Validation of IRI-2012 and IRI-2007 model in determining TEC at ananomaly crest station in India

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Abstract

The paper presents the ionospheric variations in terms of total electron content (TEC) derived from adual frequency GPS receiver that are conducted at Surat (21.160 N Geographic latitude, 72.780 EGeographic longitude) in India, which is situated under the northern crest of Equatorial IonisationAnomaly (EIA) region, for a period of three years (January 2010 - December 2012) during ascendingphase of 24th solar cycle. In this comparison plasmaspheric electron content (PEC) contribution to theGPS-TEC have been removed. These results are compared with the TEC predicted from two versionsInternational Reference Ionosphere (IRI) models: the IRI-2007 and IRI-2012. For the monthlycomparison of GPS-TEC with IRI modeled TEC both modeled TEC overestimates in June-2012 andunderestimates TEC in November-2011, December-2011 and March-2011. For all other monthsmodeled TEC matches well. In the seasonal comparison the peak time appears ~1h later than actualpeak time in winter 2010 and equinox 2011. However, the seasonal variation of the TEC for all thethree years matches well with IRI-2012 model compared to IRI-2007 model. Further, the mean annualTEC predicted well by both the versions of the IRI model.