

33308

S/560/61/000/010/006/016
D299/D302

Cosmic-ray equator...

references. The 4 most recent references to the English-language publications read as follows: J. R. Storey, Phys. Rev., 113, 297, 1959; M. A. Pomerantz, V. R. Potnis, A. E. Sandström, J. Geophys. Res., 65, 3539, 1960; J. J. Quenby, W. R. Webber, Phil. Mag., 4, 90, 1959; P. J. Kellogg, M. Schwartz, Nuovo Cimento, 13, 761, 1959.

X

Card 3/3

SAVENKO, F.A.; NESTEROV, V.Ye.; SHAVRE, F.I.; FISARENKO, N.F.

Equator of cosmic rays according to the data of the third Soviet
artificial satellite. Isk.puz.zem. no.11:30-34 '61. (MIRA 15:1)
(Cosmic rays--Measurement) (Artificial satellites)

SAVENKO, I.A.; NESTEROV, V. Ye.; SHAVRIN, P.I.; FISARENKO, N. P.

The equator of cosmic rays according to the data of the third
Soviet satellite vehicle. Geomag. i aer. 1 no.4:490-493 J1-Ag
'61. (MIRA 14:12)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova,
Institut yadernoy fiziki.
(Cosmic rays)

34751
S/203/61/001/006/003/021
D055/D113

3.2420 (1049,1482)

AUTHORS: Savenko, I.A.; Shavrin, P.I.; Pisarenko, N.F.

TITLE: Detection of soft corpuscular radiation at 320 km altitude in the near-equatorial latitudes

PERIODICAL: Geomagnetizm i aeronomiya, vol 1, no 6, 1961, 875-879

TEXT: The existence of soft corpuscular radiation at a height of 320 km in the near-equatorial latitudes between 150°E and 150°W is discussed. According to the authors, this radiation caused certain discrepancies in the readings of two detectors installed on the second Soviet spaceship. The first(external) detector, an ~~FEU~~ -15 (FEU-15) photomultiplier, could register x- and γ - rays, protons of 1 Mev energy and electrons of > 30 kev energy. The second (internal) detector, a scintillation counter, registered the γ -quanta of the bremsstrahlung with a counting threshold of 25 kev. The comparison of the two registration curves showed that, when the spaceship crossed the radiation belts, and the near-equatorial regions maxima and minima in the second part of both curves coincided. In the first part,

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S/203/61/001/006/003/021
3055, 0113

Detector of ...

maximum peaks in the curve registered by the second detector corresponded to only small peaks in the curve registered by the first detector, whereas the maximum peaks of the latter curve were registered when the space-ship crossed the near-equatorial regions between the longitudes 50°E and 150°W . These peaks could only be explained by the existence of an intensive flow of corpuscular radiation in the a/r regions at about 300 km altitude. As the second detector did not register the x-ray bremsstrahlung of this flow, it could be presumed that this flow was composed of electrons with an energy of 10^{10} ev. The absence of similar peaks in the second part of the curve could be explained by: (1) - the instability in time of the above-mentioned flow, part 2 of the curve having been registered in daytime and part 1 during the night; and (2) - a different orientation of the external detector in relation to the lines of force of the terrestrial magnetic field in parts 1 and 2. Previous flights of three Soviet satellites indicated that intensive flows of electrons with an energy of 10 kev were detected at altitudes of 1500 to 1800 km. Under certain conditions, a part of these electrons could have penetrated the ionosphere. Two maps of the world are included, showing the distribution of radiation flows according to data registered by the first and the second detectors, respectively. V.I. Krasovskiy, S.N. Vernov, A. Ya. Chudakov, V.P. Sitkina, L.V. Drozdova, T.N. Kondrat'yeva, and

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Detection of ...

3/003/61/001/006/003/021
0655/5113

T.V. Kurakina are mentioned. There are 4 figures and 8 references: 6 Soviet and 2 non-Soviet references. The two English-language references are: T. Ohayashi, *J. Geomag. and Geoelectr.*, 1958, 10, 29; R. Smith, *J. Geophys. Res.*, 1960, 65, 2583.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.
Institut yadernoy fiziki. (Moscow State University im.
M.V. Lomonosov. Institute of Nuclear Physics)

SUBMITTED: September 16, 1961.

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VERNOV, S. N., GORCHAKOV, Ye. V., LOGACHEV, Yu. I., NESTEROV, V. E., PISARENKO, N. F.,
SAVENKO, I. A., SHAVRIN, P. I.

"Investigations of Radiation During Flights of Satellites, Space
Vehicles and Rockets" 4

Report presented at the International Conference on Cosmic Rays
and Earth Storm, 4-15 Sep 61, Kyoto, Japan.

** same title submitted 12th Intl Astronautical Cong.
Wash D.C., 1-7 Oct 61*

28745 S 00513R001548720015-8
3/13/82

3 9110 (1121, 1482)

AUTHORS: Savenko, I. A., Shavrin, P. I., Nesterov, V. Ye., Pisarenko, N. F.

TITLE: Equator of cosmic rays according to data of the second Soviet spaceship

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 41, no. 3(9), 1961, 985 - 986

TEXT: The use of earth satellites for determining the equator of cosmic rays from which the structure of the geomagnetic field can be determined and which permits the checking of the correctness of the theoretical and empirical approximation of this field offers a series of advantages over the measurements made on the earth. Thus, the equator of cosmic rays and especially its effect on the geophysical phenomena can be accurately studied. The second spaceship also contained a gas-discharge counter whose pulses were fed to a rate meter which was automatically interrogated by a diurnal storage system every third minute. Upon command from the earth the information stored by this system was transmitted to the

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equator of cosmic rays according to

radar stations on the earth. The diurnal memory made it possible to measure the latitude dependence of primary cosmic radiation each time the satellite crossed the equator. Since on large degrees of latitudes the spaceship often passed the radiation belt, only experimental points for degrees of latitude below 40° were used in order to obtain the empirical formula. The equator of cosmic rays obtained was compared with that calculated by J. J. Quenby and W. R. Webber (Ref. 7: Phil. Mag., 4, 90, 1959) by taking account of a dipole and a nondipole component of the geomagnetic field and also with the equator calculated by P. J. Kellogg and M. Schwartz (Ref. 8: Nuovo Chim., 13, 76, 1959) in octupole approximation. This comparison showed good agreement within the measurement accuracy limits. The authors thank S. N. Vernov, N. L. Grigorov and I. P. Ivanenko for discussion of the results. There are 1 figure and 8 references: 1 Soviet and 7 non-Soviet. The three most important references to the English-language publications read as follows: J. R. Storey., Phys. Rev., 113, 297, 1959; M. A. Pomerantz, V. R. Potnis, A. E. Sandström., J. Geophys. Res., 65, 5539, 1960; J. J. Quenby, W.R.Webber, Phil. Mag., 4, 90, 1959.

SUBMITTED: June 7, 1961
Seri 2/4

v/

29008

S, 020/61/140/004/008/023
B104/3108

3.2420 (1049/1482)

AUTHORS: Vernov, S. N., Corresponding Member of the AS USSR, Savenko, I. A., Shavrin, P. I., Nesterov, V. Ye., and Pisarenko, N. F.

TITLE: Outer radiation belt of the Earth at 320 km altitude

PERIODICAL: Akademiya nauk SSSR. Doklady. v. 140. no. 4, 1961, 787 - 790

TEXT: The second Soviet satellite whose orbit was at an altitude of 307 - 339 km had an automatic storage system which enabled it to measure continuously the radiation intensity in latitudes of $\pm 65^\circ$. The scintillation counter consisted of a $\Phi\text{BY-16}$ (FEU-16) photomultiplier and a NaI(Tl) crystal. The energy threshold of this counter was 25 kev. A CTC-5 (STS-5) Geiger counter was also used. Measurements showed that the counting rate of the scintillation counter, from the equator to latitudes of $\pm 40 - 50^\circ$, increased from 3 - 5 pulses/cm².sec to 10 - 12 pulses/cm².sec. In latitudes from $\pm 50^\circ$ to $\pm 65^\circ$, the counting rate increased to 20 - 500 pulses/cm².sec in most cases. The authors assume that this increase in x-ray intensity is caused by particles of the radiation belt of the Earth. To prove this

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29008

S/020/51/140/004/008/023

B104/B108

Outer radiation belt of the Earth

statement, the relations between the zones of higher intensity of the northern and southern hemispheres are studied. It is shown that the zones of higher intensity on the northern and southern hemispheres are connected by lines of force of the geomagnetic field. The position of the belt of enhanced intensity at 320 km from the Earth is determined by the geomagnetic field. The indications of the two counters were compared to determine composition and energy of the radiation. The authors are convinced that the enhanced intensity recorded is due to electrons of the outer radiation belt, which are slowed down in the casing of the satellite. The authors thank A. Ye. Chudakov, I. P. Ivanenko, and V. Gorciakov for discussions. There are 2 figures, 1 table, and 6 references: 3 Soviet and 3 non-Soviet. The three references to English-language publications read as follows: E. H. Vestine et al., Planet. Space Sci., 1, 285 (1959); J. B. Cladis et al., J. Geophys. Res., 66, 343 (1961); J. A. Welch et al., J. Geophys. Res., 64, 909 (1959)

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova
(Moscow State University imeni M. V. Lomonosov)

SUBMITTED: June 7, 1961
Card 2/2

3.2420 (1049, 1482)

29111
S/020/01/140/016/000/022
B125/B136

AUTHORS: Vernov, S. N., Corresponding Member AS USSR, Savenko, I. A.,
Shavrin, P. I., Pisarenko, N. F.

TITLE: Discovery of an inner radiation belt at 320 km altitude in
the region of the South-Atlantic magnetic anomaly

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 140, no. 5, 1961, 1041-1044

TEXT: The paper reports on the discovery and investigation of the inner radiation belt by the second Soviet satellite. The radiometric apparatus (gas discharge counter CTC-5(STS-5) and scintillation counter ФЭУ-16(FEU-16) with NaI(Tl) crystal) carried on the satellite recorded increased radiation intensity above the magnetic anomaly in the South Atlantic. The scintillation counter recorded particles with a threshold of 25 kev and the total release of energy in the crystal. Analysis of the data leads to the following conclusions: The increased radiation intensity revealed to the authors by the flights of the second Soviet satellite at 320 km altitude above the Brazilian magnetic anomaly is attributable to the inner radiation belt. Since no inner radiation belt has been found north of the geomagnetic equator, the reflection points there lie higher than in the anomalous
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29111
S/020/61/140/005/006/022
B125, B138

Discovery of an inner radiation...

region. At low geomagnetic latitudes, it is the proton component of the inner radiation belt which prevails in the anomalous region. The intensity of x-radiation caused by the deceleration of electrons in the casing of the space ship rises at higher latitudes and the intensity of the proton component decreases. An outer radiation belt appears at magnetic latitudes $> 40^\circ$. There is also an intermediate region between the outer and inner radiation belts. In this intermediate region, the bremsstrahlung intensity is only a half or a quarter as much as in the intensity maxima of the inner or outer radiation belt at that altitude. The gap between the inner and outer radiation belts, which is very distinct on the northern hemisphere (measurements made from the third Soviet satellite), is practically absent in the region of the Brazilian anomaly. This fact, together with data on the size of the gap on the northern hemisphere and near the equator, might explain the formation of the inner radiation of the Earth. There are 2 figures, 1 table, and 5 references: 2 Soviet and 3 non-Soviet. The three references to English-language publications read as follows: A. C. Dessler, *J. Geophys. Res.*, 64, No 7, 713 (1959); S. Yoshida, G. E. Ludwig, J. A. Van-Allen, *J. Geophys. Res.*, 65, No 3, 907 (1960); J. A. Van-Allen, L. A. Frank, *Nature*, 183, 430 (1959); 184, 212 (1959).

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29111

S/020/61, 140, 005, 006, 022
B125/B138

Discovery of an inner radiation...

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. A. Lomonosova
(Moscow State University imeni M. V. Lomonosov)

SUBMITTED: June 30, 1961

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Card 3/5

PISARENKO, N. F., SAVENKO, I. A., CHUDAKOV, A. Ye., SHAVRIN, P. I., VERNOV, S. N.
GORCHAKOV, E. V., LOGACHEV, Yu. I., NESTEROV, V. E.

"Investigations of Radiation During Flights of Satellites, Space
Vehicles, and Rockets."

Soviet papers Presented at Plenary Meetings of Committee on Space REsearch
(COSPAR) and third International space Sumposium, Washington, D. C.,
23 Apr - 9 May 62.

S/865/62/002/000/018/042
D405/D301

AUTHORS: Nesterov, V.Ye., Pisarenko, N.F., Savenko, I.A. and Shavrin, P.I.

TITLE: Ionizing radiations at altitudes of 180-340 km and the radiation hazard to manned space flight

SOURCE: Problemy kosmicheskoy biologii. v. 2. Ed. by N. Sisykyan and V. Yazdovskiy. Moscow, Izd-vo AN SSSR, 1962, 170-190

TEXT: The experiments, conducted on the Second and Third Space Ship yielded the following new results: An external radiation belt of the Earth was detected at an altitude of 180-320 km; its boundaries were delimited at all longitudes. The dependence of the intensity on longitude was established for the external radiation belt, the intensity increasing sharply in the South Atlantic and in other regions. A lowering of the internal radiation belt to 250-320 km was observed in the region of the Brazilian magnetic anomaly. The distribution of cosmic radiation around the globe was measured.

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S/865/62/002/000/018/042
D405/D301

Ionizing radiations ...

The geographic distribution and the magnitude of absorbed dose-rates were determined. These results were obtained by means of radiometric equipment consisting of scintillation and Geiger counters. This equipment enabled the determination of the nature of the radiation, to estimate the energy of the particles and to measure the absorbed dose-rate; by using memory devices with 24 hour storage capacity it was possible to conduct these measurements around the entire globe. The average absorbed dose-rate was 3.5 and 8.3 mrad/day for the Second and Third Space Ships respectively; the absorbed dose-rate inside the space ships varied between 0.35 and 0.7 mrad, depending on the position of the orbit with respect to the radiation belts. It was found that the proton fluxes of the internal belt in the region of the Brazilian anomaly may give a substantial contribution to the dose-rate. The average dose-rate of 3.5 and 8.3 mrad/day is not dangerous to astronauts. At 320 km the absorbed dose-rate was 40 mrad/day. The presence of primary cosmic radiation at high altitudes may lead to some specific, though rare, biological effects which are not observed at sea level. In the case of flights of not very long duration at altitudes of 200-300 km, only solar cosmic

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S/865/62/002/000/018/042
D405/D301

Ionizing radiations ...

radiation, produced in chromospheric bursts, can present a radiation hazard. Some data on cosmic-radiation bursts during 1958-1959 are listed. Systematic forecasts of solar bursts accompanied by the emission of cosmic radiation are very important for the prevention of exposure to radiation hazard. Such a method of forecasting could be the recording of gamma radiation on the space ship. If the theory of the origin of cosmic radiation, developed by V.P. Shabanskiy and A.B. Severnyy is true, then any appearance of cosmic radiation at the moment of solar bursts ought to be accompanied by the emission of gamma radiation. Summing up, the absorbed dose-rate is strongly dependent on the inclination of the orbit, the flight altitude and the thickness of the space ship's protection. There are 10 figures and 3 tables.

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42155

S/203/62/002/001/003/019
I023/I223

AUTHORS: Vernov, S.N., Gavenko, I.A., Shavrin, P.I., Nesterov, V.Ye.
and Pisarenko, N.P.

TITLE: Earth's radiation belts at 180-250km height

PERIODICAL: Geomagnetizm i Aeronomiya, v.2, no.1, 1962, 41-47

TEXT: The distribution of cosmic rays and radiation belts at the height of 300-330km were obtained by the second Soviet cosmic satellite. The third cosmic space-ship, launched on December 1, 1960 with a perigee of 180km, apogee of 250km and an inclination of 65° measured the intensity and geographical position of the radiation belts in the height range 180-250km. The apparatus consisted of a NaI(Tl) crystal (a cylinder of 14mm height and 30mm diameter) with a photomultiplier and a gas counter. The crystal counted all particles above 25kev and measured the total energy dissipation in it. The counting rates increase from the equator to higher latitudes: of the counter from 0.8 to 3.2 $\frac{\text{counts}}{\text{cm}^2 \cdot \text{sec}}$.

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S/203/62/002/001/003/019
I023/I223

Earth's radiation belts...

Lomonosova, Institut yadernoy fiziki (Moscow State
University im. M.V. Lomonosov, Institute of Nuclear
Physics)

SUBMITTED: August 28, 1961

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17 1400

32.75
S/026/62/000/002/002/004
D036/D113

AUTHORS: Savenko, I.A.; Pisarenko, N.F.; Shavrin, P.I.

TITLE: Space flights and the radiation hazard

PERIODICAL: Priroda, no. 2, 1962, 40-48

TEXT: This popular article deals with radiation hazards in space flights. The system of measuring radiation doses in rads, cosmic radiation at the Earth's surface and at low altitudes, the effect of solar radiation on primary cosmic radiation, the radiation belts of the Earth, radiation connected with solar flares and dosimetric measurements made on board the second and third Soviet satellites in August and December 1960 are discussed. The dosimetric measurements are shown in charts and a graph. The maximum permissible dose in the USSR for persons working continuously with radioactive materials and ionizing-radiation sources is 0.1 rems per working week. A group of scientists led by S.N. Vernov, Corresponding Member of the

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30.75
S/026/62/000/002/002/004
D036/D113

Space flights and the radiation hazard

AN SSSR (AS USSR), established the magnitude of the flux of primary particles in interplanetary space on the basis of data obtained by cosmic rockets; in 1959, a period of intense solar activity, the flux was 2 particles./cm². sec behind a protective screen about 1 g/cm² thick, giving about 15 mrad per 24 hours. Besides the inner and outer radiation belts of the Earth, Soviet scientists also located a third belt 50-60,000 km from the Earth's center; however, the low energy of its particles (a few hundred ev) means that this belt does not constitute a radiation hazard. The Soviet dosimetric measurements showed the following: The trajectories of the second and third Soviet spaceship-satellites are safe from the radiation point of view. Protection from the outer radiation belt is possible by suitable shielding: during the flights of the first, second and third Soviet cosmic rockets through this belt the total radiation dose behind a 1-2 g/cm²-thick screen did not exceed 0.1 rad. In the inner radiation belt, a shield several tens of g/cm² thick would be required, therefore this belt should be avoided.

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3275

S/026/62/000/002/004

Space flights and the radiation hazard

D036/D113

Other planets may also have radiation belts. Radiation resulting from solar flares is the main hazard. Solar flares producing a dose of 10 rad/hr behind a screen several g/cm^2 -thick occur 3-7 times annually, more intense flares less often. For future flights, a special well-shielded cabin should be provided for protection during the flare, or else it should be possible to terminate the flight in good time. There are 8 figures and 3 references, 1 Soviet and 2 non-Soviet. The two English-language references are: "Journal of the Astronautical Science", 1961, No. 3; "Nucleonics", 1961, No. 4 (USA).

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41906

S/560/62/000/013/002/009

I046/I242

AUTHORS: Vernov, G.N., Savenko, I.A., Shavrin, E.I.,
Nesterov, V.E., and Pisarenko, N.F.

TITLE: Radiation belts of the earth at altitudes from
180 to 250 km

SOURCE: Akademiya nauk SSSR. Iskusstvennyye sputniki
Zemli. no.13. Moscow, 1962, 67-74

TEXT: Assuming identical altitude dependence of the
radiation intensity in the northern and the southern hemispheres,
it is shown from measurements made on the third orbital space ship
on December 1, 1960 (orbital data: perigee 187 km, apogee 265 km,
inclination 65°) that the radiation intensity in the outer belt
decreases by a factor of 2 between $h = 235$ km and $h = 185$ km.

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S/560/62/000/013/002/009
I046/I242

Radiation belts of the earth...

Comparison with the findings of the second orbital spaceship shows that in the high radiation-intensity region in the Southern Atlantic the bremsstrahlung intensity has increased with the 100 km decrease in altitude and the entire region appears to have shifted to the north-west. This anomalous behavior may be due to either the magnetic storm of November 30 and December 1, 1960, or to some new phenomenon on the inner boundary of the radiation belts. The average bremsstrahlung energy for the outer-belt electrons is $E_e = 2 \cdot 10^5$ eV; the corresponding electron flux is $2 \cdot 10^5$ particles $\text{cm}^{-2} \text{sec}^{-1}$. The radiation over the Brazilian magnetic anomaly is due to the protons of the inner radiation belt; the particle count in this region (Geiger counters) drops from 10 particles $\text{cm}^{-2} \text{sec}^{-1}$ at $h=320$ km (orbital ship II) to 2 particles $\text{cm}^{-2} \text{sec}^{-1}$ at $h=220$ km (orbital ship III). There are 6 figures and 2 tables.

SUBMITTED: September 12, 1961
Card 2/2

41907

S/560/62/000/013/003/009
I046/I242

AUTHORS: Savenko, I.A., Shavrin, P.I., and Pisarenko, N.F.

TITLE: Soft corpuscular radiation at an altitude of
320 km in near-equatorial latitudes

SOURCE: Akademiya nauk SSSR. Iskusstvennyye sputniki
Zemli. no.13. Moscow, 1962, 75-80

TEXT: The CsI(Tl) counter mounted on the skin of the
second Soviet orbital spaceship detected strong corpuscular radi-
ation at altitudes of about 300 km in the near-equatorial lati-
tudes in the 150°E to 150°W zone. This radiation is quite soft,
since it was detected by the inner counter situated behind a layer

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S/560/62/000/013/003/009
I046/I242

Soft corpuscular radiation at...

of about 5 g.cm^{-2} . The observed properties of the corpuscular radiation can be envisioned as 10^4 eV electrons moving in a stream of $5.10^9 \text{ particles.cm}^{-2}.\text{sec}^{-1}.\text{ster}$. The origin of the low-energy charged particles in these regions is still unknown. There are 5 figures.

SUBMITTED: September 12, 1961

Card 2/2

L1908

S/560/62/000/013/004/009
I046/I242

AUTHORS: Savenko, I.A., Fisarenko, N.F., Shavrin, P.I.,
and Lapkov, S.P.

TITLE: Measurement of the absorbed radiation dose on
the Soviet orbital spaceship III

SOURCE: Akademiya nauk SSSR. Iskusstvennyye sputniki.
Zemli. no.13. Moscow, 1962, 81-84

TEXT: The third orbital spaceship launched on December
1, 1961 (perigee 187 km, apogee 265 km, inclination 65°) regis-
tered the absorption of radiation doses at altitudes of 180 to
250 km (average of 6.9 rad per 24 hours, or 0.35 to 0.6 rad
per orbital loop, depending on the geographical position). These

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S/560/62/000/013/004/009
I046/I242

Measurement of the...

results, combined with the data produced by the second orbital ship for altitudes of 306 to 339 km, show that space flight is virtually safe at altitudes below 350 km, when there are no solar chromospheric flares. There are 2 figures.

SUBMITTED: October 10, 1961

Card 2/2

3.2420

3/048/62/026/006/013/020
5125/5102

AUTHORS: Yakulov, P. V., Vernov, J. M., Gorchakov, Ye. V., Logachev, Ye. I., Masternov, V. Ye., Nikolayev, A. G., Pisarenko, N. P., Savenko, I. A., Shulakov, A. Ye., and Chavrin, P. I.

TITLE: Radiation studies during the flights of satellites, spacehips and rockets

PERIODICAL: Aktsiya nauk SSSR. Investigiya. Seriya fizicheskaya, v. 26, no. 6, 1962, 756-761

NOTE: This report deals with radiation measurements made by the second and the third Soviet spaceship, by the rocket launched toward the Venus on February 12, 1961, and by the third Soviet earth satellite (August 15, 1958). The spacehips were equipped with scintillation counters, gas discharge counters and elements for storing data through 24 hours. The northern and southern zones of increased radiation intensity are undoubtedly linked by the lines of force of the geomagnetic field. The increased radiation intensity is due to electrons of the outer radiation belt, slowed down in the jacket of the spaceship. The

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Radiation studies during the flights ...

07/02/70 / 07/02/013/029
R129/2102

4

boundaries of this belt were determined more accurately by the lower orbiting Soviet spaceship. At 16 hours after the atmosphere flare of June 17, 1956 had vanished but still a few hours before the magnetic storm, charged particle intensity increased. The electron spectrum of the outer radiation belt does not change much at an altitude of 30,000-40,000 km, nor did the magnetic storm which occurred during the flight of the third Soviet spaceship have any substantial effect on the outer radiation belt. Except for a few percent, the proton intensity of the inner radiation belt remained constant during the three weeks' flight of the third Soviet satellite. The increased radiation intensity over the Brazilian anomaly, observed on board of the second spaceship at an altitude of 320 km, was due to the inner radiation belt. In this anomaly, the proton component of the inner radiation belt is predominant at small geomagnetic latitudes. The portion of X-rays increases with increasing latitude. A zone of lower bremsstrahlung intensity separates the outer from the inner radiation belt. This zone is practically absent in the region of the Brazilian anomaly. The equator of cosmic rays determined by the second and the third Soviet spaceship resembles remotely a sine curve running between 11° of northern and 11° of southern latitude.

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Radiation studies during the flights ...

5/045/02/026/046/013/020
B125/B102

Between 60° western and 60° eastern longitude the equator of cosmic radiation lies north of the theoretical sine curve. The general trend of the lines of equal cosmic radiation intensity corresponds in general to the distribution of magnetic rigidity. There are 10 figures and 2 tables.

ASSOCIATION: Nauchno-issledovatel'skiy institut yadernoy fiziki
Moskovskogo gos. universiteta im. M. V. Lomonosova
(Scientific Research Institute of Nuclear Physics of the
Moscow State University imeni M. V. Lomonosov).
Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR
(Physics Institute imeni P. N. Lebedev of the Academy of
Sciences USSR)

Card 3/3

L 18492-63 EWT(1)/FCC(w)/FS(v)-2/BDS/EEC-2/EED-2/EEO-2/ES(t)-2/ES(v)/
ES(a)/ES(j)/ES(c)/ES(k) AEDG/AFFTC/ASD/AFMDC/ESD-3/APGC P1-4/Po-4/Pe-4/Pq-4
Pb-4 TT/AR/GW/K S/0293/63/001/001/0172/0175

ACCESSION NR: AP3007348

AUTHOR: Savenko, I. A.; Shavrin, P. I.; Nesterov, V. Ye.;
Pisarenko, N. F.; Tel'tsov, M. V.

115
110

TITLE: Cosmic radiation conditions on the eve of the flight of
spaceships "Vostok 3" and "Vostok 4"

SOURCE: Kosmicheskiye issledovaniya, v. 1, no. 1, 1963, 172-175

TOPIC TAGS: cosmic radiation, space satellite, spaceship, geiger
counter, scintillation counter, radiometric measurement, radio-
metric equipment

ABSTRACT: The following identical equipment was carried on board
Soviet satellites Cosmos 4 and Cosmos 7 to measure radiation con-
ditions along the routes of the proposed Vostok 3 and Vostok 4
flights: 1) geiger counters, type SIS-5; 2) a scintillation
counter consisting of an FEU photomultiplier and a CsI(Tl) sensing
crystal, the latter completely surrounded by a retarding layer of
more than 3 g/cm² [material not specified]; 3) another scintillation

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L 18492-63

ACCESSION NR: AP3007348

counter of identical type but with the crystal protected by a layer of only 2 mg/cm² over 30% of its total solid angle and the rest of its surface completely shielded. In both the scintillation counters the crystals were 30 mm in diameter and 20 mm high. The first scintillation counter was placed together with the geiger counters in a common package inside the satellite, and the second was mounted in a package fixed to the external surface. The crystal counters recorded both particle count and cumulative energy levels above a fixed threshold. When gamma quanta played an important role, a comparison of geiger and scintillation counts made analysis of the radiation spectrum possible; the ratio of integral photocurrent to the pulse count gave the average energy yield for one crystal-recorded particle. Both geiger counters operated one common scaler system whose output was continuously telemetered. Data from all counters was also storable in a 100-min capacity memory which was interrogated at 40-sec and 2-min intervals from earth. Preflight calibration was made against a Cs¹³⁷ source. Analysis of the data showed that radiation intensity in the 210- to 370-km region registered by Cosmos 7 in late July 1962 was considerably

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ACCESSION NR: AP3007348

higher than the levels found by the second and third Soviet space-
ships and by Cosmos 4 (26-29 April 1962); this difference was at-
tributed to the U.S. thermonuclear test over Johnston Island on
9 July 1962. The mean daily dose as recorded by Cosmos 7 was
45 mrad, which was not considered sufficient justification for
postponement of the planned Vostok 3 and 4 flights. "The authors
thank S. F. Papkov, A. F. Tupikin, and L. A. Smirnov for their
assistance in carrying out the experiment." Orig. art. has: 2
figures.

ASSOCIATION: none

SUBMITTED: 05May63

DATE ACQ: 21Oct63

ENCL: 00

SUB CODE: AS, SD

NO REF SOV: 008

OTHER: 000

Card 3/3

SAVENKO, I.A.; PISARENKO, N.P.; SHAVRIN, P.I.; NESTEROV, V.Ye.

Radiation check during the flight of the spaceships "Vostok-3"
and "Vostok-4." Kosm. issl. 1 no.1:176-173 JI-Ag '63.
(MIRA 17:4)

SHAVRIN, P. I.; SAVENKO, I. A.; PISARENKO, N. F.; NESTEROV, V. Ye.;

"Controlling a level of cosmic radiation during the flights of the "Vostok-3", "Vostok-4",
"Vostok-5" and "Vostok-6" space ships. (USSR)

Report submitted for the COSPAR Fifth International Space Science Symposium, Florence, Italy
8-20 May 1964.

SHAVRIN, P. I.; SHARVINA, K. N.; VERNOV, S. N.; NESTEROV, V. Ye.; PISARENKO, N. F.;
SAVENKO, I. A.; SAVUN, O. I.;

" A Study of the Earth's radiation belts in the region of the Brazilian magnetic anomaly at altitudes of 235 to 345 kms. (USSR)."

Report submitted for the COSPAR Fifth International Space Science Symposium, Florence, Italy, 8-20 May 1964.

VERNOV, S.N.; SAVENKO, I.A.; SHAVRIN, P.I.; TVLRSKAYA, L.V.

Structure of the earth's radiation belts at an altitude of
320 km. Geomag. i aer. 3 no.5:812-815 S-O '63. (MIRA 16:11)

Institut yadernoy fiziki Moskovskogo gosudarstvennogo universi-
teta.

SHAVNIN, P. I., NESTEROV, V. E., SAVENKO, I. A. and PITARENKO, N. P. (Acad. Sci. USSR)

"Controlling the Level of Cosmic Radiation During the Flights of the VOSTOK-3, VOSTOK-4, VOSTOK-5, and VOSTOK-6 Spaceships"

Report presented at the COSPAR, 5th Intl Space Science Symposium, Florence, Italy, 1-21 May 1964

CHAVNIN, P. I., NESTEROV, V. E., PISARENKO, N. F., RASHEVA, E. N., VERHOV, S. N.,
and SAVENKO, I. A. (Acad. Sci. USSR)

"A Study of Cosmic Rays at Altitudes of 200 to 400 Km"

Report presented at the COSPAR, 5th Intl Space Science Symposium, Florence,
Italy, 8-20 May 1964

YERIN, S.I.; MUDAKOV, A.Ye.; GORCHAROV, Ye.V.; LUG. HD., Y...; N. TEROV,
V.Ye.; SAVENKO, I.A.; SHAVREN, P.I.

Radiation belts of the earth. Geofin. high. no. 21:9-108 164.
(MIRA 18:4)

ACCESSION NR: AP4026240

S/0293/64/002/001/0136/0146

AUTHOR: Vernov, S. N.; Savenko, I. A.; Shavrin, P. I.; Nesterov, V. Ye.;
Pisarenko, N. F.; Tel'tsov, M. V.; Pervaya, T. I.; Yerofeyeva, V. N.

TITLE: Some results of radiometric measurements at heights of 200—400 km during
1960-1963

SOURCE: Kosmicheskiye issledovaniya, v. 2, no. 1, 1964, 136-146

TOPIC TAGS: artificial satellite, radiation dose, radiation belt, cosmic radiation,
cosmic ray, solar activity cycle, artificial radiation belt, space flight,
astronaut

ABSTRACT: Measurements made by 15 satellites and spaceships (the second and third
spaceships, satellites of the "Cosmos" series, and "Vostok" spaceships) during the
period from August 1960 through June 1963 at heights of 175-405 km were used to
determine the daily values of the radiation dose for various flight trajectories;
these doses were 10-55 mrad/day and are not dangerous for astronauts when the
shielding of the ship is denser than $3-5 \text{ g/cm}^2$. At the time of measurements in
April 1962 and June 1963 it was found that there was an increase by a factor of 1.2
in the intensity of cosmic radiation in the high latitudes where the magnetic rigi-
dity does not exceed 5.4 Bev. There was no increase of intensity in the equatorial

ACCESSION NR: AP4026240

latitudes (magnetic rigidity greater than 5.4 Bev). These facts confirm the assumption of a genetic relationship between excess cosmic radiation recorded at heights of 200-400 km and primary cosmic radiation. Using mirror points at heights of about 350-370 km, it was possible to determine the lifetime of the particles of the artificial radiation belt as approximately 3 months. For orbits of 210-369 km the dose caused by the artificial radiation belt 20 days after its formation was almost 3 times as large as the dose caused by cosmic radiation in the natural belts. The dependence of the mean daily intensity caused by the radiation belts on height was determined. In an orbit of 207-407 km this intensity was 5.6 times as large as in an orbit of 209-301 km. The contribution to the dose by the radiation belts for satellites with an apogee of 400 km becomes equal to the dose caused by cosmic radiation. A table in the original article lists the characteristics of the radio-metric apparatus carried aboard the "Cosmos" satellites; another table lists the 15 satellites and spaceships and the absorbed dose measured by each. "The authors express thanks to S. F. Papkov, Yu. V. Trigubov, O. I. Savun, A. F. Tupikin, and L. A. Smirnov for participation in developing the apparatus and making the experiments and to Prof. N. L. Gridorov for participation in discussion of the results." Orig. art. has: 2 figures, 2 tables, and 9 formulas.

ASSOCIATION: none

Card 2 / 3

ACCESSION NR: AP4026240

SUBMITTED: 29Jul63

ATD PRESS: 3053

ENCL: 00

SUB CODE: AA

NO REF SOV: 011

OTHER: 002

ACCESSION NR: AP4026241

S/0293/64/002/001/0147/0149

AUTHOR: Savenko, I. A.; Pisarenko, N. F.; Shavrin, P. I.; Nesterov, V. Ye.

TITLE: Measurement of total radiation dose aboard Vostok-5 and Vostok-6

SOURCE: Kosmicheskiye issledovaniya, v. 2, no. 1, 1964, 147-149

TOPIC TAGS: radiation monitoring, radiation dosimetry, onboard dosimeter, absorbed dose, RBE dose, Vostok-5, Vostok-6

ABSTRACT: Data from onboard radiation meters (gas-discharge type) indicate that the total absorbed radiation dose was 50 mrad for By*kovskiy (Vostok-5, 119-hr flight) and 30 mrad for Tereshkova (Vostok-6, 71-hr flight). Flight data for the two spaceships were as follows:

	Vostok-5	Vostok-6
Orbit time	88.27 min	88.3 min
Apogee	222 km	231 km
Perigee	175 km	181 km

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ACCESSION NR: AP4026241

Primary cosmic radiation, radiation belt particles, and cosmic rays originating with solar chromospheric flares were the types of hard radiation monitored. Heliomagnetic and geomagnetic conditions were comparatively quiet during the period of the flights; a few flares not exceeding 2 points on the scale in intensity occurred, but were not accompanied by any significant corpuscular streams in the space near the Earth. Fig. 1 of Enclosure shows radiation data during a 70-hr segment of the flights. Although the dose rate on Vostok-3 and Vostok-4 was higher on orbits passing through the Brazilian and South Atlantic anomalies than for other orbits, the dose registered on Vostok-5 and Vostok-6 was linearly dependent on the time of flight for all orbits, indicating that radiation belts added little to the total dose during the latter flights. Values for both Vostok-5 and Vostok-6 fall in a single straight line, indicating a measured dose rate of 8 mrad per diem, or 0.33 mrad/hr. Comparison with the dose rate measured for Vostok-3 and Vostok-4 (14 mrad per diem) in August 1962 shows a decrease in radiation intensity at altitudes in the neighborhood of 200 km. This is most likely due to decay (at least at lower altitudes) of the artificial radiation belt created by upper atmosphere nuclear tests in 1962. Orig. art. has: 1 figure.

Card 2/4

ACCESSION NR: AP4026241

ASSOCIATION: none

SUBMITTED: 10Sep63

DATE ACQ: 16Apr64

ENCL: 01

SUB CODE: AM

NO REF SOV: 004

OTHER: 000

Card 3/4

ACCESSION NR: AP4026242

S/0293/64/002/001/0150/0153

AUTHOR: Savenko, I. A.; Shavrin, P. I.; Pisarenko, N. P.; Nesterov, V. Ye.; Tel'tsov, M. V.; Yerofeyeva, V. N.

TITLE: Measurement of soft radiation in the equatorial latitudes from the "Cosmos-4" satellite

SOURCE: Kosmicheskiye issledovaniya, v. 2, no. 1, 1964, 150-153

TOPIC TAGS: radiation measurement, radiation belt, cosmic ray equator, sputnik, satellite radiation measurement, Cosmos-4, soft radiation, count rate, energy release, corpuscular radiation

ABSTRACT: The second Soviet sputnik (19-20 August 1960) carried a scintillometer for recording intense, sporadic streams of corpuscular radiation in equatorial latitudes. Since this detector was designed to measure total flux energy of the particles and energy release within the crystal, the number of impulses was not directly recorded, and particle flux had to be determined from energy release in the scintillometer on the basis of various assumptions as to the nature of the particles involved and their average energy. To check conclusions

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ACCESSION NR: AP4026242

drawn from the data obtained by the 1960 satellite, Cosmos-4, launched 26 April 1962, carried an external scintillometer capable of measuring not only total energy release, but also the counting rate of particles with energies greater than 100 kev. Table 1 of Enclosure gives the counting rate N (particle/cm²/sec), the energy release E (MeV/cm²/sec), and the ratio E/N (kev), representing the average energy release per single registered particle. Values in the table are averaged over the flight segment falling within 10° of the cosmic ray equator for 13 crossings of the equator. As can be seen, the E/N values are of the order of 100 kev. However, if E/N actually represents readings caused by the simultaneous striking of the counter by two or more electrons with subthreshold (<100 kev) energies, then the count obtained may actually reflect a flux of 10⁴/cm²/sec with energies of 6 x 10⁴ ev, a flux of 10⁵/cm²/sec with energies of 3 x 10⁴ ev, or a flux of 10³/cm²/sec with energies of 1 x 10⁴ ev. Since large fluxes with energies of 10 kev were not observed stationarily, the energy of the recorded electrons must exceed 3 x 10⁴ ev. The occurrence of such electrons may possibly be related to seepage from radiation belts or electrical processes in the ionosphere. The results confirm the presence, apparently constant, of low-intensity (10² to 10⁵ particle/cm²/sec/steradian) electron streams with energies greater than

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ACCESSION NR: AP4026242

30 kev at an altitude of 300 km over the equatorial zone. No regular dependence of intensity and average energy on time was observed. Orig. art. has: 1 table and 1 figure.

ASSOCIATION: none

SUBMITTED: 20Sep63

DATE ACQ: 16Apr64

ENCL: 01

SUB CODE: AS

NO REF SOV: 009

OTHER: 000

Card 3/4

BASILOVA, R. N.; VERNOV, S. N.; NESTEROV, V. Ye.; PISARENKO, N. F.;
SAVENKO, I. A. ; SHAVRIN, P. I.

Investigating cosmic radiation at altitudes from 200 to 350 km.
with "Kosmos 4" and "Kosmos 7" satellites. Kosm. issl. 2 no. 2:
280-288 Mr-Apr '64. (MIRA 17:5)

ACCESSION NR: AP4034801

S/0293/64/002/002/0289/0295

AUTHOR: Vernov, S. N.; Yerofeyeva, V. N.; Nesterov, V. Ye.; Savenko, I. A.; Shavrin, P. I.

TITLE: Geographic position of the maxima of particle intensity in the outer radiation belt at low heights

SOURCE: Kosmicheskiye issledovaniya, v. 2, no. 2, 1964, 289-295

TOPIC TAGS: upper atmosphere, radiation belt, outer radiation belt, aurora, radiation intensity maximum

ABSTRACT: As a result of investigations by the second and third Soviet space-ships, the position of the maxima of intensity of particles in the outer radiation belt has been established experimentally at all longitudes. The experimentally determined intensity maxima in the outer radiation belt are situated at different longitudes approximately along the drift paths of the mirror points. However, in two ranges of longitude (from -150 to -110° and from -50 to -10°) in the northern hemisphere and in magnetically conjugate regions there is a displacement of the position of the intensity maxima in the direction of greater values L . In the first of the mentioned regions the position of the maxima of

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ACCESSION NR: AP4034801

frequency of occurrence of auroras also is displaced in the direction of larger L. As a result of investigations made on the satellite "Kosmos-4" it has been found that in a broad range of longitudes there is a displacement of the intensity maximum in the outer radiation belt on magnetically quiet days in the direction of greater latitudes than is the case on magnetically disturbed days. Fig. 1 of the Enclosure shows the geographic position of the maxima of intensity of particles in the outer radiation belt at low heights. The authors thank M. V. Tel'tsov and N. F. Pisarenko for participation in the experiment, L. V. Drozdova and O. F. Gorskaya for assistance in finalizing the data and V. Gess who furnished the maps of drift paths at various heights". Orig. art. has: 5 figures and 1 table.

ASSOCIATION: None

SUBMITTED: 19Nov63

DATE ACQ: 20May64

ENCL: 02

SUB CODE: AA

NO REF SOV: 006

OTHER: 005

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ACCESSION NR: AP4034801

ENCLOSURE: 01

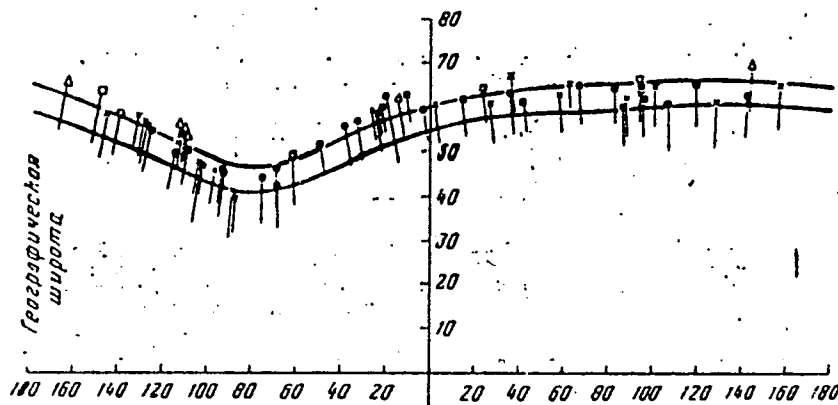


Fig. 1. Geographic position of the maxima of intensity of particles in the outer radiation belt at low heights. The filled circles and squares denote experimentally determined points of the maxima found from flights of the second and third

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ACCESSION NR: AP4034801

ENCLOSURE: 02

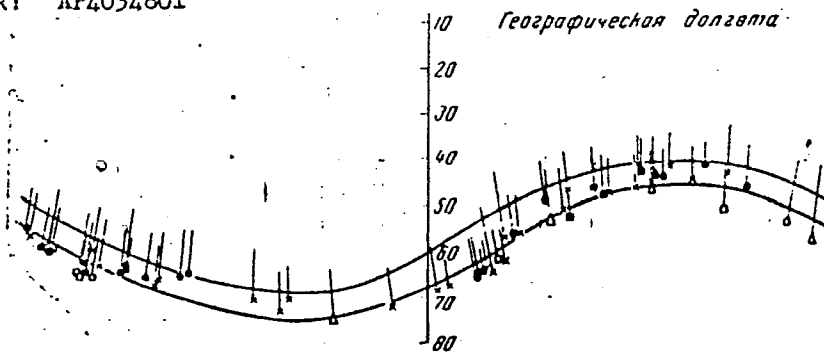


Fig. 1 (cont.) spaceships respectively; the crosses denote magnetically conjugate points for maxima measured on spaceships; the open squares denote experimentally determined points of the maxima obtained during the flight of the satellite "Kosmos-4"; the triangles denote magnetically conjugate points for maxima measured on the satellite "Kosmos-4"; the lines denote the drift paths of mirror points (at lesser latitudes for $L = 3$ and at greater latitudes for $L = 4$).

vertical: geographic latitude; horizontal: geographic longitude

Card 4/4

ACCESSION NR: AP4041571

S/0293/64/002/003/0485/0491

AUTHOR: Vernov, S. N.; Nesterov, V. Ye.; Savenko, I. A.; Shavrin, P. I.; Sharvina, K. N.

TITLE: Geographical intensity distribution of radiation in the region of Brazilian magnetic anomaly at the height of 300 km

SOURCE: Kosmicheskiye issledovaniya, v. 2, no. 3, 1964, 485-491

TOPIC TAGS: artificial satellite, geomagnetic anomaly, Geiger counter; oscillation counter, isoline, nuclear burst, artificial radiation belt, radiation intensity, inner belt

ABSTRACT: Data from Cosmos 4, Cosmos 7, and Cosmos 15, which passed through the region of the Brazilian geomagnetic anomaly at the heights of 235—340 Km, have been studied. Charged particles were counted by Geiger and oscillation counters. The results of processing are represented graphically by isolines, and the numerical values are given in a table. The numbers of the table show a difference between the two measurements. The data from Cosmos 4 were obtained before a nuclear burst in the atmosphere, and the data of Cosmos 15 were obtained

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ACCESSION NR: AP4041571

after the burst. The difference is created by an artificial radiation belt caused by the burst. The radiation of the artificial belt consists of electrons with energies of about 1—7 Mev, which have been recorded in the region of the Brazilian anomaly. The radiation intensity in the inner belt and in the artificial belt is approximately equal. Orig. art. has: 3 figures and 3 tables.

ASSOCIATION: none

SUBMITTED: 14Jan64

ATD PRESS: 3056

ENCL: 00

SUB CODE: AA

NO REF SOV: 004

OTHER: 002

Card 2/2

VERNOV, S.N.; HELMETOV, V.Ye.; PIGARENKO, N.F.; SAVENIN, I.A.;
SAVUKH, O.I.; SHAVRIN, I.I.; SHARVINA, I.N.

Study of the earth's radiation belts in the region of the
Brazilian magnetic anomaly at altitudes between 235 and 345 km.
Kosm. issl. 2 no.3:492-497 Ky-Je '64. (MIRA 17:7)

L 52204-65 ENT(1)/EWG(v)/FCC/EEC-4/EEC(t)/EWA(h) Po-4/Pe-5/Pq-4/Pae-2/Peb/Pi-4

GW

ACCESSION NR: AP5017047

UR/0048/64/028/012/2045/2048

5/
B

AUTHOR: Vernov, S. N.; Savenko, I. A.; Shavrin, P. I.; Nesterov, V. Ye.;
Pisarenko, N. F.; Basilova, R. N.

TITLE: Study of cosmic rays at high altitudes [Report of the All-Union
Conference for the Physics of Cosmic Rays, held in Moscow, 4-10 October, 1963]

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 28, no. 12, 1964, 2045-2048

TOPIC TAGS: cosmic ray, astrophysics, satellite data analysis

ABSTRACT: Measurements of the intensity of charged particles that were conducted beyond the limits of atmosphere yielded values for the intensity which exceeded many times the intensity of the primary cosmic rays. Two hypotheses for the nature of this "excess" energy are examined on the basis of changes in the counting rate of the STS-5 counter on the Kosmos-4, Vostok-5, and Vostok-6 satellites during the period from August 1960 to June 1963. The variation and geographic distribution of the intensity were recorded at altitudes of 200-300 kilometers, and analysis of the counting rate showed that the change in the counting rate is the same as that observed in cosmic rays in the atmosphere.

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L 52204-65

ACCESSION NR: AP5017047

Examination of the geographic distribution of the counting rate of the STS-5 showed a unique relationship between the counting rate and the threshold magnetic hardness of the point of measurement.

Orig. art. has: 3 graphs, 2 tables

ASSOCIATION: none

SUBMITTED: 00

ENCL: 00

SUB CODE: AA, NP

NO REF SOV: 004

OTHER: 002

JPRS

llc
Card 2/2

L:20227-65 EWI(1)/EWG(v)/FCC/EEC-4/EEC(t)/EWA(h) po-4/pe-5/pq-4/pae-2/peb/pi-4/
Pb-4 AEDC(a)/SSD(c)/SSD/AFWL/ASD(a)-5/AS(mp)-2/ASD(p)-3/AFMD(c)/AFETR/ESD(gs)/
ESD(si)/ESD(t) GW/WS S/0048/64/028/012/2049/2057
ACCESSION NR: AP5002105

AUTHOR: Vernov, S. N.; Savenko, I. A.; Shayrin, P. I.;
Nestorov, V. Ye.; Pisarenko, N. F.; Sharvina, K. N.

TITLE: Data on the earth's radiation belts obtained during the Cosmos flights at altitudes of 200-400 km. [Report presented at the Vsesoyuzhnoye soveshchaniye po fizike kosmicheskikh luchey (All-Union Conference on Cosmic Ray Physics), held at Moscow, 4-10 October 1963].

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 28, no. 12, 1964, 2049-2057.

TOPIC TAGS: satellite, radiation density, electron density, solar activity, radiation belt, cosmic ray

ABSTRACT: Some data on the earth's radiation belts collected during the Cosmos series in 1960-1963 at altitudes below 400 km are presented. Data obtained from Cosmos-4 indicate a maximum density shift within the outer radiation belt over a broad interval of longitude during magnetically quiet days. At the same time, an increase of average density was also noted within the radiation belts. From data of

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L 20227-65
ACCESSION NR: AP5002105

2

Cosmos-7 and Cosmos-15 the geographical distribution of electron density in the Brazilian anomaly at an altitude of approx 300 km was determined. This distribution roughly coincided with electron distribution in the inner-radiation belt measured by Discoverer-31. The existence of electrons with energies exceeding 2 Mev within the inner radiation belt are indirectly indicated. During the flight of Cosmos-4 in April 1962, the counting rate of the Geiger counter showed a four-fold increase over satellite measurements made in August 1960. The rate of increase coincided with the proton-density change within the inner belt during the period of the transition to minimum solar activity (and decreased atmospheric density). Orig. art. has: 6 figures.

ASSOCIATION: none

SUBMITTED: 00

ENCL: 00

SUB CODE: AA, ES

NO REF SOV: 007

OTHER: 010

ATD PRESS: 3162

Card 2/2

L 58391-65 EEO-2/EWG(j)/FSS-2/EWG(r)/EWT(1)/EWT(m)/FS(v)-3/EEC(k)-2/EPF(n)-2/
EWG(v)/EWG(m)/FCC/EWA(d)/EEC-4/EEC(t)/EWG(a)-2/EWG(c)/EWA(h) Po-4/Pe-5/Pq-4/Pac-4/
ACCESSION NR: AP5011501 Pae-2/PeB/Pi-4/UR/0188/65/000/002/0040/0043
Pu-4 TT/GW 76

AUTHORS: Savenko, I. A.; Pisarenko, N. F.; Shavrin, P. I.; 95
Nesterov, V. Ye. B

TITLE: Monitoring the cosmic radiation level during the time of
flight of the space ships Vostok-3, Vostok-4, Vostok-5, and Vostok-6 72

SOURCE: Moscow. Universitet. Vestnik. Seriya 3. Fizika,
astronomiya, no. 2, 1965, 40-43 14

TOPIC TAGS: space radiation, radiation shielding, space capsule,
astronaut protection/Vostok

ABSTRACT: The space capsules in question were provided with a dos-
imetric apparatus consisting of a transmitter (gas-discharge counter
of nuclear radiation) and a memory circuit, and was connected by
telemetry to a scientific coordination center, which received data
from various points concerning the solar activity and the radiation
level in space. In spite of the occurrence of certain high intensity
solar flares and in spite of the artificial radiation belt produced

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L 58391-65

ACCESSION NR: AP5011501

by the thermonuclear explosion in the region of the Johnston Island in the Pacific (2 July 1962), it is concluded on the basis of the accumulated data that the astronauts were not exposed to dangerous radiation during the flights of all these capsules. Original article has: 2 figures

ASSOCIATION: NIIYaF (Nuclear Physics Institute, Moscow State University)

SUBMITTED: 25Feb64

ENCL: 00

SUB CODE: SV, LS

NR REF SOV: 005

OTHER: 000

Card

2/2 *stop*

L 35617-65 EWT(1)/EWG(v)/EEC-4/EEG(t)/EWA(h)/FCC Po-4/Pe-5/Pq-4/Pae-2/Peb/Pi-4
S/0293/65/003/001/0128/0134
ACCESSION NR: AP5005441 GW-2

AUTHOR: Vernov, S. N.; Savenko, I. A.; Tverskaya, L. V.; Tverskoy, B. A.;
Shavrin, P. I. 47
43
B

TITLE: Electron intensity of radiation belts at altitudes of 180-330 km in
conjugate regions with negative geomagnetic anomalies

SOURCE: Kosmicheskiye issledovaniya, v. 3, no. 1, 1965, 128-134

TOPIC TAGS: electron intensity, radiation belt, aeronomy, geomagnetism, geomagne-
tic anomaly, Coulomb scattering, atmospheric radiation, outer radiation belt,
conjugate point

ABSTRACT: Data from the second and third Soviet satellite-ships have been used in
an investigation of the asymmetry of the electron intensity of the radiation belts
at conjugate points in a case when one of them is underground. The recording
instruments of these satellites made it possible to determine the planetary dis-
tribution of intensity at heights of 180-330 km. The data used were from a scin-
tillation counter recording mostly the bremsstrahlung of electrons. The informa-
tion was obtained during a period of approximately 24 hours. Comparison of the
counter readings at the same point in space, obtained on different flights, indi-

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L 35617-65

ACCESSION NR: AP5005441

3

cates that appreciable changes in electron intensity in the belts occur with time. Intensity was observed in the Northern Hemisphere in a region conjugate with the South Atlantic anomaly and in the Southern Hemisphere in a region conjugate with the Bering anomaly. An estimate is made of the leakage of particles from the belt, and there is a discussion of the limits of applicability of the concept of a mirror point of a particle on the basis of Coulomb scattering. It is shown that the dense layers of the atmosphere can very probably reflect electrons with small pitch angles. In all probability, the asymmetry effect in electron density can be attributed to acceleration of particles at low heights. If the observed counting rate can be attributed to the Coulomb diffusion of particles from the outer radiation belt. "The authors wish to thank T. V. Kukarina, L. V. Drozdova and Ye. A. Voronina for assistance in finalizing the results." Orig. art. has: 14 formulas, 2 figures and 2 tables. [08]

ASSOCIATION: none

SUBMITTED: 27Jan64

NO REF SOV: 003

Card 2/2

ENCL: 00

OTHER: 004

SUB CODE: ES, AA

ATD PRESS: 3220

L 27192-65 EWT(d)/EWT(l)/EEC(m)/FSF(h)/FSS-2/FS(v)⁴3/EEC(k)-2/EWG(s)-2/EWG(v)/
FCC/EWA(d)/EEC-l/EEC(t)/EWA(h)/EWA(c) Po-l/Pe-5/Pq-l/Pg-l/Pae-2/
Peb/Pi-l/Pk-l/Pl-l TT/AST/GW/WS

S/0203/65/005/001/0148/0154

ACCESSION NR: AP5005197

AUTHOR: Mel'nikov, V. V.; Savenko, I. A.; Savin, B. I.; Shavrin, P. I.

TITLE: Experience in the use of an electrostatic analyzer on Cosmos-12¹²

SOURCE: Geomagnetizm i aeronomiya, v. 5, no. 1, 1965, 148-154

TOPIC TAGS: electrostatic analyzer, ionization measurement, ion current, spaceborne ionization measurement, electron detection

ABSTRACT: Cosmos-12 (apogee, 405 km; perigee, 211 km) and Cosmos-15 (apogee, 371 km; perigee, 173 km) were equipped with identical electrostatic analyzers for the study of electron and positive ion currents with energies of 1 kev. The analyzer (see Fig. 1 of Enclosure) is basically a spherical capacitor with symmetrical potentials applied to the plates. The charged particles entering into the gap between the plates are deflected by the electric field and strike a Faraday cylinder, which serves as the collector. The angle of deflection of a particle projected along the zero equipotential in the gap was 120°. Additional deflections at the input and output of the gap did not exceed 2.5°. The copper capacitor plates were silverplated to reduce light reflection in the ultraviolet region. The radius of the outer surface of the gap was 66 mm; that of the inner, 54 mm. Conical shields were mounted

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77
70
B

L 27192-65

ACCESSION NR: AP5005197

in front of the input and behind the output of the gap to reduce the effects of stray fields. The passband width of the analyzer was approx 30%; its threshold sensitivity under isotropic conditions was approx 6×10^6 part/cm²·sec·kev. The following conclusions are drawn from measurements made with the analyzer during the flight of Cosmos-12: 1) The intensities of electrons and ions with energies of 1 kev on the night side of the Earth were usually lower than the threshold sensitivity of the analyzer. 2) On two orbits, the analyzer registered higher electron and ion intensities ($> 10^8$ part/cm²·sec·kev) over the equatorial regions of the Pacific, due presumably to the effects of a solar flare of magnitude 1 which occurred during the flight. 3) No constant intensity levels exceeding 6×10^6 part/cm²·sec·kev were measured during the daytime sectors of the flight. 4) To the south of New Zealand, occurrences of increased intensity ($\sim 10^8$ part/cm²·sec·kev) were registered on the 28th and contiguous orbits. Orig. art. has: 4 figures. [DW]

ASSOCIATION: Moskovskiy gosudarstvennyy universitet, Institut yadernoy fiziki
(Moscow State University, Institute of Nuclear Physics)

SUBMITTED: 17Sep64

ENCL: 01

SUB CODE: EC, EM

NO REF SOV: 003

OTHER: 003

ATD PRESS: 3191

Card 2/3

L 27192-65

ACCESSION NR: AP5005197

ENCLOSURE: 01

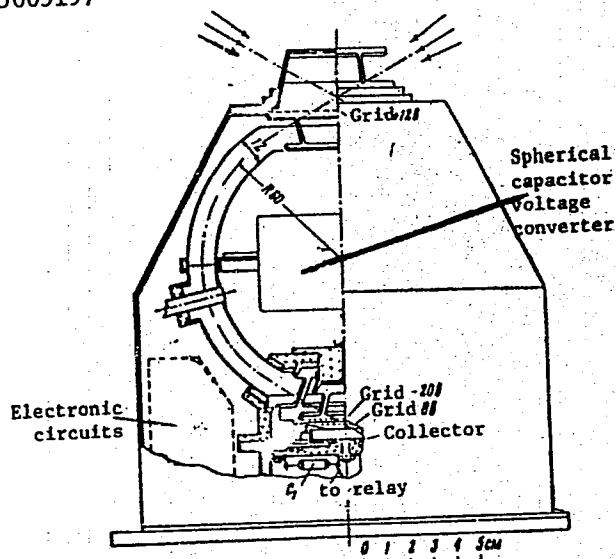


Fig. 1. Electrostatic analyzer

Card 3/3

L 53715-55 EEC-4/ENG(7)/EWA(h)/EWT(1)/EEO(t)/EEC(m)/FCC Pe-5/Pi-4/Po-4/Pq-4/
Pa-2/Pe-1/Pf-1/Pg-1/Pp-1/Pq-1/Pr-1/PS-1/PT-1/PV-1/PW-1/PX-1/PY-1/PZ-1

ACCESSION NR: AP5014116

UR/0203/65/005/003/0546/0549
550.388.2

AUTHOR: Savenko, I. A.; Savun, O. I.; Shavrin, P. I.; Yakovlev, B. M.

45
44
6

TITLE: Combined proton spectrometer for space research

SOURCE: Geomagnetizm i aeronomiya, v. 5, no. 3, 1965, 546-549

TOPIC TAGS: spectrometer, proton spectrometer, telescope spectrometer, combination spectrometer

21 10

ABSTRACT: A description is given of a four-channel telescope spectrometer designed for measuring the energy spectra of protons in the 3-100 Mev range in the presence of intense electron flux. A cylindrical silicon detector, 17 mm in diameter and 2.0 mm thick, is used as the dE/dx detector, where E is energy level. It has a sensitive layer of 1.6 mm and is mounted in front of a CsI crystal which serves as the E detector. The preamplifier and amplifier of the silicon detector are placed directly beside it. A detector bias of about 20 v is provided by a separate battery. The silicon detector senses particles whose dE/dx exceeds that of electrons (protons, deuterons, alpha-particles, etc.) and confines proton energy measurements to the 3-100 Mev range. The cylindrical CsI crystal is 15 mm in diameter and 30 mm in

Card 1/3

L 53715-65

ACCESSION NR: AP5014116

height, and is covered on three sides by a plastic anticoincidence cap. The crystal, the cap, and the photomultiplier are shielded from electrons having energies up to 8 Mev, and the crystal is protected from light by an aluminum foil 10 μ thick. Fig. 1 of the Enclosure shows a block diagram of the spectrometer. Negative pulses from the FEU-16 photomultiplier are transmitted to the emitter follower (input resistance, about 200 Kohm; input capacitance, 5-8 pf). The maximum signal transmitted without distortion is about 5 v. With an emitter resistance of 68 ohm, the output pulses transmitted to the three-channel analyzer, consisting of three integral discriminators, are set to threshold levels between 0.1 and 4 v. At the discriminator output, the negative pulses have a duration of 1.0 μ sec and a rise time of 0.05 μ sec. The pulses are transmitted from the photomultiplier to a circuit of rapid component separation which uses two pulse transformers. The pulses transmitted from the separation circuit are shaped by an integral discriminator circuit and then inverted. A delay line with $t = 0.25$ μ sec is required because the separation circuit shapes pulses with a delay of about 0.25 μ sec. The amplified signals from the silicon detector are transmitted to the shaper, which is a monostable multivibrator with a threshold of 50-100 Mv. The pulses from the detector, the three integral discriminators, and the separation circuit are transmitted to double coincidence and anticoincidence circuits. The double coincidence and anticoincidence circuits, no. I, II, III, and anticoincidence no. IV, correspond to the registration

Card 2/4

L 53715-65

ACCESSION NR: AP5014116

of protons in the 20—100, 40—100, 60—100, and 3—20-Mev energy ranges. The resolution time of the coincidence circuits is about 1 μ sec, ensuring a count rate of 1.2×10^5 pps, or registration of 10^6 proton/cm² sec. Tests at +50 to -20C have demonstrated that threshold fluctuation does not exceed $\pm 10\%$. The dimensions of the electronic circuit are 38 x 30 x 14 mm. The entire electronic circuit, including the high-voltage transformer for the photomultiplier, does not consume more than 0.3 w. Orig. art. has: 3 figures. [DW]

ASSOCIATION: Moskovskiy gosudarstvennyy universitet, Institut yadernoy fiziki
(Moscow State University, Institute of Nuclear Physics)

SUBMITTED: 03Jun64

ENCL: 01

SUB CODE: SV, *OP*

NO REF SOV: 004

OTHER: 003

ATD PRESS: 4020

Card 3/4

L 52771-65 FSS-2/EWT(1)/FS(s)/EWG(v)/FCC/EWA(d)/EEC-l/EEC(t)/EWA(h) Po-l/
Pd-l/Pe-5/Pq-l/Pac-l/Pae-2/Pe6, P1-l TT/GW-2
ACCESSION NR: AT5009977 . UR/3010/65/000/014/0096/0109

AUTHOR: Vernov, S. N., Chudakov, A. Ye., Gorchakov, Ye. V., Logachev, Yu. I., Nesterov, V. Ye., Savenko, I. A., Shavrin, P. I. 69 041

TITLE: The radiation belts of the Earth

SOURCE: AN SSSR. Mezhdudevomstvennyy geofizicheskiy komitet. Geofizicheskiy byulleten', no. 14, 1965, 96-109

TOPIC TAGS: radiation belt, radiation belt anomaly, cosmic ray measurement, Mars 1 satellite, Luna 4 satellite 12

ABSTRACT: This survey article, based mostly on published Soviet and Western papers, discusses the discovery and study of radiation belts, outlines their structure, describes the discovery of radiation belt anomalies, and presents some results of the study of cosmic rays beyond the boundaries of the magnetosphere. This last part contains graphs describing the intensity of cosmic radiation recorded by station Mars 1 as a function of its distance from the Sun, the counting rate of the gas-discharge counter STS-5 on Mars 1 and the stratosphere (at 64° latitude) over the November 1962 - January 1963 period, and the counting rate of the STS-5 counter on the Luna 4 satellite station and in the stratosphere during the first half of April of 1963. Orig. art. has: 16 figures and 2 tables.
Card 1/1

L 3226-66 EWT(1)/EWT(m)/FCC/EWA(h) DIAAP GS/GW

ACCESSION NR: AT5023617

UR/0000/65/000/000/0448/0454

AUTHORS: Nesterov, V. Ye.; Pisarenko, N. F.; Savenko, I. A.; Tel'tsov, M. V.;
Shavrin, P. I.; Sharvina, K. N.

TITLE: Investigation of the inner Van Allen belt and the artificial radiation
belt of the earth at low altitudes during 1960-1964

SOURCE: Vsesoyuznaya konferentsiya po fizike kosmicheskogo prostranstva, Moscow, 1965. Issledovaniya kosmicheskogo prostranstva (Space research); trudy konferentsii. Moscow, Izd-vo Nauka, 1965, 448-454

TOPIC TAGS: radiation belt, Van Allen belt, magnetic anomaly, atmosphere

ABSTRACT: Investigations carried out during 1960-1964 of the inner Van Allen and artificial radiation belts of the earth at low altitudes are discussed with emphasis on the South Atlantic magnetic anomaly off the coast of Brazil. Most of the measurements of particle fluxes were made on five satellites of the "Kosmos" series and the second and third cosmic ships. It was found that in the magnetic shells $1.2 \leq L \leq 1.4$ the intensity of particles toward the east from the anomaly was greater than that toward the west from the anomaly, and for

Card 1/2

L 3226-66

ACCESSION NR: AT5023617

1.5 \leq L \leq 2.1 the reverse was true. Thus, the main component of the flux of particles in the first case was protons and in the second case—electrons. It is also concluded from measurements of the change in electron intensity with altitude that the magnitude of the standard atmosphere is significantly greater than that obtained by D. G. King-Hele and M. Janice (Proc. Roy. Soc., A270, N 1343, 562, 1962). The lifetime of electrons in the artificial radiation belt created by a high-altitude thermonuclear explosion on July 9, 1962 was found to range from 170 days for L=1.3 down to about 70 days for larger L up to 2.0. Orig. art. has: 9 figures; and 1 table. [04]

ASSOCIATION: none
 Moscow (All-Union Comexp. for Cosmic Ray Research)

SUBMITTED: 02Sep65

ENCL: 00

SUB CODE: ES, SV

NO REF SOV: 007

OTHER: 007

ATD PRESS: 4106

Card 2/2

L 3236-66 EWT(1)/FCC/EWA(h) GS/GW

ACCESSION NR: AT5023621

UR/0000/65/000/000/0465/0466

AUTHORS: Savenko, I. A.; Shavrin, P. I.; Tverskaya, L. V.

TITLE: Corpuscular radiation in equatorial regions at low altitudes

40
B+1

SOURCE: Vsesoyuznaya konferentsiya po fizike kosmicheskogo prostranstva. Moscow, 1965, Issledovaniya kosmicheskogo prostranstva (Space research); trudy konferentsii. Moscow, Izd-vo Nauka, 1965, 465-466

TOPIC TAGS: electron flux, magnetic anomaly, cosmic ray, albedo

ABSTRACT: It is assumed that the intensity of electron flux at low altitudes (300-400 km) in equatorial regions is due to neutron decay in the albedo of cosmic rays. Electrons were captured at different heights. By knowing the latitude and the pitch angle (for known longitude), it is possible to compute the rate of accumulation. It was found that each energy value of electron corresponds to a definite height. Computations of expected intensities of electron flux are shown in Table 1 of the Enclosure. The intensity on ascending branches of the drift orbit is small, since electrons quickly move upward from any given height. The greatest intensity may be expected over the Pacific Ocean and over South America

Card 1/3

L 3236-66

ACCESSION NR: AT5023621

(at the western edge of the Brazilian magnetic anomaly). The neutron mechanism proves to be rather potent in creating an intensity of about 10^3 per cm^2 per sec during longitudinal drift. Orig. art. has: 3 tables. [04]

ASSOCIATION: none vidlye kon... fizike kosmicheskogo prostranstva
(All-Union Conference on Space...)

SUBMITTED: 02Sep65

ENCL: 01

SUB CODE: ES, NP

NO REF SOV: 002

OTHER: 002

ATD PRESS: 4106

Card 2/3

L 3236-66

ACCESSION NR: AT5023621

ENCLOSURE: 01

Table 1. Computations of expected intensities at an altitude of 500 km.

λ°	λ_0°	t, sec	$\text{cm}^{-5} \text{sec}^{-1}$	λ°	λ_0°	t, sec	$\text{cm}^{-5} \text{sec}^{-1}$
290	332	$1,1 \cdot 10^4$	$1,9 \cdot 10^8$	154	54	$3,3 \cdot 10^4$	$6 \cdot 10^8$
268	350	$9,4 \cdot 10^4$	$1,7 \cdot 10^8$	128	66	$2 \cdot 10^4$	$3,6 \cdot 10^8$
224	18	$6,9 \cdot 10^4$	$1,3 \cdot 10^8$	100	100	0	0

λ is the longitude of observation; λ_0 is the longitude at which electrons with energies greater than 300 kev begin to accumulate after passing the longitude of observation; t is the drift time from λ_0 to λ (time of accumulation); and I is the intensity at the point λ .

Card 3/3

L 1539-66 FSS-2/EWT(1)/FS(v)-3/FCC/EWA(d)/EWA(h) TT/GS/CW

ACCESSION NR: AT5023629

UR/0000/65/000/000/0506/0509

AUTHOR: Basilova, R. N.; Nesterov, V. Ye.; Pisarenko, M. F.; Savenko, I. A.;
Shavrin, P.I. 44.55 44.55 44.55 44.55

TITLE: Satellite cosmic ray investigations

SOURCE: Vsesoyuznaya konferentsiya po fizike kosmicheskogo prostranstva. Moscow, 1965. Issledovaniya kosmicheskogo prostranstva (Space research); trudy konferentsii. Moscow, Izd-vo Nauka, 1965, 506-509

TOPIC TAGS: cosmic ray, cosmic radiation, spacecraft

ABSTRACT: Data are presented on time variations of cosmic radiation as recorded by a number of artificial earth satellites during the period between 19 August 1960 and 27 April 1963. STS-5 gas discharge counters were used as measuring instruments. The orbit parameters and times of measurement are summarized in Table 1 of the Enclosure. The recordings of the counters in each satellite were adjusted to the data of Kosmos-4 on the basis of measurements obtained within the stability period of radiation intensity during the solar activity. The data are adjusted to an altitude of 300 km. The radiation intensity changes with time, relative to

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L 1539-66

ACCESSION NR: AT5023629

the intensity during the August--December 1960 period on the high-latitude plateau, are charted together with the recordings of "Explorer 7" and stratospheric recordings by Charakhch'yan (Geomagnetizm i aeronomiya, 3, 1963, 304; Doklad na Vses. sov. po kosmicheskim lucham. Apatity, 1964) to show a general increase of intensity by roughly 25 percent during 1961 and the first quarter of 1962. This increase is attributed to the appearance of low-momentum particles, whose integral spectrum is deduced by plotting the differentials of the increase between Kosmos-4 and Kosmos-17 and Explorer-7, and between stratospheric data and the differential spectrum of the increase according to the aforementioned satellites and Kosmos-4. The data of the Kosmos and Explorer satellites are in fair agreement but differ from those of the stratospheric measurements. It is concluded that gas-discharge counters can be used advantageously in artificial earth satellites for investigations of cosmic radiation. Orig. art. has: 3 figures. [FP]

ASSOCIATION: none

SUBMITTED: 02Sep65

ENCL: 01

SUB CODE: AA, SV

NO REF SOV: 003

OTHER: 003

ATD PRESS: 4094

Card 2/3

L 1539-66

ACCESSION NR: AT5023629

ENCLOSURE: 01

Table 1. Orbit parameters and times of measurement

Satellite	Perigee, km	Apogee, km	Line of measurement	Count speed pulse/cm ² /sec
Second Sputnik	306	339	19 August 1960	3.25 ± 0.15
Third Sputnik	187	256	1 December 1960	3.25 ± 0.15
Kosmos-4	298	330	26-29 April 1962	4.44 ± 0.05
Kosmos-9	301	358	27 September-1 October 1962	4.44 ± 0.17
Kosmos-12	211	405	22-30 December 1962	4.08 ± 0.25
Kosmos-15	117	371	22-27 April 1963	4.26 ± 0.14

Card 3/3

L 2403-66 FSS-2/EWT(1)/EWT(m)/FS(v)-3/FCC/EWA(d)/EWA(h) TT/DD/GS/GW

ACCESSION NR: AT5023639

UR/0000/65/000/000/0568/0572

AUTHORS: Nesterov, V. Ye.; Pisarenko, N. F.; Savenko, I. A.; Shavrin, P. I.

TITLE: Radiation safety problems of space flights

SOURCE: Vsesoyuznaya konferentsiya po fizike kosmicheskogo prostranstva. Moscow, 1965. Issledovaniya kosmicheskogo prostranstva (Space research); trudy konferentsii. Moscow, Izd-vo Nauka, 1965, 568-572

TOPIC TAGS: radiation hazard, radiation protection, Van Allen belt, cosmic ray, astronaut, solar activity

ABSTRACT: Three types of ²radiation hazards encountered by astronauts and space vehicles during different space missions are discussed. First are the primary cosmic rays recorded by various Soviet space probes during the 11-year solar cycle. These data show that, depending on the solar activity, the radiation dose due to cosmic rays can vary between 10 and 25 rad/year, or 40 to 100 rem/year. About 92% of this biological dose is found to be due to the heavy-particle component of the cosmic rays ($Z \geq 10$). The second radiation hazard comes from the energetic protons and hard electron radiation from the Van Allen belts. Detailed Soviet satellite observations over the years 1960-1964 indicate that a significant contribution to

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L 2403-66

ACCESSION NR: AT5023639

Van Allen belt radiation hazards comes from the radiation belt artificially created by the 1962 upper atmospheric nuclear explosions. The Voskhod-2 manned flight measured a 60 millirad dose on the astronauts Belyayev and Leonov. Furthermore, heavy damage to the space suits of astronauts may be caused by regions of soft radiation in the Van Allen belt. The third radiation hazard is the sudden, large scale, solar photospheric bursts which can generate 100-1000 rad/cm² radiation doses. The important protection factor here is an accurate prediction of such bursts and subsequent scheduling of space flights. Furthermore, a more accurate knowledge of solar burst physics and cosmic rays is necessary, especially an accurate knowledge of radiation spectra for high Z components, an accurate knowledge of energy and charge spectra of corpuscular radiation from solar bursts, and the time-resolution of solar bursts. Orig. art. has: 1 table. [04]

ASSOCIATION: none

SUBMITTED: 02Sep65

ENCL: 00

SUB CODE:SV,AA

NO REF SOV: 003

OTHER: 000

ATD PRESS: 467

PC
Card 2/2

L 2464-66 FSS-2/EWT(1)/FS(v)-3/FCC/EWA(d)/EWA(h)

TT/GW

ACCESSION NR: AP5020993

UR/0203/65/005/004/0645/0648
523.165

40
15

AUTHOR: Vernov, S. N.; Savenko, I. A.; Tel'tsov, M. V.; Shavrin, P. I.

TITLE: Measurement of 0.4-8 Mev protons by "Kosmos-41"

SOURCE: Geomagnetizm i aeronomiya, v. 5, no. 4, 1965, 645-648

TOPIC TAGS: proton intensity, satellite/Kosmos 41

ABSTRACT: Two semiconductor proton detectors, each capable of covering ~ 1 sterad and sensitive to 400 keV-7 MeV and 3-8 MeV protons, respectively, were mounted on "Kosmos-41". Readings were taken for $L = 3.5-10$ (C. E. McIlwain's parameter). Results showed that maximum intensity for 0.4-3.0 MeV protons was $2 \cdot 10^5$ prot/cm² sec sterad at $L = 3.5$ and $B = 7.6 \cdot 10^{-2}$ gauss. A comparison of data collected near the plane of the geomagnetic equator with those taken at higher latitudes, at $L = 5$, revealed that the dependence of intensity on height can be expressed as $(B/B_{\text{equat}})^{-k}$, where $k \approx 1$. The drop in proton intensity varied with L in the form L^{-n} , where $n = 30$; however, this depended on geomagnetic conditions and on variations in the

Card 1/2

L 2164-66

ACCESSION NR: AP5020993

outer radiation belt. Intense proton streams were observed at large values of L. [WC]
Orig. art. has: 3 figures and 1 table.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University);
Institut yadernoy fiziki (Institute of Nuclear Physics)/

SUBMITTED: 28Jan65

ENCL: 00

SUB CODE: ES, NP

NO REF SOV: 002

OTHER: 004

ATD PRESS: 4106

12/2

Card 2/2

L 2322-66 EWT(d)/FSS-2/EWT(1)/FS(v)-3/SEC(k)-2/FCC/EWA(h) TT/AST/GS/GW
ACCESSION NR: AT5023616 UR/0000/65/000/000/0434/0448

AUTHORS: Vernov, S. N.; Nesterov, V. Ye.; Pisarenko, N. P.; Savenko, I. A.;
Tverskaya, L. V.; Shavrin, P. I.

TITLE: Investigation of the upper Van Allen radiation belt at low altitudes during
the flights of the satellite ships and artificial earth satellites "Kosmos" from
1960 to 1963

SOURCE: Vsesoyuznaya konferentsiya po fizike kosmicheskogo prostranstva. Moscow,
1965. Issledovaniya kosmicheskogo prostranstva (Space research); trudy konferentsii.
Moscow, Izd-vo Nauka, 1965, 434-4 8

TOPIC TAGS: sputnik, artificial earth satellite, Van Allen belt, radiometry,
geomagnetic field

ABSTRACT: The results of radiometric measurements of the Van Allen radiation belt
from several "sputnik" and "Kosmos" satellites are discussed. The radiometers
consisted of inner and outer scintillation counters and gas discharge counters.
The internal scintillation counters recorded electron energies between 50 to 300 kev.
Among the various recorded measurements was the variation of radiation intensity
with longitude, which was quite apparent in the outer belt and which could be
explained clearly by the structure of the actual geomagnetic field. Several
Card 1/2

L 2322-66

ACCESSION NR: AT5023616

altitude versus longitude particle drift trajectory curves were obtained to explain the various geomagnetic anomalies observed. Next, data were obtained to determine the location of maxima in the outer Van Allen belt. Over a period of four years this varied within the limits $4 < L < 6$, and this variation could be associated with geomagnetic disturbances. As a third observation, an electron energy gap was discovered between the outer and inner radiation belts on $2 < L < 3$. The special profile of the outer Van Allen belt is shown to be characterized by the location of a maximum, a maximum radiation intensity I_{max} , and a half-width corresponding to $0.5 I_{max}$. Intensity measurements and geomagnetic line-of-force cross section estimates gave the following values for the electron lifetimes in the outer belt: for electron energies > 100 kev, $T = 5 \times 10^5$ sec, for energies > 600 kev, $T = 5 \times 10^7$ sec. Orig. art. has: 13 figures and 1 formula. [04]

ASSOCIATION: none

SUBMITTED: 02Sep65

ENCL: 00

SUB CODE: AA,SV

NO REF SOV: 015

OTHER: 012

ATD PRESS: 4107

Cord 2/2 rd

L 21028-66 FSS-2/EWT(1)/FCC/EWA(d)/EWA(h) TT/GS/GW

ACCESSION NR: AT5023619

UR/0000/65/000/000/0460/0464

AUTHORS: Vernov, S. N.; Savenko, I. A.; Tel'tsov, M. V.; Shavrin, P. I.

16
BT1

TITLE: Some results of measurements in the outer Van Allen belt by the satellite Kosmos-41

12

SOURCE: Vsesoyuznaya konferentsiya po fizike kosmicheskogo prostranstva. Moscow, 1965. Issledovaniya kosmicheskogo prostranstva (Space research); trudy konferentsii Moscow, Izd-vo Nauka, 1965, 460-464

TOPIC TAGS: radiation belt, Van Allen belt, proton bombardment, electron bombardment

ABSTRACT: Some results of measurements of proton and electron intensities in the outer Van Allen belt are presented. The measurements were made during September and October 1964 on the satellite "Kosmos-41," which was launched August 22, 1964. The form, shielding, geometric factor, and energy range of the nine detectors used are given. The results are presented as a series of graphs giving the measured particle intensities, magnetic field intensity, and altitude above the earth's surface as a function of the parameter L. The intensity of protons with

Card 1/2

L 21028-66

ACCESSION NR: AT5023619

energies 0.4-3 Mev reached $2 \cdot 10^5 / \text{cm}^2$ sec ster for $L=3.5$, whereas the intensity of protons with energies 3-8 Mev during the same time was always below the detector threshold of $3 / \text{cm}^2$ sec ster. The maximum electron intensities were measured at $L=5$. Orig. art. has: 4 figures; and 2 tables. [04]

ASSOCIATION: none
Soviet Union Conference on Space Research (USSR)

SUBMITTED: 02Sep65

ENGL: 00

SUB CODE: ES, SV

NO REF SOV: 003

OTHER: 002

ATD PRESS: 4106

Card 2/2 BK

L 2759-66 EWT(d)/FSS-2/EWT(1)/FS(v)-3/EEC(k)-2/FCC/EWA(d)/EWA(h) AST/TT/GH
ACCESSION NR: AP5021003 UR/0203/65/005/004/0749/0751
523.165

AUTHOR: Savenko, I. A.; Savin, B. I.; Mel'nikov, V. V.; Shavrin, P. I.;
Markelova, T. N.

57
54
B

TITLE: Study of 1-kev charged particle streams by Kosmos-15

SOURCE: Geomagnetizm i aeronomiya, v. 5, no. 4, 1965, 749-751

TOPIC TAGS: charged particle measurement, satellite/Kosmos 15

ABSTRACT: A spherical electrostatic analyzer, adjusted to 1-kev electron energies and containing a +12 v grid at its opening to protect the instrument compartment from positive ion bombardment, was installed on "Kosmos-15", launched 22 April 1963. The analyzer's maximum sensitivity was 20 mv, which corresponded to $\sim 1.2 \cdot 10^7$ particles/cm² sec kev. The measurement program included four stages, the first two stages consisting in recording 1-kev electrons, the third stage — 1-kev positive ions, while during the fourth stage the spheres made contact with the satellite body. The cycle was thereafter repeated. Measurement results (see Fig. 1 of Enclosure) indicated the presence of two maxima at identical latitudes on either side

Card 1/3

L 2759-66

ACCESSION NR: AP5021003

of the equator, where the daily shift of these maxima exhibited a motion toward the north. Orig. art. has: 3 figures. [WC]

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta
(Institute of Nuclear Physics, Moscow State University)

SUBMITTED: 05Oct64

ENCL: 01

SUB CODE: ES, NP

NO REF SOV: 003

OTHER: 000

ATD PRESS: 4/02

Card 2/3

L 2759-66
ACCESSION NR: AP5021003

ENCLOSURE: 01

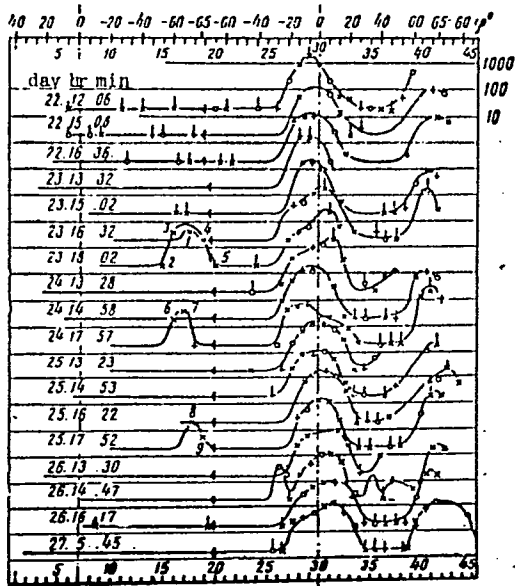


Fig. 1. Measurement results for first few days of flight

Column at left indicates date and time of passage over night equator on a given orbit. Vertical scale indicates difference in potentials on storage capacitor in mv

φ° - Geographical latitude;
+ - electron measurement;
x - positive ion measurement;
o - absence of field.

Card 3/3 *mler*

SECRET

1. The following information was obtained from the review of the [redacted] file, [redacted] (MARA 33.12)

2. [redacted]

L 6950-66 EWT(1)/FCC/EWA(h) GW

ACC NR: AP 5026234 :

SOURCE CODE: UR/0048/65/029/010/1909/1912

46
38
B

AUTHOR: Shavrin, P. I.

ORG: none

TITLE: Investigation of the outer radiation belt at low altitudes /Report, All-Union Conference on Cosmic Ray Physics held at Apatity, 24-31 August 1964/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 29, no. 10, 1965, 1909-1912

TOPIC TAGS: Radiation belt, satellite, radiation intensity, earth magnetic field

ABSTRACT: In the present paper there are reported data on the location at low altitudes of the outer radiation belt and the variations of the radiation intensity within it, recorded with scintillation counters on satellites of the Kosmos series and the first and second Soviet satellite vehicles. During 1959 and 1960 the maximum of the outer radiation belt occurred at L-values less than 4.5; the maximum tended to shift from L=4 to L=3 with increasing magnetic disturbance. The L-coordinate of the maximum of the outer radiation belt tended to decrease with increasing values of the 3-hour planetary K_p-index. During 1962 and 1963 the maximum of the outer belt occurred at L-values between 4 and 6. Supplementary radiation intensity maxima were detected in the slot between the radiation belts at L-values between 2 and 3. The positions and intensities of these maxima, which were from 5 to 20% as

Card 1/2

0902 0018

L 6950-66

ACC NR: AP 5026234

intense as the principal maximum at $L > 4$, varied considerably from time to time. Low-altitude intensity variations in the outer belt were also observed. The high-altitude nuclear explosions in 1962 did not significantly increase the radiation intensity for $L > 2.5$. 3

The author thanks I.A.Sevenko and V.Ye.Nesterov for encouraging him to complete this work, and T.V.Kurakina for assistance in presenting the results. Orig.art. has: 4 figures.

SUB CODE: AA, ES

SUBM DATE: 00/--Oct65

ORIG.REF: 008

OTH REF: 002

Card 2/2 *nds*

L 9604-66 EWT(1)/EGG/EWA(h) GW UR/0313/65/000/003/0035/0035 57
ACC NR: AR5020397 E

SOURCE: Ref. zh. Issledovaniye kosmicheskogo prostranstva, Abs. 8.62.238

AUTHOR: Vernov, S.N.; Chudakov, A.Ye.; Gorchakov, Ye.V.; Logachev, Yu.I.; Nesterov, V.Ye.; Savenko, I.A.; Shavrin, P.I.

TITLE: Radiation belts of the earth

CITED SOURCE: Geofiz. byul. Mezhdoved. geofiz. kom-t pri Prezidiume AN SSSR, no. 14, 1964, 96-109

TOPIC TAGS: satellite, rocket, radiation effect, cosmic radiation

TRANSLATION: A short outline is given of the results obtained from studies conducted using Soviet artificial satellites and cosmic rockets of the radiation belts and of primary cosmic radiation beyond the limits of the magnetic sphere.

SUB CODE: 04,03

ENCL: 00

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L 32275-66 EMT(1)/RCG GW

ACC NR: AP6011709

SOURCE CODE: UR/0203/66/006/002/0377/0380

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61

6

AUTHOR: Savenko, I.A. ; Tel'tsov, M. V. ; Shavrin, P.I.

ORG: Institute of Nuclear Physics, Moscow State University (Institut yadernoy fiziki, Moskovskiy gosudarstvennyy universitet)

TITLE: Variations of the intensity of protons and electrons of the outer radiation belt

12

SOURCE: Geomagnetizm i aeronomiya, v. 6, no. 2, 1966, 377-380

TOPIC TAGS: radiation belt, particle distribution, satellite data analysis

ABSTRACT: This article gives the results of the processing of the data during the period from the end of August to the end of December 1964 which was gathered by the radiometric apparatus installed on the satellite Cosmos-41. An examination of the curves of the intensity of protons with energies of 0.4-7 MeV shows that the outer part of the protonosphere, beginning with $L \geq 5.5$, undergoes substantial variations. From a comparison of the data on the measurement of the density of protons and electrons of the outer radiation belt for various satellite flights it is concluded that the greatest time variations of the intensity of electrons at a fixed L occurs in the region $L=5-7$, the variation of the counting rate being associated both with the change in the spatial location of the belt and with a change of the intensity of electrons with an energy exceeding the threshold of the detector; the time variations of the intensity of protons occur only in the outer part of the proton belt, beginning with $L > 4.5$

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and increase with an increase of L , whereas the position of the maximal intensity ($L_m=3.5$) and the proton intensity at the maximum change very little. The author thanks N. Gordeyev and N. Rachetkin for performing the calculations and formulating the material. Orig. art. has: 3 figures.

SUB CODE: 08 SUBM DATE: 10Jun65 / ORIG REF: 003 / OTH REF: 004

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SOURCE CODE: UA/0203/66/006/004/0658/0500

AUTHORS: Verbov, S. N.; Savenko, I. A.; Tel'tsov, M. V.; Shavrin, P. I.

ORGANIZATION: Institute of Nuclear Physics, Moscow State University (Moskovskiy gosudarstvennyy universitet, institut yadernoy fiziki)

TITLE: Intensity of protons and electrons in the outer radiation belt in the period 1961-1964

SOURCE: Geomagnetizm i aeronomiya, v. 6, no. 4, 1966, 658-660

TOPIC TAGS: radiation belt, proton, electron, solar activity

ABSTRACT: The authors present the results of equatorial measurements made in 1964 of the intensity of protons with energies $\gg 400$ keV and electrons with energies > 2 MeV at the center of the outer radiation belt. These results are compared with similar data obtained in 1961. The conclusion is drawn that there is a tendency to a decrease of the mean absolute intensity of the hard electrons of the outer radiation belt in 1964 in comparison with 1961-1962. If the noted variations in the absolute intensities of hard electrons and low-energy protons are considered within the framework of the theory of the formation of the radiation belts it can be postulated that the mean density of protons with energies of tens of keV beyond the limit of stable trapping varies little with a change of solar activity. At the same time, the density of electrons with energies of hundreds of keV, forming during the drift of hard electrons at the center of the outer radiation belt, rises sporadically only

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