# Tracing Recent Water Level Changes in a Saudi Arabian Cave by Mining YouTube Videos
## Abstract n°1877

Michelsen Nils, Darmstadt, Germany

michelsen@geo.tu-darmstadt.de

Dirks Heiko, Dornier Consulting, Riyadh, Saudi Arabia

Schulz Stephan, UFZ – Helmholtz Centre for Environmental Research, Catchment Hydrology, Halle, Germany

Kempe Stephan, Technische Universität Darmstadt, Institute for Applied Geosciences, Darmstadt, Germany

Al-saud Mohammed, Ministry of Water & Electricity, Riyadh, Saudi Arabia

KEYWORDS: participatory research, social media mining, crowdsourcing

Traditional participatory data collection methods are increasingly complemented by social media mining – the harvesting of pre-existing, crowd-generated data from Twitter, Flickr, etc.. Although this approach is participatory in a broader sense, the social media users are mostly not aware of their participation in research. Inspired by this emerging trend, we watched YouTube videos taken in Dahl Hith, a Saudi Arabian cave. The latter has recently experienced a rapid (but undocumented) water level rise. By identifying reference points in multiple videos (e.g., cave graffiti) and visually estimating the decreasing distances between these points and the water level, we were able to reconstruct the groundwater rise for 2013 and 2014 (approx. 9.5 m at an average rate of 0.4 m month). To the best of our knowledge, we thereby establish a precedent of using YouTube to study water level changes over an extended time period. Despite the sacrifice in precision, we believe that analyzing YouTube footage may represent a viable option in data-scarce settings and that the approach could be adapted to other environments (e.g., reconstruction of stream discharge, flood extents, etc.). Moreover, we see a significant outreach potential in such novel approaches. Although hydrogeology plays a pivotal role in the future of society, its importance is mostly not reflected in its public visibility. One reason could be that some of our sophisticated methods in hydrogeology might seem rather abstract to non-scientists. The present study, by contrast, utilizes one of the most popular social media websites as water level archive and applies an easily comprehensible estimation technique to reconstruct piezometric changes. We can imagine that such simple, creative approaches hold a certain potential to spark greater interest for hydrogeology among the general public.