



Urban Scale Inversions: Verifying Inventories within Urban Areas by Monitoring GHG Atmospheric Concentrations Using a Network of High Performance Analyzers

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Current methodologies used to report greenhouse gas emissions from anthropogenic activities rely on estimating inventories from self reported activities. These inventories are then resolved into spatial and temporal emission maps. Several sources of uncertainties and assumptions affect these inventory estimations. Inventories can widely vary based on assumptions used, such as power generation efficiency factors to estimate emissions from electricity consumed or combustion factors to estimate emissions from the burning of fossil fuel. In this paper, we present a very high resolution inverse system using atmospheric concentration measurements to precisely monitor and verify emissions over large urban areas. High performance cavity ring down spectroscopy analyzers are deployed around an urban area to measure the CO₂ concentrations to quantify anthropogenic emissions in the inverse modeling framework. This model, in addition to the detection of missing sources and sinks in the area, will support long term monitoring of emissions and tracking short term variability due to industrial and urban activities.