

Comparison of events with prominent fluctuations common to particle and wave observations by the ERG/Arase satellite

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The Energization and Radiation in Geospace (ERG) satellite, launched in December 2016 and also known as Arase since then, began its regular observations of the inner magnetosphere in March 2017. On board the satellite are various instruments for the measurements of electrons and ions of various energy ranges, and electric and magnetic fields at various frequencies. The electron instruments include the Low-Energy Particle Experiments - Electron Analyzer (LEP-e), which performs measurements of electrons in the energy range between ~ 20 eV and 19 keV, and three other experiments, Medium-Energy Particle Experiments - Electron Analyzer (MEP-e), High-Energy Electron Experiments (HEP) and Extremely High-Energy Electron Experiments (XEP), respectively covering the medium, high, and extremely high energy ranges up to 20 MeV. Ion measurements are performed by Low-Energy Particle Experiments - Ion Mass Analyzer (LEP-i) and Medium-Energy Particle Experiments - Ion Mass Analyzer (MEP-i) together for energies between 10 eV and 180 keV per unit charge, while the electric and magnetic fields are observed by Plasma Wave Experiment (PWE) and Magnetic Field Experiment (MGF).

As LEP-e focuses on the lowest energy range among the electron sensors, it is expected to cover the largest electron population in the observations. Hence, significant variations in the LEP-e measurements are indicators of physical processes that affect a majority of electrons. Over several months, LEP-e has observed a number of events in which the measured electron counts exhibit prominent fluctuations at regular time scales. These events are examined also using measurements of the other aforementioned experiments, and it is found that similar prominent fluctuations are also observed by all of those instruments in quite a few events. In this presentation, we focus on such events and discuss the similarities and differences among them.