Electron flux variations of the outer radiation belt during magnetic storms observed by Arase/HEP and Van Allen Probes/MagEIS

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The Arase satellite has been regularly observing high-energy electrons of the outer radiation-belt since March 2017 with the HEP (High-energy electron experiments) instrument that measures electrons with energies from 70 keV to 2 MeV. In addition to calibrations with laboratory accelerators, simulations for HEP were carried out to establish the performance of this instrument. Also, we use the calibrated data for our analysis. Since the beginning of the HEP observations, the Arase has observed more than 15 magnetic storms with Dst values under -30 nT. For these storm events, we investigate variations of energetic electron flux, primarily focusing on the dropout of the outer radiation belt during the storm main phases. Using the superposed epoch analysis, we derived average variations of the energy spectrum as a function of L and time. With this, we found the energy dependency of the flux dropout, which was identified by fitting a power-law function to energy spectra, and subsequent recovery and enhancements of the outer belt electrons. The energy spectrum tends to become hard between L ˜3 to 7 during the storm recovery phase, indicating the acceleration of energetic electrons. We also examined simultaneous observations of electrons made by Van Allen Probes to compare them with the Arase data for the same magnetic storms.