EPA Community Air Toxics Grant:
PAH Measurements Using Passive and Active Techniques

"CALIBRATING CONCERN ABOUT PAHS IN URBAN AIR USING MONITORING AND MODELING"

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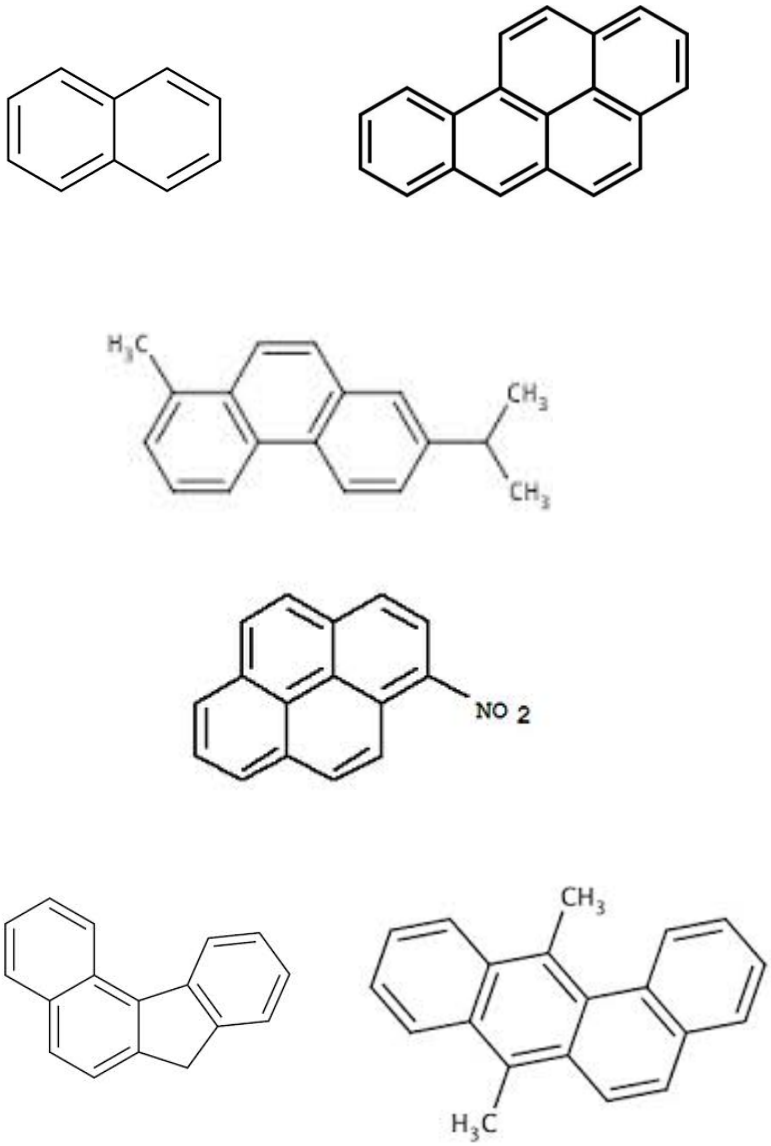
Co-Investigators

Minnesota Pollution Control Agency

MINNESOTA MDH DEPARTMENT OF HEALTH

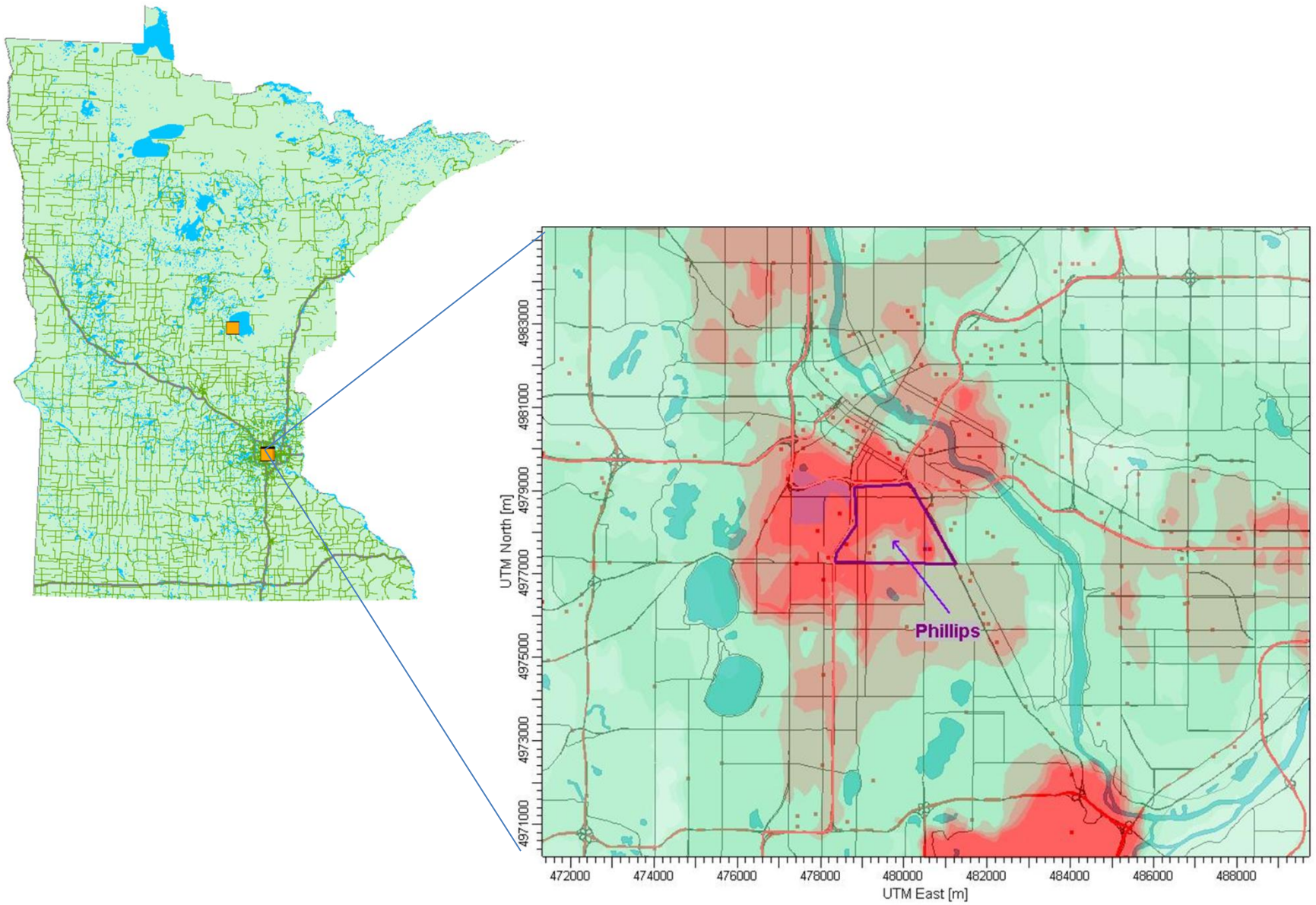
1855 MILLE LACS RESERVATION (10 STAT. 1165)

Why Measure Polycyclic Aromatic Hydrocarbons (PAHs)?

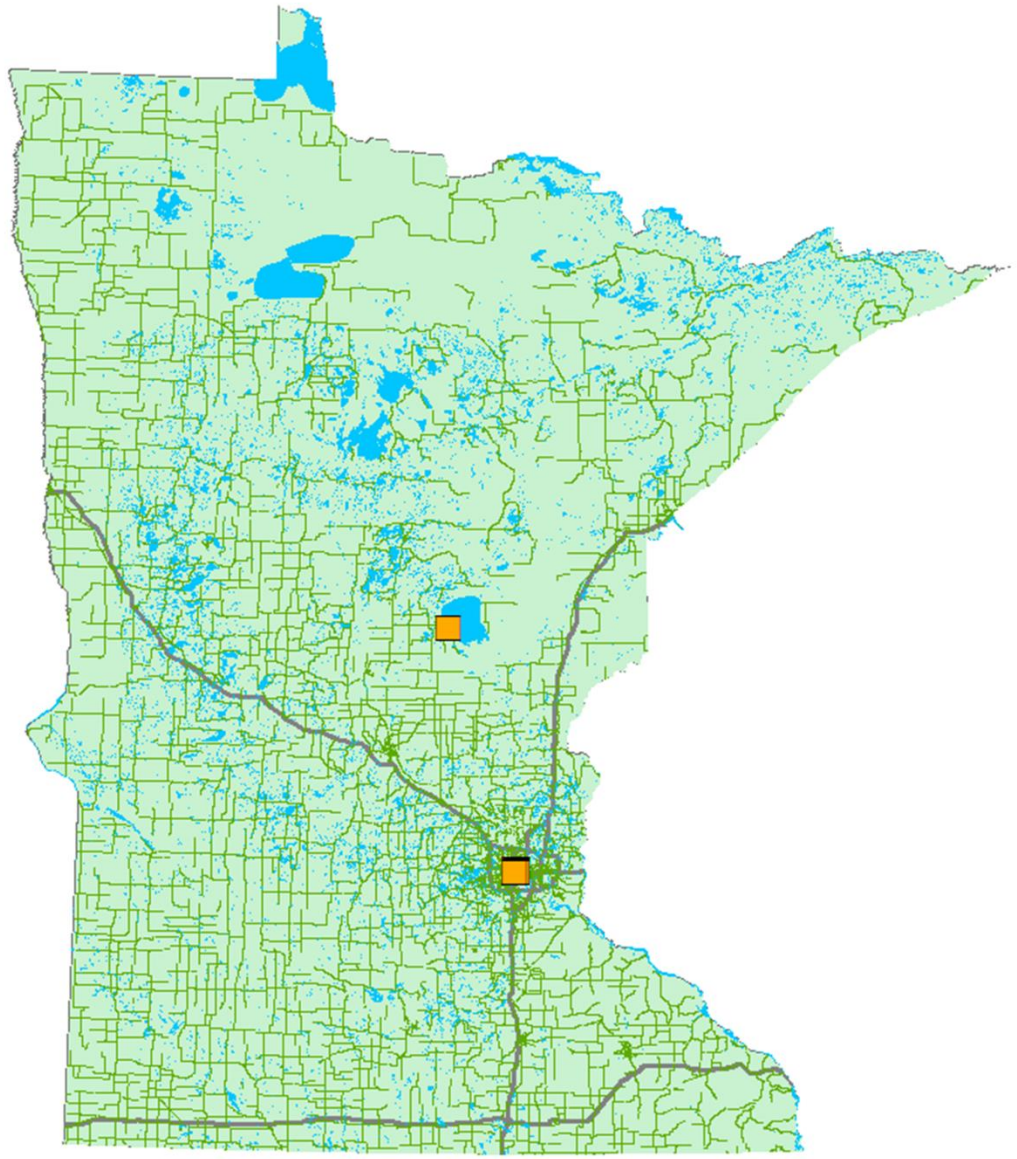


- Number (there are 100's), size, branching, and substitution support source identification efforts
- PAHs are lung carcinogens and respiratory irritants

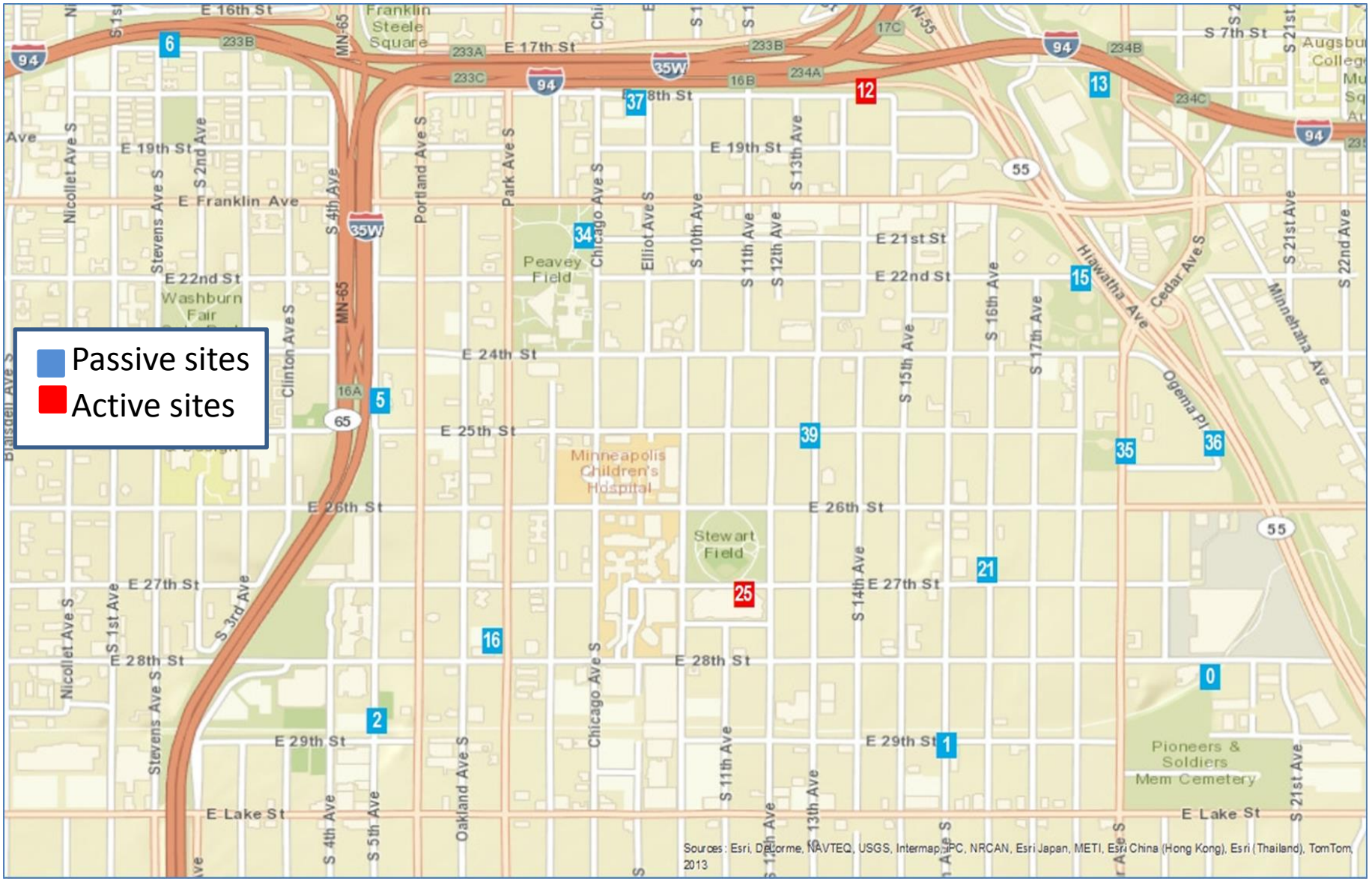
Where to put the monitors?



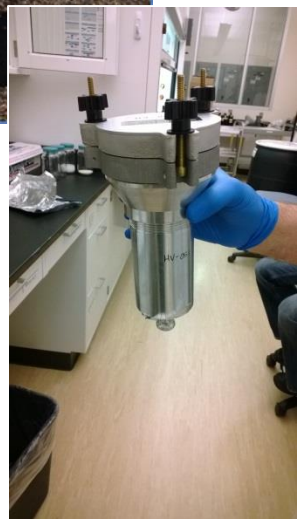
Final Sampling Plan (Rural and Urban Locations)



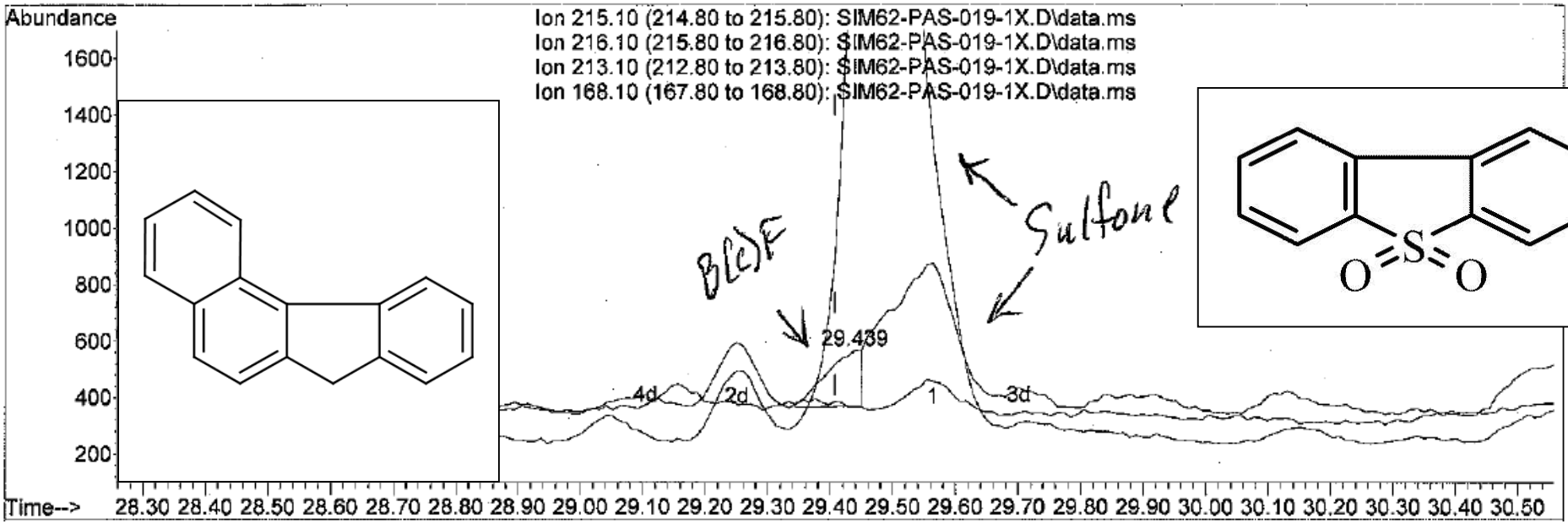
South Minneapolis Locations



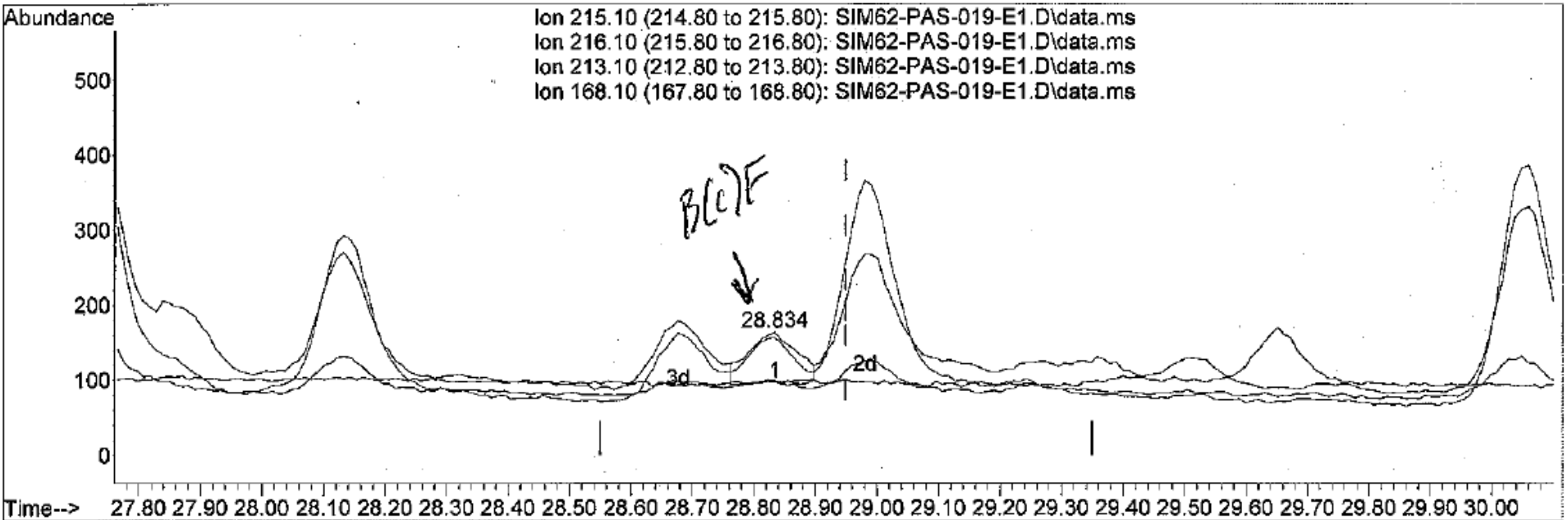
Active and Passive Air Sampling



BEFORE CLEAN-UP



AFTER CLEAN-UP

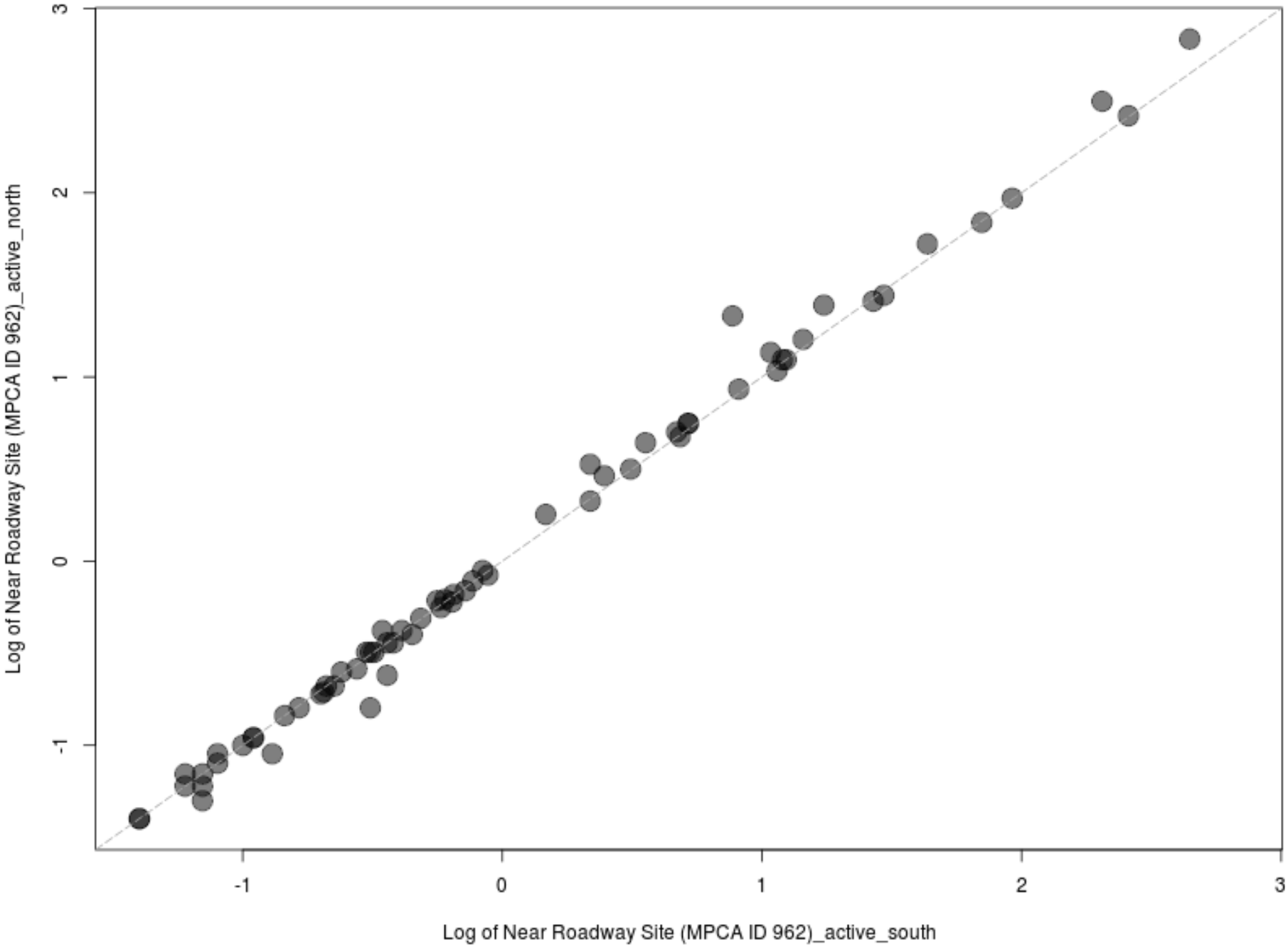


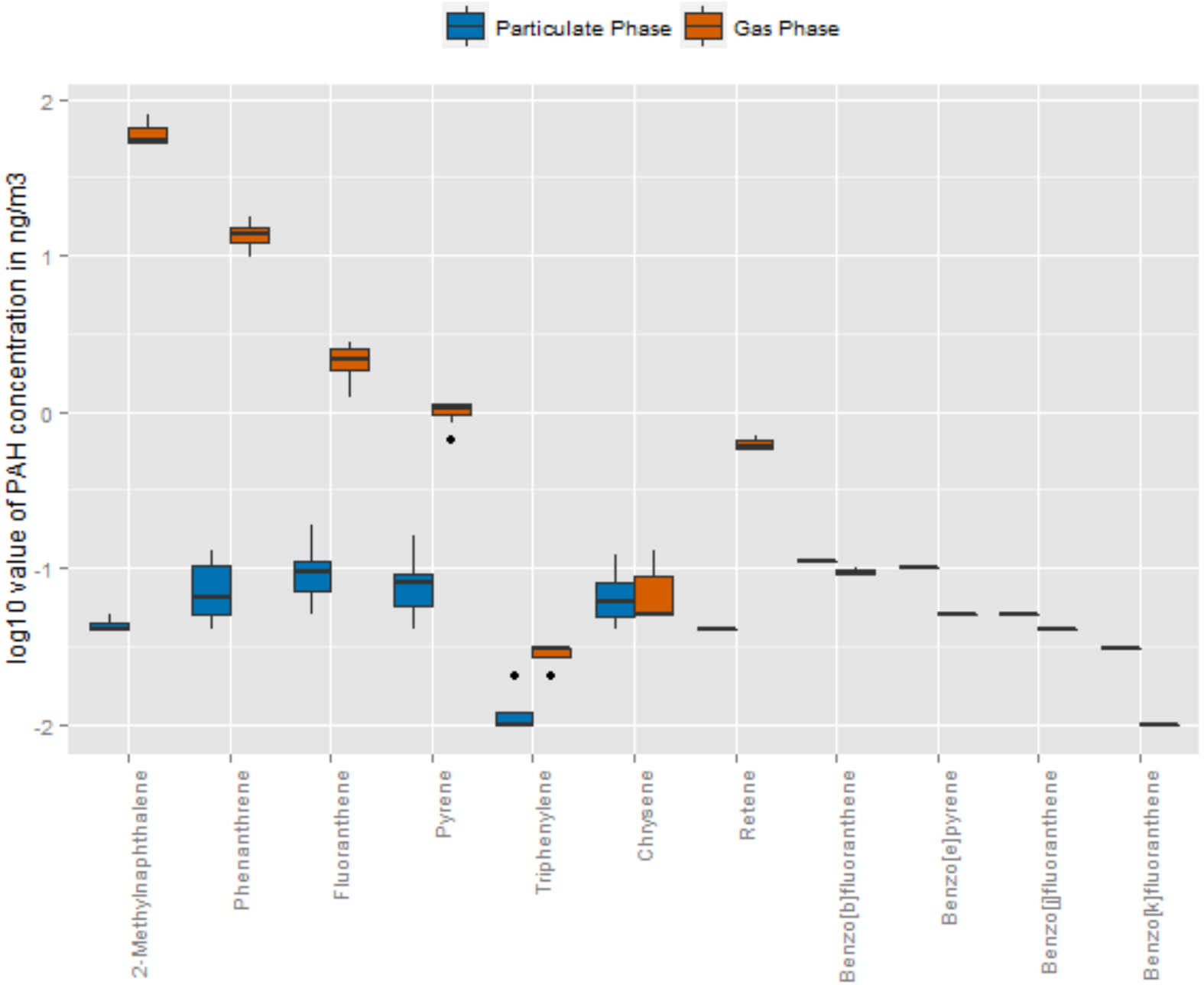
Calibration of Passive Samplers

$$\text{Sampling Rate } (m^3\ day^{-1}) = \frac{C_{PAS}}{C_{AIR} * Sampling\ Duration\ (days)}$$

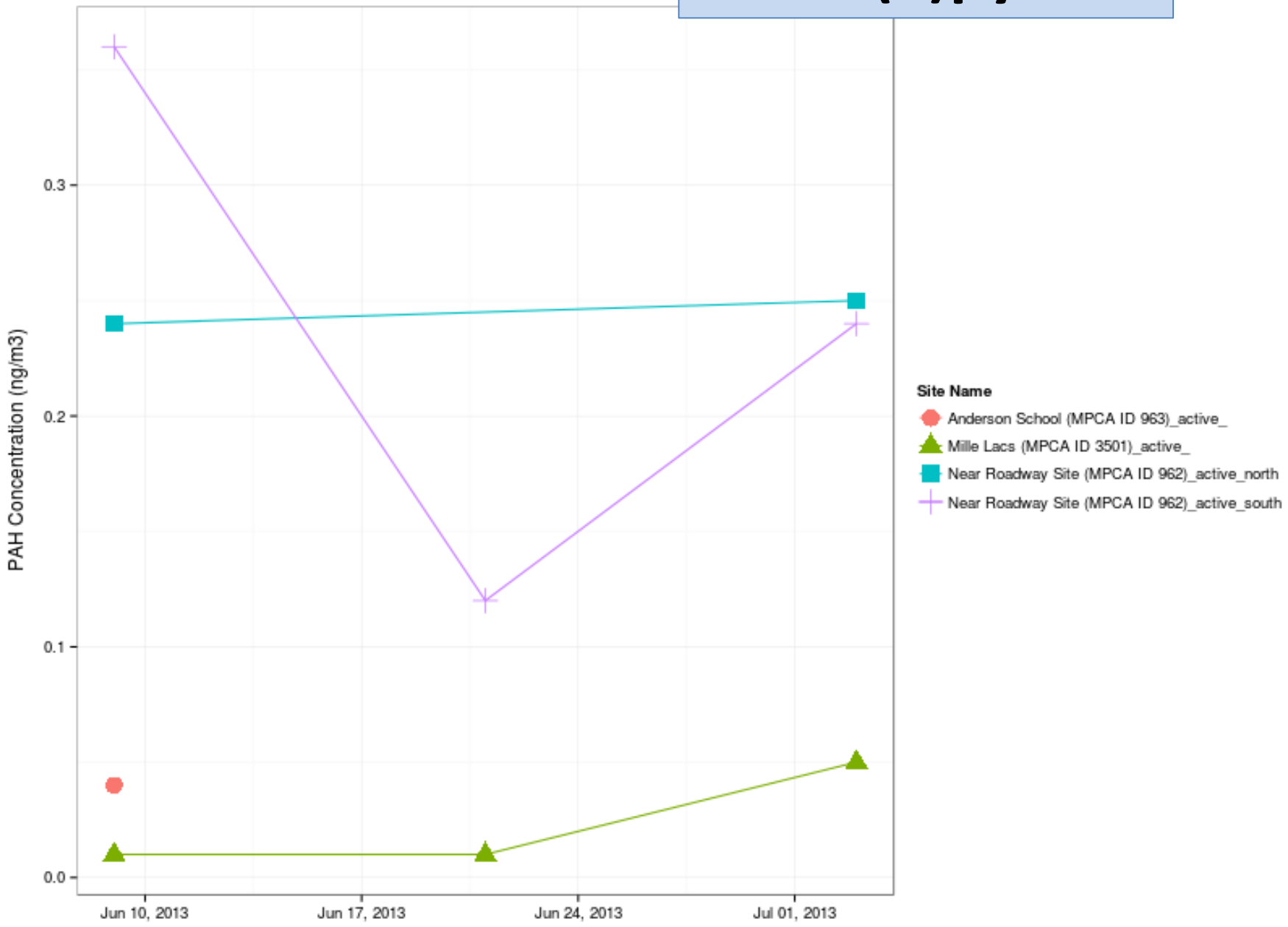
C_{PAS} = mass of specific PAH on passive sampler media (ng)
C_{AIR} = concentration of specific PAH in air (ng m^{-3})

PRELIMINARY RESULTS

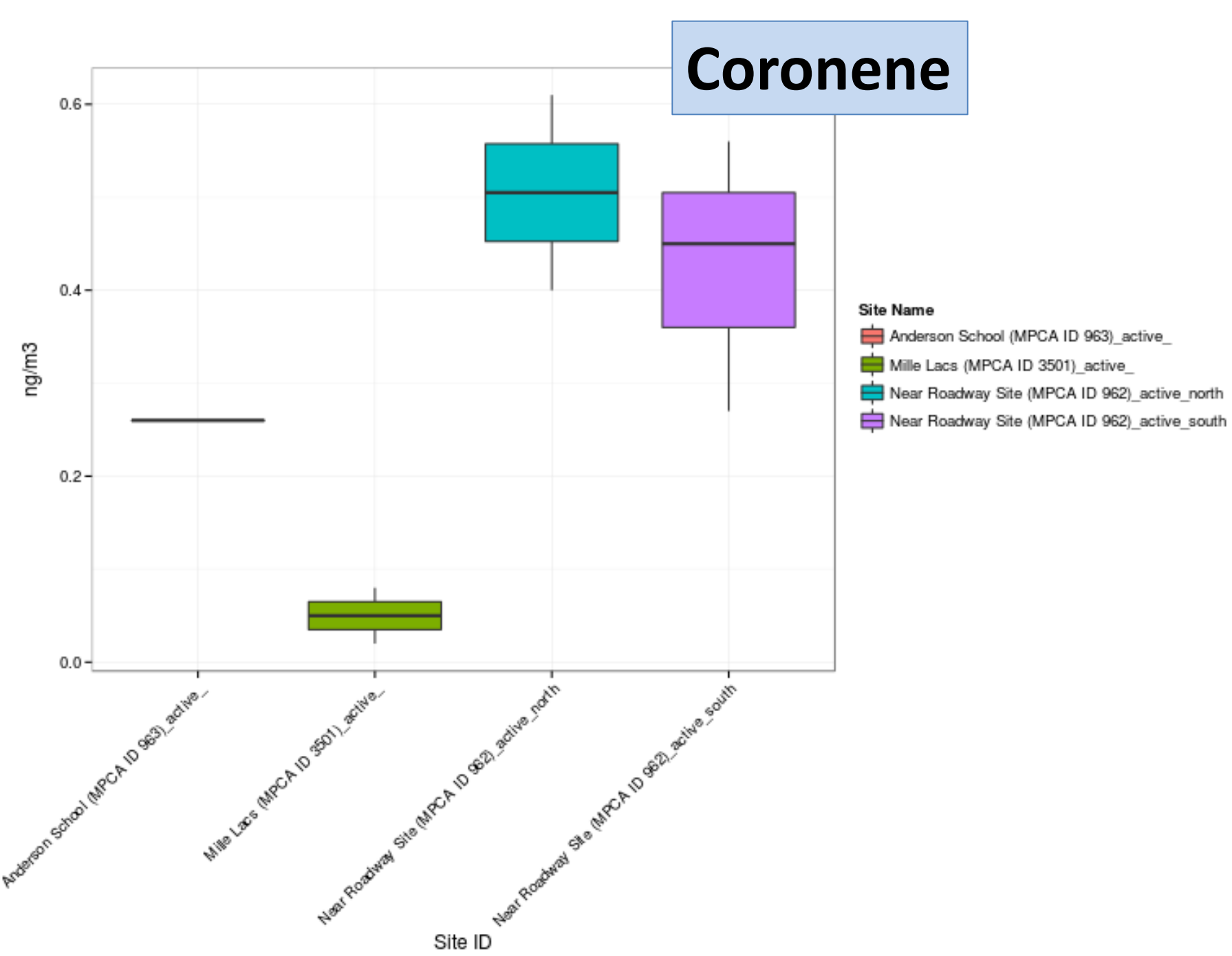

Log of Near Roadway Site (MPCA ID 962)_active_north
Log of Near Roadway Site (MPCA ID 962)_active_south
3
2
1
0
-1
-1
0
1
2
3


Particulate Phase
Gas Phase
log10 value of PAH concentration in ng/m3
2
1
0
-1
-2
2-Methylnaphthalene
Phenanthrene
Fluoranthene
Pyrene
Triphenylene
Chrysene
Retene
Benzo[b]fluoranthene
Benzo[e]pyrene
Benzo[j]fluoranthene
Benzo[k]fluoranthene

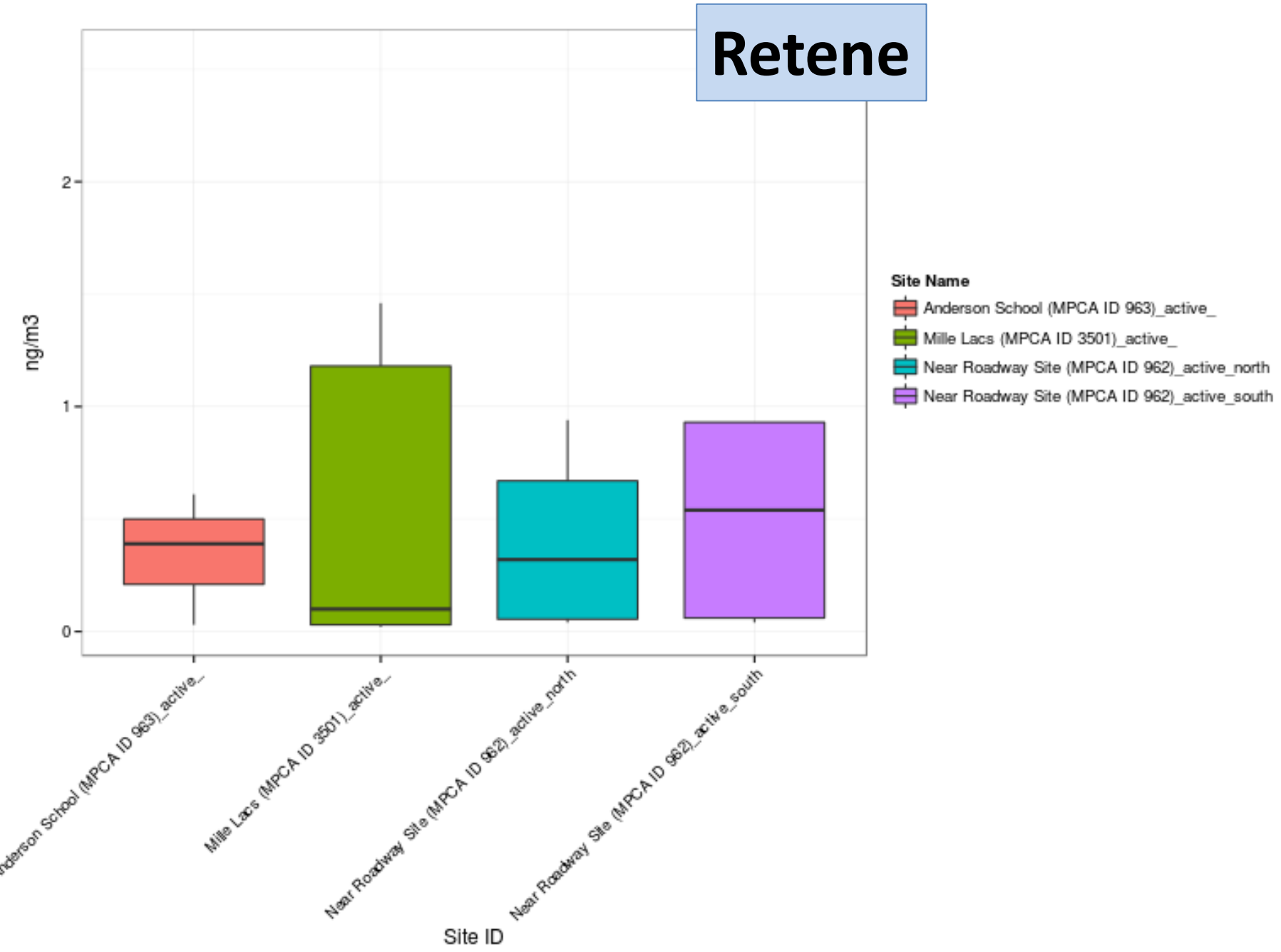
Benzo(a)pyrene



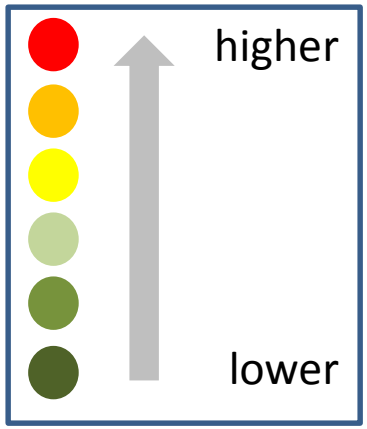
Coronene

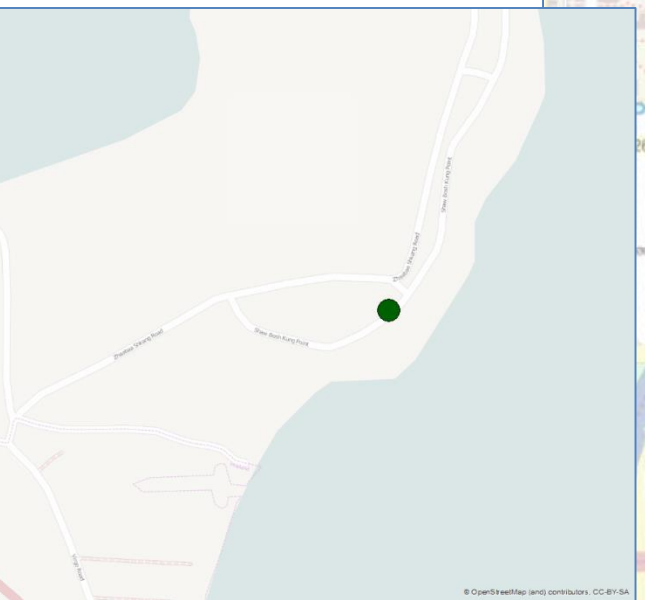

0.6
0.4
0.2
0.0
ng/m3
Anderson School (MPCA ID 963)_active_
Mille Lacs (MPCA ID 3501)_active_
Near Roadway Site (MPCA ID 962)_active_north
Near Roadway Site (MPCA ID 962)_active_south
Site ID
Site Name
Anderson School (MPCA ID 963)_active_
Mille Lacs (MPCA ID 3501)_active_
Near Roadway Site (MPCA ID 962)_active_north
Near Roadway Site (MPCA ID 962)_active_south

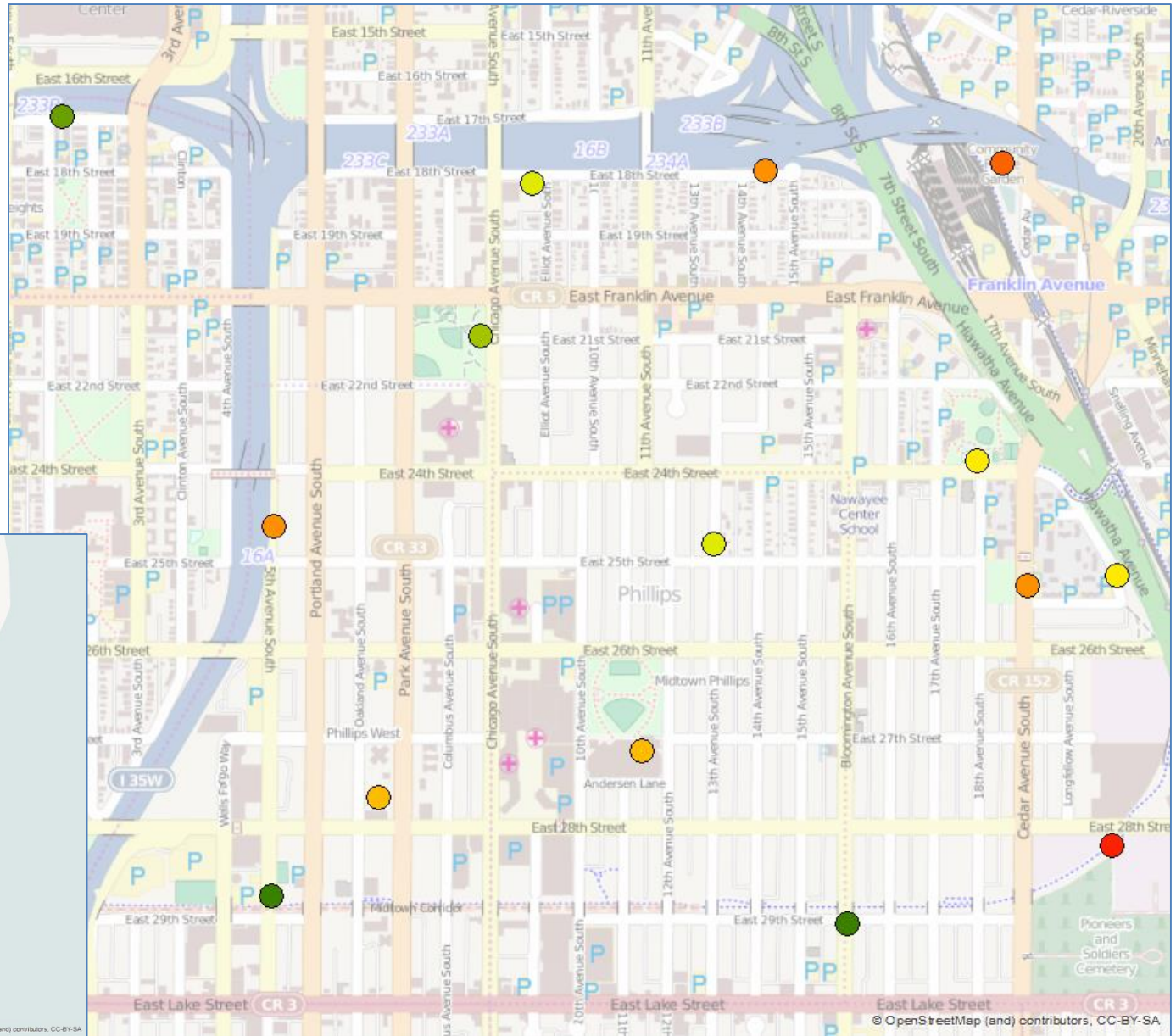
Retene


ng/m3
2
1
0
Site ID
Anderson School (MPCA ID 963)_active_
Mille Lacs (MPCA ID 3501)_active_
Near Roadway Site (MPCA ID 962)_active_north
Near Roadway Site (MPCA ID 962)_active_south
Site Name
Anderson School (MPCA ID 963)_active_
Mille Lacs (MPCA ID 3501)_active_
Near Roadway Site (MPCA ID 962)_active_north
Near Roadway Site (MPCA ID 962)_active_south

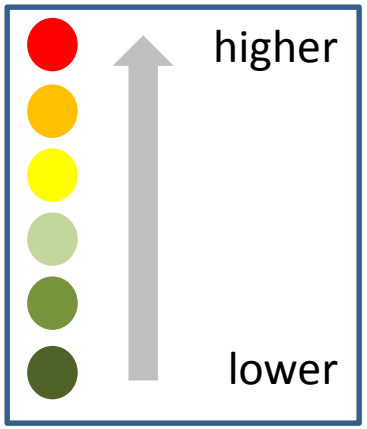
Naphthalene **Mass Loadings** for South Minneapolis and Mille Lacs

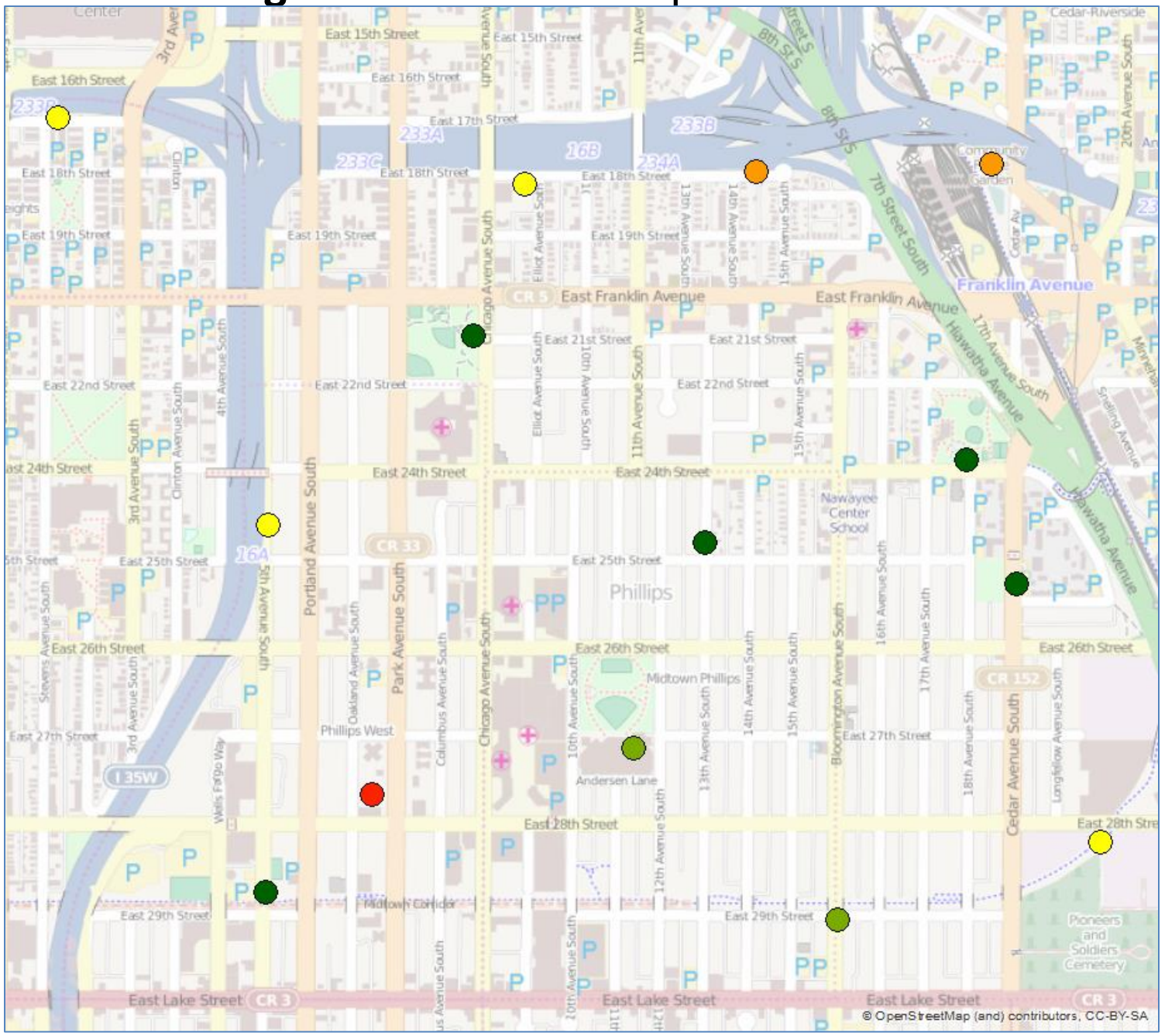






Chrysene **Mass Loadings** for South Minneapolis and Mille Lacs





Data Sharing Among Project Team - Interactive Web Application

Thanks!
Questions?

Funding: U.S. EPA Community Air Toxics Ambient Monitoring
Grant # XA00E00976

Passive Monitors: donated by Oregon State University, Simonich Environmental Chemistry Laboratory