

The effects of magnetic boundary on the uniform distribution of energetic particle intensities observed by multiple spacecraft

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In the decay phase of solar energetic particle (SEP) events, particle intensities observed by widely separated spacecraft usually present comparable intensities (within a factor of 2-3) that evolve similarly in time. The phenomenon of SEP events is called reservoir, which could be observed frequently in intensive gradual SEP events. In this work, we examine the effects of magnetic boundary on the formation of reservoir phenomenon in energetic proton and electron events. In the 1978 January 01 and the 2000 November 08 SEP events, we find the effects of magnetic boundary associated with the reservoir phenomenon were observed simultaneously in the sheath of magnetic cloud (MC)/interplanetary coronal mass ejection (ICME). Based on the observations, we suggest that the effects of magnetic boundary could be due to the magnetic mirrors and/or the small diffusion coefficients in the sheath region, and could help to form the reservoir phenomenon in both energetic proton and electron events in some large SEP events.

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Experimental Results

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