

Micro- and mesomechanical simulations in respect to deformation behavior of claystones

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Besides the macroscopic (m- up to km-scale) and more phenomenological considerations, the micro- and mesomechanical and more physical based view becomes more important.

The understanding of micromechanical damage and deformation processes is a key prerequisite for a reliable prediction of HTM-coupled longterm behavior of rock masses and consequently for a profound longterm safety analysis.

First part of the lecture presents the potential, different techniques and some selected interesting results of micro-mechanical simulations in rock mechanics. The focus is on micro-mechanical Discrete-Element approaches and such for subcritical crack growth and corresponding life time predictions.

Second part of the lecture shows own results in respect to Opalinus Clay simulations at the micro- and meso-scale. This involves HM-coupled simulations at the level of clay plates (compaction behavior, formation of anisotropy, damage processes until macroscopic fracturing) as well as EDZ development based on HM-coupled particle simulations with interesting insight into this processes at the grain size level.