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We analyze variations of energetic particle fluxes measured by low altitude spacecraft after interplanetary shock arrivals and around the times of significant geomagnetic storms. Data from two different spacecraft and energetic particle detectors are used and compared. First, we use data measured by the energetic particle detector (IDP) onboard the Detection of Electro-Magnetic Emissions Transmitted from Earthquake Regions (DEMETER) spacecraft. The spacecraft operated between 2004 and 2010 on a circular Sun-synchronous orbit at an altitude of initially 710 km, which was decreased to 660 km in December 2005. The IDP instrument measured electron flux close to the loss cone at energies between about 70 keV and 2.3 MeV (128 energy channels). Second, we use data measured by the Space Application of Timepix Radiation Monitor (SATRAM) onboard the Proba-V satellite operating since May 2013 on a circular Sun-synchronous orbit at an altitude of 820 km. The semi-conductor based pixelated radiation detector called Timepix is capable of detecting all charged particles and X-rays with sufficiently high energies. Electron energies higher than about 2 MeV and proton energies higher than about 20 MeV are detected. We identify the times of interplanetary shock arrivals and significant (Dst < –100 nT) geomagnetic storms during the mission durations. Then we perform a superposed epoch analysis to reveal characteristic particle flux variations around these times at different energies and L-shells. Although the used satellite missions do not overlap in time, we aim to compare the revealed flux variation signatures between these two independent data sets.