



Hydrogeological reconstruction of Baranja region (NE Croatia) as a key input for sustainable water management

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The preservation of good chemical and quantitative status of a groundwater resource requires a detailed management plan that needs to account for the site-specific hydrological and hydrogeological settings and the utilization of the groundwater resource. Management plans are particularly crucial in areas with a complex surface water-groundwater interaction or an unevenly distributed exploitation of the resource.

This research aims to reconstruct the hydrogeological setting of the Baranja region (NE Croatia; area of 1,172 km²) extending between the Drava River to the S and W and the Danube River to the E. Effective water resource management is crucial in Baranja. The steady growth of tourism capacities (33% increase in last 5 years), particularly in rural tourism and the Nature Park Kopački rit, drives increasing demand for water. The Nature Park Kopački rit holds particular natural and touristic value since it hosts a rich swamp ecosystem along the backwaters and ponds of the Danube and Drava rivers that strictly depend on the surface water-groundwater interaction. In addition, the agriculture industry in the region is well developed with several farms feeding one of the biggest food industry in Croatia. Despite the natural and economic appeal, the population density in Baranja is low with the inhabitants concentrated in a few settlements. The water supply system is fed by 3 well fields with a few active wells reaching a depth of 40-60 m and providing a total of 40-50 L/s. Farms and many small activities use local wells that provide water for different industrial uses. Surface water flow of rivers and main canals is regulated by several pumping stations. These conditions result in an unevenly distributed anthropic pressure on the surface water-groundwater system that could cause localized overexploitation or pollution.

Hydrogeological investigations in Baranja have been mostly conducted in the main well fields. This research includes the regional hydrogeological mapping of the aquifer system and the continuous monitoring of the groundwater level and its physico-chemical parameters. Currently, stratigraphic logs from different sources and results of well testings have been collected and digitalized in a geodatabase that contains approximately 200 wells and exploration boreholes. These data will permit to develop a 3D reconstruction of the hydrogeological setting and to plan both a continuous monitoring of the water level and a periodic sampling of the groundwater. The obtained results will represent key inputs for a comprehensive understanding of the surface water

and groundwater interaction and their utilization, the reconstruction of the main geochemical processes in the aquifer, and a sustainable groundwater management.

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