



## **Multi-point observations of large scale perturbations on the open/closed field line boundary during a geomagnetic storm, as observed by the Van Allen Probes and geostationary satellites**

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We discuss a series of lobe entry events observed by the twin Van Allen Probe spacecraft between 0200 and 0515 UTC during the November 14th 2012 geomagnetic storm. During the events Dst was below -100nT with the IMF being strongly southward ( $B_z = -15\text{nT}$ ) and eastward ( $B_y = 20\text{nT}$ ). The events occurred in the southern hemisphere flank between 0400 and 0635 local time and at altitudes between 5.6 and 6.2 RE, and were characterized by significantly diminished electron and ion fluxes and a corresponding strong, highly stretched magnetic field. Both spacecraft crossed into the lobe five times with durations from 3-10 minutes. Four of the events were seen by both Van Allen Probes nearly simultaneously despite separations of up to 45 minutes of local time. In all cases the more tailward satellite sees the boundary crossing first. The lobe was also encountered at the same time by the LANL geosynchronous satellites, both at dawn in the northern hemisphere and dusk in the southern hemisphere. These multi-spacecraft observations are used to constrain the spatial and temporal extent of the open/closed field line boundary and to compare this topology to that predicted by a range of magnetic field models. Significant accelerated field aligned oxygen signatures were measured by the HOPE low energy plasma instrument aboard the probes. Using the multi-point measurements we will examine the source of this acceleration and its role in inner magnetosphere ion dynamics.