

EGU21-14896

<https://doi.org/10.5194/egusphere-egu21-14896>

EGU General Assembly 2021

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



Karst evolution, hydrocarbon and geothermal resources in flow system context (South Hungary)

Katalin Csondor¹, Lehel Csobaji², Brigitta Zentai-Czauner¹, Orsolya Győri³, and Anita Erőss¹

¹József & Erzsébet Tóth Endowed Hydrogeology Chair, Eötvös Loránd University, Budapest, Hungary

(csondorkata@caesar.elte.hu)

²Central Transdanubian Water Management Directorate, Székesfehérvár, Hungary

³TDE ITS Ltd., Budapest, Hungary

In South Transdanubia (Hungary) there are remarkable geothermal and hydrocarbon resources. The area is also characterized by natural thermal water discharge at the boundary of outcropping carbonate hills and adjacent sedimentary basin. These regional discharge areas are favourable sites of hypogenic caves as well. These geofluid systems and groundwater related phenomena are usually investigated separately and their interactions are just neglected. The aim of this study is to give all these groundwater-related resources and phenomena a common framework applying the concept of regional hydraulic continuity, and to complete the basin-scale hydraulic assessment of the area based on preproduction archival measured data. Pressure-elevation profiles, tomographic fluid-potential maps and hydraulic cross-sections were constructed to determine the vertical and horizontal fluid-flow conditions. As a result, two kinds of fluid flow systems could be identified. Within the gravitational flow systems, horizontal flow conditions are dominant and the regional flow direction tends toward the S–SE. In deeper basin regions, an overpressured flow system is prevalent, where fluids are driven laterally from the deeper sub-basins towards their margins. Based on the regional-scale evaluation of fluid flow systems, conclusions could be drawn regarding the geothermal and hydrocarbon potential of the area. Additionally, local-scale phenomena could be explained, and the study emphasizes that knowledge on regional groundwater flow systems is essential to understand local scale groundwater-related phenomena such as recent cave formation in an area. A comparison with the marginal Buda Thermal Karst area allows for generalized conclusions regarding the connections between marginal karst reservoirs and the Pannonian Basin. Furthermore, the results of the study can be directly applied in the exploration and sustainable utilization of groundwater related resources, such as thermal waters and hydrocarbons.

This topic is part of a project that has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 810980. The National Research, Development and Innovation Fund has provided financial support to the research under the grant agreement no. PD 116227.