

SAFENET - Fracture evolution in crystalline rocks (from lab to in-situ scale)

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Abstract. The DECOVALEX Task SAFENET is dedicated to advancing the understanding of fracture nucleation and evolution processes in crystalline rocks, with applications in nuclear waste management and geothermal reservoir engineering. Further improvement of fracture mechanics models is required in two distinct areas. Firstly, there is a need to enhance numerical methods for fracture mechanics under varying thermo-hydro-mechanical (THM) conditions. Secondly, there is a requirement to develop applied tools for performance and safety assessment in the context of nuclear waste management, as well as for reservoir optimisation in geothermal applications. Building on the achievements of SAFENET, which concentrated on benchmarking fracture models and experimental laboratory analyses, SAFENET-2 is dedicated to extending and validating models from the laboratory to the field scale.

This paper gives a detailed description of the work plan for SAFENET-2 of the experimental program and the modeling exercises. The experiments will be carried out at the rock mechanics laboratories of the Universities of Edinburgh and Chongqing. For field data, the STIMTEC experiment at the Reiche Zeche teaching and research mine (Technische Universität Bergakademie Freiberg) is used. The paper gives a detailed description of the individual steps of the task. As a result of SAFENET, the benchmark suite will be made available as interactive exercises via a web portal, thus promoting the concept of open science. The paper will help the teams to organize their work efficiently and also provide an overview and insight to the community.

The Evolution Of The Crystalline Rocks

Clemens Wendtner



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