Managed artificial groundwater recharge at Apače field

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Abstract

The aquifer of Apače field is a shallow aquifer, located on the Apače plane in the statistical region of Pomurje (northeastern part of Slovenia). The north side of the plain is bordered with river Mura, which also represents the state border with Austria and the south side with the hills of the Slovenske gorice.

Because of its shallowness and thinner roof layers, intense agriculture and settlements in the area, the aquifer of Apače field is among the most vulnerable and exposed aquifers in Slovenia. On the aquifer, there are two groundwater pumping stations located near the riverbanks of river Mura (Podgrad and Segovci), which are the main drinking water supply stations for the water supply network System C, which covers 8 municipalities with 27,000 inhabitants.

To protect the two main pumping stations (pumping stations for water supply system, named System C) from nitrate polluted hinterland water and to prevent water scarcity in the summer period, a new managed artificial groundwater recharge system with induced riverbank infiltration was established. For a functional operation of the system, a well-planned monitoring system with equipped observing wells (total 49) and one meteorological lysimeter station was also constructed.

Within the projects GEOHIDRO (Vremec et. al., 2017) and SI-MUR-AT (V-A Interreg SI-AT) and two master thesis (Kolar T. 2018, Vremec M.) a steady-state and a transient groundwater flow model was established to analyze the efficiency of the artificial groundwater recharge system against possible contamination from nearby lakes and to analyse the impact of extreme climate events on the aquifers state. For the analysis to assess groundwater recharge and nitrate leaching detailed geographical, pedological and climatological information was processed, including land use and agricultural cultivation of the fields. All of this was incorporated into the tool hydrotopes as a support for further modeling.

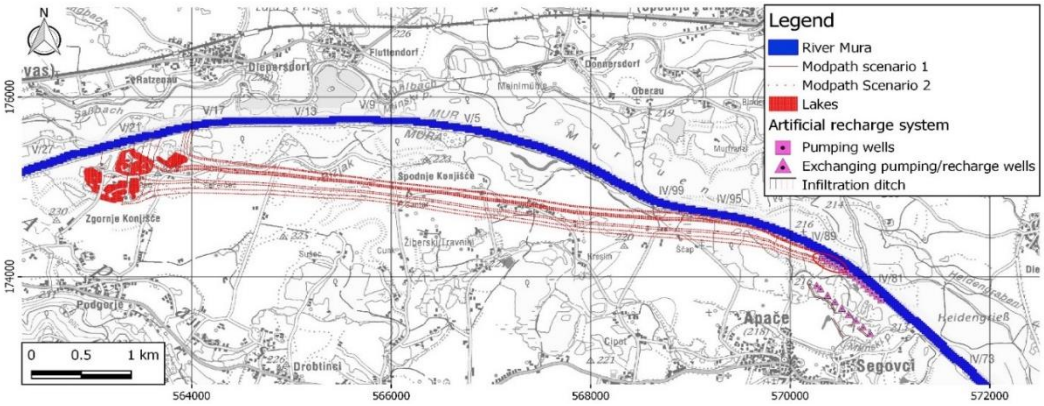

Figure 1: ***Results of Modpath particle tracking for the analysis of possible contamination from nearby lakes (Kolar, 2018)***

References

M. Vremec, D. Gošnjak, S. Krajnc, I. Kopač, J. Ravnik (2017), GEOHIDRO – Methodology for sustainable usage of groundwater. *Ekolist – environment journal* 14, 23-27.

T. Kolar (2018), Impact of lakes in Zgornje Konjišče on groundwater of Apaško polje, *Master thesis*, University of Maribor, Faculty of Mechanical Engineering.