Geophysical Research Abstracts
Vol. 13, EGU2011-12728, 2011
EGU General Assembly 2011

The Energization of Ions in the Magnetotail during CME- and CIR-driven Geomagnetic Storms

Vahe Peroomian and Mostafa El-Alaoui
UCLA, IGPP, Los Angeles, United States (vahe@igpp.ucla.edu)

The acceleration of ions of ionospheric and solar wind origin in the near-Earth magnetotail during geomagnetic storms was investigated in this study. We considered storms caused by the impact of a coronal mass ejection (CME) and by corotating interaction regions (CIRs) and high-speed streams. For each of the storms studied, we ran a global magnetohydrodynamic (MHD) simulation of the event using upstream solar wind and IMF data. We then launched ions originating from the solar wind and from the ionosphere in the global, time-dependent electric and magnetic fields obtained from the MHD simulation of the event. We examined the acceleration of ions in the near-Earth plasma sheet and ring current during the sudden storm commencement during CME-driven storms to the acceleration of ions during the more slowly evolving CIR-driven storms. To do so, we evaluated the effect of various solar wind drivers, including density enhancements as well as vBz effects, on ion velocity distribution functions computed throughout the near-Earth tail during each event. Where possible, our simulation results were compared with observations.