# Temporal and spatial variations in TEC measured from the Indian GPS network of receivers during the low solar activity period of 2004-2005

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## ABSTRACT

With the recent increase in the satellite-based navigation applications, the ionospheric total electron content (TEC) and the L-band scintillation measurements have gained significant importance. In this paper we present the temporal and spatial variations in TEC derived from the simultaneous and continuous measurements made during low sunspot activity (LSSA) period of 2004 - 2006, for the first time, using the Indian GPS network of receivers (18 Nos) located at different latitudes all the way from the equator to the northern crest of the equatorial ionization anomaly (EIA) region and beyond.

The diurnal variation in TEC at the EIA region shows a steep increase and reaches its maximum value between 13:00 and 16:00 LT, while at the equator the peak is broad and peaks around 16:00 LT. A short-lived day minimum occurs between 05:00 to 06:00 LT at all the stations from the equator to the EIA crest region. Beyond the crest region the day maximum values decrease with the increase in latitude, while the day minimum in TEC is flat during most of the nighttime hours, i.e. from 22:00 to 06:00 LT, a feature similar to that observed in the mid-latitudes. The day-to-day variability is significant at all the stations, particularly during the daytime hours, with maximum variations at the EIA crest regions.

The seasonal variation in TEC maximizes during the equinox months followed by winter and is minimum during the summer months, a feature similar to that observed in the integrated equatorial electrojet (IEEJ) strength of the corresponding seasons. In the Indian sector, the EIA crest is found to occur in the latitude belt of 15 to 25$^{o}$N geographic latitudes (5 to 15$^{o}$N geomagnetic latitudes). The EIA also maximizes during equinoxes followed by winter and is not significant in the summer months. These studies further reveal that both the location of the EIA crest and its peak value in TEC are linearly related to the IEEJ strength and increase with the increase in IEEJ.