



The radiation-belt electron phase-space-density response to stream-interaction regions: Multi-point observations, data-assimilation, physics-based modeling, and forecasting

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Presented is an analysis of the phase-space density (PSD) response to the stream-interaction region (SIR), which utilizes a reanalysis dataset principally comprised of the data-assimilative Versatile Electron Radiation Belt (VERB) code, Van Allen Probe and GOES observations. The dataset spans the period 2012-2017, and includes several SIR storms.

Using a snapshot analysis technique, the PSD is examined for evidence of injections, transport, acceleration, and loss by considering the instantaneous and time-averaged change over multiple adiabatic invariant values, simultaneously. The energies covered correspond to ring-current, relativistic, and ultra-relativistic energies. The dataset allows analysis of the dominant mechanisms, both external and internal to the magnetosphere, that cause radiation-belt electron non-adiabatic changes during these transient phenomena.

The results of this analysis are also discussed in relation to the operational data-assimilative radiation-belt forecast model, running every 2 hours at UCLA.