



專題演講

IMF dependence of EMIC waves in the magnetosphere: THEMIS observations

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摘要/Abstract :

In this study, we investigate the role of the interplanetary magnetic field (IMF) in electromagnetic ion cyclotron (EMIC) waves in the magnetosphere using Time History of Events and Macroscale Interactions during Substorms (THEMIS) observations. A north-southward component of the IMF direction (B_z) is used to identify the long-duration (longer than 4 hours) northward IMF ($B_z \geq 1$ nT) and southward IMF ($B_z \leq -1$ nT) events in order to examine the preferential location of H-band/He-band EMIC waves with respect to the directions of B_z . The statistical results reveal that H-band EMIC waves show the magnetic local time (MLT) dependence on the IMF direction. H-band EMIC waves for northward IMFs frequently occur in the predawn-prenoon sector (0400-1100 MLT) and postnoon sector (1200-1600 MLT) with the peak around the dawn sector (0400-0800 MLT) for $L \sim 10$. For southward IMFs, on the other hand, the preferential regions are located in dayside (0700-1500 MLT) with two peaks in the morning sector (0700-1100 MLT) and in the postnoon sector (1200-1500 MLT). In He-band EMIC waves, the preferential region for northward IMF intervals lies within the region from the prenoon to the dusk sector (1100-1800 MLT) with the wide L -value ($L = 5-12$). However, the preferential region for the southward IMF intervals moves into the inner L from $L < \sim 10-11$ near the noon sector to $L < 8$ near the dusk sector. The global distributions of the ambient temperature anisotropy for the low portion of the energetic ions (~ 25 keV) show that the preferential location for the H-band EMIC wave generations results from the level of magnetospheric convection. He-band EMIC waves are shown to be generated in the region where the cold plasma density is high enough (near the plasmapause/plasmaspheric plumes).

※歡迎聽講※

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