



A Community Network of 100 Black Carbon Sensors

Julien Caubel, Chelsea V. Preble, Troy Cados, Thomas W. Kirchstetter (twkirchstetter@berkeley.edu)
University of California Berkeley, Lawrence Berkeley National Laboratory



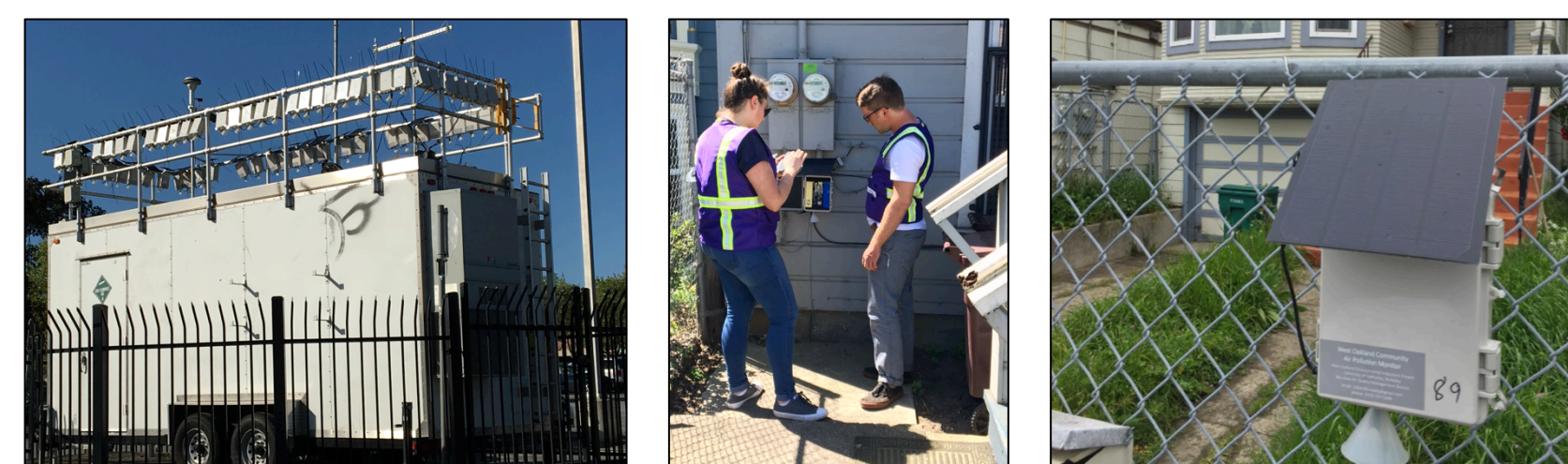
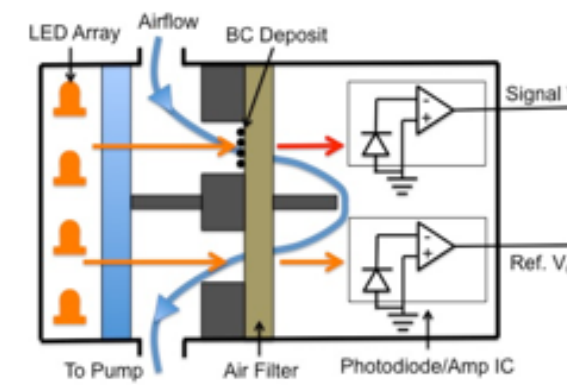
Summary

- Created and validated a new black carbon (BC) sensor
- Partnered with community and stakeholder organizations
- Created data communication, management, and backend platforms
- Deployed and operated a network of over 100 BC sensors in West Oakland for 100 days



Black Carbon Sensor Development

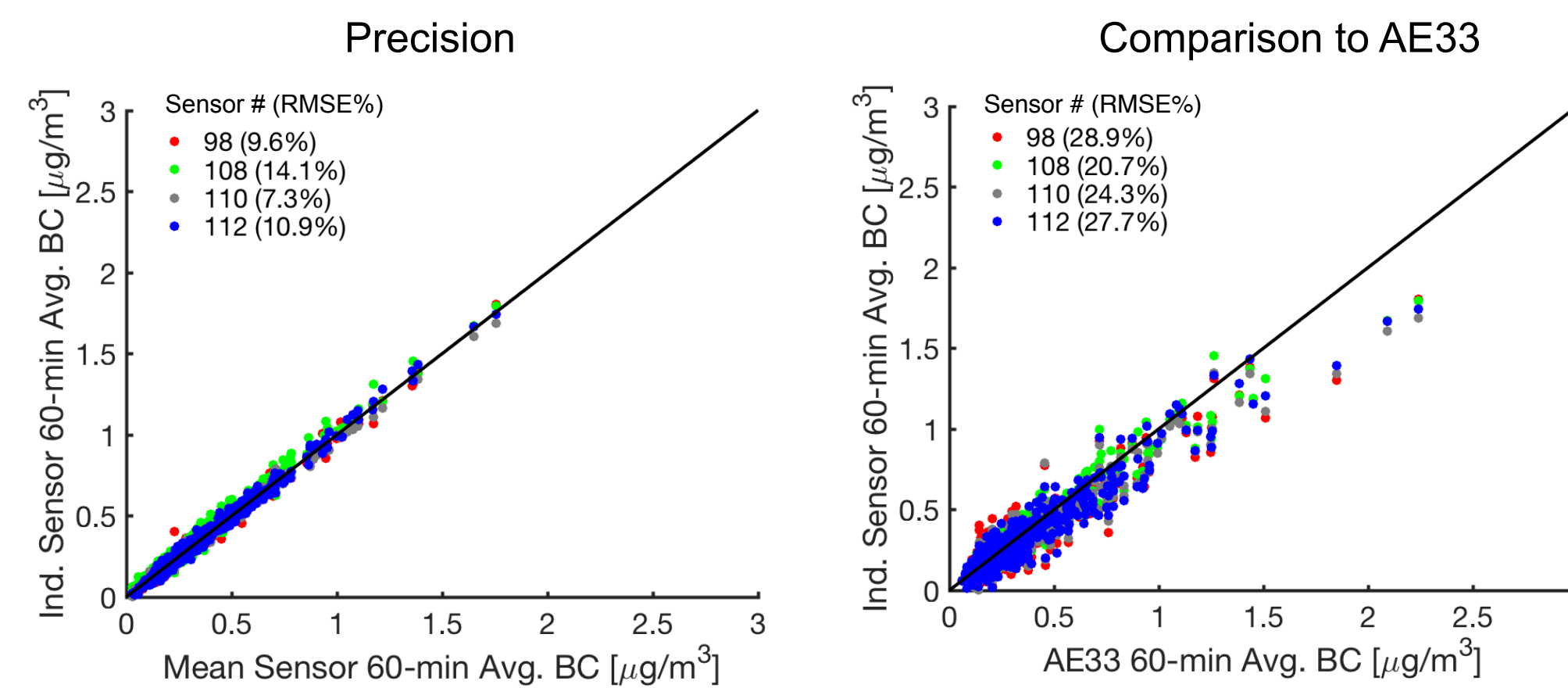
- Prototypes developed and evaluated in Kirchstetter's Lab
- Filter-based light absorption photometer method, akin to PSAP and Aethalometer
- Field validated at BAAQMD monitoring sites



Project Partnerships

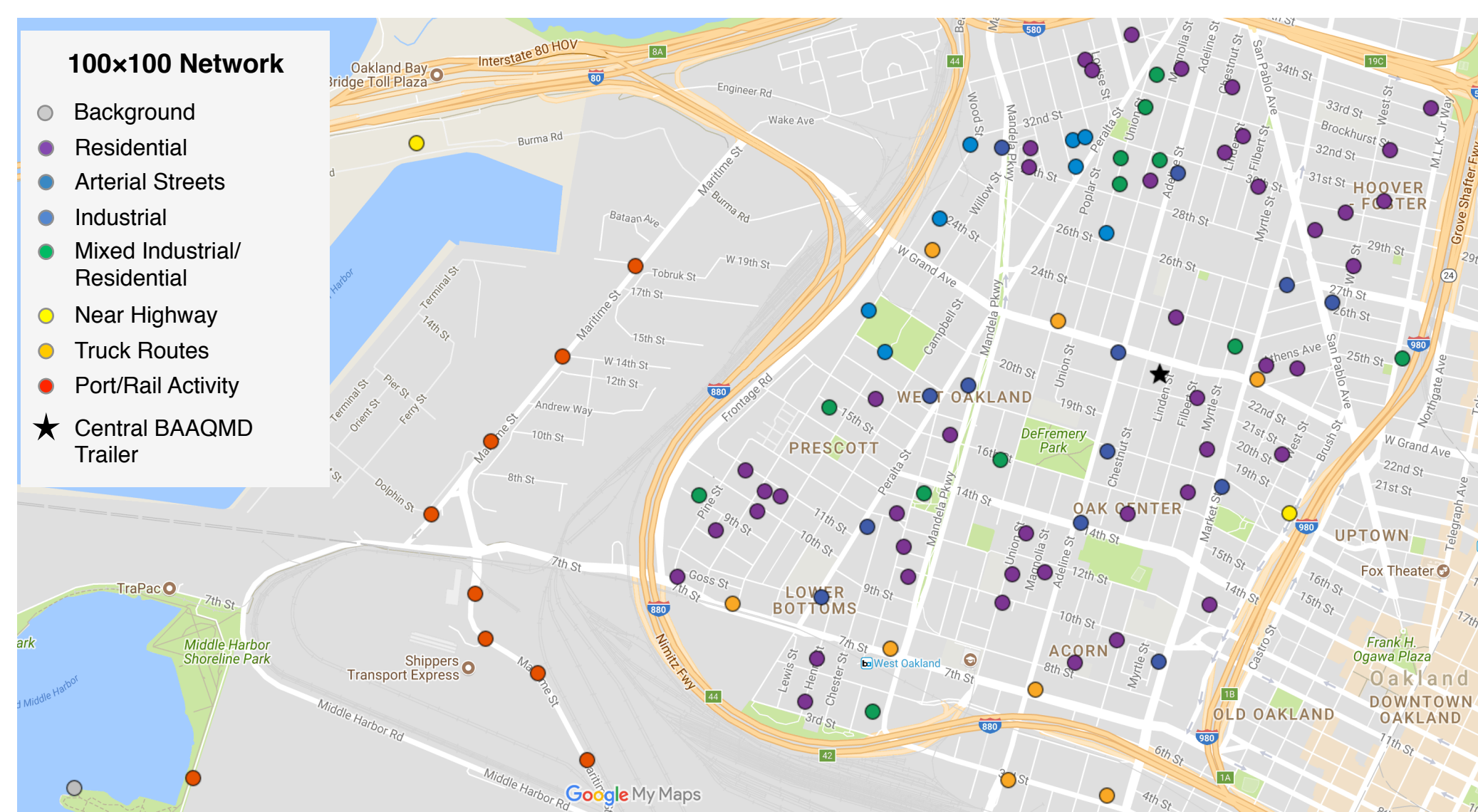
- West Oakland Environmental Indicators Project
- Environmental Defense Fund
- Bay Area Air Quality Management District
- Port of Oakland; UT Austin

In-Field Sensor Precision and Comparison to AE33

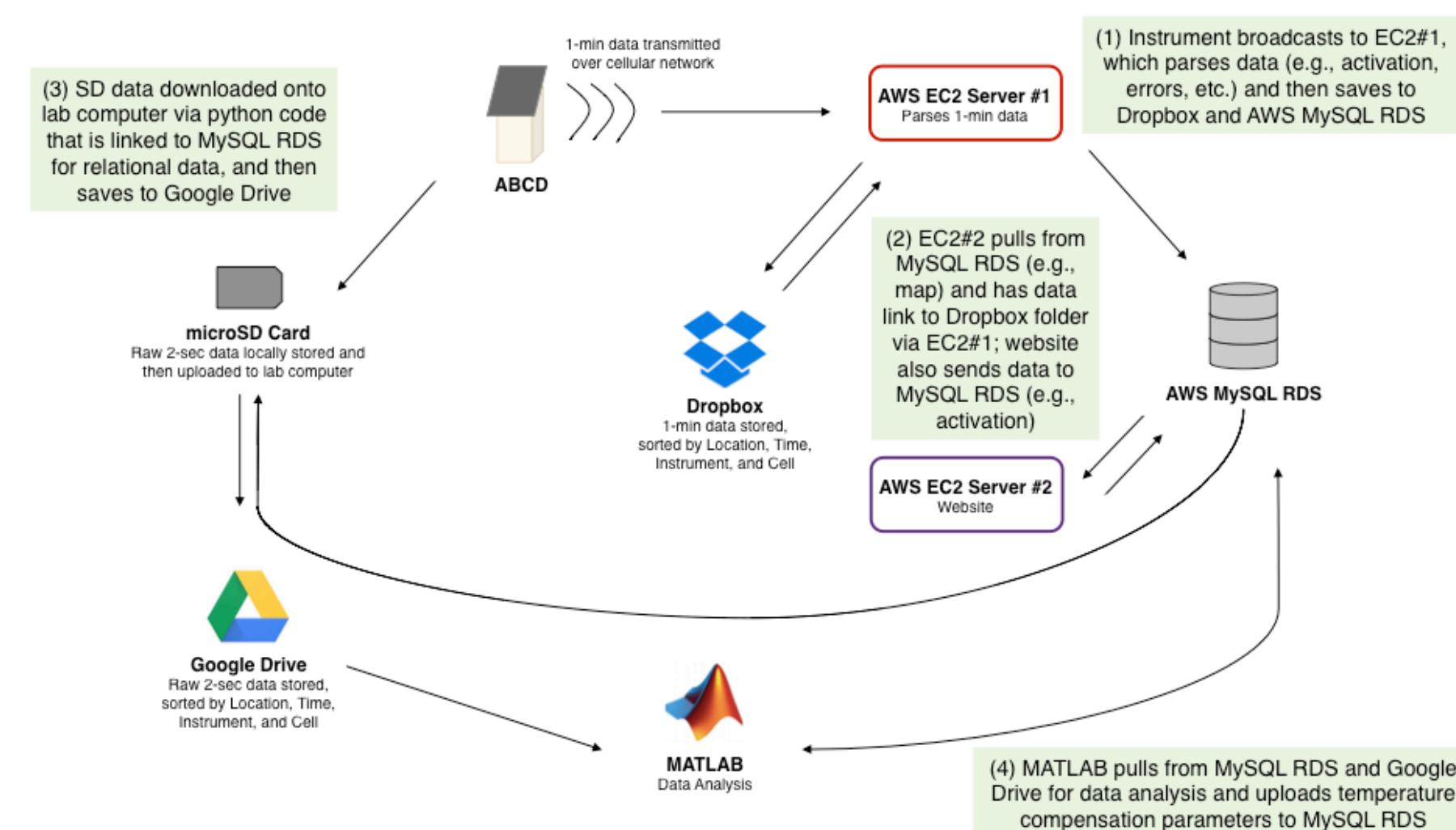


- Evaluation performed at BAAQMD site (shown below)

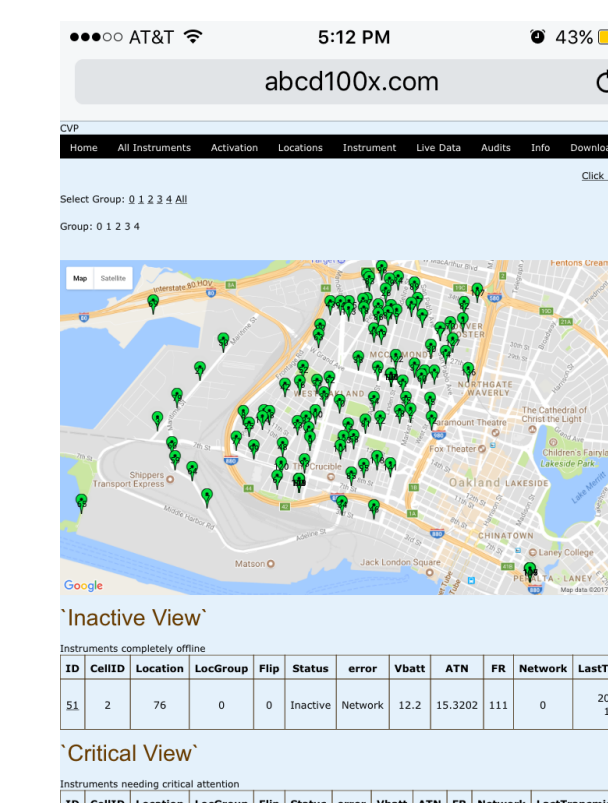
100 x 100 BC Sensor Network



Data Management and Backend

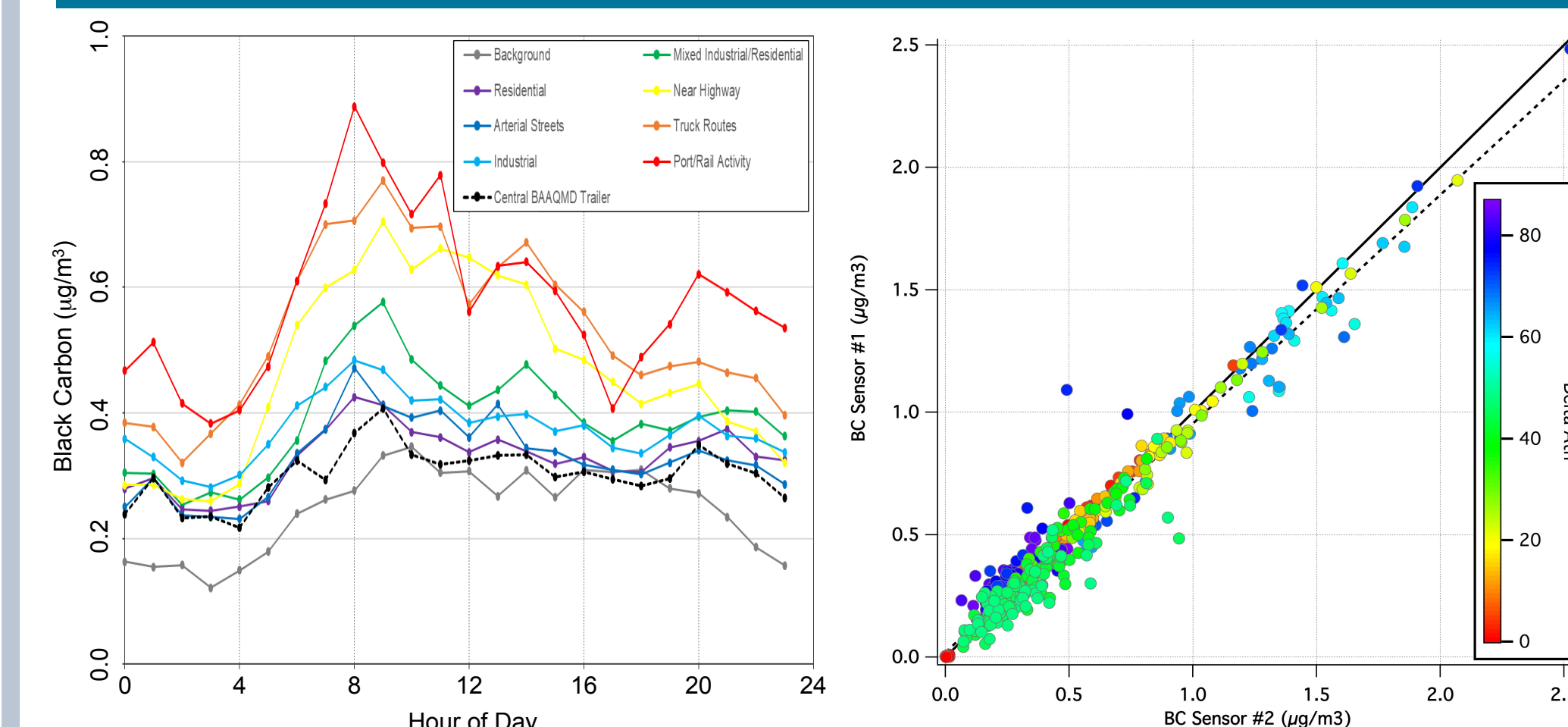


Transmitted Data Guided Sensor Maintenance



- Website guided team's routine and special maintenance of the BC sensor network based on live data
- Common service needs
 - Routine manual filter changes
 - Pump failure
 - Theft, vandalism (10%)

Preliminary Findings



- Above Left: BC concentrations at centrally located monitor in West Oakland tend to be lower than at many other locations; highest concentrations along truck routes in Port and in-neighborhood commercial corridors
- Above Right: Collocated sensors show good agreement across wide differential ATN space, indicating insignificant loading artifact

Acknowledgement

- Special thanks to the students who devoted countless hours to the building and operation of the BC sensor network: Carter Keeling, Shannon Chang, Annie Rosen, Kelly Archer, Marie-Anne Hatte
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