Injecting new life into environmental science

Picarro is using Cavro® Centris Pumps as part of an innovative atmospheric water vapor isotope analyzer. Designed for fully automated operation in remote locations, these highly sensitive instruments provide environmental scientists with valuable data to help understand the shifting global climate.

The National Oceanic and Atmospheric Administration (NOAA) Observatory at Mauna Loa, Hawaii

Isotopic analysis is a vital tool for climate modeling, providing important information on the movement and cycling of water and carbon around the world by measuring the ratio between environmentally significant isotopes, such as ^{1}H and ^{2}H or ^{16}O and ^{18}O. Picarro, based in Santa Clara, California, is a laboratory instrument manufacturer specializing in isotope analysis for the environmental sector, offering a range of instruments based on Cavity Ring-Down Spectroscopy (CRDS). Iain Green, Director of Business Development at Picarro, explained: "CRDS is an extremely sensitive method which makes time-based optical measurements, thereby having higher sensitivity and precision compared to traditional absorption-based spectroscopic techniques. This makes it ideally suited to environmental isotope analysis, providing reliable, real-time data on location, without the need for significant sample preparation."

Atmospheric scientist Dr David Noone, University of Colorado, on site with the Picarro

"One of the hallmarks of environmental analysis is that a set of measurements can only be performed once – the same weather pattern will never occur again – and so it is important to collect as much data as possible in real time. Our customers rely on fully automated, standalone systems which are able to operate autonomously in remote and inaccessible locations for prolonged periods. To achieve this, it is necessary to perform regular calibration checks using known calibration standards, and so we began developing a module that would allow remote, unattended calibration of water vapor instruments, something that had never been done before."

Picarro system on location in China

"Vaporization of the liquid standard requires very accurate control of flow rates and injection volumes, and we needed this precision combined with extremely reliable operation that would ensure consistent performance during days, weeks or even months of continuous operation. Tecan's Cavro Centris Pump can provide this accuracy while coping with the demanding operational needs of the application, and is compact enough to be easily integrated into our platform. The system has two Centris units – each delivering a separate calibration standard – allowing our instruments to perform optimally for prolonged periods in harsh and challenging conditions."

To find out more about Tecan's Cavro Centris Pump, visit **www.tecan.com/components**

To learn more about Picarro's CRDS technology, go to **www.picarro.com**