



Studies of Integrated and Sector-Specific Methane Emissions from the City of Indianapolis

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Among the important greenhouse gases is methane, whose concentration is again increasing, and which has a global warming potential that is ~ 25 times that of CO_2 . Methane is a challenging species as it is emitted to the atmosphere from biogenic and anthropogenic sources, with some of the biogenic sources under partial human control. Models of its production processes are often limited due to poor understanding of the production conditions. The recent development of satellite instruments (e.g. GOSAT) capable of conducting column methane measurements has created new interest in conducting urban area-wide methane flux measurements for validation purposes. Here we discuss efforts as part of the Indianapolis Flux Experiment (INFLUX) to conduct methane flux measurements for the city of Indianapolis, as a tractable test case. INFLUX involves mobile measurements from surface vehicles and aircraft, and measurements from a network of ~ 12 towers, at which measurements of CO_2 , CH_4 , H_2O , CO , and meteorological parameters are conducted year-round. Conditional flask sampling is conducted for a variety of tracers and for stable isotope and radiocarbon measurements. CH_4 flux measurements via the aircraft mass balance method, along with measurements from the tower network and surface vehicles, are being used to quantify relative contributions to the total flux from the dominant, identifiable sources, specifically a landfill inside the city limits, two wastewater treatment plants, and the natural gas distribution system. Our efforts to identify previously unknown sources, to apportion the total flux among sources, and to determine the uncertainty in the integrated and source-specific flux measurements will be presented.