

Halloween GLEs on October-November 2003, spectra and angular distribution- new revised results

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Precise studies of solar energetic particles provide an important basis to understand their acceleration and propagation in the interplanetary space. A specific interest is paid to solar protons possessing with energy high enough to induce an atmospheric cascade in the Earth's atmosphere, whose secondary particles can reach the ground, being eventually registered by ground-based detectors e.g. neutron monitors. This particular class of events is known as ground-level enhancements (GLEs). The solar cycle 23 provided several very strong GLEs. The first strong GLE event of the cycle was observed on 14 July 2000 (the Bastille day event), while the last was observed on 13 December 2006. In addition, the period of late October - early November 2003 was characterized by strong cosmic-ray variability and a sequence of three GLEs, which is the focus of this study. Here we performed a precise analysis of neutron-monitor records and derived the spectral and angular characteristics of the solar energetic particles for these events. We modelled the particle propagation in the Earth's magnetosphere and atmosphere using a newly computed and verified neutron-monitor yield function computed for different altitudes above sea level. The solar-protons spectra and pitch angle distributions were obtained in their dynamical development throughout the events. We briefly discussed the revealed features of the Halloween events.

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Collaboration

other Collaboration

Subcategory

Experimental Results

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