

EAS array data in relativistic solar cosmic ray studies

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Extensive Air Shower (EAS) arrays in a 1-particle mode operation are cosmic ray detectors of great area and appear to be more sensitive than standard neutron monitors to solar cosmic ray at rigidity range > 5 GV. The paper considers GLE events study with using data of EAS-arrays: Andyrchy (37 m^2 , 2050 m a.s.l.), Carpet (200 m^2 , 1700 m a.s.l.) and the Baksan Muon Detector (BMD, 190 m^2 , 5 m w.e., 1700 m a.s.l.) of the Baksan Neutrino Observatory (BNO) located at the North Caucasus (43.28°N , 42.69°E). At the BNO geomagnetic cutoff $\sim 6\text{GV}$ EAS-arrays were registered 15 of 30 or 50 % of total GLE events occurred in the period since 1982. The 20 January, 2005 GLE effect was equal at the Carpet array ($0.90 \pm 0.03\%$, 32 sigma) and at the BMD ($0.22 \pm 0.04\%$, 5.5 sigma). The start of increase was fixed at 06:55 UT and maximum - at 07:15 UT. Adding of these data to the GLE modeling using neutron monitor data has allowed deriving more accurate spectrum of solar protons in the 5-10 GV range. The coupling functions for the Baksan EAS arrays were calculated with KORSICA code.