

Radon and CO₂ as natural tracers in a Karst System

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Abstract. ²²²Rn and CO₂ are produced in large quantities in the soil covering a karst. Both gases are well water soluble and are carried down to the karst system with infiltrating rainwater.

They can be used as natural tracers to study water transport from the soil to an underground karst river or a spring. Radon decays with a half live of 3.8 days on its way down. CO₂ concentrations decrease slowly due to an interaction with the limestone. Combined radon and CO₂ measurements at a karst spring or an underground river may thus help to discriminate between water coming from the soil reservoir, the epikarst (interface between soil and karst) or freshly infiltrating rainwater.

We present combined radon/CO₂/conductivity/temperature measurements taken at 30 min intervals for several months at an underground karst river in the Swiss Jura Mountains. After moderate rainfall we observe an increase in the CO₂ concentration but the radon level stays low. We attribute this to water being pushed out from the epikarst. After heavy precipitations CO₂ and radon both increase, pointing to a contribution from the soil reservoir (Fig. 1).

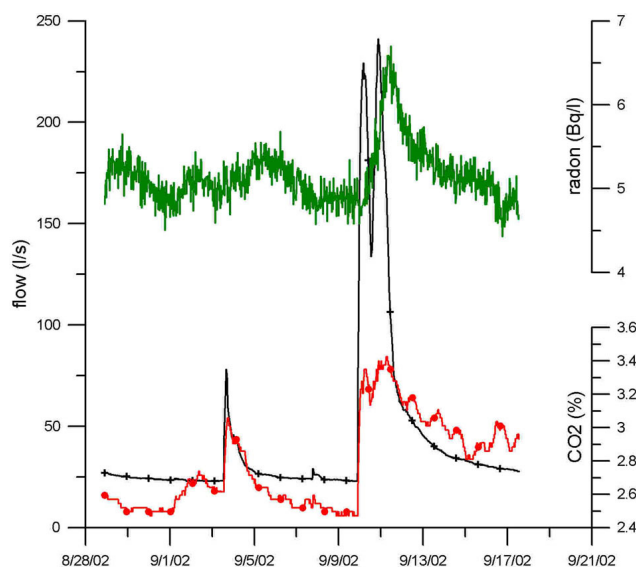


Fig. 1. CO₂ and radon increase during moderate and heavy flood events.