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Understanding the Generation of LSTIDs and their impacts on the Low-Latitude Ionosphere

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Large Scale Traveling Ionospheric Disturbances (LSTIDs) have been observed extensively in GPS TEC and other datasets, but their mechanism for formation, progression, and their global impacts are still not well understood. Our current knowledge of their origin, evolution and impact has been limited due to historically scarce geographic data coverage and the difficulty of models to adequately capture LSTIDs. Recently, however, numerical models have shown significant improvements in capturing the intricacy of the full I-T system at resolutions appropriate for the generation of LSTIDs. Therefore, we employ a two-way coupled ionosphere-thermosphere model, developed by combining WACCM-X (Whole Atmosphere Community Climate Model, Extended version) with the three-dimensional ionospheric model SAMI3 (SAMI is Another Model of Ionosphere), to simulate LSTIDs. To assess the control of high latitude drivers on LTSID generation, numerical experiments are run with and without the high latitude drivers. The impacts of LSTIDS on the low-latitude longitudinal variability are examined by comparing simulations with and without LSTIDs.