

New historical emissions trends estimated with the community emissions data system

15 January 2019



Scientists are working to better understand how aerosols, including those that build up in the air from urban environments, affect the atmosphere and Earth system processes. Credit: US Department of Energy

To better understand how aerosols affect the atmosphere and Earth system processes, historical emissions data are a key input for modeling and analyses. A research team produced a new, robust data set covering the years 1750–2014 for carbonaceous aerosols, and chemically reactive gases—which are precursors to ozone, aerosols

such as sulfate and nitrate, and carbon dioxide. To organize, analyze, and provide the data, the team developed a data system called the Community Emissions Data System.

Emissions data from different countries vary in methodology, level of detail, source coverage, and consistency across time and space. This project has helped to address the diversity of existing emissions inventory estimates with a reproducible approach applied to all emissions types, updated emissions factors, used more recent estimates (through 2014), and provided better information on the data sources. The team's approach facilitates transparency, regular updates, and lets researchers add new data. The team's approach will facilitate uncertainty analyses. Such analyses help scientists better understand aerosol sources and effects.

Country-to-country differences in compiling [emissions data](#) make it difficult to construct consistent time series of past emissions across regions. Researchers overcame these difficulties to build a data set that contains annual estimates of carbon monoxide, methane, ammonia, oxides of nitrogen, sulfur dioxide, and non-methane [volatile organic compounds](#), carbonaceous aerosols, and [carbon dioxide](#) for the years 1750–2014 by country, fuel, and sector, along with seasonal data. Researchers developed these data with the Community Emissions Data System (CEDS). This system integrates population, energy consumption, and other economic driver data with national and global emissions inventory data to produce consistent emissions trends over time. In developing this data set, they used [open-source software](#) and data, a consistent methodology for all emissions species, and national inventory data sets. The CEDS software and data will be publicly available through an open-source repository to facilitate community involvement and improvement.

More information: Rachel M. Hoesly et al.

Historical (1750–2014) anthropogenic emissions of reactive gases and aerosols from the Community Emissions Data System (CEDS), *Geoscientific Model Development* (2018). DOI: [10.5194/gmd-11-369-2018](https://doi.org/10.5194/gmd-11-369-2018)

Provided by US Department of Energy

APA citation: New historical emissions trends estimated with the community emissions data system (2019, January 15) retrieved 14 November 2019 from <https://phys.org/news/2019-01-historical-emissions-trends.html>

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