Geophysical Research Abstracts
Vol. 19, EGU2017-4740, 2017
EGU General Assembly 2017
© Author(s) 2017. CC Attribution 3.0 License.

Longitudinal structure in electron density at mid-latitudes: upward-propagating tidal effects

Hui Wang and Kedeng Zhang
Dept. of Space Physics, School of Electronic Information, Wuhan University, Wuhan, China

This work studies the upward-propagating migrating and non-migrating tidal effects from the lower atmosphere on the longitudinal variation of electron density Ne in both E and F regions at mid-latitudes at March equinox, 2002. Twelve runs are conducted by using Thermosphere Ionosphere Electrodynamic General Circulation model model (TIEGCM) for theoretical investigation. Ne at altitudes higher than 200 km is affected by upward propagating tides, with maximum values attained around 300 km. Migrating tides result in reduced longitudinal differences in Ne over North America and in the Southern Hemisphere, while non-migrating tides induce a wave-4 pattern in both hemispheres. The non-migrating effect is weaker than migrating effect after penetrating into F region. The neutral composition (i.e. ratio between atom oxygen and molecular nitrogen) is in major charge of Ne in the tidal penetration process. Ne caused by the tidal meridional wind is stronger than the tidal zonal wind under both migrating and non-migrating tidal conditions, except for the southern hemisphere under migrating tidal input. This work contributes to our understanding of mechanisms for the longitudinal modulation of Ne at mid-latitudes.