



Statistical Features of Plasma Wave Spectra Derived from 6 Years Observation by PWE/OFA on board the Arase

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The ERG (Exploration of energization and Radiation in Geospace) project is a mission to study plasma physics in the Earth's inner magnetosphere. The Plasma Wave Experiment (PWE) [1] aboard the Arase satellite measures electric wave fields from DC to 10 MHz and magnetic wave fields from a few Hz to 100 kHz. In the present paper, we statistically analyzed the spatial distribution of the plasma waves measured by the onboard frequency analyzer (OFA) [2], which is one sub-system of the PWE instrument covering the frequency range below 20kHz with a time resolution of 1 second as a nominal operation mode. This frequency range is crucial for plasma wave observation because chorus waves, magnetospheric hiss, lightning whistlers and magnetosonic waves are detected.

About six years have passed since the Arase started its observations, and the PWE continues to comprehensively observe plasma waves in the inner magnetosphere. Compared with the previous study revealed by the Van Allen Probes observation [3], we are able to investigate not only equatorial region but also the off-equatorial region due to larger inclination of the Arase orbit.

In the present paper, we report the global distributions of plasma wave intensities in electric and magnetic field in the inner magnetosphere by the statistical analyses of the power spectrum data from the OFA. Magnetosonic waves are also confined to the lower latitude region. On the other hand, the plasmaspheric hiss waves (<800Hz) are widely distributed inside of the plasmasphere with its intensity peak on the noon side. In the off-equatorial region, electrostatic waves with a lower cutoff at lower hybrid resonance frequency (f_{LHR}) mainly on the noon side are identified between the frequency range of chorus and hiss. They are categorized into lightning whistlers and plasmaspheric hiss, but more detailed analysis is necessary to classify the spatial distribution of these emissions. In the presentation, we report the parameter dependence and occurrence frequency of these plasma waves to discuss the general features of the plasma wave activities in the inner magnetosphere.

References

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