

Geological modeling for safety assessment of geological disposal

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The geological processes, to be covered in the safety assessment, and the necessary techniques in the course of the site characterization are given as a short synthesis. An assessment should take such a stepwise procedure that appropriate scenarios and their modeling should first be selected for the site characterization with later integration of long-term system evolution for the geological boundary conditions. The latter, comprising compaction / overpressures in reference to uplift and erosion or increasing overburden, diagenetic mineral transforms by thermal maturation, and climatic surface environmental changes, is relatively site-specific and, therefore, more complexed. Earthquakes, fault emplacements, volcanic eruptions, etc., are much more infrequent events which need probabilistic approach for their occurrence on one hand and then their impacts on the system performance. Of these three-fold step-wise assessment scheme, the key step may be the assessment of expected geological evolutions of the site which will be partly helped by the geological monitoring from the early stage of the siting.