

Swarm 衛星と地上低緯度地磁気観測点で観測された Pi2 地磁気脈動の比較

寺本 万里子 [1]; 能勢 正仁 [2]; 家森 俊彦 [3]; Luhr Hermann[4]; Love Jeffery[5]

[1] JAXA, 宇宙研; [2] 京大・理 地磁気センター; [3] 京大・理・地磁気センター; [4] GFZ; [5] USGS

Comparisons of Pi2 pulsations observed by the Swarm satellite in the upper ionosphere and on the ground at low latitudes

Mariko Teramoto[1]; Masahito Nose[2]; Toshihiko Iyemori[3]; Hermann Lühr[4]; Jeffery Love[5]

[1] JAXA, ISAS; [2] DACGSM, Kyoto Univ.; [3] WDC for Geomagnetism, Kyoto Univ.; [4] GFZ; [5] USGS

At the time of substorm onsets, Pi2 pulsations at low latitudes on the ground are observed at all local times. However, some studies show no evidence for dayside Pi2 pulsations in the magnetic field data observed by satellites at low latitudes within the plasmasphere [Takahashi et al., 2005; Teramoto et al., 2008; 2011]. Using the magnetic field data from the CHAMP satellite in the F region ionosphere and from the low-latitude ground stations, Sutcliffe and Lühr (2010) found that daytime Pi2 pulsations do not occur on CHAMP while nighttime Pi2 pulsations are observed simultaneously on CHAMP and at low-latitude ground stations. In order to clarify generation mechanisms of low-latitude Pi2 pulsations, we need to investigate the spatial structure of low-latitude Pi2 pulsations in the ionosphere.

In this study, we compared with Pi2 pulsations in the upper ionosphere and on ground at low latitude, using the magnetic field data observed by the Vector Field Magnetometer from the Swarm satellite and by the fluxgate magnetometers at Kakioka (KAK, 27.19 deg Geomagnetic latitude, 208.79 deg geomagnetic longitude) and San Juan (SJG, 28.20 deg Geomagnetic latitude, 6.10 deg geomagnetic latitude). The Swarm was launched on November 2013 and consists of the three identical satellites (Swarm-A, -B, and -C) in polar orbits. The Swarm-A and Swarm-B satellites move side by side at an altitude of 450 km and the Swarm-C at an altitude of 530 km. These multiple measurements are suitable for the spatial analysis of ionospheric Pi2 pulsations.

Pi2 pulsations started at 16:16 UT on 8 December 2013. At both Swarm-A and -B satellites the pulsations observed in the North component until 16:23 UT. The periods of the pulsations are 60 s and the amplitude are about ~1 nT. During 7-min interval of the event the satellites moved from 20 deg to -10 deg in geomagnetic latitude and about 1.0 hours in magnetic local time (MLT). At KAK, which is located at about 01 MLT, the H component indicates nearly identical oscillations to Pi2 pulsations at both Swarm-A and -B. These observed characteristics were a consequence of the cavity mode resonance. We will show several Pi2 events observed by the Swarm satellite at different local times and discuss the possible mechanisms of low-latitude Pi2 pulsations.