

CO₂, CO, and CH₄ Surface *In Situ* Measurement Network in Support of the Indianapolis FLUX (INFLUX) Experiment

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A 12-station surface-based measurement network measuring carbon dioxide (CO₂), carbon monoxide (CO), and methane (CH₄) has been deployed in and around the Indianapolis, IN metropolitan area as part of the Indianapolis Flux Experiment (INFLUX). Measurements began in 2010 with network installation completed in 2013. Observations are made at heights ranging from 39-m to 130-m above ground level using existing communication towers. Several towers in the network include measurements at multiple levels. Not all species are measured at all sites: two sites measure CO₂, CO, and CH₄, three sites measure CO₂ and CO, three sites measure CO₂ and CH₄, and four sites measure only CO₂ (in 2014 the four CO₂-only sites were upgraded to CO₂ and CH₄). Cavity ring-down spectrometers are used at all 12 sites and each site has at least one calibrated reference tank sampled daily. Real time data communications are achieved via cellular phone modems and data is transmitted daily for processing and quality assurance checks. This paper discusses the instrument calibration procedures used prior to deployment in the field, the air sampling strategy used at each site, and the use of the on-site calibrated reference tank in data post-processing. Long-term instrument stability/drift is examined as is total data availability. Finally, six sites in the network also collect flask samples and a comparison with them is presented, along with results from two round-robin tests in which three or four calibrated reference tanks were sampled at all 12 sites over the period of a week.

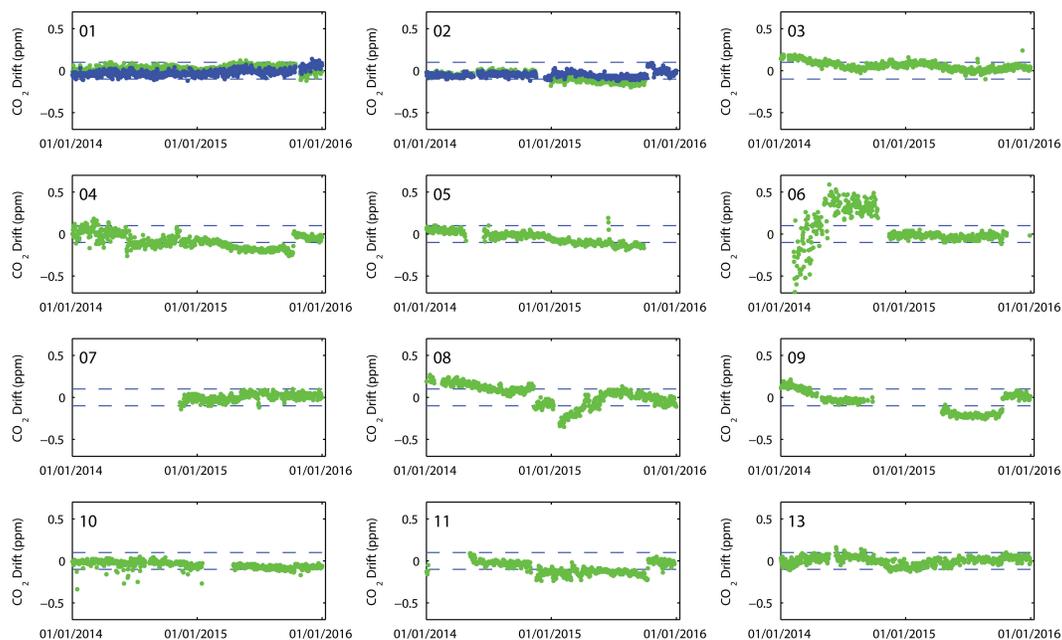


Figure 1. CO₂ target tank error (ppm, tank sampled every 23 hours) for 2014 and 2015 for all INFLUX sites. Sites 01 and 02 had two tanks, all other sites had one.