Numerical modeling of the thermosphere, ionosphere and plasmasphere behavior during the April 2002 magnetic storms

A.A. Namgaladze (1,2), A.N.Namgaladze (1), O.V.Martynenko (1,2) E.N.Doronina (2), M.A.Knyazeva (2), Yu.V.Zubova (2)

1 – Polar Geophysical Institute, Murmansk;
2 – Murmansk State Technical University; E-mail: namgaladze@mstu.edu.ru

The magnetic storm effects in the Earth's upper atmosphere such as the electric field changes, Joule heating, neutral composition and global thermospheric circulation changes, electron and ion temperature and density disturbances in the thermosphere, ionosphere and plasmasphere of the Earth have been investigated by the use of the global numerical Upper Atmosphere Model [1] for the specific conditions of the April 15-25, 2002 magnetic storms. The results of the model calculations of the electron and ion temperature and density have been compared with the data of the simultaneous observations of six incoherent scatter radars for this period. In general, a good agreement between the theoretical and experimental data have been obtained, and an analysis of the physical factors possibly responsible for some disagreements between the model results and observation data has been made.

Reference

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.

This work was supported by the Grant No.02-05-64141 of Russian Foundation for Basic Research