

Relativistic effect on energetic particle injections during the 14 July 2013 Substorm

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Substorm energetic particle injections observed by multiple satellites during a small storm on 14 July 2013 are studied by considering the relativistic effect. We combine the ground observations and in situ magnetic field and particle data from geosynchronous satellites and Van Allen Probes in the inner magnetosphere to investigate the current systems and the energetic particle injections associated with the substorm. Based on a classical electromagnetic field pulse model, we propose a relativistic model to simulate the evolution of energetic particle injections during the particular substorm event. Detailed discussion of the differences in relativistic calculation from non-relativistic ones and satellite observations will be presented.

Keywords: energetic particle injection, inner magnetosphere, substorm