

## Formation of a Ring-Like Region of Increased Electron Temperature in the Subauroral Ionosphere in Winter

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The results of numerical simulations of the electron temperature ( $T_e$ ) are compared with measurement data provided by the CHAMP satellite to show the possibility of the formation of a ring-like region of temperature increase in the subauroral ionosphere surrounding the auroral oval in the range of 04–07 h (UT) when the high-latitude ionosphere is on the night (shaded) side.

Brace et al. (1982) and Kofman (1984) used experimental data to reveal the effects of an increase in the electron temperature in the subauroral ionosphere— “hot spots.” Numerical modeling of the thermal regime of the high-latitude ionosphere was addressed in a number of studies (Schunk et al., 1986; Klimenko et al., 1991; Mingalev and Mingaleva, 2002; Prölss, 2006; David et al., 2011) analyzing the sources of hot spots. The hot spots were shown to be associated with descending heat fluxes, electric fields, and decreased electron densities  $n_e$  in the region of the main ionospheric trough (MIT). These results were obtained mainly for equinox conditions, and they allow a good description of the spots as structural features of the spatial distribution of  $T_e$ . We compare the results of numerical simulations and measurements obtained by the CHAMP satellite to study specific features of the spatial distribution of the electron temperature in the F region of the high-latitude ionosphere for winter conditions

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