Comparison of the electron density profiles obtained by Irkutsk incoherent scatter radar with the IRI-2001

A. Oinats, B. Shpynev

Institute of Solar-Terrestrial Physics, Russia (oinats@iszf.irk.ru / Phone: +7-3952-564540)

The comparison of the median electron density profiles obtained by Irkutsk Incoherent Scatter Radar (ISR) with IRI-2001 model [1] profiles is presented for September 2005. The electron density profiles were obtained by using the Faraday rotation method [2] within the height range from 150 up to 600 km. Since this method does not require external calibration, it gives us the opportunity to have a reliable ISR median data for this month. The experimental electron density profiles were averaged firstly within 2 hours inside every day and afterwards on all quiet days of September 2005. Further by fitting of the experimental profiles to Chapman layer, the parameters foF2, hoF2, B0 and B1 were determined as it corresponds to F2 layer parameters in IRI.

In previous studies we found a good agreement of ISR data with IRI for the equinoxes, both for high and moderate solar activities. In the present study the good general agreement of experimental and IRI profiles is also obtained, especially for foF2. However some discrepancies between IRI model and observations are discussed. The most discrepancies are founded for hoF2 as well as for profiles shape. We suppose these effects to be connected with regional features of the thermospheric neutral wind, as it was marked in our previous studies and corresponds to modern conceptualization of F2 layer formation [3]. The paper also presents the data for other periods which, unfortunately, can not be supported by statistical estimation due to a lack of long-time ISR experiments.

References:

1. Bilitza D., 2001. International reference ionosphere. Radio Science 36 (2), 261-275.

2. Shpynev B.G., 2004. Incoherent scatter Faraday rotation measurements on a radar with single linear polarization. Radio Science, 39 (3), RS3001 doi:10.1029/2001RS002523.

3. Rishbeth H., 1998. How the thermospheric circulation affects the ionospheric F2-layer. Journal of Atmospheric and Solar Terrestrial Physics 60, 1385-1402.