

## Impulsive Magnetic Field Variations Observed by ETS-VIII during Substorms

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In this study, we analyzed impulsive magnetic field variations observed by ETS-VIII [Koga and Obara, 2008] during substorms. In previous studies, 1-minute time resolution magnetic data observed by geostationary satellites were used. On the other hand, we used higher resolution (1-second data) magnetic data. In addition, the magnetic data from MAGDAS (MAGnetic Data Acquisition System) [Yumoto et al., 2006] low-latitude stations were used to identify the onset of substorms. At the onset of substorms, Pi 2 magnetic pulsations occur globally in the magnetosphere.

We focused on the magnetic field variations whose amplitudes of D-comp. were greater than 20 nT at synchronous altitude. The analysis period covered all of 2010.

The following results are obtained;

- (1) 77% of the selected events can be observed only with 1-second time resolution data. These were undetected in previous studies using 1-minute time resolution data.
- (2) The amplitudes of impulsive magnetic variations were ten times greater than those of Pi 2 at ETS-VIII [Uozumi, 2011].
- (3) It was found that the magnetic field variations whose amplitudes of D-comp. greater than 20 nT at synchronous altitude often observed when the magnetosphere was quiet ( $K_p < 4$ ).
- (4) It was found that the magnetic field variations whose amplitudes of D-comp. greater than 20 nT at synchronous altitude were often observed in the pre-midnight region (22 - 0 LT).
- (5) The number of events were more frequent during April, May, October and November.

The positive D-comp. magnetic field variation is increasing westward magnetic field. It means that ETS-VIII was located inside Substorm Current Wedge (SCW).

The D-comp. magnetic field variation of  $> 20$  nT at ETS-VIII maybe explained by the encounters within the SCW sheet.

In the present paper, we will show the results comparing the magnetic field variations at ETS-VIII with those of the quasi-zenith satellite QZS [Matsumoto et al., 2011] and MAGDAS stations.