The Model IRI residual Error and the new Method of N(h)-Profile Determination

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For the real-time use the IRI model must be corrected by current ionospheric data. Very often parameters foF2 or W (rarely hmF2) are used for such a correction. But the residual error exists after this procedure. It is connected with discrepancy between a shape of real and model N(h)-profiles and was noted in the first publications devoted to HF propagation using the IRI model (McNamara L.F., JATP, 1988). Statistics of this discrepancy is small because it needs to calculate N(h)-profiles. There is a standard procedure POLAN (Titheridge J.E., 1985) but it is time consumed. Nevertheless, nowadays many digisondes are equipped with this procedure and deliver N(h)-profiles by internet (Reinisch B.W., Galkin I.A., Khmyrov G. et al., ARS, 2004). What is more, there are dinasondes equipped with the new method of N(h)-determination (NeXtYZ) which includes wave arrive angle measure and ray tracing calculations (Zabotin N.A., Wright J.W., Zhbankov G.A., IES2005). The purpose of this report is to estimate: i) parameters of the residual error of the IRI model corresponding to two methods (POLAN and NeXtYZ), ii) possibility to correct the IRI model along HF path to decrease this error, iii) quantitative influence of the residual error on the calculation accuracy of MUF and length (D) for HF paths. It is shown that the residual error can be on average 1-1.2 MHz (whole range 0-3 MHz of absolute values), errors of MUF and D calculations can be 5-50%. Correction could be decrease errors up to 2-5%. Errors of the MUF and D determination connected with differential errors between two methods are given for different conditions.