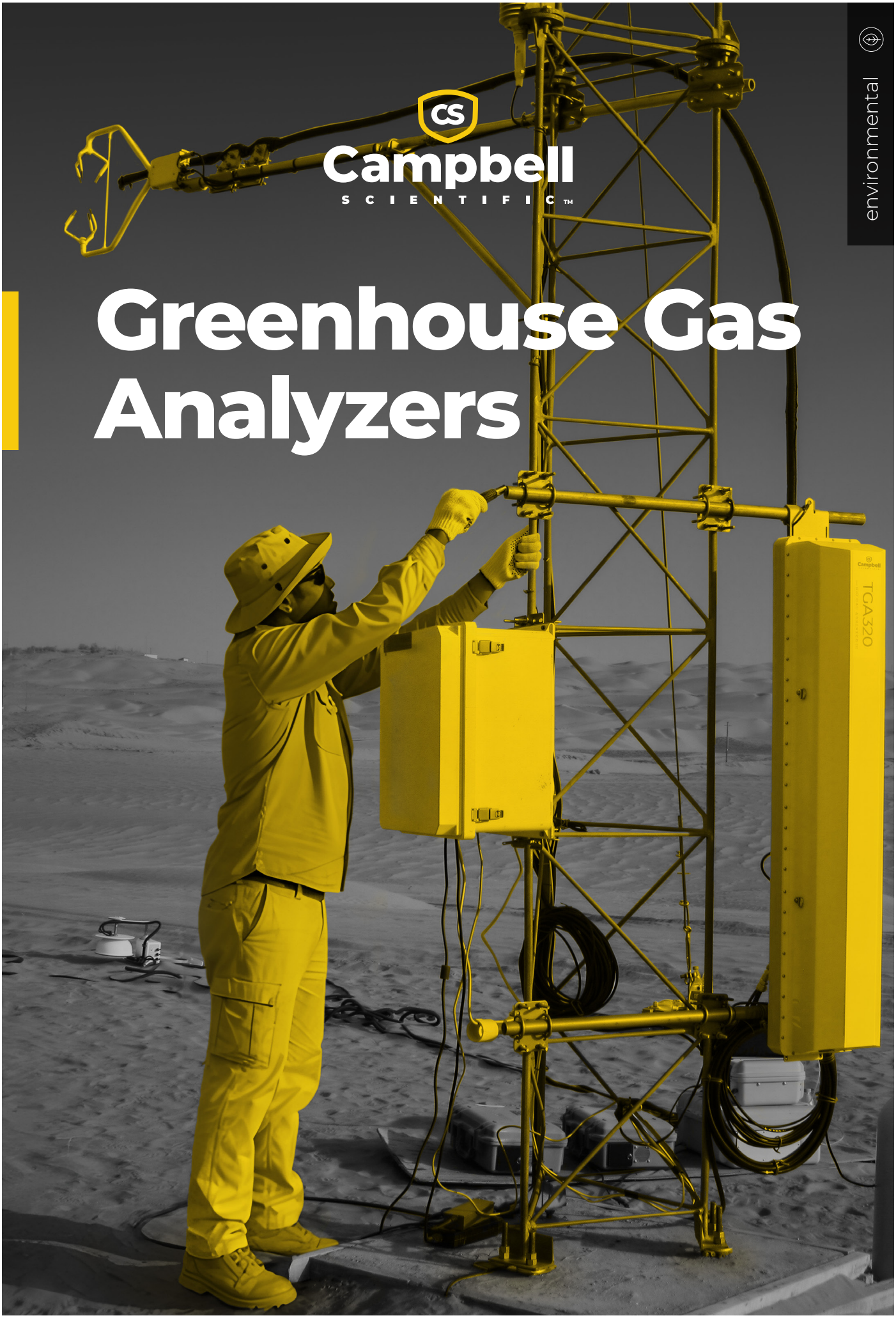
Campbell SCIENTIFIC™

environmental

Greenhouse Gas Analyzers



30%

Methane alone accounts for roughly 30% of warming since the industrial revolution.[1]

273 Times

N_2O is 273 times more potent than carbon dioxide over a hundred-year timescale.[2]

50%

Atmospheric carbon dioxide is now 50% higher than it was before the industrial revolution.[3]

Carbon dioxide, methane, and nitrous oxide are three of the most consequential greenhouse gases, and yet they remain among the most challenging to measure in the field. Carbon dioxide drives the largest share of warming outright. Methane and nitrous oxide have far greater warming effects for equivalent emissions, making their accurate measurement critical to understanding where they're coming from, how they're changing, and whether mitigation efforts are working.

Wetlands, permafrost, remote agricultural land, and tundras are often where these exchanges matter most, but they're also some of the most challenging environments for around-the-clock scientific monitoring. Grid power can be scarce, or even absent. Terrain might be difficult to access. Instruments often run unattended for a full season, or longer, through extreme cold, heat, or precipitation. Our scientific understanding depends on making these measurements where they matter most.

Synchronized, Field-Deployable Eddy-Covariance Systems

One Tower for a More Complete Picture of Greenhouse Gas Exchange

The TGA310, TGA320, and IRGASON™ were built to work together, measuring a comprehensive suite of some of the most impactful greenhouse gases from a single flux tower. These instruments were built rugged from the start, so you don't have to trade reliability for a more complete picture of the ecosystem's exchanges in harsh environments.

Every Measurement Synchronized, on the Same Clock

Flux calculations depend on comparing gas concentration to wind velocity at the same instant, not at the instant close to it. A timestamp that is off by even a few milliseconds can distort a flux value, and that error can compound quickly.

The TGA310, TGA320, IRGASON, and your chosen data logger work on the same clock, so every measurement lines up without a post-processing correction.

TGA310 · CH_4 | TGA320 · N_2O | IRGASON · CO_2 and H_2O



TGA300 Series

The TGA300 series consists of the TGA310 for methane measurements and the TGA320 for nitrous oxide measurements.

Ready for remote installations
With its low power draw, the TGA300 series is deployable at sites where trace gas measurements were previously impractical or unfeasible. It can operate on just a battery and solar panel.

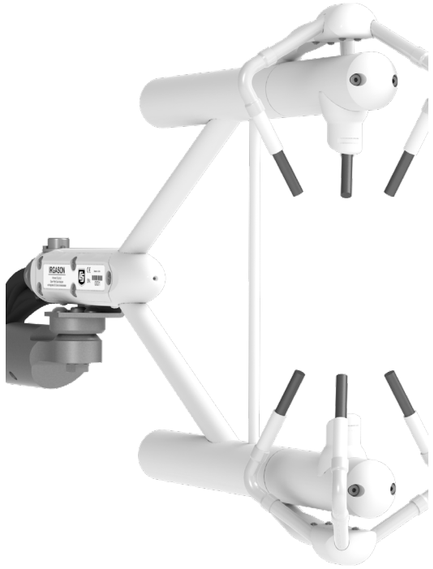
Laboratory sampling discipline on a tower
Pressure, temperature, and flow are controlled around every measurement, and the system frequency response is still faster than 3 Hz. Experience closed-path sampling without attenuation.

Wind and gas, one trigger
Control area network (CAN) peripheral interfaces (CPI) make the data logger a hardware master clock, firing the analyzer and the CSAT3C on the same scan. This means there is no need to align the measurements afterward and no drift apart.



"The field trial has shown the TGA300 to be a significant advancement in the tools available for EC [eddy-covariance] measurements of methane and nitrous oxide. The instruments met the critical benchmarks of noise, stability, frequency response, and aerodynamic footprint necessary for the technique. Practical features such as field instrumentation, maintenance schedule, and power draw of the TGA300 surpassed other currently available instrumentation.

Scott Cornelsen, et al. in *Field Trials of Trace Gas Analyzers for Eddy-Covariance Flux of Methane (CH_4) and Nitrous Oxide (N_2O)*



IRGASON

At the heart of the eddy-covariance system, the IRGASON combines a 3-D sonic anemometer and open-path CO_2 and H_2O gas analyzer into a single instrument.

See how the IRGASON is helping Valencia Anchor Station (VAS) strengthen satellite validation techniques. www.campbellsci.com/resources/case-studies/spain-strengthening-satellite-validation-carbon-flux-research

The installation of the Campbell Scientific IRGASON EC system significantly enhanced VAS's scientific capability. **The system delivers reliable, high-quality flux measurements that support satellite validation, vineyard carbon monitoring, and cutting-edge ML research**.

IRGASON Key Specifications See the full specifications at https://www.campbellsci.com/products/irgason.	
Operating Temperature Range	-30° to +50°C
Power	5 W (steady state and power up) at 25°C
Measurement Rate	60 Hz (100 Hz available upon request)
Maximum Output Rate	60 Hz with 20 Hz bandwidth
Outputs	■ U_x (m/s) ■ U_y (m/s) ■ U_z (m/s) ■ Sonic Temperature (°C) ■ Sonic Diagnostic ■ CO_2 Density (mg/m^3) ■ H_2O Density (g/m^3) ■ Gas Analyzer Diagnostic ■ Ambient Temperature (°C) ■ Atmospheric Pressure (kPa) ■ CO_2 Signal Strength ■ H_2O Signal Strength ■ Source Temperature (°C)





Taking Greenhouse Gas Measurements Further

No single measurement tells the complete story of an ecosystem. Carbon dioxide, nitrous oxide, and methane move through the environment through different processes, responding differently to changes in temperature, moisture, vegetation, land use, and climate.

The TGA310, TGA320, and IRGASON make it possible to investigate more of those exchanges together. With synchronized measurements of CH_4, N_2O, CO_2 and H_2O, and three-dimensional wind from the same tower, researchers can build a more complete understanding of how an ecosystem is changing, and why.

Because the system was engineered for the realities of field research, those measurements can extend beyond well-powered, easily accessible sites to the environments where some of the most important questions remain unanswered.

References

1. Global Methane Pledge. n.d. “The Imperative for Methane Action.” Accessed August 28, 2026. https://www.globalmethanepledge.org/imperative-methane-action.

2. United States Environmental Protection Agency. 2025. “Understanding Global Warming Potentials.” December 29. Accessed August 28, 2026. https://www.epa.gov/ghgemissions/understanding-global-warming-potentials.

3. Lindsey, Rebecca. 2025. “Climate change: atmospheric carbon dioxide.” May 21. Accessed September 1, 2026. https://www.climate.gov/news-features/understanding-climate/climate-change-atmospheric-carbon-dioxide.

Expand what you can measure.
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