

## Virtual ACOM Seminar

# Estimating NO<sub>x</sub> emissions from global cities using satellite data

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**Date: Monday, April 5, 2021, 3:30 – 4:30 pm (MT)**

**Link: <https://operations.ucar.edu/live-acom>**

### ABSTRACT

Emission inventory development for air pollutants takes many years, and involves extensive multi-national collaboration resulting in air pollutant emission estimates that are often educated approximations. This can be particularly troubling for those relying on accurate and timely emissions estimates, such as those performing policy planning or chemical transport model simulations. A complementary method to estimate air pollution emissions is in the use of satellite remote sensing. We use a proven methodology to estimate aggregated NO<sub>x</sub> emissions for approximately 50 global cities over the past 15 years using OMI NO<sub>2</sub> measurements combined with re-analysis meteorology. In more recent years, we have applied the same methodology to TROPOMI NO<sub>2</sub> to investigate NO<sub>x</sub> emissions in North American cities. When satellite-derived top-down NO<sub>x</sub> emissions estimates are compared to bottom-up emissions inventories, some cities show fairly good agreement (+/- 25%), but very often there are large discrepancies (>25%). While many of the discrepancies between top-down and bottom-up emissions estimates represent real differences, some of the differences can be related to the assumptions made to produce both estimates. Our work identifies these shortcomings, and attempts to chart a path forward for the research community.

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The National Center for Atmospheric Research is operated by the University Corporation for Atmospheric Research under the sponsorship of the National Science Foundation