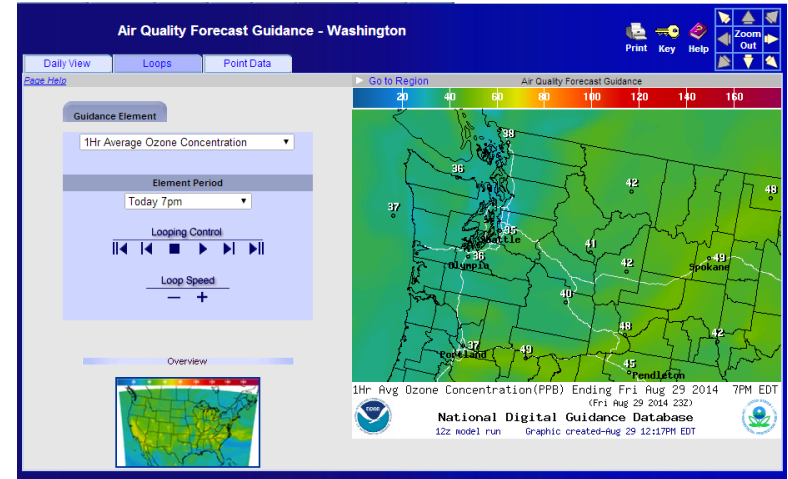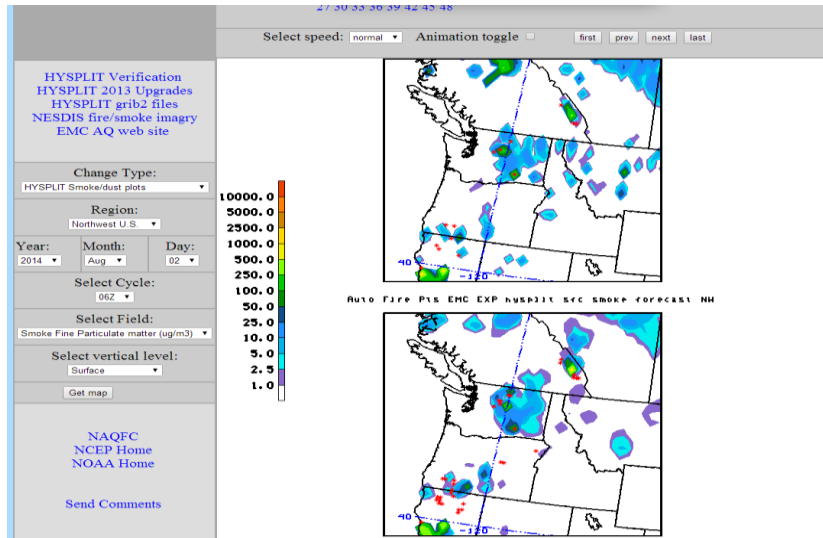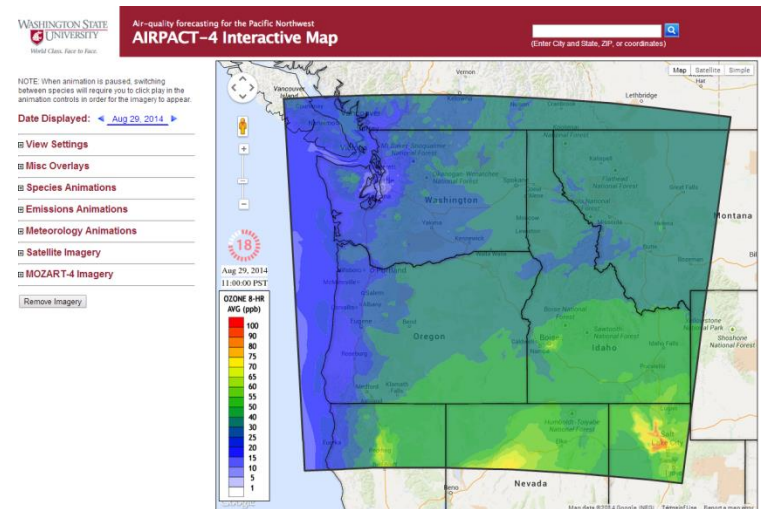# Washington State's use of NOAA AQ forecast tools

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- Often used as a backup or for a second opinion

- Advantages over our forecast system:

  ➢ Provides a dust forecast (a lot of our soil is PM_{10}, not TSP so high erosion potential even with 15 mph winds)

  ➢ Our 4km CMAQ model isn't performing as well as our now-retired 12km CMAQ model did, for Ozone.
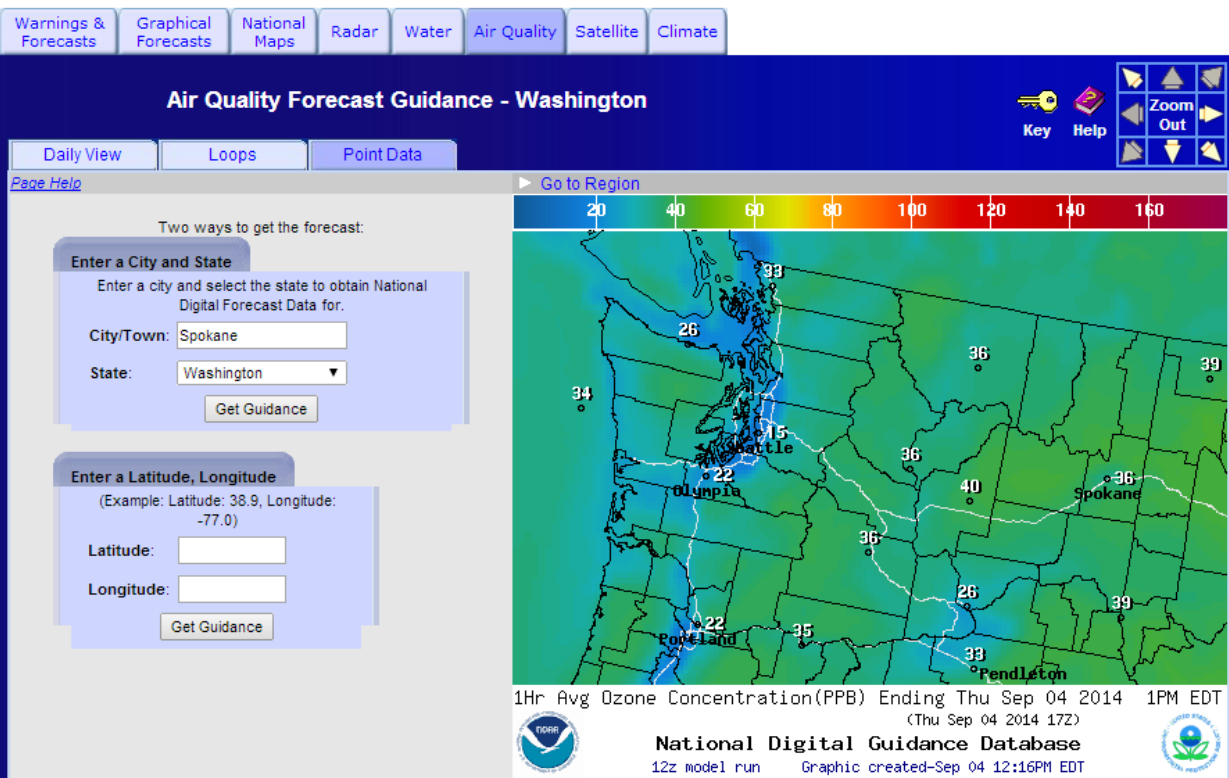
Point forecasts

- In developmental products: get point forecast on mouse click?

- Time series of model & monitor data instead of a table? Helps scale forecast by recent model performance at that site

2014 AIRPACT-4 vs. AIRNow Performance Charts

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WASHINGTON STATE UNIVERSITY
World Class. Face to Face.

Air-quality forecasting for the Pacific Northwest
AIRPACT-4 Interactive Map

(Enter City and State, ZIP, or coordinates)

NOTE: When animation is paused, switching between species will require you to click play in the animation controls in order for the imagery to appear.

Date Displayed: ◄ Aug 11, 2014 ►

⊞ **View Settings**

⊞ **Misc Overlays**

⊞ **Species Animations**

- ○ OZONE
- ○ OZONE 8hr avg
- ● PM2.5
- ○ PM2.5 24hr avg
- ○ AOD
- ○ CO
- ○ HCHO
- ○ ISOPRENE
- ○ NH_3
- ○ NO_x
- ○ SO_2
- ○ VOCs
- ○ AORGC
- ○ ANO_3

<u>Note:</u> Animations available May 1, 2012 onward (AORGC and ANO_3 available beginning June 24)
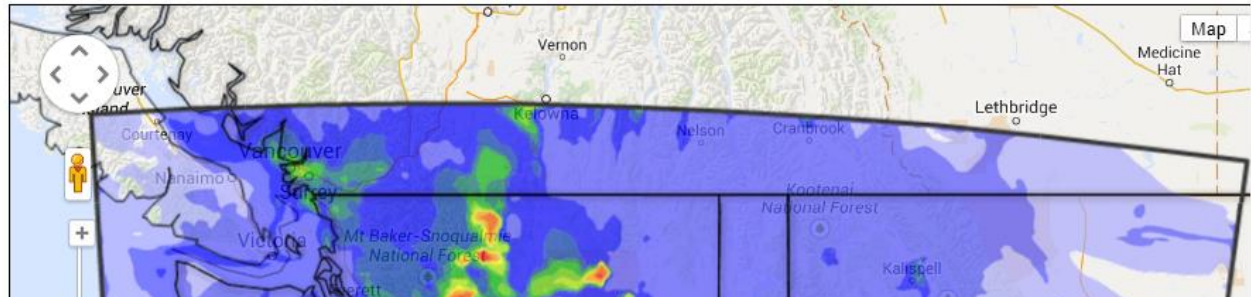
⊞ **Emissions Animations**
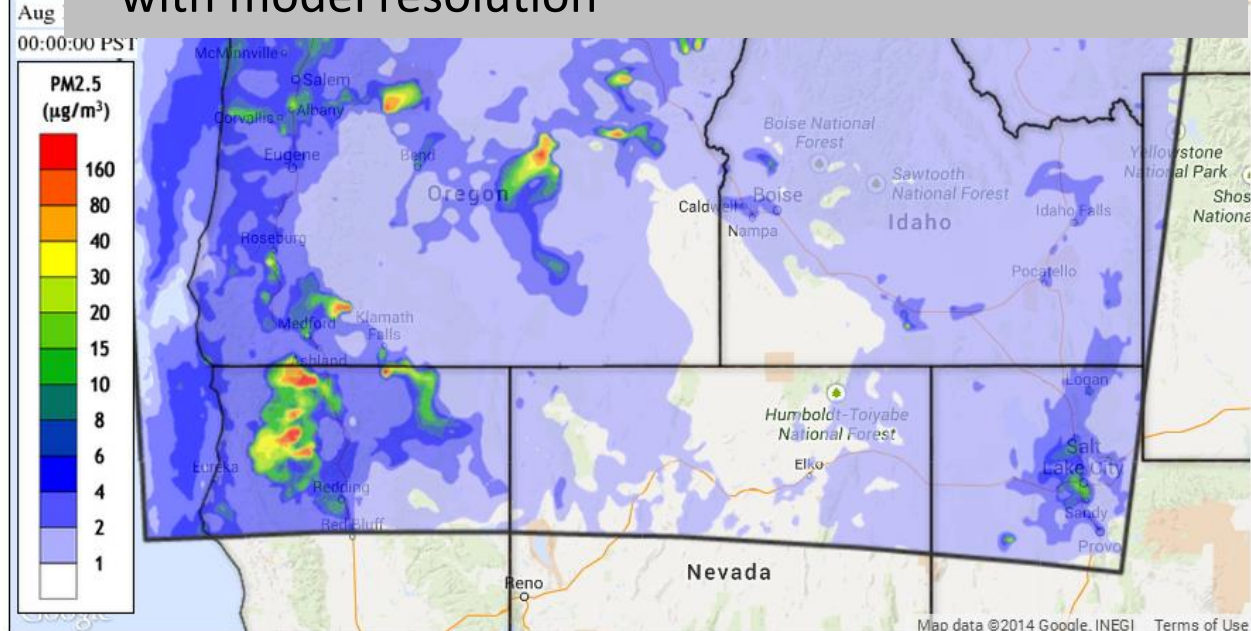
⊞ **Meteorology Animations**
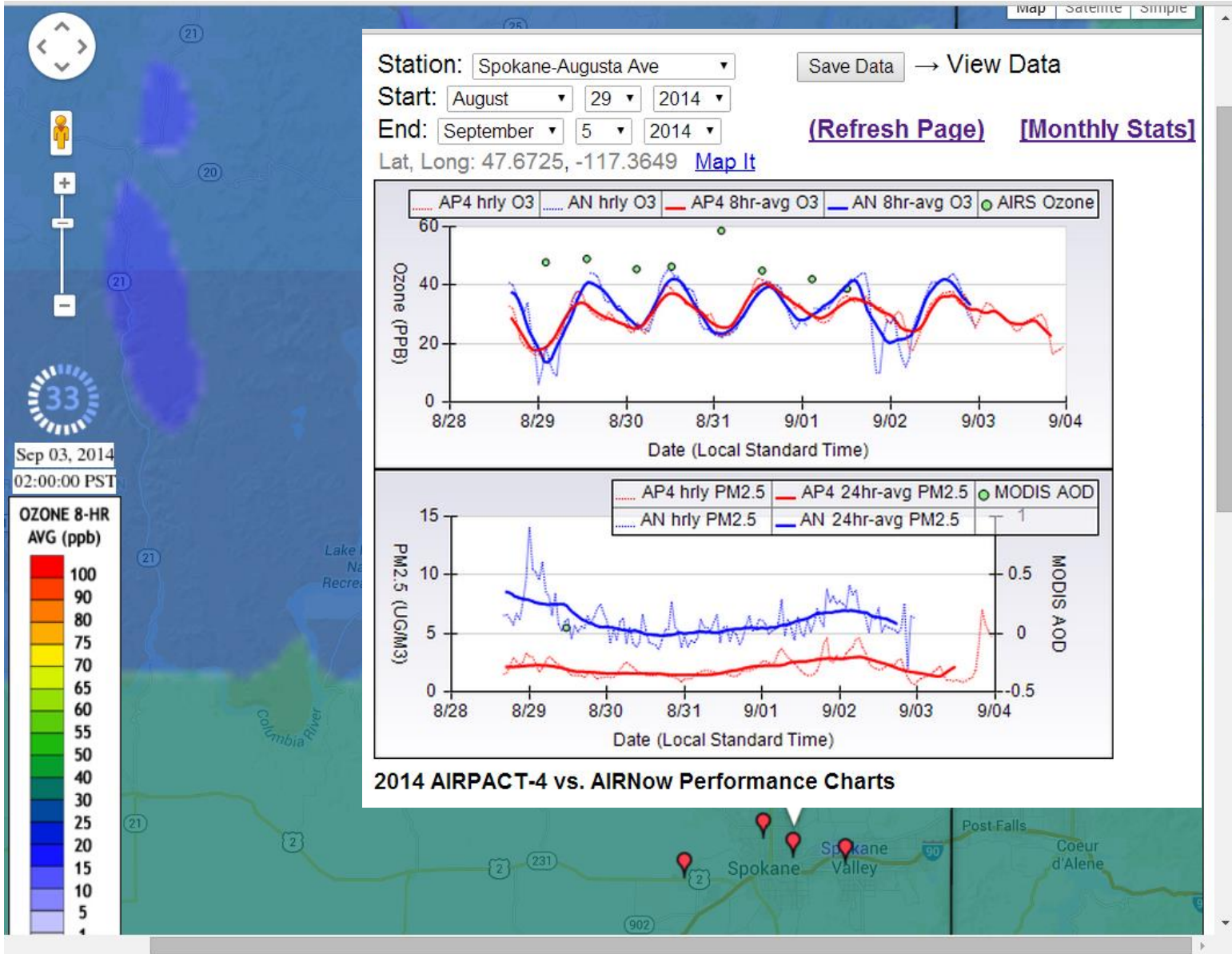
⊞ **Satellite Imagery**

⊞ **MOZART-4 Imagery**

Remove Imagery

- 4km CMAQ run out to 48 hrs, driven by 0Z WRF
- UW- Seattle runs WRF, WSU- Pullman runs CMAQ
- Google maps API. Max zoom must be consistent with model resolution

PM2.5 ($\mu g/m^3$)
160
80
40
30
20
15
10
8
6
4
2
1

2014 AIRPACT-4 vs. AIRNow Performance Charts

NCEP Air Quality Forecast Verification

Change FVS type:
Standard O3 Statistics ▼

Select fields/species: O3 ▼

Select time: July ▼

Select Run Cycle 12 UTC ▼

Select region:
All regions PARA ▼

Select averaged hour:
8 hr sfc average ▼

Select forecast four:
Diurnal period ▼

Select statistic type:
BIAS ▼

Get map

OZON/8 BIAS   AVGED BY FCST HRS
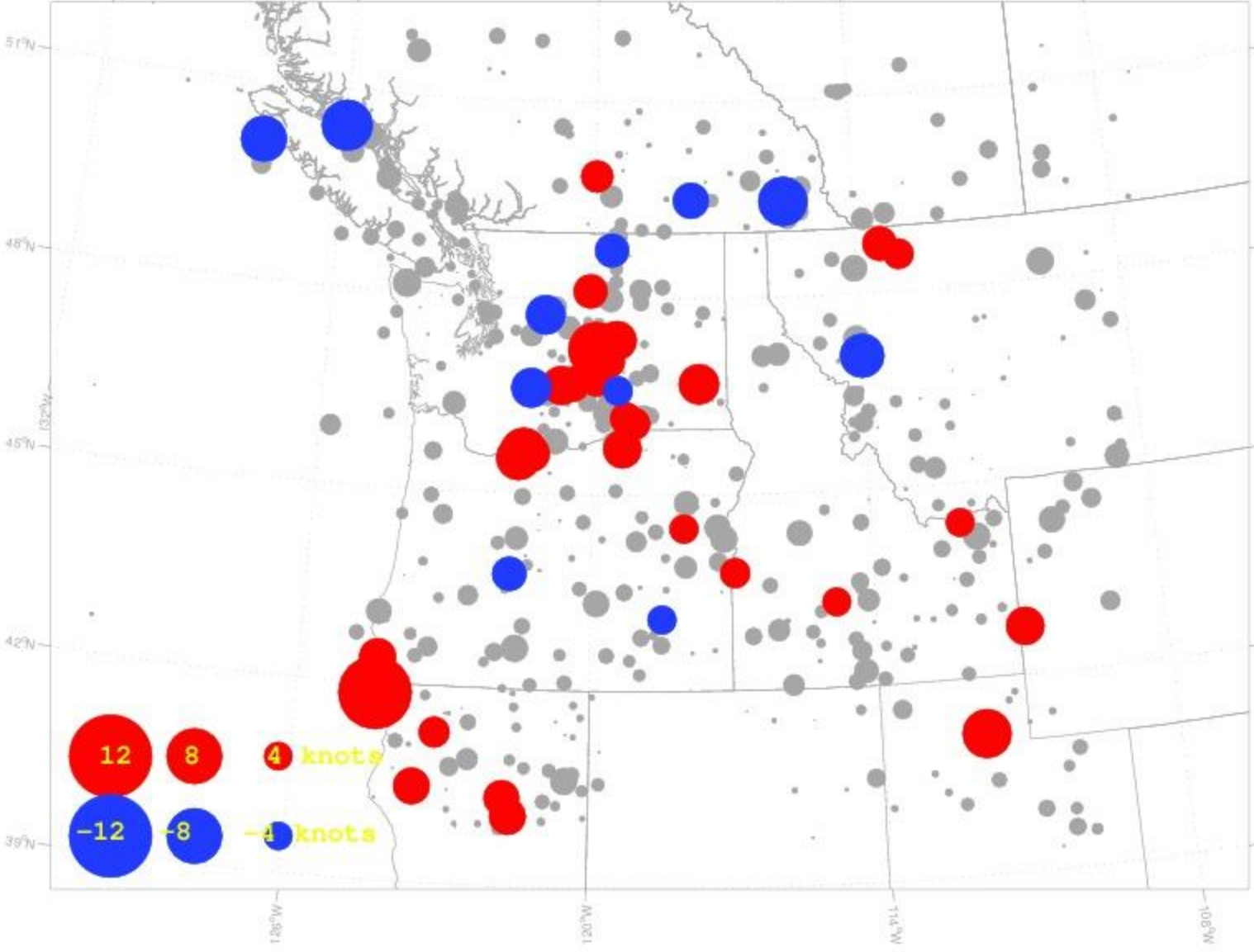20140715 TO 20140809

NAM-CMAQ-V4.6.32   NORTHEAST BIAS
NAM-CMAQ-V4.6.32   SOUTHEAST BIAS
NAM-CMAQ-V4.6.32   MIDWEST BIAS
NAM-CMAQ-V4.6.32   SWEST-COAST BIAS

FORECAST HOUR   12 UTC CYCLE

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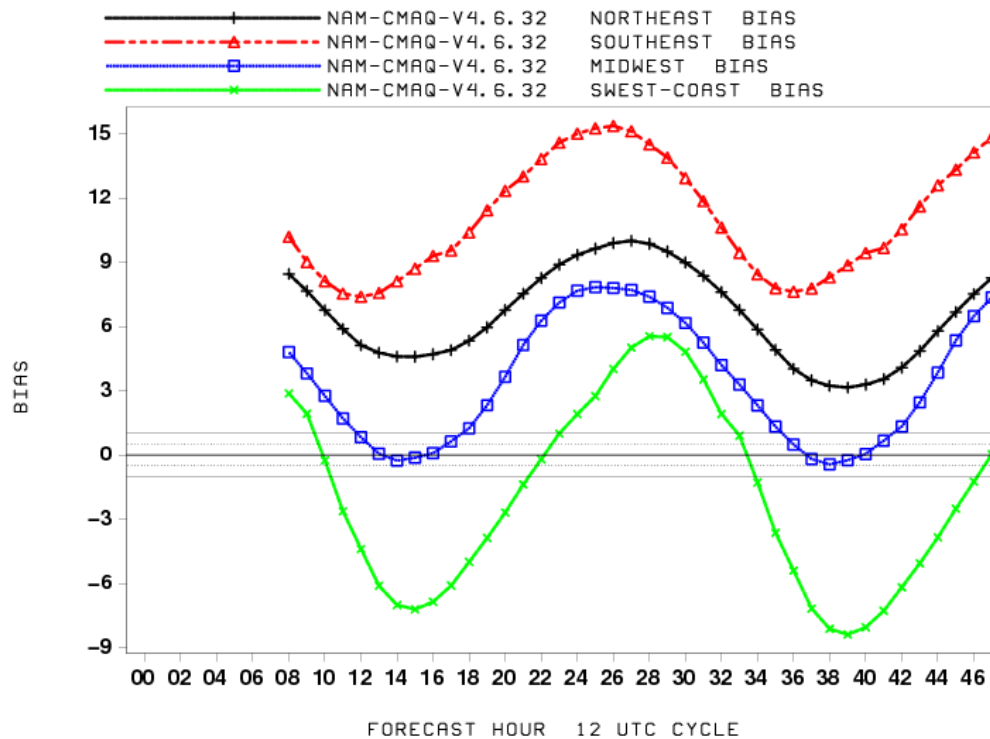
Average MEs, 10-m Wind Speed, WRFGFS-12km, 01-Aug-2014 – 31-Aug-2014, 12Z, fhr 24
Mean Error < -4 knots (blue)
Mean Error > 4 knots (red)

Visualizing model performance by region: monthly aggregate

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temp errors,WRF-12km, fhr36,2014083000
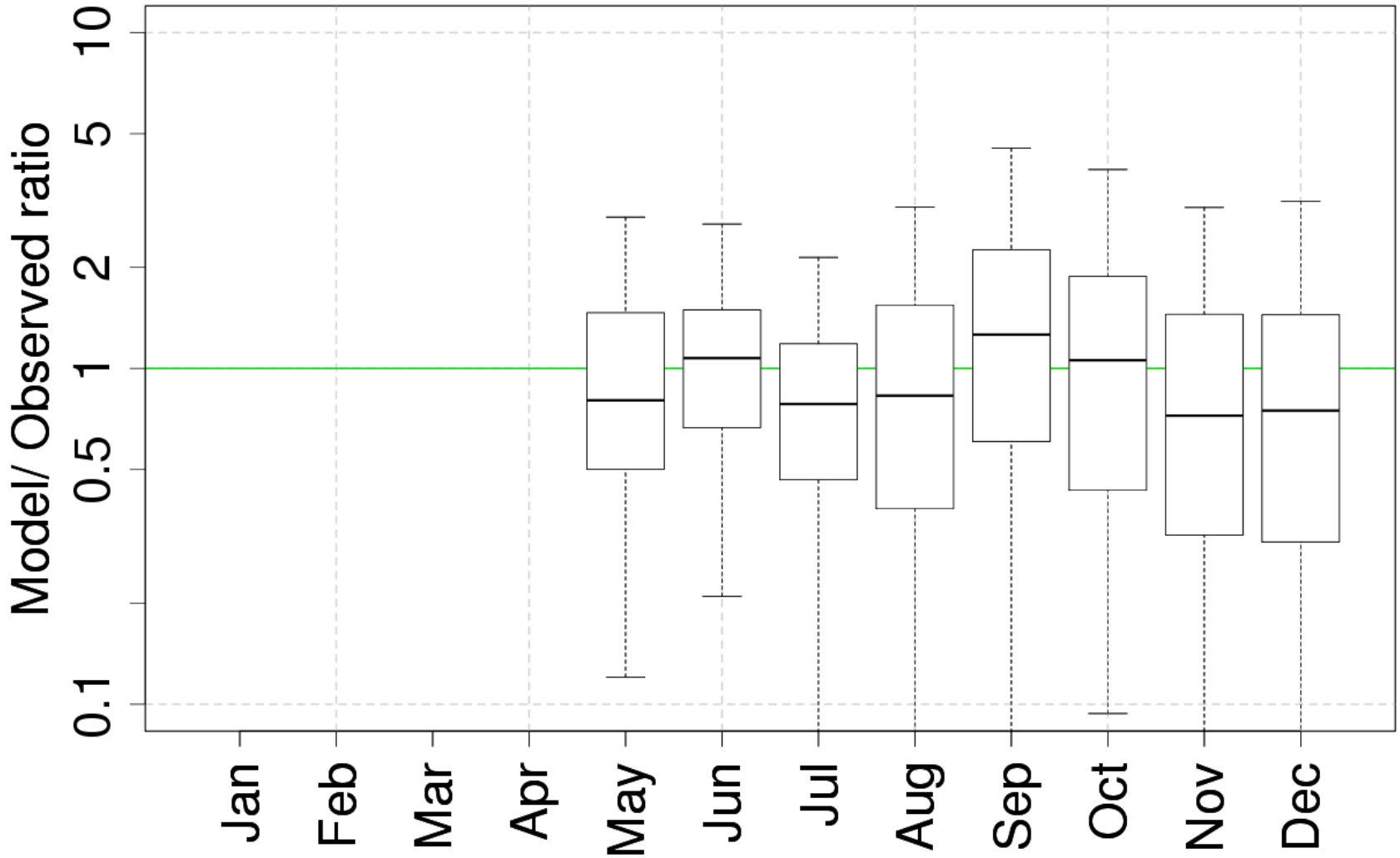error <-3°C (blue)
error >3°C (red)
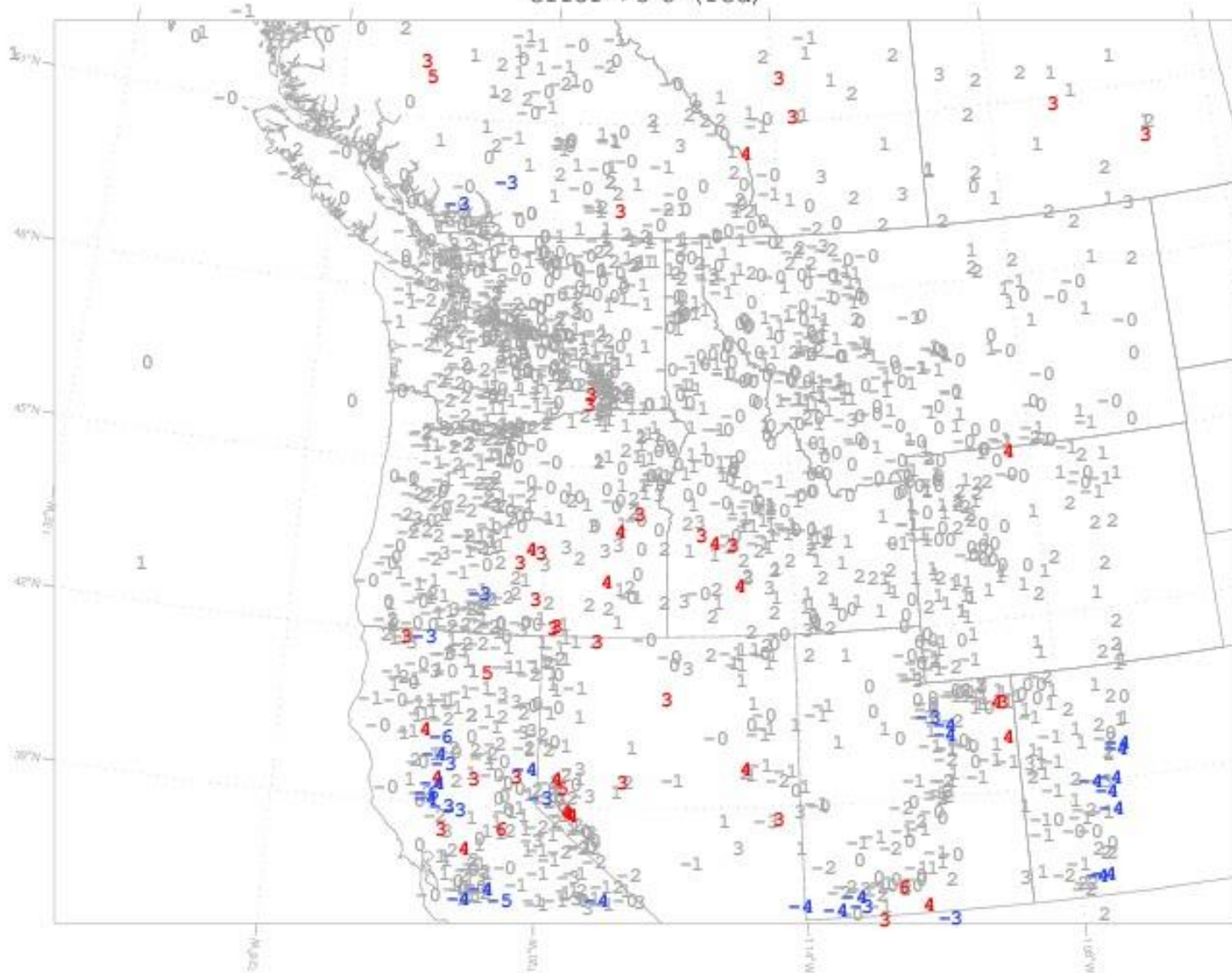
Visualizing model performance by region: daily observations

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Consider showing the full distribution of model-monitor comparisons, not just mean bias etc

PM$_{2.5}$ at all sites in 2013

Model/ Observed ratio

Seasonal means of PM$_{2.5}$ breakdown at all sites in 2014

Legend: Other, OC, NO$_3$, SO$_4$, NH$_4$, EC

y-axis: PM$_{2.5}$, μg/m³

x-axis categories: Jan-Feb: obs, Jan-Feb: model, Mar-May: obs, Mar-May: model

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