

On predictability of progress of solar energetic particles from monitoring at a eastern solar longitude in interplanetary space

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It is well known that outward motion of CME-driven interplanetary shock causes a peculiar intensity-time profile of solar energetic particles depending on observer's solar longitude. A more rapid rise and decline of particle flux is observed at the eastern observation point which is well-connected to the nose of the shock through interplanetary magnetic field lines early in the event. The observer located near the longitude of the nose is well-connected around the shock passage. The observer at the western longitude is poorly-connected until after the shock passes. This leads to the idea that monitoring of solar energetic particles at a solar longitude may enable us to predict an intensity-time profile of particle flux at a more western longitude. We examined SPM data (higher than 2 MeV) obtained on board NOZOMI and EPAM data on ACE spacecraft from late 1999 through early 2000 and found some events showing the above-mentioned characteristics when the difference in solar longitude between both spacecraft was 30-90 degrees. We discuss the predictive capability of intensity-time profile quantitatively with a model of SEP events.