



Building Best Practices for an Air Quality Sensor Network

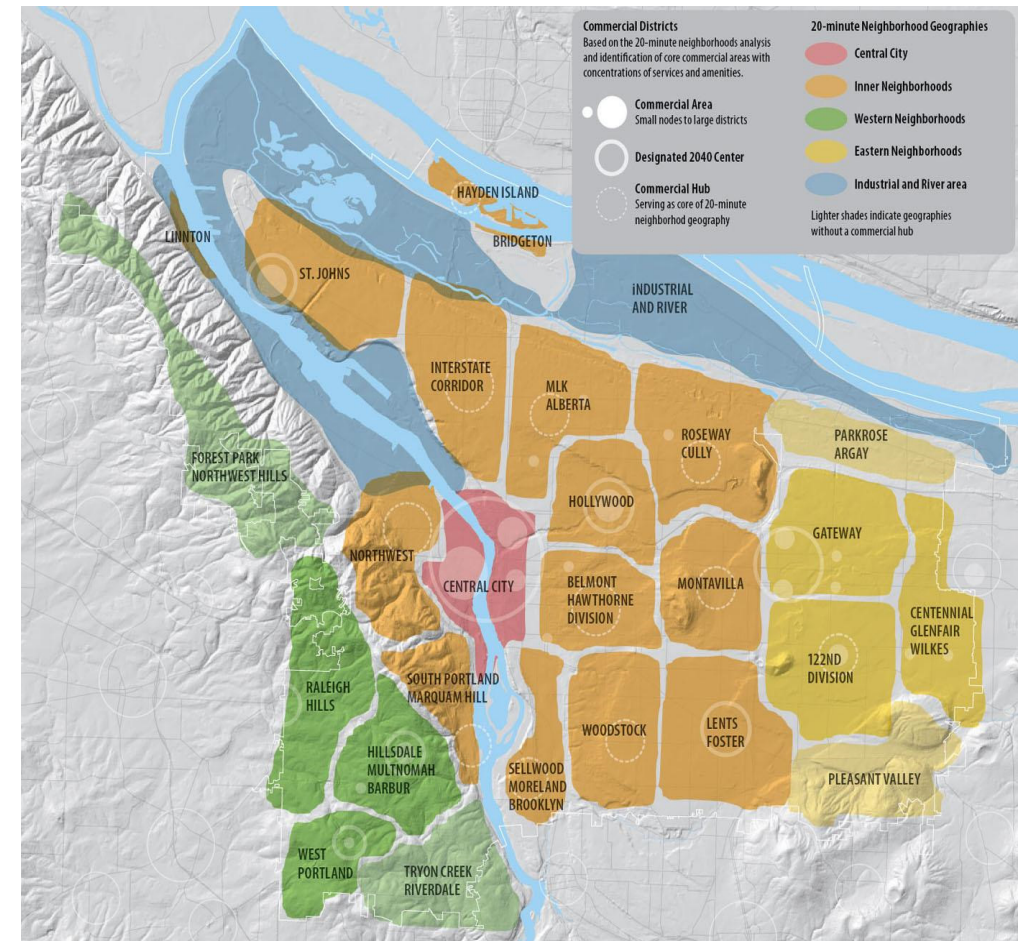
Christine Kendrick, PhD
City of Portland
Air Sensors International Conference

Why air quality sensors?

- Respond to community concerns
- Could sensors be used to:
 - Perform before and after assessments?
 - Compare neighborhoods?



Portland's 20 Minute Neighborhoods





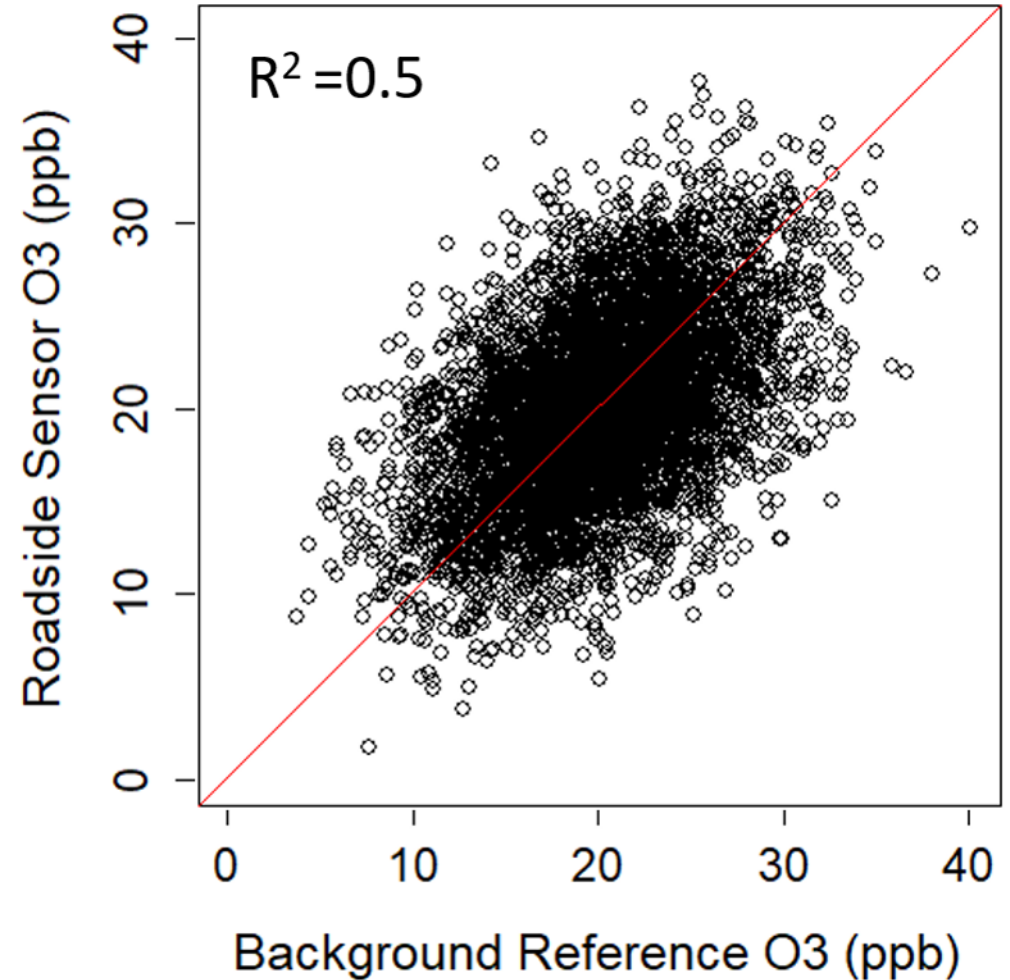
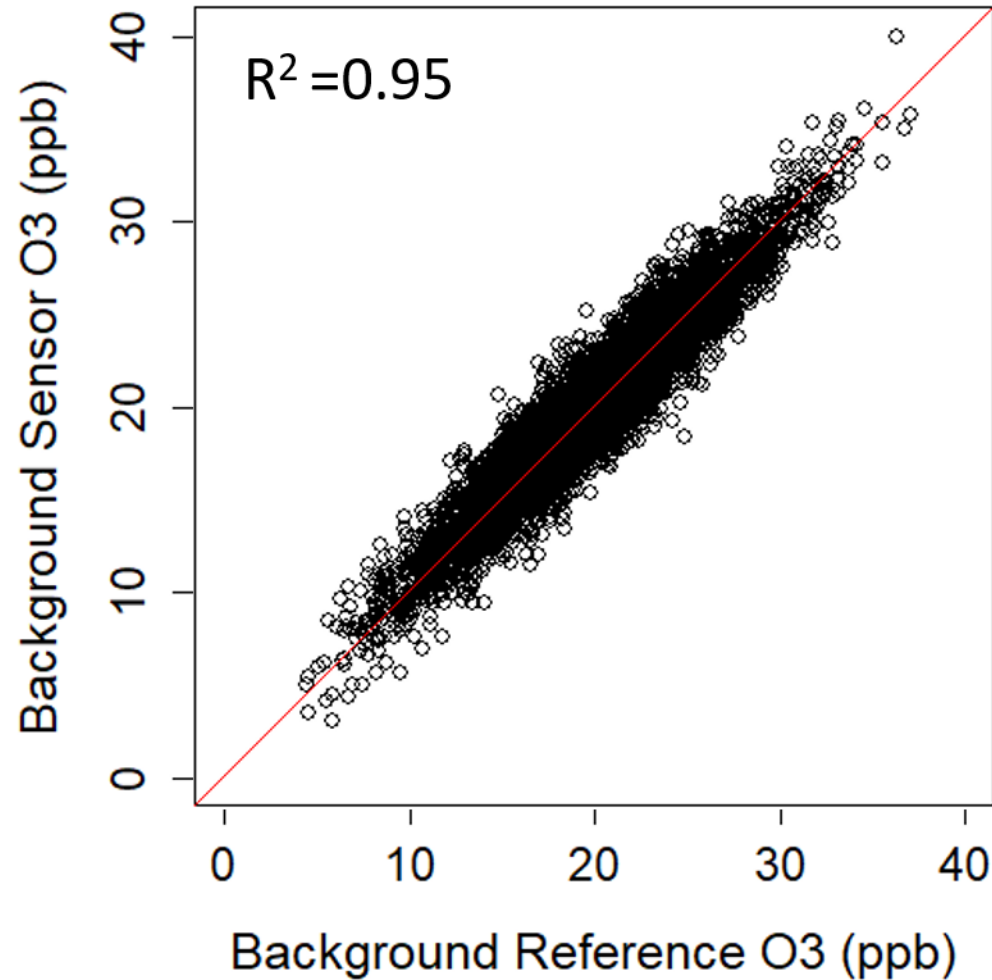
City of Portland's Approach

- Technical and sustainability considerations:
 - Sensor limitations
 - Electronics waste minimization
- Co-located study design
- Sensor review
 - Multi-Vendor Sensor Deployment

Co-Located Deployments

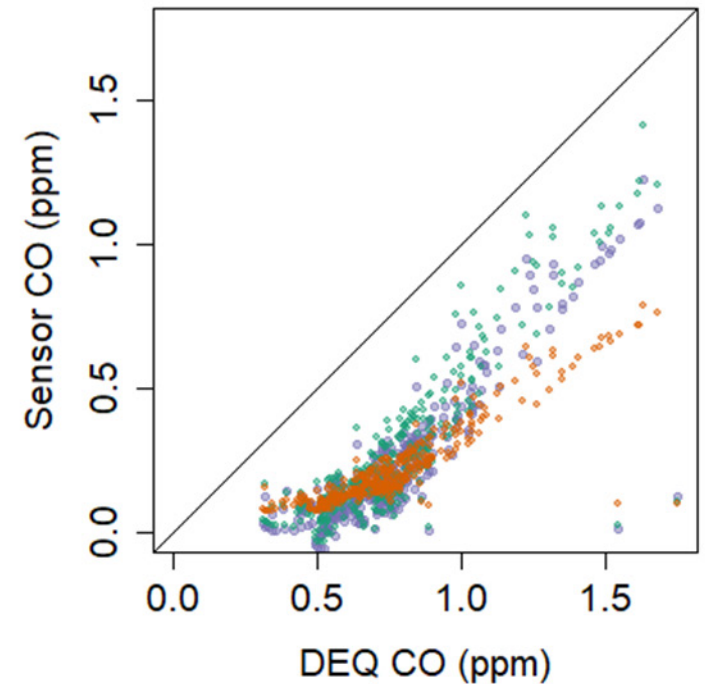
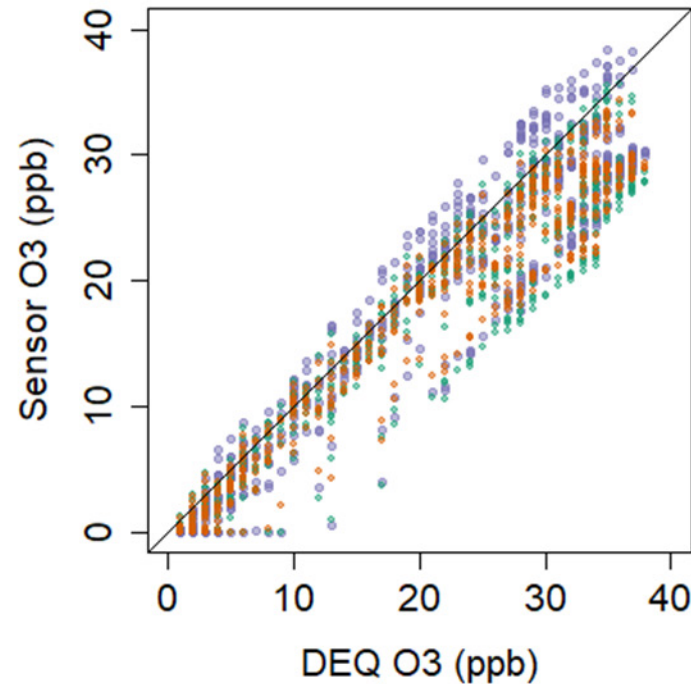
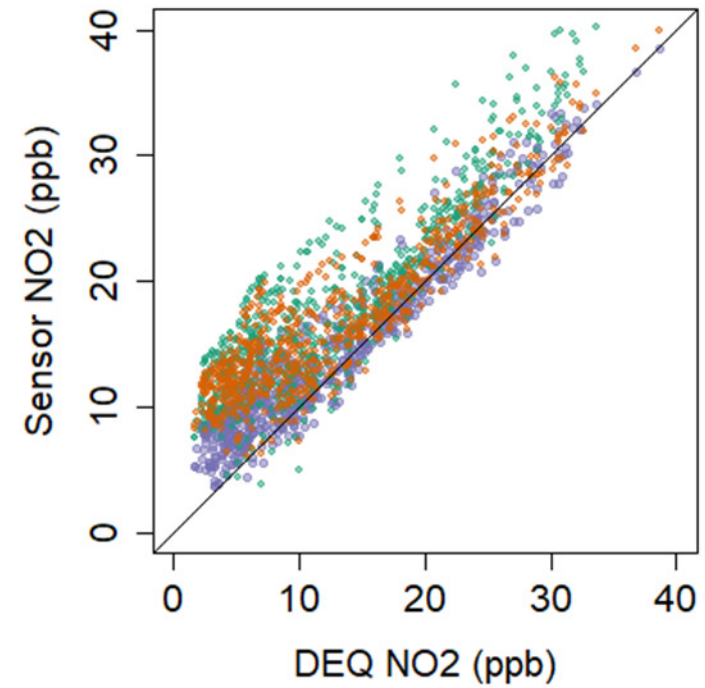
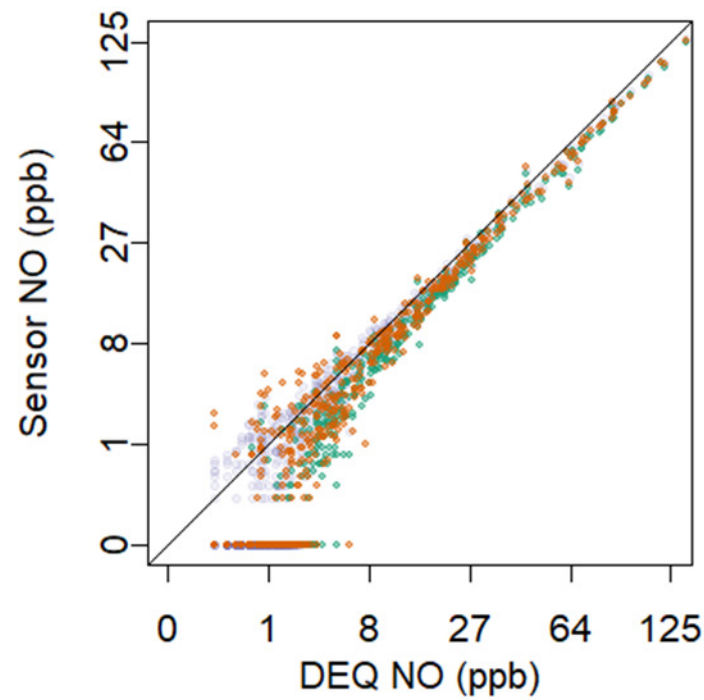


What would success look like...



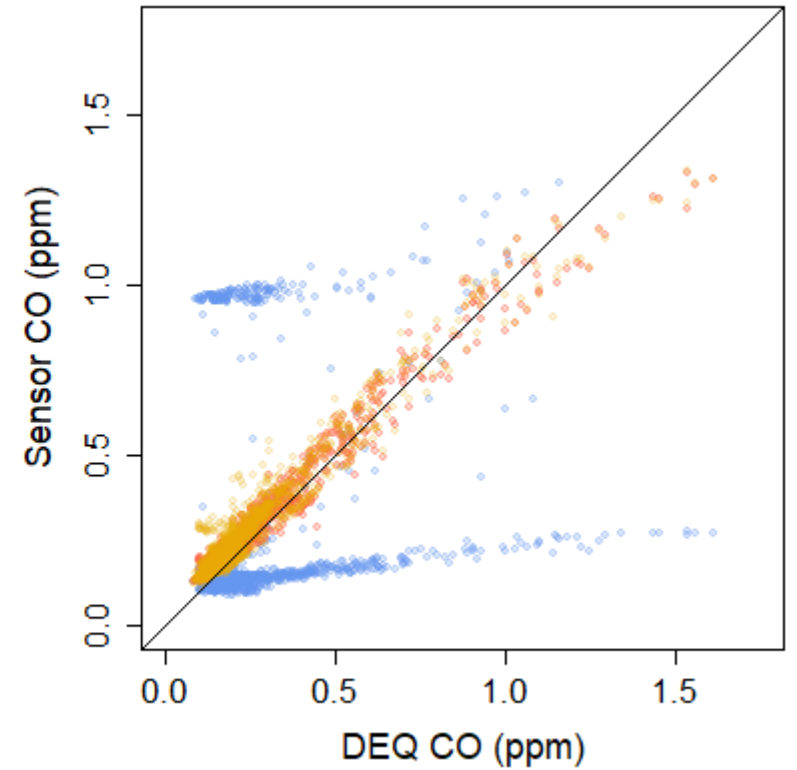
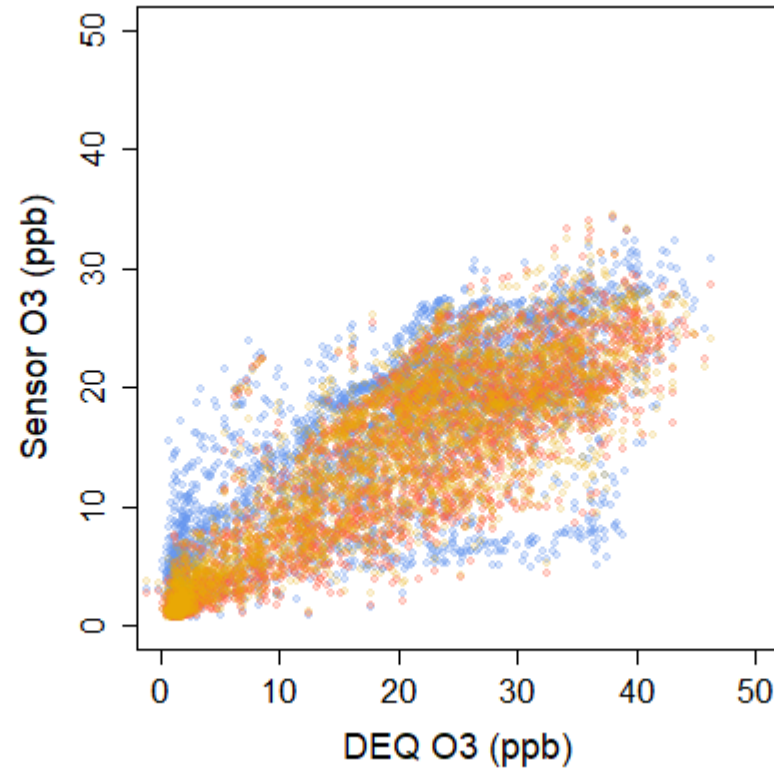
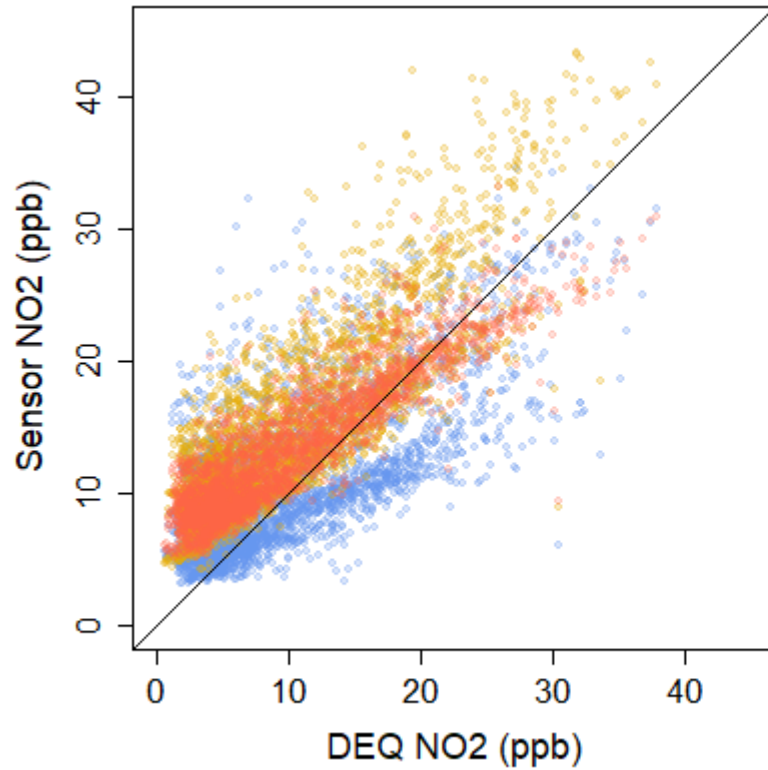
Apis & Oregon DEQ Co-Location

- SensorCell 2
- SensorCell 3
- SensorCell 4

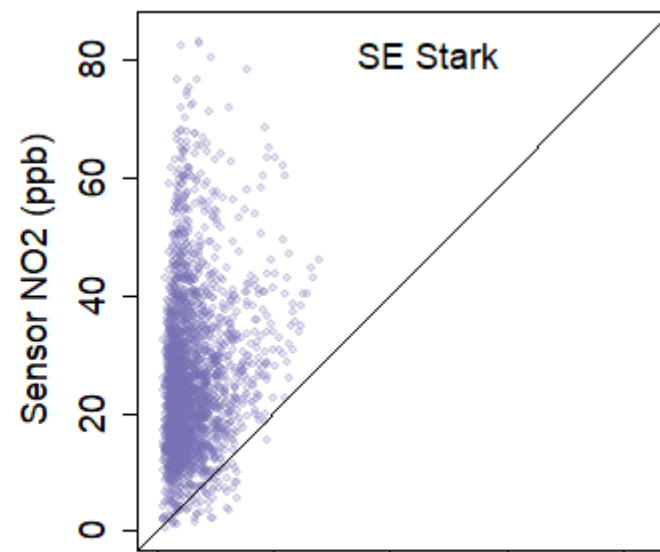
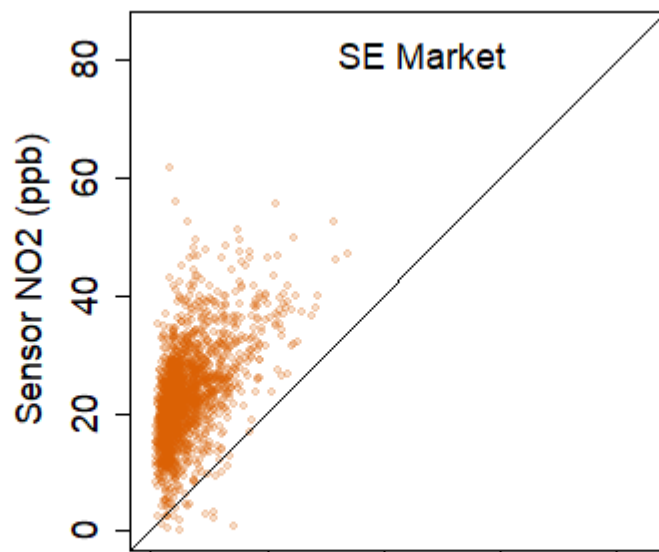
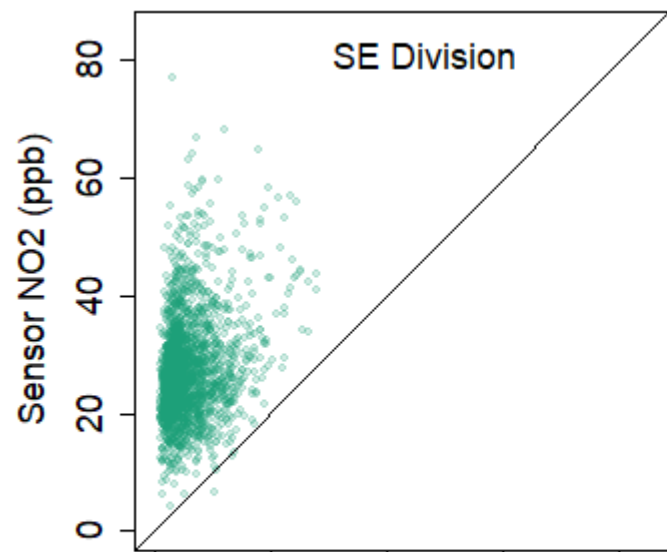


SenSevere & Oregon DEQ Co-Location

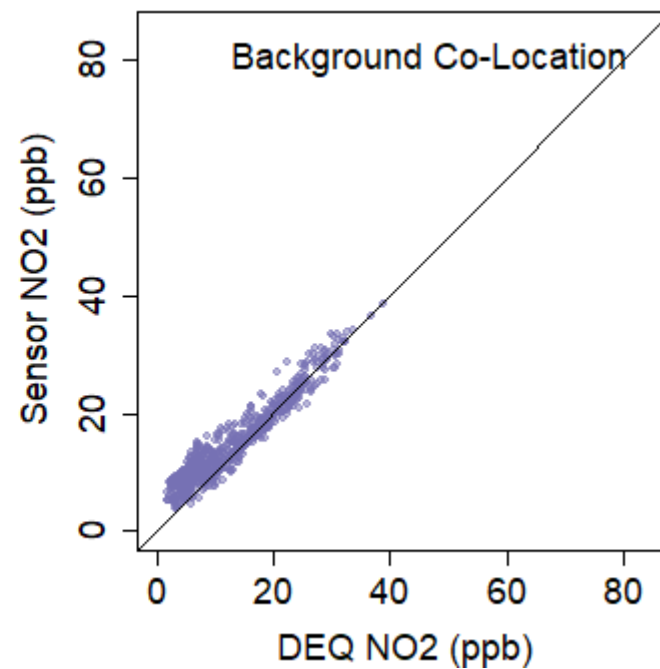
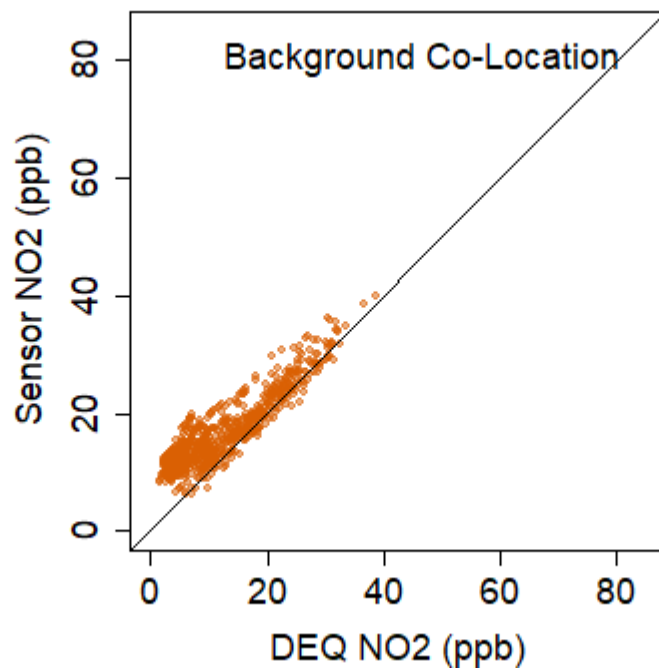
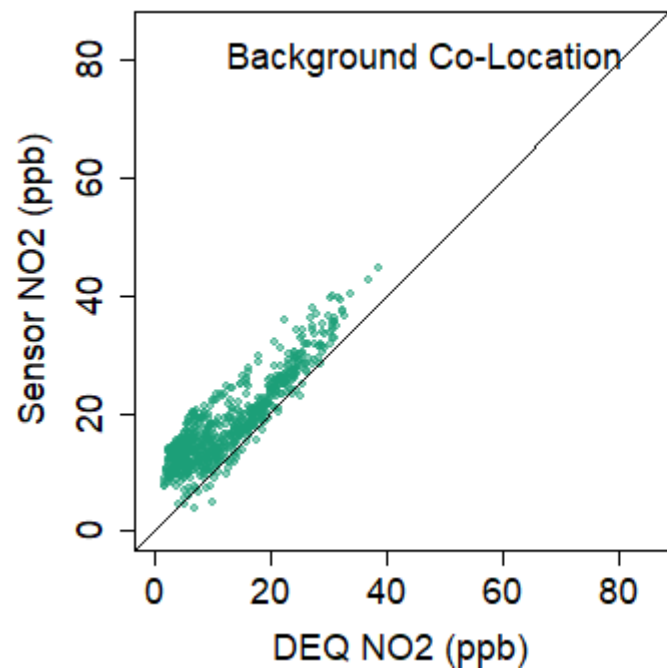
- RAMP 170
- RAMP 171
- RAMP 172



Roadside Apis Deployment

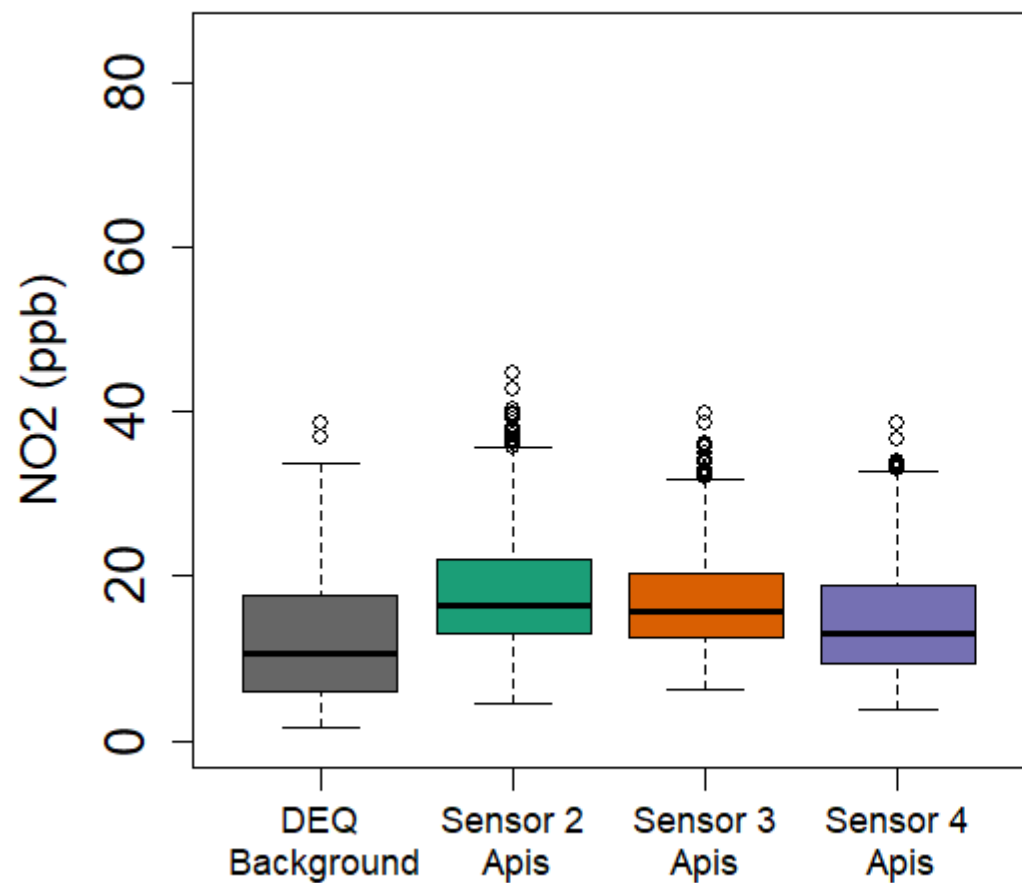


R^2 range
0.15-0.31

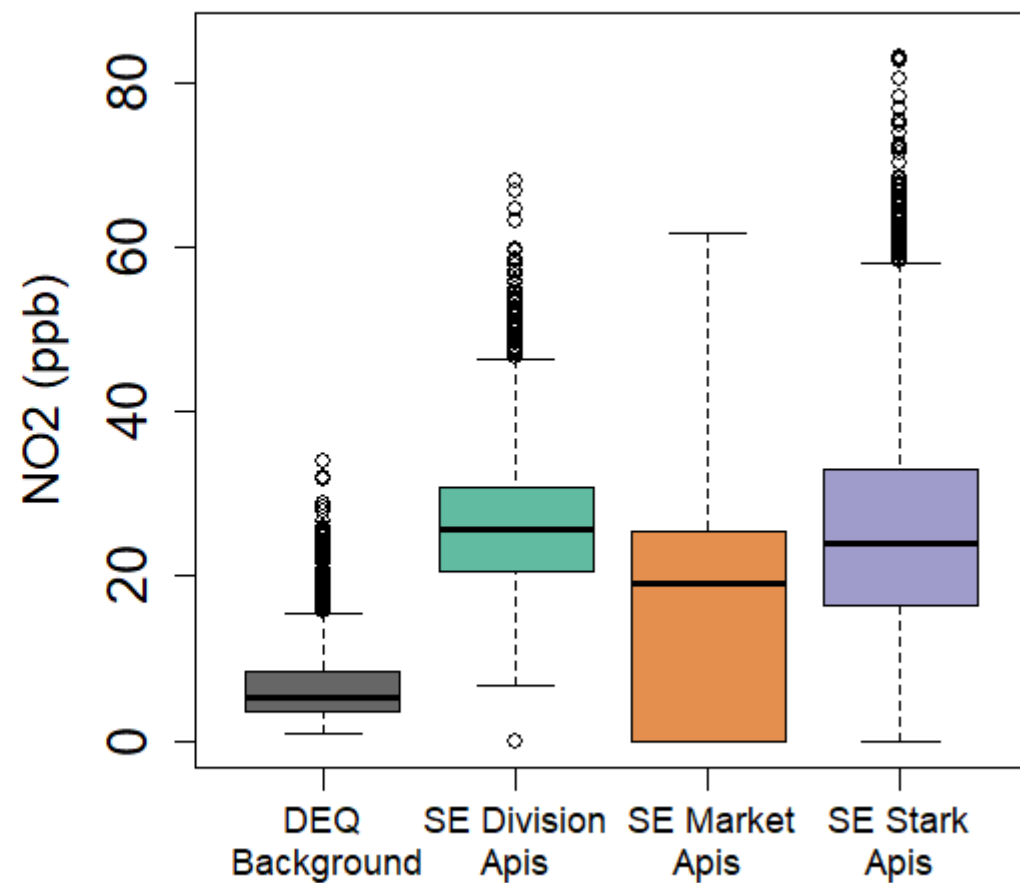


R^2 range
0.89-0.96

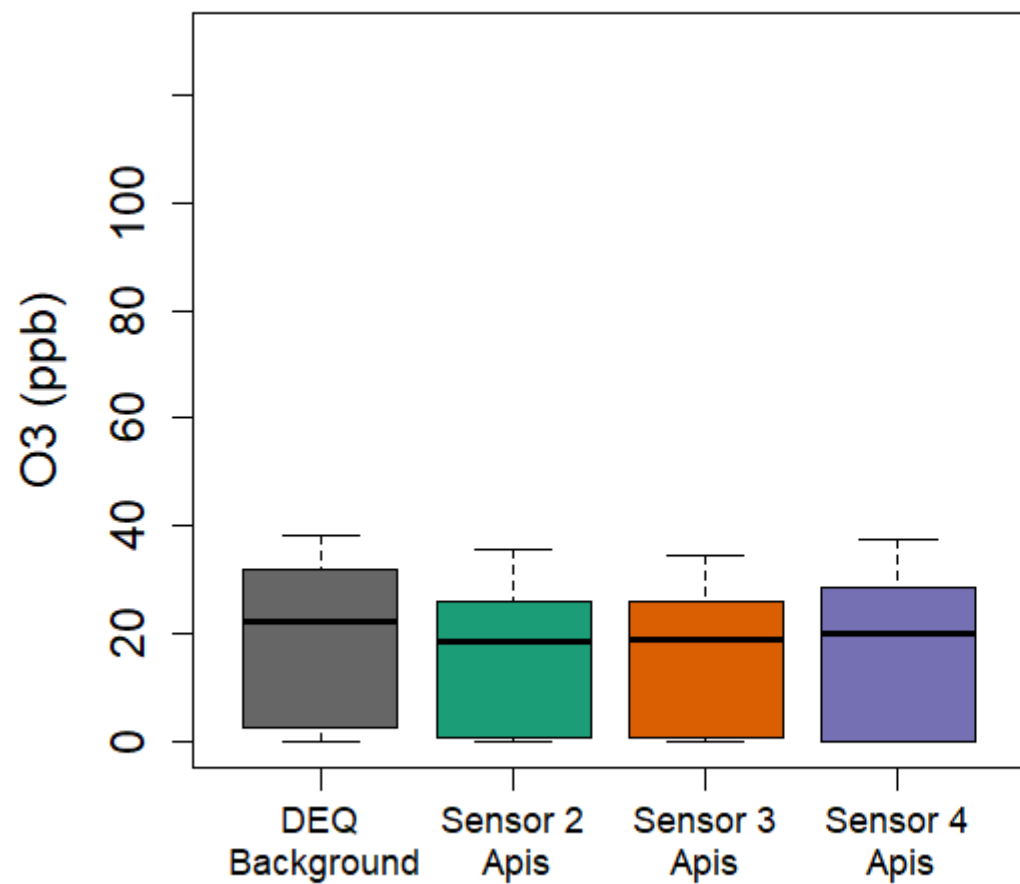
Background Co-Location (Winter)



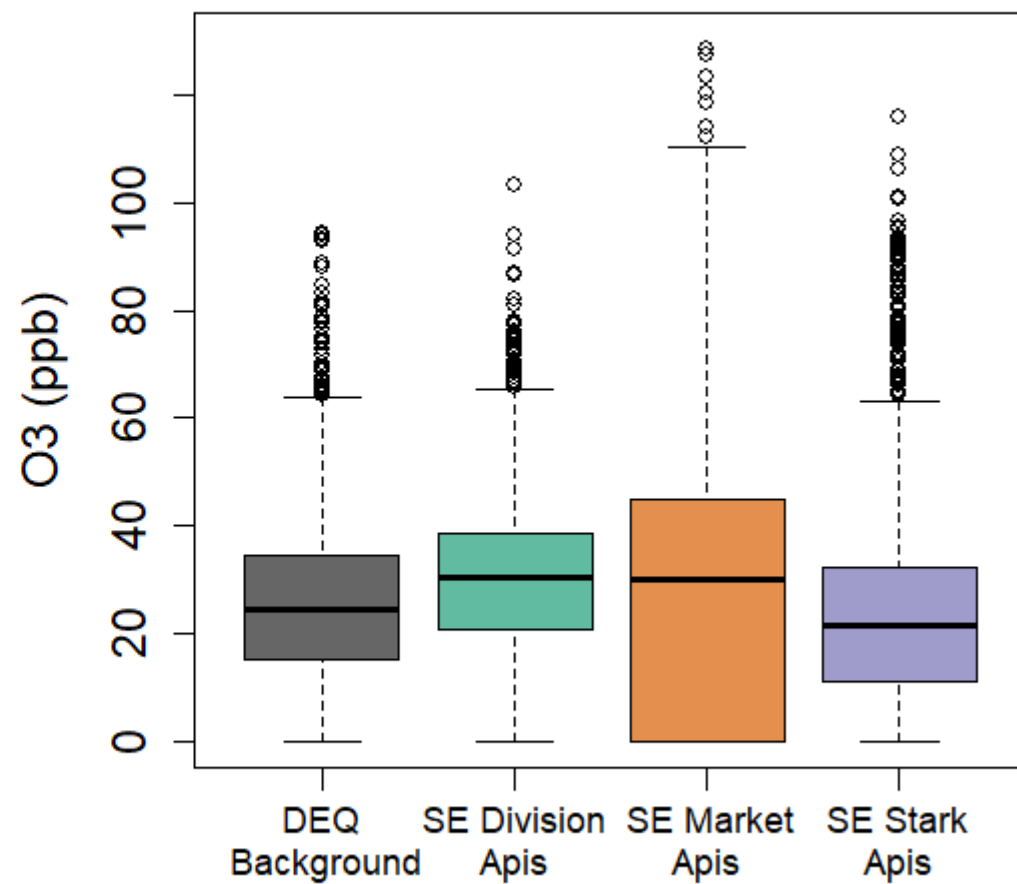
Roadside Deployment (Spring/Summer)



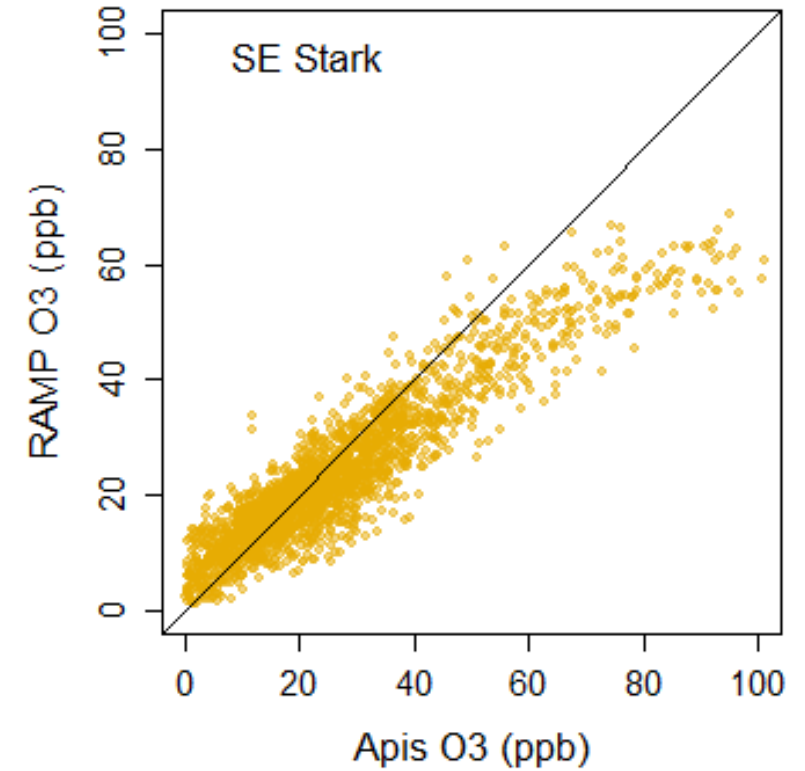
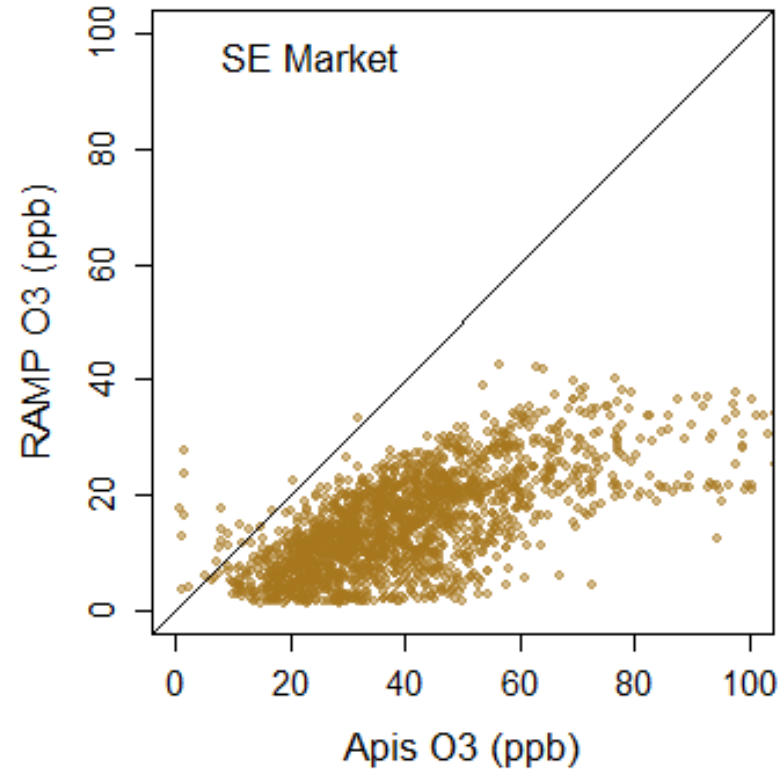
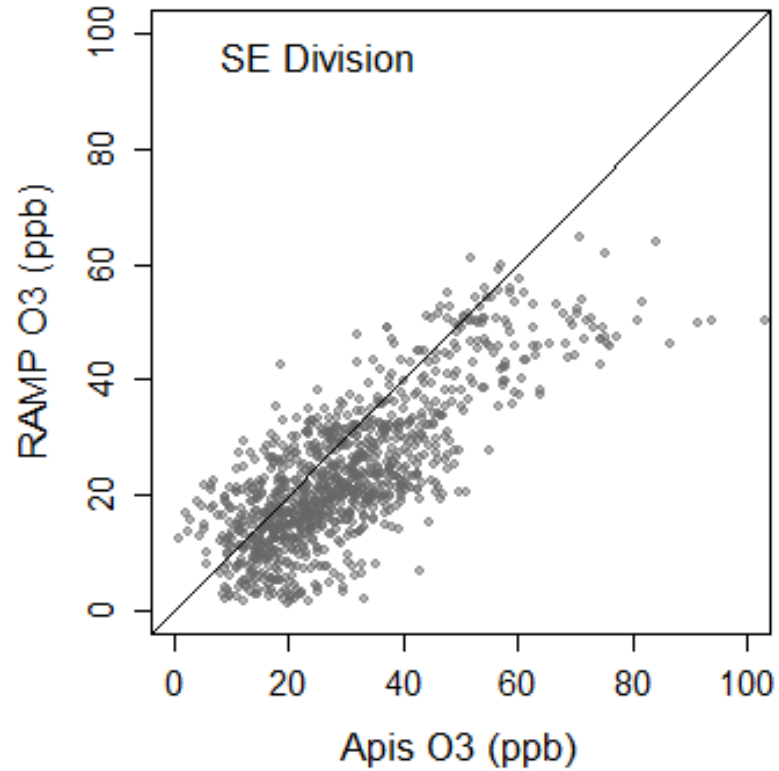
Background Co-Location (Winter)



Roadside Deployment (Spring/Summer)



Sensor Integration...





Lesson learning

Need to overestimate costs of maintenance

Increase FTE for data analysis, integration, maintenance scheduling

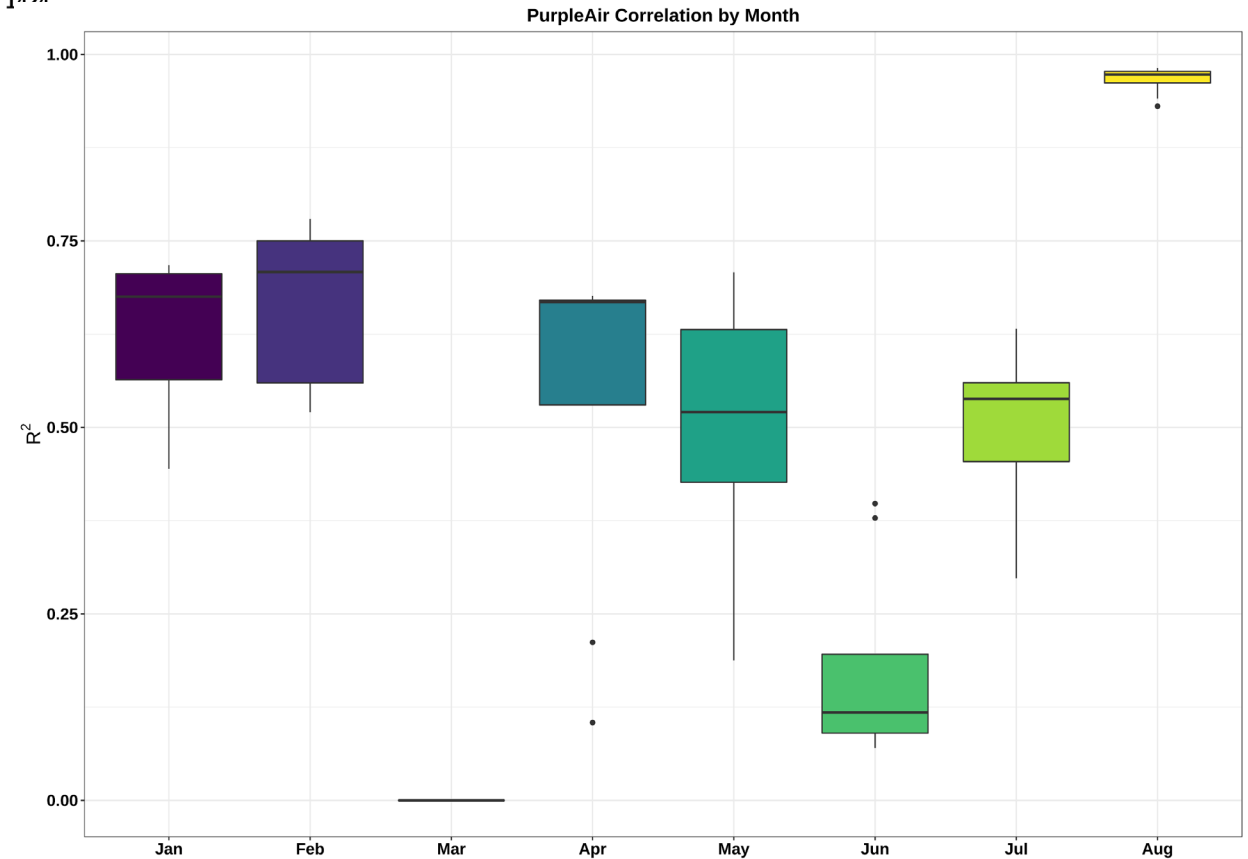
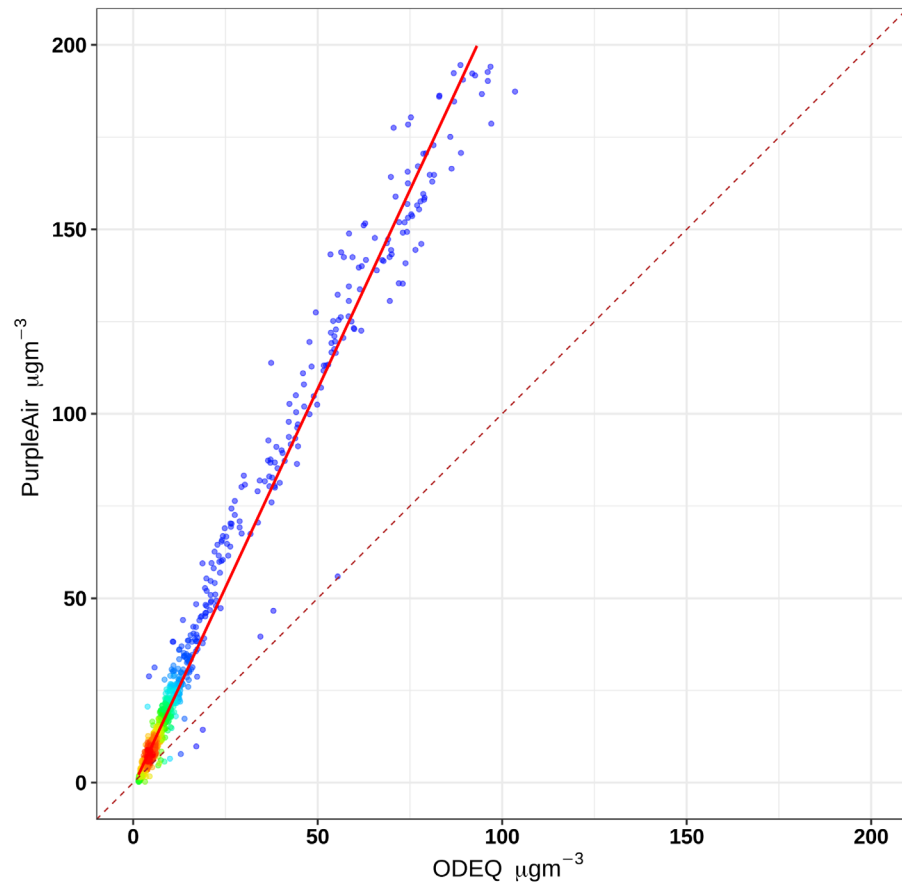
Methods to evaluate local effects when you have limited reference data

Integration across sensor devices

Integration across sensor deployments

Collaboration Across Projects is Key

STAR Lab Creston Kenilworth B & Portland SE Lafayette • 2018-07-01 • 2018-08-30 • 1 hour • n = 1424
Adj R2 = 0.9811 Intercept = -1 Slope = 2.2 P = 0



Philip Orlando, Graduate Researcher
Linda A. George, Professor Environmental Science and Management

Best Practices So Far

- Consider sustainability of sensors themselves
- Plan for maintenance and management costs
- Re-visit your original question often to identify what type of data you need to take action



Questions?



Bureau of Planning and Sustainability

Innovation. Collaboration. Practical Solutions.

City of Portland, Oregon

Ted Wheeler, Mayor • Susan Anderson, Director



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