Testing the Utilization of a Seismic Network Outside the Main Mining Facility Area for Expanding the Microseismic Monitoring Coverage in a Deep Block Caving

Abstract

In the case of mining in an inclined intrusion using the block caving method, the highest stress is usually concentrated in the seismogenic and abutment zones, especially in the front of the sloping area. In an inclined intrusion of more than 40°, the seismometer network is usually distributed in the facility area where the footwall area is also located. This causes a limitation in microseismic monitoring due to ray coverage. In this study, we conduct a seismometer deployment outside a mining facilities area with borehole seismometers. The study aims to maximize the resolution and minimize the monitoring uncertainty of underground mines. We created two scenarios of seismometer deployment: (i) seismometers are deployed following the intrusion mining level in the mining facility area; and (ii) additional seismometers are deployed in off-facilities areas. Both areas were tested for their raypath responses and sensitivity using the Checkerboard Resolution Test (CRT). The monitoring resolution influenced by the additional borehole seismometers in the off-facilities area can be quantified. The results suggest that the additional seismometers in the off-facilities areas can increase resolution by 30% in the seismogenic and abutment zones.

Keywords: **incline intrusion**; **stress**; **microseismic**; **Checkerboard Resolution Test (CRT)**

Author Contributions

Wahyu Hidayat (W.H.), David P. Sahara (D.P.S.), Sri Widiyantoro (S.W.), Suharsono Suharsono (S.S.), Ridho Kresna Wattimena (R.K.W.), Sari Melati (S.M.), I Putu Raditya Ambara Putra (I.P.R.A.P.), Septian Prahastudhi (S.P.), Eric Sitorus (E.S.), and Erwin Riyanto (E.R.)

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