Local time evolution and longitudinal difference of equatorial ionization anomaly in the low-latitude topside ionosphere

*Yiding Chen[1], Libo Liu[1], Huijun Le[1], Weixing Wan[1]

1.Institute of Geology and Geophysics, Chinese Academy of Sciences

The latitudinal structure of topside ion density (N_i) was investigated in detail based on the N_i observations of the ROCSAT-1 and DMSP satellites. EIA double-peak structure can exist at 600 km, depending on longitude, local time, season, and solar activity, while it cannot extend up to 840 km even in the case of the strong fountain effect at solar maximum sunset. The complete local time evolution of the EIA at 600 km was presented. The double-peak structure begins to appear at noontime, being later than the appearance of the EIA in F_2-peak region. The pronounced EIA induced by the strong prereversal enhancement at solar maximum begins to appear at 19:00 LT and can last to pre-midnight; and EIA crest-to-trough ratio (*CTR*) reaches a maximum at 20:00 LT, with the largest (lowest) *CTR* at March equinox (June solstice). EIA structure shows evident longitudinal difference. Pronounced EIA exists around about 100°E at 13:00 LT at the two equinoxes and June solstice, while it exists at more extensive longitudes (about 90°E to 240°E) at December solstice. The trans-equator plasma transport induced by neutral winds can weaken the double-peak structure in the topside ionosphere. The longitudinal difference in the EIA structure at 600 km is related to the longitudinal variations of equatorial upward plasma drift and geomagnetic declination.

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