



A High Performance Sample Delivery System for Closed-Path Eddy Covariance Measurements

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The Picarro G2311-f Cavity Ring-Down Spectrometer (CRDS) measures CO₂, CH₄ and water vapor at high frequency with parts-per-billion (ppb) sensitivity for eddy covariance, gradient, eddy accumulation measurements. In flux mode, the analyzer measures the concentration of all three species at 10 Hz with a cavity gas exchange time of 5 Hz. We developed an enhanced pneumatic sample delivery system for drawing air from the atmosphere into the cavity. The new sample delivery system maintains a 5 Hz gas exchange time, and allows for longer sample intake lines to be configured in tall tower applications (> 250 ft line at sea level). We quantified the system performance in terms of vacuum pump head room and 10-90% concentration step response for several intake line lengths at various elevations. Sample eddy covariance data are shown from an alfalfa field in Northern California, USA.