

Multipoint observations of a Pi2 pulsation on morning side

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Previous studies have shown that the plasmaspheric cavity mode resonance is a plausible mechanism for Pi2 pulsations. Fast mode waves emitted from a substorm onset region will bounce back and forth between two boundaries (the ionosphere and the plasmopause) and will be radially trapped, if the wave normal is nearly perpendicular to the boundaries. This is likely to occur near the midnight meridian where substorms are thought to initiate. It is expected that waves would not be trapped effectively on the flanks where the waves make oblique incident on the boundaries, resulting in no appearance of Pi2 pulsations. However, Pi2 pulsations are global phenomena observed at local times far from local midnight. The longitudinal structure of the cavity mode resonance is yet to be investigated.

In the present study we focused on a Pi2 pulsation that occurred at 0538UT on September 20, 1995, because two satellites (ETS-VI and EXOS-D) and ground stations located from low-latitude to high-latitude made observations at 07-10MLT. Magnetic field data from low-latitude stations at 02MLT and 15MLT were also available. We found that all ground stations and the ETS-VI satellite observed a Pi2 pulsation. The Pi2 pulsation detected by the ETS-VI satellite was dominated by the parallel and radial components, indicating a fast mode wave. This data set provided us a unique opportunity to investigate the Pi2 pulsation on morning side in great detail and to examine its longitudinal structure. We will discuss whether the cavity mode resonance can be established on morning side.