Groundwater flow at the Rock Garden test site

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Understanding of subsurface flow and transport is of major interest supporting optimal design for several societal relevant technologies, such as waste disposals, geothermal or groundwater production facilities. To advance measurement and modeling techniques and refine them for practical applications, we develop the fractured aquifer test site Rock Garden at the Martin-Luther University Halle.

The Rock Garden test site is situated beneath the courtyard of the Faculty of Natural Sciences III and is 60 m x 60 m in size. Fractured Rotliegend series of konglomerates, sand- and siltstones are investigated at the site by 6 drillings. A central borehole (B3) is 40 m in depth and developed as an open borehole between 15 m – 40 m below surface. Five boreholes are developed as groundwater observation wells of about 20 m depth and are equipped with filterscreens between 10 m - 20 m below surface. Natural groundwater levels are on average about 3 m below surface and vary about 0.5 m around this value.

A first pumping test in B3 unraveled hydraulic connection to all of the five surrounding boreholes. The effective transmissivities are of the order of $10^{-5} \text{ m}^2/\text{s}$ and storativities are of the order $10^{-3}$. To understand hydraulically active fractures or fracture zones and their connection to the rock matrix at the Rock Garden site, we plan to performed a first flowmeter experiment in well B3 under natural and pumping conditions. Finally we plan to characterize these fractured zones in detail performing hydraulic and tracer tomography at the Rock Garden test site in the near future.