

البحث الثاني

Title

The First Pi2 Pulsation Observed by China Seismo-Electromagnetic Satellite
Journal & year of publication

Remote sensing

ISSN 2072-4292

Authors

Essam Ghamry, Dedalo Marchetti, Akimasa Yoshikawa, Teiji Uozumi, Angelo De Santis, Loredana Perrone, Xuhui Shen, **Adel Fathy**

English Abstract

On 2 February 2018, the China Seismo-Electromagnetic Satellite (CSES) ZhangHeng 01(ZH-01) was successfully launched, carrying on board, in addition to a suite of plasma and particle physics instruments, a high precision magnetometer package (HPM), able to observe the ultra-low frequency (ULF) waves. In this paper, a night time Pi2 pulsation observed by CSES is reported for the first time. This Pi2 event occurred on 3 September 2018, and began at 14:30 UT (02:37 magnetic local time), when the satellite was in the southern hemisphere between 49 and 13 magnetic latitude (MLAT). Kakioka (KAK) ground station in Japan detected the same Pi2 between 14:30–14:42 UT (23:30–23:42 local time). The Pi2 oscillations in the compressional, toroidal, and poloidal components at the CSES satellite and the H-component at the KAK station are investigated by estimating coherence, amplitude, and cross-phase. We noticed a high degree of similarity between the Pi2 event in the horizontal component at KAK and the ionospheric fluctuations in the compressional component at CSES. This high correlation indicated the magnetospheric source of the Pi2 event. In addition, Pi2 is exhibited clearly in the B_y component at CSES, which is highly correlated with the ground H component, so the Pi2 event could be explained by the Substorm Current Wedge (SCW). This interpretation is further confirmed by checking the compressional component of Van Allen Probe (VAP) B satellite inside the plasmasphere, which, for the first time, gives observational support for an earlier model. This ULF wave observation shows the consistency and reliability of the high precision magnetometer (HPM) equipped by two fluxgate magnetometers (FGM1 and FGM2) onboard CSES.