Geophysical Research Abstracts
Vol. 20, EGU2018-14958, 2018
EGU General Assembly 2018

The longitudinal distribution of solar energetic particles

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Multi-spacecraft observations provide a powerful tool for the investigation of the spatial distribution of energetic particles in the heliosphere. Early observations from the Helios mission showed that solar energetic particles originating from a single solar event sometimes spread over very broad longitudinal spans. Ulysses observations evidenced they can also reach high heliographic latitudes. During the last decade, the unprecedented combination of multi-point remote-sensing and in-situ observations from the STEREO mission and the fleet of near-Earth spacecraft has greatly enhanced our understanding of the longitudinal distribution of solar energetic particle events in the ecliptic plane. These observations have illustrated a rich variety of events, ranging from narrow impulsive events sometimes showing unexpected longitudinal distribution patterns, to wide-spread events filling almost the entire space within the Earth orbit. We present a revision of these observations, the possible underlying physical processes involved, and the prospects for upcoming missions as Solar Orbiter and Parker Solar Probe.