

Simulating the transport of high energy solar protons during historic GLE events

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3D test particle simulations of historic GLE events are performed to investigate the propagation and distribution of solar protons within the heliosphere. Multiple past GLEs are considered that possess a variety of properties of the associated solar events, e.g. a range of source flare longitudes and coronal mass ejection velocities. The test particle model, which includes drift effects, is also used to explore the influence a heliospheric current sheet (HCS) has on the propagation of protons. For example, historic GLEs with a source location close to and far from the HCS, as well as poorly and well-connected events are considered. The modelling is performed for high energy (300-1200 MeV) protons to represent the energetic conditions under which these GLEs occur. The derived intensity profiles at 1AU are compared to observations from HEPAD onboard GOES, as well as STEREO (at lower energies and locations away from Earth) and neutron monitor data.

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