



Estimation of foF2 variations using round-the-world radio sounding data

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High-frequency round-the-world signals (RTW) were discovered at the 20th years of the past century. Since then the RTW properties were investigated at many experimental and theoretical works. The question of ionospheric parameters diagnostics using RTW data was posed but it was not elaborated.

In this study the method of estimation critical frequencies variations of the F2 ionospheric layer (foF2) using analysis of RTW radio sounding data has been described. Significance of this work is connected with the problem that foF2 variations from day to day can reach considerable magnitudes especially for evening and morning hours even for quiet geomagnetic conditions but this variations are not described by used model. The main background for the method of foF2 variations estimation serves assumption about the primary influence of region with minimum foF2 magnitudes to RTW maximum usable frequencies magnitudes. This assumption was tested by numerous computations using International Reference Ionosphere (IRI) and the program based on the normal wave method. As experimental material there were used data obtained at the Russian chirp ionosounders net.

The way for the solution of the inverse problem of diagnostics is following:

- 1) The region of the minimum foF2 magnitudes is determined on the base of model calculations.
- 2) The possible foF2 variations at this region are determined using RTW maximum observed frequencies.

Using this method we can investigate variations of foF2 over the RTW path connected with changing day to day ionospheric conditions.