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Poster
Energetic electron precipitation (EEP) plays a central role in radiation belt loss, magnetosphere-ionosphere coupling, and variable energy deposition into the upper atmosphere. Although individual wave modes, including electromagnetic ion cyclotron (EMIC), whistler-mode chorus, and electron cyclotron harmonic (ECH) waves, are each known to contribute to precipitation under specific conditions, their combined and potentially overlapping influences remain incompletely understood.

We present a multi-mission investigation of EEP associated with the joint effects of these wave populations using coordinated observations from THEMIS, ELFIN, and DMSP. THEMIS data are used to characterize wave activity and the surrounding magnetospheric environment, ELFIN provides low-altitude measurements of precipitating and trapped electron populations, and DMSP offers complementary particle observations that place precipitation signatures in a broader geophysical context.

The analysis focuses on identifying intervals in which multiple wave modes are present simultaneously or in close succession and on assessing their relative and combined contributions to electron precipitation across different energy ranges and spatial regions. By integrating measurements across missions, this study aims to better constrain the physical pathways through which wave-particle interactions produce EEP and to distinguish intervals dominated by a single mechanism from those involving coupled or sequential processes. The results will improve understanding of radiation belt dynamics and support ongoing efforts to better characterize and predict particle precipitation relevant to satellite environment specification, anomaly risk assessment, and future physics-informed forecasting applications.
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Poster location
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