



Groundwater vulnerability assessment and validation on the example of Gömör-Torna Karst, Hungary and Slovakia

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A comprehensive resource and source groundwater vulnerability assessment was carried out on a transboundary test site of the Gömör-Torna Karst (Hungary and Slovakia). The main goal of the investigation was to understand and map vulnerability in a more general hydrogeological context, taking into consideration the special characteristics of gravity-driven groundwater flow systems, i.e. the flow dynamics in the area.

In order to assess vulnerability, parametric, semi-quantitative approaches were adapted, applied, compared and validated on the test area. Focusing on the usual “weak points” of the assessment (as crucial but nonetheless mainly just roughly estimated parameters), complementary investigations were carried out with diverse techniques. The characteristic clayey sediment cover may have major impact on the infiltration. Its spatial extension and role in the infiltration process were investigated by means of geophysical techniques and grain-size measurements. In order to understand the flow dynamics in the saturated zone better, results of tracer tests were analyzed. Besides that, spring hydrograph and recession curve analysis were carried out based on long-term daily spring discharge data series.

The study provides an approach in order to improve the reliability of vulnerability maps. The well-studied and intensively karstified area of the Gömör-Torna Karst serves also as an appropriate example for further similar studies to find the best possible investigation and mapping strategies and thus to create comprehensive, reliable, process-based vulnerability maps.

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