

On the validity of the effective altitude of 350Km used in the conversion of the Slant TEC to Vertical TEC using GPS measurement in the India equatorial and low latitude sectors

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It is commonly accepted that in the mid-latitude sectors, where the altitude of the maximum electron density does not vary significantly either temporally or spatially, an effective altitude of 350 Km could be used in the conversion of the Slant TEC to Vertical TEC using GPS measurements. However, in the equatorial and low latitude sectors where the variation in the altitude of the F-layer is known to be highly significant, an attempt is made to make a systematic study on the variation of $h_{\max}F_2$ from different locations in India in different seasons. For this purpose, ionosonde data pertaining to the moderately high and low sunspot years of 2001 and 2003 during the months of January, March, June, July and December of the year 2001 and January, March, April, June, July and December of the year 2003 from four Indian ionosonde stations located at Trivandrum (Dip 0.6° N), Waltair (Dip 20° N), Ahmedabad (Dip 34° N) and Delhi (Dip 42° N) are scaled and the monthly mean variations of $h_{\max}F_2/h_pF_2$ are studied.

It is observed that the variability in $h_{\max}F_2$ is largest at the equatorial station, Trivandrum, where it varies from a minimum of 250 Km to a maximum of 600 Km. Whereas at the high latitude station, Delhi the variability in $h_{\max}F_2$ is lowest and varies between 250 – 350Km. At the intermediate stations, Waltair and Ahmedabad, the minimum to maximum variation is found to be from 275 Km to 450 Km (fig 1). Thus, the use of an average value of 350 Km needs to be examined carefully in the Indian Sector. Hence, attempts are being made to use different higher values of this effective altitude at different station and compare the values of VTEC with those obtained using 350 Km.

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