

README file for the dataset associated with the research article titled: Outdoor air pollution in India is not only an urban problem.

Research article authors: A. R. Ravishankara^{1,2}, Liji M. David^{1,2}, Jeffrey R. Pierce², Chandra Venkataraman³

Author affiliations: ¹Department of Chemistry, Colorado State University, Fort Collins, Colorado, USA, ²Department of Atmospheric Science, Colorado State University, Fort Collins, Colorado, USA, ³Department of Chemical Engineering, Indian Institute of Technology Bombay, Powai, Mumbai, India

Research article abstract: Urban outdoor air pollution in the developing world, mostly due to particulate matter with diameters smaller than 2.5 μm ($\text{PM}_{2.5}$), has been highlighted in recent years as it leads to millions of premature deaths. Outdoor air pollution has also been viewed mostly as an urban problem. We use satellite-derived demarcations to parse India's population into urban and non-urban regions (which agrees with the census data). We also use the satellite-derived surface $\text{PM}_{2.5}$ levels to calculate the health impacts in the urban and non-urban regions. We show that the outdoor air pollution problem is just as severe in non-urban regions as in the urban regions of India, with implications to monitoring, regulations, health, and policy.

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Contact: Liji David, liji.david@colostate.edu

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Data sources and structure:

Source: Data compiled by Liji David. The satellite-derived annual mean surface $\text{PM}_{2.5}$ over India for 2015.

Spatial coverage: India.

Temporal coverage: 2015

Data description: The AOD from three separate satellite instruments: (a) the MODIS instrument aboard Terra satellite; (b) the MODIS instrument aboard the Aqua satellite; and (c) the MISR instrument aboard the Aqua satellite were used. We used the GEOS-Chem model (version 12.0.3) at $0.25^\circ \times 0.3125^\circ$ resolution to calculate the ratio of daily simulated surface $\text{PM}_{2.5}$ to AOD. Using the relationship given by Liu et al. (1), the satellite-derived daily $\text{PM}_{2.5}$ was calculated for days when there was a successful satellite AOD retrieval. The daily values were averaged to calculate the satellite-derived annual mean surface $\text{PM}_{2.5}$.

Format of data files: There is a data file in the NetCDF format 'PM25.in.0.04x0.04.nc' along with a README file. The NetCDF file has the satellite-derived annual mean surface PM_{2.5} over India for 2015. The latitude and longitude ranges are ~7.5°N-37°N and 68°E-97.5°E, respectively. The size of the grid is 2.5 arc-minute.

Recommended use: Please read the associated publication to understand our analysis method.

Reference:

1. Y. Liu, *et al.*, Mapping annual mean ground-level PM_{2.5} concentrations using Multiangle Imaging Spectroradiometer aerosol optical thickness over the contiguous United States. *J. Geophys. Res. D Atmos.* **109**, 1–10 (2004).