

AGROLOGY NET ECOSYSTEM EXCHANGE (NEE)

REAL-TIME MONITORING OF NET CARBON FLOWS TO OPTIMIZE ECOSYSTEM REGENERATION AND SOIL CARBON ACCRUAL

In agricultural systems, soil carbon is more like a battery than a storage tank. For a more complete picture of ecosystem health while building healthy soils, growers and land managers can monitor flows of carbon and assess soil carbon stocks via Net Ecosystem Exchange (NEE) of CO₂. NEE illuminates how the soil carbon battery is charged via photosynthesis, providing insight into the liquid carbon pathway, as well as the discharge of CO₂ via microbial metabolism of soil organic matter (soil respiration). NEE also illuminates, in real time, how weather, moisture and on-farm practices affect dynamic CO₂ flows in and out of the soil.

The Power of Agrology NEE: Real-time carbon flows.

- Allows growers to better understand carbon dynamics and soil microbial activity, key factors in the humification of carbon (ie: long-term storage).
- Fills in the gaps of traditional MMRV approaches: increasing accuracy and transparency in agricultural and nature-based carbon programs.
- Allows for the creation of bespoke environmental assets to differentiate products, regions and practices via ground-truth data.

EDDY COVARIANCE TOWERS VS. AGROLOGY NEE

Traditionally, NEE of CO₂ is measured by deploying eddy covariance (EC) towers. EC towers are expensive and extremely complicated to install and maintain. In addition, data from EC towers requires transformation and analysis only achievable with PhD-level researchers. This has limited the ability to measure NEE outside of limited research settings.

Agrology has pioneered a novel approach to measure NEE of CO₂ by building an affordable, compact and automated system: the Arbiter. The performance of the Arbiter was (and continues to be) validated against EC towers in a wide range of crop types and environmental conditions. Agrology's initial findings demonstrate strong agreement (R squared values between .6 and .8) between our Arbiter device and EC towers.

The Arbiter provides a scalable and affordable tool to continuously measure NEE of CO₂ in commercial settings, providing a practical tool to monitor and quantify nature-based and agricultural carbon projects at scale.

FEATURES:

- Small, Cost-Effective Environmental Sensors that measure air temperature, humidity, soil moisture, soil temperature, barometric pressure, and other factors influencing greenhouse gas fluxes.
- Soil CO₂ Flux Measurement: Chambers monitor CO₂ emissions from soil respiration - a key indicator of soil microbial activity and soil health.
- Concentration Gradient: Infrared sensors track CO₂ movement across the ground, canopy, and background.
- Machine Learning Model: In-field measurements feed into a machine learning model to calculate NEE.



THE FIRST SCALABLE AND AFFORDABLE NEE MEASUREMENT SYSTEM.

- Unlocks new insights into carbon flows and regenerative land management
- Allows for affordable ground-truthing of models and MMRV programs
- Brings a new dataset into agronomic management: allowing growers to monitor carbon flows, soil biology and photosynthesis - three precursors to building healthier soils, farm-ecosystems and low-input production



“NEE is a vital metric for understanding in-field carbon dynamics. By providing continuous, in-situ data on the carbon cycle and microclimate, Agrology provides growers with a revolutionary tool to manage and increase carbon accumulation in their soils. We are excited to see this technology advance and help our clients reduce uncertainty and improve their carbon farming.



- DR. FRANCOIS VISSER, CEO OF CARBON FRIENDLY

