

# **Thermo-Hydro-Mechanical (THM) Processes in a Fractured Rock Zone due to an Advancing Glacier**

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## **Abstract**

The lecture examines the coupled thermo-hydro-mechanical (THM) processes that develop in a fractured rock zone in a fluid-saturated rock mass due to loads imposed by an advancing glacier. This scenario is a test case that needs to be examined in the siting of repositories for the deep geologic storage of high-level nuclear waste. The THM processes are examined using a computational multiphysics approach that takes into account thermo-poroelasticity of the intact geological formation and the presence of a sparse distribution of a sessile but hydraulically interacting fracture zone. The modeling considers coupled thermo-hydro-mechanical effects in both the intact rock and the fracture zone due to contact normal stresses and fluid pressures at the base of the advancing glacier. Computational modeling provides an assessment of the role of fractures that can modify the pore pressure generation within the fractured rock mass.

\* *William Scott Professor and James McGill Professor*