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Capturing and Processing Soil GHG Fluxes Using the LI-COR LI-8100A

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The LI-COR LI-8100A Automated Soil CO_2 Flux System is designed to measure soil CO_2 efflux using automated chambers and a non-steady state measurement protocol. While CO_2 is an important gas in many contexts, it is not the only gas of interest for many research applications. With some simple plumbing modifications, many third party analyzers capable of measuring other trace gases, e.g. N2O, CH4, or $13CO_2$ etc., can be interfaced with the LI-8100A System, and LI-COR's data processing software (SoilFluxPro™) can be used to compute fluxes for these additional gases. In this paper we describe considerations for selecting an appropriate third party analyzer to interface with the system, how to integrate data into the system, and the procedure used to compute fluxes of additional gases in SoilFluxPro™. A case study is presented to demonstrate methane flux measurements using an Ultra-Portable Greenhouse Gas Analyzer (Ultra-Portable GGA, model 915-0011), manufactured by Los Gatos Research and integrated into the LI-8100A System. Laboratory and field test results show that the soil CO_2 efflux based on the time series of CO_2 data measured either with the LI-8100A System or with the Ultra-Portable GGA are essentially the same. This suggests that soil GHG fluxes measured with both systems are reliable.