

Swarm 衛星で観測された電離圏上部での Pi2 地磁気脈動 Spatial characteristic of mid- and low-latitude Pi2 pulsations observed by the Swarm satellite in the upper ionosphere

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At substorm onsets, low-latitude Pi2 pulsations are observed on ground. While low-latitude Pi2 pulsations on the night side have high coherence with magnetic field perturbations in the compressional and radial components observed by satellites in the plasmasphere, some studies show that there is no magnetic signals in the plasmasphere on the dayside which correspond to low latitude Pi2 pulsations (Takahashi et al., 2005; Teramoto et al., 2008; 2011). Using magnetic field data obtained by the low-altitude Oersted satellite, Han et al. (2004) found that compressional Pi2 pulsations observed on the dayside in the topside ionosphere show out-of-phase oscillation with those at low-latitude ground stations. They suggested that the dayside Pi2 pulsations are generated by the dayside ionospheric current system rather than the cavity mode resonance mode. In contrast, Sutcliffe and Luher (2010) found that no Pi2-related magnetic signals can be detected in the topside ionosphere, using the CHAMP satellite. To reveal generation mechanism of Pi2 pulsations at low latitude, more studies at topside ionosphere are needed.

In this study, we compare Pi2 pulsations observed in the upper ionosphere and on low-latitude ground, using the magnetic field data obtained by the Swarm satellite and at Kakioka (KAK, 27.19 degrees geomagnetic latitude, 208.79 degrees geomagnetic longitude) and San Juan (SJG, 28.20 degrees geomagnetic latitude, 6.10 degrees geomagnetic longitude). The Swarm satellite was launched on November 2013 and consists of the three identical satellites (Swarm-A, -B, and -C) in polar orbits. We statistically investigate Pi2 pulsations observed by the Swarm satellites. On the nightside, Pi2 pulsations in the compressional and radial components have high coherence with those at the low-latitude ground stations. On the other hand, Pi2 pulsations observed by Swarm on the dayside do not show high coherence with those on the low-latitude ground stations. We will show typical Pi2 events observed by the Swarm satellites at different local times and discuss possible mechanisms of low-latitude Pi2 pulsations.