

INFLUX: Model-data Comparison and the Detection Limit of the Observational Network

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The goal of the INdianapolis FLUX (INFLUX) project is to detect greenhouse gas emissions at an urban scale. The project involves combining data from atmospheric models, bottom up inventories, and observed greenhouse gas mixing ratios and associated tracers (CO_2 , CH_4 , CO and $^{14}\text{CO}_2$) from towers and aircraft. The test bed city is Indianapolis, Indiana. Indianapolis was chosen as the study location because it is a large city (12th largest by population in the U.S.) with a flat terrain which simplifies the detection of urban greenhouse gases from the city.

The focus of this presentation is model-data comparisons and the detection limit of the INFLUX observational network. The model-data comparison involves evaluating output from forward simulations that utilize the Weather Research and Forecasting Advanced Research Model and Vulcan/Hestia emissions inventories with INFLUX observations. The detection limit of the observational network is addressed by perturbing the surface fluxes and examining the changes in concentrations between the perturbed and control simulations.

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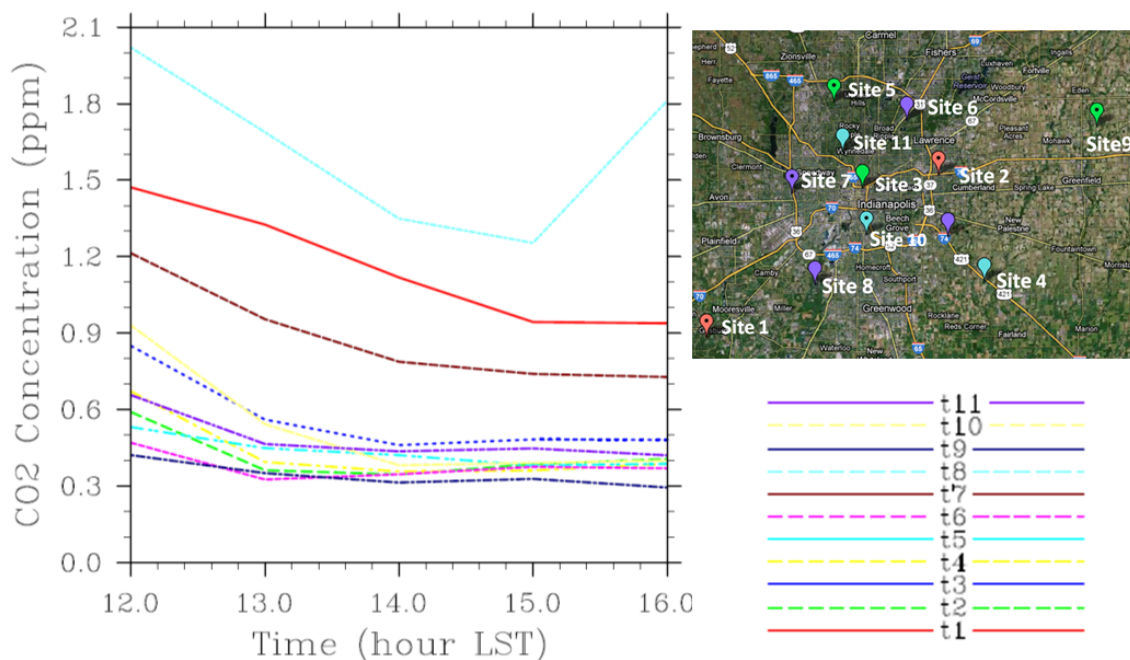


Figure 1. Observed midday boundary layer concentration changes of CO_2 at INFLUX tower locations due to a 20% increase in Vulcan surface fluxes on March 2, 2011. T1 corresponds with tower 1 at site 1 on the corresponding map, T2 corresponds to tower 2 at site 2, etc.