Communications

Total Electron Content Measurements at Jaipur

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Faraday rotation measurements made at Jaipur (75°8'E; 27°0'N; mag., dip 39°N) during the period May-July 1976 are analyzed. The ionosonde data of Ahmedabad have been used to study slab-thickness variation. A large scale travelling ionospheric disturbance (LSTID) is observed on a disturbed day (3 May 1976).

Faraday rotation measurements at Jaipur (sub-ionospheric point 71°9'E; 25°0'N) were made for the period May-July 1976 using the geostationary satellite ATS-6. The Faraday rotation angle obtained from such measurements can be converted into ionosphere total electron content (TEC) by using a suitable magnetic field factor.\(^1\) In this communication, the results of these measurements are presented. Also using ionosonde data from Ahmedabad (72.6°E; 23.0°N), a study of slab-thickness has been made.

TEC is defined as total number of free electrons in a vertical column of unit cross-section in the ionosphere. The ratio of TEC and the F2-region peak electron density \(N_m\) is known as slab-thickness \(\tau\) which is a measure of the thickness of the ionosphere, if it were of uniform electron density \(N_m\).

The mean daily variations of TEC, \(N_m\) and \(\tau\) for different months are shown in Fig. 1. Some of the salient features are as follows. (i) As one goes from May to July, TEC as well as \(N_m\) decreases. It can be explained in terms of proximity to the equinoctial months. (ii) The daily variations of TEC and \(N_m\) are similar, except in the month of July, when a significant dip in \(N_m\) variation is obtained during forenoon hours. No similar dip is observed in TEC variation. Rastogi and Sanatani\(^3\) suggested the forenoon bite-out in the F2-layer ionization to be due to the heating of the upper atmosphere. TEC being an integrated parameter, no such dip is observed in TEC variation. (iii) The slab-thickness \(\tau\) is found to be around 200 km, for all the three months. There does not seem to be any indication of midday peak in \(\tau\), as reported by Rastogi and Sharma\(^4\) for Ahmedabad, using data from orbiting satellites. This can be explained to be due to the fact that Ahmedabad is under the crest of the equatorial anomaly whereas Jaipur is outside the equatorial anomaly crest region. (iv) A pre-sunrise minimum is also noticed in the variation of \(\tau\). Similar result was reported by Rastogi and Sharma\(^4\) for summer months using orbiting satellite data.

To examine the solar flux dependence of \(\tau\), the daytime (1300-1600 hrs LT) \(\tau\) values have been plotted against the solar flux values of the corresponding days in Fig. 2. Our period of observation being a low solar activity period, most of the flux values are less than 80 units. One notices that \(\tau\) seems to be independent of the solar flux. The
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References

Counter-electrojet in the Indian Zone

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Contour maps of the percentage occurrence of daytime eastward drift in the E-region of the ionosphere over the equatorial stations, Tiruchirapalli (dip 5°N) and Thumba (dip 0°6'S), have been constructed from the spaced receiver drift measurements to investigate the time variations of counter-electrojet events. Maximum occurrence is noted during June solstices with the minima during equinoxes.

An abnormally large range in the solar daily variation of the geomagnetic H component is observed at stations within a narrow band centred at dip equator. This was explained as due to a belt of strong eastward current flowing in the E-region of the ionosphere caused by the enhanced conductivity, later confirmed by rocket experiments. Gouin reported a case where the daily variation of H at Addis Ababa was reversed around midday. Gouin and Mayaud described this as due to a narrow band of westward current and named the event “counter-electrojet”. Such depressions were later reported for other equatorial stations and have been reviewed by Rastogi and more recently by Mayaud. Spaced receiver drift measurements at Thumba confirmed the westward electric fields at times of the counter-electrojet events and the ionograms recorded at the same time were marked by the disappearance of the equatorial type of Es (Es-q).

An end-to-end chain of nine magnetometers across the magnetic equator in Central Africa. In situ

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