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Gophysical Characterization of Fractures within a Granitic Pluton

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High resolution multidisciplinary geophysical data set has been acquired to characterized the fracture network within a granitic pluton. The experiment site is located in an undreground tunnel, the FEBEX gallery (Grimsel Switzerland). A series of boreholes were drilled with continuous core. The core samples will be used for the determination of the physical properties in a physical properties laboratory. This will provide a dataset to validate the indirect geophysical measurements. The geophysic data include new borehole logging such as natural gamma, borehole televiewer, borehole ground penetrating radar and cross-hole ultrasonic tomography. The preliminary processing and integration of these different data sets indicates that the GPR records can provide images of the fractures, specially if they are fluid filled. The GPR is specially sensitive to the water content as it directly affects the electrical conductivity σ and the dielectric permittivity ϵ Therefore it is adequate for mapping water conductive fractures of the crystalline rock. The correlation of the anomalies measured by the natural gamma can be correlated with the “diffractions” in the GPR and the fractures imaged by the borehole televiewer. Furthermore, the images suggest the existence of a two fractures subparallel to the gallery axis.