



## **Repeated tracer tests in a karst system with concentrated allogenic recharge (Johnsbachtal, Austria)**

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The Johnsbachtal (Austria) is a high Alpine headwater catchment covering an area of approximately 65 km<sup>2</sup>, which is equipped with a hydrometeorological monitoring network (Strasser et al. 2013). The catchment is composed of carbonate rocks and crystalline rocks belonging to the Northern Calcareous Alps and the Greywacke Zone. The largest spring within the catchment, the Eitzbach spring, is bound on karstified carbonate rocks of the Greywacke Zone. A stream sink located at a distance of approximately 1 km from the spring was used as injection point for repeated tracer tests in the years 2012, 2013, and 2014. In each case the tracer was recovered at the spring indicating an allogenic recharge component from the crystalline parts of the catchment. The spring discharge at the times of the three tracer tests varied between approximately 0.3 and 0.6 m<sup>3</sup>/s. Likewise the tracer travel times and thus the flow velocities were found to be different. Surprisingly, the largest tracer travel time (and thus lowest flow velocity) was obtained in 2013 when the spring discharge was highest (0.6 m<sup>3</sup>/s). In addition, the flow velocities in 2012 and 2014 were found to be clearly different, although the spring discharge was similar (roughly 0.3 m<sup>3</sup>/s) in both tests. Thus, the tracer velocity appears to be not correlated with the spring discharge. Field observations indicate that this finding can potentially be attributed to complexities at both the injection location (e.g., plugging of injection points and thus different flow paths) and the sampling point (i.e. the spring, which is composed of several outlet points representing different subcatchments).

### References:

Strasser, U., Marke, T., Sass, O., Birk, S., Winkler, G. (2013): John's creek valley: a mountainous catchment for long-term interdisciplinary human-environment system research in Upper Styria (Austria). *Environmental Earth Sciences*, doi: 10.1007/s12665-013-2318-y