

**A SEARCH FOR SEQUENCES  
OF MINING-INDUCED SEISMIC EVENTS  
AT THE RUDNA COPPER MINE IN POLAND**

Grzegorz KWIATEK

Institute of Geophysics, Polish Academy of Sciences  
ul. Księcia Janusza 64, 01-452 Warszawa  
e-mail: gregus@igf.edu.pl

A b s t r a c t

A detailed analysis of the Rudna copper mine's seismic catalogue for 1980-2003, with a threshold local magnitude  $M_L \geq 1.3$ , allowed to distinguish several types of event sequences related to 345 stronger mining events of magnitude greater than 3.0. Events without aftershocks and foreshocks were observed as well as those where the number of aftershocks numbered more than ten, while foreshocks – several. Foreshocks were recorded for 58 events, nearly all of them several tens of minutes before the main seismic event. Aftershocks accompanied the 190 strongest events; the greatest number of aftershocks was 10 for an event of magnitude just over 3.0. For the two strongest events, of magnitudes  $M_L = 4.1$  and  $M_L = 4.2$ , the number of aftershocks was radically different, 9 and 1, respectively. Different numbers of aftershocks were observed depending on the location of the main event in various mining areas, which is related to the differences in the seismicity of individual zones within the mine.

Non-parametric probability distribution functions of magnitude have been determined for the different seismogenic zones. In addition, the value of the  $b$  coefficient of the Gutenberg-Richter relation has been analyzed for each zone. These studies confirmed that seismicity varies within the mine.

**Key words:** aftershocks, foreshocks, seismic sequences, seismic hazard,  $b$ -value estimator.