Using Web-based Interactive Tools for Air Quality Analyses

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Drowning in static data…

- Model output
- Monitoring Data
- Fixed-format plots
- Requests

Interactive Evaluation & Analysis Platform

- **Web service:**
  HTML, CSS, Javascript, PHP
- **MySQL database**
- **Python:**
  PsuedoNetCDF
- **Javascript libraries:**
  HighCharts, Google Maps API

Interactive MPE Tools

- **Performance statistic bar chart and map**
- **Site time series data-based charts:**
  - hourly concentration line plot
  - daily maximum concentration bar plot
  - modeled vs observed scatter plot
  - …
- **Vertical profile plot**
- **Concentration maps**
- **OSAT / APCA "wavy bacon" plot**

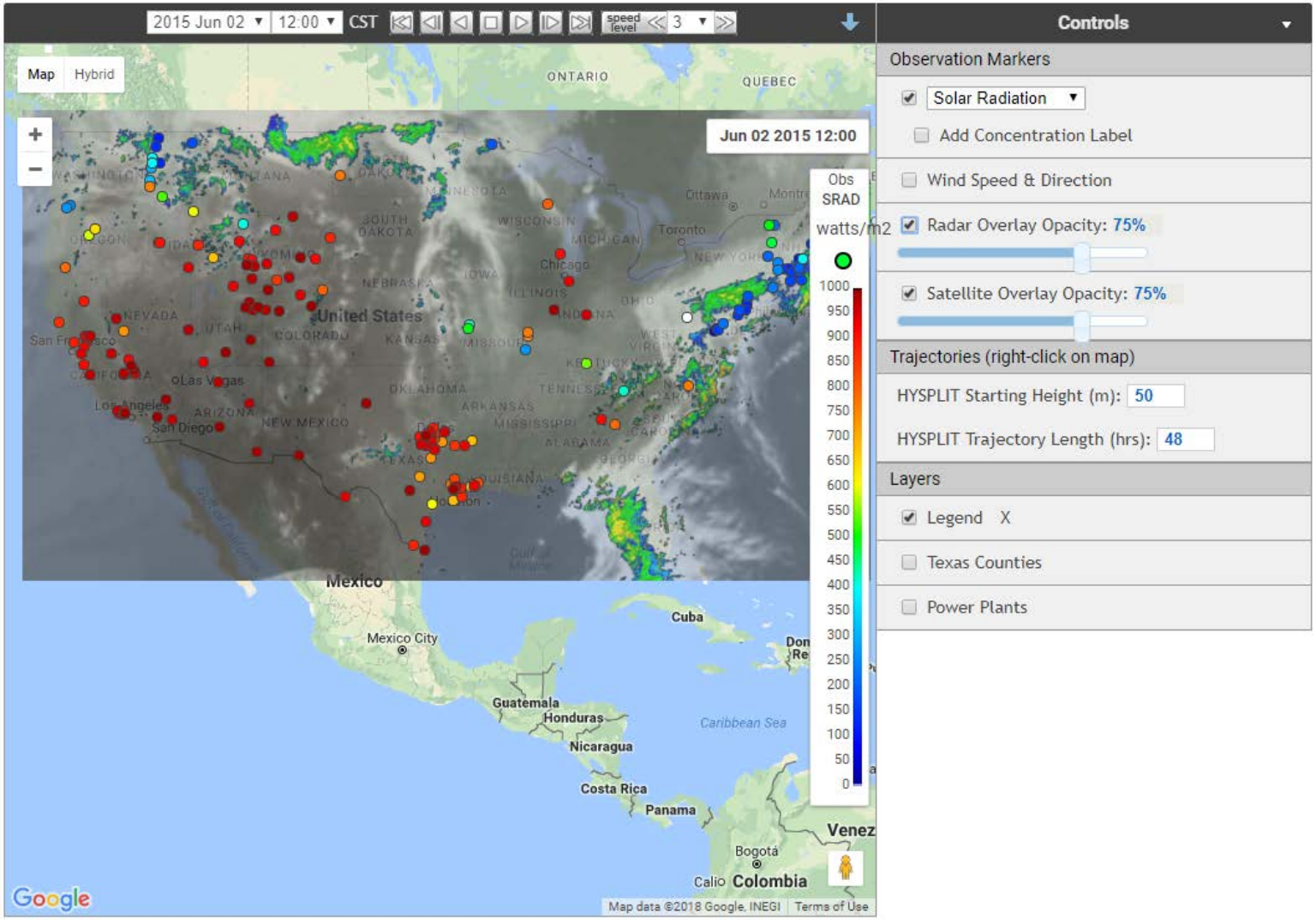
Interactive CAMx MPE Platform

Let's take a look at the MPE tools on our web site.

AirNow Interactive Map

North American Monitors:

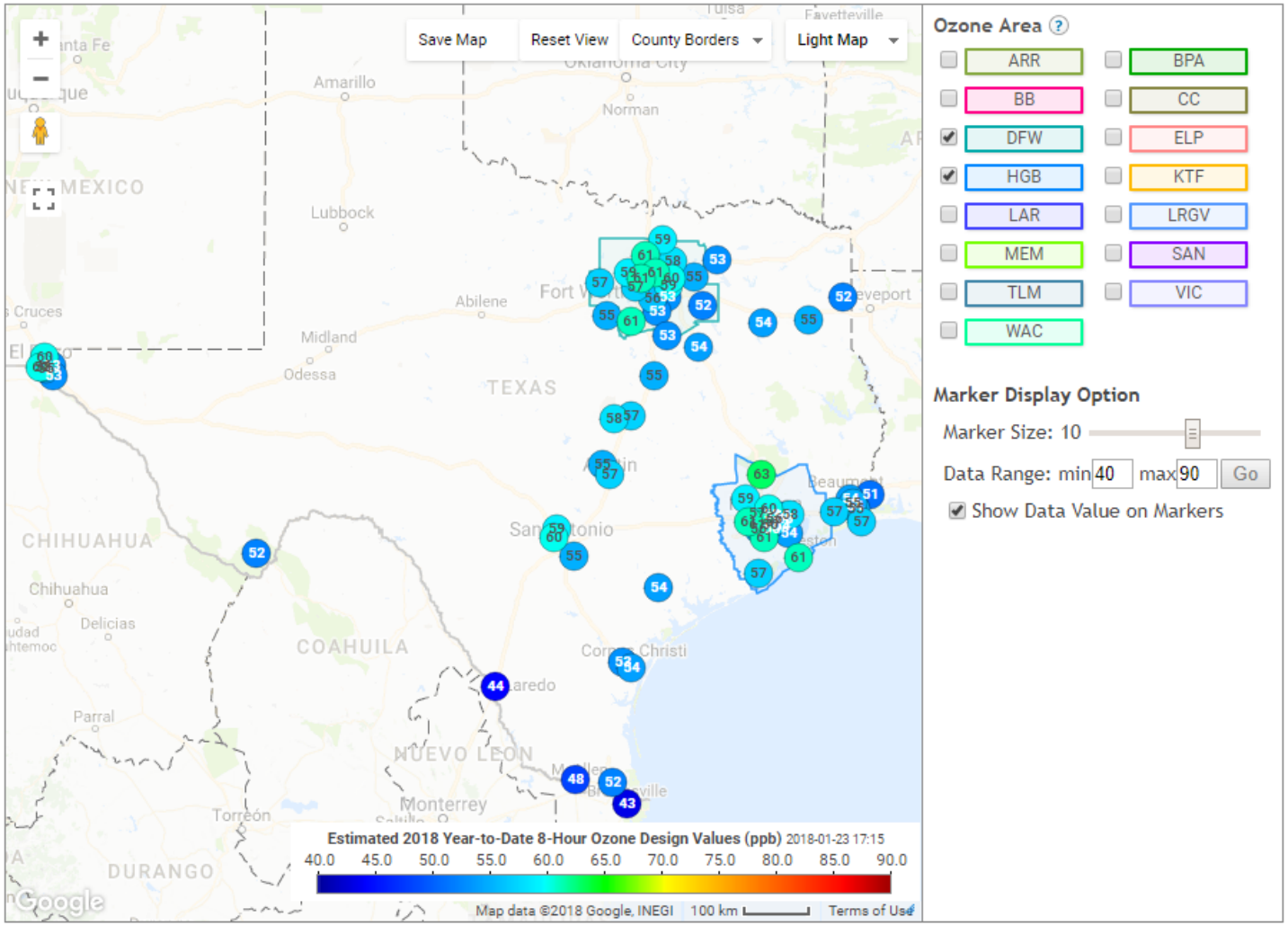
AirNow Observations: One-hour Solar Radiation Averages



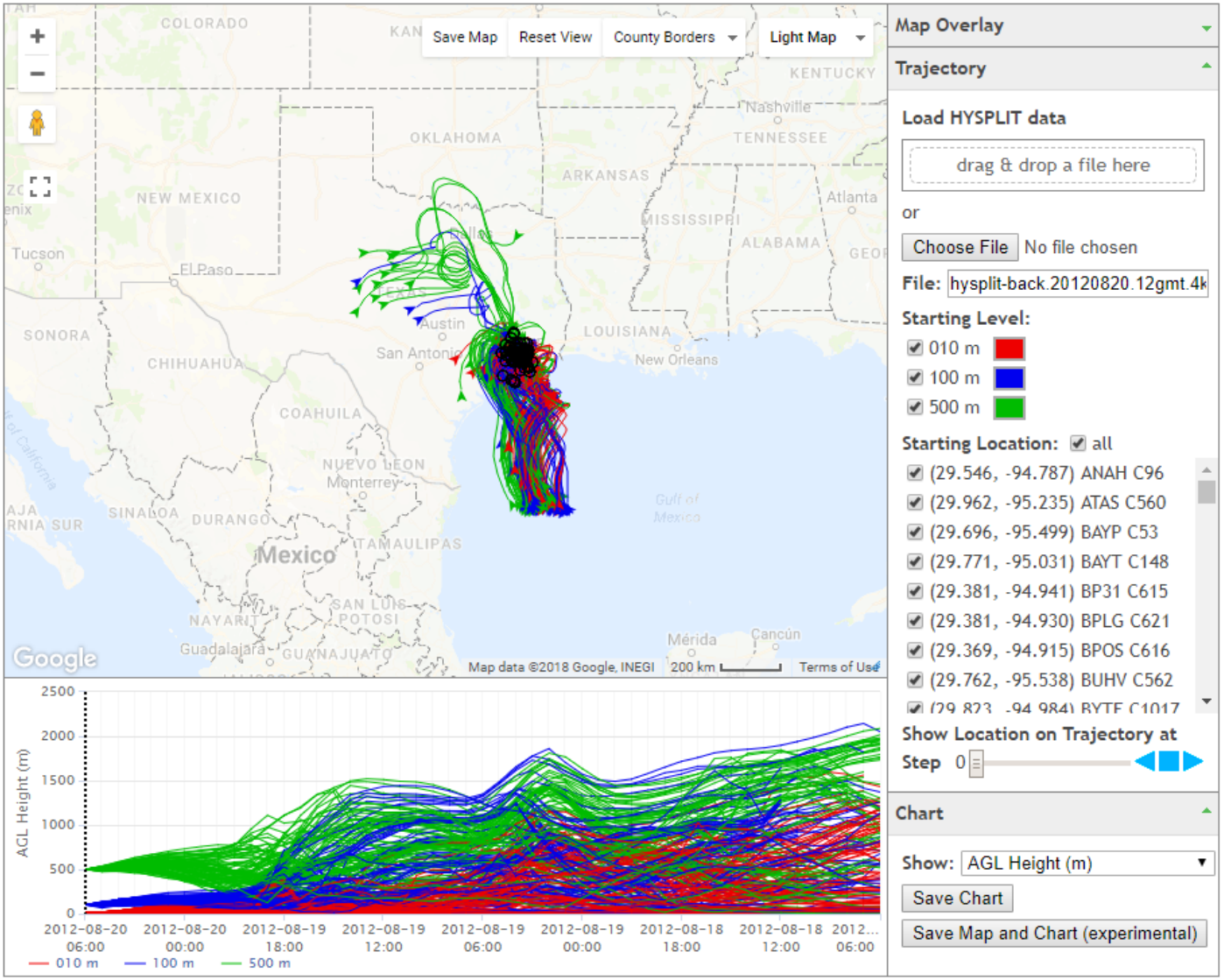
Realtime Design Value Tracker

Estimated 2018 Year-to-Date 8-Hour Ozone Design Values

| Design Values by Region Bar Chart | Design Values on Map |



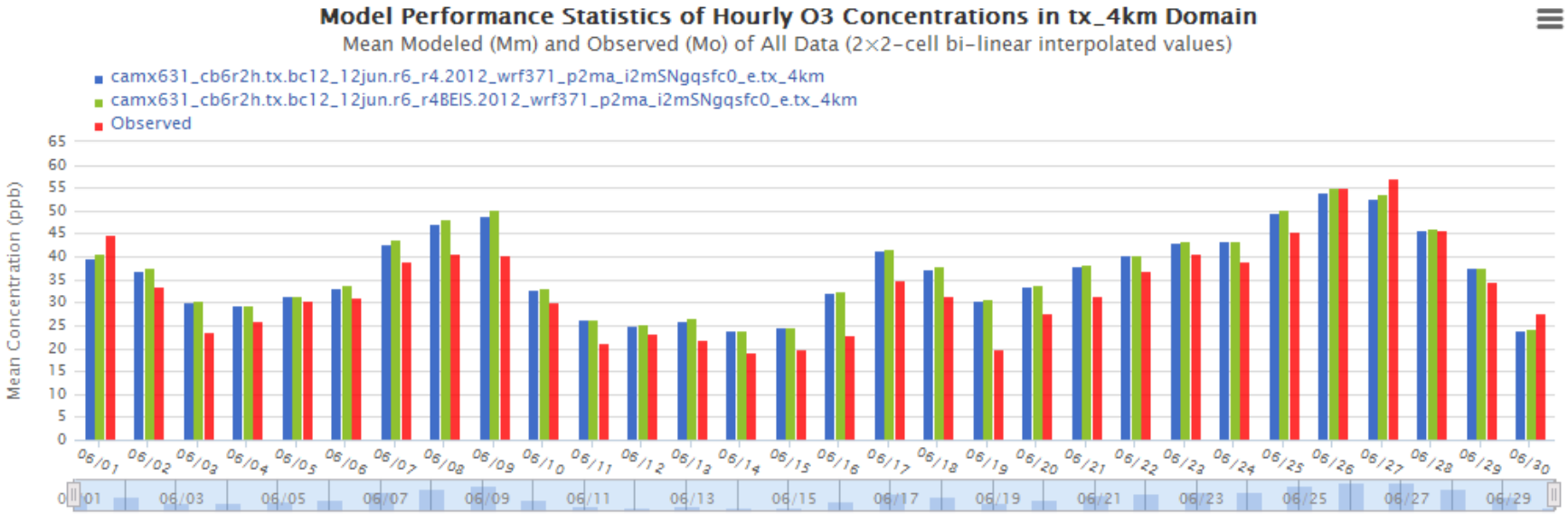
HYSPLIT Trajectory Viewer



Note: AGL - Above Ground Level.

Ozone Performance Statistic Bar Chart

Model Run	Compare to	Data Type	Statistic Metric	Spatial Option	Temporal Option	Area	Chemical
2016-06-27: camx631_cb6r2h.tx.bc12_1	2016-06-21: camx631_cb6r2h.tx.bc12_1	All Data	Mean Modeled	2×2-cell bi-l	hourly average	tx_4k	O3



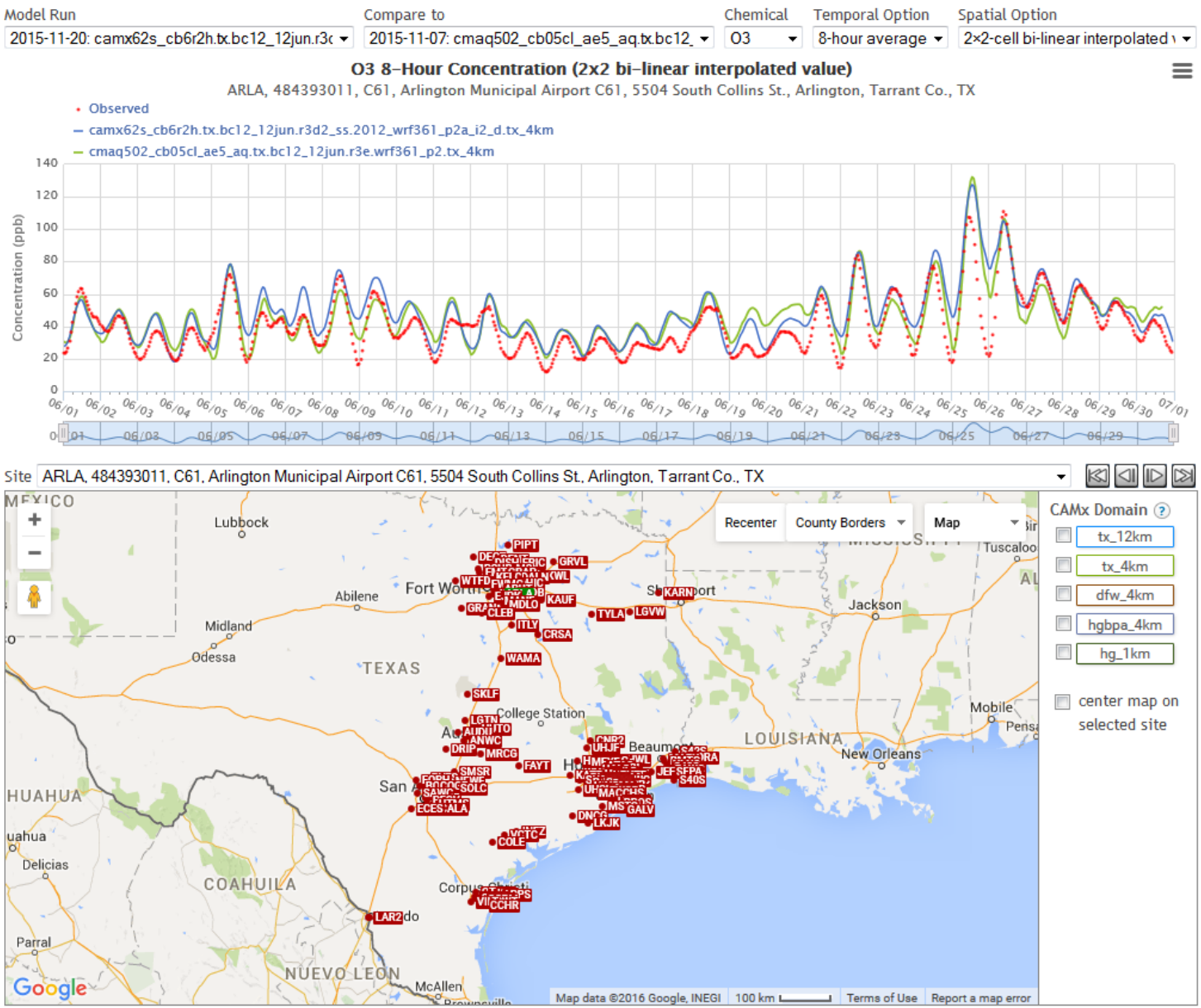
Model Performance Statistics of Hourly O3 Concentrations in tx_4km Domain (2×2-cell bi-linear interpolated values)

camx631_cb6r2h.tx.bc12_12jun.r6_r4.2012_wrf371_p2ma_i2mSNgqsfc0_e.tx_4km

Show 10 entries Search:

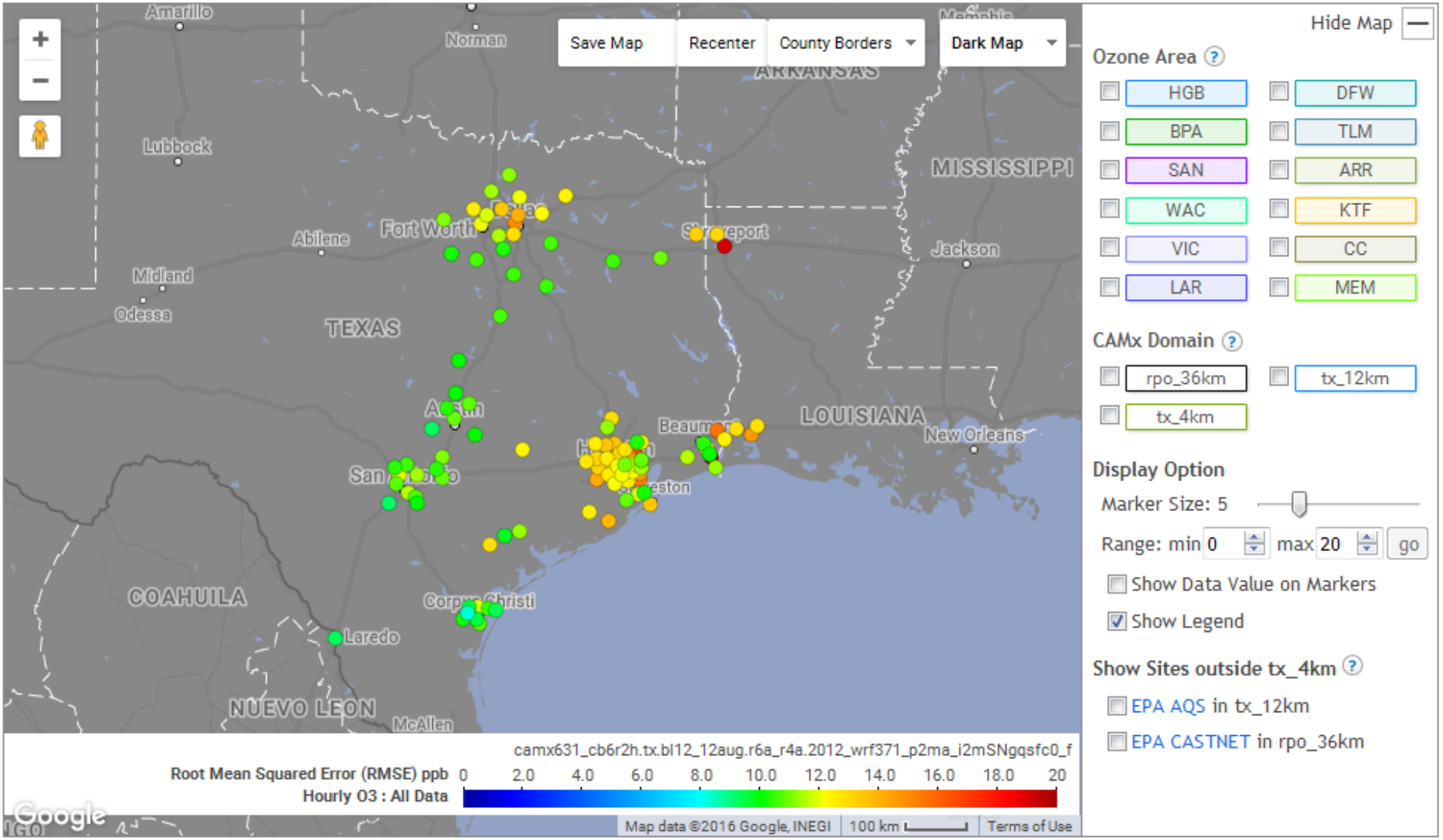
	All Data											Data with Observed ≥ 60 ppb								
Episode Date	Valid Data	Mo ppb	Mm ppb	MB ppb	ME ppb	RMSE ppb	NMB %	NME %	FB %	FE %	R^2	Valid Data	Mo ppb	Mm ppb	MB ppb	ME ppb	RMSE ppb	NMB %	NME %	FB %
20120601	2604	44.96	39.56	-5.39	10.26	13.4	-11.99	22.83	-5.89	31.06	0.73	671	74	60.1	-13.9	14.24	18.01	-18.78	19.24	-20.61
20120602	2568	33.68	37.03	3.35	9.8	12.52	9.96	29.1	11.25	30.81	0.437	152	64.91	60.17	-4.74	5.81	7.89	-7.3	8.96	-8
20120603	2636	23.62	30.18	6.56	9.07	10.94	27.78	38.41	23.37	34.85	0.422	0								
20120604	2620	26.15	29.44	3.28	7.04	8.83	12.56	26.92	8.35	27.64	0.673	33	66.48	69.68	3.2	5.67	7.3	4.81	8.53	4.35
20120605	2576	30.48	31.5	1.03	8.15	10.42	3.37	26.74	11.22	38.99	0.754	235	71.11	65.9	-5.21	8.74	11.3	-7.32	12.29	-8.03

Eight-Hour Ozone Time Series

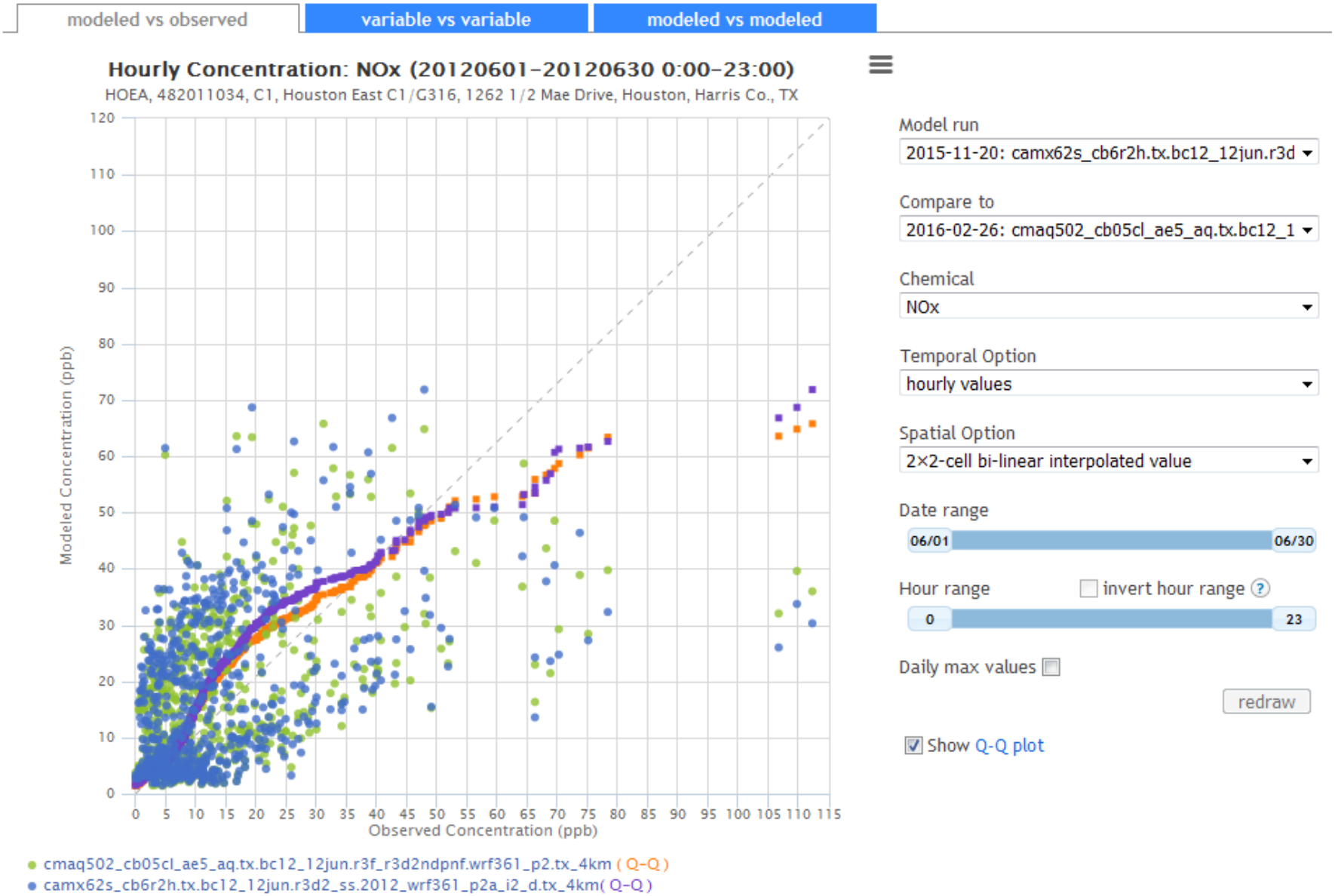


Statistic by Monitor on Google Maps

Model Run: 2016-09-23: camx631_cb6r2h.tx.bl12_12aug.r6a_r4a.2012_wrf37
Data Type: All Data
Statistic Metric: Root Mean Squarec
Spatial Option: 2×2-cell bi-lir
Temporal Option: hourly average
Chemical: O3

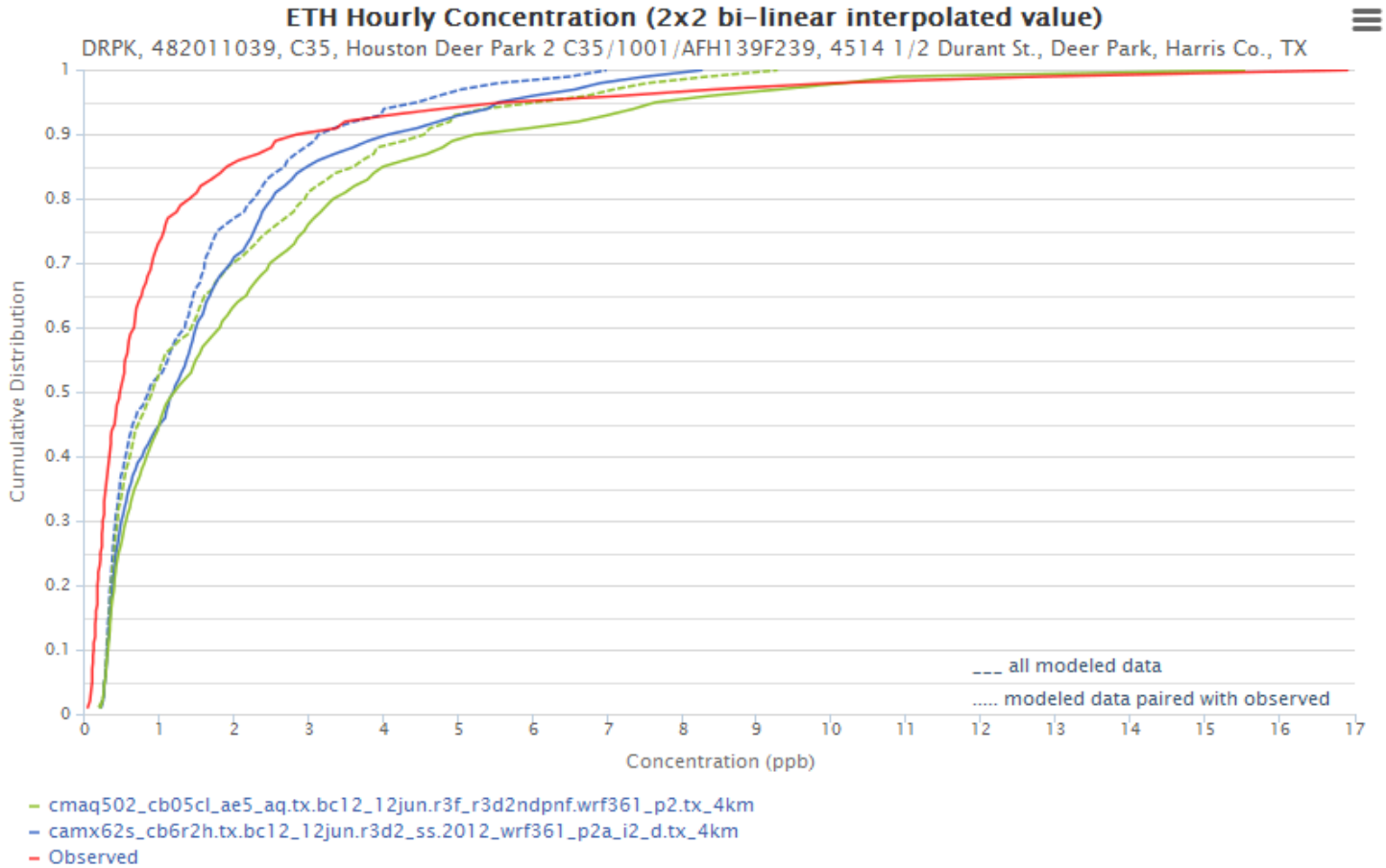


Hourly NO_X Scatter Plot



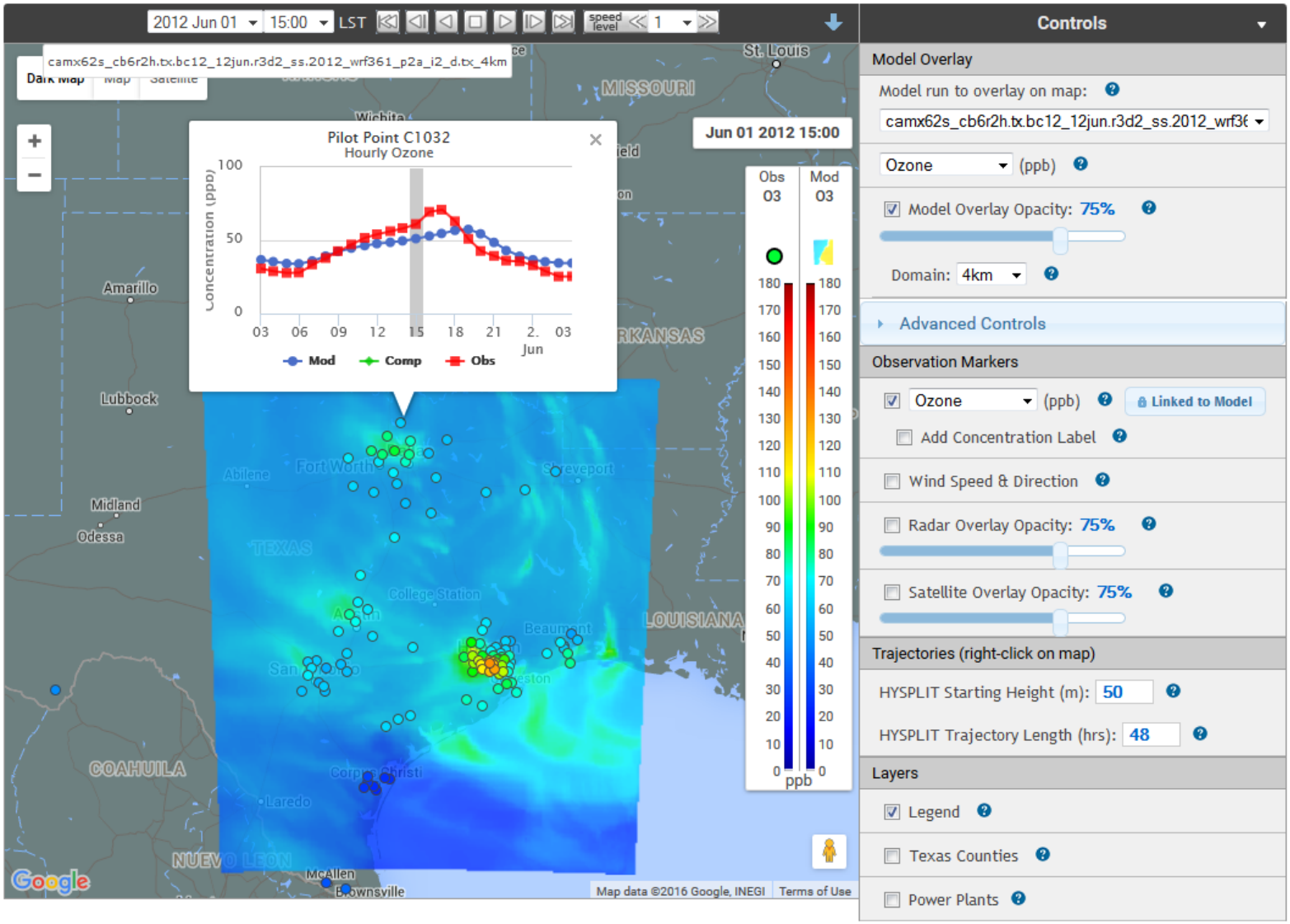
Ethylene
Cumulative Distribution Function Plot

Model Run: 2015-11-20: camx62s_cb6r2h.tx.bc12_12jun.r3
Compare to: 2016-02-26: cmaq502_cb05cl_ae5_aq.tx.bc12_
Chemical: ETH
Temporal Option: hourly average
Spatial Option: 2×2-cell bi-linear interpolated



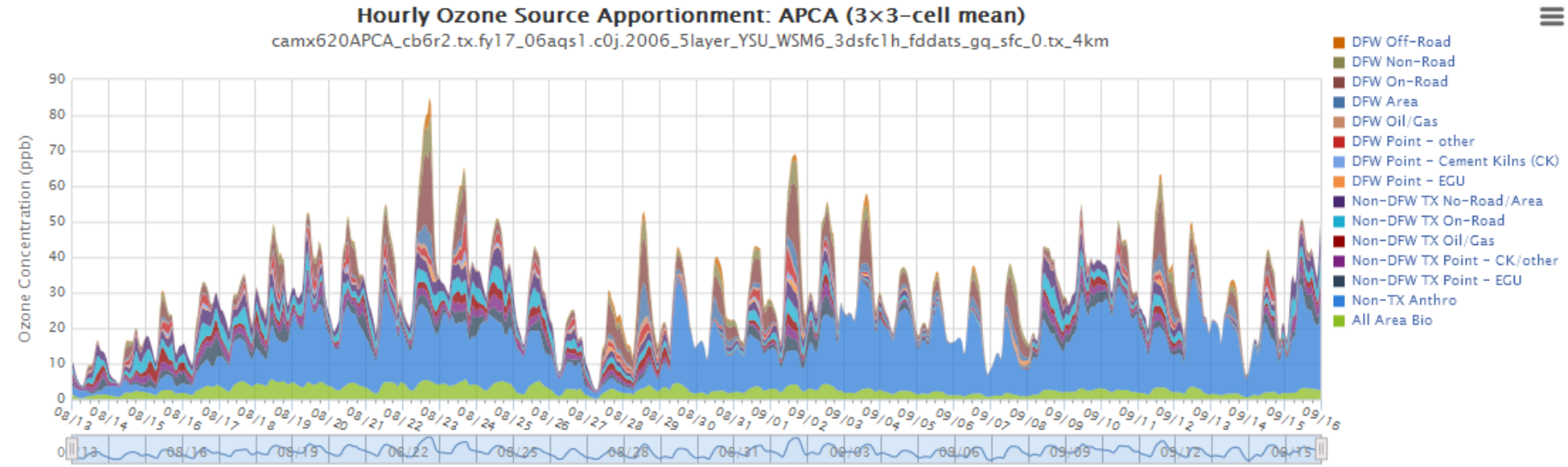
Concentration Map on Google Maps

Modeled Ozone Overlay with Observed Ozone Markers: One-hour Averages



Source Apportionment

Model Run: 2015-09-04: camx620APCA_cb6r2.tx.fy17_06ac | Temporal Option: hourly average | Spatial Option: 3×3-cell mean | Layer Stacking Option: stacked concentrations | Show Total Concentration Line | line color | line style: dots



OSAT/APCA category grouping options

category code info | group builder instruction | export group definition | redraw chart | search category | search | clear

Load predefined groups into the group definition table:

drag and drop a group definition file here (FireFox, Chrome, or IE10/11)

sa.group.2006.0.txt

Group definition table:

#	Color	Group Label	Category List
15		DFW Off-Road	NOx DFW Off-Road, VOC DFW Off-Road
14		DFW Non-Road	NOx DFW Non-Road, VOC DFW Non-Road
13		DFW On-Road	NOx DFW On-Road, VOC DFW On-Road

TCEQ Modeling Web Sites

- Interactive Modeling Statistics
  https://www.tceq.texas.gov/airquality/airmod/data/stats_area?eps=20120501-20120531

- Interactive Modeling Map Results
  https://www.tceq.texas.gov/airquality/airmod/data/results?year=2012

- Interactive Modeling Time Series
  https://www.tceq.texas.gov/airquality/airmod/data/ts?eps=20120501-20120531

- Current Modeling File FTP Site
  ftp://amdaftp.tceq.texas.gov/pub/TX/

Questions?

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air modeling data analysis