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STUDY OF THE VARIABILITY OF THE TOTAL IONIZING
COMPONENT OF COSMIC RAYS

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STUDY OF THE VARIABILITY OF THE TOTAL IONIZING
COMPONENT OF COSMIC RAYS

Geomagnetizm i Aeronomiya
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The object of this Note is to present the preliminary results of the analysis of measurements of the total ionizing component of cosmic rays. Measurements were conducted at the Novolazarevskaya station ($\Lambda = 59^{\circ}58' S$; $\Phi = 171^{\circ}41'$) during the period from June to December 1962. The intensity of cosmic rays was measured by means of two wide-angle telescopes. Each of them consisted of two series of Geiger counters, the distance between them being of 22 cm. Each series had an effective area of 0.96 m^2 . About 9000 pulses were registered by the apparatus in one minute, so that the statistical error of every minute values constituted only about one percent.

Studied also was the variability of the intensity of cosmic rays in connection with certain variations of the magnetic field, registered at that station. For the measure of intensity variability we took the ratio of the sum of squares of every minute values' deflections from the mean value for the corresponding 10-minute interval, to the number of pulses registered in that 10-minute interval. If the values of intensity, registered in minute intervals, are denoted by $N_1, N_2, \dots, N_{10}$, the measure of variability in the corresponding 10-minute interval will be determined by the formula

$$f = 10 \sum_{i=1}^{10} \left(N_i - \frac{1}{10} \sum_{i=1}^{10} N_i \right)^2 / \sum_{i=1}^{10} N_i.$$

* IZUCHENIYE IZMENCHIVOSTU OBSHCHEY IONIZIRUYUSHCHEY KOMPONENTY KOSMICHESKILH LUCHEY.

The lengthy slow variations of the intensity of cosmic radiation exert no effect upon the value of f , provided their amplitude does not reach too great a magnitude. Therefore, the values of f for every ten-minute interval are computed for the total observation time.

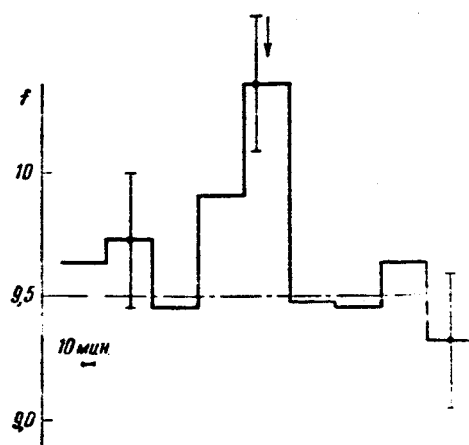


Fig. 1

The dependence of f on local magnetic storms is plotted in Fig. 1. All storms registered at the Novolazarevskaya station during the period of measurements of cosmic ray intensity were taken into account.

The horizontal line denotes the mean value of f for 6 months. The values of f prior and after magnetic storm commencement are plotted in ordinates, the commencement being marked by an arrow. We took for f the mean values for four consecutive 10-minute intervals. Each single division along the abscissa axis corresponds to 10 minutes.

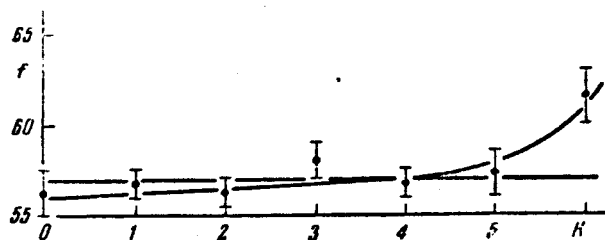


Fig. 2

The correlation between f and the values of the K -indices at the Novolazarevskaya station is given in Fig. 2 for the period of observations. The value of f corresponding to $K = 6$, is situated substantially higher than the mean value. As is well known, the K -indices have a tendency to the 27-day recurrence. That is why we composed the Bartels diagram of hourly mean values for those days, when the observations were conducted (Fig. 3). It may be seen that the tendency to the 27-days recurrence is manifest also in the values of f .

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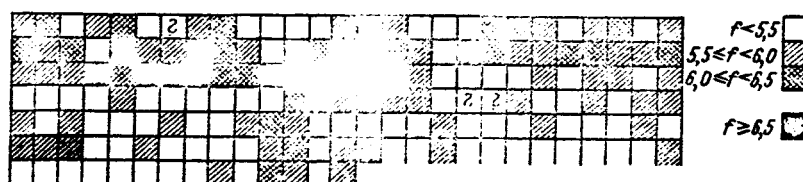


Fig. 3

It may be noted, that the registration period was very quiet. During that period, not a single case was registered of either Forbush decrease or a sudden increase in cosmic ray intensity. This is linked with the low solar activity, since the observations were conducted in a period near the solar activity minimum.

**** THE END ****

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