

Mining-Induced Seismicity and Stress Inversion

Jeff Boyd

November 28, 2011

Seismology, the study of waves in solid earth material, is an important tool for discovering and analyzing the earth's properties. Much of our planet is unreachable for direct scientific inspection, but seismic waves can be measured and analyzed to deduce properties of the materials through which they have passed.

In a mining context, excavations and interaction with faults can induce rotations and concentrations in stress, causing local stress fields to differ from regional stress estimates. Monitoring and analysis of mining-induced seismicity has potential to improve the accuracy and reach of site-specific stress models, leading to better representation of stress conditions in mine design.

An overview of stress measurement will be presented, followed by an introduction to the use of seismic event data to estimate stress fields (stress inversion and related analyses). The presentation will conclude with discussion of the research problem: statistical assessment of stress inversion methodology, with the aim of reducing variance in stress estimates.

Biography

Jeff holds a B.Sc. in Engineering Mathematics/Mechanical Engineering and an M.Sc. in Statistics, both from Queen's University in Canada. He has worked as a mathematician/statistician in a variety of fields, including engineering, medical outcomes, telecommunications, information security, and national defence.

Jeff is currently in the first year of the M.A.Sc. program in Mining at Queen's, studying geomechanics under Dr. Steve McKinnon.