Geophysical Research Abstracts
Vol. 20, EGU2018-19719, 2018
EGU General Assembly 2018

Application of an uncoupled model for contaminants transport in fractured aquifers

Maria Grazia Stoppiello, Giacome Viccione, and Leonardo Cascini
Department of Civil Engineering, University of Salerno, Italy

Transport modelling is a key element to the success of environmental risk assessment and remediation practices of contaminated groundwater. In the scientific literature, a variety of advanced models have been proposed to describe the contaminant transport through aquifers. None of these are applicable in a straightforward way in the general context of the real contaminated sites, because of the involved complex hydrogeological setting, lack of data and the high uncertainty degree of the involved parameters. This generally leads to an oversimplified representation of the subsurface flow and related transport phenomena.
In this work, an uncoupled mass transport and flow model, based on an Equivalent Porous Media (EPM) approach, is applied to simulate contaminants transport in a fractured aquifer. It consists of the application of two numerical steps: firstly, a flow solver is run to simulate the flow kinematics. Then a transport model is solved on the basis of the velocity field, previously derived. More specifically, the mono-dimensional steady-state flow problem is solved according to Darcy's law. The obtained solution is then applied to solve the advection-dispersion equation, written on the basis of the following set of assumptions: unidirectional advection, instantaneous and reversible linear sorption and degradation described as a first-order process. The proposed model is implemented on a two-dimensional vertical domain.
The aim is to evaluate the suitability of the model and the accuracy of the results with reference to an existing case of study.