

## **$^{18}\text{O}$ & $^2\text{H}$ WATER STABLE ISOTOPE ANALYSIS BY CAVITY RING DOWN SPECTROSCOPY (CRDS)**

### *Sample Analysis:*

Water samples are analyzed for both oxygen and hydrogen isotopes on a Picarro CRDS (Model L1102-i). The Picarro CRDS isotopic water analyzers provides both  $\delta^{18}\text{O}$  and  $\delta^2\text{H}$  stable isotope ratios with high precision in one fast measurement. The instrument is equipped with a high precision autosampler, capable of making consistent small volume injections into the vaporizer. In addition, the instrument is configured with a unique vaporization module that converts the liquid water sample to the vapour phase in a flash process at 140 °C. The vapour is then delivered into the CRDS cavity for analysis. This process avoids any possible fractionation effects that may occur with other liquid/vapour transitions, such as nebulizers. The Picarro analyzers are equipped with a thermally controlled optical cavity that ensures minimal drift, even in the harshest environments. In addition, an onboard wavelength monitor enables the absorption lines unique to  $\text{H}_2^{16}\text{O}$ ,  $\text{H}_2^{18}\text{O}$ , and  $\text{HD}^{16}\text{O}$  to be scanned repeatedly, quickly and precisely.

Three to four calibrated internal standards are included at the beginning and end of every run, as well as after every 10 samples. The employed internal standards have been calibrated to VSMOW, GISP, and SLAP. The results are evaluated and corrected against standards that bracket the samples, and then reported against the international reference material.

The analytical precision for analysis is  $\pm 0.1$  ‰ for oxygen and  $\pm 0.6$  ‰ for hydrogen