

THE RADAR OBSERVATIONS OF THE LOWER POLAR IONOSPHERE DURING THE SOLAR ECLIPSE OF 1999 AUGUST 11

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The solar activity is a main agent of an influence on the temporal and spatial changes of ionospheric parameters. In spite of the short-term nature of the solar eclipse phenomena they have a great importance in the ionospheric research. Consequently, during the solar eclipse of 1999 August 11 with the maximum phase 0.45 above the Kola peninsula there are possible to observe considerable D-region structure changes. The most effective method of a lower ionosphere research is the partial reflection technique. This method is based on measurements of the ordinary and extraordinary waves, which are reflected from different heights.

The data analysis of the observatory Tumanny (69.0°N; 35.7°E) revealed that during the period from 10:56 to 11:03 was a sharp drop of the intensive reflection region within the limits 91 to 86 km, and the culmination of the case was at 10:54. Then the height of the region more smoothly restituted up to former position. Furthermore, the intensive reflection from the mesopause during 10:59 - 11:10 was also a possible consequence of the eclipse. This fact can be explained with a negative change of a mesopause temperature which was a reason of a vertically wind field nonuniform structure. In turn, the wind field irregularity could generate variations of the refraction index and, as a consequence, the intensive partial reflections. Moreover, it is possible that the five-minute lag was involved with a delay of a spatial wave process of the temperature changes, which was formed by moving Moon shadow. The analysis of electron density variations during the solar eclipse revealed a significant alteration above than 94 km.