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Electron pitch angle anisotropy in corotating interaction region-driven storms – implications for radiation belt loss and electron precipitation

Hilde Nesse Tyssøy (1), Linn-Kristine Glesnes Ødegaard (1,2), Johan Stadsnes (1), Marit Sandanger (1), Finn Søraas (1), and Kristian Snekvik (1)

(1) Birkeland Centre for Space Science, University of Bergen, (2) Royal Norwegian Naval Academy

High Speed Solar Wind Streams (HSSWS) and Corotating Interaction Region (CIR) events are considered as primary drivers of relativistic electron precipitation (REP) from the outer radiation belt. HSSWS/CIR events, however, do not always cause REP and the reason for this is not fully understood. The present study identifies 41 isolated CIR events from 2006 and 2010. Bounce loss cone (BLC) fluxes are estimated based on the NOAA POES MEPED 0 and 90 degree detectors combined with theory of pitch-angle diffusion due to wave-particle interaction. Based on the pre- and post-storm BLC fluxes the events are sorted into three groups; events with increase in the > ∼750 keV flux level, events with increase in the >∼300 keV flux level, and events where the REP flux level decreases or does not change. The REP flux level is strongly dependent on the energy transferred into the magnetosphere independent of the different storm groups. Further, the level of pitch angle anisotropy increases with increased flux levels in the recovery period of the storm, except for the evening sector where EMIC waves occur. Potential acceleration and pitch angle scattering sources are discussed, as well as the associated implications for quantifying REP into the atmosphere.