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# Responses of artificial and natural tracers to a storm event in a karst catchment with allogenic recharge (Lurbach, Austria)

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Karst catchments are drained by highly permeable underground channels that focus flow toward prominent points of outflow situated in the valleys. Storm responses of these springs may provide integral information about the karst catchment. However, the analysis of storm responses is often hampered by lack of information about the spatial and temporal distribution of the input (recharge) and its physico-chemical properties. In addition, readily measurable parameters such as electrical conductivity and temperature of the water are known to be affected by rock-water interaction, which further complicates the analysis.

To overcome these difficulties and thus improve aquifer characterization techniques based on the analysis of storm responses, artificial tracer testing was combined with the analysis of multiple natural tracers in the Lurbach Karst System (Semriach-Peggau, Styria, Austria). The carbonate aquifer between Semriach and Peggau is mainly supplied with concentrated allogenic recharge at the Lurbach stream sink. Thus, the quantity and quality of the rapidly infiltrating recharge component, which mainly determines the storm responses of karst springs, can be measured at this stream sink.

In this study, an artificial tracer (fluorescein sodium) was continuously injected close to the stream sink over a period of about 10 hours, shortly before a storm and a subsequent snow-melt event. At the injection location and directly at the stream sink (Lurbach) as well as at the known points of resurgence (Hammerbach, Schmelzbach) discharge, several physico-chemical parameters and the tracer breakthrough were measured online and water samples were taken. In addition to the concentration of the artificial tracer, natural tracers such as electrical conductivity, pH, major cations and anions, and stable isotopes were quantified. The analysis of this time dependent data provide insight into the transmission of flood pulses and the transport of non-reactive (e.g., 18O, fluorescein sodium) and reactive (e.g., electrical conductivity, calcium) tracers through a karst system.