

Bachatskiy induced earthquake on June 18, 2013, ML=6.1, $I_0=7$ (Kuzbass)

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Abstract The Bachatskiy earthquake of June 18, 2013 and a seismic activation of the same name coal strip mine, started several years before the earthquake and still persists today, have been studied using temporal local seismic arrays in the area. It was found experimentally that the seismic process area is closely connected to open workings, and the earthquakes are extended from the working bed to a depth of 4-5 km. Adjacent to the mine depression sedimentary rocks were activated. Technogenic seismic regime is continuous and not stationary: intervals of background seismicity with relatively weak and seldom events are disturbed by bursts of activity with a rise in magnitude of stronger earthquakes and frequency of occurrence of weak events. The seismic activation may last for 1-3 months. During the last five years, four seismic activations have been recorded, three of which were generated by large earthquakes of 09.02.2012, ML=4.3; 04.03.2013, ML=3.9; 18.06.2013, ML=6.1. The last one was completed by a series of perceptible earthquakes with local magnitude 3.0-3.5. The focal mechanism of the Bachatskiy earthquake is a thrust fault with one of the motion planes corresponding to the anthropogenic impact. The earthquake flow forms a single process in the space with b-value of Gutenberg-Richter relationship different from the natural seismicity. The studied induced seismicity does not correspond to the structural regularities of natural seismicity in the Altai-Sayan mountain area. The findings prove that the Bachatskiy earthquake and associated activation can be considered as man-made events.

Keywords Bachatskiy earthquake, induced seismicity, technogenic earthquake, coal open pit mining, Kuzbass.

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