[구SE-28] Recurrent dipolarizations of near-Earth magnetotail during high-speed solar wind streamers

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Recurrent substorms occur when high-speed solar wind streamers pass by Earth's magnetosphere. Most of the previous researches have been done using the observations obtained at the geosynchronous orbit focusing on the relationship between the solar wind disturbances and the occurrence of substorms. However, it is important to investigate the dynamics of the magnetotail because the magnetotail is the place where substorms develop. In this study we investigated the observations of recurrent dipolarizations in the near-Earth magnetotail that occurred during high-speed solar wind streamers. The dipolarizations and subsequent stretchings have occurred for more than three days with the average period of ~2 - 3 hours. The average period of ~2 - 3 hours is consistent with the average occurrence period of recurrent substorms. Also, the observed signatures on the geosynchronous orbit and the ground show recurrent substorms have occurred during the event. These suggest that the recurrent dipolarizations in the near-Earth magnetotail should be closely related to the recurrent substorms. On the other hand, there was no clear flow activities directly associated with the dipolarizations, except for some intermittent bursty flow activities. We will discuss the detailed characteristics of the dipolarizations and the relationship with recurrent substorms.

[구SE-29] Electron Microburst Energy Dispersion Calculated by Test Particle Simulation

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Electron microbursts, energetic electron precipitation having duration less than 1 sec, have been thought to be generated by chorus wave and electron interactions. While the coincidence of chorus and microburst occurrence supports the wave-particle interaction theory, more crucial evidences have not been observed to explain the origin of microbursts. We propose the measurement of energy dispersion of microbursts could be an evidence supporting wave-particle theory. During chorus waves propagate along magnetic field, the resonance condition should be satisfied at different magnetic latitude for different energy electrons. If we observed electron microbursts at low altitude, the arrival time of different energy electrons should make unique dispersion structures. In order to observe such energy dispersion, we need a detector having fast time resolution and wide energy range. Our study is motivated from defining the time resolution and energy range of the detectors required to measure microburst energy dispersions. We performed test particles simulation to investigate how electrons interact with simple coherent waves like chorus waves. We compute a large number of electron's trajectories and successfully produce energy dispersion structures expected when microbursts are observed with 10 msec time resolution detectors at the altitude of 600 km. These results provide useful information in designing electron detectors for the future mission.