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Initial results of EMIC observation by MGF/Arase

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The Electromagnetic ion cyclotron (EMIC) wave is one of the key phenomena to understand the loss dynamics of MeV-energy electrons in the Earth's radiation belt. The precipitation into the ionosphere of MeV-energy electrons was observed in the isolated proton aurora which is an ionospheric footprint for the region of EMIC wave-particle interaction in the magnetosphere [1]. However, it is still unclear how significant the EMIC wave is in terms of the global scale of the whole radiation belt, and it is important to understand where and when the preferable condition is set in the radiation belt of the inner magnetosphere for strong EMIC waves.
Li et al. [2-3] showed that the whistler mode chorus waves, as a counter part of EMIC waves, were modulated by the compressional ULF waves and the variation of background density, and showed the global distribution of its modulation with three different mechanism, by compressional ULF waves, by density depletions, and by density enhancement. In order to find the global distribution of EMIC wave modulation and its mechanism, we investigated in situ statistical survey of EMIC waves observed by Arase satellite from March to October 2017, and identified 64 events using the fluxgate magnetometer (MGF) on the satellite. We found that the enhancements of EMIC waves were occurred at localized region less than 0.1MLT, and with 5-10nT weaker magnetic field than background, at 22:20-22:30UT on 27 May and at 2017, and at 07:30-08:00UT on 25 June 2017. We will discuss the EMIC wave excitation and enhancement mechanism in the deep inner magnetosphere.

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