

Supplement of Atmos. Meas. Tech., 12, 6385–6399, 2019  
<https://doi.org/10.5194/amt-12-6385-2019-supplement>  
© Author(s) 2019. This work is distributed under  
the Creative Commons Attribution 4.0 License.



*Supplement of*

## **A low-cost monitor for measurement of fine particulate matter and aerosol optical depth – Part 2: Citizen-science pilot campaign in northern Colorado**

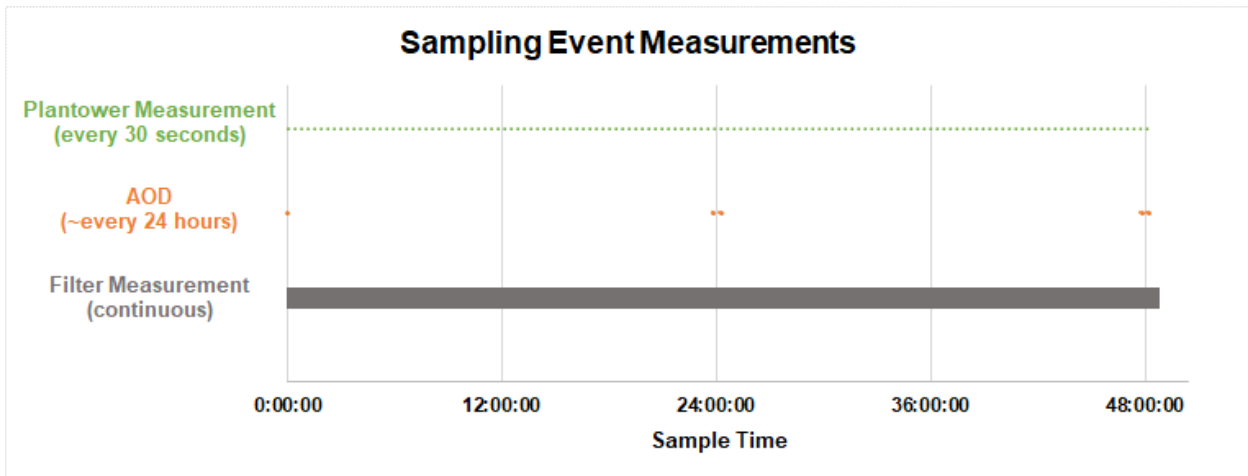
**Bonne Ford et al.**

*Correspondence to:* Bonne Ford ([bonne@atmos.colostate.edu](mailto:bonne@atmos.colostate.edu))

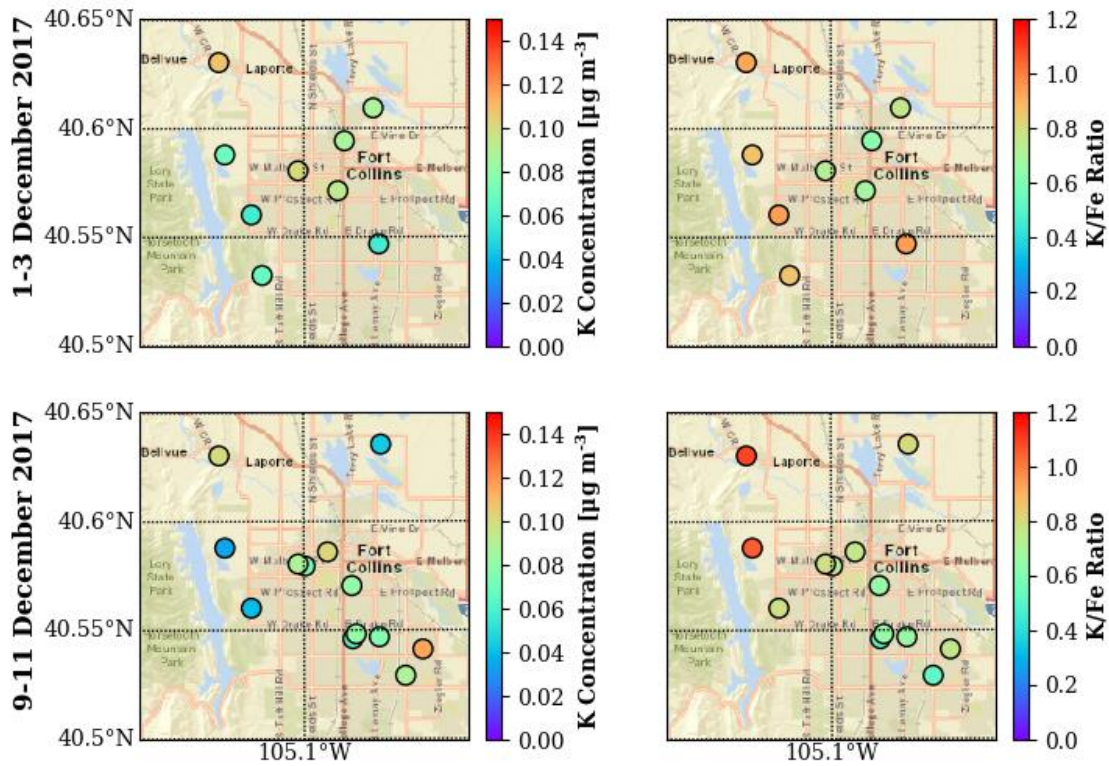
The copyright of individual parts of the supplement might differ from the CC BY 4.0 License.

**Table S1.** List of AERONET sites used for comparison.

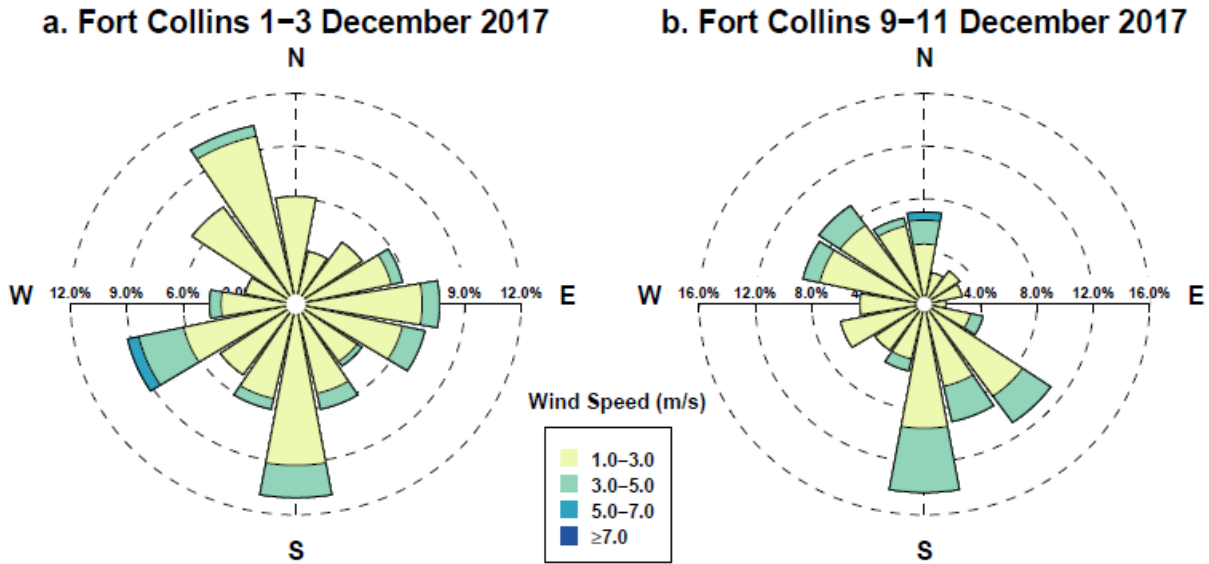
AERONET Site	Longitude	Latitude
Denver_LaCasa	-105.005°	39.7789°
DigitalGlobe_Cal	-105.137°	40.139°
NEON-CPER	-104.744238°	40.812444°
NEON_CVALLA	-105.16725°	40.16063°
NEON_NIWO	-105.582°	40.054°
NEON_RMNP	-105.545972°	40.2759°
Table_Mountain	-105.237°	40.125°



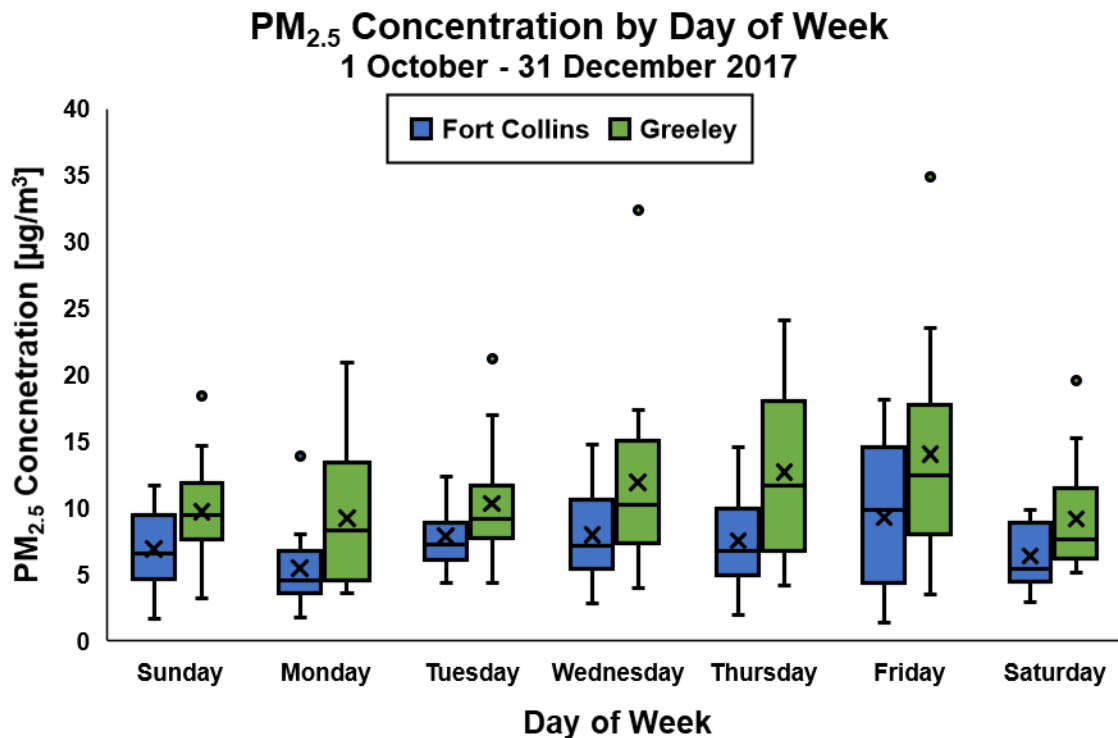
**Figure S1.** Diagram of sampling event measurements. A sampling event lasts 48 hours and 15 minutes. Filter Measurements are continuous (pumps run continuously, filters collect mass during entire sampling event), providing an integrated measurement of  $PM_{2.5}$ . For AOD, the first value is from a single measurement at the start time, and the two subsequent are selected from a 30-minute window centered on the 24-hour and 28-hour mark after the start time of the sampling event. For devices with a Plantower PMS5003, measurements are taken every 30 seconds during the sampling event, providing a time-resolved measurement of  $PM_{2.5}$ .



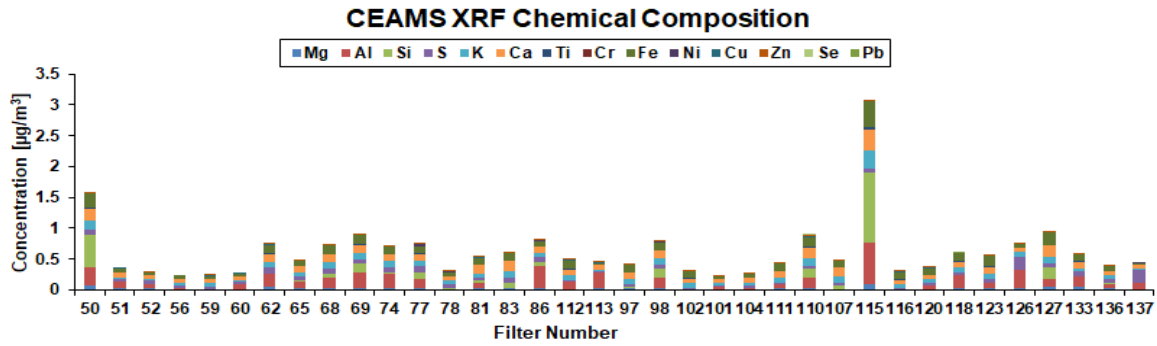
**Figure S2.** Potassium (K) concentrations and ratios of potassium to iron (K/Fe) measured in Fort Collins for 1-3 December 2017 (top row) and 9-11 December 2017 (bottom row). Maps generated using World Street Maps (credit: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCAN, Esri Japan, METI, Esri China [Hong Kong], NOSTRA, © OpenStreetMap contributors, and the GIS User Community).



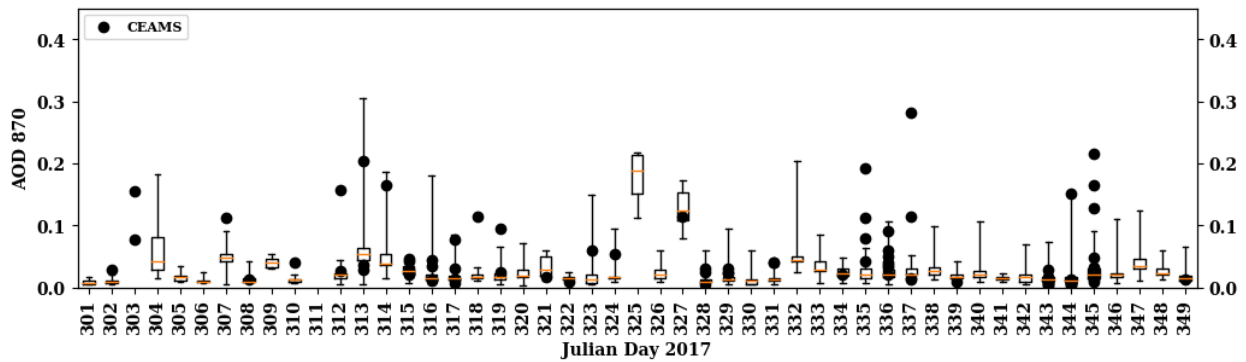
**Figure S3.** Wind rose diagrams for the two sampling periods mentioned in the main text. Measurements were taken at the Fort Collins weather station located on the Colorado State University campus (note the different scales on the panels).



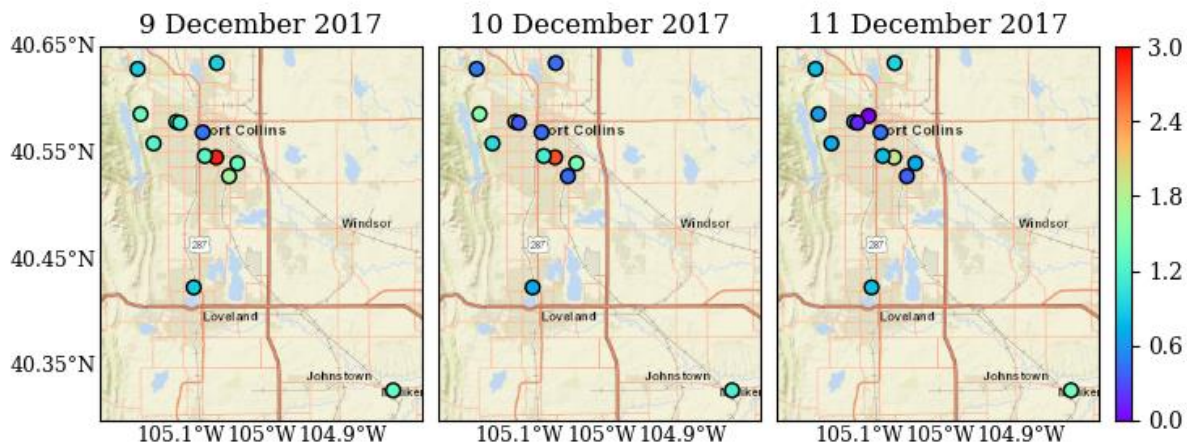
**Figure S4.** Box and whisker plots showing the distribution of daily average PM<sub>2.5</sub> concentrations by day of week at two monitoring sites in northern Colorado (Fort Collins, CO monitoring site 08-069-0009 and Greeley, CO monitoring site 08-123-0006) for 1 October – 31 December 2017.



**Figure S5.** The calculated mass concentration of each elemental species determined by XRF for each filter.

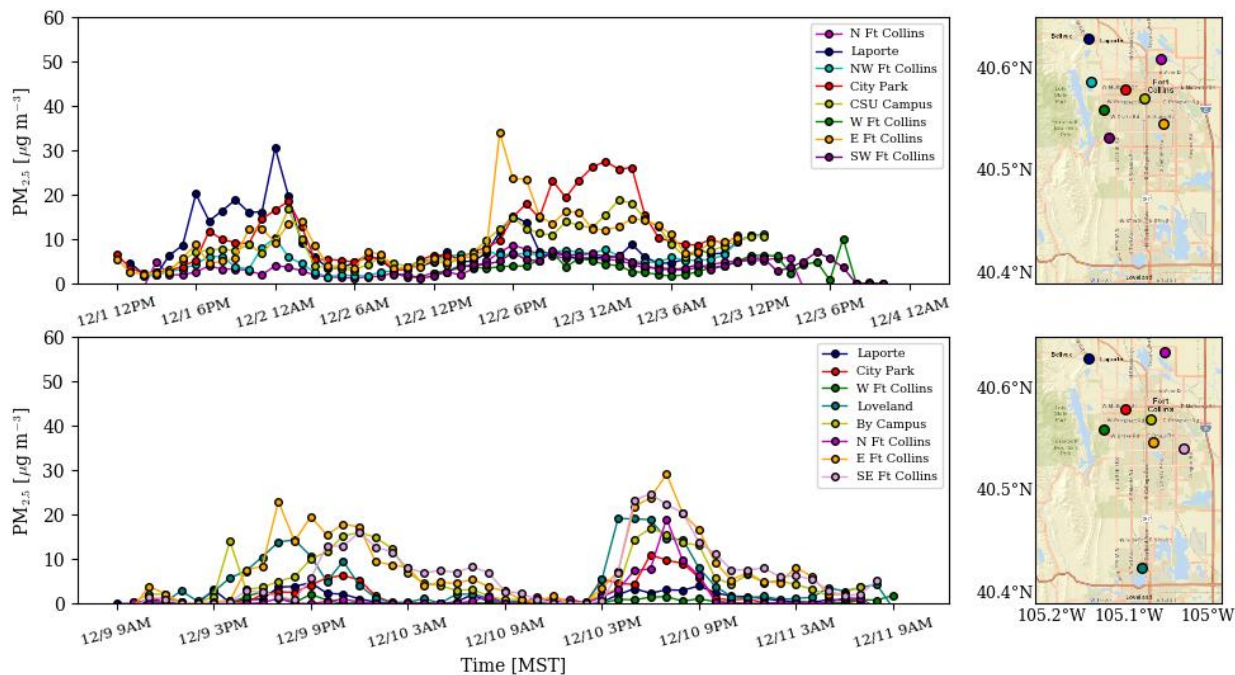


**Figure S6.** Box and whisker plots showing the distribution of AERONET AOD at 870 nm at all sites in northern Colorado (listed in Supplementary Table S1, not all sites have values for every day) for each day from 28 October - 15 December 2017. Box denotes first and third quartile; whiskers denote maximum and minimum; and orange line shows median. CEAMS AOD at 870 nm are overlaid as black dots.

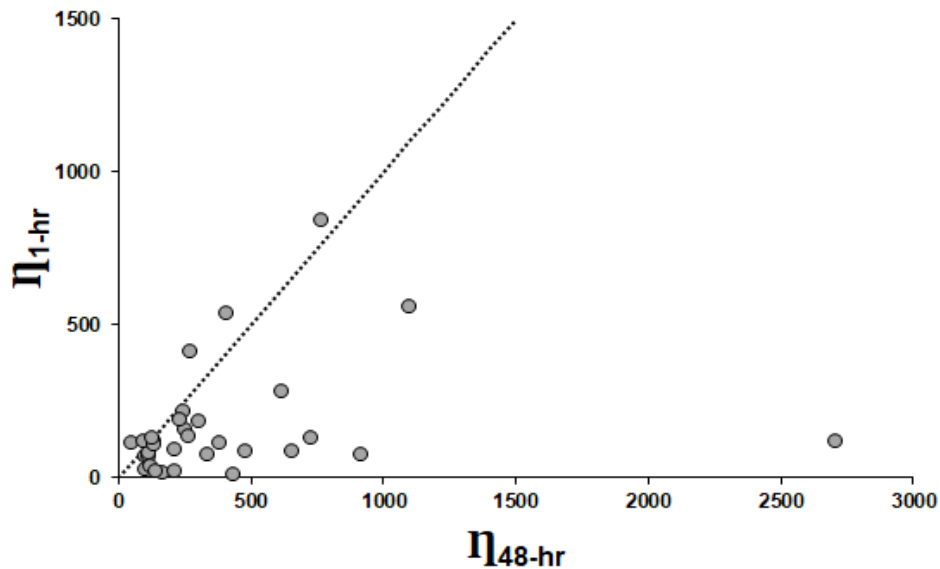


**Figure S7.** Map of the Ångström exponent values (calculated from the 870 and 440 nm wavelengths) for 9-11 December 2017. Maps generated using World Street Maps (credit: Esri,

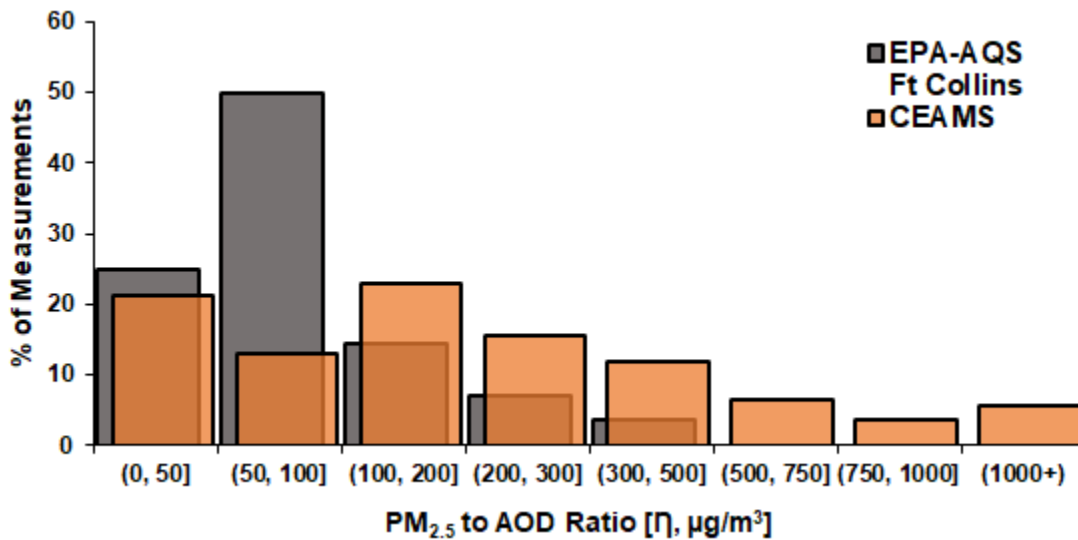
HERE, Garmin, USGS, Intermap, INCREMENT P, NRCAN, Esri Japan, METI, Esri China [Hong Kong], NOSTRA, © OpenStreetMap contributors, and the GIS User Community).



**Figure S8.** Time series of uncorrected hourly-averaged PM<sub>2.5</sub> concentrations from the Plantower PMS5003 sensor inside the AMOD for 1-3 December (top row) and 9-11 December (bottom row) sampling periods. Maps show sampling locations for each sampling period. Maps generated using World Street Maps (credit: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCAN, Esri Japan, METI, Esri China [Hong Kong], NOSTRA, © OpenStreetMap contributors, and the GIS User Community).



**Figure S9.** Comparison of  $\bar{\eta}$  calculated using the AOD measurement and the 48-hr concentration from the filter ( $\bar{\eta}_{48\text{-hr}}$ ) and the 1-hr average concentration from the Plantower PMS5003.



**Figure S10.** Distribution of the  $\text{PM}_{2.5}$  to AOD ratios calculated from CEAMS 520-nm AOD and CEAMS filter  $\text{PM}_{2.5}$  concentrations (orange) and the EPA-AQS site  $\text{PM}_{2.5}$  in Fort Collins and the MODIS 550-nm AOD (gray) for 28 October - 15 December 2017.