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Numerical and Geophysical Tools Applied for the Prediction of Mine Induced Seismicity in French Coalmines

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ABSTRACT

The determination of the influence of mining works and the induced seismicity is essentially obtained, separately from *in-situ* observations and seismic analysis, field measurements (particularly surface survey) as well as from numerical investigations. The paper presents a methodology applied for the analysis of induced seismicity due to underground coalmines based on combining numerical modelling and seismic analysis. The methodology is based on the comparing between the observations, the seismic activity and the numerical modelling for establishing a close correlation between the location of seismic activity and the induced stresses. The paper presents two case studies using seismic and geotechnical investigations, the first one concerns a fatal accident affected Lorraine coalmine (East France). The second case concerns the application of the methodology on Provence coalmines (South France). The application of the methodology shows such a coupling can be an efficient way for detecting areas subjected to rockburst hazard. This is also a powerful tool for assisting the planning of underground workings in complex geological and mining conditions. The coupling of geotechnical investigations (numerical modelling, *in-situ* stress measurements) and seismic analysis are strongly recommended.

KEYWORDS

Induced Seismicity; Numerical Modelling; Rockburst; Mining Design

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