An observational study on possible excitation of storm-time Pc5 waves

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The adiabatic acceleration associated with the radial diffusion by the ULF wave is an important mechanism that generates relativistic electrons in the radiation belts. Among various ULF waves observed in the geospace, the storm-time Pc5 wave is a possible candidate to drive the radial diffusion during magnetic storms, although its excitation process and the relation between the observed waves and the radial diffusion have not been confirmed. Storm-time Pc5 wave is thought to be excited by injected ions from magnetotail to the ring current. Recently, Yamakawa et al. (2019) demonstrate that Pc5 waves can be excited by the injected ions via the drift resonance by a numerical simulation study.

This paper would like to address the Pc5 excitation process based on recent multi-satellite observation datasets obtained in the inner magnetosphere. According to the results of Yamakawa et al. (2019), Pc5 waves excited by the drift resonance have a characteristic of the frequency evolution. Using the magnetic field observation of Arase (ERG), we have collected Pc5 wave events that show the same frequency evolution as that observed in the numerical simulation. As a result, the occurrence probability of the Pc5 wave events depends on the geomagnetic activity, and the spatial distribution of the selected events is consistent with the simulation results.

Further, we pick up the examples of Pc5 events where the ion injections are observed just before and investigate if the observed injected ions can excite Pc5 waves through drift resonance. This presentation will discuss the relationship between ion injection events and Pc5 observations in the drift resonance context.

