IONOSPHERE REGIONAL DISTURBANCES IN THE PERIOD OF THE OCTOBER 24, 2018 METEOROLOGICAL STORM

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The problem of the various factors influence of near-Earth space on the functioning of satellite systems is one of the most important objects of attention of the scientific community. On the effectiveness of the GPS have a significant impact of the ionospheric inhomogeneities that cause the signal distortion. The study of the ionospheric inhomogeneities causes is an urgent task to improve the functioning of GNSS systems.

A lot of theoretical and experimental studies show that various dynamic processes in the lower atmosphere and on the Earth's surface, for example, meteorological storms, seismological and other events have a significant impact on the state of the ionosphere. One of the most important modern problems of atmospheric physics is the development of the ideas about the physical processes that implement the connection of dynamic processes in different layers of the atmosphere.

The climatic feature of the Kaliningrad region is the instability of weather conditions in autumn, winter and spring, which is manifested in the occurrence of storm sea and meteorological conditions. The analysis of atmospheric and ionospheric parameters observations in the period of meteorological storm on October 24, 2018 is carried out. Meteorological disturbance took place against the background of quiet heliogeophysical conditions to exclude their influence on the ionosphere in the study period. The spatial dimensions of the region of ionospheric disturbances are determined by the scale of meteorological disturbances and can reach ~1000 km.

The results of observations of the hourly measurements of *fo*F2 and *hm*F2 performed at the Kaliningrad station (54˚ N, 20˚ E) during meteorological disturbances in October 2018 were analyzed. To analyze the variations in atmospheric parameters during this period, minute data from the meteorological station of the IZMIRAN Observatory (54˚ N, 20˚ E) were used. Spatial and temporal variation of atmospheric parameters over the disturbance's region was analyzed by the ECMWF ERA-Interim data. TEC global maps were analyzed using IGS (International GNSS Service) data to study the spatial scales of the ionospheric perturbation. Observations of atmospheric and ionospheric parameters over the Kaliningrad region have shown that meteorological disturbances in the lower atmosphere, accompanied by an increase in the amplitude of the wind gust velocity, affect on the ionosphere. Ionospheric disturbances are manifested in lowering the amplitude values of the ionospheric parameter TEC to 30% and the electron concentration in the maximum F2-layer to 15% in the region above the epicenter of the meteorological perturbation. In the following days, the area of reduced TEC values is shifted, which reflects the dynamics of the meteorological disturbance. Spatial scale ionospheric disturbances region exceeds the meteorological disturbances scale. It is assumed that in the conditions of meteorological storms the processes of acoustic-gravity waves (AGWs) generation in the lower atmosphere are amplified. AGWs propagation into the upper atmosphere occurs to a thermosphere perturbation on the space-time scales determined by the duration and spatial dimensions of the meteorological disturbance region. Such large-scale disturbances of the thermosphere affect circulation and electrodynamic processes in the thermosphere and ionosphere.

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