RIGIDITY DEPENDENCE OF TWO-STEP FORBUSH DECREASES

N.A. Nachkebia (1), M.A. Despotashvili (1), E.O. Flueckiger (2)
1. V. Koiava Cosmophysical Observatory of M. Nodia Institute of Geophysics of Georgian Academy of Sciences, 1, M. Aleksidze St., Tbilisi, Georgia, 380093
2. Physikalisches Institut, University of Bern, Sidlerstrasse 5, CH-3012 Bern, Switzerland
nachkebia@yahoo.com/Fax: +995-32-33-28-67

For the comparison of theoretical models on Forbush decreases (Fds) with experimental data, investigations of the rigidity spectrum parameters of the galactic cosmic ray (GCR) intensity variation during Fds are of importance. From the period 1971-1991 we examined 5 almost isotropic events with a clear two step decrease. Although the onset of the individual decreases as seen by different stations was a function of local time, the time of minimum intensity of the shock related and ejecta related decreases was a global parameter. We discuss a model that describes the relative isotropic intensity during the selected Fds. This model, however, is unable to explain the shock and ejecta related decreases separately. Using hourly data of neutron monitor stations and of the Nagoya meson telescope (median rigidity 60 - 120 GV) we determined the parameters of the rigidity spectrum for the different steps of the Fds. We found evidence that the upper rigidity limit of GCR modulation is higher for the shock related decreases than for the ejecta related decreases. Also, in all cases examined the spectral parameters for the two steps indicate a tendency for a softer spectrum during the first step. These results reflect the differences between the mechanisms of CR propagation in the media with coronal mass ejections (CMEs) and interplanetary magnetic shocks.