

## A Correlation Study for Substorm Injection Electrons in Relativistic Electron Events

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While it is presumed that substorm injection electrons of a few hundred keV are the seeds for relativistic electrons frequently observed during the recovery phase of storms, correlation between the two events has not been well explored with the observed satellite data. We would like to address this problem in the present paper using the data from the geosynchronous GOES and LANL satellites as well as from the polar orbiting NOAA satellites. Our statistical study shows the two channels of LANL SOPA instrument, 105–150 keV and 150–225 keV, best correlates with the increase of the flux levels of GOES relativistic electrons. Especially, the relativistic electron events are not observed when the flux levels of these two channels are maintained low in the substorm injections, regardless of the level of the ULF activities. The conclusion does not change whether the substorm injections occur during the storm recovery phase or during the non-storm time. As the ULF waves are observed quite frequently over the entire range of L=4 to L=7, the reason why REEs are seen mostly during the storm time seems to be related to the fact that storm-time substorms produce more seed electrons than the substorms that occur during the non-storm time.