



Real-time measurement of the evolving isotope ratios ($^2\text{H}/^1\text{H}$ and $^{18}\text{O}/^{16}\text{O}$) of water vapor emerging from plant leaves

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We have studied the temporal behavior of the deuterium and oxygen-18 isotope ratio of water vapor emerging from a freshly cut plant leaf placed in a dry nitrogen atmosphere. The leaf material was placed directly inside the sample gas cell of the Stable Isotope Ratio Infrared Spectrometer (SIRIS). At the reduced pressure (~ 40 mbar) inside the cell the appearance of water evaporating from the leaf is easily probed by the spectrometer, as well as the evolving isotope ratios, with a precision of about 1 per mil. In future experiments we will flow air over the leaf (still connected to the plant) and through the spectrometer gas cell, in order to avoid the low-pressure environment experienced by the leaves in the current setup. Plant leaf water isotope ratios provide important information towards quantification of the different components in the ecosystem water and carbon dioxide exchange.