ADDITIONAL FLUX OF PARTICLES AND ALBEDO-ELECTRONS IN UPPER ATMOSPHERE

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The paper presents the results of Monte Carlo simulation of albedo flux from the dense layers of the Earth"s atmosphere and the dependence of angular distribution on the rigidity of geomagnetic cut off and additional flux of particles at the depth in the atmosphere 15-20 g/sm^2.

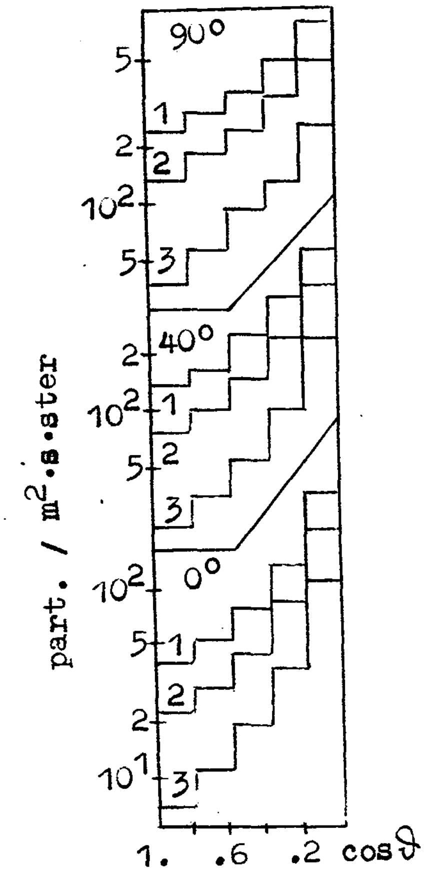
Figure 1 shows the results of Monte Carlo simulation of albedo-electron fluxes from the dense layers of atmosphere. Influence of geomagnetic field on the propagation of charged particles was not taken into account. One can see that the albedo-electrons at energies more than 10 MeV show anisotropic angular distribution: fluxes of albedo-electrons at zenith angles close to horizon is ~ 6 times greater than that directed vertically up. The ratio for the albedo-electrons at energies >100 MeV is ~ 10. Integral energy spectrum within the range 10-100 MeV can not be described by power law function. It results from the fact that electrons produced by products of decay of pions directly contributes importantly to upward albedo. Averaged over zenith angle flux of albedo-electrons at geomagnetic equator at energies more than 10 MeV equals to 120 $m^{-2}\,s^{-1}\,ster^{-1}$, at energies more than 30 MeV - 80 $m^{-2}\,s^{-1}\,ster^{-1}$, at energies > 100 MeV - 40 $m^{-2}\,s^{-1}\,ster^{-1}$.

Analysis of absorption curves of total ionising component obtained during balloon flights at latitude R_c =6,7 GV showed deformation of the depth dependence of cosmic ray intensity in the upper atmosphere (< 90 g/sm^2) after inversion of total solar magnetic field. Deformation of the form of the absorption curves (Table 1) one can explain by appearance additional flux of low energy particles.

Excluding variations produced by solar activity we reveal expected fluxes of abovementioned particles. Figure 2 shows dependence of additional flux on the depth for 1975. One can see that the curve of absorption has maximum at the depth 19-20 g/sm^2 and then drops sharply and at the depth 70 g/sm^2 its value is close to zero. Maximum of additional flux was observed in 1975-1976 at solar activity minimum. Effect was maximal at 15 g/sm^2 depth and was equal to 13%. Effect takes place in 1982-1983 that is after inversion of total solar magnetic field in 1979-1980 (Aitbaev et al., 1983) but its value is 2,3 times smaller than that in 1975.

Let's consider possible nature of the observed flux of low energy particles. First, it can be produced by meteorological effects. Analysis of the variations of barometrical pressure at the various depths in the atmosphere showed that the observed deformation of the form of the absorption curve was not produced by the variation of barometrical pressure.

Analysis of temperature variations at various depthes showed no anomalous change of temperature in the upper atmosphere and as a result no corresponding redistribution of air mass. Secondly, it can be produced by geomagnetic effects. Calculation of the variation of the rigidity cut off due to drift of balloon in the atmosphere over Alma-Ata revealed that maximal variation of counting rate produced by the factor did not exceed 0,3%. Analysis of the data on the variation of rigidity during magnetic storms in Alma-Ata region did not show possibility to attribute the observed flux of particles to the variation of cut off rigidity during magnetic storms. Third it can be produced by arrival to Alma-Ata of singly ionized atoms of < CNO > group. Calculations showed that the flux of the atoms allowed to explain additional flux of singly ionized atoms above 20 particles/ $m^{-2} s^{-1} ster^{-1}$. In order to discover the flux it is necessary to perform experiment, but experiment of the kind



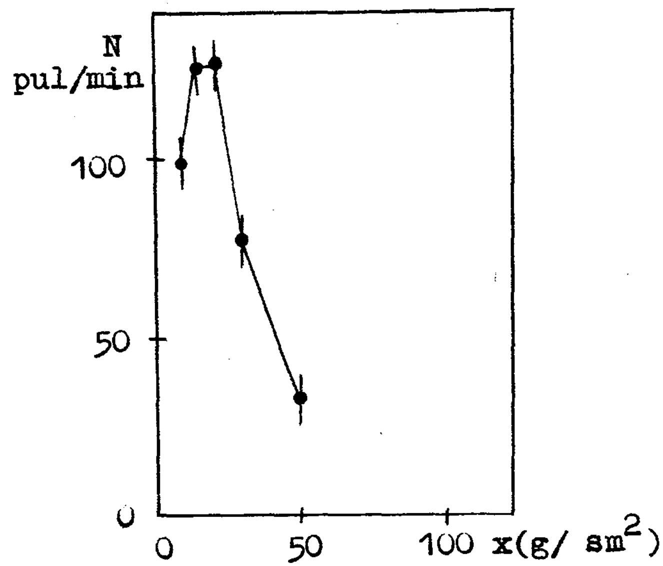


Figure 2. Absorption curve of additional flux of low energy particles (The data on of single counters obtained over Alma-Ata in 1975).

Figure 1. Dependence of electron albedo intensity at energies 10, 30, 100 MeV (histograms 1, 2, 3, correspondingly) at various geomagnetic latitudes on zenith angle.

has not been made at the boundary of atmosphere.

Table 1. Annual means of counting rate of single counter calibrated to the maximum of absorption curve

Year	Depth in the atmosphere (g/sm^2)				
	10	15	21,5	30	50
1966	0,5487	0.6234	0.6890	0.7911	0.9309
1967	0.5586	0.6143	0.6920	0,7949	0.9282
1969	0.5420	0.6166	0.6799	0.7877	0.9271
1975	0.6200	0.6936	0.7730	0.8436	0.9497
1976	0.6182	0.6850	0.7655	0.8371	0.9465
1977	0.6191	0,6935	0,7725	0,8430	0.9442
1978	0.6098	0.6844	0.7593	0.8344	0.9460
1979	0.5831	0.6498	0.7324	0.8159	0.9355

R E F E R E N C E

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