Stratification of the main ionospheric trough as an effect of the noncoincidence of the Earth's geomagnetic and geographic axes

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The tomographic reconstruction of the electron density distribution in the altitude-latitude plane indicates existence of the regions of enhanced electron density within the main ionospheric trough. By the use of the global numerical Earth's upper atmosphere model (UAM) [1] the calculations with coincidence and noncoincidence of the Earth's geomagnetic and geographic axes have been performed for the quiet geophysical conditions of January 29, 1999.

It has been shown that for the case of coinciding geomagnetic and geographical axes the picture of the calculated electron density distribution in the polar solar-geomagnetic coordinates at the altitude 300 km changes insignificantly in the course of time, and the large-scale structures are absent within the trough. For the case of noncoinciding geomagnetic and geographic axes the picture is essentially different. The trough pattern in the latitude-longitude plane varies significantly with time (UT-effect), the local stratifications of the trough appear.

The simulated results allow to conclude that the noncoincidence of the Earth's geomagnetic and geographic axes causes the convection of the ionospheric plasma to be time-dependent even for the quiet conditions and this influences on forming the trough giving rise to the local stratifications by means of mechanism proposed in [2].

References
1. Namgaladze A.A., O.V.Martynenko, M.A.Volkov, A.N.Namgaladze, R.Yu.Yurik. High-latitude version of the global numeric model of the Earth's upper atmosphere // Proceedings of MSTU. – 1998. – V.1, N.2. – P.23-84.
2. Клименко В.В., Намгаладзе А.А. Влияние нестационарной конвекции на распределение холодной плазмы в ионосфере и протоносфере Земли // Геомагнетизм и аэрономия. –1981. –Т. 21, № 6. –С.993-998.