

Top-down evaluation of point source NO_x, SO₂, and CO emissions and comparison to inventories

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Point source electric utility power plants are substantial sources of directly emitted NO_x, SO₂, and CO₂ to the atmosphere. We use airborne field data to assess 1. the accuracy of the hourly continuous emissions monitoring systems (CEMS) emission ratios of NO_x/CO₂, SO₂/CO₂, and CO/CO₂ for dozens of plants throughout the U.S., 2. track emissions changes over time, and 3. quantify any changes in atmospheric concentrations of these priority pollutants due to deliberate emissions reductions at power plants. We conclude from these analyses that emissions ratios tabulated in bottom-up national inventories based on CEMS data are in excellent agreement with emissions ratios derived using top-down estimates from ambient measurements. However, the frequency of updates to the national gridded inventories using CEMS data is not sufficient to track emissions changes in a timely manner, and thus hampers modeling efforts. Our power plant data analysis provides confidence in our use of airborne observations to extract emission ratios from other types of sources whose emissions are not measured on a continuous basis, such as large industrial point sources and urban areas.