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The hydrogeology of the transboundary Yarmouk Gorge: a case study

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The Lower Yarmouk Gorge (LYG) marks both hydrogeological and Geopolitical triple junction. It serves as a meeting point for groundwater flowing from the Syrian Haurn Plateau, the Jordanian Ajloun Mountain and the Israeli Golan Heights. It is also the natural outlet of the 6,833 km^2 transboundary Yarmouk drainage basin, which was one of the main tributaries of the Jordan River. Within the gorge, springs and boreholes exhibits various water types flowing in a wide range of temperatures. For the three riparian states, the uncertainty of groundwater origin and flow paths imposes difficulties on the management of water flowing towards the Gorge. In last few years a series of studies have attempted to unveil some of the mystery. Numerical representation of rainfall field is a method developed in order to cope with the lack of data and contributed to the assessment of water consumption and aquifer discharge at the ungauged/unreported upstream parts of the basin (Shentsis et al., 2018 and 2019). Hydrochemistry of groundwater has been investigated in light of the natural processes in the larger Yarmouk Basin and a methodology was devalued for identifying different groundwater bodies in multi-aquifer systems (Möller et al., 2016; Rosenthal et al., 2020). Finally, a new structural model for the transboundary Lower Yarmouk Gorge has been suggested based on data from Israel and Jordan (Inbar et al., 2019) and several numerical simulations have been conducted for the study of this enigmatic fractured hydrothermal system (Magri et al., 2015 and 2016; Gurezki et al., 2016). Finally, it seems that currently we are a few steps closer towards a better understanding of this complex transboundary system and the lessons learned here can be used in other transboundary system around the world.

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