Statistical Analysis of EMIC Waves Observed by Plasma Wave Experiment (PWE) aboard Arase

*松田 昇也[1]、笠原 禎也[2]、三好 由純[1]、野村 麗子[3]、栗田 怜[1]、寺本 万里子[1]、笠羽 康正[4]、石坂 圭吾[5]、小路 真史[1]、松岡 彩子[6]
*Shoya Matsuda[1], Yoshiya Kasahara[2], Yoshizumi Miyoshi[1], Reiko Nomura[3], Satoshi Kurita[1], Mariko Teramoto[1], Yasumasa Kasaba[4], Keigo Ishisaka[5], Masafumi Shoji[1], Ayako Matsuoka[6]

1. 名古屋大学　宇宙地球環境研究所、2. 金沢大学、3. JAXA、4. 東北大学、5. 富山県立大学、6. ISAS/JAXA
1. Nagoya University, 2. Kanazawa University, 3. JAXA, 4. Tohoku University, 5. Toyama Prefectural University, 6. ISAS/JAXA

The wave-particle interaction process has an important role for the electron acceleration and loss in the terrestrial inner magnetosphere. Particularly, the significant loss of relativistic electron and energetic ion precipitation due to electromagnetic ion cyclotron (EMIC) waves is a remarkable process. Statistical analyses of EMIC waves around radiation belts have been performed by using data obtained by the Van Allen probes, and they clarified local time dependence of EMIC waves in the inner magnetosphere. The Arase satellite was launched on December 20, 2016 to understand dynamics around the Van Allen radiation belt such as particle acceleration, loss mechanisms, and the dynamic evolution of space storms in the context of cross-energy and cross-regional coupling. The Plasma Wave Experiment (PWE) is one of the scientific instruments onboard the Arase satellite and measures the electric field and magnetic field in the inner magnetosphere. A great advantage of Arase's observation is its latitudinal coverage. Because the orbital inclination of Arase is 31 degrees, the satellite has many chances to observe not only around the geomagnetic equatorial region but around mid-latitude region. We successfully obtained 166 EMIC waves during first 9 months after the satellite was launched. We found that 37% of observed EMIC waves obtained by the PWE has such fine structures. Our statistical analyses showed that the spatial distributions of the unstructured EMIC waves and that of the fine-structured EMIC waves were greatly different. Occurrence probability of the fine-structured EMIC waves had a clear peak around noon. We also showed the spatial distribution of the fine-structured EMIC waves, and found that they were observed around a specified L-shell (approximately L=3-4). The wide latitudinal coverage of Arase's orbit enabled this unique analysis.

キーワード：あらせ衛星、EMIC波動
Keywords: Arase satellite, EMIC waves

