UNIVERSITÉ DE NEUCHÂTEL

CHYN
Centre d'hydrogéologie et de géothermie

MSc en Hydrogéologie et Géothermie

Sujet de travail de MSc 2021

Application of Discrete Fracture Networks to Modeling Aftershock Sequences and Monsoon-triggered Earthquakes

Contexte et objectifs

Recent modelling studies suggest that long-duration aftershocks sequences are driven by high pressure fluid pulses initiated by co-seismic rupture. Another recent study of monsoon-driven earthquakes in the Decaan Traps (India) showed that a pulse of high-pressure fluid from intense rainfall propagated through fracture networks at depth. Modelling both of these observations requires numerical studies that explicitly include fracture networks, and flow through those fracture networks, to better understand and constrain timescales, fracture network properties, and the dominant controls on flow. The objective of this study is to impose various fracture networks (constrained where possible by observations) to numerically investigate the complex processes or fracture, flow, and ultimately healing of the flow networks.

Méthodologie et approches

The approach is to use the Discrete Fracture Network (DFN) module of the COMSOL Multiphysics platform for the modelling study. Fracture networks will be generated for dilatant zones of large earthquakes, and timescales and flow volumes will be established for various scenarios of hypothesized fluid sources at depth. DFN will also be incorporated into a 3D hydrogeological model to study earthquakes triggered by monsoons, where geophysical measurements provide some constraints (Gunatilake et. al., submitted, 2021).

Partenaires et collaborations

This work will be supervised by Prof. Steve Miller, with assistance from B. Gisler and T. Gunatilake.

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