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Rockburst Mechanisms at Great Depth

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As mining progresses to greater depth, the stress regime changes, whereby vertical stresses become dominant and stress concentrations around mine openings intensify. These circumstances not only increase the seismic hazard underground, but also show diversified expressions of prevailing and induced stresses brought about by creating mine openings, such as stopes.
Despite classic slips along zones of weakness, such as faults and dyke-contacts, which show clear double couple mechanisms, facebursts, pillar and abutment failures add to the complexity of seismic observations in deep mines. Face bursts, considered as a result of hard patches along the stope face, can release a limited amount of energy only due to the available strain energy stored in the ultimate vicinity of the mine opening. In contrast, pillar and abutment failures involve much larger volumes when becoming distressed during a seismic event. All event categories constitute a potential hazard for mining personnel and can cause considerable production losses. Few examples from an ultra-deep mine environment are presented.