

$\delta^{15}\text{N}$ and $\delta^{18}\text{O}$ Isotopic and Nitrous Oxide Gas Concentration Analyzer

PICARRO



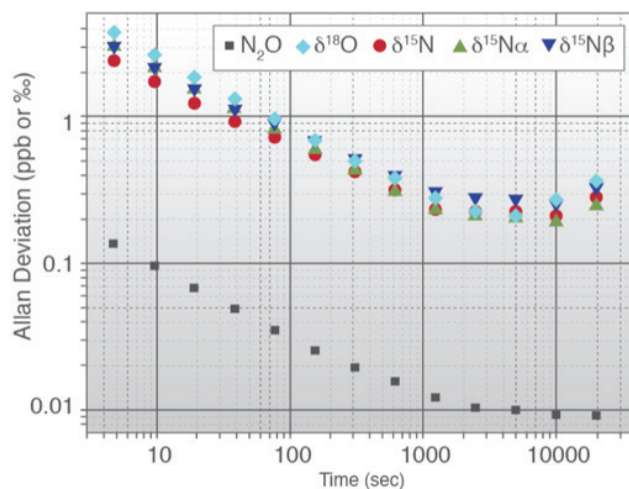
- High-precision at atmospheric concentrations
- $\delta^{15}\text{N}$ compound-specific and site-specific measurements
- $\delta^{18}\text{O}$ measurement
- Field station* and laboratory deployable
- Cryogen-free, continuous operation

The **Picarro G5131-i isotopic and gas concentration analyzer** enables simultaneous measurements of site specific and bulk $\delta^{15}\text{N}$ and $\delta^{18}\text{O}$ in N_2O . With N_2O being a very potent greenhouse gas, Picarro provides an ideal solution for discerning and measuring the source of N_2O emissions real-time in the field or through grab-sample measurements in the lab. The isotopomers of N_2O can be used to probe sources and sinks in the global nitrogen cycle by identifying nitrification and denitrification processes in soils and water. Investigating terrestrial and oceanic N_2O cycles improves predictive models and the understanding of human contributions to global warming. The analyzer measures $\delta^{15}\text{N}$, $\delta^{15}\text{N}\alpha$, $\delta^{15}\text{N}\beta$ with a precision of 0.5 permils, and it measures $\delta^{18}\text{O}$ at 0.7 permils (all precision measurements are at a 10-minute average).

Picarro's small, 48 cc, measurement cell and the reduced pressure ensures better stability, lower noise, and improved capability to handle small samples. It also produces the most compact design of any N_2O isotope analyzer.

Operating in the Mid-IR spectrum, Picarro's unique cavity ring-down spectroscopy (CRDS) technology provides unsurpassed performance by leveraging the stability of time-based measurement with the precision produced by an over 8 km optical path length.

Allan Deviation Plot



G5131-*i* Performance Specifications

Target Species	Precision 1- σ 10 min avg	Precision 1- σ 300 sec avg	Concentration Range (ppb N ₂ O in Air)	Max Drift over 24 hrs, peak to peak, 1 hr average
N ₂ O (concentration)	<0.05 ppb	<0.1 ppb	300–1500	<0.2 ppb
$\delta^{15}\text{N}$, $\delta^{15}\text{N}^{\alpha}$, $\delta^{15}\text{N}^{\beta}$	<0.7‰	<1‰	300–1500	<3‰
$\delta^{18}\text{O}$	<0.7‰	<1‰	300–1500	<3‰

G5131-*i* System Specifications

Measurement Technique	Time-based, CRDS
Measurement Interval	<10 sec
Response Time (10%–90%)	<30 sec @ 30 sccm
Temperature Sensitivity <i>as a function of ambient temperature at 330 ppm</i>	N ₂ O concentration : <0.005 ppb/°C (typical 0.001 ppb/°C) N ₂ O isotopes : <0.1‰/°C
Outputs	RS-232, Ethernet, USB
Fittings	¼" Swagelok®
Dimensions (two box system)	17" w x 12" h x 27" d (43 x 32 x 69 cm)
Weight	87 lbs (40 kg)
Power Consumption	300 W at power up and 210 W at steady state

G5131-*i* Operating Conditions

Sample Temperature	-10 to 45°C
Sample Flow Rate	<50 sccm at 760 Torr, no filtration required
Sample Pressure	300 to 1000 Torr (40 to 133 kPa)
Sample Humidity	0–2% v H ₂ O (18°C dew point) non-condensing
Temperature	15 to 35°C (operating) -10 to 50°C (storage)
Humidity (ambient)	<99% R.H. non-condensing
System Transportation in Moving Vehicles	Failure to transport in the Picarro shipping crate will void warranty
Interferences	This instrument is designed to measure the specified gases in an ambient air or air-like matrix. There may be interference from elevated levels of other gases, such as CO and CH ₄ . Please contact Picarro for more information and recommendations.

*Field Station Deployability:

The G5131-*i* system is the most conducive laser-based isotopic analyzer on the market today for field station use by virtue of its light weight, small footprint and low power consumption.

Please check with Picarro for DC power source set up and for chamber measurement recommendations.

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