

The statistical analysis of Pi2 pulsations in the inner magnetosphere observed by polar orbiting satellite DE-1

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There are a lot of discussions about excitation mechanisms of mid- and low-latitudes Pi2 pulsations observed on the ground. In recent years, magnetic field data of satellite show that cavity mode is one of important mechanisms to explain mid- and low-latitude Pi2 pulsations. Equatorial orbiting satellite data have been used in most of these studies. On the other hand, polar orbiting satellite data have been seldom used. There was only one event analysis of Pi2 pulsation by Akebono satellite. The magnetic field data observed by polar orbiting satellites are useful to know how Pi2 energy is distributed in the inner magnetic field.

In this study, we statistically analyzed Pi2 pulsations, using the 6-second magnetic field data acquired by polar orbiting satellite DE-1.

DE-1 had an elliptical orbit with a perigee altitude of ~500km and an apogee altitude of ~3.6R_E in the period between September 1981 and January 1991. Its orbital plane rotated gradually against the meridian plane. The long-term data obtained in the inner magnetosphere make it possible for us to perform a statistical analysis of Pi2. We used the AE index to identify substorm onset. An event which satisfies the following two criteria was considered as substorm onset. First, the standard deviation of the AE index for the time interval of 10 minutes before a given time is less than 10 nT. Second, AE index increased more than 100nT during 20 minutes after the given time. We defined the given time as the onset time of the substorm. We looked for damping oscillations in the magnetic field data of DE-1, if the satellite was located on less than 6 R_E found in the 2-hour period which centered at the substorm onset. As a result, we selected 120 events to be analyzed.

We will show the wave power distribution in the MLT-L plane for the damping oscillation in the Pi2 band.