Geophysical Research Abstracts
Vol. 12, EGU2010-6400, 2010
EGU General Assembly 2010

Comparison of Two Successive Substorms Observed on August 1, 1998

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Magnetospheric response to the onset and development of two successive substorms, caused by different reasons is investigated. The choice of these events was due to the successful location of satellites in different areas of near-Earth space and the presence of numerous satellite and ground based observations.
First substorm initiated at 17.20 UT on August 1, 1998 was caused by spontaneous release of exceeded energy stored in the tail. The second substorm occurred at the same day at 18.30 UT, was triggered by large and sharp solar wind dynamic pressure enhancement, accompanied by fluctuations of the interplanetary magnetic field. This pressure enhancement, consisted of a sequence of several fast increases and decreases in solar wind dynamic pressure, led to the corresponding variations of magnetic field and energetic particle fluxes at geosynchronous orbit and ground stations and auroral disturbances. It was found that correlation coefficients calculated between the solar wind pressure and magnetospheric responding parameters are very high.
It was shown that first substorm was localized in the midnight sector of the aurora, westward auroral bulge was formed during the growth phase and typical recovery phase was observed. In contrast to that the second substorm, caused by an external trigger, was characterized by dayside auroral intensification propagating to down and dusk and nightside auroral activity localized in the premidnight sector. It was shown the global modulation of magnetospheric currents by the solar wind dynamic pressure for the second event.