Tec and Slab-thickness Using GPS and Ionosonde Measurements from Equatorial and Low Latitude Stations in the Indian Sector

D.S.V.V.D.Prasad1, P.V.S.Rama Rao1, K.Venkatesh1, P.L.Saranya1, K.Niranjan1 Sudha Ravindran2, R.Sridharan2 and R.S.Dabas3 1Department of Physics, Andhra University, Visakhapatnam 530 003, India.

2Space Physics Laboratory, Vikram Sarabhai Space Centre, Trivandrum 695 022, India. 3Radio Science Division, National Physical Laboratory, New Delhi 110 012, India.

(E-mail: dsvvdprasad@yahoo.com, Phone: +91-9848502763)

The jonospheric slab-thickness is an important parameter which measures the skewness of the electron density profile of the ionosphere. In this paper, the diurnal, seasonal, day-to-day and latitudinal variations of ionospheric parameters (TEC, NmF2, slab-thickness and neutral temperature) are presented. The simultaneous observations of GPS TEC and ionosonde measurements (NmF2) at Trivandrum (8.470N, 76.910E), Waltair (17.70N, 83.30E) and Delhi (28.580N, 77.210E) are used to compute the slab-thickness (τ =TEC/NmF2) during the low sunspot period 2004 to 2005. The daytime TEC values at Waltair are greater than those at Trivandrum, while at Delhi the day time TEC values are much lower compared to those at Trivandrum and Waltair. The trend in the monthly mean diurnal variation of TEC and NmF2 are similar at Delhi, whereas they are different at Trivandrum and Waltair during the day time. In general, the slab-thickness has shown a pre-sunrise peak around 05:00hrs LT at all the three stations, except during the summer months at Delhi. A consistent secondary peak in slab-thickness around noon hours has also been observed at Trivandrum and Waltair. During equinox and winter a large night time enhancement in the slab-thickness (comparable to the early morning peak in slab-thickness) is observed at Delhi. The latitudinal variation of slabthickness has shown a decrease from the equatorial station, Trivandrum to the low-mid latitude station, Delhi. Further, the neutral temperatures (Tn) are computed from the slabthickness (τ) for the three different stations and the results of which are found to show similar nature of variation as those of the electron and ion temperatures measured by the SROSS C-2 satellite.