



Climatologic features of electron density in the polar ionosphere using measurements from EISCAT/ESR radar

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The polar ionosphere plays a key role in the solar wind-magnetosphere-ionosphere coupling processes. Its morphologic characteristics under quiet geomagnetic conditions are of basal importance in understanding and forecasting space weather.

The present research focuses on the climatologic features of electron density in the polar ionosphere F-region. Field-aligned measurements from the EISCAT UHF radar (67° N, 19° E) during the 22th solar cycle and from ESR radar (78° N, 16° E) during 1999-2001 are used. Since the two radars are located at different magnetic latitudes (66° N and 75° N respectively), we can figure out the different characteristics of electron density by statistical analyses.

It is found that the variation of electron density in the F-region at EISCAT site shows obviously the well-known winter anomaly around solar maximum and a semiannual variation around solar minimum, with diurnal peaks at local noon. In the case of the ESR data, the so-called winter anomaly in electron density disappears thoroughly, with diurnal peaks at MLT midday. Note that, however, there is also another peak at MLT midnight for winter and equinox solstices at ESR site.

Comparisons are also carried out between IRI-2001 model and radars measurements. The modeled results are reasonably consistent with measurements at EISCAT, whereas they exhibit quite different behavior from radar observations at ESR, demonstrating insufficiency of the current model for very high latitude regions. These results will provide useful clues to improve IRI model on describing the variations of electron

density in polar ionosphere. This work would be continued with more available measurements from ESR radar.