

Overview of the plasma wave experiment (PWE) on board the Arase (ERG) Satellite -Data evaluation and initial results-

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The ERG (Exploration of energization and Radiation in Geospace) project is a mission to study acceleration and loss mechanisms of relativistic electrons around the Earth. To achieve comprehensive observations of plasma/particles, fields, and waves, the Arase satellite was launched on December 20, 2016. The Plasma Wave Experiment (PWE) is one of scientific instruments on board Arase. It measures electric field from DC to 10 MHz by the wire-probe antennas (WPT), and magnetic field from a few Hz to 100 kHz by the magnetic search coils (MSC). Three kinds of receivers are implemented in the PWE; EFD (Electric Field Detector), OFA/WFC (Onboard Frequency Analyzer and Waveform Capture), and HFA (High Frequency Analyzer). Several kinds of operational modes are implemented in the PWE, and the telemetry data consists of several kinds of data such as power spectrum, waveform, spectral matrix and DC E-field.

The Arase has started nominal scientific operation in March 2017. Varieties of wave phenomena such as chorus, EMIC, and lightning whistlers have been successfully observed by the PWE. Furthermore, we sometimes identified drastic variation of electron density derived from UHR frequency and corresponding wave activity along the trajectory. We have conducted cooperative observations with the ground-based stations and the other satellites in the magnetosphere. During the campaign observation period, we intensively conducted the PWE burst mode operations, by which waveforms were continuously captured and once stored in the mission data recorder (MDR). The data stored in the MDR were selected and downloaded to the tracking stations according to the decision of the stakeholders of the campaign observation.

In the presentation, we introduce the results of data evaluation as well as initial observation results obtained from the PWE.

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