General pattern of the equatorial anomaly from the Intercosmos-19 data

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The variations in hmF2, NmF2, Ne and Te in the topside equatorial ionosphere in dependence on the latitude, longitude, altitude, local time and season have been investigated from the Intercosmos-19 satellite data. Over 35.000 ionograms of the topside sounding for winter solstice and 60.000 ionograms for summer solstice during the period 1979-1981 with high solar activity (F10.7 ~ 200) have been used. The global (for all longitudes) distributions of NmF2 in the region of the equatorial anomaly, EA, for the quiet geomagnetic conditions, both solstices and all local time hours (from 00-03 LT to 21-24 LT) have been constructed. The longitudinal variations in NmF2 on the geomagnetic equator and in the EA crest maxima for the different local time hours and seasons were revealed. It is found that the pattern of NmF2 longitudinal variations in most cases has a regular wavelike character with a period near 75-100 degrees in longitude. Such variations occur more often and their amplitude is greater in June solstice than in December one. The longitudinal variations for the different local time hours and the diurnal variations for the different longitudinal sectors in a position of the EA crests were revealed. It is shown that EA as the structure appears at 09-11 LT and disappears at 02-04 LT in dependence on longitude. The global distributions of hmF2 in the EA region for the midday and midnight hours have been build. The comparison between winter and summer solstices was curried out. The global distributions of Ne at the altitudes of 500, 700 and 800 km for midnight hours for the winter and summer conditions have been build. The variations of the EA characteristics in the altitude for these conditions were analyzed. The longitudinal variations in a shape of the N(h)-profiles over the magnetic equator were investigated. The latitude-altitudinal cross-sections of the topside equatorial ionosphere have been constructed. An asymmetry of EA depending on the longitude, local time and season were studied, the characteristic longitudinal sectors were separated where an asymmetry is strongest. It is shown that in the day-time equinoctial conditions the variations of the EA crest positions can be monitored by the variations in electron temperature, Te. The knowledge of the background behavior of EA allows to pick out the storm-time variations of the EA structure. As an example the storm-time variations of the EA for the intense magnetic storm on April 3, 1979 are considered.