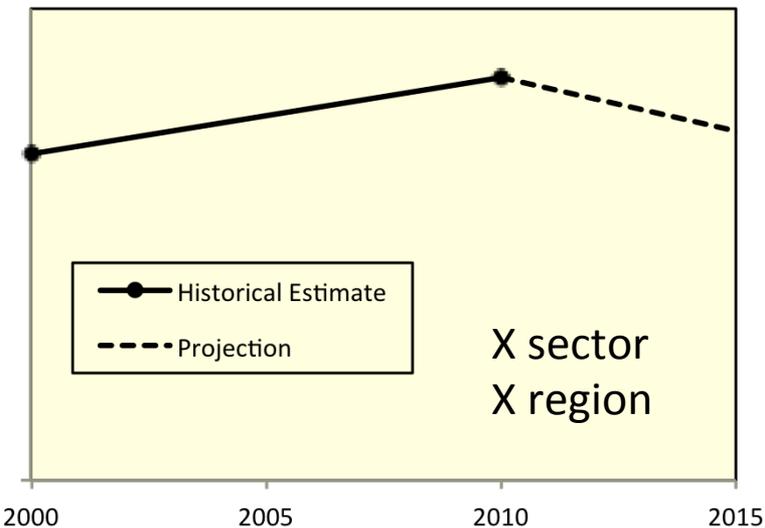


Community Emissions Data System (CEDS)

Timely “research” estimates for emissions of aerosol (BC, OC) and aerosol precursor compounds (SO₂, NO_x, NH₃, CH₄, CO, NMVOC) are key inputs for aerosol research and Earth System Models

Needed for historical and future simulations, validation/comparisons with observations, historical attribution, uncertainty quantification, IAM calibration and validation, and economic/policy analysis.

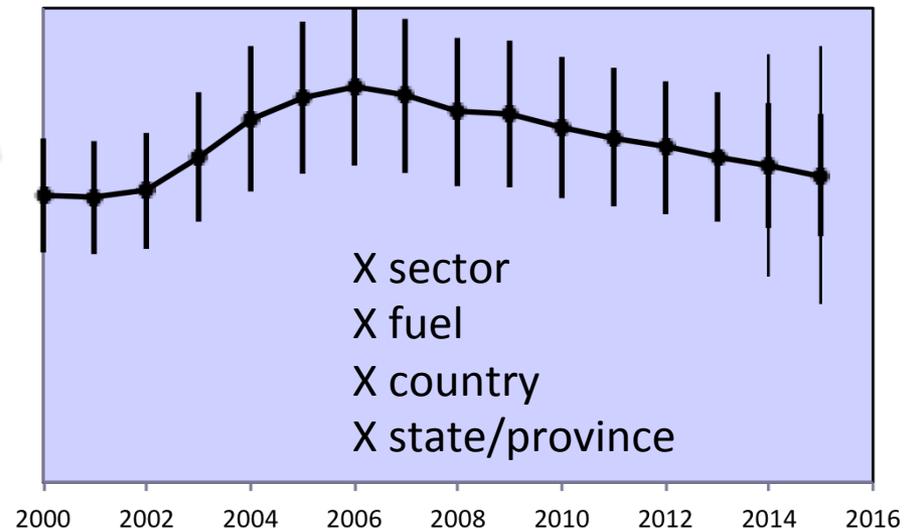
Instead of this



Produced using an open-source data system to increase data transparency and facilitate research advancements.

Produce

Uncertainty essential for estimates of more recent years.



CEDS Project Outcomes

Global Emissions by Country, Sector, and Fuel

- Annual estimates of anthropogenic emissions (not open burning) to latest full calendar year of chemically reactive species and CO₂ (as reference) over the entire industrial era. Readily updated every year.
 - With greater spatial detail (state/province) for large countries
- Uncertainty estimated at the same level of detail (Country, fuel, sector)
- Seasonal cycle (monthly), aggregate NMVOCs by sector/sub-sector
- Gridded emissions (0.1°) w/ sub-national resolution for large countries

Goals

- Consistent extrapolation at the aggregate level over time (prevent spurious discontinuities)
- Community data review: aggregate (country, sector, ...) & gridded
- Facilitate cross-country comparison (EF consistency, trends)
- Transparent emission results (assumptions -> emissions)
- Tool for more general use

Complementary project coordinated with existing, more detailed work

CEDS Implementation Details

Implementation

- Modular, data-driven system, in the **R open-source platform**
- Consistent with country-level inventories (where desired/appropriate)
- Open source code and input data
 - IEA energy statistics not open source (but can be “plugged in” by users)
 - Public release of emissions data to as high level of detail as practical
- Tool for emissions research more broadly

Timeline

2014 & Winter 2015	Spring – Summer 2015	Fall 2015	2016-2018	Future On-Going
Initial code design and prototyping	<i>System code review</i> Data collection and processing focused on recent decades	<i>Community review</i> Updated global data for CMIP6	<i>Com. review</i> Uncertainty & adl history	<i>Com. review</i> Annual Updates
		State & other Sub-Regional data	Satellite eval: recent trends	

AerChemMIP Overview

AerChemMIP will quantify **forcings, feedbacks** and global-to-regional climate **response** ($\Delta T, \Delta P$) from changes to:

- Near-Term Climate Forcers (NTCF) emissions (aerosols, O_3 precursors)
- Reactive GHGs concentrations (N_2O , CH_4 , ODSs)
- AerChemMIP will provide essential new data to answer CMPI6 Q1 “How does the Earth system respond to forcing?”. AerChemMIP will provide data on past and future changes in the chemical composition of the atmosphere and estimate the associated forcings
- AerChemMIP will provide significant contributions to WCRP theme “Biogeochemical forcings and feedbacks” (Chemistry-climate feedbacks, uncertainty associated with natural emissions,...)