Air Quality Forecast Feedback: Los Angeles Air Basin

NOAA Forecast Working Group Meeting
September 27-28, 2017

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South Coast Air Quality Management District
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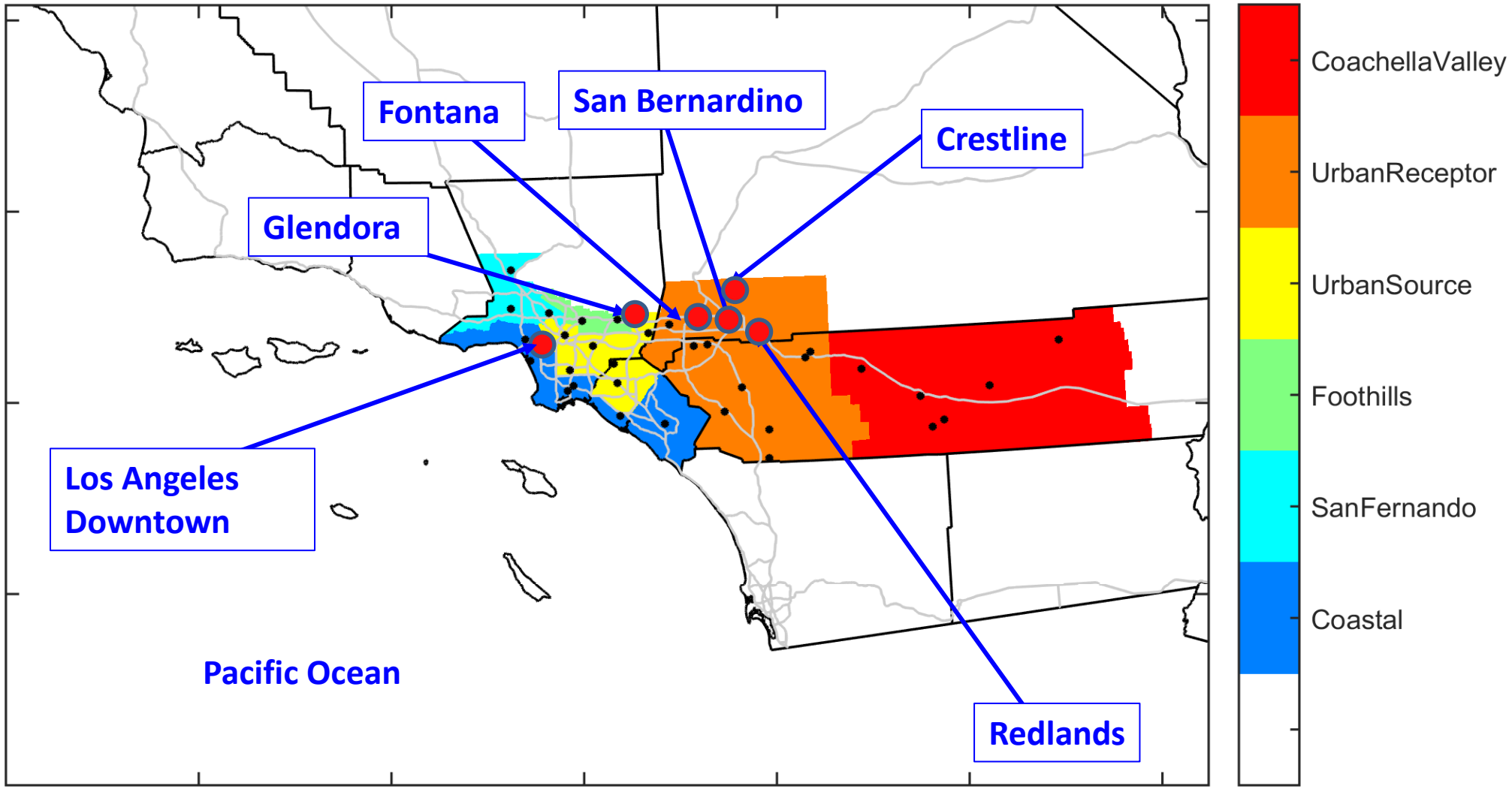
Overview

- 12 UTC cycle Forecast Products
- Retrieved for Los Angeles Air Basin
- 2nd day forecast variables were evaluated:
  - Daily Max 8-hour Ozone
  - Average 24-hour PM2.5

Performance Evaluation Zone



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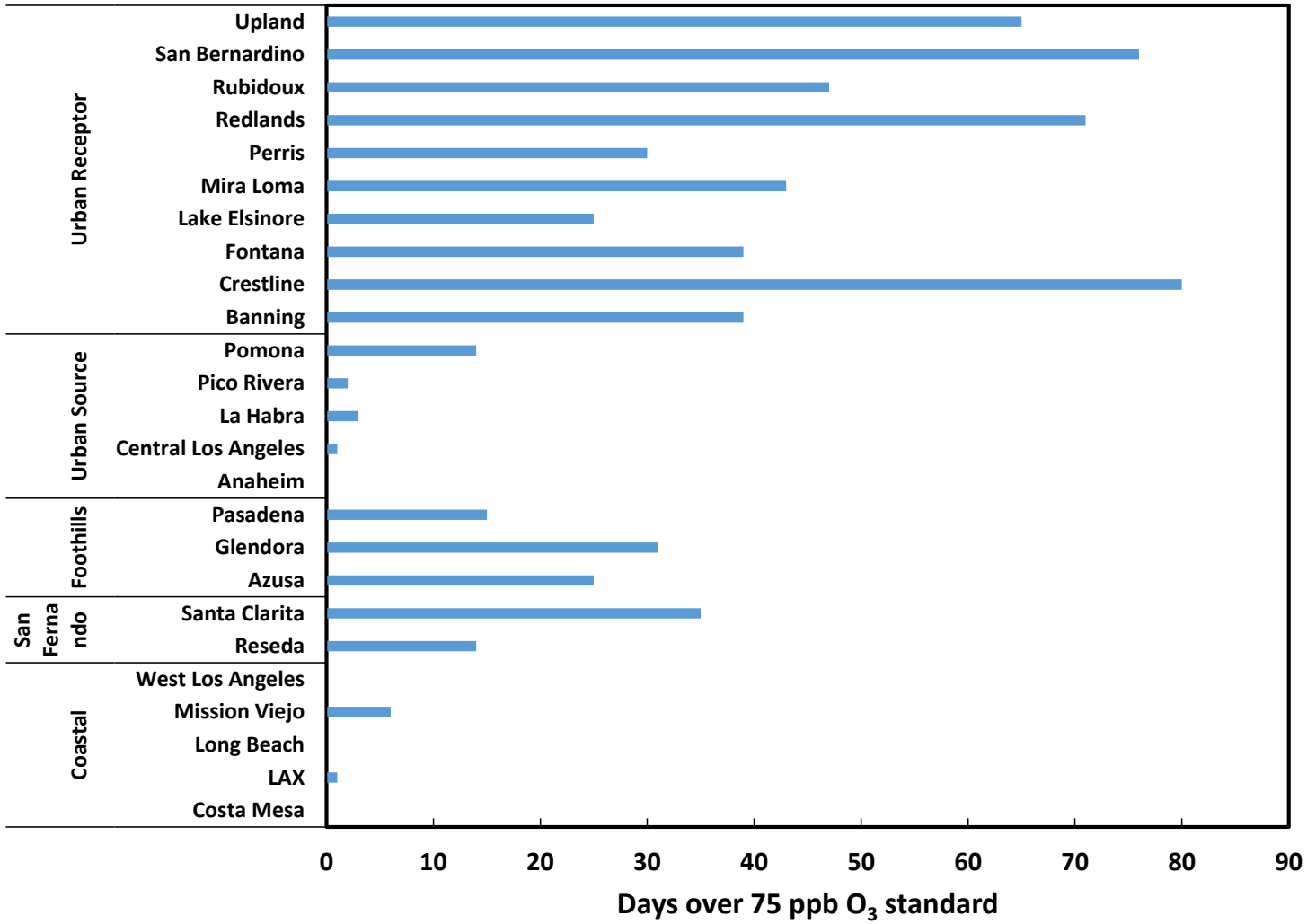
Air Quality by Geographic Area



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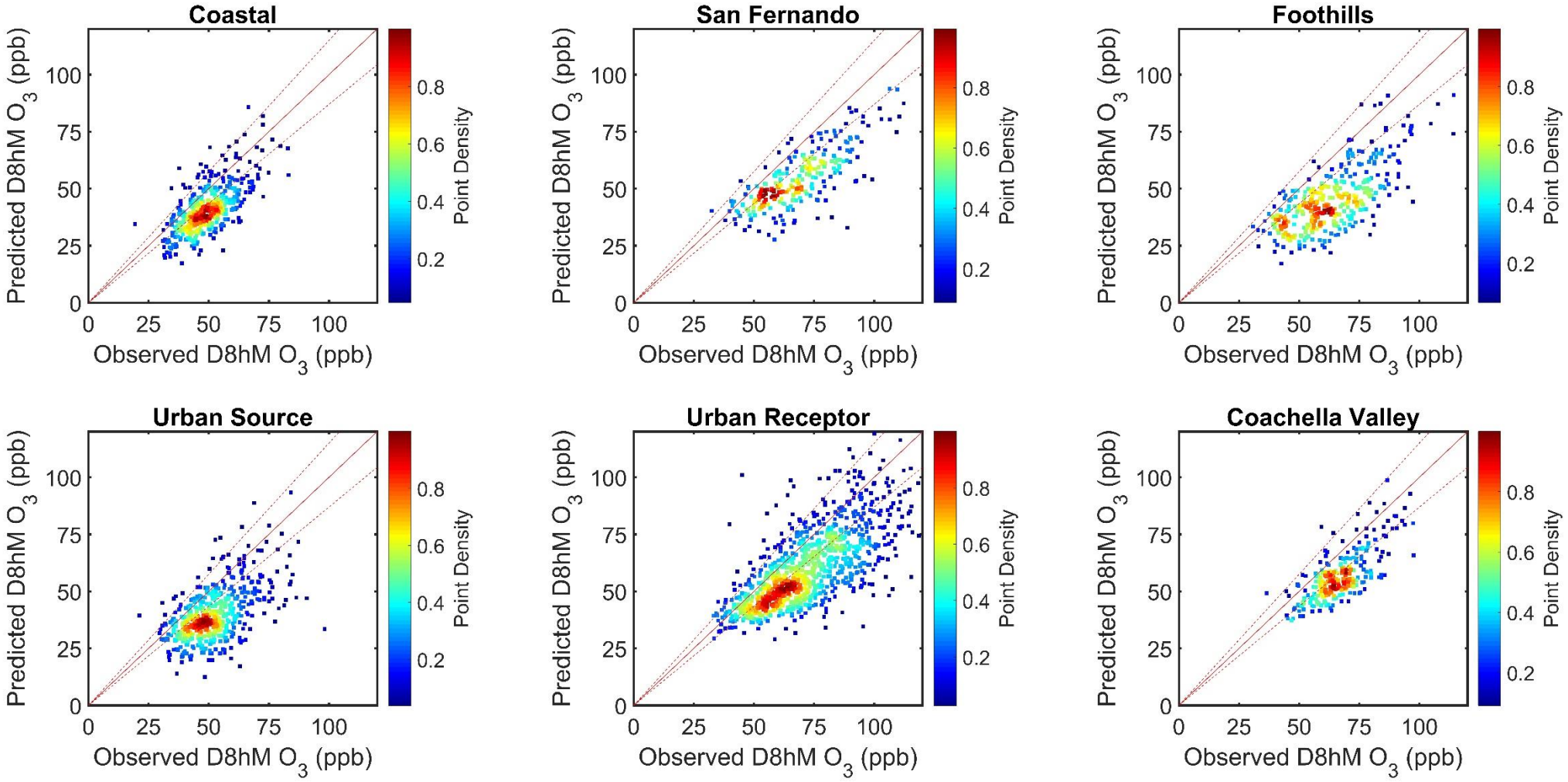
Daily Max 8-hour Ozone



Period: April-August 15th

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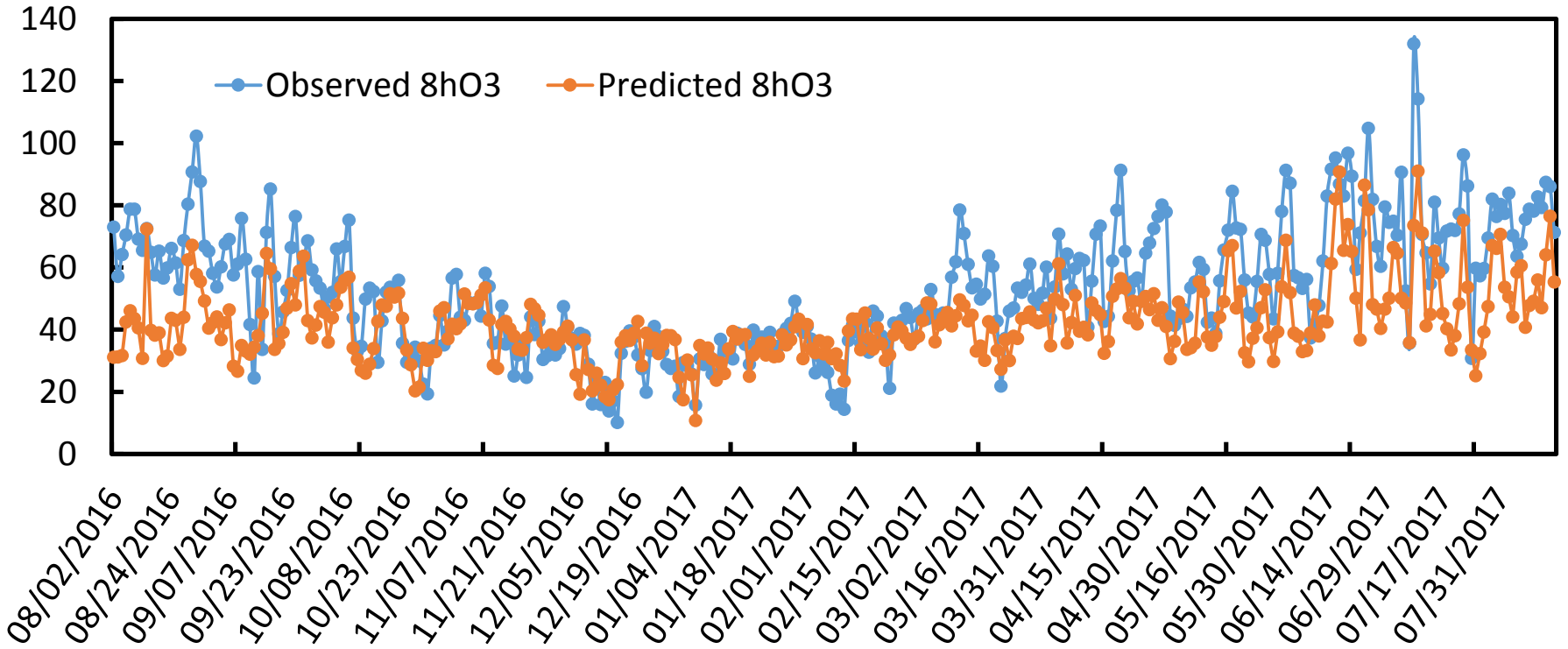
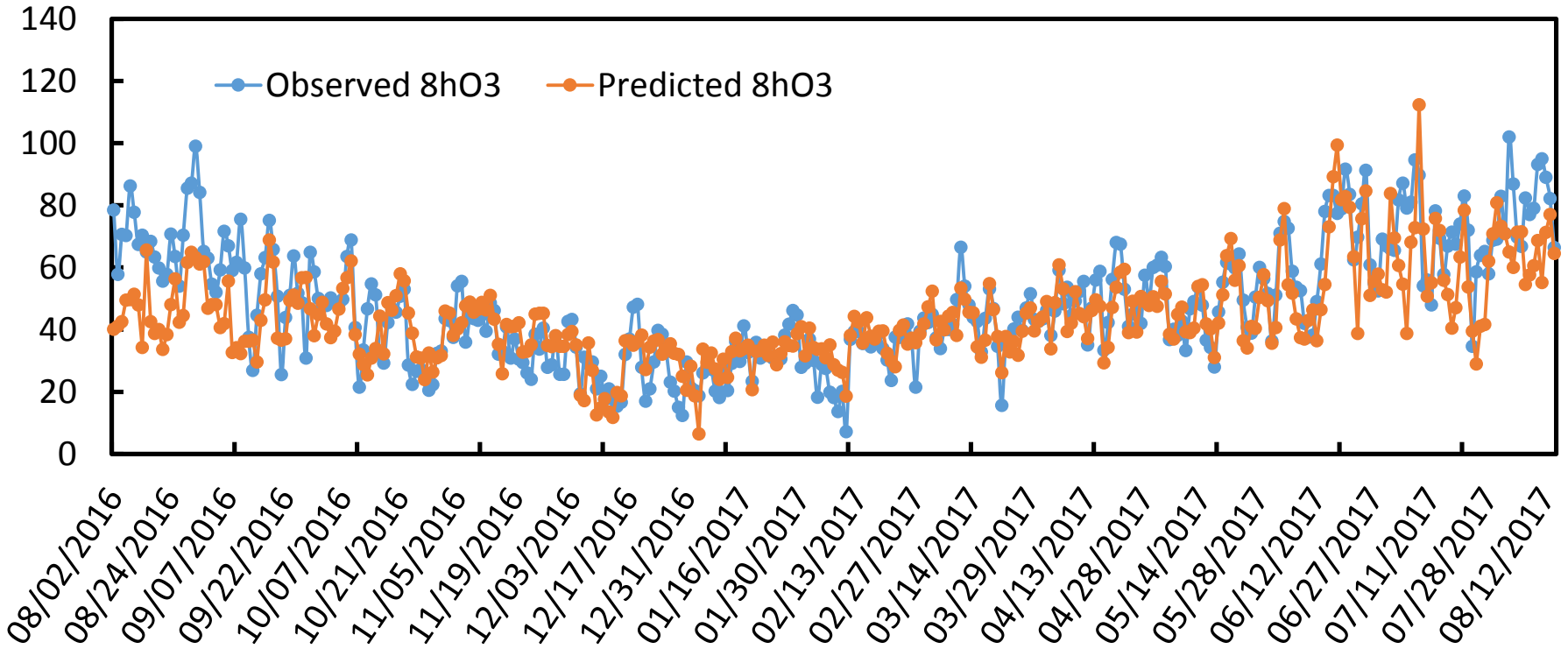
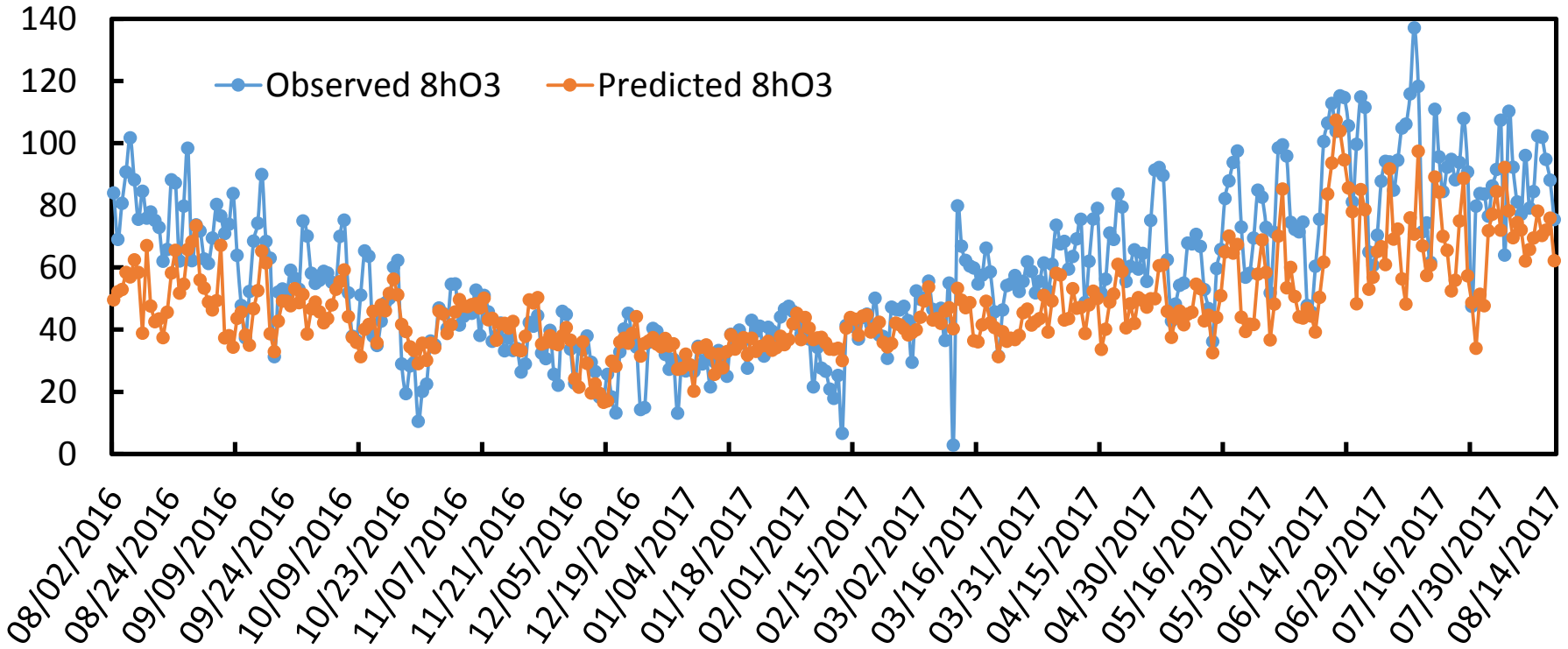
Daily Max 8-hour Ozone at Glendora (FH)



Daily Max 8-hour Ozone at Fontana (UR)



Daily Max 8-hour Ozone at San Bernardino (UR)



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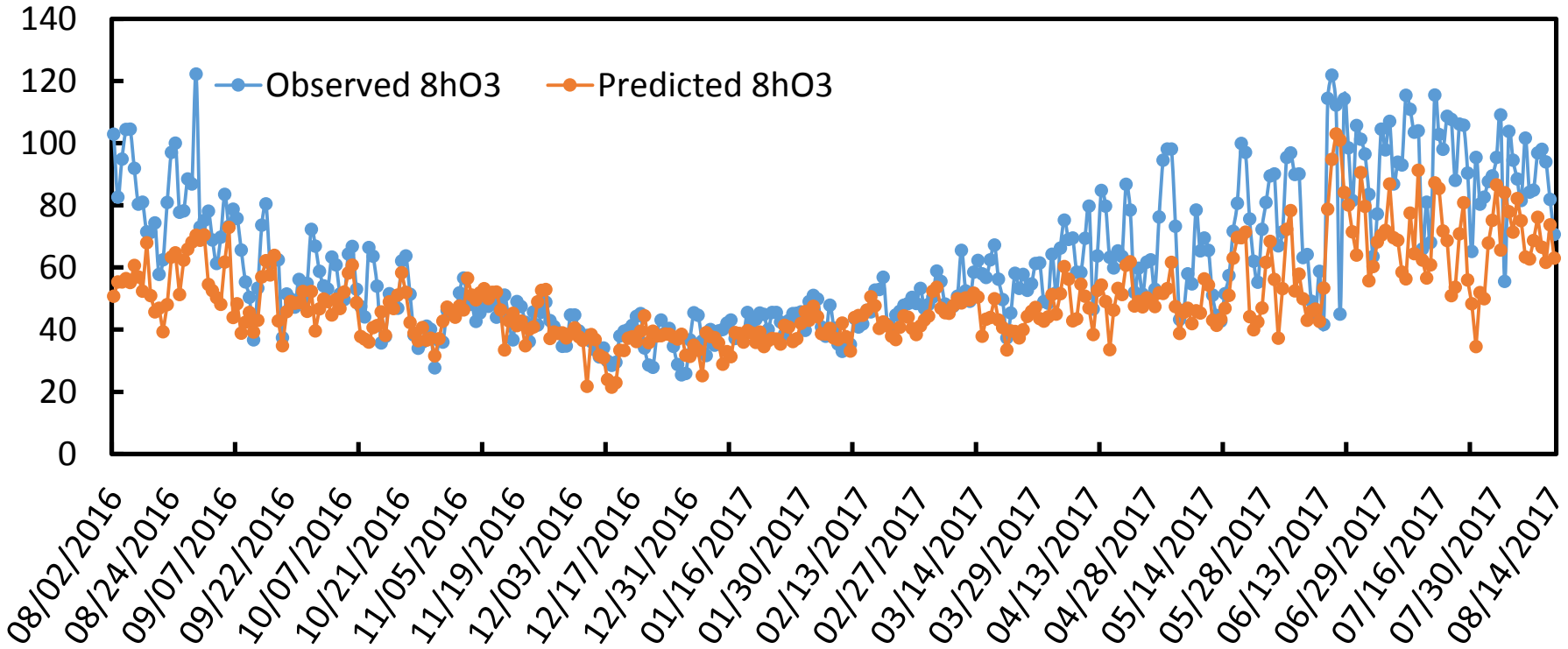
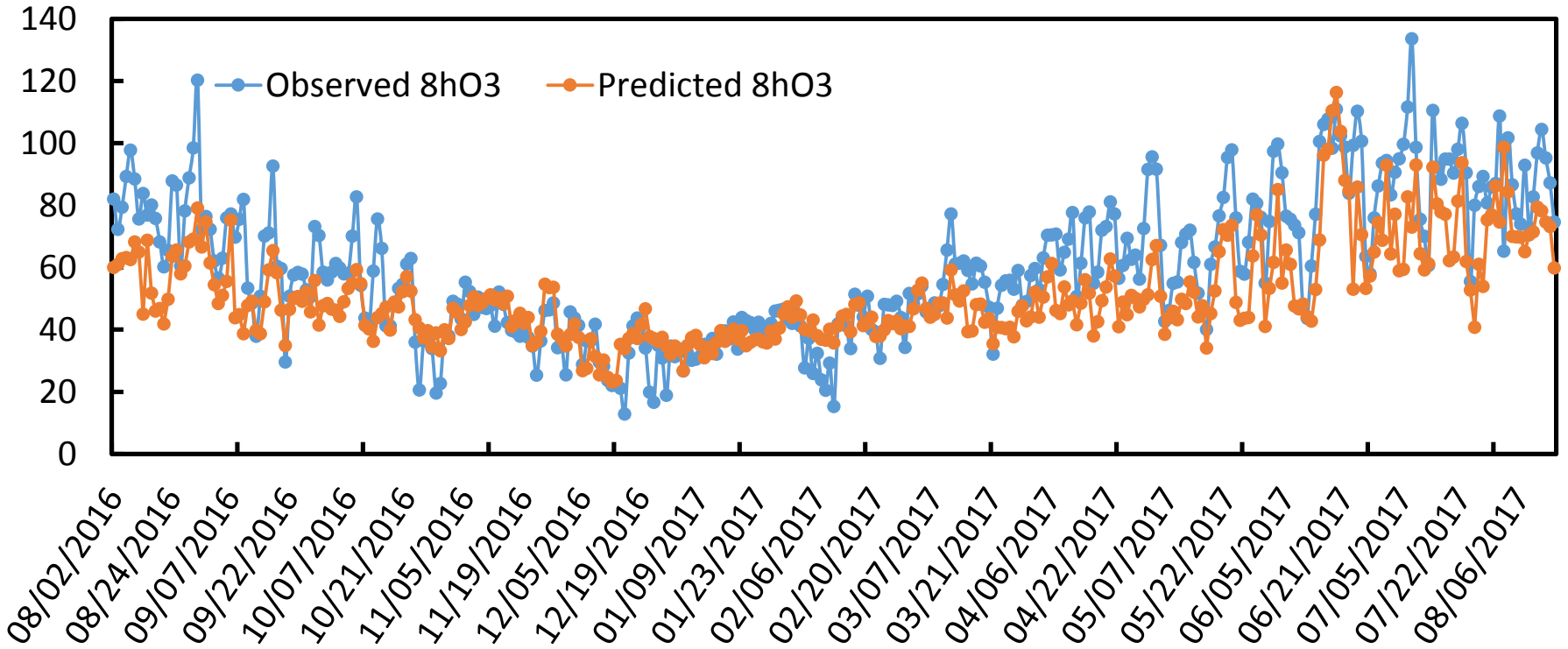
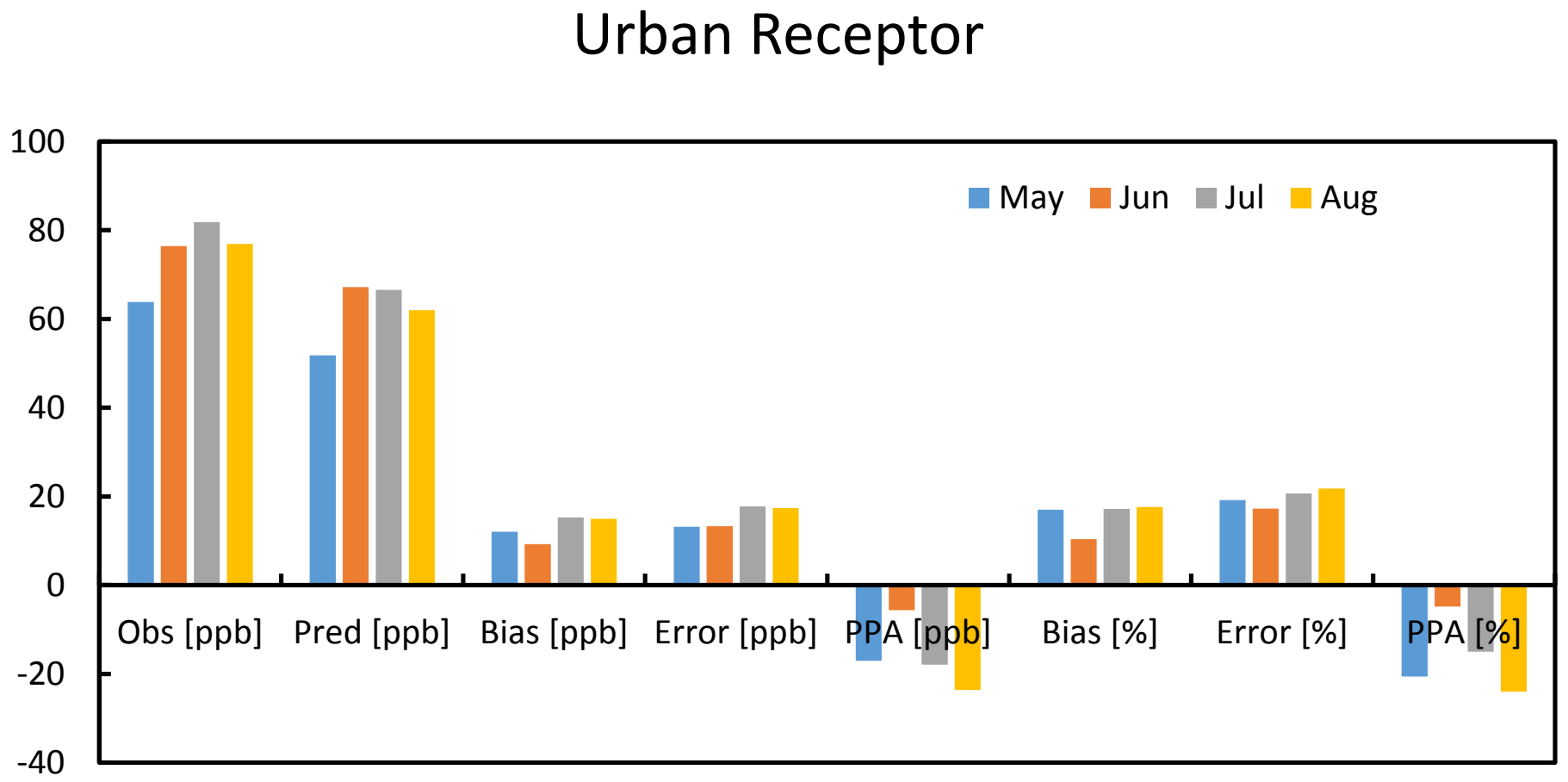
Daily Max 8-hour Ozone at Crestline (UR)



Daily Max 8-hour Ozone at Redlands (UR)



Performance Statistics by Month



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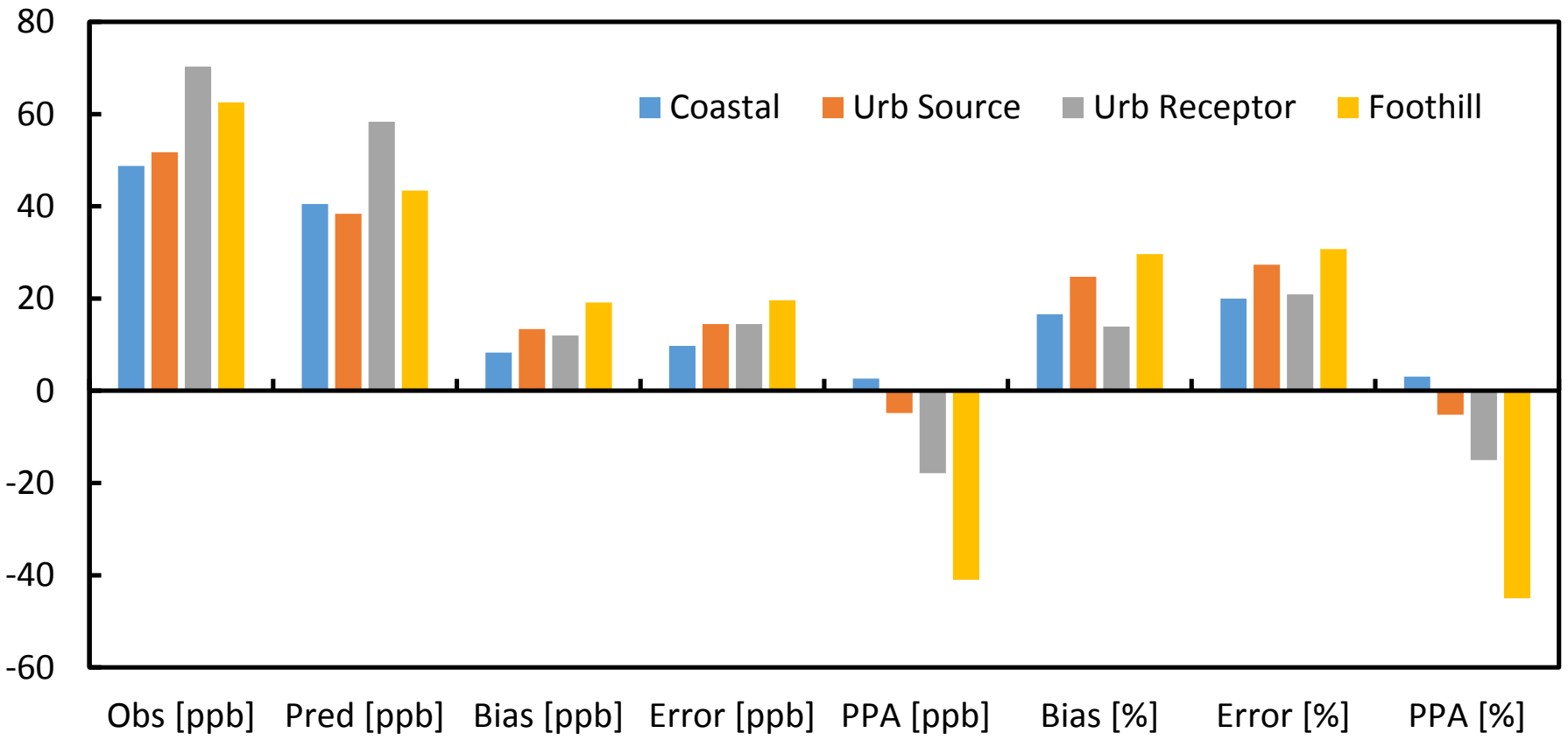
Geographical Variation



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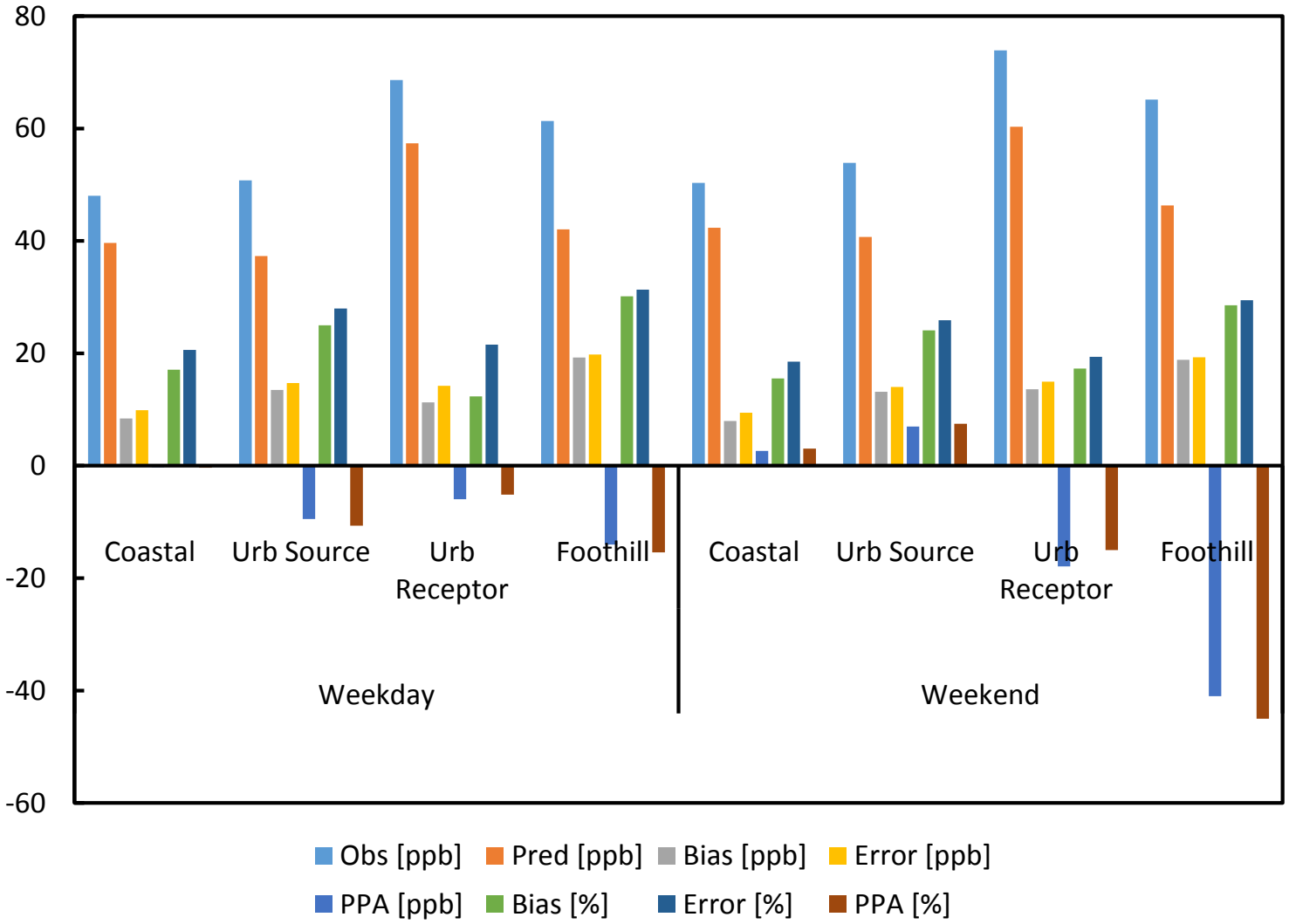
Weekend Effect



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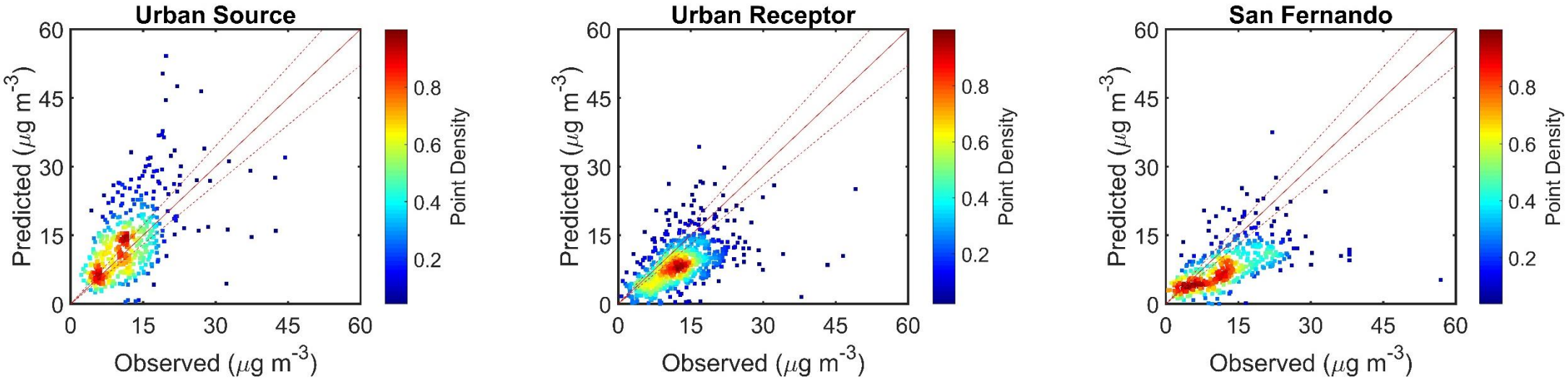
Average 24-hour PM2.5



PM2.5 measurements were made with automated Beta Attenuation Method samplers

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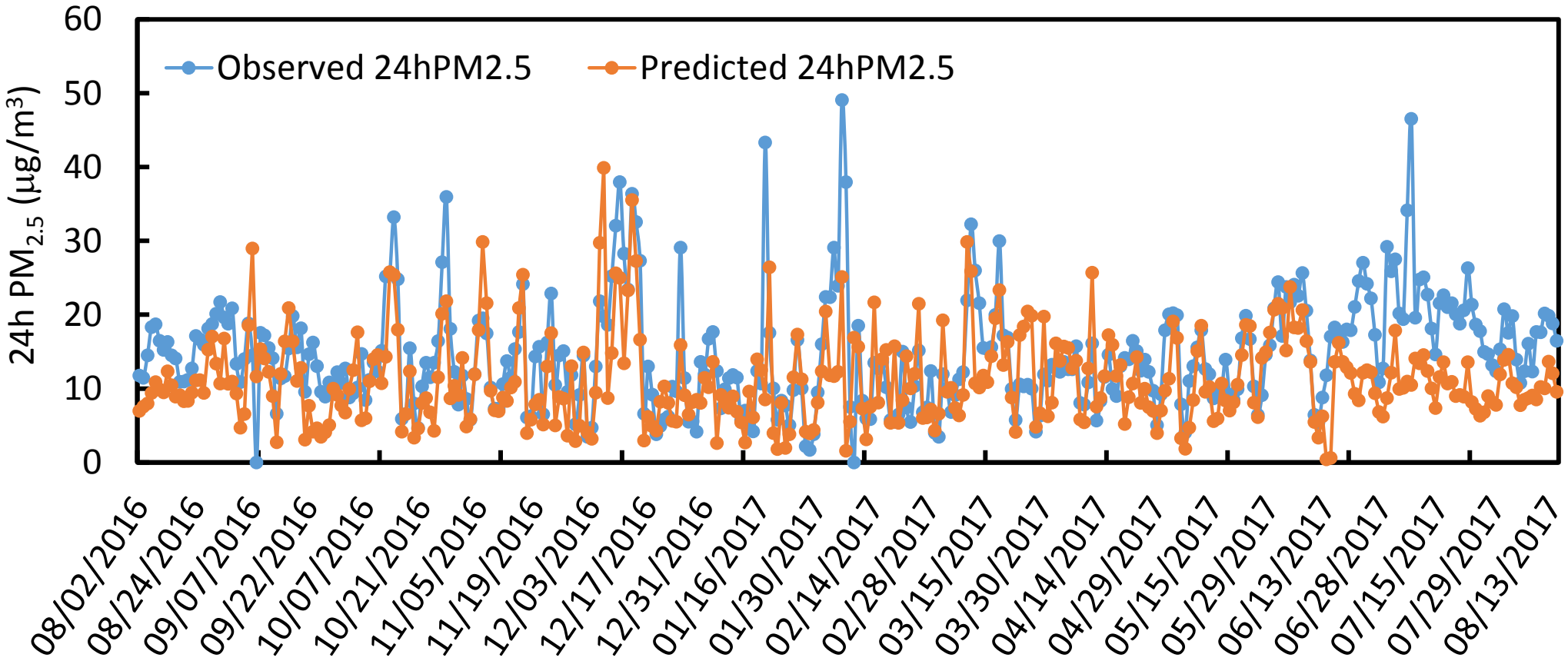
Daily 24h $PM_{2.5}$ at Riverside



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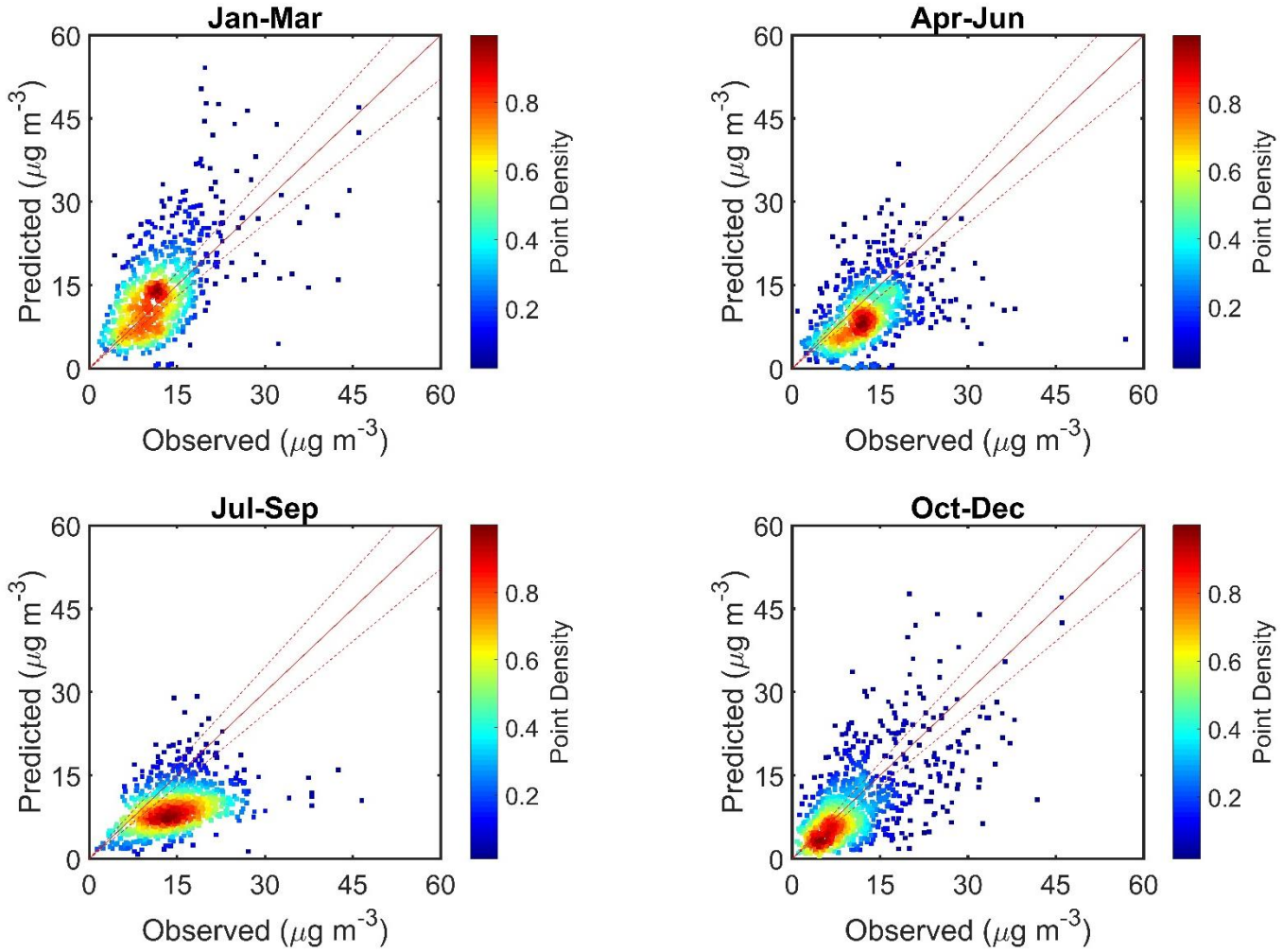
Quarterly Average 24-hour PM2.5



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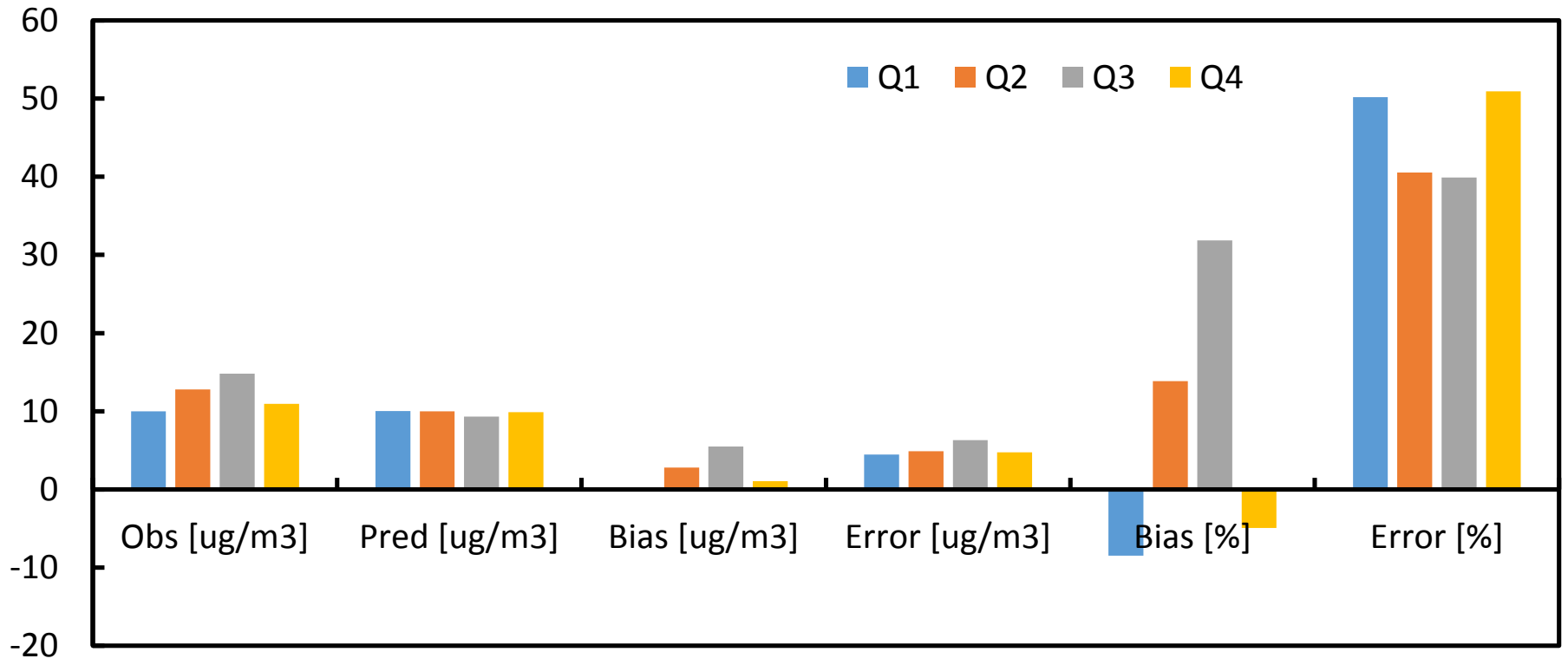
$PM_{2.5}$ Performance Statistics by Quarter



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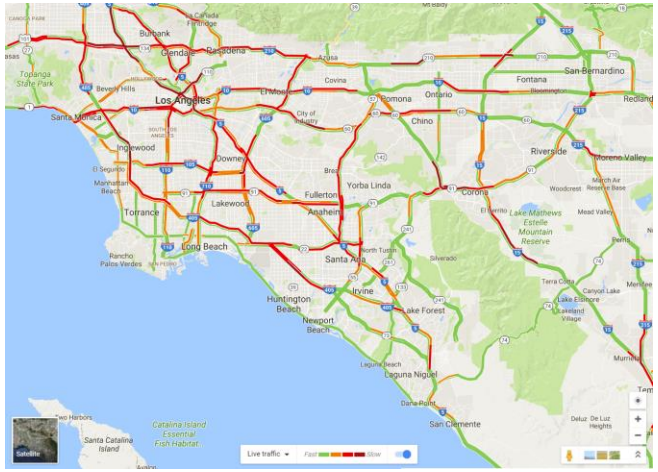
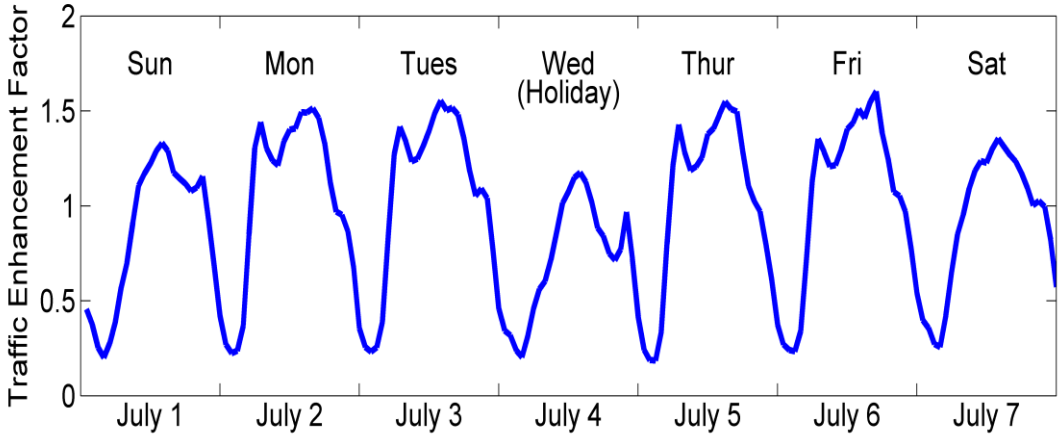
FUTURE IMPROVEMENTS

Future Improvements: On-Road Emissions Inventory

- The 2016 AQMP inventory was developed based on traffic sensor measurements data



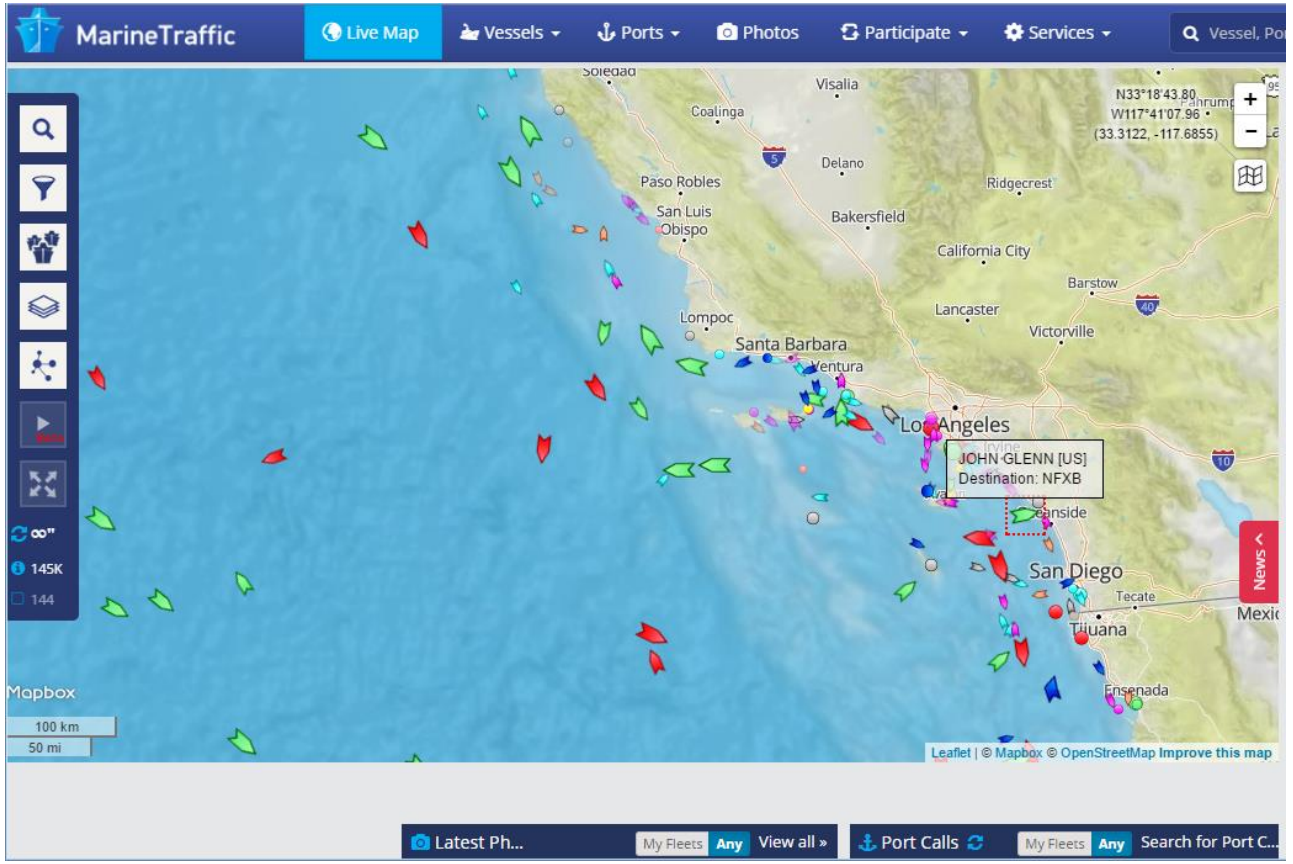
Light & Medium Duty Traffic Volume near Los Angeles downtown in 2012



- Further improvement specifically in heavy-duty vehicle category will be introduced in MATES V and next AQMP

Future Improvements: Marine Traffic Data

- The automatic identification system (AIS) is an automatic tracking system used for collision avoidance on ships and by vessel traffic services (VTS).
- Provides vessel type, size, position, course, and speed.
- Ocean Going Vessels' emission amount and distribution will be evaluated with the AIS data



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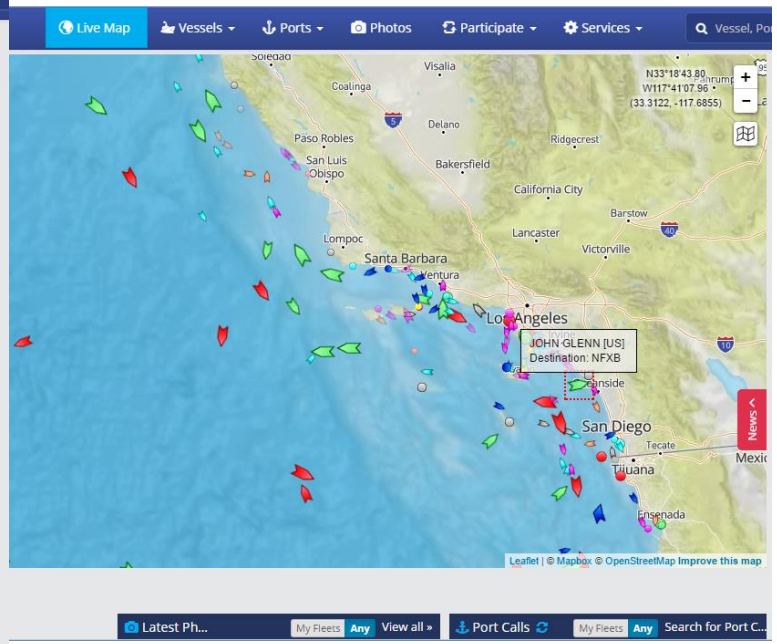
Example of ship data near Port of LA

MarineTraffic — Live Map | Vessels | Ports | Photos | Participate | Services | Vessel

Flag	Vessel Name	Photo	Type	Ship Type	Length × Breadth (m)	Deadweight	Area	Received	Destination / Reported ETA	My Fleet
	MANDO	Photos: 20		Container Ship	153x25	17250	Aegean Sea	2017-06-30 00:14 LT (UTC +2)	TRIESTE 2017-07-02 08:00 LT (UTC +2)	Add to Fleet
	ULUSOY-14	Photos: 28		Ro-Ro/Vehicles Carrier	208x26	15000	Aegean Sea	2017-06-30 00:14 LT (UTC +2)	ITTRS-TRCES 2017-06-30 08:30 LT (UTC +3)	Add to Fleet
	TALOS	Photos: 190		Ro-Ro/Vehicles Carrier	124x19	2838	Aegean Sea	2017-06-30 00:14 LT (UTC +2)	PEIRAIAS 2017-06-30 13:30 LT (UTC +3)	Add to Fleet
	AS FLORIANA	Photos: 76		Container Ship	166x25	18445	Aegean Sea	2017-06-30 00:14 LT (UTC +2)	FOR ORDER 2017-06-04 22:00 (UTC)	Add to Fleet
	LUCKY JOY	Photos: 53		General Cargo	109x17	7158	East Mediterranean	2017-06-30 00:14 LT (UTC +2)	CASTELLON 2017-07-05 15:00 LT (UTC +2)	Add to Fleet
	ALLEGRA	Photos: 49		Bulk Carrier	180x30	34146	Aegean Sea	2017-06-30 00:14 LT (UTC +2)	DERINCE 2017-07-01 12:00 LT (UTC +3)	Add to Fleet
	NEW GEMINI	Photos: 20		General Cargo	96x15	5269	Aegean Sea	2017-06-30 00:14 LT (UTC +2)	MARGHERA 2017-07-03 14:00 LT (UTC +2)	Add to Fleet



South Coast AQMD

Future Improvements: Aloft Aircraft Emissions

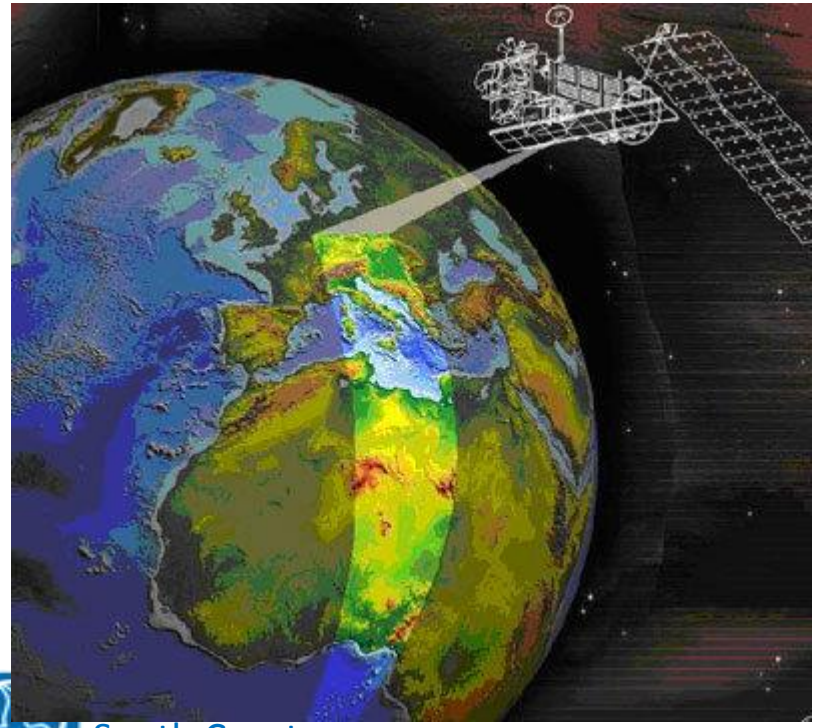
- Currently aircraft emissions are treated as ground level release
- Take-off and landing emissions will be revised to have gradual release with altitude.

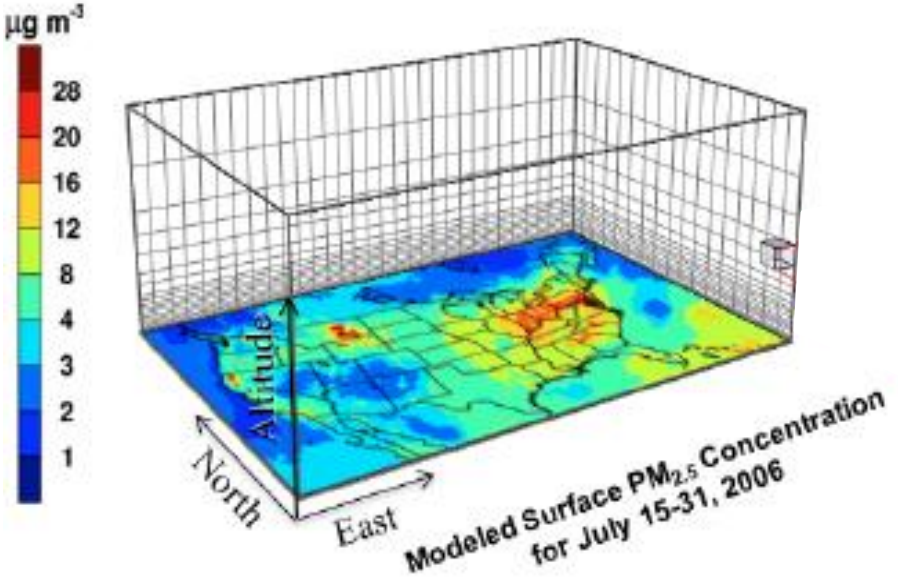
(Source: www.flickr.com)

Future Improvements: Assimilating Satellite Data

Jet Propulsion Laboratory
California Institute of Technology

- Assimilating Satellite Data into Global Chemical Transport model, GEOS-CHEM to evaluate inter-continental scale transport
- Collaboration with NASA JPL and UC Riverside





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Summary and Conclusions

- NOAA forecast still tends to under-predict high ozone episodes in the Basin especially urban receptor and foothill areas where the peak concentrations are recorded
- The ozone bias peaks in July-August, when ozone concentrations are the highest
- NOAA forecast under-predicted PM2.5 in spring and summer, and slightly over-predicted PM2.5 in fall and winter
- SCAQMD is continuously working in improving modeling capabilities: emissions modeling and background ozone