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SLAB-THICKNESS AND BOTTOMSIDE THICKNESS WITH IRI MODEL OVER AN EQUATORIAL
STATION IN AFRICA

Abstract

The previous investigation of slab-thickness (τ) was carried out using digisonde portable sounder (DPS) therefore, the plasmaspheric electron content (PEC) distribution over the morphology of was neglected over the Africa sector. The PEC distribution on the topside and bottomside electron density N_e profile add considerably to the genuine signature of τ and thickness parameter (B0). Therefore, the dynamic contributions of the PEC need to be emphasized for the accurate prediction of the ionospheric models. The present study investigates the simultaneous morphologies of τ and B0 using global positioning system TEC (GPS-TEC) and peak parameters at the F2 region from digisonde portable sounder (DPS) during the quietest period over an equatorial station in Africa. Apart from daytime signatures of the τ and B0 that are not influenced by PEC, we found that a large part of the morning and dusk period are largely control by PEC that evolved as a huge difference between the τ and B0. Our investigation reveals that the B0 profile is thicker than the τ profile during the pre-sunrise period in June that indicates the partial flow or halt of PEC. The τ and B0 also revealed approximately similar value around the sunrise period that indicate the absence or little PEC flow contributions. Another interesting outcome found during the seasonal variations is the maximum τ and B0 during the December solstice and minimized during June solstice. We also observe a moderate sunrise enhancement in τ but not conspicuous in the B0. On the relationship between the τ and B0, we found a significant relationship between τ and B0 with greatest coefficient during the June seasons. This suggests that the prediction of one τ is possible in the absence of B0 or otherwise, especially during the June season that revealed the most significant relationships in τ and B0. A validation of the model τ and B0 with the observed parameters reveal large discrepancies especially in the τ parameter.