



Low cost water vapour sampling for mobile in-situ measurements of stable water isotopes

Barbara Herbstritt, Stefan Seeger, Michael Rinderer, and Markus Weiler

Earth and Environmental Sciences, University of Freiburg, Freiburg, Germany (stefan.seeger@hydrology.uni-freiburg.de)

In-situ sampling probes for water vapour stable isotopes can provide valuable information to elucidate eco-hydrological processes. They were successfully used for monitoring in soils, groundwater and trees. However, field operation of laser based stable water isotope analysers is constrained by various aspects (risk of damaging the expensive devices, relative immobility due to weight and peripherals, high power demand for the operation).

To overcome the limitations arising from the field operation of the measurement device, we decided to leave the analyser in the laboratory and develop a sampling method that allows us to take water vapour samples from the field into the laboratory. We tested various kinds of reasonably priced air tight bags with different kinds of vapour inlets/valves in order to find an affordable, yet reliable flexible container for storage and transport of the vapour samples. Additionally, we developed a vapour sampling kit fitting into a small toolbox, that replaces the isotope analyser and its peripherals in the field and draws water vapour samples from multiple sampling probes in parallel into the sample bags, measuring flow rates and temperature, which is important for calculating the isotopic composition in the liquid water. We will present the results of our search for reliable low cost vapour sample bags and first results of the sampling kit, hopefully reaching a sampling frequency of one sample (500 ml) in not more than 15 minutes.