PHASE RELATION BETWEEN PI 2-ASSOCIATED IONOSPHERIC DOPPLER VELOCITY AND MAGNETIC PULSATION AT MID-LATITUDE MAGDAS STATION

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Pi 2 magnetic pulsation, which is an impulsive hydromagnetic oscillation, occurs globally in the magnetosphere at the onset of magnetospheric substorms [e.g., *Saito and Matsushita*, 1968]. Pi 2 pulsations have various modes depending on latitude and local time [e.g., *Yumoto and the CPMN Group*, 2001]. In particular low- and mid-latitude Pi 2 pulsations are explained by the theory of the cavity mode resonance in the plasmasphere [e.g., *Sutcliffe and Yumoto*, 1991]
However, the examination of the Pi 2-associated Doppler velocity is limited. In the present paper, we examine the phase relation between the ionospheric Doppler velocity (V*) in the ionospheric F-region detected by an FM-CW (Frequency Modulated Continuous Wave) radar and the ground magnetic H component (H) observed by MAGDAS magnetometer at PTK (L=2.05). In addition, we estimate the ionospheric electric field intensity.
From statistics, 114 Pi 2 events were observed during a 43-day period from 23 September 2006 to 4 November 2006. The variations of H and V* revealed high coherence (correlation coefficient: $\gamma \geq 0.6$) for a half of the 114 Pi 2 events, for about a half of which the H and V* variations had the same dominant frequency. For such events, the phase difference between H and V* is -90 ° or 270 ° in the midnight sector (21-03 LT), and the averaged Ey (east-west electric field) amplitude derived from V* is 0.24 mV/m. In contrast, no clear phase relation of H and V* could be found for Pi 2 oscillations in the other local time sectors. Based on a box model of the ideal cavity mode by Takahashi et al. [2001], the phase relation of H and V* for Pi 2s in the midnight sector (21-03 LT) may be explained in terms of the radial standing structure of compressional waves, i.e., cavity mode oscillation.

Pi2, Doppler Radar, Ionospheric Electric Field

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