DISCOVER-AQ OUTLOOK -- September 9, 2013

Lesser number of thunderstorms in the Houston area compared with the past few days. Continued easterly and southeasterly winds at the surface off the Gulf led to low background ozone and aerosol. The moisture is shifting to the south and west, and there was some evidence of storm outflow over the study region from those directions.

Tomorrow should see continued drying of the atmosphere. Thunderstorm may pop up along the coast, but few are expect over inland areas of our study region. There will be continued easterly and southeasterly winds off the Gulf. This flow will continue the low ozone (Code Green) over the region. Mostly clear skies off the coast of Louisiana where the King Air will fly tomorrow to rendezvous with the GEO-CAPE ship. Perhaps some scattered Cu in the lower levels and possible scattered Ci in that region during the afternoon.

Wednesday and Thursday should continue the drying trend with partly cloudy skies (less than 50% cloud cover). Relatively clean conditions for ozone and aerosols continue, except for possible influence of Mississippi Valley smoke extending down to the northern portion of our region. Wednesday will likely be a good day to fly in the Houston area.

9/9/2013 4:00 PM Update Weather Briefing

Chris Loughner

Clare Flynn

Ken Pickering

Conroe:

THIS AFTERNOON	TONIGHT	TUESDAY	TUESDAY NIGHT	WEDNESDAY	WEDNESDAY NIGHT	THURSDAY	THURSDAY NIGHT	FRIDAY
20%	20%							
Slight Chc Thunderstorms	Slight Chc Thunderstorms	Mostly Sunny	Partly Cloudy	Mostly Sunny	Partly Cloudy	Mostly Sunny	Partly Cloudy	Mostly Sunny
High: 95 °F	Low: 71 °F	High: 94 °F	Low: 71 °F	High: 95 °F	Low: 72 °F	High: 94 °F	Low: 72 °F	High: 96 °F

Houston Hobby:

THIS AFTERNOON	TONIGHT	TUESDAY	TUESDAY NIGHT	WEDNESDAY	WEDNESDAY NIGHT	THURSDAY	THURSDAY NIGHT	FRIDAY
30%	30%	20%						
Chance Thunderstorms	Chance Thunderstorms	Slight Chc Thunderstorms	Partly Cloudy	Mostly Sunny	Partly Cloudy	Mostly Sunny	Partly Cloudy	Mostly Sunny
High: 91 °F	Low: 76 °F	High: 93 °F	Low: 75 °F	High: 93 °F	Low: 76 °F	High: 93 °F	Low: 76 °F	High: 94 °F

Galveston:

THIS AFTERNOON	TONIGHT	TUESDAY	TUESDAY NIGHT	WEDNESDAY	WEDNESDAY NIGHT	THURSDAY	THURSDAY NIGHT	FRIDAY
20%	10%	20%	20%	20%		20%		
Slight Chc Thunderstorms	Slight Chc Thunderstorms	Slight Chc Thunderstorms	Slight Chc Thunderstorms	Slight Chc Thunderstorms	Partly Cloudy	Slight Chc Thunderstorms	Partly Cloudy	Mostly Sunny
High: 88 °F	Low: 78 °F	High: 89 °F	Low: 79 °F	High: 89 °F	Low: 80 °F	High: 89 °F	Low: 80 °F	High: 89 °F

Current Conditions

Conroe:

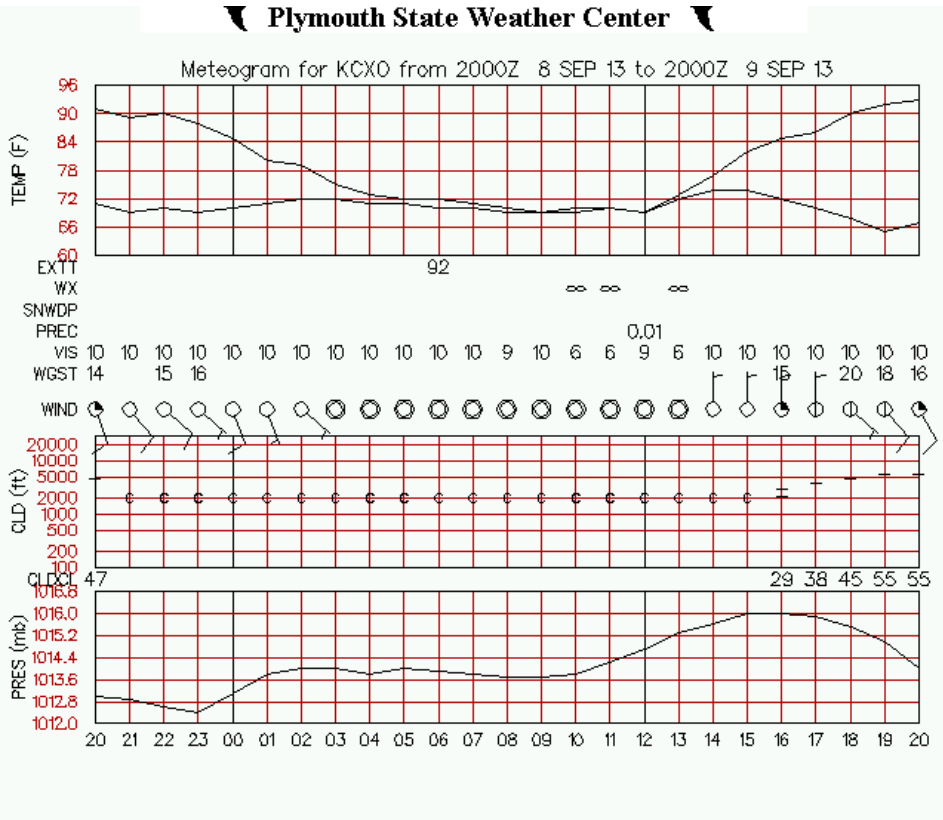
Partly Cloudy

93°F

34°C

Humidity	42%
Wind Speed	SE 14 G 18 mph
Barometer	29.96 in (1014.0 mb)
Dewpoint	67°F (19°C)
Visibility	10.00 mi
Heat Index	96°F (36°C)

Last Update on 9 Sep 2:53 pm CDT



Houston Hobby:

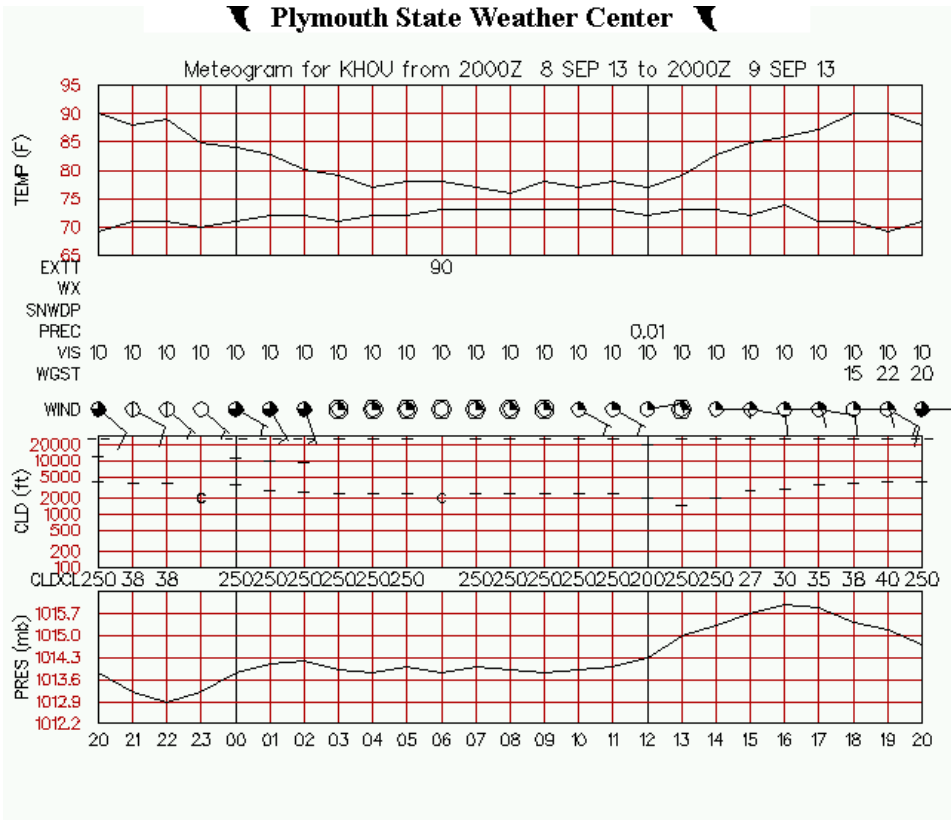
Mostly Cloudy

88°F

31°C

Humidity	57%
Wind Speed	E 15 G 23 mph
Barometer	29.95 in (1014.7 mb)
Dewpoint	71°F (22°C)
Visibility	10.00 mi
Heat Index	94°F (34°C)

Last Update on 9 Sep 2:53 pm CDT



Current Conditions

Galveston:

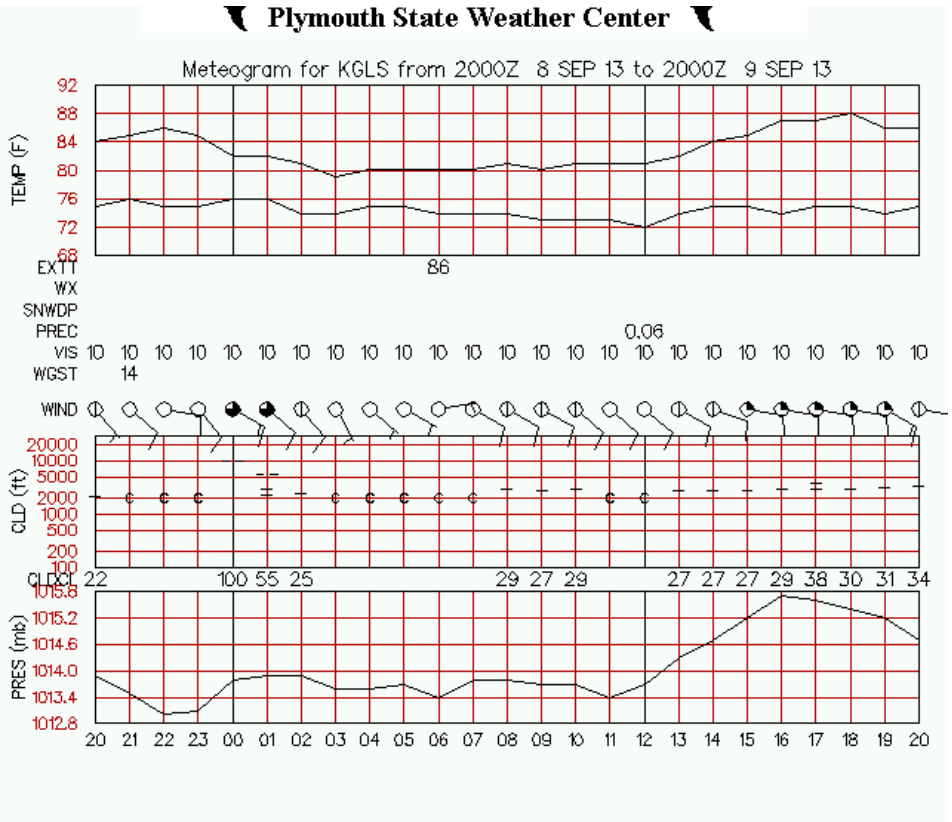
A Few Clouds

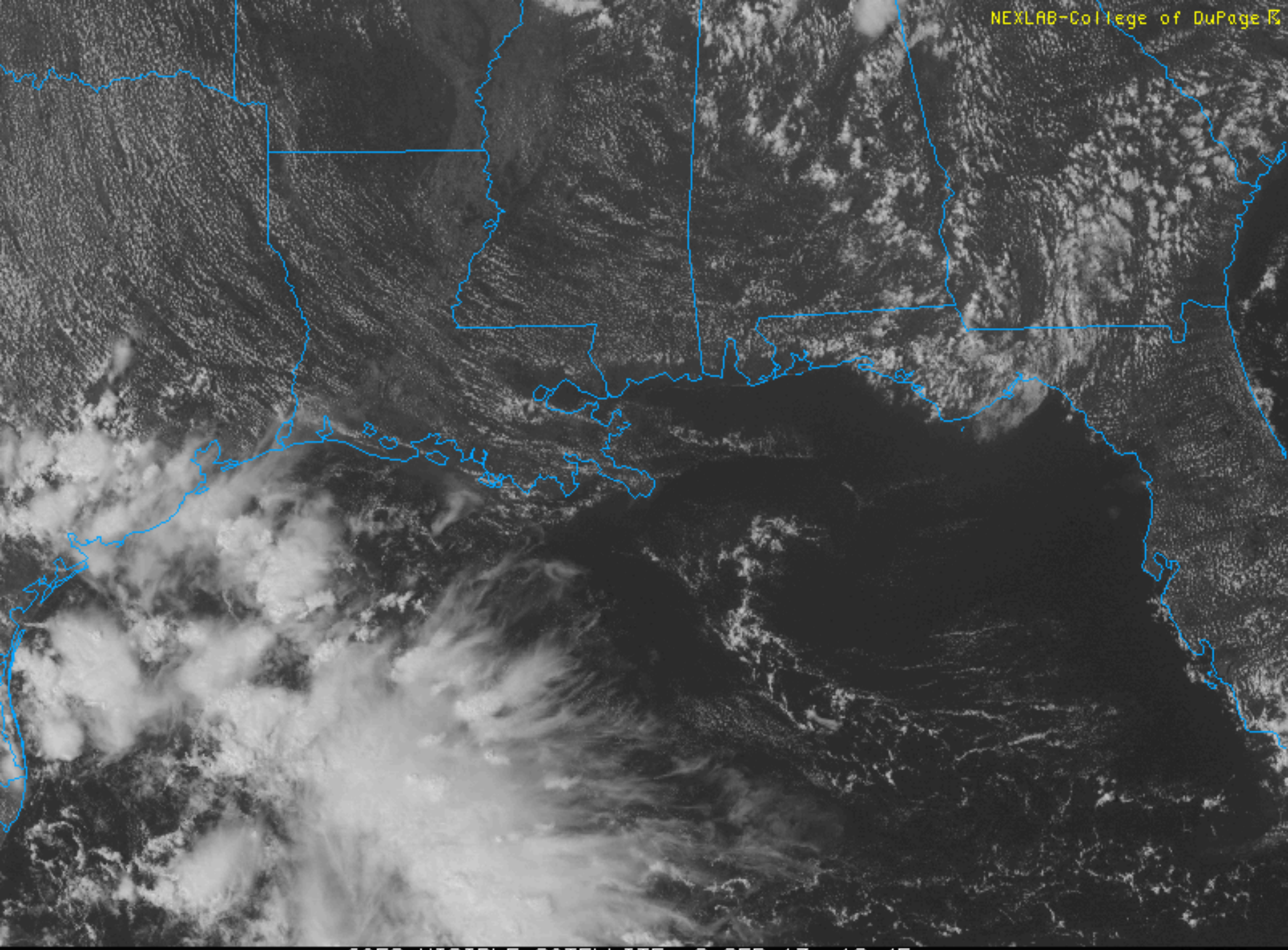
86°F

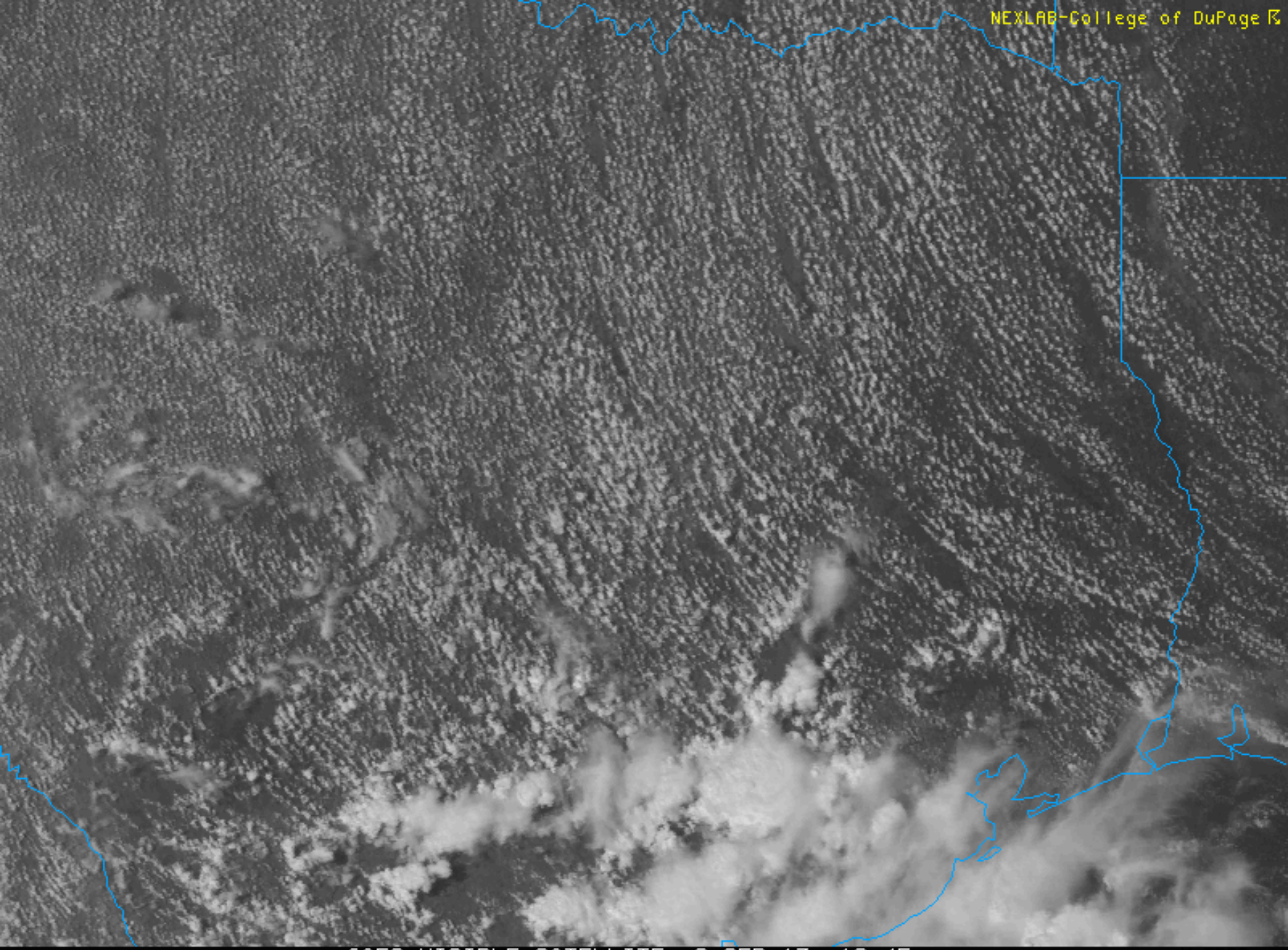
30°C

Humidity	70%
Wind Speed	E 15 mph
Barometer	29.96 in (1014.7 mb)
Dewpoint	75°F (24°C)
Visibility	10.00 mi
Heat Index	95°F (35°C)

Last Update on 9 Sep 2:52 pm CDT




NEXLAB-College of DuPage
GOES VISIBLE SATELLITE 9 SEP 13 19:45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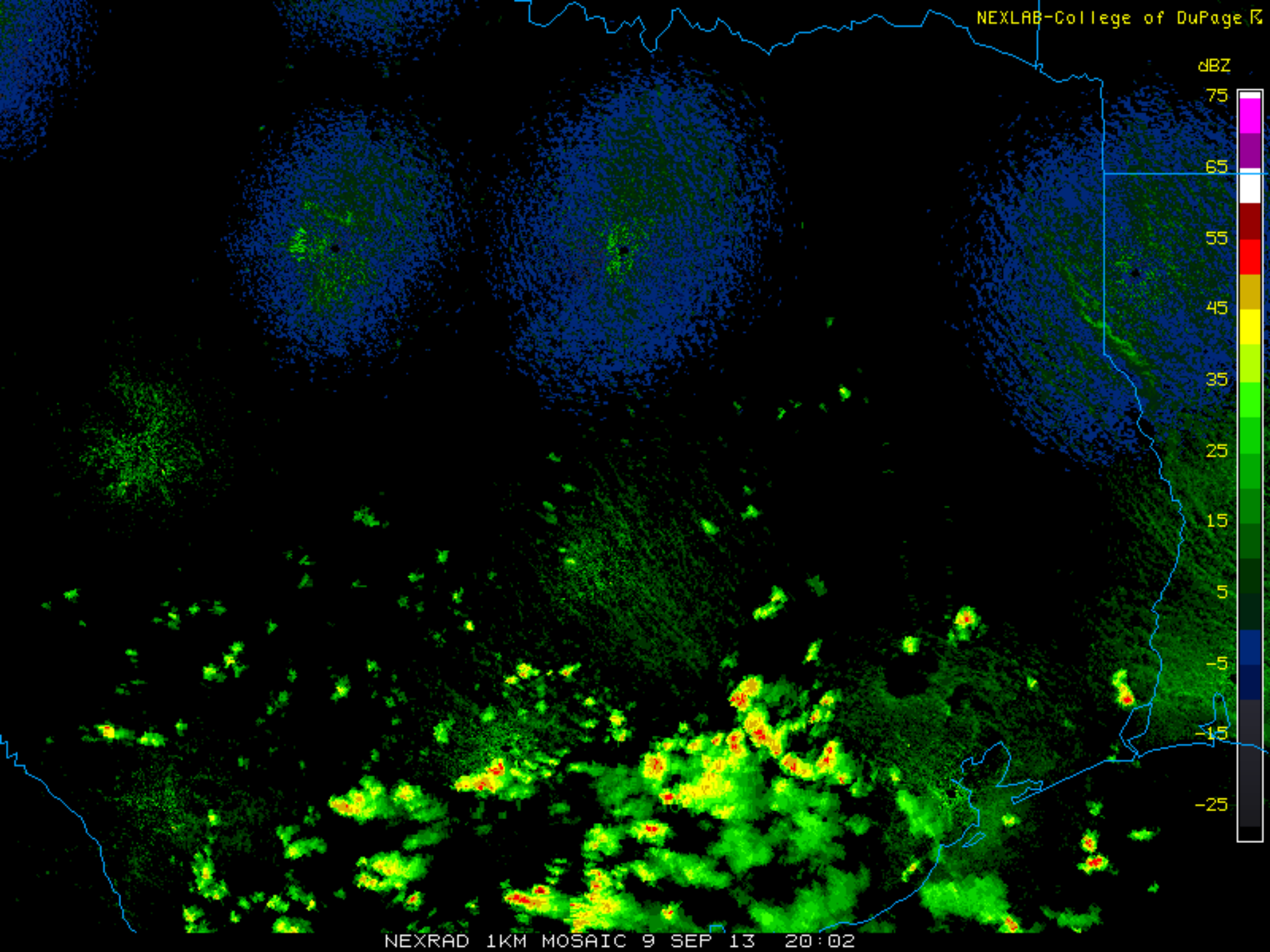
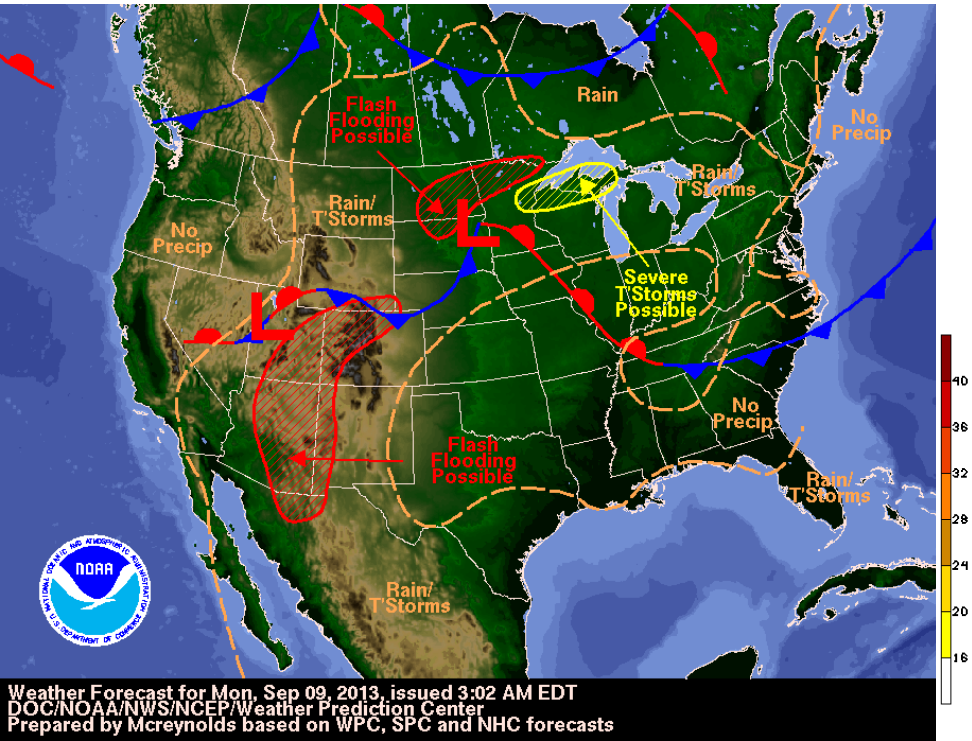
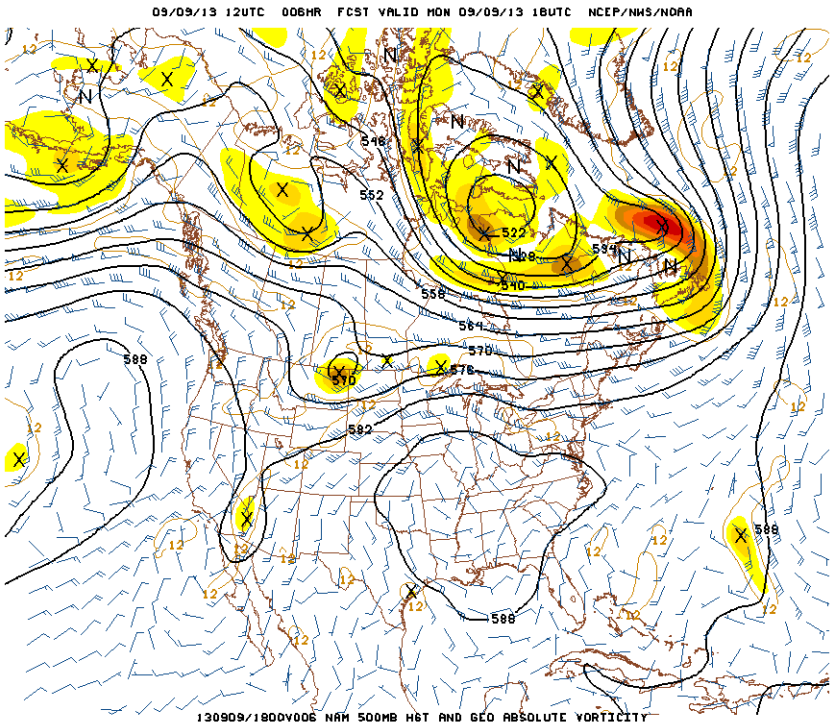
GOES VISIBLE SATELLITE 9 SEP 13 19:45


NEXLAB-College of DuPage
dBZ
75
65
55
45
35
25
15
5
-5
-15
-25
NEXRAD 1KM MOSAIC 9 SEP 13 20:02

Today: Scattered thunderstorms and southeasterly winds.

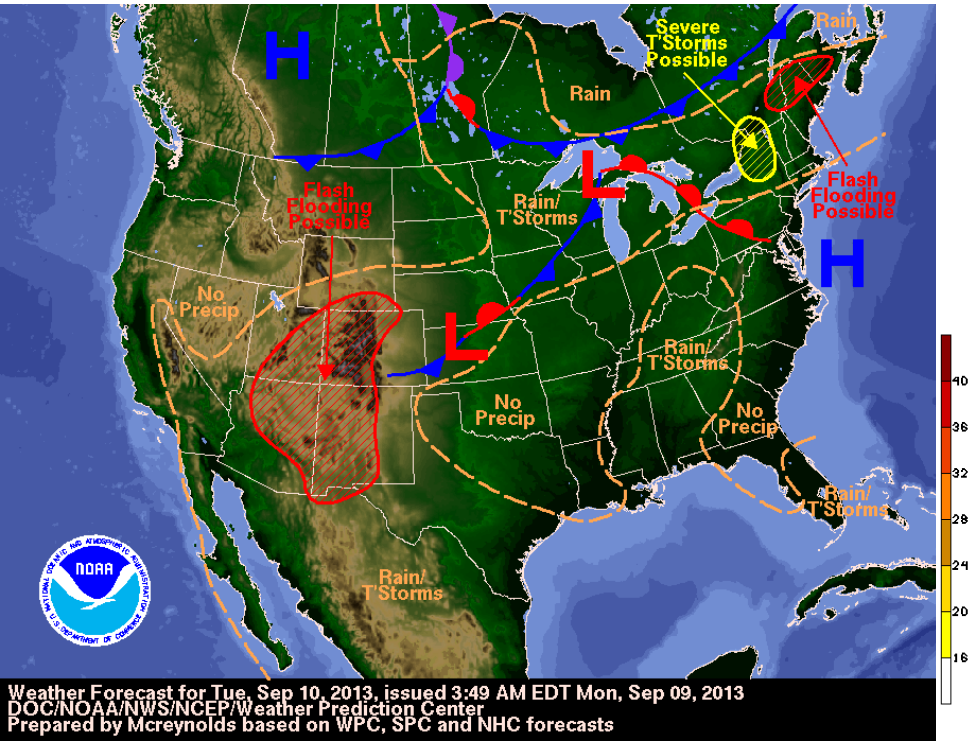
1 PM CDT
500 mb vorticity

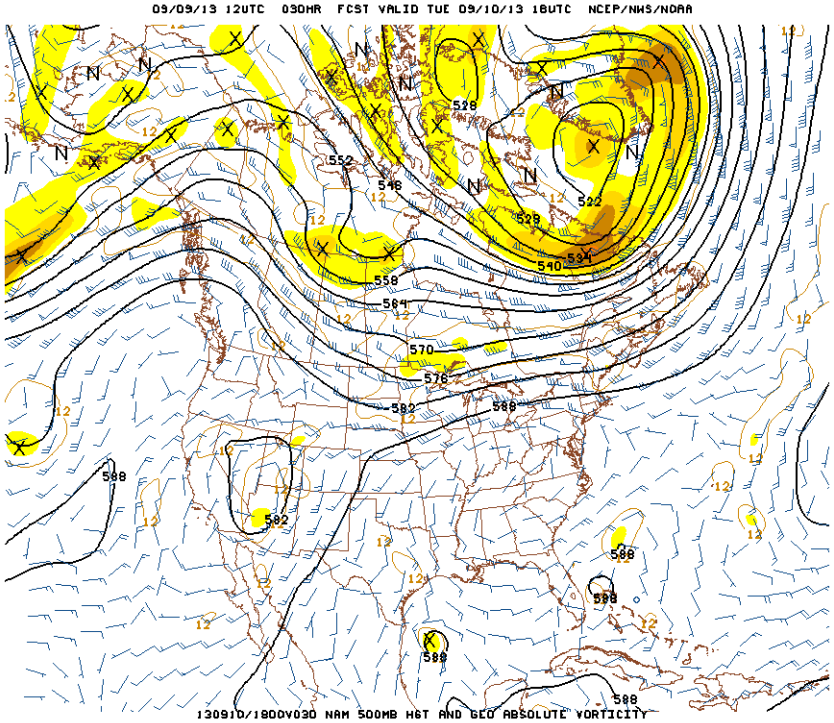




Tomorrow: Isolated thunderstorms and southeasterly winds.

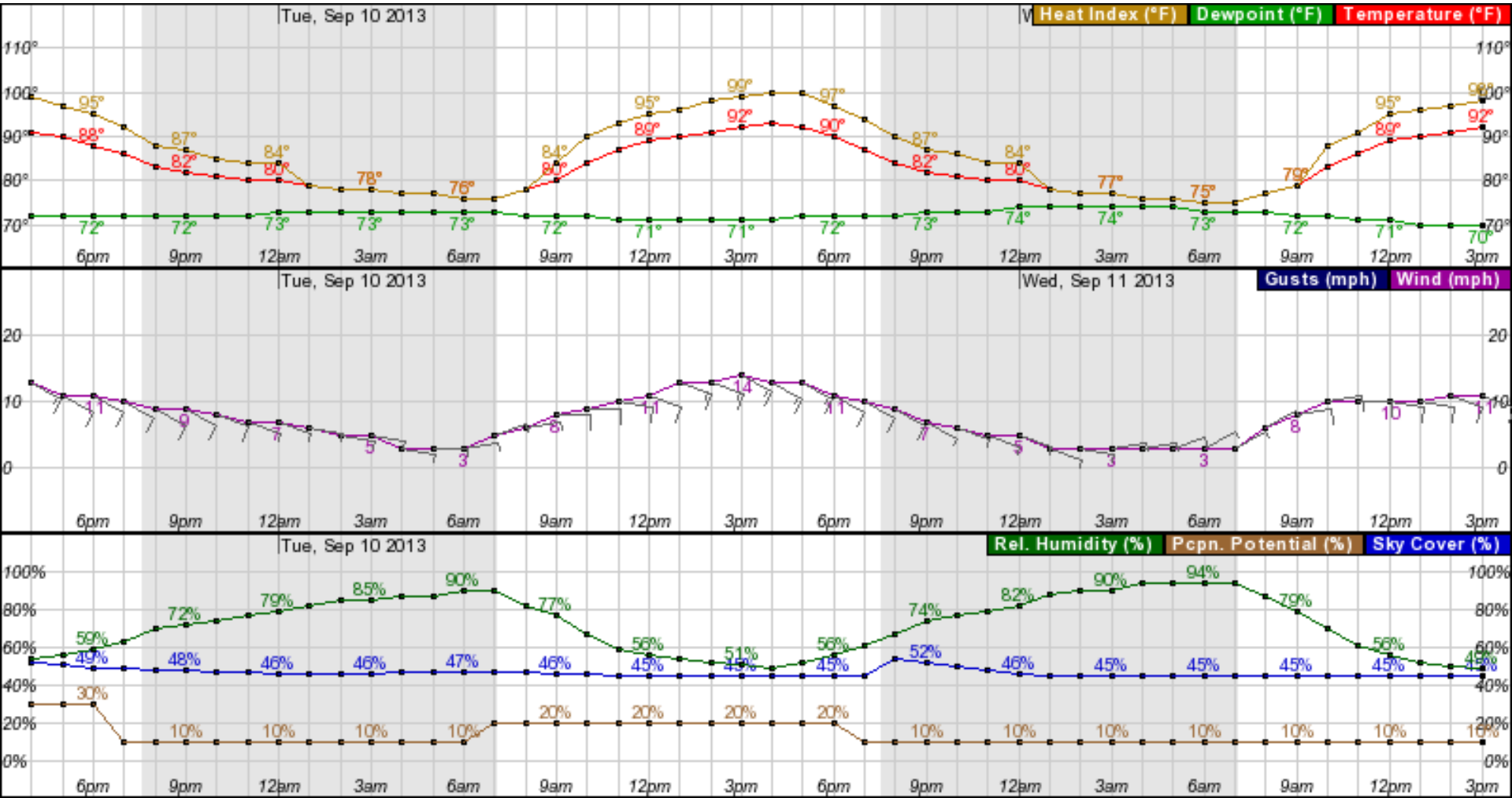
1 PM CDT
500 mb vorticity





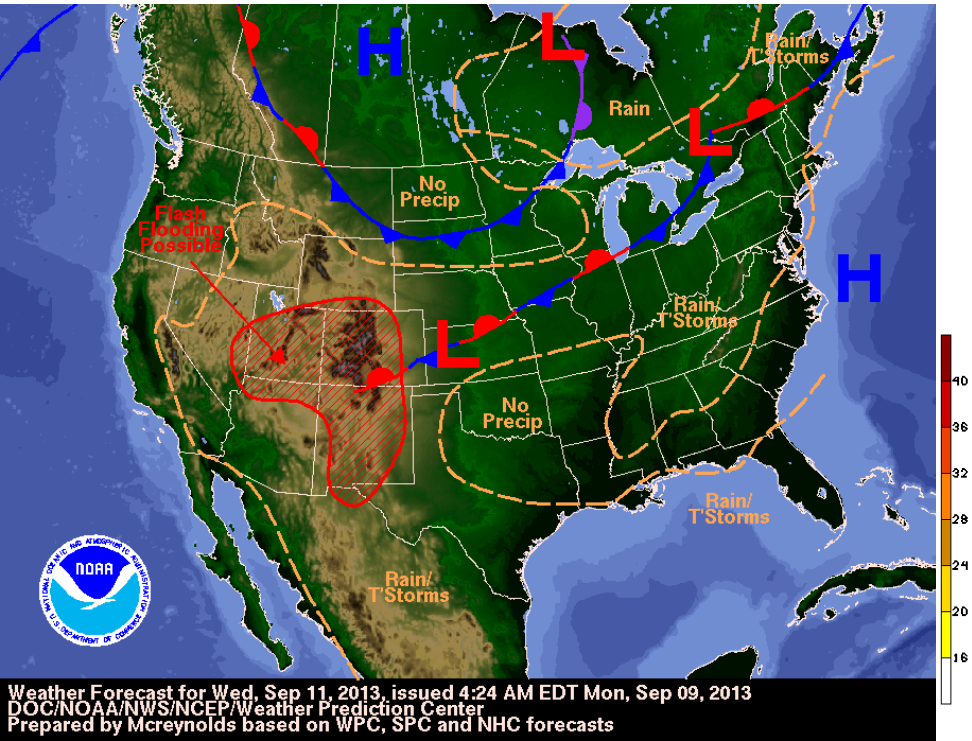
Houston Hobby
Tomorrow: Partly cloudy

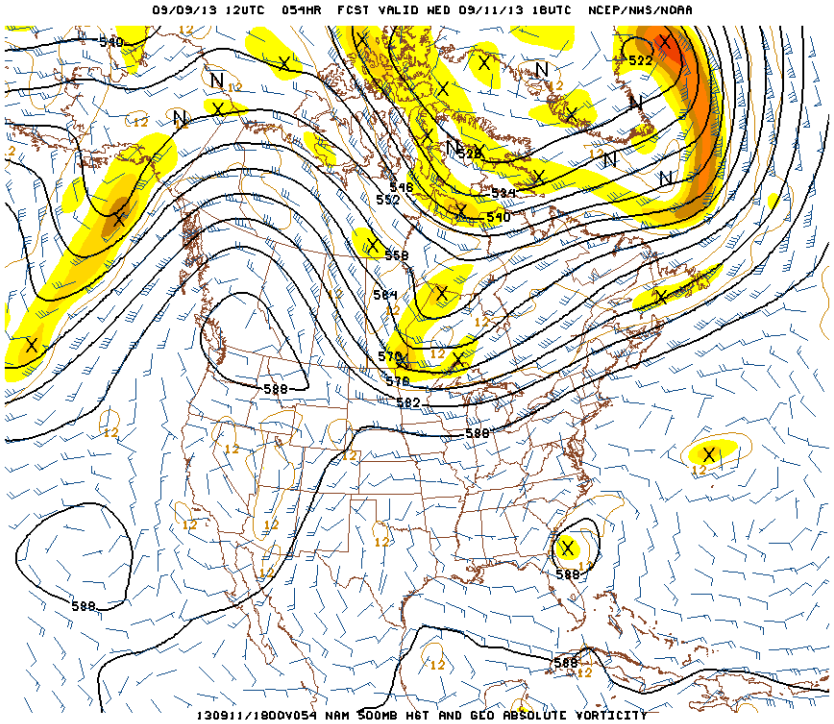
Today → Tomorrow →



Wednesday: Isolated thunderstorms, easterly winds, and upper level ridge moving inland in the Pacific Northwest.

1 PM CDT
500 mb vorticity

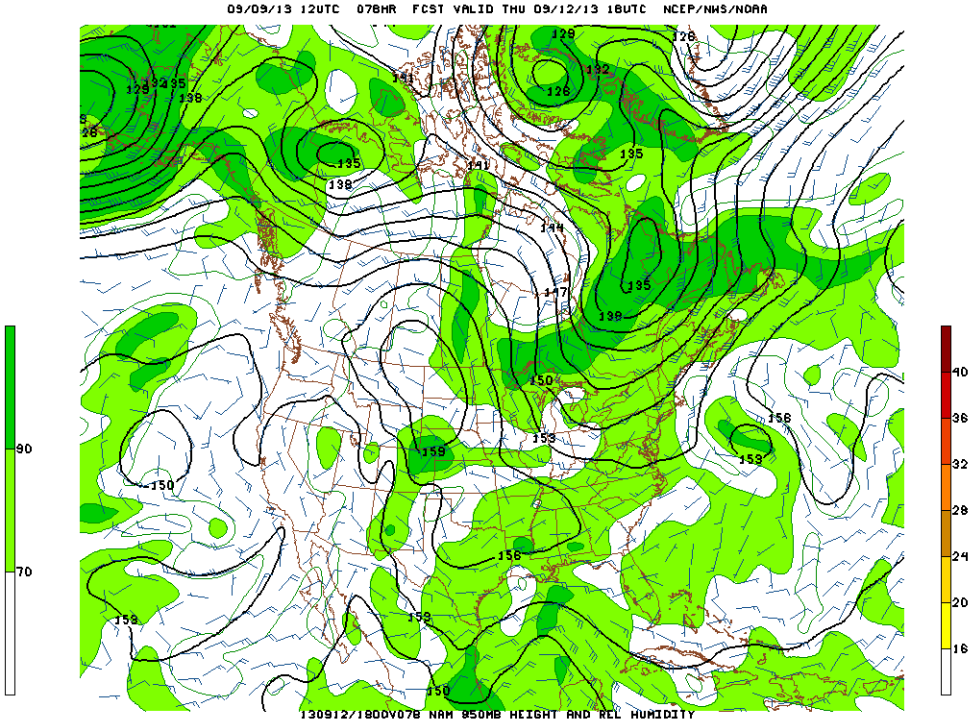




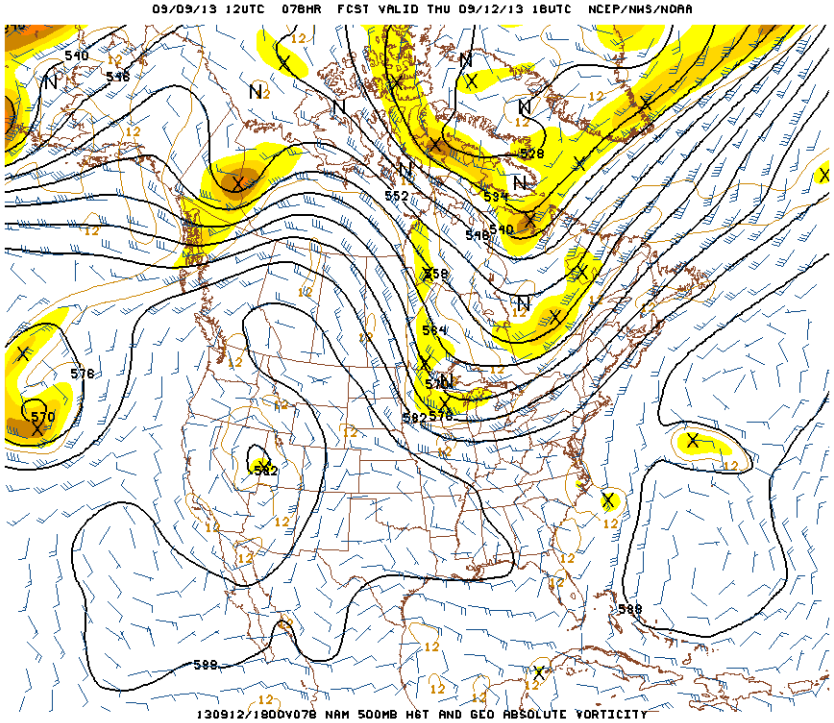
Thursday: Ridge extending from the upper Midwest to Texas.

1 PM CDT

850 mb RH



500 mb vorticity

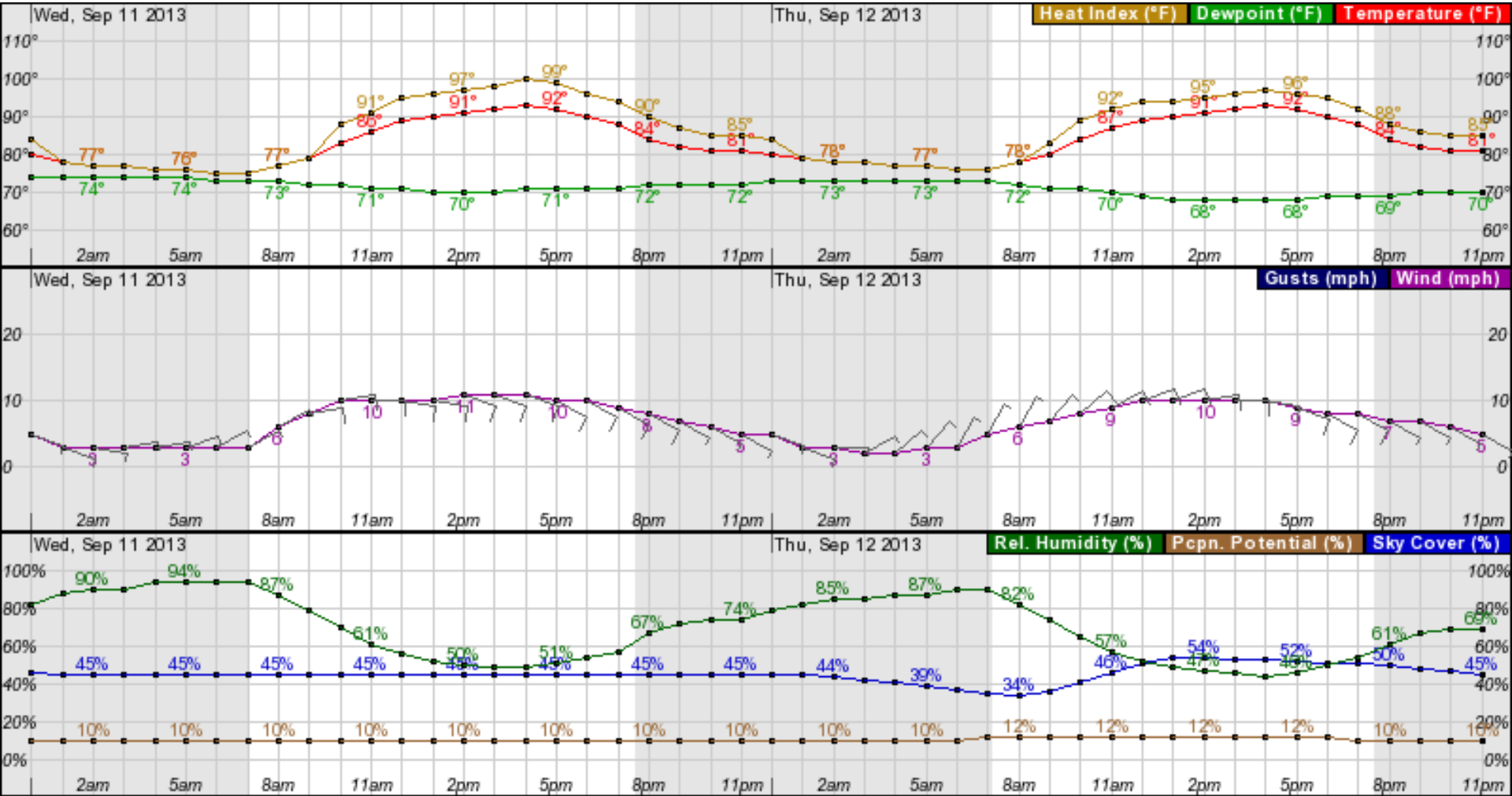


Houston Hobby

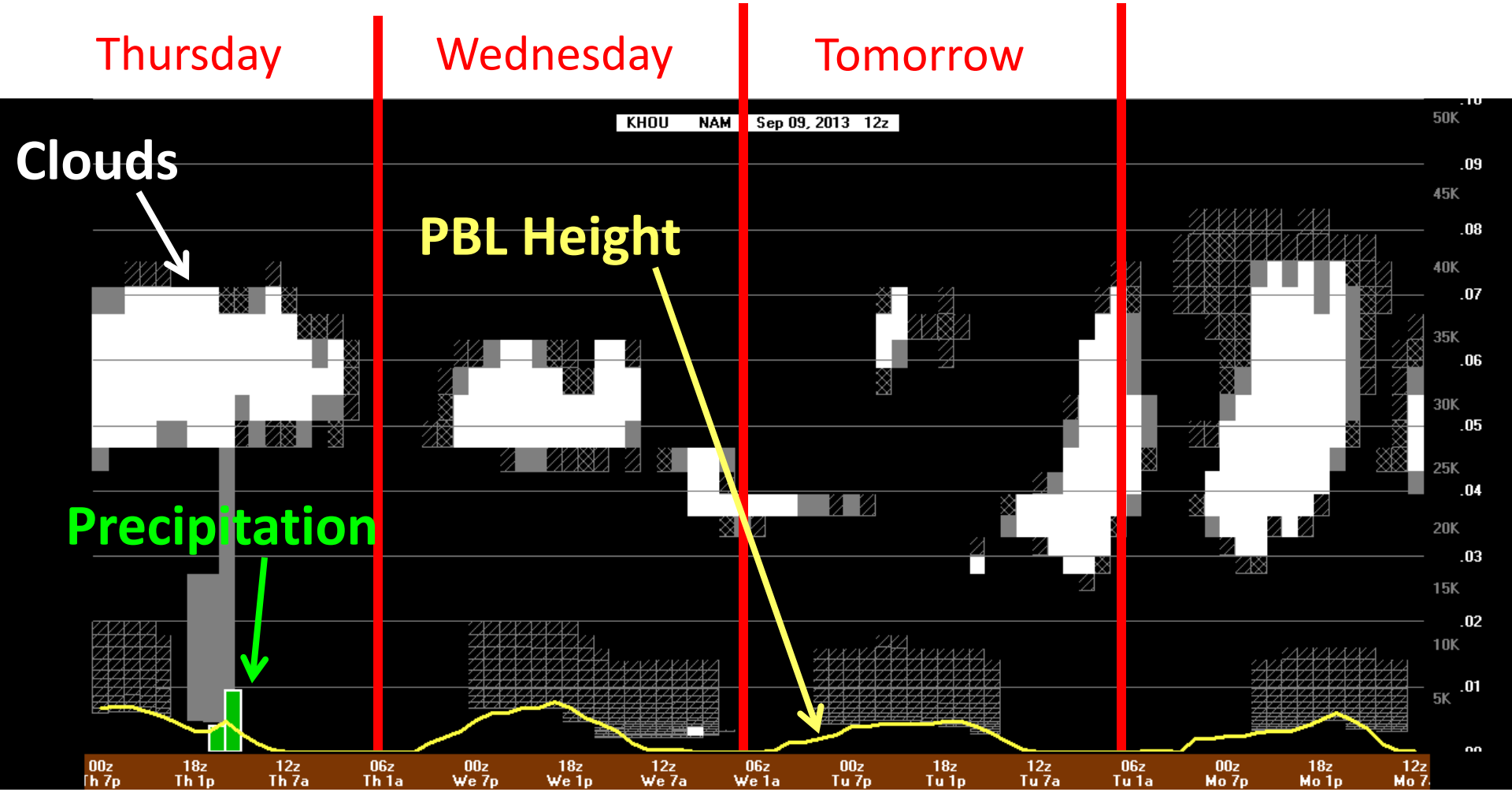
Wednesday: Partly cloudy

Thursday: Cloud cover around 50%

Wednesday→ **Thursday→**



Houston Hobby; BUFKIT – NAM (12 UTC 9 September)



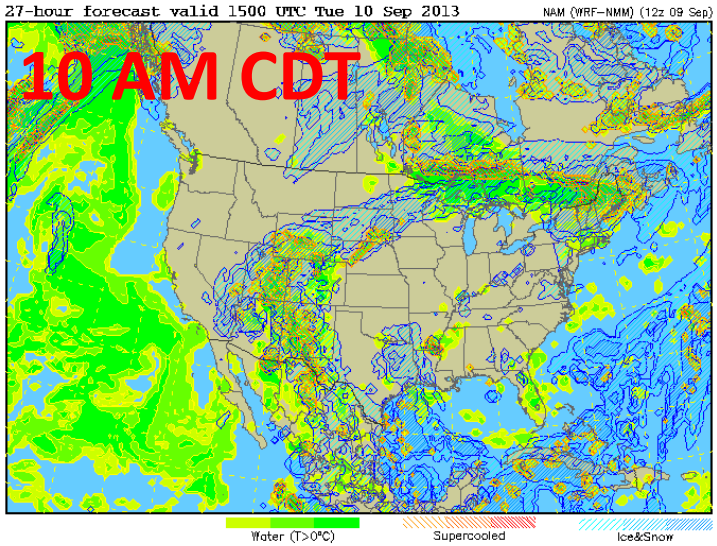
-Tomorrow: Mostly cloudy in the afternoon.

-Wednesday: Mostly cloudy.

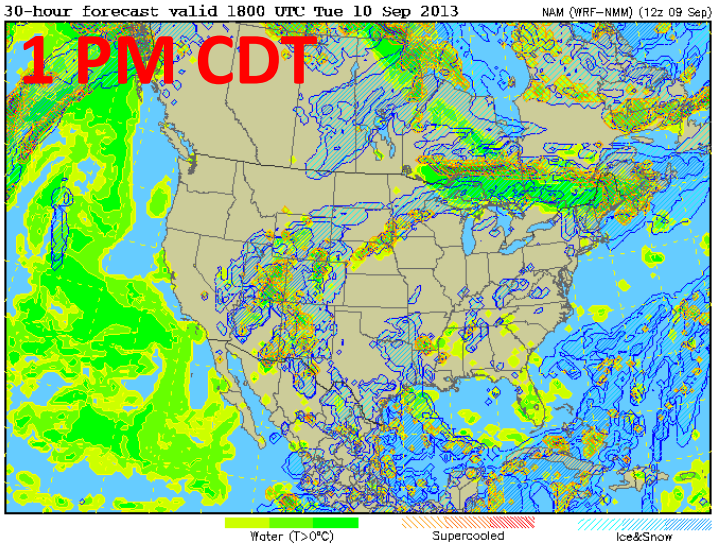
-Thursday: Mostly cloudy.

Tomorrow: NAM – high level clouds; low and mid level clouds along the coast

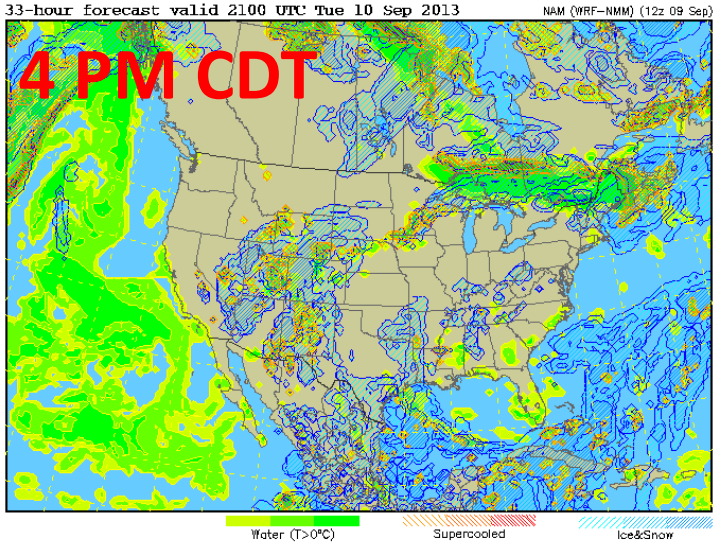
Integrated liquid and frozen hydrometeors (all levels)



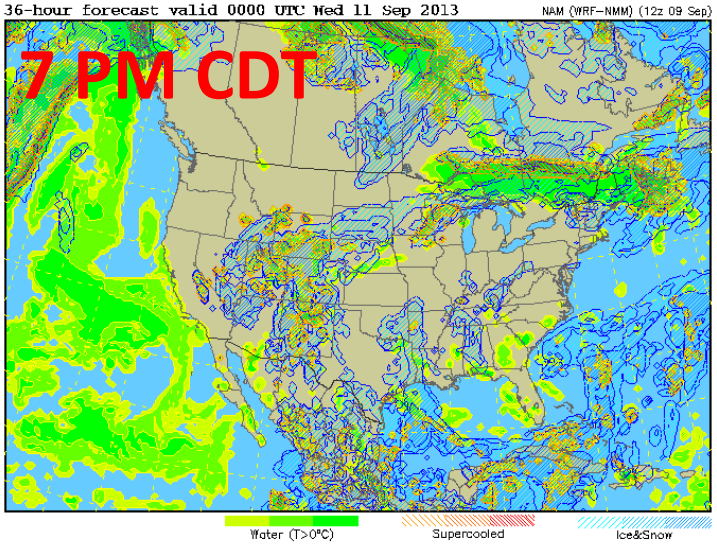
Integrated liquid and frozen hydrometeors (all levels)



Integrated liquid and frozen hydrometeors (all levels)

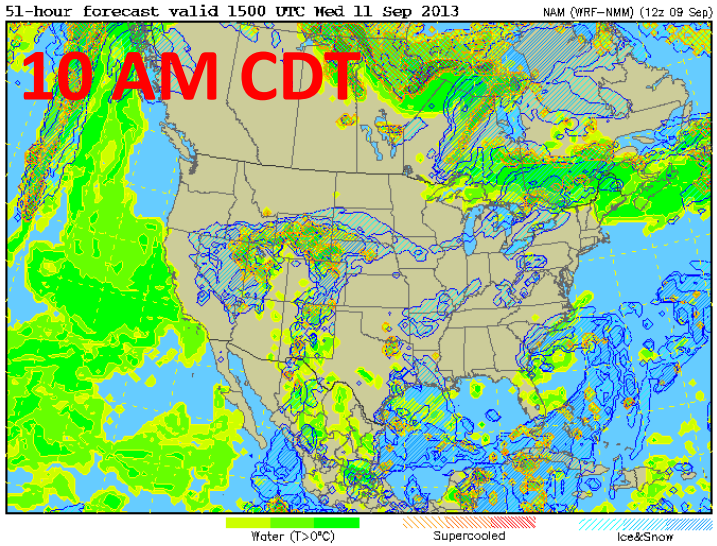


Integrated liquid and frozen hydrometeors (all levels)

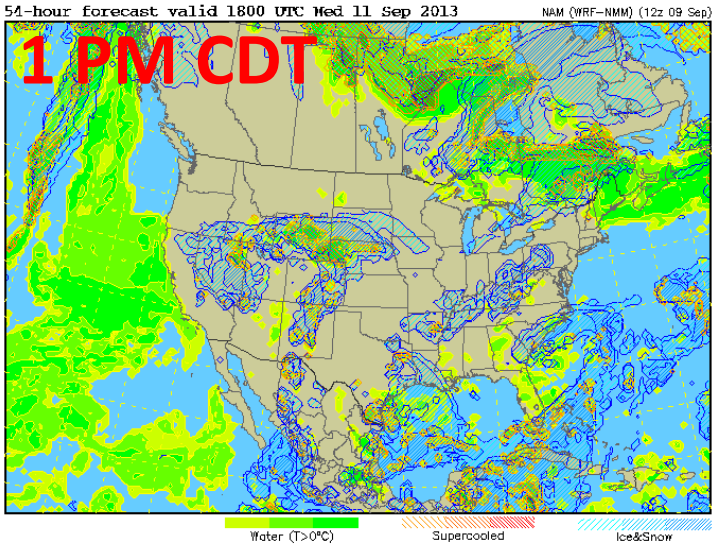


Wednesday: NAM – high level clouds; mid and low level clouds on western edge of our region

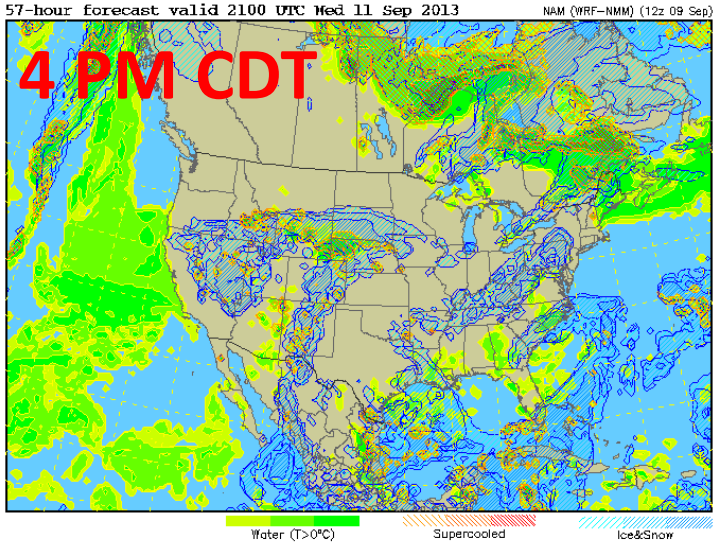
Integrated liquid and frozen hydrometeors (all levels)



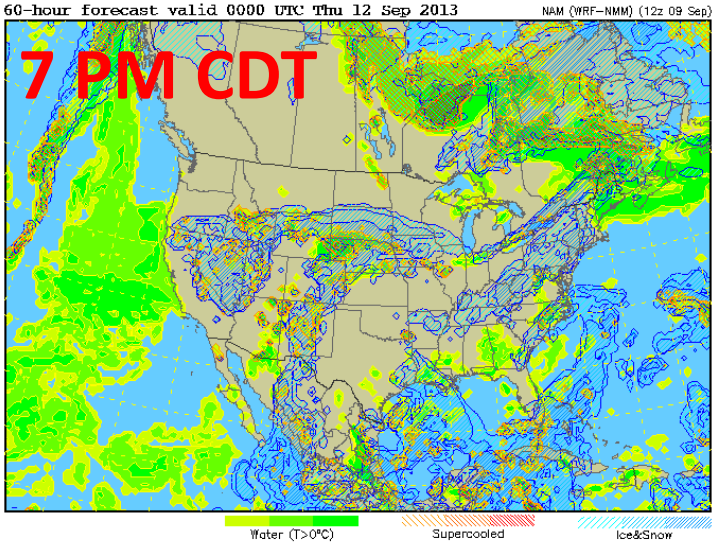
Integrated liquid and frozen hydrometeors (all levels)



Integrated liquid and frozen hydrometeors (all levels)

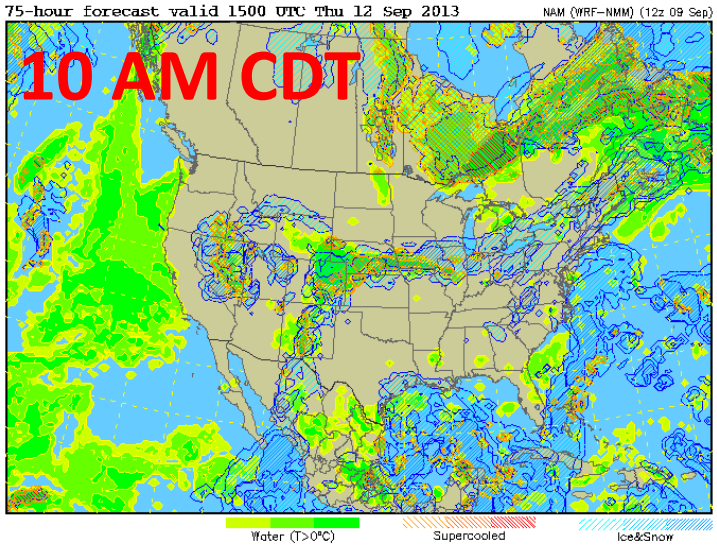


Integrated liquid and frozen hydrometeors (all levels)

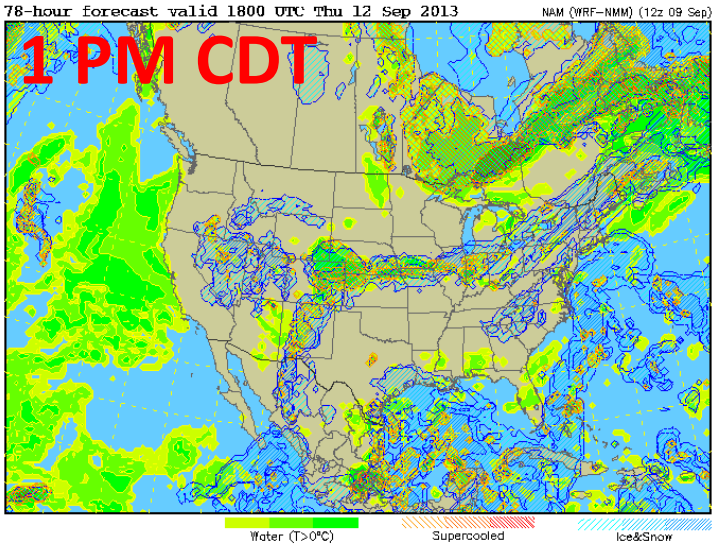


Thursday: NAM – high level clouds

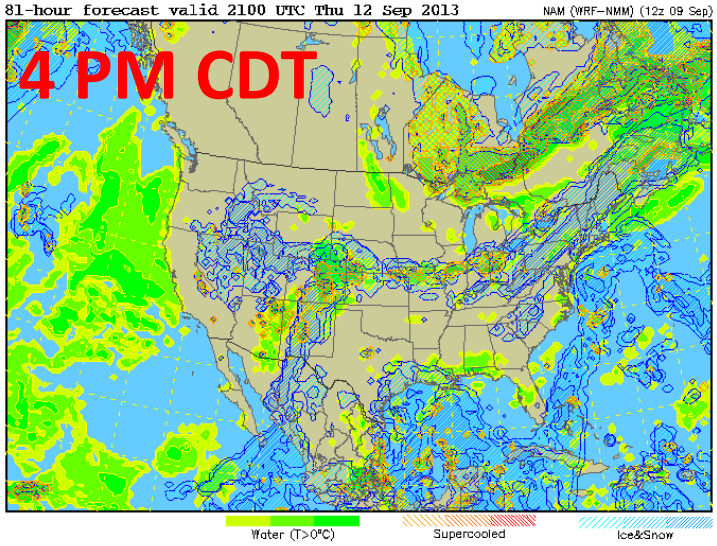
Integrated liquid and frozen hydrometeors (all levels)



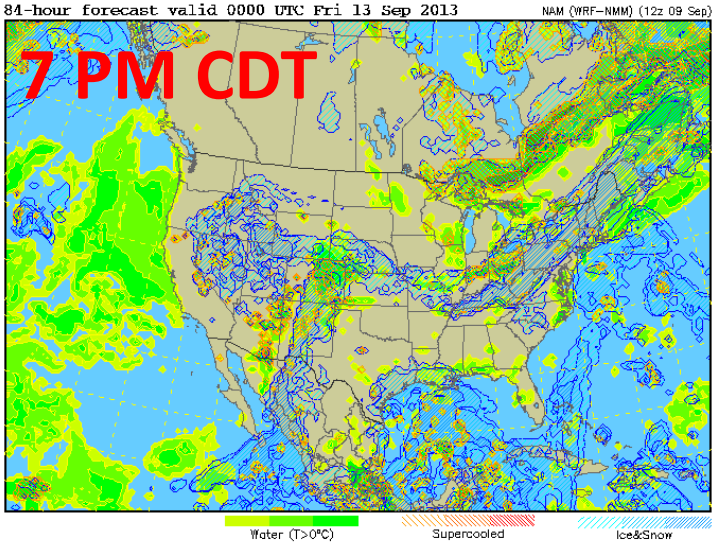
Integrated liquid and frozen hydrometeors (all levels)



Integrated liquid and frozen hydrometeors (all levels)



Integrated liquid and frozen hydrometeors (all levels)



Offshore Louisiana forecast for tomorrow

- Clear in the morning and few to scattered clouds developing by 1 PM
- Cloud base above 4,000 ft
- Less than 10% chance of thunderstorms
- Few to scattered cirrus clouds between 20,000 and 40,000 ft

Our Thoughts

The 12Z model runs appear to be overdoing the amount of cirrus clouds over the next few days. The NWS mentioned the models initialized the simulations with too much moisture in the upper troposphere. We predict that the cloud coverage will decrease over the next few days, as do the NWS as shown in their forecast.

Recommendations

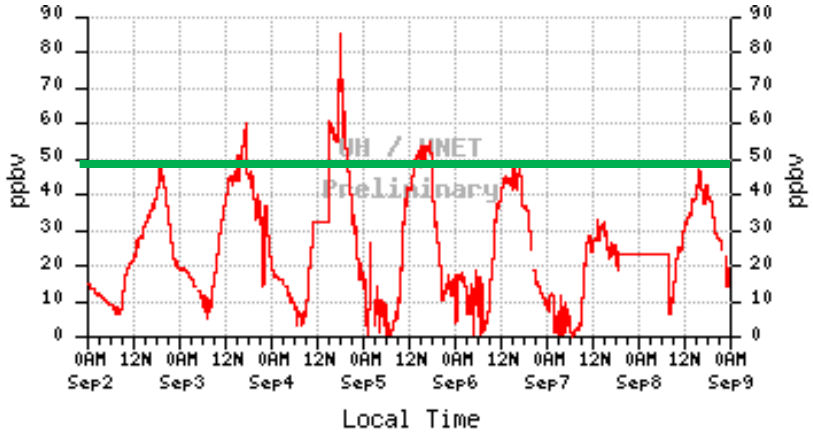
- Tomorrow: King Air flight in support of GEO-CAPE.
- Wednesday and Thursday: Possible flight days. Conditions look better Wednesday and Thursday than tomorrow as moisture axis continues to move south.

DISCOVER-AQ Air Quality Outlook
September 9, 2013

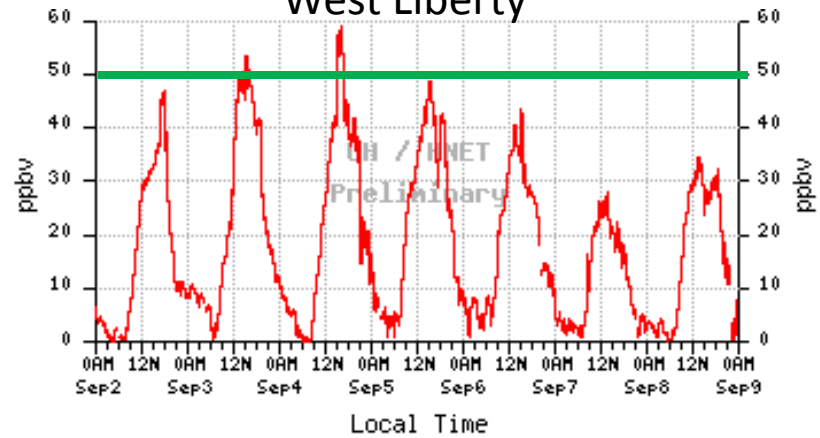
Ken Pickering

Mariel Friberg

Jones Forest



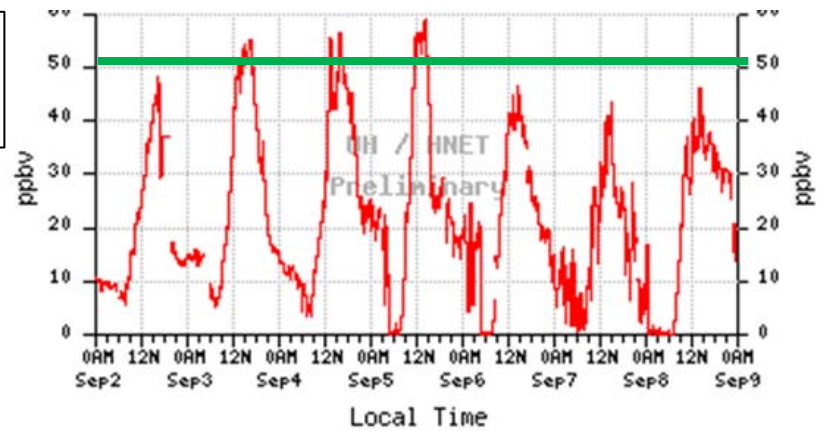
West Liberty



O_3 (ppbv) – 15 min avg
September 2nd – 8th

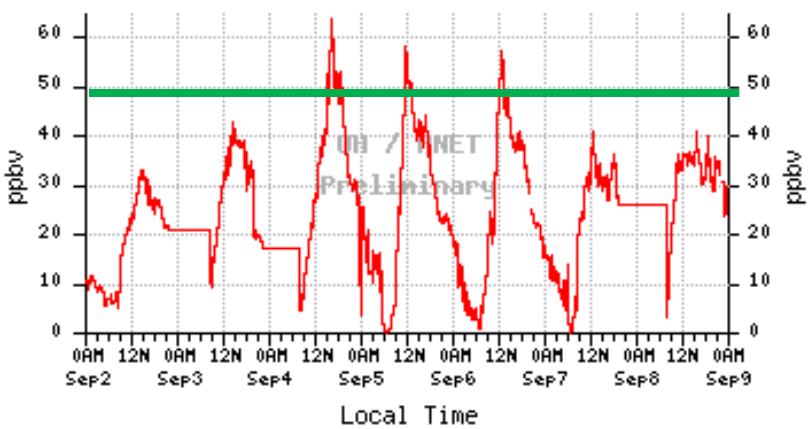
= 50 ppbv

Moody Tower

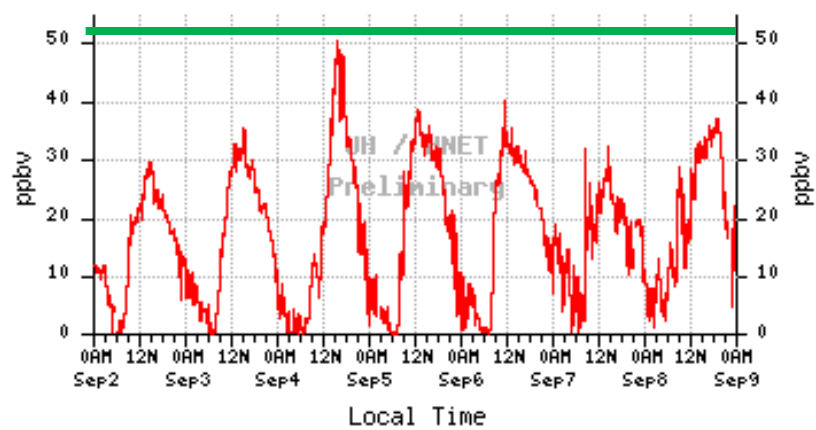


Houston – Network of Environmental Towers (H-NET)

Sugar Land



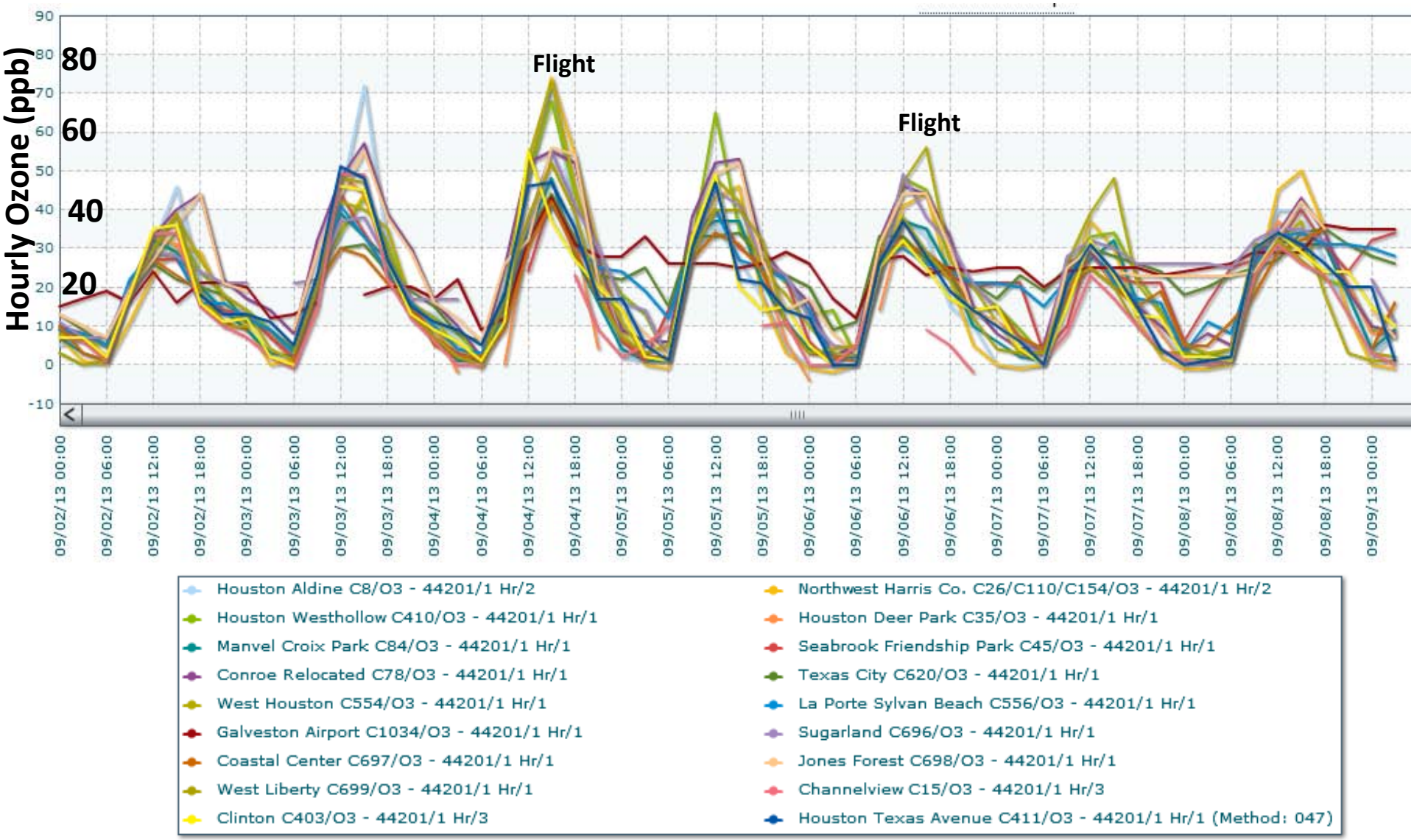
Coastal Center



Hourly Ozone (airnowtech.org)**

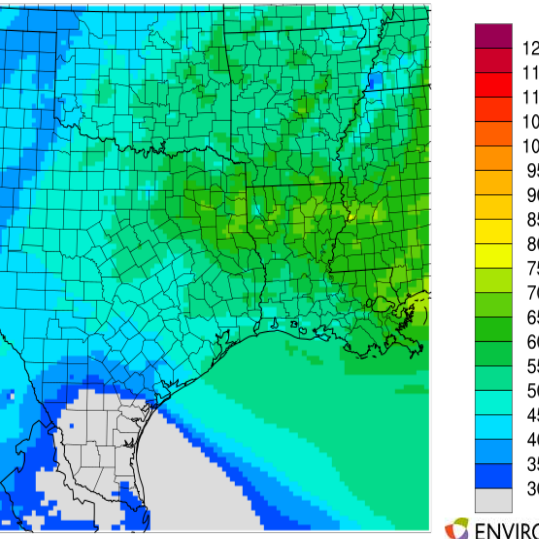
Sept. 2nd – 8th

** EVERY 3rd HOUR PLOTTED!!!!!



CAMx

Ozone
Best Case

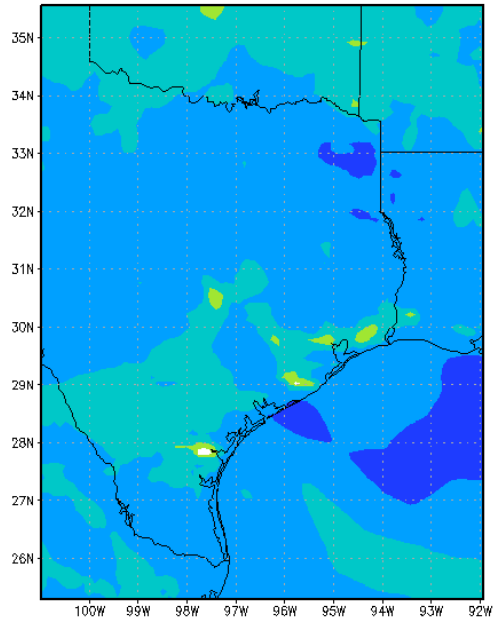


lin(55,4) = 17.5, Max(130,66) = 75.3

Tue September 10 09:00 CST

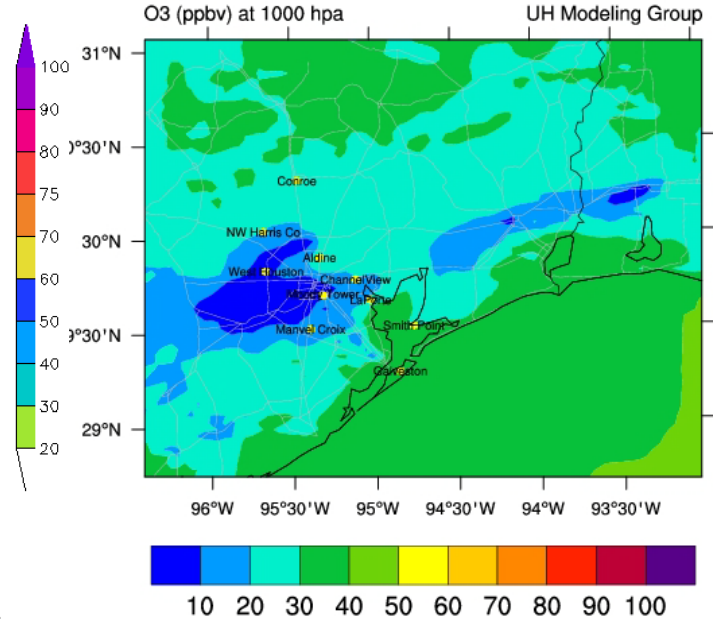
NOAA CMAQ

O3 [ppb] at 1013 [hPa] Valid 14Z SEP 10 2013

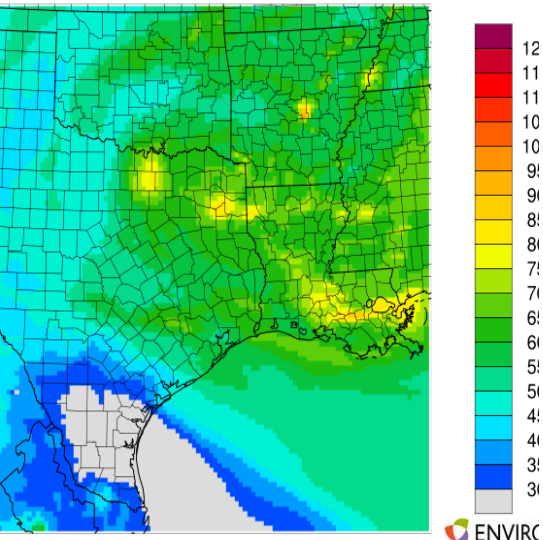


Univ. of Houston

CMAQ 20130910_14:00:00Z



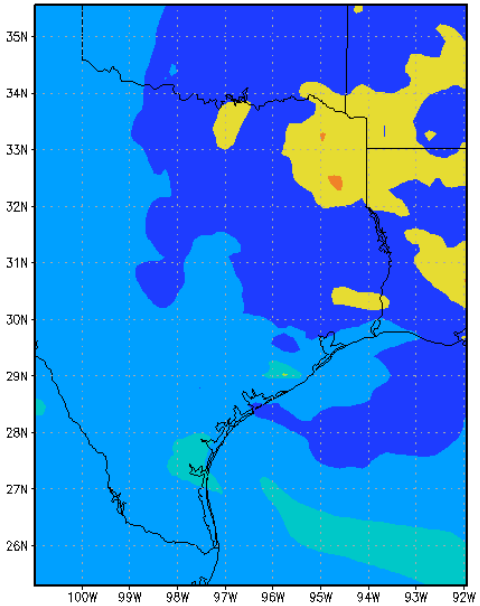
Ozone
Best Case



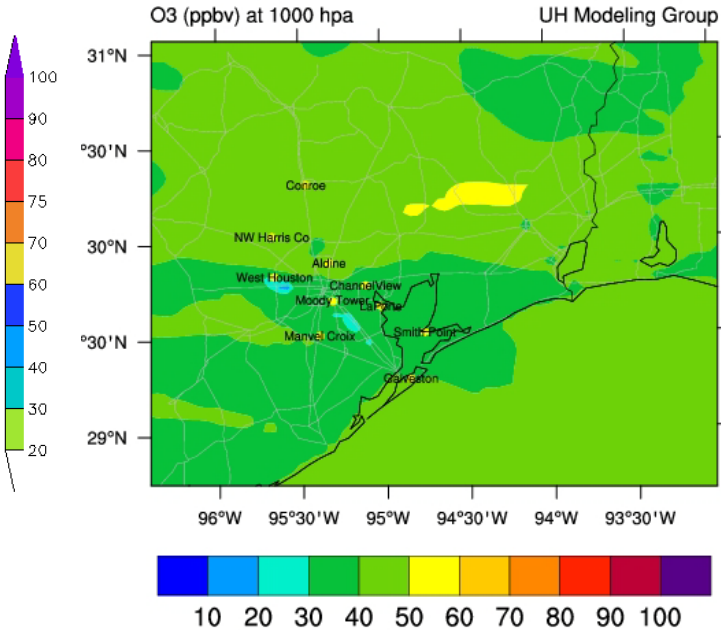
n(78,24) = 23.0, Max(119,87) = 92.8

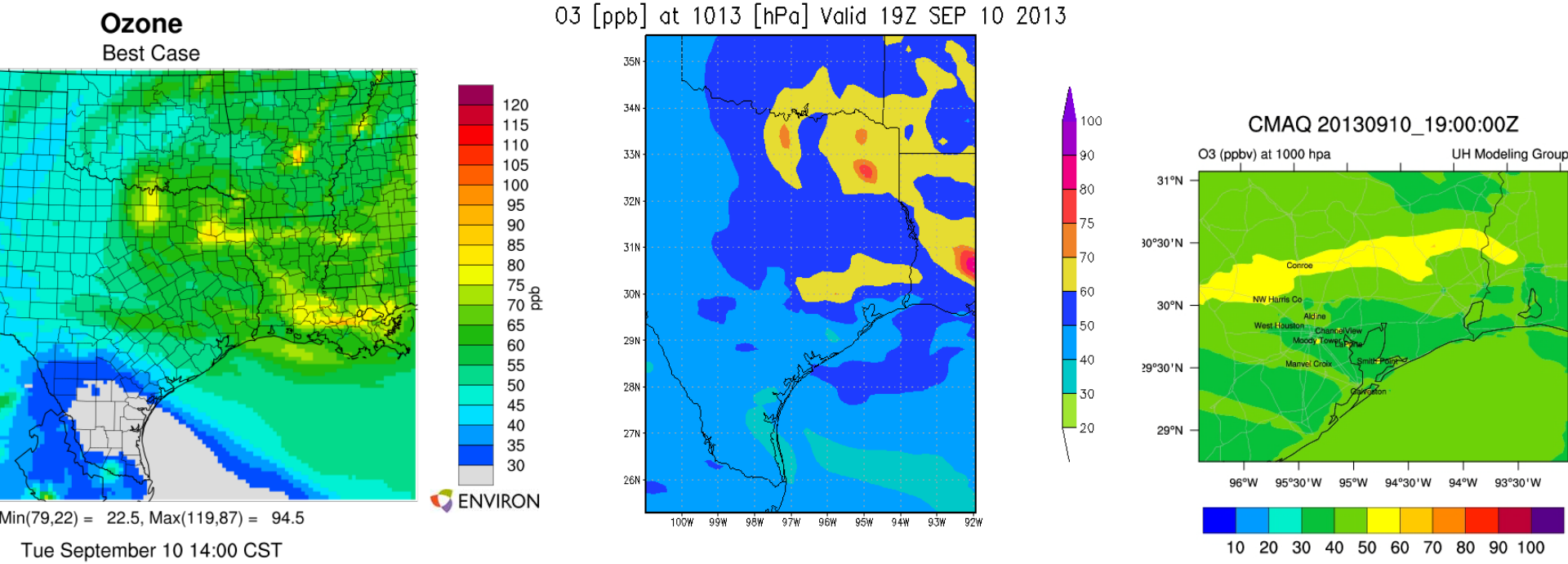
Tue September 10 12:00 CST

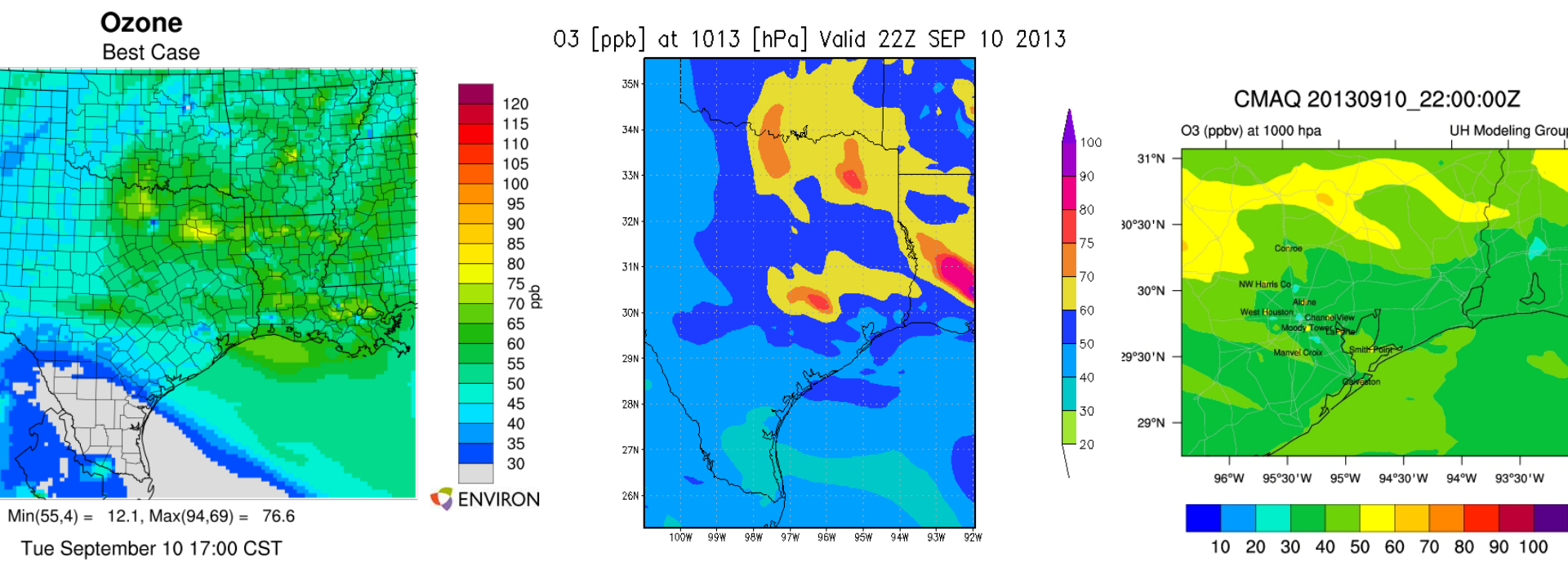
O3 [ppb] at 1013 [hPa] Valid 17Z SEP 10 2013

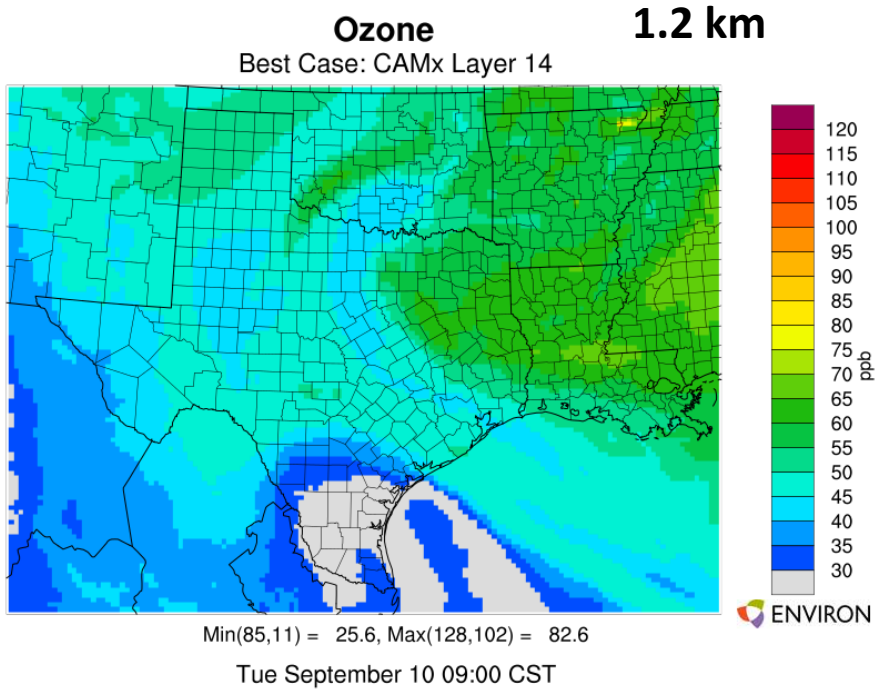


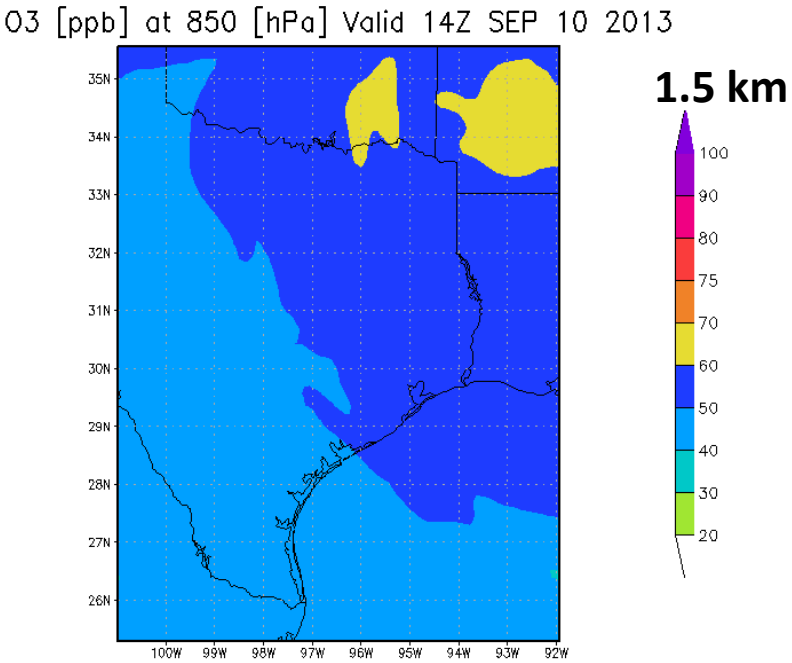
CMAQ 20130910_17:00:00Z

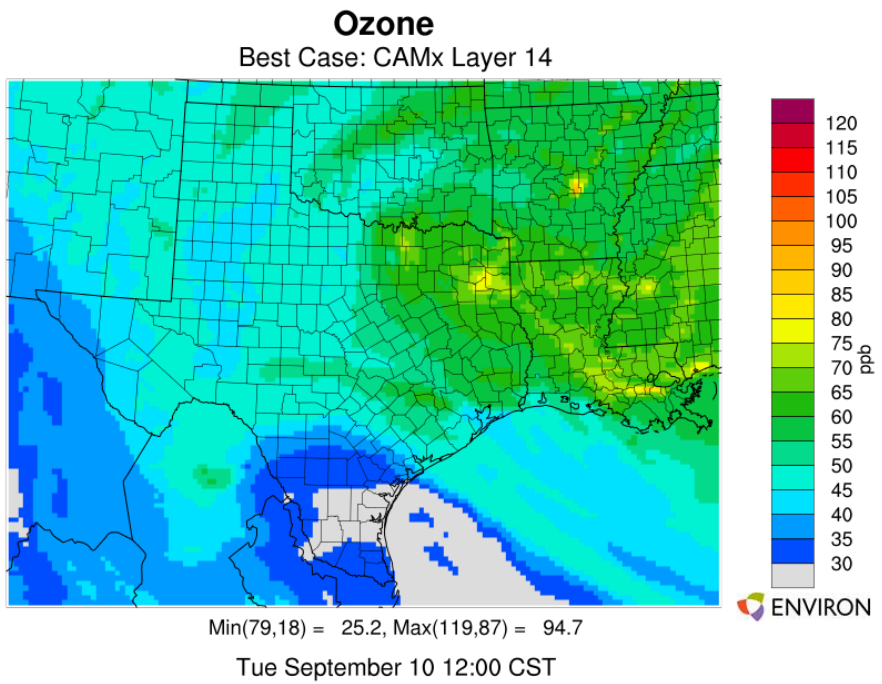


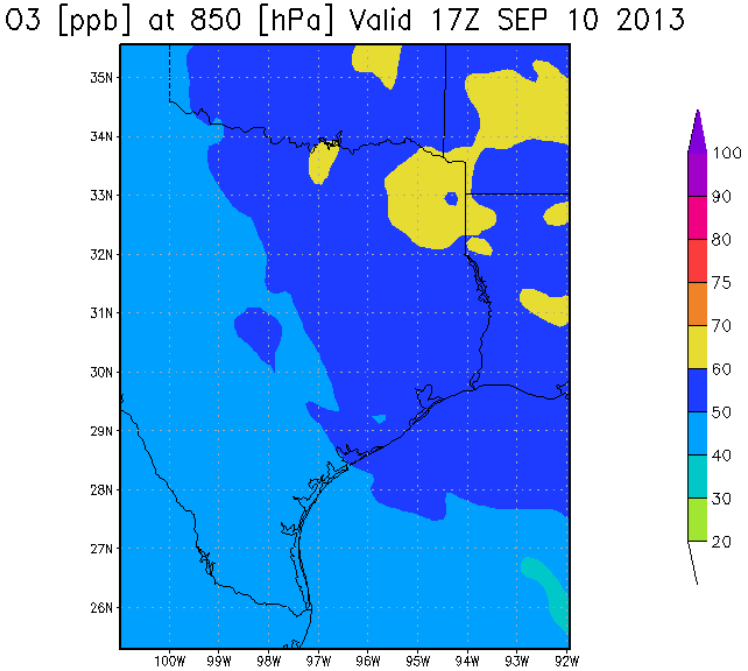

Ozone
Best Case
120
115
110
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
ppb
ENVIRON
Min(79,22) = 22.5, Max(119,87) = 94.5
Tue September 10 14:00 CST
O3 [ppb] at 1013 [hPa] Valid 19Z SEP 10 2013
35N
34N
33N
32N
31N
30N
29N
28N
27N
26N
100W
99W
98W
97W
96W
95W
94W
93W
92W
100
90
80
75
70
60
50
40
30
20
CMAQ 20130910_19:00:00Z
O3 (ppbv) at 1000 hpa
UH Modeling Group
31°N
30°30'N
30°N
29°30'N
29°N
Conroe
NW Harris Co
Aldine
West Houston
Channel View
Moody Tower
Manvel Croix
Smith Point
Galveston
96°W
95°30'W
95°W
94°30'W
94°W
93°30'W
10 20 30 40 50 60 70 80 90 100


Ozone
Best Case
120
115
110
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
ppb
ENVIRON
Min(55,4) = 12.1, Max(94,69) = 76.6
Tue September 10 17:00 CST
O3 [ppb] at 1013 [hPa] Valid 22Z SEP 10 2013
35N
34N
33N
32N
31N
30N
29N
28N
27N
26N
100W
99W
98W
97W
96W
95W
94W
93W
92W
100
90
80
75
70
60
50
40
30
20
CMAQ 20130910_22:00:00Z
O3 (ppbv) at 1000 hpa
UH Modeling Group
31°N
30°30'N
30°N
29°30'N
29°N
Conroe
NW Harris Co
Aldine
West Houston
Channel View
Moody Tower
Manvel Croix
Smith Point
Galveston
96°W
95°30'W
95°W
94°30'W
94°W
93°30'W
10 20 30 40 50 60 70 80 90 100

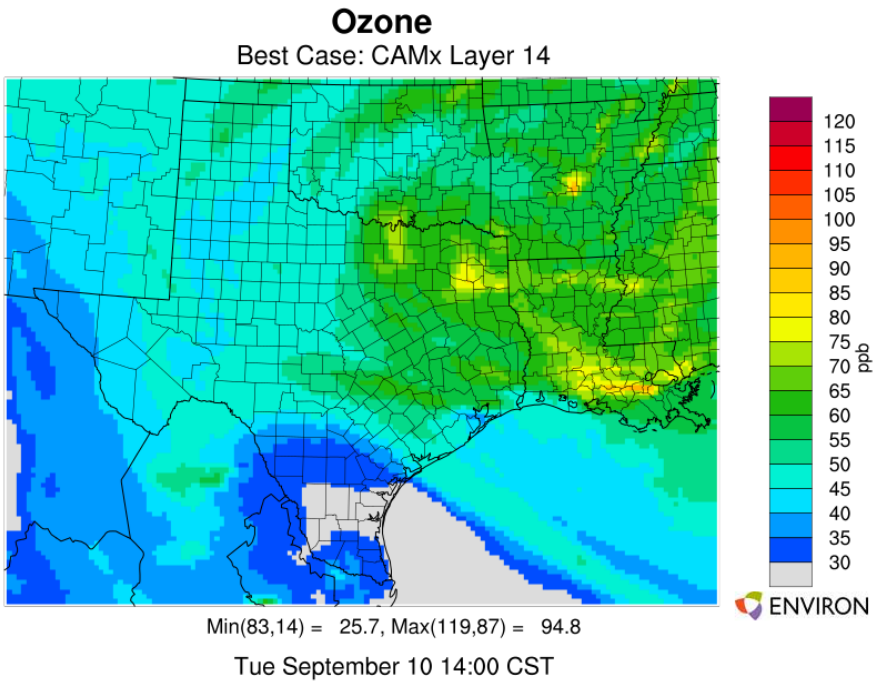


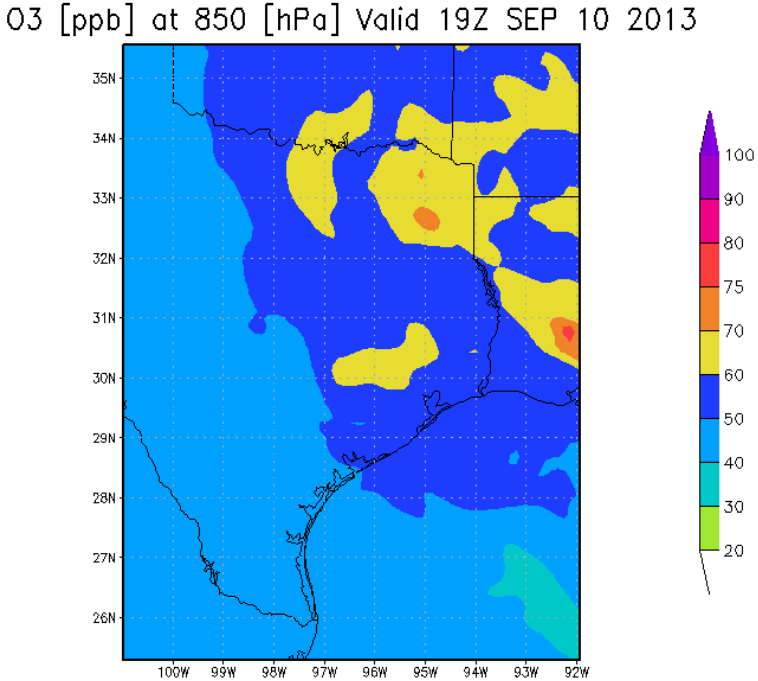


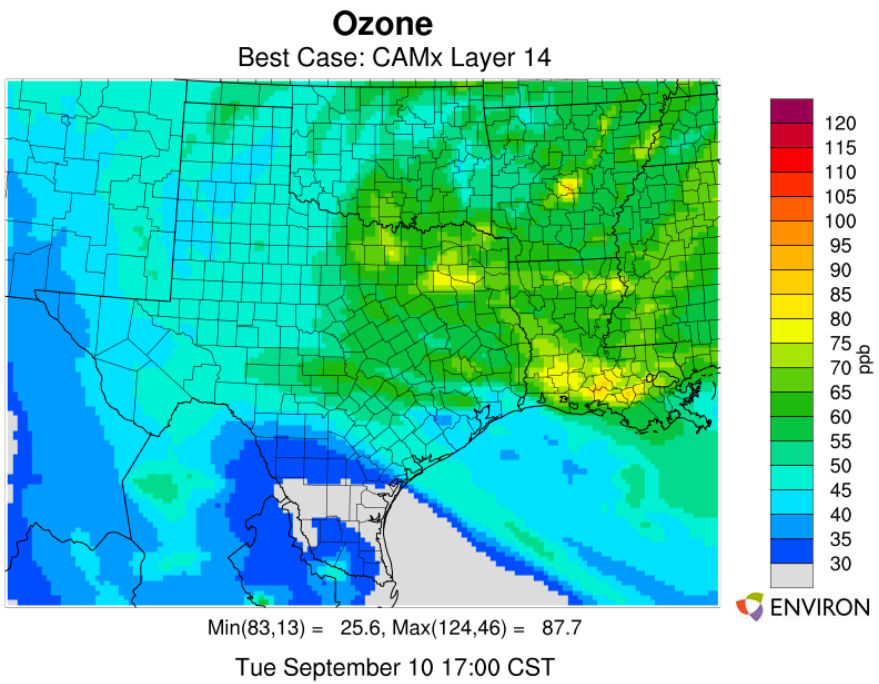


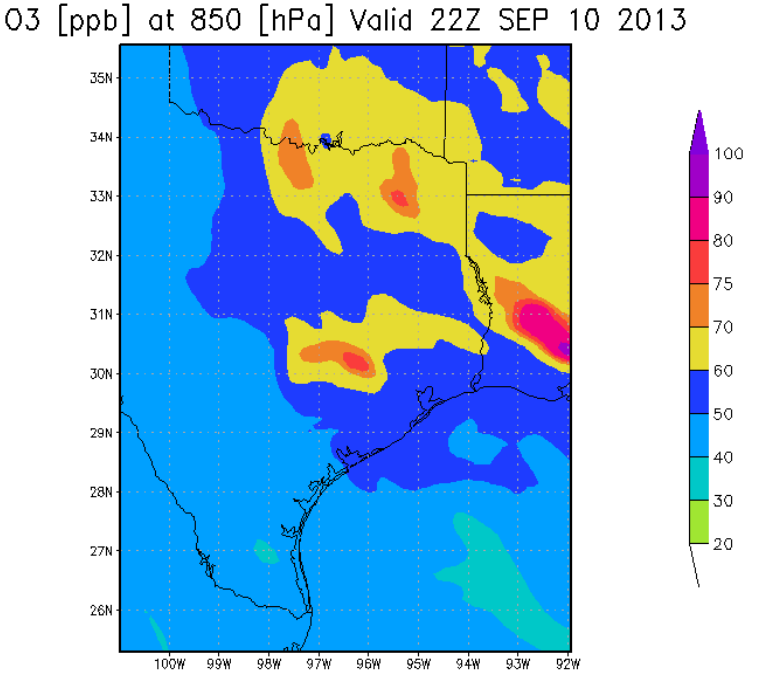


GrADS: COLA/IGES

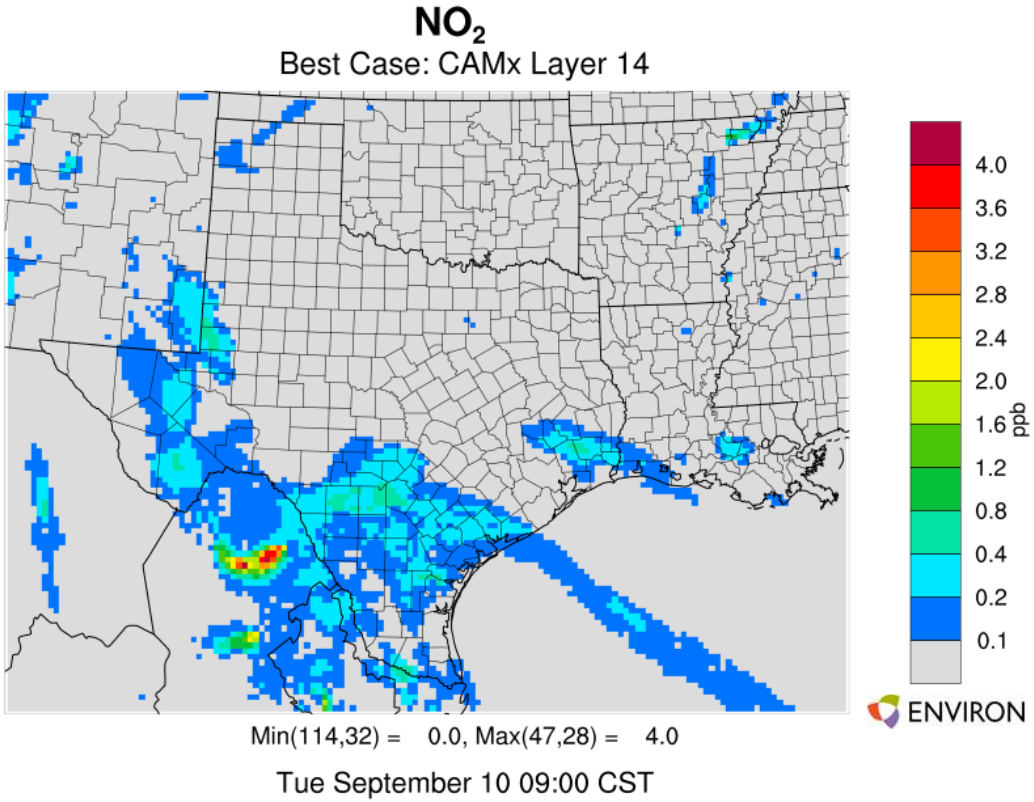


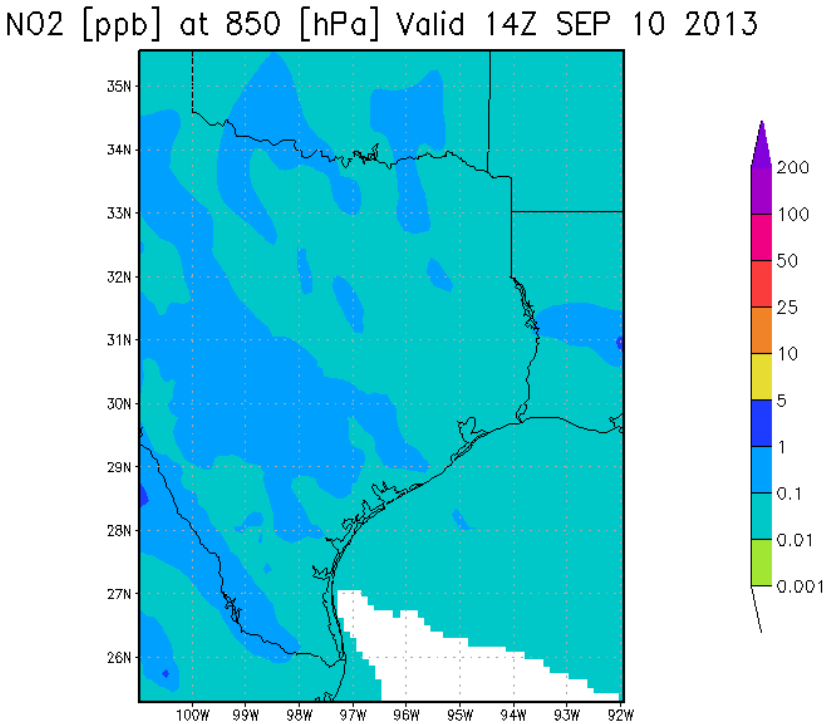


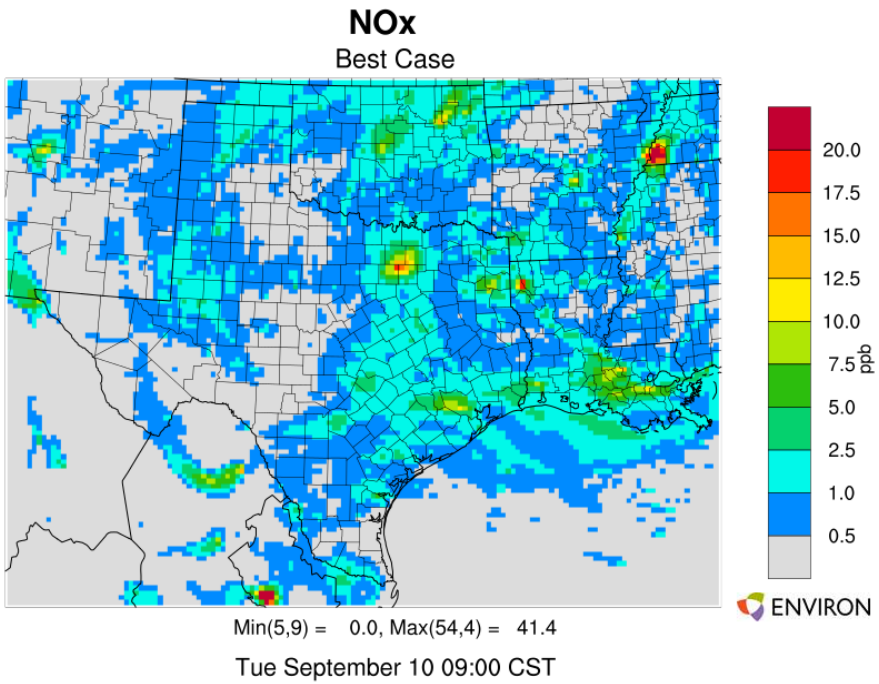


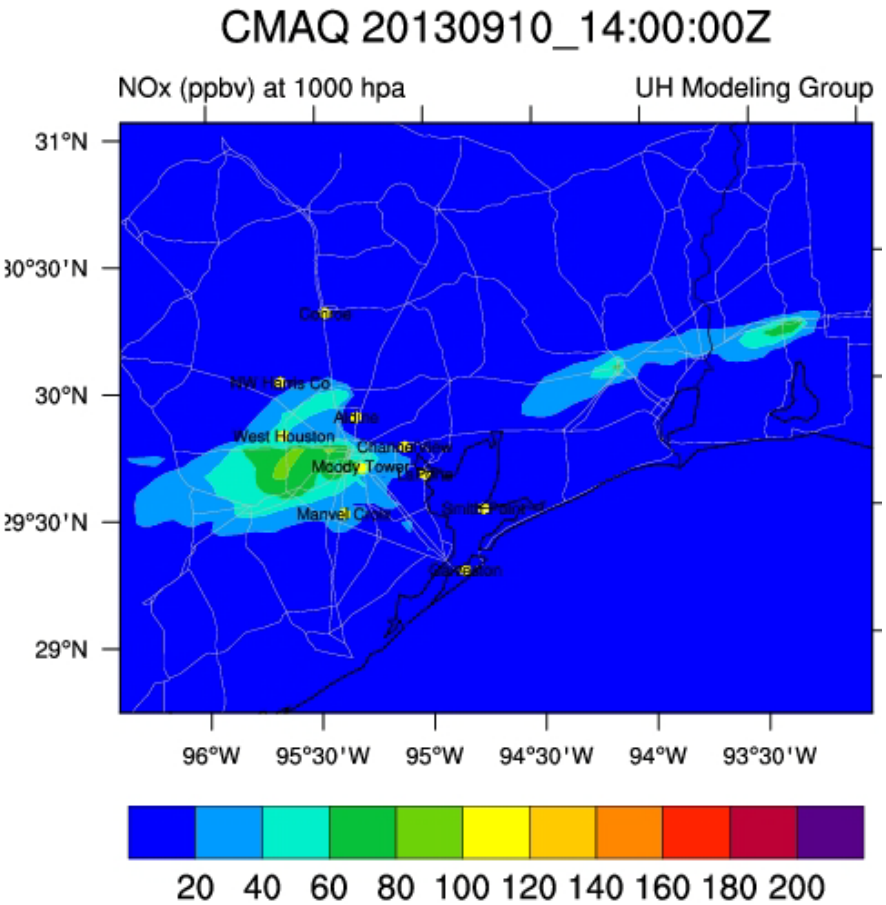


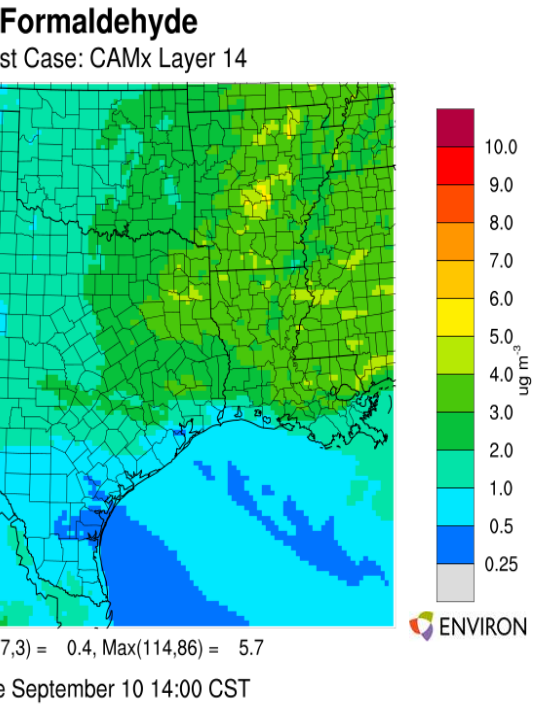
GrADS: COLA/IGES

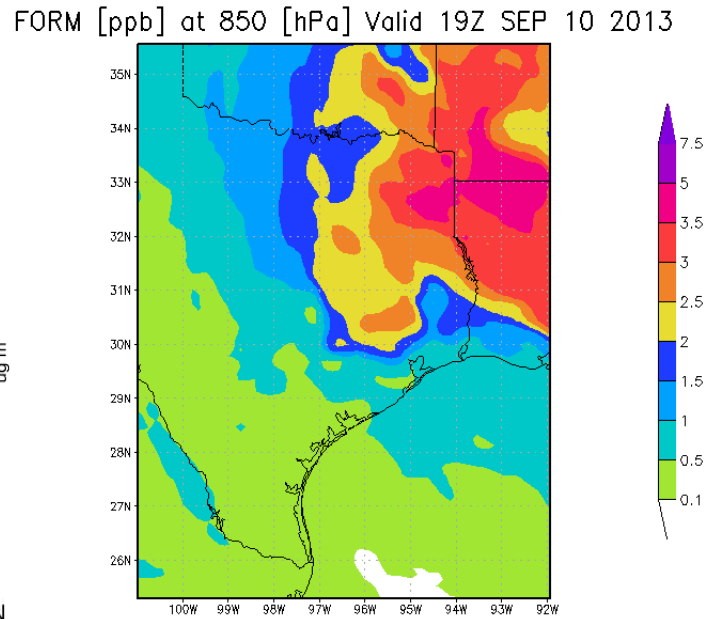

NO2
Best Case: CAMx Layer 14
4.0
3.6
3.2
2.8
2.4
2.0
1.6
1.2
0.8
0.4
0.2
0.1
ppb
ENVIRON
Min(114,32) = 0.0, Max(47,28) = 4.0
Tue September 10 09:00 CST

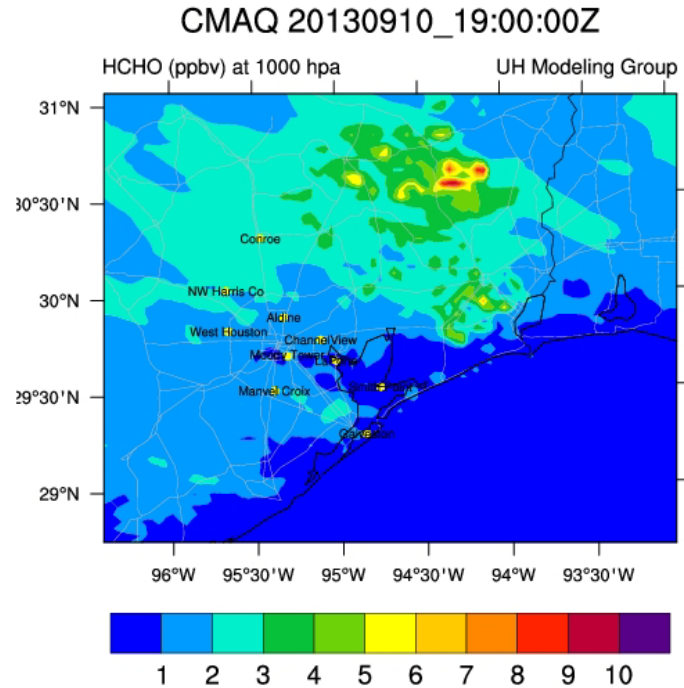

NO2 [ppb] at 850 [hPa] Valid 14Z SEP 10 2013
35N
34N
33N
32N
31N
30N
29N
28N
27N
26N
100W
99W
98W
97W
96W
95W
94W
93W
92W
200
100
50
25
10
5
1
0.1
0.01
0.001

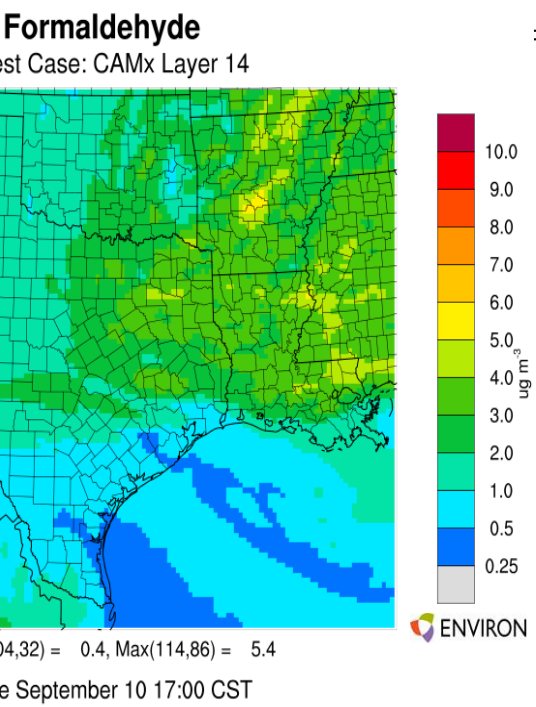

NOx
Best Case
20.0
17.5
15.0
12.5
10.0
7.5
5.0
2.5
1.0
0.5
ppb
ENVIRON
Min(5,9) = 0.0, Max(54,4) = 41.4
Tue September 10 09:00 CST

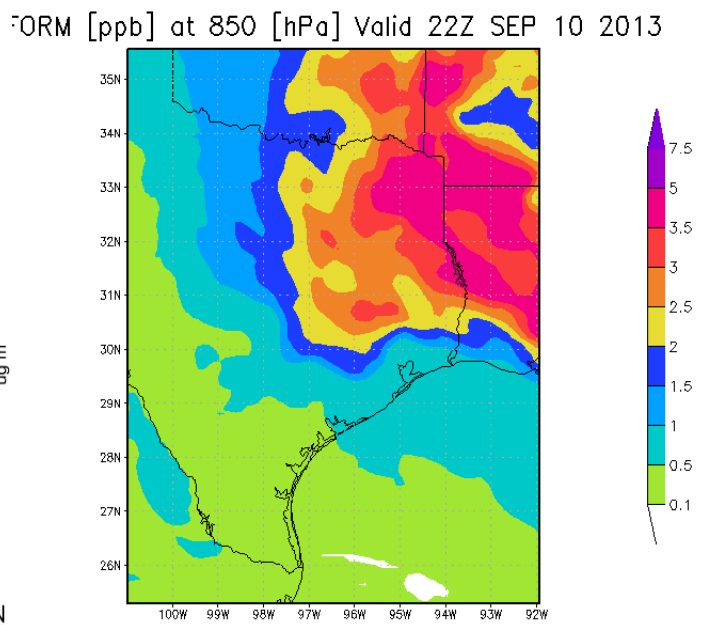

CMAQ 20130910_14:00:00Z
NOx (ppbv) at 1000 hpa
UH Modeling Group
31°N
30°30'N
30°N
29°30'N
29°N
West Houston
Moody Tower
96°W
95°30'W
95°W
94°30'W
94°W
93°30'W
20 40 60 80 100 120 140 160 180 200

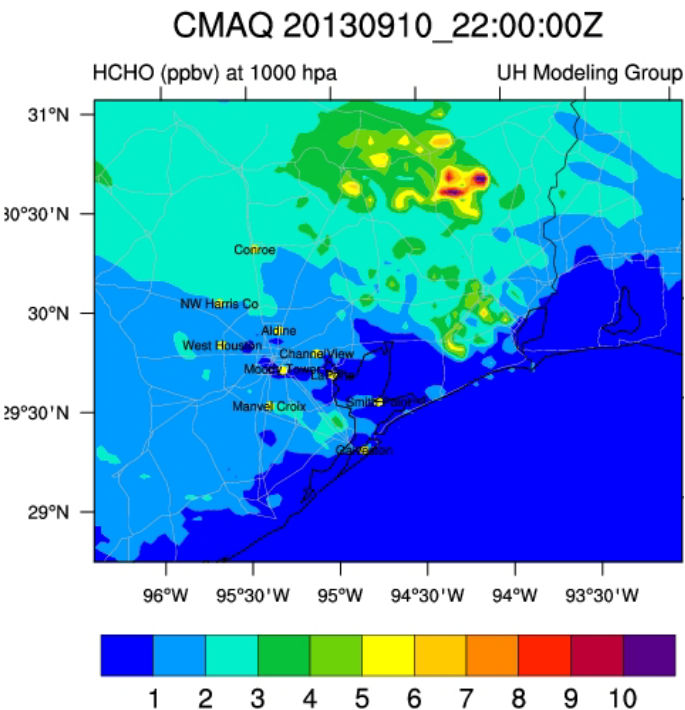

Formaldehyde
st Case: CAMx Layer 14
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.5
0.25
ug m-3
ENVIRON
7,3) = 0.4, Max(114,86) = 5.7
e September 10 14:00 CST

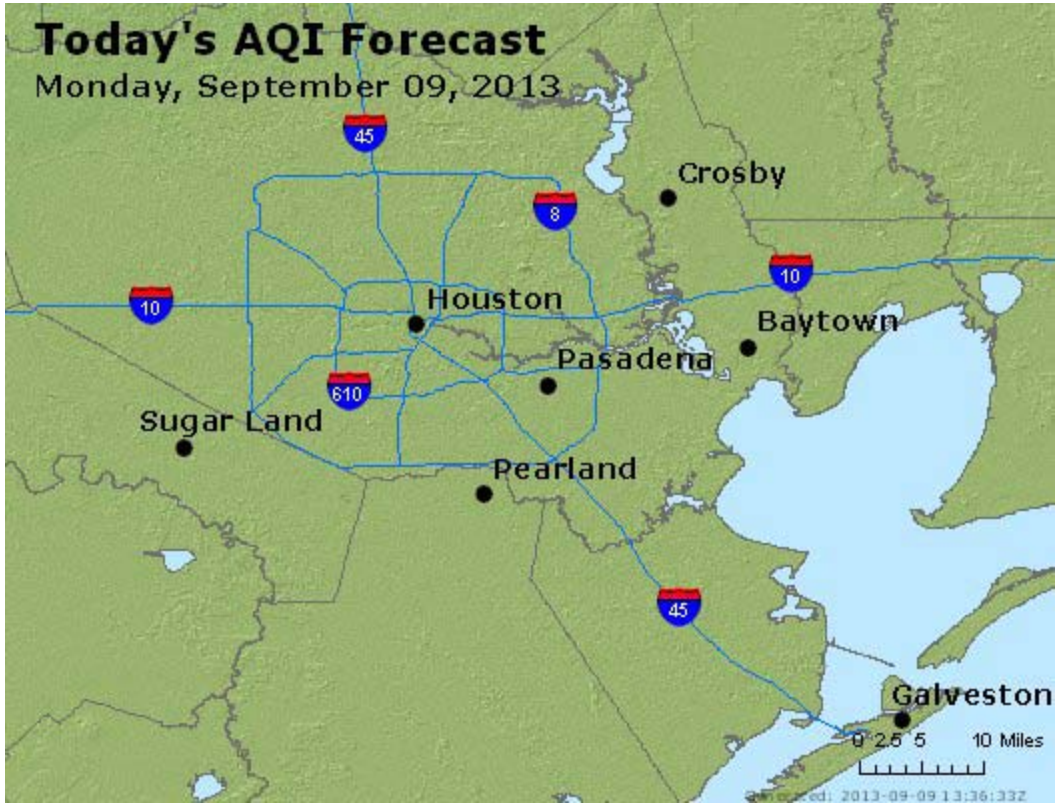

FORM [ppb] at 850 [hPa] Valid 19Z SEP 10 2013
35N
34N
33N
32N
31N
30N
29N
28N
27N
26N
100W
99W
98W
97W
96W
95W
94W
93W
92W
7.5
5
3.5
3
2.5
2
1.5
1
0.5
0.1


CMAQ 20130910_19:00:00Z
HCHO (ppbv) at 1000 hpa
UH Modeling Group
31°N
30°30'N
30°N
29°30'N
29°N
Conroe
NW Harris Co
Aldine
West Houston
ChannelView
Manvel Croix
96°W
95°30'W
95°W
94°30'W
94°W
93°30'W
1
2
3
4
5
6
7
8
9
10


Formaldehyde
st Case: CAMx Layer 14
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.5
0.25
ug m-3
ENVIRON
04,32) = 0.4, Max(114,86) = 5.4
e September 10 17:00 CST


FORM [ppb] at 850 [hPa] Valid 22Z SEP 10 2013
35N
34N
33N
32N
31N
30N
29N
28N
27N
26N
100W
99W
98W
97W
96W
95W
94W
93W
92W
7.5
5
3.5
3
2.5
2
1.5
1
0.5
0.1


CMAQ 20130910_22:00:00Z
HCHO (ppbv) at 1000 hpa
UH Modeling Group
31°N
30°30'N
30°N
29°30'N
29°N
Conroe
NW Harris Co
Aldine
West Houston
ChannelView
Manvel Croix
96°W
95°30'W
95°W
94°30'W
94°W
93°30'W
1
2
3
4
5
6
7
8
9
10



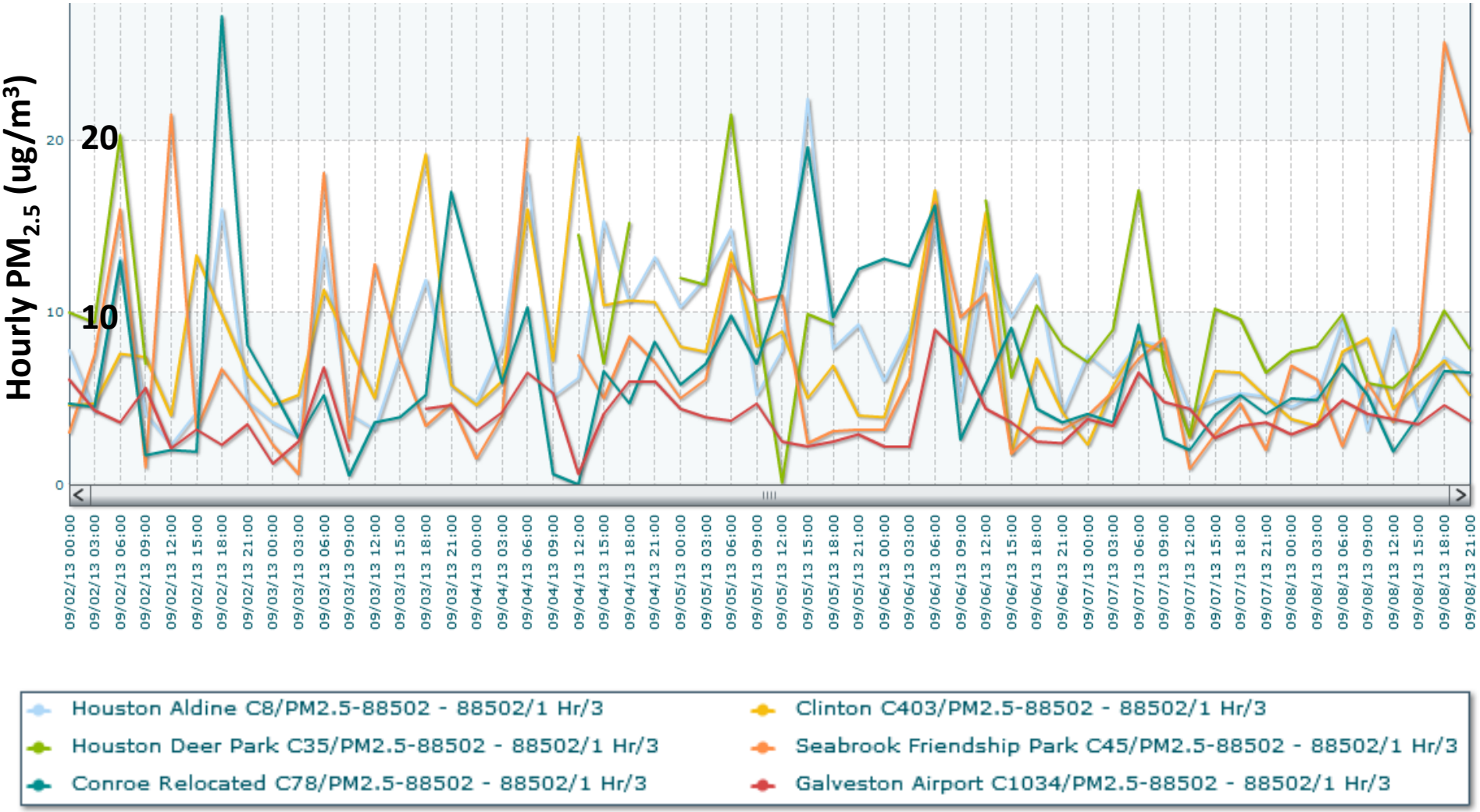
Good ozone levels (Code Green) expected:
Mon., Tues., Wed., Thurs.

Onshore flow with low background ozone will keep ozone in the Good range through Wednesday. Some chance of Moderate ozone by Thurs/Fri.

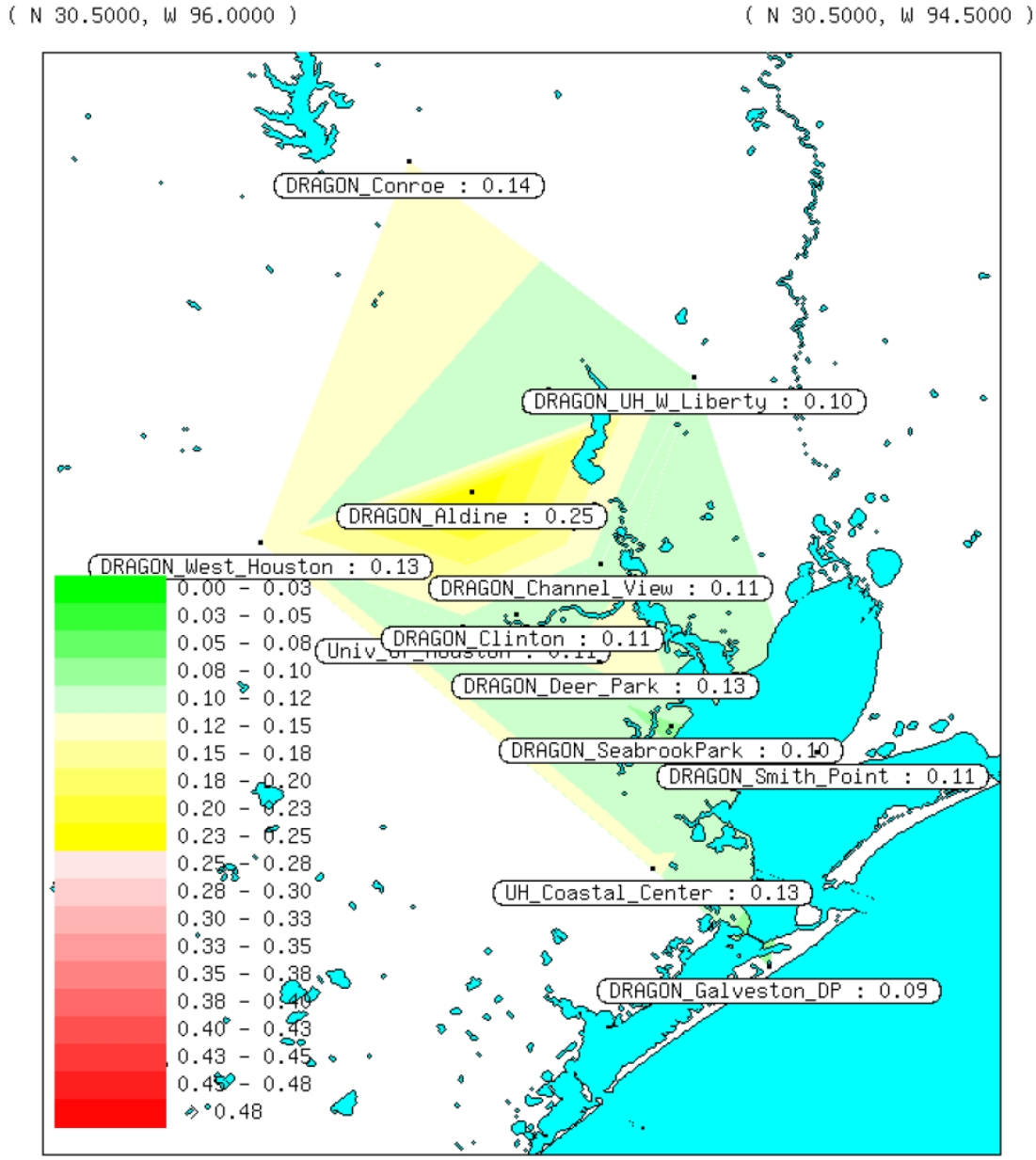
Hourly $PM_{2.5}$ (airnowtech.org)**

September 2nd – 8th (9 pm)

** EVERY 3rd HOUR PLOTTED!!!!!

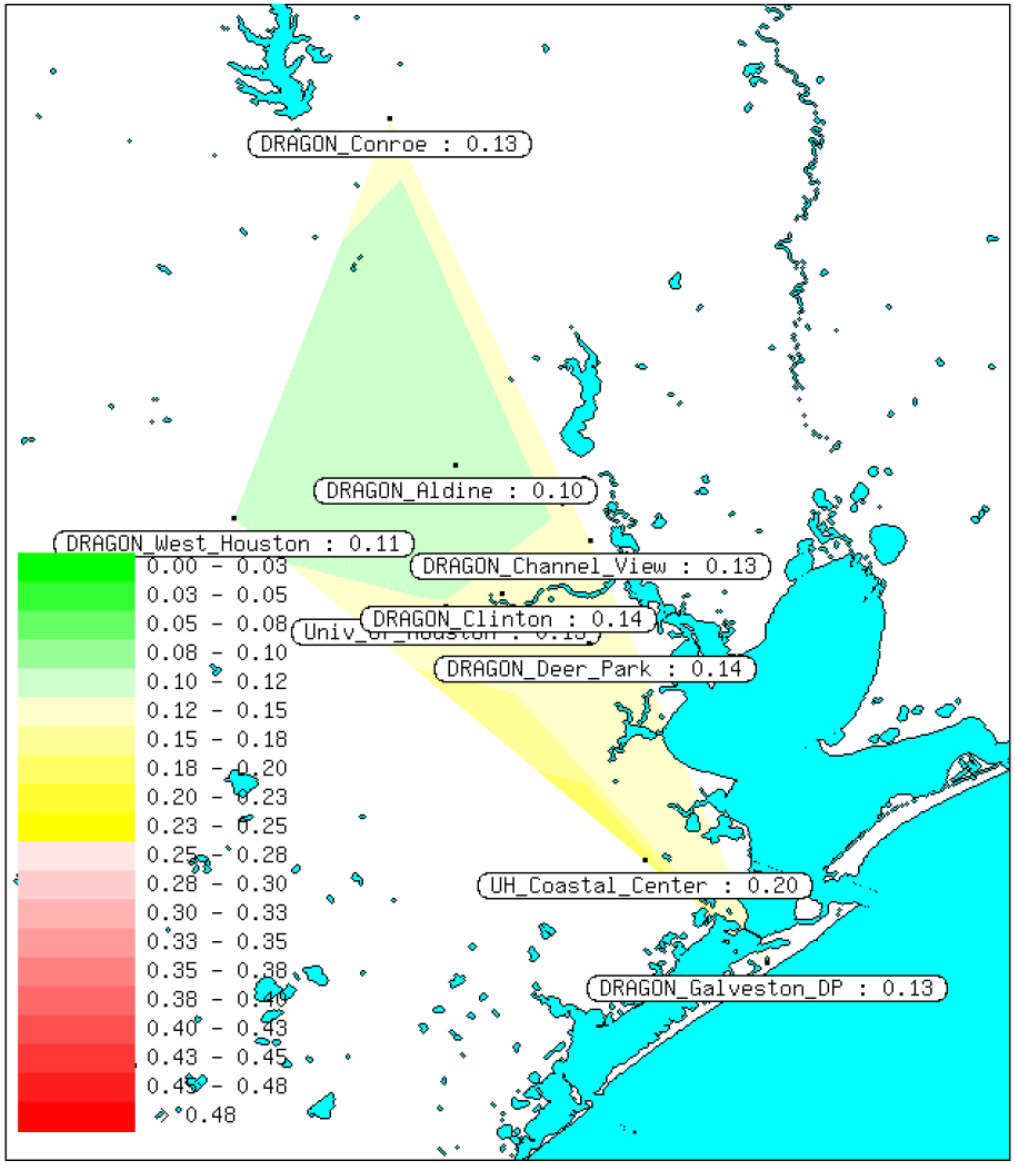


2013/SEP/08 : Daily average AOT Level 1.5, 13 sites

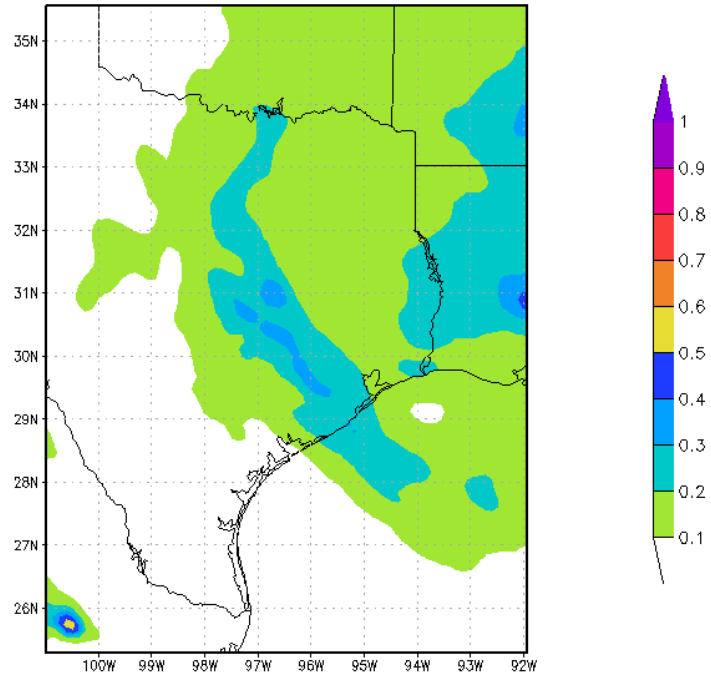


2013/SEP/09 : Daily average AOT Level 1.5, 10 sites

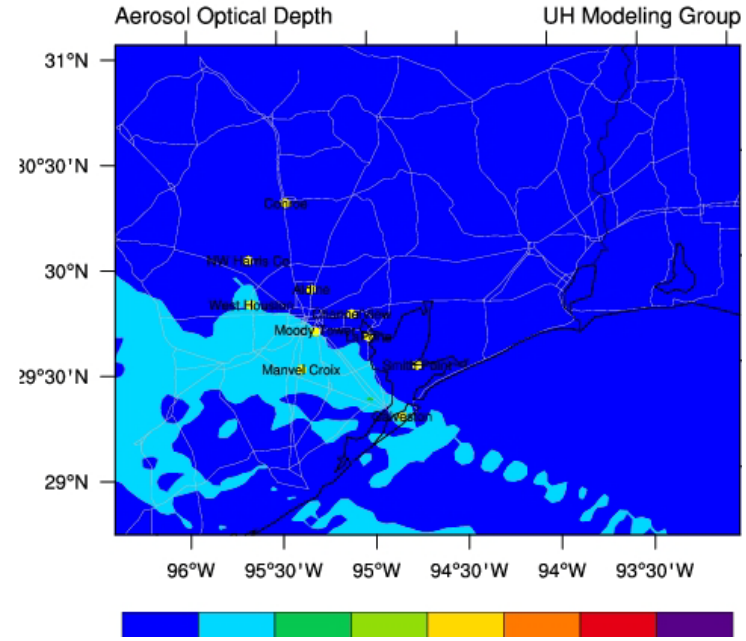
(N 30.5000, W 96.0000) (N 30.5000, W 94.5000)



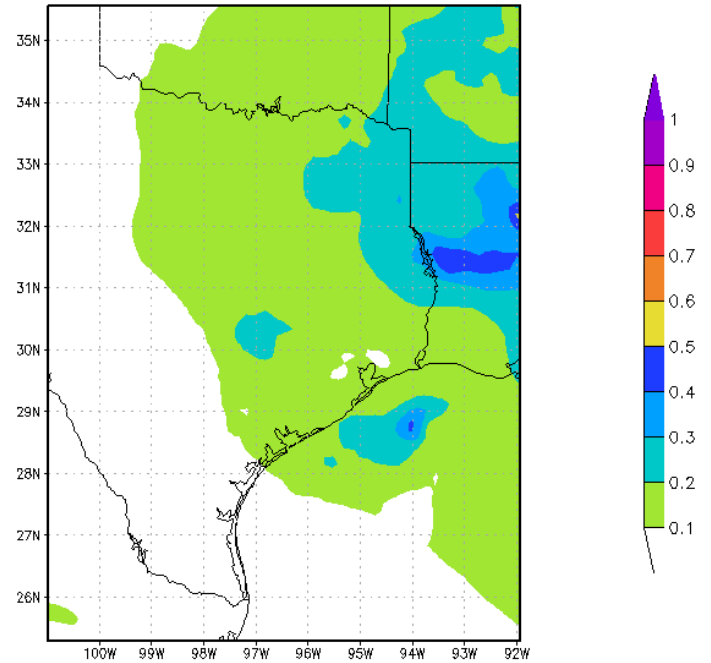
(dev) aot 32H VALID 14Z 10 SEP2013 [dimensionless]



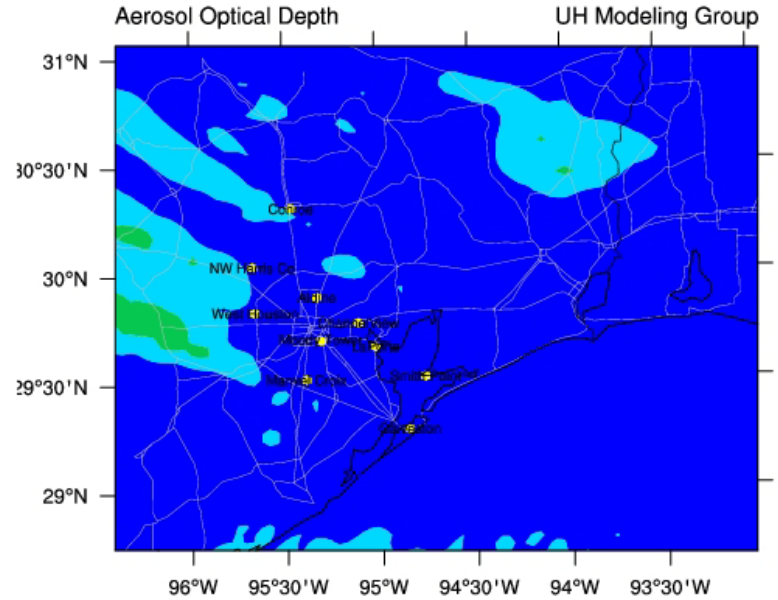
CMAQ 20130910_14:00:00Z

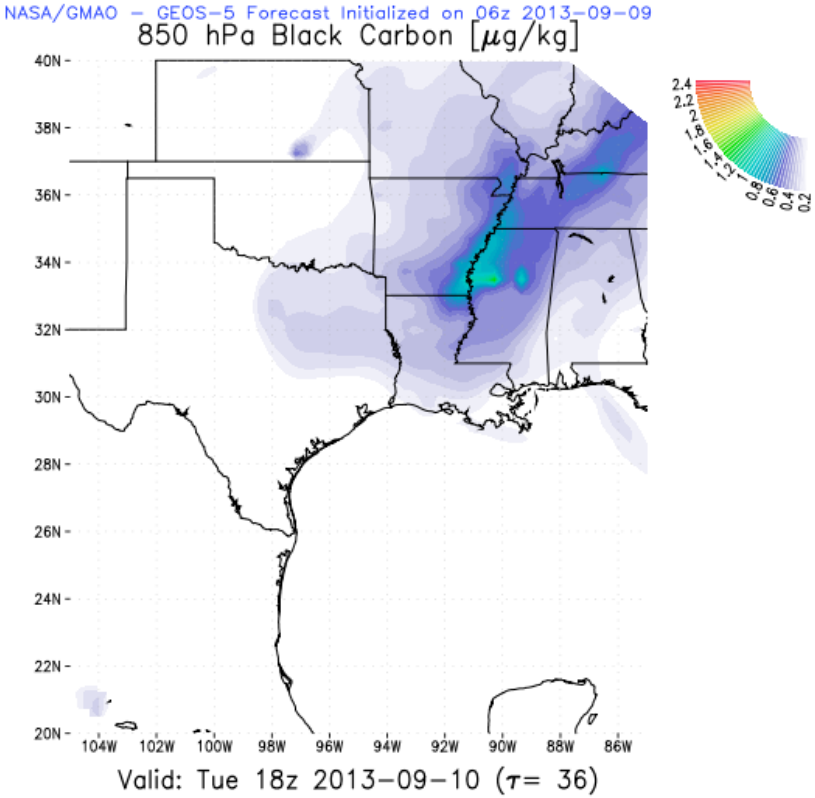


(dev) aot 40H VALID 22Z 10 SEP2013 [dimensionless]

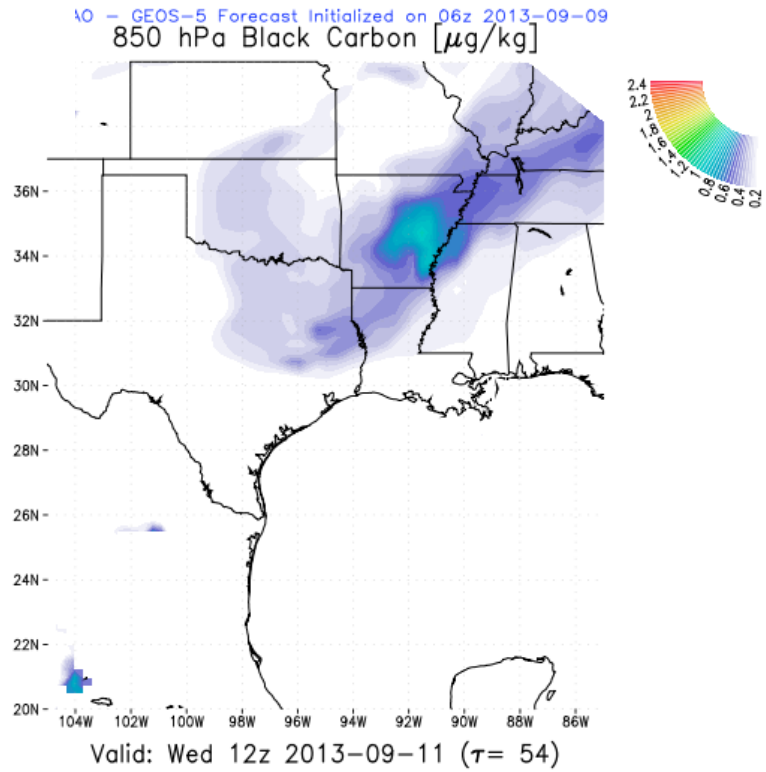


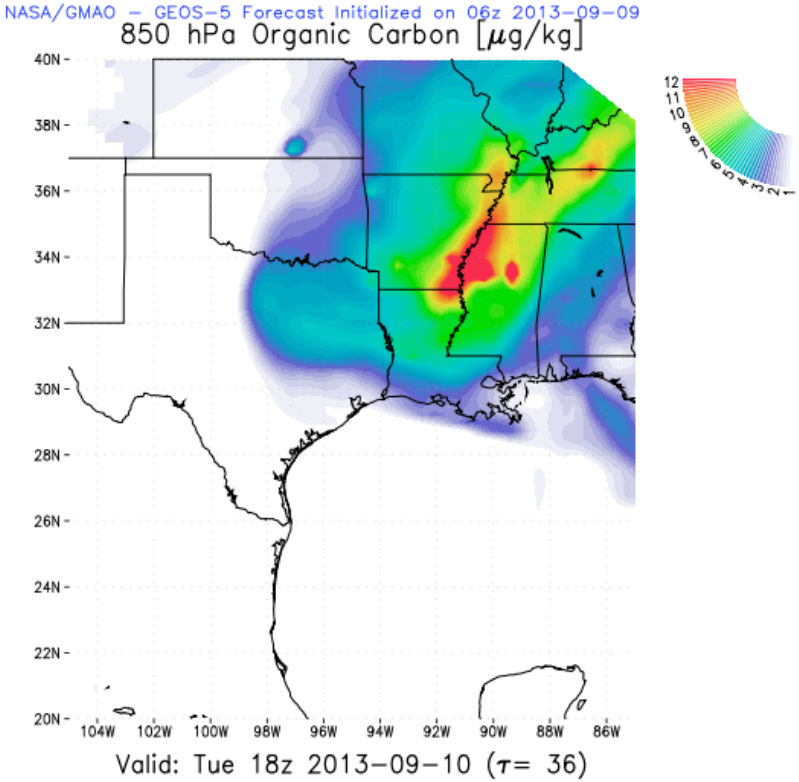
CMAQ 20130910_22:00:00Z

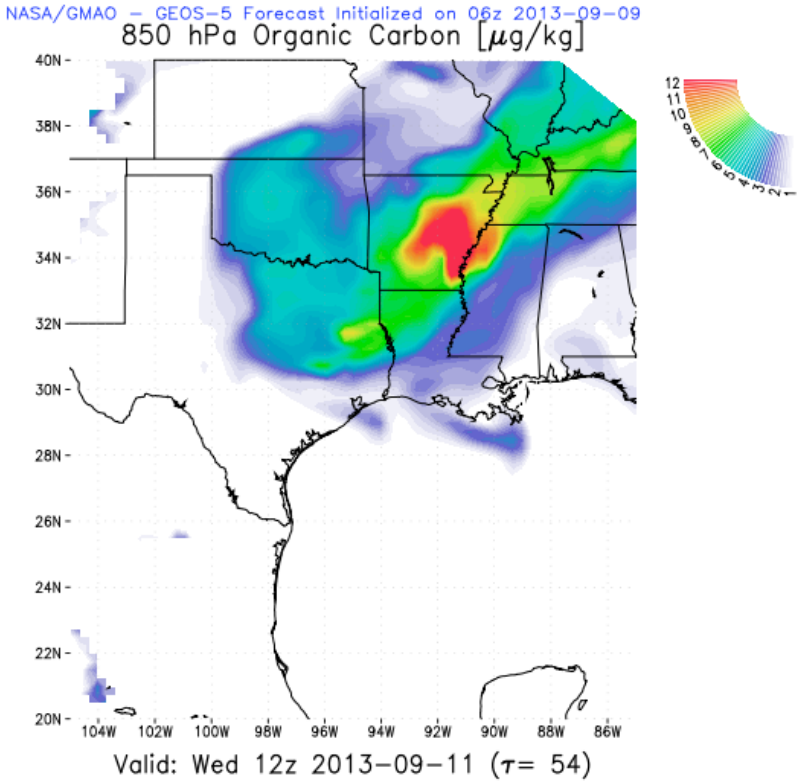


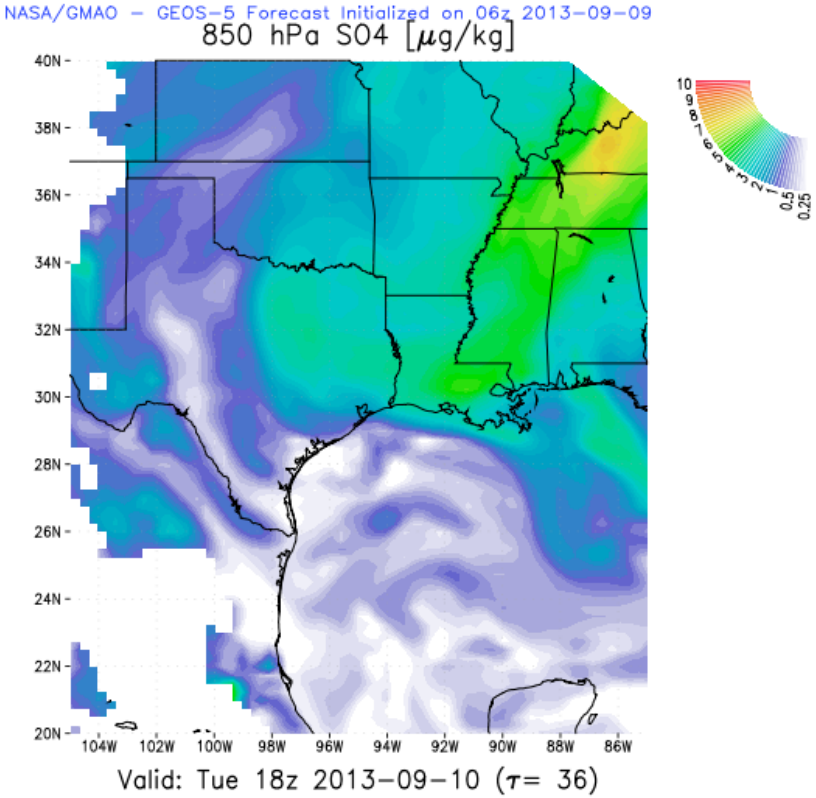

NASA/GMAO – GEOS-5 Forecast Initialized on 06z 2013-09-09
850 hPa Black Carbon [μg/kg]
40N
38N
36N
34N
32N
30N
28N
26N
24N
22N
20N
104W 102W 100W 98W 96W 94W 92W 90W 88W 86W
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
Valid: Tue 18z 2013-09-10 (τ= 36)

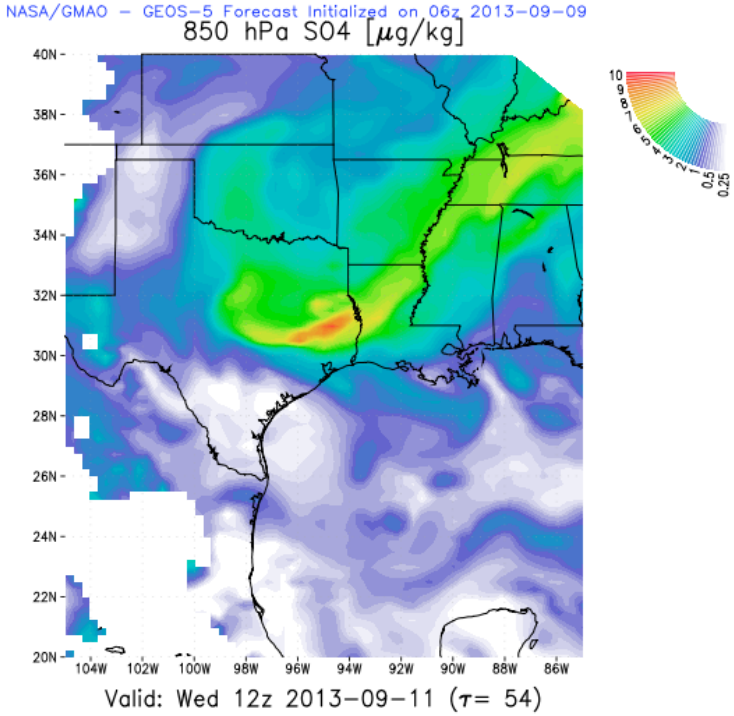
GEOS-5

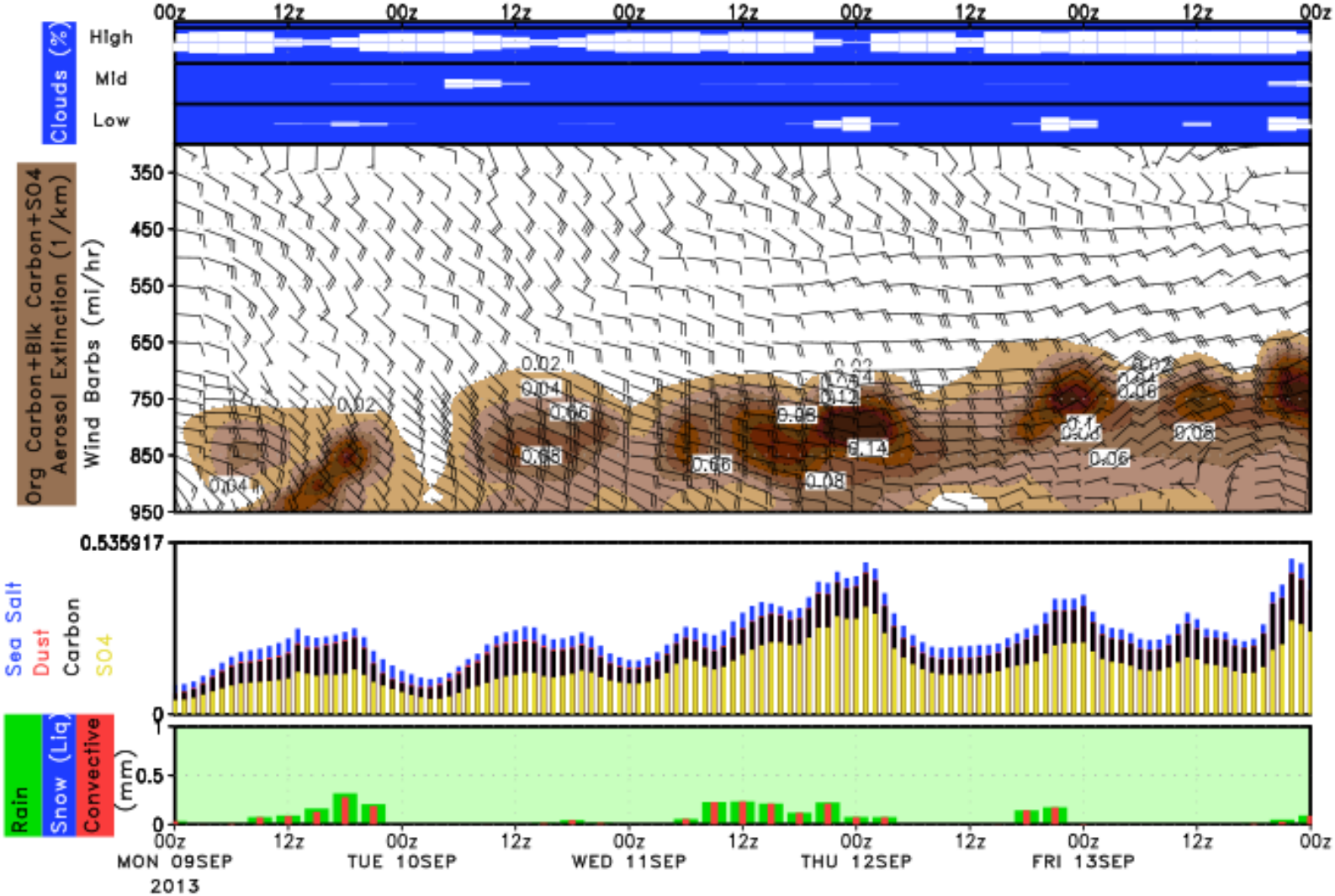

AO – GEOS-5 Forecast Initialized on 06z 2013-09-09
850 hPa Black Carbon [μg/kg]
36N
34N
32N
30N
28N
26N
24N
22N
20N
104W 102W 100W 98W 96W 94W 92W 90W 88W 86W
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
Valid: Wed 12z 2013-09-11 (τ= 54)


NASA/GMAO – GEOS-5 Forecast Initialized on 06z 2013-09-09
850 hPa Organic Carbon [μg/kg]
40N
38N
36N
34N
32N
30N
28N
26N
24N
22N
20N
104W
102W
100W
98W
96W
94W
92W
90W
88W
86W
12
11
10
Valid: Tue 18z 2013-09-10 (τ= 36)

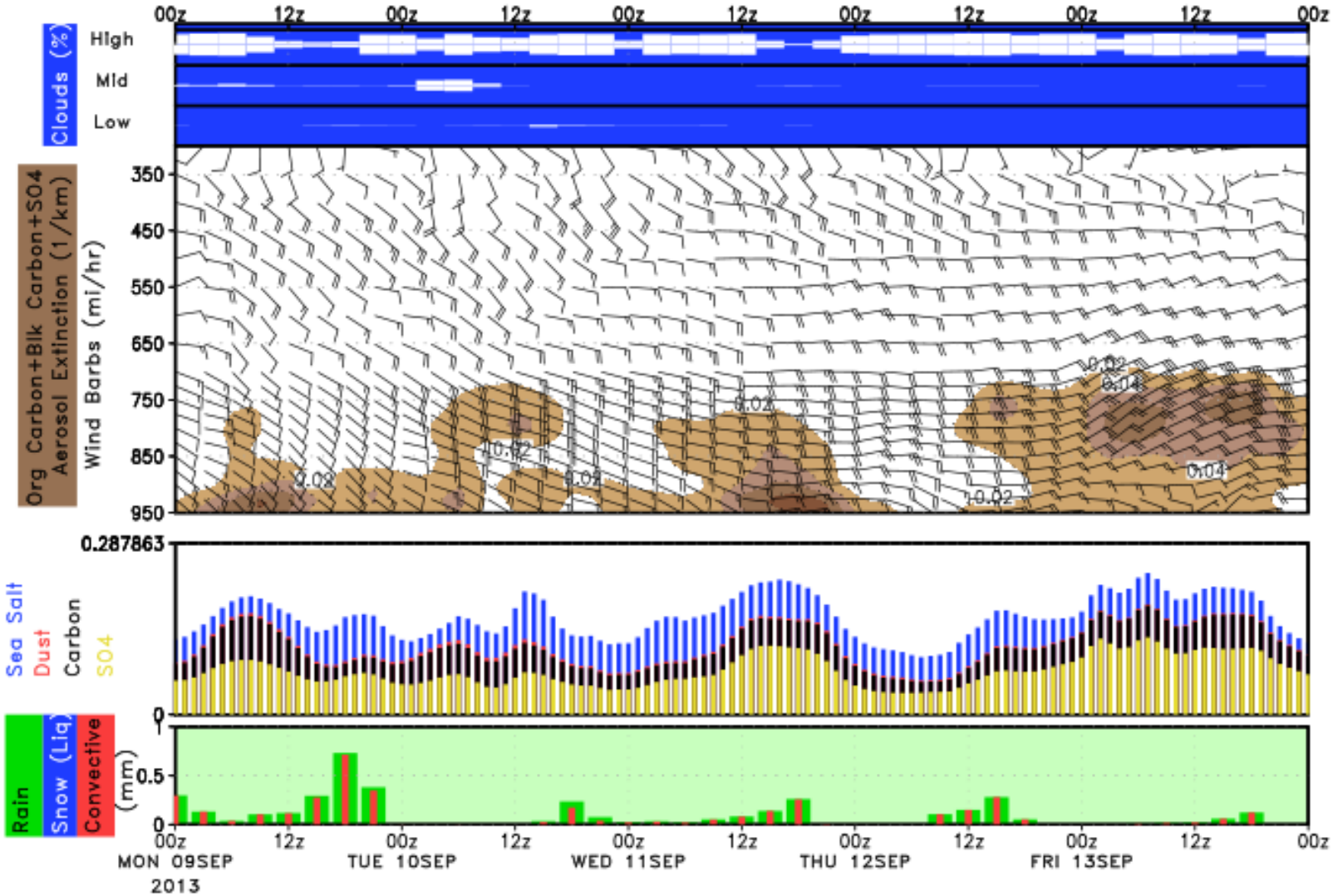

NASA/GMAO – GEOS-5 Forecast Initialized on 06z 2013-09-09
850 hPa Organic Carbon [μg/kg]
40N
38N
36N
34N
32N
30N
28N
26N
24N
22N
20N
104W
102W
100W
98W
96W
94W
92W
90W
88W
86W
12
11
10
Valid: Wed 12z 2013-09-11 (τ= 54)


NASA/GMAO – GEOS-5 Forecast Initialized on 06z 2013-09-09
850 hPa SO4 [μg/kg]
40N
38N
36N
34N
32N
30N
28N
26N
24N
22N
20N
104W
102W
100W
98W
96W
94W
92W
90W
88W
86W
10
9
8
7
6
5
4
3
2
1
0.5
0.25
Valid: Tue 18z 2013-09-10 (τ= 36)


NASA/GMAO – GEOS-5 Forecast Initialized on 06z 2013-09-09
850 hPa SO4 [μg/kg]
40N
38N
36N
34N
32N
30N
28N
26N
24N
22N
20N
104W
102W
100W
98W
96W
94W
92W
90W
88W
86W
10
9
8
7
6
5
4
3
2
1
0.5
0.25
Valid: Wed 12z 2013-09-11 (τ= 54)



LAT = 30.3 , LON = −95.4, Location = Conroe, Fcst_init = 20130909



LAT = 29.2 , LON = −94.8, Location = Galveston, Fcst_init = 20130909