Evaluation of Real Time TEC and STORM - TIME Corrections in The IRI Model

O.A. Maltseva (1), O.S. Poltavsky (2), A.S.Shljupkin (2)

(1) Institute of Physics, Rostov State University, Russia, mal@ip.rsu.ru

(2) Department of Physics, Rostov State University, Russia

Modern HF - communication systems are needed the current control of the propagation conditions. One of the ways of such a control is a correction of the IRI model. The IRI model is wide - spread. Numerous comparisons of results of vertical (VS) and oblique (OS) soundings with model parameters showed that for practical purposes, where it is necessary to know the radio wave propagation conditions along the path, the IRI model is convenient and attractive. This concerns median conditions but this model was not able to ensure real or disturbed ones. For these aims the IRI model must be corrected. There are some methods of TEC correction. Now the storm - model was developed (Araujo -Pradere E.A. et al. Radio Sci., 2002, v.37, N 5). The average value of the root mean square error (RMSE) improvement was estimated by its authors as 33%. Such an estimation can't be comprehensive because of large differences of conditions (latitude, season, level of disturbances). In this paper two methods of the IRI correction are considered by means of: 1) real - time TEC data, 2) storm - time model. Data of two databases are used: 1) SRIDR, 2) TEC - RAL for European region for two years (2003 - 2004). Quality of these corrections is estimated as an improvement or a deterioration of the root mean square error for foF2 values. It is shown that this improvement can reach 90% and more for the real - time TEC correction for quiet ionospheric conditions as a result of high correlation between foF2 and TEC. During negative disturbances the storm - time correction can bemore preferable than the TEC one. During positive disturbances none of methods have advantages over the initial IRI model. The results are statistically significant.