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Simulated velocity dispersions of Solar Energetic Particles: The effect of pre-event background to the injection times

Abstract content

Solar Energetic Particle event onset times have been traditionally studied by using the velocity dispersion analysis. Using spacecraft at 1 AU, the derived apparent path lengths can vary between 0.5 AU and 3 AU, while the distribution peaks at the nominal range (1-1.5 AU). The recently introduced simulation approach to the onset research takes into account the effect of the interplanetary scattering on the arrival time of the first particles. These studies have shown that scattering may explain the anomalously large path lengths (> 1.5 AU). We have focused on the effect of the background spectrum to the observed velocity dispersion. This is achieved by overlaying a simulated event on backgrounds of different spectral shapes and relative intensities, emulating various onset conditions. We have earlier demonstrated that in addition to the scattering conditions and the shape of the injection profiles, also the pre-event flux conditions can account for the observed large path lengths. Furthermore, under proper conditions (slow injection and softer event spectrum than background spectrum), it is also possible to obtain anomalously small (< 1.0 AU) path lengths. In this study, we concentrate to the effect of pre-event background spectrum to the deduced injection times of the Solar Energetic Particle events.

If this papers is presented for a collaboration, please specify the collaboration

Summary

Reference

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