Geophysical Research Abstracts
Vol. 12, EGU2010-1042, 2010
EGU General Assembly 2010

Solar wind density turbulence and solar flare electron transport from the Sun to the Earth

Hamish Reid and Eduard Kontar
Department of Physics and Astronomy, University of Glasgow, Glasgow, Scotland (hamish@astro.gla.ac.uk)

Electron beams accelerated during solar flare events and associated with Type III solar radio bursts can be observed near the Earth with a double power-law energy spectra. We simulate self-consistently energetic electron propagation from the Sun to the Earth in the weak turbulent regime, taking into account the turbulent solar wind plasma. The density fluctuations from the solar wind turbulence influence the spectrum of high frequency beam-driven electron plasma waves and hence can alter the beam energy spectra. Taking a Kolmogorov-type power spectrum of density fluctuations often observed at 1AU, we investigate the formation of energetic electron spectrum near the Earth. We show that an initial power-law electron spectra changes as a result of transport to a double power-law with a break in the deka-keV range flattening at low energies. With an initial power-law index of 3.5, the simulated spectrum below the break at the Earth was found between 1.7-2.1 dependent upon the level of density fluctuations present in the background solar wind.