

# ECOSYSTEM FLUX SOLUTIONS



Eddy covariance measurements provide critical insight into the exchange of  $\text{CO}_2$ ,  $\text{H}_2\text{O}$ ,  $\text{CH}_4$ , and energy between the land and atmosphere—fundamental processes that drive climate, ecosystem health, and resource management.

Whether it's proven traditional systems or next-generation technology, LI-COR provides a complete ecosystem of analyzers, software, and integrated components designed for uncompromising accuracy. With these tools, you can capture the accurate, reliable data necessary for understanding environmental change.

# Traditional Systems for Eddy Covariance

LI-COR eddy covariance systems are the global standard for ecosystem flux research. Trusted by major networks—including AmeriFlux, AsiaFlux, ICOS, and NEON—these systems deliver precise measurements of  $\text{CO}_2$ ,  $\text{H}_2\text{O}$ ,  $\text{CH}_4$ , and energy flux even in the most challenging real-world conditions.

- **Proven performance:** LI-COR systems are cited in 9,000+ publications
- **Configurable solutions:** Choose from single analyzers to fully integrated systems
- **Actionable data:** Get reliable, fully processed flux results in real time

## Field-Proven Gas Analyzers

Access analyzers that set the benchmark for precision and durability in challenging environments.

### LI-7200RS Enclosed $\text{CO}_2/\text{H}_2\text{O}$ Analyzer

Designed for environments with frequent rain, fog, or snow events and low  $\text{CO}_2$  flux rates, the LI-7200RS takes accurate gas density measurements. Includes the SmartFlux® System.

### LI-7500DS Open Path $\text{CO}_2/\text{H}_2\text{O}$ Analyzer

Suitable for sites with infrequent rain, fog, or snow events, the LI-7500DS is accurate, easy to set up and use, and very stable in harsh environments. Includes the SmartFlux® System.

### LI-7700 Open Path $\text{CH}_4$ Analyzer

As the only open path methane analyzer available for eddy covariance, the LI-7700 eliminates pump- and tubing-related issues and can run on solar power for lower power usage.



# Industry-Best Sonic Anemometers

Accurate wind measurements—such as vertical turbulence, horizontal wind speed, and direction—are essential drivers of eddy covariance flux calculations. LI-COR systems integrate seamlessly with leading sonic anemometers from Gill, Metek, and RM Young, offering the flexibility needed to match your site's design and research goals.

## Advanced Software Solutions

As the community standard for flux processing software, EddyPro® Software is a powerful, free, and open-source application for collecting and processing your eddy covariance data. It uses peer-reviewed techniques to compute accurate fluxes while meeting global network requirements.

The SmartFlux System is the on-site processing and GPS synchronization component of all LI-COR traditional systems. At its core is EddyPro, integrating biomet sensor data and delivering fully processed flux results in real time.

## Flexible Biomet Solutions

LI-COR traditional systems support a variety of biomet sensors—including radiation, soil, and meteorological sensors—that can enrich your flux data, be used for gap filling, and create a complete picture for environmental context.

- Radiometers
- Soil moisture probes
- Soil heat flux plates
- Rain gauges
- Temperature and humidity probes



# Next-Gen Solutions for Ecosystem Flux

Step beyond traditional eddy covariance systems with the Carbon and Water Nodes. These first-of-their-kind solutions deliver a comprehensive and streamlined approach to carbon and water monitoring.

Designed for simplicity, scalability, and scientific accuracy, the economical Carbon and Water Nodes enable faster deployment, automated data processing, and actionable insights that elevate your work to the next level.

- **All-in-one solution:** Includes everything you need for deployment
- **Quick deployment:** Self-powered and GPS-enabled for easy relocation
- **Scalable monitoring:** Expand coverage with multiple nodes across your site
- **Actionable, automated results:** Automatic processing and QA/QC
- **Spatial insights:** View animations of your site's flux footprints over time



## The Carbon Node

### Carbon Flux Measurement Solution

The Carbon Node delivers direct, accurate carbon flux measurements with unprecedented simplicity. Designed for fast setup and effortless scalability, it transforms how you monitor carbon dynamics across ecosystems.

### LI-720 Carbon Flux Sensor

As the Carbon Node's integrated sensor, the LI-720 Carbon Flux Sensor applies the eddy covariance method to measure  $\text{CO}_2$  and  $\text{H}_2\text{O}$  fluxes at 10 Hz, delivering fully processed results every 30 minutes.



# The Water Node

## Evapotranspiration Solution

The Water Node provides real-time, actual evapotranspiration data—eliminating the uncertainty of estimates. Built on the eddy covariance method, it offers precision and ease for water resource management.

## LI-710 Evapotranspiration Sensor

As the Water Node's integrated sensor, the LI-710 Evapotranspiration Sensor measures actual evapotranspiration using the eddy covariance method, providing fully processed results every 30 minutes.

# Wireless Biomet for Water and Carbon Nodes

Extend your Carbon or Water Node measurements with a scalable wireless biomet network. Monitor soil moisture, rainfall, microclimate, and other environmental drivers across your site to generate real-time, actionable insights.

## LI-COR® Cloud

LI-COR Cloud is the data backbone for all LI-COR eddy covariance solutions: traditional systems, the Carbon Node, and the Water Node. It transforms raw measurements into analysis-ready data automatically, so you can focus on your goals instead of data management.

With LI-COR Cloud, data is accessible anytime, anywhere, and ready for collaboration.

- **Automated workflows:** Data cleaning and gap filling produce high-quality, automated datasets.
- **Actionable insights:** Daily accumulations and flux footprints provide clarity for decision-making.
- **Remote access:** View, download, and share data with others—anywhere.
- **Fast responses:** View data in LI-COR Cloud in 30 minutes after powering on.
- **API tools:** Integrate LI-COR Cloud data into your own platforms using secure API tokens.



**Request  
a Demo**





# Traditional Systems and Next-Gen Solutions

Traditional eddy covariance systems deliver high-precision insights at core research sites, while the Carbon and Water Nodes make it easier to scale flux measurements across landscapes. Together, they support both single-site research and large-scale monitoring while delivering actionable data faster than ever—creating a flexible, scalable approach for all applications.

|                          | Traditional Eddy Covariance Systems                         | Carbon and Water Nodes                                                              |
|--------------------------|-------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Flux measurements        | LE, H, CO <sub>2</sub> , CH <sub>4</sub>                    | Carbon Node: LE, H, CO <sub>2</sub> ,<br>Water Node: LE, H                          |
| Measurement area         | Optimized for detecting small fluxes in one area            | Optimized for measuring fluxes across landscapes to represent spatial heterogeneity |
| System design            | Configurable, open or enclosed-path options                 | Pre-configured, all-in-one system                                                   |
| Setup and install        | Configurable setup allowing multiple components and options | Pre-integrated design with all components included                                  |
| Typical deployment time  | Days                                                        | ~2 hours                                                                            |
| Power and communications | Additional solar, battery, and communications               | Embedded solar, battery, and cellular communications                                |
| Data access              | Local or cloud-connected (optional)                         | Automatic cloud upload with real-time access                                        |
| Data processing          | Flexible processing with EddyPro                            | Automated processing and post-processing in LI-COR Cloud                            |
| Post-processing          | Offline analysis                                            | Automated QA/QC, gap-filling, and aggregation in LI-COR Cloud                       |
| Noise                    | Lower                                                       | Higher                                                                              |
| User skillset required   | Specialized EC expertise                                    | No specialized EC expertise required                                                |
| Scalability              | Limited                                                     | Designed for easy scaling across many locations                                     |
| Budget profile           | Higher                                                      | Lower                                                                               |
| Typical applications     | Research                                                    | Research and commercial                                                             |

# Key Specifications

|                        | LI-7500DS Open Path CO <sub>2</sub> /H <sub>2</sub> O Analyzer                                       | LI-7200RS Enclosed CO <sub>2</sub> /H <sub>2</sub> O Analyzer                                         | LI-7700 Open Path CH <sub>4</sub> Analyzer                                           | LI-710 Evapotranspiration Sensor                                                      | LI-720 Carbon Flux Sensor                                                                            |
|------------------------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| Measurement Range      | CO <sub>2</sub> : 0–3000 $\mu\text{mol mol}^{-1}$ ;<br>H <sub>2</sub> O: 0–60 mmol mol <sup>-1</sup> | CO <sub>2</sub> : 0–3000 $\mu\text{mol mol}^{-1}$ ;<br>H <sub>2</sub> O: 0–60 mmol mol <sup>-1</sup>  | CH <sub>4</sub> : ~0–50 $\mu\text{mol mol}^{-1}$                                     | H <sub>2</sub> O: 0–60 mmol mol <sup>-1</sup>                                         | CO <sub>2</sub> : 0–1500 $\mu\text{mol mol}^{-1}$ ;<br>H <sub>2</sub> O: 0–60 mmol mol <sup>-1</sup> |
| Accuracy / Noise       | ≈1% of reading<br>(CO <sub>2</sub> & H <sub>2</sub> O)                                               | ~0.004 mmol mol <sup>-1</sup> (H <sub>2</sub> O);<br>~0.1 $\mu\text{mol mol}^{-1}$ (CO <sub>2</sub> ) | ~5 ppb noise at 10 Hz                                                                | 2% of reading<br>(at 5 mmol mol <sup>-1</sup> )                                       | ~1.5% of reading<br>(CO <sub>2</sub> and H <sub>2</sub> O)                                           |
| Sampling / Output Rate | Gas sampling up to 150 Hz;<br>usable EC bandwidth 5–20 Hz                                            | Gas sampling up to 150 Hz;<br>usable EC bandwidth 5–20 Hz                                             | Gas sampling up to 40 Hz;<br>usable EC bandwidth 0–20 Hz                             | 10 Hz raw; 30-min flux averages output                                                | 10 Hz; Raw and 30-min flux averages output                                                           |
| Operating Temperature  | -25 to 50 °C                                                                                         | -25 to 50 °C                                                                                          | -25 to 50 °C                                                                         | 5 to 60 °C (Calibrated operating range)<br>-20 to 50 °C (Ambient operating range)     | -25 to 50 °C                                                                                         |
| Power Consumption      | ~4 W typical; ~8 W max                                                                               | ~8 W nominal;<br>~30 W max                                                                            | ~8 W nominal (up to 41 W with accessories)                                           | ~1.5 W                                                                                | ~1.5 W                                                                                               |
| Weight                 | ~0.67 kg (sensor head)<br>~1.6 kg with DSI box                                                       | ~1.8 kg (analyzer head)<br>~6.2 kg with LI-7550                                                       | ~5.2 kg                                                                              | ~1.4 kg                                                                               | ~2.0 kg                                                                                              |
| Communications         | Ethernet                                                                                             | Ethernet, serial, analog                                                                              | Ethernet, RS-232, analog                                                             | SDI-12                                                                                | SDI-12, RS-232                                                                                       |
| System Integration     | SmartFlux compatible                                                                                 | SmartFlux compatible                                                                                  | SmartFlux compatible                                                                 | Standalone or IOE module compatible (Cloud ready)                                     | Standalone or IOE module compatible (Cloud ready)                                                    |
| QR Codes               |                   |                    |  |  |                 |