

A Study of the Momentum Balance in the High-Latitude Lower Thermosphere Based on the Ncar-Tiegcm: Dependence on the Interplanetary Magnetic Field (IMF)

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Lower thermospheric winds are forced primarily by non-uniform solar heating, atmospheric tides and other waves coming from below, and energy and momentum forcing associated with high-latitude magnetosphere-ionosphere coupling, particularly ion drag and Joule heating. To understand the physical processes that control the thermospheric dynamics, we quantify the momentum forces that are mainly responsible for maintaining the high-latitude lower thermospheric wind system and examine the resulting momentum balance with the aid of the Thermosphere-Ionosphere Electrodynamics General Circulation Model (NCAR-TIEGCM) developed by the National Center for Atmospheric Research. Kwak et al. (2004) have shown that the high-latitude lower thermospheric winds were significantly influenced by the interplanetary magnetic field (IMF). The dependence of the momentum forcing on IMF is further examined in this study.