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# Investigating the Importance of Viscous Interactions on Ionospheric Convection via Comparisons of Open-Closed Boundaries (OCBs) and Convection Reversal Boundaries (CRBs)

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Geomagnetic storms cause large global disturbances in the Earth's magnetosphere, during which large amounts of energy are deposited in the magnetotail and inner magnetosphere, producing an enhanced ring current and energising plasma to relativistic levels by poorly-understood excitation mechanisms.

A previous study by Hutchinson et al. [2011] identified 143 geomagnetic storms over the last solar cycle (1997-2008) from the global SYM-H index and associated solar wind (SW) data from the Advanced Composition Explorer (ACE) spacecraft. Current work continues to use this dataset to investigate the characteristic ionospheric convection during magnetic storms via radar backscatter observed by the Super Dual Auroral Radar Network (SuperDARN). A superposed epoch analysis is completed using the map potential technique of Ruohoniemi and Baker [1998]. This technique has previously successfully been used to investigate substorm convection, however the technique has not particularly been employed for studies of geomagnetic storms nor has the model fit been applied to combined radar data from multiple storms for statistical studies rather than performing the analysis on an individual storm by storm basis.

Latitude-Time-Velocity (LTV) plots, analogous to standard Range-Time-Intensity (RTI) plots, are used to visualise the results, which show the 'average' ionospheric response during different sized geomagnetic storms as the substorm control on the convection is mostly 'averaged out'. This, along with the cross-cap potential derived from the superposed SuperDARN results, is compared with similarly superposed auroral images from the IMAGE and POLAR spacecraft missions to better constrain the storm time coupling between the solar wind and magnetosphere. Results from the comparison of the convection reversal boundaries (derived from the SuperDARN data) and open-closed boundaries (from the auroral imagery) are presented to investigate the significance of a possible viscous interaction between the solar wind and the magnetosphere in addition to the normal reconnection-driven interaction.