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3D groundwater modeling of the Upper Mega Aquifer System (Arabian Peninsula) using OpenGeoSys

Stephan Schulz (1,2), Randolf Rausch (2,3), Christian Siebert (1), Nils Michelsen (2), Olaf Kolditz (1,4), Mohammed I. Al-Saud (5), and Christoph Schüth (2)

(1) Helmholtz-Centre for Environmental Research - UFZ, Halle, Germany (stephan.schulz@ufz.de), (2) Technical University Darmstadt, Darmstadt, Germany, (3) GIZ International Services, Riyadh, Saudi Arabia, (4) Technical University Dresden, Dresden, Germany, (5) Ministry of Water and Electricity of the Kingdom of Saudi Arabia, Riyadh, Saudi Arabia

Groundwater is the only relevant freshwater resource for most countries on the Arabian Peninsula. Due to almost no recharge in most of the areas a sustainable management of this resource is not possible. Nevertheless, a smart and intelligent mining of groundwater can extend its lifetime. For this purpose groundwater models can be applied as powerful management tools. In this work a 3D groundwater model for the most relevant aquifer complex on the Arabian Peninsula, the Upper Mega Aquifer System, will be setup by using OpenGeoSys. The aquifer system has an extent of approximately 1.7 Mio. km2 and comprises 12 hydrogeological units from the Lower Cretaceous to the Neogene. The model serves the purpose to understand the system better and makes it possible to calculate scenarios of different abstraction rates and places. It could also help to quantify complex water balance components like the discharge into the Arabian Gulf. In order to setup the model further research as the estimation of important sink and source terms like groundwater recharge and Sabkha evaporation will be implemented.