Simulation of DNAPL distribution depending on groundwater flow velocities using TMVOC

KATHARINA ERNING¹, DIRK SCHÄFER¹, ANDREAS DAHMKE¹, ANTONELLA LUCIANO², PAOLO VIOTTI² & MARCO PETRANEGLI PAPINI³

¹ Dept. of Applied Geology, Christian-Albrechts-University Kiel, Ludewig-Meyn-Strasse 10, 24118 Kiel, Germany
² Dept. of Hydraulics, Transportations and Roads, Sapienza University of Rome, Via Eudossiana 18, 00184 Roma, Italy
³ Dept. of Chemistry, Sapienza University of Rome, P. le Aldo Moro 8, 00185 Roma, Italy

Abstract Remediation actions on groundwater contaminations are based on the knowledge of the position, the size and the mass of the source zone. We focus in our research on the question, whether high groundwater flow velocities can cause a displacement of a DNAPL source zone. Additionally, the impact of high groundwater flow velocities on the development of the DNAPL body is investigated. The tool for these investigations is multiphase modelling of different flow scenarios with TMVOC. The simulation revealed that even low groundwater flow velocities affect the DNAPL movement and distribution in the saturated zone and should thus be taken into account by site investigation.

Key words DNAPL infiltration; lateral displacement; groundwater flow velocities; multiphase flow modelling; TOUGH; TMVOC