Abstract Submitted
for the SES17 Meeting of
The American Physical Society

The role of the dynamic plasmapause in outer radiation belt electron flux enhancement and three-belt structure formation MARGIE BRUFF, University of North Carolina at Chapel Hill, ALLISON JAYNES, University of Iowa, HONG ZHAO, Lab for Atmospheric and Space Physics, Boulder CO
— Plasma waves inside and outside the Earth's plasmasphere can lead to loss or acceleration of high energy outer radiation belt electrons. Early studies found an apparent correlation on long time scales between the observed inner edge of the outer radiation belt and the simulated innermost plasmapause location. Recent work using high resolution satellite data has revealed a more complex relationship. The aim of this project was to provide a systematic study of the dynamics of the plasmapause compared to the outer belt MeV electrons. We used REPT electron flux and EFW derived density data from the Van Allen Probes. We found that the location of peak flux was consistently outside the innermost location of the plasmapause at enhancement times, with an average standoff distance ΔL=1.0 +/- 0.5. This is consistent with current chorus enhancement models and previous chorus wave observations. We also identified "three-belt" structure events where a second outer belt formed. We found a repeated pattern of plasmapause dynamics associated with specific changes in electron flux required to generate and sustain these structures. This study is significant toward understanding how the plasmasphere under differing conditions can shield Earth from or worsen the impacts of geomagnetic activity.

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Date submitted: 06 Oct 2017 Electronic form version 1.4