



Moretti, H.C., J. M. Reyes-Montes, J.R. Haycox and R. P. Young (2013). Rock Mechanics for Resources, Energy and Environment- Proceedings of EUROCK 2013 - The 2013 ISRM International Symposium Wroclaw, Poland, 23-26 Sept 2013, pp 627-631.

Temporal analysis of fracturing using acoustic emissions at the Aspö Pillar Stability Experiment

Abstract

The Aspö Pillar Stability Experiment (APSE), at SKB's Hard Rock Laboratory, involved the development of a pillar by excavating two deposition holes, 1m apart. The evolution of damage in the pillar was monitored by an ultrasonic acquisition system providing acoustic emission (AE) and ultrasonic surveying. This paper builds on previous work that revealed that spalling in the unconfined deposition hole pillar wall was concentrated in two 0.5m areas at 1m and 3m depth which correlated to higher seismic b-values thought to be a result of the greater heterogeneity. The data set of 15,198 AEs cluster tightly around the damaged zones in sufficient quantity to allow a detailed temporal analysis of changes in the seismicity prior to spalling and assess the degree to which these changes correlate to changes to the heterogeneity, local stress regime failure in the integrity of the deposition holes. The temporal and spatial analysis of patterns in seismicity were analyzed, showing minima in b-value of induced event prior to observed periods of major damage development.

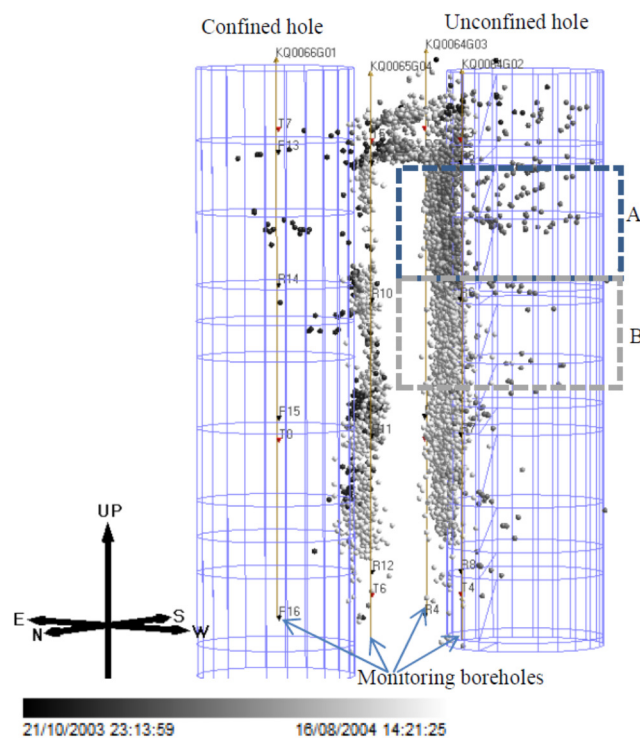


Figure: AE locations of all 17,360 AE events induced between 21st October, 2003 and 16th August, 2004 scaled to occurrence time. The dashed squares mark the two sub-sets analyzed in this paper: box A comprises the set of events located between 447 m and 448 m depth, box B, the subset of events located between 448 and 449 m depth.

Please contact us (info@microseismic.net) for the details of the paper.