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Variation of energetic electron flux in Earth's radiation belts based on Van Allen Probes observations

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The Earth's radiation belts have been an important research topic of solar-terrestrial physics from 1958. In 2012, Van Allen Probes (VAP) were launched into near-equatorial orbit and provide very good in-situ observations of energetic particles in inner magnetosphere. Since magnetospheric substorm can cause the severe disturbance of the Earth's megnetospheric environment, here we focus on the characteristics of energetic electron fluxes in the radiation belts during substorm time and non-storm time. Energetic electron data observed by the Magnetic Electron Ion Spectrometer (MagEIS) and Energetic Particle Composition and Thermal Plasma Suite (ECT) of VAP during 2012 to 2014 are carefully analyzed. We select portions of energetic electron data from substorm onset phase, growth phase, recovery phase, and quiet time, and make a comparisons with theoretical computations. We find that the electron differential fluxes present E^{-1} shape at lower energies (<1MeV), and have a sharp transition with steeper slopes at high energies for large L-shells, which are in coincidence with Mauk's model [Mauk et al., 2010].