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Study of mining-induced seismicity in rock strata in the vicinity of faults

Abstract

An inherent feature of Polish collieries within the Upper Silesia Coal Basin is the high-level of mining induced seismicity, resulting in elevated rockburst hazard levels. One of the major causes of high-energy seismic events is that mining operations are continued in the vicinity of major faulting zones. The study summarises the results of geo-mechanical and statistical analysis of mining-induced seismic activity in the region of major faults, in a selected section within a colliery.

Seismic activity assessment involves the categorisation of seismic events due to tectonic movements in the context of various face development systems with respect to the faulting zone: perpendicular (advancing towards the faulting zone or retreating) or parallel (along the faulting zone). Registered seismic activity was analysed in the context of epicenter locations and variations of seismic activity in relation to the developing face operations in the function of time and energy ratings (Guttenberg-Richter formulas). Results have demonstrated that increased levels of seismic activity in the strata can be attributable to mining operations in the vicinity of major faulting zones.