**Energetic electron precipitation in during substorm injections**  
  
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Substorm energetic electron precipitation (EEP) from the equatorial magnetosphere to the atmosphere is the most powerful, transient mesoscale driver of atmospheric chemistry dynamics and the formation of low-ionosphere (<100km) conductance layer. Two concurrent mechanisms are potentially responsible for EEP: resonant electron scattering by whistler-mode waves and electron scattering by magnetic field-line curvature in the magnetotail current sheet. Contribution of these mechanisms to EEP is dictated by the latitudinal (radial) location of the precipitation regions, with curvature scattering dominating poleward from the inner magnetosphere that is likely controlled by whistler-scattering. However, the low energy resolution of previous EEP measurements at low altitudes and large mapping uncertainties to the equator prohibits a precise evaluation of the energy range and radial location of substorm EEP. This presentation reports the analysis of two substrom EEP events (with electron energies ~MeV) that lasts for two hours and occupies a region from the plasmapause to the near-Earth plasmasheet. Using ELFIN, Swarm, POES, and THEMIS observations, we show that EEP at relativistic energies is likely driven by curvature scattering due to the earthward motion of the magnetotail current sheet at the post-midnight sector, but in the pre-midnight sector such EEP is provided by electron resonant scattering by electromagnetic ion cyclotron waves. We also estimate the impact of such strong substrom EEP on the ionosphere ionization, in comparison with precipitation of plasma sheet (<30keV) electrons.