Response of the F_2-peak electron density and height to plasma depletion bays in the equatorial nighttime ionosphere observed by FORMOSAT-7/COSMIC-2

*FU-YUAN CHANG[1,2], Jann-Yenq G Liu[1,2], PANTHALINGAL-KRISHNANUNNI RAJESH[3], CHI-YEN LIN[1,2]

1. National Central University, 2. Center for Astronautical Physics and Engineering, National Central University, Taiwan, 3. Department of Earth Sciences, National Cheng Kung University, Taiwan

FORMOSAT-7/COSMIC-2 (F7/C2) satellite cluster, launched in June 2019, performs radio occultation experiments observing the vertical electron density profiles in the low-latitude ionosphere. The F7/C2 F_2 -peak electron density (*NmF2*) and height (*hmF2*) are used to identify and examine the behavior of the plasma depletion bay (PDB) structures in the equatorial nighttime ionosphere. The *NmF2* reveals three distinct PDBs within 60°W–15°E, 30°–90°E, and 110°–160°E during June solstice, while a single PDB appears within 150°–60°W during December solstice. All the four PDBs' features simultaneously appear during March and September equinoxes. Asymmetries in the *hmF2* over the PDB regions suggests that the electron density increases (decreases) are related to the *NmF2* ascending (descending) in the summer (winter) hemispheres. Agreements between F7/C2 observations and HWM93 results show that the asymmetry of vertical motions driven by the neutral wind is the main causal mechanism for the longitudinal variation of PDBs.

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