



Effective energy of solar energetic particles causing a ground-level enhancement

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Ground level enhancements (GLEs) are short sporadic events when the count rate of a ground-based neutron monitor (NM) is significantly enhanced over the background of galactic cosmic rays due to high fluxes of solar energetic particles (SEPs). It is difficult to measure the spectrum of SEPs directly, since the measurements should be performed outside the shielding effect of the Earth magnetosphere and atmosphere. On the other hand, a quick estimate of the total fluence of SEP above some effective energy E_{eff} can be made based on the observed GLE response. Here we define such effective energy that the SEP fluence above it is directly proportional to the GLE strength as recorded by polar NMs. We show, using data from the International GLE database (<http://gle.oulu.fi>) and applying a recent yield function of NM that the response of a polar NM to a GLE is directly proportional to the SEP fluence above 600-800 MeV. Thus, the effective energy of SEP as detected by ground-based NMs is $E_{\text{eff}}=600-880$ MeV.