

EVALUATION OF SOME MODELS OF GAS TRANSPORT AT DIFFERENT SCALES IN A DEEP GEOLOGICAL REPOSITORY

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The aim of this talk is to present some examples of two-phase flow and two-component (air-water or hydrogen-water) transport problems at different scales based on TOUGH code capabilities, which have been studied in the framework of a safety case of a high level waste (HLW) repository. The first example presented at small scale (meters and days) is that of the simulation of the in-situ PGZ-experiment of nitrogen transport in the Callovo-Oxfordian (COx) argillite. In this example, it is shown the importance of air-entry pressure in hydraulic properties of the COx for enhancement of nitrogen pressure data simulation in the COx. The second example is that of hydrogen transport at cell and module scales (dozen to hundred of meters, thousands of years) of a HLW repository site, where the problem of interfaces is invoked. The last example deals with the problem of the impact of piston flow of hydrogen on radionuclides transport at the scale of the repository site (kilometers, thousands of years), where a simplified repository model is used in order to study this impact. Finally, discussions about some studies on progress are presented, especially modelling of hysteresis, gas-solubility, and geo-mechanics which can have a great impact on gas transport at different scales.

References

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