Internet of the Environment (IoE) and Eddy Covariance-based Ecosystem Fluxes

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IoE Advantages – The Node Concept

Sensor and IoE Module create a Sensor Node, with embedded communication, local data back-up, solar power, and telescopic mast of up to 5 m height

Simple but powerful, allows to setup a new site in approx. 30 minutes, register IoE Module via QR code with LI-COR Cloud

Supports consistent measurement techniques that are scalable from field to landscape to continental levels, all while reducing operational costs.

Leads to cost savings and minimizes data loss through enhanced operations, utilizing predictive maintenance powered by machine learning.

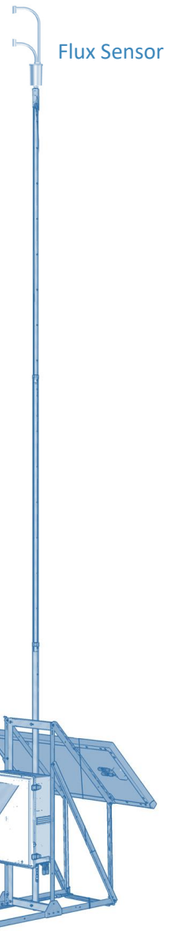
Integrates various external data sources into a unified cloud platform, enabling automated post-processing and advanced data analytics.

Sensor Node Fleet Management

LI-COR Cloud™

Over-the-air update:
- SDI-12 Sensor auto config.
- LI-710 / LI-720 firmware
- IoE Module firmware

Remote Control:
- IoE Module reboot
- SDI-12 Sensor power cycle



Data plan included, LTE CAT1 cellular modem (prepared for cell-to-satellite connection)

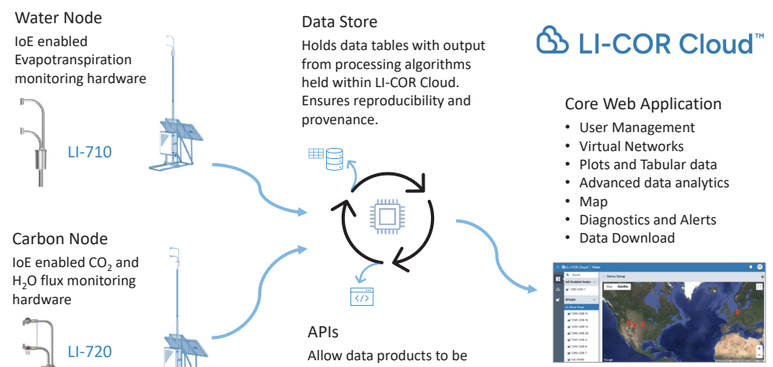
Back-up recording on SD card

SDI-12 Sensor auto-configuration: e.g. LI-710, LI-720, Stevens soil moisture probe, and sensors on demand

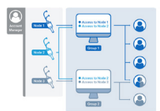
Data integrity, from the Node to the cloud, using SHA256 cryptographic hashing

Secure data transmission (MQTTS)

IoE System Description



Virtual Networks



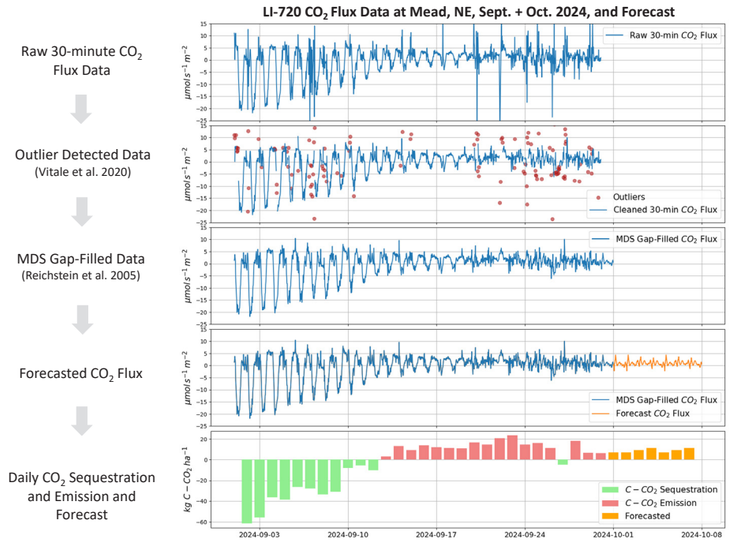
Group your sensors with sensors of other researchers to create virtual networks

Allow other researchers to conveniently access your data, even if they do not own a sensor themselves

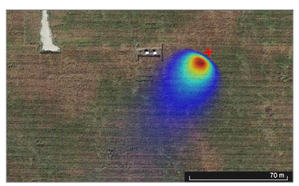
Example of distributed ETa Measurements at Field Level

18x LI-710 Evapotranspiration sensors installed in pairs at 9 locations distributed over an agricultural landscape, Imperial Valley, California

LI-COR Cloud: Automated Data Processing



Carbon Node, averaged 2D Footprint, Sept. 1st, 2024
(Kljun et al. 2015)



Carbon Node

References

Vitale et al. 2020, DOI: 10.5194/bg-17-1367-2020
Reichstein et al. 2005, DOI: 10.1111/j.1365-2486.2005.001002
Kljun et al. 2015, DOI: 10.5194/gmd-8-3695-2015

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