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Formation of O^+ trough zones in the polar cap ionosphere-magnetosphere coupling region: Dynamic Fluid-Kinetic Simulations[1]
JAMES HORWITZ, WEN ZENG, FAJER JAAFARI, Department of Physics, The University of Texas at Arlington, Arlington, TX 76019 — Thermal ion measurements by the Thermal Ion Dynamics Experiment(TIDE) on the POLAR spacecraft show that the O^+ densities in the polar cap near 6000 km altitude display structured variations featuring low-density trough regions. For this presentation, the UT Arlington Dynamic Fluid-Kinetic (DyFK) model is utilized to investigate such O^+ density profiles. Using available measured solar wind parameters to drive a time-varying high-latitude convection model and incorporating auroral processes of soft electron precipitation and wave-driven ion heating, we simulate the evolving high-latitude ionospheric plasma transport and associated parameter profiles for several convecting flux tubes in the high-latitude ionosphere-magnetosphere system. The modeled densities near 6000 km altitudes are compared with multiple trough events featuring POLAR/TIDE-measured O^+ densities for inside and outside of such trough regions.

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