



1  
2

## CLUSTERING OF MINING INDUCED EVENTS FROM RUDNA MINE (POLAND) IN EQUIVALENT DIMENSION SPACES

1

Grzegorz LIZUREK<sup>1</sup> and Stanisław LASOCKI<sup>2</sup>

1  
2

High energy release during seismic events induced by mining operation is one of the major dangers perturbing production in underground mines. In this work temporal changes of seismic event parameters for one of the Rudna Mine (Poland) panels are investigated. The study aim was to find whether the temporal clustering of smaller events in different parameters can be observed before and after the high energy events ( $M_I \geq 3$ ) in mining panel. The method chosen for analysis was the study of temporal variation of fractal dimension of the seismic events parameter sets composed from: the interevent epicentral distance ( $d_r$ ), logarithm of seismic energy ( $IE$ ) and interevent energy coefficient ( $dIE$ ), which is the absolute difference between logarithms of energy of two consecutive events. Temporal variations study was performed in equivalent dimension (ED) space. The transformation of the seismic source parameters into ED space allowed to estimate and compare the temporal changes of the fractal dimension of different parameter spaces using the same method – correlation fractal dimension, and then easily compare the obtained temporal changes of fractal dimension of different parameter sets. The effect of grouping is expressed by decrease of fractal dimension, which is connected with similarity of events parameter values. The temporal changes of the fractal dimension of seismicity before the strong induced events would indicate some initiation phase of the process leading to the high energy release. In case of studied Rudna Mine panel the temporal behavior of the fractal dimension values in different parameter spaces before seismic events shown some similarities according to source mechanisms.

---

<sup>1</sup> Ph. D, Institute of Geophysics Polish Academy of Sciences, Warszawa, lizurek@igf.edu.pl

<sup>2</sup> Prof., Institute of Geophysics Polish Academy of Sciences, Warszawa, lasocki@igf.edu.pl