High-energy electron observation with the HEP instruments onboard Arase

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The high-energy electron experiments (HEP) onboard the Arase satellite detect 70 keV-2 MeV electrons and generates a three-dimensional velocity distribution of electrons for every period of the spacecraft spin. HEP comprises two types of telescopes, HEP-L and HEP-H, that have different geometrical factors (G-factor) and energy ranges. HEP-L observes 70 keV-1.0 MeV electrons, and its G-factor is about 10^{-3} cm ^{2} sr for three detector modules, and HEP-H observes 0.7-2.0 MeV, and its G-factor is about 10^{-2} cm^{2} sr. To deduce the distribution of incident electrons from the direction and energy detections in orbit, we are developing a detector simulator using the Geant4 toolkit. Especially contamination from high energy particles must be take care of with the simulator. We are working on comparisons between the simulation results and observation.

Since HEP started its normal observations in late March 2017, it has observed several cycles of sudden depletion and recovery of electron fluxes in the outer radiation belt in response to geomagnetic storms. When the geomagnetic activity was low for about a month, the electron fluxes slowly decrease in the outer radiation belt.

We will present calibration status using the simulator and also highlights of the HEP one-year observations.

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