GLOBAL COMPARISON OF PROTON AURORA AND TRAPPED PARTICLE DYNAMICS

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With recent IMAGE energetic neutral atom (ENA) observations we can globally correlate the dynamics of precipitating proton auroral phenomena with the dynamics of non-precipitating plasma, tying processes at different portions along magnetic field lines together. We present comparisons for IMAGE FUV proton aurora and IMAGE MENA medium energy neutral atom (ENA) observations of isolated and storm-time substorm events during the time period 2000 to 2002, supplemented by Los Alamos geosynchronous in situ plasma measurements. We compare remotely sensed particle fluxes during the growth, expansion and recovery phase of isolated substorms. The proton auroral response is typically both quicker and stronger, with significant flux increases over short periods of time. The ENA response is typically slower and more gradual. In addition, enhanced flux levels will persist up to several hours, much longer than the, by comparison, short-lived auroral displays. While this represents a considerable difference in the time evolution of an event, the magnetic local time extent of precipitating and trapped particles tracks much more closely. We will compare this behavior to in situ plasma measurements at geosynchronous altitudes. We will also discuss how ENA signatures of isolated substorms compare to storm-time events.