Variatioin of ionospheric total electron content in the Equatorial Anomaly Region during solar cycle 23: 1994-2003

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The ionospheric total electron content (TEC) in the equatorial anomaly region is studied by analyzing dual-frequency signals of the Global Position System (GPS) acquired from a meridional chain of 9 observational sites clustered around Taiwan (21.9°-26.2° N, 118.4°-112.6°). This relatively dense GPS chain observation provides a powerful tool for studying ionospheric ionospheric total electron content in the northern hemispheric equatorial anomaly region with an unprecedented spatial resolution. Specifically, we studied seasonal and geomagnetic effects on the equatorial ionospheric anomaly during solar cycle 23 : 1994-2003.

It is found that the surveyed data indicated equatorial anomaly crests yield their maximum values during the vernal and autumal months and their minimum values during the summer (except 1998). For 10 years long term statistical studies indicated that the monthly values of I_c do not correlate with the geomagnetic activity *Dst* index (correlation coefficient, c.c. = 0.07) but correlate well with the solar emission *F10.7* index (c.c. = 0.87), suggesting that variations of TEC are mainly driven by solar activity. In the contrast, for the short term (one year) statistical studies indicated that the monthly values of I_c do correlated with *Dst* (c.c. $\geq$ 0.71) but do not correlated with *F10.7* (c.c. $\leq$ 0.56) during solar quiet period, 1994-1997.