Development of a United States Wide Correction for PM2.5 Data Collected with the PurpleAir Sensor

Figure data (7 files)

Associated publication: Barkjohn, K. K., Gantt, B., and Clements, A. L.: Development and Application of a United States wide correction for PM2.5 data collected with the PurpleAir sensor, Atmos. Meas. Tech., https://doi.org/10.5194/amt-2020-413, 2021.

Full24hrdataset.csv (24-hr averaged dataset)

* contains data for Figures 3, 5, 6, S2, S3, S5-10
  + Date: Year-month-day example: 2019-08-22
  + ID: State number ID (e.g. AK1, NC1) as used throughout the paper
  + Region: Regions as defined in the text
  + FEMorFRM: Is the measurement a federal equivalent method (FEM) or federal reference method (FRM)
  + PM25FM: FEM or FRM PM2.5 in ug/m3
  + PM25cfatm: AB channel averaged lower cf PM2.5 in ug/m3
  + PM25cf1: AB channel averaged higher cf PM2.5 in ug/m3
  + b0.3um…b10um: PurpleAir particle count >0.3 µm …> 10 µm
  + b0.3to0.5 … b5to10: PurpleAir particle count between 0.3 and 0.5 µm … between 5 and 10 µm
    - Calculated by subtracting the raw PurpleAir binned data
  + TempC: Temperature in Celcius as measured by PurpleAir
  + RH: Relative Humidity in Percent as measured by PurpleAir
  + Dewpoint: Dewpoint in Celsius calculated from the PurpleAir temperature and RH
  + PM25PAlinearcor: PurpleAir PM2.5 corrected using a linear correction built over the full dataset
  + PM25PARHcor: PurpleAir PM2.5 corrected using a correction with RH built over the full dataset (eq. 10 U.S-wide correction)
  + ratioPARHcor\_FM: PM25PARHcor divided by the FEM or FRM. Set to NA if FEM or FRM is <1
  + diffPARHcor\_FM: difference between the FEM or FRM and PM25PARHcor
  + ratiocfatm\_FM: PurpleAir cf\_atm data divided by the FEM or FRM
  + diffcfatm\_FM: difference between PurpleAir cf\_atm data and the FEM or FRM
  + ratiocf1\_FM: PurpleAir cf\_1 data divided by the FEM or FRM
  + diffcf1\_FM: difference between the PurpleAir cf\_1 data and the FEM or FRM

Fig1.csv (24-hr averaged dataset)

* Contains data for Figure 1
  + PM25cf1a: A channel higher cf PM2.5 in ug/m3
  + PM25cf1b: B channel higher cf PM2.5 in ug/m3
  + ID: State number ID (e.g. AK1, NC1) as used throughout the paper
  + Diff: categorical
    - “within 2sd”: Meets the AB QA requirements (both percent and absolute ug/m3 criteria)
    - “>abs(2sd)”: Does not meet AB QA requirements and will be excluded from the dataset moving forward.

Fig4.csv

* + Type:
    - LOBD: Leave out by date
    - LOSO: Leave one state out
  + Modelnum: 0raw- 7PM\*RH\*D\*T models tested as described in the paper
  + Variable:
    - MBE: Mean bias error
    - MAE: Mean absolute error
  + Value: MAE or MBE in ug/m3

Withheldfinaldataset\_Fig7.csv

* + Date: Year-month-day example: 2019-08-22
  + ID: State number ID (e.g. AK1, NC1) as used throughout the paper
  + State: 2 letter state abbreviation (e.g. AK)
  + PM25FM: FEM or FRM PM2.5 in ug/m3
  + AQIcategory: AQI category based on the corrected PurpleAir data using LOSO (next column)
  + PM25PAcor\_withholding: Data corrected using leaving one state out (LOSO) withholding
  + RH: Relative Humidity in Percent as measured by PurpleAir
  + PM25cf1: PurpleAir higher cf PM2.5 data (ug/m3)

FigS1\_IA (24-hr averaged dataset)

* PM25: PurpleAir higher cf PM2.5 data (ug/m3)
* Temperature: in oC as measured by PurpleAir
* Humidity: RH in % as measured by PurpleAir
* Grp:
  + IASubset: Subset of Iowa dataset used in model development
  + IA: Full dataset from Iowa

Note: Data for Figures 2 and S4 are included in the tables in the SI.