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Spatio-temporal assessments of rockburst hazard combining *b* values and seismic tomography

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Abstract

A better understanding of rockburst precursors and high stress distribution characteristics can allow for higher extraction efficiency with reduced safety concerns. Taking the rockburst that occurred on 30 January 2015 in the Sanhejian Coal Mine, Jiangsu Province, China, as an example, the mechanism of rockburst development in a roadway was analysed, and a combined method involving *b* values and seismic velocity tomography was used to assess the rockburst in both time and space, respectively. The results indicate that before the rockburst, *b* values dropped significantly from 0.829 to 0.373. Moreover, a good agreement between a significant decrease in *b* values and the increase of the number of strong tremors was found. Using seismic tomography, two rockburst risk areas were determined where the maximum velocity, maximum velocity anomaly and maximum velocity gradient anomaly were 6 km/s, 0.14 and 0.13, respectively. The high-velocity regions corresponded well with the rockburst zone and large seismic event distributions. The combination of *b* values and seismic tomography is proven to have been a promising tool for use in evaluating rockburst risk during underground coal mining.

Key words: coal mining, rockburst, *b* value, seismic velocity tomography, strong tremors.

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