

Connection between the geological structure and the water flow in karstic aquifers

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In Hungary, more than 90% of drinking water is coming from subsurface water. The water stored in the sensitive karstified rocks of Transdanubian Central Mountains forms one of the 40 most significant drinking-water resources of the country. Furthermore, this karst water is the source of the world-famous thermal springs, which are situated at the margins of the Transdanubian Central Mountains.

Due to the withdrawal of the coal and bauxite mining the original karst water level (+170-180 m a.s.l.) dropped by 100-180 m in mining areas and by an average of 30 m throughout the entire region by the early 1990's. The decline of water level caused a numerous environmental problems. In 1990 the water pumping decreased, due to environmental and financial reasons. At that point, the rehabilitation of depression cones, and the entire region, in general began. The refilling process offered an unique opportunity to study the geological factors that determine water flow between the recharge and discharge areas.

This research unambiguously showed that the water level and water flow are determined by similar geological elements: the spatial extent and location of the impermeable and permeable formations, their type of connection, and karstic fissure and cavern system. The geological elements were determined by the original sedimentation, and post-depositional tectonic events. In the depression cones the role of the horizontal faults is clearly defined. Due to the regional nature of the hydrogeologically important geological elements, the Transdanubian Central Mountains is one hydrodynamic unit, which, nonetheless, can be divided into well defined sections.