

Characterization of hydrological properties of fractured rock using continuous borehole self-potential measurements

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Numerical simulation studies by Ishido and Pritchett (2003) showed that borehole SP monitoring has a great deal of promise for complementing pressure transient data to help map and characterize fracture networks. In order to study this prediction experimentally, we have carried out continuous SP monitoring using multi Ag-AgCl electrodes installed within well KF-1 at the Kamaishi Mine, Japan. The observed streaming potential divided by the pressure change due to opening wellhead valve increases with increasing interval of valve opening from 30 seconds to 10 minutes and almost constant between 10 and 100 minutes, which suggests that the time required for pressure equilibrium between the fracture and matrix regions is around 10 minutes for the surrounding granite body.