



Application of stable isotope analyses as support for determination of hydrological response of nonhomogeneous catchment of the Ljubljanica River

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Since all of the questions in hydrology cannot be answered with hydrological measurements, hydrologists have been applying stable isotopes analyses for several decades in their research. For example, with stable isotopes flow paths of rainfall to the streams can be identified and mean residence time can be estimated. Only with traditional measurements and conventional hydrological analyses on small catchments, which have relatively homogenous properties, it is difficult (and doubtful) to make conclusions about spatial extrapolation of rainfall runoff in a larger non-homogeneous catchment.

In the scope of the research project Modelling of Hydrologic Response of Nonhomogeneous Catchments stable isotopes (^{18}O , ^2H) will be used for the determination of the hydrological control mechanisms, which regulate rainfall runoff in individual hydrologically homogeneous sub-areas (e.g. karst area). Based on the measurements, we will try to improve the existing hydrological models and introduce new approaches especially in terms of the possibilities for the calibration of hydrological models. Isotope measurements will be supported by traditional hydrological measurements of precipitation, discharge, sediment transport and water chemistry. Combination of isotopic measurements and traditional measurements at relatively large catchment of the Ljubljanica River (approx. 1,990 km²), which has a nonhomogeneous composition (karst hinterland and torrential tributary Gradaščica River), will represent a new approach to hydrological analyses both in Slovenia and worldwide.