

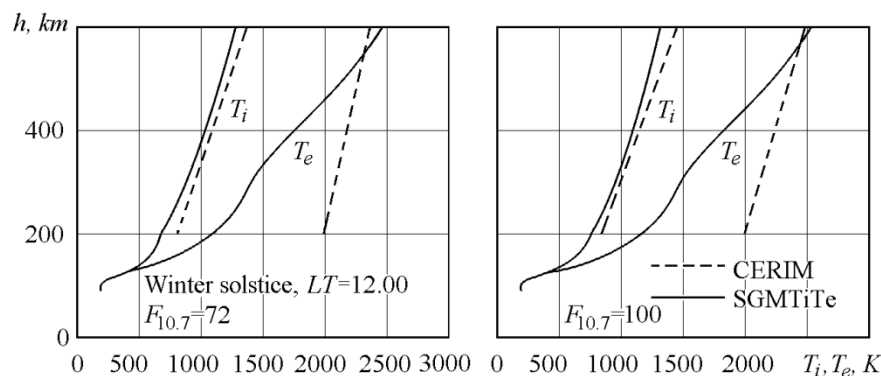
COMPARISON OF ION AND ELECTRON TEMPERATURES, CALCULATED BY CERIM AND SGM TiTe MODELS

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The CERIM model (Central Europe Regional Ionospheric Model) is constructed on the basis of the Kharkiv Incoherent Scatter Radar (ISR) database for four seasons (winter and summer solstices, spring and autumn equinoxes). Solar activity is specified by the index $F_{10.7}$ on the simulation day. The ion (T_i) and electron (T_e) temperatures are calculated in the altitude range of 200–750 km [1].

The empirical planetary model of ion and electron temperatures SGM TiTe (Simple Global Model of T_i , T_e) is being developed by the authors of this paper. The input parameters of the SGM TiTe model are: number of day in a year, altitude, geographic latitude and longitude, local or universal time, average $F_{10.7}$ index of solar activity, value of $F_{10.7}$ index on the calculating day, value of $F_{10.7}$ index on the previous day, and average value of magnetic index A_p on 24 hours before the calculating moment. The SGM TiTe model is structurally included in the simulation program for the theoretical calculation of electron density and plasma velocity [2].

In the present paper the altitude temperature profiles are compared for different seasons. Kharkiv ISR coordinates were taken as input values for calculations by the global SGM TiTe model. The results of simulations for the winter solstice at local noon under magnetically quiet conditions are below presented. Values of $F_{10.7}$ index are equal to 72 and 100.



References:

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2. S. Grinchenko. Theoretical calculation of daytime and nighttime profiles of electron density of F2-region plasma in middle-latitude ionosphere for quiet geomagnetic conditions // 2020 IEEE Ukrainian Microwave Week Proceedings (UkrMW), Volume 3. 2020 IEEE 10th International Kharkiv Symposium on Physics and Engineering of Microwaves, Millimeter and Submillimeter Waves (MSMW). Kharkiv, Ukraine, September 21-25, 2020. P. 786–792.