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Recession curve analysis in function of karst lake hydrogeological regime identification: case study Red Lake, Croatia

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Red Lake is an example of a karst phenomenon near the town of Imotski (Croatia), in the central part of Dinaric Karst. It is considered the deepest submerged karst feature in the world, located in an inaccessible area with large slopes of the lakeshore, which makes the research difficult and resource intensive. For this reason, to better understand the hydrogeological functioning of the lake, data on the water level in the lake, collected over a period of five years, were analyzed. The morphometric model of Red Lake was used to determine a relationship between lake volume and depth, furthermore to define integral water inflow and outflow quantities. Recession curves were extracted from the graphical representation of the water influx data series. The calculated recession coefficients were used to identify the dominant hydrogeologic mechanism respective to the water level in the lake and the ratio between recharge components of groundwater and direct runoff. The approach provides a tool for identifying the hydrogeological regime of karst lakes and the stratification of different porosity levels of the surrounding karst massif.