

PARTICLE ACCELERATION AND MAGNETOSPHERIC RECONFIGURATION AT SUBSTORM ONSET SEEN AT LOW-ALTITUDES

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On August 12, 1979 two polar spacecraft TIROS and NOAA6 passed through the same area of substorm initiation, correspondingly, ~10 min before and several minutes after the substorm onset. The relative changes of auroral (0.3-20 keV) and energetic (30-300 keV) particle fluxes indicated a very strong particle energization and increased precipitation at the substorm onset during this moderate (AL ~300 nT) substorm event. Based on the variations of Energetic Particle (EP) flux and anisotropy (ratio of precipitated to trapped particle flux), and by invoking the mechanism of particle scattering in the current sheet, we discuss the possible magnetospheric origin of several distinct EP precipitation regions observed at the substorm onset. The major acceleration/precipitation region in the center of auroral zone (EP flux increased by a factor 100-1000 at energies up to 300 keV) was associated with the major dipolarization region in the magnetosphere. Its sharp outer boundary contacted with the sharp current sheet, together they formed an Y-type magnetic configuration. Detached weak precipitation region was detected at the low latitude side of the break-up, which could be the low-altitude image of innermost injection boundary of energetic particles.

This research has been supported by the grant NTW000 from the International Science Foundation.