New 3D modelling approaches in the study of Palmottu fracture patterns

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The classical Palmottu natural analogue site was used to apply three new fracture modeling tools in statistical analysis, visualizing and modeling fracture properties in 3D. The Palmottu site has been studied during an uranium exploration phase in the early 1980's and later during the Palmottu Natural Analogue Project 1994-1998. The Matlab scripts (Markovaara-Koivisto and Laine 2012) was used to cluster orientation data and to present statistical summaries and to reflect the change in degree of rock brokenness along drill holes. An intensity rose diagram was utilized to visualize interdependency of fracture properties and orientation. The FractCar Plug-in for Paradigm GOCAD was used to the model and visualize 3D fracture patterns based on the statistical analysis of fracture properties. Fracture representation was done through a Discrete Fracture Network (DFN). In addition, Multiple-point Statistics –method by ISATIS (Geovariances) based on training images was tested for fracture simulation. The resulted 3D fracture patterns were visualized and used in 3D modeling radioactive elements at Palmottu site.

References:

Markovaara-Koivisto M and Laine E, 2012. MATLAB in analysing and visualizing scanline data. Computers & Geosciences Volume 40, pp 185–193.