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Inter-Hemispheric Coupling of Large Scale Travelling Ionospheric Disturbances during Geomagnetic Storms

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Large Scale Travelling Ionospheric Disturbances (LSTIDs) are fluctuating disturbances in the ionospheric plasma density that are frequently observed during the main phase of geomagnetic storm. They are characterized by horizontal velocities of 500 to 1000 m/s, wavelength of 1000 to 3000 km and 1 to 3-hour period. In the present project, the data obtained from GNSS receiver network and the network of magnetometers over north and south America are used to study the behavior/interactions of the LSTIDs due to auroral source in one hemisphere (e.g. northern hemisphere) with the LSTIDs due to similar auroral source in the other hemisphere (e.g. southern hemisphere) during an intense geomagnetic storm of September 8-9, 2017. We investigate the hemispheric electrodynamic interconnectivity of the propagating LSTIDs and their basic features such as amplitude, velocity, wavelength, damping, frequency, as well as the phase of these waves that propagate from one source region to the other. Our study also indicates the initialization of the LSTIDs, their duration and whether they survived into the conjugate hemisphere (i.e. whether wave interactions are constructive or destructive).

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