

THE STUDY OF UNDULAR PERTURBATIONS IN THE LOWER POLAR IONOSPHERE

V.D. Tereshchenko, O.F. Ogloblina, E.B. Vasiljev,
V.A. Tereshchenko (Polar Geophysical Institute, Murmansk, Russia)

An experimental and theoretical study of ionospheric plasma undular perturbations, which are generated by internal gravity waves, is one of the most important problems of the upper atmosphere physics. The MF radioechoes observations above the Kola peninsular allow to reveal and to study undular motions in the high-latitude lower ionosphere.

The results of the experiment of 1999 demonstrated the undular changes in the temporal variations of the radioreflections amplitudes, which were also revealed in electron density isolines. Furthermore, the electron distribution can be either horizontal or vertical stratified and oblique.

A spectrum analysis of the records of the MF signal amplitudes for the summer period of 1999 displayed the perturbations from 75 to 90 km with periods between 6 - 11 min and 7 - 11 days. Internal gravity waves and tides can cause such variations. The measurements reveal a relation of a geomagnetic activity and perturbations with the periods from 11.5 to 111 min. It is also observed intensive oscillations with the periods within 4 - 30 sec., which don't correlate with a geomagnetic activity (infrasonic waves).

It was also determined local cutoff frequencies of a gravity wave spectrum for the periods from 4.2 to 8.3 min. Furthermore a possibility of mesosphere temperature defining by using the spectrum parameters is discussed.