R}$	$\lg E_S$	$\eta\sigma$, бар	σ_0, бар	σ_1, бар
10.VI	15	12,5	5,0	31	7,3	42	22,7	21,7	45	49	41
13.VI	6,2	8,0	4,0	20	24	83	22,6	22,1	40	52	28
15.VI	6,0	6,4	3,2	16	36	103	22,3	22,1	25	43	7

Key:

1. Date

By using the values of T_0 and M_0 obtained in this way, the same parameters of the focal points were calculated as from the standard equipment, from formulas from [1-4]: r, $\bar{u}$, $\Delta\sigma$, E and E_S when $\nu = 6.6$ km/sec and $\mu = 4 \cdot 10^{11}$ dynes/cm^2.

In addition, from the ChISS data, the values were determined of the average $\eta\sigma$, the initial σ_0 and the final σ_1 of the fault stresses according to the relations:

$$\eta\sigma = \mu E / M_0, \quad \sigma_0 = \eta\sigma + \tfrac{1}{2}\Delta\sigma,$$
$$\sigma_1 = \eta\sigma - \tfrac{1}{2}\Delta\sigma.$$

The values of the parameters of the focal points for the three Kuril earthquakes calculated from these formulas are given in Table 5.

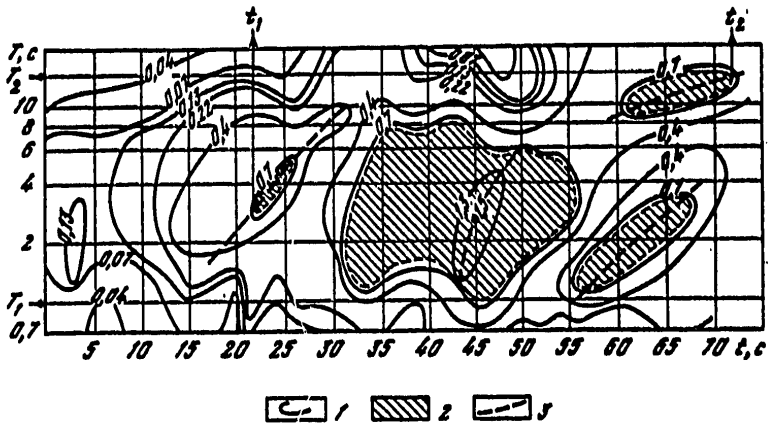

Figure 7. Time-and-Frequency Field of Earthquake on 10 June, at 1300 Hours

1--isolines of the topography; 2--conditional area S; 3--ridges of the topography

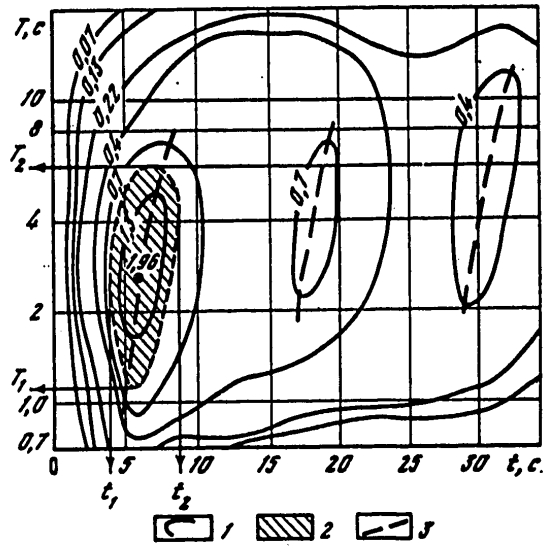

Figure 8. Time-and-Frequency Field of Earthquake on 15 June

Symbols same as in Figure 7

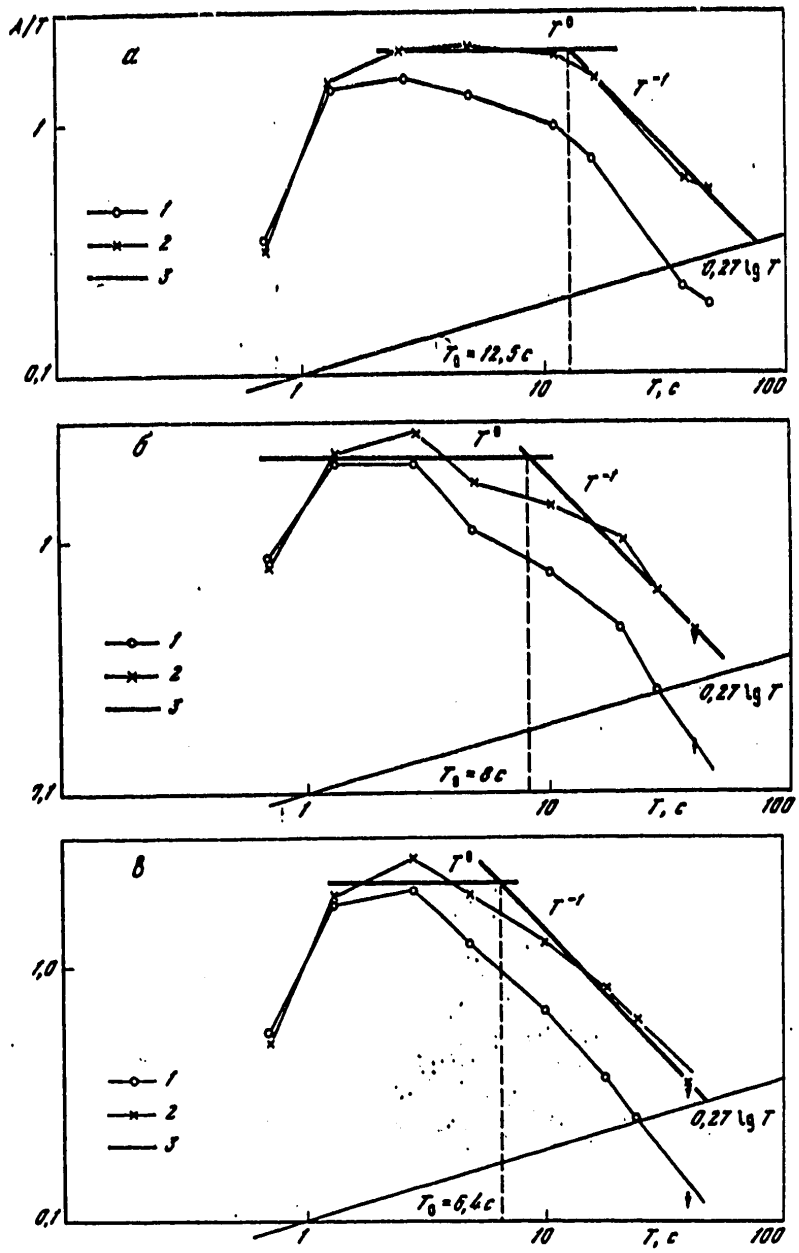

Figure 9. Determining Corner Period of Spectrum T_0 (a, b, c--earthquakes on 10, 13, 15 June 1975 respectively [Key on following page]

Figure 9. Determination of Corner Period of Spectrum T_0 (a, b, c--earthquakes on 10, 13 and 15 June 1975, respectively)

1--ChISS-spectrum; 2--corrected in accordance with [13]; 3--approximation of spectrum by straight lines

The tsunamigenic earthquake on 10 June (No 3) differs from the other, just as strong earthquakes of this series (Nos 7, 8), both with respect to the time-and-frequency responses of the emission and the parameters of the focus. The duration of the build-up of maximum intensity of the main earthquake (τ = 44 sec) is 7-fold higher than the value of τ for earthquakes Nos 7, 8. The duration of the oscillaions of maximum intensity of the P-wave ($t_2 - t_1$ = = 50 sec) is 10-fold higher in the tsunamigenic earthquake. The long-period boundary of the active band of the spectrum of the main shock T_2 = 15 sec, is 2.5-fold higher than in the aftershocks of essentially the same magnitude. The conditional area of the time-and-frequency field of the main earthquake, proportional to the energy of the emission, is 6-8-fold higher than in shocks Nos 7, 8. The seismic moment M_0 of the main earthquake exceeds, although negligibly, the corresponding value of M_0 of its main aftershocks. The area of the surface of the fault A, nominally calculated in the assumption of a circular dislocation, near the main shock is 2-4-fold larger than in the aftershocks equal in magnitude.

Having compared the linear dimensions of these focal points and the depths of their occurrence, it could be assumed that the faults with the aftershocks did not reach the earth's surface and did not affect the topography of the bottom at their epicenters, while the dimensions of the fault of the main earthquake are comparable with the depth of the focus, and therefore could cause a change in the bottom topography.

Judging by the nature of the time dependence, the magnitudes of the P-wave of the main shock, typical for strong earthquakes accompanied by ruptures on the earth's surface (length of the formation of the maximum of the P-wave --44 sec), the focus of the main earthquake could hardly be conceived in the form of a circular dislocation.

At present it is still difficult to indicate which of the characteristics of the tsunamigenic earthquake presented are more representative. Intuitively, however, one may count on the representativeness of the parameters of and the values of the seismic moment M_0, depending according to formula (1) on both the intensity of the focal emission m, and on the dimensions of the fault, proportional to T_0. For these purposes it is more convenient to use, not M_0, but its relative value $\bar{M}_0$:

$$\lg \bar{M}_0 = m + \lg T_0.$$

For the earthquake on 10 June, $\lg M_0 = 7.1 + 1.1 = 8.2$. For the Moneronskiy earthquake on 5 September 1971, also accompanied by a weak wave tsunami, $\lg M_0 = 8.4$. It is possible that these values of $\lg M_0$ are close to the threshold level of occurrence of tsunami waves.

It is obvious that examination of the R-emission alone cannot be considered adequate when ascertaining the tsunami danger of an earthquake. The next step in this direction should be a combined analysis of both the P waves and S waves.

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SPECTRAL AND TEMPORAL CHARACTERISTICS OF P-WAVES OF STRONG EARTHQUAKES IN 1974 (ACCORDING TO THE DATA FROM THE FREQUENCY SELECTION SEISMIC STATION AT THE OBNINSK CENTRAL SEISMOLOGICAL OBSERVATORY)

K. K. Zapol'skiy, N. A. Zhbrykunova, V. Ya. Zhbrykunov

In 1974 the frequency-selection station of the Obninsk Central Seismological Observatory registered 12 strong earthquakes with $m_{max}^{ChISS} > 5.5$, the epicenters of which were located on the territory of the USSR. The basic parameters of these earthquakes, according to the data from the Seismological Bulletin of the Unified System of Seismic Observation, are given in Table 1. It can be seen from the table that five earthquakes occurred within the Kurilo-Kamchatka zone, two--in the Caucasus and five--in Northern Pamir.

Table 2 gives the spectral distribution of the vibrational velocity A/T for the periods and the active band of the spectrums T_1-T_2 at a level of 0.5 of the maximum vibrational velocity.

The series of continental earthquakes in Northern Pamir is very interesting. An earthquake with $m_{max}^{ChISS} = 6.9$ (M = 7.3) occurred here on 11 Augst at 0100 hours. Its epicenter was located at the juncture of the Zaalayskiy and Sarykol'skiy ranges, called the Markansuyskiy. This earthquake was accompanied by a large number of aftershocks. The repeated shocks were weak, however, and the P-wave spectrums could be plotted for only four of them with $m_{max}^{ChISS} > 5.5$. The spectrums of the main shock (No 8) and its four aftershocks (Nos 9-12) are given in Figure 1.

On the basis of an analysis of the observations of the ChISS [frequency selection seismic station] in 1969-1973, several general conformances to principle were revealed in the change in the ChiSS-spectrums of the P-waves from the magnitude and empirical formulas were obtained for the duration of the build-up of maximum intensity τ, the period of maximum intensity T_{max} and the long-period limit of the active band of the spectrum T_2 [1-8]:

$$\begin{aligned} \lg \tau &= 0.35\ M - 1.4, \\ \lg T_{max} &= 0.17\ M - 0.6, \\ \lg T_2 &= 0.35\ M - 1.2. \end{aligned} \qquad (1)$$

Table 1. Basic Parameters of Earthquakes

(1) № п/п	(2) Дата	(3) Час	(4) Координаты эпицентров		H, км
			φ° N	λ° E	
1	15.V	18	49,9	156,2	50
2	28.VII	11	46,9	153,1	45
3	29.VII	03	46,3	152,9	40
4	9.X	07	44,7	150,3	50
5	27.V	04	50,7	157,3	50
6	4.VIII	15	42,4	45,9	5
7	13.XI	02	42,8	46,5	25
8	11.VIII	01	39,4	73,9	5
9	11.VIII	20	39,6	73,9	15
10	11.VIII	21	39,5	73,6	15
11	27.VIII	12	39,6	73,8	15
12	3.IX	19	39,5	73,7	15

Symbols: m_{ChISS}^{max} is the maximum magnitude in the spectrum of the P-waves;

Key:
1. No, in order
2. Date
3. Hour
4. Coordinates of epicenters

Table 3 gives the parameters of the ChiSS-spectrums obtained by experiment and calculated according to the formulas of (1).

As can be seen, the experiment values of the periods of T_{max} deviate little from the estimated ones. The values of T_2 for earthquakes Nos 8-11 are approximately 1.5-fold less than the estimated ones, which is usually related to a certain detph of the focus. This assumption is justified, however, only for the main shock, since it agrees with the lower value of , characteristic for deepened shocks. In all the aftershocks τ was 1.5-2-fold greater than that estimated . Drawing attention are the essentially identical values of τ in the main shock and its three aftershocks, including shock No 9, the magnitude of which, M, was 1 1/2 units less than for the main shock. The relation of τ to the magnitude in this case seems to be lacking. In order to define this unexpected effect more precisely, a more detailed comparison was made of the special characteristics of the time dependence of the magnitude of the P-waves of the main shock and its aftershocks. For this, the registration envelopes of the main earthquake and two of its aftershocks, Nos 9 and 10, were plotted on a single graph in a logarithmic scale, on three short-period recording channels with band widths in seconds: ϕ_1 = 0.6-1.1, ϕ_2 = 1.1-2.1, ϕ_3 = 2-4. The envelopes of the recordings of aftershocks Nos 9 and 10 essentially coincide, and therefore, Figure 2 gives the envelopes of the main shock and only one aftershock, No 9. The complete similarity of the initial parts of the recordings of the earthquakes, so different in magnitude, draws attention.

Δ°	M(ECCH)		$m_{max}^{ЧИСС}$	T*	(1) Район
	M_{LH}	m_{PV}			
63,7	6,7	6,5	6,4	12	Курильские (2) острова
65,3	6,9	6,9	7,1	2,2	Там же
64,9	6,5	6,5	6,6	3,2	" (3)
64,8	6,8	7,1	7,1	2,8	"
63,5	6,0	6,2	6,1	5,0	Южнее п-ова (4)
					Камчатка (5)
14,2	5,1	5,8	–	–	Кавказ (6)
13,8	4,7	5,6	–	–	"
29,3	7,3	6,9	6,9	2,2	Северный Памир (7)
29,1	5,8	6,2	6,2	2,4	" "
29,2	6,3	6,6	6,4	2,4	" "
29,1	6,0	6,2	6,2	1,5	" "
29,1	5,1	5,6	5,7	1,4	" "

T*--the period corresponding to the maximum in the ChISS spectrum

Key:

1. Locality
2. Kuril Island
3. Same
4. Yuzhneye Peninsula
5. Kamchatka
6. Caucasus
7. Northern Pamir

At other focal zones no similar recordings of strong and weak shocks were observed. The steep slope of the build-up in magnitude with weak shocks is as a rule greater than for the strong ones.

Figure 3. gives the time-and-frequency field of the main shock of the Markansuyskiy earthquake. The isolines with a magnitude of A = const are given in units of magnitude, since with the given epicentral distance, the magnitude is fully determined as the amount of vibrational velocity A/T [1]. The parameters of the time-and-frequency field are as follows: $m_{max}^{ChISS} = 6.9$, $\tau_{max} = 7$ sec, $T_{max} = 2.2$ sec, $T_1 = 1.0$ sec, $T_2 = 11$ sec, $t_1 = 4$ sec, $t_2 = 23$ sec, K = 0.8, S = 16.

It can be seen from Figure 3 that the value $(A/T)_{max} = 1.74$ m/sec, determining $m_{max}^{ChISS} = 6.9$ of this earthquake, is formed after $\tau_{max} = 7$ sec, and is confined to the period $T_{max} = 2.2$ sec. After that in periods of less than 3 sec, the value of the vibrational velocity diminishes sharply, and at the 10th-12th second from the arrival of the P-wave a depression is noted in the relief of the field. The value of the vibrational velocity is lowered almost 10-fold, to 0.18 μm/sec. An analogous sharp drop in intensity in the interval from 7 to 10 sec from the arrival of the P-wave is also observed in the following shocks (Nos 9 and 10), which can be clearly seen from the envelopes in Figure 2.

Table 2. Spectral Distribution of the Vibrational Velocity $(A/T)_{max}$

(1) № п/п	1		2		3		4	
	T	*A/T*	*T*	*A/T*	*T*	*A/T*	*T*	*A/T*
1	0,9	0,09	1,2	0,11	2,4	0,17	3,6	0,19
2	0,9	0,27	1,4	0,57	2,2	1,65	5,6	0,59
3	0,9	0,14	1,2	0,22	2,4	0,44	3,2	0,55
4	0,07	1,07	1,3	1,58	2,8	1,39	5,6	1,23
5	0,9	0,03	1,2	0,04	2,8	0,07	5,0	0,13
6	0,9	0,54	1,2	0,54	2,4	0,27	3,2	0,16
							4,0*	0,10
7	0,7	0,15	1,3	0,25	2,8	0,34	5,6	0,19
8	0,9	0,76	1,3	1,11	2,2	1,74	4,8	1,68
9	0,9	0,11	1,3	0,21	2,4	0,38	4,0	0,21
							4,5*	0,19
10	0,9	0,12	1,3	0,24	2,4	0,52	4,0	0,34
							4,5*	0,32
11	0,8	0,16	1,5	0,42	3,0	0,18	4,8	0,11
12	0,8	0,09	1,4	0,15	2,2	0,14	4,1	0,06
							6,5*	0,03

Symbols: T--period in sec; A/T in μm/sec; 1, 2, ... --number of octal

* Additional shocks.

Table 3. Experimental and Estimated Parameters of ChISS-Spectrums of Markansuyskiy Earthquakes

№ землетрясения (1)	M_{LH}	T_{max}, с (расч.) (2)	T_{max}, с (эксп.) (3)	T_{max}, с (расч.) (2)	T_{max}, с (эксп.) (3)	T_2, с (расч.) (2)	T_2, с (эксп.) (3)
8	7,3	14	7	4,4	2,2-5	22	11
9	5,8	4,3	6,5	2,4	2,4	6,8	4,4
10	6,3	6,3	7	2,9	2,4	10	5
11	6,0	5,0	7	2,6	1,5	7,9	2,8
12	5,1	2,4	4,5	1,8	1,4	3,8	3,5

Key:

1. Number of earthquake
2. (estim.)
3. (experim.)

5		6		7		8		$T_1 - T_2$
T	A/T	T	A/T	T	A/T	T	A/T	
12	0,28	22	0,19	32	0,21	40	0,20	1,8–4,5
15*	0,24	25*	0,18	45*	0,14	80*	0,06	
12	0,32	–						1,6–4,3
12	0,23	20	0,08	25	0,06	–	–	1,5–8,5
				40*	0,03	–	–	
10	0,76	16	0,40	30	0,25	42	0,20	(0,8)–9,3
		24*	0,22	40*	0,19	70*	0,09	
12	0,07	24	0,03	32	0,02	–	–	2,6–12,5
				45*	0,01	–	–	
12	0,02	16	0,01	–	–		–	(0,9)–2,2
		25*	0,01	–	–	–	–	
6,6	0,16							0,8–6,4
11*	0,10							
12	0,78	20	0,50	24	0,41	38	0,20	1,0–1
		24*	0,46	40*	0,16	80*	0,06	
14	0,04	18	0,03	–	–	–	–	1,2–4,4
		25*	0,02	–	–	–	–	
12	0,09	14	0,07	–	–	–	–	1,3–5,0
17*	0,07	25*	0,02	–	–	–	–	
8,0	0,08	–	–	–	–	–	–	0,9–2,8
12*	0,05	–	–	–	–	–	–	(0,8)–3,5

T_1-T_2--active band of spectrum; (0.8)--conditional period T_1 for spectrum, open from the left.

We will now discuss certain special features of the spectral characteristics of the P-waves of other earthquakes, given in tables 1 and 2.

The five Kuril-Kamchatka earthquakes with a range of magnitudes less than a unit (M varies from 6 to 6.9) are distinguished by the great variety of the spectral composition. The periods of T_{max} vary from 12 (No 1) to 1.3 sec (No 4), and the period T_2--respectively from 45 to 4.3 sec, i.e., approximately 10-fold, which goes beyond the boundaries of scattering in deriving the empirical formulas (1). The spectrum of earthquake No 1 deviates particularly greatly from the average, from the focal zone near Paramushir Island, where tsunamigenic earthquakes often occur, as for example the earthquake on 28 February 1973 [3]. The spectrums of both these Paramushir earthquakes are characterized by a shift of the long-period boundary of the active band (T_2) toward the lower frequencies, by approximately 2-3-fold. At the same time, the period of the maximum of the spectrum T_{max} also shifts toward the low-frequency area. A similar deviation from the average for T_2 and T_{max} is also noted for another weaker earthquake, No 5 (M = 6), the epicenter of which is located in approximately the same zone, south of the Kamchatka peninsula.

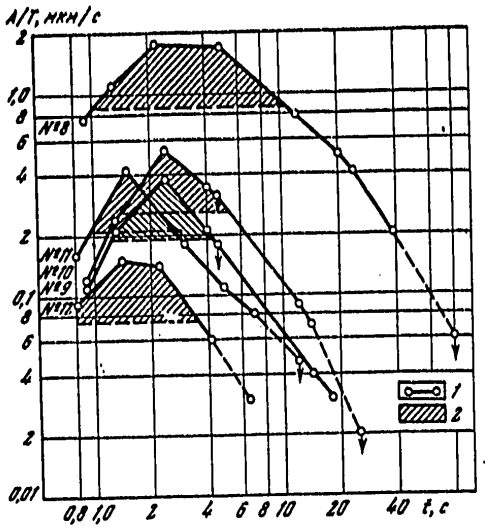

Figure 1. ChISS-Spectrums of P-Waves of Markansuyskiy Earthquakes

1--spectrums of individual earthquakes (numbers correspond to Table 1);
2--active band of spectrum at level 0.5 $(A/T)_{max}$

The value of the relative seismic moment of the earthquake $\bar{M}_o$, which lends itself to operational determination according to the data from the ChISS spectrums, may serve as the quantitative expression of the long-period shift in the spectrums of the radiation: $\lg \bar{M}_o = \overset{ChISS}{max} + 2 \lg T_2$.
A comparison of the value of M_o for the Markansuyiskiy (No 8) earthquake near Paramushir Island (No 1) shows that the relative seismic moment of the weaker Paramushir earthquake has almost one order higher value of M_o than the Markansuyskiy earthquake. For the Paramushir earthquake, $\lg \bar{M}_o$ = = 6.4 + 3.3 = 9.7, and for the Markansuyskiy earthquake $\lg \bar{M}_o$ = 6.9 + 2 = = 8.9.

The spectrums of the two Caucasus earthquakes Nos 6 and 7, measured in the zone of shadow with Δ = 14° are not related to the straight P-waves and are not discussed in this work.

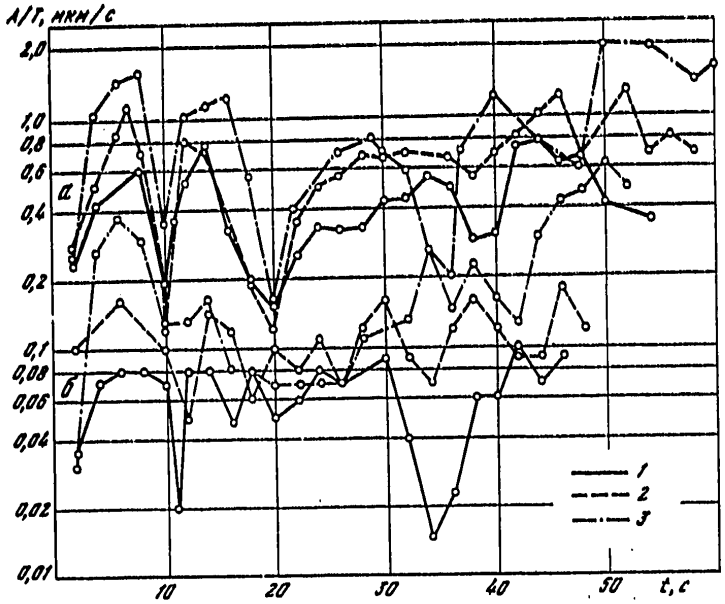

Figure 2. Envelopes of Recordings of Three Channels of ChISS of P-Waves of Markansuyskiy Earthquakes

a--11 August 1974, at 0100; b--aftershock on 11 August 1974 at 2000; 1--filter ϕ_1, band width 0.6-1.1 sec; 2--ϕ_2 = 1.1-21. sec; 3--ϕ_3 = 2-4 sec.

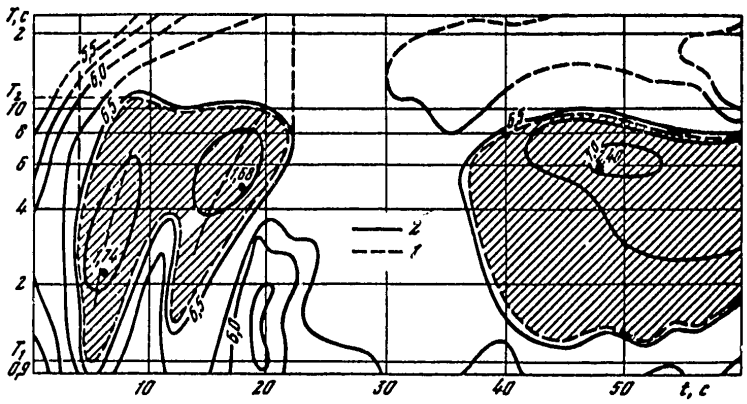

Figure 3. Time-and Frequency Field of Markansuyskiy Earthquake on 11 August 1974.

1--isolines of topography; 2--conditional area

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CATALOGS OF EARTHQUAKES

Basic Catalog of Strong Earthquakes on USSR Territory
N. V. Kondorskaya, chief compiler
V. V. Kislovskaya, L. N. Pavlova, Ye. A. Khrometskaya, compilers

№ п/п	Дата	Время		Координаты эпицентра			Глубина очага		
		ч м с	код точности	φ°N	λ°E	код точности	h, км	код точности	
1	2	3	4	5	6	7	8	9	

Key:
1. No, in order
2. Date
3. Time, hrs, mins, secs.
4. Accuracy code
5. Coordinates of epicenter: φ °N
6. λ °E
7. Accuracy code
8. Depth of focus: h, in km
9. Accuracy code

		Carpathians						
1	7.III	04 13 03,4 ±2c	1	45,85	26,66 ±0,2	4	5 ± 5	5
		Crimea and Lower Kuban						
2	17.IV	07 35 17,1 ±2c	1	43,7	33,0 ±0,2	4	33 ±15	4
		Caucasus						
3	9.I	23 09 42,8 ±2c	1	43,09	47,10 ±0,2	4	4 ± 4	5
4		23 40 03,5 ±2c	1	43,06	47,12 ±0,2	4	10 ±5	4
5	10.I	01 29 20,0 ±2c	1	43,07	47,13 ±0,2	4	10 ±5	4
6	12.I	04 39 40 ±2c	1	40,6	42,0 ±0,2	4	33 ±15	4
7	20.II	14 44 21,0 ±1c	0	42,54	45,14 ±0,1	3	5 ±3	4
8	21.III	02 59 17,8 ±2c	1	40,85	44,30 ±0,2	4	5 3–7	4
9	20.VI	13 53 23,7 ±2c	1	42,80	48,03 ±0,2	4	9 6–13	4

Магнитуда				Интенсивность в эпицентре		Примечание
M_{LH}	код точности	m_{PV}	код точности	I_0, баллы	код точности	
10	11	12	13	14	15	16

Key:

10. Magnitude: M_{LH}
11. Accuracy code
12. m_{PV}
13. Accuracy code
14. Intensity at epicenter: I_0, in points
15. Accuracy code
16. Notes

Carpathians

4,8	2	5,1*	2	0	0	2–180 (Кишинев)
± 0,3	7	± 0,3	7		1	a = 6 км; b = 8 км; α = 8°; K = 13

Crimea and Lower Kuban

(4,0)	4					K = 11; M_{LH} по K
±0,7	1.					

Caucasus

5,2	1	5,7	3	8	6	a = 6 км; b = 6 км;
±0,2	18	±0,5	2	±0,5	82	α = 337°
		5,3*	1			
		±0,2	15			
4,5	2	4,8*	3	0	0	a = 6 км; b = 7 км;
±0,3	7	±0,5	5			α = 3°
4,5	2	4,8*	3	0	0	4–5–20 (Махачкала);
±0,3	7	±0,5	4		1	a = 6 км; b = 6 км; α = 334°
		5,0*	1	0	0	K = 12
		±0,2	12			
4,3	3	5,1*	1	0	0	4–5–50 (Душети);
±0,5	5	± 0,2	12		3	4–70 (Кварели); 3–140 (Хашури); a = 6 км; b = 7 км; α = 349°
3,8	3	–	–	6–7	4	Спитакское; 6–2 (2);
±0,5	1			±0,5	16	5–5 (2); 4–11 (5); 3–21 (7); h_{IM}=7; h_I=2; h_u = 5 ± 5
4,4	2	4,7*	2	(6)	3	Избербашское;
±0,3	10	±0,2	6	±1	35	5–11 (5); 4–25 (14); 3–42 (12); a =7 км; b = 7 км; h_I=8; h_{IM} = 10; h_u =25 ± 10

1	2	3	4	5	6	7	8	9
				Caucasus				
10	6.VIII	00 54 58,0 ±2c	1	40,80	48,64 ±0,2	4	7 5–10	4
11	10.VIII	03 17 56 ±2c	1	41,5	47,5 ±0,2	4	5 3–7	4
12	20.X	03 20 03,1 ±2c	1	41,61	48,28 ±0,2	4	58 ±20	4
				Central Asia and Kazakhstan				
14	12.II	13 34 51,8 ±2c	1	43,20	78,91 ±0,2	4	10 ±5	4
15	28. II	23 56 39 ±2c	1	36,6	70,5 ±0,2	4	190 ±20	2
16	3.III	09 48 25 ±2c	1	36,7	70,9 ±0,2	4	200 ±10	1
17	9.IV	22 25 33 ±2c	1	38, 2	72, 4 ±0,2	4	120 ±20	3
18	14.V	22 23 01,8 ±2c	1	36,07	70,89 ±0,2	4	90 ±20	3
19	26.V	18 01 32 ±2c	1	40,2	78,1 ±0,2	4	35 29–42	3
20	9.VI	18 36 45 ±1c	0	38,87	70,29 ±0,1	3	10 ±5	4
21	26.VI	16 54 18 ±1c	0	37,73	69,71 ±0,1	3	8 5–12	4

10	11	12	13	14	15	16
			Caucasus			
4,0 ±0,3	2 7	4,7* ±0,3	2 7	6 ±0,5	3 110	5–7 (28); 4–17 (53); 3–30 (25); a = 7 км; b = 8 км, α = 293°; h_I = 3; h_{IM} = 6; h_M = 10 ± 5
3,7 ±0,5	3 3	4,5* ±0,5	3 2	6 ±0,5	3 19	Курахское; 6–4 (4); 5–11 (7); 4–18 (6); h_I = 6; h_{IM} = 6; h_H = 25 ± 10
4,6 ±0,3	2 5	5,0* ±0,3	2 5	6 ±1	1	a = 6км; b = 7 км; α = 33°
			Central Asia and Kazakhstan			
5,2 ±0,2	1 17	5,8 ±0,3 5,3* ±0,2	2 7 1 14			a = 5 км; b = 6 км; α = 351°
5,1 ±0,2	1 16	5,7 ±0,5 5,5* ±0,2	3 2 1 13	6 ±0,5	4 47	Турайгырское; 6–25 (5); 5–40 (11); 4–80 (19); 3–125 (12); a = 5 км; b = 8 км; α = 333°; h_I = 22; h_{IM} = 22
		5,6* ±0,1	0 23	(4) ±1	1 4	2–150–530; (Хорог, Душанбе, Кайранкум, Ташкент); K = 12
		6,0 ±0,2 5,7* ±0,2	1 12 1 17	(4–5) ±1	1 19	4–150 (5); 3–250 (10); 2–400 (4); K = 14
		5,6	3	(4)	1	3–250 (5); 2–3–350 (6)
		±0,5 5,4* ±0,2	2 1 11	±1	11	K = 13
		5,8 ±0,3 5,8* ±0,2	2 6 1 12	(4) ±1	1 4	3–175,540 (Хорог, Андижан); 2–280,320 (Нурек, Душанбе); a = 4 км; b = 8 км; α = 10°; K = 13
5,0 ±0,2	1 16	5,4 ±0,5 5,2* ±0,2	3 3 1 14	(5) ±1	1 4	4–30 (Джиргаталь); 2–3–230 (Душанбе, Ташкент); 2–345 (Самарканд); h_I = (35); h_{IM} = (36); h_H = 33 ± 10; K=13
5,0 ±0,2	1 17	5,7 ±0,5 5,4* ±0,2	3 3 1 12	6–7 ±1	1 5	5–40 (Чиль-Дара); 3–4–18 (Гарм); 2–130–240 (Душанбе, Ташкент); K=12
4,4 ±0,5	3 4	4,8* ±0,5	3 5	(6) ±1	1 6	5–11 (1); 4–15 (2); 3–35 (3); h_I = 5; h_{IM} = 12; h_H = 10 ± ±5; K = 12

1	2	3	4	5	6	7	8	9
		Central Asia and Kazakhstan						
22	28.VI	04 26 35 ±2c	1	36,6	70,0 ±0,2	4	200 ±20	2
23	28.VII	12 31 59 ±2c	1	39,33	72,42 ±0,2	4	20 ±10	4
24	31.VII	11 07 11 ±2c	1	39,67	70,56 ±0,2	4	23 19-28	3
25	9.IX	18 32 31,0 ±2c	1	40,02	78,72 ±0,2	4	20 ±10	4
26	17.IX	03 48 32 ±2c	1	37,4	71,6 ±0,2	4	135 ±10	2
27	17.X	01 09 04,6 ±3c	2	37,35	71,27 ±0,2	4	80 ±20	3
28	11.XI	03 53 59,1 ±3c	2	40,62	73,11 ±0,2	4	40 ±20	4
		Altay and Sayan						
29	2.II	07 46 54 ±2c	1	50,6	90,7 ±0,2	4	33 ±15	4
		Yakutiya and Northeast						
30	12.VIII	14 59 58 ±2c	2	70,8	126,6 ±0,3	5	33 ±15	4
		Amur Region and Primor'ye						
31	29.VI	12 24 43,3 ±2c	1	53,14	132,09 ±0,2	4	33 ±10	4
		Kuril						
32	2.I	08 58 53,7 ±2c	1	46,82	151,54 ±0,2	4	10 ±5	4
33	11.V	06 56 43 ±2c	1	49,2	156,1 ±0,2	4	60 ±10	3
34	10.VI	13 47 12,0 ±2c	1	42,97	147,80 ±0,2	4	10 ±5	4
35		14 37 49,3 ±3c	2	43,37	147,93 ±0,2	4	40 ±10	3

10	11	12	13	14	15	16
			Central Asia and Kazakhstan			
		5,3*	1			
		±0,2	18			a = 6 км; b = 7 км;
		5,5*	1			α = 337°
4,8	1	±0,2	11			5–20 (2); 4–70 (12);
±0,2	13	5,1*	2	5–6	3	3–160 (12); h_f = 15;
4,7	2	±0,3	7	±0,5	26	h_{IM} = 20; $h_и$ = 26 ±
±0,3	7					± 10
						a = 6 км; b = 7 км;
5,5	1	5,8	2			α = 29°
±0,2	18	±0,3	9			
5,3*	3	5,4*	1			
±0,5	5	±0,2	14			
		5,0*	2			
		±0,3	7			
		5,1*	1			a = 6 км; b = 8 км;
		±0,2	12			α = 18°; K = 12
		5,0*	3	5	3	5–(10) (2); 4–30
		±0,5	4	±1	86	(28); 3–70 (56);
						a = 7 км; b = 11 км;
						α = 327°; h_f = 15;
						h_{IM} = 22; $h_{и(регион)}$ *
						=5 ± 5; $h_и$ = 40 ±
						± 20 (5); K = 12
			Altay and Sayan			
5,0	3	5,4*	3			
±0,5	2	±0,5	4			
			Yakutiya and Northeast			
		5,4*	2	(6)	3	5–60 (Чекуровка);
		±0,3	8	±1	3	4–75 (р. Эскит);
						3–100 (Кюсюр)
			Amur Region and Primor'ye			
						Селемджинское;
4,8	3	5,2*	2			a = 9 км; b = 12 км;
±0,5	4	±0,3	9			α = 12°
			Kuril			
6,5	0	6,1	2			5–40 (о-в Симушир); 3–160
±0,1	23	±0,3	7			(о-в Уруп);
		5,8*	1			a = 7 км; b = 10 км;
		±0,2	16			α = 16°
6,1	0	6,4	1	0	0	4–5–70 (м. Васильева)
±0,1	31	±0,2	17		2	2–170 (Северо-Курильск)
6,0*	2	5,8*	0			
±0,3	6	±0,1	23			
7,3	1	7,0	1			4–120 (о-в Шикотан);
±0,2	17	±0,2	17			3–190 (Южно-Курильск);
		6,3*	2			2–250 (Курильск);
		±0,3	10			a = 5 км; b = 10 км;
						α = 20°;

1	2	3	4	5	6	7	8	9
			Kuril					
36	10.VI	14 58 59 ±2c	1	43,3	147,3 ±0,2	4	50 ±10	3
37		15 21 20 ±2c	1	43,5	147,3 ±0,2	4	25 ±10	4
38	13.VI	18 08 14,1 ±2c	1	43,55	147,76 ±0,2	4	45 ±20	4
39	14.VI	18 38 01,1 ±1c	0	43,55	147,99 ±0,1	3	40 ±10	3
40		19 14 05,4 ±2c	1	43,70	147,78 ±0,2	4	50 ±20	4
41	15.VI	00 19 33,6 ±2c	1	43,70	147,95 ±0,2	4	40 ±10	3
42	22.VI	22 44 11,1 ±2c	1	43,21	147,25 ±0,2	4	37 ±10	3
43		23 00 52 ±2c	1	43,0	147,1 ±0,2	4	20 ±10	4
44	23.VI	09 13 41 ±2c	1	43,0	147,2 ±0,2	4	25 ±10	4
45	26.VI	10 31 08 ±2c	1	43,1	148,0 ±0,2	4	20 ±10	4
46	20.VII	08 02 41,2 ±2c	1	44,43	148,16 ±0,2	4	100 ±20	3
47	6.VIII	21 37 41 ±2c	1	43,8	139,4 ±0,2	4	230 ±10	1
48	19.IX	03 15 22 ±2c	1	47,0	152,0 ±0,2	4	120 ±10	2
49	2.X	11 06 48 ±2c	1	43,2	145,9 ±0,2	4	75 ±10	2
50	11.XI	04 25 33 ±2c	1	46,5	145,7 ±0,2	4	355 ±10	1

10	11	12	13	14	15	16
			Kuril			
6,5 ±0,5	3 4	6,5° ±0,3	2 9			5–120 (о-в Шикотан); a = 9 км; b = = 12 км; α = 18°
6,5 ±0,5	3 2	6,5° ±0,3	2 10			
6,0 ±0,5	3 5	6,4° ±0,3	2 9	0	0	a = 6 км; b = 9 км; α = 16°
7,2 ±0,1	0 24	7,1 ±0,1	0 24			6–85 (Малокурильское);
7,0° ±0,3	2 6	6,9° ±0,2	1 15			4–170 (Южно-Курильск); 3–4–190 (Курильск)
6,7 ±0,1	0 29	6,7 ±0,1	0 23			5–6–100 (Малокурильское);
6,7° ±0,3	2 7	6,5° ±0,2	1 11			2–(о-в Хоккайдо); a = 6 км; b = 9 км; α = 21°
		6,1° ±0,3	2 10			a = 7 км; b = = 10 км; α = 6°
7,0 ±0,1	0 21	7,1 ±0,1	0 21			a = 6 км; b = = 10 км; α = 11°;
		7,0° ±0,3	2 9			5–100 (о-в Шикотан)
6,7 ±0,1	0 33	6,5 ±0,2	1 19			a = 6 км; b =8 км α=12°4–85 (о-в Шикотан);
6,6° ±0,3	2 6	6,4° ±0,2	1 13			3–4–150 (Южно-Курильск)
		6,0° ±0,3	2 7			3–4–90,150 (о-в Шикотан, Южно-Курильск)
6,1 ±0,1	0 32	6,3 ±0,2	1 13			
5,9° ±0,5	3 5	6,0° ±0,2	1 13			
5,6 ±0,1	0 21	6,4 ±0,5	3 5			
		5,9° ±0,2	1 14			
		6,4 ±0,2	1 16			4–130 (Малокурильское);
		6,0° ±0,2	1 16			3–4–200 (Южно-Курильск); 3–100 (Курильск)
		6,0 ±0,3	2 9			
		5,5° ±0,1	0 25			
		6,3 ±0,3	2 7			
		6,0° ±0,2	1 14			
4,5 ±0,5	3 4	6,3 ±0,5	3 5			
		5,9° ±0,1	0 23			
		6,0	1			

1	2	3	4	5	6	7	8	9
				Kuril				
51	24.XI	07 58 02 ±2c	1	43,3 ±0,2	147,7	4	30 ±10	4
52		09 51 46 ±2c	1	43,2 ±0,2	147,7	4	40 ±10	3
53	5.XII	20 14 18,1 ±2c	1	43,61 ±0,2	146,59	4	80 ±20	3
54	27	07 41 54 ±2c	1	43,1 ±0,2	147,2	4	39 ±10	3
				Kamchatka				
55	5.IV	16 52 45 ±2c	1	52,17 ±0,2	160,29	4	10 ±10	5
56	5.IV	17 49 56,2 ±2c	1	52,18 ±0,2	160,25	4	10 ±10	5
57	6.IV	09 55 18 ±2c	1	52,11 ±0,2	160,19	4	15 ±15	5
58		10 34 55 ±2c	1	52,14 ±0,2	160,14	4	10 ±10	5
59	22.V	04 25 16 ±2c	1	52,0 ±0,2	157,5	4	150 ±30	3
60	2.VII	07 10 52,1 ±2c	1	55,65 ±0,2	160,20	4	5 ±5	5
61		07 34 20,2 ±2c	1	55,60 ±0,2	160,30	4	15 ±15	4
62	11.VII	05 23 22,8 ±2c		55,23 ±0,2	159,00	4	120 ±10	2
63	15.VIII	07 28 22,1 ±2c	1	54,85 ±0,2	167,73	4	30 ±10	4
64	23.VIII	13 51 23,9 ±2c	1	54,58 ±0,2	160,21	4	160 ±20	2

10	11	12	13	14	15	16
			Kuril			
		±0,2	11			
		5,6*	1			
		±0,2	19			
5,8	0	6,5	1			3–100 (о-в Шикотан)
±0,1	30	±0,2	15			
		6,4*	1			
		±0,2	18			
5,6	0	6,3	2			3–110 (о-в Шикотан)
±0,1	22	±0,3	6			
		6,1*	1			
		±0,2	11			
5,4	1	6,6	2	(6)	1	3–6–40 (Малокурильское).
±0,2	17	±0,3	8	±1	3	3–4–90,200 (Южно-Курильск; Курильск); a =6км; b = = 9 км; α = 10°
		6,5*	2			
		±0,3	8			
6,1	0	6,2	2			
±0,1	31	±0,3	10			
5,9*	3	5,9*	2			
±0,5	5	±0,3	10			
			Kamchatka			
6,0	0	6,0	2			3–4–140 (Петропавловск); 3–100 км (м. Шипунский)
±0,1	34	±0,3	10			
5,9*	3	5,9*	0			
±0,5	5	±0,1	27			
6,2	0	6,1	1			4–140 (Петропавловск);
±0,1	36	±0,2	14			3–100 (м. Шипунский)
6,3*	3	5,9*	1			
±0,5	5	±0,2	20			
6,8	0	6,3	0			4–5–150 (Петропавловск);
±0,1	31	±0,1	26			
6,9*	2	6,1*	0			4–160 (Авача);
±0,3	6	±0,1	22			3–120 (м. Шипунский): a = 7 км; b = = 13 км; α = 28°
6,8	1	6,4	2			3–4–150 (Петропавловск, Авача);
±0,2	19	±0,3	6			
6,9*	3	6,1*	0			3–120 (м. Шипунский)
±0,5	5	±0,1	23			
		5,6*	0			4–150 (Петропавловск)
		±0,1	21			
5,0	2	5,0*	1			a = 7 км; b = = 12 км; α = 359°
±0,3	10	±0,2	13			
5,0	2	5,0*	2			a = 8 км; b = = 16 км; α = 1°
±0,3	6	±0,3	9			
		5,0*	2			
		±0,3	9			
6,9	0	6,9	0			4–350 (Крутобогово);
±0,1	32	±0,1	36			
6,8*	2	6,7*	1			a = 6 км, b = = 9 км; α = 32°
±0,3	6	±0,2	20			

1	2	3	4	5	6	7	8	9
				Kamchatka				
65	12.IX	15 28 37 ±2c	1	51,7 ±0,2	157,5	4	120 ±10	2
66	21.XII	10 54 17,2 ±2c	1	51,80 ±0,2	151,91	4	570 ±20	1
				Arctic Basin				
67	26.II	04 48 54 ±5c	2	85,0 ±0,5	98,1	5	33 ±15	4
68	2.III	14 23 26 ±5c	2	85,0 ±0,5	97,7	5	33 ±15	4

* Magnitude, determined according to SKM instruments.

10	11	12	13	14	15	16
			Kamchatka			
		6,0 ±0,2 5,7* ±0,2 6,0 ±0,3 5,7* ±0,2 6,6 ±0,1 6,5* ±0,1	1 17 1 17 2 6 1 20 0 28 0 27	0	0 5	3-100-220(5); a = 7 км; b = = 12 км; α = 9° a = 7 км; b = = 10 км; α = = 15°; 3-900 (Крутоберегово)
			Arctic Basin			
5,7 ±0,1	0 27	6,2 ±0,1 5,9* ±0,2	0 25 1 15			a = 7 км; b = = 79 км; α = = 358°
5,0 ±0,2	1 17	5,9 ±0,5 5,5* ±0,2	3 5 1 18			

Note: Underlined in the first column are the numbers of earthquakes, the description of which is given in this collection.

Regional Catalog of Earthquakes in the Carpathians
O. P. Kostyuk, chief compiler
I. M. Rudenskaya, T. S. Karpiv, compilers

(1) № п/п	(2) Дата	(3) Момент возникновения, ч м с	Координаты эпицентра (4) φ° N	λ° E	Глубина (5) очага, км	Класс точности (6)	M (7) (для глубоких m)	K	(8) № района	Макросейсмические данные (9)
	22.I	16 48 43	48,9	24,1		Б		8,5	1	
	27.I	14 26 56	48,9	24,1				9,0	1	
1	8.II	08 21 21	45,1	25,7		Б	4,6	12,0	2	
	25.II	02 42 48	45,6	26,3	150	Б	3,7*	10,0	2	
	2.III	13 21 19	45,4	26,9			3,8	10,0	2	
2	7.III	04 13 07	45,9	26,6	5	A	5,1	13,0	2	Кишинев 2 балла (10)
3	8.III	16 39 25	45,6	26,7	160	A	4,2	11,0	2	
4	31.III	08 28 46	45,5	26,4	145	A	4,7	12,0	2	
	13.V	12 18 56	45,6	26,6	140	A	4,4*	10,0	2	
	15.V	23 24 14	45,6	26,6	110	Б	3,2*	10,0	2	
	26.V	06 50 54	45,5	26,9				10,0	2	
5	26.V	22 01 43	45,5	26,9		A		11,0	2	
	8.VI	06 00 42	47,7	23,6		Б		10,0	1	
	6.VII	11 54 38	45,8	26,7	100	Б	3,5*	10,0	2	
	30.VIII	01 35 34	45,7	26,4	150		3,7*	10,0	2	
6	5.IX	00 39 25	45,6	26,4	150	A	5,3*	11,0	2	
	6.XI	10 17 34	48,0	23,3				9,0	1	
7	27.XII	18 32 22	45,8	26,6	130	A	4,7	11,0	2	

* According to the data from the 10-day bulletins of the seismological station at Kishinev, and the rest from international reports.

Key:

1. No, in order
2. Date
3. Moment of occurrence, hrs, mins, secs.
4. Coordinates of epicenter
5. Depth of focus, in km
6. Class of accuracy
7. M (for deep m)
8. Number of region
9. Macroseismic data
10. Kishinev, 2 points

Regional Catalog of Earthquakes in the Crimea and Lower Kuban
I. I. Popov, chief compiler
I. B. Dubinskiy, S. A. Kapitanova, compilers

(1) № п/п	(2) Дата	Момент возникновения, (3) ч м с	Координаты эпицентра (4) φ° N	λ° E	Глубина очага, км (5)	Класс точности (6)	K
1	29.I	17 14 39,1	44,6	34,4	10-20	A	7
2	3.II	19 57 33	44,8	36,4	33	A	9
3	17.IV	07 35 17,1	43,7	33,0	33	A	11
4	24.V	02 04 15,8	44,8	36,3	33	A	9
5	10.VI	17 00 41,2	44,55	34,45	10-20	a	8
6	7.VIII	22 47 15,2	45,25	34,20	31-40	a	9
7	23.VIII	11 31 45	44,70	36,50	33	A	9
8	24.VIII	22 17 16,6	44,80	34,75	10-20	б	7
9	4.IX	21 57 35,7	44,45	34,3	10-20	б	6
10	18.IX	21 37 (03,7)	44,45	34,35	10-20	б	7
11	18.X	00 57 55,0	44,55	34,55	21-30	б	7
12	21.X	22 11 48,9	44,55	34,30	21-30	б	7

Key:

1. No, in order
2. Date
3. Moment of occurrence, hrs, mins, secs.
4. Coordinates of epicenter
5. Depth of focus, in km
6. Class of accuracy

Regional Catalog of Earthquakes in the Caucasus

V. G. Papalashvili, A. Kh. Bagramyan (Armenian SSR), Z. Z. Sultanova (Azerbaijan SSR), O. D. Gotsadze (Georgian SSR), chief compilers
T. M. Lebedeva, L. K. Darakhvelidze, Ts. A. Tabutsadze, L. A. Kakhiani, L. V. Labadze, L. A. Bikashvili, S. G. Kazyva, V. V. Chikovani, E. G. Geodakyan, R. A. Levkovich, M. D. Petrosyan, G. V. Sarkisyan, R. A. Agamirzoyev, A. B. Izrailevskiy, compilers

Key:

1. Number, in order
2. Number
3. Moment of occurrence, hrs, mins, secs.
4. Coordinates of epicenter: φ°N
5. Coordinates of epicenter: λ°E
6. Depth of focus, in km
7. Class of accuracy
8. M
9. K
10. Number of region
11. Macroseismic data

№ п/п	Число	Момент возникновения, ч м с	Координаты эпицентра φ°N	λ°E	Глубина очага, км	Класс точности	M	K	№ района	Макросейсмические данные
1	2	3	4	5	6	7	8	9	10	11
				January						
	1	11 29 25,4	43,45	42,75	0–10	6		9	2	
	2	22 45 18,1	40,7	47,9		A		9	7	
	4	09 01 12,7	43,1	47,4		A		9	3	Махачкала 3 балла
	6	12 35 00,1	43,0	42,8		A	3,2	10	3	[points]
		23 09 16,6	44,7	44,0		A		10	12	
	7	15 29 23,1	43,2	45,9		A		9	3	
1	9	23 09 42,7	42,9	47,1		A	5,2	13	3	
		23 40 03	43,1	47,1	10		4,5			
2		23 14 45,5	42,9	47,1		A	4,1	11	3	
		23 15 25,0	42,9	47,1		A	3,3	10	3	
3		23 18 30,8	42,9	47,1		A	3,9	11	3	
		23 22 26,7	42,9	47,1		A		9	3	
		23 26 34,2	42,9	47,1		A		9	3	
		23 28 01,9	42,9	47,1		A	3,3	10	3	
		23 33 14,6	42,9	47,1		A		10	3	
4		23 40 03,0	42,9	47,1		A	4,5	12	3	
		23 49 30,5	43,0	47,0		A	3,8	10	3	
		23 53 16,3	42,9	47,1		A	3,6	10	3	
		23 55 22,7	42,9	47,1		A	3,7	10	3	
5		23 57 04,6	42,9	47,1		A	4,2	11	3	
	10	00 08 20,0	43,0	47,0		A	3,6	10	3	
		00 30 16,2	42,9	47,0		A	3,0	10	3	
		00 44 23,4	42,9	47,1		A		9	3	
		00 46 40,6	42,9	47,1		A		9	3	
		01 01 55,2	42,9	47,1		A		9	3	
6		01 09 18,7	42,9	47,1		A	4,1	12	3	
7		01 29 19,3	42,9	47,0		A	4,5	12	3	Махачкала 4–5 баллов

1	2	3	4	5	6	7	8	9	10	11
				January						
8		01 31 48,7	42,9	47,1		A	3,8	11	3	
		02 17 59,1	42,8	47,1		A		9	3	
		02 52 25,3	42,8	47,1		A		9	3	
		03 00 48,0	42,8	47,1		A		9	3	
		03 41 48,5	42,9	47,1		A		9	3	
		04 21 58,8	42,8	47,1		A		9	3	
9		04 35 33,3	42,9	47,1		A	4,1	11	3	Махачкала 3–4 балла
		05 18 44,1	42,8	47,1		A		9	3	
10		09 01 41,8	42,9	47,1		A	4,0	11	3	Махачкала 3 балла
		10 25 54,7	42,9	47,1		A		9	3	
11		11 50 10,5	43,0	47,0		A	4,1	11	3	Махачкала 3 балла
		14 21 15,0	42,9	47,2		A		9	3	
		14 24 16,5	42,9	47,1		A	3,6	10	3	
		15 19 12,5	42,9	47,1		A	3,6	10	3	
		21 55 54,2	41,35	43,67	0–10	б		9	6	Пасандаури 4–5 баллов
	10	23 17 39,9	42,9	47,1		A		9	3	
	11	02 30 12,2	42,9	47,0		A		10	3	
		21 14 41,8	42,9	47,0		A		9	3	
12	12	04 39 39,9	40,6	42,0		A	4,6	12	16	
		10 15 56,4	42,9	46,9		A		9	3	
13		13 51 51,0	43,0	47,0		A	4,3	11	3	
		23 45 48,2	42,9	46,9		A		9	3	
14	13	07 58 31,3	43,0	47,0		A	4,2	12	3	
		17 51 34,5	40,5	41,3		A		9	16	
	14	00 05 18,4	42,4	47,3		A		9	3	
	17	17 51 24,7	42,9	46,9		A		9	3	
	18	20 28 38,1	41,37	44,03	0–10	а		9	6	Степанаван 3 балла
		22 11 53,3	42,8	47,1		A		10	3	
	19	00 40 23,0	42,8	47,1		A	3,8	9	3	Буйнакск
	20	15 06 16,1	42,8	47,2		A		9	3	3–4 балла
		17 30 06,6	43,0	46,8		A		9	3	
	23	23 28 00,1	40,4	48,4		A		9	7	
	26	07 49 20,4	38,5	45,2				10	17	Джульфа 4–5 баллов
		12 04 22,2	38,9	45,5				9	17	
		17 50 53,1	43,0	46,8		A		9	3	
				February						
	1	02 33 14,7	39,7	42,3		A		9	16	
		10 08 24,6	40,1	45,7		A		9	8	
	2	09 07 47,3	43,1	45,2		A		9	3	
		19 49 43,2	40,4	48,5		A		9	7	
		23 31 32,4	42,0	45,5		A		9	3	
	5	00 27 57,2	43,6	45,0		A		9	13	
	8	17 44 25,5	42,9	47,1		A		9	3	
	13	00 57 45,2	40,7	48,2		A		10	7	
		13 16 36,1	43,1	45,1		A		9	13	
	15	00 04 21,0	41,20	43,98	0–10	а		9	6	
	18	04 31 21,2	43,1	46,7		A		9	3	
	19	18 59 48,1	40,9	42,2		A		9	16	
15	20	14 44 20,8	42,5	45,3		A	4,3	12	3	Душети, 4–5 баллов; Кварели 4 балла; Хашури 3–4 балла

1	2	3	4	5	6	7	8	9	10	11
				February						
	21	09 10 38,2	42,4	45,2		A		9	3	
		09 46 38,7	42,4	45,1		A	3,0	10	3	
		15 46 40,1	42,4	45,2		A		9	3	
	22	02 21 11,6	40,9	39,6		A		9	15	
		12 19 45,3	41,4	44,7		A		9	6	
	23	19 38 12,2	42,3	46,6		A		9	3	
	24	04 14 31,3	42,0	43,0		A		9	2	
16		21 58 54,6	41,0	42,1		A	3,5	11	16	
	26	22 36 21,9	44,0	42,7		A		9	12	
17	27	03 33 11,6	42,9	46,9		A	3,9	11	3	Дубки 4–5 баллов; Махачкала 3 балла
	28	00 55 41,8	42,8	47,0		A		9	3	
				March						
	5	17 46 40,0	42,96	41,39		6		9	1	
	7	00 15 31,6	41,0	51,2		A		9	11	
	9	22 35 09,7	38,5	44,8		A		10	17	
	10	03 32 11,4	40,3	48,6		A		9	7	
	11	01 32 03,3	38,5	47,1		A		10	17	
	12	15 00 52,5	42,9	46,8		A		9	13	
		22 32 56,5	43,6	45,1		A		9	13	
	13	06 10 15,1	43,1	45,5		A		9	3	
		17 33 11,0	37,3	50,7			$m = 4,7^*$			
	14	21 37 31,6	42,9	46,8		A		9	3	
	15	11 30 40,1	42,6	45,1		A		9	3	
	16	02 18 54,1	40,3	42,8		A		10	16	
		04 59 57,3	40,3	42,8		A		9	16	
		08 56 26,5	41,4	45,7		A		10	11	
	17	10 36 50,6	41,8	45,6		A		9	3	
	18	06 37 48,8	42,8	47,0		A		9	3	
	21	02 59 17,8	40,85	44,30	0–10	6		10	6	see text
	22	05 24 37,4	41,6	47,7		A		9	3	
	23	05 14 01,0	41,3	48,6		A		10	3	
	24	02 47 05,7	41,8	46,1		A		9	3	
	27	19 22 27,5	43,0	46,9		A		9	3	
	29	18 24 55,0	41,25	44,00	0–10	6		9	6	
		19 16 11,2	41,7	47,8		A		9	3	
				April						
	2	21 30 25,0	41,65	44,20	0–10	a		9	6	
	3	00 49 43,0	40,90	44,30		6		10	8	
		15 23 41,4	42,0	48,9		A		9	11	
		20 28 38,4	42,8	46,9		A		10	3	
	5	19 05 47,0	43,1	47,2		A		9	3	
	7	02 55 19,0	42,6	47,6		A		9	3	
	8	14 31 07,0	42,6	47,9		A		9	3	
	12	01 05 19,1	39,8	45,3		A		9	9	
	14	06 50 32,8	39,3	43,7		A		9	16	
		18 45 51,6	41,0	47,5		A		9	7	
	16	11 01 17,1	43,8	44,8		A		9	13	
	20	19 50 33,3	40,4	45,9		A		9	8	
	21	17 40 15,9	41,7	50,2		A		9	11	
	22	06 56 51,5	39,5	44,7		A		9	17	
		12 51 52,0	41,42	44,05	0–10	a		10	6	
		13 47 21,4	41,37	44,03		a		9	6	
	23	19 52 11,5	43,5	46,0		A		9	13	
	24	01 16 16,0	39,4	46,0		A		9	8	
	25	12 16 02,7	40,3	42,9		A		9	16	
	29	11 45 12,2	40,5	42,3		A		9	16	

1	2	3	4	5	6	7	8	9	10	11
					May					
	1	05 58 51,2	42,3	41,5	0-10	б		9	10	
		10 31 07,9	41,3	45,6		А		9	7	
		16 23 56,6	42,5	48,6		А		10	11	
	3	02 47 32,1	41,80	43,67	0-10	а		9	6	
		12 13 08,2	42,0	49,4		А		9	11	
		16 11 31,7	39,5	45,5		А		9	8	
	4	18 49 36,6	43,5	44,0		А		9	8	
	5	08 08 06,6	39,9	44,5		А		9	16	
		09 31 47,6	41,6	46,8		А		9	3	
	9	01 06 52,3	38,4	44,8		А		9	17	
		06 34 36,5	42,9	46,6		А		9	3	
18	9	12 47 50,6	38,2	44,6		Б	4,0	11	[illegible]	
		12 51 33,1	38,3	47,2		А		9	[illegible]	
	10	05 54 21,8	43,1	47,0		А		9	[illegible]	
	11	00 15 41,8	38,8	47,1		А		9	[illegible]	
		11 28 09,6	42,7	46,9		А		9	[illegible]	
		13 49 31,0	42,6	47,1		А		9	[illegible]	
19		21 55 26,9	42,5	45,0	25	А	3,4	11	[illegible]	[redacted]
	14	01 22 28,1	41,11	43,97	0-10	б		9	[illegible]	
	15	05 11 21,2	42,40	43,17		б		9	[illegible]	
	18	23 23 50,2	42,9	46,1		А		9	[illegible]	
		12 03 08,5	41,05	43,98	0-10	б		9	[illegible]	
		21 54 44,1	41,1	48,5		А		9	[illegible]	
	20	05 58 59,2	40,4	47,4		А		9	[illegible]	
	23	13 09 54,5	40,8	45,0		А		9	[illegible]	
	25	10 38 40,1	44,4	46,5		А		9	[illegible]	
	30	09 30 46,1	42,7	46,4		А		9	[illegible]	
		10 12 39,4	42,9	45,7		А		9	[illegible]	
					June					
	4	22 22 20,8	42,8	45,2		А		9	[illegible]	
		22 28 58,9	38,4	44,3		А		9	[illegible]	
	7	06 59 05,1	42,7	46,8		А		10	[illegible]	See 20 June (Separate article)
	8	08 17 29,7	40,9	48,2		А		9	[illegible]	
		14 06 38,2	41,1	48,1		А		9	[illegible]	
	11	10 52 09,6	41,75	43,30	0-10	а		10	[illegible]	[redacted]
	13	06 08 52,6	42,7	47,2		А		9	[illegible]	
	15	13 18 29,7	43,0	47,0		А		9	[illegible]	
	16	07 30 00,7	40,9	47,2		А		9	[illegible]	
	17	17 08 50,1	41,7	43,2	0-10	а		10	[illegible]	[redacted]
		19 47 25,7	41,83	44,33	0-10	а		9	[illegible]	
20	20	13 53 22,5	42,7	48,0		А	4,4	12	[illegible]	See separate article
		14 01 42,6	42,6	48,0		А		10	11	
		14 49 08,5	42,7	48,1		А		9	11	
		19 59 50,2	42,5	48,1		А		10	11	
	21	12 22 33,9	41,5	44,9		А		9	7	
		19 01 01,6	41,8	47,1		А		9	3	
	22	14 22 12,0	41,15	43,40	0-10	б		10	6	
		16 46 17,4	42,9	47,1		А		9	3	
	23	02 48 49,3	38,8	44,5		А		10	17	
		13 12 24,4	38,9	45,1		А		10	17	
		18 42 27,6	40,4	47,3		А		9	7	

1	2	3	4	5	6	7	8	9	10	11
					June					
	26	22 20 18,7	43,2	46,7		A		9	3	
	27	17 54 04,4	43,6	45,6		A		9	13	
	28	01 42 02,2	43,2	48,2		A		9	11	
		04 45 35,8	42,3	48,0		A		10	3	
		05 17 39,0	42,6	48,0		A		10	11	
		05 25 52,0	41,30	44,10	0-10	6		9	6	
	30	20 41 15,7	40,0	42,0		A		9	16	
					July					
	8	18 42 29,3	42,1	48,0		A		9	3	
	10	13 49 30,7	42,5	48,3				9	11	
21	12	22 11 31,2	38,8	43,4		A	4,5	11	16	
	13	16 41 06,9	40,3	48,4		A		9	7	
	15	02 42 10,8	42,1	48,3		A		9	11	
	18	12 57 18,2	41,5	50,5		A		10	11	
22		23 44 57,0	39,0	45,7		A	3,8	11	8	Каджаран 5 баллов; Дастакерт, Горис 4 балла
	26	20 07 17,7	38,9	44,9		A		10	17	
	29	07 51 05,4	38,4	46,6		Б		9	17	
	31	15 38 15,3	42,8	47,0		A	3,6	10	3	
					August					
	1	17 44 10,6	42,2	47,6		A		9	3	
	2	00 06 15,5	43,3	45,9		A		9	13	
		16 28 09,5	40,1	50,0		A	3,0	10	11	
		16 55 33,8	41,15	44,0	0-10	6		9	6	
		17 01 47,7	41,17	44,03	0-10	6		9	6	
	3	00 56 52,3	41,0	45,6		A		9	7	
		03 48 19,4	41,17	43,98	0-10	6		9	6	
		07 43 24,4	41,1	44,0	0-10	6		9	8	
23	4	00 20 15,9	40,3	48,4		A	3,5	11	7	См. текст[See text]
		00 57 35,7	40,4	48,5		A		9	7	
		03 25 12,1	42,9	46,9		A		9	3	
		09 03 22,0	40,4	48,1		A		10	7	
		23 34 34,6	40,5	48,4		A		9	7	
	5	00 25 03,5	40,4	48,5		A		9	9	
		11 58 16,0	40,4	48,4		A		9	7	
		12 39 26,2	43,6	45,2		A		9	13	
		12 41 18,4	38,1	45,3		A		10	17	
24	6	00 54 58,2	40,6	48,4		A	4,0	11	7	См. текст
		01 43 30,9	40,2	48,4		A	3,5	10	7	"
		07 27 59,9	40,4	48,5		A		9	7	
		09 22 56,8	40,4	48,4		A	3,6	10	7	"
	7	04 23 03,6	41,35	43,95	0-10	6	3,1	10	6	
		05 53 40,9	40,4	48,5		A		9	7	
		09 47 14,5	40,4	48,5		A		9	7	
	8	00 44 16,2	40,5	48,5		A		10	7	
	9	13 11 54,3	41,37	43,91	0-10	6		9	6	
		13 27 44,2	41,0	48,6		A		9	3	
25	10	03 17 56,0	41,5	47,5		A	3,8	11	3	См. текст
	11	00 12 18,5	38,8	48,7		A		10	14	
		10 01 29,4	42,6	46,8		A		9	3	
		14 42 49,9	40,4	48,5		A		9	7	
	12	03 10 28,6	40,5	48,5		A		9	7	
		03 22 34,7	40,4	48,4		A		9	7	
		04 47 18,7	40,4	48,5		A		9	7	
		08 33 37,0	42,4	44,9		A		10	3	
	14	03 38 50,2	42,6	48,1		A		9	11	
		10 53 10,1	42,85	42,48		6		9	2	
		14 47 11,4	43,0	47,7		A		9	11	

1	2	3	4	5	6	7	8	9	10	11
				August						
	15	00 53 01,3	41,7	46,1		A		9	3	
		01 59 59,3	41,6	46,2		A	3,4	10	3	
	16	13 47 43,4	42,7	48,4				9	11	
	20	06 08 34,0	40,4	49,3	33		$m=4,7^{\circ}$	9	11	
		06 40 04,6	43,1	47,1		A		9	3	
	21	00 42 31,7	41,30	44,05	0-10	a		9	6	
	24	11 05 47,4	40,3	45,7		A		9	8	
	25	03 21 23,1	39,7	44,0		A		9	16	
	27	18 55 15,5	42,4	43,1		A		9	2	
		19 21 24,0	39,8	40,0		A		9	16	
				September						
	3	01 48 00,1	41,00	44,17	0-10	6		9	8	
		23 03 03,2	41,35	43,60	0-10	a		9	6	
	6	10 57 22,3	41,35	44,03	0-10	6		10	6	
	10	00 08 33,3	43,4	44,9		A		9	13	
26		00 42 40,6	43,4	44,8		A	3,6	11	13	
		13 02 57,8	40,9	47,8		A		9	3	
		22 21 18,9	38,7	44,7		A		10	16	
27	12	00 41 22,6	38,6	40,3		A	4,2	11	16	
	14	05 20 00,9	42,0	46,0		A		9	3	
28	16	12 51 13,0	38,4	40,7		A	4,2	11	16	
29	17	00 14 19,4	38,8	41,1		A	4,0	11	16	
30		09 12 40,4	38,6	40,8			3,9	11	16	
31		11 21 19,2	38,5	40,5			4,6	12	16	
32	19	12 00 23,2	38,7	40,8			4,1	12	16	
33		16 25 56,9	41,6	51,1			3,8	11	11	
	20	06 08 29,4	40,4	49,3				10	3	
34		15 53 25,0	38,8	40,8			4,0	11	16	
	21	17 38 46,3	41,1	46,9		A		10	7	
	22	15 26 10,8	41,8	48,2		A		10	3	
	23	05 38 37,6	38,5	44,9		A		10	16	
		19 55 24,7	42,4	46,5		A		9	3	
	27	07 00 39,8	42,3	45,5				9	3	
		23 12 15,6	41,30	44,03	0-10	a		9	6	
	29	16 18 37,0	43,5	45,2		A		9	13	
	30	19 50 14,2	40,1	47,7		A		9	7	
				October						
	1	09 24 04,5	39,3	44,0				9	16	
		21 19 04,6	41,8	47,5				9	3	
		22 34 24,0	39,6	44,9		A		9	17	
35	6	18 07 15,3	38,1	48,4		A	$m=4,8^{\circ}$	12	17	
		20 46 09,0	38,0	46,5		A		10	17	
	7	05 38 53,0	42,7	47,1		A		9	3	
	12	05 37 03,4	43,1	47,1		A		9	3	
	15	05 54 25,2	42,8	45,9		A		9	3	
		20 07 33,4	40,1	42,9		A		9	16	
	16	15 01 50,6	40,3	48,6		A		9	2	
		22 46 46,1	43,1	46,9		A	3,3	10	3	Буйнакск, 4 балла
36	20	02 54 05,7	43,4	44,4		A	3,4	11	13	
37		03 19 59,9	41,7	48,1		A	$m=5,0^{\circ}$	12	3	См. текст
		05 46 12,8	43,4	44,4		A	3,1	10	13	
38		07 56 50,6	43,4	44,2		A	3,5	11	13	
		10 08 10,7	43,4	44,4		A		9	13	
	23	12 45 45,2	43,0	46,8		A		9	3	
	24	21 54 48,2	43,0	46,8		A		9	3	
	26	05 33 06,7	40,2	46,7		A		9	8	
	31	18 34 15,6	38,0	46,3				9	17	

1	2	3	4	5	6	7	8	9	10	11
				November						
	2	11 46 24,2	42,0	49,1		A		10	11	
	7	10 32 05,9	41,35	44,05	0-10	a		9	6	
		10 33 26,5	41,33	44,05	0-10	a		9	6	
39	8	12 54 12,0	38,8	40,8		A	4,0	11	16	
	9	20 29 00,9	40,3	45,7		A		9	8	
	10	21 14 23,6	43,1	43,9		A		9	2	
		23 57 43,8	43,1	44,1		A		9	2	
	12	02 02 43,0	42,5	46,5		A		9	3	
	14	19 50 30,2	43,9	45,7		A	3,4	10	13	
	15	17 13 28,7	40,0	47,3		A		10	7	
40	19	23 21 15,7	38,4	45,8		A	4,0	11	17	Горис 3-4 балла
	21	21 06 51,2	42,95	42,15	0-10	a		9	2	
	23	06 31 17,6	41,50	44,48	0-10	6		9	6	
		23 33 56,8	40,0	47,0		A		9	8	
	28	04 25 02,3	42,06	43,80	0-10	6		9	2	
		16 1? 26,0	41,40	43,78	0-10	6		10	6	Богдановка 4-5 баллов
	30	04 47 21,3	42,2	48,4		A		9	11	
		22 17 18,2	40,4	43,1	0-10	A		9	16	
				December						
	2	20 43 24,8	40,7	43,7		A		9	9	
	3	16 40 44,8	40,5	43,1		A		10	16	
	4	03 31 30,2	43,2	44,2		A		9	13	
41	5	15 27 15,0	38,6	44,8		A	3,9	11	17	
	6	06 10 24,0	40,5	43,1		A		9	16	
		13 30 58,4	38,7	44,8		A		9	17	
	7	02 13 56,7	40,5	43,2		A		9	16	
		05 11 06,6	40,5	43,2		A		9	16	
		14 23 52,0	40,5	43,1		A		10	6	
		17 40 34,7	43,5	44,5		A		9	13	
	8	23 52 43,0	39,9	50,1		A		10	11	
	9	02 10 05,2	42,1	45,8		A		9	3	
42	10	07 43 02,6	40,5	43,1		A	3,8	11	16	
		07 45 24,7	40,5	43,1		A	3,6	10	16	
43	11	13 50 39,2	42,2	48,3		A	4,0	11	11	
	12	02 51 50,8	41,37	43,88	0-10	a		9	6	
	13	11 27 41,8	43,0	44,6		A		9	2	
	16	02 07 46,8	42,1	45,8		A		9	3	
44		07 42 50,0	39,7	48,1		A	$m=4,9^*$	11	7	
	20	19 05 38,3	43,6	40,1				9	1	
		19 50 12,7	42,9	47,0		A		9	3	
	21	12 44 47,9	42,3	47,3		A		9	3	
	22	03 20 33,1	43,0	47,0		A		9	3	
	23	11 59 20,1	42,0	46,2		A		9	3	
	24	05 26 00,5	43,1	47,0		A		9	3	
	29	19 59 30,6	40,9	43,5		A		9	3	
	30	05 28 49,3	41,13	44,03	0-10	6		9	8	

* Magnitude, determined according to body waves, registered by SKM instruments.

Regional Catalog of Earthquakes in Western Turkmeniya

A. R. Rakhimov, chief compiler
N. Annamuzkhamedov, T. A. Annaorazova, G. L. Golinskiy, T. N. Gorodkova, K. D. Lagutochkina, N. A. Makarenko, M. Musayeva, N. P. Pavlenko, A. P. Rakhimov, compilers

Key:

1. Number
2. Moment of occurrence, hrs, mins, secs
3. Coordinates of epicenter: φ°N
4. Coordinates of epicenter: λ°E
5. Class of accuracy
6. M
7. K

Число	Момент возникновения, ч м с	Координаты эпицентра φ° N	λ° E	Класс точности	M	K
1	2	3	4	5	6	7
		January				
1	08 54 52	37,1	58,0			9
2	04 30 24	37,7	58,1	Б		7
	23 32 02	37,0	56,4	Б	3,0(3)	9
3	07 49 53	36,2	57,8			9
	17 16 55	37,7	57,7			7
	19 33 32	37,6	56,8			8
	22 17 31	37,8	57,7			7
4	06 25 41	37,6	56,9			8
	07 52 55	37,5	56,8			8
	19 17 24	37,9	58,4	А		7
5	01 51 09	37,9	58,1	А		5
	07 36 16	37,7	56,3	А	3,3(3)	10
	09 17 53	38,5	56,2	А		6
	09 19 13	38,5	56,2	А		7
	09 21 37	38,5	56,2	А		7
6	19 56 10	37,9	58,1	А		5
	23 32 04	37,1	56,4			8
8	00 45 05	37,2	56,4	А	3,5(5)	10
9	10 43 56	37,6	56,2	А		9
10	08 06 34	37,7	57,9	Б	3,0	9
11	12 38 25	37,8	57,1	А	3,3(3)	10
12	21 41 22	38,0	57,6			8
	22 40 31	36,9	55,8		3,2(2)	10
13	03 07 06	37,1	57,3			8
	22 54 20	37,4	57,3			9
15	10 16 20	37,9	58,4	Б		9
18	10 04 19	40,0	53,1	Б		9
20	00 50 43	37,4	57,2	А		9
	01 15 30	37,5	56,0	Б		9
	07 53 52	40,0	53,0	А		6
22	06 02 33	36,8	57,9		3,5(2)	11
	22 12 44	37,8	58,2	А		7
24	01 52 07	37,9	58,1	А		5
	11 48 15	40,0	53,1	А		7
	14 39 06	37,9	57,1			8
25	15 28 19	38,4	56,2	А		7
	15 53 45	37,9	57,3			7
	15 54 40	37,8	57,4			7
	22 08 04	37,9	57,4			8

1	2	3	4	5	6	7
		January				
26	02 42 11	37,8	57,9	А		7
	05 42 10	37,8	57,8	Б		7
	12 40 52	37,9	57,4			8
	22 03 17	37,8	57,2	А	3,3(4)	10
29	00 49 47	37,6	57,9	Б		8
	08 07 33	37,9	58,1	А		6
	12 52 49	40,0	52,9	А		7
30	10 39 24	37,6	58,1	Б		9
	21 49 46	37,7	58,2	Б		7
		February				
1	17 17 52	36,7	56,8			9
	20 21 59	37,4	57,0		3,0(3)	9
3	03 07 44	35,8	56,0			9
	12 29 04	37,3	57,5			8
	14 27 06	40,2	53,2		3,0	9
4	23 33 22	37,9	58,1	А		5
5	21 51 25	40,3	53,2			9
6	01 20 47	37,4	57,6	Б		8
	01 46 55	37,8	58,4	А		6
7	00 40 31	37,1	55,6	Б		9
8	09 10 19	37,3	57,5			8
	11 17 07	35,5	56,5			8
9	07 45 18	37,2	56,7		3,0(2)	9
	09 45 13	37,2	56,7	Б	3,2(3)	10
10	11 00 05	37,8	57,8	Б		9
	14 16 48	37,7	57,6			9
11	05 31 24	37,5	57,2			8
	05 46 09	37,5	56,8			8
	07 05 48	40,0	53,0	А		7
	18 56 27	37,5	58,2	Б		8
12	14 38 45	37,8	57,9	Б		6
13	07 22 30	35,7	54,7		3,6	10-11
	11 46 06	36,6	54,5		3,3	10
	22 57 11	37,8	57,8			7
	22 58 30	37,8	58,0			7
	23 00 52	37,7	57,7			8
	23 12 27	37,8	58,0			8
	23 18 48	37,8	57,8			8
	23 26 39	37,7	57,8			8
14	00 05 56	37,7	57,7			8
	00 06 25	37,8	57,8			8
	00 09 49	37,8	57,8			7
	00 17 51	37,8	57,8			8
	00 51 39	37,8	58,0			7
14	01 02 53	37,8	57,8			8
15	01 08 03	37,9	58,2	А		6
	04 47 46	36,3	57,9			8
16	19 51 48	37,7	57,7	Б		7
	21 17 25	37,8	57,8			7
17	07 05 48	40,0	53,0	А		7
	10 37 10	37,9	57,7	Б	3,0(2)	9-10
	23 31 18	37,8	57,9		3,0(2)	9-10
18	09 26 56	37,9	57,5	Б		9
19	08 16 17	40,0	53,0	А		7
	14 22 56	37,8	58,5	Б		8
	10 59 24	37,9	58,4	Б		8
20	12 03 46	40,0	53,0	А		6
21	02 56 21	37,5	58,4	Б		8
	03 55 36	35,7	53,0			9
	06 14 07	36,0	54,5		3,1	9-10
	07 39 58	37,9	58,2	А		7

1	2	3	4	5	6	7
		February				
23	06 42 07	40,5	53,2			9
	13 39 31	37,0	58,3			8
	21 19 02	37,7	56,6	Б		8
24	01 15 56	37,9	56,0			9
	09 15 41	37,8	57,8			9
	17 32 26	35,9	54,0			9
	19 22 44	37,8	57,8			7
	20 16 30	37,2	56,5			8
25	03 25 26	35,8	53,7		3,0	9
	10 31 17	38,0	57,7	Б		9
26	02 44 30	40,3	53,2			9
	10 45 19	38,0	58,0	А		8
26	12 33 30	37,9	58,1	А		4
	13 08 05	40,0	53,0	А		7
	17 36 26	37,9	58,1	А		7
	17 43 39	37,9	58,1	А		5
	23 39 22	37,9	57,8	Б		8
27	09 25 29	37,5	58,1	Б		7
	13 45 36	37,5	54,5			8
	21 50 23	37,0	57,2	Б		8
28	05 20 06	37,5	56,4			9
	10 16 53	37,7	58,7	Б		7
	10 48 14	37,7	58,8	Б		7
		March				
2	19 56 18	37,7	57,4	Б		8
3	15 00 14	35,9	55,95		3,6(3)	10
5	00 13 54	37,3	59,4			9
	09 44 19	40,0	53,0	А		6
6	01 20 59	38,2	57,1			9
7	10 32 11	40,1	53,0	А		7
	17 41 39	37,9	57,4	Б		8
8	00 31 00	38,3	57,3	Б		9
	02 16 23	37,3	57,2			8
	13 18 17	37,9	58,2	Б		7
10	18 38 20	35,8	56,0	А	3,2(3)	10
	20 36 01	35,8	56,0	А	3,4(4)	10
	22 57 52	37,3	57,2			8
11	07 28 24	38,0	58,1	А		7
12	21 44 26	37,8	58,0	А		7
13	18 20 46	37,8	57,2			9
14	07 54 49	37,8	57,3			8
	16 57 04	37,9	58,1			7
17	09 05 27	37,9	58,1	А		6
	12 55 12	37,7	57,9	Б	3,0	9
	17 07 12	37,4	58,2	А	3,0(3)	9
19	11 04 10	38,0	58,1	А		8
20	04 32 42	38,1	57,5			9
21	02 39 45	38,3	57,1	А		9
22	05 50 48	36,8	54,5			9
	07 25 06	37,7	57,7	Б		8
	12 06 53	37,4	55,2			9
	13 18 46	37,9	56,3			8
	19 36 59	37,8	58,6			7
23	12 13 17	37,0	54,5		3,0	9
	18 09 57	37,9	58,1	А		7
24	07 50 33	38,1	57,9	А		8
	10 11 46	37,9	57,7	А	3,0(2)	9
26	00 10 33	37,9	58,0	Б		6
	07 31 12	37,9	58,3	А		6
27	07 01 23	37,8	57,8	Б		8
29	09 20 17	38,0	57,2	А		9
30	01 40 34	37,8	57,9			6
	16 00 11	37,2	56,4	А		8

1	2	3	4	5	6	7
			April			
1	15 13 [illegible]	36,7	57,8			7
2	05 50 53	37,0	56,4			8
	12 45 31	[illegible]	54,4	Б	3,1 (3)	9-10
	21 30 24	38,0	[illegible]		3,0 (2)	9-10
3	07 24 51	38,0	58,0	А		6
	12 13 25	37,0	56,5	А		9
4	08 53 45	37,5	58,5	А		9
	09 17 44	37,2	58,4			9
	15 42 08	37,2	56,3		3,2	10
	19 41 21	36,7	57,8			9
5	18 46 06	38,0	57,0			8
6	07 34 39	37,8	57,6			8
	11 24 14	38,2	57,8	А		9
	15 19 33	36,2	57,1			8
	20 37 29	38,3	57,3			8
7	04 42 14	37,9	57,9	Б		7
8	10 06 25	38,2	57,3			8
	10 40 23	37,8	57,0	А	3,0 (3)	9
	20 40 47	38,0	58,1	А		5
	20 59 14	38,0	58,1	А		5
	23 16 40	38,0	58,1	А		5
9	04 16 33	37,7	58,1	Б		8
	06 50 54	37,9	57,6			8
	16 28 52	38,0	58,1	А		8
10	02 47 55	38,0	58,0	А		7-8
	03 25 54	37,9	57,1	А	3,4 (4)	10
	08 39 48	37,8	58,3			8
12	02 01 20	37,8	58,3	А		8
	15 06 37	37,8	57,6			8
13	03 35 24	37,4	57,3			8
14	03 29 33	38,0	58,1	А		6
	16 53 45	38,0	58,1	А		6
	16 54 26	38,3	57,3	А	3,3 (3)	10
	17 26 04	38,3	57,3	Б		9
	18 10 02	38,3	57,3			8
	18 20 00	38,3	57,3			8
	20 46 03	38,3	57,3			9
15	03 58 57	37,5	57,0			9
	10 02 50	38,3	57,3			8
16	07 58 19	38,1	57,9	Б		8
20	05 39 12	37,4	57,2	Б	3,0 (2)	9
	23 31 27	37,8	56,9			8
21	02 20 29	37,9	57,8	Б		6
	12 26 05	40,1	53,1	А		8
	22 28 25	37,8	58,8	Б		7
22	09 00 04	37,8	58,3	А		8
	10 45 42	37,8	58,2	Б		8
	14 35 49	38,3	56,8			9
23	01 49 55	38,3	56,6			9
	02 14 08	38,3	56,7			8
	07 50 51	37,8	57,9	Б		9
25	05 50 51	36,2	57,1			9
	07 09 33	37,3	56,2		3,0 (2)	9-10
	07 35 42	38,0	58,1	А		5
	10 57 44	38,0	58,1	А		7
	11 19 35	38,0	58,1	А		5
28	10 45 01	38,1	57,8	Б		9
29	13 10 49	40,0	53,1	А		7
	15 40 11	40,0	53,1	А		7

1	2	3	4	5	6	7
		May				
1	13 18 23	36,3	54,9			9
2	09 33 39	36,2	57,0			9
3	11 09 40	40,0	52,0			8
	11 10 23	40,0	53,0	А		5
	17 46 28	37,8	57,5			7
5	10 29 39	38,0	58,1	А		4
6	07 22 49	38,0	58,0	Б		7
	14 29 40	35,8	56,8			8
	16 39 54	36,8	57,5			9
7	14 49 26	37,9	57,8			6
	17 43 37	40,3	55,3	А	4,1 (4)	11
9	12 50 08	40,0	51,0			8
	16 10 26	40,1	51,2			8
10	02 57 20	36,8	57,5			9
11	22 42 27	36,2	57,0			8
12	01 28 16	38,3	56,8			9
	07 03 49	37,9	57,9	Б		7
	08 44 36	37,5	57,5			8
	09 03 55	35,95	55,4			9
	12 30 33	38,3	56,3			9
13	00 38 34	37,8	57,9			7
	19 49 35	36,2	55,7	Б	3,3 (4)	10
14	06 22 29	37,6	57,7			8
	19 38 09	36,45	54,93	А	3,4 (4)	10
15	09 08 15	37,0	57,6			8
16	03 44 01	37,5	57,8			8-9
	10 38 25	35,95	55,4		3,4 (4)	10
17	09 16 17	38,0	58,2	А		4
19	07 46 [illegible]	37,9	58,1	Б		7
	09 50	38,0	58,1	А		6
	09 57 [illegible]	38,03	56,1	А	3,2 (3)	10
	21 30 14	37,3	57,6			9
	21 38 22	37,3	57,6			7
20	07 20 00	38,1	57,8			8
	07 20 55	38,1	57,8			8
	09 02 21	37,6	57,5			8
	12 53 56	37,2	57,5			8
	20 13 54	37,2	57,5			9
21	03 23 09	39,3	51,6			9
24	04 49 19	37,8	58,0	Б		6
	14 36 29	35,3	56,3			9
	15 27 37	36,75	55,3	А		9
	16 15 15	36,75	55,23	А	3,0 (2)	9-10
	21 13 36	37,8	55,9			9
	21 35 51	36,3	57,0			9
25	07 25 02	37,5	55,5		3,3 (2)	10
26	22 00 50	37,8	57,9	Б		7
27	15 11 33	37,8	57,9	Б		7
28	08 14 21	38,4	56,6			8
	08 19 53	40,1	53,1	А	3,3	10
	12 26 42	37,9	58,1	Б		7
	12 39 22	36,7	59,4		3,0 (2)	9
	16 22 42	37,2	58,0	Б		8
	17 09 54	37,6	57,6	Б		8
29	03 22 32	36,3	58,3		3,2 (2)	9-10
	06 51 11	37,8	57,9	Б		8
29	16 14 35	37,9	58,1	А		6
30	04 16 26	40,3	53,5			9
31	14 45 12	40,1	53,1	А		6

1	2	3	4	5	6	7
			June			
1	07 39 26	38,2	56,0			7
	12 32 24	38,5	56,3	А		6
	15 08 01	37,2	57,1	А	3,1 (5)	9–10
	17 58 06	37,9	58,1	А		5
3	12 19 43	37,9	57,8	Б		8
4	09 07 29	37,7	58,8	Б		8
	16 43 20	37,0	57,6			8
	19 51 20	35,6	56,0			9
5	10 40 16	38,0	58,0	А		7
	10 47 20	37,7	58,6	Б		7
	17 21 53	37,6	57,9	Б		8
6	08 58 31	36,8	57,3			8
	10 56 35	37,3	58,0	Б		8
	13 39 47	37,3	58,0			8
	17 38 55	36,8	54,8	А	3,3 (4)	10
7	15 59 19	37,7	58,4	А		7
8	21 00 25	37,5	57,7	А		8
9	08 09 17	37,6	58,8			8
10	14 35 01	37,5	58,0	А		9
	19 58 21	39,5	51,2			9
11	11 29 53	37,9	58,1	А		4
12	08 29 05	37,5	57,7			7
13	07 05 19	37,6	57,9	А		8
	08 54 17	37,6	58,4	Б		8
	23 15 13	38,0	58,1	А		5
15	16 56 16	37,6	58,4			7
	16 57 22	37,4	58,0			7
	18 54 00	36,8	57,3			8
	23 10 11	37,6	57,9	Б		7
16	08 01 16	37,9	57,8	А		8
19	10 04 08	37,6	58,4	Б		9
	13 13 56	37,5	58,0	Б		8
	23 59 35	35,4	56,4	А	3,2 (3)	10
20	07 32 30	38,0	58,0	А		8
21	09 20 39	38,5	55,8	А	3,1 (3)	10
22	22 09 39	38,8	56,5			9
23	02 03 51	38,8	56,5			9
24	08 31 34	37,5	57,9			9
25	07 04 38	37,7	57,9	Б		8
	15 01 37	36,2	57,1	А	3,0 (3)	9–10
	20 01 07	36,3	56,9	Б	3,3 (4)	10
	22 20 30	37,2	56,3	А	3,2 (4)	10
26	21 50 07	36,7	57,2			8
27	08 11 43	37,7	58,0	Б		8
	09 06 28	37,7	58,5	Б		8
	09 14 23	37,6	58,5	Б		8
28	19 53 50	37,0	57,6			8
			July			
1	10 22 37	40,0	53,0	А		7
2	02 47 26	37,0	57,6			9
5	11 52 55	36,3	54,8			10
	23 05 09	37,8	58,0	Б		8
	23 53 48	37,5	56,6	А	3,1 (3)	9–10
6	05 30 10	39,9	51,9			10–11
	12 50 11	37,8	57,4	Б	3,0 (3)	10
10	12 36 46	37,7	56,0	А	3,1 (3)	10
	14 14 37	37,6	56,3		3,3	10
11	07 14 45	37,5	57,6			9
	09 21 10	37,9	58,7	Б		8

1	2	3	4	5	6	7
		July				
13	04 54 00	36,5	58,5	Б	4,0(5)	11
14	03 58 50	38,1	57,6	Б	3,4(4)	10
	19 25 08	37,8	56,2	А		9
15	07 21 37	38,1	57,8	А		7
	16 22 38	37,8	56,2	А		9
16	14 56 34	37,4	58,0			8-9
	15 01 53	37,7	58,6	Б		8
	15 09 20	37,8	58,0	Б		8
	15 16 34	37,8	57,9	Б		8
18	10 01 22	37,8	58,6	Б		9
	19 45 26	37,5	58,2	Б		9
	19 53 35	37,6	58,3	Б		8
20	02 24 57	37,9	58,4	А		8
	10 08 54	37,7	56,2	А	3,2(4)	10
	10 57 23	36,2	57,5			8
	16 05 02	36,3	57,4			9
21	10 45 51	38,0	58,0	А		6
	19 48 24	38,0	58,0	А		6
22	09 09 05	39,6	54,1	А	3,3(5)	10
	09 25 14	37,5	57,4		3,0(2)	9
	10 37 06	37,1	57,9	Б		8
	10 59 49	37,0	58,0	Б		7
23	17 11 36	37,8	57,9	Б		8
24	08 05 27	37,9	58,4	А		7
	10 36 29	38,0	58,0	А		7
25	07 30 04	40,1	53,0	А		7
	13 40 27	40,0	56,5	Б	3,3	10
26	17 29 46	37,8	58,0	Б		8
27	06 39 01	37,4	58,0			8
28	08 24 14	38,0	58,0	А		6
	16 04 49	40,2	53,0	А		7
29	09 59 44	36,8	57,0			8
30	07 41 02	37,9	57,8	Б		8
	10 58 48	37,0	58,0			8
	21 30 36	37,9	58,4	А		7
		August				
2	01 51 53	35,3	55,9	Б	3,1(2)	10
	16 28 17	39,5	51,2		3,2(2)	10
	03 27 02	37,1	57,0			9
	11 07 59	37,0	57,0			8
5	17 42 46	37,7	57,6			7
	18 45 17	36,7	57,2			8
6	11 34 37	36,8	54,5			9
8	02 45 20	40,5	53,2			9
8	03 54 54	39,2	54,2		3,0(2)	9-10
	08 01 41	38,0	57,9	А		8
	13 07 06	36,8	57,3			8
9	14 45 06	37,4	57,3			9
11	10 22 09	36,2	57,4			8
	23 47 41	37,7	57,6	А	3,3(4)	10
12	11 55 34	37,5	58,2	Б		7
13	13 29 29	36,2	57,6			8
	14 27 48	37,9	58,0	А		6
14	03 38 22	37,0	57,0			9
	14 47 46	37,1	58,0			8
15	04 01 55	38,0	58,0	А		6
	10 54 53	37,8	57,7	Б		8
	21 57 36	36,2	57,5			8

1	2	3	4	5	6	7
			August			
18	02 31 15	36,4	57,5			8
	19 48 05	38,0	58,1	А		6
20	00 52 01	39,6	54,1	А	3,3 (3)	10
21	04 00 01	37,8	57,0	А	3,9 (3)	11
22	09 44 15	37,7	58,0	Б		7
	09 58 11	38,0	58,1	А		5
23	04 44 45	37,3	57,6			8
	05 04 41	37,4	57,5			8
	06 28 54	37,4	57,6			7
26	03 06 14	37,7	57,7	Б		8
27	21 36 03	36,3	57,5			8
28	03 46 30	36,4	57,5			8
	06 52 44	37,8	57,9	Б		7
	07 00 48	37,1	55,3			9
	08 19 03	40,1	53,1	А		8
29	10 57 18	38,1	57,7	Б		9
	13 12 38	36,5	57,1		3,0 (2)	9-10
	14 57 45	40,1	53,1	А		7
30	03 07 02	37,1	57,2			9
			September			
4	02 46 10	38,0	58,1	А		6
	03 28 29	38,1	58,1	Б		6
	04 19 20	38,0	57,8	Б	3,0	8
	06 40 50	38,0	57,8	Б	3,0	10
	10 31 10	38,0	58,1	А		9
5	15 10 16	39,7	52,2		3,7	11
	15 56 08	36,5	55,5		3,3	10
6	02 54 20	37,8	57,3	А	4,1 (5)	11
8	16 20 24	37,2	58,9			8
9	01 33 46	38,0	57,6	Б	3,0 (2)	9
10	11 00 09	38,0	57,9	Б		7
11	10 39 26	37,9	57,7	Б		8
	15 26 30	37,3	58,0			10
12	09 08 59	37,8	57,0			7
13	18 57 01	37,8	57,2			8
17	11 03 58	37,2	57,4	Б	3,8 (5)	11
	17 17 07	37,0	54,8			11
	22 13 58	38,1	57,5	Б		9
18	10 06 28	37,8	58,8	Б		8
19	08 29 52	37,9	58,8	Б		8
21	05 02 28	38,1	57,5	Б		8
22	08 59 52	37,8	57,8	Б		8
	20 41 00	38,0	58,0	А		5
23	08 36 25	37,8	58,7	Б		8
	14 18 10	38,0	57,9	А		8
26	10 44 37	37,6	57,9	А		9
28	13 04 29	37,2	57,3			7-8
	13 18 10	38,0	56,8		3,0 (2)	9
	18 24 18	37,6	58,1	А		8
29	07 36 14	37,6	58,0	Б		8
	09 57 19	37,7	57,6	Б		8
	15 43 18	38,0	57,2			7
30	10 59 28	37,6	57,9	Б		9
	13 06 30	37,0	55,6			9
	17 05 12	38,0	57,0	А	3,5 (4)	10

1	2	3	4	5	6	7
			October			
1	04 59 19	39,7	52,2			8-9
3	07 21 07	37,9	58,4	А		6
	08 50 47	37,9	58,9	А	3,0 (2)	10
4	09 15 32	38,0	56,3			8
	10 13 22	37,3	57,1	А	3,6 (3)	10
	13 21 30	37,6	53,7	Б	4,3 (4)	11-12
5	03 24 48	38,1	57,4	Б		8
	11 16 38	36,8	57,8			8
6	18 07 50	35,6	52,1		4,0 (5)	11
	18 17 37	40,0	53,6		3,3	10
	20 35 14	40,3	53,4	Б		8
7	23 52 53	40,0	56,5			9
8	11 10 49	38,0	57,7	Б		7
	16 26 11	37,4	58,4			7
9	01 53 39	37,1	58,4		3,2 (2)	10
10	09 05 27	37,5	58,3	Б		8
11	19 13 05	37,3	57,8			7
12	17 37 18	38,0	58,0	А		6
	23 56 27	38,0	58,0	А		5
13	03 37 19	37,1	59,4			9
	04 09 52	37,5	57,1			8
	06 43 10	37,8	58,8	Б		8
	06 57 18	37,9	58,4	А		6
	08 27 36	37,9	58,2	А		7
	08 28 23	37,8	57,9	Б		7
	08 32 30	37,9	58,4	А		6
	08 33 14	38,2	57,6	Б		7
14	06 54 46	37,9	58,4	А		6
	06 55 36	38,0	58,2	Б		7
	07 14 46	37,9	58,5	А		5
	07 15 38	38,0	58,1	А		6
	09 23 56	38,0	58,4	А		7
	09 29 21	37,6	58,3	Б		7
15	09 17 40	38,0	57,7		3,0	9
16	11 39 55	40,1	53,1	Б		7
17	04 24 03	37,7	57,1	А	4,0 (5)	11
	09 27 14	37,6	58,5	Б		8
18	15 09 27	39,5	52,1			9
19	03 10 05	37,2	58,0			7
	11 24 40	37,2	58,0			7
20	13 51 01	37,9	58,0	Б		6
24	06 44 22	37,3	57,5			7-8
	07 56 48	37,9	57,9	А		9
	08 24 29	37,3	57,9			8
	09 13 21	38,2	57,2			8-9
25	10 45 09	38,0	58,2	Б		6
	12 38 34	37,6	58,9			8
26	20 17 16	37,5	58,0			8
27	05 48 55	36,4	57,0			8
28	00 43 27	38,0	58,2	А		5
	07 45 36	40,0	53,0	А		6
	13 37 29	40,0	53,0	А		7
29	10 20 29	37,6	57,9	Б		8
31	03 41 39	38,0	57,9	Б		7
	13 41 34	37,5	57,9			8

1	2	3	4	5	6	7
			November			
2	04 44 54	39,3	51,3			8
	06 58 20	37,7	57,9	Б		7
	08 35 43	37,5	58,0			7
	11 47 14	39,3	51,3			8-9
4	11 30 17	37,8	58,5	А		8
	12 47 34	37,8	57,5	Б		9
	14 08 40	37,6	57,5	Б		9
5	21 00 39	37,2	56,5	Б	3,0(4)	9
6	04 09 29	35,8	53,1	А	4,6(5)	12
	04 58 13	37,8	56,0	Б	4,2(4)	12
9	10 40 58	37,2	56,0	Б	3,8(5)	11
11	09 26 58	38,2	57,1			9
12	11 21 04	38,2	57,7	Б		8
16	05 50 29	37,9	57,7			7
	08 22 08	39,2	56,4	А		8
17	15 35 40	38,0	58,2	Б		7
18	04 30 44	36,1	54,7		3,4	10
	10 36 00	38,0	58,0	А		5
20	08 58 20	40,0	53,0	А		6
	09 48 44	37,4	58,0			9-10
	10 51 46	35,8	57,4			9
21	08 54 55	37,9	58,4	А		8-9
	11 10 34	38,0	57,9	А		8-9
22	02 26 15	37,3	57,6			4
	22 27 19	37,1	57,5			8
24	23 26 48	36,4	54,7		3,3	10
	23 37 46	39,5	51,3		3,1	9-10
25	07 29 36	37,1	57,1			9
26	04 33 13	38,5	57,5	Б	3,8(5)	11
	14 42 25	39,0	51,7			9
27	07 21 30	38,0	58,1	А		8
	09 47 25	37,8	58,8	Б		9
	12 36 53	40,1	53,1	А		8
28	08 12 23	38,1	57,7	Б		8
29	00 06 03	38,3	57,0			9
	07 47 25	37,5	56,7			9
	22 42 35	36,4	57,5			8
30	16 44 26	37,7	58,2			9
			December			
1	13 51 21	38,0	57,8			9
3	21 09 57	37,8	57,9	Б		8
	21 11 40	38,0	57,8	Б		7
4	01 27 06	36,3	57,0			9
	04 49 13	37,5	58,0			8
	18 05 13	37,8	58,2	Б		7
6	22 58 02	37,5	58,0			8
7	07 50 22	37,6	58,3	Б	3,4(5)	10
10	09 27 56	37,6	58,3	Б		9
11	22 39 54	36,6	54,8	Б	3,9(4)	11
12	09 50 30	38,1	57,9	Б		9
14	23 51 18	38,0	57,9	Б		9
18	11 13 58	37,8	58,8	Б		9
20	22 04 59	38,1	57,9	Б		8
22	09 11 45	38,1	57,9	Б		8-9
26	08 51 18	38,1	57,9	Б		9
27	00 13 08	37,8	56,3		4,3(5)	12
28	07 29 39	38,1	58,0	А	3,1	9-10

1	2	3	4	5	6	7
		December				
	09 06 32	36,6	58,0	Б	4,5(3)	12
	12 28 10	36,5	57,1			9
	15 41 17	36,6	57,0			8
29	07 58 26	38,0	57,8	Б		7
	13 04 26	38,0	58,2	А		5
30	00 11 04	37,5	58,1	Б		9

Note. In parenthes--number of stations according to which magnitude was determined.

Regional Catalog of Earthquakes in Central Asia and Kazakhstan with K 9

M. P. Fadina, A. P. Katok (Tadzhik SSR), M. G. Flenova (Uzbek SSR), K. D. Dzhanuzakov (Kirgiz SSR), A. B. Ospanov, (Kazakh SSR), chief compilers
Ye. T. Astaf'yeva, V. N. Barmenkova, A. V. Zav'yavlova, I. I. Ivanova, T. R. Ulubeyeva, G. N. Shakirzhanova, R. K. Kurmanaliyeva, R. B. Shukurova, V. N. Yakoblev, N. N. Mikhaylova, T. A. Kinyapina, V. K. Iodko, A. A. Kon'kov, A. F. Krasnova, A. T. Mamatkulova, L. A. Kogan, compilers

Key:

1. No, in order
2. Date
3. Time of occurrence of earthquake, hrs, mins, secs.
4. Coordinates: φ °N
5. Coordinates: λ °E
6. H
7. Class of accuracy
8. M
9. K
10. Number of region
11. Macroseismic data

№ п/п	Дата	Время возникновения землетрясения, ч м с	Координаты		H	Класс точности	M	K	№ района	Макросейсмические данные
			φ°N	λ°E						
1	2	3	4	5	6	7	8	9	10	11
				January						
1		02 08 48	36,1	69,0	150	Б		9	1	
		02 19 59	36,5	70,1	200	Б		9	1	
		17 58 42	36,6	71,0		Б		10	1	
2		08 35 02	36,1	69,9	80	Б		9	1	
		10 58 05,3	41,29	68,8	0-5	б		9	10	
		11 28 9,0	41,28	68,8	0-5	а		10	10	
		21 41 15	39,4	71,9		А		9	3	

1	2	3	4	5	6	7	8	9	10	11
				January						
	3	01 53 43	37,5	71,6	130	Б		11	2	
		13 56 15	39,4	73,7		Б		10	11	
		14 01 25	36,4	70,7	180	Б		9	1	
		15 19 28	40,4	78,4		Б		9	5	
		23 20 56	39,5	73,9		Б		10	11	
	4	02 45 51	36,1	69,5	80	Б		10	1	
		05 15 12	41,0	68,5	10	А		9	10	
		05 16 35,2	40,8	68,4	10	а		9	10	
		07 11 48	36,6	70,2	180	Б		10	1	
		09 13 34	39,5	73,6		Б		9	3	
		13 16 17	36,6	71,0	100	Б		10	1	
		15 42 46	36,8	71,3	80	Б		9	1	
		17 07 21	37,1	71,2	90	Б		9	2	
		18 03 54	38,68	70,17	10	б		10	3	
		20 03 30	36,1	69,7	100	Б		9	1	
		21 47 40,4	43,13	76,78	10	а		10	7	
	4	22 40 47,0	37,84	69,54	1-2	б		9	3	
		23 26 19,0	38,88	70,10	10	б		9	3	
	5	02 47 30	37,1	71,3	90	Б		11	2	
	6	00 54 32	36,7	70,9	240	Б		10	1	
		04 31 50	37,3	71,8	210	Б		10	2	
		05 48 13	39,3	73,9		Б		10	11	
		06 03 10	39,8	75,3		А		10	11	
	7	03 04 09	39,4	72,0		Б		10	3	
		15 14 15	36,7	70,2	200	Б		9	1	
		17 31 40	37,3	71,8	150	Б		11	2	
		20 57 35	37,9	66,3		Б		9	23	
	8	06 48 36	39,4	73,8		Б		9	11	
		09 09 52	36,4	70,5	200	Б		9	1	
		11 28 39	40,0	70,7	5	А		9	5	
		12 44 33	37,3	71,2	90	Б		9	2	
		22 52 43	37,3	72,5		Б		9	2	
	9	11 55 38	37,6	66,0		Б		9	4	
		13 09 33	36,5	71,0		Б		9	1	
		19 35 13	37,6	72,0	150	Б		9	2	
		20 08 33	39,0	73,3		Б		9	3	
	10	01 45 05	37,5	72,0	200	Б		9	2	
		04 01 01	37,1	71,6	140	Б		11	2	
		10 43 40,7	42,30	70,10		а		9	9	
		13 01 33	36,7	70,2	210	Б		10	1	
		13 20 02	36,8	68,3		Б		9	1	
		14 45 05	36,2	70,6	120	Б		10	1	
	11	01 49 23	36,4	70,7	100	Б		9	1	
		13 24 51,0	39,11	70,52	4	б		11	3	
	12	01 41 11	39,4	73,5		Б		9	3	
		04 20 41,7	39,60	73,70	5	а		10	11	
		15 57 25,5	42,47	72,23	5	а		9	7	
	13	11 26 04	39,7	74,4		Б		10	11	
		14 31 58,8	39,90	71,80	0-5	б		9	5	
		22 18 49	37,7	72,0	140	Б		10	2	
		23 49 43	36,6	70,0	230	Б		10	1	
	14	00 36 48,4	40,75	72,55	10	а		9	8	
		09 31 22	37,0	70,6				9	1	
		15 21 20,8	40,60	71,90	5	б		9	8	
		23 19 54	36,3	71,0	80	Б		10	1	
		23 36 52	40,0	75,1		Б		9	5	
	15	05 04 40	36,5	71,0	150	Б		10	1	
		18 30 03	39,4	73,8		Б		9	11	
		18 38 10	38,3	72,5				9	2	
		18 56 28,3	40,61	71,51	5	б		9	8	
		23 42 48	36,6	70,1	210	Б		9	1	

1	2	3	4	5	6	7	8	9	10	11
				January						
	16	00 52 02	36,6	70,9	210	Б		10	1	
		04 28 31	36,4	70,2	220	А		11	1	
		07 04 29	36,5	70,7	160	Б		9	1	
16		14 32 27,0	39,30	73,60	0-5	б		9	3	
		18 29 46	44,8	79,2		А		9	13	
		20 04 19	37,2	71,7	150	Б		9	2	
		21 51 53	36,6	71,1	180	В		11	1	
		22 54 33	36,7	70,6	200			9	1	
		23 23 13,7	40,90	72,38	10	а		9	8	
	17	07 54 46	36,4	70,7	210	Б		10	1	
		11 39 20	37,5	72,2	200	Б		11	2	
		12 19 39	40,2	72,7		А		9	5	
	18	00 16 38	39,2	74,0		Б		12	11	
		05 59 33	36,9	71,0	80	Б		9	1	
		10 13 12	38,5	73,3	110	Б		10	2	
		11 57 38,6	40,00	64,70	5	а		9	22	
	19	01 24 19	38,5	73,3	110	Б		9	2	
		19 16 20	36,4	70,6	210	Б		10	1	
	21	00 39 53	36,6	70,9				10	1	
		06 23 00	36,3	70,7	80	Б		11	1	
		06 39 01	39,5	73,8		Б		10	3	
		21 01 17,0	37,57	69,75	2	б		9	2	
	22	10 37 48,8	41,50	72,30	30	б		9	8	
	23	05 04 17	36,6	70,0	230			9	1	
	24	02 37 46	36,9	70,7				9	1	
		02 38 40	37,5	69,5				10	2	
		08 41 51	37,7	72,0	200	А		10	2	
		09 19 07	36,4	70,9	80			9	1	
		10 07 26	36,5	71,1	80			9	1	
		16 05 52,0	44,12	79,28		б		10	13	
		19 09 03,9	40,60	77,80		а		9	5	
	25	01 35 54	36,5	70,3	200	Б		10	1	
		08 37 45	37,7	72,1	150			9	2	
		11 23 07,6	39,90	69,63	0-5	а		9	5	
		15 29 53	38,5	73,9	130	А		10	2	
	26	08 10 53,7	41,30	71,60		б		9	8	
		11 17 50,0	38,67	70,17	5	б		9	3	
		11 34 33	37,2	70,2		Б		9	2	
		20 52 01	36,1	70,3	100	А		10	1	
	27	06 16 51	37,3	72,5				9	2	
		07 08 57	37,3	71,6	130	Б		9	2	
		07 11 56	41,0	73,5	5	А		9	6	
		07 22 43	37,5	67,9		Б		9	4	
		17 50 46	36,4	71,2	80	Б		9	1	
	28	00 03 28	39,5	73,9		Б		9	3	
		02 48 47	37,2	71,5	160	Б		9	2	
		05 38 59	39,8	75,5		Б		9	5	
		05 48 27	37,2	70,9				9	2	
		06 15 58	37,3	71,6	130	Б		9	2	
		13 35 04	36,4	70,6	200	А		10	1	
	29	06 48 08,0	38,95	70,59	5	а		10	3	
		09 27 58	36,5	70,1	200	Б		10	1	
		09 56 39,0	39,20	70,99	15	а		9	3	
		10 09 07	36,7	70,3	240			9	1	
		17 47 26	39,5	74,0		Б		10	11	
		19 52 55	39,5	74,0		Б		9	11	
	30	01 46 44	39,5	74,0		Б		10	11	
		04 06 37	36,6	70,0	210			9	1	
		04 52 12	39,42	71,88	15	а		10	3	
		09 34 50,0	40,63	72,68	10	б		10	8	
		11 57 38,6	39,70	64,50	10	б		10	22	
		19 44 39	36,6	70,6	220			9	1	
		20 47 48,1	41,57	72,90	15	а		9	8	

1	2	3	4	5	6	7	8	9	10	11
				January						
	31	06 26 33	38,0	72,3	100	Б		10	2	
		08 21 12,0	40,58	73,00	5	б		10	8	
		21 36 34,0	38,66	69,71	20	а		9	4	
				February						
	1	01 32 45	36,5	71,2	80	Б		10	1	
		07 30 13	39,9	76,9		Б		9	5	
		10 59 05,5	39,70	69,60		б		9	5	
		18 43 23	36,3	69,3	160	Б		11	1	
	2	00 30 29	37,2	71,9	160	Б		10	2	
		01 00 27	36,5	70,2	220	Б		9	1	
		08 23 12	36,5	70,9	220	Б		10	1	
		09 57 31	37,2	71,7	140	Б		10	2	
		13 07 35	39,5	73,6		А		9	3	
		17 30 43	39,4	73,6		Б		9	3	
		18 40 25	37,7	73,0		Б		9	2	
		23 12 15	36,7	71,0	230	Б		9	1	
	3	02 35 51	36,5	70,7	150	Б		9	1	
		07 09 45	38,5	73,4	120	Б		10	2	
		12 13 45,7	38,30	67,70	0–5	а		10	4	
2		14 11 49	39,4	72,9		Б		12	3	
		19 34 00	37,7	71,8	100	Б		9	2	
	4	04 32 39	37,8	72,0	100	Б		11	2	
		14 47 44	37,0	70,9		Б		10	2	
	5	02 25 53	36,3	69,8	130	Б		9	1	
3		05 43 48	37,1	71,6	140	Б		12	2	
		08 53 58	36,5	70,9	80	Б		9	1	
		16 88 14	39,5	73,9		А		9	3	
		23 01 26	37,2	71,1	80	Б		9	2	
	6	06 08 25,0	38,90	70,48	5	а		9	3	
		09 16 07	36,5	70,2	210	Б		10	1	
		14 43 52	36,5	69,3	140			9	1	
	7	02 45 28	41,0	68,6	5	А		10	10	
		16 01 57	37,1	71,1	80	Б		10	2	
	8	04 18 41	36,3	67,2		Б		9	1	
		13 04 28	39,4	73,7		Б		9	3	
		13 44 07	39,4	73,9		Б		10	11	
		16 44 41	36,4	71,2	80			9	1	
		17 06 05	36,5	70,1	210	Б		9	1	
	9	02 52 30	36,7	70,8	210	Б		9	1	
		03 57 16	39,4	73,5		Б		10	3	
		06 02 33	39,4	73,7		А		9	3	
		07 39 59	36,4	71,1	70	Б		11	1	
		12 20 12	36,4	70,9	70	Б		11	1	
4		17 47 03	36,5	70,8	200	А		12	1	
		17 57 49	39,4	73,7		А		10	3	
		20 22 32	39,1	74,5				9	11	
5		21 45 41	36,6	70,9	230	А		12	1	
		22 35 42	36,5	70,0	180	Б		9	1	
	10	01 28 04	39,4	73,7		Б		10	3	
		07 08 32	39,5	73,7		А		9	3	
		19 08 08	36,5	70,6	170	Б		9	1	
		22 46 10,5	41,29	71,86	10	а		10	8	Караван 4 балла
	11	00 21 10	36,4	70,5	210	Б		11	1	
		03 42 47	39,4	72,9		А		10	3	
		03 46 39	36,2	70,1	80	Б		11	1	
		06 02 51	36,2	70,1	100	Б		9	1	

1	2	3	4	5	6	7	8	9	10	11
				February						
		14 32 12	36,5	70,8	190	Б		9	1	
		16 58 52	36,3	70,7	140	А		9	1	
	11	18 33 24	40,1	78,4		А		10	5	
		19 22 21	36,6	70,5	210	Б		9	1	
6		20 30 13	38,2	75,4		Б		13	11	
		20 44 34	38,3	75,2		Б		11	11	
		21 09 01	37,5	68,0		А		9	4	
7		22 04 09	38,4	75,2		Б		13	11	
		22 39 14	38,1	75,3		Б		10	11	
		22 56 08	38,3	75,2		Б		11	11	
		23 26 44	39,4	74,1		Б		10	11	
	12	02 00 32	38,3	75,2		Б		9	11	
		02 58 01	36,7	70,7	210	Б		9	1	
		09 36 47,5	41,39	71,75	10	а		10	8	Караван 4–5 баллов
8		13 34 52,4	43,25	78,75		б		13	7	Талгар 4–5 баллов
	13	01 24 37	38,2	75,2		Б		10	11	
		03 20 54	38,3	75,2		Б		11	11	
		04 59 22	36,9	70,7		Б		9	1	
		06 20 18,0	43,23	78,85		б		9	7	
		06 56 14	37,5	71,4	90	Б		11	2	
		09 31 25,6	43,27	78,80		б		9	7	
		10 27 39	36,2	70,0	70	Б		10	1	
		16 26 04,4	43,30	78,83		б		9	7	
		16 59 26	38,3	75,2		Б		9	11	
		18 29 20	36,4	70,9	210	Б		10	1	
	14	03 31 42	36,7	71,1	220	Б		9	1	
		06 05 52	38,5	75,2		Б		11	11	
		07 11 46	37,3	71,6	100	Б		9	2	
		13 40 06	39,6	73,5		А		9	3	
	14	16 35 27	39,4	73,5		А		9	3	
		19 16 08	36,2	69,5		Б		9	1	
		23 10 42	36,1	69,8	80	А		10	1	
	15	04 19 48	40,2	71,9	10	А		9	8	
		05 54 57,3	43,27	78,80		б		9	7	
		09 26 14	36,8	70,9	220	Б		9	1	
		09 28 14	37,5	72,0	150	Б		10	2	
		10 55 49	38,81	70,18	10	б		9	3	
	16	01 20 17,6	43,23	78,67		б		9	7	
		02 02 26	43,0	77,0		А		9	7	
		03 50 15	39,3	73,9		А		10	12	
		06 15 54	39,4	73,7		Б		9	3	
	17	02 41 46	38,4	75,3		Б		10	11	
		03 27 34	36,3	70,9		Б		11	1	
9		08 10 32	36,5	70,2	210	А		12	1	
		11 59 37	36,4	70,8	120	Б		9	1	
		20 33 55	37,2	71,6	200	Б		9	2	
	18	00 05 28	36,4	70,6	200	Б		9	1	
		18 40 06	36,6	69,6				9	1	
		21 49 23	37,3	71,9		Б		9	2	
	19	08 54 27	41,7	79,5		А		10	5	
		10 49 12,0	40,11	67,55	0–5	а		9	5	
		14 20 37	37,3	71,9		Б		9	2	
		17 49 17	39,4	73,5		А		9	11	
	20	17 10 09	38,5	73,4	130	Б		10	2	
		18 28 33	37,3	71,5	130	А		11	2	
		19 06 15,2	42,22	76,40	5	а		10	7	
		21 33 09	39,0	75,0		Б		9	11	

1	2	3	4	5	6	7	8	9	10	11
					February					
	21	00 45 27	36,6	71,0	80	Б		9	1	
		04 35 37,9	40,1	77,0		Б		9	5	
		06 25 36 .	37,1	71,6	230	Б		9	2	
		07 21 31,5	39,93	64,80	0-5	а		9	22	
		08 28 34	38,3	69,1		Б		9	4	
		14 26 24	36,3	69,4	140	Б		10	1	
		18 58 32	37,4	71,9	150	Б		9	2	
	22	03 51 51	36,1	70,3	100	Б		9	1	
		07 52 31	36,8	71,2	100	Б		9	1	
		14 17 44,1	42,18	75,12	5	а		9	7	
	23	00 01 19,0	38,79	70,96	15	б		9	3	
		00 29 38	39,7	75,4		А		9	11	
		10 05 40	36,3	71,1	80	Б		9	1	
		12 29 46	36,5	70,8	100	Б		11	1	
		12 59 31	38,8	70,6		Б		9	3	
		15 35 48	36,5	70,9	190	Б		9	1	
		15 39 00	36,2	70,9	80	Б		10	1	
		23 57 01	39,4	73,8		Б		9	11	
	24	00 38 14	39,3	72,4		А		9	3	
		07 32 20	36,5	71,0	130	Б		9	1	
		12 36 46	37,1	71,3	100	Б		11	2	
10	25	06 27 53	38,3	72,9	25	А		13	2	
11		06 29 35	38,3	72,9		Б		12*	2	
		06 38 37	38,3	72,9		Б		9	2	
12		10 04 35	38,3	72,9		Б		12	2	
		11 28 16	38,3	72,9		Б		10	2	
		14 18 59	37,4	72,1	200	Б		10	2	
		14 45 02	39,7	77,4		А		9	12	
		15 22 13	36,7	70,3	200	Б		10	1	
	26	03 07 13	36,3	69,8	100	Б		9	1	
		07 18 26	37,3	72,5				10	2	
		12 28 42,0	38,71	70,26	12	б		9	3	
		13 09 27	37,2	69,7		Б		9	2	
		17 17 17	36,6	71,2	120	Б		9	1	
13		21 53 17	36,6	69,9	230	Б		12	1	
	27	01 10 00	37,6	70,6		Б		10	2	
		04 44 10	39,4	73,6		Б		10	3	
		06 25 46	37,3	72,4		Б		10	2	
		06 58 00	39,5	73,4		Б		9	3	
14		09 01 53	36,3	64,4	150	А		12	1	
		11 04 52,0	38,98	70,66	2	а		9	3	
		14 18 33	38,4	75,1				10	11	
		14 36 44,3	40,73	73,43		б		9	8	
		15 08 06	37,3	71,7	160	Б		10	2	
		18 21 39	36,6	70,8	210	Б		9	1	
		20 29 49	36,3	71,0	100	Б		9	1	
		20 34 41	36,6	70,7	190	Б		9	1	
15	28	10 55 53	37,1	71,2	90	Б		12**	2	
		19 56 27	36,0	70,4	100	Б		9	1	
		23 35 48	37,2	71,3	90	Б		10	2	
16		23 56 39	36,6	70,5	190	Б		14	1	see text

* Khorog (150) 3 points; Murgab (100) 2-3 points; Rushan (125) 2 points.

** Tashkent (532) 2-3 points; Khorog (142), Dushanbe (267), Kayrakum (407 2 points.

1	2	3	4	5	6	7	8	9	10	11
				March						
	1	08 48 01	37,0	71,5	120	Б		9	2	
		11 40 25,0	40,35	72,68	0-10	6		9	8	
		12 13 05	37,1	71,1	90	Б		10	2	
		12 26 38	41,9	79,4		А		10	5	
		14 20 57,6	39,90	69,66	5	6		9	5	
	1	16 08 42	36,5	70,7	190	Б		9	1	
		16 10 40	37,7	72,2	170	Б		9	2	
		18 57 55	39,5	73,6		А		10	3	
		19 48 59	37,2	71,8	160	Б		9	2	
		21 20 02	36,4	70,9	100	Б		10	1	
		22 13 10	37,2	71,2	100	Б		9	2	
	2	01 51 31	37,1	71,8	180	Б		9	2	
		08 27 12	41,0	79,7		А		9	5	
		08 28 36	41,6	79,6		А		9	5	
		11 58 48	37,1	71,4	100	Б		9	2	
		14 54 02	36,6	70,7	200	Б		10	1	
		23 42 10	41,0	78,9		А		9	5	
	3	04 52 53	37,0	71,1	80	Б		9	2	
		07 56 01,2	43,13	75,85	15	6		9	7	
		09 26 18	36,5	71,1		Б		9	1	
17		09 48 23	36,6	70,7	210	А		14	1	see text
		13 45 35	39,3	73,0		А		10	3	
		15 29 38	36,4	70,7	130	Б		9	1	
		16 37 23	37,5	71,7	140	Б		9	2	
		17 23 30	38,4	72,6		Б		10	2	
		18 11 39	38,1	73,8	170	Б		9	2	
	4	06 07 24,0	38,00	69,53	10	6		9	3	
		09 04 19	37,5	71,9	160	Б		9	2	
18		17 00 53	36,3	71,3	90	Б		12	1	
		22 38 16	39,8	72,3	15	А		9	5	
		23 16 08,3	40,93	73,41	10	6		11	8	Сузак 4-5 баллов, Джалал-абад 4 балла
	5	01 53 32	38,29	69,33	1-2	6		9	4	
	5	02 31 06	37,4	67,5	0-5	А		11	4	
		06 41 54	37,1	71,2	100	Б		10	2	
		12 59 12	39,3	73,9		Б		9	11	
	6	03 18 02	36,5	70,6	210	Б		9	Г	
		10 04 38	36,4	71,0	80			11	1	
	7	01 18 42	37,2	72,9		Б		9	2	
		02 38 03	39,5	73,7		А		9	11	
		03 07 06	36,4	70,1	190	Б		9	1	
		03 17 38	36,4	70,6	180	Б		10	1	
		05 22 42,0	37,59	69,87	2	6		10	2	
		19 36 22	36,5	70,5	180	Б		10	1	
	8	03 38 30,5	41,16	72,26	5	6		11	8	Андижан 2-3 балла
		03 43 18	39,5	73,7		А		9	3	
		04 07 43	37,2	71,1	90	Б		10	2	
		06 58 53	37,7	69,8	2-5	Б		9	2	
		08 09 44	39,3	72,8		А		9	3	
		13 21 42,0	38,69	69,96	2	6		9	3	
	9	01 11 46	39,4	75		Б		10	11	
		04 42 11	36,7	71,3	200	Б		9	1	
		07 50 39,9	41,20	73,32		6		9	8	
		10 55 10	36,6	70,1	20	Б		10	1	
		11 50 36	39,6	73,9		Б		9	3	
		12 25 06,0	37,75	69,40	1-2	6		9	2	
		16 27 14	37,75	69,40	1-2	6		9	2	
		19 44 36	36,6	70,9	210	Б		9	1	
		21 50 12	37,6	72,1	140	Б		9	2	

1	2	3	4	5	6	7	8	9	10	11
					March					
	10	10 36 11	38,47	70,35	2	6		9	3	
	10	10 49 24,0	38,47	70,37	1-2	6		9	3	
		12 00 53	36,4	70,8	140	Б		10	1	
		12 02 09,0	38,47	70,37	2	6		9	3	
		19 26 27	37,6	72,0	180	Б		9	2	
	11	00 38 11	37,7	72,0	200	Б		9	2	
		10 10 54	38,2	73,8	160	Б		10	2	
		13 36 09	36,7	71,3	130	Б		10	1	
		18 15 38	37,3	67,4	0-5	А		10	1	
	12	02 52 37	38,8	75,1		Б		10	11	
		06 17 40	36,3	71,2	120	Б		9	1	
		06 46 37	37,1	71,1	110	Б		10	2	
		15 26 08	36,6	70,8	130	Б		9	1	
	13	07 47 23	40,8	74,1		А		9	6	
		14 05 23	36,5	70,8	120	Б		9	1	
		16 11 50,0	38,28	69,33	5	6		10	4	Нурек 2 балла
		18 29 17	40,7	77,2		А		9	5	
		21 31 43,6	40,0	72,0	0-10	6		10	5	
		22 57 56	36,4	70,5	110	А		9	1	
	14	05 51 15,0	38,28	69,33	5	6		11	4	
		11 51 03	37,5	72,0	200	Б		10	2	
		13 05 50	37,5	71,8	200	Б		10	2	
		21 23 53	36,2	70,4		Б		9	1	
		23 47 03	36,3	70,8	240	Б		10	1	
	15	02 30 34	39,5	73,9		А		9	3	
		04 10 08,8	40,11	67,00	0-5	6		10	5	
		11 34 33	36,6	70,6	150	Б		9	1	
		18 00 44,0	38,45	70,38	2	6		9	3	
		21 24 08,0	37,75	69,38	2	6		11	3	
	16	02 29 30,0	37,75	69,38	2	6		10	3	
		04 27 07,0	37,73	69,38	2	6		9	3	
		05 16 34	36,5	70,9	230	Б		10	1	
		05 46 22	39,4	73,8		А		9	11	
		05 49 50,0	37,73	69,38	2	6		9	2	
		18 54 42,0	37,75	69,38	2	6		10	3	
	17	00 08 04	37,5	72,0	220	Б		10	2	
		01 28 49	36,6	70,8	220	Б		9	1	
		12 30 37	36,4	71,0	110	Б		10	1	
		13 12 35	36,5	70,1	200	Б		9	1	
		15 37 40	36,5	70,1	160	Б		9	1	
		17 39 35	36,7	71,2	200	Б		9	1	
		18 06 10	37,1	73,3	80	Б		9	1	
		19 17 08	36,4	71,0	140	Б		10	1	
		20 05 41	39,9	72,9				9	5	
		20 25 41	39,6	73,1		Б		9	3	
		22 23 17	41,4	73,3		А		9	6	
		23 44 51	36,9	71,3	180	Б		9	1	
	18	01 37 30,0	38,28	69,33	5	6		9	4	
		01 39 07,2	43,72	76,80		6		9	15	
		02 40 53	36,4	71,1	200	Б		9	1	
		06 24 50	36,4	70,0	200	Б		9	1	
	19	09 20 44	38,7	75,1		Б		12	11	
		11 23 23,6	43,30	78,60	15	6		9	7	
		19 16 27	39,5	73,8		А		10	3	
	19	01 24 07	36,9	71,6	250	Б		9	2	
		02 04 15	37,6	72,0	180	Б		9	2	
		12 12 13	36,3	70,9	70	Б		10	1	
		15 23 58,0	38,82	70,17	10	6		9	3	

1	2	3	4	5	6	7	8	9	10	11
				March						
	20	02 29 53,2	42,18	77,00	10	6		10	7	
		10 28 38	38,5	72,9		Б		9	3	
		18 12 05	36,4	71,1	120	Б		10	1	
		22 59 36,2	41,29	68,52	5	6		9	10	
		23 30 12	36,5	71,0	170	А		10	1	
	21	10 08 40	36,5	70,1	210	Б		10	1	
		10 27 55	40,2	76,8		А		10	5	
		14 20 21	36,4	71,0	80	Б		9	1	
		15 35 45,0	37,67	69,78	2	6		9	2	
		23 56 21	37,6	72,0	220	Б		9	2	
	22	03 51 15	36,7	70,6	200	А		10	1	
		04 16 58	36,4	70,0	220	Б		9	1	
		09 20 15	39,1	71,1		А		9	3	
		17 15 08	39,2	72,5		Б		10	3	
		22 22 03	39,3	72,5		Б		9	3	
		22 22 11	39,5	72,2		Б		9	3	
	23	00 50 20	36,1	68,6				10	1	
		01 32 54	36,3	69,3	130	Б		9	1	
		09 58 57	36,5	70,1	200	Б		10	1	
		21 55 54	36,7	71,1	210	Б		9	1	
		23 42 23,0	38,27	69,35	1-2	6		9	4	
	24	01 22 15,9	41,00	71,90		6		9	8	
		03 06 56	36,6	70,8	210	Б		9	1	
		03 43 03	37,3	71,8	140	Б		9	2	
		08 01 42	39,3	66,9	5	А		10	5	
		12 23 57	39,4	73,1		Б		10	3	
		16 31 48	36,5	71,0	130	Б		9	1	
		17 25 08	36,5	70,7	180	Б		9	1	
	25	13 07 58	36,5	70,3	190	Б		9	1	
		13 47 35	36,6	70,9	210	Б		10	1	
		21 41 43	36,5	70,8	90	А		9	1	
		23 50 39,0	38,76	68,58	10	а		9	5	
	26	03 43 56	36,7	71,2	200	А		10	1	
		06 16 04	36,4	71,4	120	А		9	1	
		11 08 03,6	40,12	68,18	0-5	а		9	5	
		11 18 00	38,08	70,07	10	6		9	3	
		12 46 52	36,5	70,3	220	А		9	1	
20		13 20 10	36,5	70,7	200	А		12	1	
		21 21 44,0	37,58	69,70	2			10	2	
	27	12 14 16	36,2	69,0	70	Б		9	1	
		12 34 47	36,7	70,8	230			9	1	
		16 39 43	36,3	69,8	130	А		9	1	
	28	00 22 50,5	41,47	72,50	25	6		9	8	
		02 30 55,1	41,40	72,48	35	6		9	8	
		04 09 22,0	41,40	72,46	10	а		9	8	
		05 14 01	41,4	79,4		А		10	5	
21		05 52 32	36,4	70,6	220	А		12	1	
		18 11 44	39,0	67,1		Б		9	5	
		19 26 36	36,4	70,4	130	Б		9	1	
		21 10 58	37,4	71,6	130			9	2	
	29	00 31 36	37,7	70,4		Б		9	2	
		05 54 05	36,7	71,2	190	Б		9	1	
		06 04 42	39,8	77,6		А		9	5	
	29	06 22 43	38,1	73,1		А		9	2	
		09 05 51	39,4	75,4		А		9	11	
		19 17 38	36,6	71,8	90	Б		9	1	
		20 13 30	36,2	70,0	150	Б		9	1	
		23 45 16	36,5	70,1	200	А		10	1	
	30	08 10 54	39,0	72,0		А		9	3	

1	2	3	4	5	6	7	8	9	10	11
					March					
		13 49 05	38,6	67,8	5	А		10	4	
		19 01 22,2	39,70	73,70		6		10	3	
	31	11 52 36	40,2	71,7	15	А		11	8	
		13 02 34	37,3	71,7	170	А		11	2	
		13 20 27	36,7	71,2	180	Б		10	1	
					April					
	1	03 07 12,9	40,6	77,9		А		10	5	
		14 04 10	36,5	70,5	160	Б		9	1	
		22 05 03	37,3	71,6	130	Б		9	2	
		23 22 59	36,6	70,8	150	Б		9	1	
	2	02 43 04	36,4	71,0	80	А		11	1	
		03 38 28,0	38,79	70,15	20	6		10	3	
		04 34 20	36,3	71,2	80	Б		9	1	
		13 02 25	36,7	70,4	190	Б		10	1	
		17 05 12	36,8	70,7	210	Б		9	1	
		18 54 14	36,3	70,2	120	Б		9	1	
		19 06 31	39,3	71,0		Б		9	5	
		22 08 58	36,7	71,5	90	Б		9	1	
		23 29 19	36,3	70,7	100	Б		9	1	
	3	00 03 41,3	40,63	73,10	5	6		9	8	
		09 18 33	38,1	72,3	130	Б		10	2	
		17 17 40	37,2	71,3	110	Б		10	2	
		20 51 33	40,3	76,5		А		9	5	
	4	05 44 15	36,8	70,2	230	Б		10	1	
		14 53 13	36,6	70,8	210	Б		9	1	
		23 33 49	40,2	75,3		А		9	5	
	5	03 19 20	37,5	71,8	150	Б		10	2	
		10 47 32	37,1	71,0	80	Б		10	2	
		11 21 05	39,7	74,2		Б		9	11	
		15 07 15	37,1	71,4	110	Б		9	2	
		22 04 07,0	38,90	70,82	6	6		9	3	
	6	03 08 29	36,6	70,2	200	Б		9	1	
		08 50 01	37,5	72,0	200	Б		9	2	
22		09 09 51	36,6	71,1	230	Б		12	1	
		21 41 05	39,4	73,8		А		10	3	
	7	01 31 19	36,0	69,4	70	Б		11	1	
		19 33 22	39,2	72,6		Б		9	3	
	8	00 21 31,0	38,74	70,21	7	6		10	3	
		02 13 01	37,5	71,9	160	Б		10	2	
		02 46 11	36,5	70,7	150	Б		9	1	
		04 09 19,9	42,45	72,10		6		10	7	Талас 4 балла
		06 43 46	36,6	70,1	200	Б		10	1	
		13 27 10	39,5	73,8		А		10	3	
		19 20 13,0	38,71	70,62	1-2	6		9	3	
		19 23 16,0	38,71	70,62	6	6		11	3	
		19 46 21	36,8	71,2	200	Б		9	1	
	9	02 14 45	36,6	70,1	200	Б		9	1	
		04 03 34	36,3	70,8	110	А		11	1	
		09 08 48	36,4	71,1	130	Б		10	1	
		15 08 10	36,4	71,1	80	Б		9	1	
		19 08 52	37,4	71,7	140	Б		9	2	
23		22 25 33	38,2	72,4	120	А		13	2	see text
	10	02 48 56	39,5	72,0	5	А		11	3	
		11 20 02	37,3	71,4	110	Б		10	2	
	10	16 51 24	41,6	79,1		А		9	5	
		19 25 23	37,1	71,7		Б		9	2	
		19 39 24	39,0	73,0		Б		9	3	
		21 02 38	36,8	70,8	210	Б		9	1	
		22 30 54	40,8	77,9		А		9	5	

1	2	3	4	5	6	7	8	9	10	11
				April						
	11	06 37 18	36,5	71,0	90	Б		10	1	
		09 01 00	37,6	72,0	190	Б		9	2	
		16 22 58	36,6	70,8	200	Б		10	1	
		18 59 49	36,5	70,2	200	А		11	1	
		20 37 08	36,5	70,8	80	Б		9	1	
		23 49 48	39,0	75,0		Б		11	11	
	12	06 47 59	37,3	71,3	120	Б		9	2	
		12 18 41,4	41,28	72,17	0-5	6		9	8	
		13 20 36	37,4	71,7	140	Б		9	2	
		15 11 16	39,4	73,9		Б		9	11	
		21 28 52	39,2	71,2		А		9	3	
	13	05 14 52	37,2	71,8	190	Б		9	2	
		11 34 02,0	39,56	71,23	18	6		9	5	
		15 02 56,0	40,50	64,10	10	6		11	22	
		16 19 02	40,3	63,7	5	А		10	22	
		18 28 27	37,8	72,0		Б		9	2	
		22 23 15	36,5	70,8	150	Б		9	1	
	14	00 53 55	38,0	67,1		Б		9	4	
24		01 05 31	36,3	69,4	150	Б		12	1	
		03 10 53	36,5	70,1	210	Б		10	1	
		04 12 12	37,7	72,1	190	Б		9	2	
		05 42 45	36,0	69,4	140	Б		9	1	
25		12 59 05	36,6	70,9	210	Б		12	1	
		16 38 11	39,4	67,0		А		9	5	
	14	19 52 34	36,5	70,9	120	Б		9	1	
		22 30 49	36,4	70,4	80	Б		10	1	
	15	10 30 20	36,5	70,8	90	Б		11	1	
		10 45 59	39,3	73,5		А		10	3	
		14 50 39	36,2	68,8		Б		9	1	
		16 52 38	37,3	71,9	160	Б		9	2	
		19 44 52	39,3	73,9		А		9	11	
	16	00 58 58	37,8	70,3		Б		9	3	
		08 40 53	41,9	72,2	5	А		9	9	
		08 44 34	39,6	71,7		Б		9	5	
		10 10 19	41,3	78,5		А		11	5	
		11 07 47	37,6	71,5	90	Б		9	2	
		11 40 47	36,4	71,0	100	Б		11	1	
	17	11 28 31	37,8	70,3		Б		9	3	
		17 21 50	41,5	78,6		А		9	5	
		18 23 18	41,5	78,7		А		9	5	
		18 29 30	41,4	78,6		А		10	5	
	18	15 02 51,6	40,0	79,30		6		9	12	
		15 49 08	36,6	70,8	170	А		10	1	
		17 16 41	36,3	71,2	90	Б		9	1	
		18 48 57	36,4	70,8	130	Б		9	1	
	19	00 14 32	39,3	74,9		А		10	11	
		05 35 48,0	39,05	71,33	10	6		9	3	
		07 54 01	36,6	70,2	200	Б		10	1	
		09 54 20	40,4	78,4		А		10	5	
		11 31 22	47,2	79,0				9	13	
		16 48 24	41,6	78,8		А		9	5	
	20	00 05 57	37,3	72,0	230	Б		9	2	
		02 17 53	36,1	70,4	140	Б		9	1	
		06 14 17	36,6	70,7	190	Б		9	1	
		12 20 32	39,5	73,6		А		9	3	
		18 21 46	39,4	73,5		А		10	3	
		23 09 28	39,5	73,5		А		9	3	
	21	09 15 10	36,2	69,6	110	Б		9	1	
		09 22 08	39,5	73,6		А		9	3	
		10 15 59	37,3	71,7	170	Б		10	2	
		14 26 33	37,5	71,9	110	Б		9	2	
		16 58 20	36,6	70,9	230	А		11	1	
		23 30 51	36,6	70,9	230	Б		10	1	

1	2	3	4	5	6	7	8	9	10	11
		April								
	22	10 01 48	36,8	70,9	230	I		9	1	
		11 51 54	37,8	72,4	180	I		9	2	
		14 05 24	37,7	72,0	200	I		9	2	
		18 09 24	36,6	70,9	180	I		9	1	
	23	11 38 44	39,3	73,6		A		10	3	
		12 25 49	37,6	71,8	120	Б		9	2	
		13 27 25	36,3	70,4	110	Б		9	1	
		20 01 13	37,2	71,7	160	Б		9	2	
	24	03 16 33	37,8	72,0	120	Б		9	2	
		03 28 09	36,7	71,2	180	Б		9	1	
		07 54 17	36,6	71,2	170	Б		10	1	
		14 14 39,0	38,72	69,98	22	б		10	3	
		14 47 10	37,3	71,7	180	Б		9	2	
		17 01 45	39,4	73,8		A		9	11	
26		21 30 35	36,6	70,8	220	Б		12	1	
		23 43 37	36,6	70,9	150	Б		9	1	
	25	03 43 56	36,7	70,9	220	Б		10	1	
		05 54 09	36,6	70,8	210	Б		9	1	
		12 04 32,6	40,30	72,70	0-5	б		9	5	
		18 01 29	42,9	78,7		A		9	7	
		23 49 06	36,5	70,1	210	Б		10	1	
	26	14 07 38	36,3	68,6		Б		9	1	
		15 35 10	36,5	70,8	70	Б		10	1	
		17 23 50	36,5	70,7	200	Б		10	1	
		23 51 16	40,7	77,7		A		9	5	
	27	04 02 38	37,1	71,7	210	Б		10	2	
		10 12 36	37,0	71,6	250	Б		9	2	
		23 51 21	39,5	72,7		Б		9	3	
	28	01 32 44	38,7	74,9		Б		9	11	
		02 50 13,2	41,80	64,38	0-5	б		9	20	
		05 52 32	39,3	74,1		Б		9	11	
		06 50 20	36,3	70,9	80	Б		9	1	
		13 24 55	36,4	70,3	220	Б		11	1	
	29	00 09 59	36,6	71,0	150	Б		9	1	
		00 31 36	36,7	71,3	70	Б		10	1	
	30	04 47 45	36,4	70,0	230	A		11	1	
		09 57 26	40,0	72,5	0-5	A		9	5	
		21 37 03	36,5	70,2	200	Б		9	1	
		May								
	1	09 59 02	37,1	71,1	100	Б		9	2	
		10 53 59	36,5	71,0	70	Б		11	1	
		14 19 10,0	40,86	73,53	0-5	а		9	8	
		15 54 06	36,4	70,0	200	Б		10	1	
		17 58 51	36,5	70,1	210	Б		11	1	
	2	02 15 03	36,5	70,3	210	Б		11	1	
		05 31 07	36,5	70,7	130	Б		9	1	
		10 17 45	36,6	70,2	210	Б		9	1	
		19 21 05	37,4	71,3	200	Б		9	2	
	3	04 32 48	37,4	70,9		Б		9	2	
		04 53 41	37,2	70,7		Б		9	2	
		22 32 14	36,5	70,2	200	Б		10	1	
	4	01 25 13	36,4	71,0	80	Б		9	1	
		05 17 50	36,8	68,4		Б		9	1	
	5	17 39 24,7	41,46	73,35	5	б		9	6	
	6	06 48 40	36,4	69,4	150	Б		9	1	
		18 23 57,0	37,93	69,28	2	б		9	3	
	7	01 37 20	37,4	71,7	120	Б		9	2	
		06 19 46	37,5	72,1	200	Б		10	2	
		14 39 33,0	37,89	69,95	2	б		11	3	Куляб (13 км) 3-4 балла

1	2	3	4	5	6	7	8	9	10	11
				May						
		16 26 24	36,8	70,7		Б		11	1	
		18 22 36	37,6	72,1	200	А		10	2	
		19 19 59	36,0	70,0	150	Б		9	1	
		22 53 56	40,2	77,2		А		10	5	
	8	06 42 56	36,4	69,6		Б		11	1	
		10 25 33,4	40,00	72,54	5	а		9	5	
		13 43 35,1	41,40	73,37	5	б		9	6	
		22 45 23,7	41,40	73,25	5	а		9	6	
	9	00 02 05,4	40,21	71,58	5	а		10	8	
		02 48 28	36,5	70,8	180	Б		10	1	
		03 12 40	39,6	75,1		А		9	11	
		03 28 11	38,0	72,2	100	Б		9	2	
		18 07 14,8	38,96	68,41	0-5	б		9	5	
	10	09 21 44	39,5	73,6		А		9	3	
		11 52 06	41,6	72,5	0-5	А		9	9	
		14 27 21,7	40,30	76,98		б		10	5	
	11	00 54 01	39,9	73,8	0-5	А		9	3	
		07 37 25,8	40,32	72,83	0-5	а		9	5	
		12 18 48	39,2	72,4		А		11	3	
		12 25 58	36,4	71,3				10	1	
		13 00 57	39,3	72,6		А		10	3	
		15 10 14,0	38,72	70,73	8	б		9	3	
		21 44 05	37,7	72,2	180	Б		9	2	
		23 07 59	39,9	78,0		Б		10	5	
	12	02 22 12	36,5	69,5	160	Б		10	1	
		02 56 42	36,2	69,3	100	Б		10	1	
		07 02 06,6	40,93	73,21	0-5	а		9	8	
		17 48 10	39,4	71,9				9	3	
		18 48 10	39,3	73,8		А		9	11	
		19 26 17	37,3	71,6	160	А		11	2	
	13	01 21 40	38,0	72,4	160	Б		9	2	
		05 45 59,0	38,44	69,52	10	б		9	4	
		06 04 04,0	40,91	71,33	5	б		10	8	Уйгур 3-4 балла
		06 17 49,9	40,97	71,25	0-5	б		9	8	
		07 37 50,0	38,59	70,63	2	б		10	3	
		19 33 09	36,5	71,2	240	А		11	1	
		22 03 34,0	38,85	71,19	18	б		11	3	
		22 45 22,0	38,86	71,17	20	б		9	3	
	14	07 30 22	39,7	76,5		А		9	12	
		07 51 40	39,9	78,4		Б		9	12	
		09 15 48,0	38,45	70,37	2	б		11	3	
		13 47 29,0	39,03	71,37	12	б		10	3	
		15 57 44	36,2	69,5	80	Б		11	1	
		16 28 00	38,47	70,36	5	б		11	3	
		18 05 28,0	38,48	70,33	5	б		10	3	
		18 09 13	38,5	73,7	140	Б		10	2	
		18 13 31,0	38,47	70,35	2	б		9	3	
		20 58 45,0	38,47	70,37	2	б		9	3	
		21 32 39,0	38,41	69,32	5	б		9	4	Нурек 3 балла
27		22 23 05	36,1	70,7	70	Б		13	1	
	15	07 04 47	36,6	71,2	170	Б		10	1	
		09 26 42,0	38,90	70,25	12	б		9	3	
		11 52 25	37,5	71,7	130	Б		10	2	
		14 30 53	39,3	73,8		А		10	11	
		16 08 58	36,3	71,1	80	Б		9	1	
	16	00 24 26	36,2	69,3		Б		9	1	
		18 29 42	36,4	71,0	160	А		10	1	
		19 58 18	36,7	70,0	220	А		9	1	
		22 42 51	36,9	68,3		Б		9	1	

1	2	3	4	5	6	7	8	9	10	11
					May					
	17	11 04 23	39,8	73,8		А		9	3	
		14 25 56	39,6	75,1		А		9	11	
		18 50 44	36,2	70,6	170	Б		9	1	
	18	05 56 36	36,6	70,7	210	Б		11	1	
		14 30 52	36,5	71,1	130	Б		10	1	
		14 57 28	39,3	72,2		А		10	3	
28		17 51 32	36,1	70,9	100	А		12	1	
		20 23 13,6	42,57	76,13	0-5	а		9	7	
		21 03 39	37,4	72,8				9	2	
		22 31 59	37,6	72,1	200	Б		9	2	
	19	18 53 54	39,5	74,0		Б		10	3	
		20 21 45	37,5	73,8		Б		10	2	
		22 38 00	38,48	70,36	2	б		9	3	
	20	03 08 01.0	38,93	70,21	10	б		9	3	
		03 38 57,0	38,92	70,23	10	б		9	3	
		03 58 27	36,4	71,0	110	Б		11	1	
		04 18 52	38,4	74,2	140	Б		11	2	
		04 55 08	37,2	71,3	100	Б		9	2	
		07 16 46	39,1	71,9		Б		9	3	
		13 37 30,0	39,22	70,83	12	б		10	5	
	21	02 31 46,0	38,48	70,33	10	б		9	3	
		07 11 23	36,5	69,6	150	Б		9	1	
		10 49 19,6	41,49	72,11	0-10	а		9	8	
29		14 04 13	39,5	73,8		А		12	11	Иркештам 2-3 балла
		15 43 48	40,6	78,4		А		10	5	
30		17 26 16	37,8	72,1	140	Б		12	2	Душанбе 2 балла
		17 36 28	36,5	69,5		Б		9	1	
	22	00 09 48	38,9	74,7		Б		9	11	
		01 00 29	36,9	71,8	70	Б		10	2	
		03 39 04	37,0	70,7		Б		10	2	
		06 22 09	37,1	72,9				10	2	
		08 19 11	36,6	70,0	220	Б		9	1	
		13 19 34,5	41,10	72,78	10	б		10	8	
		14 50 49	36,5	71,1	80	Б		10	1	
	23	12 13 47,3	41,26	71,33	0-5	б		9	8	
		19 13 28	38,0	72,3	140	Б		10	2	
		21 21 32	40,6	78,1		А		11	5	
		22 30 32	36,7	70,8	240	Б		10	1	
	23	23 03 33	36,6	70,9	250	Б		10	1	
	24	05 18 36	40,2	78,3		Б		9	5	
		05 47 46	36,8	70,9	220	Б		10	1	
		17 01 50	36,9	70,6	250	Б		9	1	
	25	03 45 53	36,6	70,7	210	Б		9	1	
		04 36 07	36,7	70,8	200	Б		10	1	
		05 51 03,0	38,53	70,55	4	б		9	3	
		06 11 23,0	38,54	70,53	4	б		9	3	
		06 22 35	36,6	71,0	120	Б		10	1	
		13 52 19	36,8	71,1	210	Б		10	1	
		23 54 25	39,5	73,8		А		9	3	
	26	01 10 28	36,0	69,3	80	Б		9	1	
31		18 01 30	40,4	78,1		А	5,0	13	5	see text
		18 28 49	40,4	78,1		А		10	5	
	27	04 47 36	40,2	78,2		Б		9	5	
		11 07 03	36,4	70,9	100	Б		11	1	

* Khorog (173), Andizhan (538) 3 points; Nurek (278), Dushanbe (320) 2 points.

1	2	3	4	5	6	7	8	9	10	11
				May						
	28	01 06 40	36,5	71,2	90	Б		11	1	
		04 36 22	36,6	70,1		Б		9	1	
		06 02 29	36,7	73,5		Б		9	2	
		12 04 54	39,3	75,0		А		29	11	
32		17 00 37	36,6	71,0	250	Б		12	1	
		20 53 02	39,3	73,6		А		9	3	
	29	02 51 08	36,7	69,9	220	Б		10	1	
		03 21 56	39,2	71,0		А		9	3	
		03 22 34	36,5	70,5	210	Б		10	1	Джигталь 3 балла
		05 05 02,3	40,35	72,23	10	б		9	8	
		05 07 16	40,3	72,1	10	А		9	8	
		05 33 45	36,7	70,7	210	Б		10	1	
		05 58 36	36,4	70,2	190	Б		10	1	
33	30	00 46 30	36,5	70,1	220	Б		12	1	
		01 27 07	36,8	71,0	250	Б		10	1	
		09 51 06	36,7	70,8	80	Б		9	1	
		14 18 47	36,8	71,0	220	Б		10	1	
		15 01 26	37,1	69,5		Б		9	2	
	31	03 29 05	36,6	71,2	160	Б		9	1	
		06 52 54	37,2	70,8		Б		9	2	
				June						
	1	00 56 05	36,2	71,0	80	Б		9	1	
		06 17 43	36,0	70,5	80	Б		10	1	
		07 15 41	36,8	70,8	220	Б		9	1	
	2	03 14 03,0	38,33	68,55	2	б		9	4	
		06 30 01	36,8	73,1		Б		9	2	
		12 10 34	36,2	69,6	80	Б		9	1	
		13 27 55	39,8	75,2		А		9	5	
		17 32 42,4	39,03	70,61		а		9	3	
		19 01 08	37,3	71,9	140	Б		9	2	
		20 20 59	36,2	71,0	70	Б		9	1	
	2	23 12 02	40,4	77,6		А		9	5	
	3	21 39 54	36,7	70,9	80	Б		9	1	
	5	04 17 35	36,5	70,9	250	Б		9	1	
		05 46 07	36,2	69,4	130	Б		10	1	
		05 55 29	36,5	70,9	80	Б		10	1	
		06 22 06	36,5	70,6	120	Б		10	1	
		07 51 51,0	44,00	78,86		а		10	13	
		09 08 14	39,5	73,5		А		10	3	
		09 32 05	39,5	73,8		Б		9	3	
	5	09 38 49	42,9	72,2	0–5	А		9	7	
		10 44 32,2	41,00	69,74	5	б		9	9	
		19 11 01	36,7	71,1	210	Б		9	1	
		19 28 51	36,3	71,2	100	Б		11	1	
		20 14 44	36,6	71,0	220	Б		9	1	
	6	00 31 47	36,7	73,4		Б		10	2	
		06 47 35	39,4	73,8		Б		9	11	
		08 23 24	39,5	73,7		Б		9	3	
		11 05 06,7	40,80	69,53	5	б		10	9	
		20 05 09	38,8	75,2		Б		11	11	
		23 08 13	36,6	70,8	200	Б		10	1	
		23 08 15	36,3	69,4	160	Б		10	1	
	7	01 51 18,8	39,95	71,11	0–5	а		9	5	
		04 59 18	36,9	71,2	180	Б		9	1	
		06 03 29	36,8	71,1	220	Б		9	1	
		06 07 36	36,7	70,1	220	Б		9	1	
		15 20 46	36,6	71,1	190	Б		9	1	
		22 12 37	37,8	72,0	130	Б		9	2	
		22 27 12	36,7	70,7	250	А		10	1	

1	2	3	4	5	6	7	8	9	10	11
				June						
	8	04 59 36	43,2	80,0		A		10	7	
		21 05 34	39,4	73,8		Б		9	11	
		22 21 18	36,2	69,6	70	Б		9	1	
		22 57 26	36,6	71,0	70	Б		9	1	
	9	04 55 35	37,5	69,5		Б		11	2	
		08 19 48	36,8	70,6	270	Б		9	1	
		11 50 19	36,6	71,3	100	Б		9	1	
34		18 36 45,0	38,87	70,29	10	6		13*	3	
		20 18 29	40,3	78,2		A		11	5	
35		22 01 59	36,5	70,2	190	Б		12	1	
	10	02 26 22	36,9	71,3	180	Б		9	2	
		02 57 19	36,6	70,5	220	Б		11	1	
		04 52 27	39,5	74,8		Б		10	11	
		05 10 02,0	40,4	70,4	5	A		9	8	
		07 48 38	39,4	73,8		A		9	11	
		08 15 14	37,2	71,5	140	Б		10	2	
		17 40 03	39,4	73,8		A		11	11	
		22 20 44	36,4	71,3	80	Б		11	1	
		22 50 00	36,4	70,9	90	Б		9	1	
	11	03 12 12	41,6	72,7	0-5	A		10	6	
		07 13 06	36,8	70,0	210	Б		9	1	
		09 49 44	37,3	71,9	240	Б		9	2	
		17 40 36	36,5	71,0	100	Б		10	1	
	12	03 07 34,2	41,40	72,96	5	6		9	6	
	13	02 12 18	36,2	69,6	80	Б		9	1	
	14	01 50 59	36,5	70,5	220	Б		10	1	
		15 13 29	37,6	71,8	110	Б		9	2	
	15	02 47 49	36,6	69,4	160	Б		10	1	
36		13 58 22	36,5	70,7	200	Б		12	1	
		14 01 13,0	38,75	69,22	25	6		10	4	
	16	03 51 09	36,7	71,2	160	Б		10	1	
		04 55 53	37,4	72,7		Б		11	2	
		12 41 42	37,4	72,7		Б		11	2	
		18 05 38	37,5	71,9	150	Б		9	2	
		19 09 50	37,1	71,4	110	Б		9	2	
		21 40 36,0	42,43	71,81	10	а		9	7	
	17	10 42 53,1	40,23	72,43	0-5	6		9	5	
		11 23 35,1	40,90	73,36	15	6		9	8	
		18 00 23	37,0	71,1	80	Б		11	2	
	18	00 27 29,5	40,85	72,73	10	6		9	8	
		00 38 16,6	40,93	72,70	5	а		9	8	
		04 52 55	36,4	69,7	150	Б		10	1	
		05 33 24	37,5	71,6	110	Б		10	2	
		05 56 03	36,7	70,8	220	Б		9	1	
		06 28 59,0	38,43	69,54	2	6		9	4	
		11 54 56,9	40,00	71,45	0-5	6		10	5	
		15 39 40	36,6	70,6	160	Б		9	1	
	19	11 26 22	40,0	68,5	0-5	A		9	5	
		15 58 40	36,8	71,2	190	Б		9	1	
		16 12 56	41,8	73,3		A		9	6	
		21 45 05	36,8	71,0	220	Б		9	1	
	20	02 35 30	38,8	74,7		Б		10	11	
		07 19 10	41,9	79,8		A		9	5	
		23 02 33	37,5	71,9	160	Б		10	2	

* Chil'-Dara (40) 5 points; Garm (18) 3-4 points; Komsomolabad (28), Tashkent (290) 2-3 points; Dushanbe 2 points.

1	2	3	4	5	6	7	8	9	10	11
				June						
	21	03 21 55	37,1	71,0	80	Б		10	2	
		06 59 10	36,8	70,8	80	Б		10	1	
		07 34 34	36,7	70,8	230	Б		10	1	
		09 51 53,0	38,43	69,53	2	6		9	4	
		12 22 44,1	40,95	71,50	20	6		11	8	
		15 08 57,0	41,10	71,70	25	6		9	8	
		20 13 11	37,7	71,7	90	Б		9	2	
	22	04 24 04	37,3	71,8	160	Б		10	2	
		06 06 05	39,4	73,8		А		9	11	
		09 43 27	36,5	70,2	210	Б		9	1	
		10 06 07	39,3	73,8		Б		9	11	
		11 44 55	39,4	73,4				9	3	
		12 37 28,0	38,42	69,54	1-2	6		10	4	
		16 00 44	37,0	71,2	70	Б		9	2	
		19 24 54	36,3	69,3	100	Б		9	1	
		23 57 11	36,6	71,2	200	Б		9	1	
	23	07 22 10,1	42,33	74,06	15	а		9	7	
		10 48 27	36,6	71,0	240			9	1	
		10 57 48	37,6	72,0	180	Б		9	2	
		16 21 45	36,6	70,2	200	Б		9	1	
		21 50 38	36,5	71,1	80	Б		10	1	
	24	04 56 31	39,6	77,5		Б		10	12	
		10 55 27,8	41,87	69,67	0-5	6		9	9	
		13 40 39	36,9	70,8		Б		9	1	
		21 03 29	40,0	77,6		Б		9	5	
	25	03 39 19	37,1	70,7		Б		10	2	
		10 21 24	39,6	77,5		А		11	12	
		11 58 35	36,3	70,0	100	Б		9	1	
		19 27 46	40,0	76,8		А		10	5	
		19 39 05	39,4	74,8		А		9	11	
		21 15 12	36,3	70,5	140	Б		9	1	
		21 26 19,2	40,96	71,40	5	6		9	8	
	26	04 32 34	36,7	70,7	240	Б		9	1	
		11 04 14	37,3	71,9	200	Б		9	2	
		13 51 55	37,6	72,2	200	Б		10	2	
		14 56 10	38,3	72,2	100	Б		11	3	
		16 53 05,0	37,73	69,71	10	6		10	2	
37		16 54 18,0	37,73	69,71	10	6		12*	2	
		18 58 06,4	41,36	72,43	5	6		9	8	
		21 36 29	37,3	71,9	210	Б		10	2	
		21 57 05,0	37,73	69,71	10	Б		9	2	
	27	06 07 49	36,6	70,9	210	Б		10	1	
		06 16 45	40,9	75,0		А		11	6	
		09 02 59,0	37,75	69,73	5	6		10	2	Куляб 3 балла
		09 43 05,2	39,88	68,68	15	6		9	5	
		11 29 32	38,6	73,0		Б		9	3	
		11 55 06,7	40,31	72,70	5	а		9	5	
		16 09 57	36,1	70,1	100	Б		9	1	
		17 12 14	36,6	69,1				9	1	
38		19 02 31	36,5	71,1	230	Б		13	1	
39	28	04 26 35	36,6	70,0	200	Б		13	1	
		07 54 19	36,8	71,1	80	Б		9	1	
		19 44 33	38,5	73,6	130	Б		10	2	
		20 03 57	36,3	66,8		Б		9	1	
		20 18 42	36,4	70,3	180	Б		9	1	
		22 45 19,7	40,96	73,40	10	6		9	8	

* Sary-Chashma (11) 5 points; Bagarak (118) 4-5 points; Moskovskoye (10), Dakhan (117) 4 points, Kulyab (21), Parkhir (35), Sovetskoye (36) 3 points.

1	2	3	4	5	6	7	8	9	10	11
					June					
	29	04 35 24	39,4	73,0		A		11	3	
		06 23 33	38,6	75,0		Б		11	11	
		07 30 54	39,0	73,2		Б		9	3	
		12 14 22	36,3	68,5				9	1	
		16 07 12	36,4	69,4	150	Б		9	1	
	30	00 00 07	36,8	71,2	180	Б		10	1	
		03 00 08	37,1	71,9	80			9	2	
		04 37 31	36,3	71,2	100	Б		9	1	
		07 53 32,0	39,93	73,20		6		10	5	
		14 01 55	39,5	73,6		A		9	3	
					July					
	1	00 42 17,0	39,07	70,19	0i7	6		11	5	
		05 53 36,0	38,54	70,21	5	6		9	3	
	1	09 24 44	37,8	72,5	220	Б		10	2	
		10 43 22,0	40,60	72,65	10	6		9	8	
		12 38 29	37,3	72,1	250	A		10	2	
		13 05 35	37,8	73,3	70	Б		10	2	
		15 37 18	39,7	69,9		A		9	5	
		22 02 49	39,4	70,8		Б		9	5	
	2	02 02 28	39,6	73,8		Б		9	3	
		14 43 49,0	39,23	70,85	10	6		12*	5	
	2	14 59 38,0	39,22	70,87	8	6		9	5	
		20 59 10	36,5	70,1	210	Б		9	1	
41	3	09 39 13	36,3	70,6	120	A		12	1	
		11 46 12	37,4	71,8	210			9	2	
		14 10 32	36,5	70,1	200	A		10	1	
		17 38 15	39,8	73,2		A		9	5	
		21 06 22	36,3	70,5	100	Б		9	1	
		23 40 42	41,6	78,9		A		9	5	
	4	01 13 40	37,5	71,9	150	Б		10	2	
		06 09 36	36,1	70,1	90	Б		10	1	
		06 17 07	40,0	77,5		A		9	5	
		17 31 39	37,4	71,9	140	Б		11	2	
		21 11 49	36,7	70,9	220			9	1	
	5	04 56 10	37,4	72,1	230	Б		10	2	
		05 48 08	37,9	71,9	110	Б		9	2	
		07 51 14	36,2	67,7	80	Б		10	1	
		14 55 36	37,5	71,9	190	Б		9	2	
		19 33 51	36,5	70,2	230	Б		9	1	
		20 18 28	39,4	73,5		A		10	3	
		22 07 55	39,9	76,9				9	5	
	6	04 56 08	36,9	71,5	150	Б		9	2	
		06 05 17,0	38,73	70,71	4	6		9	3	
		21 55 45	36,6	71,3	120	Б		10	1	
	7	01 29 27	36,5	70,7	190	Б		11	1	
		04 13 31,0	38,97	70,78	10	6		9	3	
		07 25 24	36,5	70,8	100	Б		10	1	
		09 10 36	39,1	70,7		Б		9	3	
		10 56 58	37,6	72,0	210	Б		9	2	
	8	05 45 27	36,6	71,1	210	Б		10	1	
		17 25 30	36,5	70,5	170	Б		10	1	
		20 27 56	36,4	70,7	100	Б		10	1	
		22 21 30	36,5	70,7	210	Б		9	1	
		22 29 38	37,7	72,2	200	Б		9	2	

* Dzhirgatal' (30) 3 points; Dushanbe (200), Tashkent (265) 2-3 points; Samarkand (345) 2 points.

1	2	3	4	5	6	7	8	9	10	11
				July						
	9	06 17 45	36,9	71,0	240	Б		9	1	
		07 55 17	40,3	70,1	0-5	А		9	5	
		11 55 56	39,4	73,6		А		9	3	
		17 00 36,0	38,97	70,77	4	б		9	3	
		23 58 20	37,5	71,9	140	Б		10	2	
	10	17 29 18	39,9	73,6		А		9	5	
		20 15 48	42,4	79,8				9	6	
		22 43 16	38,0	71,5				9	2	
	11	00 16 39	36,6	71,2	100	Б		9	1	
		10 22 16	40,60	69,3	5	А		10	8	
		11 55 49	36,4	70,2	200	Б		10	1	
		12 39 04	37,2	72,2	240	Б		9	2	
		13 15 29	36,2	69,4	150			9	1	
		19 30 43	36,9	71,8	100			9	2	
	12	12 26 27	36,6	71,0	200	Б		10	1	
		14 40 34	37,3	73,3	80			9	2	
		22 19 39	36,1	69,9	80			9	1	
		22 52 49	36,5	70,8	100			9	1	
	13	12 04 47	36,4	69,9	250	Б		10	1	
		17 01 18	36,9	70,7				9	1	
	14	05 21 08	36,3	70,5	150	Б		10	1	
		05 43 34,2	41,0	71,70	5	б		9	8	
		14 34 23	36,3	69,1		Б		10	1	
		20 43 26	39,5	73,7		А		9	3	
	15	12 05 59	36,5	70,7	180	Б		9	1	
		16 29 16	36,3	69,8	140	Б		10	1	
		18 00 31	37,3	72,0	210	Б		10	2	
	16	13 03 53	37,0	71,9	230	Б		9	2	
		20 09 48,1	41,68	72,71	10	б		10	6	
		23 14 38	39,3	73,5		Б		11	3	
	17	09 24 35	40,5	77,8		А		9	5	
	18	00 13 46,0	38,92	70,92	6	а		9	3	
		03 57 10	36,0	69,4	80	Б		10	1	
		05 31 33	36,3	71,0		Б		9	1	
		08 02 47	36,5	71,0	250	Б		10	1	
		09 30 09	36,6	71,2	130	Б		9	1	
		11 41 14,0	38,67	70,33	10	б		10	3	
		15 04 21	38,5	73,0	110	Б		10	2	
		15 42 53	36,4	69,6	230	Б		9	1	
		18 45 02	36,5	70,4	220	Б		11	1	
		23 38 31	36,4	70,1	220	Б		9	1	
	19	00 15 14	36,3	70,7	200	Б		10	1	
		05 12 49	36,2	69,8	80	Б		9	1	
		12 43 42,0	38,27	68,35	1-2	б		9	4	
		14 35 33	37,1	71,9	240	Б		9	2	
		16 49 36	36,8	71,1	190	Б		10	1	
		18 50 49	38,2	73,8	150	Б		9	2	
	20	00 50 57	37,0	71,4	100	Б		9	2	
		05 18 26	41,0	74,7		А		9	6	
		07 13 13	37,4	71,4	110	Б		10	2	
		09 46 13	40,0	76,1		А		10	5	
		11 00 39	36,7	68,5		Б		9	1	
		13 12 46	36,9	69,2		Б		10	1	
42		20 51 24	36,4	71,0	80	Б		12	1	
	21	05 23 25	36,2	71,3	80	Б		9	1	
		13 03 00,6	43,21	78.43	35	б		11	7	
		17 43 50	42,1	75,1		А		9	7	
		17 43 50,5	41,95	78,15	5	а		9	6	
	22	02 29 34	36,4	70,9	100	А		9	1	
		02 43 13	36,4	70,6	220	А		11	1	
		03 43 37	40,5	77,1		А		9	5	

1	2	3	4	5	6	7	8	9	10	11
				July						
	23	00 01 11	40,2	77,5		А		9	5	
		04 07 31	40,5	77,7		А		10	5	
		18 13 42	36,6	70,8	220	Б		11	1	
		18 35 03	36,5	70,1	190	Б		9	1	
	24	03 45 39	36,2	71,2	70	Б		9	1	
		03 47 54,0	38,97	70,65	1-2	6		10	3	
		11 42 48	38,3	72,9	110	Б		9	2	
		13 02 40	36,0	69,0	80	Б		9	1	
		16 29 05	36,7	70,9	220	Б		10	1	
		16 35 54	40,3	77,6		А		9	5	
		18 25 09	36,8	71,3	210	Б		9	2	
	25	10 07 13	40,0	68,5		Б		9	5	
		13 32 24	40,4	77,6		А		9	5	
	26	01 18 57	39,5	67,5	15	А		9	5	
		02 21 15	37,6	72,1	200	Б		9	2	
		04 46 34	39,4	73,5		А		9	3	
		06 54 27	36,5	71,0		Б		9	1	
		07 13 12	39,1	74,2		Б		10	11	
		08 07 08	39,8	77,0				9	12	
		10 31 45	26,6	70,8		А		10	1	
	26	12 42 06	36,7	70,9	230	Б		10	1	
		15 43 47	37,3	69,8		А		11	2	
		22 22 54	37,1	71,8	220	Б		9	2	
	27	07 13 53,4	40,23	72,58	5	6		9	5	
		09 51 30	39,4	73,5		А		9	3	
		14 31 03	37,5	72,0	190	Б		9	2	
		18 25 57	41,0	77,6		А		9	5	
		23 07 38	36,6	70,7	120	Б		10	1	
		23 26 47	37,7	72,1	210	Б		9	2	
	28	03 11 24	36,6	70,8	240	Б		9	1	
43		12 31 57	39,3	72,4	20	А	4,8	12	3	Сары-Таш 3-4 балла; Андижан 3 балла
		10 33 57	36,6	70,1	200	Б		9	1	
		21 27 35	36,7	70,0	230	Б		9	1	
		21 40 40	36,6	70,8	150	Б		10	1	
	29	05 09 14	36,6	70,1	230	Б		10	1	
		19 23 03	37,4	70,0		Б		9	2	
	30	01 58 26	36,6	70,9	210	Б		9	1	
		03 31 50	36,8	71,2	190	Б		9	1	
		08 03 23	39,3	73,9		А		11	11	
		11 14 34	36,7	70,1	210	Б		9	1	
	31	02 24 22	37,0	70,8	90	Б		10	2	
		09 04 59	42,4	80,4		А		9	6	
		09 45 57	39,5	72,5		Б		9	3	
44		11 07 11,2	39,75	70,53	20	а		13	5	See text, Fig. 4
		13 23 52	36,7	70,7	250	Б		9	1	
		15 15 34	36,3	70,7	100	Б		10	1	
	1	05 02 06	36,2	70,2	80	Б		9	1	
		06 35 56	37,2	71,6	210	Б		9	2	
		09 23 58	36,7	70,4	130	Б		9	1	
		12 52 04	39,8	73,9		А		10	3	
		19 44 31	37,4	71,7	180	Б		9	2	
		21 34 14	36,1	70,6	80	Б		9	1	

1	2	3	4	5	6	7	8	9	10	11
				August						
	2	05 35 38	37,4	71,4	170	Б		9	2	
		07 54 39	36,0	69,2	80	Б		9	1	
		08 15 50	36,1	69,4	80	Б		9	1	
		12 06 24	36,5	71,0	250	Б		9	1	
		18 43 07	38,3	72,5	110	Б		9	2	
		20 38 40	36,6	70,7	210	Б		10	1	
		21 38 28	36,9	71,4	100	Б		9	2	
	3	06 58 28	39,4	73,7		А		9	11	
		11 45 49	39,9	70,0	0-5	А		10	5	
		12 44 49	37,2	71,5	120	Б		9	2	
		14 09 14,0	37,67	69,10	2	6		9	2	
		15 08 10	36,6	69,9	230	Б		10	1	
		19 41 08	36,4	71,0	120	А		10	1	
	4	03 17 12	36,8	70,7	240	Б		9	1	
		06 03 30	36,6	69,8	220	Б		9	1	
		08 10 05	41,8	72,4		Б		9	9	
45		08 23 50	39,4	73,9		Б		12	11	
		12 22 16	39,3	73,6		А		10	11	
		14 34 55	36,6	70,9	160	А		11	1	
	5	03 57 41	36,6	70,8	240	Б		9	1	
		06 43 33	36,6	71,0	190	Б		9	1	
		15 59 50	36,2	70,9	70	Б		9	1	
		18 10 10	36,4	69,9	130	А		11	1	
	6	06 19 00	37,1	71,4	110	Б		9	2	
		17 41 46	36,7	71,1	230	Б		11	1	
		21 00 38	36,7	71,0	220	Б		10	1	
		23 40 36	36,7	71,0	240	Б		10	1	
	7	05 41 06	36,3	69,0	100	Б		9	1	
		07 51 59	37,6	71,9	140	Б		9	2	
		07 52 58	39,6	73,0		А		10	3	
	8	00 50 33	39,5	74,1		Б		9	11	
		13 07 43	37,4	72,0	220	Б		9	2	
		13 10 37,0	39,10	70,52	1-2	6		10	5	
		18 26 33	36,2	69,4	120	Б		9	1	
		20 20 30	41,7	79,2		А		10	5	
		22 04 49	36,7	71,0	220	Б		9	1	
		23 03 06	36,7	68,5		Б		10	1	
	9	01 16 51	44,8	78,6		А		9	13	
		06 20 22	39,2	72,1		А		9	3	
		07 07 47	36,7	70,6	210	Б		9	1	
		11 02 09	36,8	68,8		Б		11	1	
		12 28 09	36,7	71,1	190	Б		9	1	
		21 59 19	38,2	67,3		Б		11	4	Каламазар 3–4 балла
		22 59 21,0	38,13	67,40	0-5	6		11	4	
		23 37 14	37,7	72,3	200	Б		9	2	
46	10	03 31 52,0	38,88	70,88	10	6		12	3	
		23 38 30	36,8	70,3	230	Б		9	1	
	11	05 41 10,0	38,95	70,42	18	6		9	3	
		05 41 49	36,8	71,3	200	Б		9	1	
		08 40 31	36,5	69,9	230	Б		10	1	
		22 24 24	39,8	73,6		Б		9	5	
	12	04 06 35	36,1	71,0	120	Б		9	1	
		04 33 24	39,4	73,7		Б		9	3	
		07 16 09	36,7	70,8	220	Б		9	1	
		10 34 16,4	40,06	72,78	15	а		11*	5	
		23 56 04	36,1	69,1	150	Б		9	1	

* Kirgiz-Ata (10) 4-5 points; Iski-Naukat (16), Yangi-Nakust (18), Kichik-Alay (26) 4 points; Karavan (45) 3-4 points.

1	2	3	4	5	6	7	8	9	10	11
				August						
	13	02 03 57	36,6	70,5	200	Б		10	1	
		07 26 07	38,5	73,9	120	Б		10	2	
		09 35 07	36,4	69,4	120	Б		10	1	
		10 24 14,0	38,96	70,56	10	б		11	3	
		11 20 42,2	40,45	69,40	5	б		10	8	
		15 52 01	36,6	71,0	190	Б		9	1	
		16 59 32	36,6	71,1	210	Б		9	1	
		18 06 59	36,7	70,9	230	Б		9	1	
		18 30 22	36,6	70,8	130	Б		9	1	
		21 11 00	38,2	67,3	0-5	А		11	4	
	14	05 57 05	36,5	70,9	160	Б		10	1	
		10 29 24	38,1	67,4		Б		9	4	
		18 38 39,0	38,95	70,56	1-2	а		10	3	
	15	16 27 36	36,6	70,1	210	Б		9	1	
		19 46 04	36,6	70,7	230			9	1	
	16	03 26 36	36,6	70,6	210	Б		9	1	
	17	00 18 46	36,3	71,0	70	Б		9	1	
		01 45 00	36,8	71,1		Б		9	1	
		05 13 43	36,1	70,4	90	Б		9	1	
		09 18 21	44,8	80,0		А		10	13	
		18 10 36	39,9	77,9		А		11	5	
	18	22 08 23	36,3	71,0	90	Б		9	1	
	19	03 16 29	36,5	70,1	190	Б		9	1	
		07 27 32	39,8	67,3		Б		9	5	
		09 40 44	36,5	71,1	100	Б		11	1	
		13 14 48	36,0	70,1	70	Б		11	1	
	20	00 59 36	39,2	74,2		Б		9	11	
		12 15 01	36,8	71,2	190	Б		9	1	
		12 28 07	39,8	78,3		Б		10	12	
		22 02 59	36,5	71,1	90	Б		9	1	
	22	01 41 45	36,6	70,2	200	Б		10	1	
		07 46 58	37,5	71,6	120	Б		11	2	
	23	01 27 18	37,7	72,1	180	Б		9	2	
		02 46 34	38,1	72,8	120	Б		10	2	
		04 54 33	40,1	77,3		Б		9	5	
		12 08 38	36,4	71,0	70	Б		9	1	
		12 58 03	36,4	70,9	80	Б		11	1	
		14 03 31	39,1	75,1		Б		10	11	
		17 25 24	36,5	71,0	100	Б		9	1	
		18 40 35,5	41,51	74,13	15	а		9	6	
		20 46 49	44,5	81,1				9	13	
		21 21 20	36,8	71,0	200	Б		10	1	
		21 25 03	36,4	70,3	210	Б		9	1	
	24	03 24 39	36,4	70,5	120	Б		9	1	
		05 53 24	36,4	69,4		Б		9	1	
		06 51 28	36,5	70,6	180	Б		9	1	
		07 05 14	36,8	70,8	220	Б		11	1	
		19 57 33	38,0	72,5	150	Б		9	2	
		19 58 54	36,4	70,7	180	Б		9	1	
		20 23 41	36,6	70,7	170	Б		9	1	
	25	00 14 27	37,8	72,6	210	Б		9	2	
		10 46 29	36,6	69,4		Б		11	1	
		14 53 39	40,1	78,0		Б		9	5	
		18 05 18	36,9	71,1	70	Б		10	1	
		23 51 39	36,3	69,2		Б		9	1	
	26	02 28 32	39,4	74,0		Б		9	11	
		06 04 29	37,3	72,0	200	Б		9	2	
		11 05 43	40,6	69,0	5	А		9	10	
		12 40 25	36,5	70,7	350			10	1	
		14 14 02	36,6	71,0	110	Б		9	1	

1	2	3	4	5	6	7	8	9	10	11
				August						
		17 43 29	36,4	69,2		Б		9	1	
		19 36 39	36,7	71,3	190	Б		9	1	
		22 23 40	38,6	72,0		Б		9	3	
		22 29 12,7	41,26	73,06		б		9	8	
	27	14 08 44	36,7	71,0	230	Б		9	1	
		18 53 04	36,3	70,8	70	Б		11	1	
		21 02 14,3	42,05	79,01		б		9	6	
	28	01 12 32	36,2	68,9		Б		10	1	
		04 58 10	36,5	70,1	200	Б		9	1	
		22 38 00	41,7	73,5	5	А		9	6	
	29	10 16 57	40,7	69,2	0-5	А		9	10	
		17 39 15	36,2	69,0		Б		9	1	
		22 27 51	36,2	68,9		Б		9	1	
	30	01 12 56	36,8	71,0	200	Б		9	1	
		02 34 43	36,6	71,0	210	Б		9	1	
		04 35 42	36,5	70,1	180	Б		10	1	
		13 09 43	37,3	71,4	100	Б		10	2	
	31	13 50 04	36,5	70,9	90	Б		9	1	
				September						
	1	00 35 32,0	38,25	68,98	12	а		9	4	
		01 59 34	36,3	71,1	80	Б		10	1	
		02 53 02	36,4	73,4		А		10	2	
		07 25 12	36,1	68,9		Б		10	1	
		09 03 17	36,1	70,0	150	Б		11	1	
		09 48 37	40,6	75,9		А		10	5	
		13 39 06	36,5	70,9	210	Б		9	1	
		16 09 31	36,4	71,0	240	Б		9	1	
		19 26 20	39,4	73,4		А		9	3	
		19 40 20	36,4	70,2	210	Б		10	1	
		21 59 29	40,3	72,5	5	А		9	5	
	2	10 58 20	36,9	71,2	120			9	1	
		13 23 06	37,2	71,7	200	Б		10	2	
		20 55 07	36,7	71,2	200	Б		9	1	
		22 04 06	36,9	71,0	240			9	1	
	3	00 00 42	36,8	70,3	220	Б		9	1	
		00 40 57	36,2	70,4	80	А		9	1	
		00 55 47	36,6	70,1	200	Б		9	1	
		06 03 05	36,7	71,0	190	Б		9	1	
		07 06 53,0	38,77	68,95	17	б		9	5	
		09 54 36	44,5	77,2		А		9	14	
		13 34 32	40,0	74,7		Б		9	5	
		20 59 12	36,5	70,9	150	Б		9	1	
	4	03 19 37	36,6	70,1	210	Б		10	1	
		08 55 59	37,2	71,1	80	Б		9	2	
		10 45 47	36,4	70,7	100	Б		9	1	
		13 54 12	36,5	70,1	200	Б		11	1	
		14 17 16	41,5	79,4		Б		10	5	
	5	01 48 32	36,3	69,3		Б		9	1	
		03 02 11	36,4	69,5		Б		10	1	
		09 29 55	36,4	70,5	210	Б		10	1	
		10 58 57	40,5	69,2	5	А		9	8	
	6	00 47 19	36,8	69,3		Б		11	1	
		01 52 36	36,2	70,4	100			9	1	
		04 36 54	36,4	70,5	190	Б		11	1	
		08 27 45	36,8	71,1	210	Б		10	1	
		09 37 50	36,6	70,0	210	Б		11	1	

1	2	3	4	5	6	7	8	9	10	11.
					September					
		09 41 05	36,6	70,0	210	Б		11	1	
		12 54 15	36,4	71,0	150	Б		9	1	
		14 50 09	36,7	69,8				9	1	
		18 49 14	46,3	78,2				9	14	
		23 39 18	42,2	78,0				9	7	
	7	01 03 41	37,1	71,8	250	А		10	2	
		02 45 54	36,9	71,2	200			9	1	
		07 42 04	37,0	71,2	100			9	2	
		09 38 00,0	38,93	70,82	0-5	6		10	3	
		16 36 56	36,7	70,7				9	1	
		20 28 10	40,0	77,5		Б		11	5	
		20 46 40	38,3	74,0	160	Б		9	2	
		23 12 31,5	43,01	77,23		6		9	7	
	8	00 02 55,0	43,16	78,20		6		9	7	
		00 45 28	36,5	71,0	130	Б		9	1	
		02 21 08	36,2	70,5	100	Б		9	1	
		15 19 11	39,2	74,5		Б		9	11	
		22 30 20	41,3	79,1		А		9	5	
	9	04 36 37	36,2	69,8		Б		9	1	
		06 26 45	36,8	71,0	240	Б		9	1	
		09 19 10	40,2	76,3		А		9	5	
		15 18 41	36,3	69,3		Б		9	1	
47		18 32 31	40,2	78,9		А		13	12	
		21 22 59	40,0	78,8		Б		9	12	
	10	00 09 31	40,0	78,8		А		10	12	
		00 56 08	40,0	78,8		Б		9	12	
		06 19 22,0	38,05	69,30	1-2	6		10	3	
		08 13 22	40,0	78,9		Б		9	12	
		11 45 19	40,1	78,7		Б		9	12	
		17 43 46	37,3	72,2	220	Б		9	2	
		18 41 11	40,4	78,5		Б		10	5	
		19 19 06	40,2	78,6		Б		9	5	
		21 30 27	40,0	78,6		Б		10	12	
		23 56 36	37,2	71,6	140	Б		9	2	
	11	03 45 10	36,6	70,5	200	Б		10	1	
		06 02 21	40,0	78,7		Б		10	12	
		16 01 28	36,6	69,9	230	Б		10	1	
	12	00 32 15	36,5	70,9	80	Б		9	1	
		05 11 35	36,6	70,0	230	Б		9	1	
		06 42 18	38,8	70,4		Б		9	3	
		09 33 44	36,4	71,1	70	Б		9	1	
		12 16 12,0	38,08	69,31	1-2	6		9	4	
		15 55 28	39,5	73,6		Б		10	3	
		17 47 34	37,2	71,4	120	Б		9	2	
	13	00 06 43	41,3	79,3		Б		10	5	
		04 57 37,2	41,18	74,77		6		9	6	
		13 16 40	36,3	71,0	110	Б		9	1	
		14 14-47	37,4	70,3		Б		9	2	
		14 57 16	37,2	71,6	120	Б		9	2	
		18 37 29	38,5	71,6		Б		9	3	
	14	01 26 21,0	40,24	71,30	5	а		10	8	
		02 40 09	37,5	72,1	160	Б		11	2	
		04 12 01	37,4	70,3		Б		11	2	
		04 39 28	37,4	70,2		Б		9	2	
		05 13 36	37,5	71,8	120	Б		10	2	
48		05 33 05	36,6	71,3	80	Б		12	1	
		05 38 41,0	38,42	70,33	2	6		9	3	
		12 38 15	36,4	71,2	80	Б		10	1	
		17 36 35	38,7	70,5		Б		9	3	
		18 21 39	39,5	73,9		Б		10	3	

1	2	3	4	5	6	7	8	9	10	11
					September					
		18 54 49,0	38,61	70,52	4	б		9	3	
		19 13 49	38,6	70,5		Б		9	3	
		19 41 47,0	38,61	70,52	4	б		9	3	
		20 50 45	38,6	70,5		Б		9	3	
		21 29 53	38,6	70,5		Б		9	3	
	15	01 55 45	36,3	70,5	140	Б		9	1	
		02 53 28	39,7	72,1	0-5	А		10	3	
		04 32 04,0	38,61	70,52	4	б		10	3	
		14 34 06,0	38,92	70,52	4	б		9	3	
		16 36 37	36,4	69,9	150	Б		9	1	
		18 19 41,4	40,90	72,70		б		9	8	
		22 37 48,0	38,47	70,33	2	б		9	3	
	16	02 55 13	36,5	71,0	80	Б		10	1	
		15 39 23,0	38,87	70,28	10	б		10	3	
		17 16 38	39,5	73,7		Б		11	3	
		23 12 32	36,5	70,2	200	Б		9	1	
	17	02 44 08,0	38,48	70,33	2	б		9	3	
49		03 48 31	37,2	71,5	130	Б		12	2	
		04 40 18	37,7	72,1	170	Б		9	2	
		07 19 44,0	38,47	70,32	2			9	3	
		07 23 56	36,3	70,3	160	Б		10	1	
		08 01 01,4	42,40	77,18		б		9	7	
		18 14 49	37,6	72,0	210	Б		10	2	
		19 39 20	36,5	70,2	210	Б		10	1	
		20 42 54	39,4	75,7				9	11	
		21 47 07	39,4	73,7		Б		9	3	
		22 43 54	36,5	70,2	210	Б		9	1	
		23 17 09	36,1	71,1	80			9	1	
	18	00 15 03	36,4	71,0	100	Б		9	1	
		01 07 28,0	38,46	70,33	2	б		11	3	
		01 09 32,0	38,46	70,33	2	б		9	3	
		01 35 38,0	38,45	70,33	2	б		9	3	
		03 31 02,0	38,46	70,22	1-2			9	3	
		04 16 51	40,0	78,7		Б		9	12	
		04 57 20	40,0	78,1		Б		9	5	
		07 59 03	36,6	70,5	200	Б		10	1	
		11 47 45,0	38,42	70,37	10	б		11	3	
		12 15 14	40,5	77,5		Б		9	5	
		13 21 43	36,7	71,0	210	Б		9	1	
		16 50 08,0	42,02	71,29	0-5	б		9	9	
		18 35 24	39,2	73,5		А		9	3	
		19 48 26,0	38,44	70,36	2	б		10	3	
		22 15 44,0	38,43	70,37	2	б		9	3	
		23 59 45	36,1	70,3	80	Б		9	1	
	19	00 36 08,5	41,66	73,28	6-10	а		9	6	
		05 35 59	36,8	69,7	100	Б		9	1	
		09 38 59,0	38,50	70,33	5	б		9	3	
		09 56 43	37,0	69,8		Б		9	1	
		12 52 49	36,6	71,1	140	Б		10	1	
		15 20 42	38,5	73,5	120	Б		10	2	
		17 04 16,0	38,47	70,33	2	б		9	3	
		17 26 16,0	38,46	70,35	2	б		9	3	
	20	02 50 44	38,5	70,4		Б		9	3	
		11 08 45,0	38,49	70,49	4	б		9	3	
		13 57 17,0	38,44	70,33	2	б		9	3	
		14 38 48	37,0	70,7	240	Б		9	1	
		16 03 42	36,3	69,3	100	В		9	1	
		18 52 36,0	38,48	70,32	2	б		9	3	
		22 35 56,0	38,48	70,33	2	б		9	3	

1	2	3	4	5	6	7	8	9	10	11
				September						
	21	05 52 17	44,8	78,6		А		9	13	
		06 18 49	36,6	70,8	200	А		11	1	
		06 26 38	39,2	70,8		Б		9	3	
		07 26 14	38,0	72,7		Б		9	2	
		12 16 29	39,7	73,9		А		9	3	
	22	04 33 20	39,7	77,2		Б		9	12	
		05 43 56,0	38,47	70,33	7	6		9	3	
		05 44 40,0	38,47	70,33	7	6		9	3	
		06 12 38	39,5	72,9		А		10	3	
		09 36 29,0	38,47	70,33	2	6		9	3	
		18 59 01	38,0	72,3	120	Б		11	2	
		21 09 54,0	38,49	70,33	7	6		9	3	
		21 36 34	41,1	79,0		А		9	5	
	23	01 20 47	36,7	71,0	230	Б		9	1	
	24	00 00 35,5	39,80	71,40	5	а		11	5	
		02 08 50,0	42,05	75,90	0-5	6		9	7	
		06 53 01	38,5	73,0		Б		11	2	
		11 07 35	38,5	73,2				10	2	
		12 31 42	36,1	69,8	100	Б		9	1	
	25	02 06 49	37,1	71,8	180			9	2	
		02 59 42	36,4	71,1	100	Б		10	1	
		05 28 04	38,5	71,5		А		11	3	
		05 41 25	38,5	71,5		Б		9	3	
		05 55 24	38,5	71,5		Б		9	3	
		11 51 39,0	38,71	69,97	22	6		11	3	
		12 05 37,0	38,22	70,21	2	6		9	3	
		13 03 36,0	38,87	70,33	7	6		9	3	
		17 10 32,0	41,00	72,80		6		10	8	
		23 55 46	36,2	70,2	80	Б		9	1	
	26	05 04 40	38,4	73,3		Б		10	2	
		05 42 00	37,3	71,8	200	Б		9	2	
		10 28 00,8	40,86	70,10	0-5	а		9	9	
		18 21 13	36,5	70,7	180	Б		10	1	
		18 25 12	36,6	70,3	220	Б		9	1	
		23 54 00	36,5	70,7	200	Б		10	1	
	27	02 04 23	36,2	70,9	100	Б		9	1	
		05 07 07	36,4	71,1	80			9	1	
		08 27 53	39,4	73,7		А		9	11	
		09 22 06,0	38,47	70,33	7	6		10	3	
		11 21 46,0	38,47	70,33	7	6		9	3	
		11 29 24,0	38,47	70,35	7	6		10	3	
		19 15 43	36,4	70,4	200	Б		10	1	
		22 27 23,0	38,22	70,20	2	6		10	3	
	28	00 46 33	38,4	73,6	80	Б		9	2	
		02 08 14	36,1	69,9	80	Б		11	1	
		02 12 26	36,2	69,8	80			10	1	
		04 57 41	36,4	70,6	180	Б		10	1	
		12 46 52	36,5	70,5	200	Б		11	1	
		15 34 15	37,4	71,5	110	Б		10	2	
		16 21 04,0	38,45	70,32	2	6		10	3	
	29	09 29 41	39,2	73,5		А		9	3	
50		12 14 08	39,3	73,7		А		13*	11	
		12 28 41	39,3	73,6		5		10	11	
		13 45 42,0	38,50	70,32	1-2			9	3	
		21 31 29,4	41,21	72,58	30	6		9	8	
	30	03 27 19	36,3	69,4	80	Б		9	1	

* Irkeshtam (27), Sofikurgan (56), Kara-Kul'dzhi (123) 3-4 points; Kara-Taryk (127), Osh (135), Sufikishlak (160), Andizhan (181), Tashkent (422) 3 points; Samarkand (574) 2 points.

1	2	3	4	5	6	7	8	9	10	11
				October						
	1	00 04 04,0	38,55	69,70	2	6		9	3	
		01 15 29,0	38,47	70,32	2	6		9	3	
		01 21 08,0	38,64	70,65	4	6		9	3	
		02 49 12	36,6	71,0	220	Б		9	1	
		08 39 23	37,3	71,7	140	Б		9	2	
51		13 23 59	36,1	70,5	130	Б		12	1	
		19 08 09	36,5	70,9	110	Б		9	1	
	2	02 34 24	39,3	73,4		А		9	3	
		05 09 32	37,3	71,8	200	Б		9	2	
		10 08 10	36,5	70,9	150	Б		9	1	
		15 07 04	41,0	63,5	0-5	А		10	21	
52		19 33 44,0	39,0	71,45	36	6		12	3	
		20 42 52	36,6	71,0	230	Б		11	1	
		21 04 18	37,3	70,6		Б		10	2	
	3	02 04 59	36,5	71,4		Б		9	1	
		10 15 44	36,4	71,0	220	А		10	1	
	4	03 14 00	36,7	70,7	230	Б		10	1	
		09 26 24	46,9	77,5				9	14	
		10 12 04,9	39,87	69,65	0-5	6		9	5	
		11 06 29	42,0	70,0		А		9	9	
		16 25 20	37,5	71,8	200	Б		9	2	
	5	01 29 48	37,6	71,9	200	Б		9	2	
		06 16 12	36,6	70,7	190	Б		9	1	
		06 58 40	37,7	71,2	220	Б		9	2	
		11 14 23	36,6	70,9	230	Б		10	1	
		16 14 30	39,5	72,9				9	3	
		21 49 23	37,5	71,6	250	Б		9	2	
		23 46 59	36,5	71,0	80	Б		10	1	
	6	01 09 54	40,0	75,1		А		10	5	
		05 49 00	36,5	70,0	200	Б		9	1	
		12 42 15	36,6	71,0	230	Б		11	1	
	7	00 25 00	36,1	69,1	150	Б		10	1	
		01 50 41	39,0	75,5		Б		10	11	
		01 50 44	38,4	73,3	120	Б		10	2	
		06 53 50	36,2	70,4	110	Б		9	1	
		10 33 46	40,0	72,3	0-5	А		10	5	
		17 38 05	36,2	68,2				9	1	
		18 41 51	36,4	70,6	140	Б		9	1	
		19 53 24	40,0	77,2		А		9	5	
		23 04 38	36,6	70,9	210	Б		9	1	
	8	01 29 37	36,7	72,8				10	1	
		02 45 40	36,5	70,1	140	Б		9	1	
		03 24 53	39,6	78,4		Б		9	12	
		05 59 45,0	38,46	70,33	2	6		9	3	
		06 33 56,0	38,47	70,33	2	6		9	3	
		07 57 54	36,4	70,8	80	Б		10	1	
	9	06 08 26	37,2	71,4	130	Б		9	2	
		08 03 46	39,9	69,6	5	А		9	5	
		09 37 56	43,3	78,8		А		10	7	
	10	06 07 29	38,7	65,3	0-5	А		9	22	
		08 50 40	37,0	71,3	120	А		11	2	
		09 10 04,0	38,48	70,34	5	6		9	3	
		11 23 18	41,8	78,2		А		9	5	
		13 02 48	41,2	78,7		А		9	5	
		14 57 22	39,0	72,7		А		9	3	
		23 03 54	36,6	71,1	120	Б		9	1	
		23 26 50	36,8	71,1	210	Б		9	1	
	11	05 16 58	37,1	71,3		Б		9	2	
		16 39 27	40,6	71,7		А		9	8	
	12	01 00 36	39,1	71,8		Б		9	3	

1	2	3	4	5	6	7	8	9	10	11
				October						
	12	07 39 55	36,4	71,3	100	А		10	1	
		08 51 11,0	39,07	71,47	12	б		9	3	
		10 22 52	36,6	70,0	200	Б		9	1	
		11 40 35	36,6	70,3	230	Б		9	1	
		14 18 24	36,5	71,1	100	Б		9	1	
	13	03 59 57	36,8	70,5	240			9	1	
		08 12 10	39,5	74,1		Б		10	11	
	14	00 50 31	39,4	73,5		А		11	3	
		02 31 27	36,6	71,0	230	Б		10	1	
		02 36 29	39,4	73,4		Б		10	3	
		02 52 38	36,4	70,6	150	Б		9	1	
		16 16 13	36,5	70,0	220	Б		10	1	
		18 18 32	36,5	70,4	200	Б		10	1	
	15	03 53 58	37,9	70,4		Б		10	3	
		06 24 26	37,6	71,6	160	Б		9	2	
		06 25 07	42,3	69,7	10	А		9	9	
		10 46 28	37,4	69,9		Б		9	2	
	16	07 56 16	36,9	70,5		Б		10	1	
		08 43 33	38,0	72,7		Б		9	2	
		09 17 18	36,6	69,4	170	Б		11	1	
		20 42 52	36,2	70,3	70	Б		10	1	
		21 26 10	36,5	70,8	190	Б		9	1	
		22 30 49,0	38,96	69,94	12	б		9	3	
		22 59 45	36,5	70,6	180	Б		9	1	
53	17	01 09 05	37,5	70,9		Б		12	2	Душанбе 2 балла
		17 29 19	38,5	73,0		Б		10	2	
		23 36 57,0	38,76	70,67	1-2	а		10	3	
	18	05 02 14	38,2	73,8	200	Б		10	2	
		13 02 38	37,3	71,7	170	Б		9	2	
		19 23 38	39,4	73,9		А		9	11	
		19 36 41	36,7	71,1	110	Б		10	1	
	19	05 14 42,6	42,02	75,13	25	а		10	7	
		15 25 54	37,1	71,7	170	Б		9	2	
		19 16 02,0	38,50	69,78	5-7	а		10	3	
		20 02 25	36,5	68,9	200	Б		9	1	
	20	03 29 12	36,6	70,9	220	Б		10	1	
		03 48 18,0	38,47	69,18	10	а		10	5	
		18 53 27	36,5	70,8	190	А		10	1	
		23 23 26	41,4	63,5	0-5	А		9	21	
	21	01 07 16,0	39,07	71,45	4	б		10	3	
		01 25 52,0	39,09	71,50	12	б		9	3	
		03 13 20	39,2	71,5		Б		10	3	
		04 48 30,1	41,19	68,63	5	а		10	10	
		11 08 04,0	39,02	71,48	8	б		10	3	
		14 54 31	36,1	69,1		Б		11	1	
		18 28 22	36,9	71,2	70			9	1	
	22	15 14 24	36,7	70,1	210	Б		9	1	
		16 04 08	37,9	70,2		Б		9	3	
		23 42 54	36,6	70,7	230	Б		9	1	
	23	06 10 25	40,4	73,4		А		9	5	
		11 35 04	36,9	70,7	230	Б		9	1	
		16 41 00	36,6	70,8	200	Б		11	1	
		18 03 14	36,2	69,4	70	Б		10	1	
	24	02 36 36	39,2	71,6		Б		9	3	
		02 36 48	40,9	72,6		А		9	8	
		06 46 16	39,9	75,5		А		10	5	

1	2	3	4	5	6	7	8	9	10	11
				October						
54	24	06 59 20	39,8	75,0		Б		12	11	
		07 03 54	39,8	75,5		А		10	5	
		07 36 31	39,5	69,2		Б		9	5	
		11 12 47,0	39,22	71,26	14	б		11	3	
55		13 35 29	37,4	71,3	100	Б		12	2	
		18 36 12	38,1	73,1		Б		9	2	
		18 41 15	36,5	70,6	200	Б		9	1	
56	25	00 31 44	36,1	70,7	70	Б		12	1	Хорог 2 балла
57		11 11 11,0	38,21	69,33	1-2	б		12	3	Дангара 3-4 балла
		18 45 00	37,0	71,6	80	Б		9	2	
		20 03 59	36,5	70,4	200	Б		10	1	
		23 44 07	36,6	70,2	190	Б		9	1	
	26	05 02 38	39,4	74,1		А		9	11	
		07 36 20	36,6	71,1	170	Б		10	1	
		12 56 02	37,2	71,3	100	Б		9	2	
		14 33 51	36,7	71,3	150	Б		9	1	
		15 37 12	39,3	72,8		А		9	3	
		22 37 18	36,6	70,5	170	Б		9	1	
		23 40 49	40,5	77,1		А		9	5	
	27	08 30 43	40,1	75,0		А		10	5	
		16 54 08	37,93	69,63	5	б		9	3	
	28	00 39 11	37,2	71,4	120	Б		10	2	
		10 32 09	41,5	70,1				10	9	
		11 48 42	39,2	74,1		А		9	11	
		13 19 36	36,3	71,1	80	Б		9	1	
	28	14 07 44	36,8	70,5	270	Б		9	1	
		22 51 50	36,5	69,9	220	Б		9	1	
	29	04 10 19	44,4	79,5		А		9	13	
	30	21 40 43	36,3	70,5	100	Б		9	1	
		23 00 19	36,6	71,5	120	Б		10	1	
		23 16 15,5	40,83	72,95	5	а		11*	8	
		23 59 31	36,6	70,5	140	Б		9	1	
	31	03 14 33	39,7	71,8	0-5	А		9	5	
		05 31 15,0	38,88	70,91	6	б		11	3	
		17 20 44	36,7	71,0	200	Б		9	1	
				November						
	1	03 19 33	36,7	67,7				9	1	
		09 31 28	36,2	70,8	80	А		9	1	
		19 38 35	36,5	70,1	200	А		9	1	
	2	01 08 29,0	38,60	70,65	4	а		11	3	
		03 14 37	36,5	70,1	200	Б		9	1	
		15 54 47,0	38,75	69,90	10	б		9	4	
	3	16 02 58,0	38,75	69,90	10	б		10	4	
		19 42 10	37,6	71,8	120			9	2	
		21 05 45	37,6	71,8	140	А		9	2	
		21 19 29	37,7	71,9	140	Б		9	2	
		22 44 22	36,2	69,4	80	Б		9	1	
	4	00 16 11,0	37,84	69,46	1-2	б		9	3	
		04 28 51	36,6	70,8	220	Б		9	1	
		09 42 47	39,4	72,9		А		10	3	
		11 45 40,2	39,40	72,80	20	б		9	3	
		13 48 06	36,1	70,7	80	Б		10	1	

* Suzak, Sernyy Rudnik, Kara-Taryk 4 points

1	2	3	4	5	6	7	8	9	10	11
				November						
	4	16 39 30	36,5	70,8	200	В		9	1	
		18 06 42	36,7	69,4	240	В		10	1	
		21 53 17,6	40,07	71,83	20	а		9	5	
	5	03 11 47	37,1	71,6	170	Б		9	2	
		03 15 53	39,6	72,2		Б		9	2	
		06 38 19	40,8	78,8		А		9	5	
		09 52 01	39,4	73,4		А		9	3	
		13 05 49,3	40,53	74,00	0-5	а		10	5	
	6	11 44 10	36,4	70,3	190	Б		9	1	
		14 23 54	39,4	73,7		А		9	11	
		16 49 16	36,9	71,2	100	Б		10	2	
		17 22 38,0	38,10	70,25	1-2	б		9	3	
	7	08 51 46	36,5	70,9	220	В		9	1	
		11 10 42	37,6	72,2	230	Б		9	2	
		12 01 10	36,6	69,7	180	Б		9	1	
		16 09 05	36,6	70,1	190	Б		9	1	
		18 20 02	37,8	72,1	130	А		9	2	
	8	15 33 06	36,0	70,3	80	Б		9	1	
		23 39 31	40,1	72,0		Б		9	5	
	9	00 19 12	36,3	71,2	100	А		10	1	
		09 49 27	36,6	70,9	190	Б		10	1	
		10 20 56	36,5	71,1	230	А		9	1	
		23 51 15	38,2	74,5	120	А		10	2	
	10	02 01 41	40,4	77,4		А		9	5	
		11 22 24,0	38,64	69,83	10	б		9	4	
		13 12 26	37,3	70,2		А		10	2	
58	11	03 53 56,4	40,55	73,29	5	а		12	5	See text, Fig. 5
59		06 42 40	36,5	70,3	180	А		12	1	
		09 44 40	36,6	68,2		Б		9	1	
		10 17 48	38,2	72,3	100	Б		10	2	
		20 18 43	36,3	69,9	140	Б		10	1	
		22 58 07	37,5	72,0	210	Б		9	2	
	12	11 34 55	37,4	71,8	150	Б		9	2	
		12 06 37	39,9	75,5		А		9	5	
		18 28 41	36,2	71,1	100	Б		10	1	
		18 43 27	39,2	70,7		Б		9	3	
		22 31 46	36,5	70,6	180	Б		11	1	
	13	03 53 10	37,0	71,9	210	Б		9	2	
		04 54 14	38,0	73,2		Б		10	2	
		06 33 34	38,0	73,2		Б		9	2	
		07 01 40,9	42,90	77,82	10	б		9	7	
		07 33 22	36,2	69,8		Б		9	1	
		14 33 57	40,1	75,5		А		9	5	
		21 16 40	38,4	73,2		Б		11	2	
	14	01 37 55	36,1	68,7		Б		11	1	
		03 13 47,5	40,78	73,41	15	а		9	8	
		11 40 22,0	38,50	69,75	2	б		10	3	
		15 19 41	39,3	73,6				9	3	
		18 38 44	36,5	70,4	200	Б		10	1	
		18 50 08	36,6	71,0	150	Б		9	1	
		21 33 14	36,6	70,3	210	Б		9	1	
		23 06 14	36,2	69,7	150	Б		9	1	
	15	01 15 31	36,4	71,2	80	Б		9	1	
		02 07 02	36,4	71,2	240	Б		9	1	
		06 46 55	41,0	75,1		А		9	6	
		14 13 01	36,6	70,2	200			9	1	
	15	14 44 44	36,8	71,1	70	Б		10	1	
	16	11 33 46	36,6	69,4		Б		9	1	

1	2	3	4	5	6	7	8	9	10	11
					November					
60		13 24 23	36,4	70,9	100	Б		12	1	
61		16 59 28	38,9	75,0		А		12	11	
		22 21 42,0	38,58	70,52	0-5	6		9	3	
	17	05 46 56	40,1	78,9		А		11	12	
		19 54 08	36,6	70,9	220	Б		9	1	
	18	03 05 09	39,1	70,5		Б		9	5	
		04 47 04	41,0	74,9		А		9	6	
		10 05 45,7	42,65	76,28	15	а		10	7	
		12 23 32	37,0	71,2	80	Б		9	2	
	19	01 59 41	37,3	71,8	150	Б		9	2	
		05 06 05	37,0	71,8	160	Б		10	2	
		05 22 17	36,6	71,0	230	Б		9	1	
		08 50 12	36,4	71,0	180	Б		9	1	
		12 58 34	36,6	71,0	230	Б		11	1	
	20	02 33 44,0	38,49	69,29	1-2	6		9	4	
		04 24 41	37,2	72,3	130	Б		10	2	
		10 06 01	36,6	69,9		Б		11	1	
		15 28 34	39,2	73,5		Б		9	3	
	21	01 40 47	41,7	79,0		А		11	5	
		07 45 23	36,3	70,9	80	Б		9	1	
		16 00 38	36,4	68,9		Б		9	1	
		16 31 39	41,7	76,7		А		9	6	
		19 26 21	37,0	71,4	120	Б		10	2	
	22	07 49 04	36,6	70,8	170	Б		9	1	
		15 24 39	36,2	70,3	120	Б		10	1	
		16 06 23	37,6	72,1	200	Б		9	2	
		20 24 42	40,7	73,5		А		9	8	
		22 11 02	39,5	69,2		Б		9	5	
		23 35 12	38,3	72,9	120	Б		11	2	
	23	04 42 45	39,0	73,8		А		10	3	
		08 33 06	38,7	70,7		Б		9	3	
		11 25 59	36,6	70,8	180	Б		9	1	
	24	01 40 23	38,5	73,0	110	Б		10	2	
		03 10 38	36,5	70,9	220	Б		9	1	
		06 59 47	36,5	70,9	230	Б		9	1	
		09 24 16,0	38,87	70,38	7	6		9	3	
		09 46 42	36,6	70,2	200	Б		9	1	
		13 44 37	36,7	71,1	70			9	1	
	25	00 44 51	38,5	73,4	120	Б		10	2	
		01 25 46	36,5	70,6	200	Б		10	1	
		02 29 02	39,0	67,3		Б		9	5	
		05 43 19	36,3	70,2	140	Б		9	1	
		11 50 09	36,2	70,3	80	Б		9	1	
		16 21 51	37,1	69,5		Б		9	2	
		22 43 03	36,5	70,5	230	Б		9	1	
		22 54 03	37,2	71,2	90	Б		9	2	
	26	05 18 30	37,4	71,6	140	Б		9	2	
		07 55 14	39,0	73,3		А		10	3	
		12 52 54	36,7	71,2	180	Б		10	1	
		18 03 00	36,5	70,2	210	Б		10	1	
		21 35 33	36,6	69,2		Б		9	1	
	27	00 39 11	36,5	69,5		Б		9	1	
		01 56 01,0	40,80	73,06	20	6		10*	8	
	27	06 53 59	38,9	70,3		Б		9	3	
		09 17 31	37,4	72,0	220	Б		10	2	
		13 24 43	36,5	71,2	80	Б		9	1	
		20 07 55	37,8	70,5		Б		10	3	

* Dzalal-Abad (16), Kara-Su (18), Sarylare (22) 4 points; Osh 3-4 points; Sufikishlak (36) 3 points.

1	2	3	4	5	6	7	8	9	10	11
				November						
		20 40 32	36,7	70,9	220	Б		10	1	
		22 58 17	36,5	70,1	200	Б		10	1	
	28	00 00 35	36,5	71,1	110	Б		10	1	
		04 45 05,5	41,0	72,83		6		9	8	
		08 36 31	36,7	70,6	210	Б		9	1	
		09 43 17	36,5	70,8	200	Б		9	1	
		10 54 15,0	41,20	70,62	10	6		9	9	
		12 03 09,7	39,0	67,10	0-5	6		9	5	Иори, Сарыкамыр 3 балла
		16 04 03	37,4	71,8	140	Б		9	2	
62		18 14 32	39,2	73,5		Б		12	3	
	29	22 10 33	37,4	71,9	200	Б		9	2	
	30	05 50 02	36,2	69,6	80	Б		9	1	
		06 44 29	36,4	71,0	220	А		11	1	
		10 25 27	37,2	71,7	150	Б		9	2	
		11 47 45	37,3	71,5	110	Б		9	2	
		16 25 51	37,2	71,7	160	Б		9	2	
		22 38 06	42,8	79,3		А		11	7	
				December						
	1	02 41 14	36,5	71,0	70	Б		10	1	
		04 11 21	36,6	71,1	160	Б		10	1	
		07 21 59	36,6	70,6	250			9	1	
		07 52 11	36,5	69,7		Б		9	1	
		08 55 01	39,6	74,0		А		10	11	
		12 45 30	39,6	73,4		А		9	3	
		15 30 08	36,6	70,9	230	А		10	1	
		17 40 08,0	38,71	70,73	6	6		9	3	
		23 14 13	36,5	71,3	100	А		11	1	
	2	10 38 56	36,5	70,8	180			9	1	
		13 54 59	36,6	70,9	130			9	1	
		15 01 28,0	38,53	70,50	4	6		9	3	
		17 48 07	36,9	70,8	230			9	1	
		18 47 37	36,7	70,8	220	Б		9	1	
		21 14 05	38,4	72,8		Б		11	2	
		23 40 39	36,5	70,8	200	А		11	1	
	3	15 06 01	36,6	70,7		Б		9	1	
		15 19 00,6	42,93	77,55	10	а		10	7	
		23 32 02	36,5	70,7	180			9	1	
	4	03 21 52	36,7	71,3	180	Б		9	1	
		05 34 07	40,0	72,0		А		10	5	
		07 44 16,0	38,97	70,64	2	6		9	3	
		09 24 34	36,5	70,9	130	Б		9	1	
	5	04 09 18	36,9	71,0	80	Б		10	1	
		10 48 28	36,3	69,8		Б		9	1	
		15 35 46,0	41,20	71,33	25-30	6		10	8	see text
	6	03 05 34	36,6	70,8	230	Б		10	1	
		03 37 01,0	37,77	68,71	7	6		10	4	
		06 55 42	36,6	70,9	210	Б		10	1	
		08 23 38	36,5	71,1	210	Б		9	1	
		14 35 27,0	37,77	68,71	7	6		11	4	
		16 07 05	36.1	70.6	140	Б		9	1	
	6	21 05 55	36,3	70,0	100	Б		10	1	
		21 56 51	39,3	73,6		А		9	3	
	7	08 55 43	36,7	70,8	220	Б		9	1	
		12 37 01	37,5	72,0	190	Б		10	2	
	8	14 14 25,5	41,58	73,33	10	6		10	6	
		15 30 19	36,5	70,9	160	Б		9	1	
		15 53 42	37,2	71,4	120	Б		10	2	

1	2	3	4	5	6	7	8	9	10	11
					December					
	9	05 42 55	36,8	70,7	230	Б		9	1	
		06 46 27	36,3	70,4	130	Б		9	1	
		07 59 05	36,7	71,2	180	Б		10	1	
		08 24 34	36,2	70,2	130	Б		10	1	
		13 36 55	44,0	74,8		А		9	16	
		19 34 25	40,0	76,7		А		9	5	
		21 42 56,0	38,56	69,04	7	а		9	4	
	10	01 34 53	36,6	70,9	160	Б		9	1	
		01 47 06	36,2	70,8	80	А		10	1	
		05 17 05	40,5	72,2	30	А		11*	8	
63		06 23 08	40,6	77,6		А		12	5	Ат-Баши, Дюрбельджин 3–4 балла
		08 35 57,0	38,52	69,59	2	б		11	4	
		08 36 06	40,6	77,9		А		11	5	
		11 33 39	36,4	71,0	100	Б		9	1	
		12 30 36	36,3	70,3	80	Б		9	1	
		13 13 17	40,6	77,2		А		10	5	
		17 10 50	40,5	77,5		А		10	5	
	11	00 23 49,0	38,59	70,56	4	б		9	3	
		03 56 20	37,2	72,1	220	Б		10	2	
		12 38 49,9	39,71	73,10	0–5	б		9	3	
	12	01 58 05	37,1	71,3	120	Б		9	2	
		03 59 48,5	40,77	71,23	20	б		9	8	
		06 53 11	36,1	71,1	80	Б		9	1	
		10 35 16,0	40,27	72,30	10	б		10	8	
		14 02 10	39,5	73,8		А		9	3	
		21 05 38	36,4	71,0	130	А		9	1	
	13	02 40 53	36,6	70,2	200	Б		10	1	
		11 39 56	37,1	71,3	80			10	3	
		12 19 53	36,1	69,5				9	1	
		13 02 45	36,5	70,3	210	Б		11	1	
		16 51 19	38,2	73,8	170	А		11	2	
		17 51 35	37,2	71,6	120	А		11	2	
	14	02 40 19,0	38,46	70,37	1–2	б		9	3	
		03 14 15	36,1	68,8		Б		10	1	
		14 27 33	36,5	70,2	200	Б		9	1	
		18 45 22	36,6	70,3	220	Б		11	1	
		19 58 29	36,5	71,0	100	Б		9	1	
		22 37 09	39,3	73,6		А		9	11	
64		23 06 50	39,4	73,3		А		12	3	
		23 41 57	39,4	73,4		А		9	3	
	15	07 17 43	37,5	71,7	250			9	2	
		12 46 42	36,7	70,7	180	Б		9	1	
		13 04 32	36,6	71,1	80	Б		9	1	
	15	19 04 04	37,5	72,3	200	Б		11	2	
		21 05 19	36,8	70,8	200	Б		9	1	
	16	15 22 53	37,4	72,8	150	Б		10	2	
	17	00 55 04	36,8	68,2				9	1	
		05 56 04	37,3	71,8	160	А		11	2	
		13 55 44	36,8	71,2	210			9	1	
	18	00 42 38	37,3	71,9	250	А		10	2	
		15 36 45	36,8	70,7	240			9	1	
		17 23 29	36,6	70,8	200	Б		9	1	
		18 19 24	39,2	73,2		А		10	3	

* Kuvasay (73), Markhamat (102), Aravai (111) 4 points; Uchdurgan (66), Kyzyl-Kiya (73), Leninsk (117) 3-4 points; Karavan (78), Kuve (100), Palvantash (107) 3 points; Fergana (83) 2 points.

1	2	3	4	5	6	7	8	9	10	11
				December						
	19	15 47 18	37,3	71,3	100	Б		9	2	
		17 25 20	36,4	71,1	130	Б		9	1	
	20	02 08 41	39,9	73,9		А		9	11	
		08 51 34	36,8	70,6	210	Б		10	1	
		11 05 03,0	37,80	69,77	5	6		9	2	
		12 22 22,0	38,98	70,71	4	6		10	3	
		12 30 23,0	37,77	69,73	5	6		9	2	
		12 53 39,0	37,85	69,66	2	6		10	3	
		13 28 07,0	37,78	69,75	5	6		10	3	
		13 29 39,0	37,78	69,75	5	6		9	3	
		14 31 30	37,3	71,4	220			9	2	
		19 55 58	37,0	70,5		Б		10	1	
		20 59 40	36,8	71,2	240	Б		10	1	
		20 59 45	39,5	73,8		А		9	3	
		23 24 49	36,7	70,9	220	А		10	1	
	21	00 15 05	36,3	69,5	150	Б		10	1	
		05 41 26,0	37,77	69,73	2	6		9	3	
		09 30 57	39,9	77,1		А		10	5	
		11 35 54	36,9	71,1	220	Б		10	1	
		14 29 03	36,5	71,0	120	Б		9	1	
		16 08 42,0	37,76	69,75	5	6		10	3	
		16 14 01,0	37,76	69,75	5	6		9	3	
		21 51 57	39,4	74,9		А		10	11	
	22	02 00 58	39,5	74,0		А		9	11	
		02 20 23	39,5	74,2		А		9	11	
		05 05 23,0	38,47	70,33	2	6		10	3	
		07 26 08	38,0	67,0		Б		10	4	
		08 45 44	39,6	74,3		А		10	11	
		11 56 28	36,6	70,8	210	Б		10	1	
	23	01 23 23	39,4	72,0		А		9	3	
		08 39 39	36,6	71,2	200	Б		9	1	
		12 24 46	40,0	69,5		А		9	5	
		14 15 57	39,2	74,9		А		10	11	
		18 31 52	36,7	70,7	250	Б		9	1	
		18 43 39	36,6	69,8	180	Б		9	1	
		19 24 19	37,3	71,6	140	А		9	2	
		20 46 29	36,4	70,7	150	Б		9	1	
	24	14 32 40	39,5	71,4		А		9	5	
		19 30 55	36,5	70,3	200	Б		9	1	
		21 44 00	39,3	71,7		А		9	3	
	25	00 47 03	39,2	71,6		А		10	3	
		10 31 00	38,71	68,87	2	а		9	4	
		14 43 21	36,8	70,8	220	Б		9	1	
		19 45 21	39,6	68,1		А		9	5	
		20 13 37	36,5	70,9	140	Б		9	1	
	26	10 59 43	36,5	70,3	200	А		11	1	
		14 14 28	36,6	70,9	120	Б		10	1	
		18 00 17	36,9	71,9		Б		10	2	
	26	22 17 38	38,3	73,3	140	Б		9	2	
		23 34 53	36,7	70,4	230	Б		9	1	
	27	04 57 56	36,8	71,5	130	Б		9	1	
		05 47 41	37,7	72,0	140	А		11	2	
		06 12 39	36,7	70,1	210	Б		9	1	
		07 54 26	36,6	70,8	220	Б		10	1	
	27	09 01 22	37,8	72,4	140	А		10	2	
65		09 35 31	36,3	69,4	80	Б		12*	1	

* Shaartuz (150), Vose (170), Kulyab (182) 3 points; Dushanbe (255) 2 points.

1	2	3	4	5	6	7	8	9	10	11
				December						
		10 [illegible]	36,4	70,2	200	A		11	1	
		21 36 01	37,6	71,8	130	A		9	2	
		22 39 50	36,7	70,9	220	Б		9	1	
	28	03 17 21	37,2	71,2	90	A		9	2	
		07 19 33	40,5	71,2	0-5	A		9	8	
		13 25 33	38,2	73,9	160	A		10	2	
	29	08 43 15	39,5	73,6		Б		9	3	
		16 29 51	36,8	71,4	200	Б		9	1	
		18 39 32	37,2	71,1	80	Б		9	2	
		20 50 51	37,0	71,2	100	A		10	2	
	30	02 [illegible] 35,4	42,33	76,27	20	a		9	7	
		06 57 47	36,4	70,8	200	A		11	1	
66		16 36 44	36,2	71,1	100	A		12	1	
		19 46 37	36,5	70,8	130	Б		10	1	
		21 02 49,0	38,68	67,98	10	6		9	5	
	31	00 32 26	36,2	68,9		Б		10	1	
		13 43 12	39,7	73,9	0-5	A		9	3	
		18 37 50	37,5	72,1	200	Б		9	2	
		23 32 47	37,1	71,6	110	Б		9	2	

Regional Catalog of Earthquakes in Northern Tian Shan

A. B. Ospanov, chief compiler
N. N. Mikhaylova, A. D. Dosymov, M. S. Khaydarov, compilers

Key:

1. Number
2. Moment of occurrence, hrs, mins, secs,
3. Coordinates of epicenter: φ°N
4. Coordinates of epicenter: λ°E
5. Class of accuracy
6. Depth of focus, in km
7. K
8. Number of region

Число	Момент возникновения, ч м с	Координаты эпицентра		Класс точности	Глубина очага, км	K	№ района
		φ°N	λ°E				
1	2	3	4	5	6	7	8
			January				
4	21 47 40,4	43,08	76,47	a	14	10	4
21	19 42 42,0	42,05	76,55	A		8	7
22	06 06 03,8	42,49	79,53	A		8	9
24	16 05 52,0	44,07	79,17	A		10	1
25	08 17 10,0	44,30	76,44	A		8	1

1	2	3	4	5	6	7	8
			February				
6	05 38 22,0	44,28	79,16	A		8	1
10	19 45 49,6	43,02	77,04	A	20	8	4
11	11 56 41,2	43,36	75,27	A		7	13
12	13 34 52,4	43,10	78,47	6	23	$M = 5,1$	5
	16 07 40,2	43,15	78,40	6	25	8	5
	19 59 54,0	43,13	78,36	6	27	7	5
	21 10 02,1	43,13	78,38	6	30	8	5
13	06 20 18,0	43,14	78,42	6	23	9	5
	09 31 25,6	43,15	78,46	6	16	9	5
	16 26 04,4	43,17	78,46	6	20	9	5
15	05 54 57,3	43,20	78,31	6	38	9	5
	19 35 44,5	42,16	76,18	A		8	7
16	01 20 17,6	43,15	78,36	6	23	9	5
	02 02 26,4	43,02	77,02	A	15	9	4
20	19 06 17,2	42,13	76,24	6		10	7
22	14 05 30,5	42,10	75,14	A		8	10
25	12 48 56,4	42,47	77,51	6	0	7	5
	16 30 58,2	43,55	77,30	6		8	2
	18 21 38,6	42,11	76,42	6		8	6
28	20 38 11,4	43,18	78,42	6	30	8	5
			March				
1	12 15 05,4	42,52	76,52	6		7	4
	12 26 38,0	41,55	79,26	A		10	11
3	07 56 00,7	43,05	76,48	A	23	9	4
10	10 28 12,4	43,00	77,23	A	0	8	4
12	03 01 36,8	41,53	76,46	A		8	7
14	07 27 57,6	43,13	78,43	6	15	7	5
	12 36 36,4	43,00	77,01	6	15	7	4
18	01 39 09,8	43,44	76,48	6	10	8	2
	11 23 23,6	43,19	78,45	6	35	8	5
	14 45 35,0	41,43	78,53	A		7	11
19	10 49 46,8	43,08	75,05	A		8	3
	12 22 37,8	44,19	76,32	A	30	8	1
20	02 29 53,6	42,12	76,57	A	18	9	6
22	11 39 48,4	44,13	77,35	A		8	1
25	00 56 36,6	42,49	77,46	A	13	8	5
26	09 52 17,2	43,19	78,40	6	18	7	5
28	16 54 18,0	42,13	76,30	A		8	6
29	08 06 25,2	42,42	77,53	A	14	7	6
	13 42 52,5	42,40	78,04	A		7	6
30	10 37 58,0	43,06	79,43	A		8	9
			April				
4	11 09 14,4	43,08	75,04	A		8	3
8	21 54 46,2	42,08	76,23	A		8	7
9	00 14 39,0	42,15	76,05	A		8	7
10	11 54 08,0	43,03	75,02	A		8	3
11	03 44 34,8	43,17	78,41	A	33	7	5
12	09 39 10,0	42,49	76,02	A		8	3
15	10 17 57,0	42,17	76,21	A		7	6
16	05 21 01,6	43,17	78,41	A	34	8	5
17	17 21 52,6	41,41	78,31	A		8	12
20	01 53 18,4	43,18	78,40	a	30	7	5
	02 41 53,0	44,17	76,38	a		8	1
25	15 05 59,0	42,43	76,11	A		7	3
	18 01 29,2	42,54	78,40	A		9	5
26	03 04 31,6	44,18	78,36	A		8	1

1	2	3	4	5	6	7	8
			May				
13	17 29 39,3	43,24	77,56	6		8	2
15	11 58 40,2	43,37	75,27	A		7	13
16	01 45 06,5	42,57	78,57	A		8	5
	11 42 35,5	43,04	75,01	A		8	3
	22 59 15,5	42,07	76,46	A		8	7
18	03 38 48,3	43,03	76,55	A		8	3
	17 51 51,4	42,48	78,43	A		7	8
	20 23 14,2	42,37	76,05	A		9	3
22	20 21 39,5	42,54	78,25	6		7	5
23	20 16 39,4	42,09	76,12	A		8	7
30	06 36 26,8	42,51	78,38	A		7	5
			June				
1	03 10 46,2	42,44	77,40	6	23	8	4
2	16 35 12,5	43,12	78,47	A	24	7	5
5	07 51 51,0	44,01	78,53	6		10	2
	10 55 15,9	43,35	75,29	A		8	13
	11 23 25,0	43,00	75,03	6		8	3
7	17 38 09,0	44,16	78,19	A		8	1
18	04 58 07,7	42,56	78,14	6		8	5
20	07 19 10,4	41,56	79,46	A		9	11
22	09 54 36,8	42,59	77,03	6	10	7	4
24	12 28 18,2	41,40	77,31	A		8	12
25	15 52 00,0	42,00	77,00	A		8	7
26	10 36 50,6	43,07	75,10	A		8	3
27	02 52 13,0	42,23	79,15	A		8	7
29	01 43 38,4	43,08	77,51	A		7	5
			July				
2	02 52 51,8	42,36	78,47	A		8	8
9	19 59 38,4	42,55	76,04	A		8	3
10	20 15 50,6	42,13	79,47	A		8	11
11	20 43 00,0	43,43	76,55	6		8	2
12	10 28 37,2	43,00	77,11	A	8	8	4
20	04 57 38,4	42,53	77,41	6		7	4
21	13 03 02,0	43,15	78,48	a	24	11	5
	17 43 50,8	42,06	75,07	A		9	10
25	12 53 39,4	43,03	75,02	A		8	3
31	23 12 07,2	42,38	75,18	A		7	10
			August				
2	13 53 20,0	43,08	75,25	A		8	3
	18 26 06,2	43,17	78,42	A		7	5
8	20 20 30,0	41,45	79,15	н/к		10	11
13	17 44 04,0	41,42	77,36	A		8	12
24	19 08 46,8	42,42	79,10	A		8	6
27	14 57 16,8	42,35	78,15	A		8	6
	21 02 16,0	42,05	78,55	A		9	7
			September				
3	09 54 36,0	44,30	77,13	A		9	1
6	23 39 21,6	42,53	77,43	A	32	8	4
7	23 12 31,5	42,54	77,14	A		9	4
8	00 02 54,0	43,07	78,17	A		9	5
9	21 59 08,8	43,03	78,20	A		8	5
17	08 01 01,4	41,58	75,20	A		9	7

1	2	3	4	5	6	7	8
			September				
17	19 32 33,6	42,51	77,55	6	28	7	5
22	20 48 37,6	43,20	78,35	6	30	8	5
24	02 08 49,8	42,02	76,01	A		8	7
29	03 56 20,0	42,32	78,32	A		8	8
			October				
9	09 37 56,3	43,13	78,48	A	25	10	5
10	11 33 18,2	41,49	78,14	A		9	7
11	09 19 56,2	43,02	77,02	H/K	20	7	4
13	11 25 39,8	42,59	75,02	A		8	3
16	03 22 17,5	44,17	77,40	A		7	1
17	19 45 42,2	43,50	77,51	A		8	2
19	05 14 43,6	42,06	75,06	H/K		10	10
20	16 32 45,2	44,02	78,47	A		8	2
	19 00 03,4	44,01	78,35	A		8	2
24	12 23 26,1	43,38	75,32	H/K		7	13
29	04 10 18,6	44,23	79,28	A		9	1
31	11 45 58,0	42,36	75,14	A		7	3
			November				
1	08 51 42,8	42,58	77,00	6	25	8	4
	10 18 32,2	42,38	75,00	A		8	10
13	07 01 40,5	42,48	77,47	A	20	9	5
14	01 39 33,4	43,04	76,36	A	15	8	4
	09 28 53,0	43,27	77,06	A		7	2
18	10 05 46,2	42,41	76,19	A		9	3
21	01 40 47,4	41,43	78,59	A		11	11
21	08 27 16,8	44,18	77,36	A		7	1
	16 31 38,8	41,40	76,45	A		9	12
30	22 38 06,0	42,48	79,21	A		11	8
			December				
3	15 18 52,2	42,49	77,33	A	25	9	4
4	11 35 41,4	41,53	78,24	A		8	7
	13 02 00,6	43,44	75,43	A		8	13
8	23 47 40,2	42,24	79,09	A		8	7
22	09 45 25,0	43,13	76,58	A	20	8	4
24	04 47 20,8	44,16	79,12	A		7	1
30	02 44 32,5	41,21	76,13	A		9	6

Regional Catalog of Earthquakes in Altay and Sayan

A. T. Filina, chief compiler
I. D. Tsibul'chik, compiler

Key:

1. No, in order
2. Number
3. Moment of occurrence, hrs, mins, secs
4. Coordinates of epicenter: φ ° N
5. Coordinates of epicenter: λ ° E
6. Class of accuracy
7. K
8. Number of region

№ п/п	Число	Момент возникновения, ч м с	Координаты эпицентра φ°N	λ°E	Класс точности	K	№ района
1	2	3	4	5	6	7	8
			January				
	2	17 28 45,0	51,67	98,43	6	9	3
1	4	02 18 56,5	51,81	98,50	6	11	4
	13	18 02 51	51,7	98,4	A	9	3
2	17	13 21 31,7	50,43	90,80	6	11	5
	20	15 10 47	47,3	93,3	A	9	10
3	24	04 44 07,6	51,89	98,68	6	11	3
	24	04 55 59,3	51,78	98,39	6	10	3
	25	10 48 53,0	50,27	91,20	a	9	1
		12 51 12,2	50,40	90,97	6	10	5
	26	03 17 44,2	48,82	88,22	6	9	11
		18 07 46,0	50,48	90,93	6	10	5
		23 56 16,5	51,88	98,59	6	9	3
	27	04 16 00,0	54,4	96,5	A	10	4
			February				
4	2	07 46 50,0	50,43	90,97	6	5,4*	1
5		08 08 52,5	50,27	91,07	6	11	1
		08 25 38,7	50,55	91,07	6	9	5
		17 09 11,8	50,42	91,07	6	9	5
6		17 53 22,8	46,73	91,67	6	11	11
	3	12 53 30,0	51,78	98,50	6	10	3
	4	11 33 56,0	50,40	91,03	6	10	5
		22 09 20,5	50,33	91,03	6	9	1
	6	05 59 19,0	47,88	89,78	6	10	11
	9	18 39 31,3	50,38	91,10	6	9	5
	10	13 55 23,0	47,33	89,80	6	9	11
		22 26 42,3	52,07	88,63	6	9	19
	12	01 56 56	47,9	80,9	A	9	14
		18 45 14,1	50,38	91,12	6	10	5
	14	05 00 44,0	50,30	91,30	6	9	1
	18	06 06 14,2	50,25	91,27	6	9	1
		13 58 52	47,1	83,2	A	10	14
	20	00 18 41,0	50,43	91,00	a	9	5
		02 49 27	52,2	95,2	A	9	3
7	21	02 19 43,8	50,47	91,03	6	11	5
	22	10 45 36,0	50,38	91,05	6	9	1-5
	23	12 31 33,0	50,35	91,02	a	9	1
	27	01 58 13	46,9	91,4	A	9	11
	28	07 46 27,4	50,61	87,30	6	9	1

1	2	3	4	5	6	7	8
		March					
	2	07 01 30,0	50,38	91,00	6	9	1
	3	23 50 49,6	49,33	95,17	6	9	9
	6	20 10 26	49,8	98,2	A	9	7
	7	10 03 54,0	49,92	98,33	6	9	7
	12	20 00 12,5	50,23	91,35	a	9	10
	14	02 02 35,2	51,84	98,54	6	9	3
		03 20 20,0	51,90	98,28	6	10	3
	15	05 53 17,6	51,75	98,40	6	10	3
	16	22 50 18,0	51,10	89,70	6	9	2
	18	23 15 29	52,2	98,3	A	9	3
	19	13 27 17	52,1	96,0	A	10	3
	21	16 19 58,5	53,85	89,83	6	10	22
		23 03 25	46,0	93,9	Б	9	11
	26	04 30 35,0	49,58	97,23	6	10	8
	27	00 20 07	52,2	95,1	A	9	3
8	28	07 39 30,00	46,87	91,45	6	12	11
		21 37 12,8	46,70	91,67	6	9	11
	29	00 14 52	50,4	91,0	A	9	5
9	31	10 05 31	47,0	91,3	A	13	11
		April					
	1	07 16 02	46,3	91,4	A	9	11
		07 16 45,5	47,05	91,45	6	9	11
	2	09 42 15	47,2	91,5	A	9	11
		11 29 38,5	50,48	91,02	6	9	5
	3	05 51 31,4	49,38	99,72	6	10	8
	4	05 19 58,0	50,42	91,02	6	9	1-5
	10	01 23 38,0	50,20	89,67	a	9	1
	12	17 27 58,0	51,88	98,05	6	10	3
	13	13 20 27,0	47,22	91,38	6	10	11
	18	15 47 57,0	51,22	93,00	6	10	6
10	23	05 12 27	46,2	82,4	A	13	13
		17 09 47	46,5	91,7	A	9	11
	24	21 51 13,5	51,73	98,82	6	10	3
	28	11 07 41	49,6	98,4	A	9	7
	29	04 20 43	54,6	96,9	A	9	4
	30	11 42 28,9	52,23	98,56	6	10	3
		May					
	2	06 35 33,4	46,85	91,57	6	9	11
	5	16 06 34,0	50,15	91,25	6	10	1
	11	13 31 43,0	49,10	86,32	6	9	15
11	13	04 20 37,5	50,70	91,58	6	11	5
	15	03 20 45	51,8	98,42	A	9	3
	16	16 58 40,0	51,80	98,37	6	9	3
	17	21 31 36,5	49,48	94,75	6	10	9
	19	19 07 24,6	51,32	99,54	6	9	3
	27	03 18 38,6	50,38	91,10	6	9	5
	30	19 04 12,0	48,52	88,48	6	9	11
	31	14 43 43,7	51,12	98,38	6	9	3
		June					
	2	17 46 23,2	47,87	84,48	6	10	14
12	10	06 04 54,0	52,23	98,50	6	11	3
		21 31 11,2	49,58	91,73	6	9	10
	26	18 06 40,8	51,23	98,17	6	9	3
	28	14 05 13	51,2	97,6	A	9	3
13		18 23 12,0	51,10	97,92	6	11	3

1	2	3	4	5	6	7	8
			July				
	6	03 09 07,0	49,23	98,53	6	9	8
		19 22 08,3	51,23	97,93	6	9	3
	8	21 48 18,0	49,63	96,38	6	9	7-8
	10	19 08 02,0	49,23	98,72	6	9	8
	18	04 17 44,2	50,80	91,41	6	9	5
	23	19 36 41,0	51,93	97,00	6	9	3
			August				
	9	10 42 41,6	50,72	99,02	6	9	23
	10	12 57 48,2	52,13	88,67	6	9	19
	13	04 25 11,0	49,62	98,37	6	10	7
	20	09 43 55,0	51,90	88,58	6	9	19
14	21	18 42 35,0	49,63	97,38	6	12	7
	26	01 34 29,8	49,90	87,75	6	9	1
	27	19 35 22,0	52,00	98,70	6	9	3
			September				
	2	07 07 17,0	52,10	98,63	6	9	3
		08 55 12,7	49,82	95,05	6	9	9
	4	06 47 44,4	51,72	98,57	6	9	3
	5	16 40 40,0	46,78	91,53	6	9	1
	6	15 05 01	47,1	91,3	A	9	11
	11	00 58 43,5	49,87	89,22	a	9	1
	16	04 25 22,0	51,77	98,51	6	9	3
		11 01 32,7	52,61	99,06	a	9	4
	24	08 56 41	48,8	84,9	A	9	15
15	25	14 29 29,0	49,57	98,35	6	12	7
	29	02 50 17,8	46,27	90,53	6	9	11
			October				
	1	05 10 49,0	50,77	97,83	6	10	3-7
	7	00 30 49,0	53,35	97,70	6	9	4
	9	04 35 34,4	51,20	98,07	6	9	3
	13	22 06 12,0	49,85	89,33	6	9	1
	18	02 01 45,8	50,62	96,57	6	9	7
	19	19 50 42,0	51,63	87,65	6	9	1
	25	03 56 32,1	49,37	90,92	6	9	10-11
		20 46 46,2	48,90	95,48	6	10	9
	29	09 29 47,5	50,93	98,50	6	10	3
16		13 29 42,6	49,95	87,25	6	11	1
	30	04 44 02,2	53,00	82,67	6	9	16
	31	19 30 32,0	49,51	97,15	6	10	8
			November				
	3	01 35 40	46,2	90,4	A	9	11
	7	19 04 19,6	49,68	93,10	6	9	9
	8	04 07 55	52,3	99,7	A	9	4
	11	01 47 47,5	49,17	97,58	6	10	8
	15	00 13 25,3	51,75	97,45	6	9	3
		07 24 20	51,8	95,6	A	9	3
		08 10 29,5	49,62	98,33	6	10	7
		12 11 14,5	50,42	91,12	6	9	5
	18	10 04 07,5	50,93	89,97	6	9	2
17		18 56 22	47,3	92,5	A	11	11
	20	19 00 44,5	51,25	92,47	6	9	6

* Magnitude, determined according to body waves, recorded by SKM instruments.

1	2	3	4	5	6	7	8
		November					
	23	16 47 57,2	51,35	88,73	а	9	1
	24	04 48 00	47,5	83,1	Б	9	15
	26	03 07 52,9	49,22	95,17	б	9	9
		06 44 49	53,6	81,3	А	9	16
		21 04 21,8	49,75	89,50	а	9	1
	28	21 52 50,7	49,55	94,72	б	9	9
		December					
18	1	14 03 17,0	50,68	91,63	б	13	5
	3	09 15 41,7	50,77	91,60	б	9	2
	7	19 07 57,4	51,08	97,93	б	9	3
		20 31 50,0	49,55	97,55	б	9	8
	19	23 34 40,4	47,10	95,60	б	9	25
	26	18 18 49,7	50,63	88,82	б	9	1
	30	07 34 45,0	50,00	91,80	б	9	10
		14 03 09,0	51,15	97,98	б	9	3

Regional Catalog of Earthquakes in the Baykal Region

S. I. Golenetskiy, chief compiler
K. I. Bukina, L. V. Anisimiova, L. I. Belova, N. I. Belova, L. P. Vinogradov, N. I. Dorogokupets, G. F. Drennova, L. N. Masal'skaya, G. I. Perevalova, Ye. V. Fomina, compilers

Key:

1. Number, in order
2. Number
3. Moment of occurrence, hrs, mins, secs.
4. Coordinates of epicenter: φ°N
5. Coordinates of epicenter λ°E
6. Class of accuracy
7. M
8. K
9. Number of region
10. Macroseismic data

№ п/п	Число	Момент возникновения, ч м с	Координаты эпицентра φ°N	Координаты эпицентра λ°E	Класс точности	M	K	№ района	Макросейсмические данные
1	2	3	4	5	6	7	8	9	10
		January							
	1	03 40 37,2	51,70	103,55	6		9	5	
		04 14 31,1	51,71	103,51	6		9	5	
	2	08 02 42,4	53,93	117,37	6	6	10	21	
		17 28 45,0	51,67	98,43	6		9	2	
		19 00 17,1	56,25	114,72	6		9	15	

1	2	3	4	5	6	7	8	9	10
				January					
	3	01 44 03,5	55,18	111,36	б		10	14	
	4	02 18 56,5	51,81	98,50	б		11	2	
		21 29 50,9	49,16	110,70	А		9	11	
	5	02 10 13,8	56,30	117,83	б		9	20	
		09 48 41,5	56,18	113,83	б		9	15	
	6	20 45 24,3	53,77	119,58	б		10	21	
	11	09 45 37,5	56,56	121,12	б		10	20	
	13	18 02 51,0	51,75	98,42	б		9	2	
	14	03 33 36,8	48,44	102,97	А		9	7	
	19	11 10 40,6	56,49	117,15	б		9	20	
	20	08 28 43,3	55,12	110,31	а		10	14	
	22	07 39 41,4	56,58	121,01	б		9	20	
	24	04 44 07,6	51,89	98,68	б		11	2	
		04 55 59,3	51,78	98,39	б		10	2	
	25	23 20 50,3	56,38	117,98	а		10	20	
	26	23 56 16,5	51,84	98,59	б		9	2	
	27	04 16 00,0	54,43	96,53	А		10	1	
		09 34 38,4	56,41	117,68	а		10	20	
				February					
	1	13 36 36,5	49,62	107,00	А		9	7	
	2	02 45 00,9	53,13	107,78	б		9	8	
		07 11 39,0	47,84	102,81	А		10	7	
	3	12 45 34,3	56,16	113,99	б		9	15	
		12 53 30,0	51,78	98,50	б		10	2	
	4	01 19 56,5	53,44	108,46	б		9	8	
		12 51 56,4	53,56	111,29	б		9	17	
	5	00 54 03,6	55,40	111,23	б		10	14	
		05 21 05,7	55,38	111,39	б		9	14	
		15 33 06,2	55,40	111,31	б		9	14	
		21 26 32,0	54,67	110,38	б		9	14	
	6	15 30 53,9	56,48	117,21	а		9	20	
		17 10 40,6	54,89	112,67	б		9	16	
1		21 26 38,7	56,41	117,89	б	4,7	13	20	Чара 3 балла
		22 40 59,2	56,40	117,94	а		9	20	
	7	03 14 48,8	56,39	117,99	б		9	20	
	8	12 05 46,0	56,31	116,10	б		9	19	
	9	12 43 08,6	55,31	110,03	б		9	14	
	10	20 09 44,4	56,27	116,17	а		9	19	
	11	12 22 57,1	52,98	107,35	б		9	8	
	12	06 18 38,8	54,87	112,64	а		10	16	
	15	01 46 58,0	47,89	103,27	А		9	7	
		06 15 16,9	54,79	111,11	б		9	14	
		13 15 58,4	54,73	110,97	б		10	14	
	16	09 04 16,6	51,73	98,52	б		9	2	
	17	06 33 31,4	56,29	116,17	б		9	19	
		08 28 50,9	56,70	117,42	а		9	20	
		14 50 39,0	56,32	116,21	а		9	19	
	20	16 30 19,9	55,10	110,16	б		9	14	
		19 09 30,6	52,18	106,44	б		9	8	
	21	09 58 57,1	48,01	102,93	А		9	7	
		20 14 46,7	47,91	102,78	А		9	7	
	22	06 40 26,9	52,40	106,42	б		10	8	Tyrgan--felt
	23	12 07 46,8	52,80	107,18	б		10	8	
	24	13 28 28,3	52,79	107,33	б		9	8	
	25	02 54 57,4	56,00	121,00	А		10	20	
		11 53 24,2	52,85	107,29	б		9	8	

1	2	3			4	5	6	7	8	9	10
					March						
	2	07	06	21,6	53,22	108,08	6		9	8	
	3	03	35	30,2	55,11	110,23	6		10	14	
	5	10	39	24,9	50,53	111,93	6		10	18	
	6	20	10	26,5	49,79	98,25	A		9	2	
	7	10	03	54,0	49,92	98,33	6		9	2	
	8	20	51	43,9	55,09	111,53	6		10	14	
	9	11	40	40,2	55,14	109,48	6		9	9	
	10	11	06	35,4	57,82	120,80	A		9	12	
	11	01	20	18,6	51,97	105,46	a		9	5	
		06	47	20,0	54,34	117,34	6		9	21	
		10	35	27,2	56,54	113,73	a		9	15	
		13	09	23,8	51,49	100,53	6		9	2	
	14	02	02	31,7	51,78	98,37	6		9	2	
		03	20	20,0	51,85	98,58	6		10	2	
	15	05	53	17,6	51,75	98,40	6		10	2	
		07	49	19,2	53,77	108,02	6		9	8	
		12	15	21,9	55,27	111,24	6		9	14	
	16	03	32	59,3	51,96	100,07	6		9	1	
		13	29	34,0	55,38	111,31	a		10	14	
		22	11	52,7	52,67	101,16	a		9	1	
		23	00	53,1	55,00	111,49	6		11	16	
	18	23	15	29,0	52,22	98,32	6		9	2	
	20	20	41	48,0	56,36	118,00	a		9	20	
	21	02	29	00,9	48,30	103,19	A		9	7	
		12	28	57,1	55,40	111,29	6		10	14	
	26	04	30	35,0	49,58	97,23	6		10	2	
	27	18	46	49,9	54,35	111,42	6		9	14	
	28	07	03	12,4	53,26	107,89	6		10	8	
	29	23	11	45,0	53,23	107,87	6		9	8	
	31	00	08	50,8	55,05	121,76	A		9	21	
		04	46	32,9	55,42	111,34	6		9	14	
					April						
	1	11	20	15,2	55,07	110,24	a		9	14	
	2	21	58	57,6	57,77	115,39	6		9	12	
		23	02	31,6	53,01	107,57	6		9	8	
	3	05	51	31,4	49,38	99,72	6		10	2	
	5	02	52	49,6	51,65	100,79	a		10	2	
		14	51	51,1	48,85	100,84	A		9	2	
	6	15	16	31,3	56,37	114,12	a		9	15	
	9	21	10	49,5	50,85	121,49	A		10	22	
	10	13	14	50,2	56,13	113,52	6		9	15	
		18	04	51,1	56,11	113,48	a		9	15	
	11	11	56	05,7	56,14	113,52	6		9	15	
	12	17	27	58,0	51,88	98,05	6		10	2	
		19	23	35,2	56,17	113,59	6		9	15	
	13	05	50	06,7	51,76	104,84	6		9	5	
		10	45	26,0	48,00	102,37	A		9	7	
		23	13	42,0	56,13	113,50	6		10	15	
	15	05	56	07,1	55,74	113,89	a		9	15	
	17	02	41	03,2	56,10	113,53	6		9	15	
		02	51	36,2	56,11	113,58	6		9	15	
	24	16	34	19,9	56,22	116,74	6		11	19	
		21	51	13,5	51,73	98,82	6		10	2	
	28	11	07	41,0	49,65	98,43	A		9	2	
		19	33	14,5	56,13	113,52	6		9	15	
	29	04	20	43,0	54,57	96,93	A		9	1	
		21	30	03,0	55,10	121,77	A		9	21	
	30	01	22	56,1	56,06	113,60	6		9	15	
		11	42	28,9	52,23	98,56	a		10	2	

1	2	3			4	5	6	7	8	9	10
						May					
	2	05	00	07,3	55,08	110,24	a		9	14	
	3	11	10	40,7	56,61	120,99	6		9	20	
	4	21	08	41,4	56,10	113,64	6		9	15	
	10	10	49	42,4	50,37	101,87	6		10	2	
	12	14	06	45,2	54,75	111,16	6		9	14	
		18	35	43,0	48,05	102,58	A		11	7	
	13	22	41	21,3	53,46	108,92	6		9	8	
	15	03	20	44,9	51,78	98,42	A		9	2	
	16	16	58	40,0	51,80	98,37	6		9	2	
	17	05	09	20,1	55,15	110,08	6		9	14	
		19	23	37,6	50,27	103,42	6		10	6	Закаменск - по 4 баллов
	18	22	22	05,4	56,47	114,61	6		9	15	
	19	00	44	32,5	53,63	108,56	A		9	8	
		19	07	24,6	51,32	99,54	6		9	2	
	20	08	32	50,2	54,98	111,44	6		9	14	
		09	51	45,7	50,97	114,80	6		9	18	
		12	28	21,9	55,14	110,20	a		9	14	
		14	28	54,4	56,64	111,82	6		9	13	
	21	01	37	27,6	55,14	110,24	6		10	14	
		13	09	11,1	55,17	110,16	A		9	14	
		23	06	46,6	48,47	103,10	A		9	7	
	22	06	19	46,5	55,14	110,21	A		9	14	
		13	38	25,1	55,09	110,13	6		9	14	
		14	17	07,3	56,18	113,50	A		9	15	
	23	06	33	28,5	55,10	110,17	a		9	14	
	29	03	41	48,3	47,95	102,77	A		9	7	
	31	14	43	43,7	51,12	98,38	6		9	2	
		19	41	04,0	55,11	110,23	6		9	14	
	1	06	21	56,6	55,09	110,17	a		9	14	
		07	05	09,8	55,10	110,15	6		9	14	
	3	22	21	01,8	55,11	110,21	6		9	14	
	6	04	41	41,3	55,13	110,22	a		10	14	
	10	06	04	54,0	52,23	98,50	6		11	2	
		07	18	59,3	52,14	105,88	6		9	5	
	12	15	11	28,2	55,63	110,84	6		9	13	
	13	07	48	11,7	55,09	110,21	a		9	14	
	18	00	00	12,5	49,14	104,82	A		9	7	
	19	10	53	50,6	54,89	111,32	a		9	14	
		21	27	56,8	51,40	100,65	6		10	2	
	20	00	28	14,1	55,12	110,23	a		11	14	
		00	54	02,3	55,13	110,23	a		9	14	
		00	56	18,0	55,14	110,22	a		9	14	
		01	32	36,1	48,01	102,96	A		9	7	
		03	54	26,7	55,14	110,22	a		11	14	
		06	23	20,0	55,15	110,25	a		9	14	
		07	05	35,0	55,17	110,23	a		9	14	
		07	55	01,8	55,13	110,19	a		9	14	
		10	43	37,9	55,13	110,22	a		9	14	
		12	40	47,0	55,12	110,16	6		11	14	
		13	58	16,2	55,14	110,21	a		9	14	
	21	10	22	10,4	55,10	110,17	6		9	14	
		10	23	43,3	55,09	110,20	a		10	14	
		10	26	34,6	55,11	110,23	6		9	14	
		11	03	22,5	55,09	110,14	6		9	14	
		11	16	52,3	55,17	110,24	6		10	14	
		11	24	00,2	55,10	110,16	6		9	14	
		12	10	16,0	55,14	110,19	6		9	14	
		13	01	05,4	55,13	110,24	6		9	14	
		15	23	47,7	55,14	110,21	6		9	14	
		15	45	04,9	55,14	110,23	a		9	14	
		18	28	03,6	55,10	110,16	a		9	14	

1	2	3			4	5	6	7	8	9	10
					May						
	22	05	34	34,6	55,10	110,10	a		9	14	
		06	00	37,3	55,19	110,08	6		10	14	
		09	12	52,2	55,11	110,16	6		9	14	
		23	21	35,3	55,13	110,23	a		10	14	
		23	22	21,7	55,11	110,22	6		11	14	
					June						
	23	00	37	53,2	55,27	110,00	6		9	14	
		18	19	16,0	55,09	110,09	6		9	14	
		19	51	19,7	55,35	111,17	6		11	14	
	24	10	34	25,8	55,12	110,16	6		9	14	
		15	03	23,8	56,05	113,57	a		9	15	
		22	12	54,4	55,10	110,16	6		10	14	
	25	04	01	22,3	55,14	110,13	6		10	14	
		04	56	49,8	56,30	113,49	6		9	15	
		19	39	35,4	52,89	107,20	6		9	8	
	26	14	08	48,9	55,10	110,09	6		9	14	
		18	06	40,8	51,23	98,17	6		9	2	
		19	18	49,7	54,11	111,36	a		9	14	
		20	38	22,3	55,13	110,17	6		9	14	
	28	02	08	57,1	53,43	109,87	6		11	14	
		02	13	08,9	55,10	110,16	6		10	14	
		14	05	13,0	51,22	97,57	A		9	2	
		18	23	12,0	51,10	97,92	6		11	2	
	29	07	42	40,7	55,75	113,00	6		9	15	
	30	04	30	12,0	56,67	117,29	a		10	20	
		12	03	19,2	55,25	111,04	6		9	14	
					July						
	2	09	38	47,6	56,64	117,84	a		10	20	
	3	06	34	06,8	55,12	110,18	6		10	14	
		06	46	54,9	55,12	110,14	6		9	14	
		06	48	57,9	55,12	110,17	a		9	14	
	4	03	22	20,9	52,46	106,93	6		9	8	
		09	40	33,6	55,12	110,22	6		9	14	
		09	47	42,0	55,09	110,16	6		9	14	
		10	39	32,8	55,10	110,22	6		9	14	
	6	03	09	07,0	49,23	98,53	6		9	2	
		19	22	08,3	51,23	97,93	6		9	2	
	8	12	53	01,7	55,83	112,94	A		9	15	
		21	48	18,0	49,63	96,38	6		9	2	
	10	19	08	02,0	49,23	98,72	6		9	2	
	13	05	04	15,4	55,12	110,21	6		9	14	
	19	04	25	55,1	56,22	117,26	6		10	20	
	20	14	04	42,7	54,91	111,27	6		9	14	
	21	17	15	14,1	53,39	107,56	6		9	8	
		18	43	34,0	49,09	102,80	6		11	7	
	23	19	36	41,0	51,93	97,00	6		9	2	
	24	09	14	54,8	55,02	112,58	6		9	16	
	25	19	41	03,8	55,91	113,07	6		10	15	
	26	14	57	33,8	51,71	101,28	6		10	4	Mondy--felt
	27	09	27	57,8	52,13	105,64	6		9	5	
	29	02	23	00,6	56,08	113,84	6		9	15	
					August						
	1	03	57	32,8	53,02	108,72	6		9	8	
	4	17	14	12,0	54,14	121,54	6		10	21	
	6	09	29	15,9	53,79	109,00	6		9	8	
		11	10	09,0	53,95	121,43	A		9	21	

1	2	3	4	5	6	7	8	9	10
				August					
	9	10 42 41,6	50,72	99,02	6		9	2	
	12	03 34 06,3	55,41	113,48	6		9	16	
	13	04 25 11,0	49,62	98,37	6		10	2	
	15	00 59 59,8	50,76	113,81	6		10	18	
	16	12 46 49,4	56,50	118,47	a		10	20	
	18	09 14 35,8	54,04	121,61	A		9	21	
		10 15 00,0	53,99	121,56	6		10	21	
		12 07 32,8	53,00	108,00	6		9	8	
2	21	18 42 35,0	49,63	97,38	6		12	2	
	25	04 32 06,7	52,22	106,36	6		10	8	Tyrgan--up to 3 points, rumble heard
	27	19 35 22,0	52,00	98,70	6		9	2	
	28	23 51 50,4	56,15	113,66	6		10	15	
				September					
	2	07 07 15,0	52,10	98,63	6		9	2	
	4	06 47 44,4	51,72	98,57	6		9	2	
	5	04 13 25,6	55,69	111,27	6		11	13	
	8	07 24 07,5	52,18	106,41	6		9	8	
	9	00 48 58,4	48,96	103,72	6		10	7	
	10	01 11 14,3	54,43	109,94	6		9	14	
	12	06 14 34,6	47,96	102,87	A		9	7	
3		22 02 14,9	49,07	103,41	6	4,5*	12	7	Zakamensk--up to 4 points
	16	04 25 22,0	51,77	98,51	6		9	2	
		10 04 51,8	56,21	112,82	a		9	13	
		11 01 32,7	52,61	99,06	a		9	1	
4	24	17 40 14,4	53,85	109,13	6	4,7*	12	8	
	25	02 55 44,6	48,15	103,18	A		9	7	
5		14 29 29,0	49,57	98,35	6		12	2	
		22 44 56,0	53,64	111,61	6		9	17	
	27	20 34 01,6	53,86	108,30	6		9	8	
	28	05 46 01,2	56,07	113,64	a		10	15	
		07 16 58,0	47,96	102,78	A		10	7	
	29	07 12 30,7	55,23	112,51	a		10	16	
				October					
	1	05 10 49,0	50,77	97,83	6		10	2	
	3	05 35 36,1	54,68	109,93	6		9	14	
		15 19 13,6	56,22	115,25	6		9	19	
6	4	16 39 58,0	53,84	109,12	6	4,6*	12	8	
		20 42 38,3	53,05	108,00	6		9	8	
	5	17 54 01,5	56,04	113,65	6		9	15	
	7	00 30 49,0	53,35	97,70	6		9	2	
	9	04 35 34,4	51,20	98,07	6		9	2	
		18 05 47,8	56,23	117,58	6		9	20	
	13	02 25 51,7	54,73	111,59	6		10	14	
	18	01 22 32,3	53,92	117,35	6		9	21	
		02 01 45,8	50,62	96,57	6		9	2	
7	27	16 18 40,5	47,83	102,90	A		13	7	
		22 27 51,2	47,77	102,84	A		11	7	
	29	00 49 06,0	56,26	113,25	6		9	15	
		06 21 37,7	57,57	120,89	A		9	20	
		09 29 47,5	50,93	98,50	6		10	2	
	31	19 30 32,0	49,51	97,15	6		10	2	

* Magnitude according to body waves--according to SKM instruments

1	2	3			4	5	6	7	8	9	10	
						November						
		2	00	14	53,4	53,80	121,15	A		9	21	
		4	14	24	12,5	57,68	121,07	A		9	20	
			15	43	22,9	54,97	111,59	6		9	14	
		5	13	48	27,6	56,88	121,10	6		10	20	
		8	04	07	56,3	52,22	100,14	6		9	1	
	8	9	17	33	43,1	55,34	111,17	6		12	14	
	9		17	44	42,7	47,72	103,00	A		13	7	
		10	22	43	13,8	56,40	117,94	6		9	20	
		11	01	47	47,5	49,17	97,58	6		10	10	
			23	26	07,7	55,41	111,10	a		10	14	
		13	12	55	05,1	48,17	112,95	A		11	11	
		14	05	15	46,9	48,16	112,96	A		10	11	
		15	00	13	25,3	51,75	97,45	6		9	2	
			08	10	29,5	49,62	98,33	6		10	2	
		16	09	15	05,2	56,08	114,61	a		9	15	
		22	20	59	47,8	53,14	107,78	6		9	8	
		25	09	11	22,0	53,36	107,75	6		9	8	
		27	14	09	52,9	53,91	109,23	6		9	8	
		30	03	33	04,8	55,37	111,08	6		10	14	
			04	00	45,7	55,36	111,16	6		9	14	
			19	45	48,8	55,36	111,31	a		9	14	
						December						
		1	00	13	46,4	56,74	121,21	6		9	20	
			08	11	36,6	54,71	109,17	6		9	9	
			19	29	08,6	50,66	112,44	6		10	18	
		3	20	53	45,4	54,14	120,84	6		10	21	
		5	09	17	59,5	54,24	111,23	a		10	14	
		7	19	07	57,4	51,08	97,93	6		9	2	
			20	31	50,0	49,55	97,55	6		9	2	
		8	12	22	31,8	56,25	117,89	a		9	20	
		10	19	02	51,1	56,20	116,58	a		9	19	
		17	22	41	43,9	49,76	101,07	6		9	2	
		19	02	36	22,7	56,08	113,81	a		9	15	
		20	01	28	35,8	51,86	105,23	6		10	5	
			07	57	40,0	53,93	121,99	6		9	21	
		21	16	09	17,1	55,33	113,14	a		9	16	
		22	01	14	47,6	57,35	121,21	a		9	20	
			01	28	41,4	51,20	100,31	6		11	2	Mondy, 2-3 points, Zakamensk--felt
		24	03	44	18,1	51,35	103,51	6		9	6	
		25	13	03	24,0	55,37	111,32	6		9	14	
		30	03	04	29,8	53,82	108,86	6		10	8	
			14	03	09,9	51,15	97,98	6		9	2	

Regional Catalog of Earthquakes in Yakutiya and Northeastern SSR

B. M. Koz'min, T. A. Andreyev, chief compilers
A. A. Yemel'yanova, N. M. Dareshkina, compilers

Key:

1. No, in order
2. Number
3. Moment of occurrence, hrs, mins, secs
4. Coordinates of epicenter: φ °N
5. Coordinates of epicenter: λ °E
6. Depth of focus, km
7. Class of accuracy
8. K
9. Number of region

№ п/п	Число	Момент возникновения, ч м с	Координаты эпицентра φ °N	Координаты эпицентра λ °E	Глубина очага, км	Класс точности	K	№ района
1	2	3	4	5	6	7	8	9
			January					
	1	09 01 52,3	56,95	123,54		б	8	2
	2	12 31 52	57,2	126,5		А	9	2
	3	09 56 37	61,0	136,1		А	8	6
	5	02 23 55,9	56,60	121,08		а	8	1
		18 19 16	57,8	121,0		А	8	1
	11	09 45 37,5	56,56	121,12		б	10	1
	14	03 52 29	66,8	129,0		А	8	7
		11 25 24	56,1	124,5		А	8	2
	18	10 11 54	59,7	141,3		А	9	5
		22 17 09	58,6	132,9		А	9	4
	19	16 22 31	61,7	163,5		Б	10	5
	20	21 38 41,8	62,99	146,27		б	8	9
	22	07 39 41,4	56,58	121,01		б	9	1
	25	16 54 03,0	57,35	123,88		б	8	2
	26	16 28 52	64,2	146,6		А	8	9
	28	13 23 48	61,3	153,9		А	9	5
	29	10 14 48,4	57,32	122,16		б	8	2
		19 33 17,9	57,09	126,00		б	8	2
			February					
	7	15 13 32	60,7	150,7		Б	8	5
		17 53 52	64,2	152,5		А	8	9
	9	00 12 42	56,1	123,1		А	8	2
1	11	11 21 38	66,7	119,2		А	12	7
							$M = 4,7^*$	
		17 27 26	72,9	143,0		А	9	10
	12	03 07 42	60,0	161,3		Б	10	5
		13 52 39	56,4	132,5		А	8	2
	14	02 02 19	65,5	137,1		А	8	8
		14 06 34	64,2	146,0		А	9	9
	15	06 56 34	64,0	133,9		А	8	7
		18 49 06	58,1	133,7		А	9	4

1	2	3	4	5	6	7	8	9
				February				
	17	03 58 28,9	56,41	123,58		6	8	2
		08 40 46	56,4	127,4		A	8	2
		17 16 02	60,5	150,9		A	8	5
	18	07 13 16	56,3	133,4		A	8	2
	19	06 52 37	56,2	133,6		A	8	2
		17 11 12	62,4	143,8		A	9	8
	20	20 47 37	63,5	145,0		A	9	9
	22	02 34 34,8	61,27	148,68		6	8	5
		12 06 05	60,1	151,2		A	8	5
	23	06 01 29	71,0	134,0		A	9	7
		09 41 36	63,5	145,6		A	9	9
		21 18 09	62,0	157,1		A	8	5
	25	02 54 57	56,0	121,0		A	10	1
	27	01 28 57	62,0	146,4		A	8	9
2		02 09 13	67,0	129,0		A	11	7
		03 31 45	63,6	154,3		A	9	10
	28	05 48 34	63,6	150,4		A	9	9
		12 04 18	70,4	133,5		A	9	7
		14 48 05	60,2	153,2		A	9	5
				March				
	2	22 01 31	73,5	124,8		Б	9	11
	3	12 57 32	57,0	128,6		A	8	3
		19 31 13	67,4	139,6		A	9	9
	5	21 49 27	63,2	151,0		A	8	9
		23 47 11	67,0	130,0		A	9	7
	6	22 03 09	57,3	133,0		A	8	4
	8	04 04 31	59,4	152,8		A	8	5
		08 35 49	61,9	147,4		A	8	9
	10	02 09 28	64,0	148,0		A	8	9
		11 06 35	57,8	120,8		A	9	1
	13	00 31 01	57,6	120,7		A	8	1
	14	04 12 32	62,2	141,2		A	8	7
		16 31 29	61,2	137,0		A	9	6
	15	07 36 42,3	56,25	122,97		6	10	2
		08 58 13	57,0	131,9		A	8	4
		15 48 27	62,4	145,1		A	9	9
		21 12 53,9	57,89	122,29		6	8	2
3	16	08 26 55	64,4	146,0		A	11	9
		09 02 36	64,8	146,8		A	8	9
		15 45 51	65,5	136,4		A	9	8
		19 53 20	64,3	145,4		A	9	9
	17	06 32 14	62,2	152,0		A	8	5
		12 14 14	63,6	146,6		A	10	9
	18	03 04 24	60,0	153,0		A	8	5
	19	00 51 19	65,0	142,6		A	8	9
	20	04 36 11	61,9	144,2		A	9	5
		06 42 58	62,1	154,0		A	8	5
		16 02 11	57,4	120,6		A	8	1
	21	16 24 35	71,2	135,3		A	8	10
	25	17 58 51	62,3	152,0		A	9	5
	27	10 13 41,4	56,64	121,17	14	6	8	1
	28	08 20 36	57,3	125,8		A	9	2
		18 51 24	57,0	126,2		A	8	2
		21 03 56	57,0	126,2		A	8	2
	29	00 45 05	61,3	148,2		A	8	5
	30	13 33 01	74,3	137,5		Б	10	11
	31	16 59 27	57,0	128,6		A	8	3

1	2	3	4	5	6	7	8	9
				April				
	1	16 45 02	67,1	140,2		A	8	9
	2	06 57 48	63,6	159,1		A	8	5
		10 59 40	63,3	158,9		A	9	5
	3	02 57 10	64,3	146,0		A	8	9
	4	09 07 52	61,2	148,7		A	8	5
	8	20 02 08	56,4	129,3		A	8	2
	9	01 37 16	63,7	150,8		A	9	9
	10	00 09 31	59,4	146,5		A	9	5
		07 45 14	64,8	142,7		A	8	9
	11	02 41 03	59,8	150,8		A	8	5
		03 45 53,7	57,66	123,32		6	8	2
	13	15 35 36	64,6	146,4		A	8	9
	15	08 00 48,7	56,17	123,64		6	8	2
	16	00 57 48,1	56,78	120,93		a	8	1
		22 39 44	60,9	133,1		A	8	4
	17	01 37 40	61,6	140,7		A	9	5
	18	06 01 16	73,0	123,0		A	10	11
	18	16 32 29	62,1	140.5		A	9	7
	19	00 50 42	73,4	125,5		A	10	11
	21	00 12 02	62,6	142,7		A	8	8
		03 45 28,0	56,57	121,06	11	6	8	1
	23	01 10 25	66,4	130,5		A	8	7
		02 15 33	62,0	145,7		A	8	5
		08 08 49	67,0	130,6		A	8	7
		17 32 51	58,4	132,4		A	8	4
	25	01 22 01	73,4	128,5		A	10	11
	27	21 44 19,5	56,26	124,10		6	8	2
	30	05 56 07	64,8	142,6		A	8	9
				May				
	2	05 43 51	57,4	125,6		A	8	2
		17 28 03,7	57,04	122,45		6	8	2
	3	11 10 40,7	56,61	120,99		6	9	1
		21 13 27,0	61,85	147,49		6	8	9
	8	05 34 42	61,2	148,3		A	8	5
	9	14 40 31	62,3	145,0		A	9	5
		17 08 58,5	66,8	132,5		A	8	8
	10	12 12 46,9	61,9	147,2		A	8	9
		17 44 42	64,1	145,7		A	8	9
	11	02 15 08	58,0	121,0		A	8	1
	12	08 26 18,7	56,61	121,06		6	8	1
	13	06 05 24	59,8	153,6		A	8	5
	16	11 31 37	66,0	142,2		A	8	9
	20	14 02 47	61,1	136,7		A	8	6
	22	01 58 47	61,9	143,2		A	9	7
		08 56 59	71,1	134,3		A	9	7
	22	18 00 01,0	63,08	150,92		6	8	9
	23	07 43 46	63,9	148,3		A	8	9
		19 37 50	66,3	130,6		A	9	7
	24	15 10 36	63,4	156,4		A	9	5
	26	11 17 12	62,5	155,0		A	8	5
	28	02 05 52	61,4	151,0		A	8	5
		08 21 10	61,2	156,6		A	8	5
	29	11 06 09	58,7	122,9		A	8	3
	30	18 50 02,3	56,57	121,09		6	8	1

1	2	3	4	5	6	7	8	9
				June				
	2	08 29 08	57,1	127,8		А	9	3
		11 58 03	57,1	127,7		А	8	3
	3	01 35 36	59,0	122,4		А	8	1
	5	13 32 47	59,1	120,4		А	8	1
		22 59 25,9	57,00	123,62		Б	8	2
	7	07 00 01	63,8	146,6		А	8	9
		13 11 28	59,2	152,6		А	9	5
	8	05 13 59	56,1	126,2		А	9	2
	11	07 14 00	57,6	121,1		А	8	1
		07 34 59,1	57,64	121,04		Б	8	1
	14	20 57 43	59,9	152,9		А	8	5
	17	11 52 15,9	56,69	121,83		Б	8	1
		17 08 14	60,7	150,8		А	8	5
	18	04 11 03,7	56,75	122,11	23	в	9	2
		23 41 42	59,6	148,2		А	8	5
	20	05 44 42	63,8	148,2		А	8	9
		15 19 21	62,0	153,9		А	8	5
		20 44 41	59,2	147,5		А	8	5
	21	05 00 46	63,7	147,8		А	8	9
	22	10 42 54	64,3	146,6		А	8	9
	23	05 00 43	56,5	127,4		А	8	2
	26	12 42 10	56,3	122,9		А	8	2
	29	00 16 04,0	56,87	123,75		в	8	2
	30	02 10 12	65,6	132,1		А	9	7
				July				
	2	05 39 22	64,0	148,2		А	8	9
		14 36 36,4	56,91	123,00		Б	8	2
	5	01 16 26	56,8	127,9		А	8	2
		01 26 40	56,9	120,3		А	8	1
	8	04 43 07	63,7	145,2		А	8	9
	10	07 45 45	63,7	147,5		А	8	9
	11	10 25 06	68,5	142,3		Б	9	10
		14 40 56,8	56,56	121,12	14	в	8	1
	13	03 55 48	57,7	121,1		А	8	1
		21 24 17	64,6	146,7		А	9	9
	14	15 20 12	61,6	138,9		А	8	6
	15	03 59 12	57,8	126,0		А	8	3
	18	12 54 48	57,7	128,7		А	8	3
	21	00 30 02	61,5	142,8		А	9	5
	23	22 40 52	57,4	127,5		А	8	3
	26	03 03 14	63,8	131,8		А	8	7
		15 44 57	63,5	145,3		А	9	9
	28	16 20 51	57,1	127,7		А	8	3
		18 15 15	57,6	122,8		А	8	2
	29	08 17 16,3	56,82	123,04		Б	8	2
	30	04 36 21	62,0	148,1		А	8	9
	31	16 19 04	56,4	134,2		А	10	4
				August				
	1	08 39 23	61,1	147,1		А	8	5
		09 14 36	66,3	141,4		А	9	9
		10 16 39	56,9	123,1		А	8	2
	2	16 26 38,8	56,87	120,25		Б	8	1
	5	05 06 18	68,4	132,1		А	9	7
	6	13 34 53	57,2	127,8		А	8	3
	8	05 43 31	57,1	132,5		Б	8	4
	9	22 38 48	56,7	125,9		А	8	2

1	2	3			4	5	6	7	8	9
						August				
	11	12	17	35	68,0	138,6		Б	8	9
		12	46	02	68,1	138,8		А	9	9
4	12	14	39	58	70,8	126,6		А	12	7
									M = 5,4*	
	13	04	27	10	61,7	154,3		А	8	5
		20	09	18	61,4	155,9		А	9	5
	14	19	10	57	61,7	156,7		А	8	5
	15	19	43	13	61,5	140,7		А	9	5
	17	23	54	33	61,6	156,5		А	8	5
	18	10	29	49	56,8	125,1		А	8	2
	20	02	12	06	65,2	146,2		А	9	9
	21	15	24	32	62,0	147,1		А	8	9
	24	20	19	50	61,6	140,5		А	10	5
	25	19	51	52	62,0	157,6		А	9	5
	26	00	10	05	61,8	157,4		А	8	5
		07	24	59	57,6	121,1		А	8	1
	29	00	12	10	63,8	156,0		А	8	5
						September				
	2	03	27	02	57,3	127,9		А	8	3
	4	14	42	26	65,1	145,9		А	8	9
	5	18	42	18	57,3	127,9		А	9	3
	6	23	02	33	57,3	127,8		А	8	3
	9	07	31	20,6	56,28	123,00		6	8	2
	10	20	56	13,5	56,57	121,08	16	6	8	1
	12	06	13	46	57,6	121,2		А	8	1
	14	08	13	56	63,5	146,7		А	9	9
		20	31	40	57,0	130,9		А	9	3
	15	23	21	52	62,9	145,5		А	8	9
	17	14	39	13	56,3	126,7		А	8	2
	18	09	39	57	57,8	120,9		А	8	1
		16	33	44	57,6	128,1		А	8	3
		16	55	32	56,4	123,8		А	8	2
	20	12	42	17	63,6	145,8		А	8	9
	21	09	22	47	59,9	127,8		А	10	3
		19	53	42,4	56,57	121,13	25	6	8	1
	22	22	43	28	57,1	127,6		А	8	3
	23	20	13	05	57,0	131,4		А	8	3
	24	07	15	39	61,7	153,4		А	10	5
		20	12	58	66,1	143,5		А	10	9
	25	04	06	54	57,6	128,0		А	9	3
		08	17	42	57,6	128,0		А	8	3
	27	06	47	14	61,4	152,4		А	8	5
	28	00	56	58	62,8	154,0		А	8	5
	29	01	23	52	56,3	123,7		А	9	2
						October				
	2	20	51	58	60,2	143,0		А	9	5
	11	08	41	44	71,5	128,8		А	9	7
		19	30	30,1	57,24	120,74		6	8	1
	12	01	01	21	61,3	153,6		А	9	5
	14	00	45	21	57,1	127,8		А	8	3
		23	53	49	72,4	132,0		Б	10	7
	16	00	03	05	57,7	121,1		А	8	1
		13	44	14	60,1	146,8		А	8	5
		23	51	17	65,2	139,9		А	9	8
	17	14	39	18	64,3	146,3		А	8	9
	18	02	31	43	57,6	131,4		А	8	3

1	2	3	4	5	6	7	8	9
				October				
	23	17 13 04	62,1	148,7		A	8	5
	25	23 23 34	62,9	140,6		A	9	7
	26	14 54 32	56,0	123,8		A	8	2
	29	06 21 32	57,7	121,0		A	9	1
		15 43 14	65,0	139,6		A	8	8
	31	19 01 38	64,1	146,3		A	8	9
				November				
	2	00 12 32	58,2	134,9		A	8	4
		18 58 15	62,0	153,3		A	8	5
	3	12 06 58	57,8	126,2		A	10	3
							12	5
5	4	12 41 11	60,0	160,0		A	9	1
		14 24 12	57,7	121,1		A	8	1
		16 27 37	57,7	121,1		A	10	1
	5	13 48 27,6	56,88	121,10		6	9	2
	6	05 15 00,9	56,57	124,86		6	8	4
	10	19 47 00	56,9	132,8		A	9	9
	11	08 00 31	63,3	148,6		A	8	2
		08 39 48,8	57,00	124,20		6	8	7
	12	03 42 04	67,7	130,2		B	10	5
		16 04 55	60,8	153,3		A	8	5
	13	14 32 35	61,4	153,9		A	8	3
	15	21 43 22	57,4	127,4		A	12	11
6	19	23 18 14	74,0	143,8		B	8	10
	20	03 10 00	64,8	152,6		A	8	5
		06 13 37	61,5	147,8		A	10	5
	22	05 49 52	60,2	153,2		A	8	8
		11 02 14	65,6	139,9		A	8	5
		13 16 02	59,8	151,5		A	8	4
		20 07 08	56,9	133,1		A	8	3
	23	18 32 54	57,6	127,5		A	8	5
	26	01 12 26	60,8	153,4		A	9	4
		07 00 00	56,2	134,9		A	8	1
		16 15 20,2	56,55	121,02	7	a	8	2
		19 41 46	56,2	125,4		A	10	2
		23 18 15,2	56,46	124,79		6	9	9
	29	03 40 24	64,2	145,9		A	8	2
	30	01 46 10,4	56,08	124,71		6	8	9
		03 27 59	62,2	146,5		A	9	2
		21 48 34	56,2	125,4		A		
				December				
	1	00 13 46,4	56,74	121,21		6	9	1
	5	14 55 03	61,9	147,0		A	8	9
	8	22 56 23	61,4	153,3		A	8	5
	12	15 26 44	57,5	127,6		A	8	3
	16	10 42 30	57,1	127,7		A	10	3
		17 59 34,5	57,61	121,16		a	8	1
		19 23 22,4	57,61	121,25		6	8	1
	17	01 24 04,2	56,27	123,62		6	8	2
		02 10 49	57,1	127,8		A	8	3
	19	08 58 14	56,7	126,7		A	8	2
	20	08 57 05	61,3	148,0		A	8	5
		10 55 58	57,7	127,9		A	8	3
	22	00 07 50,0	57,34	121,27		a	8	1
		01 14 47,6	57,35	121,21		a	9	1
		07 05 12	65,0	143,8		A	8	9
	21	21 34 40	57,4	127,7		A	8	3

* Magnitude according to body waves--from SKM instruments

1	2	3	4	5	6	7	8	9
		December						
	23	01 28 18	56,5	134,4		A	8	4
		08 20 27,4	57,36	121,12	16	A	8	1
7	24	01 29 05	61,9	144,5		A	11	5
		15 31 23	57,1	127,7		A	8	3
8	27	03 54 21	62,0	154,8		A	11	5
		22 24 17	62,1	153,6		A	9	5
	28	19 48 38	58,9	132,2		A	8	4

Regional Catalog of Earthquakes in Amur Region and Primor'ye [Coastal Region]

L. S. Oskorbin, chief compiler
T. V. Nagornykh, V. S. Vorob'yev, L. F. Volkova, I. D. Lazarenko, compilers

Key:

1. Number
2. Moment of occurence, hrs, mins, secs
3. Coordinates of epicenter: φ°N
4. Coordinates of epicenter: λ°E
5. Depth of focus, km
6. Class of accuracy
7. K

Число	Момент возникновения, ч м с	Координаты эпицентра φ° N	λ° E	Глубина очага, км	Класс точности	K
1	2	3	4	5	6	7
		January				
2	12 55 55	52,2	123,7	10	н/кл.	8
5	23 35 49	53,0	124,0	10	н/кл.	8
6	08 32 03	54,0	136,0		н/кл.	8
8	05 52 00	53,9	123,9	30	н/кл.	8
11	07 58 15	53,8	123,5	30	н/кл.	8
13	06 23 03	52,1	131,1	30	н/кл.	8,5
18	14 08 50	53,4	123,8	30	Б	9
20	10 45 02	54,0	123,9	30	н/кл.	8
21	10 21 47	50,6	125,6	30	н/кл.	8
28	23 20 35	54,2	126,3	10	н/кл.	8
29	06 53 59	52,7	131,9	30	Б	9
29	14 49 56	54,9	130,8	30	н/кл.	8
	17 25 22	51,4	128,6	30	н/кл	8
30	11 51 41	52,2	131,3	30	н/кл.	8
31	05 30 39	55,9	129,6	30	А	8
		February				
3	01 00 24	53,9	124,2	10	Б	8
	02 17 20	54,3	126,0	10	Б	9
	13 10 52	53,3	127,8	10	Б	8
4	06 22 34	55,1	133,8	10	Б	8
5	08 39 32	51,0	129,3	30	н/кл.	8

1	2	3	4	5	6	7
		February				
5	13 15 05	52,2	130,3		н/кл.	8
6	05 22 28	53,9	128,1	10	А	9
10	02 38 11	54,9	131,1		н/кл.	8
	07 46 44	54,9	130,6		н/кл.	8
11	05 25 10	55,2	132,6	10	Б	9
	05 35 35	53,9	123,9		Б	8,5
	23 25 10	52,9	129,0		Б	8,5
12	14 06 38	51,8	129,0		Б	8
13	02 39 30	54,0	124,2		Б	8
14	07 52 14	53,9	124,0		Б	8
16	12 24 13	55,6	130,6		Б	8
18	07 13 17	56,1	134,3		Б	9
22	04 41 15	52,0	126,7		Б	8
	13 26 14	55,0	131,0		Б	8
23	13 34 59	54,3	125,7		Б	9
26	09 50 00	54,1	127,5		Б	9
28	08 40 12	54,0	124,2		н/кл.	8
		March				
5	07 57 35	54,3	124,0	30	А	8
	08 49 37	51,5	126,1	30	н/кл.	9
7	11 15 15	52,3	130,0	30	н/кл.	8
9	06 23 41	54,3	124,0	30	Б	8
10	07 50 27	55,0	131,9		н/кл.	8
10	21 12 38	55,1	130,7	30	А	9
11	05 57 49	54,8	126,7	10	А	8,5
12	03 19 51	54,0	123,8	10	Б	8,5
12	04 52 21	54,9	131,0	30	н/кл.	8
	09 48 37	50,7	129,3	30	н/кл.	8
14	10 08 48	54,2	124,2	30	Б	8
	17 40 29	55,7	128,5	10	н/кл.	9
18	03 48 19	53,5	122,5	30	А	9
19	15 34 58	55,5	132,3	5	А	9,5
	16 06 22	54,1	132,3	30	А	8
21	08 08 23	53,1	126,5	30	А	8
22	20 13 56	54,1	126,1	10	А	8,5
25	08 00 21	53,9	124,2	30	Б	8
27	06 58 48	52,6	131,4	30	Б	10
28	03 36 55	54,6	124,2	30	Б	8
	08 11 49	54,6	123,9	30	А	8,5
29	07 10 21	52,0	128,3	10	Б	8
	08 20 08	54,2	124,0	10	А	8
31	07 35 19	52,6	126,2	30	н/кл.	8
		April				
4	04 14 22	55,2	130,9	10	Б	8
6	03 45 39	55,1	123,9	10	Б	8
8	20 02 10	56,1	129,5	10	Б	9
11	12 36 42	57,2	135,1	10	н/кл.	9
18	21 12 47	54,1	127,7	10	А	8
21	10 52 59	54,3	125,8	10	Б	8
24	11 34 33	55,1	124,2	10	А	8,5

1	2	3	4	5	6	7
			May			
17	00 44 12	51,3	138,6	30	Б	9
	07 45 02	53,9	124,3	10	н/кл.	8
18	17 28 39	54,8	110,9	10	н/кл.	8
20	13 30 19	53,1	120,0	30	А	8
	22 57 59	55,4	130,7	10	Б	9
22	12 05 41	54,9	130,4	30	н/кл.	8
	19 44 50	55,7	130,0	10	Б	8
23	23 31 27	54,0	124,2	30	н/кл.	8
25	15 37 24	54,9	131,5	30	А	8
27	11 50 40	56,7	134,0	10	Б	8
			June			
1	06 24 53	54,7	123,8	33	А	8
3	14 24 03	54,9	130,8	10	н/кл.	8
8	10 33 44	55,7	130,8	10	А	9
	11 07 35	55,9	130,6	10	Б	8
10	11 40 43	54,3	122,5	10	А	8,5
13	04 14 20	54,1	124,2	10	н/кл.	8
	14 53 02	55,8	130,0	10	Б	8
14	09 52 53	54,2	124,7	10	н/кл.	8
25	18 49 22	55,4	130,8	10	Б	8
	23 37 48	55,9	130,8	10	А	8
29	12 24 42	53,2	132,2	20–30	А	13,5 *M* = 5,3
	15 14 57	53,2	132,5	10	А	9
			July			
3	16 47 37	53,0	132,9	30	н/кл.	8,5
5	01 16 11	55,9	129,9	10	Б	8
	07 50 33	53,9	128,3	30	Б	8,5
13	15 55 49	53,3	123,1	30	Б	8
21	10 25 48	55,6	129,9	10	А	8,5
31	16 19 00	56,5	135,4	30	Б	11
			August			
9	19 54 47	55,3	130,7	10–20	Б	8,5
			September			
7	23 54 24	54,1	120,5	30	Б	8,5
14	20 31 32	57,0	132,0	10	Б	9
15	08 05 03	52,8	120,6	10	Б	8,5
21	09 30 25	53,6	120,9	30	Б	11
	10 03 15	53,8	121,0	10	Б	11
25	10 20 53	53,3	128,3	30	Б	9
26	07 17 00	53,8	127,3	10	Б	8
27	01 52 39	54,4	129,6	10	А	8
			October			
2	13 22 26	54,3	122,4	30	Б	8,5
7	20 00 19	49,8	132,6	30	Б	11,5
13	20 56 17	54,5	122,2	30	Б	10
14	52 15 56	53,3	122,5	30	Б	9
24	20 21 17	52,3	133,1	30	Б	8
29	08 59 33	55,5	122,9	30	Б	9

1	2	3	4	5	6	7
			November			
1	20 29 15	53,8	133,9		Б	8,5
2	00 38 16	54,1	127,1		А	8
11	21 57 44	53,3	126,7		Б	8
18	02 11 52	54,5	127,6		Б	8
29	15 23 11	55,4	125,2		Б	8
			December			
2	08 03 09	55,7	122,6	30	н/кл.	8
10	17 15 36	53,7	125,2	30	Б	9,5
16	03 35 06	55,6	122,7	30	А	8
17	07 37 43	55,4	122,7	10	Б	8
18	09 50 33	54,5	124,0	30	Б	8
	19 26 23	52,0	130,1	30	Б	9
20	07 57 46	54,8	121,9	30	Б	9,5
	09 00 56	55,4	122,7	30	Б	8
30	03 22 47	52,6	124,2	30	н/кл.	8,5
	04 05 11	53,8	127,8	10	А	8

Regional Catalog of Earthquakes in Sakhalin

L. S. Oskorbin, chief compiler
L. F. Volkova, T. V. Nagornykh, compilers

Key:

1. Number
2. Moment of occurrence, hrs, mins, secs
3. Coordinates of epicenter: φ°N, λ°E
4. Depth of focus, km
5. Class of accuracy
6. M
7. K
8. Number of region
9. Macroseismic data

Число	Момент возникновения, ч м с	Координаты эпицентра φ°N	λ°E	Глубина очага, км	Класс точности	M	K	№ района	Макросейсмические данные
1	2	3		4	5	6	7	8	9
				January					
4	03 58 48	51,4	143,5	10–20	А		9	3	
	07 44 37	51.6	141,9	10	А		9	3	Вахту 4–5 баллов
11	09 12 37	46,4	141,1	10–30	А		8	8	
16	08 2[illegible] 10	53,8	141,6	10–30	Б	4,5	10	1	
26	20 18 05	48,5	141,6	10–30	Б		8	4	
30	15 34 20	55,4	143,7	10–20	Б		9,5	2	

1	2	3		4	5	6	7	8	9
				February					
5	12 01 27	49,3	141,5	10	Б		8	8	
	23 22 00	53,3	143,2	10-30	Б		8	2	
25	09 19 32	52,5	143,0	10	Б		8	2	
				March					
6	03 28 39	49,3	141,4	0-10	Б		9,5	8	
8	21 53 04	49,3	141,2	10	Б		8	8	
				April					
8	05 24 49	52,8	142,9	10-30	А	4,3		1	Нефтегорск 3-4 балла
				May					
9	12 03 57	50,4	142,2	10	Б		8,5	4	
14	10 52 07	53,3	143,2	10	Б		8	2	
21	01 09 50	49,5	141,6	10	Б		8	8	
				June					
8	02 45 11	53,4	142,1	10	Б		8	1	
				August					
12	01 04 50	52,1	142,8	0-10	Б		8	1	
				September					
5	06 03 56	51,8	140,0	5-10	Б		8	7	
9	16 05 15	53,7	143,1	20-30	А		8,5	2	
				October					
4	15 09 50	55,0	141,4	10-20	Б		9	1	
10	17 00 14	53,2	144,7	10-20	Б		8	2	
25	10 28 05	49,6	141,8	10-20	А	4,6	10	4	Углегорск 2-3 балла
				November					
5	20 21 27	53,3	143,8	10	Б		8	2	
21	17 33 10	47,5	141,5	5-10	Б		8	8	
				December					
11	11 14 26	46,2	141,7	20-30	Б		8	4	
	21 21 38	46,6	142,3	10	Б		8	4	
14	06 57 10	53,6	141,6	10-20	Б		8	1	
21	07 16 35	52,3	144,8	20-30	Б		8,5	2	
28	13 24 32	52,8	143,4	30	Б		8,5	2	
31	11 03 35	49,5	142,2	10	Б		8	4	

Regional Catalog of Earthquakes in Kuril

L. N. Poplavskaya, chief compiler
L. N. Boychuk, M. I. Rudik, compilers

Key:

1. Number, in order
2. Number
3. Moment of occurrence, hrs, mins, secs
4. Coordinates: °N
5. Coordinates: °E
6. Depth of focus, km
7. Class of accuracy

№ п/п	Число	Момент возникновения, ч	м	с	Координаты φ° N	λ° E	Глубина очага, км	Класс точности
1	2	3			4	5	6	7
		January						
	1	23	00	17	50,8	158,2	40	
1	2	08	58	53	47,0	151,5	0–5	А
	3	02	55	02	46,6	152,0	90	А
		04	24	47	46,3	153,2	40	А
		14	39	44	50,6	157,0	10–20	Б
	4	00	20	45	51,0	158,1	50	А
	5	12	35	45	44,3	148,7	40	А
	6	04	05	22	43,4	146,2	30–40	А
		17	02	54	43,4	146,6	40–50	А
		20	13	22	43,6	147,6	40	А
	7	01	46	23	46,1	151,1	80	А
	8	00	48	48	50,2	159,6	40	А
		14	04	02	44,5	147,1	20	А
		19	32	32	44,6	146,9	40	А
	9	06	08	20	45,2	150,2	40	А
	12	20	02	23	43,6	146,2	80	А
	18	00	19	34	46,0	148,2	20	А
	20	20	35	42	45,2	150,2	40	Б
	21	03	28	34	43,5	144,6	30	
		04	00	22	49,7	155,9	40	Б
		10	52	40	44,2	148,8	40	Б
		13	09	47	44,2	148,8	30	Б
		14	45	58	44,2	148,9	30	
		20	43	29	43,4	147,1	30	Б
	22	03	13	02	49,7	159,9	30	
		09	29	43	43,4	146,8	30	
	23	07	32	17	46,4	153,8	30	
		09	59	25	46,8	152,8	40	Б
		22	12	36	48,5	154,6	30	А
	24	06	03	38	44,1	147,1	30	А
	25	17	12	49	49,4	155,7	30	Б
	27	14	53	51	43,2	145,8	30	
		19	48	10	44,1	147,0	30	
	28	01	13	31	42,8	145,1	40	
		13	17	50	44,1	141,1	150	
		18	32	59	44,4	148,3	85	Б

Key:
8. Magnitude: $\bar{M}$
9. Magnitude: m_{PV}
10. Magnitude m_{PH}
11. Magnitude m_{SH}
12. K
13. Number of region
14. Macroseismic data

Магнитуда				K	№ района	Макросейсмические данные
$\bar{M}$	m_{PV}	m_{PH}	m_{SH}			
8	9	10	11	12	13	14
				January		
				9	1	
6,5	6,1		5,8		3	о-в Симушир 5 баллов
				9,5	3	
				9,5	3	
				10	1	
4,4	5,0*		5,0		1	
				9,5	4	
				9,5	5	
				9,5	5	
				9	5	
4,3	6,4		6,0	10	3	
	5,0*			9,5	1	
				9,5	5	
5,0	6,0		5,4		5	
				9	4	
				9	5	
4,5	5,7		5,1	10	8	
				9,5	3	
				9,5	6	
				10	1	
				9,5	4	
4,5	5,8		5,6	11	4	
4,4			5,1	9	4	
				10,5	5	
				9,5	1	
				9	5	
				9	3	
				9	3	
				9,5	2	
				9,5	5	
				10,5	2	
				9	6	
				9	5	
				9	6	
					6	
				10	4	

1	2	3			4	5	6	7
				February				
1	14	12	14		43,3	144,8	65	А
	15	57	54		49,4	155,8	40	
2	16	17	29		44,3	147,1	150	А
	20	23	05		50,2	157,3	30-40	А
	20	51	38		43,9	148,1	40	
	23	06	50		50,6	157,3	30	А
3	08	07	00		48,2	157,2	30	А
4	21	17	27		44,6	151,7	50	Б
	06	59	45		50,9	159,8	0-10	Б
5	05	59	00		49,7	156,4	40	
	17	47	56		43,2	146,1	30-40	А
6	01	44	10		49,6	157,0	40	
	09	34	50		44,2	148,1	40	А
7	06	02	00		42,7	144,9	30	
	10	22	25		49,0	156,5	40	
8	12	37	54		46,3	152,7	40	А
9	17	10	45		46,2	152,6	40	Б
10	06	28	33		44,8	149,0	40	
11	13	40	36		50,3	157,0	40	А
	15	59	05		44,1	149,0	40	
	17	12	10		42,1	142,9	40-50	
14	09	38	03		43,9	146,8	30-40	
15	09	19	38		49,7	156,3	30-40	
16	17	54	03		43,3	146,3	40	А
17	06	05	58		42,7	145,6	30	А
18	14	26	10		43,2	146,5	40	А
	15	20	10		43,8	146,9	50-60	А
	22	12	20		48,1	154,4	40	
	17	24	35		50,7	157,6	40	Б
20	19	15	14		42,6	143,6	95	А
22	14	48	17		45,0	151,4	40	Б
	15	58	12		50,7	157,4	30	А
23	23	39	08		43,2	146,7	50	А
	22	57	18		52,4	153,0	480	А
25	23	56	04		46,3	153,0	40	А
	09	50	27		42,9	146,6	40	
26	03	34	52		43,1	146,6	40	А
27	07	17	23		42,4	143,7	50	А
				March				
1	09	26	49		52,7	152,9	525	А
7	01	51	10		42,5	148,0	40	Б
	05	32	59		46,6	152,9	30	А
8	22	37	30		44,0	147,2	45	А
9	13	34	32		42,0	143,0	40	А
	21	13	33		52,3	153,3	460	А
11	15	47	07		44,3	151,1	30	
13	01	09	54		45,3	149,9	30	Б
	12	38	57		49,4	155,5	30	А
	16	18	57		45,8	153,9	20	А
14	05	15	19		46,4	153,0	60	А
	05	29	25		46,6	153,5	30	
	13	23	52		46,3	153,7	30	Б
14	16	05	26		44,1	148,8	40-50	А
	17	08	24		48,9	155,6	30	Б
	22	44	18		44,9	147,4	130-140	А

8	9	10	11	12	13	14
			February			
				9	6	
				9	1	
			5,9	11	5	
4,8	6,2			9,5	1	
	5,4*			9	5	
				9,5	1	
				11	2	
4,5		5,2*		9	3	
				9,5	1	
				9,5	1	
				9	5	
				9	1	
				9	5	
				9	6	
				9,5	1	
				9,5	3	
				9	3	
				9	4	
				9,5	1	Северо-Курильск 2 балла
				9	4	
				9	6	
				10,5	5	
				9	1	
				9	5	
				10	5	
				9,5	5	о-в Шикотан 1–2 балла
				9,5	5	о-в Шикотан 2 балла
				9	2	
				9,5	1	
				10	6	
				9	3	
				9,5	1	
				9,5	5	
			5,3		8	
				9	3	
				9	5	
				10	5	
				10	6	
			March			
			4,4		8	
				9	5	
				9,5	3	
				9	5	
				10,5	6	
			4,5		8	
				9	4	
				10,5	4	
				10,5	2	
4,8	5,6*		5,8	10,5	3	
5,4	6,0		5,4		3	
				9,5	3	
4,7	5,4		4,9		3	
4,8	6,1		5,1	11,5	4	
	5,3*			10	2	
	5,2		4,7		5	о-в Шикотан 3 балла

1	2	3			4	5	6	7
					March			
		04	00	15	43,6	146,6	50	А
		07	24	21	45,7	151,0	90	Б
	19	12	05	42	43,9	147,5	60	Б
	20	06	08	32	47,4	152,5	60	А
		18	06	32	45,0	148,4	150	А
	21	16	09	18	42,5	146,6	40	
	22	13	55	00	45,6	151,0	50	А
	23	19	48	11	46,6	152,8	60	А
	24	00	46	21	43,3	147,6	70	А
	26	15	44	52	44,4	148,1	40	А
	29	12	12	52	43,3	146,5	40	А
	31	19	04	37	44,3	150,1	40	А
					April			
	1	11	56	23	42,3	144,9	40	
		16	31	14	44,6	150,0	25-30	Б
		19	21	28	48,7	154,7	30	Б
		20	11	21	47,9	155,4	40	А
		22	45	17	49,8	156,6	30	
	3	01	04	39	44,6	149,2	30	Б
		16	15	17	43,6	148,7	30	Б
		22	43	09	45,3	151,5	30	Б
	4	04	17	20	43,5	148,8	20	Б
	7	14	34	58	42,4	142,1	170-175	Б
		17	21	38	42,4	143,2	30-40	
	9	21	05	50	46,5	151,7	130	Б
	10	00	59	32	46,4	154,8	30	Б
		01	50	38	50,6	158,5	30	
		08	49	01	49,9	156,5	30	
		09	40	59	49,5	156,2	30	А
		14	55	46	43,4	146,2	30	А
	15	01	17	11	46,4	152,1	80	Б
		14	27	14	45,2	146,9	20	А
2	16	21	33	26	48,3	154,8	33	А
	17	05	38	08	47,9	156,6	30	
	19	10	00	02	50,3	157,1	25	Б
	20	06	37	50	50,2	156,8	30	А
	21	19	49	33	45,1	150,0	40	А
	22	20	05	04	44,6	149,1	70	А
	23	00	17	59	44,0	132,0	495	А
	24	11	51	42	50,2	157,0	30	
		11	55	46	44,6	150,0	40	А
	27	05	18	40	46,8	153,3	40	А
		13	09	56	42,8	145,2	40	А
		17	36	50	43,8	145,0	115	А
	28	11	26	37	44,1	146,4	140	А
		23	03	36	44,3	148,8	30	А
	29	01	47	37	44,3	148,0	40	А
		14	53	41	42,7	141,5	130	А
	30	12	58	01	49,2	155,3	20	Б

8	9	10	11	12	13	14	
				March			
				9,5	5		о-в Шикотан 2 балла
				9	3		
	5,7		4,8	10,5	5		Малокурильское 3 балла
				9,5	3		
					4		
				9	5		
4,5	5,4		5,3	11	3		
5,1	6,2		5,7		3		о-в Уруп 2–3 балла
	5,6*			10	5		о-в Шикотан 3 балла
				9,5	4		
				9	5		
4,6	5,2*		5,2	11	4		
				April			
					9	6	
				4,8	9,5	4	
	4,9	6,1	5,8	5,7		2	
					10	2	
					9	2	
					9	4	
					10	5	
					9,5	3	
					10	5	
						6	
					9,5	6	
						3	
					9	2	
					9	1	
					10	1	
					10,5	1	
					9,5	5	
					9	3	
					9,5	8	
	5,8	6,3	6,4	6,5		2	о-в Матуа 2–3 балла
					9	2	
					9,5	1	Северо-Курильск 2 балла
					9,5	1	
					9	4	
	4,5	5,7	6,0	5,4		4	
		5,1*					
		5,2		5,4		7	
					9	1	
					9,5	4	
					9,5	3	
					9	6	
						5	
						5	
					9,5	4	
					9,5	5	
						6	
					9,5	2	

1	2	3			4	5	6	7
					May			
	1	14	44	57	50,4	156,9	20	А
		19	09	58	44,0	147,3	40	Б
	2	01	14	33	49,8	156,0	30	А
		11	05	17	45,4	150,0	55	А
		14	05	53	47,1	154,7	40	А
3	3	05	16	14	47,0	145,3	375	А
		07	06	55	43,2	148,0	40	А
		22	27	17	49,0	158,4	40	А
	4	01	03	00	43,0	148,1	40	А
		19	01	14	47,7	155,4	40	А
	5	03	49	00	50,3	157,1	40	А
	6	17	29	35	44,4	148,5	40	А
	7	13	39	05	47,2	153,2	130	А
		15	56	20	47,9	155,7	40	Б
	8	23	59	10	44,5	147,1	120	А
4	11	06	56	43	49,2	156,1	60	А
		07	11	43	49,1	156,7	30	А
		07	37	13	49,0	157,0	40	Б
		20	21	52	49,1	156,6	40	А
		20	35	14	49,0	156,8	45	А
		22	07	31	49,2	156,3	40	Б
	12	02	10	04	49,3	156,2	40	Б
		08	31	18	49,1	156,6	40	А
5		10	11	50	49,0	156,9	40	А
		11	43	05	49,0	156,6	40	А
		15	12	08	49,1	156,6	40	А
		20	52	35	43,3	146,7	40	А
	13	10	31	56	43,0	147,5	40	Б
	14	09	03	23	44,2	147,5	40	А
6		11	41	56	47,0	151,3	180	А
	15	23	13	25	43,2	142,4	40	Б
	16	21	04	32	42,5	149,0	40	Б
	18	16	09	45	45,0	147,8	160	А
7	18	22	34	17	44,2	147,7	105	А
	19	22	42	16	49,6	157,5	60	А
	22	05	47	15	46,7	152,9	40	Б
		18	05	51	49,4	156,0	40	А
	23	12	03	56	43,0	146,0	40	А
	24	07	15	20	44,3	147,6	80	А
		22	12	10	44,8	149,7	50	А
	25	12	31	24	43,0	146,0	40	А
8	26	14	19	52	44,6	147,6	130	А
		18	23	05	42,9	145,2	40	А
	27	06	41	20	44,1	148,3	50	А
		22	51	27	49,0	156,8	40	

8	9	10	11	12	13	14
			May			
				9,5	1	
				9	5	
				9,5	1	
3,9	6,4	6,0	5,7	11	3	
4,0				10	2	
5,7	5,9	6,0	5,7		8	
				9,5	5	
				10	1	
				9,5	5	
				10	2	
				9,5	1	
	4,6			10	4	
			4,8		2	
				9	2	
			4,0		5	
6,1	6,4	6,6	6,6		1	м. Васильева 4–5 баллов, Северо-Курильск 2 балла
	5,8*					
	6,4	6,1	5,7	11	1	
				10	1	
4,6	5,0*	5,4	5,2		1	
4,8	6,1	6,1	6,0		1	Северо-Курильск 2 балла
	5,4*					
				10	1	
				9,5	1	
4,9	5,8	5,8	5,8		1	
5,5	6,2	6,2	6,2		1	
	5,8*					
4,3	5,7		5,2		1	
				10	1	
				9,5	5	о-в Шикотан 3 балла
				9	5	
				9	5	
5,8	6,6	6,1	5,8		3	
				9,5	6	
				9	5	
					4	
5,9	5,8	6,2	5,9		5	
	5,3*					
4,5	6,4		6,0		1	
				9	3	
4,3			4,5		1	Северо-Курильск 2 балла
				9,5	5	
				9,5	5	
	6,1	5,7	5,0	11	4	
				10	5	
6,1	6,3		6,1		5	о-в Шикотан 3 балла
4,5	5,6	5,2	5,5		6	о-в Шикотан 3 балла; Южно-Курильск 2–3 балла
5,2	5,8	5,3	5,7	11	5	
	5,3*			9,5	1	

1	2	3			4	5	6	7
				May				
	28	17	05	12	48,5	155,1	40	А
		22	54	50	46,5	153,8	40	А
	30	03	10	09	43,0	146,7	40	
9		04	07	28	46,1	150,1	170	А
		10	25	18	46,5	153,0	30–40	А
10		21	57	28	42,5	142,6	120	А
	31	03	18	31	48,2	156,1	40	
		07	19	03	44,8	148,6	90	А
				June				
	1	04	59	55	42,6	144,8	50	Б
		12	43	45	43,9	147,5	40	А
	3	12	43	52	45,6	152,3	40	А
		20	15	30	44,9	146,4	170	А
	4	09	46	22	46,6	152,7	40	А
	5	13	46	10	43,8	147,5	40	
	6	20	42	51	43,9	146,4	30	А
	7	06	25	00	44,2	151,3	40	
		09	30	04	43,6	146,5	40	А
		09	39	22	43,6	146,5	40	А
		15	52	26	43,6	148,0	30	А
		21	48	27	49,5	155,3	40–50	А
	8	01	26	28	43,4	146,7	30	А
	9	10	09	00	44,4	148,8	30	А
		14	53	50	44,5	149,2	40	А
11	10	13	47	20	43,2	147,5	30	А
		13	55	23	43,1	147,5	30	Б
12	10	14	18	37	43,2	147,6	23	А
		14	25	31	43,3	148,0	30	
		14	29	22	43,3	147,8	30	А
13		14	37	46	42,9	147,9	27	А
		14	49	17	43,0	147,8	22	А
		14	54	14	43,9	147,8	30	Б
14		14	58	59	43,3	147,3	50	А
		15	05	00	43,4	147,8	30	
		15	09	27	43,4	147,9	30	
15		15	21	20	43,5	147,3	25	А
		15	25	25	43,5	147,9	30	Б
		15	26	32	43,6	148,1	30	А
		15	29	07	43,2	147,9	30	А
		15	30	13	43,3	148,0	30	Б
		15	35	45	43,2	147,9	40	А
		15	38	26	43,3	148,0	30	

8	9	10	11	12	13	14
			May			
				9,5	2	
4,5	5,6	5,5	5,6		3	
				9	5	
5,6	5,8	5,8	5,6		3	
4,1			5,5	11	3	
5,6	6,2	6,3	5,6		6	
				9,5	2	
			4,0		4	
			June			
4,1	5,6		5,2		6	
				9	5	
				9	3	
					8	
4,2		5,8	5,5	10,5	3	
				9	5	
				9,5	5	о-в Шикотан 2 балла
				9	3	
				9,5	5	о-в Шикотан 2–3 балла
				9,5	5	
4,1	6,2	5,9	5,7	10,5	5	о-в Шикотан 3 балла
		5,0	5,5	10,5	2	
				9	5	
				9,5	4	
4,0	6,2	6,2	5,5	11	4	
7,3	6,4	6,2	6,7		5	о-в Шикотан 4 балла; Южно-Курильск 3 балла; Курильск 2 балла
	6,2*					
				9,5	5	
5,5	6,7	6,8	6,2		5	о-в Шикотан 4 балла
	6,1*					
				9,5	5	
	6,6	6,7		10,5	5	о-в Шикотан 3 балла
6,4	7,0	6,8	6,5		5	о-в Шикотан 5 баллов
	6,5*					
5,7	6,6	6,7	6,1		5	о-в Шикотан 3–4 балла
				9	5	
6,5	6,5*				5	
				9	5	
				9	5	
6,0	6,4*				5	о-в Шикотан 3–4 балла
				9,5	5	
				9,5	5	
				9,5	5	
				9,5	5	о-в Шикотан 2 балла
				10	5	о-в Шикотан 2–3 балла
				9,5	5	

1	2	3			4	5	6	7
		June						
		15	46	12	43,3	148,0	35	А
		15	46	20	43,2	148,0	30	А
		15	47	48	43,2	148,0	40	А
		15	51	08	42,9	147,4	25	Б
	10	16	01	22	42,9	147,8	30	А
		16	06	29	43,3	147,9	40	А
		16	10	19	42,1	147,5	30	Б
		16	11	20	42,2	148,0	40	Б
		16	13	31	43,4	148,0	30	
		16	14	01	43,5	148,2	30	Б
		16	14	44	43,5	148,0	30	А
		16	19	28	43,2	148,2	30	Б
16		16	20	34	43,2	148,2	24	А
17		16	21	45	42,9	147,4	30	А
		16	23	58	43,4	148,0	30	А
		16	27	04	43,4	147,9	30	А
		16	28	08	43,3	147,9	30	А
		16	30	07	43,1	147,8	30	
		16	49	50	43,2	147,8	30	А
		16	50	19	43,5	147,9	30	Б
		16	53	38	42,0	148,0	30	А
		16	58	26	43,2	147,7	30	
		17	00	24	42,9	147,7	35	Б
		17	09	20	43,1	147,8	30	Б
		17	10	32	43,3	147,8	30	А
		17	11	02	43,1	147,7	30	Б
		17	22	50	43,0	147,4	30	А
	10	17	23	51	43,2	148,0	30	Б
		17	23	08	43,3	147,4	40	
		17	28	27	43,2	147,6	30	А
		17	38	27	42,9	147,6	35	А
		17	41	28	43,2	147,6	30	А
		17	43	11	43,0	148,0	30	А
		17	52	36	42,9	147,4	30	Б
		18	01	26	43,2	147,5	30	А
		18	06	29	43,1	147,7	30	А
		18	11	04	43,2	148,1	30	А
		18	12	05	43,3	148,0	30	Б
		18	22	03	43,4	147,8	30	Б
		18	23	58	43,3	148,0	30	
		18	26	27	43,2	147,7	35	Б
		18	26	30	43,3	147,8	30	А
		18	28	08	42,9	147,5	30	
		18	32	10	43,1	147,7	30	А
		18	34	17	43,2	148,0	30	А
		18	37	20	42,9	147,6	30	Б
		18	47	24	43,3	148,0	30	
		18	47	48	43,3	148,0	30	Б
		18	54	28	43,1	148,0	30	А
		18	57	38	43,2	147,4	19	Б
		19	06	20	43,3	147,7	30	А
		19	08	00	43,0	147,6	30	А
	10	19	21	04	43,2	148,0	30	А
		19	30	24	43,3	147,9	30	А

8	9	10	11	12	13	14
			June			
				10	5	
				10	5	
				10	5	
5,1	6,1*				5	о-в Шикотан 2–3 балла
				9,5	5	
				9,5	5	
				9	5	
				9	5	
				9	5	
				9,5	5	
4,8	5,7*				5	о-в Шикотан 2 балла
				9,5	5	
5,5	5,8	5,8	5,1		5	о-в Шикотан 4 балла
5,5					5	
4,8	5,8*				5	
				9,5	5	
				9,5	5	
				9,5	5	
				10	5	
				9,5	5	
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4,1				10	5	
				9,5	5	
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				9,5	5	
				9,5	5	
				9,5	5	
				9,5	5	
4,5	5,4*				5	
4,8	5,6*			10,5	5	
				9	5	
				9,5	5	
				10	5	

1	2	3			4	5	6	7
		June						
		19	37	17	43,3	147,7	30	
		19	42	17	43,2	147,6	30	
		19	59	51	43,4	147,8	30	А
		20	06	19	43,2	147,8	30	Б
		20	06	45	43,0	147,9	30	
		20	15	53	43,3	147,7	30	Б
		20	27	14	43,0	148,3	30	Б
		20	32	35	43,3	147,6	30	А
		20	41	23	43,4	147,8	30	А
		20	45	10	43,4	147,8	30	А
		20	59	32	43,3	147,6	30	
		21	03	34	43,4	147,6	30	Б
		21	15	39	43,1	147,5	30	Б
		21	26	29	43,4	147,8	30	А
		21	25	45	43,4	147,9	30	Б
		21	43	19	43,3	147,7	30	А
		22	03	26	43,3	148,0	30	
		22	04	07	43,1	147,6	30	
		22	14	15	43,1	148,2	27	А
		22	25	18	43,2	147,7	30	Б
		22	55	50	43,2	147,6	30	А
		22	35	08	43,2	148,0	30	
	10	22	42	35	43,1	147,5	30	Б
		23	03	04	43,1	148,0	25	А
		23	14	52	43,0	148,0	30	
		23	17	50	43,2	148,1	30	Б
		23	37	44	43,3	147,6	30	А
	11	00	05	39	43,2	147,6	30	А
		00	33	24	43,2	147,9	40	Б
		00	17	41	43,0	147,5	30	А
		00	50	14	42,8	147,8	30	Б
		01	26	10	42,9	148,2	30	Б
		01	58	36	48,0	154,5	30	Б
		02	13	20	43,1	147,9	30	А
		02	18	10	43,6	147,7	30	Б
		02	41	27	43,6	147,4	30	
		03	05	00	43,0	147,9	30	Б
		03	06	42	42,7	148,0	30	
		03	46	12	43,2	147,9	30	Б
		03	49	23	42,8	147,4	30	
		04	12	40	42,9	146,9	30	Б
		04	23	10	43,0	147,2	30	
		04	33	06	43,2	148,1	30	Б
		04	47	54	43,3	147,7	30	
		05	20	29	43,1	147,5	30	А
		05	21	15	43,2	147,7	20	Б
		05	34	26	43,2	148,3	30	
		05	42	56	43,2	147,7	30	
		05	45	15	43,2	148,1	30	
		05	47	13	42,4	147,9	30	
		06	03	16	43,2	148,1	30	Б
		06	05	54	43,4	148,1	30	

8	9	10	11	12	13	14
				June		
				9	5	
				9	5	
				9,5	5	
				9,5	5	
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				9,5	5	
				9	5	
4,0			4,4		5	
4,0				10	5	
5,0	5,4*	5,4	5,1		5	
				9	5	
				9,5	5	
				9	5	
				9,5	5	
				9	5	
				9	5	
				9	5	
				9	5	
5,2	4,9 5,7*	5,2	5,2		5	
				9	5	
				9	5	
				9	5	
				9	5	
4,7	5,3*		5,0		5	
				9	5	
				9	5	
4,6	5,5*	5,6	5,5		5	о-в Шикотан 2-3 балла
				9,5	5	
				9,5	5	
4,2	5,0*			10	5	
				10	5	
				10,5	5	
				10	2	
				9,5	5	
				9,5	5	
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				10	5	
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				9,5	5	
				9	5	
				9,5	5	
				9,5	5	
				9,5	5	о-в Шикотан 3 балла
4,9	5,7 5,3*	5,7	5,0	11	5	
				9	5	
				9	5	
				9	5	
				9	5	
				9	5	
				9	5	

1	2	3			4	5	6	7
		June						
		06	30	47	42,9	147,4	30	Б
		06	31	56	43,0	147,9	30	Б
		07	20	01	43,4	147,7	30	Б
		07	08	54	43,2	147,6	30	Б
		08	34	12	43,0	147,8	30	А
		09	22	39	42,9	148,2	30	
		09	59	19	43,0	147,4	30	Б
		10	05	45	42,7	148,1	30	Б
		10	08	22	42,9	147,1	30	
		10	18	20	43,0	147,5	40	Б
		10	23	03	42,9	148,1	30	
		10	32	27	43,0	147,7	40	А
		10	56	55	43,2	147,8	30	Б
		11	02	36	43,1	148,1	30	А
		11	14	06	43,1	147,7	40	Б
		11	47	25	43,2	147,9	40	Б
		12	03	17	43,1	147,3	40	А
		12	05	05	42,9	147,2	40	Б
		12	15	35	42,9	147,3	40	Б
		12	39	13	43,1	147,5	40	А
		12	53	12	42,9	147,5	30	Б
		13	23	54	43,0	147,0	30	Б
		13	29	02	43,0	147,3	30	Б
		13	41	51	42,9	147,5	30	Б
		13	53	56	43,1	147,8	35	Б
		14	20	10	43,3	147,8	15	Б
		14	22	53	43,1	147,9	30	Б
		14	30	43	43,0	147,7	30	Б
		14	38	51	43,1	147,5	30	Б
		14	48	21	42,9	146,8	30	Б
		14	52	00	43,2	147,8	30	Б
		14	56	55	42,6	148,0	30	
		15	14	33	43,1	147,8	30	Б
		15	24	38	42,1	147,7	30	Б
		15	32	35	43,3	147,8	20	А
		15	39	40	42,9	147,6	30	
		15	52	55	43,1	147,6	30	Б
		16	40	36	42,9	147,5	30	Б
		16	41	41	43,2	147,6	30	Б
		16	45	08	42,9	147,3	30	Б
		16	52	56	43,3	147,7	20	А
		16	57	30	43,1	147,6	20	А
		16	59	18	43,6	148,4	30	
		17	05	58	42,9	148,0	30	Б
		17	09	03	42,9	147,6	30	Б
		17	25	28	43,2	147,3	30	А
		17	43	43	43,3	147,8	25	А
		18	02	20	43,2	148,0	30	А
		18	18	15	42,9	148,0	30	А
		18	31	31	43,4	148,0	30	Б
		18	37	16	43,2	147,8	30	Б
		18	40	25	43,0	148,4	30	Б
		19	11	24	42,9	147,7	30	Б

8	9	10	11	12	13	14
				June		
				9,5	5	
4,2	5,8*	5,6	5,3		5	
4,1	5,4	5,1	4,7	9,5	5	
				9	5	
				9	5	
				9	5	
				9	5	
3,7				10,5	5	
				9	5	
				9,5	5	
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				9,5	5	
				9	5	
				9	5	
5,2	5,6	5,5	5,2		5	
	5,4*					
				9,5	5	
				9,5	5	
				9,5	5	
				9	5	
4,4	5,5	5,7	5,2	10	5	
				9	5	
				9	5	
				9,5	5	
5,0	5,6	5,4	4,8		5	Малокурильское 3 балла
				9	5	
				9,5	5	
				9	5	
				10,5	5	
				9,5	5	
4,8	5,8	5,9			5	Малокурильское 2-3 балла
	5,5*					
4,6	6,0	6,1	5,7		5	То же
				9,5	5	
				9	5	
				9,5	5	
				9,5	5	
4,6	5,6*	5,9	5,3		5	
4,2				10	5	
				9,5	5	
4,3	5,1	5,8	5,3		5	
				9	5	
				10	5	
				10	5	

1	2	3			4	5	6	7
					June			
		19	32	12	42,8	147,9	30	А
		19	44	59	42,7	148,1	30	А
		20	30	25	43,1	147,9	30	А
		20	40	43	43,3	147,8	30	Б
		20	58	46	43,3	147,8	20	Б
		21	13	35	43,0	147,0	30	А
		21	36	40	43,0	148,4	30	Б
		22	25	31	43,1	147,7	30	
		22	36	07	42,7	148,2	30	А
		22	59	59	43,0	147,4	30	Б
		23	14	20	43,2	147,6	30	Б
		23	23	24	43,0	147,9	30	
		23	28	04	43,3	147,8	30	Б
		23	28	28	43,0	147,1	30	
		23	35	53	43,0	147,4	30	Б
		23	44	47	42,9	147,5	30	
		23	54	10	42,9	147,4	30	Б
		23	55	54	42,9	147,1	30	
	12	00	14	24	46,4	152,6	30	А
		00	41	57	43,2	147,8	30	
		01	07	52	43,3	148,1	30	Б
		01	28	27	43,2	148,2	30	
		01	46	47	43,0	148,4	30	
		01	49	13	43,0	147,5	30	Б
		02	00	40	43,0	147,5	30	
		02	18	26	42,8	147,0	30	
		03	02	03	43,2	148,0	30	Б
		03	32	18	43,3	148,0	30	
		03	45	52	43,2	148,0	30	Б
		04	27	30	43,3	148,1	30	Б
		04	34	06	43,5	147,8	30	А
		05	32	38	43,1	147,8	30	Б
		05	33	32	43,1	147,8	30	Б
		06	06	43	43,0	148,2	30	
		06	12	35	42,9	147,4	30	Б
		06	25	04	42,6	148,1	30	
		06	35	14	42,6	148,1	30	
		06	58	02	43,0	146,9	30	Б
		07	17	48	43,2	147,9	30	Б
		07	28	38	42,7	148,1	30	
		08	13	56	43,2	147,7	30	Б
		08	50	47	43,2	147,7	30	
		08	54	24	43,2	147,7	30	
		10	36	08	42,9	147,5	30	
		13	15	16	42,7	147,4	20	А
		13	28	48	42,6	148,1	30	
		13	40	15	42,7	147,4	30	
		13	55	48	42,8	147,2	30	Б
		14	31	14	43,0	147,4	30	А
		14	37	10	42,8	147,8	30	А
		14	58	38	43,1	147,7	30	А
		15	23	34	43,0	147,4	20	А

8	9	10	11	12	13	14
				June		
				9	5	
				9	5	
				10	5	
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				10	5	
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				9,5	5	
				9	5	
				9,5	5	
				9	5	
4,8	6,3				3	
	5,2*					
				9	5	
5,2	5,6*	5,4	5,4		5	
				9,5	5	
				9	5	
4,8	5,2			11	5	
				9,5	5	
				9	5	
4,5	5,5		4,4	10	5	
	5,2*					
4,1				9,5	5	
4,2	5,1*				5	
4,0						
5,2	5,8*		5,3			
				9,5	5	
4,8	5,4		4,9		5	
	5,2*					
				9	5	
				9,5	5	
				10	5	
4,0				9,5	5	
				10	5	
				9,5	5	
				9,5	5	
4,6	5,7		4,8		5	
	5,6*					
				9,5	5	
				9	5	
				9	5	
4,9	5,2*		5,0	11	5	
				9	5	
				9,5	5	
4,3				10	5	
5,0	5,5		5,4		5	Малокурильское 2–3 балла
	5,6*					
4,7			5,1			
4,5	5,4*			10,5	5	
4,6	5,2*				5	

1	2	3			4	5	6	7
				June				
		16	39	12	42,7	147,4	30	
		16	41	17	42,7	147,3	30	
		18	27	05	43,1	147,9	30	
		18	48	31	42,9	147,4	30	
		20	14	30	43,2	148,1	30	Б
		20	30	58	42,9	147,2	30	
		21	37	04	43,3	147,9	20	Б
18		23	21	03	43,1	148,0	20	А
		23	24	19	43,0	147,4	30	
		23	33	10	42,9	147,4	30	
		23	34	07	43,0	147,5	30	
	13	00	55	22	43,3	148,2	10	Б
		01	45	24	42,7	147,5	30	Б
		03	16	43	42,9	147,7	30	
		04	13	16	43,0	147,4	30	
		06	47	28	42,9	147,8	30	
		07	07	37	42,8	147,7	30	
		08	10	15	42,9	147,4	20	
		08	25	19	43,2	147,8	20	А
		09	57	05	42,7	147,9	10-20	А
		11	46	06	43,2	148,4	40	Б
		12	57	05	43,1	147,3	24	А
		13	10	51	43,0	147,3	25	А
		13	42	06	42,9	147,5	30	Б
		13	56	22	43,2	147,8	30	Б
		14	21	05	42,9	147,4	30	Б
		16	19	58	43,2	147,6	30	Б
		16	39	20	43,2	148,2	30	А
19		18	08	11	43,3	148,0	20	А
		18	14	47	43,2	147,7	30	
		18	18	48	43,3	148,0	20	
		18	20	35	43,3	148,2	30	
		18	22	16	43,2	147,8	30	
		18	25	16	43,1	147,8	30	Б
		18	26	44	43,2	147,8	30	Б
		18	33	13	43,2	147,8	30	
		18	42	55	43,1	147,9	30	Б
		18	48	43	43,2	147,8	20	Б
		18	53	37	43,0	148,0	30	Б
		19	14	11	43,1	147,8	20	А
		19	15	25	43,3	148,0	30	
		19	19	28	43,2	147,8	30	Б
		19	30	24	43,1	147,6	30	Б
		19	33	47	43,1	147,6	30	
		19	37	26	43,3	147,8	30	Б
20		19	40	26	43,3	147,9	20	А
		19	46	11	43,3	148,0	30	Б
	13	19	52	36	43,3	148,0	30	А
		19	54	47	43,2	148,1	30	

8	9	10	11	12	13	14
				June		
				9	5	
				9	5	
				9,5	5	
				9,5	5	
					5	
4,5				10	5	
4,0				10,5	5	
4,3					5	
5,6	6,1		5,7			
	5,9*					
				9,5	5	
				9	5	
				9	5	
				9	5	
				10	5	
				9	5	
				9	5	
					5	
					5	
				9,5	5	
	5,3		4,8		5	
				10	5	
				9,5	5	
5,2	5,6		5,5		5	
	5,8*					
4,8	5,1*				5	
				9	5	
				9,5	5	
				9,5	5	
				9,5	5	
				9,5	5	
4,0						
7,2	7,1		7,0		5	Малокурильское 6 баллов; Южно-Курильск 4 балла; Курильск 3–4 балла
	6,9*					
				9,5	5	
				10,5	5	
				10	5	
				9,5	5	
				10	5	
				10,5	5	
				10	5	
				10,5	5	
				10	5	
				9,5	5	
4,8	5,2*			10,5	5	
				10,5	5	
				10	5	
				10	5	
				9,5	5	
				10	5	
5,6	5,6*				5	
				10,5	5	
5,0	5,7			11	5	
				9,5	5	

1	2	3			4	5	6	7
		June						
		19	56	20	43,3	147,7	30	
		19	58	11	43,3	148,0	20	А
		20	00	56	43,3	148,0	26	А
		20	09	31	43,2	148,1	30	
		20	18	24	43,2	147,8	30	А
		20	20	56	43,1	147,7	30	А
		21	09	25	43,2	148,0	15	А
		21	19	10	43,4	147,5	30	
		22	19	21	43,3	147,5	60	
		22	29	48	43,0	148,3	25	Б
		22	32	26	43,1	148,0	30	Б
		22	35	44	43,2	147,8	30	Б
		22	52	42	43,1	148,1	30	Б
		23	12	49	43,2	147,9	30	Б
		23	40	03	42,8	147,3	30	
		23	56	33	43,3	147,9	30	Б
		23	57	44	43,5	148,0	30	А
		23	58	58	43,1	148,0	30	Б
	14	00	00	07	43,4	148,0	30	А
		00	01	44	43,1	147,7	30	
		00	04	15	43,2	148,0	30	
		00	10	20	43,1	148,0	10	Б
	14	00	42	59	43,2	147,9	30	Б
		00	46	30	42,9	147,2	30	
		01	41	42	43,3	147,7	20	А
		01	47	49	43,2	147,8	25	А
		01	56	32	43,3	147,7	30	А
		02	14	32	42,9	148,2	20	А
		02	25	23	43,4	147,7	30	Б
21		02	59	19	43,1	147,8	30	А
		03	05	59	43,1	147,6	30	Б
		03	37	33	43,3	147,8	30	А
		03	40	58	43,4	148,1	30	Б
		03	52	24	43,2	148,0	30	А
		03	55	21	43,1	148,0	30	Б
		04	01	39	43,4	147,8	30	Б
		04	07	12	43,5	148,0	30	Б
		04	35	44	43,2	147,8	25	Б
		04	41	37	43,3	147,8	30	А
		04	43	00	43,3	148,0	30	Б
		04	46	18	43,5	148,0	30	
		04	53	48	43,2	147,6	30	А
		05	03	02	43,4	147,8	30	Б
		05	13	54	43,0	147,8	30	А
	14	05	31	53	43,0	147,5	30	
		05	33	52	43,0	148,0	30	А
		05	55	45	43,4	147,9	30	А
		06	16	44	43,3	147,8	30	Б
		06	37	08	43,2	147,6	30	
		07	30	40	43,0	147,5	30	Б
		07	51	22	42,9	147,5	30	А
		08	09	44	42,9	147,3	30	

8	9	10	11	12	13	14
			June			
				9	5	
				10	5	
4,8	5,0*			10,5	5	
				9,5	5	
5,0	5,6*		5,4		5	
5,0	5,7*		5,3		5	
4,0				10	5	
				9,5	5	
				9,5	5	
				10	5	
				9,5	5	
4,2				10	5	
				10	5	
4,0				10	5	
				9,5	5	
				9,5	5	
	5,1*			10	5	
5,1				10,5	5	
5,2	6,1	6,0	5,5		5	
	5,8*					
				9,5	5	
4,5				10	5	
4,5				10	5	
				9,5	5	
				9	5	
4,2	5,1*				5	
5,4	6,0	5,9	5,7		5	с-в Шикотан 3 балла
	5,7*					
5,1	5,5*			11,5	5	
4,6	6,2		5,3		5	
				9,5	5	
5,7	6,2	6,3	5,8		5	с-в Шикотан 3–4 балла
	5,8*					
				9,5	5	
4,6				10	5	
				9	5	
4,1	5,2*				5	
				9,5	5	
				9,5	5	
4,6	5,4*			11	5	
5,2	6,2	6,4	5,8		5	
	5,9*					
4,6				11	5	
4,6	5,6*				5	
				9,5	5	
				10	5	
5,2	6,1	5,8	5,7		5	
	5,6*					
4,6				10	5	с-в Шикотан 3 балла
				9,5	5	
4,1	5,6			10	5	
				9,5	5	
4,3	5,4*				5	
				9,5	5	
4,0					5	
4,2				10	5	
				9,5	5	

1	2	3			4	5	6	7
		June						
		08	43	15	43,3	147,9	30	А
		08	48	56	43,2	148,0	30	
		09	02	18	43,3	147,7	29	А
		09	23	21	42,9	147,5	30	
		09	24	35	43,1	147,5	30	
		09	27	00	43,0	147,3	30	
		09	42	32	43,4	147,6	30	А
		09	46	22	42,6	148,0	30	
		09	54	41	43,1	148,0	30	А
		09	57	30	43,2	147,8	30	Б
		10	45	01	43,2	147,7	25	А
		10	50	20	43,2	147,6	30	
		11	04	20	43,3	147,7	30	
		11	15	39	43,2	147,6	30	
		11	21	21	43,2	147,8	30	Б
		13	25	22	43,1	147,3	30	А
	14	14	26	57	46,5	152,3	30	А
		14	28	20	42,3	147,8	30	А
		15	29	11	43,1	147,7	30	А
		17	11	15	43,2	147,7	30	А
		17	33	39	43,1	148,0	30	А
23		17	37	12	43,1	147,8	24	А
		17	41	41	43,2	147,6	30	Б
24		18	38	02	43,5	148,0	30	А
		18	42	07	43,4	148,0	30	
		18	44	07	43,3	148,0	30	Б
25		18	49	41	43,4	147,9	30	А
		18	52	05	43,1	147,9	30	А
		19	01	05	43,2	148,1	30	Б
		19	14	03	43,3	147,9	50	А
		19	20	09	43,4	148,0	30	
		19	38	43	43,4	148,0	30	Б
		20	01	35	43,3	148,2	30	Б
		20	02	50	43,1	148,1	30	Б
		20	05	38	43,5	148,0	30	
		20	07	48	43,2	148,0	30	Б
		20	12	20	43,2	147,6	30	Б
	14	20	28	32	43,4	147,8	30	
		20	31	37	43,6	148,0	30	Б
		20	35	26	43,7	147,8	24	А
		21	00	22	43,5	148,0	30	А
		21	41	06	42,7	147,2	30	
		22	14	04	43,5	147,9	30	А
		22	21	59	43,2	147,6	30	А
		22	33	38	43,2	147,8	30	А
		23	20	32	42,8	147,6	30	
26	15	00	19	30	43,2	148,0	29	А

8	9	10	11	12	13	14
			June			
5,6	6,2 6,0*	6,2	5,7		5	о-в Шикотан 3–4 балла
				9,5	5	
5,1	6,2 5,8*	6,4	6,0		5	
				9	5	
				9,5	5	
				9	5	
4,0				10	5	
				9	5	
3,9				9,5	5	
4,0				10	5	
5,3	6,1 5,8*	6,0	6,0		5	
				9	5	
				9	5	
				9	5	
				9	5	
				9	5	
4,0				10	3	
				10	5	
				9,5	5	
5,4	6,2 6,0*	5,8	5,7		5	о-в Шикотан 3 балла
				10	5	
5,8	6,0 5,9*	6,0	5,6		5	
				10	5	
6,7	6,7 6,5*	6,6	6,1		5	п. Малокурильское 5–6 баллов; о-в Хоккайдо 2 балла
				10	5	
				10,5	5	
5,7	5,9*				5	
5,3				11	5	
				10,5	5	
5,4	6,9 6,1*	7,0	7,2		5	
				9,5	5	
				10	5	
4,7				9,5	5	
				9,5	5	
				9	5	
				9,5	5	
4,6				10	5	
4,2				10	5	
4,7	5,6*			10,7	5	
5,0	5,8*				5	
				9	5	
				9,5	5	
4,3	5,1*			10,5	5	
				10	5	
4,1					5	
				9,5	5	
7,0	7,1 7,0*				5	о-в Шикотан 5 баллов

1	2	3			4	5	6	7
June								
		00	22	37	43,2	147,8	20	А
		00	28	27	43,0	148,1	30	
		00	30	28	43,4	148,3	20	
		00	31	50	43,0	148,3	30	
		00	54	14	43,4	148,0	30	
		01	03	31	43,3	148,1	17	А
		01	15	44	43,3	148,0	25	А
		01	18	14	43,1	147,9	30	А
		01	28	36	43,5	146,6	30	А
		01	33	41	43,1	148,1	30	А
		01	39	17	43,0	148,2	30	
		01	46	17	43,1	147,9	30	
		02	06	42	43,1	148,1	30	
27	15	02	09	10	42,5	148,2	26	А
		02	16	03	43,2	148,6	24	А
		02	30	45	42,6	147,9	30	
		02	34	28	43,4	147,7	30	
		02	35	12	43,1	148,0	30	
		02	41	17	43,9	148,1	20	А
		03	02	43	42,8	148,4	30	А
		03	08	28	42,7	148,0	30	
		03	19	20	43,2	148,4	30	
		03	29	55	43,4	148,0	30	А
		05	11	58	43,2	147,6	30	А
		05	12	48	43,2	147,7	30	Б
		06	02	32	43,5	147,6	24	А
		06	16	33	43,2	148,1	30	А
		07	15	39	43,3	148,0	24	А
		07	27	34	42,8	148,1	30	
		07	38	07	43,2	147,7	30	
		07	42	07	43,1	148,7	25	А
		08	15	06	43,5	148,0	30	А
		08	47	10	43,2	148,3	25	А
		09	00	47	43,1	147,7	30	
		09	21	35	43,3	147,8	30	
		09	24	24	43,4	147,9	20	
		09	30	14	43,4	147,8	20	А
	15	09	34	43	43,3	147,8	30	
		09	41	00	43,2	147,8	30	
		09	45	14	43,5	148,0	30	
		09	57	03	42,6	148,0	30	А
		09	59	57	43,5	147,8	30	
		10	46	38	43,3	148,3	30	А
		10	53	02	43,0	147,4	30	
		10	58	00	43,0	147,4	20	А
		10	59	58	43,0	147,4	30	
		11	14	32	43,3	147,8	30	
		11	49	54	42,9	148,1	30	

8	9	10	11	12	13	14
				June		
				11,5	5	
				9,5	5	
				10	5	
				9	5	
				9	5	
				10	5	
				10	5	
				9,5	5	
				9,5	5	
				9,5	5	
				9,5	5	
				9	5	
				9,5	5	
5,5				11,5	5	Малокурильское 3 балла
	5,6*			10	5	
				9,5	5	
				9	5	
				9,5	5	
				10	5	
				9,5	5	
				9,5	5	
				9	5	
				9,5	5	
				9,5	5	
				9,5	5	
4,5	6,0		5,3		5	Малокурильское 3 балла
	5,5*					
				10,5	5	
4,6	6,0		5,8		5	
	5,6*					
				9	5	
4,3				9	5	
3,9				10	5	
4,9	5,9	5,8	5,4	10	5	
					5	
	5,6*					
				9	5	
				9	5	
				9	5	
4,2			5,0	10	5	
				9	5	
				9	5	
				9	5	
4,3			5,0	10	5	
				9	5	
4,7	6,1	6,0	5,4	10,5	5	о-в Шикотан 2–3 балла
	5,6*					
				9	5	
4,4			5,0	10	5	о-в Шикотан 2–3 балла
				9	5	
				9,5	5	
				9	5	

1	2	3			4	5	6	7
				June				
		11	52	36	43,2	148,0	30	
		12	19	52	43,2	148,1	30	А
		15	11	53	42,9	148,3	30	
		16	49	58	43,3	147,9	30	А
		17	45	27	42,7	148,1	30	
		20	24	14	42,7	147,9	29	А
		20	34	32	42,6	147,9	30	А
		20	39	10	43,0	147,3	25	
		21	11	40	43,0	148,2	30	
		21	14	32	43,1	148,0	30	
		22	39	05	43,3	147,8	30	
		23	08	45	43,3	148,3	27	А
	15	23	20	52	43,5	148,2	30	
		23	30	46	43,4	148,3	27	А
		23	41	41	43,6	148,0	30	
	16	04	35	41	43,2	147,6	30	А
		09	41	17	43,2	147,6	30	
		16	46	25	50,1	156,9	30	Б
		17	05	30	43,2	147,7	30	А
		17	07	26	43,0	148,0	30	
		17	22	47	43,5	147,7	30	А
		21	09	00	43,3	147,9	30	А
		22	19	50	43,4	147,8	30	А
		22	39	21	43,3	147,9	30	А
		22	56	42	42,9	147.8	30	А
	17	00	07	54	43,4	147,8	30	Б
		00	46	21	48,6	156,7	30	
		01	00	25	43,2	147,6	30	А
		01	46	15	42,9	147,6	30	Б
		08	42	29	43,1	148,2	30	А
		13	23	15	42,4	147,8	30	А
		17	46	21	50,2	156,9	30	А
		19	54	27	43,0	147,6	30	Б
		20	14	09	47,6	147,1	350	Б
	18	10	01	00	42,9	148,0	30	А
		12	05	39	43,1	147,7	30	Б
	18	12	08	00	42,7	148,1	30	Б
		13	35	03	42,8	147,5	40	Б
		17	08	35	43,2	148,4	40	Б
		18	54	15	43,1	148,3	30	Б
	19	01	19	27	43,2	147,8	30	А
		01	54	16	44,3	149,0	40	А
		03	04	50	43,4	148,3	30	А
		03	41	30	43,2	147,9	30	А
		05	08	49	43,3	147,9	30	А
		08	25	43	42,9	147,8	30	
		08	27	11	43,5	147,6	30	А
		08	52	16	43,4	147,8	30	А
		12	37	33	43,0	148,0	30	А
		17	37	31	43,3	148,0	30	А
	20	03	37	30	43,3	147,8	30	А
		13	05	20	42,9	147,8	30	А
		18	15	03	43,1	148,0	30	А
		20	24	08	43,0	147,6	30	А
	21	02	39	00	43,0	147,6	30	Б

8	9	10	11	12	13	14
				June		
				9	5	
				9,5	5	
				9	5	
				10	5	
				9,5	5	
				10	5	
4,1				10	5	
				9,5	5	
				9,5	5	
				9,5	5	
				9	5	
4,7	6,0	5,9	5,2		5	
	5,6*			9,5	5	
4,9	6,3	6,0	5,5		5	
	5,8*			9,5	5	
				9,5	5	
				9	5	
				9,5	1	
				9	5	
				9	5	
				9,5	5	
4,2	5,1*				5	
				9,5	5	
4,5	5,4*				5	
				9,5	5	
				9	5	
				9,5	1	
				9	5	
				10	5	
				9	5	
				9,5	5	
				9,5	1	
				9,5	5	
					8	
				9	5	
				9	5	
				9	5	
4,5	6,0	5,7	5,6	10,5	5	
				10	5	
				10	5	
				9	5	
				9,5	4	
				9	5	
	5,1*			10	5	
4,3					5	
				9	5	
4,8	5,5*				5	
4,3					5	
				9,5	5	
				9,5	5	
				9,5	5	
4,6					5	
				9	5	
				9,5	5	
				9	5	

1	2	3			4	5	6	7
				June				
		03	21	55	43,2	147,7	30	
		05	21	54	43,2	147,7	30	
		05	54	16	43,3	147,7	30	
		09	49	38	42,9	147,5	30	Б
		10	59	30	43,2	147,4	30	Б
		11	19	56	43,1	147,7	20	
	21	16	05	38	43,0	147,7	30	Б
		20	59	38	46,8	153,3	20	Б
	22	01	50	40	43,3	147,8	30	Б
		01	52	19	43,4	147,3	30	
		07	32	40	50,4	157,0	20	
		09	06	14	42,9	147,3	30	А
		10	02	07	43,0	147,5	30	
		10	18	49	43,1	147,5	20	
		16	29	41	43,3	147,9	30	Б
		16	42	25	47,1	154,9	40	Б
		18	37	18	43,3	147,9	30	
		19	42	16	43,0	148,0	30	
28		22	44	09	42,9	147,4	30	Б
		22	52	12	43,0	147,3	30	Б
		22	56	51	43,0	147,5	30	А
29		23	00	52	43,0	147,4	20	Б
		23	05	51	43,1	147,8	30	
		23	06	16	43,3	147,8	30	
		23	07	25	42,9	147,4	30	
		23	08	28	43,2	148,0	30	
		23	15	42	42,9	147,3	30	Б
		23	17	24	43,2	147,5	30	Б
		23	21	17	43,1	147,5	30	
	22	23	33	28	43,3	147,9	30	
		23	35	56	43,1	147,5	30	Б
		23	37	13	42,9	147,5	30	А
		23	38	48	42,9	147,5	30	
		23	39	08	42,9	147,5	30	Б
		23	43	47	42,9	147,1	30	Б
		23	46	36	42,9	147,2	30	Б
		23	49	24	42,9	147,2	30	Б
		23	57	40	42,9	147,1	30	Б
	23	00	02	01	42,8	147,4	30	
		00	24	25	42,9	147,1	30	
		00	50	37	43,0	147,1	30	
		00	54	02	43,1	147,4	20	
		01	20	55	43,0	147,4	30	
		01	22	42	42,8	147,2	24	А
		01	27	57	43,0	147,4	30	А
		01	43	06	42,6	147,4	30	
		02	27	46	43,0	146,9	30	Б
		03	19	03	42,7	147,4	30	
		04	07	41	43,0	147,3	30	Б
		07	09	10	42,8	147,4	30	Б
30		09	13	41	43,0	147,2	25	А

8	9	10	11	12	13	14
				June		
				9	5	
				9	5	
				9	5	
				9,5	5	
				9,5	5	
				9	5	
				9	5	
				9,5	3	
4,5	5,5	5,5	5,0		5	
				9,5	5	
				9	1	
				10	5	
				9	5	
				9	5	
				9,5	5	
				10	2	
				9	5	
				9	5	
6,7	6,5 6,4*	6,4			5	о-в Шикотан 4 балла; Южно-Курильск 3–4 балла
				9,5	5	
				9,5	5	
6,0	6,8 6,0*	6,6			5	о-в Шикотан, Южно-Курильск 3–4 балла
				9	5	
				9	5	
				9,5	5	
				9	5	
				10	5	
				9,5	5	о-в Шикотан 2 балла
				9	5	
				9	5	
				10	5	
4,5				10	5	
				9	5	
				9,5	5	
			4,4	10,5	5	
				9	5	
				9	5	
				9,5	5	
				9,5	5	
				9	5	
				9,5	5	
				9,5	5	
				9,5	5	
4,5			5,8		5	
4,5	6,3		6,1		5	
4,0				9,5	5	
				9,5	5	
				9,5	5	
3,5	6,3	6,3	6,2	9,5	5	
6,1	6,0*			10,5	5	
					5	

1	2	3			4	5	6	7
		June						
		09	17	47	42,9	147,1	30	Б
		10	20	44	43,0	147,4	30	
	23	11	25	24	42,8	147,2	30	
		11	31	32	42,8	147,1	30	
		11	45	48	42,8	147,1	30	
		11	51	57	42,8	147,1	30	
		11	56	26	42,9	147,3	25	А
		12	11	01	43,0	147,1	30	Б
		12	21	37	42,8	147,1	20	А
		12	38	45	42,8	147,2	30	Б
		12	45	24	42,9	147,1	24	А
		13	08	31	42,9	147,1	30	Б
		13	26	37	42,9	147,1	30	Б
		14	02	27	42,9	147,2	30	Б
		14	32	30	43,0	147,2	20	Б
		14	57	57	43,0	147,3	30	
		15	26	42	42,9	147,1	30	А
		19	28	41	42,7	147,1	30	Б
		19	30	14	43,0	147,2	30	
		22	18	03	42,9	147,1	30	А
		22	33	10	42,8	147,1	30	
	24	01	51	05	43,0	147,3	30	Б
		02	17	14	43,0	147,5	30	Б
		04	18	55	42,8	147,0	30	Б
		07	23	41	47,1	154,4	30	
		11	40	31	43,0	147,4	20	А
	24	12	21	59	47,4	152,6	110	А
		16	21	46	46,9	146,6	360	А
		18	18	14	43,9	148,5	30	А
		18	52	28	43,2	147,9	20	А
		19	04	13	43,1	147,9	30	
		21	23	16	43,0	147,1	30	
	25	02	03	35	43,8	147,2	30	
		04	58	10	43,0	147,1	25	А
		12	30	21	42,3	148,1	30	Б
		13	05	50	42,9	147,1	30	
		13	08	40	42,9	147,0	30	
		13	39	00	42,8	147,4	30	Б
		16	14	22	43,2	147,8	16	Б
		21	35	49	43,3	148,0	40	
	26	04	25	32	42,8	147,1	40	Б
		04	28	22	42,9	148,3	40	А
		07	31	52	42,9	147,1	40	А
		09	07	06	42,8	147,2	40	Б
		09	17	38	42,9	147,2	40	А
		09	22	43	43,0	147,1	40	А
		09	29	44	42,9	147,7	40	А
		09	47	32	42,9	147,2	40	А
31		10	31	08	43,1	148,0	23	А
		11	17	39	43,2	147,9	40	А
	26	12	30	30	42,9	148,0	40	А
		13	07	00	42,9	148,2	30	А

8	9	10	11	12	13	14

June

				10,5	5	
				9,5	5	
				9	5	
				9,5	5	
				9,5	5	
				9	5	
4,8	5,2*		5,2		5	
				9,5	5	
				10,5	5	
				9,5	5	
4,6	5,2*				5	
				10	5	
				10	5	
				9,5	5	
4,0				10	5	
				9	5	
				9,5	5	
				9,5	5	
				9	5	
4,1				10,5	5	
				9	5	
				9,5	5	
				9,5	5	
				10	5	
				9	2	
4,0				10	5	
					2	
			4,3		8	
				10	4	
4,5			5,4	10,5	5	
				9,5	5	
				9	5	
				9	5	
4,1	5,1*			10,5	5	
				9	5	
				9	5	
				9,5	5	
				9,5	5	
4,4	6,0		5,7	10	5	
	5,3*					
				9	5	
				9,5	5	
				9	5	
4,5				10	5	
				9	5	
				10	5	
				9,5	5	
				9,5	5	
4,2				9	5	
					5	
5,6	6,4					
	5,9*			9,5	5	
				10	5	
5,3	6,2			11,5	5	
	5,7*					

1	2	3			4	5	6	7
				June				
		14	54	27	42,9	147,1	40	А
		15	02	16	42,9	147,1	40	А
		15	27	03	42,9	148,1	40	А
		15	29	42	43,8	147,5	30	Б
		23	43	00	42,8	147,2	30	А
	27	02	17	29	42,9	147,6	30	
		08	56	37	43,3	147,9	25	А
		14	42	27	43,1	147,8	30	
		19	24	28	42,9	147,5	30	
		23	24	13	45,1	151,5	30	
	28	00	40	17	43,3	148,2	30	
		02	08	32	43,0	148,3	30	
		02	50	50	43,2	148,0	30	А
		03	41	33	43,1	147,7	30	Б
		05	04	13	47,7	155,6	40	
		06	29	21	42,8	147,9	40	А
		07	20	35	43,5	147,7	30	
		17	08	48	43,7	148,0	30	
		19	41	34	42,8	147,5	30	
		21	28	18	43,0	147,4	30	
	29	01	59	06	43,1	147,7	40	Б
		02	10	52	43,1	147,7	40	Б
		10	04	42	42,8	148,0	40	А
	29	10	07	06	42,6	148,0	40	А
		14	45	11	42,7	148,1	40	А
	30	03	58	34	44,6	146,7	160	А
				July				
	1	08	45	21	42,9	148,1	30	
		12	14	16	46,6	153,7	30	
	2	02	02	26	43,0	147,1	30	Б
		10	35	42	49,4	156,0	30	Б
		11	53	04	42,8	147,1	30	
		13	12	13	43,4	146,8	110	А
		19	42	34	48,1	154,5	70	А
		20	20	37	48,1	154,6	40	
		23	35	43	42,8	148,0	30	
	3	03	47	28	43,4	147,8	20	А
		06	22	51	42,6	147,9	30	Б
		06	33	32	46,2	152,8	40	Б
		19	20	42	42,9	147,2	30	
	4	09	48	30	43,0	147,9	30	
	5	07	24	39	43,0	147,8	30	
		12	38	34	43,1	147,6	30	
	6	02	35	35	43,1	148,0	30	Б
		02	38	08	43,3	148,0	30	А
		02	41	02	43,2	148,0	30	А
		02	48	45	43,3	148,0	30	Б
		08	01	26	48,9	156,6	40	
	6	22	51	09	42,9	147,6	30	
	7	00	25	27	51,3	160,7	30	
		16	48	55	42,8	148,0	30	Б
		19	10	07	43,2	145,5	40	Б

8	9	10	11	12	13	14
				June		
				9	5	
				9,5	5	
				10,5	5	
				9,5	5	
4,3				10,5	5	
				9,5	5	
4,1				10	5	
				9,5	5	
				9,5	5	
				9	3	
				9	5	
				9,5	5	
4,8	5,6*			10,5	5	
3,8				9,5	5	
				9,5	2	
				9	5	
				9,5	5	
				9	5	
				9	5	
				9	5	
				9,5	5	
				9	5	
				9,5	5	
				9	5	
				9	5	
					5	
				July		
				9	5	
				9,5	3	
				9,5	5	
				9,5	2	
				9	5	
					5	
4,8	5,6	5,5	5,8		2	о-в Матуа 2–3 балла
				9	2	
				9,5	5	
4,0	5,0*			10	5	
4,0				10,5	5	
				9,5	3	
				9,5	5	
				9	5	
3,7				9,5	5	
				9	5	
				9,5	5	
4,0				10	5	
4,1				10,5	5	
4,0				10	5	
				9	2	
				9	5	
				9	1	
				9	5	
				10	5	

1	2	3			4	5	6	7
				July				
	8	07	28	27	47,1	153,8	30	Б
		14	42	02	44,4	148,4	30	Б
	9	03	55	46	43,3	147,2	30	Б
32		11	34	43	43,2	147,4	20	А
		14	55	02	43,0	147,4	30	
		14	56	03	42,7	147,7	30	
		17	17	47	43,0	147,5	30	Б
	10	01	02	28	43,4	146,0	30	
	11	01	59	55	42,8	148,2	20	А
		08	57	44	43,5	146,4	50	Б
		21	44	33	43,2	147,8	30	Б
	12	07	34	48	49,7	156,5	30	
		13	08	06	42,6	147,6	30	
		16	28	21	51,0	151,0	530	А
		20	02	44	43,2	148,1	30	
	13	01	32	48	43,2	148,0	30	
	14	05	01	00	43,3	148,0	30	Б
	15	04	22	20	43,0	147,8	30	
	15	16	11	19	42,3	143,1	50	Б
		18	08	53	42,9	148,0	30	Б
	16	03	24	45	43,3	146,2	80	А
	17	15	42	10	46,0	150,3	160	А
		21	55	21	48,2	154,4	30	
	18	03	51	14	49,4	156,2	30	
		21	59	37	46,5	154,2	30	Б
	19	02	14	56	48,6	156,1	30	Б
		06	42	37	46,8	153,9	30	Б
		12	26	06	46,3	152,5	30	Б
33	20	08	02	42	44,2	148,0	95	А
	21	06	36	33	50,1	156,2	80	Б
	22	10	25	24	46,6	146,4	340	А
		20	36	28	46,4	152,8	30	
	25	19	51	01	44,5	140,6	260	Б
		22	47	45	43,0	146,9	20	А
	26	01	12	56	43,0	147,0	20	Б
		01	21	16	44,2	148,3	30	Б
		02	33	29	43,0	146,7	30	Б
	27	18	55	00	48,6	156,7	30	
34	29	14	00	35	46,6	151,6	100	А
		16	10	46	46,5	151,7	100	Б
				August				
	1	03	54	07	48,3	155,2	40	А
		03	58	01	43,1	147,9	40	А
	2	16	39	57	49,2	156,8	40	А
	3	06	26	27	49,7	156,6	40	А

8	9	10	11	12	13	14
						July
				9,5	2	
				9,5	4	
				9	5	
5,5	6,2 5,8*	6,1	5,7		5	Южно-Курильск 2–3 балла
				9	5	
4,0				10	5	
4,1				10	5	
				9,5	5	
				9,5	5	
				9	5	
				9,5	5	
				9,5	1	
				9	5	
					8	
				9	5	
				9	5	
				9,5	5	
				9,5	5	
				9,5	6	
4,1				10	5	
4,3	5,4*		5,0	11	5	Южно-Курильск 2–3 балла
					3	
				9,5	2	
				9	1	
				9,5	2	
				10	2	
				9	2	
				9,5	3	
5,6	6,4 6,0*	6,4	6,3		5	Малокурильское 4 балла; Южно-Курильск 3–4 балла; Курильск 3 балла
				9,5	1	
					8	
				9	3	
					7	
4,9	5,9 5,5*	5,7	5,9		5	
4,1				10,5	5	
3,6				9,5	4	
				9,5	5	
				9,5	2	
	6,1 5,5*	6,0	6,0		3	о-в Симушир 4 балла
					3	
						August
				10	2	
3,9				10	5	
4,0				11	1	
				9	1	

1	2	3			4	5	6	7
		August						
		20	53	09	44,7	150,2	40	А
	4	09	45	56	44,6	149,2	30	Б
		18	51	07	48,8	156,4	35	А
		19	00	04	46,0	150,8	110	А
		21	27	51	50,5	157,7	20	А
	5	08	03	20	50,3	156,6	70	А
	6	16	24	16	42,9	147,4	40	А
35[1]		21	37	41	43,8	139,4	230	А
	7	12	47	54	48,5	156,5	40	
		20	26	33	43,8	146,1	130	А
	10	14	38	55	49,1	158,6	40	А
	11	16	31	16	43,9	148,2	30	Б
	12	04	01	23	50,2	156,8	40	А
		12	53	37	45,7	150,3	110	А
	13	03	25	42	48,8	156,6	40	А
	13	04	14	39	47,3	154,6	40	Б
		13	52	54	42,9	148,0	30	А
	17	00	45	59	44,2	147,0	90	А
		07	58	42	42,6	145,5	40	Б
		23	15	33	45,6	154,5	40	Б
	18	02	49	25	42,0	143,9	40	А
	19	07	44	10	50,5	157,2	10	А
		22	52	21	42,6	146,5	40	Б
	20	22	49	18	48,9	156,5	40	А
	21	13	43	30	46,4	147,8	260	А
	22	03	42	42	43,2	148,2	40	Б
		20	42	08	42,0	142,2	60	А
	23	11	41	14	44,6	147,9	90	А
		20	24	15	51,1	158,0	40	Б
	24	05	22	47	43,1	148,1	40	А
		20	44	31	43,1	147,9	40	А
	25	18	11	33	42,6	147,2	40	
	28	16	45	27	43,7	147,0	40	А
	29	11	57	24	46,2	152,0	40	А
		22	15	18	48,9	156,6	40	А
	30	13	51	44	49,6	156,2	40	А
	31	20	07	36	43,3	146,5	40	А
		22	41	31	44,4	148,2	60	А
		September						
	1	16	26	15	42,8	147,7	30	А
	2	15	37	02	43,3	146,5	40	А
		20	05	12	46,2	151,7	60	А
	3	06	18	00	42,7	147,5	40	А
		07	13	21	43,7	148,3	40	А
		09	07	15	50,0	157,0	40	А
		10	36	10	46,7	152,8	40	А
		14	52	00	43,4	146,1	40	А
	4	09	54	21	42,8	148,2	40	А
		09	55	34	42,9	148,0	40	Б
		15	44	24	42,9	148,2	40	А

[1] Earthquake located outside limits of map of epicenters

8	9	10	11	12	13	14
			August			
				9	4	
				9,5	4	
				10	2	
	5,4		5,3		3	
				9	1	
				9	1	
				9	5	
	6,4	6,4	6,2		7	
				9,5	2	
					5	
4,3	4,9*			10	1	
				9	5	
				10,5	1	Северо-Курильск 1–2 балла
					3	
				9,5	1	
				9,5	2	
4,1	5,0*			10	5	
					5	
				9,5	6	
				9,5	3	
				9,5	6	
				9,5	1	
				9	5	
				11	1	
					8	
				9	5	
				9	6	
					4	
				9,5	1	
				10,5	5	
				10,5	5	
				9	5	
				9	5	
				10	3	о-в Симушир 4 балла
3,9				10	1	
				9,5	1	
				9,5	5	
				9,5	4	
			September			
				10	5	
				9,5	5	
				10	3	
				9,5	5	
				9,5	5	
				9,5	1	Северо-Курильск 1–2 балла
				9	3	
				9,5	5	
				9,5	5	
				9	5	
				9,5	5	

1	2	3			4	5	6	7
				September				
		15	49	15	43,4	147,9	50	А
		17	20	44	43,2	147,9	30	А
	5	00	32	41	43,6	148,7	40	Б
		01	47	34	43,0	148,0	40	А
		07	20	38	42,7	148,3	40	А
	7	11	40	41	42,9	139,3	200	А
		16	29	03	44,4	148,1	50	А
	8	09	12	54	49,7	154,7	175	А
		18	35	23	42,3	146,4	40	А
	10	07	55	10	43,8	147,2	80	А
	12	04	41	50	44,3	148,2	40	
		17	29	51	47,8	154,4	40	А
	13	13	25	12	43,1	148,0	40	Б
	14	03	42	59	49,8	157,0	30	А
	15	22	45	22	47,5	154,1	40	
	16	16	55	40	43,0	146,6	40	
	17	16	51	40	42,5	141,7	80	А
	18	08	24	18	44,4	148,2	40	А
		19	14	38	43,3	148,0	40	А
36	19	03	15	22	47,0	152,0	120	
	20	09	54	15	43,2	147,9	40	Б
		14	08	27	43,0	148,1	40	А
	23	07	30	16	44,0	148,8	20	А
		20	47	52	50,2	157,0	50	А
	25	11	23	34	45,4	150,2	120	А
		11	35	10	43,0	145,4	40	А
	28	00	55	45	42,3	141,3	110	А
		20	19	02	46,2	153,6	40	А
	30	05	16	49	44,4	147,3	150	А
		07	25	28	44,3	149,1	40	Б
		09	42	57	42,6	143,7	40	А
				October				
	1	08	14	17	43,0	147,9	30	
	2	08	57	54	44,2	148,0	30	Б
		11	06	48	43,2	145,9	75	А
		13	19	15	42,6	145,2	30	Б
	3	02	38	25	49,6	155,6	140	А
		19	45	07	45,3	148,4	10	А
	5	14	34	36	42,4	137,8	250	Б
		21	08	01	43,5	146,2	30	Б
	7	05	06	34	43,5	146,2	30	
		12	32	44	43,9	146,7	50	Б
	9	13	10	45	44,8	140,9	270	А
		19	42	22	46,2	154,4	30	Б
	11	02	22	27	43,3	147,8	30	А
		03	26	20	46,0	152,1	20	А
		16	13	50	42,9	148,0	30	Б
	12	01	23	55	43,3	147,7	30	
	13	06	34	17	43,7	146,7	40	Б
		11	51	37	43,0	147,8	20	А
	15	04	44	22	43,1	149,1	30	Б
		07	12	11	47,8	156,9	30	Б
		14	49	27	44,2	147,2	100	А
	16	02	55	54	42,6	147,4	30	

8	9	10	11	12	13	14
				September		
4,6	5,4*			10	5	
				9	5	
				10	5	
				10	5	
	5,2		4,8		7	
				10,5	4	
					2	
				9,5	4	
				10	5	
				9	4	
				10,5	2	
				9	5	
				9,5	1	
				9,5	2	
				9	5	
				9,5	6	
				9,5	4	
				10	5	
4,3					3	
	6,3	6,4	6,0			
	6,0*					
				9	5	
				9,5	5	
				10,5	4	
				10	1	
					3	
				9,5	6	
					6	
				10	3	
4,2					5	
				9	4	
				10,5	6	
				October		
				9,5	5	
				10	5	
4,8	6,3	5,8	5,8		5	
				9,5	6	
			4,9		1	
				9	4	
					7	
				9	5	
				9	5	
				9	5	
	5,6		5,2		7	
				9	3	
				9,5	5	
4,0				10,5	3	
				9,5	5	
				9	5	
				10,5	5	
5,0	5,5	5,2	5,1		5	
	5,4*					
				10,5	5	
				9,5	2	
					5	
				9,5	5	

1	2	3			4	5	6	7
				October				
		03	14	30	43,2	148,0	30	А
		21	55	31	43,7	146,7	50	Б
	17	17	58	12	42,4	145,0	40	А
	18	14	32	26	44,3	148,2	60	В
	19	01	27	48	44,0	148,6	30	Б
	21	17	54	59	43,1	147,8	30	
	22	04	34	25	44,1	148,4	30	
		05	10	45	49,4	150,0	420	А
		14	30	57	45,0	142,9	280	А
	26	14	23	11	46,3	153,5	40	А
	27	02	52	27	48,6	154,3	40	Б
	28	20	45	53	42,5	148,0	30	
	29	00	35	38	45,2	153,0	30	
		00	37	16	45,2	153,0	30	
37	30	01	41	32	42,0	142,9	60	А
				November				
	2	00	02	42	49,1	155,3	40	А
	4	09	42	43	45,8	150,2	110	А
		11	30	59	43,7	138,1	250	А
	6	07	59	36	43,6	147,0	60	А
	7	00	28	06	43,2	148,1	40	
	9	02	04	22	49,8	159,4	40	А
		18	10	01	43,2	146,3	40	А
	10	04	39	55	43,4	147,8	40	А
		08	33	24	43,5	147,7	40	Б
		10	24	50	42,9	148,1	30	
	11	04	25	33	46,5	145,7	355	А
		04	54	40	44,2	148,8	40	Б
	13	15	48	46	50,2	157,0	80	А
		17	25	02	50,3	157,2	33	Б
		18	49	20	50,3	157,2	33	Б
		19	18	35	50,3	157,2	33	
	14	10	31	54	43,4	146,6	40	Б
	15	00	26	40	50,3	157,1	30	
		04	23	27	42,7	146,8	40	Б
		05	42	26	50,3	157,1	30	
		16	12	12	45,6	150,6	60	А
	16	21	23	04	45,0	147,2	10	Б
	17	00	23	41	44,3	148,0	40	Б
	18	05	05	28	45,0	147,4	10	Б
	23	14	24	27	44,6	149,4	40	
38	24	07	58	02	43,3	147,7	30	Б
		08	01	13	43,2	147,8	30	
		08	25	07	43,2	147,6	30	Б
		08	28	40	43,2	147,7	40	Б
39		09	51	46	43,2	147,7	40	А
		09	49	26	43,2	147,6	40	
		10	24	46	43,2	147,7	40	
		11	32	59	43,2	147,7	40	Б
		12	53	04	43,2	147,7	40	
		14	49	40	43,2	147,7	40	

8	9	10	11	12	13	14
			October			
4,2	5,3*			10	5	
				9	5	
5,3	6,1	5,7	5,4		6	
				9	4	
				9,5	4	
				9	5	
				9,5	5	
	5,6		5,4		8	
					8	
4,1	5,5*			10	3	
				10	2	
				9	5	
				9,5	3	
				9	3	
6,0	6,6	6,4	6,3		6	
			November			
				10,5	2	
			6,1		3	
					7	
				9,5	5	
				9	5	
				10	1	
				9	5	
				9,5	5	
				9,5	5	
				9,5	5	
	6,5	6,4	5,8		8	
				9	4	
4,7	6,3	6,1	6,0		1	Северо-Курильск 4–5 баллов
	5,2*					
				9,5	1	
				9,5	1	
				9	1	
				9,5	5	
				9	1	
				9	5	
				9,5	1	
				9,5	3	
					8	п. Буревестник 3 балла
4,7	5,3*					
				9,5	4	
				9,5	8	
				9	4	
					5	о-в Шикотан 3 балла
5,8	6,5	6,1	6,0			
	6,4*			9	5	
					5	о-в Шикотан 2–3 балла
4,7	5,7*					
				9,5	5	
					5	о-в Шикотан 3 балла
5,6	6,3					
	6,1*					
				9	5	
				9	5	
				9,5	5	
				9	5	
				9	5	

1	2	3			4	5	6	7
					November			
	24	18	01	53	43,1	147,6	40	
		22	33	32	43,2	147,6	40	Б
	25	05	33	58	43,1	147,8	40	
		07	06	52	43,3	147,7	40	
	26	12	35	28	43,2	147,7	40	
		14	14	17	42,8	147,3	25	А
	27	06	51	11	43,0	147,6	40	
		15	14	17	42,9	147,2	40	
		19	21	57	43,2	147,7	30	А
		19	34	40	43,3	147,8	25	А
		19	48	56	43,1	147,5	40	Б
		19	55	36	43,3	147,8	40	
		20	57	09	43,4	147,3	30	А
		22	33	40	43,1	147,6	40	
	28	02	54	03	43,2	147,7	30	
		06	00	49	43,2	147,7	20	А
	29	16	13	31	43,2	147,7	30	
		21	04	25	46,4	153,3	40	Б
					December			
	2	01	38	46	45,3	149,7	50	Б
		14	49	02	44,0	149,6	40	
	3	01	19	02	44,5	149,5	40	
	3	07	14	32	43,2	145,9	50	А
	5	16	07	29	43,3	148,0	40	
		17	01	07	46,1	152,7	40	Б
40		20	14	18	43,4	146,6	80	Б
	6	10	39	10	43,3	147,0	40	Б
	7	07	57	57	43,6	147,2	30	А
	9	03	26	33	43,6	148,7	40	
		07	57	13	43,5	146,4	40	Б
	11	07	07	40	44,6	147,1	150	Б
		12	35	18	43,4	148,7	50	
		16	26	31	42,7	146,4	40	
		16	43	12	44,5	149,3	40	А
	16	04	49	45	43,1	147,1	30	А
		18	26	46	46,5	153,7	40	Б
		20	45	46	42,8	147,7	40	Б
	18	14	48	20	43,5	148,5	40	
	19	11	33	54	43,9	147,0	50	Б
		23	06	41	46,5	153,2	40	А
	20	00	21	02	42,9	148,0	40	Б
41	21	10	54	18	51,9	151,9	550	Б
		14	47	58	43,7	146,8	50	Б
		21	36	26	44,6	150,2	40	Б
	22	10	19	19	42,8	148,2	40	Б
		18	15	55	45,0	150,5	40	
	23	13	24	33	43,3	147,1	40	Б
	24	08	44	00	44,4	148,0	30	
		18	48	02	45,2	151,7	40	А
	25	01	55	00	44,9	151,8	40	А

8	9	10	11	12	13	14
				November		
				9	5	
				9,5	5	
				9	5	
				9	5	
				9	5	
4,7	5,3*			10,5	5	
				9	5	
				9	5	
4,4	5,0*			10	5	
4,7	5,5*			10,5	5	
				9,5	5	
				9	5	
				9,5	5	о-в Шикотан 2 балла
				9	5	
				9	5	
4,5	5,4*			10,5	5	
				9	5	
				9	3	
				December		
				10	4	
				9	4	
				9	4	
5,0	6,0				5	Малокурильское 3–4 балла; Южно-Курильск 3 балла
	5,4*					
				9	5	
				9,5	3	
5,5	6,6				5	Малокурильское 5–6 баллов; Курильск, Южно-Курильск 3–4 балла
	6,5*					
				9	5	
4,5					5	
				9	4	
	5,5*			9	5	
					5	
				9	5	
				9	5	
					4	Курильск 4 балла
4,7	5,8*				5	
4,8	5,5*			9,5	2	
				9,5	5	
				9	5	
				9,5	5	
4,5	5,2*			11,5	3	
				9,5	5	
	6,7		7,1		8	
				9,5	5	
				10,5	4	
				9,5	5	
				9	3	
				9,5	5	
				9	4	
4,9	5,6*			9,5	3	
					3	

1	2	3			4	5	6	7
					December			
		15	36	11	45,1	151,6	50	А
		16	00	14	45,1	151,7	40	А
		16	10	30	45,0	151,7	40	
		17	06	27	45,0	151,7	40	А
		21	38	15	42,8	147,5	40	Б
		21	42	45	42,7	147,5	40	
		22	18	04	42,5	147,5	30	
		22	21	08	43,1	147,2	30	
		22	31	28	42,8	147,5	40	
		23	04	50	42,8	147,3	40	
	26	01	33	54	45,2	151,6	40	Б
		07	17	00	42,7	147,4	40	Б
		10	38	18	42,5	147,3	40	Б
		18	51	58	43,2	148,0	40	
		18	55	38	45,1	151,8	40	Б
	26	19	01	50	42,8	147,5	40	
	27	05	32	24	42,7	147,2	40	Б
		05	25	28	42,8	147,6	40	Б
		06	47	29	43,0	148,0	40	
42		07	41	56	43,1	147,2	40	А
		08	39	55	42,8	147,4	40	
		08	40	46	42,9	147,1	40	
		09	05	34	42,9	147,4	40	
		09	39	10	43,0	147,5	40	
		11	04	08	42,8	147,3	40	Б
		11	41	50	42,9	147,2	40	Б
		12	50	46	43,0	147,5	40	Б
		13	43	44	42,7	147,0	40	
		14	08	41	42,8	147,3	40	Б
		16	14	38	42,9	147,4	40	Б
		17	03	43	42,9	147,6	40	А
		20	43	27	43,0	147,4	40	А
	28	03	09	40	42,8	147,3	40	Б
		15	52	15	42,8	147,3	40	
	29	11	42	30	50,1	157,6	10	
	30	16	23	35	43,0	147,7	40	Б
	31	17	17	38	43,0	146,8	40	

* Magnitude M_{PV}--according to SKM-3 instruments

8	9	10	11	12	13	14
			December			
4,7	5,7°			11,5	3	
4,8	5,8°			9	3	
				9,5	3	
4,7					5	
				9	5	
				9	5	
				9	5	
				9	5	
				9,5	5	
				9,5	3	
				9,5	5	
4,7	5,4°			10,5	5	
				9	5	
				10,5	3	
				9	5	
				9,5	5	
4,6	5,5°			9,5	5	
6,1	6,2				5	
	5,9°			9	5	
				9,5	5	
				9,5	5	
				9,5	5	
				9,5	5	
				9	5	
4,5				10	5	
				9	5	
				9,5	5	
				9,5	5	
4,6	5,3°				5	
				9,5	5	
				9,5	5	
				9	5	
				9,5	1	
				9,5	5	
				9	5	

Regional Catalog of Earthquakes in Kamchatka

S. A. Fedotov, I. G. Simbireva, chief compilers
T. S. Lepskaya, L. I. Bogatova, Z. A. Borisova, I. I. Berezovskaya, Ah. V. Yerokhina, T. V. Mindlina, N. I. Pasechko, Ye. V. Popkova, L. I. Pribylova, V. D. Feofilaktov, compilers

Key:

1. Number, in order
2. Number
3. Moment of occurrence, hrs, mins, secs
4. Coordinates of epicenter: φ°N
5. Coordinates of epicenter: λ°E
6. Depth, km
7. Class of accuracy
8. M^{ECCH}_{LH} (for deep m)
9. $K^{\Phi 68}_{S1,2}$
10. Number of region
11. Macroseismic data

№ п/п	Число	Момент возникновения, ч м с	Координаты эпицентра φ°N	λ°E	Глубина, км	Класс точности	M^{ECCH}_{LH} (для глубоких m)	$K^{\Phi 68}_{S1,2}$	№ района	Макросейсмические данные
1	2	3	4	5	6	7	8	9	10	11
				January						
	1	17 49 04,9	52,02	158,73	40	а/б		10,5	11	
	2	05 20 17,3	54,94	160,52	130	а/б		9,5	7	
1		19 31 45,7	52,79	159,70	40	а/б	5,2 m = 5,8	13,0	10	Петропавловск 4–5 баллов; Авача 4–5 баллов
	3	14 39 43,8	60,57	157,06	10–40	н/н		10,6	13	
2	4	00 20 44,8	50,98	158,10	20–30	а/б		12,7	12	
	6	04 45 23,3	55,64	162,02	10	а/б		9,5	6	
	7	04 38 06,0	56,21	164,23	20	а/б		9,6	20а	
	8	00 48 48,5	50,22	157,55	40	а/б		10,0	22б	
		05 03 26,5	53,31	160,45	40	а/б		9,5	9	
		08 30 13,0	55,03	162,18	40	а/б		10,8	7	
	9	18 43 07,8	54,94	168,02	20	б/н		9,7	20б	
	11	01 24 13,0	54,44	161,60	40	а/б		9,5	7–8	
	14	14 16 47,3	50,72	157,05	130–140	а/б		9,6	13	
	16	10 19 30,6	53,98	161,33	30	а/в		11,0	8	
	17	21 03 04,3	51,41	156,80	10	а/в	4,7	10,8	12	Паужетка 2–3 балла
	23	07 31 36,5	50,62	156,96	0	а/в	5,6	9,6	13	
3	28	11 53 30,4	56,10	164,74	40	а/б	m=5,9	13,0	20а	
	29	14 26 24,5	52,73	160,38	30	а/б		10,5	10	
		14 44 33,6	52,84	160.29	30	а/б		10,1	10	

1	2	3	4	5	6	7	8	9	10	11
				February						
4	4	06 25 22,6	51,36	159,86	10–20	а/в	4,8	12,0	11	
		08 30 54,3	51,43	159,55	0	а/в		9,5	11	
		09 24 17,3	51,28	159,80	0	а/в		9,6	11	
		14 34 42,9	50,99	157,85	0	а/б		10,3	12	
		16 20 30,2	54,88	166,00	40	а/в		10,8	206	
5		16 59 09,5	51,30	159,90	10	б/в		11,6	11	
	5	15 00 25,5	52,73	160,39	40	а/б		9,6	10	
		21 29 20,1	56,10	164,15	20	а/б		9,7	20а	
6		23 43 30,0	51,42	159,80	10	а/б		12,1	11	
	6	07 50 57,1	55,81	160,53	160	б/в		10,1	176	
	8	16 20 04,2	56,06	164,10	10	а/б		10,7	20а	
	9	11 06 41,0	51,23	159,81	0	б/м		9,5	11	
		14 00 50,5	54,92	160,59	130	а/в		9,8	7	
	10	04 38 50,9	52,87	159,92	40	а/б		9,8	10	
		15 34 57,7	54,39	167,89	0–10	б/в		10,9	206	
	11	20 05 41,4	55,63	161,63	80	а/б		9,6	6	
	12	10 10 31,5	51,57	157,55	120	а/в		11,3	12	
		13 57 19,7	56,13	164,22	5–10	а/б		9,9	20а	
	13	11 29 00,5	55,75	163,95	5–10	а/в		9,7	206	
	16	04 54 46,4	56,26	164,34	20	а/б		9,9	20а	
	18	18 09 28,4	53,74	160,65	40	а/б		10,1	8–9	
	19	16 53 12,5	51,26	160,08	0	а/в		10,0	22а	
	21	05 52 59,5	54,83	160,99	100–110	а/б		10,9	7	Кроноки 3 балла
		07 43 33,2	52,82	160,10	40	а/б		9,8	10	
		15 34 00,8	56,15	164,20	10	а/б		9,6	20а	
		19 33 21,0	52,65	162,25	40	а/б		9,9	216	
	22	09 26 27,5	54,73	162,26	10–20	б/в		10,2	7	
	23	10 32 17,8	52,57	162,69	40	а/в		10,6	216	
		20 37 52,0	56,10	164,13	10–20	а/б		10,3	20а	
	25	01 04 34,5	54,50	161,58	40	а/б		9,7	7	Кроноки 2 балла.
	26	20 14 21,5	56,24	164,25	10–20	а/б		10,4	20а	
	27	05 03 21,6	55,34	166,49	20–30	а/в		11,2	206	о-в Беринга 2–3 балла
		06 02 50,5	53,35	159,89	70	а/б		10,3	9	
7		14 42 25,7	56,24	164,27	20	а/б		11,6	20а	
				March						
	3	03 33 20,9	52,87	158,10	160	а/в		10,8	10	
		17 25 47,5	56,05	164,15	10–20	а/б		10,3	20а	
	4	10 44 43,5	52,18	160,54	60	а/б		11,1	10	
		10 54 32,8	52,20	160,60	20	а/б		11,2	10	
	5	01 11 41,0	52,21	160,41	20	а/в		10,9	10	
	6	18 18 19,4	51,32	159,95	20	а/в		11,3	11	
	7	00 53 32,3	50,50	157,00	20	а/б		10,3	13	
		15 36 21,5	51,41	159,95	0	б/в		11,3	11	
	9	04 32 24,1	56,13	164,18	5–10	а/б		9,6	20а	
	11	12 39 04,5	55,92	164,39	10	а/б		10,4	20а	
8	15	10 00 23,7	52,71	160,25	40	а/б	4,6	11,7	10	Петропавловск 2–3 балла
	16	11 21 29,7	52,03	158,90	40	а/б		9,8	11	
	19	22 44 23,0	53,56	161,50	20–30	а/в		10,2	8	
	21	08 26 47,0	52,36	159,07	30–40	а/б		10,2	10	
		12 56 57,5	54,93	162,27	20	а/б		9,9	7	

1	2	3	4	5	6	7	8	9	10	11
					March					
	22	01 45 54,2	50,09	156,80	0	а/в		9,6	14	
9		18 54 29,2	54,40	161,65	60	а/б	4,8	12,8	8	Петропавловск 3 балла
	26	10 34 21,1	51,40	159,85	10	б/в		10,0	11	
10		18 02 56,5	52,94	160,05	50	а/б		11,8	10	Петропавловск 3–4 балла; Шипунский 3–4 балла; Тополово 3 балла
	27	18 36 47,0	51,22	160,58	0	а/б		10,2	22а	
	28	11 38 13,0	50,00	156,76	0	а/в		10,1	14	
	31	03 08 41,6	54,42	161,75	20–30	а/б		10,4	7	
					April					
	4	07 32 24,2	55,00	159,17	220–230	н/н		9,7	17а	
	5	14 35 43,4	53,62	160,57	30–40	а/б		9,7	9	
		16 52 03,7	52,03	160,43	10	а/б		10,4	10	
11		16 52 45,0	52,17	160,29	10–20	а/б	6,0 $m = 6,0$	12,9	10	Петропавловск 3–4 балла; Шипунский 3 балла
12		17 49 56,2	52,18	160,25	5–10	а/б	6,2 $m=6,1$	13,8	10	Петропавловск 4 балла; Шипунский 3 балла
		21 24 08,2	52,20	160,32	20	а/в		9,8	10	
		21 53 53,7	52,22	160,04	10	а/б		10,8	10	
		22 32 07,1	52,23	160,30	10	а/б		10,8	10	
	6	05 48 23,4	52,22	160,31	10	а/б		11,2	10	Шипунский 2 балла; Петропавловск 2 балла
		05 51 00,0	52,28	160,31	10	а/б		9,8	10	
		09 10 20,4	52,26	160,11	10	а/б		9,9	10	
13		09 55 18,0	52,11	160,19	10–20	а/б	6,8 $m=6,3$	13,6	10	Петропавловск 4–5 баллов; Шипунский 3 балла; Авача 4 балла
14		10 34 55,0	52,14	160,14	10	а/б	6,8 $m=6,4$	13,5	10	Петропавловск 3–4 балла; Шипунский 3 балла; Авача 3–4 балла
		10 43 14,0	52,22	160,05	10	а/б		10,3	10	
		10 57 04,5	52,35	160,21	10	а/в		9,9	10	Авача 3 балла; Шипунский 2–3 балла
		11 19 59,0	52,26	160,09	10–20	а/б		9,6	10	
15		13 35 56,9	52,16	160,16	20–30	а/б	4,8	12,4	10	Авача 3 балла; Шипунский 2–3 балла

1	2	3	4	5	6	7	8	9	10	11
				April						
16		13 45 38,3	52,21	160,25	10	a/6		11,7	10	Авача 2-3 балла; Шипунский 2-3 балла
		13 49 16,2	52,25	160,10	10	a/6		10,1	10	
		14 21 55,0	52,13	160,03	10	a/6		10,8	10	
		15 36 49,5	52,10	160,05	20	a/6		11,4	10	Петропавловск 2 балла
		16 16 25,7	52,22	160,18	10-20	a/6		11,0	10	Петропавловск 2-3 балла
		13 49 16,2	52,25	160,10	10	a/6		10,1	10	
		14 21 55,0	52,13	160,03	10	a/6		10,8	10	
		15 36 49,5	52,10	160,05	20	a/6		11,4	10	Петропавловск 2 балла
		16 16 25,7	52,22	160,18	10-20	a/6		11,0	10	Петропавловск 2-3 балла
	6	17 05 25,9	52,20	160,33	30	a/6		9,8	10	
		19 10 18,4	53,06	160,00	50	a/6		10,2	9	
		22 40 40,0	52,24	160,21	5-10	a/6		9,7	10	
17	7	03 29 12,3	52,16	160,26	10-20	a/6	4,6	11,8	10	Петропавловск 2 балла
		04 18 31,2	52,56	160,30	10	a/a		10,2	10	
		16 14 12,2	52,29	160,10	10	a/6		9,7	10	
		16 16 26,7	52,22	160,24	20	a/6		9,6	10	
18		17 50 57,4	52,22	160,05	10	a/6	4,9	12,4	10	Петропавловск 2 балла
		20 15 28,8	52,14	160,02	10-20	a/a		9,8	10	
	8	10 07 45,4	55,07	162,70	10	a/a		9,7	7	
		17 02 05,0	52,14	160,07	30	a/6		11,2	10	Петропавловск 2 балла
		18 49 35,6	52,16	159,99	10	a/6		10,5	10	
		21 31 55,4	51,38	160,12	0	б/в		10,4	22а	
19		21 50 42,0	51,58	159,82	10	a/a	4,7	11,5	11	
		23 37 55,1	52,23	160,11	20	a/6		11,4	10	
	9	14 52 59,2	52,18	159,89	10	a/6		10,1	10	
	10	00 28 53,7	52,18	160,41	5-10	a/6		10,7	10	
		01 31 32,5	52,14	160,39	20-30	a/a		9,8	10	
		01 50 37,0	50,59	158,56	40	a/6		10,1	12	
		02 23 03,3	52,16	160,30	20	a/6		10,8	10	
		05 10 58,8	52,14	160,09	10	a/6		9,9	10	
		07 48 02,5	50,51	157,67	30-40	a/a		10,4	13	
		13 20 58,0	52,02	160,06	10	a/6		10,7	10	
		20 19 30,7	52,26	160,63	10	a/a		9,7	10	
		20 20 51,5	52,16	160,40	10	a/a		10,3	10	
	11	01 43 47,9	52,12	160,60	10-20	a/6		10,4	10	
		11 49 14,2	50,43	157,14	20	б/в		9,6	13	
		19 58 30,6	52,12	160,59	30	a/a		10,6	10	
		23 06 31,3	53,99	160,91	40	a/6		9,5	8	
	13	14 08 53,6	54,98	161,80	30-40	a/6		10,0	7	
20	14	20 52 13,4	51,89	160,05	20-30	a/6		11,5	11	
	15	00 34 11,7	51,34	159,85	10	a/a		9,6	11	
	18	06 12 39,1	52,18	160,10	10	a/6		10,7	10	

1	2	3	4	5	6	7	8	9	10	11
					April					
		19 16 58,8	52,54	159,10	40	а/а		10,2	10	Петропавловск 2 балла
		20 19 42,0	52,80	160,78	0	а/б		10,8	9	
21	20	18 48 37,0	51,83	160,05	40	а/б	5,2	12,4	11	Петропавловск 2–3 балла
		18 56 31,8	51,45	160,88	0	а/а		10,7	22а	
		18 58 55,8	56,20	164,23	20	а/б		10,3	20а	
		22 23 06,5	51,68	160,20	5–10	а/а		10,6	11	
	21	04 29 52,5	51,83	160,03	20	а/б		10,0	11	
		12 26 49,0	51,80	160,18	30	а/б		9,5	11	
	23	00 20 06,2	52,90	161,90	10–20	а/б		11,2	9	
	24	03 01 29,0	55,82	162,18	10	а/б		9,6	6	
22	25	14 23 23,5	52,07	160,17	40	а/б	5,2	11,6	10	
	26	01 33 23,5	53,08	159,40	80	а/б		9,6	10	
		12 15 36,5	54,28	161,39	40	а/б		10,0	8	Кронокы 3–4 балла
		20 50 58,0	54,22	161,41	40	а/б		10,4	8	
	29	20 27 03,0	51,79	160,06	30	а/б		10,9	11	
		20 45 49,0	51,79	160,06	20–30	а/б		10,4	11	
	30	02 52 15,0	51,98	160,20	0	а/б		9,9	10	
		07 47 39,0	51,14	158,90	10	а/а		9,7	12	
					May					
	1	19 56 26,4	53,85	160,55	20	а/б		10,2	8	
	3	21 44 42,2	55,73	162,20	20	а/б		9,7	6	
	4	09 34 39,5	54,32	167,49	0–10	б/м		11,4	20б	
	6	14 25 34,5	56,17	164,15	10–20	а/б		9,5	20а	
		19 15 45,6	50,18	156,88	10–40	б/б		9,6	13	
		21 20 42,0	56,17	164,14	20	а/б		10,2	20а	
	7	04 38 21,5	51,92	158,03	110–120	а/б		10,7	11	
	8	12 47 25,0	54,43	161,80	30–40	а/б		9,9	7	
	11	07 36 19,7	53,59	160,76	40	а/б		10,4	9	
	12	21 17 19,4	51,15	159,96	0	а/а		10,6	22а	
	13	23 44 16,5	56,06	164,15	10	а/б		9,8	20а	
	14	05 27 46,2	52,88	159,90	40	а/б		10,2	10	
23		18 37 07,4	50,98	158,01	40	а/а		12,1	12	
	15	09 29 41,0	54,66	162,39	30	а/б		9,6	7	
		17 15 33,5	53,95	168,18	10–20	б/м		9,9	20б	
	16	00 41 25,6	50,28	157,00	20	а/а		10,0	13	
	18	23 21 42,3	54,95	163,95	40	а/а		10,1	20б	
24	20	01 05 19,7	52,14	158,72	40	а/б		11,8	11	
	21	18 16 45,0	52,75	158,05	130	а/б		10,9	10	
25		18 21 40,0	56,11	162,84	20	а/б	4,7	11,8	5	Крутобережово 4 балла
	22	10 10 46,2	50,28	156,92	10–40	б/б		10,2	13	

1	2	3	4	5	6	7	8	9	10	11
					May					
	23	15 04 56,5	52,08	160,12	30	а/б		10,3	10	
	24	12 45 14,0	52,93	160,00	40	а/б		9,7	9-10	
	25	05 23 50,2	56,23	162,90	20	а/б		11,0	5	Крутобереговое 4 балла
	26	06 50 38,5	55,44	166,49	20	а/б		9,6	20а	
		22 14 32,5	55,58	166,22	10	а/б		11,0	20а	
	27	13 54 16,5	55,52	166,64	20	а/в		9,6	20а	
	28	20 35 22,5	55,82	165,51	20	а/в		9,7	20а	
26		22 38 22,3	51,38	158,25	10	а/в		11,5	12	
	31	22 41 39,0	52,84	160,00	40	а/б		9,5	10	
					June					
	2	23 34 57,5	52,95	158,92	100	а/б		10,0	10	
	3	14 50 58,9	53,44	160,48	40	а/б		9,6	9	
		16 21 59,0	52,37	157,63	130-140	а/б		9,9	11	
	4	18 00 11,0	55,38	162,90	20-30	а/б		10,0	6	
	6	10 47 20,0	54,47	161,00	70	а/б		11,1	8	
		16 28 55,5	55,03	162,05	40	а/б		10,4	7	
27	7	15 12 50,5	51,18	158,66	60	а/б		12,0	12	
	9	02 12 49,0	53,10	158,10	170	а/б		10,0	16а	
		03 54 22,5	51,97	160,60	5-10	а/б	5,1	11,3	10	
	10	01 20 38,0	54,77	166,03	40	а/п		9,8	20б	
		18 22 15,5	55,03	160,76	150	а/б		10,1	7	
	13	09 20 07,8	50,52	157,04	0	а/б		10,1	13	
28	14	21 24 39,3	53,45	169,10	20	а/б		12,0	20в	
	15	01 40 33,8	56,25	164,16	20-30	а/в		10,3	20а	
		19 10 42,5	51,84	159,03	40	а/б		10,7	11	
	16	16 46 26,5	50,50	156,97	10-40	б/н		9,7	13	
		18 37 21,5	53,70	160,66	40	а/б		10,3	9	
	17	17 47 21,0	50,45	156,97	10-40	б/н		9,6	13	
	20	02 37 30,2	56,04	164,19	20	а/б		10,1	20а	
		21 20 48,0	55,26	162,37	20-30	а/б		10,2	6	
	21	23 54 30,0	51,85	159,06	20	а/б		9,6	11	
29	22	04 25 17,0	51,82	157,97	130	а/б		12,8	11	Петропавловск 4 балла
	23	01 43 30,7	55,12	162,90	5-10	а/б		10,4	6	
		01 44 17,5	55,10	162,87	20	а/б		12,3	6	
	24	23 10 40,0	52,97	158,29	150	а/в		10,7	10	
	26	08 08 44,0	52,77	160,16	40	а/б		11,4	10	
	27	06 03 08,0	54,49	167,92	40	в/в		11,0	20б	
		16 38 13,2	55,67	160,22	0-5	а/б		11,0	17	Вулк. [volcanic]
	28	05 11 32,0	55,06	162,93	10-20	а/б		9,5	7	
		08 57 05,8	56,33	164,22	40	а/в		10,9	20а	
		11 14 42,0	55,67	160,23	0-5	а/а		9,8	17	Вулк.
		11 51 27,1	55,66	160,13	5-10	б/б		9,6	17	"

1	2	3	4	5	6	7	8	9	10	11
				June						
		12 45 56,7	55,67	160,22	0–5	а/в		10,7	17	Вулк.
		13 50 03,2	55,70	160,17	15–30	а/в		10,3	17	"
		16 15 26,0	55,70	160,22	10–15	а/б		9,9	17	"
	29	10 19 10,0	55,63	162,13	80–90	а/б		10,0	6	
		15 08 44,6	55,64	160,23	10–15	а/б		10,8	17	Вулк.
		17 02 52,8	55,72	160,20	5	а/а		9,6	17	"
		22 28 07,7	55,70	160,27	5–10	а/б		10,6	17	"
	30	13 42 30,3	56,12	164,15	10–20	а/б		9,9	20а	
		14 31 28,8	55,70	160,21	0–5	а/б		10,2	17	Вулк.
				July						
	1	04 07 48,8	55,70	160,25	0	а/а		9,6	17	Вулк.
	2	01 49 59,5	55,66	160,17	0	а/в		9,8	17	Вулк.
30		07 10 52,3	55,65	160,27	10	а/б	5,0	11,5	17	"
		07 34 20,3	55,67	160,25	10–20	а/в	5,0	10,6	17	"
		07 43 34,0	55,63	160,25	0–5	а/б		9,5	17	"
		13 00 50,9	55,67	160,23	5–10	а/в		10,5	17	"
	3	05 00 31,8	56,25	164,19	20–30	а/в		10,3	20а	Крутобере-гово 2 балла
		08 55 10,6	56,26	164,16	40	а/в		10,3	20а	Крутобере-гово 3 балла
		21 52 30,0	55,63	160,23	0–5	а/в		10,5	17	Вулк.
	4	03 09 44,0	50,44	157,59	30	а/б		10,0	13	
		09 53 55,0	55,72	160,27	<0	а/б		10,1	17	Вулк.
		21 36 43,0	55,67	160,23	<0	а/б		9,5	17	"
	5	05 04 33,3	52,05	158,49	40	а/б		9,6	11	
		05 24 14,4	55,95	164,06	0	а/б		10,7	20а	
		18 50 34,0	52,36	160,71	10	а/б		9,5	10	
	6	19 37 02,1	54,94	164,29	10	а/б		9,5	20б	
		23 13 24,1	55,69	160,27	<0	а/б		9,5	17	Вулк.
	7	00 19 50,2	54,86	164,33	20	а/б		10,3	20б	
		00 25 26,7	51,37	160,71	30	а/б		9,6	22а	
	8	10 51 16,5	56,13	164,08	10	а/б		9,7	20а	
	9	05 06 52,3	52,02	158,76	40	а/б		10,2	11	
31	11	05 23 22,8	52,33	159,00	110–120	а/б		11,7	10	
		05 54 12,0	51,23	159,22	10	а/б		10,2	12	
		05 56 30,0	51,25	159,08	40	а/в		9,6	12	
		10 34 45,9	56,29	164,21	20–30	а/б		10,1	20а	
		17 25 24,7	50,40	156,71	70	а/а		10,2	13	
	13	08 40 43,5	51,10	158,13	30	а/б		9,7	12	
	16	15 14 38,0	55,70	160,27	0	а/б		10,3	17	Вулк.
		22 08 28,0	55,47	163,00	10–20	а/б		9,6	6	
	17	09 07 26,0	55,68	163,90	0	а/в		9,5	20б	
		19 30 34,4	55,00	161,22	90–100	а/б		9,7	7	
	18	15 36 32,5	55,38	162,23	20	а/б		9,8	6	
	20	19 15 06,0	56,30	164,29	20	а/б		10,3	20а	
	22	05 08 26,4	50,42	156,99	0	а/в		9,5	13	
		06 36 33,5	50,30	156,89	0	а/в		11,0	13	

1	2	3	4	5	6	7	8	9	10	11
					July					
	24	14 17 38,1	56,12	164,10	10–20	а/в		10,4	20а	
		15 04 52,9	56,26	164,24	10	а/в		9,7	20а	
	25	15 08 47,9	55,06	161,70	80	а/б		10,1	7	
		19 20 37,2	55,62	161,84	80–90	а/в		9,5	6	
	27	02 02 24,5	52,43	159,16	40	а/в		9,7	10	
	29	07 26 20,0	56,03	164,06	10	а/б		10,3	20а	
		21 45 34,5	54,77	165,90	20	б/в		10,0	20б	
	30	05 12 37,7	55,62	164,00	20	а/б		10,0	20б	
		19 46 58,5	55,73	160,20	0–5	а/а		10,3	17	Вулк.
	31	00 20 12,7	54,56	162,85	30–40	а/б		10,1	7	
					August					
32	1	02 14 46,7	56,32	162,90	10	а/б		11,6	5	Крутобереговo 5–6 баллов
		02 20 30,0	56,32	162,90	10	а/в		9,7	5	Крутобереговo 3–4 балла
		03 50 17,8	56,32	162,90	10	а/б		9,8	5	То же
33		17 03 17,9	51,63	159,15	30–40	а/б		12,1	11	
	5	07 08 18,1	55,07	162,63	20	а/б		9,7	7	
		15 45 10,0	53,21	160,03	50–60	а/б		10,3	9	
	6	16 36 12,9	55,68	160,30	0	а/б		9,8	17	Вулк.
	7	00 00 20,6	54,47	161,93	20–30	а/б		9,6	7	
		23 21 44,0	54,14	161,51	40	а/б		9,5	8	
	8	10 17 35,2	55,67	160,23	<0	б/а		9,6	17	Вулк.
34		21 07 20,0	54,32	160,27	100	а/б		11,5	8	
	10	01 40 42,9	55,63	160,25	0–5	б/а		9,8	17	Вулк.
		09 46 42,4	54,28	161,55	30–40	а/б		9,7	8	
35	15	03 42 19,0	54,03	161,26	40	а/б		12,1	8	
36		07 28 20,1	54,87	167,93	40	а/в	6,9 m=6,9	13,9	20б	Крутобереговo 4 балла
		07 33 09,0	52,01	160,70	0	в/н		10,6	10	
37		08 47 47,0	54,85	167,81	40	а/в		11,5	20б	
	19	01 21 40,0	53,39	160,45	40	а/б		10,4	9	
	20	22 52 56,0	54,47	161,60	40	а/б		10,0	7	
38	22	05 50 53,5	54,02	161,29	40	а/б		11,5	8	
39	23	13 51 23,7	54,53	160,35	150	а/б	6,0	13,6	8	Крутобереговo 3–4 балла; Петропавловск 3 балла; Карымский 3 балла; Авача 3 балла; Шипунский 3 балла
		19 30 18,3	51,47	158,50	30	а/б		10,7	12	
	24	12 30 37,6	53,19	162,80	60	а/б		9,8	21а	
		13 19 42,5	55,02	162,75	40	а/в		9,7	7	
	25	00 20 21,0	56.17	160,53	180	а/б		9,5	17б	
	26	20 10 59,5	51,33	159,38	0	а/б		10,0	11	
	30	17 21 42,4	52,90	160,15	40	а/в		9,5	10	
	31	08 57 41,3	53,99	163,98	40	б/н		9,5	20в	

1	2	3	4	5	6	7	8	9	10	11
					September					
	2	10 27 35,8	56,13	163,55	20	а/б		9,9	5	
	3	03 58 08,0	52,30	160,67	20-30	а/б		9,5	10	
	6	22 07 01,8	51,82	161,66	20	а/б		9,8	21в	
	8	17 37 34,0	55,02	162,12	30-40	а/б		9,8	7	
	10	12 50 00,3	54,47	161,60	40	а/б		10,6	7	
40	12	15 28 37,4	51,72	157,52	120	а/б	6,0	13,0	12	
		19 04 14,2	52,92	159,95	60	а/б		9,7	10	
41	13	16 06 26,2	52,97	160,19	40	а/б		11,8	9	
	16	15 45 43,2	55,62	160,23	<0	а/б		9,5	17	Вулк.
		22 36 43,6	55,62	160,23	0-5	а/б		10,5	17	"
		21 22 34,2	53,03	160,04	90-100	а/б		9,8	9	
42	19	02 43 39,0	52,88	159,92	40	а/б		12,2	10	Кроноки 3-4 балла; Шикуп-ский 3 балла
		12 16 33,5	54,93	162,61	20-30	а/б		10,3	7	
		12 19 08,9	54,96	162,61	20-30	а/б		10,0	7	
	21	16 28 13,7	55,48	160,98	130-140	а/б		10,6	6	
	22	04 28 55,8	52,96	159,94	50	а/б		9,8	10	
	23	00 39 01,2	51,87	159,05	40	а/б		10,3	11	
		05 47 33,0	51,50	159,66	0	а/в		10,1	11	
		07 47 14,1	54,74	162,84	30-40	а/в		10,0	7	
43	24	17 54 42,7	54,33	160,67	100	а/б		12,9	8	Кроноки 5-6 баллов
		21 28 19,3	53,00	160,20	40	а/б		9,6	9	
	26	16 52 37,0	52,02	160,88	40	а/б		9,5	21в	
	28	21 02 12,0	52,95	160,02	40	а/б		10,0	10	Шикунский 2 балла
	29	07 09 03,9	52,21	158,22	120-130	а/б		9,7	11	
	30	11 56 01,6	52,85	159,97	40	а/б		9,6	10	
		22 04 00,0	52,75	160,48	20	а/б		9,6	10	
					October					
	2	07 01 49,5	52,77	161,14	10	а/в		9,7	9	
		07 14 16,7	52,70	161,09	10-20	а/б		9,9	9	
	4	14 23 27,7	52,20	159,30	40	б/в		10,1	11	
		15 56 29,0	55,47	166,29	20	а/в		9,9	20в	
	5	01 04 00,0	55,45	166,39	20	а/в		11,1	20в	
		20 09 20,5	50,63	157,35	40	а/в		10,2	13	
	7	02 53 36,7	50,72	157,56	10	а/б		10,6	13	
		22 49 23,7	51,27	160,80	30	а/в		9,5	22в	
	14	03 01 51,7	54,87	160,78	100	а/б		9,9	7	
		12 09 53,5	54,99	164,75	40	а/в		9,8	20б	
		13 43 11,5	50,07	156,90	0	а/в		10,7	14	
		14 49 10,1	52,75	159,54	40	а/б		10,3	10	
	16	10 15 50,5	54,91	162,14	20	а/б		9,7	7	
		21 00 09,5	52,47	159,11	40	а/б		10,2	10	
	17	11 18 58,6	51,38	160,02	0	б/в		9,9	22в	
		12 48 00,6	53,38	160,38	40	а/б		9,6	9	
		22 53 55,0	50,88	157,44	40	а/б		11,2	13	
	18	17 43 45,4	56,05	162,36	10	а/б		9,8	6	
	20	06 29 54,0	55,64	165,80	40	а/в		9,6	20в	
		07 23 59,0	55,54	165,80	40	а/в		9,6	20в	
		16 06 16,7	55,76	165,92	40	а/в		10,5	20в	
		16 45 33,0	55,76	165,92	40	а/в		9,5	20в	
	23	12 32 43,3	54,48	160,60	40	а/б		10,5	7	
		12 48 45,8	54,46	161,63	40	а/б		9,9	7	
	24	21 53 30,7	55,41	162,48	5-10	а/в		9,6	6	
	30	08 15 27,7	51,28	159,82	20	а/в		10,4	11	
44		22 37 28,0	51,44	159,43	0	а/б		12,2	11	

1	2	3	4	5	6	7	8	9	10	11
				November						
45	4	17 05 55,3	54,16	167,69	20	а/б	5,5	13,1	206	о-в Беринга 3 балла
46		12 41 03,0	60,20	160,40	10	н/с		11,9		
	6	06 28 35,5	53,90	161,22	40	а/б		10,7	8	
	8	12 25 11,9	50,41	157,06	10-20	а/ш		9,5	13	
		13 31 01,5	56,12	162,37	5-10	а/б		10,4	5	Крутоберего-во 3 балла
	8	23 30 07,7	49,97	156,94	5-10	а/б		11,2	14	
	9	02 04 21,4	50,08	159,08	0	а/в		10,9	22в	
47		18 52 24,5	55,51	162,56	5-10	а/б		12,1	6	
	11	14 46 01,0	55,29	166,77	30	а/б		9,8	20б	
	12	19 25 35,0	55,38	162,25	20	а/б		9,6	6	
	13	06 18 23,5	54,15	164,20	40	а/б		10,9	20в	
		10 55 10,0	50,55	156,99	10	а/б		9,9	13	
		11 11 23,3	54,97	161,16	90	а/б		10,1	7	
48		15 48 46,2	50,33	157,10	20	а/б	4,8	13,4	13	Паужетка 4 балла
	18	00 00 36,0	54,03	159,95	20	а/б		10,5	8	
49	19	11 06 28,3	54,23	161,50	70	а/б		13,5	8	Крноноки 4-5 баллов; Авача 3 балла; Шипунский 2-3 балла; Петропавловск 2-3 балла
	20	07 59 59,0	50,32	157,13	10	а/б		9,8	13	
	21	04 05 45,5	55,09	162,16	40	а/б		9,9	7	
50		13 46 23,1	52,67	159,53	20-30	а/б		11,8	10	
		15 00 37,5	52,74	159,53	30	а/б		9,7	10	
		16 43 19,3	54,59	161,50	40	а/б		9,9	7	
	23	15 39 49,9	53,00	159,90	70	а/б		9,7	10	
		23 52 50,7	51,04	160,00	0	а/в		9,7	22а	
	24	22 20 46,5	56,10	161,18	100	а/б		9,5	6	
	26	16 07 35,5	54,95	163,34	40	а/б		9,6	20в	
	29	07 59 52,7	51,17	157,68	70	а/в		10,1	12	
				December						
	1	05 16 04,7	53,92	160,81	30	а/б		11,4	8	
		21 54 09,0	51,46	159,80	0	б/в		9,5	11	
	2	23 35 19,4	55,07	163,14	40	а/б		10,4	6	
	3	22 57 11,8	55,46	162,19	10-20	а/б		9,6	6	
	4	09 54 48,7	51,98	158,15	80	а/б		9,8	11	
	7	17 57 44,0	53,10	159,30	90	а/б		9,6	10	
51	8	18 55 40,5	52,70	160,20	40	а/в	4,9	12,5	10	Шипунский 3-4 балла; Авача 3 балла; Петропавловск 3-4 балла
	9	12 39 40,2	55,69	164,16	0	а/в		9,5	20б	
	10	11 28 00,8	55,10	160,47	150-160	а/б		10,3	7	
	12	02 35 07,2	52,43	162,15	40	а/б		10,8	21б	
		06 05 09,0	52,44	159,50	40			10,4	10	
		09 08 13,0	55,37	160,57	160-170	а/в		9,7	7	
	14	16 49 19,5	55,54	162,46	10	а/в		10,1	6	
	15	12 47 09,5	52,56	159,61	20-30	а/б		10,2	10	
	16	19 08 53,5	52,17	160,75	10	а/в		10,2	10	
	20	06 47 01,0	56,13	162,80	10	а/б		10,5	5	Крутоберего-во 3 балла
		12 55 42,0	53,42	161,64	20	а/б		9,9	9	
		14 21 17,4	53,38	161,72	20	а/б		10,6	9	

1	2	3	4	5	6	7	8	9	10	11
				December						
52	21	10 54 06,3	51,8	151,9	550	c/c	6,6	15,0		Крутобере-гово 3 балла
		16 56 14,3	53,48	161,62	10	a/6		9,7	8	
	22	16 08 12,5	55,54	161,08	150	a/6		9,5	6	
	22	16 56 16,0	53,42	161,70	10-20	a/6		10,8	9	
	25	00 51 08,5	53,40	161,66	10-20	a/6		9,9	9	
53		05 12 02,3	50,51	157,43	10-20	a/a		11,6	13	
		08 31 51,0	55,24	164,16	40	a/6		10,8	206	
		21 52 49,8	52,64	159,63	30-40	a/6		10,1	10	
		22 39 36,4	52,54	158,06	160	a/a		11,0	11	
	28	09 17 19,5	54,63	162,03	30-40	a/6		9,7	7	
	30	23 22 50,0	53,85	161,46	20	a/6		10,3	8	

Notes: 1. Classes of accuracy (first letter--according to coordinates of epicenter, second--according to depth) are described in [2]. Letters a, b, , и , c indicate that the discrepancy in solutions does not exceed 5, 10, 15, 25 km or is over 25 km.

2. The number of the region is given according to the system presented in [4].

3. In the graph, "Macroseismic Data," the designation of the locality of "Petropavlovsk" refers to the city, and the rest of the designations--to the seismological stations in the Kamchatka network. The note, "[illegible]," designates a volcanic earthquake.

Regional Catalog of Earthquakes in Chukotka and Arctic Basin

Key:

1. Number, in order
2. Date
3. Moment of occurrence, hrs, mins, secs
4. Coordinates of epicenter: φ °N
5. Coordinates of epicenter: λ °E
6. M
7. K
8. Region

(1) № п/п	(2) Дата	Момент возникновения, (3) ч м с	Координаты эпицентра φ°N (4)	λ° (5)	(6) M	(7) K	(8) Район
1	11.II	11 21 38	66,7	119,2E	4,8		Якутия
2	26.II	04 48 50	84,8	97,7E	5,7		Севернее о-вов Северной Земли
3		14 50 04	69,2	177,5E		11	Чукотское нагорье*
4	2.III	14 17 18	84,6	101,8E			Севернее о-вов Северной Земли
5		14 23 22	84,9	96,9E	5,0		То же
	12.III	07 35 51	66,6	179,3W		9	Чукотское нагорье*
	10.V	23 55 29	66,5	179,0W		10	То же
	16.V	10 38 42	67,2	176,2W		9	" "
	31.V	02 17 40	68,7	179,2E		8	" "
6	28.VIII	04 21 08	63,6	176,6E		12	Анадырская низменность*
7	30.VIII	06 41 35	81,5	117,7E	3,3		Северо-восточнее Северной Земли
8	21.X	09 54 42	66,6	177,2W		12	Чукотское нагорье* Иультин 3–4 балла
	3.XI	19 55 29	68,7	177,6E		8	Чукотское нагорье*
	23.XI	19 07 08	66,1	173,8W		9	То же
	24.XI	21 53 54	66,3	173,3W		9	" "
	5.XII	18 39 15	65,6	173,5W		10	" "
		18 46 17	66,3	173,4W		8	" "
		22 05 25	65,6	173,1W	3,4	11	" "
9	16.XII	21 00 51	66,3	177,0W		8	" "

* All parameters of the earthquake focus are according to the data from the station at Iul'tin.

Catalog of Strong Earthquakes in the World

V. V. Kirilovskaya, N. V. Shatornaya, chief compilers

Key:

1. Number, in order
2. Number
3. Moment of occurrence, hrs, mins, sec
4. Coordinates of epicenter: φ °N
5. Coordinates of epicenter: λ °
6. Depth at focus, km
7. Magnitude: M_{LH}
8. Magnitude: m_{pv} : SKM
9. Magnitude: m_{pv} : SK
10. Region

№ п/п	Число	Момент возникновения, ч м с	Координаты эпицентра		Глубина очага, км	Магнитуда			Район
			φ°N	λ°		M_{LH}	m_{pv} СКМ	m_{pv} СК	
1	2	3	4	5	6	7	8	9	10
				January					
	2	08 59 00	47,1 N	151,2 E		6,5	5,6	6,0	Kuril islands
	2	14 15 59	21,5 N	143,2 E	300		5,7	6,2	Northern Mariana islands
	8	01 58 54	2,8 S	101,6 E	80–100		6,2	6,7	Indonesia
	14	19 37 18	4,7 S	130,2 E	20	6,4	6,2	6,7	"
	14	19 49 04	4,8 S	130,2 E	70	6,5	6,6	6,9	"
	15	11 34 41	29,3 N	101,9 E		6,1	6,0	6,4	China
	15	20 29 46	7,9 S	112,0 E	60		6,3	6,6	Indonesia
	17	09 30 39	17,4 S	174,4 W	110		5,8	6,3	Tonga Island
1	19	08 02 03	32,6 N	78,6 E	25	7,0	6,5	7,0	India-China boundary area
	20	17 31 15	35,3 N	141,1 E	50	6,0	6,0	6,2	Japan
	23	14 19 22	33,5 N	131,0 E		6,1	5,4		"
	25	02 08 43	7,9 N	78,0 W		6,5	6,1		Panama
				February					
2	2	08 43 39	53,1 N	173,4 E	10	7,3	6,2	6,8	Aleutian islands
3	4	11 36 07	41,0 N	122,7 E	20	7,7	6,4	7,0	China
	7	04 51 46	6,7 S	149,7 E		6,6	6,4	7,2	New Britain Island
	22	08 36 06	51,5 N	179,4 W		6,9	6,8	7,1	Aleutian islands
	22	22 04 29	25,0 S	179,1 W	300		6,4	6,8	Southern Fiji islands

1	2	3	4	5	6	7	8	9	10
					March				
	5	00 22 24	2,0 S	126,1 E	50	6,5	6,4	7,1	Indonesia
	7	07 04 41	27,2 N	56,3 E		6,1	5,9	6,4	Iran
	13	15 26 47	26,5 S	71,6 W		6,9			Chile
	13	18 45 29	21,4 S	170,6 E	65	6,9	6,3	6,8	New Hebrides islands
	23	07 32 40	23,2 N	122,8 E		6,8	6,5	6,8	Taiwan Island
	27	05 15 04	40,0 N	25,3 E		6,7	5,9	6,4	Greece
	28	02 31 00	41,0 N	112,7 W		6,0	6,2	6,6	United States,Utah
					April				
	5	16 52 52	52,4 N	159,4 E	65	6,0	5,9	5,9	Kamchatka pen.
	5	17 50 02	52,4 N	159,7 E	60	6,1	5,9	5,9	"
	6	09 55 18	52,1 N	160,2 E	15	6,8	5,9	6,3	"
	6	10 34 57	52,3 N	159,8 E	40	6,8	6,1	6,4	
	9	06 26 19	3,5 S	154,2 E	100-120		6,2	6,5	New Ireland Island
	13	01 34 33	5,5 N	125,4 E	200		6,0	6,2	Philippines
	16	01 27 15	71,5 N	11,1 W		6,6	6,2	6,8	Sea of Greenland
	16	21 33 30	49,1 N	154,0 E		5,9	5,6	6,2	Kuril islands
	20	11 40 41	36,8 S	100,3 W		6,3			West Chilean elevation
	20	17 35 56	33,5 N	131,2 E		6,4	6,0	6,3	Japan
	23	11 15 14	17,3 N	99,0 W	200-230		5,8	6,1	Mexico
	28	11 06 37	35,6 N	79,9 E		6,1	5,9	6,3	China
					May				
	5	05 18 47	33,4 N	92,9 E		6,3	6,1	6,3	China
	6	10 18 23	31,3 N	141,6 E		6,2	6,0	6,3	Japan
	10	14 27 41	38,8 S	74,3 W		7,4			Chile
4	11	06 56 47	49,6 N	155,7 E	55	6,1	5,9	6,4	Kuril islands
	13	21 18 45	1,6 N	125,8 E		6,3	6,2		Indonesia
	18	16 48 38	46,2 S	78,1 W		6,5			Western Chile
	23	16 01 54	23,0 N	122,7E		6,5	6,3	6,5	Taiwan Island
5	26	09 11 48	36,2 N	17,6 W		7,9	6,8	7,6	Northern Madeira islands
	30	17 44 59	26,5 N	97,2 E	55	6,1	6,0	6,4	Burma
					June				
	4	02 24 29	35,9 N	80,0 E		6,0	5,9	6,4	China
6	10	13 47 15	43,0 N	147,7 E		7,3	5,7	6,4	Kuril islands
	10	15 21 17	43,3 N	147,4 E		6,1	6,0		Same
	13	06 08 34	12,2 N	125,5 E		6,0	6,0	6,3	Philippines
	13	18 08 14	43,6 N	147,8 E	45	7,2	6,5	7,1	Kuril islands
	14	18 38 05	44,1 N	147,9 E	50	6,6	6,2	6,6	Same
	14	23 36 33	36,9 N	143,2 E		6,1	6,3	6,3	Japan
	15	00 19 44	44,7 N	147,6 E	80	6,9	6,4	6,9	Kuril islands
	16	22 35 17	2,9 S	148,2 E		6,2	6,2	6,5	New Guinea

1	2	3	4	5	6	7	8	9	10
				June					
	22	02 23 53	30,0 N	142,3 E		6,3	6,3	6,7	Nampo Island
	22	22 44 11	43,2 N	147,2 E		6,7	6,0	6,5	Kuril islands
	22	23 00 46	42,9 N	147,5 E		6,0	5,6		Japan
	29	10 37 45	39,1 N	130,1 E	600		6,7	6,9	Sea of Japan
	30	18 54 22	45,6 N	110,8 W		6,0	5,6	6,1	United States, Montana
				July					
	4	20 40 13	8,1 S	123,2 E	150		5,9	6,2	Indonesia
	8	09 37 17	27,5 N	113,0 W		6,8	5,8	6,5	Mexico
	8	12 04 35	21,2 N	94,9 E	100		6,5	7,0	Burma
	8	22 46 20	33,1 N	142,2 E	40	6,0	6,1	6,4	Japan
R	10	18 29 11	6,6 N	126,8 E	40	7,0	6,2	6,8	Philippines
	11	18 54 28	10,2 S	161,6 E	90		5,9	6,5	Solomon Islands
	14	23 28 15	36,4 S	78,9 E		6,1	5,5	6,2	Central Indian range
	20	08 02 41	44,5 N	147,0 E	110		5,7	6,1	Kuril Islands
9	20	14 37 33	6,9 S	154,8 E		7,3	6,7	7,1	Solomon Islands
	20	19 54 27	7,0 S	155,3 E		7,1	6,2	6,9	Same
10	20	23 05 19	6,1 S	154,7 E		6,2	6,3	6,8	"
	21	02 03 52	7,0 S	155,3 E		6,2	6,3	6,8	"
	21	02 38 57	6,4 S	155,0 E		6,7	6,4	6,8	"
	22	19 20 14	7,1 S	155,8 E		6,0	6,1	6,3	"
	30	09 17 13	9,4 S	123,7 E		6,0	6,1	6,4	Indonesia
				August					
	2	10 18 20	53,8 N	161,9 W		6,5	6,5	6,8	United States, Alaska
	6	22 24 37	1,4 S	145,9 E		6,2	6,1	6,3	New Guinea
	10	10 25 43	22,9 S	66,9 W	160	6,5			Argentina-Chile border area
	12	14 21 06	32,3 N	137,7 E	390		5,8	6,1	Southeast Honshu Island
	15	07 28 22	54,8 N	167,7 E		6,9	6,2	6,9	Kamchatka pen.
	23	13 51 26	54,6 N	159,8 E	160		5,7	6,4	Philippines
	23	15 06 41	10,1 N	125,9 E	50	5,9	6,3	6,5	
				September					
	6	09 20 13	38,7 N	40,7 E		6,6	6,2	6,7	Turkey
	11	22 00 09	8,3 N	104,4 W	90		6,6		Mexico
	19	03 37 17	33,4 S	81,6 E		6,2	6,1	6,5	Central Indian range
	19	17 54 41	42,3 N	142,8 E	80	6,1	5,8		Japan
	24	01 47 45	20,7 S	174,0 W		6,1	6,2		Tonga Island
	24	17 19 28	23,7 N	110,2 W		6,2	5,3		United States, California
	29	14 36 25	3,9 S	124,6 E		6,1	6,1	6,3	Indonesia

1	2	3	4	5	6	7	8	9	10
				October					
	1	03 30 03	4,5 S	102,2 E	50	6,9	6,5	6,9	Indonesia
	1	04 13 30	4,9 S	102,1 E	45	6,1	6,3	6,8	"
	3	05 14 29	30,6 N	66,3 E		6,8	5,9	6,2	Pakistan-Afghanistan border area
	3	17 31 33	30,5 N	66,4 E		6,5	6,0		Same
11	6	22 24 20	11,8 S	166,6 E	65	7,0	6,1	6,9	Santa Cruz Islands
	7	08 27 59	0,01S	27,6 W		6,6	6,4	6,9	North Atlantic ridge
12	11	14 35 16	26,1 S	175,4 W		7,5	6,7	7,1	Tonga Island
	11	18 00 55	3,2 S	148,6 E		6,2	6,1	6,6	New Britain Island
	17	03 31 55	7,1 S	128,8 E	120		6,4	6,3	Indonesia,
	20	22 25 33	15,1 S	176,4 W		6,2	6,1		Fiji Islands
	21	17 12 25	11,9 N	121,6 E		6,2	6,2	6,4	Philippines
	21	23 06 20	11,9 N	121,6 E		6,4	6,0	6,6	"
	26	10 41 38	7,4 N	126,3 E	60	6,1	6,2	6,6	Philippines
	27	18 26 50	8,9 N	126,4 E		6,0	5,8	6,3	"
	28	06 54 17	23,0 S	70,4W		6,2			Chile
	30	01 41 35	42,8 N	142,4 E	60	6,0	6,0	6,4	Japan
13	31	08 28 03	12,8 N	126,1 E	50	7,6	6,8	7,6	Philippines
				November					
	1	01 17 32	14,0 N	145,1 E	100		6,0	6,3	Mariana Islands
	1	06 14 48	18,2 S	177,2 W	350		6,1		Fiji Islands
	6	12 36 26	12,9 N	126,0 E	90		6,1	6,2	Philippines
	15	15 28 31	18,3 N	102,3 W		6,0	6,0		Mexico
	15	20 39 26	12,4 N	126,2 E		6,1	6,4	6,7	Philippines
	21	04 45 35	7,5 S	127,3 E	100		6,0	6,2	Indonesia
	23	23 02 09	41,6 N	140,1 E	165		5,7	6,2	Japan
	25	08 06 43	8,9 S	156,8 E		6,0	5,9	6,3	Solomon Islands
	29	02 18 01	12,3 N	125,7 E	50	6,2	5,8	6,4	Philippines
	29	10 46 52	58,4 S	27,0 W		6,0			So. Sandwich Islands
14	29	14 47 37	18,6 N	155,9 W		7,0	6,1	6,4	Hawaiian Islands
	30	20 30 17	53,2 N	167,4 W		6,5	6,1	6,3	Aleutian Islands
				December					
	5	20 14 25	44,7 N	146,0 E	80		6,1	6,7	Kuril Islands
	9	09 14 42	14,5 S	172,1 W		6,1	6,0	6,7	Samoa
	17	05 35 19	5,0 N	95,8 E		6,2	5,8	6,5	Indonesia
	21	10 54 16	51,9 N	151,8 E	550		6,4	6,7	Okhotsk Sea
	24	11 49 01	27,3 N	55,5 E	60		5,8	6,4	Iran
	25	23 22 21	4,0 S	142,5 E	115		6,8	7,2	New Guinea
15	26	15 56 41	16,0 S	172,3 W		7,5	6,6	7,4	Samoa
	27	07 41 47	43,0 N	147,4 E		6,0	5,5	6,0	Japan
	28	15 24 47	7,9 S	115,2 E	160		6,3	6,4	Indonesia
	29	03 39 44	57,2S	70,6W		6,7	6,1		Drake's Bay
	29	05 07 55	26,6 N	97,3 E	20	6,0	5,7		Burma

Additional Parameters of Earthquake Focal Points

Altay-Sayan

A. G. Filina, I. D. Tsibul'chik

(1) Дата	(2) Время возникновения, ч м	H	K	(3) Плоскость разрыва I Az°	e°	(4) Компоненты подвижки по простиранию (5)	по падению (6)
28.III	07 39	Земная кора (7)	12	19	51 N-W	-0,37	-0,93
31.III	10 05	То же (8)	13	32	70 S-E	-0,63	+0,78

Key:

1. Date
2. Time of occurrence, hrs, mins, secs
3. Fault plane I
4. Components of shift
5. Along strike
6. Along dip
7. Earth's crust
8. Same

(1) Дата	(2) Время возникновения, ч м	(3) Плоскость разрыва II Az°	e°	(4) Компоненты подвижки по простиранию (5)	по падению (6)	(7) Напряжение сжатия (8) Az°	e°	промежуточное (9) Az°	e°	растяжения (10) Az°	e°
28.III	07 39	166	44 N-E	+0,42	-0,91	352	72	184	17	94	4
31.III	10 05	101	43 N-E	+0,88	+0,47	331	17	228	37	81	46

Key:

1. Date
2. Time of occurrence, hrs, mins
3. Fault plane II
4. Components of shift
5. Along strike
6. Along dip
7. Stress
8. Compression
9. Interstitial
10. Strain

Baykal Region

N. V. Solonenko

(1) Дата	(2) Время возникновения, ч м	H, км	M	(3) Плоскость разрыва I Az°	e°	Компоненты подвижки (4) по простиранию (5)	по падению (6)
24.IX	17 40	Земная кора (7)	4,7*	12	40N-W	+0,104	-0,994
4.X	16 39	То же (8)	4,6*	32	63N-W	-0,545	-0,839

* Магнитуда m по приборам СКМ. (9)

Key:
1. Date
2. Time of occurrence, hrs, mins
3. Fault plane I
4. Components of shift
5. Along strike
6. Along dip
7. Earth's crust
8. Same
9. *Magnitude m according to SKM instruments

(1) Дата	(2) Время возникновения, ч м	(3) Плоскость разрыва II Az°	e°	Компоненты подвижки (4) по простиранию (5)	по падению (6)	(7) Напряжение сжатия (8) Az°	e°	промежуточное (9) Az°	e°	растяжения (10) Az°	e°
24.IX	17 40	19	50 S-E	-0,035	-0,999	128	85	16	3	288	5
4.X	16 39	157	41 N-E	+0,719	-0,695	348	59	196	19	99	13

Key:
1. Date
2. Time of occurrence, hrs, mins
3. Fault plane II
4. Components of shift
5. Along strike
6. Along dip
7. Stress
8. Compression
9. Interstitial
10. Strain

Kuril

L. N. Poplavskaya, M. I. Rudich

Key:

1. Date
2. Moment of occurrence, hrs, mins
3. H, km
4. M
5. Plane I: Az°
6. Plane I: e°
7. Plane I: shift components: along strike
8. Plane I: along dip

Дата	Момент возникновения, ч м	H, км	M	Плоскость I			
				Az°	e°	Компоненты подвижки	
						по простиранию	по падению
1	2	3	4	5	6	7	8
2. I	08 58	0-5	6,5	316	72	0,743	+0,669
				166	90	0,00	1,00
4. I	00 20	50	4,4	121	60	0,913	+0,406
2. II	16 17	150	4,8	286	50	0,891	+0,454
				272	56	0,978	+0,207
3. II	08 07	30	4,5	324	58	0,906	-0,423
				320	62	0,990	-0,139
25. II	22 57	480	-	252	90	1,00	0.00
1.III	09 26	525	-	318	74	0,987	-0,156
9.III	13 34	40	-	230	70	0,544	+0,838
13.III	16 18	20	4,8	321	60	0,939	-0,342
				353	70	0,939	-0,342
14.III	05 15	60	5,4	301	66	0,731	-0,682
				336	83	0,995	+0,104
14.III	16 05	40-50	4,7	270	80	0,914	-0,406
				269	83	0,875	-0,485
16.III	23 40	50	4,6	252	60	0,454	+0,891
				311	66	1,00	0,00
22.III	13 55	50	4,5	113	40	0,629	+0,777
23.III	19 48	60	5,0	115	70	0,883	+0,469
31.III	19 04	40	4,6	290	60	0,914	-0,406
				345	64	0,914	+0,406
1.IV	19 21	30	5,1	283	80	0,996	+0,087
				287	38	0,809	-0,587
16.IV	21 33	33	5,8	298	40	0,559	+0,829
22.IV	20 05	70	4,5	305	40	0,643	+0,766
23.IV	00 17	495		267	70	0,848	+0,529
3.V	05 16	375	-	119	82	0,545	-0,838
11.V	06 56	60	6,1	301	60	0,766	-0,643
11.V	07 11	30	5.0	308	68	0,883	-0,469
11.V	20 21	40	4.8	321	62	0,939	-0,342
11.V	20 35	45	5,0	306	70	0,883	-0.469
12.V	08 31	40	4,9	318	80	0.891	-0.454
12.V	10 11	40	5,5	313	68	0.891	-0,454
14.V	11 41	180	-	259	60	0.906	-0.423
18.V	22 34	105	4,4	295	72	0.629	-0,777
19.V	22 42	60	4,5	282	40	0,629	+0,777

Key:

9. Plane II: Az°
10. Plane II: e°
11. Plane II: shift components: along strike
12. Plane II: shift components: along dip
13. Compression stress: Az°
14. Compression stress: e°
15. Interstitial stress: Az°
16. Interstitial stress: e°
17. Stress-strain: Az°
18. Stress-strain: e°

Плоскость II				Напряжение сжатия		Промежуточное напряжение		Напряжение растяжения	
Az°	e°	Компоненты подвижки							
		по простиранию	по падению	Az°	e°	Az°	e°	Az°	e°
9	10	11	12	13	14	15	16	17	18
209	50	0,914	+0,406	348	15	244	44	90	41
76	90	0,00	1,000	301	00	121	90	30	00
224	70	0,829	+0,559	260	08	179	59	356	37
177	70	0,732	+0,682	146	11	247	43	44	44
176	80	0,848	+0,528	137	14	248	54	39	31
219	70	0,819	-0,573	88	38	284	51	183	07
226	82	0,875	-0,485	89	25	300	60	185	15
162	90	1,00	0,00	298	00	208	90	28	00
225	80	0,956	-0,292	91	18	282	71	183	05
115	40	0,838	+0,545	255	20	153	32	13	53
220	74	0,857	-0,515	87	34	285	55	183	08
256	70	0,927	-0,375	123	19	305	61	214	01
51	50	0,857	-0,515	169	47	08	40	270	10
244	84	0,993	+0,122	200	01	294	81	110	09
04	65	0,985	-0,174	134	24	339	64	229	11
04	60	0,991	-0,139	133	26	348	57	230	16
115	39	0,602	+0,798	270	12	175	22	21	63
221	90	0,914	0,406	179	17	312	66	84	17
12	40	0,974	+0,225	142	26	30	38	257	42
215	64	0,927	+0,374	76	05	171	56	343	33
186	70	0,838	-0,545	55	36	249	52	150	07
85	66	0,891	+0,454	123	01	32	55	215	34
192	84	0,987	+0,156	147	04	253	78	57	10
46	68	0,545	-0,838	188	54	330	29	71	18
158	58	0,438	+0,898	140	10	235	21	27	66
173	60	0,485	+0,875	152	12	247	34	40	63
165	60	0,927	+0,374	305	05	206	52	38	36
17	32	0,970	-0,242	268	44	34	30	145	30
187	56	0,788	-0,615	67	49	240	41	335	03
49	64	0,914	-0,406	178	35	04	54	269	04
61	70	0,866	-0,500	192	34	02	54	99	07
45	64	0,933	-0,358	175	33	04	56	266	04
220	60	0,978	-0,207	91	26	244	57	358	11
53	64	0,921	-0,391	182	35	09	55	274	04
03	68	0,857	-0,515	133	37	303	51	39	04
46	40	0,891	-0,454	156	48	10	35	267	18
148	60	0,469	+0,883	129	11	224	24	16	64

1	2	3	4	5	6	7	8
26.V	18 23	40	4,5	300	60	0,891	-0,454
27.V	06 41	50	5,0	289	50	0,891	+0,454
30.V	04 07	170	-	274	50	0,743	+0,669
30.V	21 57	120	-	329	66	0,838	-0,545
7.VI	15 12	100	4,4	254	62	0,682	-0,731
12.VI	00 14	30	4,8	299	70	0,920	-0,391
2.VII	19 43	70	4,8	356	60	0,920	-0,390
16.VII	03 24	80	4,3	316	50	0,766	+0,643
20.VII	03 02	80	5,6	281	50	1,00	0,000
29.VII	14 00	100	-	317	64	0,857	-0,515
6.VIII	21 37	330	-	224	64	0,743	-0,669
7.IX	11 40	200	-	200	70	0,956	-0,292
19.IX	03 15	120	-	310	80	0,857	-0,515
22.X	05 10	420	-	234	70	0,788	+0,615
30.X	01 41	60	6,0	277	40	0,500	+0,866
11.XI	04 25	355	-	294	70	0,500	+0,866
13.XI	15 48	33	4,8	292	50	0,643	+0,766
11.XII	16 43	40	5,0	333	56	0,643	+0,766
21.XII	10 54	550	-	328	40	0,809	-0,587
24.XII	18 48	40	5,0	318	46	0,891	+0,454
25.XII	15 36	50	4,8	307	46	0,875	+0,484
25.XII	16 00	40	5,0	301	44	0,875	+0,484

9	10	11	12	13	14	15	16	17	18
44	66	0,848	-0,529	175	40	346	50	81	04
180	70	0,719	+0,695	149	13	250	42	45	45
151	60	0,643	+0,766	125	06	218	35	27	54
224	60	0,883	-0,469	100	40	271	50	06	05
137	50	0,798	-0,602	21	53	186	37	283	08
37	66	0,933	-0,358	167	31	352	58	258	02
98	70	0,848	-0,529	229	37	37	53	136	06
74	60	0,694	+0,719	103	05	09	35	200	54
10	90	0,766	+0,643	153	27	281	50	48	27
62	62	0,874	-0,485	189	39	12	49	280	03
112	54	0,838	-0,544	354	47	160	42	257	08
104	74	0,939	-0,342	332	24	157	64	63	03
212	60	0,974	-0,225	86	29	236	57	349	13
130	54	0,914	+0,406	+270	10	168	48	07	40
134	56	0,390	+0,920	118	08	197	34	06	70
55	36	0,829	+0,559	274	21	14	28	155	55
165	54	0,615	+0,788	140	03	230	30	46	60
97	50	0,695	+0,719	306	04	38	31	211	57
86	70	0,573	-0,819	225	54	11	31	112	17
207	70	0,682	+0,731	178	15	280	40	72	46
196	70	0,643	+0,766	167	16	268	39	60	49
188	70	0,643	+0,766	160	16	262	37	53	48

Earthquakes on 10-15 June 1975 and Their Aftershocks

Key:

1. Date
2. Time of occurrence, hrs, mins
3. H, km
4. M
5. Plane 1: Az°
6. Plane 1: e°
7. Plane 1: shift components: along strike
8. Plane 1: shift components: along dip

Дата	Время возникновения, ч м	H, км	M	Плоскость 1			
				Az°	e°	Компоненты подвижки	
						по простиранию	по падению
1	2	3	4	5	6	7	8
10.VI	13 47	30	7,1	306	63	0,883	-0,469
10.VI	14 11	24	5,4	302	70	0,898	-0,438
10.VI	14 18	23	5,5	291	70	0,669	-0,743
10.VI	14 37	27	6,0	307	64	0,819	-0,573
10.VI	14 58	50	6,4	320	70	0,838	-0,545
10.VI	15 21	25	6,0	146	70	0,898	+0,438
10.VI	15 51	25	5,1	279	64	0,615	-0,788
10.VI	16 14	30	4,8	320	64	0,438	-0,898
10.VI	16 20	24	5,2	268	50	0,951	+0,309
				247	70	0,985	-0,174
10.VI	16 23	30	4,8	305	70	0,602	-0,978
10.VI	18 57	19	4,5	312	60	0,656	-0,754
10.VI	19 06	30	4,5	320	60	0,788	-0,615
10.VI	22 14	27	5,1	308	78	0,838	-0,544
10.VI	23 37	30	4,8	322	60	0,656	-0,754
11.VI	05 21	20	4,8	304	70	0,848	-0,529
11.VI	14 20	15	5,2	301	60	0,898	-0,438
11.VI	15 32	28	5,1	310	60	0,669	-0,743
11.VI	16 52	20	4,9	290	67	0,874	-0,485
11.VI	17 43	25	4,6	270	70	0,937	-0,358
12.VI	01 07	30	5,3	320	68	0,883	-0,615
12.VI	01 49	30	4,8	321	62	0,819	-0,574
12.VI	04 34	30	5,3	298	68	0,777	-0,629
12.VI	08 13	30	4,7	346	56	0,629	+0,777
12.VI	13 15	20	4,9	266	64	0,829	+0,559
12.VI	14 31	30	5,0	339	64	0,559	-0,829
12.VI	14 37	30	4,7	320	70	0,848	-0,529
12.VI	14 58	30	4,5	340	56	0,798	+0,602
12.VI	21 37	16	4,8	323	66	0,898	-0,438
12.VI	23 21	20	5,7	290	70	0,920	-0,390
13.VI	12 57	25	5,1	316	70	0,838	-0,545
13.VI	18 08	20	7,0	302	44	0,766	+0,643
				182	64	0,883	+0,469
13.VI	19 40	20	5,6	317	70	0,732	-0,682
13.VI	19 52	30	5,2	301	70	0,848	-0,529
13.VI	20 20	30	5,0	326	66	0,838	-0,544
13.VI	20 18	30	5,1	324	68	0,643	-0,766

Key:

9. Plane II: Az°
10. Plane II: e°
11. Plane II: shift components: along strike
12. Plane II: shift components: along dip
13. Compression stress: Az°
14. Compression stress: e°
15. Interstitial stress: Az°
16. Interstitial stress: e°
17. Stress-strain: Az°
18. Stress-strain: e°

Плоскость II				Напряжение сжатия		Промежуточное напряжение		Напряжение растяжения	
Az°	e°	Компоненты подвижки							
		по простиранию	по падению	Az°	e°	Az°	e°	Az°	e°
9	10	11	12	13	14	15	16	17	18
201	65	0,866	-0,500	72	37	255	51	164	01
41	64	0,927	-0,375	170	33	358	56	262	04
42	45	0,883	-0,469	155	48	04	37	262	14
54	58	0,857	-0,515	178	43	04	46	272	04
216	60	0,914	-0,406	92	37	258	52	357	07
246	66	0,920	+0,391	107	03	202	57	15	33
38	46	0,766	-0,642	147	56	348	34	252	10
187	36	0,669	-0,743	99	62	242	23	339	16
10	76	0,766	+0,642	45	17	295	46	146	38
154	80	0,939	-0,342	20	20	218	67	112	07
190	40	0,857	-0,515	82	51	227	33	330	17
190	50	0,743	-0,669	78	54	245	35	341	06
208	58	0,809	-0,587	85	47	263	43	353	02
202	60	0,898	-0,438	78	38	248	51	344	05
203	50	0,766	-0,643	90	54	256	35	350	07
200	60	0,920	-0,391	74	36	241	52	341	06
197	58	0,848	-0,529	67	38	258	51	160	04
189	50	0,743	-0,669	76	55	243	35	336	05
32	60	0,906	-0,422	159	36	347	51	250	03
172	70	0,927	-0,374	41	28	221	61	131	00
60	64	0,913	-0,406	188	36	15	54	281	04
213	60	0,838	-0,545	88	44	266	47	357	01
191	56	0,891	-0,454	70	43	234	48	331	10
220	50	0,682	+0,731	02	04	280	32	109	58
158	60	0,857	+0,515	302	03	209	47	34	42
103	40	0,731	-0,682	203	58	52	28	315	13
217	60	0,920	-0,390	92	37	257	53	357	07
226	60	0,766	+0,643	194	03	287	41	102	48
64	66	0,906	-0,423	194	36	15	55	105	01
192	70	0,933	-0,358	60	30	240	60	330	02
212	60	0,914	-0,406	87	37	253	52	352	07
180	64	0,601	+0,798	154	12	252	33	47	56
79	64	0,891	+0,454	221	01	131	51	310	38
209	50	0,898	-0,438	90	44	246	44	349	13
43	58	0,921	-0,391	170	38	03	51	263	07
220	60	0,883	-0,469	94	39	268	49	02	03
208	44	0,838	-0,545	97	50	250	35	351	13

1	2	3	4	5	6	7	8
14.VI	00 00	30	5,2	300	70	0,848	-0,529
14.VI	01 47	25	5,3	317	70	0,848	-0,529
14.VI	01 56	30	5,0	272	54	0,529	-0,848
14.VI	02 14	20	4,6	325	68	0,848	-0,529
14.VI	02 59	30	5,8	312	50	0,898	+0,438
14.VI	04 35	25	5,2	300	74	0,743	-0,669
				157	70	0,848	+0,529
14.VI	05 03	30	5,2	95	70	0,755	-0,656
14.VI	08 43	30	5,6	289	60	0,798	-0,602
14.VI	09 02	29	5,1	312	66	0,829	-0,559
14.VI	10 45	25	5,3	308	70	0,731	-0,682
14.VI	17 11	30	5,3	274	76	0,857	-0,515
14.VI	17 37	24	6,8	297	66	0,891	-0,454
14.VI	18 38	30	6,8	321	68	0,934	-0,338
14.VI	18 49	30	5,7	306	68	0,916	-0,406
14.VI	19 14	50	5,4	304	70	0,719	-0,695
14.VI	20 31	30	4,7	315	66	0,933	-0,358
14.VI	20 35	24	5,1	290	74	0,956	-0,292
15.VI	00 19	30	7,0	308	70	0,743	-0,669
15.VI	02 09	26	5,5	306	44	0,682	-0,731
15.VI	06 02	24	4,7	281	70	0,996	-0,087
15.VI	07 15	24	4,8	325	62	0,914	+0,406
15.VI	08 47	25	4,9	317	68	0,848	-0,529
15.VI	10 46	30	4,9	300	70	0,848	-0,529
15.VI	23 08	27	4,6	307	64	0,829	-0,559
15.VI	23 30	27	4,8	275	68	0,927	-0,375
16.VI	22 39	30	4,5	285	70	0,669	-0,743
18.VI	13 35	40	4,5	322	70	0,956	-0,292
22.VI	01 50	30	4,5	320	62	0,682	-0,731
22.VI	22 44	30	6,4	219	54	0,898	+0,438
22.VI	23 00	20	6,0	200	50	0,970	+0,242
23.VI	09 13	20-25	6,1	128	70	0,719	+0,695
23.VI	11 56	20-25	5,0	165	69	0,669	-0,743
25.VI	16 14	15	4,4	122	78	0,883	-0,469
26.VI	10 31	20-25	5,6	264	80	0,615	-0,788
26.VI	13 07	30	5,3	326	48	0,500	-0,866
9.VII	11 34	20	5,5	300	68	0,927	-0,374
25.VII	22 47	20	4,9	309	70	0,719	-0,695
17.IX	17 58	40	5,3	275	70	0,719	-0,695
2.X	11 06	75	4,8	288	50	0,788	+0,615
24.XI	07 58	30	5,6	347	56	0,629	+0,777
24.XI	08 25	30	4,7	287	60	0,920	-0,390
24.XI	09 51	40	5,5	314	68	0,838	-0,545
27, XI	19 34	25	4,9	343	46	0,883	+0,469
28.XI	06 00	20	4,5	293	70	0,933	-0,358
3.XII	07 14	50	5,1	249	62	0,920	+0,390
5.XII	20 14	50	5,0	312	74	0,848	+0,529
16.XII	04 49	30	4,8	300	40	0,857	-0,515
25.XII	21 38	40	4,7	255	60	0,669	-0,743
27.XII	07 41	40	6,0	283	66	0,838	-0,544

9	10	11	12	13	14	15	16	17	18
198	60	0,920	-0,391	73	37	239	53	338	06
215	60	0,920	-0,391	88	37	255	53	354	07
46	46	0,573	-0,819	154	65	341	25	249	04
67	60	0,914	-0,406	194	38	24	51	287	06
204	70	0,731	+0,682	172	13	274	44	72	44
196	50	0,933	-0,358	76	41	227	45	333	16
55	58	0,927	+0,375	194	09	93	50	290	37
350	50	0,914	-0,406	230	42	25	43	128	13
179	58	0,809	-0,587	55	47	232	43	324	02
205	60	0,883	-0,469	80	40	253	49	347	04
198	50	0,891	-0,454	82	44	236	42	339	13
175	60	0,961	-0,275	47	32	206	56	312	12
194	66	0,891	-0,454	66	36	246	54	155	00
222	70	0,920	-0,391	90	31	273	59	186	00
45	66	0,906	-0,423	175	34	357	56	86	00
195	50	0,891	-0,454	78	45	233	43	336	12
216	70	0,898	-0,438	85	30	269	58	176	03
196	74	0,956	-0,292	63	23	243	66	333	01
200	52	0,891	-0,454	81	44	238	44	340	11
176	60	0,545	-0,838	49	61	248	27	154	09
198	80	0,982	-0,191	55	11	252	67	146	04
222	70	0,866	+0,500	186	05	282	54	91	35
59	60	0,906	-0,422	185	38	16	51	280	05
196	60	0,923	-0,393	71	37	237	52	337	07
200	60	0,857	-0,515	75	43	250	48	343	03
175	70	0,914	-0,406	45	30	227	59	136	01
174	46	0,883	-0,469	61	47	213	39	316	16
225	74	0,933	-0,358	93	26	280	63	184	02
202	50	0,788	-0,615	88	52	253	36	349	07
113	70	0,766	+0,643	79	11	180	46	341	42
101	80	0,766	+0,643	67	20	178	46	323	35
236	50	0,883	+0,469	96	14	198	42	353	45
52	46	0,865	-0,500	194	14	92	40	193	13
26	61	0,978	-0,207	258	29	52	58	161	13
170	70	0,985	-0,174	37	18	199	68	306	05
184	50	0,469	-0,883	74	69	256	21	164	00
201	70	0,891	-0,391	70	30	254	59	160	01
201	50	0,898	-0,438	83	45	238	43	342	13
167	50	0,898	-0,438	48	44	204	43	307	14
171	62	0,682	+0,731	142	08	236	38	42	51
222	50	0,682	+0,732	14	03	281	31	110	58
184	70	0,848	-0,529	52	36	246	53	147	06
210	60	0,898	-0,438	85	38	254	51	351	06
93	70	0,682	+0,731	123	15	20	39	228	47
195	70	0,933	-0,358	63	28	243	61	154	00
148	70	0,866	+0,500	110	05	206	55	16	35
52	58	0,951	+0,309	275	11	10	52	178	33
185	70	0,574	-0,819	45	52	262	33	159	17
136	50	0,766	-0,643	21	54	189	35	284	07
178	60	0,883	-0,469	53	40	224	49	319	05

UDC 550.341-550.34:91

"Earthquakes in the Carpathians," Kostyuk, O. P., "Zemletryaseniya v SSSR v 1975 godu," Moscow, Nauka, 1978, pp 9-11

The seismicity of the Carpathians is described. The spatial distribution is analyzed from the map of the epicenters given. It is noted that the Vrancha region on Romanian territory, just as formerly, is most active. The article is accompanied by a catalog of earthquakes.

Illustrations--1, Tables--1, Bibliography--2 entries.

UDC 550.341-550.34:91

"Earthquakes in the Crimea and Lower Kuban," Popov, I. I., "Zemletryaseniya v SSSR v 1975 godu," Moscow, Nauka, 1978, pp 12-13.

The characteristics of the seismic activity of the Crimea during the year are given. Data are presented on the parameters of earthquakes and the methods of determining them. A catalog of earthquakes is presented.

Illustrations--1, Bibliography--2 entries

UDC 550.341-550.34:91

"Earthquakes in the Caucasus," Papalashvili, V. G.; Bagramyan, A. Kh.; Levkovich, R. A.; and Agamirzoyev, R. A., "Zemletryaseniya v SSSR v 1975 godu," Moscow, Nauka, 1978, pp 14-21

The article is devoted to a description of the seismicity of the Caucasus during the year. Information is given on the seismological stations, the data from which were used in determining the parameters of the earthquakes. Methods of determining these parameters are described, and a survey is given of the seismicity of the Caucasus with respect to the two major areas--the Eastern Caucasus and the Dzhavakhetskiy upland. A map of the epicenters is given. Macroseismic data are given for the strongest earthquakes of this year. The article is accompanied by a catalog of earthquakes.

Illustrations--5, Tables--3, Bibliography--4 entries

UDC 550.341-550.34:91

"Izerbash Earthquake on 20 June 1975," Levkovich, R. A.; Asmanov, O. A., "Zemletryaseniya v SSSR v 1975 godu," Moscow, Nauka, 1978, pp 22-25

Macroseismic information is given on a scale of MSK-64, as well as a map of the isoseismal lines.

Illustrations--1, Tables--2, Bibliography--1 entry

UDC 550.341-550.34:91

"Shakhnazar Earthquake on 30 March 1974," Bagramyan, A. Kh; Geodakyan, E. G.; Gogmachadze, S.; Makhatadze, . N.; Papalashvili, V. G.; and Simonyan, S. S., "Zemletryaseniya v SSSR v 1975 godu," Moscow, Nauka, 1978, pp 27-31.

A description is given of the macroseismic consequences of the Shakhnazar earthquake, estimated by scale MSK-64; instrument data and a list of the aftershocks of this earthquake are given.

Illustrations--4, Tables--2, Bibliography--6 entries.

UDC 550.341-550.34:91

"Bezhtinsk Earthquake on 4 August 1974," Asmanov, O.A.; Aref'yev, S.S.; Idarmachev, Sh. G.; Kakhiani, L. A.; Levkovich, R.A.; Papalashvili, V. G.; and Shebalin, N. V., "Zemletryaseniya v SSSR v 1975 godu," Moscow, Nauka, 1978, pp 32-36.

UDC 550.341-550.34:91

Detailed macroseismic data on the MSK-64 scale are given, as well as instrument data and a list of the earthquakes that have occurred on the territory of the southwestern section of the Greater Caucasus.

Illustrations--2, Tables--2, Bibliography--5 entries.

UDC 550.341-550.34:91

"Kilyatl Earthquake on 13 November 1974 in Dagestan," Asmanov, O.A.; Aref'yev, S. S.; Kasparov, S. A.; Levkovich, R. A.; and Shukin, V. I., "Zemletryaseniya v SSSR v 1975 godu," Moscow, Nauka, 1978, pp 37-43.

The geological conditions of the Kilyatl earthquake are described. Information from the temporary expeditionary stations is given on this earthquake, as well as detailed macroseismic data on the MSK-64 scale.

Illustrations--5, Tables--2, Bibliography--5 entries.

UDC 550.341-550.34:91

"Sala-Tau Earthquake on 23 December 1974 in Dagestan," Asmanov, O. A.; Aref'yev, S. S.; Idarmachev, Sh. G.; Kasparov, S. A.; Kramynin, P. I.; Levkovich, R. A.; and Shchukin, V. I., "Zemletryaseniya v SSSR v 1975 godu," Moscow, Nauka, 1978, pp 44-52.

The geological conditions of the Sala-Tau earthquake are described. Information from the temporary expeditionary stations is given on this earthquake, as well as detailed macroseismic data on the MSK-64 scale.

Illustrations--10, Tables--2.

UDC 550.341-550.34:91

"Earthquakes in Western Turkmeniya," Golinskiy, G. L.; Gorodkova, T. N; and Rakhimov, A. R.,"Zemletryaseniya v SSSR v 1975 godu," Moscow, Nauka, 1978, pp 53-56.

An analysis is made of the seismicity of Turkmeniya and the adjacent territories of Northern Iran included in the Kopetdag zone. The methods used to determine the basic parameters of earthquakes are described. An analysis is given of the accuracy on the basis of the location of the stations with respect to the epicenter. A brief description is given of the nature of the manifestation of the perceptible earthquakes. The article is accompanied by a catalog of earthquakes.

Illustrations--2, Tables--2, Bibliography--12 entries.

UDC 550.341-550.34:91

"Earthquakes in Central Asia and Kazakhstan," Ulomov, V. I.; Flenova, M. G.; Fadina, M. P.; Katok, A. P.; Dzhanuzakov, K. D.; Iodko, V. K.; Kinyapina, T. A.; and Kon'kov, A. A., "Zemletryaseniya v SSSR v 1975 godu," Moscow, Nauka, 1978, pp 57-68.

The article is devoted to a description of the seismicity of Central Asia. Most active, as usual, was the Pamiro-Hindukush region, both with respect to the number of recorded crustal and deep earthquakes. For the major seismogenic zones and the most active regions, the parameters of the seismic conditions γ and A_{ic} are determined, in accordance with which the seismoactive regions are combined into three groups. Macroseismic information is also given on some strong earthquakes. The article is accompanied by a catalog of earthquakes.

Illustrations--5, Tables--6, Bibliography--4 entries.

UDC 550.341-550.34:91

"Earthquakes in Northern Tian-Shan'," Ospanov, A. B., "Zemletryaseniya v SSSR v 1975 godu," Moscow, Nauka, 1978, pp 69-75.

Data are given on the network of seismic stations in the Northern Tyan'-Shan zone. The seismic activity is described and a catalog of earthquakes in 1975 is compiled. Maps are plotted of the epicenters and density of the epicenters. Note is made of the regeneration of the seismic conditions in the center areas of the catastrophic Chilikskiy (1889) and Vernenskiy (1887) earthquakes. There is a detailed discussion of the most significant event--the Toraygyr earthquake on 12 February 1975, with M=5.0 and an intensity of 6 points at the epicenter. A map is plotted of the isoseismal lines, a copy of the recording of this earthquake by an SMTR seismograph is

given, and the spatial-temporal conformities of its aftershock activity are studied.

Illustrations--4, Tables--1, Bibliography--4 entries.

UDC 550.341-550.34:91

"Earthquakes in Altay and Sayan," Filina, A. G., "Zemletryaseniya v SSSR v 1975 godu," Moscow, Nauka, 1978, pp 76-79.

The pronounced level of activity of all the regions characteristic of the area connected with strong and catastrophic earthquakes is noted.

The series of aftershocks of the earthquakes on 15 May 1970 and 29 November 1974 continue. Their distribution by classes is given. Note is taken of the level of seismic activity, higher than 1974, with respect to the aftershocks of the region of the Ureg-Nursk earthquake. The region of the Shapshal'skiy earthquakes of 1973-1974, also active this year, is linked with it.

For the regions of the Mongol-Altay 1931 and Tannu-Ol'sk 1905 earthquakes, there is a change in the average yearly number of earthquakes during the period of 1963-1975, and in each case an increase is observed in the number of earthquakes in 1975 after periods of relative calm. Determinations of the mechanism of the center, using the methodology of A. V. Vvedenskaya, are made for earthquakes Nos 8 and 9 from the region of the catastrophic Mongolian-Altay earthquake of 1931. It is noted that the course of the axes of the main stresses in both cases is maintained, and only their incline toward the horizontal plane changes.

As before, the region of Dzhungarskiy Ala-Tau and Lake Zaysan is active. Earthquakes were recorded in the Kamnya-na-Ob' region.

The article is accompanied by a catalog of earthquakes.

Illustrations--2, Bibliography--2 entries.

UDC 550.341-550.34:91

"Earthquakes in the Baykal Region," Golenetskiy, S. I., "Zemletryaseniya v SSSR v 1975 godu," Moscow, Nauka, 1978, pp 80-86.

The seismicity of the Baykal seismic zone was studied in 1975 in accordance with the observations of the regional network of 18 seismic stations. Some 2,609 epicenters of earthquakes were determined. The catalog given contains information on 324 jolts from the 9th energy class. Charts are computed for the frequency of earthquakes for the entire zone and the reef area and individually for its northeastern and southwestern sections. The results are given from determining the mechanism of the centers of the two

earthquakes in the region of the Chivyrkuyskiy inlet at Baykal. The development of the seismic process during 1975 is discussed in time and in its connection with the manifestations of seismicity in the preceding period. The study of the seismicity is made on the basis of maps of the epicenters, the seismic activity and charts of the distribution of earthquakes with respect to energy and in time.

Particular attention is paid to discussing the large-scale cluster of earthquakes on the Barguzinskiy range, which constitutes one of the most significant characteristics of the region's seismicity in 1975.

Illustrations--5, Tables--3, Bibliography--9 entries

UDC 550.341-550.34:91

"Earthquakes in Yakutiya and the Northeastern USSR," Koz'min, B. M., and Andreyev, T. A., "Zemletryaseniya v SSSR v 1975 godu," Moscow, Nauka, 1978, pp 87-89

Studies of earthquakes were made at 13 regional seismological stations with uniform equipment. The methodology of processing the data is given. An analysis of the seismicity showed that the most seismoactive in 1975 were the northern regions of the zone: Verkhoyanskiy range, Laptevkykh Sea, Dzhugdzhur range and coast of the Sea of Okhotsk. Some 95 percent of the yearly seismic energy of the region was released here. There is a macroseismic description of two earthquakes in the region of the Verkhoyanskiy range and the Laptevykh Sea. A catalog of earthquakes is appended to the article.

Illustrations--1, Tables--2, Bibliography--4 entries

UDC 550.341-550.34:91

"Earthquakes in the Amur Region and Primor'ye [Coastal] Region," Oskorbin, L. S., "Zemletryaseniya v SSSR v 1975 godu," Moscow, Nauka, 1978, pp 90-93

An analysis of the detailed seismicity of the Amur region is made from studies of seismological stations of the regional and field type. A map of the epicenters and catalog of earthquakes are given.

Illustrations--2, Bibliography--4 entries

UDC 550.341-550.34:91

"Earthquakes in Sakhalin," Oskorbin, L. S., "Zemletryaseniya v SSSR v 1975 godu," Moscow, Nauka, 1978, pp 94-98

The article is devoted to an analysis of the seismicity of Sakhalin. The parameters are determined for 80 earthquakes, recorded by permanent and

expeditionary stations. There is a detailed discussion of the seismicity of individually, conditionally singled out regions. A graph of the frequency is plotted. The article is accompanied by a catalog of earthquakes.

Illustrations--3, Tables--1, Bibliography--4 entries.

UDC 550.341-550.34:91

"Earthquakes in Kuril," Poplavskaya, L. N.; Boychuk, A. N.; and Rudik, M. I., "Zemletryaseniya v SSSR v 1975 godu," Moscow, Nauka, 1978, pp 99-105.

The characteristics of the seismic conditions during the year are given on the basis of a map of the epicenters and data from a graph of the frequency and distribution of the Kurilo-Okhotsk earthquakes of 1975 with respect to magnitude and depth of the focus.. The manifestation of seismicity is described in detail for eight regions conventionally singled out. The dynamic parameters of the focus of the strongest earthquakes are determined. Information on the basic parameters of 1,130 earthquakes is given in a catalog.

Illustrations--2, Tables--2, Bibliography--3 entries.

UDC 550.341-550.34:91

"Strong Earthquakes in the Lesser Kuril'skaya Range," Poplavskaya, L. N.; Boychuk, A. N.; Go Chan Nam; Zhigulina, N. D.; Zhak, V. M.; Kleshchenko, N. A.; Naumenko, B. N.; Osipov, A. F.;, Rudik, M. I.; Skripnik, A. V.; Akripnik, V. M.; Kharlamov, A. A.; and Khristoforov, G. N.; "Zemletryaseniya v SSSR v 1975 godu," Moscow, Nauka, 1978, pp 106-110.

The results of a study of the focal center of a series of strong earthquakes on 10-15 June 1975 in the Lesser Kuril'skaya Range region are given. An analysis is made of the dynamic parameters of the mechanisms of the focal points of the earthquakes. For the tectonic jolt on 10 June there are detailed instrument data on the manifestation by seismic sea waves at the Kuril Islands and Hokkaydo Island.

Illustrations--2, Tables--4, Bibliography--2 entries.

UDC 550.341-550.34:91

"Earthquakes in Kamchatka," Fedotov, S. A.; Simbireva, I. G.; Feofilaktov, V. D.; Gusev, A. A.; Gorel'chik, V. I.; and Stepanov, V. V., "Zemletryaseniya v SSSR v 1975 godu," Moscow, Nauka, 1978, pp 111-114.

The article describes the seismicity of the Kamchatka region in 1975. Maps of the epicenters and seismic activity are given, as well as the vertical cross section and catalog of earthquakes with $K \geq 10$. The

strongest occurrence of the year was the double tremor with M = 7.0 and 7.8 on 5 April. The seismicity related to the great Tolbachik fissure eruption is briefly described.

Illustrations--4, Bibliography--4 entries.

UDC 550.341-550.34:91

"Earthquakes in Chukotka and the Arctic Basin," Lazareva, A. P., "Zemletryaseniya v SSSR v 1975 godu," Moscow, Nauka, 1978, pp 115-117.

A survey is given of the seismicity of the Soviet sector of the Arctic in 1975 on the basis of all the available instrument data. The parameters of some weak earthquakes were determined from data from only one station. The greatest activity in the area was confined to the underwater Gakkel' ridge. A table is also given with the distribution of earthquakes recorded by stations at Iul'tin and Tiksi, according to the epicentral distances and energy classes. A catalog of earthquakes is presented.

Illustrations--1, Tables--1, Bibliography--4 entries

UDC 550.341-550.34:91

"Antarctic Earthquake on 15 October 1974," Oborina, S. F., "Zemletryaseniya v SSSR v 1975 godu," Moscow, Nauka, 1978, pp 118-119.

A description is given of an earthquake with a magnitude of 5, recorded for the first time on Antarctic territory. The epicenter of the earthquake may indicate the continuation of the Pacific Ocean alpine folded ring from New Zealand to Western Antarctica. The fact of the recording of short-period waves L_g and P_g in Eastern Antarctica is noted.

Bibliography--8 entries.

UDC 550.341-550:34:91

"Strong Earthquakes of the World," Shatornaya, N. V., "Zemletryaseniya v SSSR v 1975 godu," Moscow, Nauka, 1978, pp 120-123.

A survey is given of the seismicity of the earth with respect to earthquakes with $M \geq 6$, the parameters of which are determined from the data from a network of Unified System of Seismic Operations support stations.

The table contains information on the yearly frequency of the manifestation of earthquakes with a certain magnitude during the last 10 years and shows the comparative distribution of the total seismic energy released from the focal points of strong earthquakes in 1975 for the five seismoactive belts in the world: Pacific Ocean, Trans-Asiatic, Arctic, Atlantic and Indian. A catalog of earthquakes is appended to the article.

Illustrations--1, Tables--2, Bibliography--3 entries.

UDC 550.341-550.34:91

"Additional Parameters of the Focal Points of Strong Earthquakes," Zakharova, A. I.; Chepkunas, L. S.; Zapol'skiy, K. A.; Zhbrykunova, N. A.; Zhbrykunov, V. Ya.; and Levkina, T. G., "Zemletryaseniya v SSSR v 1975 godu," Moscow, Nauka, 1978, pp 124-140.

For some strong earthquakes with $M \geq 7$, the dynamic parameters are determined for the focal points with respect to the spectrums of the longitudinal waves recorded at the TsSO at Obninsk with standard apparatus and frequency selection seismic station: the seismic moment, length of the discontinuity, magnitude of the shift and drop of the stress.

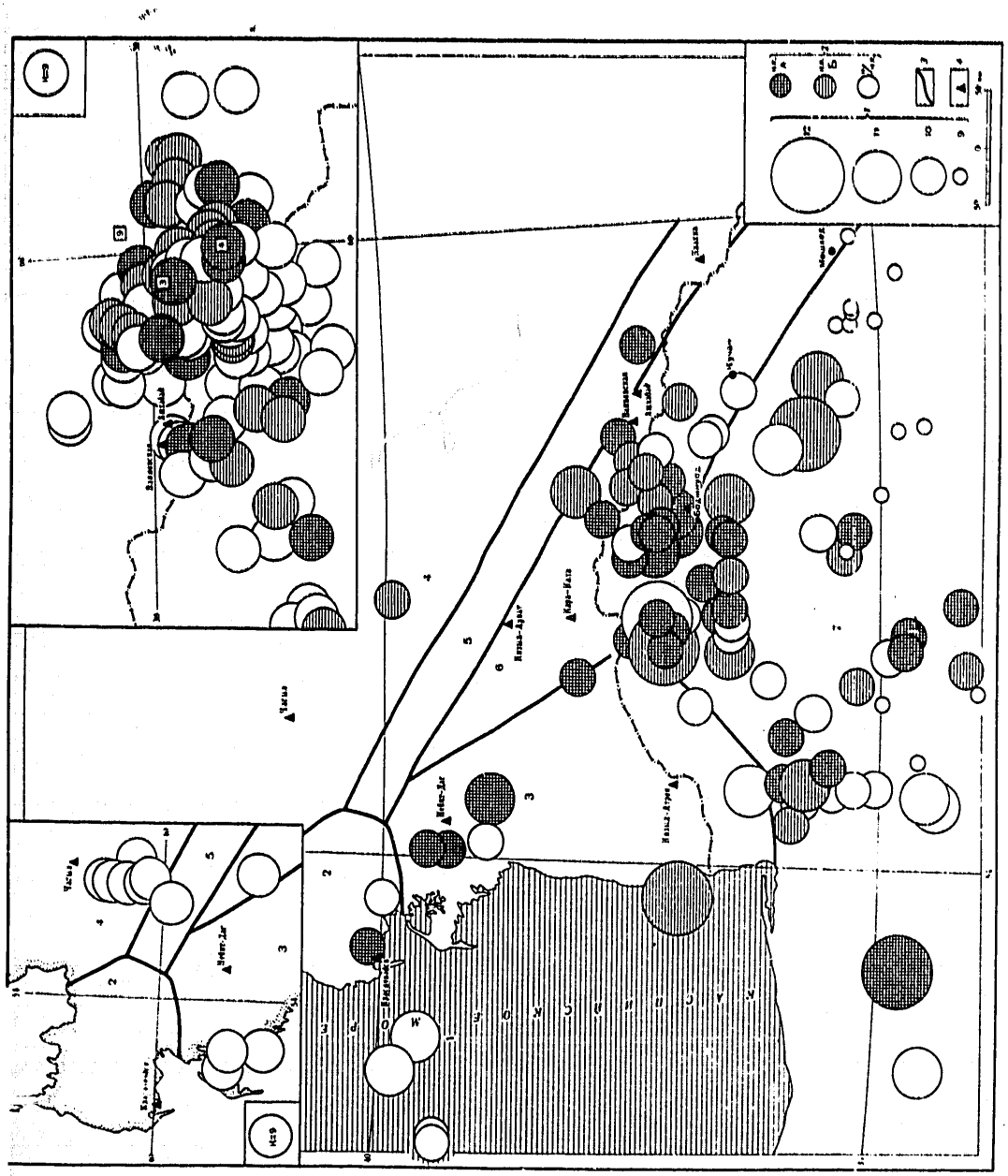
Illustrations--9, Tables--5, Bibliography--14 entries

UDC 550.341-550.34:91

"Spectral and Temporal Characteristics of the P-Waves of Strong Earthquakes in 1974 (from the data of the frequency selection seismic station at the TsSO at Obninsk)," Zapol'skiy, K. K.; Zhbrykunova, N. A.; and Zhbrykunov, V. Ya., "Zemletryaseniya v SSSR v 1975 godu," Moscow, Nauka, 1978, pp 141-146.

The spectrums of strong earthquakes according to the frequency selection seismic stations that diffract the recordings and frequency-temporal fields of P-waves are discussed.

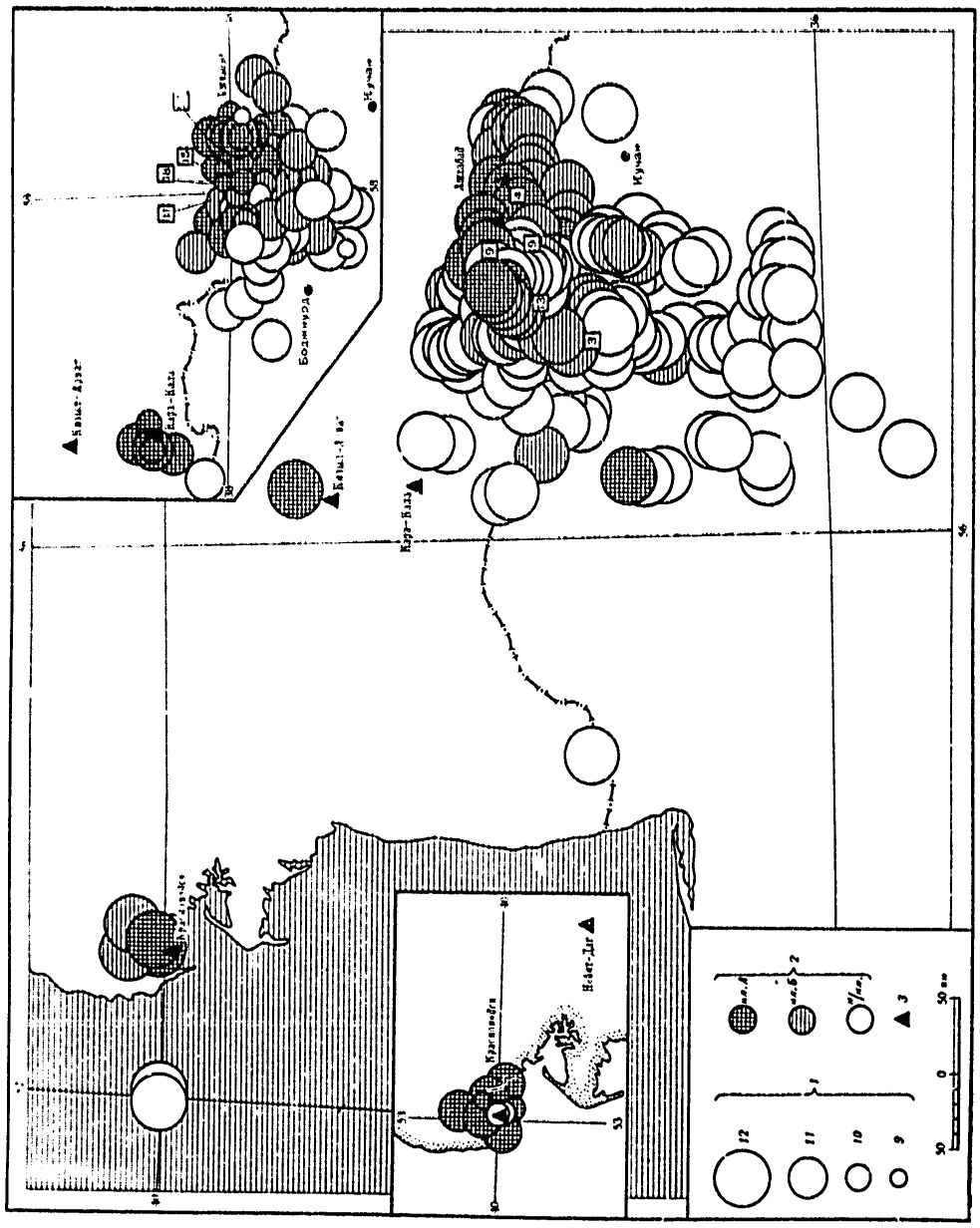
Illustrations--3, Tables--3, Bibliography--8 entries.



For article, "Earthquakes in Western Turkmeniya"

Figure 1. Map of Epicenters of Strong Earthquakes in Turkmeniya in 1975 (K 9)

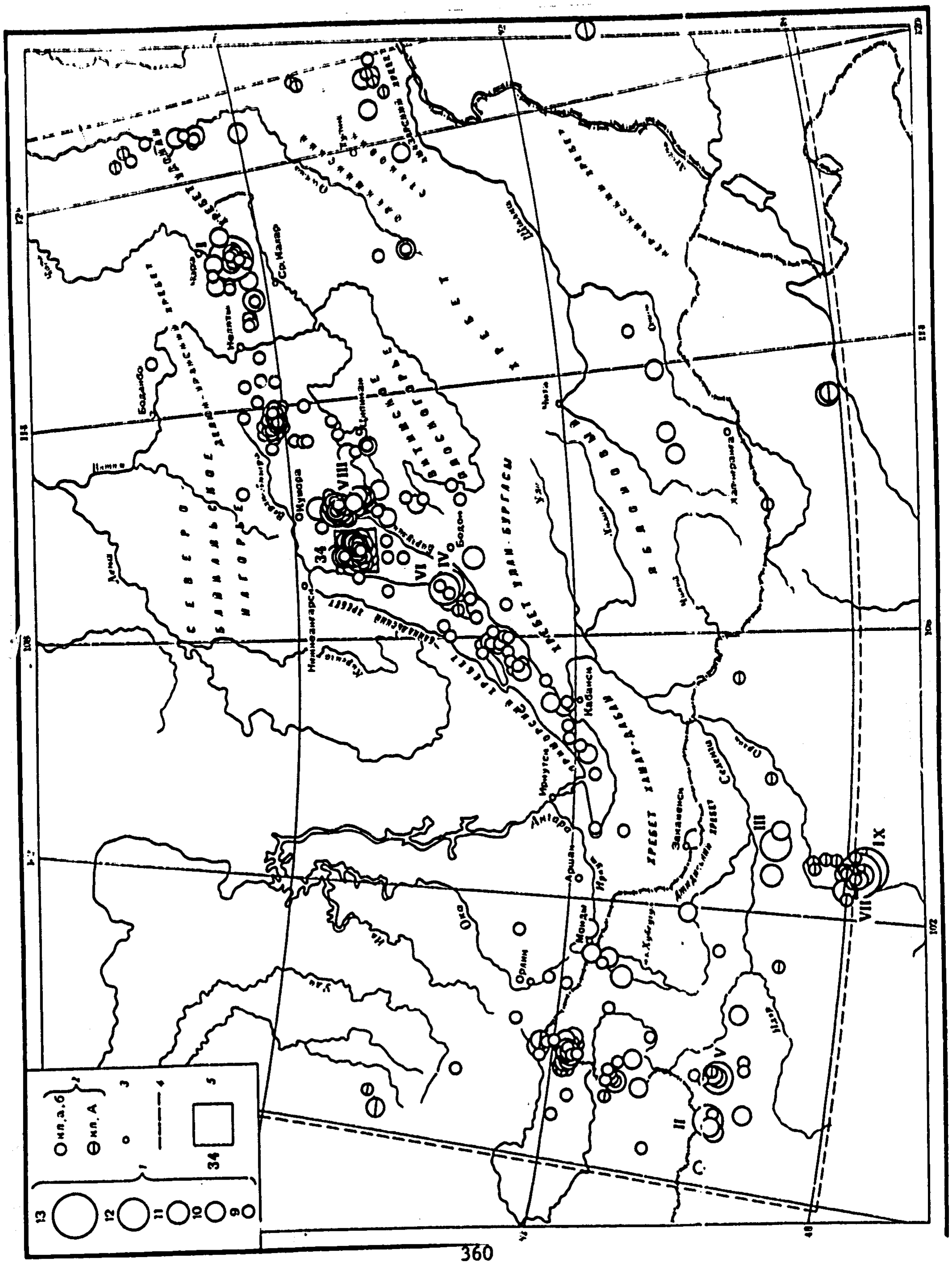
1--energy class K; 2--class of accuracy in determining coordinates of epicenters; 3--boundaries of seismic regions; 4--seismological stations. In the inset maps: at the right--epicenters of earthquakes with K = 9 in Ashkhabad region, at the left--same, for Krasnovodsk region. The numbers designate the number of epicenters at the given point.



For article, "Earthquakes in Western Turkmeniya"

Figure 2. Map of Epicenters of Weak Earthquakes in Turkmeniya in 1975 (K 9)

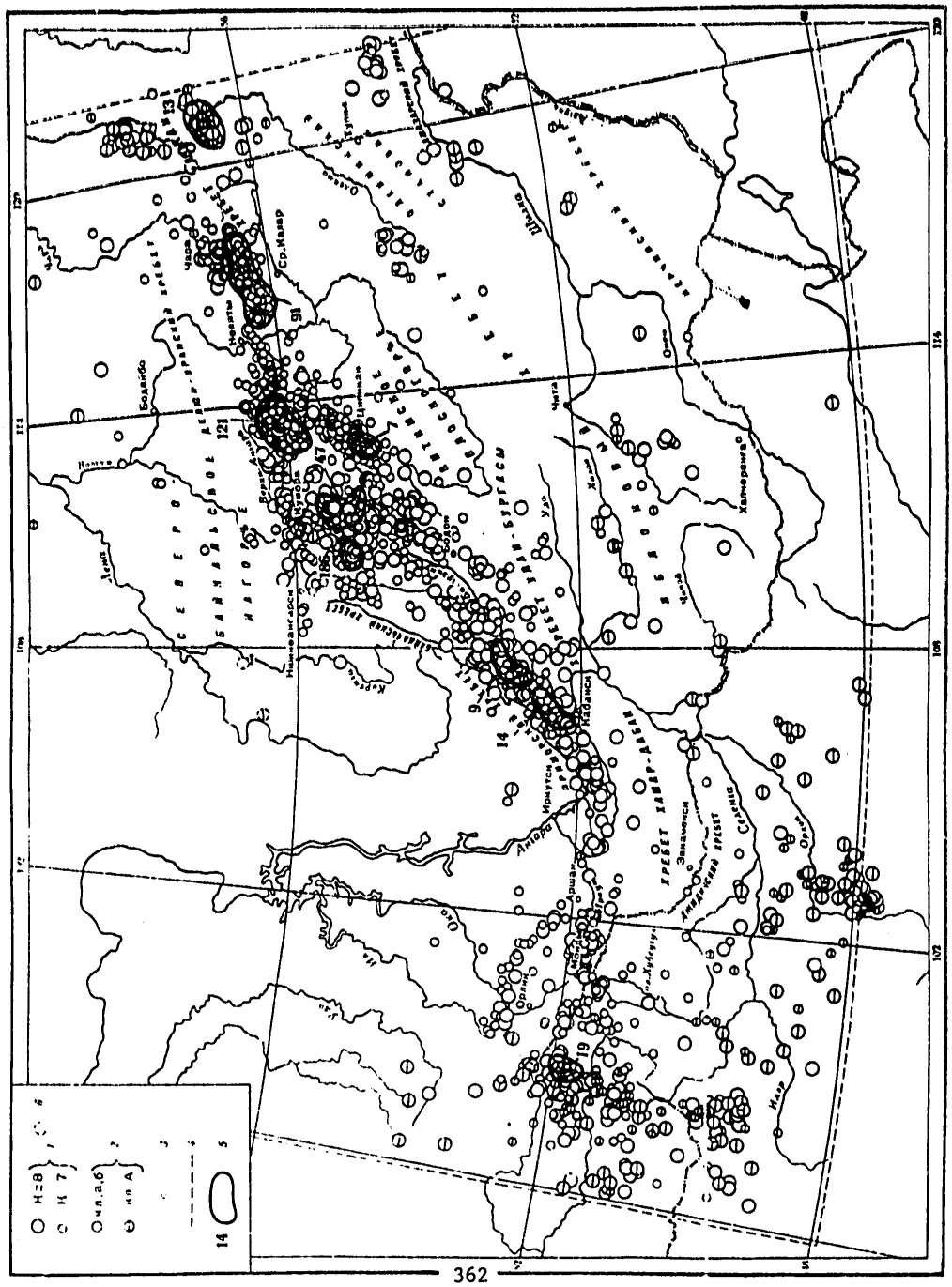
1--energy class K; 2--class of accuracy of determining coordinates of epicenters; 3--seismological stations. In the inset maps: at the right--epicenters of earthquakes with K = 4-7 in Ashkhabad region, at the left--same, for Krasnovodsk region.



For article, "Earthquakes in Baykal Region"

Figure 1. Map of Epicenters of Earthquakes in the Baykal Zone in 1975 With K 9

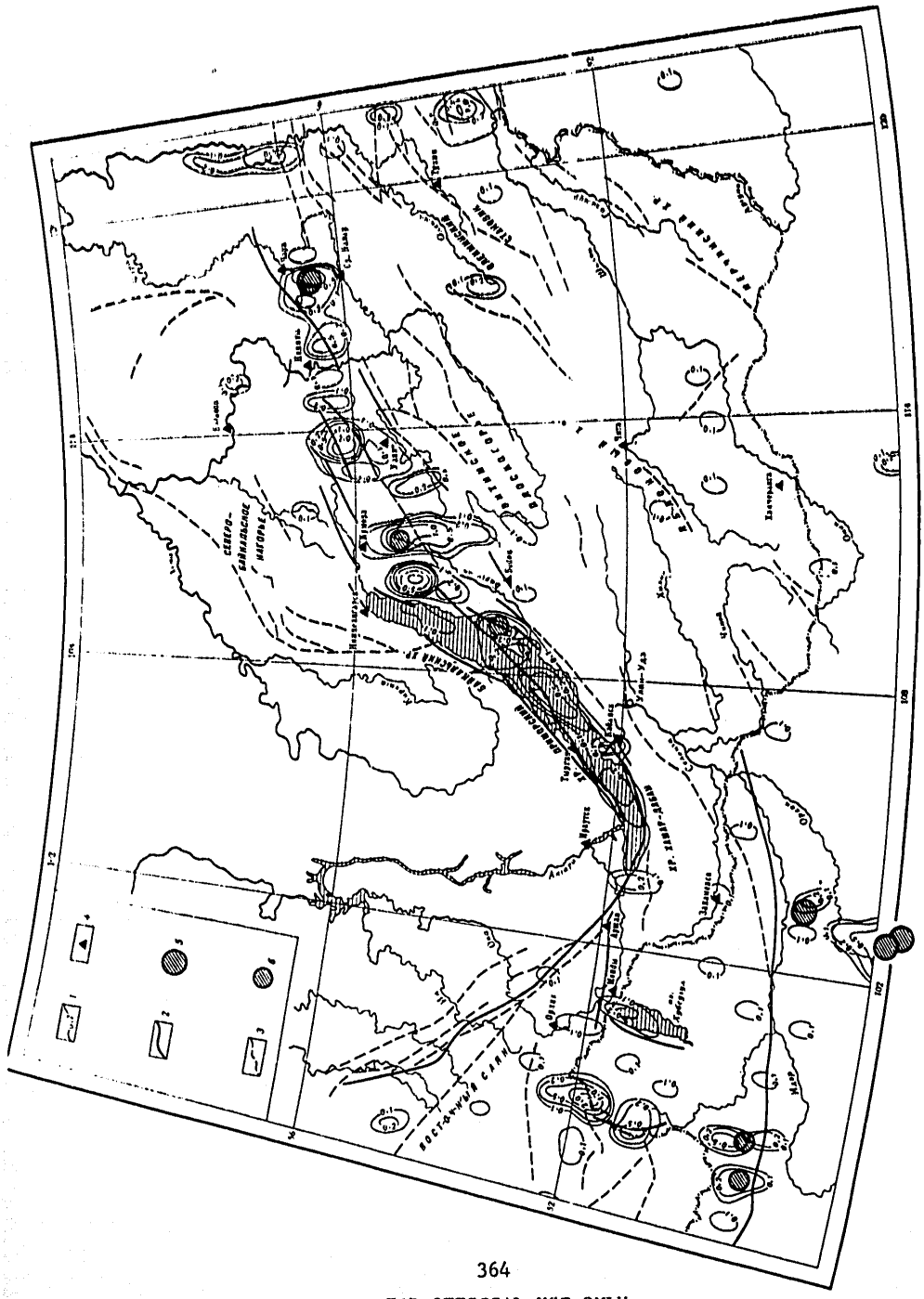
1--energy class K; 2--classes of accuracy (a, b--error does not exceed 5-10 km, A--25 km); 3--seismological stations; 4--boundary of Baykal seismic zone; 5--outlines of the area with the number of epicenters not entered on the map due to their great density. Earthquakes with K = 12 are designated by Roman numerals in chronological order.



For article, "Earthquakes in Baykal Region"

Figure 2. Map of Epicenters of Earthquakes in the Baykal Zone in 1975 With K = 7-8

1-5--designations the same as in Figure 1; 6--focal points, possibly of nonseismic origin



For article, "Earthquakes in Baykal Region"

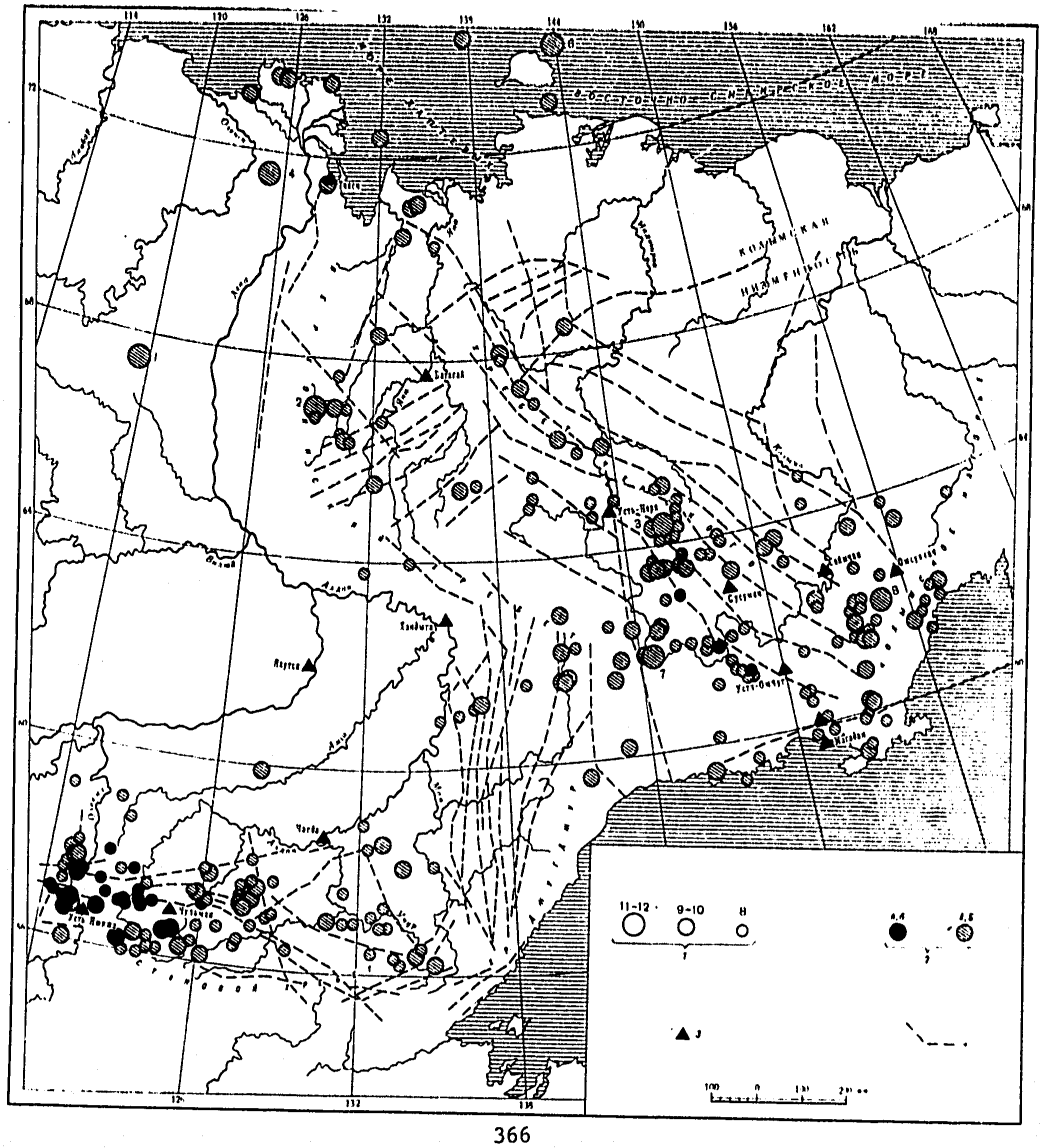
Figure 3. Map of Seismic Activity of Baykal Zone in 1975

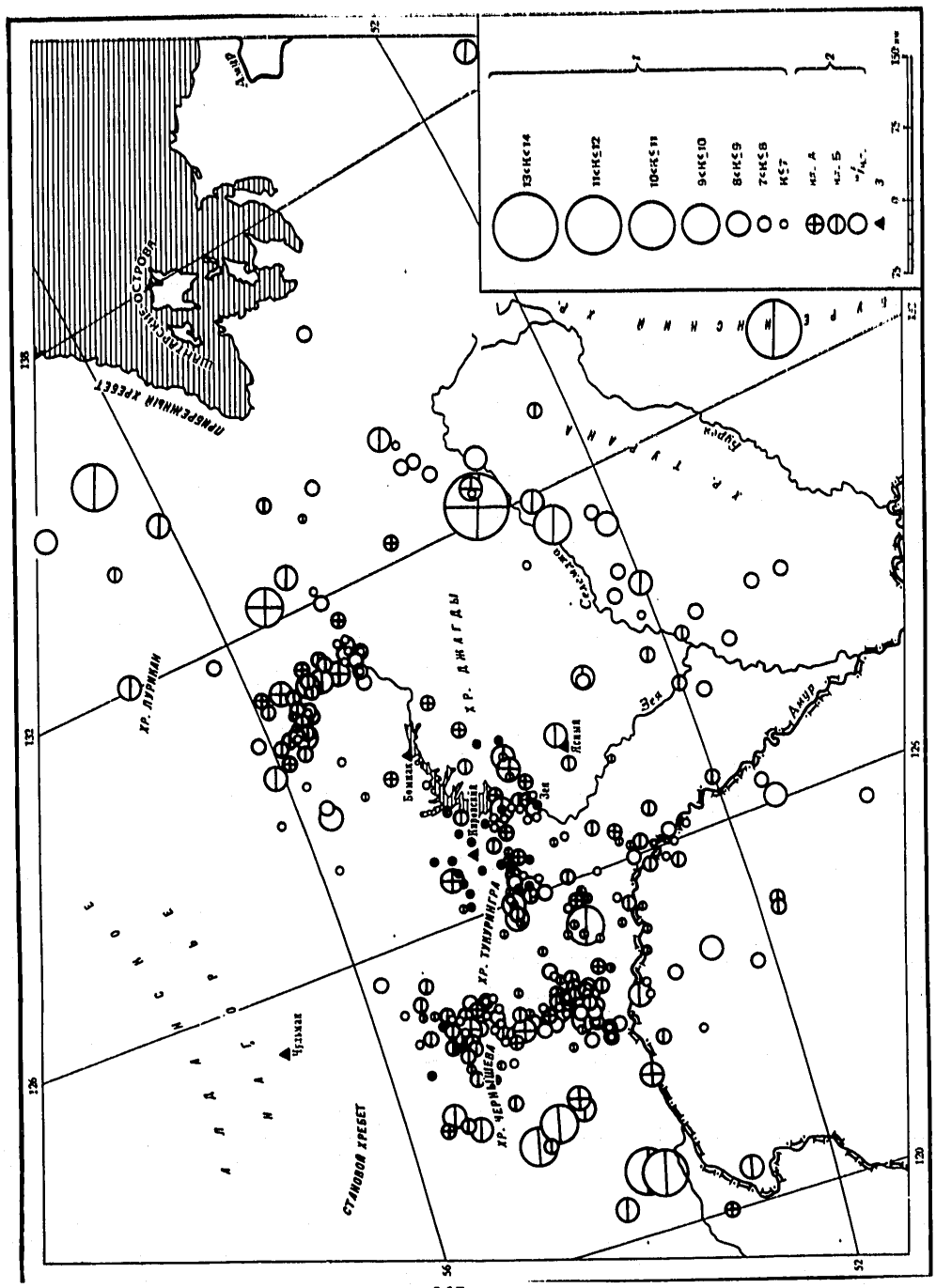
1--isolines of seismic activity ; 2--activated faults; 3--faults; 4--seismological stations; 5, 6--epicenters of earthquakes of 13th and 12th energy classes respectively

For the article, "Earthquakes in Yakutiya and the Northeastern USSR"

Map of Epicenters of Earthquakes in Yakutiya and Northeastern USSR in 1975

1--energy class, K; 2--accuracy of determining epicenters: class a-- ± 5 km; b-- ± 10 km; A-- ± 25 km; B-- ± 50 km; 3--seismological stations; 4--faults

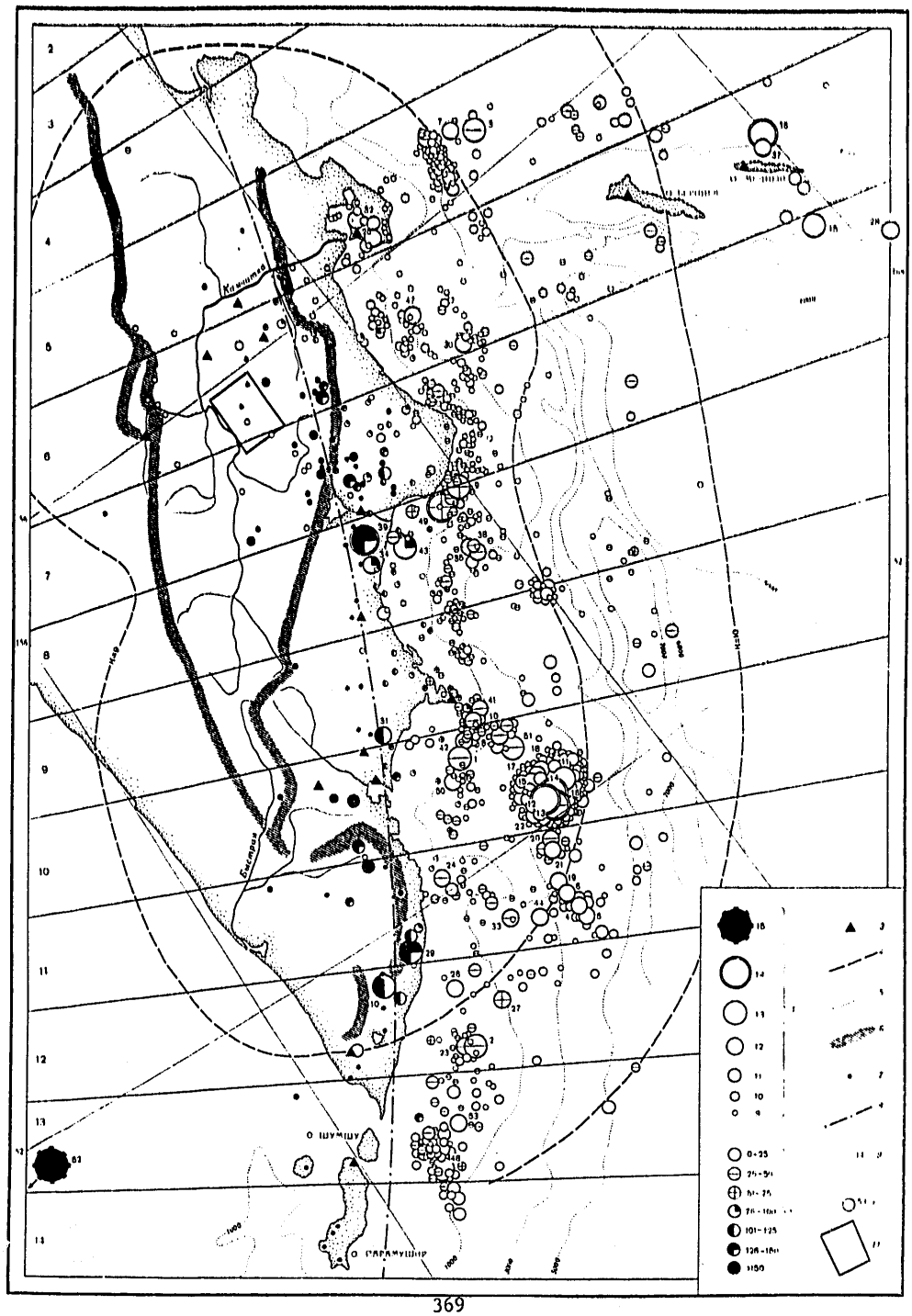




For the article, "Earthquakes in the Amur Region"

Figure 1. Epicenters of Earthquakes in the Amur Region in 1975

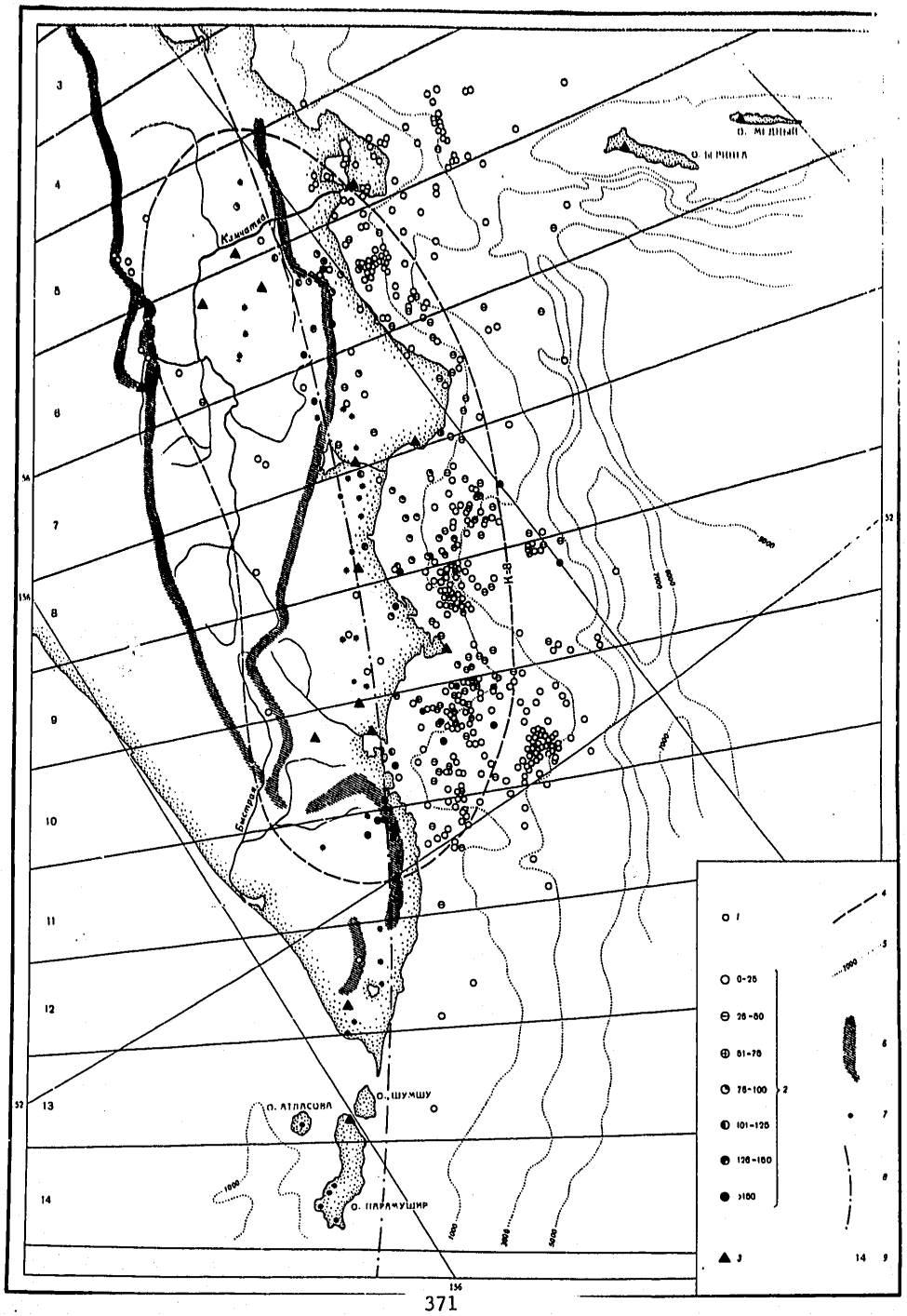
1--energy class K; 2--accuracy of determining position of epicenter; 3--seismological stations



For the Article, "Earthquakes in Kamchatka"

Figure 1. Map of Epicenters of Earthquakes in Kamchatka and Komandorskiy Islands With 9 in 1975.

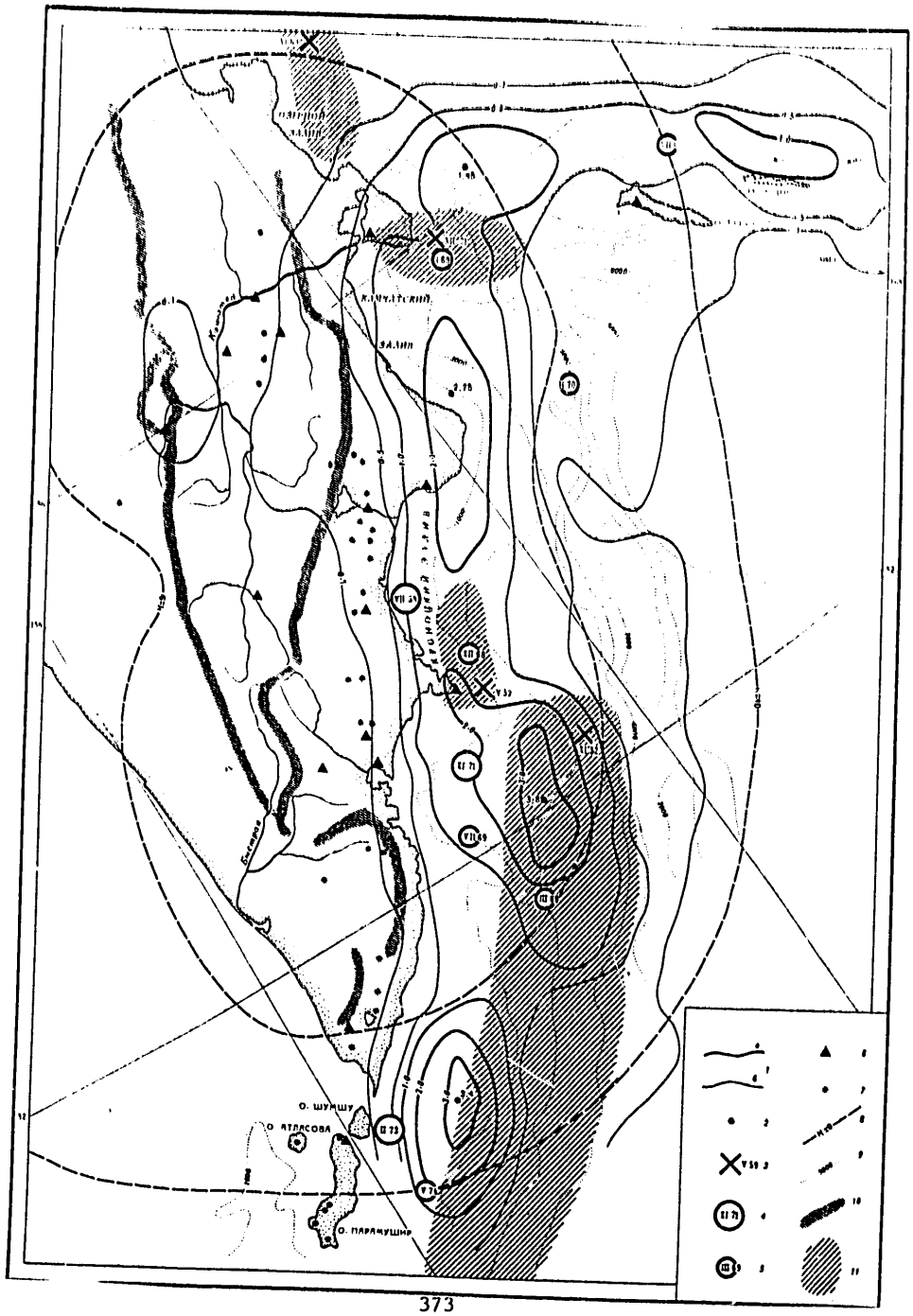
1--energy class K; 2--depth of focus in km; 3--seismological stations; 4--outlines of reliable recording with K = 9 and 10; 5--isobaths; 6--mountain ranges; 7--active volcanoes; 8--axis of volcanic arc; 9--numbers of sectors of volcanic arc; 10--numbers of earthquakes with K 12; 11--Tolbachik volcano region



For the article, "Earthquakes in Kamchatka"

Figure 2. Map of Epicenters of Earthquakes in Kamchatka and Komandorskiy Islands With K = 8 in 1975

1--energy class K; 2--depth of focus H in km; 3--seismological stations; 4--outlines of reliable recording; 5--isobaths; 6--mountain ranges; 7--active volcanoes; 8--axis of volcanic arc; 9--numbers of sectors of volcanic arc



For article, "Earthquakes in Kamchatka"

Figure 3. Map of Seismic Activity of Kamchatka and Komandorskiy Islands

1:a, b--isolines of seismic activity in units ; 2--maximum and minimum of seismic activity in units ; 3--epicenters according to instrument data on earthquakes; 4--November 1952 with M = 8.5; 5 May 1959 with M = 7.5; 22 July 1969 with M = 7.7; 5--epicenters of strong earthquakes with M = 6-7.25 in preceding 25 years; 6--seismological stations; 7--active volcanoes; 8--outlines of reliable recording of earthquakes with energy class K = 9 and 10; 9--isobaths; 10--mountain ranges; 11--areas of focal points of earthquakes mentioned with M 7.7.

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