Geophysical Research Abstracts
Vol. 15, EGU2013-11569, 2013
EGU General Assembly 2013

Modelling gas transport in the shallow subsurface in the Maguelone field experiment

Farzad Basirat (1), Auli Niemi (1), Hervé Perroud (2), Johanna Lofi (2), Nataliya Denchik (2), Gérard Lods (2), Philippe Pezard (2), Prabhakar Sharma (1), and Fritjof Fagerlund (1)

(1) Uppsala University, Earth Science, Uppsala, Sweden (farzad.basirat@geo.uu.se), (2) Géosciences Montpellier, CNRS, Université de Montpellier 2, 34095 Montpellier, France

Developing reliable monitoring techniques to detect and characterize CO_2 leakage in shallow subsurface is necessary for the safety of any GCS project. To test different monitoring techniques, shallow injection-monitoring experiment have and are being carried out at the Maguelone, along the Mediterranean lido of the Gulf of Lions, near Montpellier, France. This experimental site was developed in the context of EU FP7 project MUSTANG and is documented in Lofi et al. (2012). Gas injection experiments are being carried out and three techniques of pressure, electrical resistivity and seismic monitoring have been used to detect the nitrogen and CO_2 release in the near surface environment. In the present work we use the multiphase and multicomponent TOUGH2/EOS7CA model to simulate the gaseous nitrogen and CO_2 transport of the experiments carried out so far. The objective is both to gain understanding of the system performance based on the model analysis as well as to further develop and validate modelling approaches for gas transport in the shallow subsurface, against the well-controlled data sets. Numerical simulation can also be used for the prediction of experimental setup limitations. We expect the simulations to represent the breakthrough time for the different tested injection rates. Based on the hydrogeological formation data beneath the lido, we also expect the vertical heterogeneities in grain size distribution create an effective capillary barrier against upward gas transport in numerical simulations.

Lofi J., Pezard P.A., Bouchette F., Raynal O., Sabatier P., Denchik N., Levannier A., Dezileau L., and Certain R. Integrated onshore-offshore geophysical investigation of a layered coastal aquifer, NW Mediterranean. Ground Water, (2012).