

Simulated longitudinal variations in the E-region plasma density induced by non-migrating tides

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Based on the GCITEM-IGGCAS model and tides from TIMED/SABER observations, the longitudinal variations of the E-region plasma densities, which is induced by non-migrating tides, are investigated. We simulated the intra-annual variation of the E-region plasma density, and found that equinoctial E-region plasma density shows an obvious wavenumber-4 longitudinal structure both in Equinox and in June Solstice, and a wavenumber-3 longitudinal structure in December Solstice. Our simulations suggest that DE3 tide can drive the wavenumber-4 structure in E-region plasma density, and DE2 tide can drive the wavenumber-3 structure. O_2^+ controls the longitudinal variations of total ions density at lower E-region, and NO^+ mainly controls that at higher E-region. We also noticed that the longitudinal variations of O_2^+ and of NO^+ show obvious phase differences.

Keywords: Longitudinal variation, E-region plasma density, non-migrating tides