



Bored boys, graffiti, and YouTube – tracing recent groundwater level changes in a Saudi Arabian cave

Nils Michelsen (1), Heiko Dirks (2), Stephan Schulz (3), Stephan Kempe (1), and Christoph Schüth (1)

(1) Institute for Applied Geosciences, TU Darmstadt, Darmstadt, Germany (n.michelsen@gmx.de), (2) GIZ International Services/Dornier Consulting, Riyadh, Kingdom of Saudi Arabia, (3) UFZ – Helmholtz Centre for Environmental Research, Halle, Germany

The Dahl Hith cave is located approximately 30 km southeast of Riyadh, the capital of Saudi Arabia. In the past decades, the groundwater table exposed inside the cave became subject to appreciable changes. After a decline due to agricultural water abstraction for irrigation purposes, the water table exhibited a rapid rise in the last few years. Considering that most of the aquifers of the country show a depletion of the largely fossil groundwater, the mentioned rise is quite unusual. The area does not host an observation well, i.e. reliable data on the piezometric changes is hitherto not available. Hence, two uncommon data sources were used to reconstruct the water level changes: (1) YouTube videos and (2) graffiti inscriptions.

(1) The cave is frequently visited by locals and expats from Riyadh and many visitors are willing to share their cave adventures on YouTube. Identifying certain reference points in the uploaded videos (e.g. specific boulders, cave graffiti) and estimating their position relative to the water table allows for an approximate reconstruction of the recent groundwater rise. Information on the observation time is derived from the uploading date. Occasionally, also the exact date of the visit is provided as part of the footage description. (2) Some people documented their visit by graffiti inscriptions. These do not only serve as a marker in the videos, but also contain genuine data on historic water levels: if written on parts of the cave wall, which are only accessible from the water, they indicate the water level at the time of their creation. Fortunately, some graffiti also feature the date of the visit.

In order to improve the reliability of the water level estimations, measurements conducted in the course of own site visits in the past few years were considered for the evaluation. Also photographs taken during these surveys helped to improve the quality of the water level reconstruction.

The described “Youtube Approach” could be interpreted as a citizen science project with citizens being unaware of their participation. It illustrates the occasional need for creative solutions in data-scarce settings.