

DISCOVER-AQ OUTLOOK -- September 27, 2013

The P-3B did not fly today because of electrical problems. The King Air flew the morning flight, but was substantially hampered by clouds. A broken to sometimes overcast deck of cumulus formed during mid-morning and led to a weakening of ozone production compared with yesterday. The outlook was for not much improvement until late afternoon. Therefore, the King Air's second flight of the day was cancelled.

The forecast question for Saturday, Sunday, and Monday is whether or not smoke plumes from fires can be sampled in the Mississippi Valley on the return to the East Coast. The cold front now well to our west will be approaching tomorrow, but cloud cover in the MS Valley (Arkansas, southern Missouri) will be less than 30%, allowing remote sensing of fire plumes. However, a rapid increase in cloudiness will occur on Sat. night as the front approaches and Sunday will be mostly overcast with rain in that region. New fires in that region are unlikely due to the rain, but some aged smoke may still remain in that area. The front will likely stall just east of our main area of interest and low clouds will still be likely on Monday as a weak low forms along the front over Louisiana/Mississippi.

The King Air will likely fly home on Saturday, but without viewing this hotbed of fire activity. The P-3B will likely transit home on Sunday, but the exact route, as it relates to fires, is yet to be determined.

9/27/2013 Weather Briefing

Ryan Stauffer

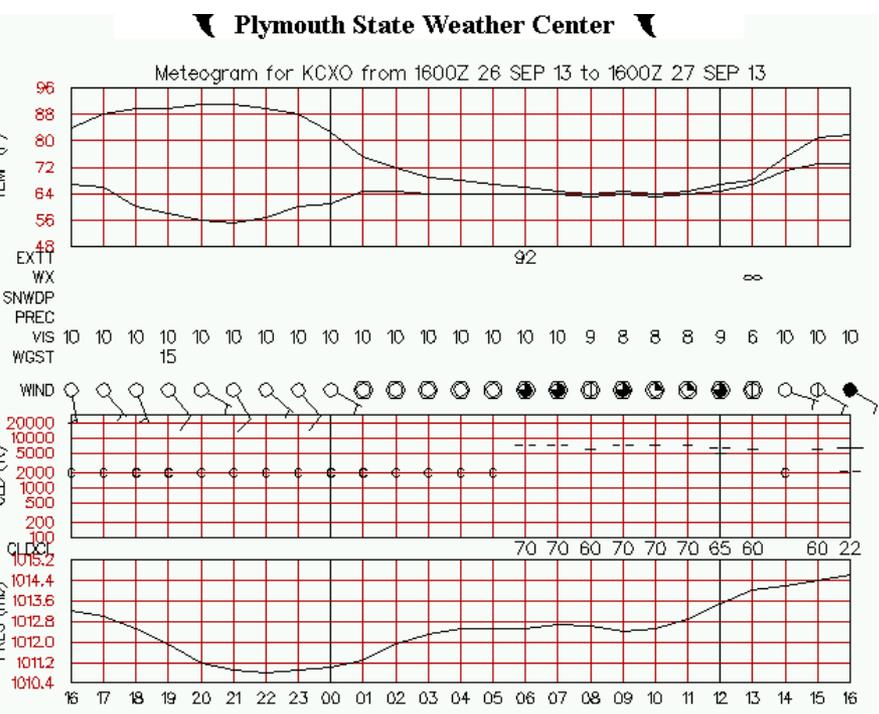
Ken Pickering

Recommendations

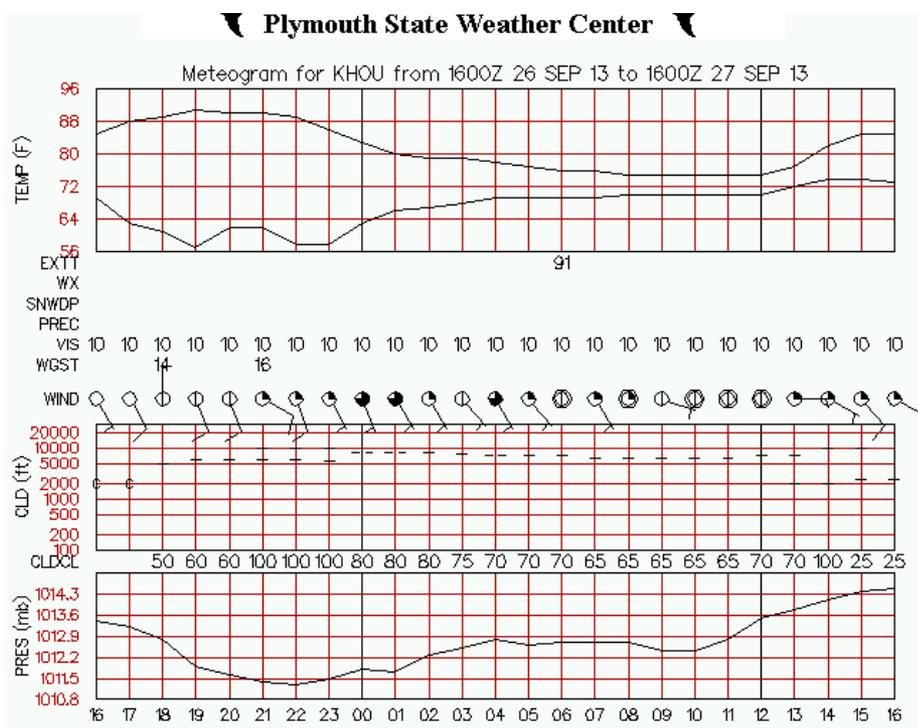
- **Saturday:** Plentiful fires are likely in the MS Valley ahead of the cold front that is approaching from the west. Cloud cover should be in the 20-30% range in that region. Airborne remote sensing possible.
- **Sunday:** Frontal system moves in early on Sunday to the MS Valley, accompanied by large increase in cloudiness and likely rain. Fires unlikely. Aged smoke possible.
- **Monday:** Frontal system stalls over and just E of area of interest, keeping significant cloudiness over the region and chance of showers. Fires unlikely due to wet vegetation.

Current Conditions

Conroe:



Houston Hobby:

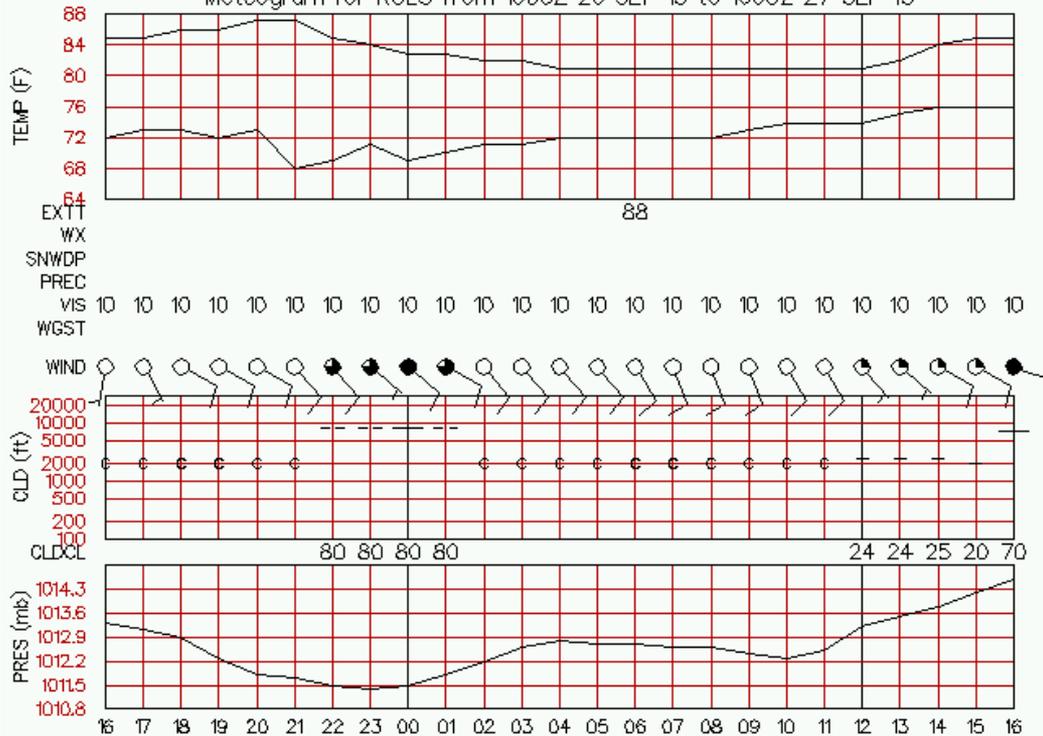


Current Conditions

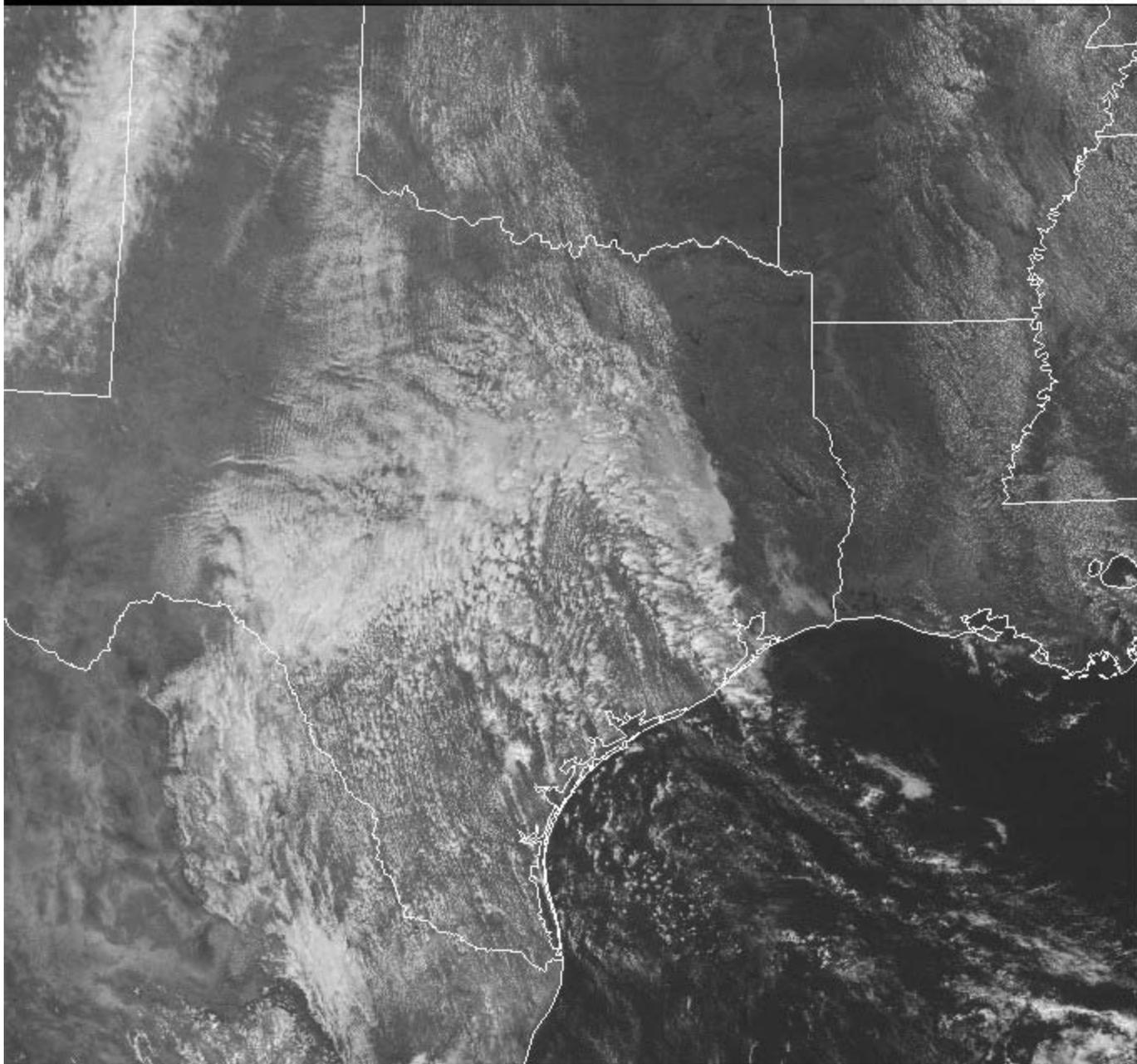
Galveston:

Plymouth State Weather Center

Meteogram for KGLS from 1600Z 26 SEP 13 to 1600Z 27 SEP 13



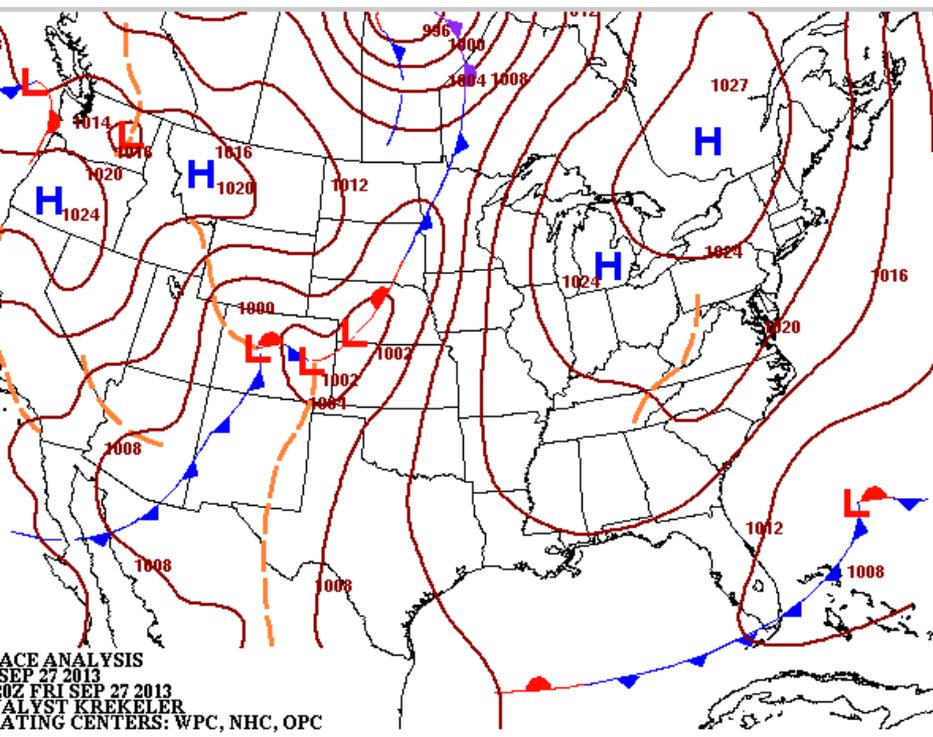
0 6 9 12 15 18 21 24 27 30 33 36 39 42 45 48 51 54 57 60 63 66 69 72 75 78 81 84 87 90 93 96 99



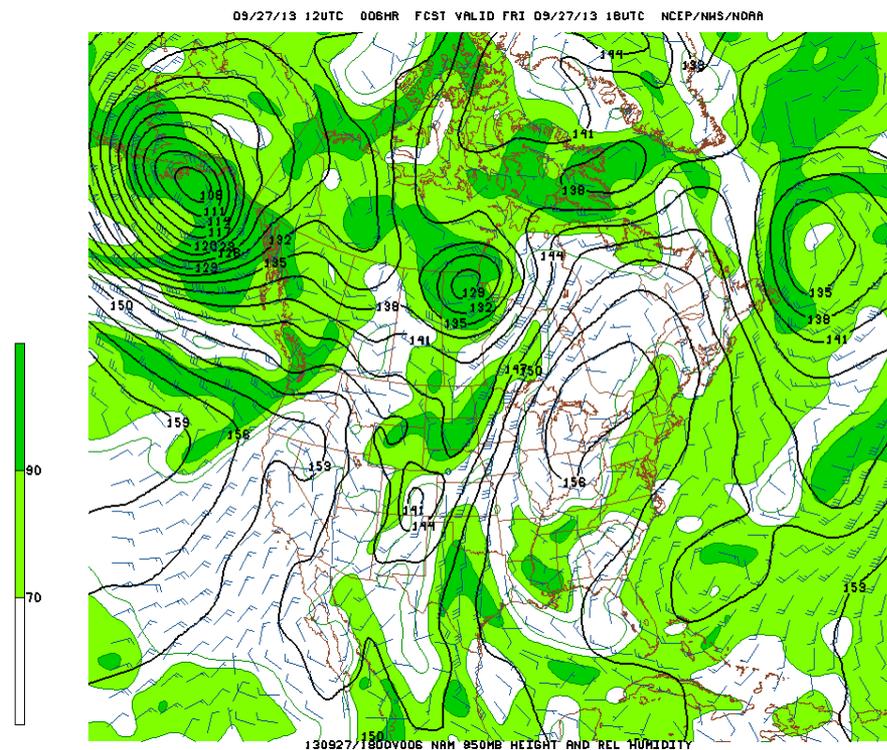
1217 CDT

Today: Low level moisture is streaming from the Gulf under SE winds. Cumulus deck was formed quickly and covers most of the area with BKN-OVC skies. May have to watch potential for some mid-afternoon clearing

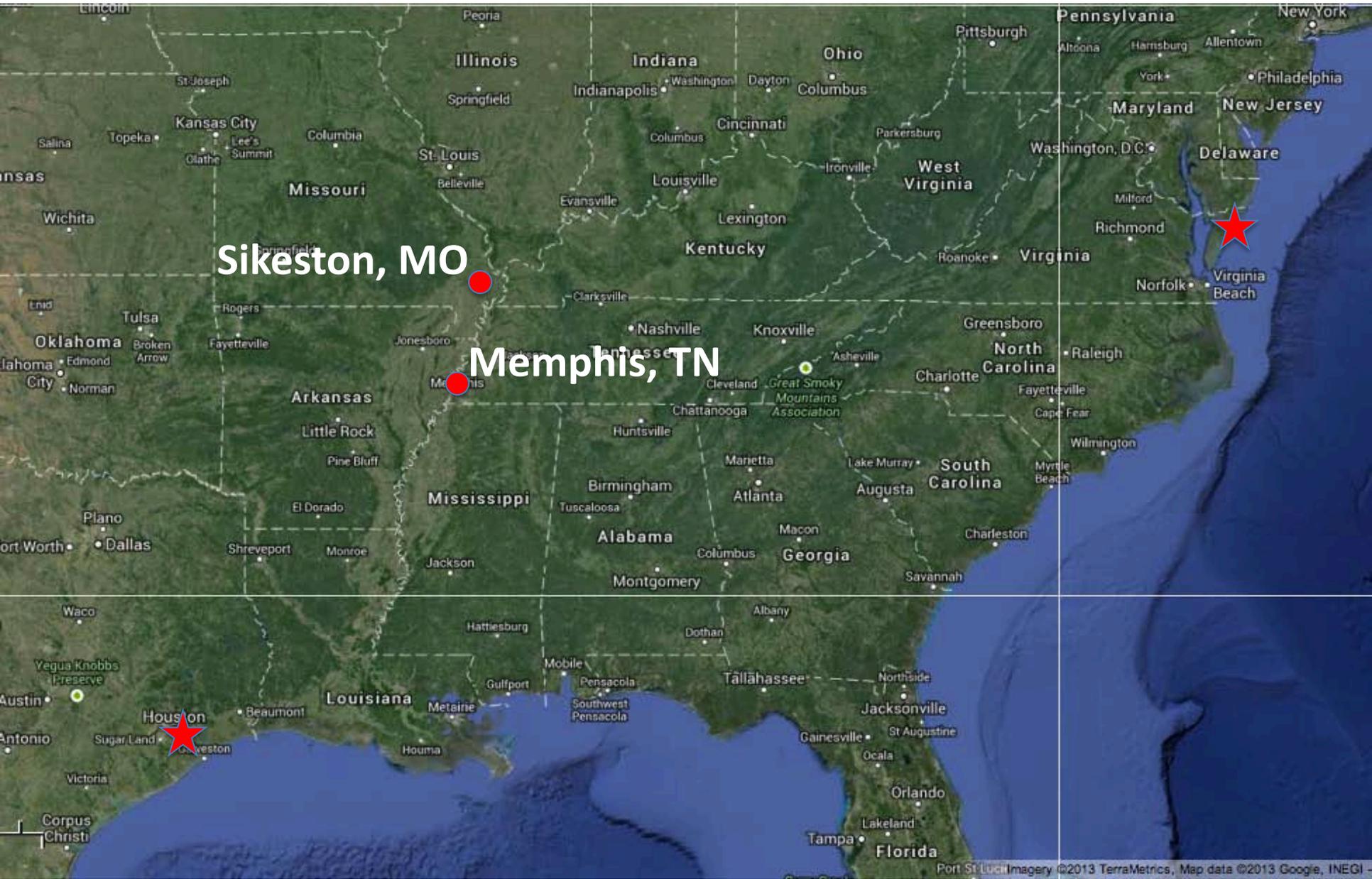
12z Surface Analysis



4 PM CDT NAM 850 mb RH



MS Valley Forecast: Saturday-Sunday-Monday



Sikeston:

TODAY



Sunny

High: 84 °F

TONIGHT



Mostly
Clear

Low: 59 °F

SATURDAY



Sunny

High: 84 °F

SATURDAY
NIGHT



50%

Chance
Showers

Low: 64 °F

SUNDAY



60%

Showers
Likely

High: 76 °F

SUNDAY
NIGHT



20%

Slight Chc
Showers

Low: 56 °F

MONDAY



20%

Slight Chc
Thunderstorms

High: 80 °F

MONDAY
NIGHT



Partly
Cloudy

Low: 59 °F

TUESDAY



Mostly
Sunny

High: 83 °F

Memphis:

TODAY



Sunny

High: 88 °F

TONIGHT



Mostly
Clear

Low: 67 °F

SATURDAY



Sunny

High: 89 °F

SATURDAY
NIGHT



20%

Slight Chc
Thunderstorms

Low: 70 °F

SUNDAY



60%

Showers
Likely

High: 82 °F

SUNDAY
NIGHT



40%

Chance
Thunderstorms

Low: 65 °F

MONDAY



30%

Chance
Thunderstorms

High: 83 °F

MONDAY
NIGHT



20%

Slight Chc
Thunderstorms

Low: 66 °F

TUESDAY

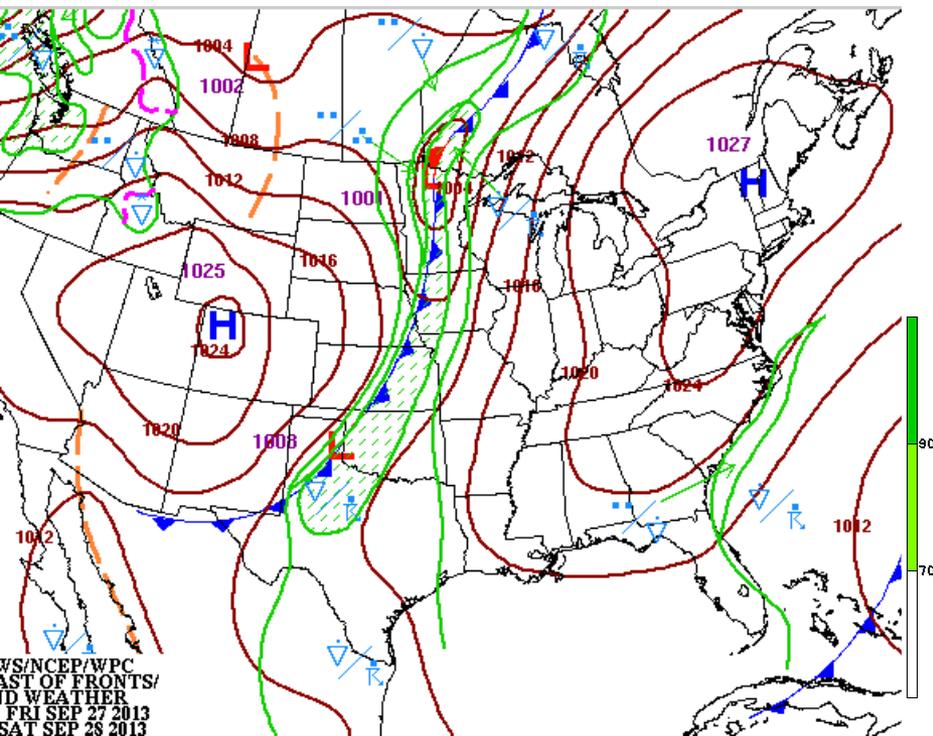


Partly
Sunny

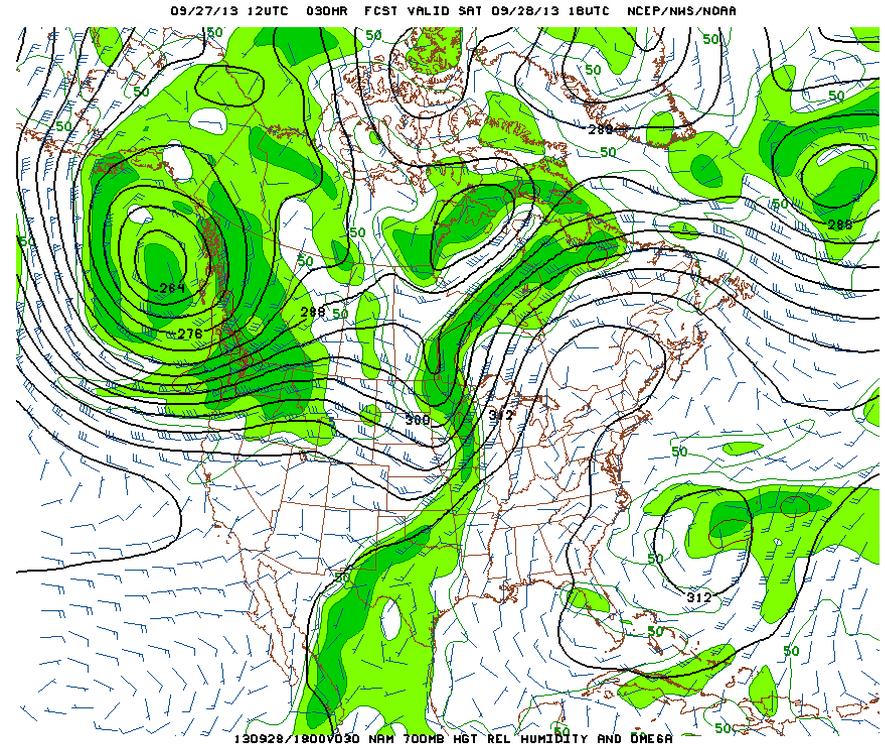
High: 85 °F

Tomorrow: Front approaches Houston area with thicker cloud cover and some showers. MS Valley will be mostly clear ahead of the frontal system and more removed from the flow of Gulf Moisture

12z Surface Forecast



1 PM CDT NAM 850mb RH



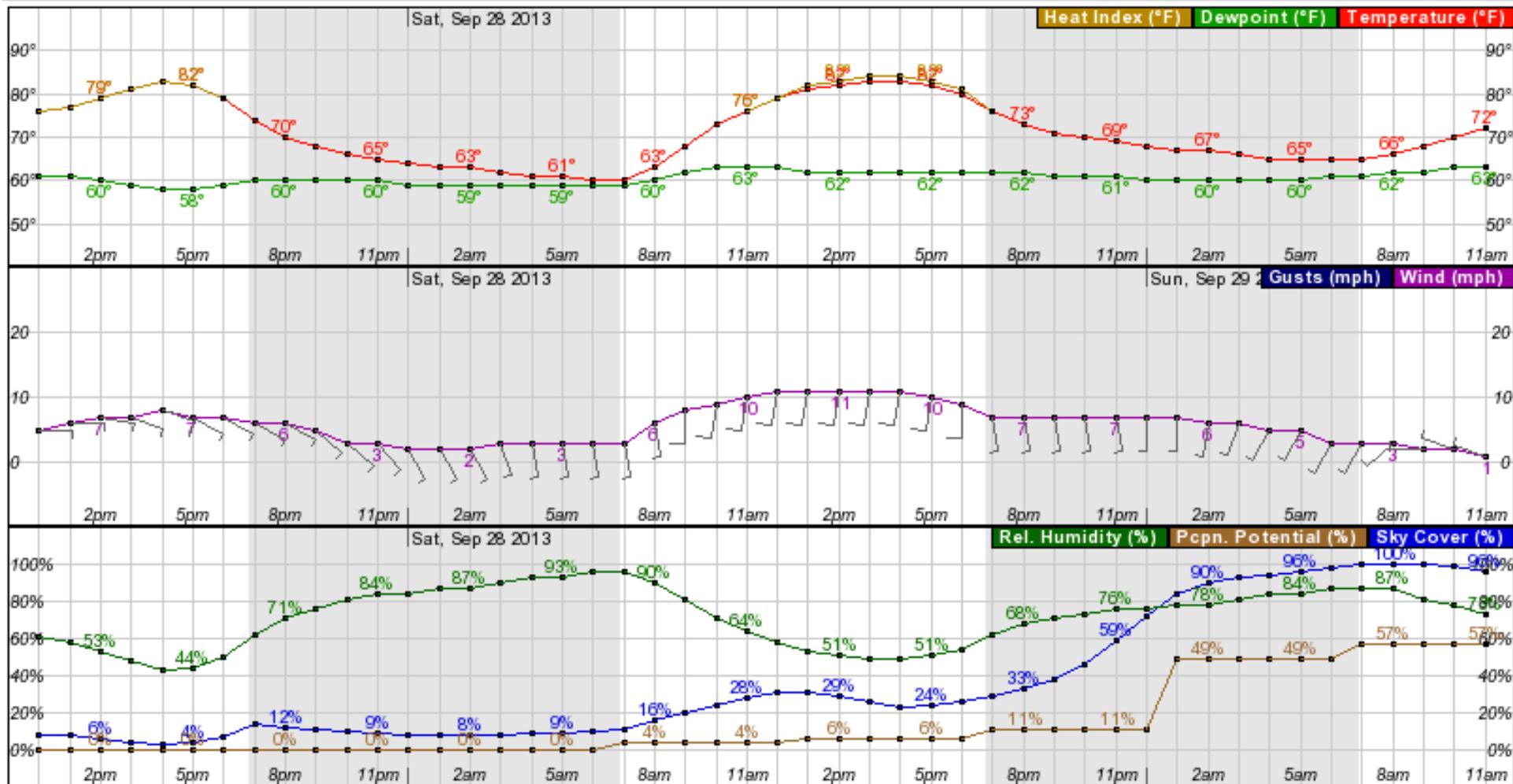
Sikeston

Today: Mostly clear, light ESE wind

Tomorrow: Wind shift to S and a few more clouds

Today →

Tomorrow →



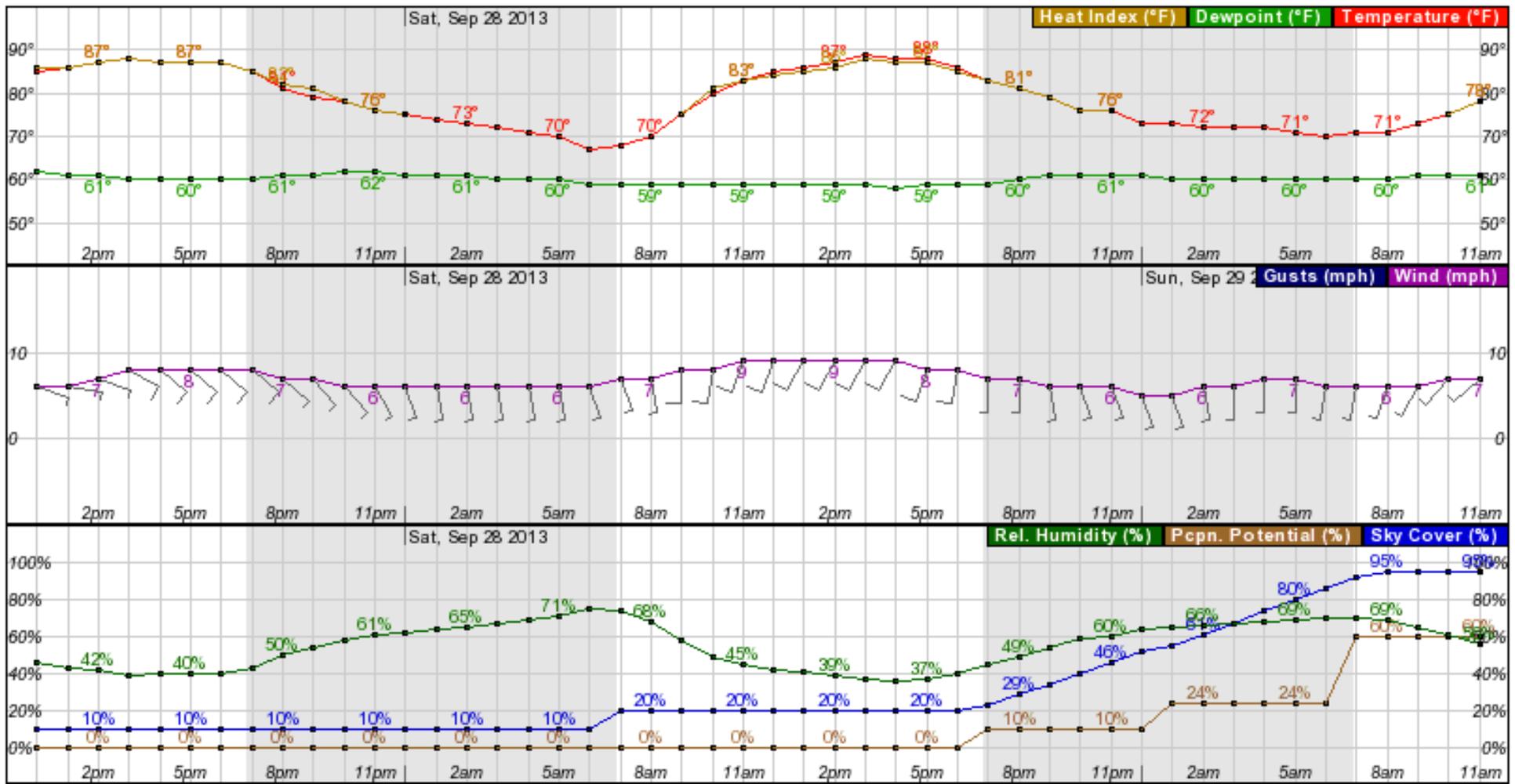
Memphis

Today: SE wind and mostly clear skies

Tomorrow: Winds more SSW, maybe few more clouds

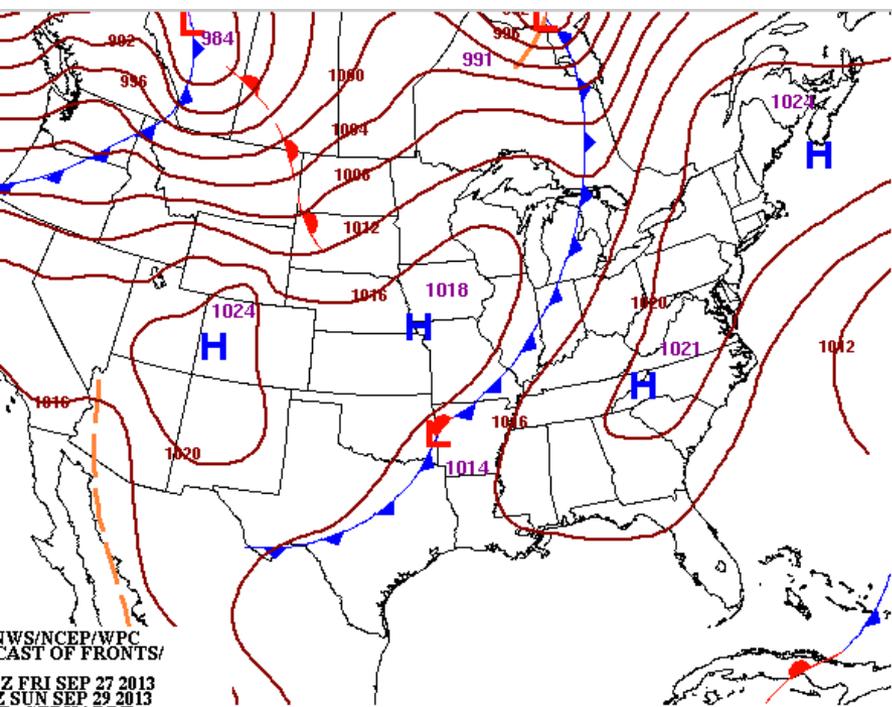
Today →

Tomorrow →



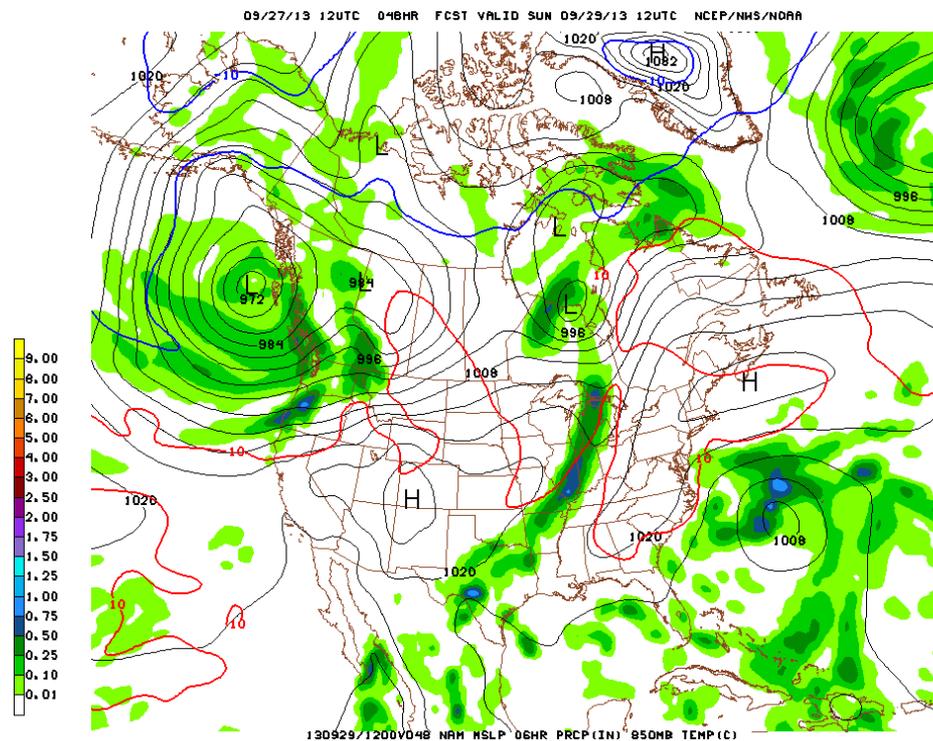
Sunday: Front draped across C. TX through the MS Valley, widespread showers and OVC conditions along the front. Expecting 0.5" + of rain in MS Valley

12z Surface Forecast



7 AM CDT NAM

Sfc Pressure/6-hr Precip



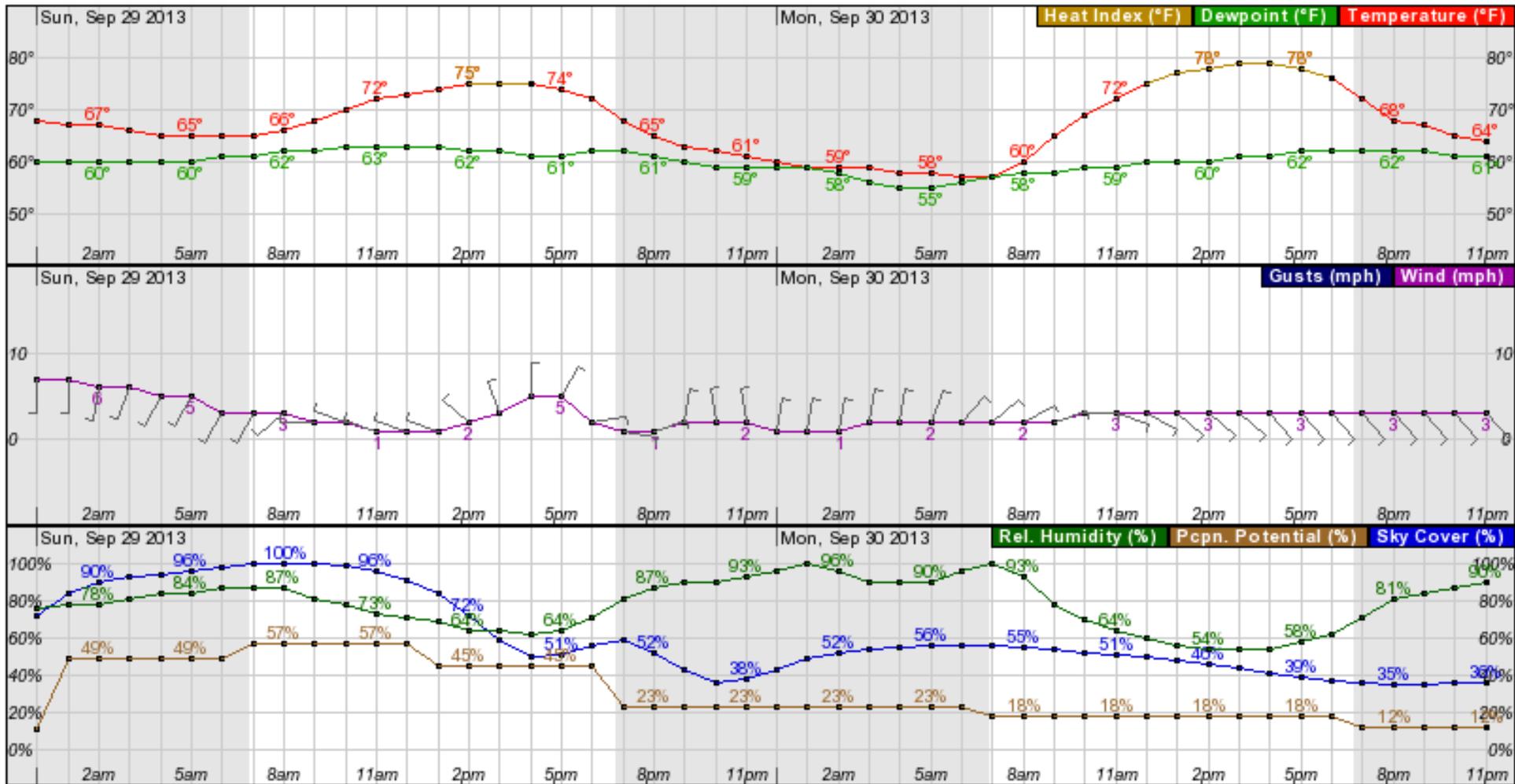
Sikeston

Sunday: Good chance of showers and t-storms, overcast

Monday: Front stalls a bit? Unsettled, clouds, few showers

Sunday →

Monday →



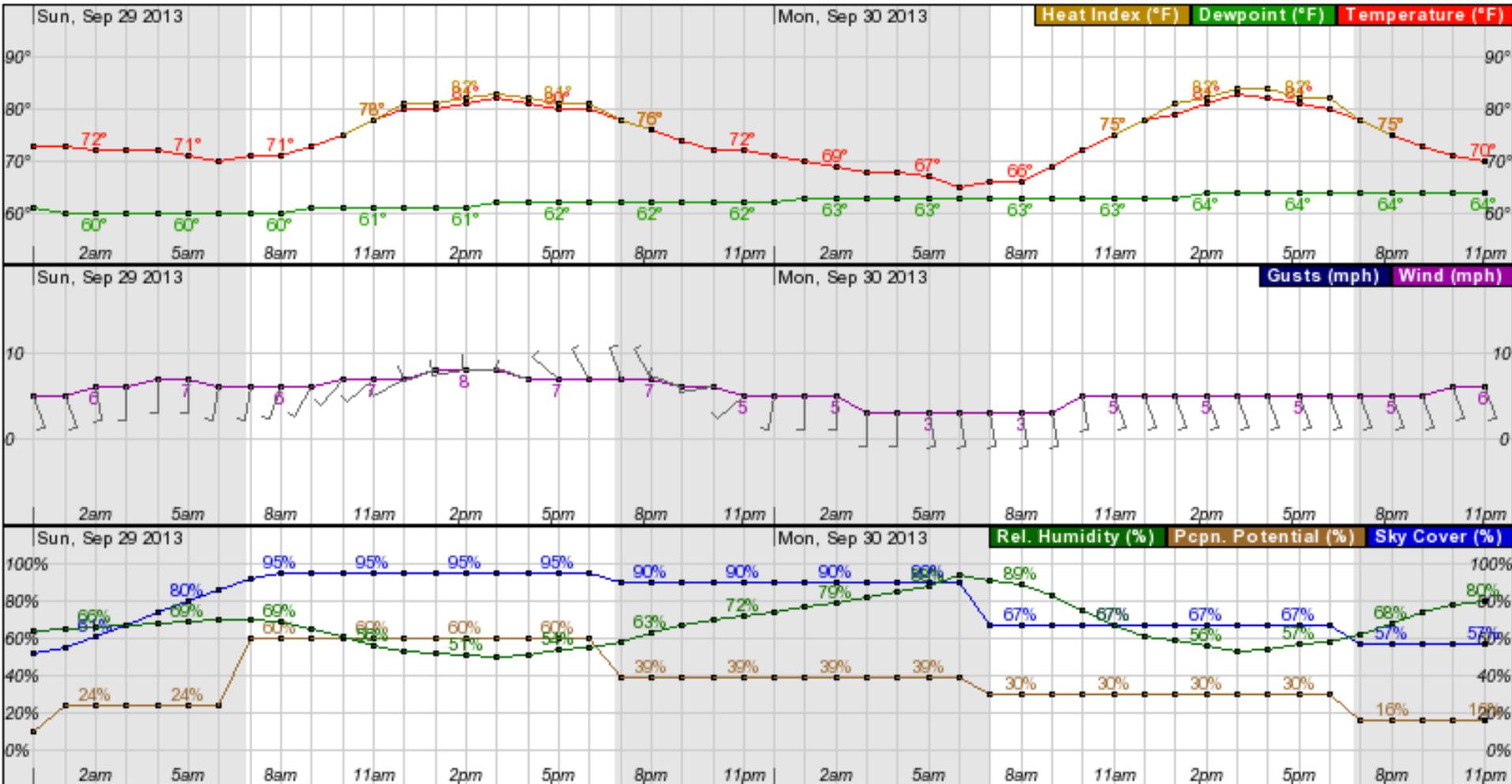
Memphis

Sunday: Overcast with rain and t-storms

Monday: Clouds and showers hang around

Sunday →

Monday →



Tomorrow (Saturday): GEOS-5 – BKN to OVC most of the day here, clearer MS Valley

10 am

1 pm

4 pm

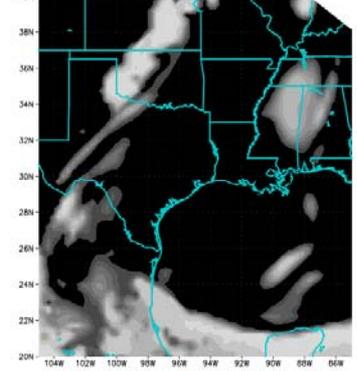
7 pm

High

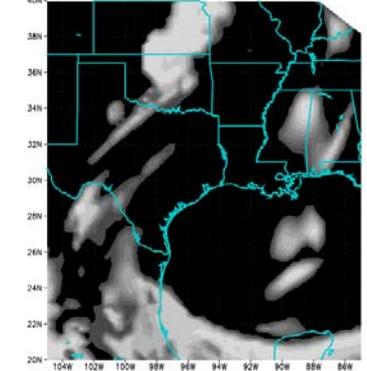
Mid

Low

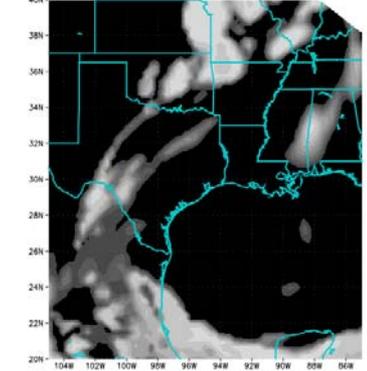
NASA/GMAO – GEOS-5 Forecast Initialized on 06z 2013-09-27
High Cloud Fraction



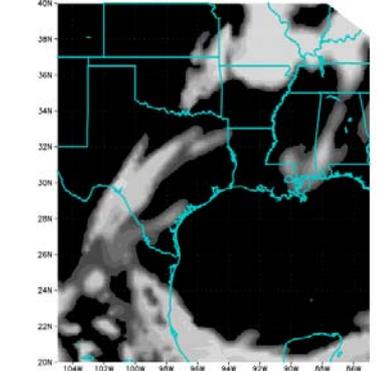
NASA/GMAO – GEOS-5 Forecast Initialized on 06z 2013-09-27
High Cloud Fraction



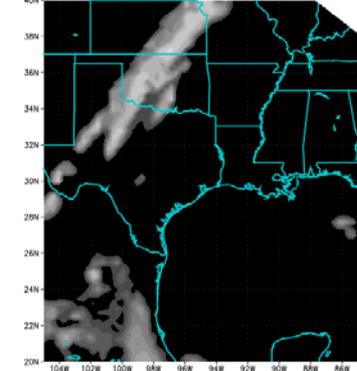
NASA/GMAO – GEOS-5 Forecast Initialized on 06z 2013-09-27
High Cloud Fraction



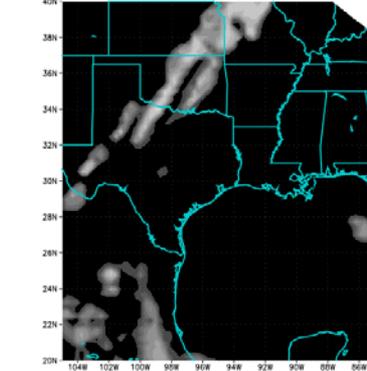
NASA/GMAO – GEOS-5 Forecast Initialized on 06z 2013-09-27
High Cloud Fraction



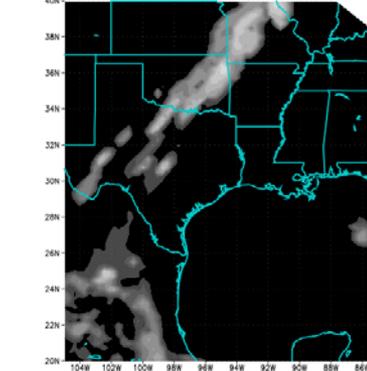
NASA/GMAO – GEOS-5 Forecast Initialized on 06z 2013-09-27
Middle Cloud Fraction



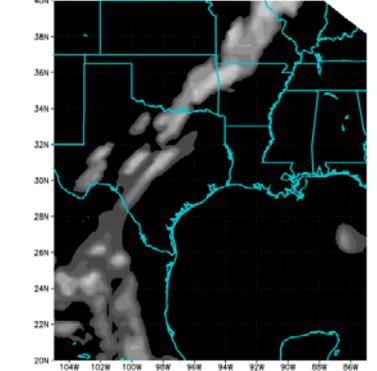
NASA/GMAO – GEOS-5 Forecast Initialized on 06z 2013-09-27
Middle Cloud Fraction



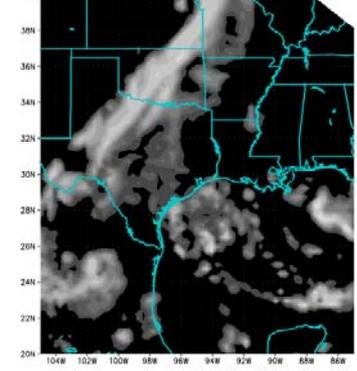
NASA/GMAO – GEOS-5 Forecast Initialized on 06z 2013-09-27
Middle Cloud Fraction



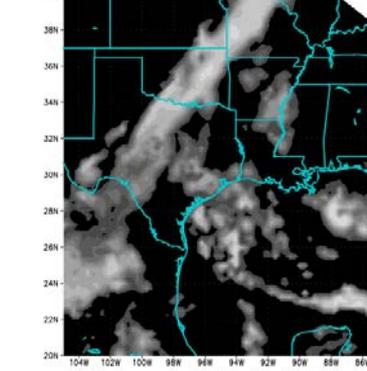
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Middle Cloud Fraction



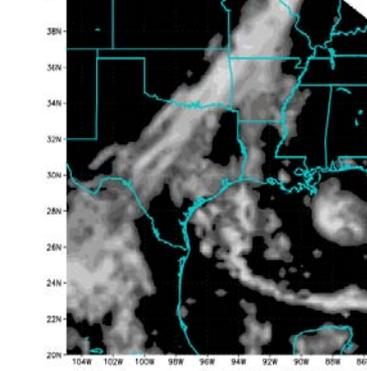
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Low Cloud Fraction



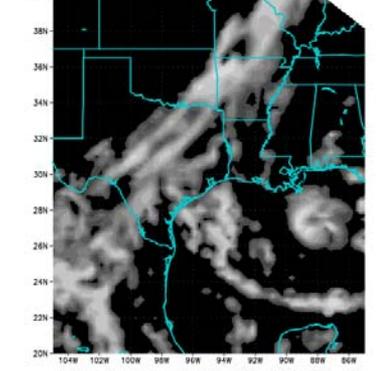
NASA/GMAO – GEOS-5 Forecast Initialized on 06z 2013-09-27
Low Cloud Fraction



NASA/GMAO – GEOS-5 Forecast Initialized on 06z 2013-09-27
Low Cloud Fraction



NASA/GMAO – GEOS-5 Forecast Initialized on 06z 2013-09-27
Low Cloud Fraction



Sunday: GEOS-5 – Rain and often OVC both here and MS Valley

10 am

1 pm

4 pm

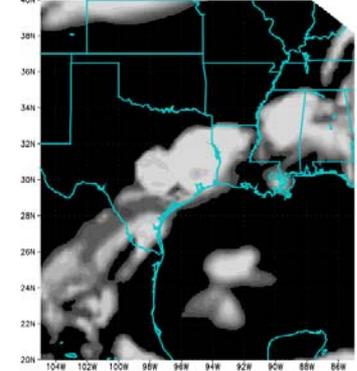
7 pm

High

Mid

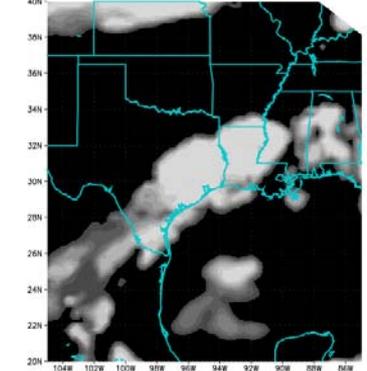
Low

NASA/GMAO – GEOS-5 Forecast Initialized on 06z 2013-09-27
High Cloud Fraction



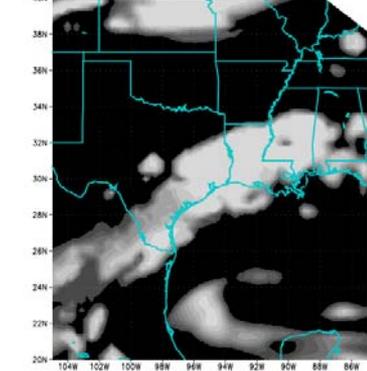
57 hr forecast valid Sun 15z 2013-09-29

NASA/GMAO – GEOS-5 Forecast Initialized on 06z 2013-09-27
High Cloud Fraction



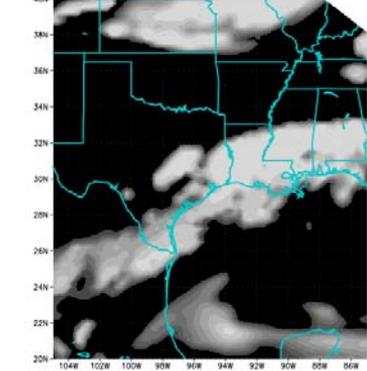
60 hr forecast valid Sun 18z 2013-09-29

NASA/GMAO – GEOS-5 Forecast Initialized on 06z 2013-09-27
High Cloud Fraction



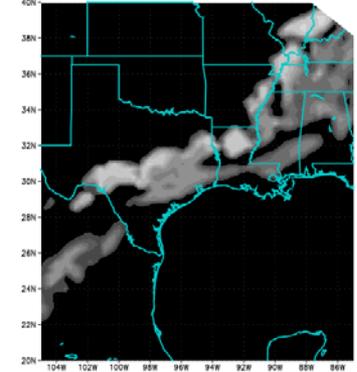
63 hr forecast valid Sun 21z 2013-09-29

NASA/GMAO – GEOS-5 Forecast Initialized on 06z 2013-09-27
High Cloud Fraction



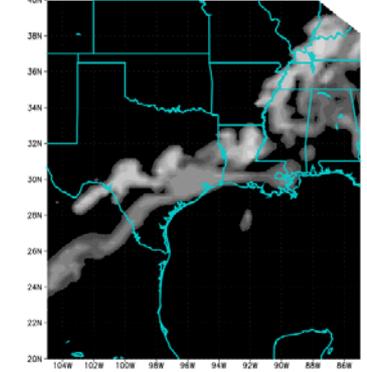
66 hr forecast valid Mon 00z 2013-09-30

NASA/GMAO – GEOS-5 Forecast Initialized on 06z 2013-09-27
Middle Cloud Fraction



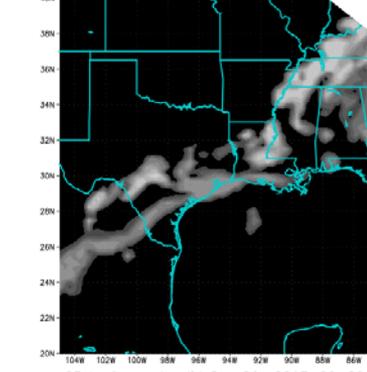
57 hr forecast valid Sun 15z 2013-09-29

NASA/GMAO – GEOS-5 Forecast Initialized on 06z 2013-09-27
Middle Cloud Fraction



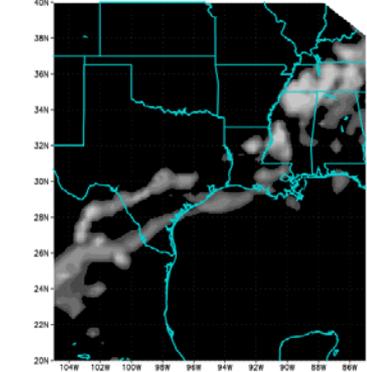
60 hr forecast valid Sun 18z 2013-09-29

NASA/GMAO – GEOS-5 Forecast Initialized on 06z 2013-09-27
Middle Cloud Fraction



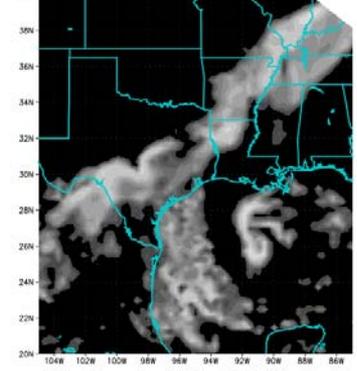
63 hr forecast valid Sun 21z 2013-09-29

NASA/GMAO – GEOS-5 Forecast Initialized on 06z 2013-09-27
Middle Cloud Fraction



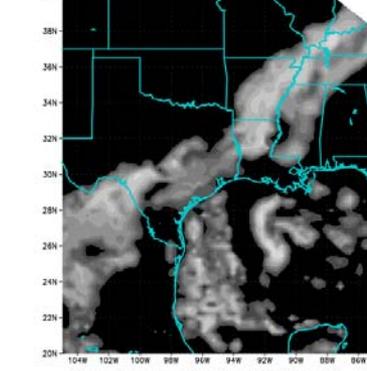
66 hr forecast valid Mon 00z 2013-09-30

NASA/GMAO – GEOS-5 Forecast Initialized on 06z 2013-09-27
Low Cloud Fraction



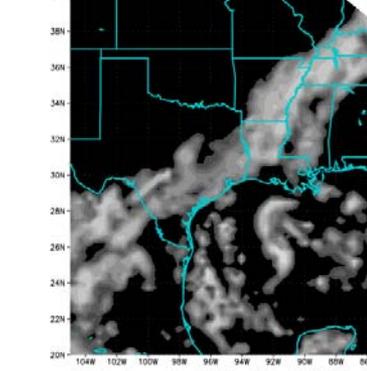
57 hr forecast valid Sun 15z 2013-09-29

NASA/GMAO – GEOS-5 Forecast Initialized on 06z 2013-09-27
Low Cloud Fraction



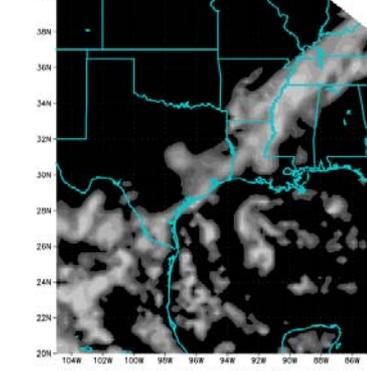
60 hr forecast valid Sun 18z 2013-09-29

NASA/GMAO – GEOS-5 Forecast Initialized on 06z 2013-09-27
Low Cloud Fraction



63 hr forecast valid Sun 21z 2013-09-29

NASA/GMAO – GEOS-5 Forecast Initialized on 06z 2013-09-27
Low Cloud Fraction



66 hr forecast valid Mon 00z 2013-09-30

Summary

- **Saturday:** Plentiful fires are likely in the MS Valley ahead of the cold front that is approaching from the west. Cloud cover should be in the 20-30% range in that region. Airborne remote sensing possible.
- **Sunday:** Frontal system moves in early on Sunday to the MS Valley, accompanied by large increase in cloudiness and likely rain. Fires unlikely. Aged smoke possible.
- **Monday:** Frontal system stalls over and just E of area of interest, keeping significant cloudiness over the region and chance of showers. Fires unlikely due to wet vegetation.

DISCOVER-AQ Air Quality Outlook

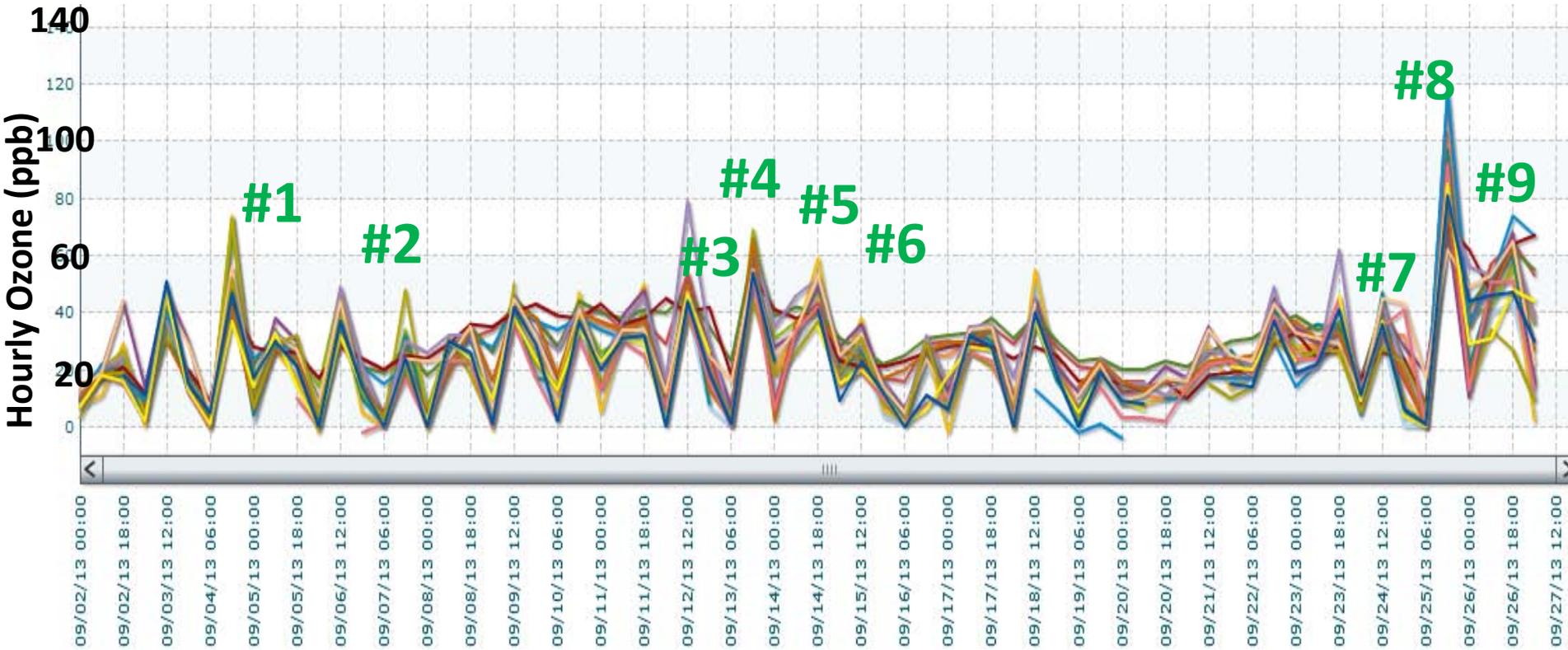
September 27, 2013

Ken Pickering

Bryan Duncan

Hourly Ozone (airnowtech.org)**

September 2nd – 26th ** EVERY 9th HOUR PLOTTED!!!!



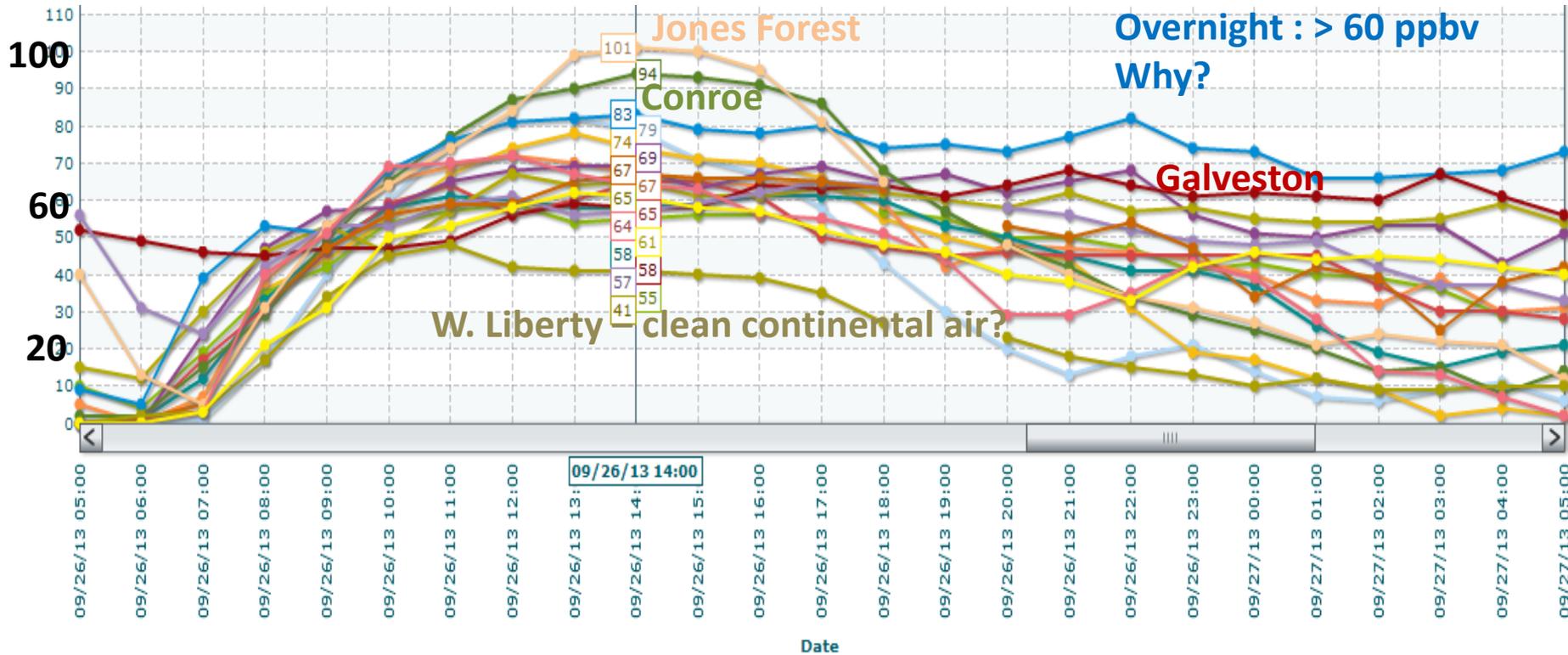
- | | |
|---|---|
| Houston Aldine C8/O3 - 44201/1 Hr/2 | Northwest Harris Co. C26/C110/C154/O3 - 44201/1 Hr/2 |
| Houston Westhollow C410/O3 - 44201/1 Hr/1 | Houston Deer Park C35/O3 - 44201/1 Hr/1 |
| Manvel Croix Park C84/O3 - 44201/1 Hr/1 | Seabrook Friendship Park C45/O3 - 44201/1 Hr/1 |
| Conroe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

Hourly Ozone (airnowtech.org)

September 26th (Yesterday)

La Porte: very high levels
Overnight : > 60 ppbv
Why?

Hourly Ozone (ppbv)



W. Liberty clean continental air?

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

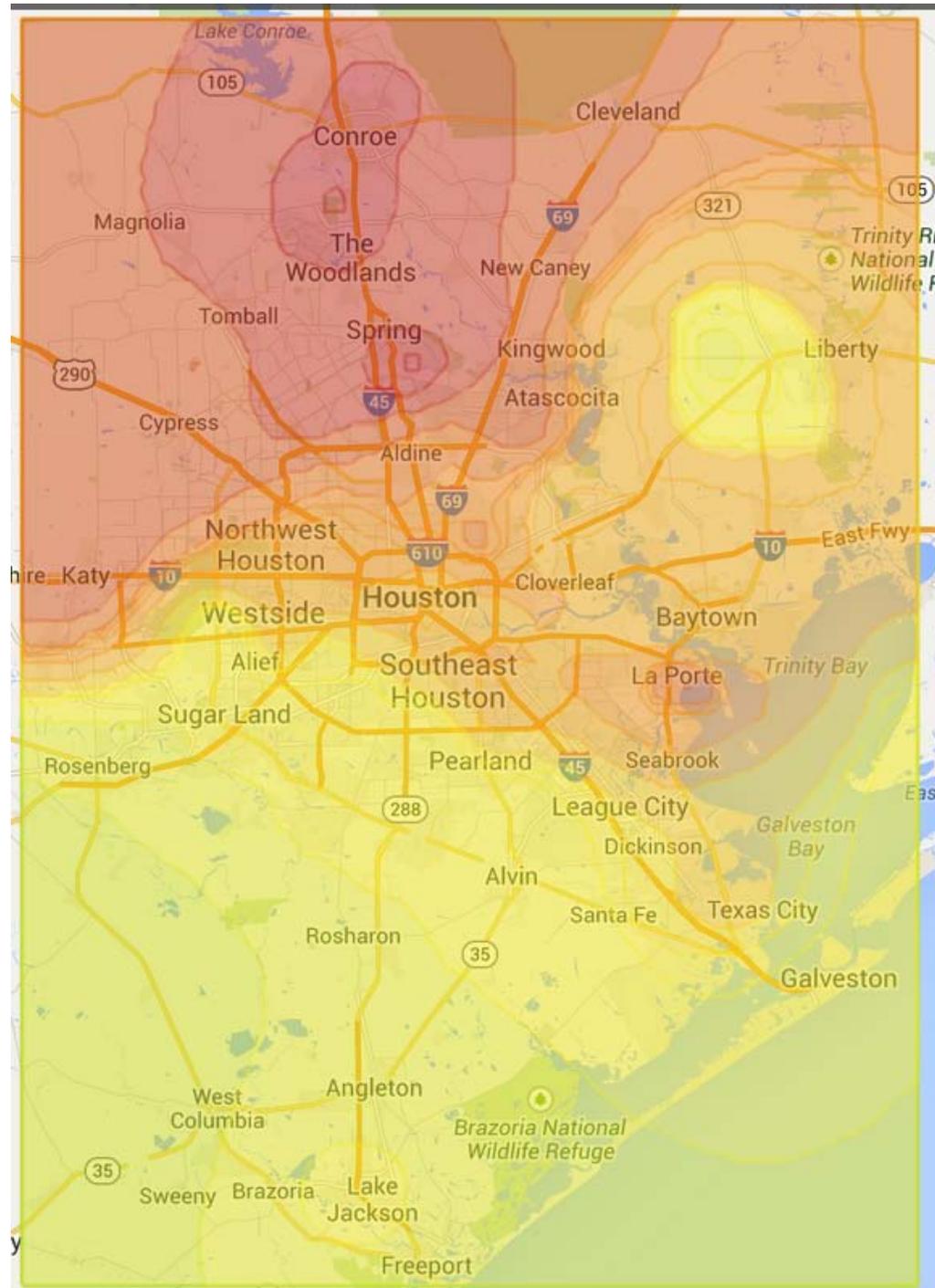
Ozone levels stayed high overnight at many sites. Mechanical vertical mixing?
Lots of interesting heterogeneity! Background levels very high in some spots to begin day.

Houston Clean Air Network

<http://houstoncleanairnetwork.com>

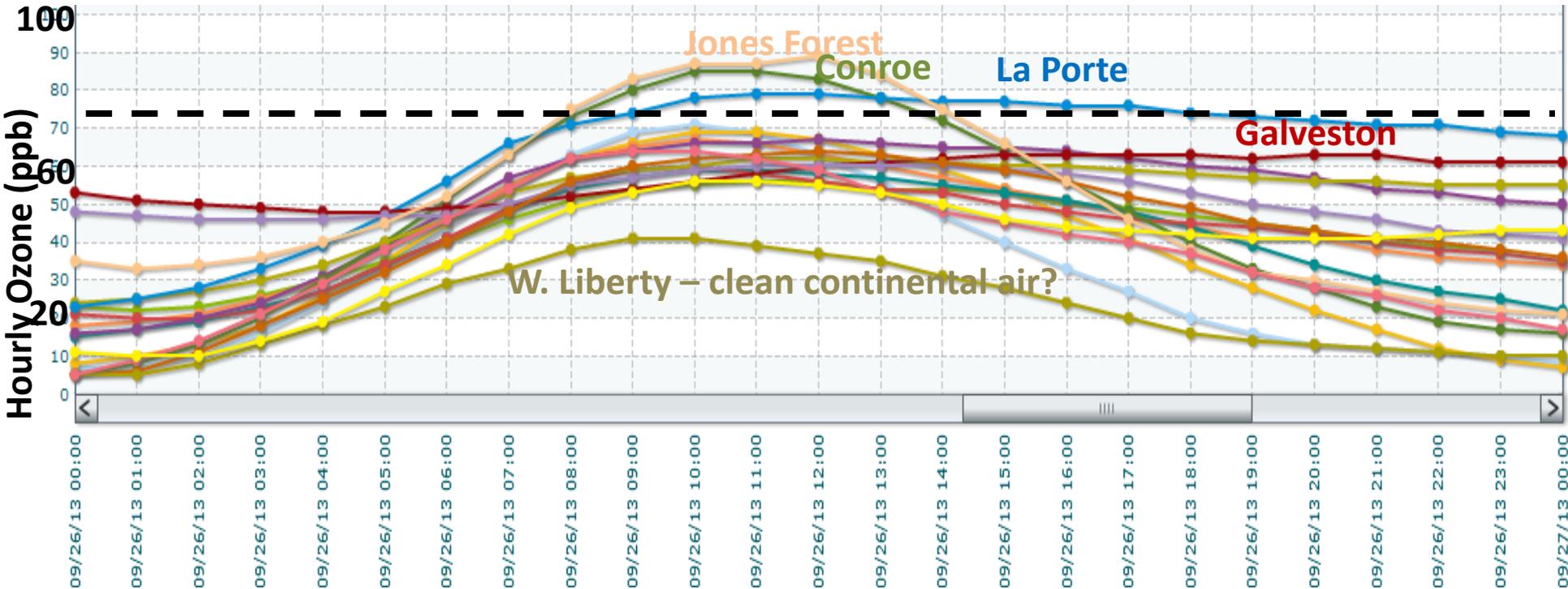
Ozone

Yesterday @ 3:10 pm



Hourly (8 Hr) Ozone (airnowtech.org)

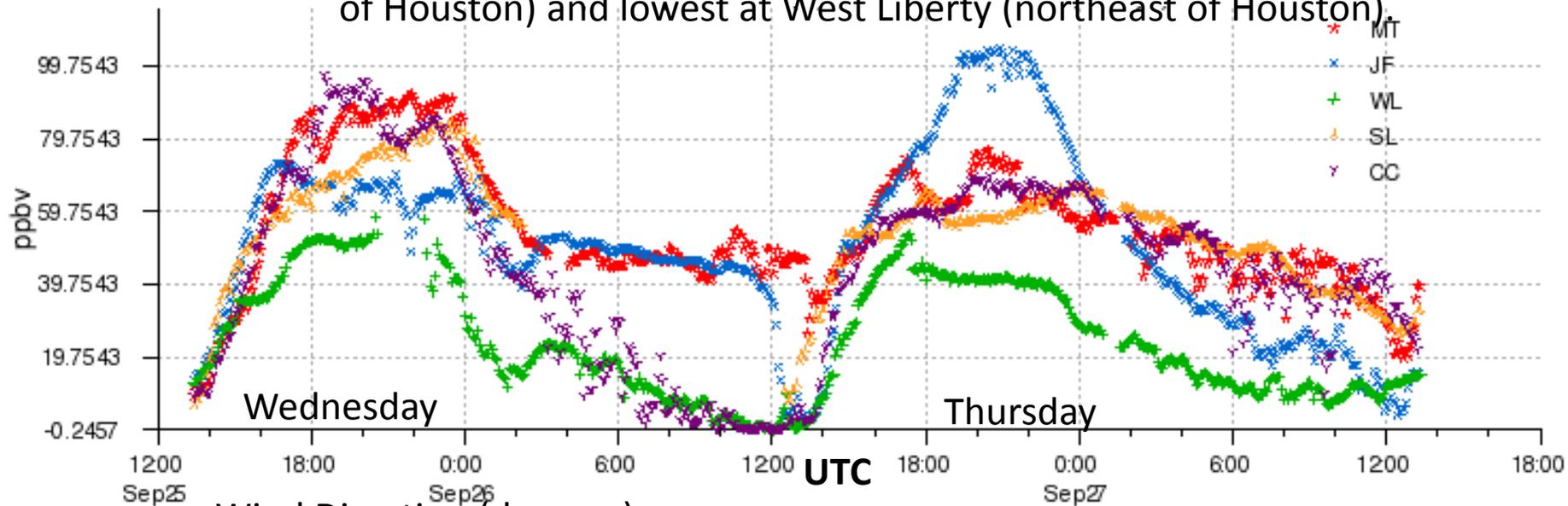
September 26th (Yesterday)



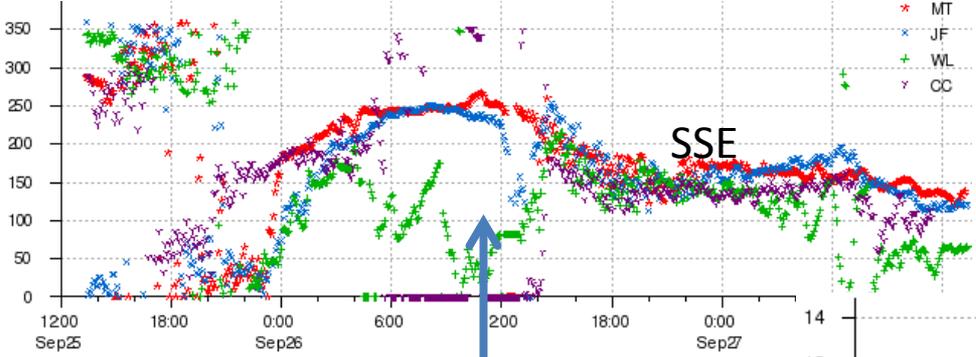
- | | |
|---|---|
| Houston Aldine C8/O3 - 44201/1 Hr/2 | Northwest Harris Co. C26/C110/C154/O3 - 44201/1 Hr/2 |
| Houston Westhollow C410/O3 - 44201/1 Hr/1 | Houston Deer Park C35/O3 - 44201/1 Hr/1 |
| Manvel Croix Park C84/O3 - 44201/1 Hr/1 | Seabrook Friendship Park C45/O3 - 44201/1 Hr/1 |
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|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

HNET : Ozone (ppbv)

Interestingly, highest ozone yesterday at Jones Forest (on tower & north of Houston) and lowest at West Liberty (northeast of Houston).

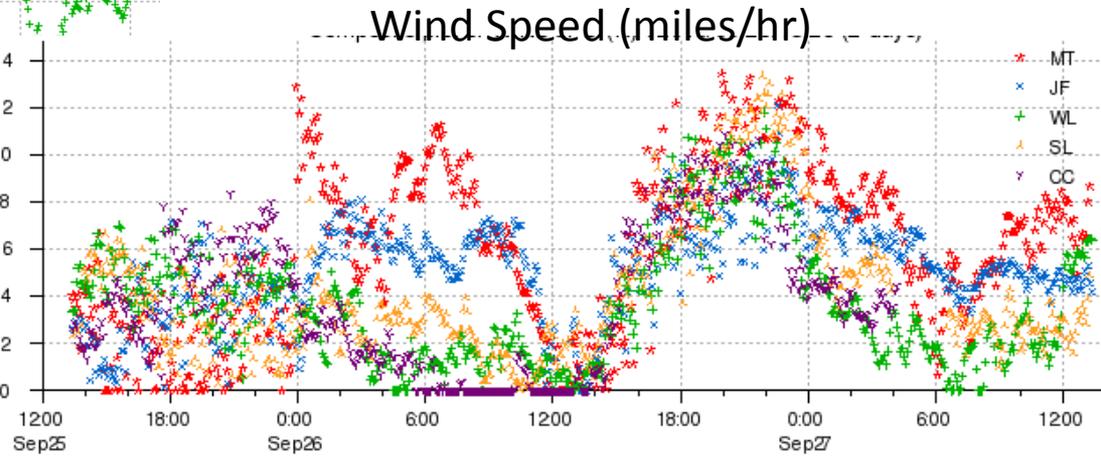


Wind Direction (degrees)



Wind direction the same at all stations though during day.

Wind speed very low at night.

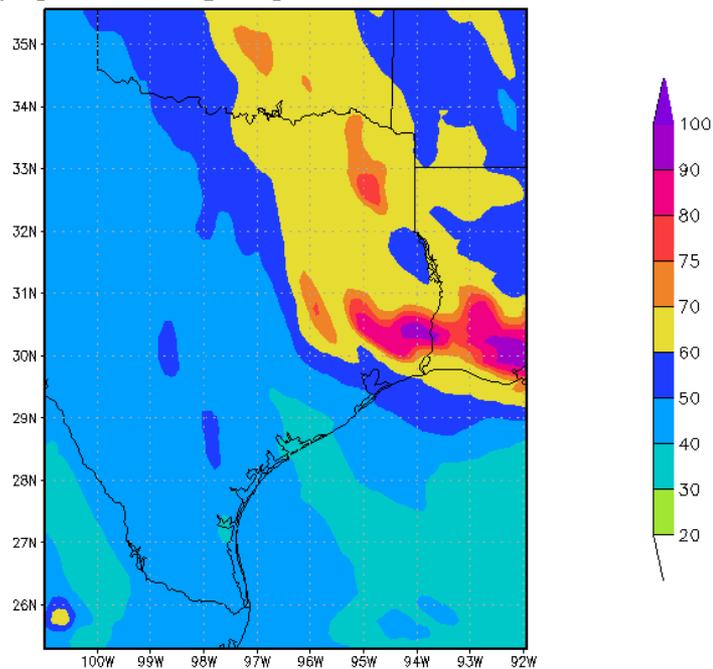


TCEQ Air Quality Forecast:

Friday: Code **Yellow for Ozone – cleaner background air coming off Gulf; less stagnant conditions
Code **Green** for PM2.5**

Sat., Sun., Mon.: Code **Green for Ozone and PM2.5**

O3 [ppb] at 1013 [hPa] Valid 20Z SEP 27 2013



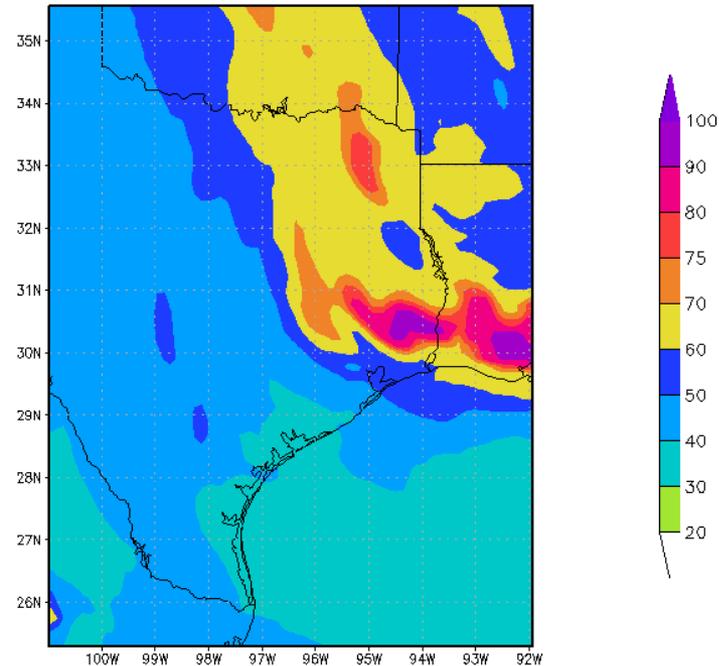
3 PM

GRADS: COLA/IGES

NOAA Experimental CMAQ
Forecast for Today

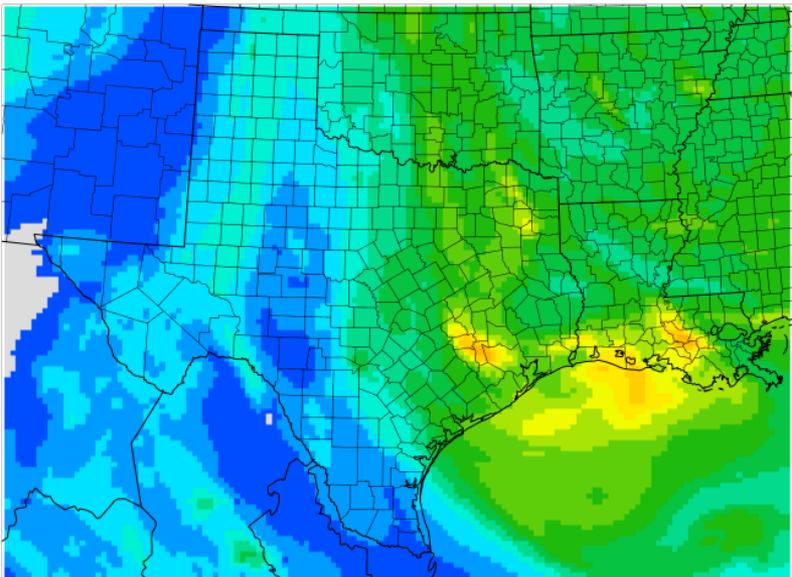
5 PM

O3 [ppb] at 1013 [hPa] Valid 22Z SEP 27 2013



GRADS: COLA/IGES

Ozone Best Case



Min(51,31) = 26.6, Max(90,44) = 93.5

Fri September 27 14:00 CST

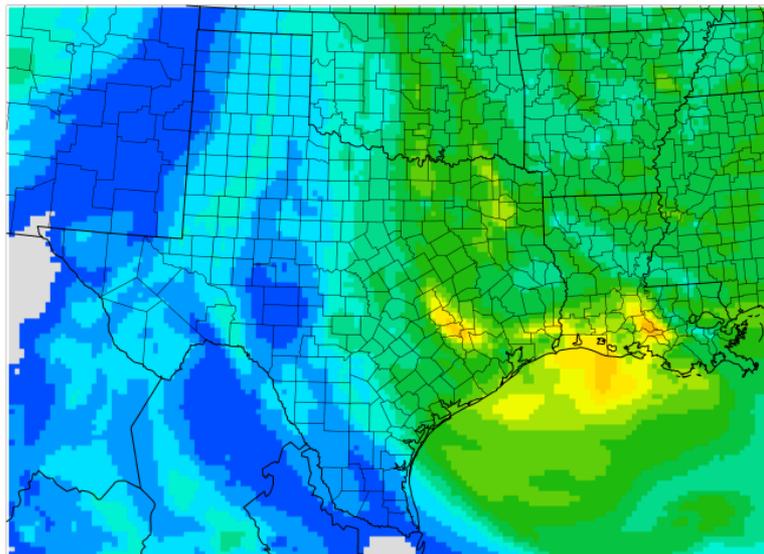


3 PM

TCEQ/ENVIRON CAMx Forecast for Today

5 PM

Ozone Best Case



Min(5,57) = 27.3, Max(126,46) = 91.0

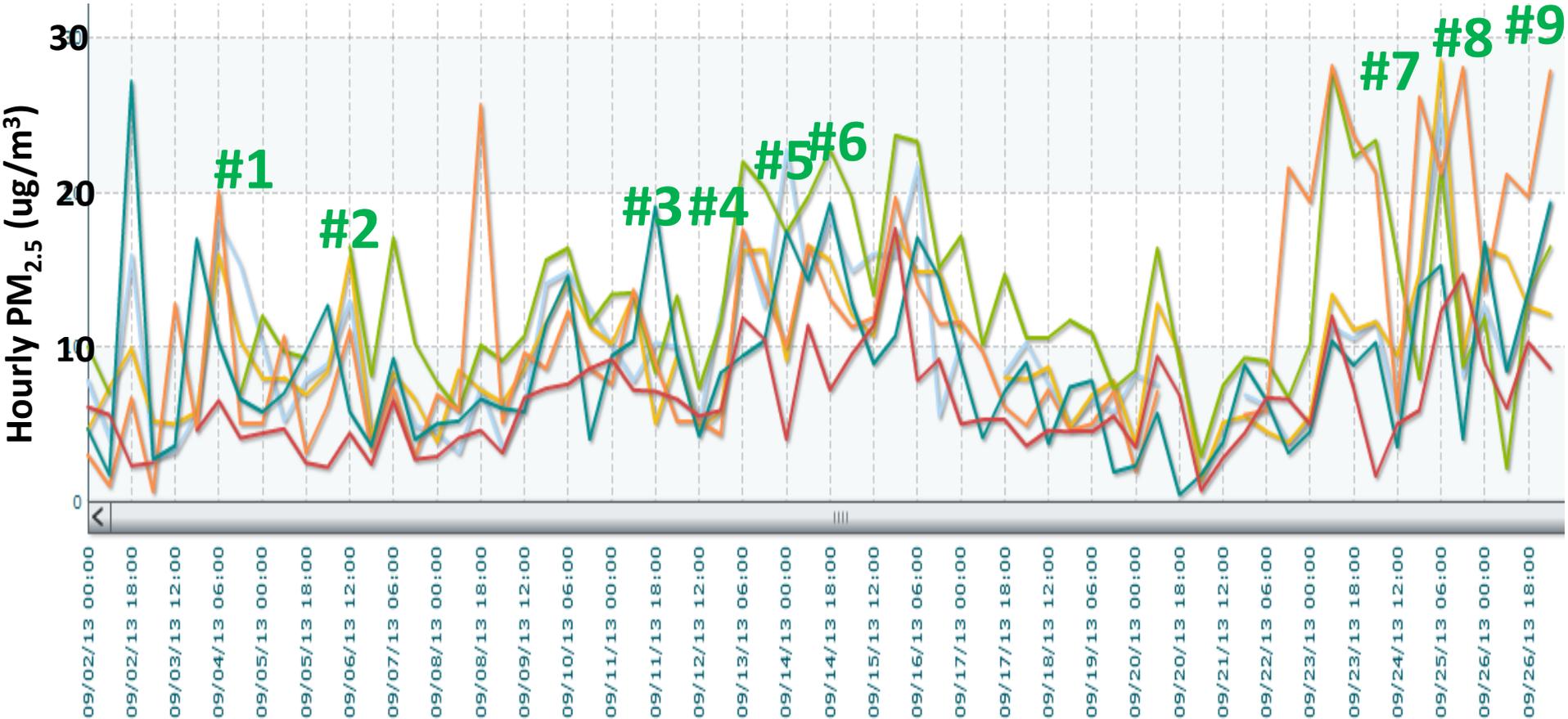
Fri September 27 16:00 CST



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

September 2nd – 26th

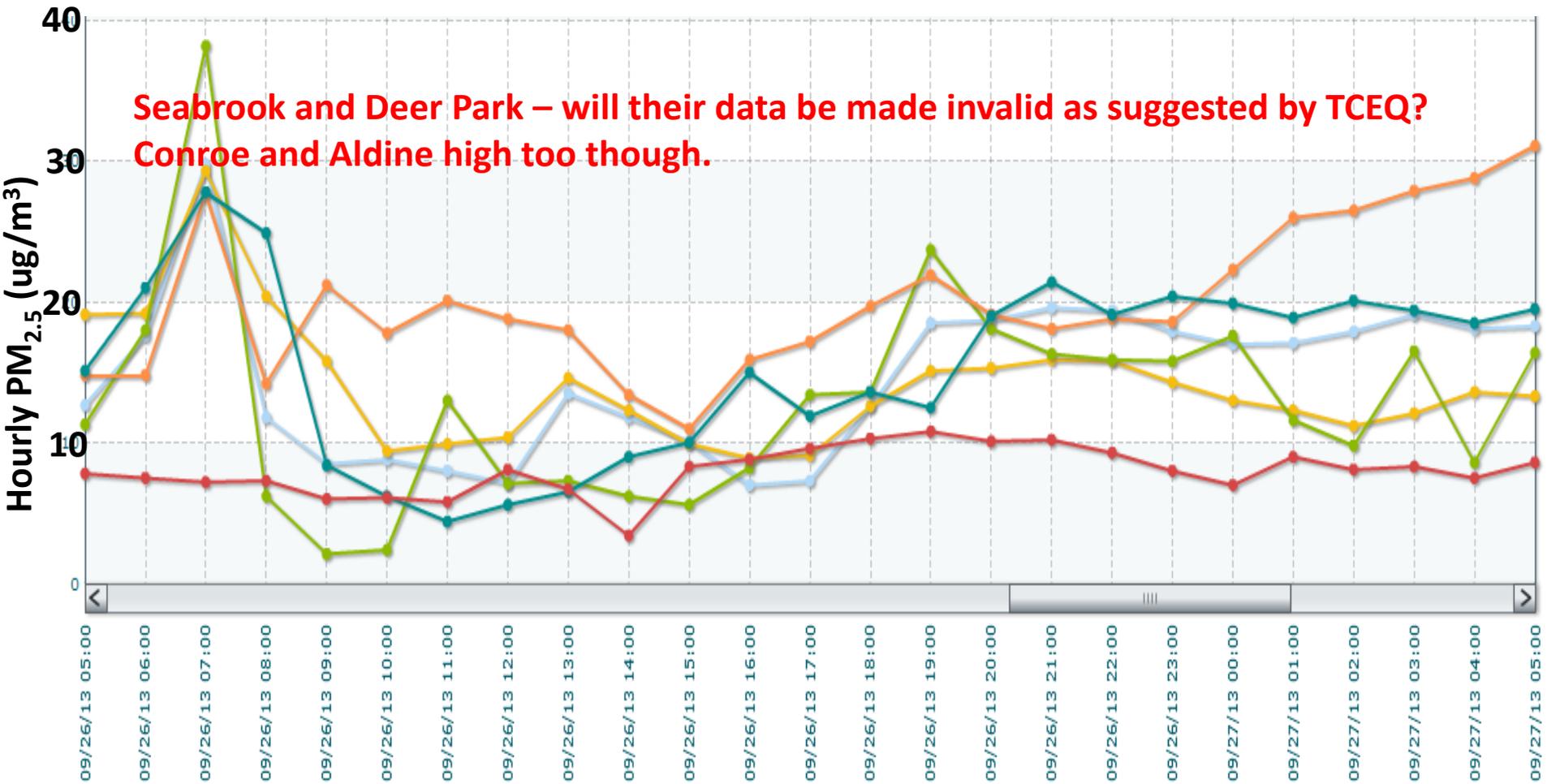
** EVERY 9th HOUR PLOTTED!!!!



- 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

Hourly PM_{2.5} (airnowtech.org)

September 26th



- 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

Fires – will the rain put them out for Sunday's transit flight? If not, will it be too cloudy?

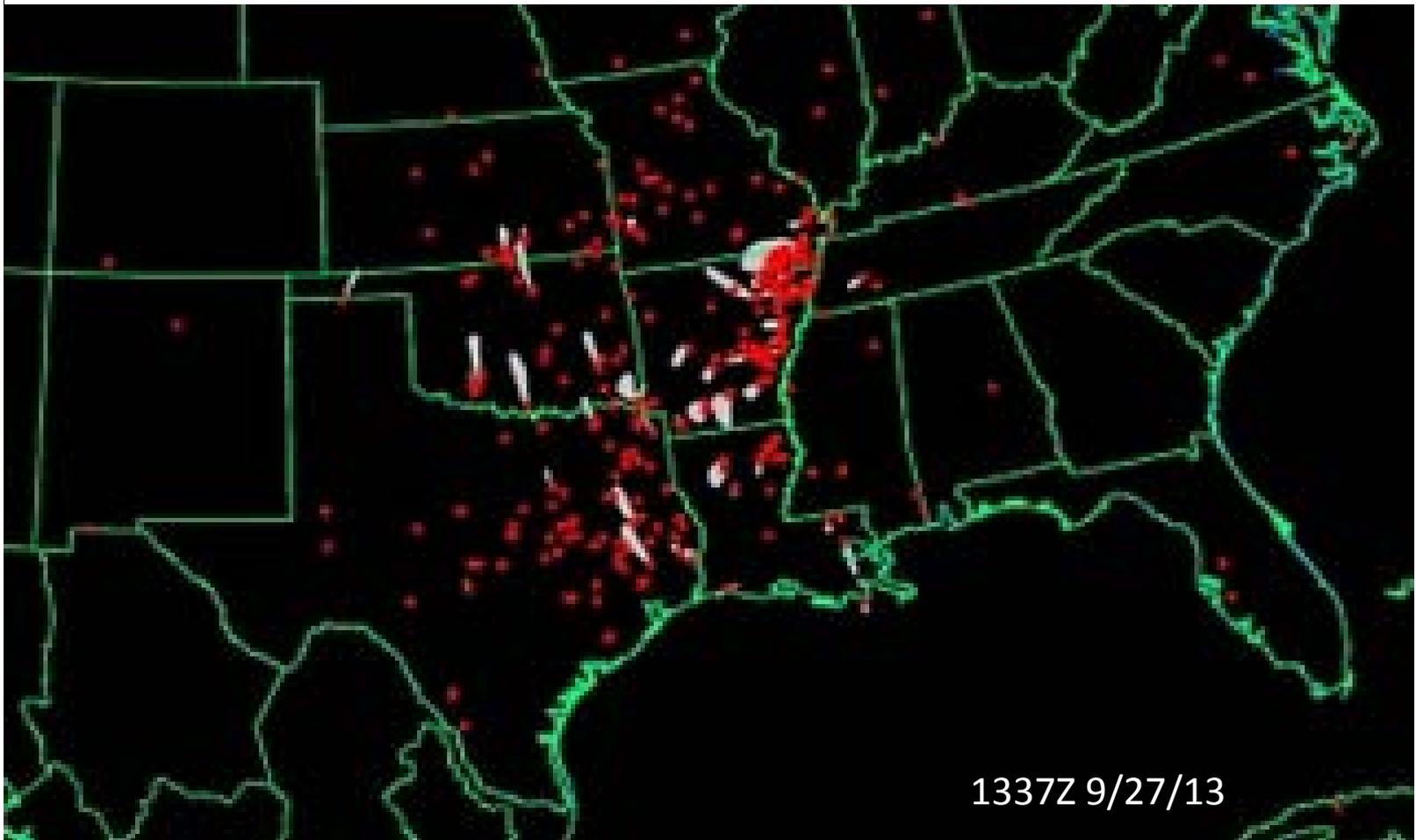
Memphis TN

7 Day Forecast

Memphis, TN

NWS Weather Forecast Office

TODAY	TONIGHT	SATURDAY	SATURDAY NIGHT	SUNDAY	SUNDAY NIGHT	MONDAY	MONDAY NIGHT	TUESDAY
								
Patched Fog High: 88 °F	Mostly Clear Low: 68 °F	Sunny High: 89 °F	Slight Chc Thunderstorms Low: 70 °F	Showers Likely High: 82 °F	Chance Thunderstorms Low: 65 °F	Chance Thunderstorms High: 83 °F	Slight Chc Thunderstorms Low: 66 °F	Partly Sunny High: 85 °F

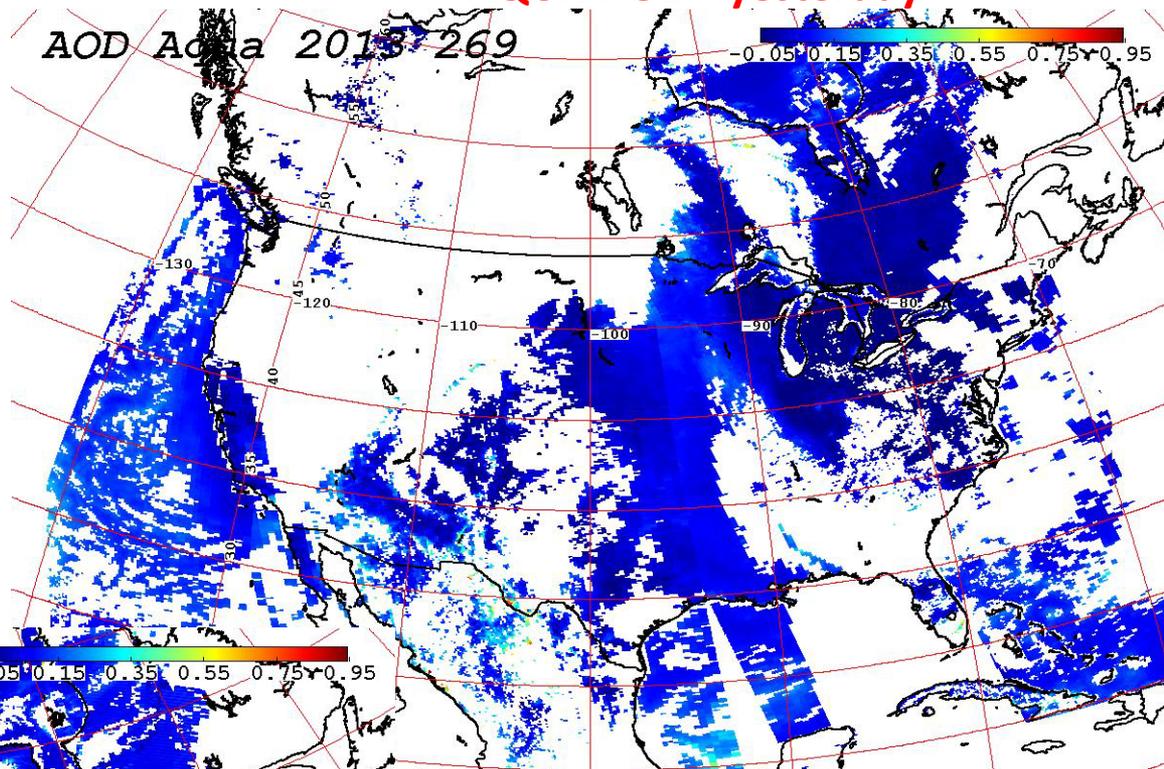


1337Z 9/27/13

No obvious areas of high AOD despite fires.

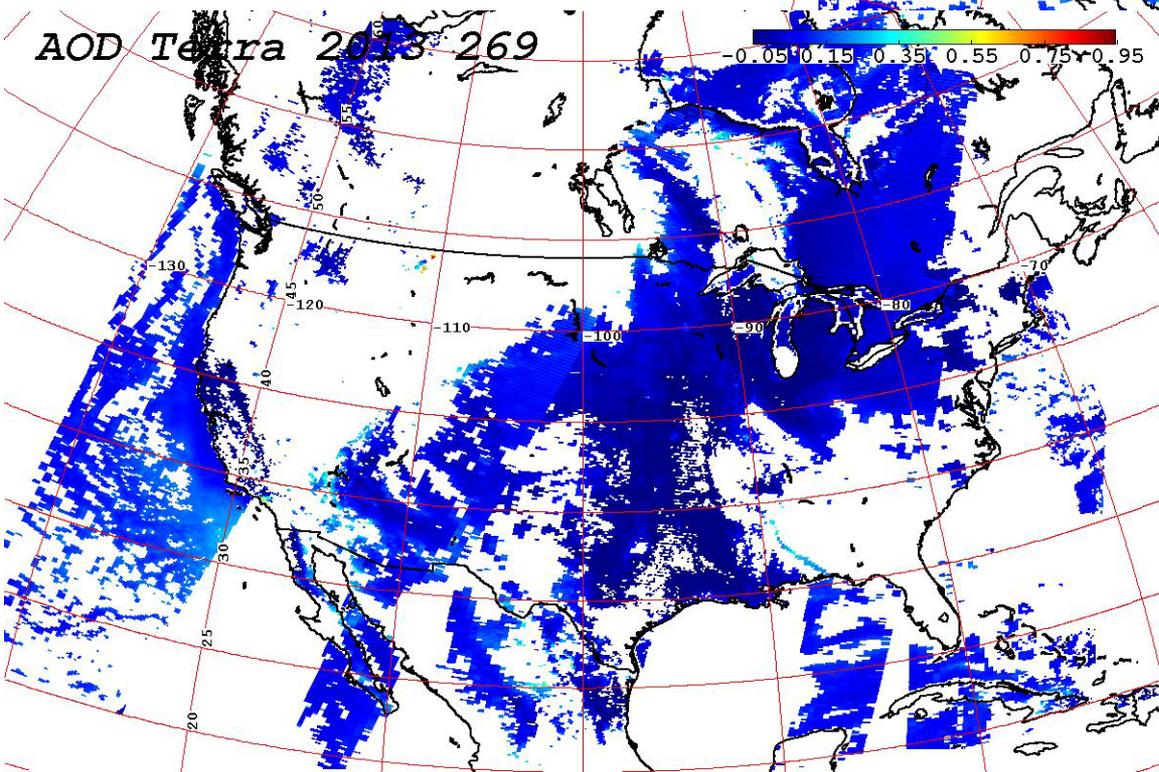
AQUA AOD - yesterday

AOD Aqua 2013 269



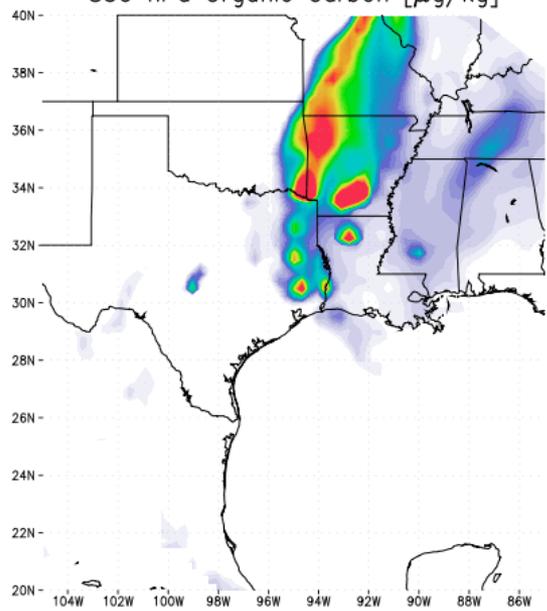
TERRA AOD - yesterday

AOD Terra 2013 269



NASA/GMAO - GEOS-5 Forecast Initialized on 06z 2013-09-27

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

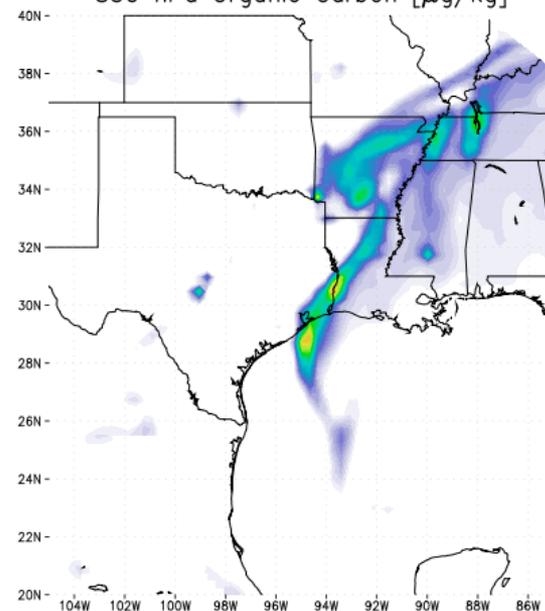


Valid: Sat 18z 2013-09-28 ($\tau= 36$)

GEOS-5
Forecast

NASA/GMAO - GEOS-5 Forecast Initialized on 06z 2013-09-27

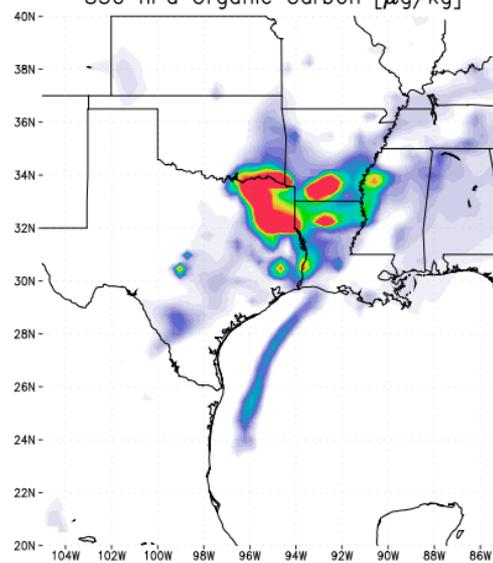
850 hPa Organic Carbon [$\mu\text{g}/\text{kg}$]



Valid: Sun 18z 2013-09-29 ($\tau= 60$)

NASA/GMAO - GEOS-5 Forecast Initialized on 06z 2013-09-27

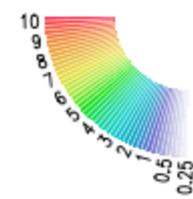
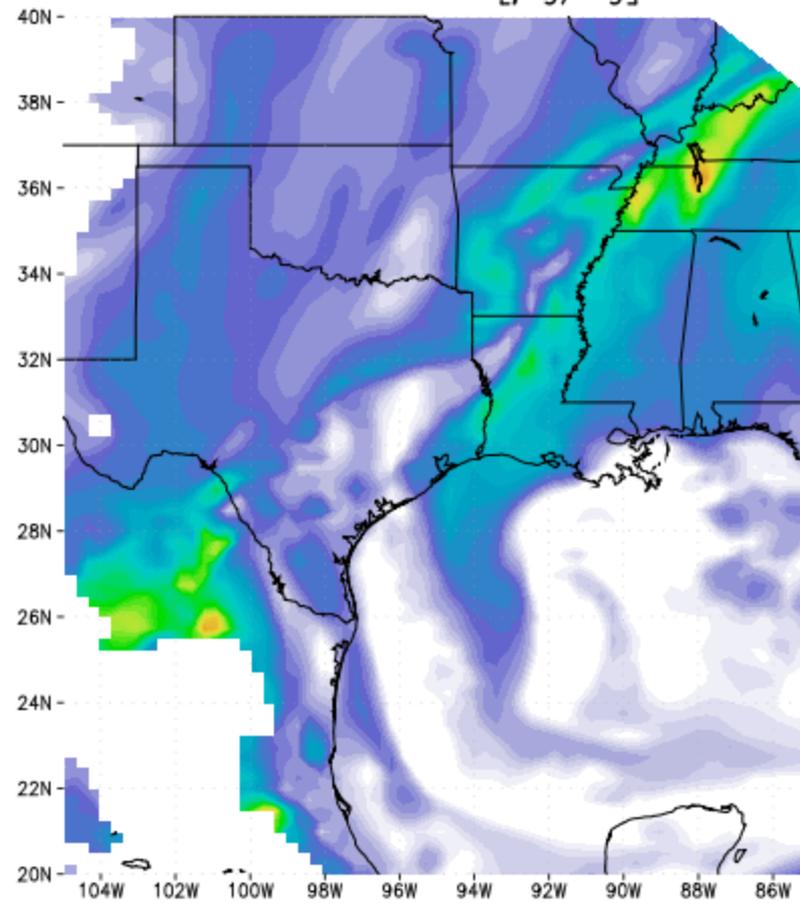
850 hPa Organic Carbon [$\mu\text{g}/\text{kg}$]



Valid: Mon 18z 2013-09-30 ($\tau= 84$)

NASA/GMAO - GEOS-5 Forecast Initialized on 06z 2013-09-27

850 hPa S04 [$\mu\text{g}/\text{kg}$]



Valid: Sun 18z 2013-09-29 ($\tau = 60$)

SUMMARY

CMAQ and CAMx show max O₃ today to the NW of Houston

Plentiful fires going in MS Valley today, especially Arkansas!

GEOS-5 model suggests organic carbon still remains in MS Valley on Sunday afternoon despite rain.