

# Isotopic Water Analyzer for $\delta^{18}\text{O}$ and $\delta\text{D}$

# PICARRO



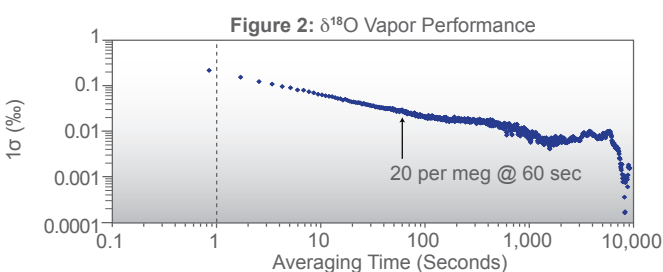
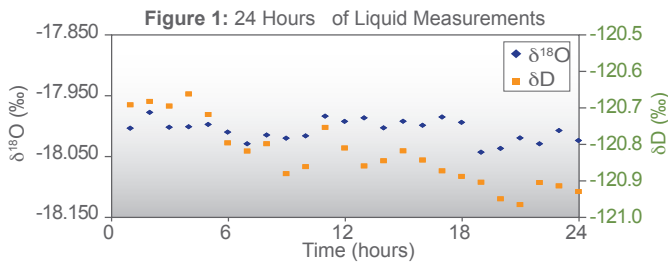
- High-precision measurements of  $\delta^{18}\text{O}$  and  $\delta\text{D}$
- Minimal drift: calibrate once per day while measuring with sub per mil certainty
- Flexibility to measure water samples from different sources, including liquids, vapor and solids
- Small footprint and robust design
- Intuitive user-interface and data processing

The Picarro isotopic water analyzer provides high quality measurements of water stable isotopes that are critical for demanding applications such as paleoclimatology, hydrology, and oceanography.  $\delta^{18}\text{O}$  and  $\delta\text{D}$  are measured with the highest precision and reproducibility as illustrated in Figures 1 and 2.

Along with the analyzer, Picarro offers a variety of peripherals that allow for analyzing water in various forms or sources.

## Patented CRDS Technology

Our sophisticated time-based measurement uses a laser to quantify spectral features of gas phase molecules in an optical cavity. Picarro's unique design enables an effective measurement path length of up to 20 kilometers in a compact cavity, which results in exceptional precision and sensitivity in a small footprint.



Source: C:\Users\j\Documents\Development\Bioscience\ChemCorrect\H2O217\_SolWater\_20160207\_093622 - Copy.rvt  
 Product: C:\Users\j\Documents\Development\Bioscience\ChemCorrect\H2O217\_SolWater\_20160207\_093622 - Copy.rvt  
 Standard: C:\Users\j\Documents\Development\Bioscience\ChemCorrect\H2O217\_SolWater\_20160207\_093622 - Copy.rvt

Sample	Name	Calibrated $\delta^{18}\text{O}$ Mean	Calibrated $\delta^2\text{H}$ Mean	CH <sub>4</sub>	C <sub>2</sub> alcohols	relative %deviation	Uncalibrated $\delta^{18}\text{O}$ precision	Uncalibrated $\delta^2\text{H}$ precision	Slope	curvature
1	WW	-3.99	31.81				0.04	0.04		
2	SD	22.84	201.25				0.08	0.15		
3	SW	-21.04	172.38				0.07	0.25		
4	SWAMP_CEL_1	-25.91	196.88				0.02	0.26		
5	SWAMP_CEL_2	-25.32	194.17				0.05	0.22		
6	SWAMP_CEL_1	-25.91	199.18				0.02	0.26		
7	SWAMP_CEL_2	-25.32	199.38				0.02	0.26		
8	SWAMP_CEL_1	-25.36	199.33				0.03	0.26		
9	SWAMP_CEL_2	-25.32	199.83				0.02	0.26		
10	SWAMP_CEL_1	-25.30	199.82				0.05	0.27		
11	SWAMP_CEL_2	-25.32	199.13				0.01	0.26		
12	SD	-23.11	204.52				0.04	0.31		
13	SD_VAP_100.0.0	-34.77	214.38				0.12	0.36		
14	SD_COSYAP_0.0	-34.62	213.28				0.15	0.37		
15	SD_VAP_0.0	-34.91	213.31	3.00			0.04	0.11		
16	SD_VAP_100.0.0	-34.83	214.28	3.00			0.04	0.14		
17	SD_COSYAP_0.0	-34.41	212.78	3.00			0.03	0.13		
18	SD_VAP_0.0	-35.50	212.22				0.01	0.13		
19	SW	-21.43	173.87				0.08	0.28		
20	SD	-23.38	204.57				0.03	0.32		
21	WW	3.63	28.25				0.03	1.05		

Legend:  
 \* (asterisk) The data information generating this value has exceptions.  
 (grey) Ignore this fraction. Detail row.  
 (green) The required number. Standard.  
 (yellow) Missing value. No calibration. GOOD.  
 (red) Missing value. Data calibration. PROBABLY GOOD.  
 (blue) Missing value. Data calibration. PROBABLY GOOD.

ChemCorrect™ post-processing software interface

## L2130-i Technical Specifications

### L2130-i Liquid Specifications (with A0211 and A0325)

Precision (1 $\sigma$ )	Guaranteed: 0.025/0.1‰ for $\delta^{18}\text{O}/\delta\text{D}$
Drift (24 hour)	Guaranteed: 0.2/0.8‰ for $\delta^{18}\text{O}/\delta\text{D}$
Throughput	12 to 54 minutes per sample depending upon vaporizer model and mode
Memory	Guaranteed at better than 99/98% for $\delta^{18}\text{O}/\delta\text{D}$ after 4th injection
Total Dissolved Solids	<200 g/kg

### L2130-i Vapor Specifications

Measurement Range	1,000 to 50,000 ppm
Guaranteed Precision (1 $\sigma$ ) 2,500 ppm	0.250/0.080‰ for $\delta^{18}\text{O}$ for 10/100 sec 1.600/0.500‰ for $\delta\text{D}$ for 10/100 sec
Guaranteed Precision (1 $\sigma$ ) 12,500 ppm	0.120/0.040‰ for $\delta^{18}\text{O}$ for 10/100 sec 0.300/0.100‰ for $\delta\text{D}$ for 10/100 sec
Measurement Rate	~ 1Hz

### L2130-i Analyzer Specifications

Measurement Technique	Cavity Ring-Down Spectroscopy
Temperature	-10 to 45 °C (vapor sample); 10 to 35 °C (liquid sample & system operation); -10 to 50 °C (storage)
Sample Pressure	300 to 1000 Torr (40 to 133 kPa)
Sample Flow Rate	~40 sccm at 760 Torr, no filtration required
Installation	Benchtop or 19" rack mount
Analyzer Dimensions	17" w x 7.5" h x 17" d (43.2 cm x 19.1 cm x 43.2 cm)
Analyzer Weight	45 lbs (20.4 kg)
Power	90–240 VAC, 50/60 Hz, <150 W steady state (analyzer), 80 W (external pump)
Operating System	Windows 7 Professional with onboard Picarro Software

## Standard

ChemCorrect™ post-processing software for flagging contamination and normalizing measurements.

## Optional Peripherals

### For Discrete Liquid Water

A0211 – High Precision Vaporizer  
A0325 – Autosampler  
A0214 – Micro-Combustion Module (MCM)

### For Continuous Liquid Water

A0217 – Continuous Water Sampler (CWS)

### For Water Vapor

A0101 – Standards Delivery Module  
A0912 – Dual Mode Kit  
(requires A0211 and A0325)

### For Solids

A0213 – Induction Module (IM)

## Accessories

C0354 – Salt Liner