

## 6.102 Fluxes of Greenhouse Gases from Baltimore-Washington and Indianapolis: Results from the Winter 2015/2016 Aircraft Observations.

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Abstract:

Urban areas are responsible for a major component of the anthropogenic greenhouse gas (GHG) emissions. Quantification of urban GHG fluxes is important for establishing scientifically sound and cost-effective policies for mitigating GHG emissions. Discrepancies between observations and model simulations of GHGs suggest uncharacterized sources in urban environments. In this study, we quantified fluxes of carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>) from the Baltimore-Washington and Indianapolis areas based on the mass balance approach using observations from two aircraft flown in winter 2015 and 2016. Using the HYSPLIT back trajectory model, point sources of CO<sub>2</sub> and CH<sub>4</sub> were identified. The emissions from these point sources were quantified based on the aircraft observations and compared to the emission inventory data. In limited canister samples collected during the flights, the ethane-to-methane ratios indicate that both natural gas leaks and the upwind oil and natural gas operations are responsible for the observed enhancement in CH<sub>4</sub> concentration downwind of the urban area. The CO<sub>2</sub> data collected during the campaign are compared to OCO-2 satellite observations.