

LI-COR'S NEW TRACE GAS ANALYSERS AIM TO MAKE SCIENCE MORE ACCESSIBLE... AND AFFORDABLE

What are LI-COR's new analysers for and why were they developed?

This summer, LI-COR Biosciences is releasing two new trace gas analysers: model LI-7815, which measures carbon dioxide and water vapour, and model LI-7810, which measures methane, carbon dioxide, and water vapour. These analysers are anticipated to be embraced by traditional atmospheric, climate and soil gas research communities. However, they offer an opportunity for increased adoption by new sectors including municipalities, the oil and gas industry, agricultural sectors and perhaps others. LI-COR asked three researchers that regularly employ trace gas analysers to discuss technology needs in their field and how LI-COR's new high performance, low-cost analysers might change things.



Bill Miller, LI-COR's Senior Customer Development Manager, explains that LI-COR values the goals of the atmospheric and soil measurement community. "We want to facilitate this work with tools that enable research, not inhibit it. We want researchers to focus on their research, not making their machines work. We hope to see great new research coming out because of this tool." To help boost research pursuits, the new LI-7810 and LI-7815 analysers embody multiple new technologies, trademarked as the PreciseTech™ Design, intended to increase the flexibility and performance of the instruments. Abby Brooke, LI-COR's Marketing Operations Supervisor, points out, "It's a package of new technologies that provide exceptional performance. These analysers have more patents than any of our other products. This combination is not an incremental leap. You get performance, price and usability all in one." With 11 patents and more on the way, the innovative analysers will provide users with a suite of compelling features. These include laser-based gas analysis for high precision, accuracy and reliability; low power requirements and solar, battery or AC options for a mobile and portable design; a weather resistant case that eliminates the need for a cooling apparatus; and a web-enabled server for remote instrument control and data viewing.

Where and how can analysers be used?

Trace gases, which include greenhouse gases, influence Earth's climate. Analysers support research efforts to monitor natural and manmade sources and sinks of these gases. Trace gas analysers can be employed in a variety of settings, from natural and agricultural landscapes, and for municipal purposes. Collecting usable trace gas data requires accurate equipment, a lot of data and often multiple sensors. Researchers described the atmosphere as "lumpy" and variable, making reliable and precise data necessary for valuable research conclusions. Dr. Kenneth Davis, a Professor of Atmospheric and Climate Science at Penn State's College of Earth and Mineral Sciences explains the relationship between instrument reliability and cost. "The cost of making high-quality measurements is a significant barrier. There are not nearly enough of these data points to make all the inferences about [greenhouse gas] sources and sinks we would like to. We are data-limited without question. If a competitor can drive down the price and/or increase the reliability, that will help." Herein lies a critical benefit of LI-COR's new analysers: cost efficiency. They have been designed to match or outperform current analysers in the market but at a half to a third of the price (Fig. 1).

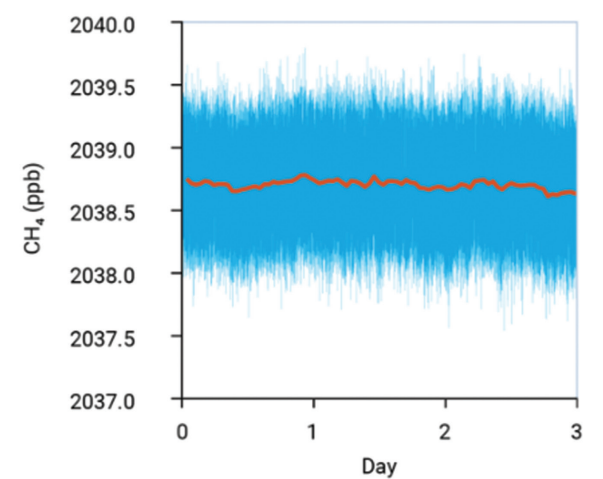


Figure 1: Methane stability from a prototype LI-7810. This 3-day subset represents a portion of a long-term dataset. The instrument was operated continuously over a 7-day period with a continuous flow of tank gas. The blue line shows 1-second measurements; the orange line shows a 50-minute block average.

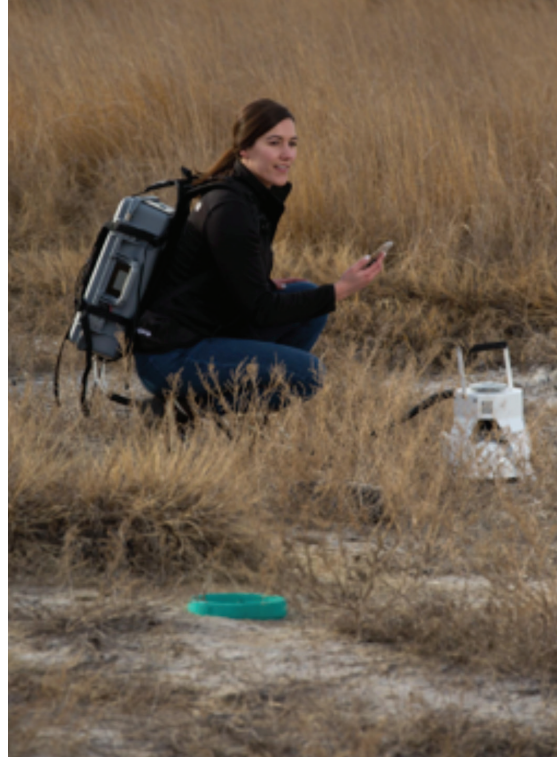
What would this cost difference mean? Dr. Jay Ham, a Professor of Environmental Physics and Micrometeorology in Colorado State University's Department of Soil and Crop Sciences, explains, "If you have a budget for [one] analyser and ... one location, now you could have three and get a more representative sample. It's the same with mobile sampling - instead of having one car driving around with an analyser on it, we could have three cars." Having multiple analysers allows researchers to do more than gather piles of data. Dr. Joseph von Fischer, an Associate Professor in Colorado State University's Department of Biology, explains that LI-COR's new analysers will let users take more precise measurements per day. "LI-COR's new equipment package is a device that will allow users to collect a lot of information about how their study system is releasing or consuming greenhouse gases. It will allow users to gather a statistically more meaningful data set faster and with greater accuracy."

A more affordable design with new possibilities

Dr. Ham, explained that there may be new potential uses. "I think once you put the tool out there, people will come up with all sorts of interesting ways to use it. ...Anytime you drop the cost of something by a factor of 3 or 4, it usually opens all kinds of new opportunities." A particularly promising opportunity is the adoption of high-sensitivity analysers by non-researchers in the agricultural, oil & gas, and government (municipality and cities) sectors for self-monitoring. Dr. von Fischer further expounds that, "Individual cities have signed on to their [greenhouse gas reduction] commitments, demonstrating a scale of passion... Having high-precision low-cost sensors and analytics that allow us to understand what we're seeing in cities could be a major way to manage greenhouse gas emissions globally." Self-monitoring would provide data for users to independently characterize trace gas emissions, identify leaks along a pipeline system, and verify that emission reduction actions are actually working.

A call to action

Researchers called on the old adage, "You can't manage what you can't measure." Dr. Fischer expressed a sense of urgency. "Every year that ticks by, we're accumulating gases in the atmosphere as a result of our inactivity. LI-COR's devices ...



are part of the package that we need to stem the tide of greenhouse gases flooding into the atmosphere." Dr. Davis also shared a pressing need for data-informed actions. "If we are able to deploy more sensor networks in key regions [...] we'll be able to generate more policy-relevant knowledge to know how to get a handle on the global climate situation." LI-COR's new analysers may also initiate a wave of participatory opportunities for the public. Dr. Ham noted that the potential of Wi-Fi-enabled devices, such as LI-COR's new analysers, "means a lot of people could be looking at the data in real-time. [...Putting data] on a public website could ... draw public awareness to greenhouse gases and air quality, invite public participation and citizen science. ...Third graders could be watching their city's carbon dioxide [...] when their teacher is [teaching] them about climate change."

LI-COR's new trace gas analysers are on the frontline of making science more accessible, affordable and inclusive. Find out more about the new LI-7815 and LI-7810 analysers by requesting a detailed report showing instrument performance, including a comparison against common analysers currently available: contact LI-COR Biosciences at +1-402-467-3576, email envsales@licor.com or visit www.licor.com/tracegas.

Authorship:

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