Geophysical Research Abstracts
Vol. 19, EGU2017-9563, 2017
EGU General Assembly 2017

Active tectonics at the Lower Yarmouk Gorge?

Nimrod Inbar (1,2), Marwan Raggad (3), Christian Siebert (4), Peter Möller (5), Tino Rödiger (4), Eliyaho Rosenthal (1), Josseph Guttman (6), Fabien Magri (7,8)

(1) The Department Earth Sciences, Tel Aviv University, Tel Aviv, Israel (nimr@post.tau.ac.il), (2) Eastern Regional R&D Center, Ariel University, Ariel, Israel, (3) University of Jordan, Amman, Jordan, (4) Helmholtz Centre for Environmental Research – UFZ, Dept. Catchment Hydrology, Halle, Germany, (5) GFZ German Research Centre for Geosciences, Section 3.4: Fluid Systems Modelling, Potsdam, Germany, (6) MEKOROT, the National Water Co. of Israel , (7) Helmholtz Centre for Environmental Research - UFZ, ENVIF, Department of Environmental Informatics, Leipzig, Germany, (8) Freie Universität Berlin, Hydrogeology, Berlin, Germany

The Lower Yarmouk Gorge (LYG) extends on the eastern margin of the Jordan Rift Valley (JRV) adjacent to the Kinneret basin which makes part in the chain of pull-apart basins along the Dead Sea Transform (DST). The LYG is bounded to the south by the Ajloun Plateau (northern Jordan) and to the north by the Golan Heights (Israel). It acts as the outflow of the Yarmouk drainage basin into the Jordan River a few kilometers south of Lake Tiberias.

Although topographically the Golan Heights and the Ajloun seem to be different provinces separated by the LYG, the northern Ajloun and southern Golan form the southern flank of a major synclinal structure. Morphologically, the LYG resembles the Sheikh-Ali strike-slip fault and other NE-SW striking faults related to the DST. However, the existence of faulting along that line is debatable. As the gorge serves also as state boundary, no seismic lines cross the LYG. Quaternary landslides, mostly on the southern flank of the LYG cover possible surface evidence of faulting although Quaternary basalts located at the gorge path may indicate possible vertical pathways. Moreover, hydrological studies (Siebert et al., 2014, Goretzki et al., 2016) show that permeability anisotropy along the LYG line allows heated groundwater to emerge along the gorge with temperatures rising up to 60°C.

The presented study uses well data from northern Jordan and southern Golan Heights as well as seismic data from the southern Golan Heights to bridge over the information gap. Based on the available information we present our hypothesis on the geology of the LYG aiming to contribute to the discussion regarding active tectonics at the Lower Yarmouk Gorge. Our preliminary results show that a major fault along the gorge path is dubious however, perpendicular faulting is more likely to occur. We expect the results of current research to contribute to the understanding of the local complex geohydrological system. Furthermore, results are expected to deepen our understanding of pull-apart basin tectonics effect on the evolution of marginal structures.

Reference:

Goretzki, N. et al., 2016. Inverse Problem to Constrain Hydraulic and Thermal Parameters Inducing Anomalous Heat Flow in the Lower Yarmouk Gorge. Energy Procedia, 97: 419-426. DOI:http://dx.doi.org/10.1016/j.egypro.2016.10.038

Siebert, C. et al., 2014. Thermal waters in the Lower Yarmouk Gorge and their relation to surrounding aquifers. Chemie der Erde - Geochemistry, 74(3): 425-441. DOI:http://dx.doi.org/10.1016/j.chemer.2014.04.002