



Effect of EMIC Waves on Relativistic and Ultra-Relativistic Electron Populations: Ground-based and Van Allen Probes Observations

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We study the effect of electromagnetic ion cyclotron (EMIC) waves on the loss and pitch-angle scattering of relativistic and ultra-relativistic electrons during the recovery phase of a moderate geomagnetic storm on October 11, 2012. The EMIC wave activity was observed in-situ on the Van Allen Probes and conjugately on the ground across the CARISMA array throughout an extended 18-hour interval. However, neither enhanced precipitation of >0.7 MeV electrons, nor reductions in Van Allen Probe 90o pitch-angle ultra-relativistic electron flux were observed. Computed radiation belt electron pitch-angle diffusion rates demonstrate that rapid pitch-angle diffusion is confined to low pitch angles and cannot reach 90o. For the first time, from both observational and modeling perspectives, we show evidence of EMIC waves triggering ultra-relativistic ($\sim 2-8$ MeV) electron loss, but which is confined to pitch angles below around 45 degrees and not affecting the core distribution.