

Longitudinal structure in the low-latitude ionosphere observed by FORMOSAT-3/COSMIC

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Abstract

A nighttime feature of plasma depletion bay (PDB) on the longitudinal structure over the equatorial and low-latitudes is observed by the FORMOSAT-3/COSMIC (F3/C) electron density profiles. The existence of the PDB feature is confirmed by the OI 135.6-nm radiance from TIMED/GUVI, which together with F3/C electron density shows that one North PDB extending to the Southern Hemisphere prominently appears over Southwest America while three South PDBs extending to the Northern Hemisphere occur over North Atlantic, India Ocean, and Southeast Asia. Three dimensional F3/C ionospheric electron densities are further used to examine PDB structures at various local times, seasons, solar activities, and altitudes during 2007–2014. It is found that the North PDB is observed during October–March, while the South PDBs mostly exist during April–September. These PDBs can be observed within 250–350 km altitudes in the nighttime, appearing pronounced over 275–300 km altitudes around 2300–0100 LT, in the low solar activity year of 2007.