Ionospheric observations of Novosibirsk during earthquakes in Altai

Belinskaya A., Kovalev A.

Trofimuk Institute of Petroleum Geology and Geophysics of Siberian Branch of Russian Academy of Sciences, Novosibirsk, Russia

e-mail: BelinskayaAY@ipgg.sbras.ru

Comprehensive geophysical observations, including ionospheric observations, are carried out at the Geophysical Observatory "Klyuchi"(INGG SB RAS, Novosibirsk). At present, there is a lot of evidence that during the preparation of strong earthquakes in various focal zones, the ionosphere variability sharply increases. Using the results of long-term monitoring, the possible effects of earthquakes (including during the preparation period) on the ionosphere over Novosibirsk were investigated.

Earthquakes with a magnitude of $M \geq 3.5$ and remoteness of the epicenter from the Klyuchi observatory no more than 1000 km from 2000 to 2018 were considered. Variations of the critical frequency and height of the F2 layer, as well as the appearance of sporadic Es layers, are analyzed. To identify the ionospheric effect, additional data were collected from the ionospheric stations in Kochenevo (West Siberian Hydrometeorology and Environmental Monitoring Department), 60 km away from our observatory, and in Tomsk (Tomsk State University), which is located 300 km to the north Novosibirsk. The events were considered taking into account the geomagnetic situation, season, magnitude and depth of the epicenter of the earthquake. the case of man-made earthquake of 18.06.2013. with an epicenter of less than 300 km from Novosibirsk, demanded separate consideration.

Deviations from the median hourly values for several days before and after the event were calculated for each earthquake. Analysis of variations in the ionospheric parameters showed the presence of characteristic deviations for some of the earthquakes under consideration. The results obtained are based on the consideration of known earthquakes; therefore, the question of isolating seismogenic disturbances against the background of the general variability of the ionosphere is still open.