

3.060 Eight Years of Airborne Methane Measurements in Indianapolis.

Early Career Scientist

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Abstract:

Efforts to better understand anthropogenic and biogenic emissions of methane (CH_4), a greenhouse gas with a 100-yr global warming potential 25-fold greater than that of carbon dioxide, have become increasingly important as atmospheric CH_4 concentrations have grown to over 2.5 times pre-industrial levels. Landfills and natural gas distribution networks within cities have been shown to be significant CH_4 sources. The Indianapolis Flux Experiment (INFLUX), a multi-institution and multi-method campaign, has been evaluating top-down and bottom-up approaches for quantifying urban greenhouse gas emissions since 2008. The city of Indianapolis is an ideal testbed for studying urban emissions, given its isolation from other major cities and relatively simple topography and meteorology.

Airborne measurements of CH_4 in Indianapolis using Purdue University's Airborne Laboratory for Atmospheric Research (ALAR), a light twin-engine aircraft instrumented for atmospheric observations, have been ongoing since 2008. To estimate city-wide emission rates of CH_4 from Indianapolis, our group uses a mass balance approach to quantify the city's contribution of CH_4 relative to background levels. In addition to eight years of city-wide CH_4 emission rate estimates, we will discuss intra- and inter-annual trends in the magnitude of CH_4 emissions from Indianapolis.