

## **A dual stable-isotope approach to analyse the linkages between tree water fluxes and soil water pools in a Mediterranean mountain catchment**

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This work uses a dual isotope-based approach ( $^{18}\text{O}$ ,  $^2\text{H}$ ) to examine the mixing of water in the soil and the linkages between tree water fluxes and soil water pools in a Mediterranean mountain catchment (Vallcebre Research Catchments, NE Spain,  $42^\circ 12'\text{N}$ ,  $1^\circ 49'\text{E}$ ).

Since May 2015, water-isotopes have been monitored in rainfall, throughfall and stemflow below a Scots pine stand and in stream water at the Can Vila (0.56 km<sup>2</sup>) catchment outlet. Moreover, fortnightly (From May to December 2015) soil samples (10, 20, 30, 50 and 100 cm), xylem samples (3 Scots pines) and mobile soil water samples in low-suction lysimeters (20, 50 and 100 cm) and in a piezometer (150-300 cm deep) were collected at the same stand. Water from soil and xylem samples was extracted by cryogenic vacuum distillation and isotope analyses were obtained by infrared spectroscopy. All this information has been combined with continuous measurement of meteorological, soil moisture and water potential, piezometric levels and hydrological variables at the stand and catchment scales.

Stable isotopes ratios of bound soil water fell below the local meteoric water line (LMWL), with more evaporative enrichment in the shallow horizons. On the contrary, mobile soil water (low suction lysimeters) and groundwater fell along the LMWL, well mixed with stream water. The differences observed between these two water pools remained similar during the whole study period.

Stable isotopes ratios indicate that Scots pine trees use shallow bound soil water during the whole study period. No marked changes in depth of water uptake were observed, presumably due to the availability of water in the shallow horizons, even during the summer months.