



SOHO/EPHIN energy spectra during GLE 69 and 70

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Ground Level Enhancements (GLEs) are solar energetic particle (SEP) events that are recorded by ground-based instrumentation. The energy of the particles is so high that they produce secondary particles in the Earth's atmosphere, i.e. protons and neutrons, which are detected as sudden increases in cosmic ray intensities measured by e.g. neutron monitors. Since the launch of SOHO in December 1995 the neutron monitor network recorded 16 GLEs. The Electron Proton Helium INstrument on board SOHO has been designed to measure protons and helium up to 53 MeV/nucleon as well as electrons up to 8.3 MeV. Above these energies, particles penetrate all detector elements and thus, a separation between different particle species becomes more complicated. Recently we developed a method that allows deriving the energy spectrum for penetrating protons up to more than 1 GeV. In this contribution we present the proton energy spectra for two of the 16 above-mentioned GLEs and compare them to previous measurements. Although there are differences of up to a factor two the overall shape of the energy spectra agree surprisingly well. Thus it has been demonstrated that EPHIN measurements are a valuable tool for understanding GLE. In addition our measurements allow the investigation of SUB GLEs that are events that are below the threshold of GLEs but may affect the ionization in the upper atmosphere.