

DISCOVER-AQ OUTLOOK - Sept. 10, 2013

The Houston area was covered with clouds and light rain this morning, giving way to some sunshine during the afternoon. However, a few small scattered thunderstorms were in the area in the afternoon. However, most convective activity was confined to areas south and west of the Houston region. Relatively clean conditions for ozone and aerosol persisted with the easterly and southeasterly flow.

Tomorrow looks like the best day we will have to fly in the near future. Cloud cover should decrease compared with today. Some fair weather cumulus will exist. Ozone may build up to larger values than we have seen in the past few days, with afternoon ozone reaching moderate levels (Code Yellow), especially to the west and northwest of the city.

Thursday may also be a good day to fly, with the possibility of ozone building further. However, there is a chance that cirrus may enter the area by the afternoon as convection will be quite active over the Gulf. Friday may bring more coverage by cirrus, as the convection in the southern Gulf intensifies with an easterly wave off the south Texas and Mexican coast. Also by Friday or Saturday, tropical storm development in the Bay of Campeche may increase the cirrus shield even further. The National Hurricane Center is giving this region a 70% chance of tropical cyclone development over the next 5 days.

9/10/2013 Weather Briefing

Clare Flynn

Chris Loughner

Ken Pickering

Conroe:

TODAY	TONIGHT	WEDNESDAY	WEDNESDAY NIGHT	THURSDAY	THURSDAY NIGHT	FRIDAY	FRIDAY NIGHT	SATURDAY
 20%								
Slight Chc Thunderstorms High: 94 °F	Partly Cloudy Low: 70 °F	Mostly Sunny High: 94 °F	Partly Cloudy Low: 70 °F	Mostly Sunny High: 95 °F	Partly Cloudy Low: 71 °F	Mostly Sunny High: 96 °F	Partly Cloudy Low: 71 °F	Mostly Sunny High: 95 °F

Houston Hobby:

TODAY	TONIGHT	WEDNESDAY	WEDNESDAY NIGHT	THURSDAY	THURSDAY NIGHT	FRIDAY	FRIDAY NIGHT	SATURDAY
 30%								
Chance Thunderstorms High: 93 °F	Partly Cloudy Low: 76 °F	Mostly Sunny High: 93 °F	Partly Cloudy Low: 76 °F	Mostly Sunny High: 93 °F	Partly Cloudy Low: 76 °F	Mostly Sunny High: 94 °F	Partly Cloudy Low: 75 °F	Mostly Sunny High: 94 °F

Galveston:

TODAY	TONIGHT	WEDNESDAY	WEDNESDAY NIGHT	THURSDAY	THURSDAY NIGHT	FRIDAY	FRIDAY NIGHT	SATURDAY
 30%	 20%	 20%		 20%				
Chance Thunderstorms High: 89 °F	Slight Chc Thunderstorms Low: 80 °F	Slight Chc Thunderstorms High: 88 °F	Partly Cloudy Low: 80 °F	Slight Chc Thunderstorms High: 90 °F	Partly Cloudy Low: 81 °F	Mostly Sunny High: 89 °F	Partly Cloudy Low: 80 °F	Mostly Sunny High: 89 °F

Current Conditions

Conroe:



Fair
88°F
 31°C

Humidity 59%
 Wind Speed SE 5 mph
 Barometer 30.04 in (1016.7 mb)
 Dewpoint 72°F (22°C)
 Visibility 10.00 mi
 Heat Index 95°F (35°C)
 Last Update on 10 Sep 2:53 pm CDT

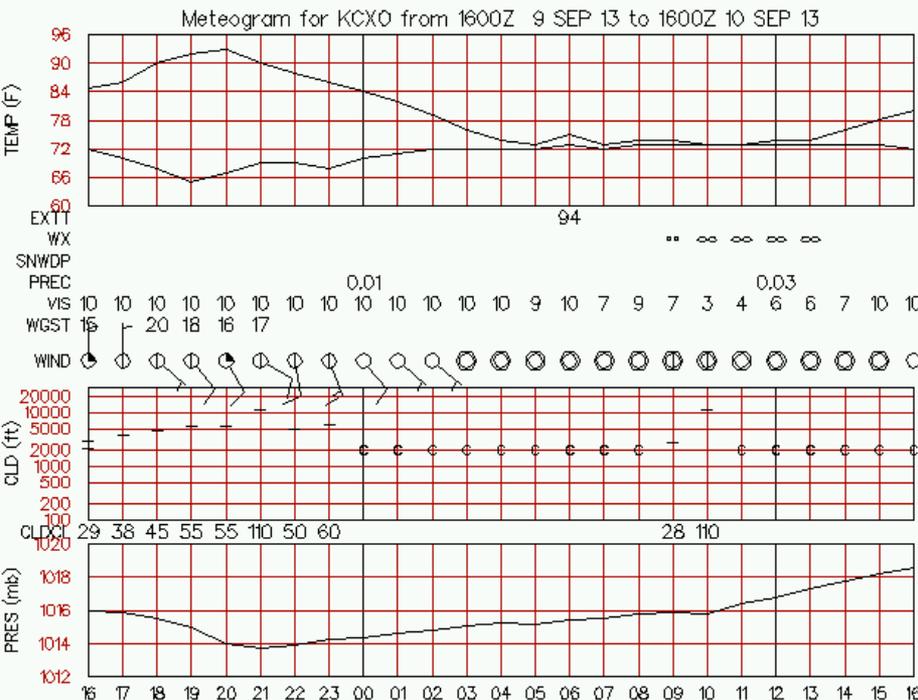
Houston Hobby:



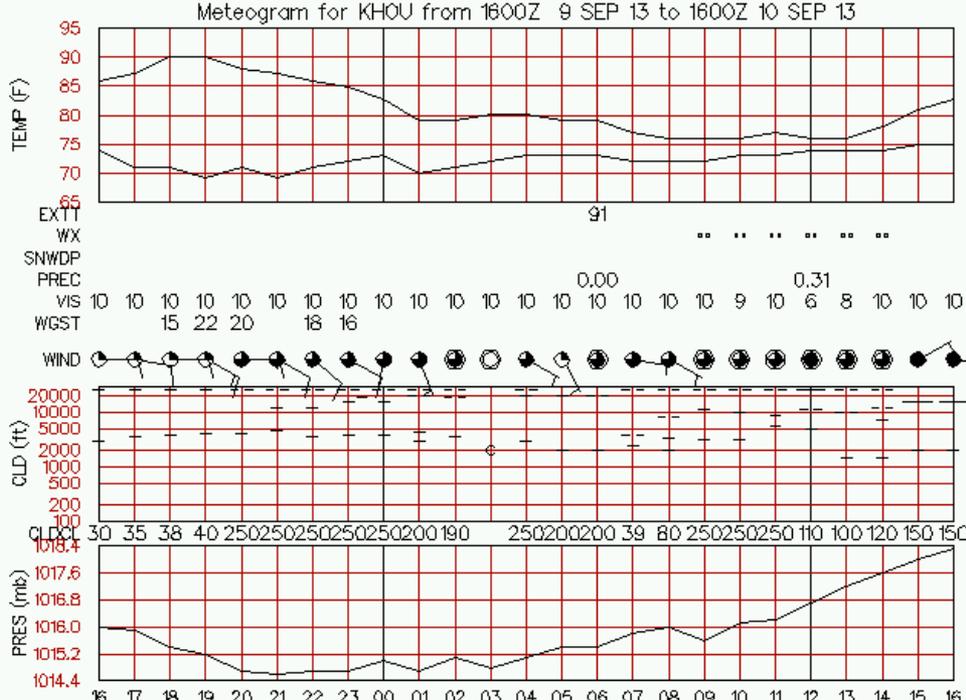
Partly Cloudy
89°F
 32°C

Humidity 61%
 Wind Speed E 13 G 23 mph
 Barometer 30.02 in (1016.8 mb)
 Dewpoint 74°F (23°C)
 Visibility 10.00 mi
 Heat Index 98°F (37°C)
 Last Update on 10 Sep 2:53 pm CDT

▼ Plymouth State Weather Center ▼



▼ Plymouth State Weather Center ▼



Current Conditions

Galveston:



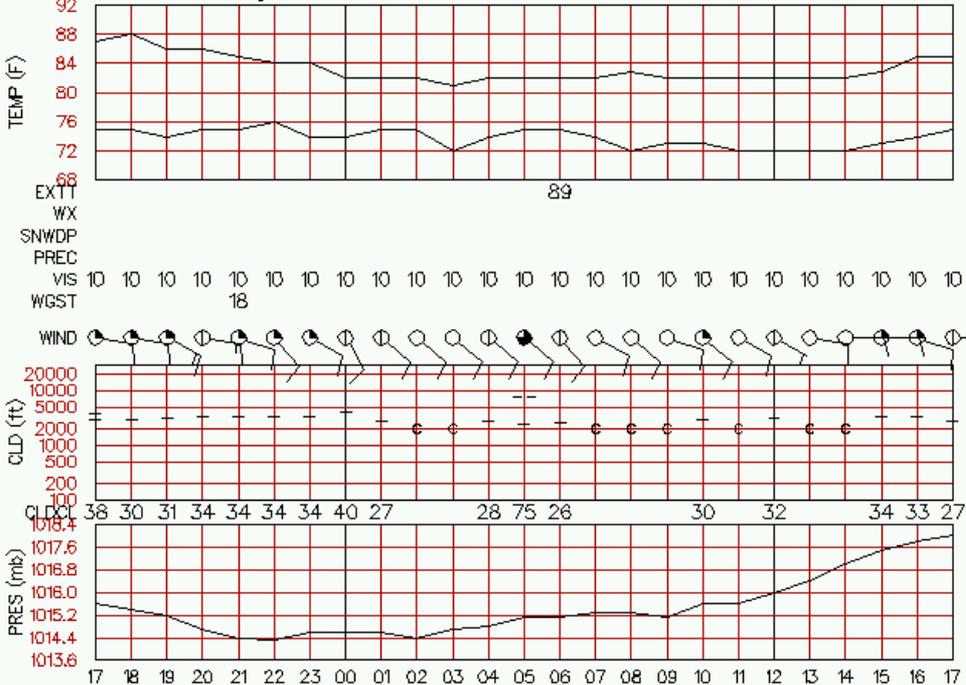
Mostly Cloudy
85°F
29°C

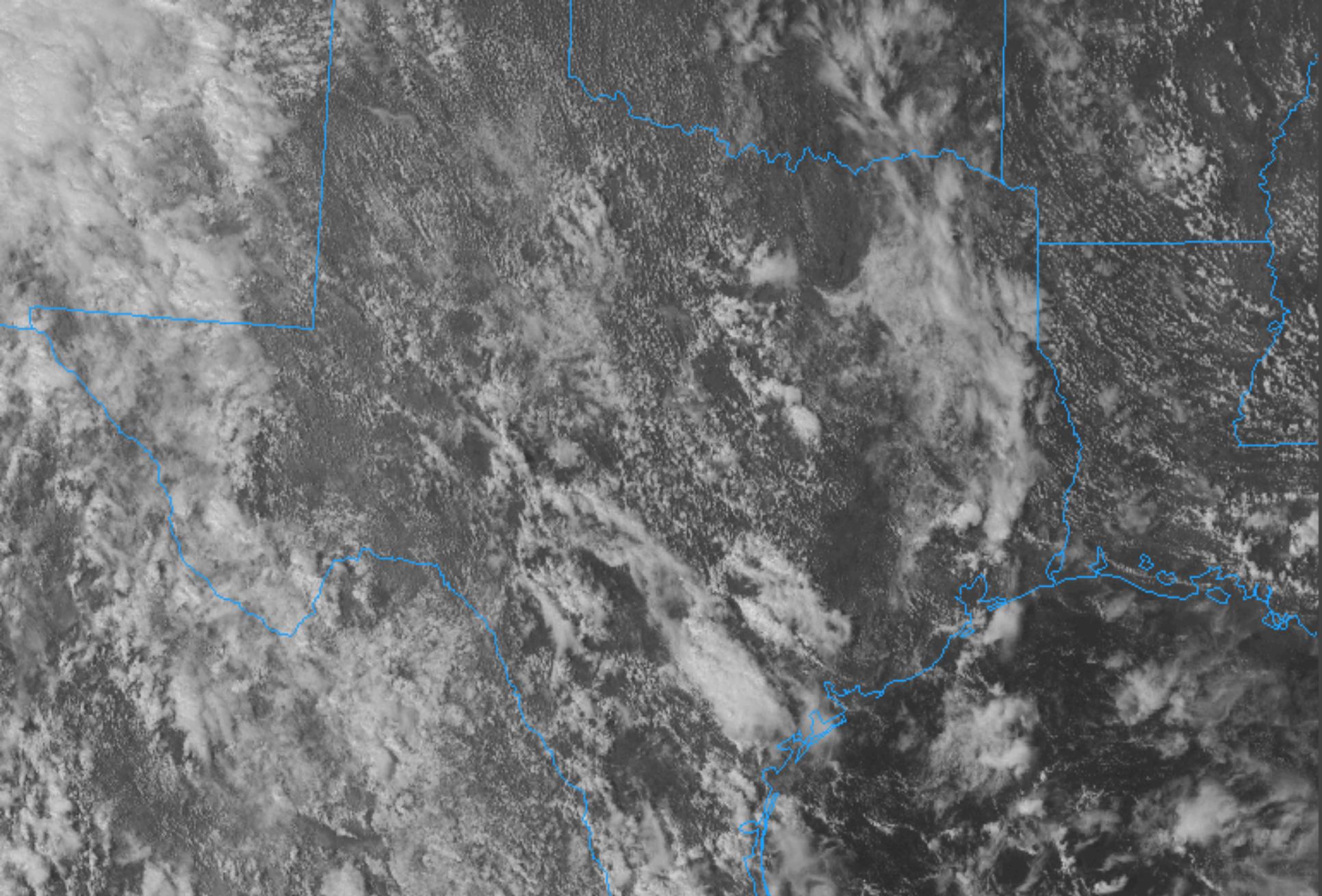
Humidity 75%
Wind Speed SE 17 G 25 mph
Barometer 30.03 in (1017.0 mb)
Dewpoint 76°F (24°C)
Visibility 10.00 mi
Heat Index 95°F (35°C)

Last Update on 10 Sep 2:52 pm CDT

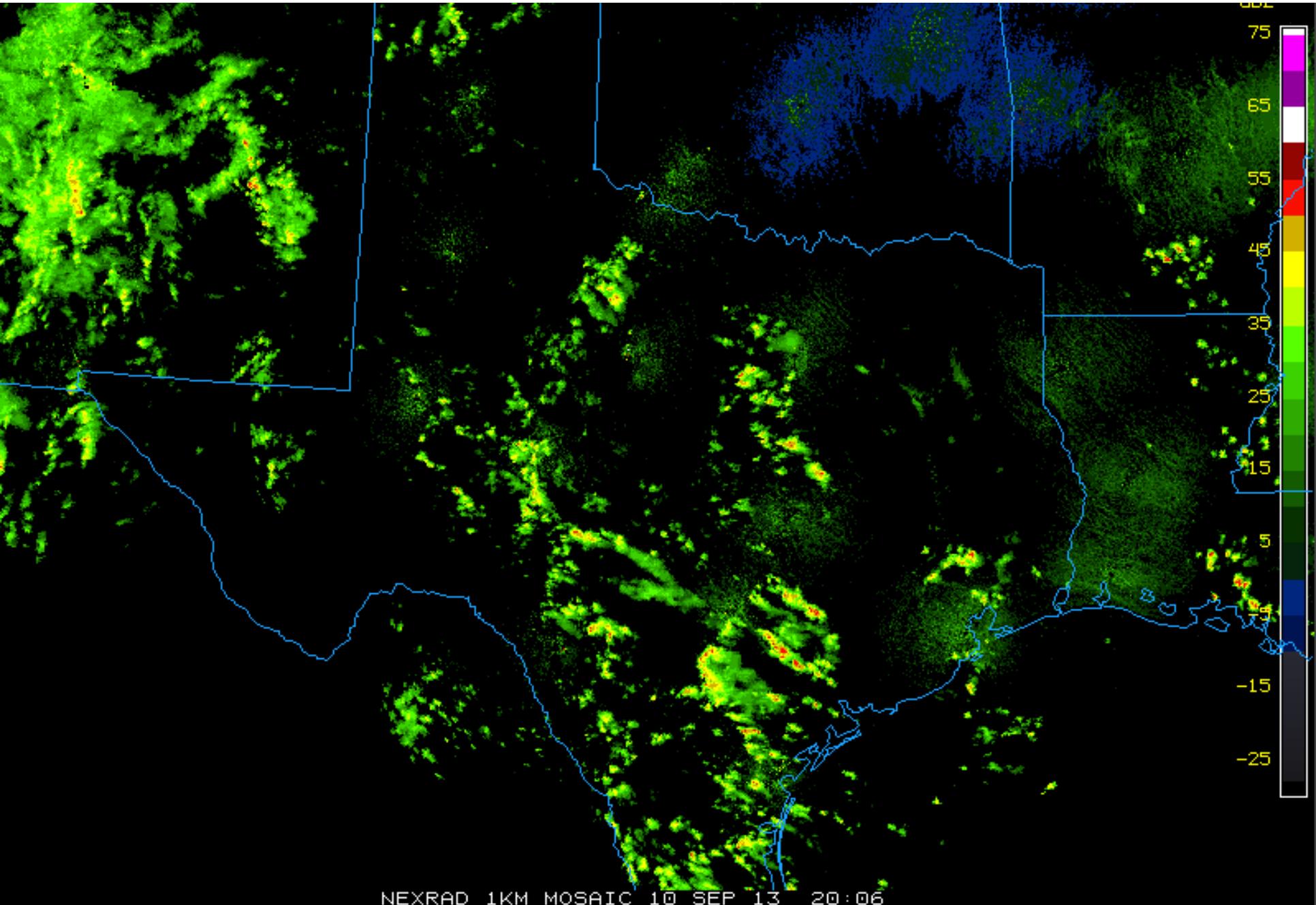
▼ Plymouth State Weather Center ▼

Meteogram for KGLS from 1700Z 9 SEP 13 to 1700Z 10 SEP 13

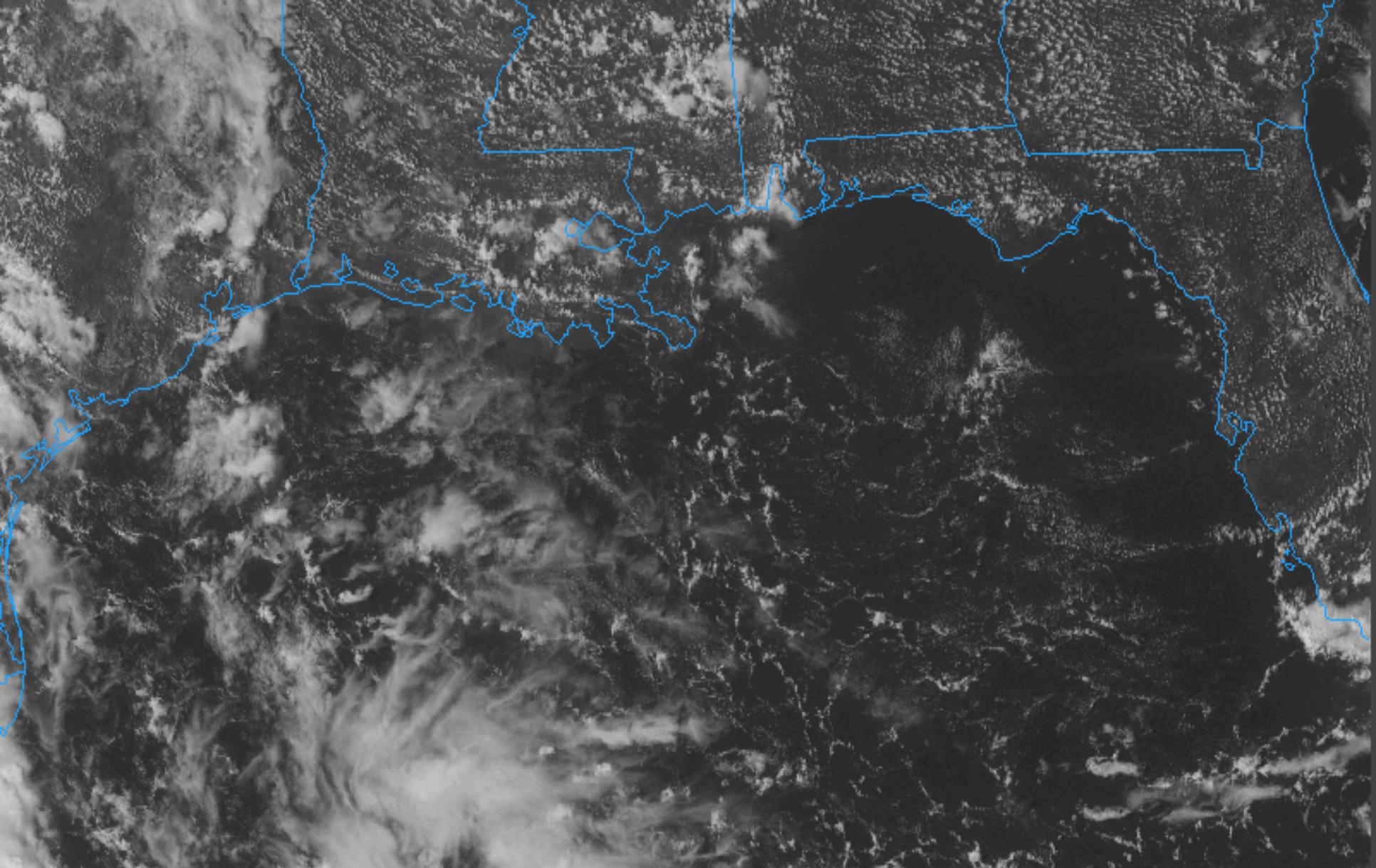




GOES VISIBLE SATELLITE 10 SEP 13 20:01



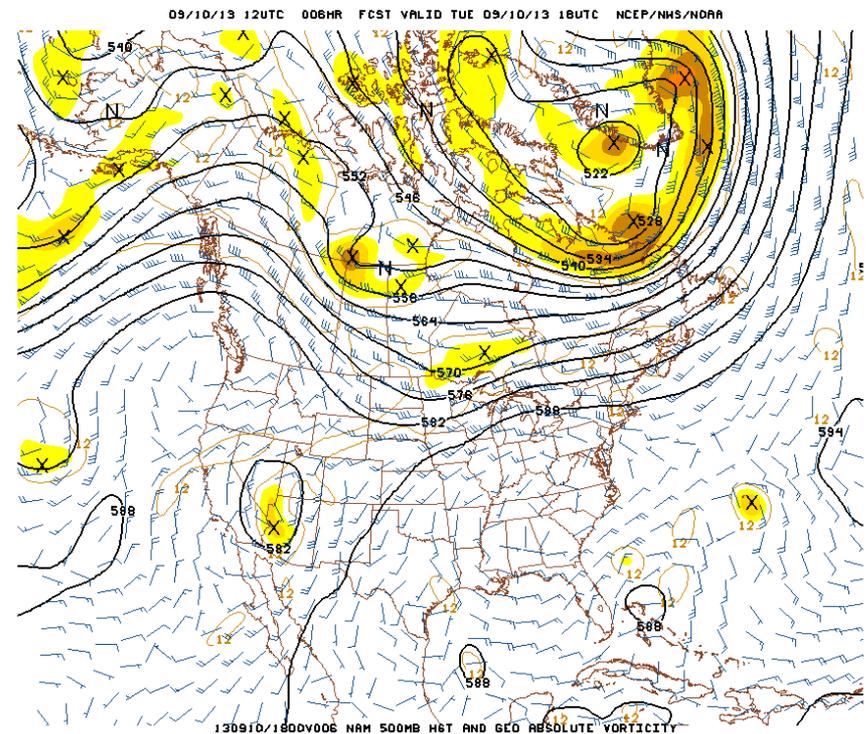
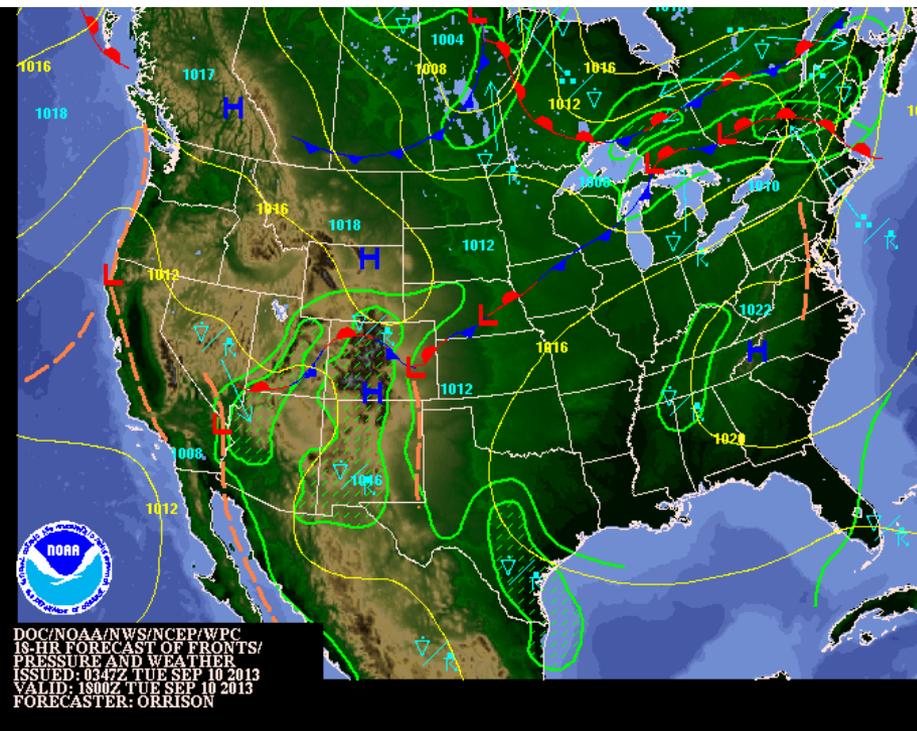
NEXRAD 1KM MOSAIC 10 SEP 13 20:06



GOES VISIBLE SATELLITE 10 SEP 13 20:01

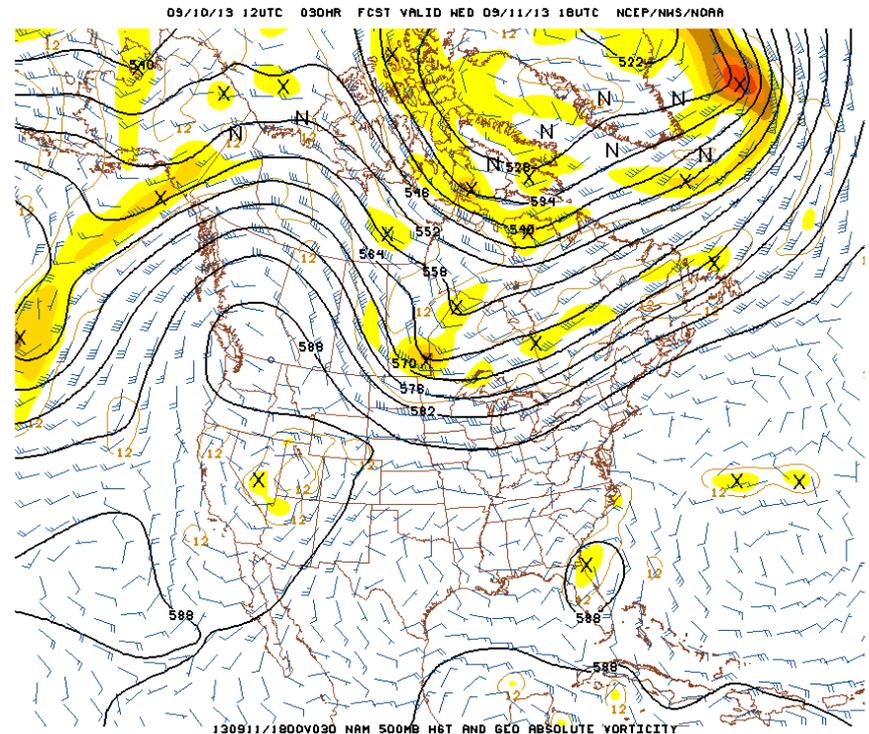
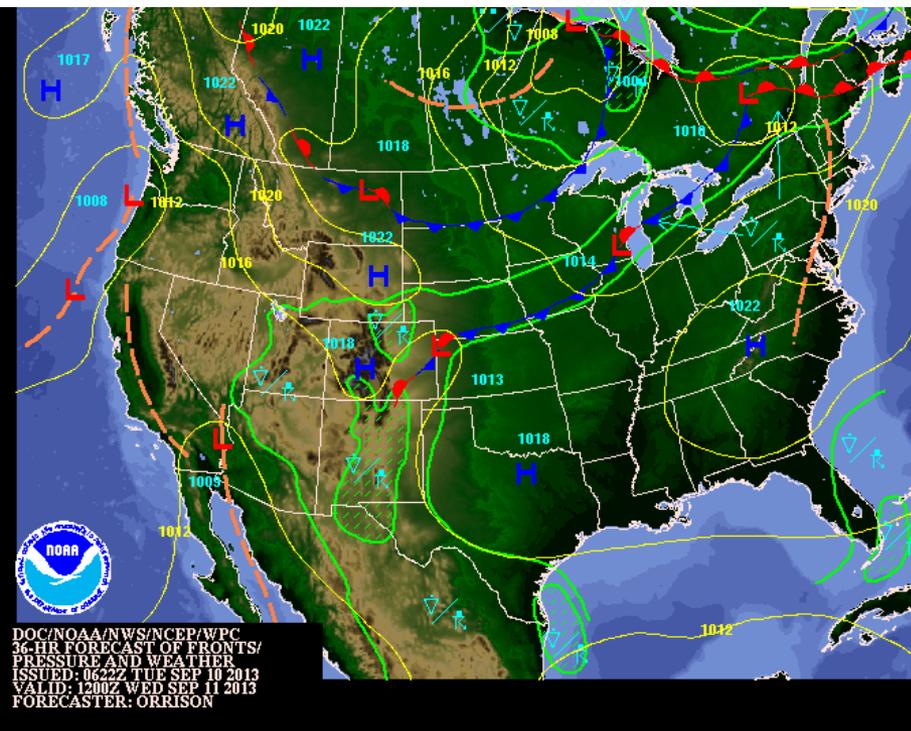
Today: Showers during morning, then mainly sunny.
Southeasterly winds.

1 PM CDT
500 mb vorticity



Tomorrow: Southeasterly flow and drying over the research area as we come under influence of an upper level high.

1 PM CDT
500 mb vorticity



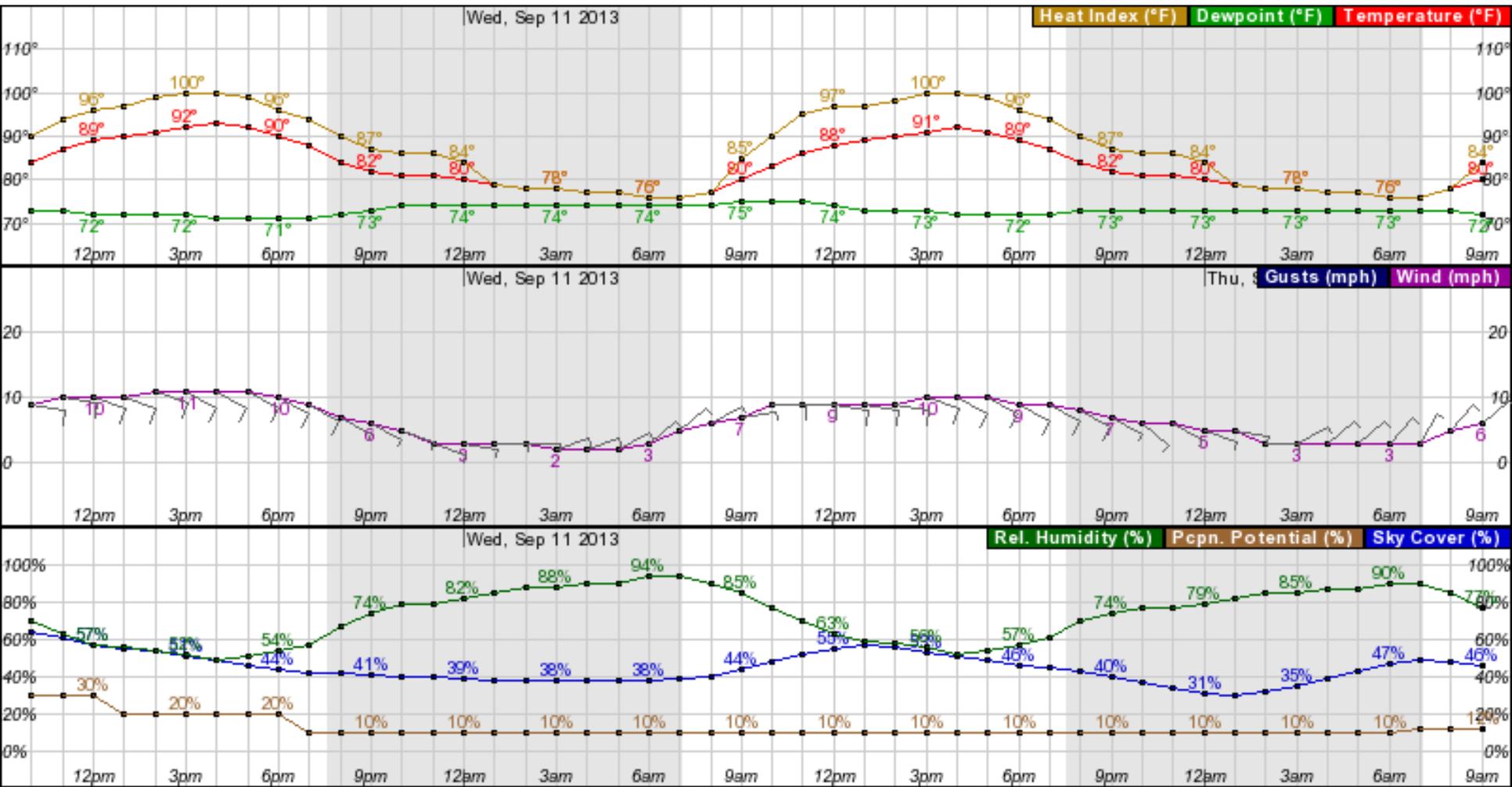
Houston Hobby

Today: Mostly cloudy

Tomorrow: Cloud cover around 50%

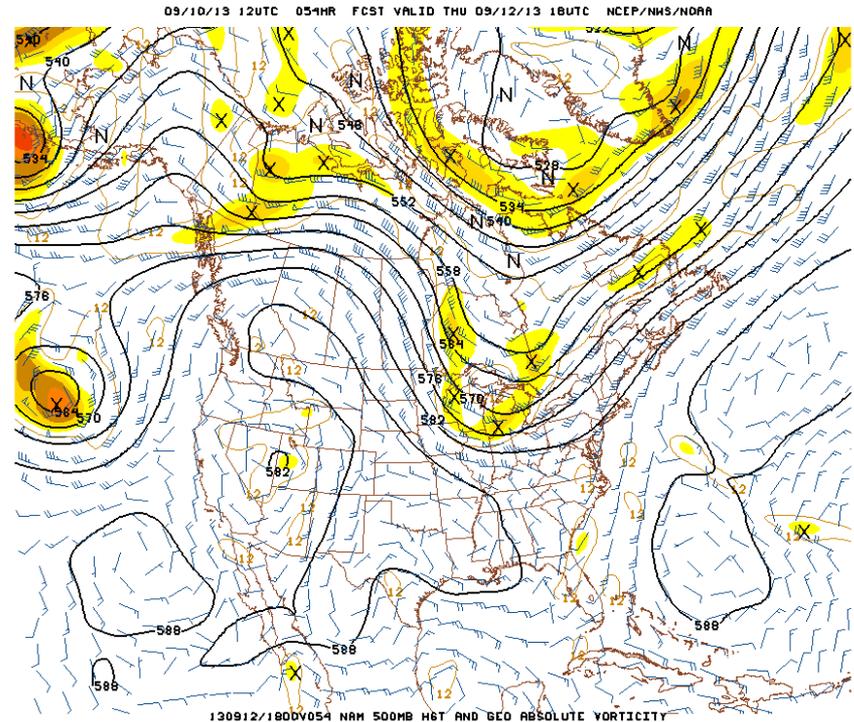
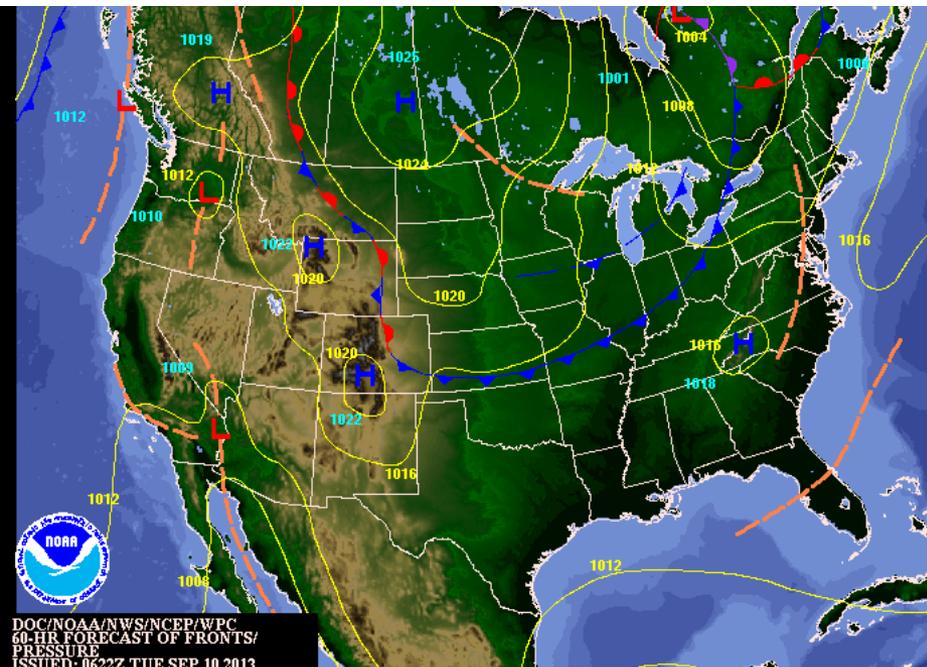
Today →

Tomorrow →



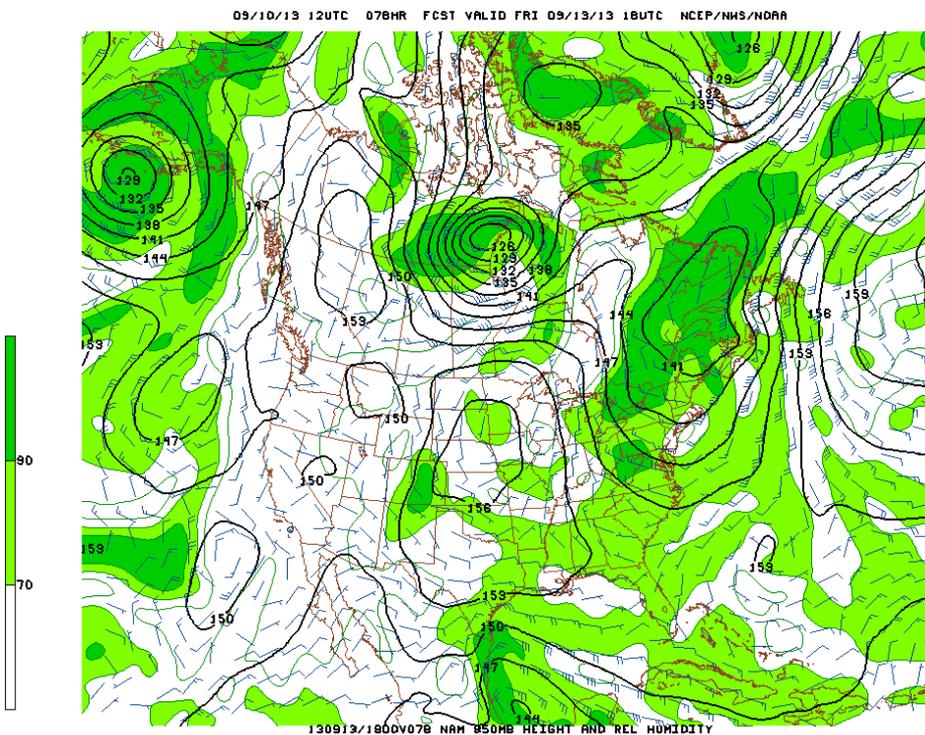
Thursday: Continuation of the drying trend under the influence of the upper high. Easterly flow.

1 PM CDT
500 mb vorticity

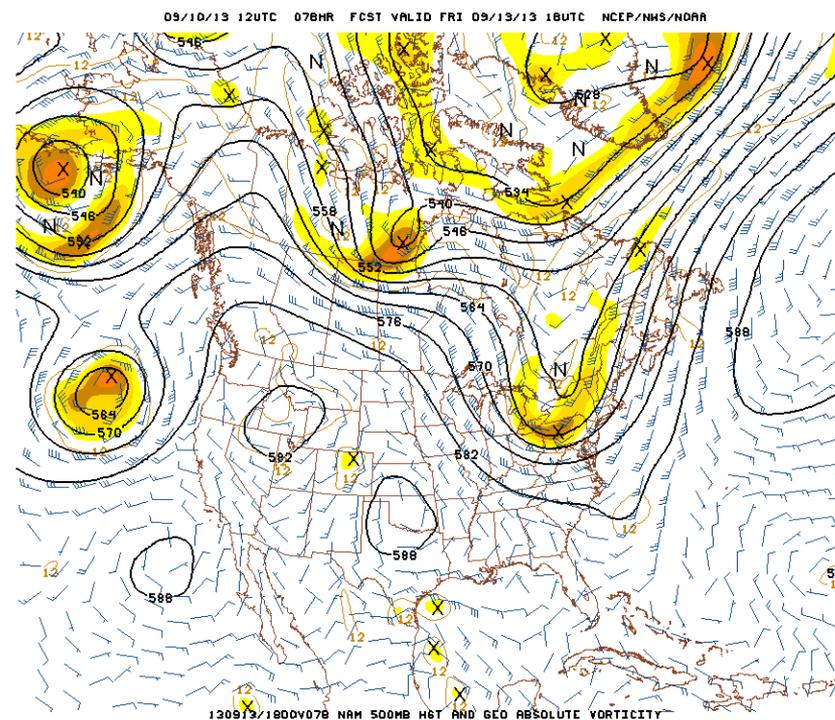


Friday: Study area continues to be under influence of the upper high. Moisture begins to push back into area; best chances of rain over the Gulf.

1 PM CDT
850 mb RH



500 mb vorticity



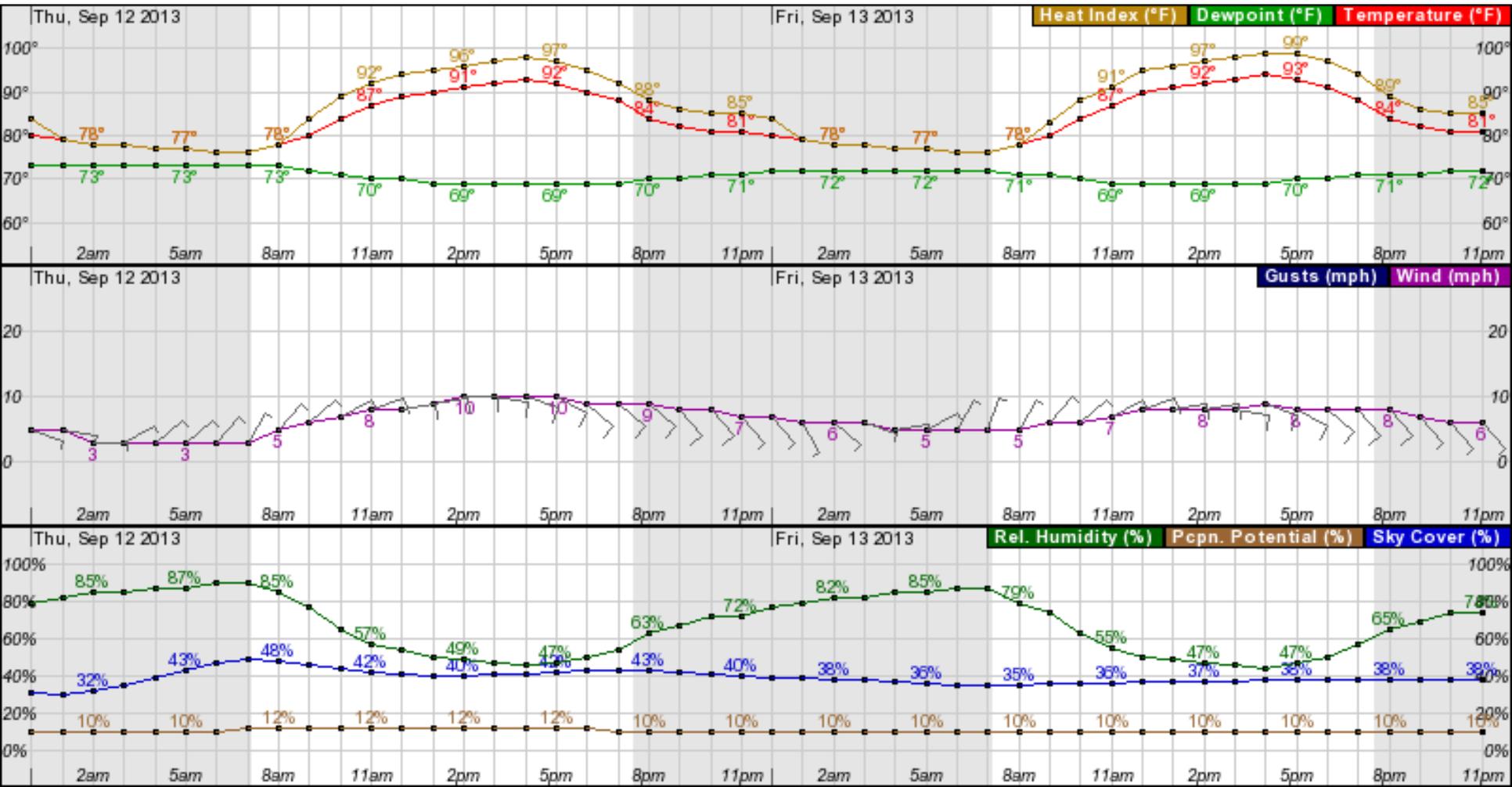
Houston Hobby

Thursday: Partly cloudy

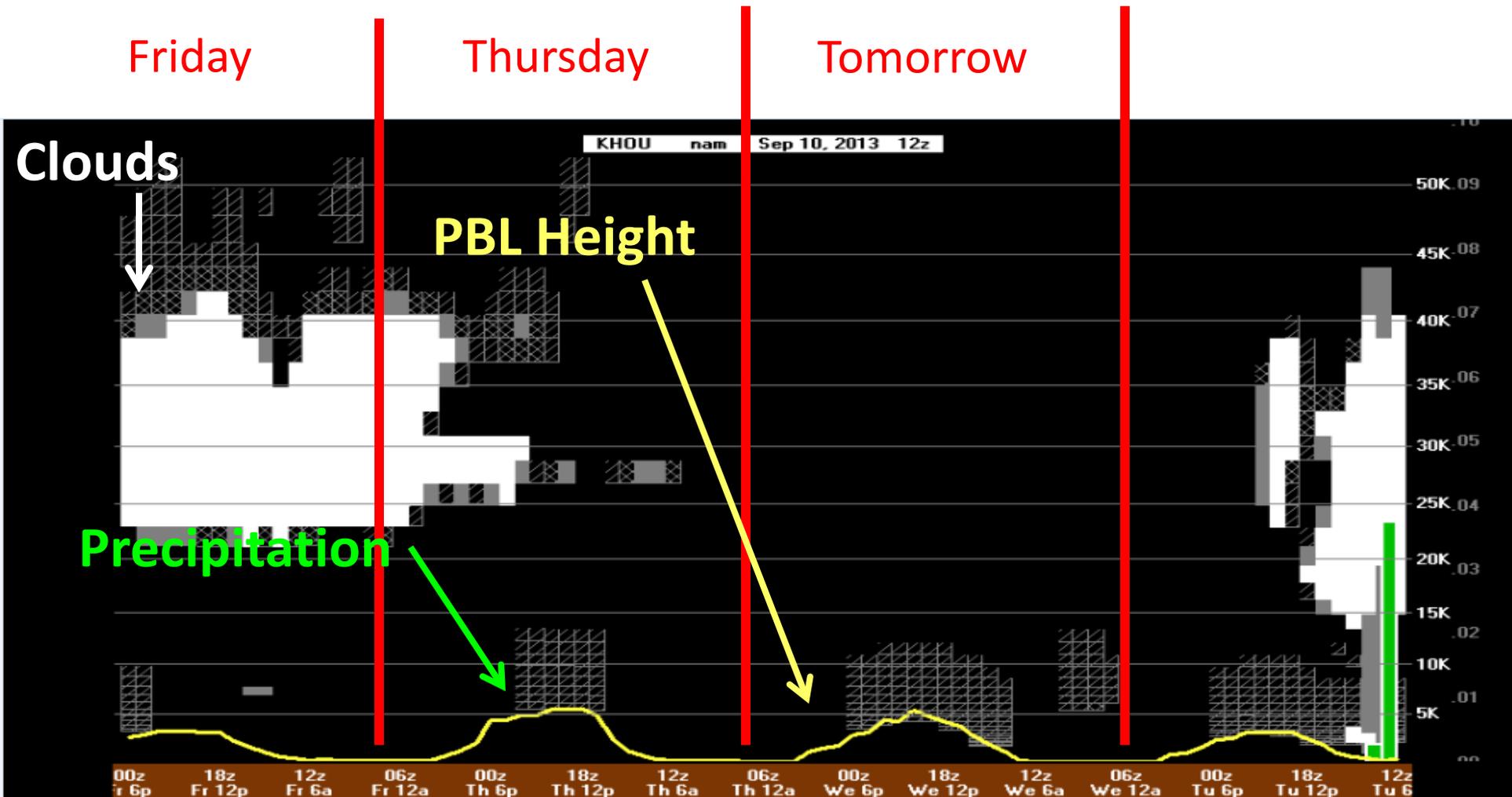
Friday: Partly cloudy

Thursday →

Friday →



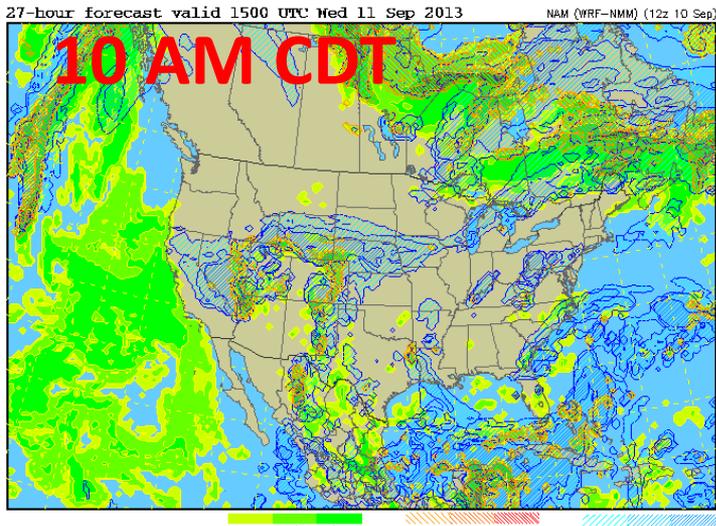
Houston Hobby; BUFKIT – NAM (12 UTC 10 September)



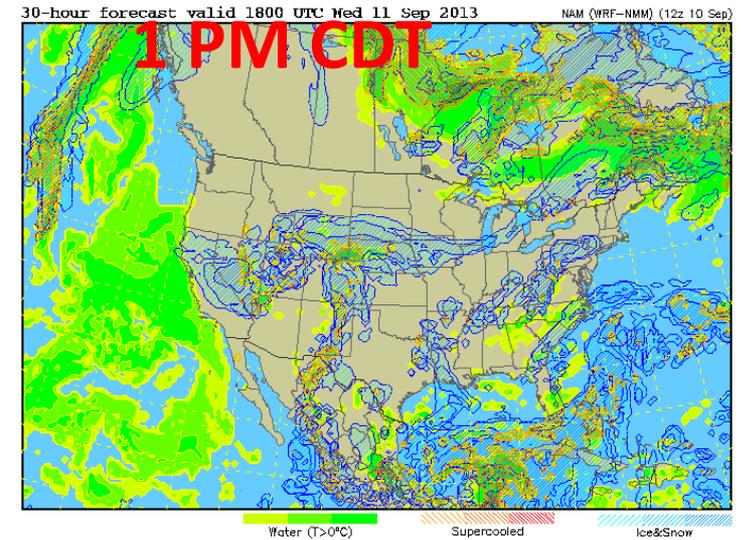
- Tomorrow: Some Cu clouds most of the day.
- Thursday: Some Cu clouds during afternoon. Cirrus may move in.
- Friday: Mostly cloudy (cirrus)

Tomorrow: NAM – region remains mostly cloud-free throughout the day; some low level clouds to the NW.

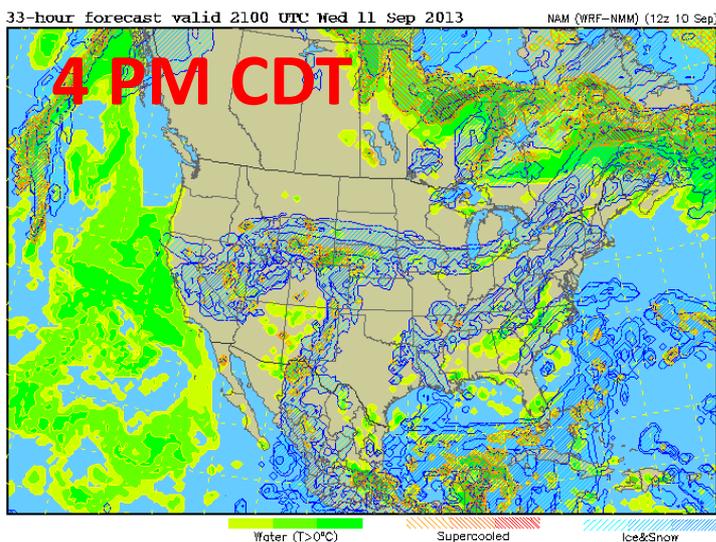
Integrated liquid and frozen hydrometeors (all levels)



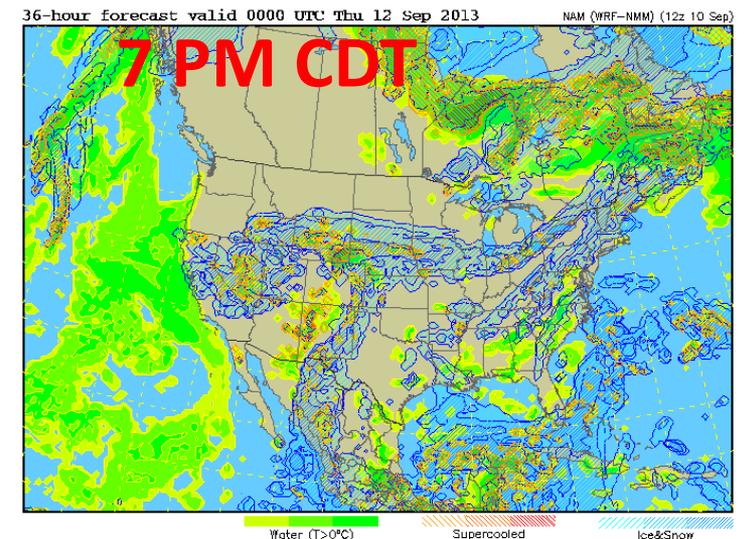
Integrated liquid and frozen hydrometeors (all levels)



Integrated liquid and frozen hydrometeors (all levels)

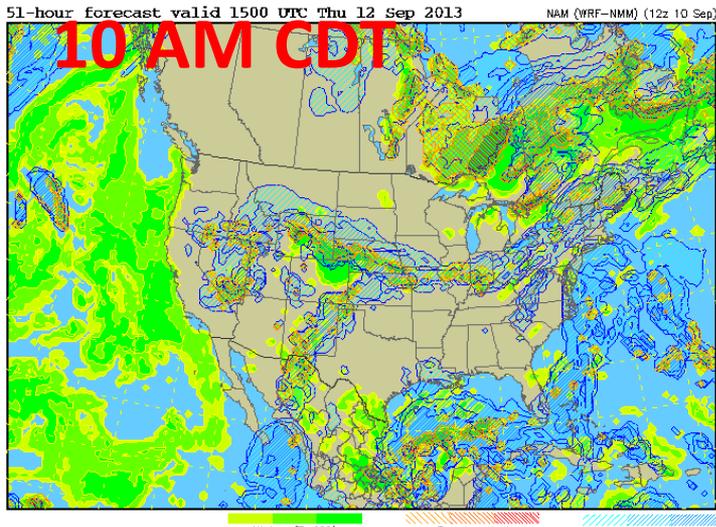


Integrated liquid and frozen hydrometeors (all levels)

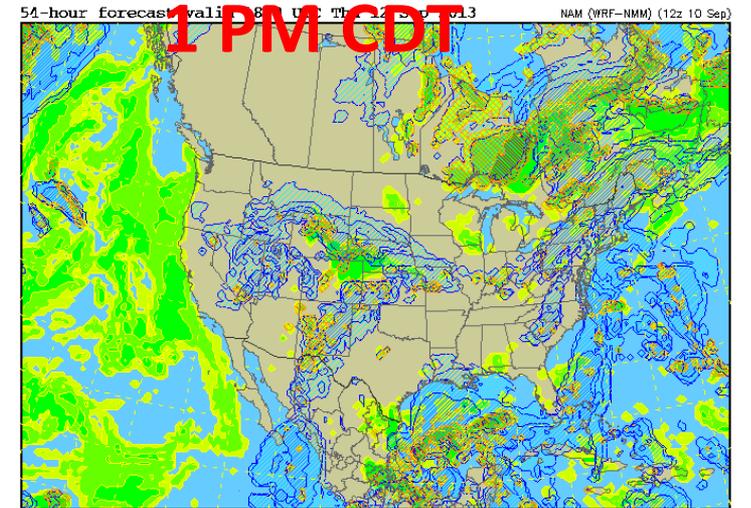


Thursday: NAM – high level clouds; lower level clouds begin to push into region by late afternoon

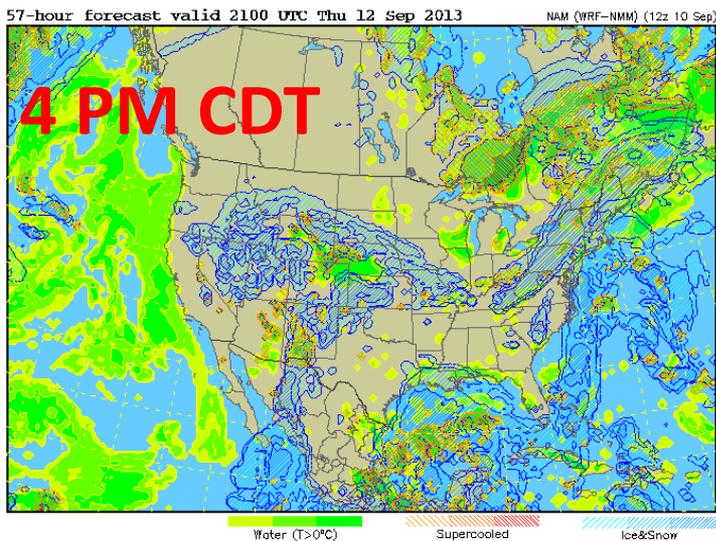
Integrated liquid and frozen hydrometeors (all levels)



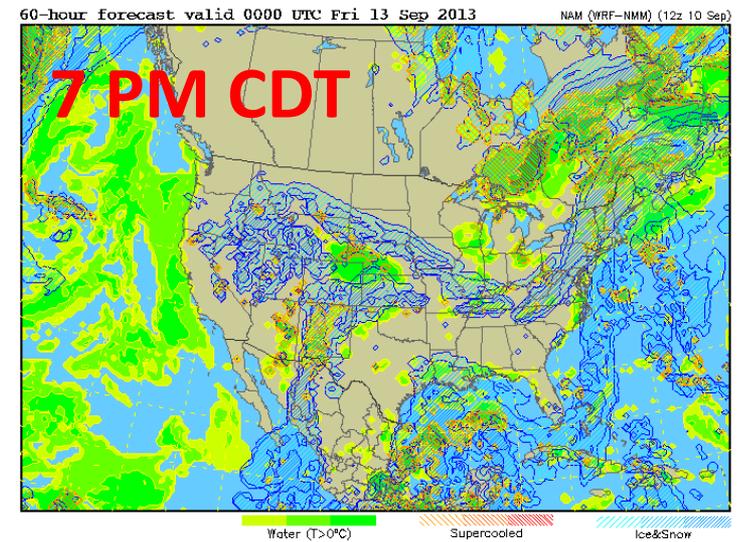
Integrated liquid and frozen hydrometeors (all levels)



Integrated liquid and frozen hydrometeors (all levels)

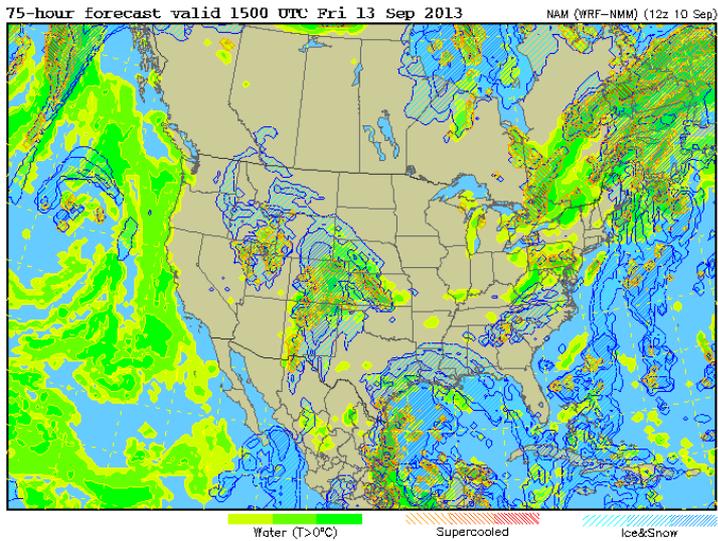


Integrated liquid and frozen hydrometeors (all levels)

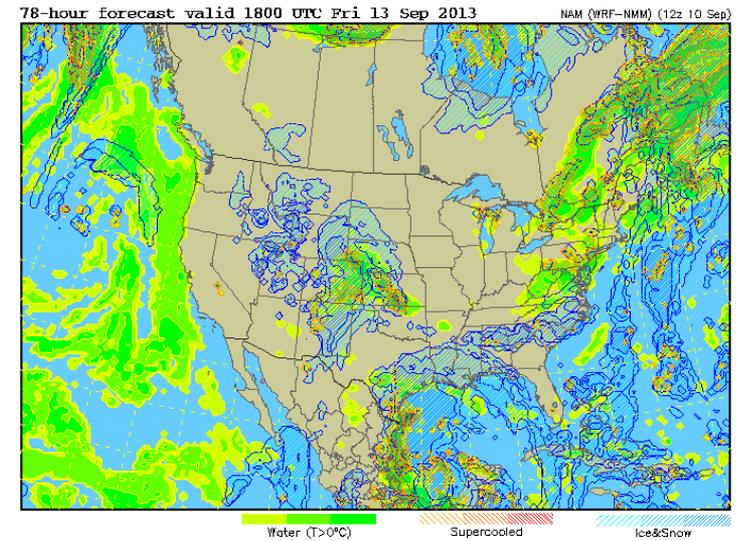


Friday: NAM – high level and low level clouds

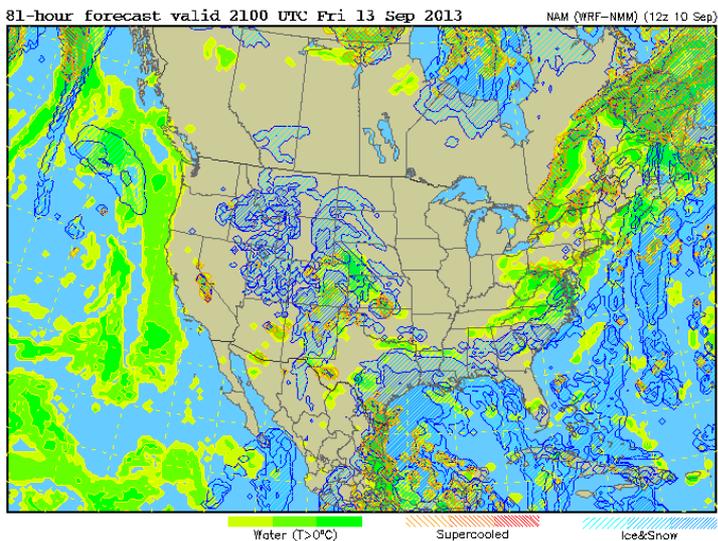
Integrated liquid and frozen hydrometeors (all levels)



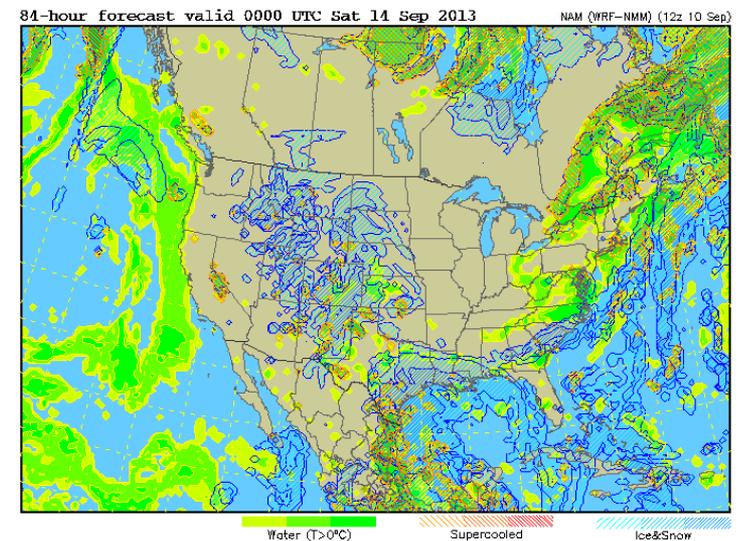
Integrated liquid and frozen hydrometeors (all levels)



Integrated liquid and frozen hydrometeors (all levels)



Integrated liquid and frozen hydrometeors (all levels)



Eastern Pacific

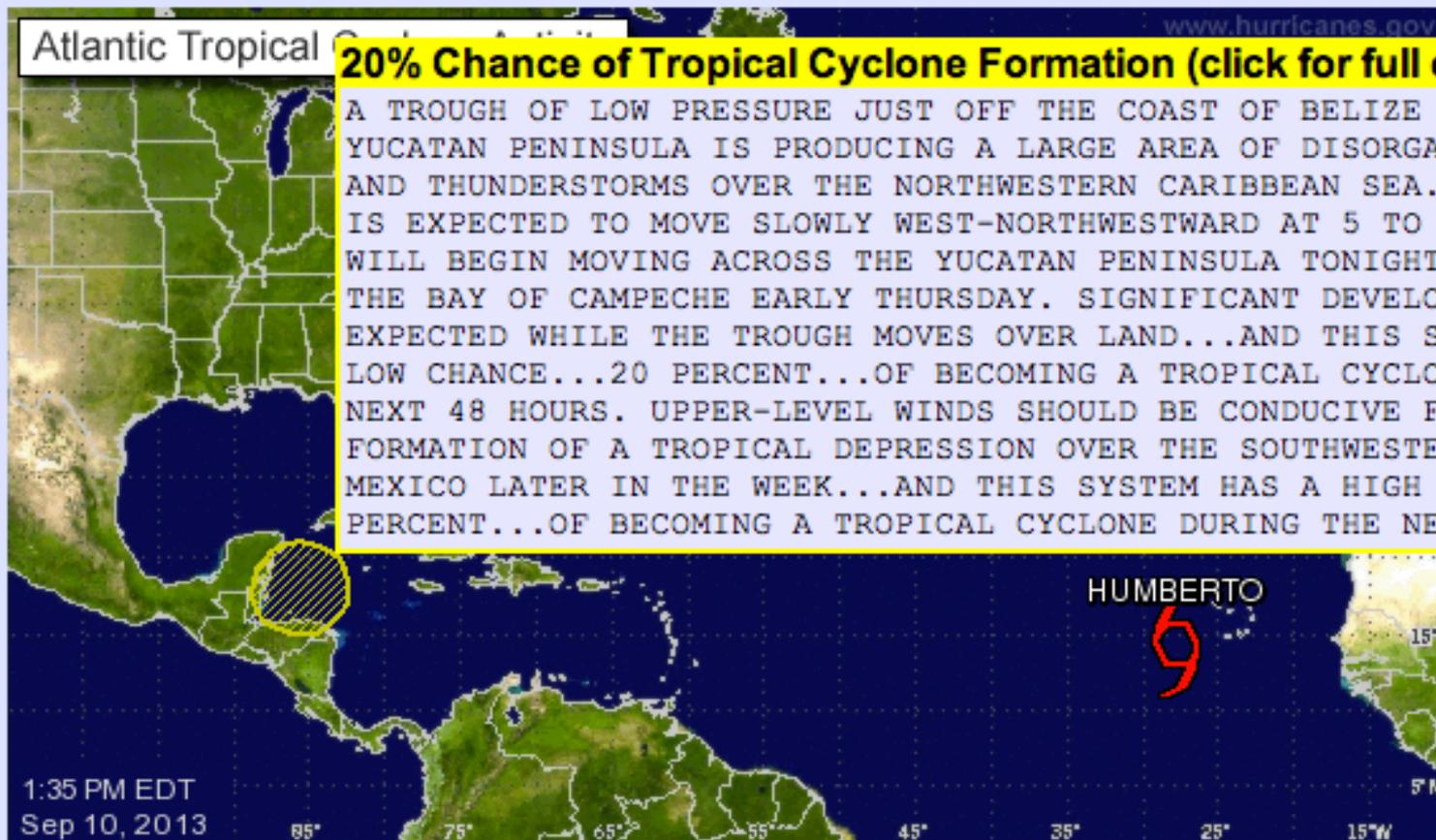
Atlantic

Atlantic Tropical Outlook

www.hurricanes.gov

20% Chance of Tropical Cyclone Formation (click for full outlook)

A TROUGH OF LOW PRESSURE JUST OFF THE COAST OF BELIZE AND THE YUCATAN PENINSULA IS PRODUCING A LARGE AREA OF DISORGANIZED SHOWERS AND THUNDERSTORMS OVER THE NORTHWESTERN CARIBBEAN SEA. THE TROUGH IS EXPECTED TO MOVE SLOWLY WEST-NORTHWESTWARD AT 5 TO 10 MPH...AND WILL BEGIN MOVING ACROSS THE YUCATAN PENINSULA TONIGHT...AND ENTER THE BAY OF CAMPECHE EARLY THURSDAY. SIGNIFICANT DEVELOPMENT IS NOT EXPECTED WHILE THE TROUGH MOVES OVER LAND...AND THIS SYSTEM HAS A LOW CHANCE...20 PERCENT...OF BECOMING A TROPICAL CYCLONE DURING THE NEXT 48 HOURS. UPPER-LEVEL WINDS SHOULD BE CONDUCIVE FOR THE FORMATION OF A TROPICAL DEPRESSION OVER THE SOUTHWESTERN GULF OF MEXICO LATER IN THE WEEK...AND THIS SYSTEM HAS A HIGH CHANCE...70 PERCENT...OF BECOMING A TROPICAL CYCLONE DURING THE NEXT 5 DAYS.



48-hour formation potential: Low <30% Medium 30-50% High >50%

Graphical Tropical Weather Outlook | Active Storms | Marine Forecasts

National Hurricane Center
Since 1970

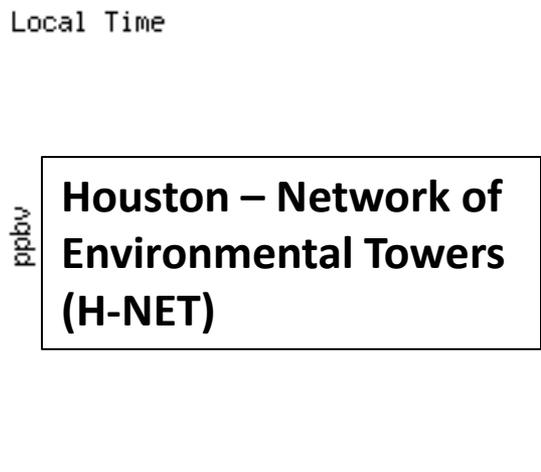
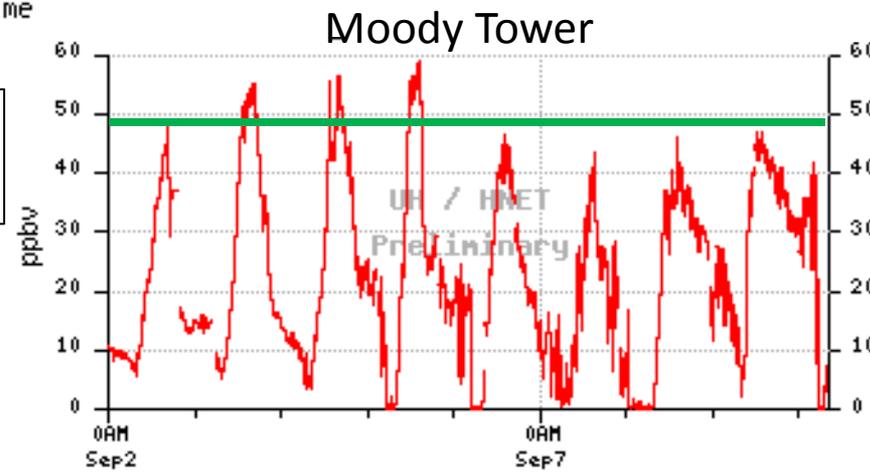
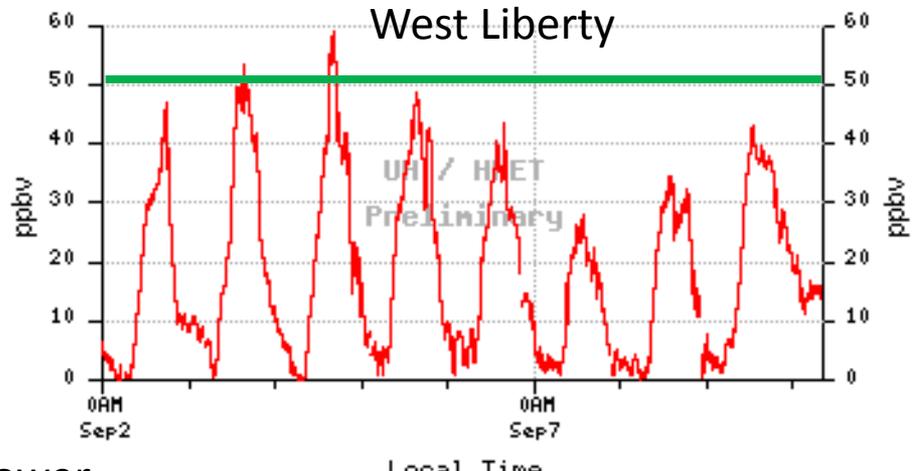
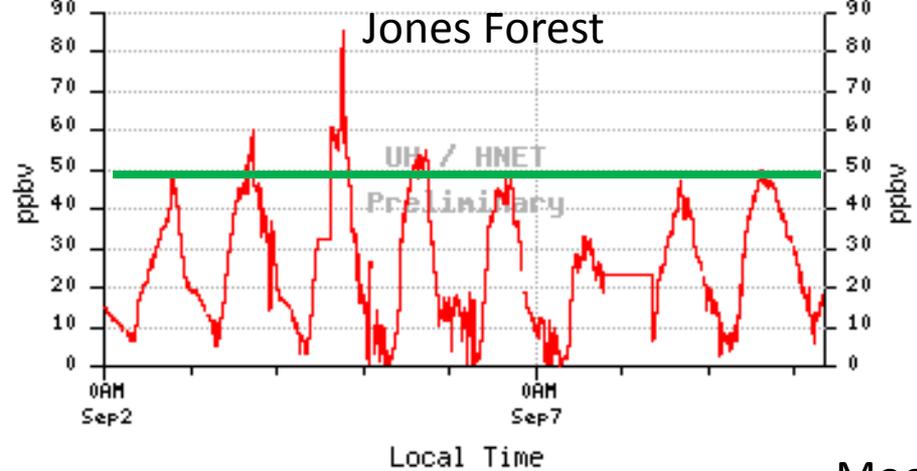
Recommendations

- Tomorrow: P3B and King Air flight day. NWS forecaster is confident that tomorrow is the best day.
- Thursday and Friday: Possible flight days. Depends on development of weather in the Gulf/Bay of Campeche. Thursday might be better than Friday, based on today's forecast.

DISCOVER-AQ Air Quality Outlook
September 10, 2013

Ken Pickering

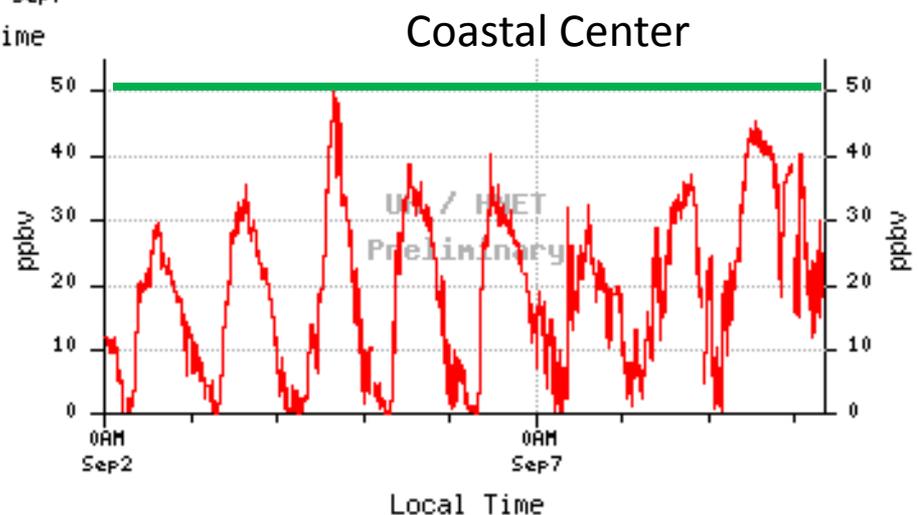
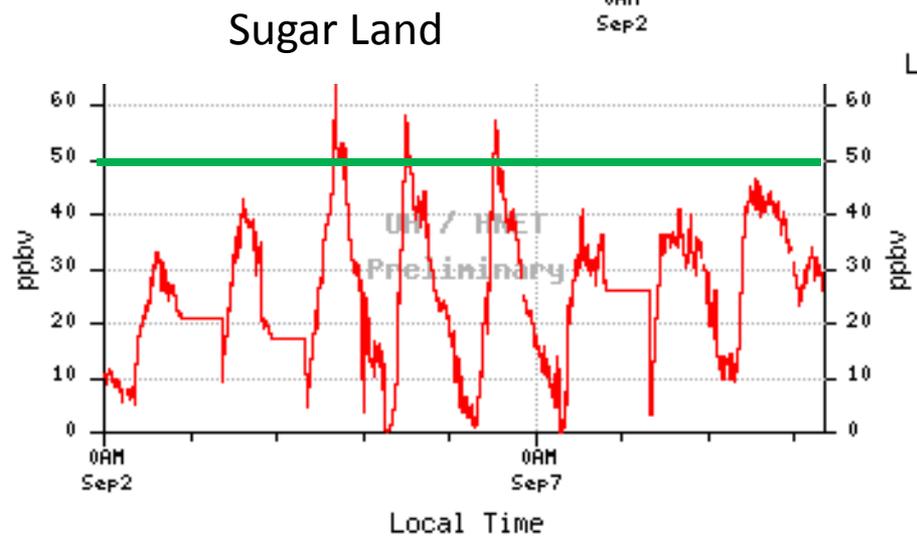
Mariel Friberg



O₃ (ppbv) – 15 min avg
September 2nd – 9th

— = 50 ppbv

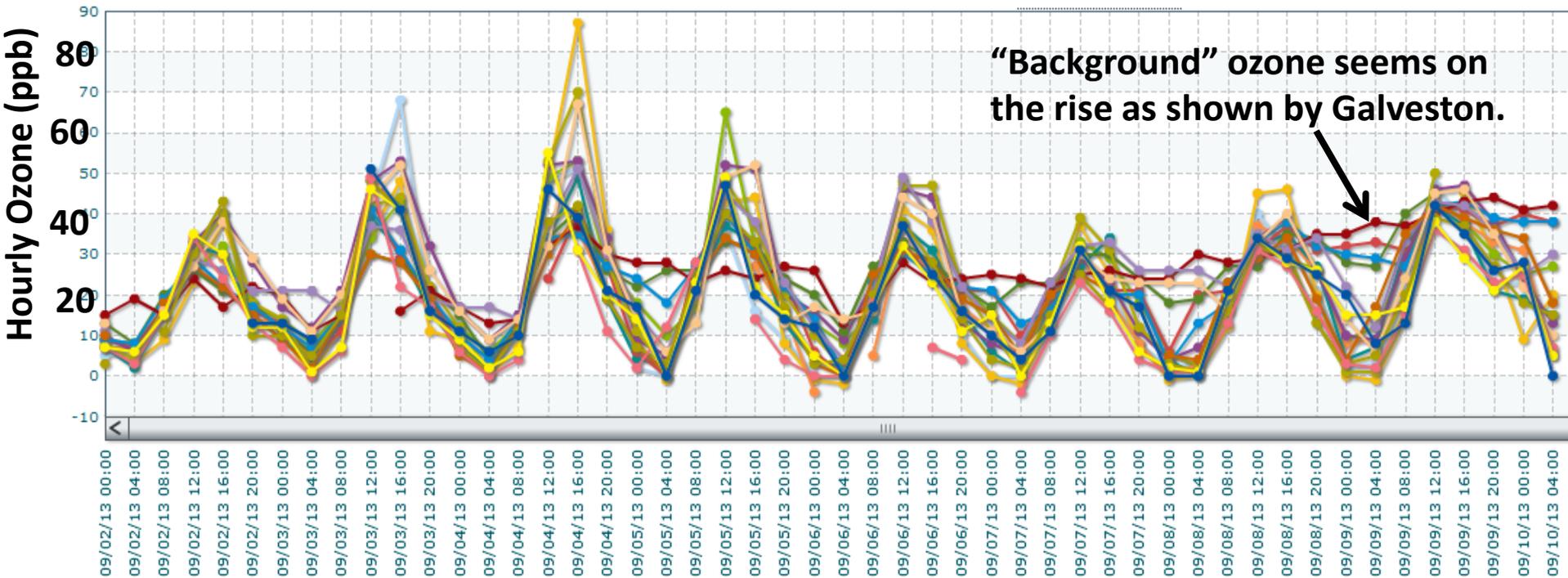
Houston – Network of Environmental Towers (H-NET)



Hourly Ozone (airnowtech.org)**

September 2nd – 9th

** EVERY 4th HOUR PLOTTED!!!!

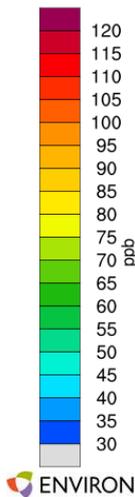
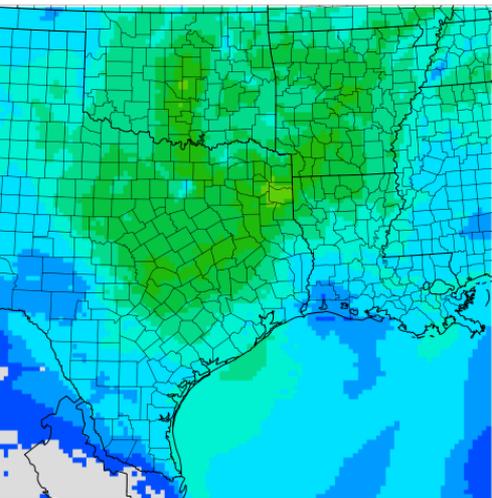


- Houston Aldine C8/O3 - 44201/1 Hr/2
- Houston Westhollow C410/O3 - 44201/1 Hr/1
- Manvel Croix Park C84/O3 - 44201/1 Hr/1
- Conroe Relocated C78/O3 - 44201/1 Hr/1
- West Houston C554/O3 - 44201/1 Hr/1
- Galveston Airport C1034/O3 - 44201/1 Hr/1
- Coastal Center C697/O3 - 44201/1 Hr/1
- West Liberty C699/O3 - 44201/1 Hr/1
- Clinton C403/O3 - 44201/1 Hr/3
- Northwest Harris Co. C26/C110/C154/O3 - 44201/1 Hr/2
- Houston Deer Park C35/O3 - 44201/1 Hr/1
- Seabrook Friendship Park C45/O3 - 44201/1 Hr/1
- Texas City C620/O3 - 44201/1 Hr/1
- La Porte Sylvan Beach C556/O3 - 44201/1 Hr/1
- Sugarland C696/O3 - 44201/1 Hr/1
- Jones Forest C698/O3 - 44201/1 Hr/1
- Channelview C15/O3 - 44201/1 Hr/3
- Houston Texas Avenue C411/O3 - 44201/1 Hr/1 (Method: 047)

CAMx

Ozone
Best Case

Surface

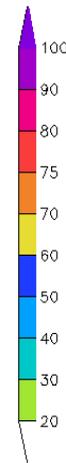
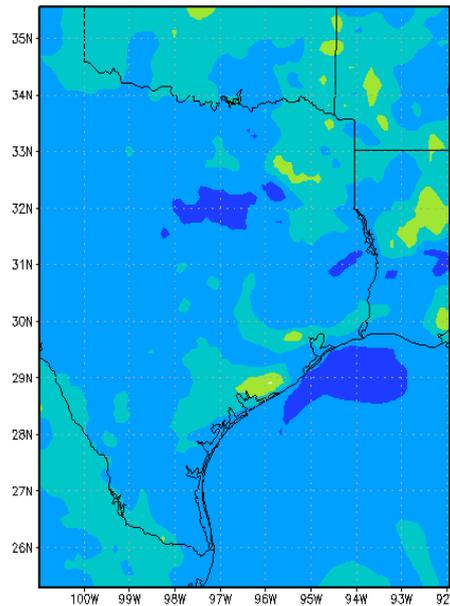


Min(54,4) = 6.0, Max(100,69) = 69.9

Wed September 11 09:00 CST

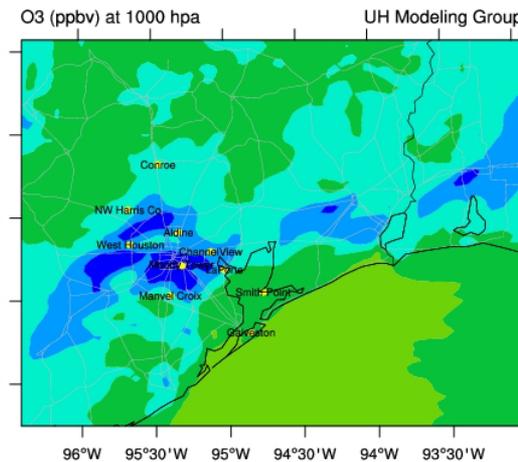
NOAA CMAQ

O3 [ppb] at 1013 [hPa] Valid 14Z SEP 11 2013

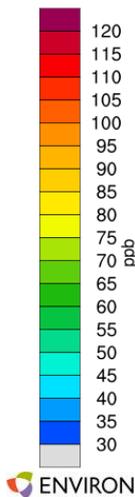
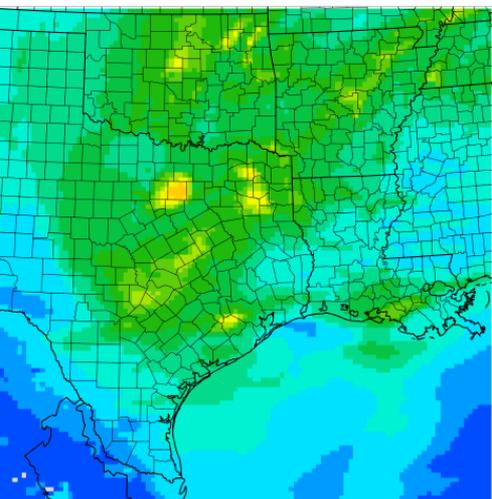


Univ. of Houston

CMAQ 20130911_14:00:00Z



Ozone
Best Case

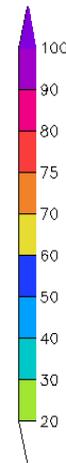
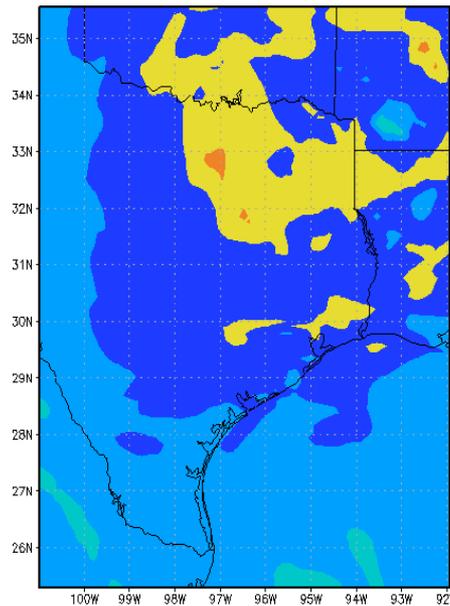


Min(2,84) = 25.8, Max(81,70) = 88.9

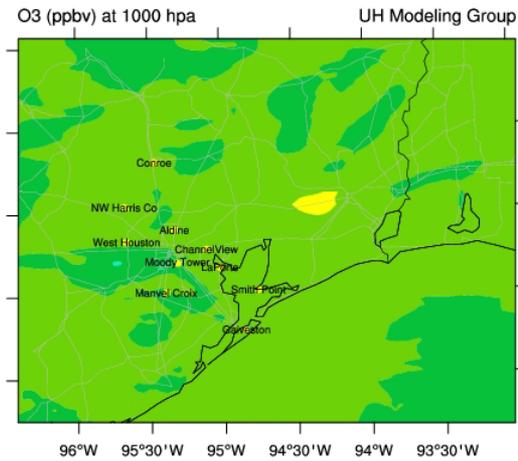
Wed September 11 12:00 CST

NOAA CMAQ

O3 [ppb] at 1013 [hPa] Valid 17Z SEP 11 2013

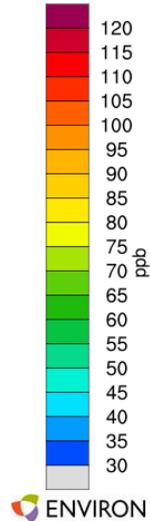
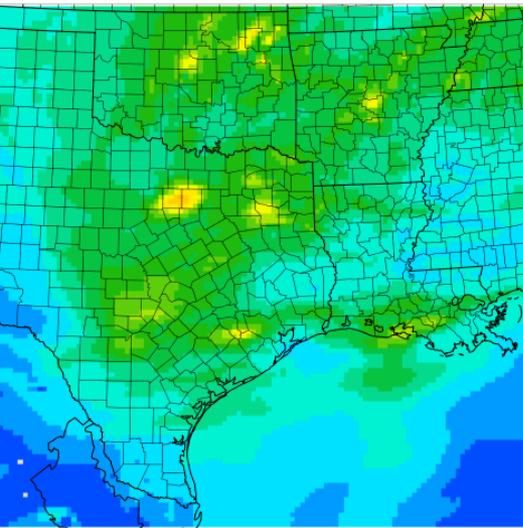


CMAQ 20130911_17:00:00Z

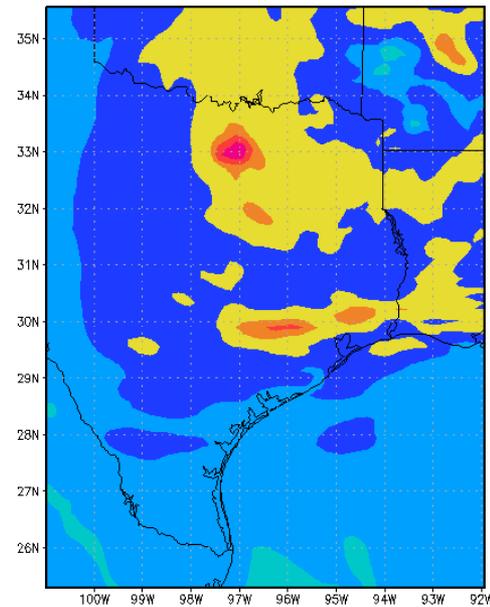


Ozone

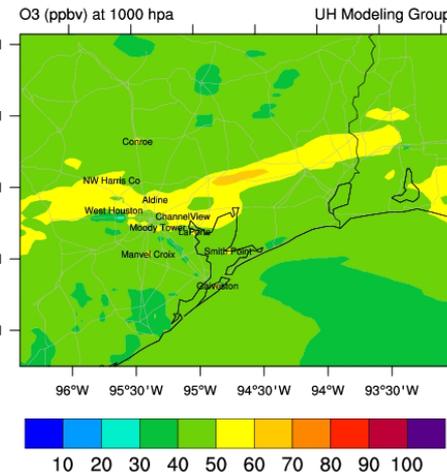
Best Case



O3 [ppb] at 1013 [hPa] Valid 19Z SEP 11 2013



CMAQ 20130911_19:00:00Z

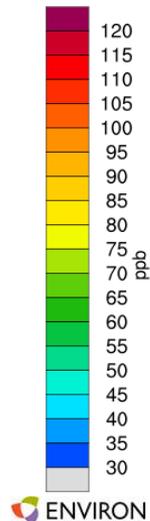
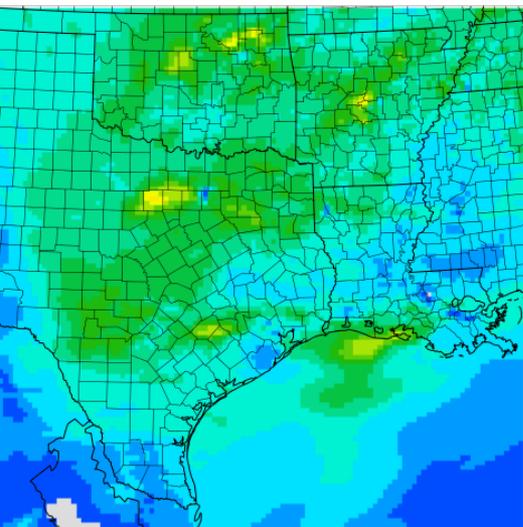


Min(3,84) = 28.0, Max(78,70) = 90.5

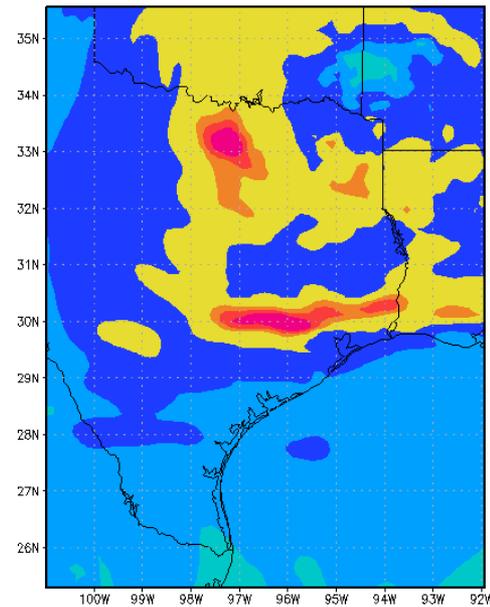
Wed September 11 14:00 CST

Ozone

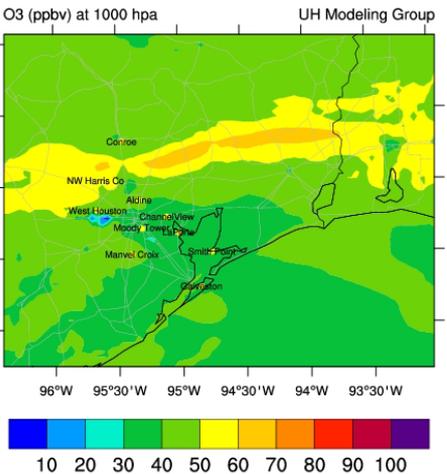
Best Case



O3 [ppb] at 1013 [hPa] Valid 22Z SEP 11 2013



CMAQ 20130911_22:00:00Z



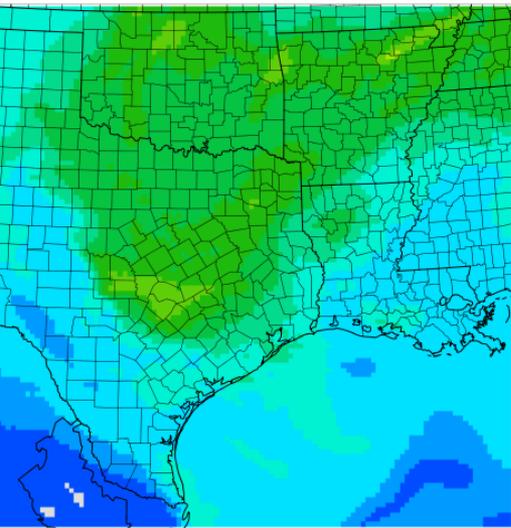
Min(55,4) = 0.8, Max(72,70) = 80.6

Wed September 11 17:00 CST

Ozone

Best Case: CAMx Layer 14

1.2 km



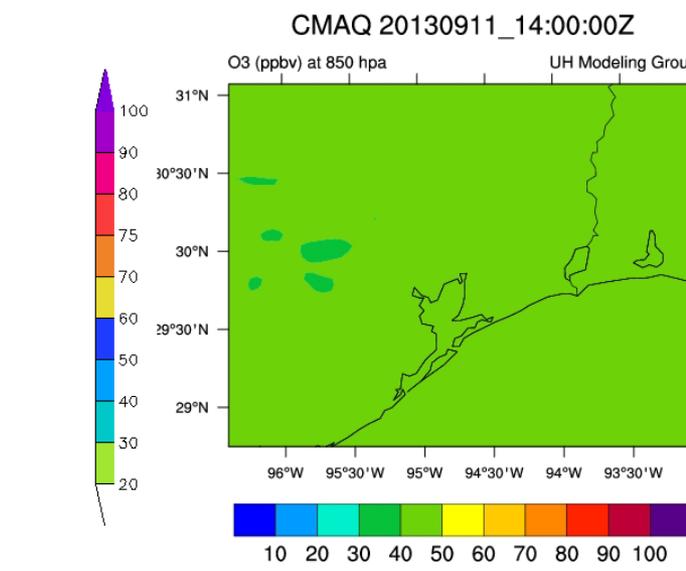
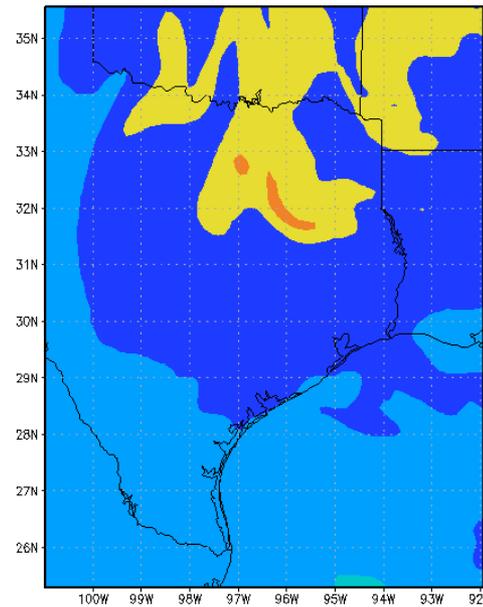
Min(53,4) = 28.8, Max(125,100) = 71.7

Wed September 11 09:00 CST



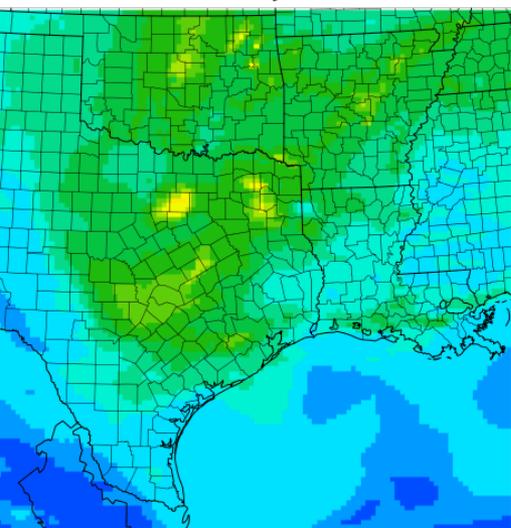
GRADS: COLA/IGES

O3 [ppb] at 850 [hPa] Valid 14Z SEP 11 2013



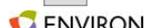
Ozone

Best Case: CAMx Layer 14

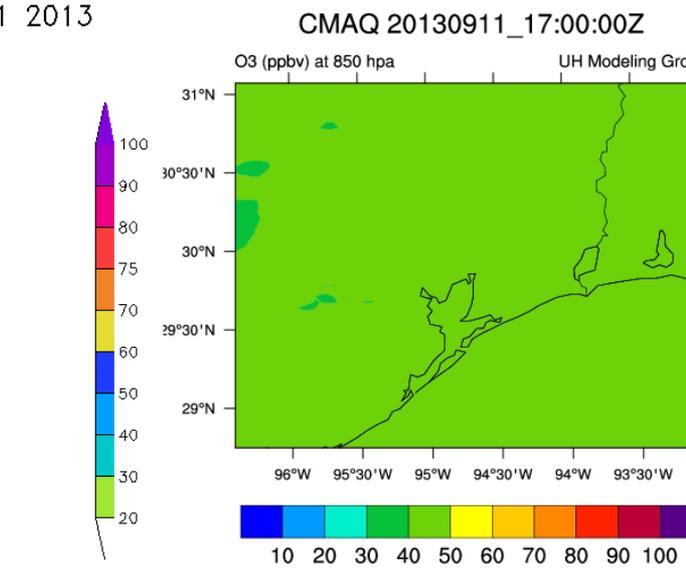
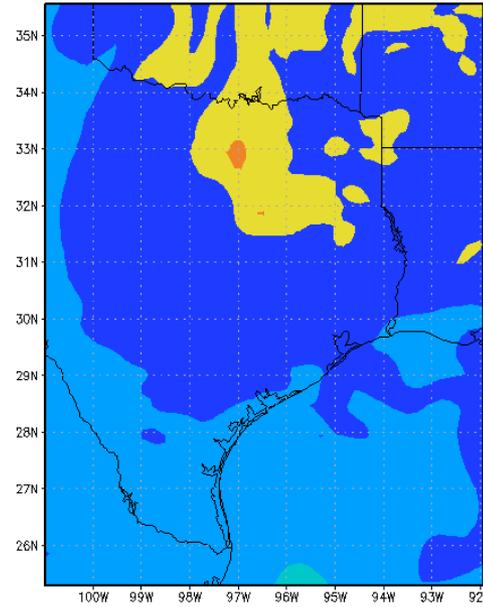


Min(54,10) = 30.9, Max(80,70) = 81.8

Wed September 11 12:00 CST

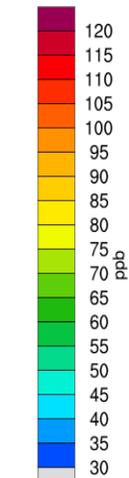
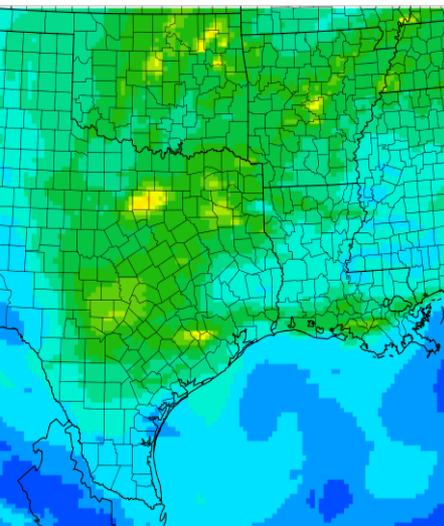


O3 [ppb] at 850 [hPa] Valid 17Z SEP 11 2013



Ozone

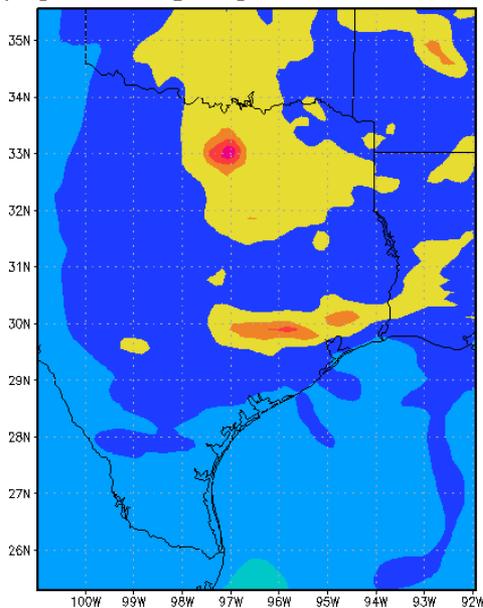
Best Case: CAMx Layer 14



Min(3,63) = 31.4, Max(78,70) = 86.0

Wed September 11 14:00 CST

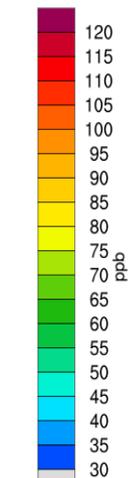
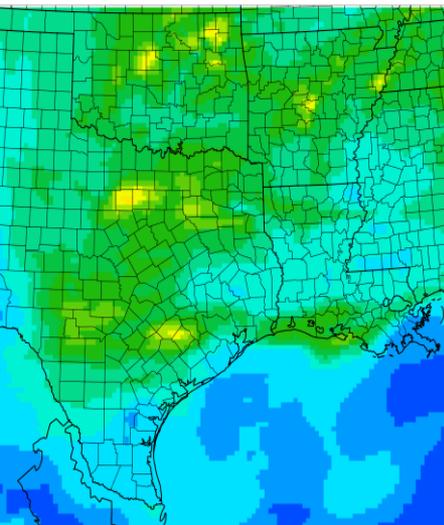
O3 [ppb] at 850 [hPa] Valid 19Z SEP 11 2013



GRADS: COLA/IGES

Ozone

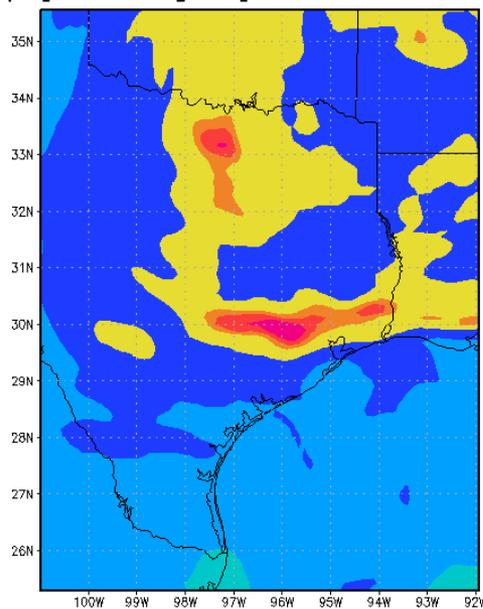
Best Case: CAMx Layer 14



Min(34,7) = 32.0, Max(73,70) = 82.4

Wed September 11 17:00 CST

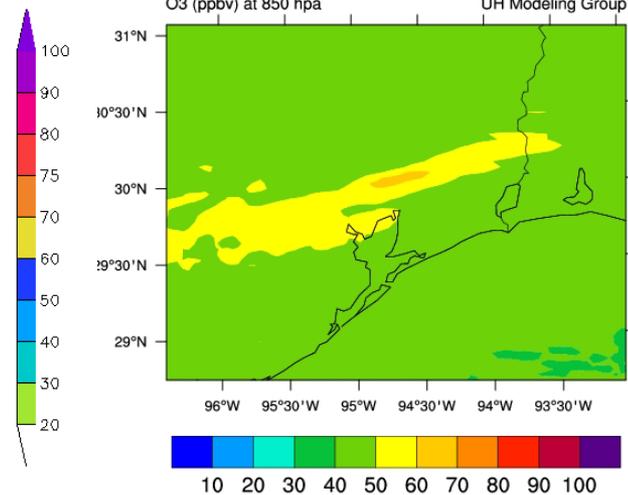
O3 [ppb] at 850 [hPa] Valid 22Z SEP 11 2013



GRADS: COLA/IGES

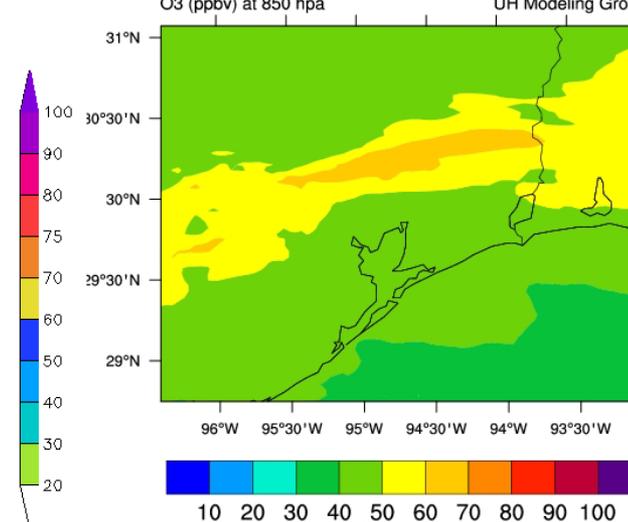
CMAQ 20130911_19:00:00Z

O3 (ppbv) at 850 hpa UH Modeling Group

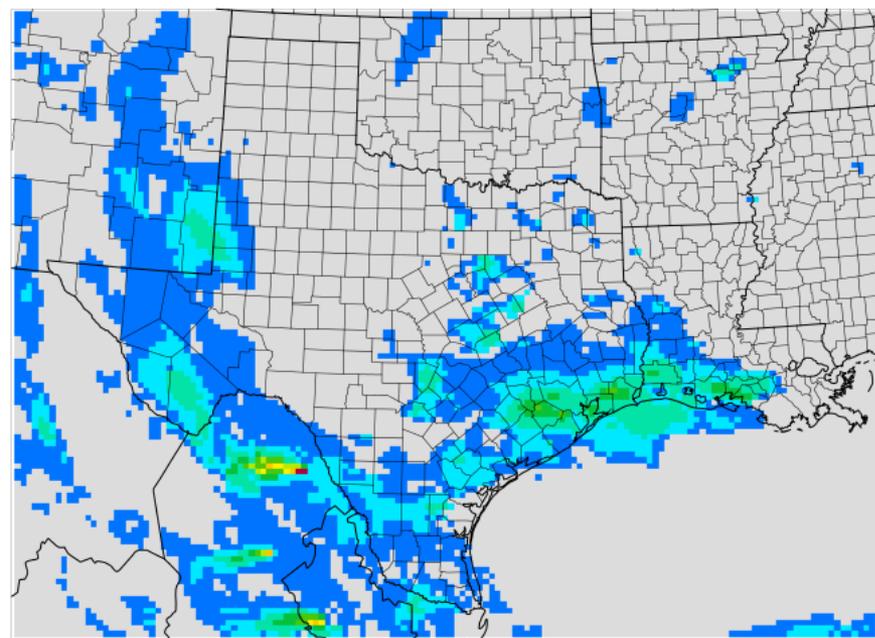


CMAQ 20130911_22:00:00Z

O3 (ppbv) at 850 hpa UH Modeling Group



NO₂
Best Case: CAMx Layer 14

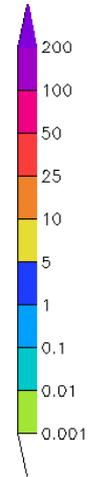
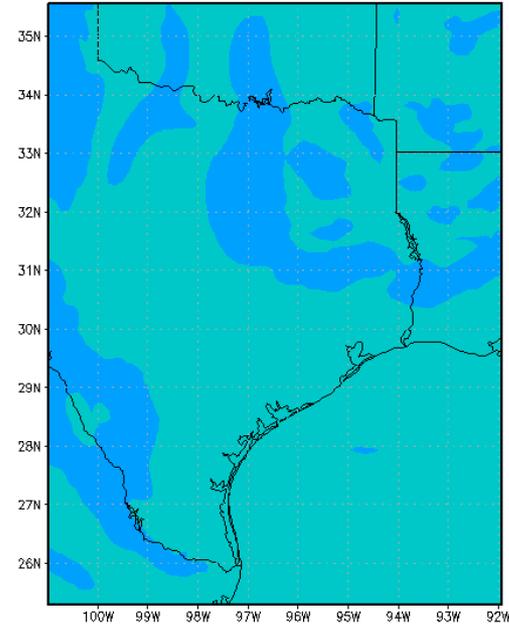


Min(122,32) = 0.0, Max(51,30) = 4.9

Wed September 11 09:00 CST

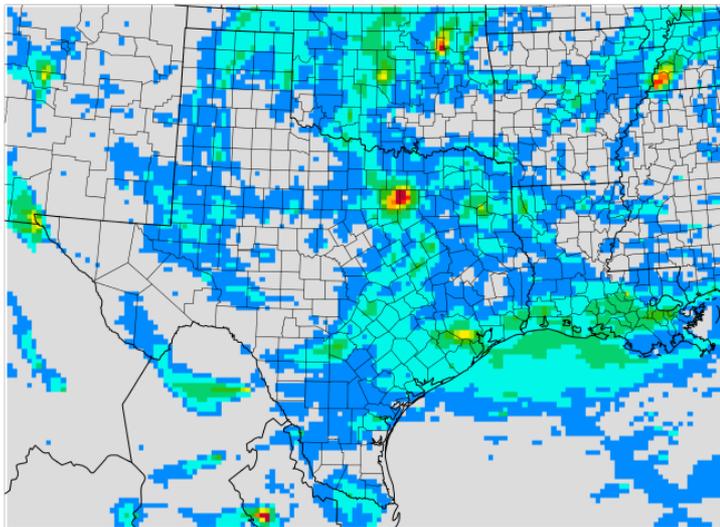


NO2 [ppb] at 850 [hPa] Valid 14Z SEP 11 2013



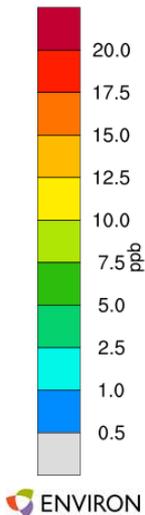
NOx

Best Case



Min(3,13) = 0.1, Max(55,4) = 35.8

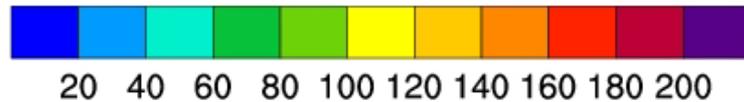
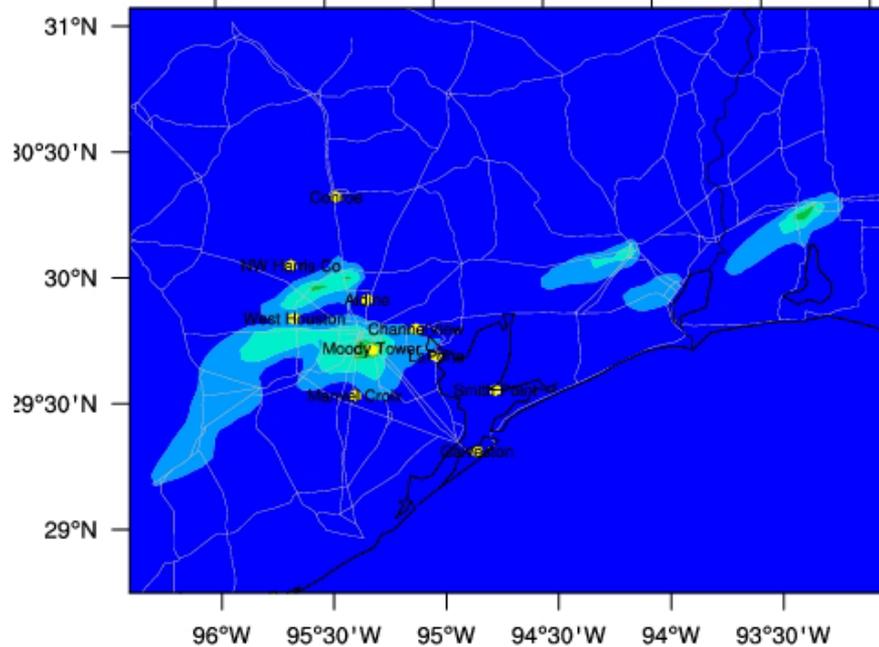
Wed September 11 09:00 CST



CMAQ 20130911_14:00:00Z

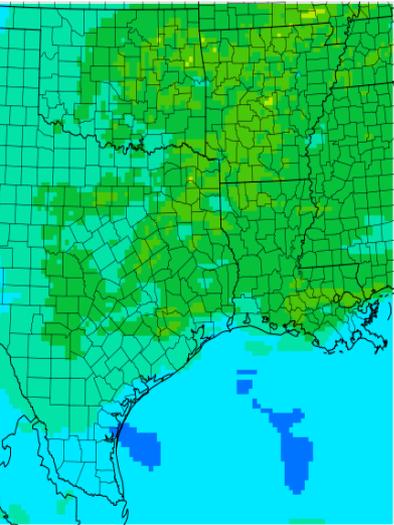
NOx (ppbv) at 1000 hpa

UH Modeling Group



Formaldehyde

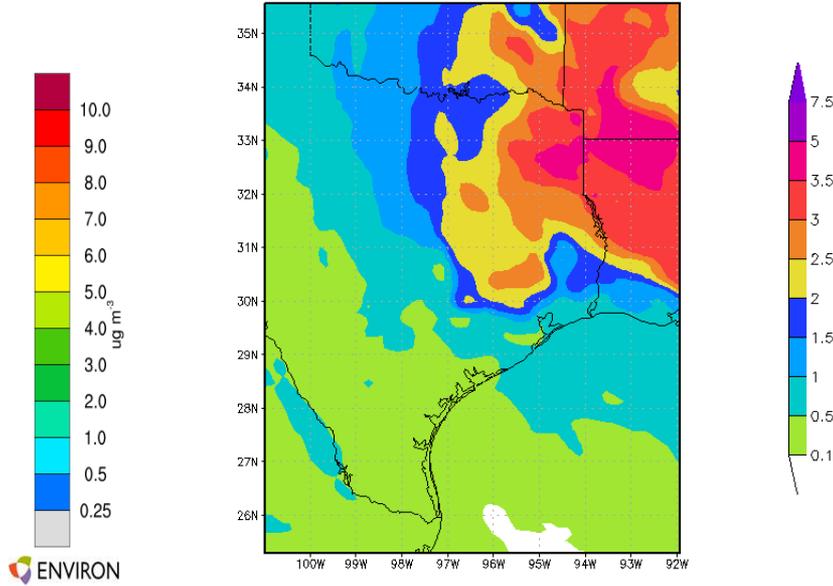
Best Case: CAMx Layer 14



Min(121,22) = 0.4, Max(128,107) = 4.3

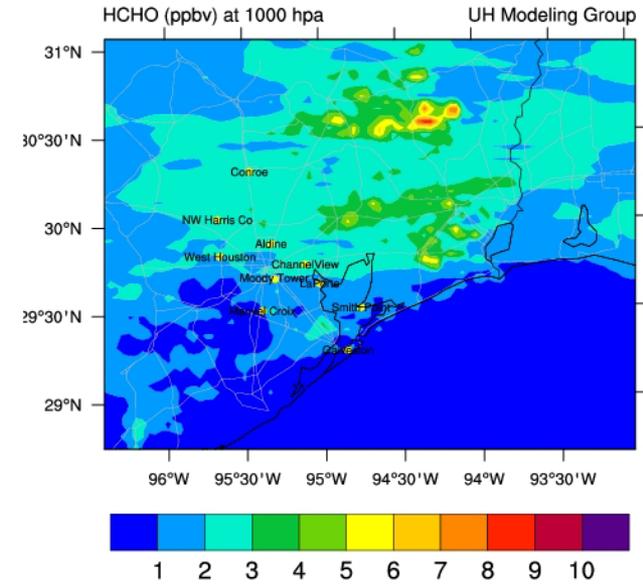
Wed September 11 14:00 CST

FORM [ppb] at 850 [hPa] Valid 19Z SEP 10 2013



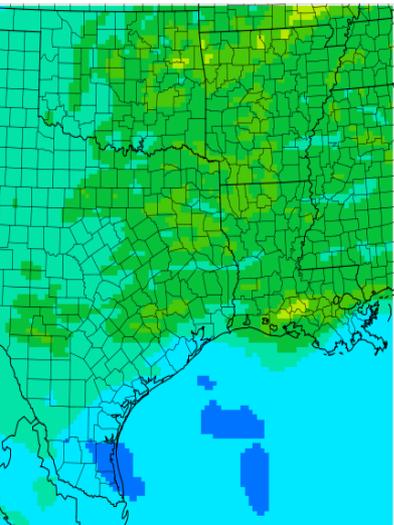
ENVIRON

CMAQ 20130911_19:00:00Z



Formaldehyde

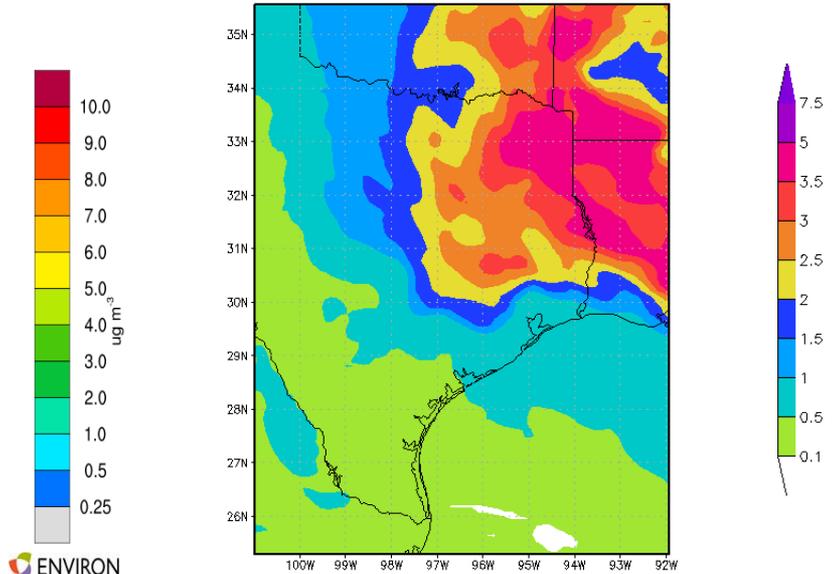
Best Case: CAMx Layer 14



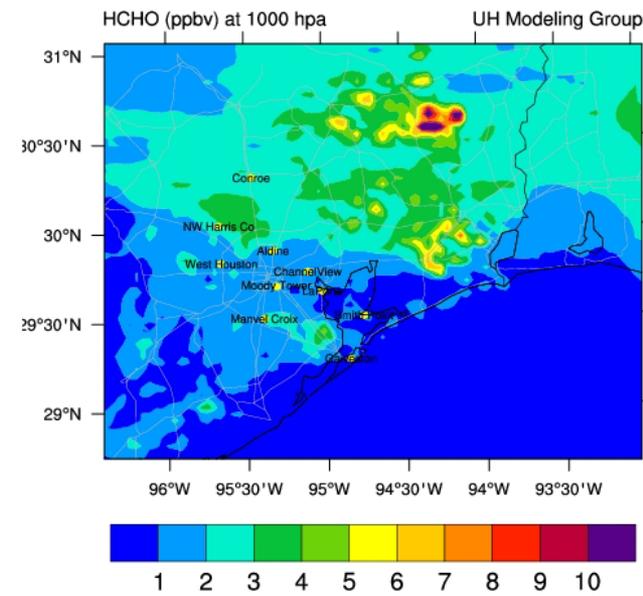
Min(113,23) = 0.4, Max(127,108) = 4.5

Wed September 11 17:00 CST

FORM [ppb] at 850 [hPa] Valid 22Z SEP 10 2013

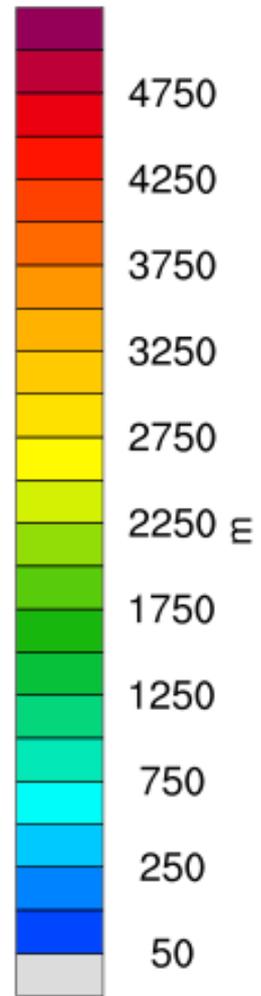
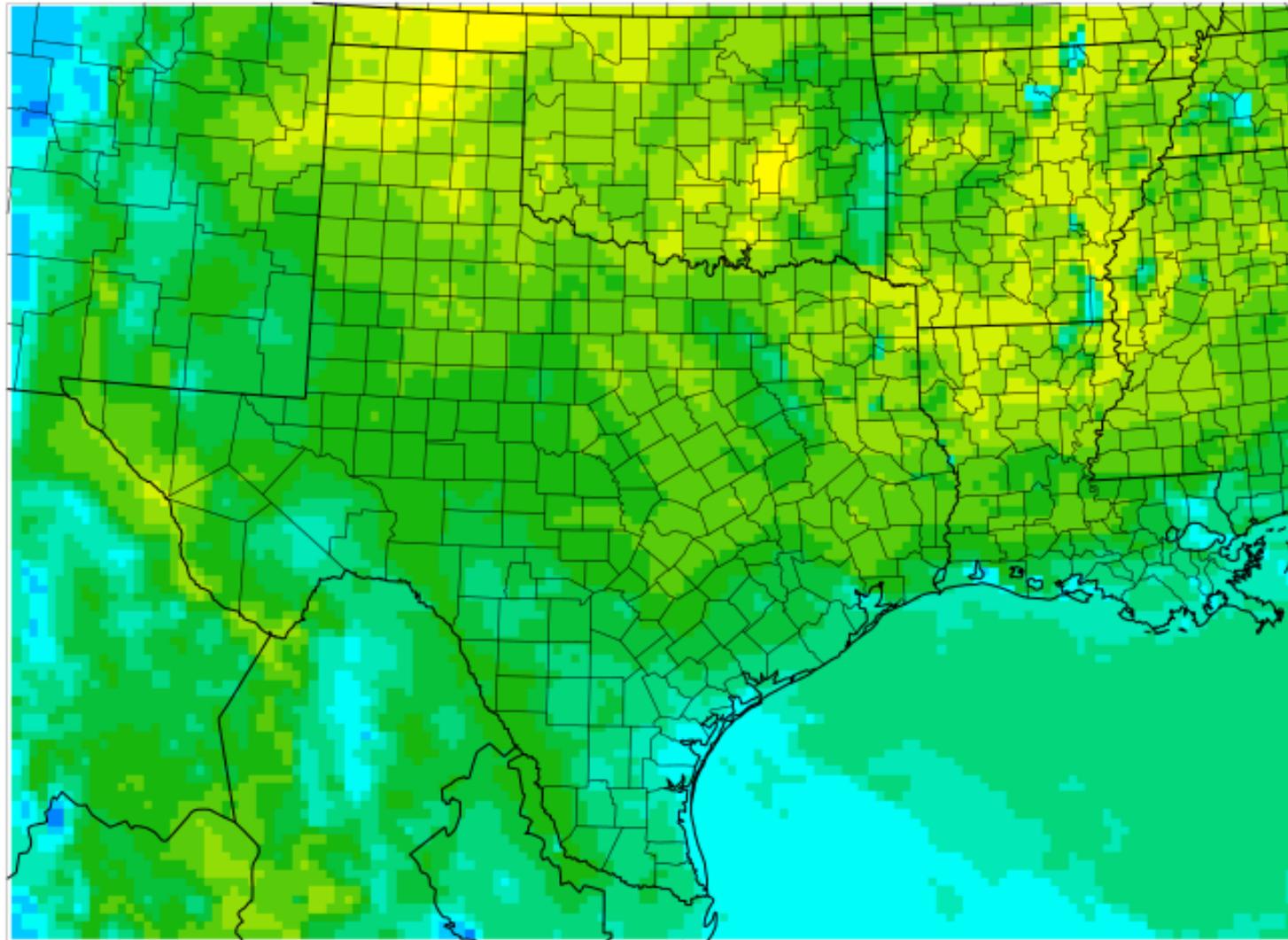


ENVIRON



PBL Height

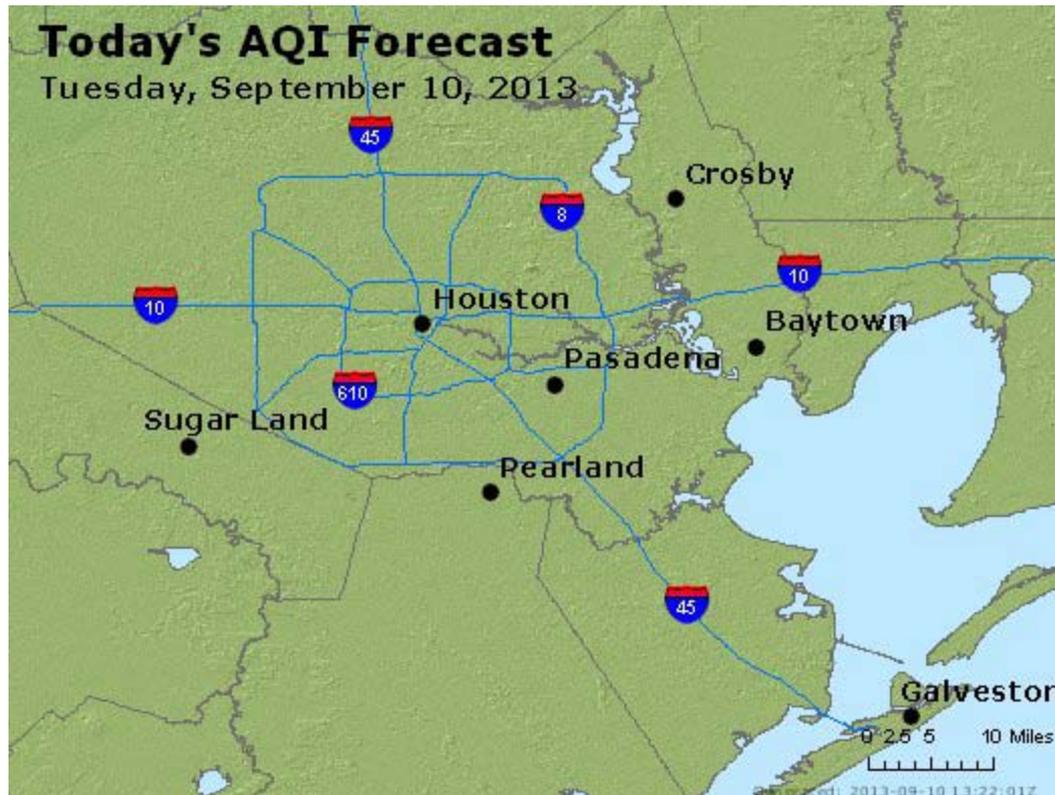
Texas 12km



Min(3,97) = 165.3, Max(88,90) = 2701.1

Tue September 10 14:00 CST





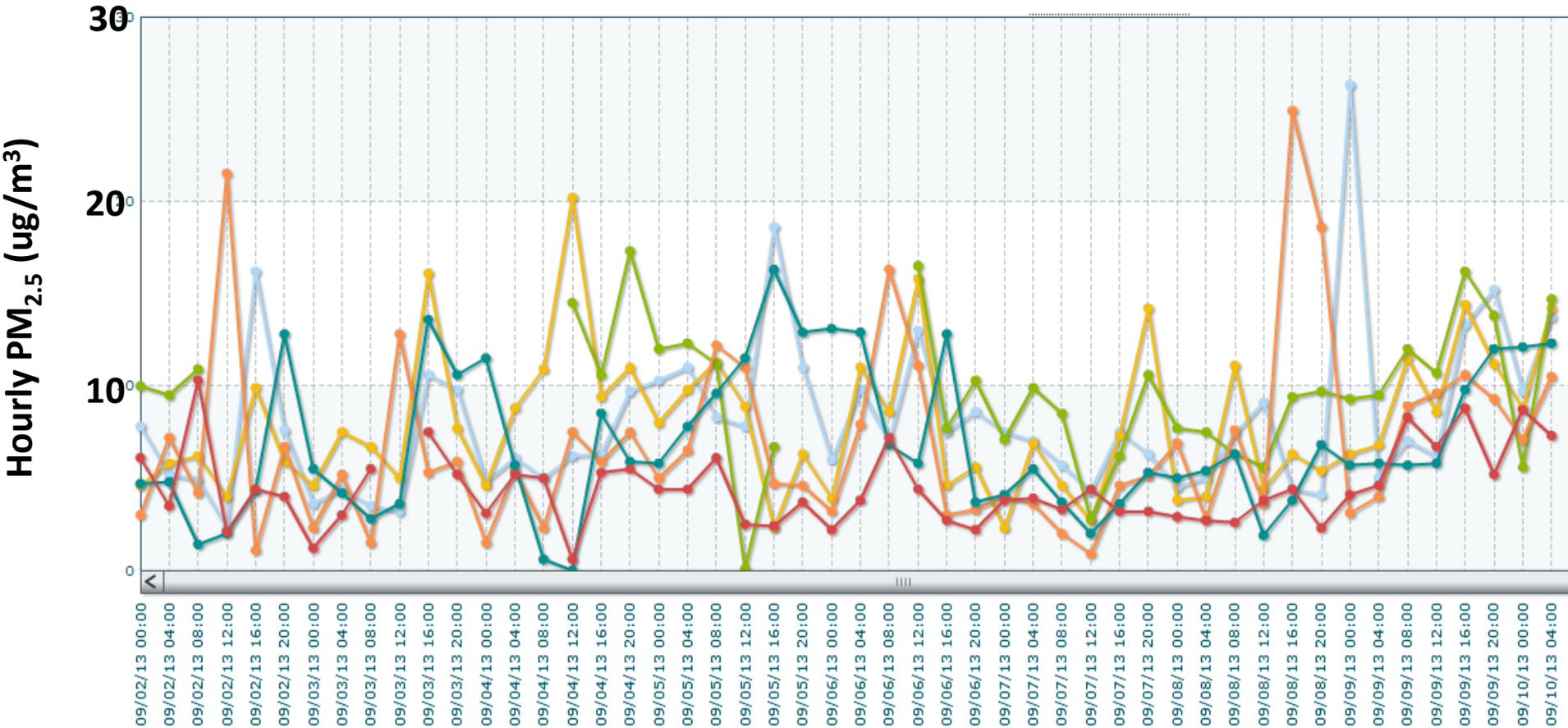
Code Green (Good) for Ozone today, increasing to Code Yellow (Moderate) Wed, Thurs., Fri.

Code Yellow (Moderate) for PM2.5 today, decreasing to Code Green (Good) on Wed., Thurs., Fri.

Hourly PM_{2.5} (airnowtech.org)**

September 2nd – 9th

** EVERY 4th HOUR PLOTTED!!!!



Houston Aldine C8/PM_{2.5}-88502 - 88502/1 Hr/3

Houston Deer Park C35/PM_{2.5}-88502 - 88502/1 Hr/3

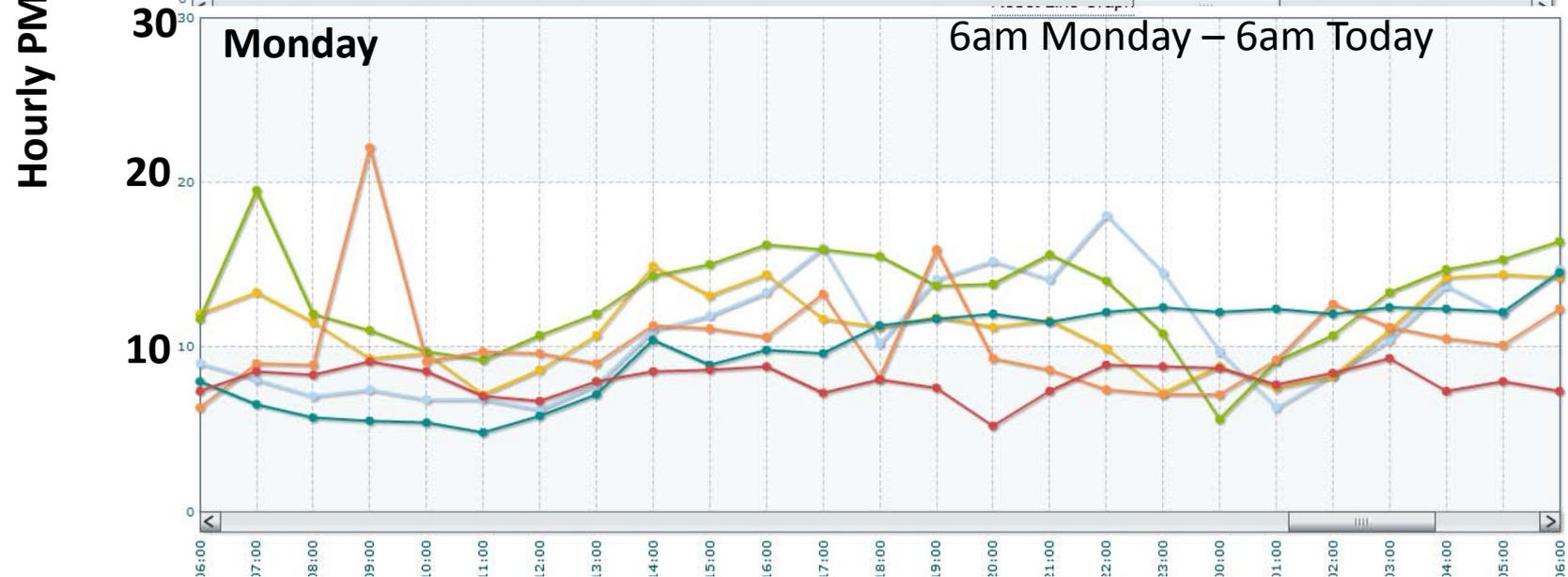
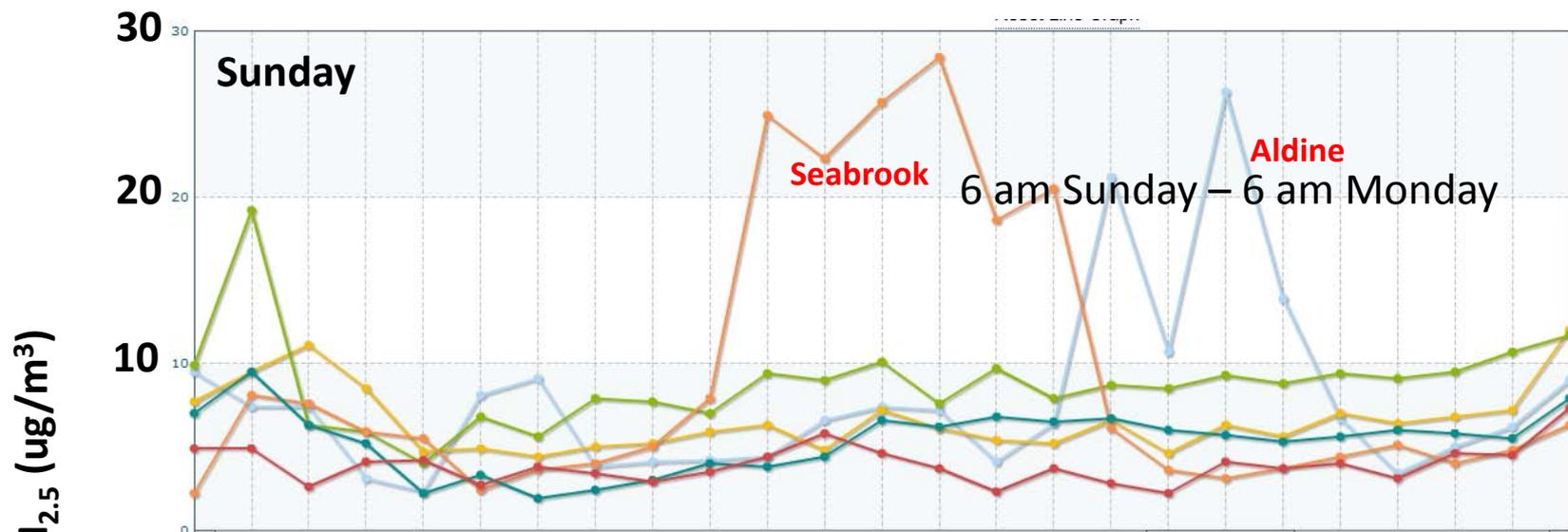
Conroe Relocated C78/PM_{2.5}-88502 - 88502/1 Hr/3

Clinton C403/PM_{2.5}-88502 - 88502/1 Hr/3

Seabrook Friendship Park C45/PM_{2.5}-88502 - 88502/1 Hr/3

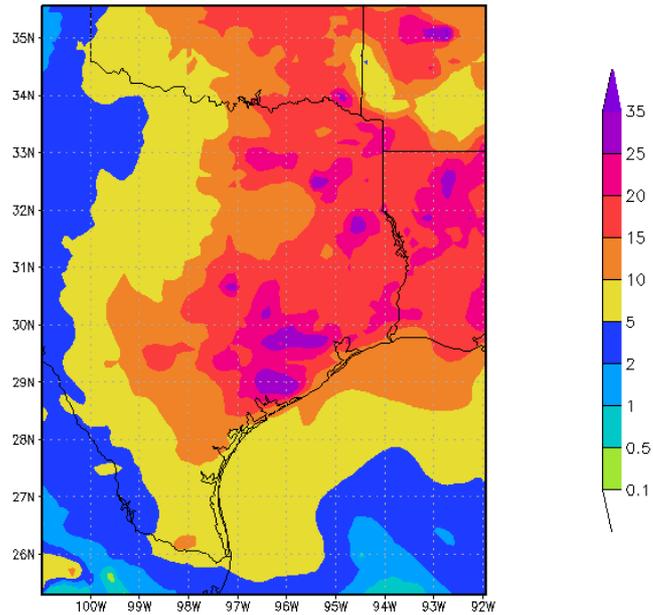
Galveston Airport C1034/PM_{2.5}-88502 - 88502/1 Hr/3

Hourly PM_{2.5} (airnowtech.org)

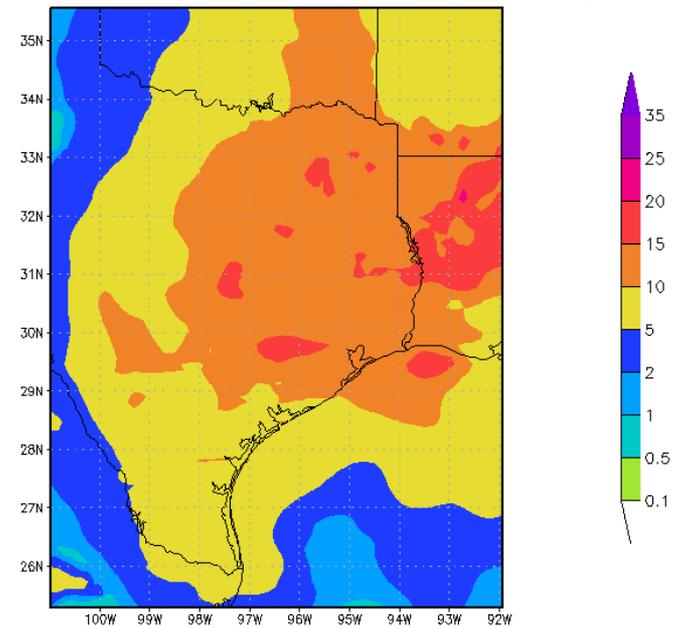


- ◆ Houston Aldine C8/PM2.5-88502 - 88502/1 Hr/3
- ◆ Houston Deer Park C35/PM2.5-88502 - 88502/1 Hr/3
- ◆ Conroe Relocated C78/PM2.5-88502 - 88502/1 Hr/3
- ◆ Clinton C403/PM2.5-88502 - 88502/1 Hr/3
- ◆ Seabrook Friendship Park C45/PM2.5-88502 - 88502/1 Hr/3
- ◆ Galveston Airport C1034/PM2.5-88502 - 88502/1 Hr/3

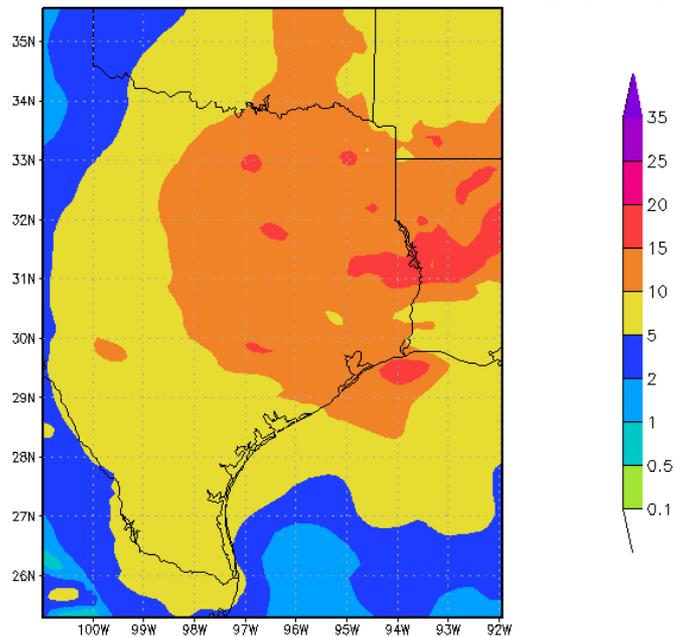
(dev) sfc pm25 32H VALID 14Z 11 SEP2013 [$\mu\text{g}/\text{m}^3$]



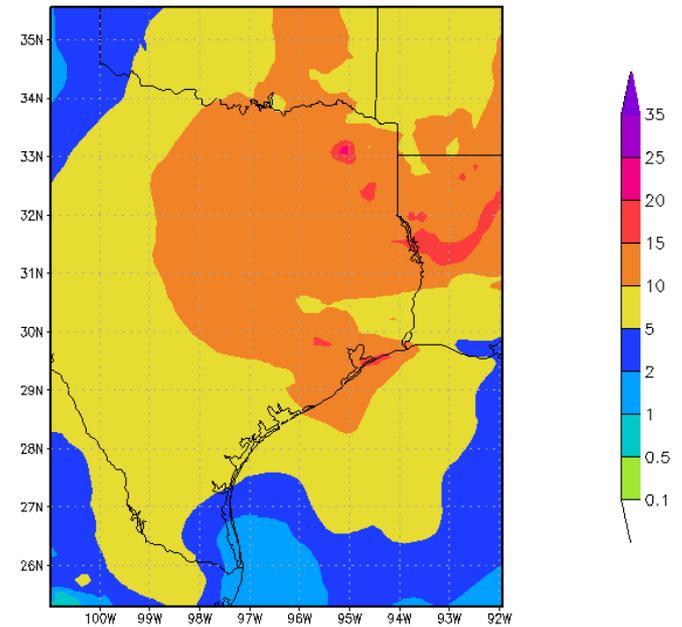
(dev) sfc pm25 35H VALID 17Z 11 SEP2013 [$\mu\text{g}/\text{m}^3$]



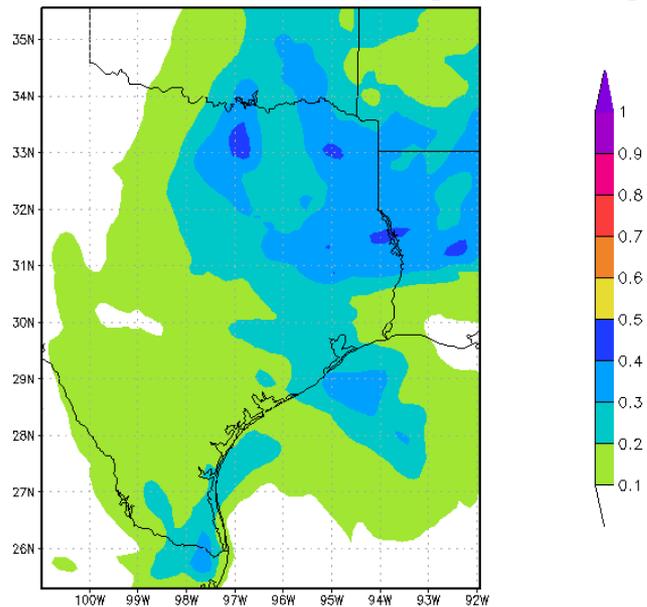
(dev) sfc pm25 37H VALID 19Z 11 SEP2013 [$\mu\text{g}/\text{m}^3$]



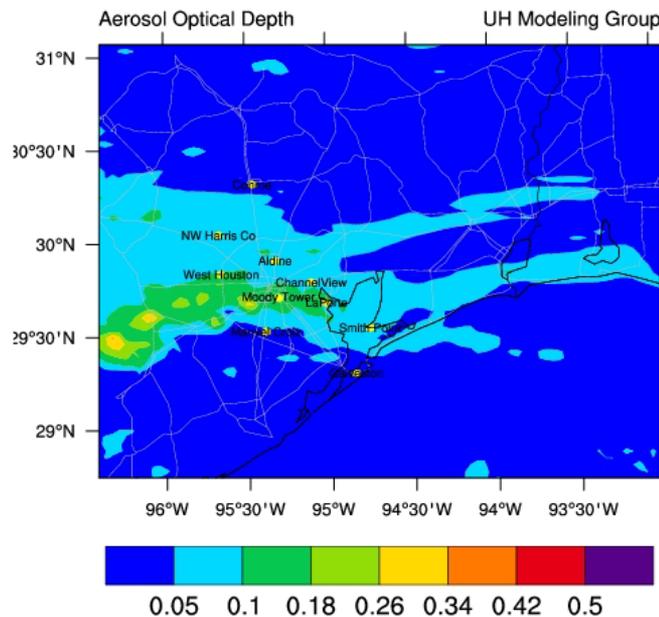
(dev) sfc pm25 40H VALID 22Z 11 SEP2013 [$\mu\text{g}/\text{m}^3$]



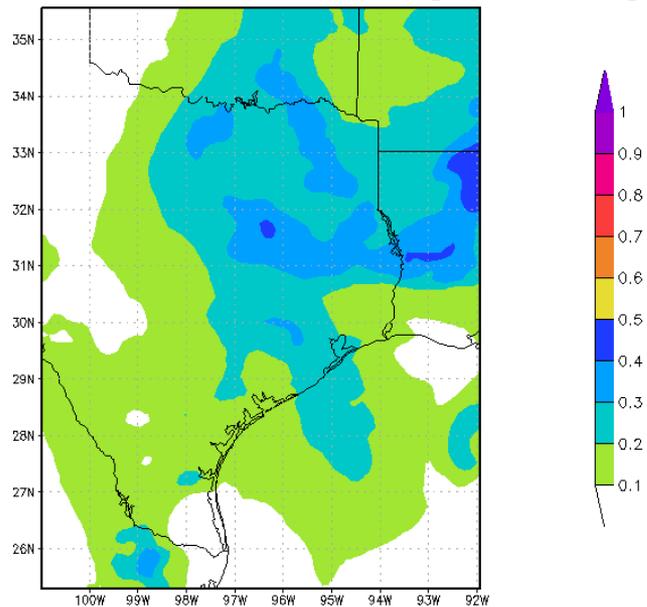
(dev) aot 37H VALID 19Z 11 SEP2013 [dimensionless]



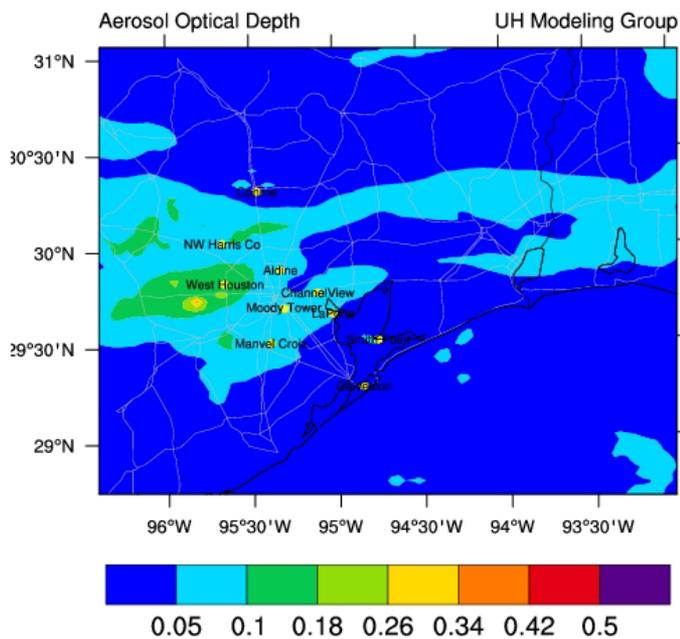
CMAQ 20130911_19:00:00Z



(dev) aot 40H VALID 22Z 11 SEP2013 [dimensionless]

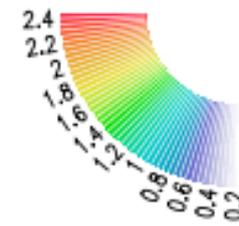
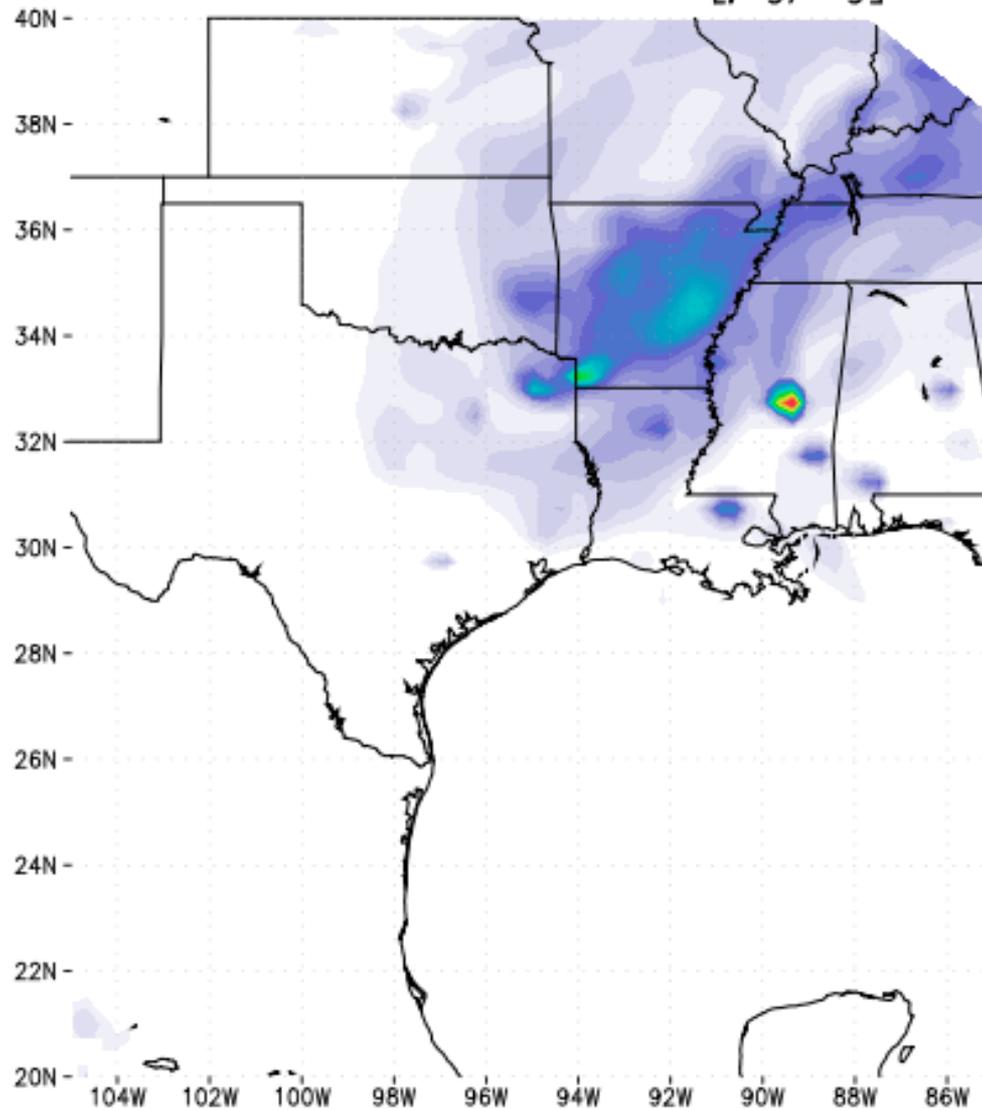


CMAQ 20130911_22:00:00Z



NASA/GMAO - GEOS-5 Forecast Initialized on 06z 2013-09-10

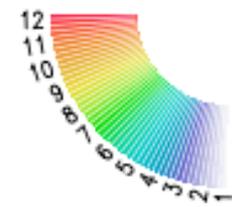
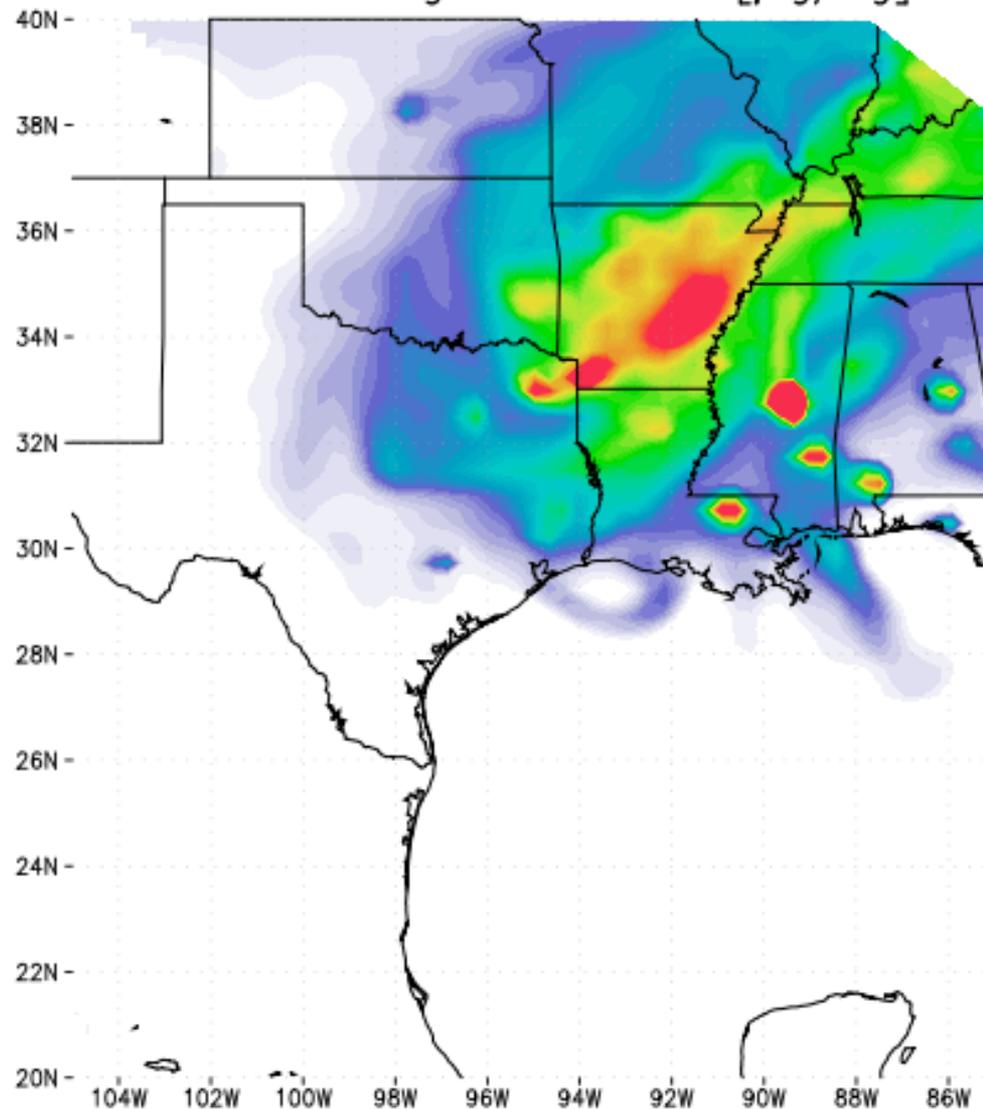
850 hPa Black Carbon [$\mu\text{g}/\text{kg}$]



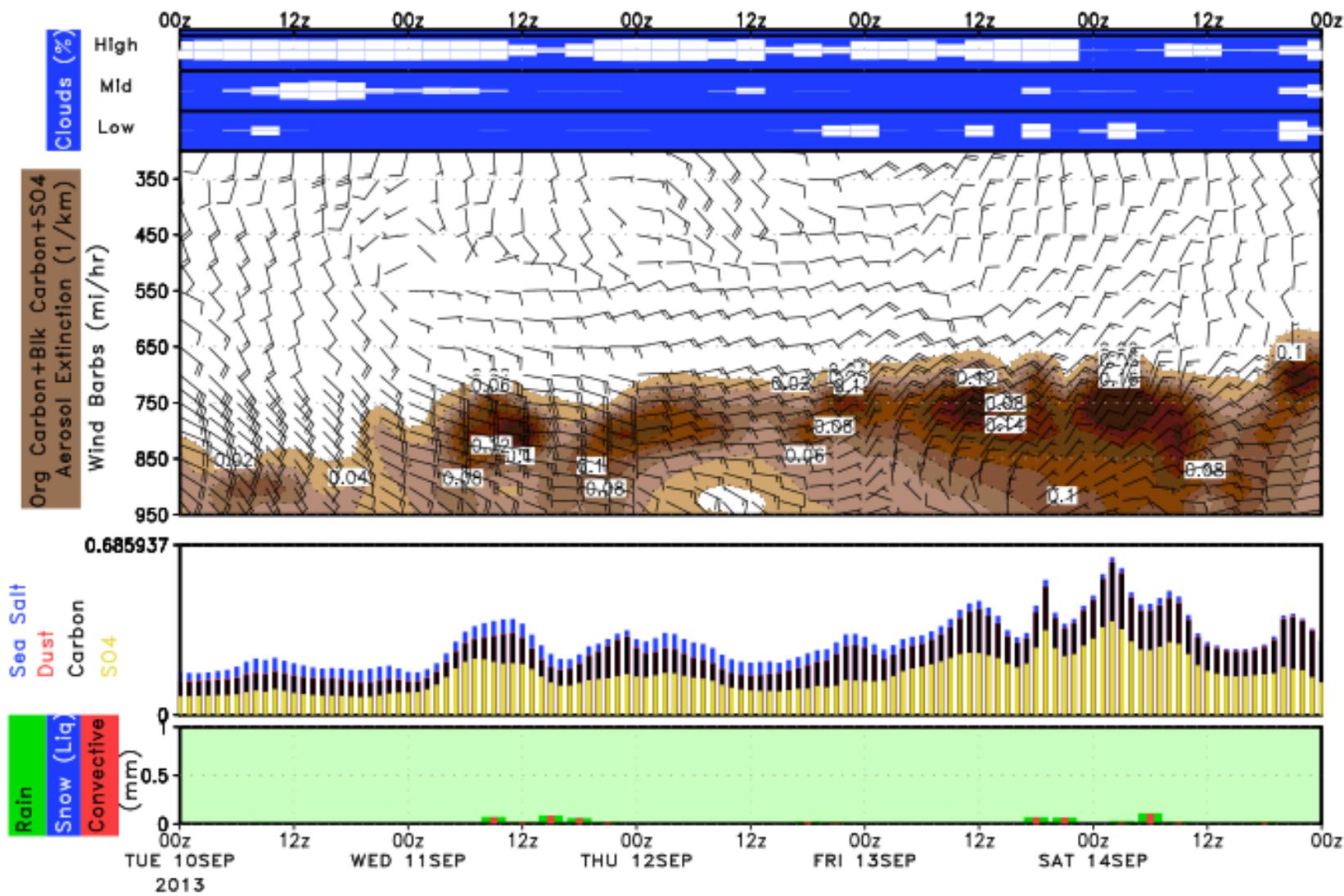
Valid: Wed 18z 2013-09-11 ($\tau = 36$)

NASA/GMAO – GEOS-5 Forecast Initialized on 06z 2013-09-10

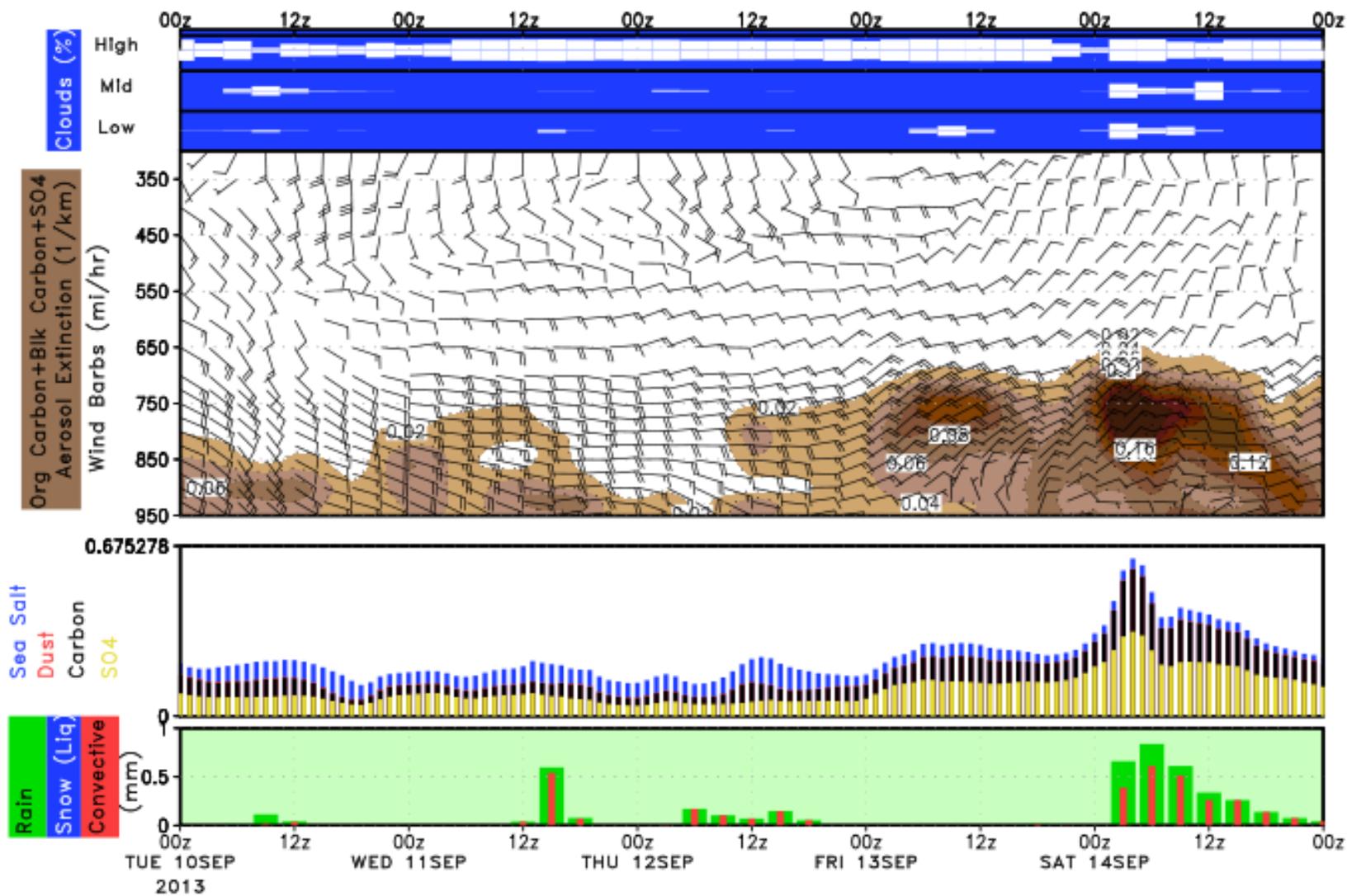
850 hPa Organic Carbon [$\mu\text{g}/\text{kg}$]



Valid: Wed 18z 2013-09-11 ($\tau = 36$)



LAT = 30.3 , LON = -95.4, Location = Conroe, Fcst_init = 20130910



LAT = 29.2 , LON = -94.8, Location = Galveston, Fcst_init = 20130910