Improved throughput for $\delta^{18}$O and $\delta$D measurements of water with Cavity Ring-Down Spectroscopy

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Oxygen ($^{18}$O/$^{16}$O) and deuterium (D/H) isotopes are a widespread tool to trace physical and chemical processes in hydrology and biogeoosciences. Precision and throughput are key parameters for water isotope analysis. Here, we will present two new methodologies for the Picarro L2130-i Cavity Ring-Down Spectroscopy (CRDS) water isotope analyzer that allow to increase the throughput with no compromise of data quality.

The Picarro Express Method now distinguishes between a memory reduction stage and a sample analysis stage and allows to measure up to 50 samples per day while maintaining the excellent precision of CRDS (i.e. 0.01‰ for $\delta^{18}$O and 0.05‰ for $\delta$D). This corresponds to doubling the throughput compared to the standard Picarro methodology. The Picarro Survey Method makes use of ultrafast injections and sorts the samples by their measured isotopic values, enabling a powerful new strategy to reduce memory effects.

We will discuss different measurement strategies to increase the throughput for routine water isotope analysis. The improved methodologies do not require any hardware changes and are solely based on modifications of the injection procedure. If you are interested in Picarro's off-the-shelf solution for increasing productivity of your existing and future installations, please visit the Picarro vEGU 2021 booth for a free voucher.