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New Open-Path Low-Power Standardized Automated CO_2/H_2O Flux Measurement System: Concentrations, Co-spectra and Fluxes Comparison with Established Models

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Spatial and temporal flux data coverage have improved significantly in recent years due to standardization, automation and management of data collection, and better handling of the generated data. With more stations and networks, larger data streams from each station, and smaller operating budgets, modern tools are required to effectively and efficiently handle the entire process. These tools should produce standardized verifiable datasets, and provide a way to cross-share the standardized data with external collaborators to leverage available funding, and promote data analyses and publications.

In 2015, open-path and enclosed flux measurement systems [1] were developed, based on established gas analyzer models [2,3], with the goal of improving stability in the presence of contamination over older models [4], refining temperature control and compensation [5,6], providing more accurate gas concentration measurements [1], and synchronizing analyzer and anemometer data streams in a very careful manner [7].

In late 2017, the new open-path system was further refined to simplify hardware configuration, to significantly reduce power consumption and cost, and to prevent or considerably minimize flow distortion8 in the anemometer to increase data coverage.

Additionally, all new systems incorporate complete automated on-site flux calculations using EddyPro® Software [9] run by a weatherized remotely-accessible microcomputer to provide standardized verifiable datasets.

This presentation will describe details and results from the latest field tests of the new flux systems, in comparison to older models and control reference instruments.

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