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Improved throughput for δ18O, δD and 17O-excess measurements of water with Cavity Ring-Down Spectroscopy

Content

Stable isotope analysis of water has become a routine tool to investigate processes in climate, environment and hydrological studies. Cavity Ring-Down Spectroscopy (CRDS) allows to measure the isotopic composition of H2O from different terrestrial and marine sources in the laboratory or directly in the field. We recognize that precision and sample throughput are key parameters for water isotope measurements. Here, we will present two new measurement modes for the Picarro Cavity Ring-Down Spectroscopy (CRDS) water isotope analyzer that allow the user to increase the sample throughput.

The Picarro Express mode now distinguishes between a memory reduction stage and a sample analysis stage and allows the user to measure up to 50 samples per day while maintaining the excellent precision of CRDS (i.e., 0.01‰ for δ18O and 0.05‰ for δD). This corresponds to doubling the throughput compared to the standard Picarro methodology. The Picarro Survey mode makes use of ultrafast injections and sorts the samples by their measured isotopic values, enabling a powerful new strategy to reduce memory effects.

The Picarro Express mode can also be used to measure 17O-excess along with δ18O and δD using a Picarro L2140-i analyzer. We present results of several series of samples and standards of different water isotopic composition (δ18O ranging from -54 to 0 ‰) ran three times with both the Standard and the Express modes to compare the performances of the two modes.

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