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Usefulness of O-18 and deuterium to study transport processes at aquatic interfaces

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Several different tracers are used in ecohydrology to study the manifold transport processes across groundwater-surface water interfaces. The stable isotopes of oxygen (O-18) and hydrogen (deuterium) as parts of the water molecule might be perfect tracers since their behavior in the environment is quite conservative. Isotope signatures of water differ due to origin of the water and can help to identify processes such as in- or exfiltration at groundwater-surface water interfaces. The recent development of cavity ring-down spectroscopy facilitates reliable measurements by far compared to the previously common method of mass spectroscopy. Nowadays, stable isotope measurements are orders of magnitude cheaper, faster and easier than five years ago. Based on that analytical progress, an increasing number of studies employ the stable isotopes O-18 and deuterium. Ecohydrological applications and their limitations are critically discussed in this contribution focusing on aquifer-lake interfaces.