

On the association of quiet-time Pi2 pulsations with IMF variations

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The association of quiet-time Pi2 pulsations with the variations of the interplanetary magnetic field (IMF) has been examined by using three reported events for 10 March 1997, 27 December 1997, and 11 May 1999. For the first event, the onset time of ground Pi2s maps to the IMF structure bearing a variation cycle of north to south and north again as seen by Wind in the upstream region. Likewise, the second and the third events have four and three recurrent ones sensed by multiple satellites. The comparison of geomagnetic perturbations, auroral brightenings, and energetic particle data in the magnetotail with the IMF observations shows successive substorm-like activations accompanied by ground Pi2 onsets. For each variation cycle, the first Pi2 burst appears in a period of time after southward turning of the IMF and the second one follows northward turning. While the IMF is back to steady north, subsequent Pi2 onsets are associated with a decreasing By magnitude or cavity resonances in the plasma sheet driven by fluctuations in the solar wind. These observational results can be interpreted with the prevailing models of externally triggered substorm. Consequently, we suggest that recurrent quiet-time Pi2s could be associated with IMF variations and their cause may be the same as those for substorm times.