On Monitoring of mining explosions conducted on the territory of the former Semipalatinsk Test Site

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Abstract Several mineral deposits located on the territory of the former Semipalatinsk Test Site (STS) conduct active blasting activity. The largest number of explosions is carried out at the Karazhyra coal mine. These explosions are recorded by stations of the IGR NNC RK network, three of them are part of the International Monitoring System. These are seismic arrays Borovoye (AS057), Makanchi (PS23), Kurchatov-Cross (AS058). The distances to the mines from these stations are 668 km, 452 km, 68 km, respectively. In total, about 2800 explosions were recorded during 19 years of observations. The analysis of the results of routine processing on operational seismic bulletins of the IGR NNC RK Data Center has shown that the field of received epicenters of explosions exceeds the size of the quarry. A detailed processing of explosions waveforms was carried out to find out the reasons of this scatter. Geotool and DTK – GPMCC software included in the NDC-in-a Box package was used to process and analyze the waveforms. It was found that back azimuth values for different regional phases Pn, Pg, Sn, Lg differ from each other and have different dispersion. There are systematic deviations of back azimuths for some phases from the true one. A clear dependence of the epicenter determination accuracy on the energy (power) of the explosion was noted. Subjective factors in the work of analysts that affect the accuracy of estimates are also found. Processing recommendations to improve accuracy were given for analysts of Kazakhstan National Data Centre (KNDC).

Keywords Test Site, mining explosion, seismic array, configuration, back azimuth, progressive multichannel correlation.

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