URSI GASS 2023, Sapporo, Japan, 19 – 26 August 2023

Study on Statistical Properties of Plasmaspheric Hiss Observed by the Arase Satellite

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Plasmaspheric hiss is a whistler mode wave with structureless spectrum observed mainly inside of the plasmasphere. It has been suggested that it contributes to the generation of slot region as a consequence of the loss of energetic particles [1,2]. The detailed features of plasmaspheric hiss are, however, still unknown and it is necessary to understand the parameter dependences of the spatial distribution, the variation of intensity and E/B ratio. Malaspina et al. (2016) revealed the spatial distribution of plasma waves, including plasmaspheric hiss, and their activity around the magnetic equatorial region using the data observed by the Van Allen Probes for about 3 years [3]. In the previous study, however, the analysis was limited within ± 20 degrees of magnetic latitude since the inclinations of the Van Allen Probes are about 10 degrees.

In this work, we analyze the plasma wave data observed by the Arase satellite for 5 years to clarify the statistical properties of plasmaspheric hiss. As the inclination of the Arase is about 31 degrees, we are able to analyze the wider magnetic latitude range up to ± 40 degrees. We investigate the spatial distribution of plasmaspheric hiss intensity using electromagnetic spectral data observed by PWE/OFA [4,5] onboard the Arase satellite referring the orbit data of the Arase.

The analysis reveals that the plasmaspheric hiss intensity has local time dependence : strong in the dayside region a weak in the nightside region. It is also found that the intensity depends on the Kp index : that the intensity increases with larger Kp index.

References

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