



## **Modeling a ventilation experiment: Combined effect of desaturation and EDZ**

**Daniel Fernàndez-Garcia, J. Jaime Gómez-Hernández, Juan-Carlos Mayor**

(1)Universidad Politécnica de Valencia, Institute of Water and Environmental Engineering, Camino de Vera, s/n. 46022 Valencia, Spain, (2)Empresa Nacional de Residuos Radioactivos S.A. (ENRESA), Emilio Vargas 7, 28043 Madrid, Spain.

A ventilation experiment (VE) was conducted in a non-lined microtunnel at the Mont Terri Rock Laboratory under well controlled conditions to evaluate “in situ” the consequences of desaturation induced by ventilation on repository design and performance in consolidated Opalinus Clay rock formations. Specifically, from the point of view of long-term safety assessment of the disposal of radioactive waste in clay formations, it is crucial to estimate the saturated hydraulic conductivity based on measurements of transient-state piezometric heads and measurements of water flow rates leaving the rock formation through the tunnel surface. In this work, on the grounds of numerical simulations, it is shown that, in general, routine characterization of saturated hydraulic conductivity based on standard well test analysis can largely overestimate the hydraulic conductivity due to the desaturation of the near field of the microtunnel. The reason for this overestimation is apparently due to the combined effects of the excavation damage zone and the desaturation of the rock near the tunnel wall. Introducing a skin in the modeling process allows us to model the transient-state water pressures but grossly underestimates the flow rates into the tunnel. The difference between the measured values and the simulated ones can be interpreted as formation water drained from the skin zone.