

## Cluster衛星がプラズマ圏界面近傍で観測した high azimuthal wave number を持つ Pi2 地磁気脈動

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## Pi2 pulsations with a high azimuthal wave number observed near the plasmopause by the Cluster satellite

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Two different models, plasmaspheric cavity mode [*Saito and Matshita*, 1968] and surface wave mode [*Chen and Hasegawa*, 1974], have been proposed for the generation of mid- and low-latitude Pi2 pulsations. Plasmaspheric cavity mode is a global poloidal wave with a large azimuthal extent (i.e. a small azimuthal wave number), which is radially trapped between the ionosphere and plasmopause near the midnight meridian. On the other hand, surface wave mode is a poloidal wave with a small azimuthal extent (a very high azimuthal wave number), which is localized to the plasmopause [*Fujita and Itonaga*, 2003]. There have been very few reports on the satellite observations of Pi2 pulsations generated by the surface wave mode, whereas several previous studies [e.g., *Takahashi et al.*, 1995] presented Pi2 pulsations generated by cavity mode resonance.

In this study, we report on Pi2 pulsations starting at 21:24 UT on 17 February 2002 observed by the Cluster 1-4 satellites, which were located in the plasmasphere (at  $\sim 0031$ - $0035$  MLT and  $L \sim 4.7$ - $4.5$ ) near the plasmopause. The tetrahedral configuration of the Cluster 1-4 satellites positions is well suitable for extracting spatial variations of the Pi2 pulsations near the plasmopause. We found that these Pi2 pulsations were dominant in the compressional component. To investigate the longitudinal structure, we evaluated the azimuthal wave number from the phase difference of a Pi2 pulsation at the Cluster 3 satellite relative to that at the Cluster 2 satellite, which was located at approximately the same  $L$  as the Cluster 3 satellite with longitudinal separation. The estimated azimuthal wave number was unusually high ( $\sim 182$ ). The high azimuthal wave number indicates that these pulsations are likely to be generated by the surface wave.

Whereas the Cluster satellite observed very clear Pi2 pulsations near the plasmopause, nearby SAMNET ground stations located on the nightside (2330-0030 MLT) in the range from  $L \sim 2.8$  to  $L \sim 6.2$  could not observe clear Pi2 pulsations. This observation indicates that Pi2 pulsations generated by the surface wave mode near the plasmopause cannot propagate to the ground because the ionospheric screening effect attenuates magnetic pulsations with high azimuthal wave numbers.