How Coherent are Flux Variations in the Outer Van Allen Radiation Belt?

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The electron population inside Earth's outer radiation belt is highly variable and typically linked to geomagnetic activity such as storms and substorms. These variations can differ with radial distance, such that the fluxes at the outer boundary are different from those in the heart of the belt. Using data from the Proton Electron Telescope (PET) on board NASA's Solar Anomalous Magnetospheric Particle Explorer (SAMPEX), we have examined the correlation between electron fluxes at all L's within the radiation belts for a range of geomagnetic conditions, as well as longer-term averages. Our analysis shows that fluxes at L=2-4 and L=4-10 are well correlated within these regions, with coefficients in excess of 80\%, however, the correlation between these two regions is low. These correlations vary between storm-times and quiet-times. We examine whether, and to what extent this correlation is related to the level of enhancement of the outer radiation belt during geomagnetic storms, and whether the plasmapause plays any role defining the different regions of correlated flux.