

Transport and acceleration of >300 MeV solar protons

Tuesday, 26 July 2022 11:00 (30 minutes)

Large solar eruptive events, e.g. flares and coronal mass ejections, are capable of accelerating solar energetic particles (SEPs) to energies >300 MeV. These high energy SEP events are capable of causing disruption on Earth through ground level enhancements (GLEs). As such, the propagation of these particles towards Earth pose a significant space weather hazard. We explore past SEP events, both through 3D test particle simulations of particle propagation through the heliosphere and through analysis of SEP properties observed by GOES-HEPAD between 1984-2017. Our research suggests that features like the heliospheric current sheet are relevant to 71% of our historic events, and that the majority of GLE events have source locations close to the HCS. Other factors, such as flare and CME parameters, are compared to the observed SEP properties (e.g. peak flux and fluence). We find weaker correlations between peak fluxes and both flare intensities and CME speeds that is observed at lower particle energies.

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Session Classification: Invited highlights

Track Classification: invited highlight