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Ultimate Ground Level Enhancements of Solar Cosmic Rays

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Possible values of cosmic ray (CR) ground level enhancements (GLE) registered by neutron monitor (NM) were estimated for ultimate solar proton spectrum using two different methods. Integral and differential ultimate spectra of solar protons were proposed by Struminsky (2015). The first method is based on statistical dependence of integral flux of >100 MeV solar protons observed by satellites and maximal values of GLE registered by NM. A convolution of solar proton differential spectrum and NM yield function, which is an expected value of GLE, is calculated by the second method. An estimate by the first method varies from 9600 to 1.6105 % for high latitude neutron monitors and by the second method from 1200% to 7.510**5 %. Obtained lower limits correspond roughly to GLE values observed already and upper limits are more than two orders higher them. If solar events with proton spectrum close to ultimate occur then they should produce a dangerous level of radiation deep in the Earth atmosphere even at the equator.

Primary author: Dr BELOV, Anatoly (IZMIRAN)

Co-author: Dr STRUMINSKY, Alexei (Space Research Institute)

Presenter: Dr STRUMINSKY, Alexei (Space Research Institute)

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