87467

3.1800 (1041, 1062, 1168)
9.9840

S/169/60/000/012/005/010
A005/A001

Translation from: Referativnyy zhurnal, Geofizika, 1960, No. 12, p. 219, # 16268

AUTHORS: Blokh, Ya. L., Glokova, Ye. S., Dorman, L. I.

TITLE: Investigation of the Nature of the Cosmic Ray Effect During the Magnetic Storm on August 29, 1957, on the Basis of Materials From the International Station Network of the IGY

PERIODICAL: V sb.: Variatsii kosmich. luchey pod zemley, na urovne morya i v stratosfere, No. 1, Moscow, AN SSSR, 1959, pp. 7-36

TEXT: The analysis is given of the great intensity decrease of the cosmic rays which began on August 29, 1957. The investigation was performed on the basis of the materials of the international network embracing 50 observation points (77 recording devices). It was stated that the energy spectrum of variation of the primary cosmic rays, which caused the intensity decrease effect, has the form:

$$\delta D(\mathcal{E})/D(\mathcal{E}) = 0.17\,A,$$

where $A = -1$ for $\mathcal{E} < \mathcal{E}_{min}/4$, $A = -(2/\pi)\arcsin(\mathcal{E}_{min}/2\mathcal{E}-1)$ for $\mathcal{E}_{min}/4 < \mathcal{E} < \mathcal{E}_{min}/2$, and $A = 0$ for $\mathcal{E} < \mathcal{E}_{min}/2$ and $\mathcal{E}_{min} = 90$ Bev. The analysis results allow

Card 1/2

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S/169/60/000/012/005/010
A005/A001

Investigation of the Nature of the Cosmic Ray Effect During the Magnetic Storm on August 29, 1957, on the Basis of Materials From the International Station Network of the IGY

the following interpretation of the observed phenomena. A wide corpuscular stream containing the frozen-in regular magnetic field ($H \approx 10^{-5}$ Gs) hit the Earth with its leading front on August 29. The scattering of the cosmic rays by this field led to the observed intensity decrease. The absence of solar-diurnal variations during this period points out that the direction of the magnetic field in the stream coincided apparently with the ecliptic plane. On September 2, the Earth was hit by the second corpuscular stream having caused a very intense magnetic storm and a new decrease in the cosmic ray intensity. The analysis of the diurnal variations, observed during this period, points out that the magnetic field frozen-in in the stream was oriented perpendicular to the ecliptic plane. The investigation of some phenomena is presented, which accompanied the main effect of intensity decrease: a soft decrease and following increase in intensity before the beginning of the main effect, the alteration of the variation spectrum with time, and others. - There are 16 references. N. S. Kaminer

Translator's note: This is the full translation of the original Russian abstract.

Card 2/2

87469

3.1800 (1041, 1062, 1168)
9.9700

S/169/60/000/012/007/010
A005/A001

Translation from: Referativnyy zhurnal, Geofizika, 1960, No. 12, p. 219, # 16270

AUTHORS: Blokh, Ya. L., Vernov, S. N., Dorman, L. I., Dubrovin, M. M.

TITLE: Preliminary Results of an Investigation of the Underground Variations of Cosmic Rays

PERIODICAL: V sb.: Variatsii kosmich. luchey pod zemley, na urovne morya i v stratosfere. No. 1, Moscow, AN SSSR, 1959 pp. 37-47

TEXT: The variations of the cosmic ray intensity are investigated on the basis of data obtained from a counter telescope of triple coincidences, which was located under the earth's surface at the depth of 40 m of water equivalent. By the simple-correlation method the value of the barometric coefficient $\beta = (0.021 \pm 0.008)$ %/mb was obtained. The diurnal variation of the underground intensity amounts to about 0.05%. By averaging the data it is shown that the average effect at the depth of 40 m of water equivalent amounts to 0.3% during 11 events of decreases of the Forbush type. The investigation of the disturbed diurnal variations in the cosmic ray intensity was also carried out. N. K.

Translator's note: This is the full translation of the original Russian abstract.

Card 1/1

87468

3.1800 (1041, 1062, 1168)
9.9840

S/169/60/000/012/006/010
A005/A001

Translation from: Referativnyy zhurnal, Geofizika, 1960, No. 12, p. 219, # 16269

AUTHORS: Dorman, L. I., Feynberg, Ye. L.

TITLE: Some Problems of the Theory of Cosmic Ray Variations

PERIODICAL: V sb.: Variatsii kosmich. luchey pod zemley, na urovne morya i v atmosfere. No. 1, Moscow, AN SSSR, 1959, pp. 49-57

TEXT: Certain consequences are described from the theory of the effect of the solar corpuscular streams on the intensity of the cosmic rays, when the corpuscular rays carry frozen regular magnetic fields. It is shown that this theory explains well the observed decreases in the intensity of the cosmic rays during magnetic storms; the variation of the intensity is totally determined by the nature of the capture of the Earth by the corpuscular stream (by the leading front or the by-side). It is known that the duration of the decrease in the intensity of the cosmic rays is considerably greater than the duration of the geomagnetic disturbances. For explaining this difference, the assumption is made that the lines of force of the magnetic field frozen in the corpuscular stream run out beyond the boundaries of the latter and are circuited at the Sun (if the

Card 1/2

87468

Some Problems of the Theory of Cosmic Ray Variations

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A005/A001

general solar field is frozen in) or in the interplanetary space (if the field of the sunspots is frozen in). In this manner, the region scattering the cosmic rays increases, which leads to the increase in the duration of the decrease effect of cosmic ray intensity. In connection with the fact that the observed variations in the cosmic ray intensity extend to energies of not lower than about 100 Bev, it is necessary to know the relation coefficient between the variations of the primary and secondary components of the cosmic rays for underground observations. Basing on sufficiently accurate results of rating the relation coefficient for counter telescopes on sea level, the relation coefficients are calculated for underground investigations at various depths down to 2,000 m of water equivalent under certain simplifying assumptions.

N. S. K.

Translator's note: This is the full translation of the original Russian abstract.

Card 2/2

ZHDANOV, G.B., glavnyy red.; IVANENKO, I.P., zam.glavnogo red.; ZATSEPIN, V.I., otv.red.toma; KHUDENOV, B.A., zam.red.toma; GERASIMOVA, N.M., red.; NIKISHOV, A.I., red.; DORMAN, L.I., red.; TULINOV, V.F., red.; SYROVATSKIY, S.I., red.; FEDOROV, V.M., red.; VAVILOV, Yu.N., red.; ABROSIMOV, A.T., red.; GUROV, K.P., red.izd-va; BERKGAUT, V.G., red.izd-va; BRUZGUL', V.V., tekhn.red.

[Extensive air showers and cascade processes] Shirokie atmosfernye livni i kaskadnye protsessy. Moskva, Izd-vo Akad.nauk SSSR, 1960. 351 p. (Trudy mezhdunarodnoy konferentsii po kosmicheskim lucham, no.2). (MIRA 13:12)

1. International Conference of Cosmic Radiation.
(Cosmic rays)

ZHDANOV, G.B., glav. red.; IVANENKO, I.P., pom. glav. red.; GERASIMOVA, N.M., red. toma; NIKISHOV, A.I., pom. red. toma; ZATSEPIN, V.I., red.; KHRENOV, V.A., red.; DORMAN, L.I., red.; TULINOV, V.F., red.; SYROVATSKIY, S.I., red.; FEDOROV, V.M., red.; VAVILOV, Yu.N., red.; ABROSIMOV, A.T., red.;

Proceedings of the Moscow Cosmic Ray Conference. July 6-11, 1959. Moscow. Vol.1. 1960. 333 p.
(No subject heading)

ZHDANOV, G.B., glav. red.; IVANENKO, I.P., pom. glav. red.; DORMAN, L.I., red. toma; TULINOV, V.F., pom. red. toma; GERASIMOVA, N.M., red.; NIKISHOV, A.I., red.; ZATSEPIN, V.I., red.; KHRENOV, V.A., red.; SYROVATSKIY, S.I., red.; FEDOROV, V.M., red.; VAVILOV, Yu.N., red.; ABROSIMOV, A.T., red.

Proceedings of the Moscow Cosmic Ray Conference, July 6-11, 1959. Moscow. Vol. 4. Variations of cosmic-ray intensity. 1960. 365 p. Vol. 4.

(No subject heading)

ZHDANOV, G.B., glavnyy red.; IVANENKO, I.P., zam.glavnogo red.; SYROVATSKIY, S.I., otv.red.toma; KHRENOV, B.A., zam.red.toma; GERASIMOVA, N.M., red.; NIKISHOV, A.I., red.; ALEKSEPLN, V.I., red.; DORMAN, L.I., red.; TULINOV, V.F., red.; FEDOROV, V.M.; VAVILOV, Yu.N., red.; ABRASIMOV, A.T., red.; FRADKIN, M.I., red.izd-va; BRUZGUL', V.V., tekhn.red.

[Radiation belts of the earth. Primary cosmic radiation and its properties and origin] Radiatsionnyi poias Zemli. Pervichnoe kosmicheskoe izluchenie, ego svoistva i proiskhozhdenie. Moskva, Izd-vo Akad.nauk SSSR, 1960. 258 p. (Trudy Mezhdunarodnoi konferentsii po kosmicheskim lucham, no.3)

(MIRA 14:2)

1. International Conference of Cosmic Radiation. (Cosmic rays)

ACCESSION NR: AT3012740 S/2961/60/000/002/0005/0057

AUTHORS: Blokh, Ya. L.; Dorman, L. I.; Kaminer, N. S.

TITLE: Individual cases of the influence of magnetic storms on cosmic rays, and their interpretation

SOURCE: AN SSSR. Mezhduvedomst. komit. po prov. mezhdunarodn. geofizich. goda. 7 razdel program. MGG. Kosmicheskiye luchi. Sb. statey, no. 2, 1960, 5-57

TOPIC TAGS: cosmic rays, cosmic ray hard component, cosmic ray neutron component, magnetic storm, sudden magnetic storm, corpuscular stream, solar corpuscular stream, cosmic ray intensity profile

ABSTRACT: An analysis is presented of the changes in intensity of the hard and neutron components of cosmic radiation occurring in about 50 different magnetic storms from 1954 through 1959 and observed in the world network of stations. The profile of each case

Card 1/4 3

ACCESSION NR: AT3012740

is classified (groups I, II, and III) and compared with the theoretically expected profile under various assumptions concerning the velocities of the corpuscular streams which carry frozen-in magnetic fields, concerning the manner whereby the earth enters the streams (sideways, leading front at different distances from the stream axes, etc.), and concerning the field structure. It is concluded that the field intensity in the leading side edge of the stream is much larger than in the remaining part of the stream. A considerable kinetic energy density dispersion is observed in the stream, decreasing on going to the trailing side edge of the stream. This explains why magnetic perturbations terminate after the resumption of the cosmic-ray intensity. The plasma in the leading part of the stream becomes highly condensed and consequently the frozen-in field intensity increases. This explains the sharp decrease in the intensity of cosmic rays during the time of some sudden magnetic storms. The following general properties are found to be common to all streams: the angular width of the stream is equal in the mean to the

Card 2/4

ACCESSION NR: AT3012740

angular width of the active region, the front edge of the stream is characterized by a considerable increase of the magnetic field (and corresponding compression of the plasma), and the field is somewhat more intense in the leading part of the stream compared with the field in the lagging edge. It is assumed on the basis of the analysis that during magnetic storms the cosmic ray intensity profile is determined completely by the manner in which the earth enters the stream, by the stream velocity, and by the field distribution in the stream. A detailed study of this profile can therefore yield important information on the stream properties. "In conclusion we take the opportunity to express deep gratitude to Professor Ye. L. Feynberg and to O. I. Inozemtsova for a discussion of the results. We are also grateful to the researchers who provided us with the experimental data used in the present work." Orig. art. has: 39 figures, 17 formulas, and 1 table.

ASSOCIATION: None

Card 3/4

ACCESSION NR: AT3012741 S/2961/60/000/002/0058/0073

AUTHOR: Dorman, L. I.

TITLE: Change in cosmic ray intensity during the entry of the earth in corpuscular streams carrying homogeneous and inhomogeneous frozen-in magnetic fields

SOURCE: AN SSSR. Mezhduvedomst. komit. po prov. mezhdunarodn. geofizich. goda. 7 razdel program. MGG. Kosmicheskiye luchi. Sb. statey, no. 2, 1960, 58-73

TOPIC TAGS: cosmic rays, cosmic ray intensity, cosmic ray intensity variation, corpuscular stream, solar corpuscular stream, cosmic ray neutron component, cosmic ray meson component, frozen in magnetic field

ABSTRACT: The expected profiles of the intensity variations of the neutron and meson components of cosmic rays are calculated for 40,

Card 1/3

ACCESSION NR: AT3012741

60, 80, 100 and 120 BeV. The calculations are made for front velocities 2, 3.5, 6, 12, and 24 x 10^7 cm/sec. These calculations are an extension of an earlier investigation (L. I. Dorman, Tr. Mezhdunar. konferentsii po kosmicheskim lucham, AN SSSR, 1960, v. 4, p. 113) of the variations of the intensity of cosmic rays due to the scattering of particles by the magnetic fields of streams for different cases of entry of the earth in the stream, where only a homogeneous magnetic field in the plane perpendicular to the field was considered and the only energy value was 100 BeV. The profiles expected for different characters of inhomogeneity of the magnetic field are also calculated. Comparison of these profiles with the experimental data makes it possible to estimate the field distribution in the stream for each individual case. The profiles investigated have the forms of a drooping straight line, a parabola, a triangle and an inverted parabola. The capture of the earth by the leading front of the stream with the field having a higher intensity in the front part is also considered. Comparison of the various

ACCESSION NR: AT3012741

profiles with the experimental data makes it possible to estimate the distribution of the field in the stream for each individual case. Orig. art. has: 30 formulas, 5 tables, and 6 figures.

ASSOCIATION: None

SUBMITTED: 00	DATE ACQ: 22Oct63	ENCL: 00
SUB CODE: PH	NO REF SOV: 002	OTHER: 000

Card 3/3

ACCESSION NR: AT3012744 S/2961/60/000/002/0105/0109

AUTHOR: Dorman, L. I.

TITLE: Cosmic ray anisotropy due to the electric field of a corpuscular stream

SOURCE: AN SSSR. Mezhduvedomst. komit. po prov. mezhdunarodn. geofizich. goda. 7 razdel program, MGG. Kosmicheskiya luchi. Sb. statey, no. 2, 1960, 105-109

TOPIC TAGS: cosmic rays, cosmic ray anisotropy, corpuscular stream, solar corpuscular stream, cosmic ray anisotropy spectrum, cosmic particle momentum, cosmic particle energy

ABSTRACT: The distribution over the earth's sphere is calculated for the spectrum of the expected variations due to the electric field under various assumptions regarding the structure of the regular inhomogeneous magnetic field. The momentum intervals at which

Card 1/2

ACCESSION NR: AT3012744

the particles acquire or lose energy are also calculated, with allowance for the effect of the stream magnetic field on the particle trajectories. The calculations are made for different positions of the earth in the stream and for closed and open particle trajectories. It is planned to take into account the influence of the geomagnetic field and to use the anisotropy spectrum obtained here to determine the expected variations of different secondary components under different registration conditions. Orig. art. has: 1 figure and 15 formulas.

ASSOCIATION: None

SUBMITTED: 00 DATE ACQ: 22Oct63 ENCL: 00

SUB CODE: PH NO REF SOV: 003 OTHER: 003

Card 2/2

ACCESSION NR: AT3012745 S/2961/60/000/002/0110/0130

AUTHOR: Dorman, L. I.

TITLE: Diurnal variations of cosmic rays, due to anisotropic scattering of particles by inhomogeneous magnetic fields of corpuscular streams

SOURCE: AN SSSR. Mezhduvedomst. komit. po prov. mezhdunarodn. geofizich. goda. 7 razdel program. MGG. Kosmicheskiye luchi. Sb. statey, no. 2, 1960, 110-130

TOPIC TAGS: cosmic rays, cosmic ray diurnal variation, corpuscular stream, solar corpuscular stream, corpuscular stream magnetic field, cosmic ray scattering, cosmic ray meson component, cosmic ray neutron component

ABSTRACT: Continuing earlier investigations (Variatsii kosmicheskikh luchey, M.,. Gostekhizdat, 1957; Tr. Mezhdunar. konf. po kos-

Card 1/3

ACCESSION NR: AT3012745

micheskim lucham, AN SSSR, 1960, v. 4, p. 113) the author considers the diurnal variations of cosmic rays resulting from anisotropic scattering of particles by the regular frozen-in homogeneous and inhomogeneous magnetic fields. A general solution is obtained for the case when the field is perpendicular to the stream axis. The energy spectrum of the variations is determined as a function of the local time for different distributions of the magnetic field in the stream, with and without approximate allowance for the influence of the magnetic field on the particle trajectories. The expected variations of the intensities of the neutron and meson cosmic ray components are determined at sea level and at mountain altitudes for stations with different geomagnetic thresholds, for different distributions of the frozen field, and for different positions of the earth in the stream. Numerical calculations are presented for the case of a linear variation of the field from a maximum at the leading edge of the stream to a minimum at the lagging side edge. Comparison with the experimental data yields information on the structure of the mag-

Card 2/3

ACCESSION NR: AT3012745

netic field in the corpuscular streams. The effect of the orientation of the instruments on the measurement results is also discussed. A graph and tables make it possible to find the expected variation of the cosmic-ray intensity and the solar-diurnal variations for each specific magnetic storm under various assumptions. "I take the opportunity to express deep gratitude to laboratory assistant R. T. Gushchina for help with the calculations." Orig. art. has: 5 figures, 29 formulas, and 3 tables.

ASSOCIATION: None

SUBMITTED: 00 DATE ACQ: 22Oct63 ENCL: 00

SUB CODE: PH NO REF SOV: 004 OTHER: 003

Card 3/3

29665
S/169/61/000/005/024/049
A005/A130

3,2410

AUTHOR: Dorman, L.I.

TITLE: A method for determining the temperature of cosmic rays from the altitudes of isobaric surfaces

PERIODICAL: Referativnyy zhurnal, Geofizika, no. 5, 1961, 11, abstract 5 G 94. (Tr. Yakutskogo fil. AN SSSR. Ser. fiz., 1960, no. 3, 55-57)

TEXT: The author examines the possibility of replacing the atmospheric temperature by the altitudes of standard isobaric surfaces in order to calculate the temperature effect of the hard component of cosmic rays. The intensity variation $\delta N/N$ of cosmic rays, which is caused by temperature variations $\delta T(h)$ in the atmosphere at isobaric level h, is determined by means of $\frac{\delta N}{N} = \int_0^{h_0} W_T(h)\ \delta T(h)\ dh$, where $W_T(h)$ is the density of the temperature coefficient and h_0 is the pressure at the observation level. Taking into account that the altitude of an isobaric surface with pressure

Card 1/3

29665
S/169/61/000/005/024/049
A005/A130

A method for determining the temperature of ...

h equals $H = \int_h^{h_0} \frac{dh'}{\rho(h')}$, where $\rho(h')$ is the density of air at the h' level, for the variation of cosmic ray intensity that is caused by atmospheric temperature variation the author derives the expression $\frac{\delta N}{N} = -\int_0^{h_0} \frac{h}{R} W_T(h) \frac{d(\delta H)}{dh} dh$. Having subdivided the entire atmosphere into sufficiently fine layers (about 100 g/cm^2 each), one can determine the density (%/km) of the temperature coefficients which makes it possible to calculate the temperature effect from the variation in altitude δH of the isobaric surfaces. The author gives the values of the coefficients, calculated for the introduction of temperature corrections for the altitudes of the isobaric surfaces, for a shielded ionization chamber (h_o = 1,000 g/cm^2). The author points out that the proposed method of taking into account the temperature effect has several advantages; in particular, it

Card 2/3

29665
S/169/61/000/005/024/049
A005/A130

A method for determining the temperature of ...

enables one to avoid errors associated with radiation heating of the temperature receivers in meteorologic sondes.

N. Kaminer

[Abstractor's note: Complete translation.]

4

Card 3/3

29369
S/169/6[illegible]/000/000/051/039
A005/A130

3.2410

AUTHOR: Dorman, L.I.

TITLE: The nature of soft radiation in the upper atmosphere

PERIODICAL: Referativnyy zhurnal, Geofizika, no. 6, 1961, 11-12, abstract 6G80. (Tr. Mezhdunar. konferentsii po kosmich. lucham, 1959, T. 3. Moscow, AN SSSR, 1960, 87-94)

TEXT: The author studied the nature of the increases in the intensity of the low-energy cosmic radiation ($\lesssim$1 Bev) that is observed in the stratosphere at high geomagnetic latitudes. Analysis of the experimental data leads to the conclusion that three types of increase in intensity exist. The first type is characterized by onset of intensity increase immediately after an intense chromospheric splash. After attaining a maximum, the intensity decreases with time according to the law $t^{-3/2}$ or t^{-2}. The second type is characterized by increase of radiation intensity some hours after a chromospheric splash. To the third type belong those cases when the increase in intensity takes place after the onset of a

Card 1/3

The nature of soft radiation ...

magnetic storm, and the decrease in intensity is characterized by an exponential correlation. To explain the first and second types of increase it is assumed that the pressure of particles accelerated in the splash region is sufficient to throw out a cloud of magnetized plasma from the sun's surface. If the upper energy limit of the accelerated particles is $\gtrsim 10$ Bev, they quickly pass through the sun's atmosphere and reach the earth (type I). Particles of lower energy pass through the sun's atmosphere and corona via a channel formed by ejected plasma and arrive with a delay of about 10^4 sec (type II). Decrease of intensity according to the law $t^{-3/2}$ (or t^{-2}) follows from diffusion theory on considering the scattering of charged low-energy particles by magnetic inhomogeneities in interplanetary space. To explain the sharp increase and subsequent decrease of intensity according to exponential law (type III) it is assumed that at the instant of formation of a corpuscular stream on the sun a magnetic trap is formed in its frontal part which is capable of holding back the captured charged low-energy particles for a long time ($\sim 10^5$ sec). In the absence of marked diffusion of particles in the trap volume the distribution of particles will reflect the time dependence of

The nature of soft radiation ...

the density of particles in the zone of generation, i.e., it will have an exponential character. Incident to encounter of the corpuscular stream with the earth's magnetic field, the trap breaks up and the particles accelerated on the sun penetrate into high latitudes and cause the increase of intensity observed in the stratosphere.

N. Kaminer

[Abstractor's note: Complete translation.]

Card 3/3

S/035/61/000/011/011/028
A001/A101

AUTHOR: Dorman, L.I.

TITLE: On energy spectrum and duration of rising of cosmic ray intensity on the Earth, caused by a shock wave of a corpuscular stream

PERIODICAL: Referativnyy zhurnal. Astronomiya i Geodeziya, no. 11, 1961, 35, abstract 11A282 ("Tr. Yakutskogo fil. AN SSSR, Ser. fiz.", 1960, no. 3, 145 - 147)

TEXT: The author investigates the problem of acceleration of charged particles following a face-on collision with a shock wave front moving in a magnetized plasma. Such a wave may arise in the motion of a solar corpuscular stream carrying a frozen-in magnetic field. The shock wave effect must manifest itself in a noticeable rise of cosmic ray intensity prior to the beginning of the Forbush effect. The amplitudes of rising of the penetrating component ($\sim$ 1%), and neutron one (3-4% at latitude 50°, and 1% on the equator) prior to the beginning to the Forbush effect on August 29, 1957, which were calculated theoretically, do not contradict experimental data.
[Abstracter's note: Complete translation]

L. Dorman

Card 1/1

29673
S/169/61/000/005/038/049
A005/A130

3.2410
3,1860 (1041,1046)

AUTHOR: Dorman, L.I.

TITLE: Determination of the energy spectrum of primary variation in a very small energy range on the basis of a difference in effects in Europe and America

PERIODICAL: Referativnyy zhurnal, Geofizika, no. 5, 1961, 14, abstract 5 G 108. (Tr. Yakutskogo fil. AN SSSR, Ser. fiz., 1960, no. 3, 155-157)

TEXT: The author notes the possibility of determining the energy spectrum of primary variations in the very low energy range by comparison of the intensity variations of cosmic rays at points that have the same geomagnetic latitude but different cosmic ray cutoff energies $\varepsilon_{\lambda}^{min}$. Such a possibility emerges on comparing variations based on observations in Europe and America. If at geomagnetic latitude λ incident to the recording of a component of type i the amplitude of some variation on the h_o level in America equals $\left[\delta N_{\lambda}^{i}(h_o)/N_{\lambda}^{i}(h_o)\right]$ Am,

Card 1/2

29673
S/169/61/000/005/038/049
A005/A130

and at the same latitude in Europe equals $\left[\delta N_\lambda^i (h_o)/N_\lambda^i (h_o)\right]_{Eur}$, then the difference between the amplitudes of these variations will be:

$$\left[\frac{\delta N_\lambda^i (h_o)}{N_\lambda^i (h_o)}\right]_{Am} - \left[\frac{\delta N_\lambda^i (h_o)}{N_\lambda^i (h_o)}\right]_{Eur} - \Delta\varepsilon_\lambda \frac{\delta D}{D} (\bar{\varepsilon}) W_\lambda^i (\bar{\varepsilon}, h_o) \qquad (1)$$

where $\Delta\varepsilon_\lambda = (\varepsilon_\lambda^{min})_{Eur} - (\varepsilon_\lambda^{min})_{Am}$; $(\varepsilon_\lambda^{min})_{Am} < \bar{\varepsilon} < (\varepsilon_\lambda^{min})_{Eur}$ (2)

Since the differential coefficients of the relation $W_\lambda^i (\bar{\varepsilon}, h_o)$ are known, it is easy to determine from Eq. (1) the energy spectrum of the $\delta D/D (\bar{\varepsilon})$ variations of primary cosmic rays. By way of example the author cites the determination of the energy spectrum of $\delta D/D (\varepsilon)$ variation in the $\bar{\varepsilon} \sim 1.5 - 2.0$ Bev energy range for the intensity decrease of cosmic rays during the magnetic storm of August 29, 1957.

N. Kaminer

[Abstractor's note: Complete translation.]

29674
S/169/61/000/005/039/049
A005/A150

3,2410
3,1800 (1041, 1046)

AUTHOR: Dorman, L.I.

TITLE: Determination of the earth's point of impact against a corpuscular stream, the character of the earth's motion within the stream and stream velocity by detailed investigation of variation of cosmic ray intensity during magnetic storms

PERIODICAL: Referativnyy zhurnal, Geofizika, no. 5, 1961, 14, abstract 5 G 109. (Tr. Yakutskogo fil. AN SSSR. Ser. fiz., no. 3, 158-165)

TEXT: The author investigates the assumption that the differences in observed decreases of cosmic ray intensity during magnetic storms are not determined by specific properties of the solar corpuscular streams but by the character of the earth's capture by the stream. Calculations based upon purely geometric considerations show that incident to capture of the earth by the lateral side of a slow corpuscular stream smooth decrease of cosmic ray intensity and similar smooth restoration should be

Card 1/2

Determination of the earth's point of impact ...

observed. This being the case, the amplitude of the effect will be determined by the magnitude of the magnetic field frozen in the stream and the earth's distance from the stream axis. Incident to capture of the earth by the stream front, the character of the variation of cosmic ray intensity is determined by the velocity of the stream and the point of the earth's entry into the stream (distance from the edge or axis of the stream). The calculation results enable one to determine the stream velocity and magnetic field distribution in the stream from the decrease profile of cosmic ray intensity.

N. Kaminer

[Abstractor's note: Complete translation.]

Card 2/2

3,2410

S/035/61/000/009/020/036
A001/A101

AUTHOR: Dorman, L.I.

TITLE: On the nature of changes in intensity of cosmic rays during magnetic storms

PERIODICAL: Referativnyy zhurnal, Astronomiya i Geodeziya, no. 9, 1961, 38, abstract 9A299 ("Tr. Mezhdunar. konferentsii po kosmich. lucham, 1959, v. 4", Moscow, AN SSSR, 1960, 113 - 125)

TEXT: The author considers the effect of magnetic fields of solar corpuscular streams on intensity of cosmic rays and shows that the profile of intensity reduction during magnetic storms is determined first, by the form of Earth capture by corpuscular streams and second, by electromagnetic properties of the streams. Anisotropy of the flux of cosmic rays during motion of the Earth through the stream is estimated. Calculations are performed for both uniform and non-uniform fields frozen-in in the stream. A conclusion is drawn from the comparison with experimental data that the field in the stream is non-uniform, because it is weakened from the advancing side edge to the lagging one and is intensified markedly near the front edge of the stream.
[Abstracter's note: Complete translation] L. Dorman

Card 1/1

VB

3,2430
3,2410

S/035/61/000/009/021/036
A001/A101

AUTHOR: Dorman, L.I.

TITLE: On energy spectrum and duration of increasing on the Earth of cosmic ray intensity, caused by the shock wave and albedo from the forward magnetized front of a corpuscular stream

PERIODICAL: Referativnyy zhurnal. Astronomiya i Geodeziya, no. 9, 1961, 38, abstract 9A300 ("Tr. Mezhdunar. konferentsii po kosmich. lucham, 1959, v. 4", Moscow, AN SSSR, 1960, 132 - 139)

TEXT: The author calculates the energy spectrum of primary variations caused by the shock wave from the forward front of the corpuscular stream. An analogous increase in intensity of cosmic rays must be also observed prior to the beginning of the Forbush-effect as a consequence of reflection of charged particles from the forward front of a magnetized corpuscular stream. This intensity increase may attain several per cent in the neutron and penetrating components on the Earth's surface. There are 8 references.

L. D.

[Abstracter's note: Complete translation]

Card 1/1

28833 S/169/61/000/004/010/026
A005/A130

3.2430 (1482,1559)

AUTHORS: Blokh, Ya.L.; Dorman, L.I.; Kaminer, N.S.

TITLE: Determination of the nature of earth's capture by streams, and the properties of corpuscular streams from cosmic ray variations during sundry magnetic storms

PERIODICAL: Referativnyy zhurnal. Geofizika, no. 4, 1961, 17, abstract 4 G 100. (Tr. Mezhdunar. konferentsii po kosmich. lucham, 1959, v. 4. Moscow, AN SSSR, 1960, 154 - 171)

TEXT: The authors study the variations in intensity of neutron and hard emission components of cosmic rays during magnetic storms for the period 1954 - 1959. The intensity variation profile was determined for each individual instance of Forbush effect and was compared with the theoretical expectancy for different assumptions regarding the velocity of solar corpuscular streams, the nature of earth's capture by streams and the structure of the magnetic field frozen in the stream. The results of analysis are compared with the nature of the geomagnetic disturbances on the earth and the properties of the active area of the sun that corresponds to these disturbances. The authors show that two

Card 1/2

28833 S/169/61/000/004/010/026
A005/A130

Determination of the nature of earth's capture by....

types of stream exist: 1) long-term extensive streams that capture the earth by their lateral face, and 2) narrow short-term streams carrying intense frozen magnetic fields. Often the narrow streams move within the wide streams. The field intensity in the lateral outstripping section of the stream is on an average twice as great as in the lagging section. The density of kinetic energy in the stream decreases markedly for transition to the lagging lateral section of the stream. In the front section of the stream, substantial compression (by a factor of 6 - 10) of plasma and increase of the frozen magnetic field occur.

N.K.

[Abstracter's note: Complete translation.]

Card 2/2

28834 S/169/61/000/004/011/026
A005/A130

3.2430 (1482, 1559)

AUTHORS: Blokh, Ya.L.; Dorman, L.I.; Kaminer, N.S.

TITLE: The effect of cosmic ray intensity increase preceding magnetic storms

PERIODICAL: Referativnyy zhurnal. Geofizika, no. 4, 1961, 17, abstract 4 G 101. (Tr. Mezhdunar. konferentsii po kosmich. lucham, 1959, v. 4. Moscow, AN SSSR, 178 - 191) 1960.

TEXT: The authors study the effect of cosmic ray intensity increase preceding magnetic storms that is due to acceleration of charged particles incident to their collision with the front of the corpuscular stream traveling from the sun. It is shown that this effect occurred prior to the magnetic storms of July 8, 1958, and August 29, 1957. The longitudinal distributions of the magnitude and of the time of onset of the effect are elucidated. The authors study the energy spectrum of the emission responsible for anisotropic increase of intensity. Analysis of the increase in cosmic ray intensity in the stratosphere on July 8, 1958, suggests to the authors that a magnetic trap may exist in the magnetized frontal section of the corpuscular stream. This trap may carry particles with energies of some hundreds of Mev that have been accelerated in the active region

Card 1/2

28834 S/169/61/000/004/011/026
A005/A130

The effect of cosmic ray intensity increase....

of the sun. Incident to collision of the stream with the earth the trap breaks up and the particles arrive in the high-latitude regions of the earth via the lines of force of the magnetic field. It is shown in agreement with theory that incident to capture of the earth by the lateral face of the stream the effect increase of intensity prior to a magnetic storm does not occur. Capture of the earth by the front section of the stream (storms with sudden onset), on the other hand, is always accompanied by the effect. No effects of acceleration of cosmic ray particles by the shock wave generated by the front of the corpuscular stream was detected.

N. Kaminer

[Abstracter's note: Complete translation.]

Card 2/2

S/058/61/000/010/008/100
A001/A101

3.2410

AUTHOR: Dorman, L. I.

TITLE: On the theory of cosmic ray modulation by the solar wind

PERIODICAL: Referativnyy zhurnal. Fizika, no. 10, 1961, 94, abstract 10B480 ("Tr. Mezhdunar. konferentsii po kosmich. lucham, 1959, v. 4", Moscow, AN SSSR, 1960, 328-334)

TEXT: The problem of the nature of 11-year variation in cosmic ray intensity is investigated. Experimental data are compared with effects expected from theories of modulation of the galactic flux of cosmic radiation, advanced by Parker and Singer; it is shown that these theories cannot fully explain variations in the spectrum of cosmic radiation with the solar activity cycle. If the broad spectrum of non-homogeneities of the magnetic field in the interplanetary medium is taken into account, an agreement can be secured between the experimentally observed and theoretically expected energy spectra of 11-year variation of the primary cosmic radiation.

L. Dorman

[Abstracter's note: Complete translation]

Card 1/1

VERNOV, S.N., otv. red.; DORMAN, L.I., kand. fiziko-matem.nauk, otv. red.; PODOL'SKIY, A.D., red. izd-va; GOLUB', S.P., tekhn. red.

[Collection of articles] Sbornik statei. Moskva, Izd-vo Akad. nauk SSSR. No.4. 1961. 258 p. (MIRA 15:6)

1. Akademiya nauk SSSR. Mezhduvedomstvennyy komitet po provedeniyu Mezhdunarodnogo geofizicheskogo goda. VII razdel programmy MGG. Kosmicheskiye luchi. 2. Chlen-korrespondent Akademii nauk SSSR (for Vernov).

(Cosmic rays)

S/058/62/000/010/040/093
A061/A101

AUTHOR: Dorman, L. I.

TITLE: Current concepts on cosmic ray variations

PERIODICAL: Referativnyy zhurnal, Fizika, no. 10, 1962, 61, abstract 10B454 (In collection: "Kosmicheskiye luchi, no. 3", Moscow, AN SSSR, 1961, 5 - 63, summary in English)

TEXT: This is a review of fundamental work done on the subject of time variations of cosmic rays in the Soviet Union and in other countries, particularly during the International Geophysical Year. Discussed are questions of how to improve methods of eliminating extraneous factors from time variation data, and also studies concerning different categories of variations and electromagnetic processes originating in the neighborhood of the Sun, in the interplanetary medium, and in the neighborhood of the Earth. Special attention is devoted to two categories of cosmic ray variations: effects of modulation and effects of solar flares.

[Abstracter's note: Complete translation]

Card 1/1

37294
S/169/62/000/004/069/103
D218/D302

3.2410 (2205, 2705, 2805)

AUTHORS: Glokova, Ye.S., Dorman, L.I., and Kaminer, N.S.

TITLE: On the method of introducing meteorological corrections into the cosmic-ray intensity data

PERIODICAL: Referativnyy zhurnal. Geofizika, no. 4, 1962, 13, abstract 4G68 (V. sb. Kosmicheskiye luchi, no. 3, M., AN SSSR, 1961, 149-162)

TEXT: A method of introducing meteorological corrections to the intensity data for μ-meson and neutron cosmic-ray components is discussed. It is shown that it is sufficient to introduce only the correction for the barometric effect. When the barometric correction is computed, the exponential dependence of the intensity of the neutron component on the atmospheric pressure must be borne in mind. In the presence of large temperature variations, the neutron component may exhibit variations of temperature origin, and in order to take these into account, the theoretical distribution of the temperature coefficients must be employed. A detailed description is given of the method whereby the barometric and temperature effects

Card 1/2

S/169/62/000/004/069/103
D218/D302

On the method of introducing ...

can be taken into account for the hard component. Examples are given of how tables of meteorological corrections, suitable for practical purposes, can be set up. The most accurate methods of extrapolation of aerological data on the temperature of the upper layers of the atmosphere are indicated. [Abstractor's note: Complete translation].

Card 2/2

37286

S/169/62/000/004/071/103
D218/D302

3.2410 (2205, 2705, 2805)

AUTHORS: Blokh, Ya.L., Dorman, L.I., and Dubrovin, M.M.

TITLE: Meteorological effects of cosmic rays under the earth's surface

PERIODICAL: Referativnyy zhurnal. Geofizika, no. 4, 1962, 13, abstract 4G70 (V. sb. Kosmicheskiye luchi, no. 3, M., AN SSSR, 1961, 166-169)

TEXT: A study is reported of meteorological effects in the μ-meson component of cosmic rays, based on underground recordings in Moscow (40 m) and Yakutsk (60 m) in 1957 - 1958. The triple-correlation method was used to determine the partial and total correlation and regression coefficients α and β between the observed cosmic-ray intensity variations, the barometric pressure and the temperature of the atmosphere, (β is the barometric coefficient and α is the temperature coefficient representing atmospheric temperature variations up to heights of 12 - 20 km). Although the values of α and β obtained for separate months exhibit a large spread, their average values are quite reliable and are in good agreement with the theoretical

Card 1/2

Meteorological effects of cosmic ... S/169/62/000/004/071/103
D218/D302

results. For Moscow (40 m) : $\beta = (-0.050 \pm 0.007)$ %/mb and for Yakutsk (60 m): $\beta = (-0.029 \pm 0.006)$ %/mb. Comparison of the values of α shows that the upper layers of the atmosphere play an important role in producing the temperature effect in the hard component. [Abstractor's note: Complete translation].

Card 2/2

3.2410

S/058/62/000/010/045/093
A061/A101

AUTHOR: Dorman, L. I.

TITLE: Calculation of the integrated multiplicity of muon generation in the earth's atmosphere for observations under different absorber thicknesses

PERIODICAL: Referativnyy zhurnal, Fizika, no. 10, 1962, 61 - 62, abstract 10B459 (In collection: "Kosmicheskiye luchi, no. 3,", Moscow, AN SSSR, 1961, 174 - 198, summary in English)

TEXT: The integrated multiplicity of muon generation has been calculated for observations at sea level and at different depths underground, using different model representations of the elementary interaction event of primary particles with atomic nuclei of the air. It is assumed that the first interaction of a primary particle with atomic nuclei of the air takes place at a depth of λ g/cm^2, where λ denotes the interaction range, and the subsequent interactions take place discretely at depths of 2λ, 3λ, etc. The calculation of ionization losses and muonic decay is of essential importance in this connection. The fluctuations in the depths of the first and following collisions, the spectrum of pion

Card 1/2

generation, their capture and decay into muons are more accurately taken into consideration. Once the integrated multiplicity has been found for different versions and different cases of observation, it is possible to determine the differential muon spectrum at sea level and at different levels underground, as well as the intensity curve with depth. A comparison with observational results permits an estimate of the extent to which a choice of one or other value is essential for parameters determining the elementary interaction event of primary particles with atomic nuclei of the air. Detailed numerical calculations are performed for the cases where 20, 40, and 50% of the incident nucleon energy is transferred to the muons. The muon spectrum found theoretically at sea level and the curve of the intensity change with depth are compared with experimental data. The poor response of measurement results to the choice of elementary interaction parameters within a wide range of the latter is noted. The muon intensity is calculated as a function of the geomagnetic threshold for different absorber thicknesses. The expected changes of spectrum and muon intensity with a change of solar activity (in connection with changes in the energy spectrum of primary particles) are also calculated.

[Abstracter's note: Complete translation]

Card 2/2

S/058/62/000/010/039/093
A061/A101

3.2410

AUTHOR: Dorman, L. I.

TITLE: On the interrelation factors between primary and secondary variations of cosmic rays in the high-energy range

PERIODICAL: Referativnyy zhurnal, Fizika, no. 10, 1962, 61, abstract 10B453 (In collection: "Kosmicheskiye luchi, no. 3, Moscow, AN SSSR, 1961, 199 - 204, summary in English)

TEXT: Using the integral multiplicity functions of muon generation for different absorber thicknesses, that have been calculated in a preceding paper (abstract 10B459), the author determines the interrelation factor for the conversion from secondary variations of muon intensity at sea level and at different depths underground to primary variations of cosmic rays at the boundary of the atmosphere.

[Abstracter's note: Complete translation]

Card 1/1

3,2410

S/169/62/000/008/068/090
E032/E114

AUTHOR: Dorman, L.I.

TITLE: Variation in the coefficients of coupling between primary and secondary variations of cosmic rays with changes in solar activity. Some practical problems in the determination of the spectrum of the variations.

PERIODICAL: Referativnyy zhurnal, Geofizika, no.8, 1962, 11, abstract 8 G 81. (In the Symposium: 'Kosmicheskiye luchi, no.3' ('Cosmic Rays. no.3'), M., AN SSSR, 1961, 205-210. (abstract in English)).

TEXT: Data on changes in the energy spectrum of primary cosmic rays with the solar activity cycle are used to calculate changes in the coefficients of coupling between components sensitive to variations in the low-energy part of the spectrum of the primary radiation. The coupling coefficients are computed for epochs corresponding to the solar activity maximum and minimum and may be used in the recording of cosmic rays from

Card 1/2

Variation in the coefficients of ... S/169/62/000/008/068/090
E032/E114

rockets and satellites, and also in the recording of the neutron and μ-meson components at the earth's surface and in the atmosphere. A brief description is given of the methods used to determine the energy spectrum of the variations in the intensity of the primary radiation. The effect of the position of the cut-off due to geomagnetic disturbances on the results of determinations of the energy spectrum of variations in the primary radiation is estimated.

[Abstractor's note: Complete translation.]

Card 2/2

37288

S/169/62/000/004/073/103
D218/D302

3,2410 (2205, 2705, 2805)

AUTHOR: Dorman, L.I.

TITLE: On the nature of the lunar diurnal variation in cosmic rays

PERIODICAL: Referativnyy zhurnal, Geofizika, no. 4, 1962, 14, abstract 4G72 (V. sb. Kosmicheskiye luchi, no. 3, M., AN SSSR, 1961, 253-255)

TEXT: It is shown that the observed lunar diurnal variations in the cosmic-ray intensity may be associated with the amplitude and phase modulation of the solar-diurnal variation by the 27-day wave. 27-day variations in the solar-diurnal effect should lead to the appearance of two waves with periods of 23.2 and 24.9 hours in addition to the wave with a period of 24 hours. One of the harmonics (24.9 hours) does in fact have a period close to the period of the lunar-diurnal variation. When it will be found experimentally that both harmonics are present, this will indicate that the lunar-diurnal wave is spurious. If, on the other hand, the experimental data confirm the presence of the harmonic with a period of 23.2 hours,

Card 1/2

S/169/62/000/004/073/103
On the nature of the lunar diurnal ... D218/D302

then the lunar-diurnal wave will be expected to be real. [Abstractor's note: Complete translation].

Card 2/2

37259
S/169/62/000/004/074/103
D218/D302

3.9120
3.2410 (2205, 2705, 2805)

AUTHORS: Dorman L.I., Blokh, Ya.L., and Kaminer, N.S.

TITLE: The character of the increase in the cosmic-ray intensity at the Forbush-effect minimum

PERIODICAL: Referativnyy zhurnal. Geofizika, no. 4, 1962, 14, abstract 4G73 (V. sb. Kosmicheskiye luchi, no. 4, M., AN SSSR, 1961, 5-15)

TEXT: The method of coupling coefficients is used to investigate the increase in cosmic-ray intensity during the principal phase of geomagnetic storms which is due to a reduction in the H-component of the magnetic field, and the compression of the volume of the geomagnetic field by a corpuscular stream. A theoretical calculation is given of the effects expected in the various secondary components of cosmic rays at sea level and in the mountains. The results of these calculations are compared with experimental data obtained by the world station network during the magnetic storms of September 13, 1957 and February 11, 1958. It follows from the analysis of these two cases that the observed increase in the cosmic-ray intens-

Card 1/2

The character of the increase in the ...

ity is in fact associated with a reduction in the geomagnetic cut-off threshold during the principal phase of a magnetic storm. It is noted that in the case of the hard component the effect is only partly due to the change in the geomagnetic threshold. A part of the effect is due to a disturbed solar-diurnal variation. It was found that there is not only a latitude, but also a longitude dependence of the amplitude of the increase, and hence it follows that the cavity which appears as a result of the flow of the corpuscular stream round the geomagnetic field is not axially symmetric in form. It is concluded that geomagnetic storms with sudden commencement are produced as a result of the capture of the earth by the leading front of a solar corpuscular stream which flows round the geomagnetic field with ultrasonic velocity. [Abstractor's note: Complete translation].

Card 2/2

3727

3.2410 (2205, 2705, 2805)
3.9120

S/169/62/000/004/076/103
D218/D302

AUTHORS: Blokh, Ya.L., Kaminer, N.S., and Dorman, L.I.

TITLE: Cosmic-ray effects preceding a magnetic storm

PERIODICAL: Referativnyy zhurnal. Geofizika, no. 4, 1962, 14, abstract 4G75 (V sb. Kosmicheskiye luchi, no. 4, M., AN SSSR, 1961, 25-30)

TEXT: Discusses the interaction of the magnetized front of a corpuscular stream with cosmic rays which may give rise to the appearance of certain effects just before the onset of a magnetic storm. A corpuscular stream produces a shock wave in the interplanetary space, and the magnetic field of this wave interacts with cosmic-ray particles. Reflection of the particles from the wave front gives rise to their acceleration, and therefore the intensity of the radiation should increase before a magnetic storm. The expected spectrum of this variation is relatively soft. After the earth has entered the disturbed medium behind the shock wave front, where the magnetized interplanetary plasma is compressed and the field is correspondingly enhanced, the cosmic-ray intensity should decrease.
Card (1/2)

Cosmic-ray effects preceding a ...

This effect is anisotropic and the character of the anisotropy depends on the direction of the interplanetary magnetic field. Reflection of cosmic-ray particles directly from the magnetized front of the moving corpuscular stream should lead to an anisotropic increase in the intensity, a few hours prior to the beginning of the geomagnetic storm. This type of increase in the intensity has in fact been observed before a number of geomagnetic storms accompanied by large Forbush effects. [Abstractor's note: Complete translation].

Card 2/2

37280
S/169/62/000/004/065/103
D228/D302

3,2430

AUTHORS: Kaminer, N.S., Blokh, Ya.L., and Dorman, L.I.

TITLE: The emission duration and the angular width of solar corpuscular flows

PERIODICAL: Referativnyy zhurnal, Geofizika, no. 4, 1962, 10, abstract 4G53 (V sb. Kosmich. luchi, no. 4, M., AN SSSR, 1961, 31 - 34)

TEXT: The width of solar corpuscular flows is determined from the profile of Forbush-effects in cosmic rays; this is then compared with the angular width (the longitudinal extent) of the active regions on the sun that have caused the generation of these corpuscular flows. A positive correlation with a correlation coefficient of ~ 0.9 and a regression coefficient of ~ 1 was discovered between these two parameters. The estimation of the angular flow width according to geomagnetic disturbances gives a considerably smaller angular width. The possible causes of the divergences in the estimation of the flow width by these two methods are briefly discussed. A number of arguments are cited in favor of the fact that geoeffecti-

Card 1/2

S/169/62/000/004/065/103
D228/D302

The emission duration and the ...

ve corpuscular flows are continuously emitted by active regions during long intervals of time (several revolutions of the sun). At the same time it is possible that plasma clouds are ejected from an active region when the emission of a corpuscular flow has yet to be completed. [Abstractor's note: Complete translation].

Card 2/2

37293
S/169/62/000/004/078/103
D218/D302

3.24/0 (2205, 2705, 2805)

AUTHORS: Dorman, L.I., Kaminer, N.S., and Blokh, Ya.L.

TITLE: On the nature of the preliminary reduction in the cosmic-ray intensity before a magnetic storm

PERIODICAL: Referativnyy zhurnal. Geofizika, no. 4, 1962, 14-15, abstract 4G77 (V sb. Kosmicheskiye luchi, no. 4, M., AN SSSR, 1961, 49-58)

TEXT: A discussion is given of the nature of the preliminary reduction in the cosmic-ray intensity which is observed before the onset of many magnetic storms accompanied by the Forbush effect. The motion of a corpuscular stream with a velocity of $\sim 10^8$ cm/sec through interplanetary medium containing a weak magnetic field, should lead to the appearance of a shock wave moving towards the earth with a velocity equal to 4/3 of the velocity of the stream. The magnetic field of the medium behind the shock wave front is enhanced. Hence, the arrival of the shock wave at the earth should be accompanied by a reduction in the cosmic-ray intensity. If the interplanetary magnetic field is regular, and is directed at right

Card 1/2

angles to the plane of the ecliptic in the same sense as the earth's field, then the maximum reduction in the intensity should be observed for particle streams arriving from the West relative to the sun -earth line. In order to confirm these conclusions on the basis of the world station network data, an analysis was carried out of the cosmic-ray intensity variations during periods preceding major geomagnetic disturbances and Forbush effects. A study of the longitude and latitude dependence of the preliminary reduction in the intensity shows that the effect is particularly appreciable for those groups of stations for which the particles arrive preferentially from the direction of the sun, or from a direction west of the earth-sun line. The spectrum of the preliminary reduction effect is close to the Forbush decrease spectrum, although it is slightly softer than the latter. [Abstractor's note: Complete translation].

Card 2/2

S/159/62/000/005/071/093
D223/D307

AUTHORS: Kaminer, N. S., Dorman, L. I. and Blokh, Ya. L.

TITLE: The magnetic storm in mid-May 1959 and cosmic ray variations

PERIODICAL: Referativnyy zhurnal, Geofizika, no. 5, 1962, 10, abstract 5G83 (V sb. Kosmich. luchi, no. 4, M., AN SSSR, 1961, 59-83)

TEXT: The intricate complex of phenomena, observed in cosmic rays in connection with the solar chromospheric flare of 10/V/1959, is being studied from the data of the world station network. These phenomena include: the large increase in the intensity of soft cosmic rays of a solar origin in the stratosphere in high latitudes, the Forbush-effect, the intensity increase before the beginning of the geomagnetic storm, etc. A marked increase in the intensity of cosmic rays was noted for several days before the start of the Forbush-effect. The peculiarities of this phenomenon compel one to assume that it is due to the arrival of an additio-

Card 1/3

nal radiation flow, generated on the sun and coming towards the earth as a result of diffusion in magnetic irregularities with a field intensity of $\sim 3 \times 10^{-4} - 10^{-3}$ gauss. The beginning of the Forbush effect of May 11 occurred simultaneously throughout the world. In the first place the reduction's effect started at stations where particles, coming from westwards directions in relation to the line sun-earth, were recorded. At these stations the reduction's effects began three hours before the outbreak of the geomagnetic storm. For particles arriving from eastwards directions in relation to the line sun-earth, the effect commenced 2 - 3 hours after the beginning of the storm. The epigenetic spectrum of the primary radiation's variation during the Forbush effect was determined. This spectrum agrees with the supposition that cosmic rays are scattered by the regular magnetic field frozen into the flow. The parameters of the corpuscular flow and of the magnetic field frozen into it were ascertained from the profile of the Forbush effect. The flow's width amounts to 5×10^{13} cm, the mean intensity of the field in it being $\sim 6 \times 10^{-6}$ gauss.

Card 2/3

S/169/62/000/005/071/093
D228/D307

The nature of the increase in the intensity in the minimum of the Forbush effect, observed on May 12-14, is discussed. It is shown that only a small part of the effect of the intensity's increase is explained by the change in the geomagnetic trimming threshold; the main cause of this phenomenon may be the anisotropic screening of the earth by the corpuscular flow. [Abstracter's note: Complete translation.]

Card 3/3

37294

S/169/62/000/004/079/103
D218/D302

3.2400 (2205, 2705, 2805)

AUTHORS: Blokh, Ya.L., Dorman, L.I., and Kaminer, N.S.

TITLE: On the superposition of Forbush effects in July 1959

PERIODICAL: Referativnyy zhurnal. Geofizika, no. 4, 1962, 15, abstract 4G78 (V sb. Kosmicheskiye luchi, no. 4, M., AN SSSR, 1961, 84-95)

TEXT: A detailed study is reported of the character of the superposition of Forbush effects in July 1959. Analysis of world station network data showed that the observed phenomena may be explained by assuming that the modulation of cosmic rays is due to regular magnetic fields frozen into corpuscular streams. The second and third Forbush decreases occurred as a result of the simultaneous capture of the earth by two or even three corpuscular streams. The properties of these streams, their dimensions and the intensity of the frozen-in magnetic fields are determined. The energy spectrum of the increase in the cosmic-ray intensity observed on July 17 is determined. Analysis of this effect is used to estimate the intensity of the magnetic field of the stream which is found to be in good

Card 1/2

On the superposition of Forbush ... S/169/62/000/004/079/103
D218/D302

agreement with the value obtained from an analysis of the profile of the Forbush effect. [Abstractor's note: Complete translation].

Card 2/2

37295

3,2410 (2205, 2705, 2805)

S/169/62/000/004/080/103
D218/D302

AUTHOR: Dorman, L.I.

TITLE: On the effect of a solar corpuscular stream in the form of a magnetized shell on cosmic rays

PERIODICAL: Referativnyy zhurnal. Geofizika, no. 4, 1962, 15, abstract 4G79 (V sb. Kosmicheskiye luchi, no. 4, M., AN SSSR, 1961, 96-121)

TEXT: A study is reported of the modulation of the intensity of the galactic stream of cosmic rays by a solar corpuscular stream in the form of a thin-walled magnetized shell ('magnetic sack'). The importance of the following factors is estimated: Absorption of cosmic-ray particles by the sun, change in the intensity as a result of the expansion of the shell, exchange of particles through the surface of the shell leading to equalization in the particle density, change in the reflecting properties of the shell on expansion. The solution of a differential equation for the particle balance, which simultaneously takes into account these factors, was

Card 1/2

On the effect of a solar ...

used to determine the energy spectrum of the variations for a shell in the form of a sphere and a spherical sector. In addition, the general solution is obtained for a shell of arbitrary form and an incompletely closed shell. Numerical results are given for different values of the velocity and dimensions of the shell, and various assumptions regarding its properties. The calculations were carried out both for relativistic and non-relativistic cases. [Abstractor's note: Complete translation].

Card 2/2

37296
S/169/62/000/004/081/103
D218/D302

3.2410 (2205, 2705, 2805)

AUTHOR: Dorman, L.I.

TITLE: The earth as an absorber of cosmic rays and its role in producing Forbush-type effects, and 27-day and 11-year variations

PERIODICAL: Referativnyy zhurnal. Geofizika, no. 3, 1962, 15, abstract 4G80 (V sb. Kosmicheskiye luchi, no. 4, M., AN SSSR, 1961, 122-127)

TEXT: A theoretical discussion is given of the effect of a local absorber on the particle density in a scattering medium. It follows from the calculations that if the earth is surrounded by a scattering medium consisting of magnetic irregularities, then the cosmic-ray intensity near the earth should be reduced. This reduction depends on the properties of the medium. In particular, during magnetic storms and also during changes in the level of solar activity, the scattering properties of the interplanetary medium near the earth should change considerably and this should lead to changes in the cosmic-ray intensity at the earth. The dependence of the ampli-

Card 1/2

The earth as an absorber of ...

tude of the expected effect on the mean free path for scattering and the intensity distribution near the absorbing body are determined. Special cases of the capture of the earth by clouds of plasma with finite and infinite dimensions and transparent (with respect to particle exchange), semi-transparent and opaque boundaries are discussed. [Abstractor's note: Complete translation].

Card 2/2

37297
S/169/62/000/004/082/103
D218/D302

3.2410 (2205, 2705, 2805)

AUTHOR: Dorman, L.I.

TITLE: Cosmic-ray variations due to an expanding turbulent magnetized cloud

PERIODICAL: Referativnyy zhurnal. Geofizika, no. 4, 1962, 15, abstract 4G81 (V sb. Kosmicheskiya luchi, no. 4, M., AN SSSR, 1961, 128-131)

TEXT: Cosmic-ray intensity changes at the earth due to the capture of the earth by an expanding turbulent magnetized plasma cloud arriving from the direction of the sun are discussed. The problem is solved for the stationary spherically symmetric case on the assumption that the range to a scattering event depends on the distance to the center of a cloud. The expected reduction in the cosmic-ray intensity at the earth's orbit is found for a cloud velocity of $u = 3 \times 10^7$ cm/sec and particle velocities of $v = 10^{10}$ cm/sec and $v = 3 \times 10^{10}$ cm/sec. A considerable reduction in the intensity is to be expected for relatively small values of the mean free path for scattering ($\lambda \sim 10^{11}$ cm), i.e. for low-energy particles. Moreover, the

Card 1/2

S/169/62/000/004/082/103
D218/D302

Cosmic-ray variations due to an ...

deceleration of field irregularities by the interplanetary medium is taken into account in the stationary case. Here also, appreciable changes in the intensity are only possible for values of which are much smaller than 10^{13} cm. Hence the magnetic fields which are necessary at the earth's orbit to give rise to effective scattering of particles with $\varepsilon \sim 10^{10}$ eV are $H \gtrsim 3 \times 10^{-6}$ gauss. [Abstractor's note: Complete translation].

Card 2/2

37258

3,2410 (2205, 2805)
3,1800

S/169/62/000/004/083/103
D218/D302

AUTHORS: Kaminer, N.S., Blokh, Ya.L., and Dorman, L.I.

TITLE: The cosmic-ray flare of May 4, 1960

PERIODICAL: Referativnyy zhurnal. Geofizika, no. 4, 1962, 15, abstract 4G82 (V sb. Kosmicheskiye luchi, no. 4, M., AN SSSR, 1961, 146-167)

TEXT: The world station network data are used to investigate the increase in the cosmic-ray intensity on May 4, 1960. A chromospheric flare of importance 3 was observed on the western limb of the sun at 10 hr. 5 min. It was accompanied by a series of radio bursts on 92.209 and 600 Mc/sec. By acting on the ionosphere, the ultraviolet emission from the flare gave rise to a reduction in the critical frequency of the F2 layer and the appearance of a bay-like disturbance in the H-component of the geomagnetic field. After 15 to 20 minutes, there was a rapid increase in the cosmic-ray intensity. It follows from the analysis of the data that in the initial stage of the increase in the intensity, the additional radiation was anisotropic. The method of coupling coefficients is used to calculate

Card 1/2

The cosmic-ray flare of ...

the distribution of intensity over the earth's surface. The real spectrum of the additional radiation and the finite extent of its source are taken into account. Comparison with experimental data shows that on the first approximation the intensity distribution corresponds to the position of the shock zones. However, better agreement between experimental and theoretical results is obtained if it is assumed that the shock zones are considerably wider, or that they are displaced by 30 to 40° to the East. The possible reasons for this displacement are discussed. The energy spectrum of the emission of the flare and the time variation in the intensity are determined. The dimensions and the intensity of the magnetic field of scattering irregularities in the interplanetary medium are estimated. 32 references. [Abstractor's note: Complete translation].

Card 2/2

37299
S/169/62/000/004/084/103
D218/D302

3.2430

AUTHOR: Dorman, L.I.

TITLE: Cosmic-ray flares in connection with the properties of corpuscular streams and electromagnetic conditions in the interplanetary medium and the earth's neighborhood

PERIODICAL: Referativnyy zhurnal. Geofizika, no. 4, 1962, 15-16, abstract 4G83 (V sb. Kosmicheskiye luchi, no. 4, M., AN SSSR, 1961, 168-172)

TEXT: The main energy and time characteristics of cosmic-ray flares are briefly discussed in connection with the electromagnetic properties of corpuscular streams and the interplanetary medium. IX Possible mechanisms of generation of fast particles in solar chromospheric flares, the character of propagation of these particles in the solar super-corona, and the possible paths of their transport to the earth (magnetic traps of corpuscular streams, diffusion in interplanetary magnetic fields) are discussed. [Abstractor's note: Complete translation].

Card 1/1

S/169/62/000/005/073/093
D228/D307

3.2410

AUTHORS: Dorman, L. I. and Shatashvili, L. Kh.

TITLE: Investigation of the 27-day cosmic ray variations from the data of the world network of IGY stations for the period July-December 1957

PERIODICAL: Referativnyy zhurnal, Geofizika, no. 5, 1962, 11, abstract 5G85 (V sb. Kosmich. luchi, no. 4, M., AN SSSR, 1961, 179-201)

TEXT: The properties of the 27-day variation in the cosmic ray intensity are investigated, as are the changes in the solar and the geomagnetic activity in the period of the solar activity maximum (July-December 1957). It is shown that the tendency to a 27-day recurrence during the period under consideration is better displayed in cosmic rays than in the solar and the geomagnetic activity. Magnetic storms, which are accompanied by Forbush-effects in the cosmic rays, are observed near the minimum of the 27-day wave. In all phenomena the 27-day repetition is best displayed if days with

Card 1/2

Investigation of the ...

extreme values of the intensity of the neutron cosmic-ray component are chosen as the zero days (when using the epochal imposition method). The epigenetic spectrum of the 27-day variation is determined from the latitudinal change in the effect's amplitude by means of the coupling factor method. The epigenetic spectrum falls as the particle energy increases and agrees with the results of measurements of the total component in the stratosphere and of the hard component underground. It is concluded that in this period the 27-day variation in the intensity was related to the stable region of active longitudes on the sun. [Abstracter's note: Complete translation.]

Card 2/2

37300

S/169/62/000/004/085/103
D218/D302

3,2410 (2205, 2705, 2805)

AUTHOR: Dorman, L.I.

TITLE: On cosmic-ray variations due to asymmetric solar wind

PERIODICAL: Referativnyy zhurnal. Geofizika, no. 4, 1962, 16, abstract 4G84 (V sb. Kosmicheskiye luchi, no. 4, M., AN SSSR, 1961, 204-208)

TEXT: Assuming that the radial flow of magnetic field irregularities from the sun may be spherically asymmetric, a calculation is made of the cosmic-ray intensity variations associated with an asymmetric transport and diffusion of particles. An approximate solution is found for the equation of diffusion with transport for the case where the asymmetric field may be represented in the form of a spherical sector whose leading front moves with a constant velocity. This asymmetric field is characterized by a diffusion coefficient which may be very different from the diffusion coefficient in a spherical region in which the magnetic irregularities move with the same velocity. Cosmic-ray intensity variations in space and time are calculated inside this region. [Abstractor's note: Complete Translation.

Card 1/2

37302
S/169/62/000/004/086/103
D218/D302

3.2410 (2205, 2705, 2805)

AUTHORS: Dorman, I.L., and Inozemtseva, O.I.

TITLE: Experiments with crossed telescopes and the nature of the solar-diurnal variation in cosmic rays during the maximum and minimum of solar activity

PERIODICAL: Referativnyy zhurnal. Geofizika, no. 4, 1962, 16, abstract 4G85 (V sb. Kosmicheskiye luchi, no. 4, M., AN SSSR, 1961, 209-224)

TEXT: A study is reported of the solar-diurnal cosmic-ray intensity variations on the basis of data obtained with crossed counter telescopes. It is shown that the introduction of temperature corrections into the data recorded during minimum solar activity considerably modifies the observational results. If during the period of a solar-activity maximum, the phase of the diurnal variation from the 'East' leads the phase from the 'West', and the phase from the 'North' leads the phase from the 'South', then during the years of minimum activity the opposite situation occurs, namely, the phase from the 'South' leads the phase from the 'North', and the phase

Card 1/3

from the 'West' leads the phase from the 'East'. The results obtained are used to determine the properties of the sources of the diurnal variation at the minimum of solar activity. The method of coupling coefficients is used to find the sensitivity of crossed telescopes for primary particles of various energies. Next, corrections are introduced for the deflection of primary particles with energies between 7 and 200 BeV in the earth's magnetic field for various directions of arrival of the particles. This enabled the authors to discover two sources of diurnal variation during the period of minimum solar activity. The first source is responsible for the modulation of the particles arriving only from directions close to the plane of the ecliptic; it is capable of explaining completely the diurnal variation from the western and northern directions. The diurnal variation from the western and northern directions is partly due to the first source and partly to the second. In contrast to the first source, the second is a high-latitude source and provides a good explanation of the experimental data if it is assumed that cosmic rays with energies in excess of 50 - 100 BeV are associated with it. The low-latitude source is located to the left of the sun-earth line and is apparently connected with corpuscular streams.
Card 2/3

Experiments with crossed telescopes ...

The second source lies to the right of the sun-earth line and is associated with the preferential arrival of particles of galactic origin from the center of the Galaxy. The strength of this source should be variable and should depend on the degree to which the interplanetary space is filled with magnetized turbulent elements, i. e. it should depend on the level of solar activity. [Abstractor's note: Complete translation].

X

Card 3/3

3730
S/169/62/000/004/089/103
D218/D302

3,2410 (2205, 2705, 2805)

AUTHORS: Dorman, L.I., and Inozemtseva, O.I.

TITLE: On the nature of the diurnal variations of cosmic radiation arriving at the earth from various directions which are disturbed during magnetic storms

PERIODICAL: Referativnyy zhurnal. Geofizika, no. 4, 1962, 16, abstract 4G88 (V sb. Kosmicheskiye luchi, no. 4, M., AN SSSR, 1961, 237-250)

TEXT: Using the directional properties of crossed counter telescopes, and data on charged-particle trajectories in a geomagnetic field, a study is made of the disturbed solar-diurnal variation in the cosmic-ray intensity. Use is made of continuous measurements of the hard component at sea level (south-north) and at depths of 7, 20 and 60 m below ground (south-north) and also neutron-component measurements. The method of coupling coefficients is used to determine the diurnal variation in the intensity, depending on the direction of arrival of the particles before the onset of geomagnetic storms accompanied by the Forbush effect, during the period of the

Card 1/2

On the nature of the diurnal ...

principal phase of these storms, and also during the recovery in the intensity following the Forbush effect minimum. It is shown that in order to explain the observed properties of the solar-diurnal variation it is necessary to take into account the effect on the cosmic rays of not only solar corpuscular streams but also processes in the immediate neighborhood of the earth. In particular, analysis of the data shows that during geomagnetic disturbances the magnetic field at large distances from the earth's surface is not spherically symmetric. [Abstractor's note: Complete translation].

Card 2/2

37305
S/169/62/000/004/090/103
D218/D302

3.2410 (2205, 2705, 2805)

AUTHOR: Dorman, L.I.

TITLE: On the nature of the source of the diurnal variation in cosmic rays with the direction of the sun

PERIODICAL: Referativnyy zhurnal. Geofizika, no. 4, 1962, 16, abstract 4G89 (V sb. Kosmicheskiye luchi, no. 4, M., AN SSSR, 1961, 251-252)

TEXT: It is shown that independently of the structure of the magnetic field frozen into a corpuscular stream, cosmic-ray particles entering the stream will drift with the velocity of its plasma in a radial direction relative to the sun. As a result, a cosmic-ray anisotropy will be observed at the earth. When the corpuscular stream velocity is $\sim 10^8$ cm/sec, the amplitude of the diurnal variation for low-energy particles is a few tenths of a percent. For particles with an energy ~ 3 BeV, the amplitude will be about 0.03 %. Moreover, as a result of drift, there is a change in the particle energy and this enhances their anisotropy still further. [Abstractor's note: Complete translation].

Card 1/1

L 19443-63 EWT(1)/EWT(m)/FCC(w)/BDS/ES(v)/EED-2 AMD/AFFTC/ASD/
AFMDC/ESD-3/APGC Pi-4/Po-4/Pq-4/Pe-4 AR/GW/K
ACCESSION NR: AT3007837 S/2961/61/000/004/0253/0255

AUTHOR: Dorman, L. I.

TITLE: Character of lunar diurnal variations of cosmic rays

SOURCE: AN SSSR. Mezhduvedomstv. geofizich. komitet. VII razdel programmy* MGG: Kosmicheskiye luchi. Sbornik statey, no. 4, 1961, 253-255

TOPIC TAGS: cosmic ray, lunar culmination, lunar shadow, pseudo-lunar diurnal variation, amplitudinal modulation, phase modulation, interplanetary plasma, tidal wave, magnetic force line, geomagnetic threshold

ABSTRACT: The existence of a period of lunar variations of cosmic rays, coinciding with the period of lunar diurnal culminations, is difficult to prove experimentally, as the lunar shadow is too narrow to permit detection of its influence. Two possibilities for pseudolunar diurnal variations of cosmic rays arise. The first is related to the amplitude modulation of solar diurnal variations in the 27-day period. Mathematical analysis of

Card 1/2

L 19443-63
ACCESSION NR: AT3007837

amplitudinal modulation yields two periods, 23.2 hr and 24.9 hr, the latter coinciding with the lunar 24-hr period. The second possibility is related to phase modulation. Mathematical analysis in this case yields two periods identical to those determined in the first case. Experimental proof of the existence of the 23.2-hr period would establish the falsity of lunar diurnal variations. If experimental investigations do not indicate the existence of such a period, the reality of lunar diurnal variations would be established. Such variations can be explained as the result of a tidal wave in interplanetary plasma with frozen magnetic force lines. Such a wave causes periodic changes in the geomagnetic threshold which act on earth as the lunar diurnal variations. Orig. art. has: 6 formulas.

ASSOCIATION: none

SUBMITTED: 00 DATE ACQ: 22Oct63 ENCL: 00

SUB CODE: AS NO REF SOV: 002 OTHER: 001

Card 2/2

DORMAN, L.I.

Cosmic rays and geomagnetism; a survey. Geomag. i aer. 1 no.3:293-313 My-Je '61. (MIRA 14:9)

1. Magnitnaya laboratoriya AN SSSR.
(Cosmic rays) (Magnetism, Terrestrial)

DORMAN, L.I.; KOLOMEYETS, Ye.V.; SERGEYEVA, G.A.

Investigating variations in the intensity of cosmic rays and properties of the corpuscular stream during the magnetic storm of July 1958. Geomag. i aer. 1 no.3:326-332 My-Je '61. (MIRA 14:9)

1. Magnitnaya laboratoriya AN SSSR i Kazakhskiy gosudarstvennyy universitet imeni S.M. Kirova.
(Cosmic rays) (Magnetic storms)

DORMAN, L.I.; KUZ'MIN, A.I.; SKRIPIN, G.V.

Sounding electromagnetic conditions in the interplanetary space and in the vicinity of the earth by high-energy cosmic rays. Geomag. i aer. 1 no.3:333-345 My-Je '61. (MIRA 14:9)

1. Magnitnaya laboratoriya AN SSSR i Laboratoriya fizicheskikh problem Yakutskogo filiala Sibirskogo otdeleniya AN SSSR.
(Cosmic rays)

DORMAN, L.I.; KOLOMEYETS, Ye.V.

Individual small neutron intensity flares of cosmic rays according to the data of the world station network. Geomag. i aer. 1 no.4: 500-506 Jl-Ag '61. (MIRA 14:12)

1. Magnitnaya laboratoriya AN SSSR i Kazakhskiy gosudarstvennyy universitet imeni Kirova.

(Cosmic rays)

31802
S/203/61/001/005/005/028
A006/A101

3.2410(2205, 2705, 2805)

AUTHORS: Dorman, L.I., Kolomeyets, Ye.V.

TITLE: Statistical analysis of "small" bursts of cosmic radiation during quiet days of the period of maximum solar activity

PERIODICAL: Geomagnetizm i aeronomiya, v. 1, no. 5, 1961, 652 - 657

TEXT: Although a number of studies has been devoted to large and small bursts of cosmic radiation, two main problems have as yet not been solved, namely: 1) whether all chromospheric flares produce increased intensity of cosmic radiation incident on the Earth, 2) whether there is an effect of small bursts in cosmic radiation during the period of maximum solar activity. The authors studied the dependence of the effect of increased cosmic radiation intensity on the index of chromospheric flare using data from observations of the neutron component during the IGY at 6 stations, located on geomagnetic latitudes 48 - 88°C (Climax, Upsala, Churchill, Mauson, Resolute-Bay and Thule). Three groups of solar flares were determined from July 1957 to January 1959, namely I. flares of 3 and 3+ intensity (40); II. flares of 2 and 2+ intensity (225); III. flares of 1 and 1+ intensity (186). The effects were found for each group. It was stated that during

Card 1/2

Statistical analysis ...

the maximum of solar activity, in spite of the presence of magnetic clouds in interplanetary space, solar cosmic radiation reaches the Earth within several hours; solar flares of intensity number 2, 2+, 3 and 3+ produce, on the average, the same stream of high-energy particles and substantially different low-energy streams. The dependence of the effect on the location of stations was investigated (within and without the zones of incidence). No substantial dependence was revealed during the maximum of solar activity, contrary to the minimum. This indicates a diffusional nature of distribution of solar particles during the period investigated. There are 4 figures, 1 table and 18 references: 9 Soviet-bloc and 9 non-Soviet-bloc.

ASSOCIATION: Magnitnaya laboratoriya AN SSSR (Magnetic Laboratory of AS USSR)
Kazakhskiy gosudarstvennyy universitet imeni S.M. Kirova (Kazakh State University imeni S.M. Kirov)

SUBMITTED: July 4, 1961

Card 2/2

3,2410 (1559, 2205, 2705)

31804 S/203/61/001/005/007/028
A006/A101

AUTHORS: Dorman, L.I., Shatashvili, L.Kh.

TITLE: Lunar-diurnal variation of the neutron component of cosmic radiation and the problem of its origin

PERIODICAL: Geomagnetizm i aeronomiya, v. 1, no. 5, 1961, 663 - 670

TEXT: The authors investigated the lunar diurnal variation in intensity of the neutron component of cosmic radiation, using observation materials from high-mountain stations during the IGY. The authors established the existence of lunar diurnal variations of cosmic radiation and their latitudinal dependence. It is proved that these variations depend mainly on the mutual position of the Sun, the Moon and the Earth, attaining a maximum during the full-moon and a minimum during the new-moon period. At the same time substantial changes in the phase take place. The origin of lunar diurnal variations can be explained as follows: The gravitation forces of the Moon and the Sun affect the plasma of the terrestrial magnetosphere. As a result, terrestrial magnetic force lines frozen in the plasma at high altitudes are shifted. The effect of the deformed geomagnetic field on the cosmic radiation entails the appearance of lunar-diurnal variations. It can

Lunar-diurnal variation ...

be expected that this effect will be the higher, the more the corresponding layers are remote from the Earth. The results obtained prove the reality of the tide-forming movements of the plasma and the magnetic field in the outer layers of the terrestrial atmosphere, bordering the interplanetary medium. These phenomena should be studied by observations with artificial satellites and rockets. There are 5 figures and 10 references: 7 Soviet-bloc and 3 non-Soviet-bloc.

ASSOCIATION: Magnitnaya Laboratoriya AN SSSR (Magnetic Laboratory, AS USSR) Institut Geofiziki AN GruzSSR (Institute of Geophysics, AS Georgian SSR)

SUBMITTED: August 22, 1961

Card 2/2

S/203/61/001/005/022/028
A006/A101

AUTHORS: Dorman, L. I., Kolomeyets, Ye. V.

TITLE: The dependence of solar cosmic ray intensity on the earth on location of chromospheric flare in the Sun

PERIODICAL: Geomagnetizm i aeronomiya, v. 1, no. 5, 1961, 830 - 831

TEXT: The authors studied the effect of solar cosmic ray intensity on the helio-latitudes of flares, using data obtained from observations of 149 chromospheric flares with magnitudes of 2 or higher, which are effective in the intensity of the cosmic ray neutron component. The range of solar latitudes was divided into 3 zones: I - from 0 to 10° (17 flares); II - from 10 to 20° (75 flares); III - from 20 to 50° (57 flares). The analysis shows that the intensity of solar cosmic rays produced by flares between the solar equator and 10° helio-latitude, is 1.5 times greater than the intensity of radiation from flares between 10 - 50° helio-latitude. A study of cosmic-ray neutron data obtained at the Climax and Churchill stations indicates that conditions for the propagation of relatively high-energy particles (several Bev) toward the earth are independent of the longitudinal distribution of chromospheric flares. Data from the Thule sta-

The dependence of solar cosmic ray intensity...

tion confirm that about twice as many low-energy particles were incident on the earth when a flare occurred on the western solar limb as when it occurred on the eastern limb. There are 3 figures and 5 references: 3 Soviet-bloc and 2 non-Soviet-bloc.

ASSOCIATION: Magnitnaya laboratoriya AN SSSR (Magnetic Laboratory AS USSR)
Kazakhskiy gosudarstvennyy universitet imeni S. M. Kirova (Kazakh State University imeni S. M. Kirov)

SUBMITTED: July 21, 1961

Card 2/2

S/203/61/001/005/026/028
A006/A101

AUTHORS: Dorman, L.I., Koyava, V.K.

TITLE: Effects of magnetic storms in cosmic rays during the minimum of solar activity

PERIODICAL: Geomagnetizm i aeronomiya, v. 1, no. 5, 1961, 839 - 841

TEXT: The authors analyzed the decrease of intensity of cosmic radiation during magnetic storms (Forbush effect) in 1953-1955, using data on magnetic storms obtained at Tbilisi and data on cosmic radiation gathered with the aid of an ionization camera. An analysis of the effect of magnetic storms of different intensity and nature of commencement on the cosmic radiation leads to the following preliminary conclusions: The Forbush effect is observed only for big storms commencing suddenly. Consequently, the corpuscular streams causing these storms carry frozen-in magnetic fields of large extent and high strength. These fields scatter effectively cosmic rays with an energy of dozens of Bev. For big storms beginning suddenly, an effect of increase before the commencement of magnetic storms apparently takes place. This shows that the corpuscular streams, causing the storms in the minimum of solar activity, are magnetized and that a magnetic

Card 1/2

cushion was formed in their front section. In the minimum of solar activity no substantial changes occur in the nature of correlations between the corpuscular stream and the geomagnetic field, as far as changes in the sharpness of cut-off are similar to those in the maximum of solar activity. The authors thank N.A. Katsiashvili for the materials submitted. There are 3 figures and 7 Soviet-bloc references.

ASSOCIATION: Magnitnaya laboratoriya AN SSSR (Magnetic Laboratory, AS USSR), Institut geofiziki AN GruzSSR (Institute of Geophysics, AS Georgian SSR)

SUBMITTED: July 4, 1961

34359
S/203/61/001/006/020/021
D055/D113

3,1720(1641,1127,1129,1395)

AUTHORS: Dorman, L.I., and Kolomeyets, Ye.V.

TITLE: Small flares of cosmic rays on quiet and magnetically-disturbed days, connected with solar radio bursts of types II and III

PERIODICAL: Geomagnetizm i aeronomiya, v. 1, no.6, 1961, 1015-1016

TEXT: To discover the nature of solar radio bursts connected with chromospheric flares, it is important to know whether relativistic particles are generated during these flares. Cosmic ray flares on Earth may indicate that this is so. In any case, an increase in intensity is a direct indication of particle generation in the solar atmosphere. Relativistic particles are usually generated in flares which are accompanied by radio bursts of types II and III, but the effect for flares accompanied by type-II bursts is considerably greater than for other flares (Ref. 4: L.I.Dorman, Ye.V.Kolomeyets. Geomagn. i aeronomiya, 1961, 1, no. 5, 653). When the Earth

Card 1/4

Small flares ...

is in a corpuscular flow, during days of magnetic disturbance, the Earth is effectively screened by the magnetic fields frozen in the corpuscular currents, which accords with another study (Ref. 5: L.I. Dorman, Ye.V. Kolomeyets. Geomagn. i aeronomiya, 1962, 2, no. 1). If it is assumed that the particle spectrum which causes the increase on quiet days is the same as during large flares (Ref.6: L.I. Dorman, G.I. Freydman. Tr. Yakutsk. fil. AN SSSR, 1958, 2, 129) or flares in the stratosphere (Ref. 7: A.N. Charakhch'yan, V.F. Tulinov, T.N. Charakhch'yan. Zh. eksperim. i teor.fiz., 1960, 39, 249) then the additional flow of particles to the Earth is:

$$\varphi_D(\varepsilon) \approx \varepsilon^{-n}, \quad (n \approx 4 \div 7). \qquad (1)$$

According to numerous data (rapid attainment of isotropy in the additional flow of solar particles, decrease in intensity by the $t^{3/2}$ law, etc.) particles are distributed in interplanetary space by diffusion. The intensity of particles on the Earth after emission from the Sun at a moment of time t will be (Ref. 8: L.I. Dorman. Sb. "Progress in physics of cosmic ray elementary particles", 1961, 6):

Card 2/4

Small flares ..

$$\delta D(\xi, t) = \frac{N4\pi v}{8\left(\frac{\pi v t \lambda}{3}\right)^{3/2}} \exp\left(-\frac{3r^2 \xi}{4 v \lambda t}\right), \qquad (2)$$

where N is the total number of particles generated in the flare, λ - the mean effective distance for scattering, r - radius of the Earth's orbit, v - velocity of solar particles (for relativistic particles $v \approx c$). If formula (2) is used in conjunction with coupling coefficients for the neutron component and the spectrum in the form of (1) is included, the flow of particles in a flare can be calculated for every actual case. As a result of nuclear reactions in the solar atmosphere, these particles will generate fast secondary electrons, whose motion in magnetic fields will cause synchronotronic radio-emission. Flows of fast relativistic particles through the solar atmosphere outwards will excite the plasma and cause it to generate radio bursts. Both processes may be associated with the creation of solar radio bursts connected with chromospheric flares in which relativ-

Card 3/4

Small flares ...

istic particles are generated at the same time. There are 2 figures and 8 references: 6 Soviet and 2 non-Soviet. The two English-language references are: Monthly bulletin of solar-geophysical data. Boulder, Colorado, 1957-58; Quart. bull. on solar activity. Zürich, 1957, no. 7-12; 1958, no. 1-12 [Abstracter's note: Essentially complete translation]

ASSOCIATION: Magnitnaya laboratoriya AN SSSR, Kazakhskiy gosudarstvennyy universitet im. S.M. Kirova (Magnetic Laboratory, AS USSR, Kazakh State University imeni S.M. Kirov.)

SUBMITTED: July 4, 1961

Card 4/4