Continuous Carbon Data Dashboard

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For the National Ambient Air Monitoring Conference, New Orleans, LA

August 2024

STI-8182

Outline

- Continuous Carbon Data
- Continuous Carbon Dashboard
  - Overview
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- Network-Wide Tabs
  - Network Completeness, Network Concentrations, Method Quality Assurance (QA), etc.
- Site-Specific Tabs
  - Seasonality Analysis, Black Carbon (BC) Source Apportionment, etc.

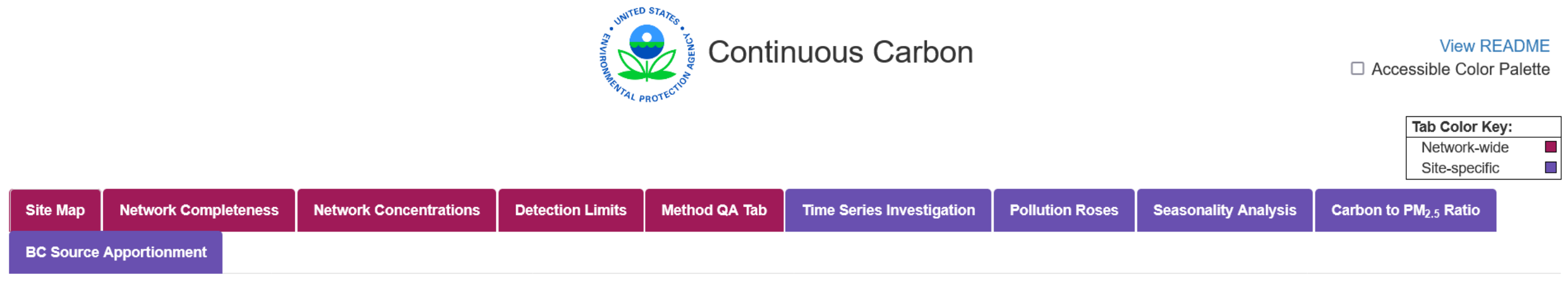
Continuous Carbon Data

- Continuous Carbon refers to hourly Aethalometer measurements of UV Carbon and BC
- Parameter codes and names:
  - 84313: BC $PM_{2.5}$ Standard Temperature and Pressure (STP)
  - 84314: UV Carbon $PM_{2.5}$ STP
  - 88313: BC $PM_{2.5}$ at 880 nm
  - 88314: UV Carbon $PM_{2.5}$ at 370 nm
  - 88317: BC $PM_{2.5}$ Corrected

Continuous Carbon Dashboard; Overview

- Coded in an R environment; displayed using the Shiny package
- Back-end code compiles all data via the Air Quality System (AQS) API (2016–present)
- Most recent two years of data updated weekly; older data updated every quarter
- Features visualizations of particular interest (e.g., EC-to-BC comparisons)
- Users can see full characterizations of a specific station
- Designed to summarize large amounts of information in a quick and concise manner

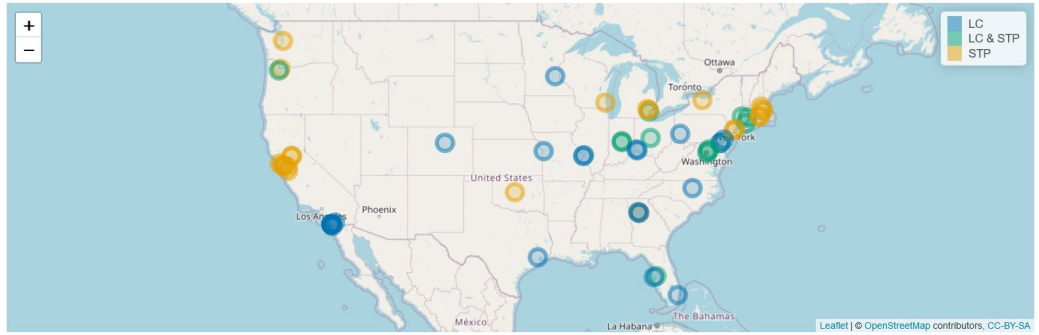
Continuous Carbon Dashboard; Tabs



- Network-level assessments
  - Network-wide quality indicators
  - Intrasite comparisons
- Specific site-level assessments
  - Site-specific quality indicators and analysis tools
  - Site selection necessary for tabs to populate with data
  - Site metadata, including instrumentation

Network-Wide Tabs; Continuous Carbon Sites

- Interactive map
- Sites designated as local conditions (LC), STP, or both
- Selection on map interacts with the site-specific tabs
  - Selected site metadata table appears on every site-specific tab
- Metadata table below map
- Fifty-nine sites comprised of different networks (e.g., CSN, Near-Road, etc.)



Download Table

Search:

AQS Site Code	Site Name	City	State	Continuous BC & UV Availability	CSN/Improve EC Availability	Network Affiliation(s)	Last Sample Date
482011039	Houston Deer Park #2	Deer Park	TX	LC	EC_TOR, EC_TOT	CSN STN	2016-06-12
060670006	Sacramento-Del Paso Manor	Arden-Arcade	CA	STP	EC_TOR, EC_TOT	CSN STN	2023-12-31
100032004	MLK CORNER OF MLK BLVD AND JUSTISON ST	Wilmington	DE	LC	EC_TOR	CSN SUPPLEMENTAL	2022-04-30
295100085	Blair Street	St. Louis	MO	LC	EC_TOR	CSN STN	2024-01-31
371830014	Millbrook School	Raleigh	NC	LC	EC_TOR	CSN SUPPLEMENTAL	2020-03-27

Showing 1 to 5 of 59 entries

Previous 1 2 3 4 5 … 12 Next

Network-Wide Tabs; Network Completeness

Select year:

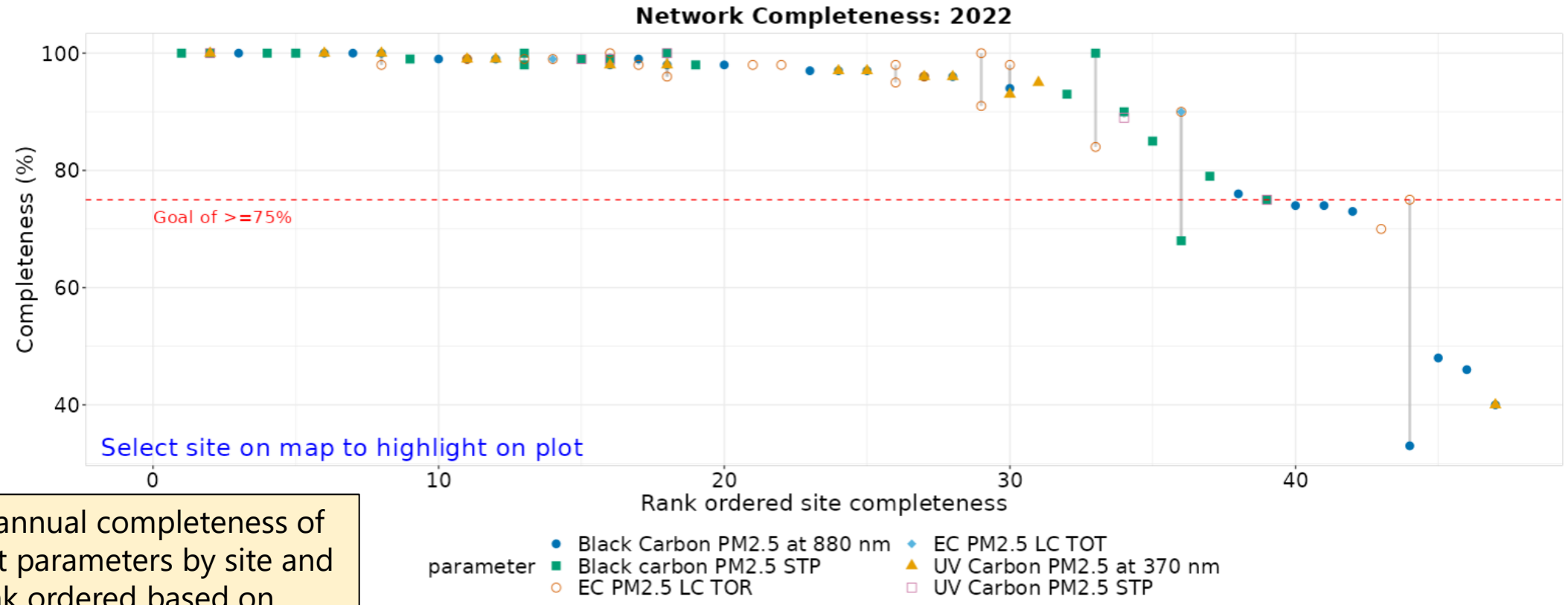
2022

Year toggle

Interactive plot; click, drag, and select to highlight sites to see metadata displayed in a table below

Show EC completeness

Drag and double-click to display details below plot. Double-click to reset.

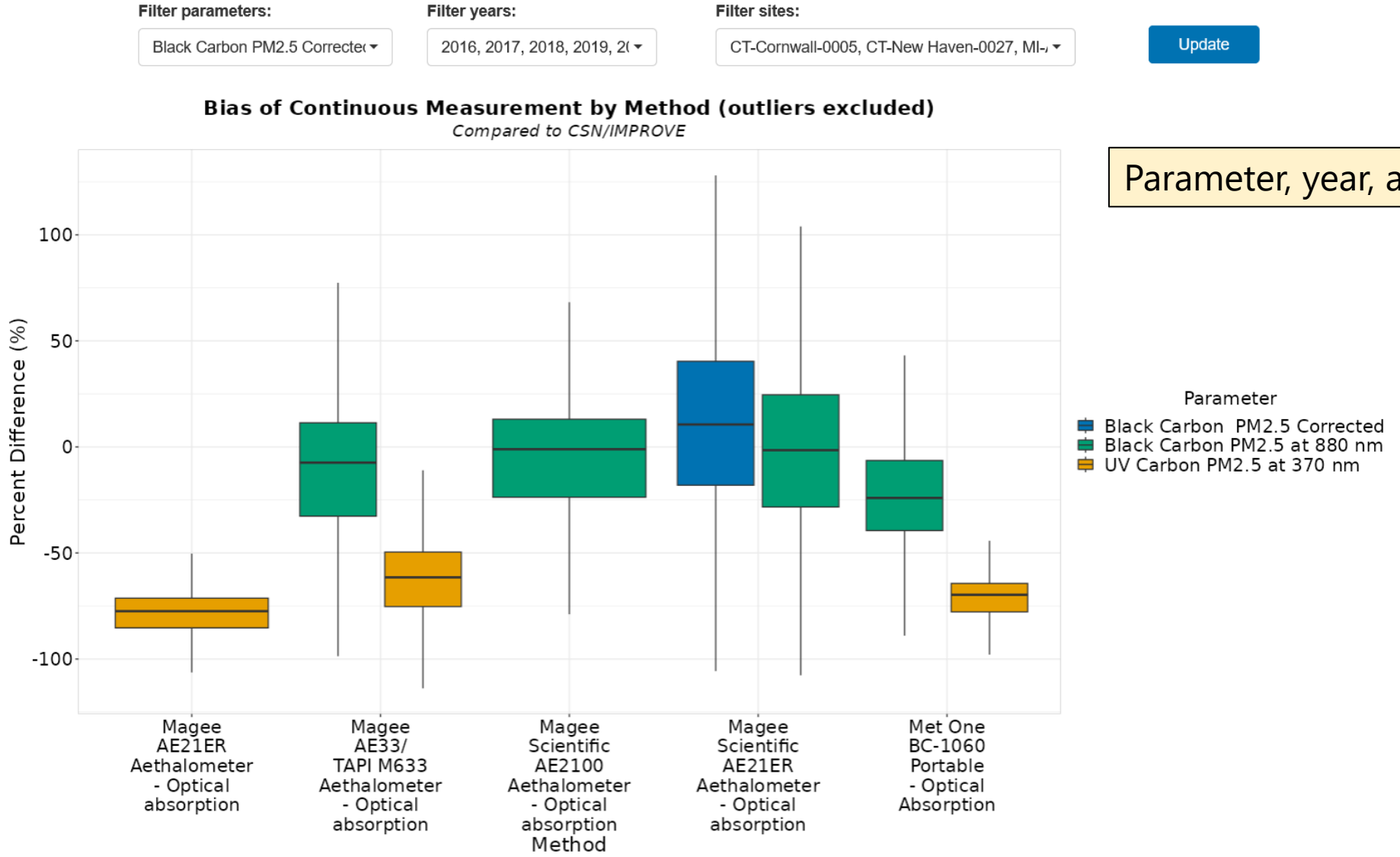


Percent annual completeness of pollutant parameters by site and year; rank ordered based on annual completeness

Network-Wide Tabs; Method QA

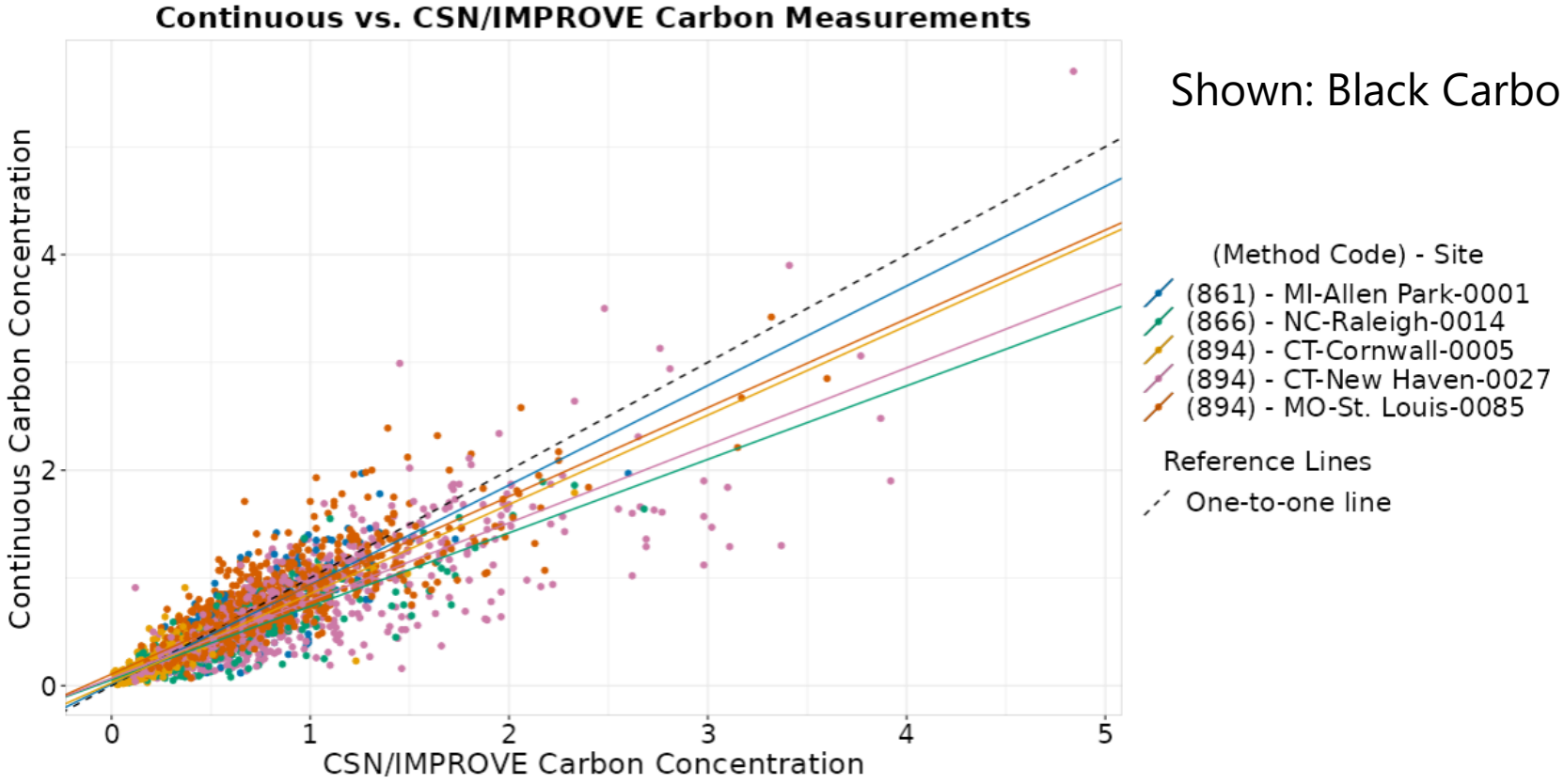
- Evaluate continuous carbon methods against CSN/IMPROVE (filter) methods
- Comparisons are made between 24-hour observations of:
  - Continuous BC and CSN/IMPROVE EC
  - Continuous UV and CSN/IMPROVE OC
- Percent difference is calculated with CSN/IMPROVE measurements as the “true” value

Network-Wide Tabs; Method QA



Parameter, year, and site toggles

Network-Wide Tabs; Method QA



Shown: Black Carbon PM2.5 at 880 nm

Linear Model Equations:

$y = 0.01 + 0.92x;\ r^2 = 0.71$

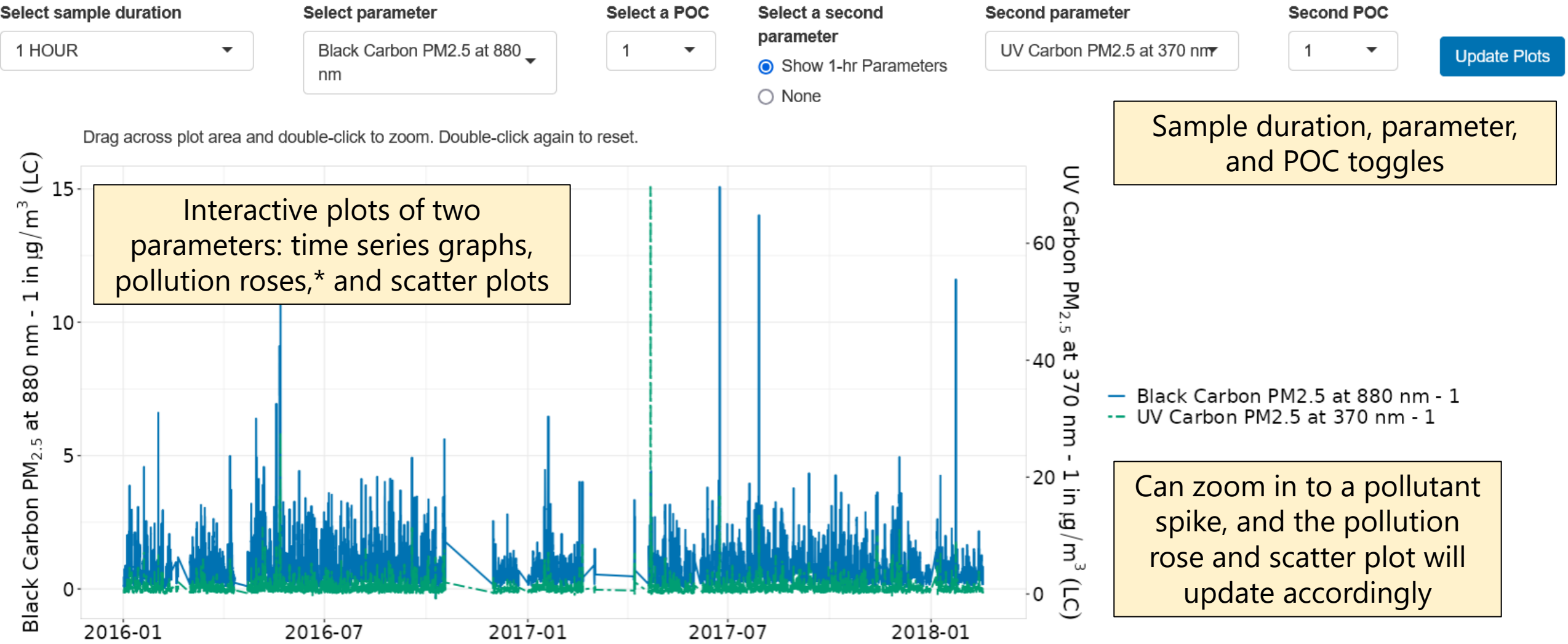
$y = 0.05 + 0.68x;\ r^2 = 0.76$

$y = 0.02 + 0.83x;\ r^2 = 0.76$

$y = 0.07 + 0.72x;\ r^2 = 0.7$

$y = 0.11 + 0.82x;\ r^2 = 0.73$

Site-Specific Tabs; Time Series Investigation



Sample duration, parameter, and POC toggles

Interactive plots of two parameters: time series graphs, pollution roses,* and scatter plots

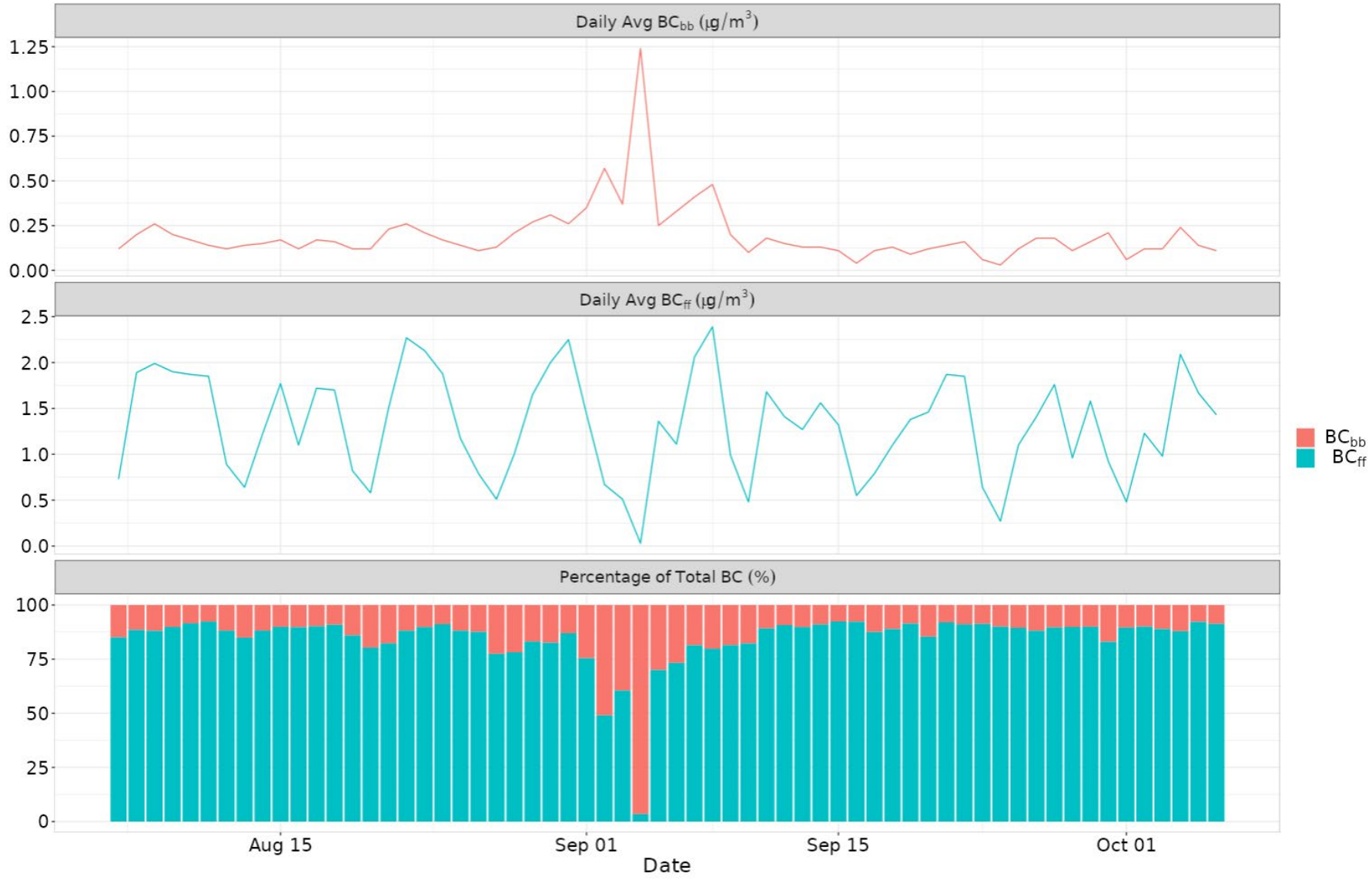
Can zoom in to a pollutant spike, and the pollution rose and scatter plot will update accordingly

*only if there is wind speed/direction at the site

Site-Specific Tabs; BC Source Apportionment

- Compares how proportions of biomass burning-sourced and fossil fuel-sourced BC changes over time at the selected site.
- **BC_{bb}** refers to biomass burning-sourced BC
- **BC_{ff}** refers to fossil fuel-sourced BC
- Interactive time series graph for daily average **BC_{bb}** and **BC_{ff}**, percentage graph, and table
  - User can zoom in on a particular time

Site-Specific Tabs; BC Source Apportionment



Continuous Carbon Dashboard Summary

The Continuous Carbon Dashboard:

- Compiles a large quantity of data from all sites in the AQS database that measure hourly UV and BC
- Displays data in various forms
- Allows for intersite comparisons
- Is highly interactive

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Questions?

The *suite of dashboards available:*

- *PAMS Dashboard*
- *NCore Dashboard*
- *Near-Road Dashboard*
- *FRM-FEM Comparability Dashboard*
- *Ozone, QVA, CO, NO, NO_2, NO_y, SO_2, and FRM Dashboards*

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