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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Numerical modelling of flow and transport in Bari industrial area by means of rough walled parallel plate and random walk models" *by* Claudia Cherubini et al.

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The manuscript under discussion presented by Claudia Cherubini et al. combines existing concepts for modeling flow and transport in fissured/karstified aquifers, which in the past have been mostly used for theoretical studies or laboratory experiments, to characterize a contaminated site in a limestone aquifer of Southern Italy. This applied part in their work clearly presents a benefit to the scientific community. However, the manuscript would benefit from clarifications from the authors on the novelty in their work, on stating how certain observations/data are essential for the study, on a balanced discussion of the comparison simulated vs. observed data, on improved figures

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Discussion paper

illustrating the simulation results, and on a revision of the language and grammar.

Their work is introduced by an extensive overview, or almost review of the existing concepts to simulate flow and transport in fissured/karstified aquifers. In my opinion, this section could be slightly more focused/shortened to existing research which is in direct relation to the presented work. The section would benefit from a statement where the presented work is situated compared to the existing work, and where it presents a novel approach. The geological framework is described in some detail, although is not clear why some of the details such as depositional environment of the lower Pleistocene on top of the Bari Formation, presence of syn-/anticline axis, the geophysical properties (P-, S-Wave velocity), or geoelectrical surveys are useful for the study. In addition, properties of the Bari Fm are presented in the Lower Pleistocene part such as the hydraulic conductivities from 10E-3 to 10E-4 m/s. It is also not stated that this range likely presents an average, assuming that the value range would be much wider in a karstic aquifer? Data of hydrology and hydraulics, data interpolation and model implementation is straight-forward, and step-by-step. However, improved visibility of illustrations and figure legends would create benefits, e.g. show mentioned two hotspots in Fig. 6, including naming substance displayed (PCE?); blue labels in Fig.9 are not visible; Fig. 11 is to small, and its results are not mentioned or discussed in the text(?): what are the flow velocity errors exactly, errors compared to which velocity, darcy-flow velocities without fractures? In Fig. 12 simulation results are compared to normalized measurements, but figure resolution/size make it difficult to compare The manuscript would generally benefit from more extensive discussion of the results, e.g. in a separate discussion chapter.

L(ine) 25: . . .WITH respect. . .to the NON-constant. . .

L72ff: avoid one sentence paragraphs

L199: ..consider pulse-like. . .

L228: The formation shows. . . (no paragraph)

L232: unclear what “not interested by tectonical discontinuities” means

L260: how can the presence of a fault line control the development of the actual hydrographic network?

L267: Average of K-values? (see comment above)

L268: What does “under low pressure” mean, under a low GRADIENT?

L271: what is the (hardly visible) hydrographic network in Fig. 1? An area of climatic stations?

L300: Rather “estimated”, or “calculated” EVT instead of “real”. . .

L495: equation number missing

L540: L374 mentions two hotspots, here only one observed?

Please revise grammar/language

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