

## DISCOVER-AQ Outlook for Friday, July 29, 2011

Cloud cover has been the issue for today's flights. Even with the extensive cloud cover, considerable ozone has been produced. We expect the clouds to persist overnight in response to the passage of the short wave to the north. Clearing should take place in the morning as a result of strong ridging into the region from the upper-level anticyclone centered over NC, SC, and TN. This will lead to a very hot and humid day in the study region tomorrow, with ozone reaching Code Orange on a widespread basis. Aerosol optical depth should also respond to the increased humidity with possible  $AOD > 0.4$ . We will carefully watch the progression of the clearing during the morning. We do recommend flying tomorrow to capture these polluted conditions. Late afternoon thunderstorms could become an issue tomorrow. If we do not for some reason fly tomorrow, Saturday looks bleak with the passage of a frontal system bringing cloudiness. The front may pass far enough to the south on Sunday to bring clearing, but considerably cleaner conditions.

# Recommendations July 29<sup>th</sup>-31<sup>st</sup>

July 29, Friday: Can Fly – Early A.M. clouds; chance of late afternoon t-storms

July 30, Saturday: Front approaching

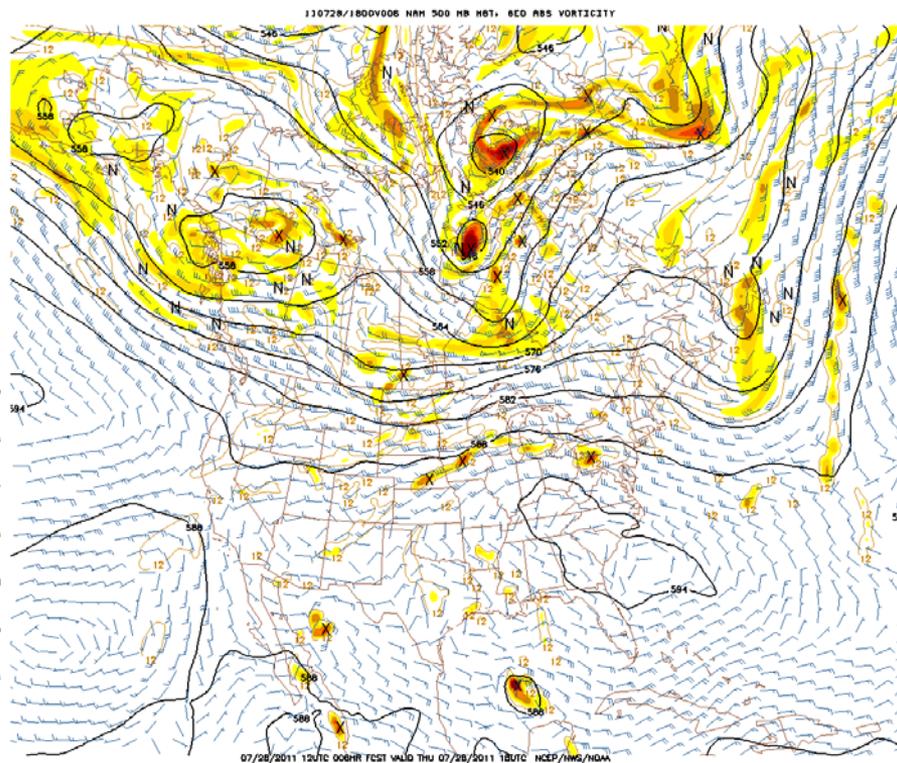
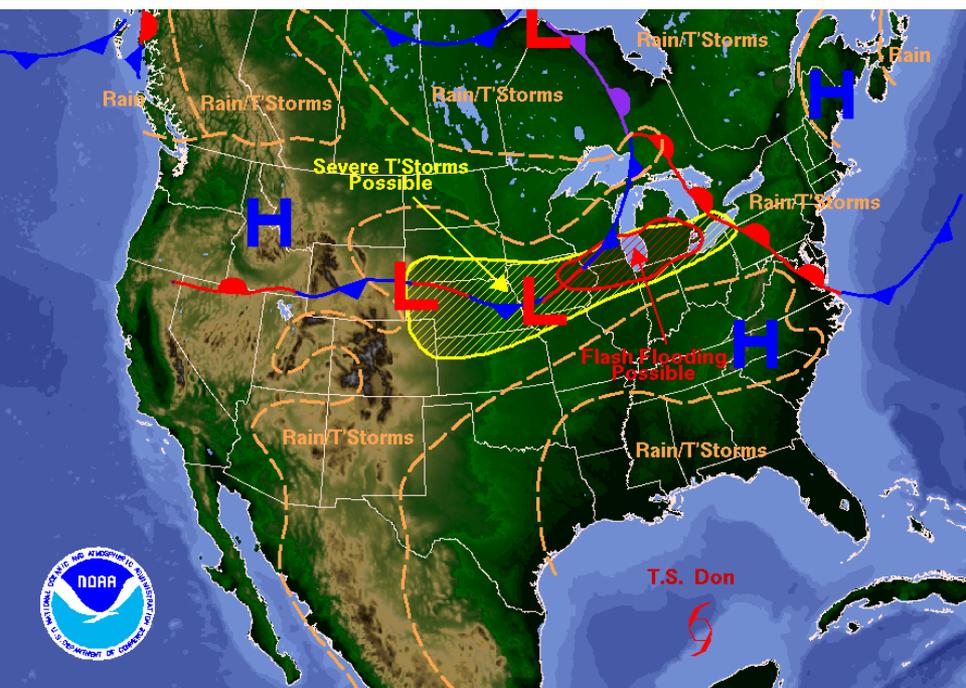
July 31, Sunday: Close to frontal boundary but maybe behind it

Today	Tonight	Friday	Friday Night	Saturday	Saturday Night	Sunday	Sunday Night	Monday
								
30%	30%	20%		20%				
Chance Showers	Chance Showers	Slight Chc Tstms	Partly Cloudy	Slight Chc Tstms	Partly Cloudy	Mostly Sunny	Partly Cloudy	Mostly Sunny
Hi 91 °F	Lo 73 °F	Hi 98 °F	Lo 78 °F	Hi 94 °F	Lo 78 °F	Hi 93 °F	Lo 74 °F	Hi 93 °F



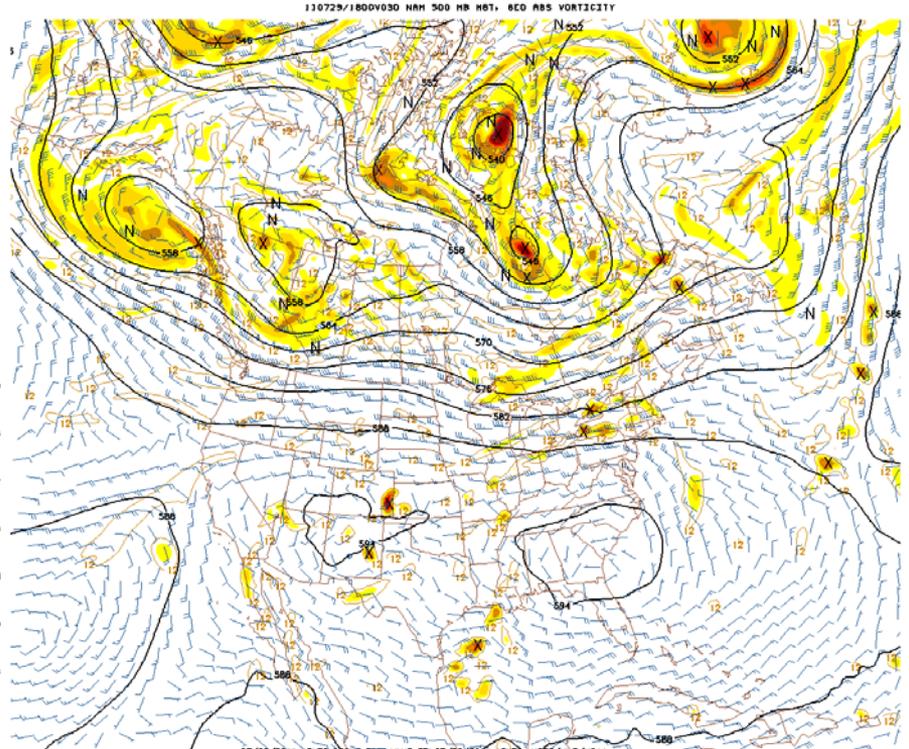
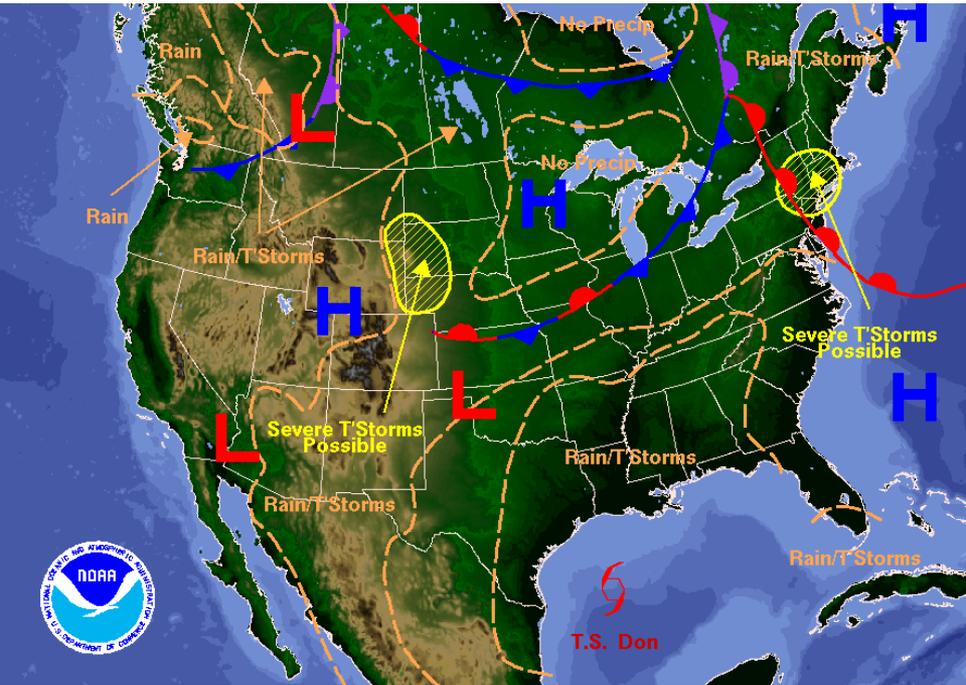
Today: Convective outflow and clouds associated with a series of shortwave troughs passing through Pennsylvania entering our area. Chance of precipitation this afternoon.

500 mb NAM at 2 PM.



Tomorrow: Hot and humid. Convective outflow leaving our region in the morning and a chance of afternoon thunderstorms.

500 mb NAM at 2 PM.

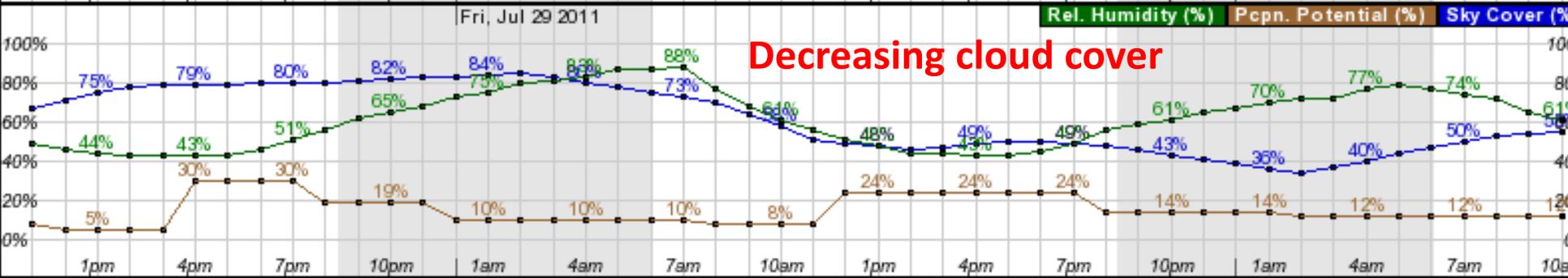
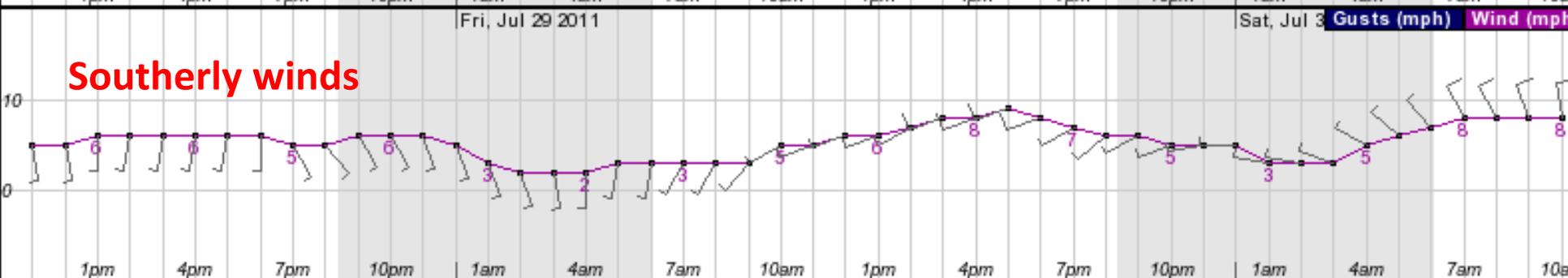
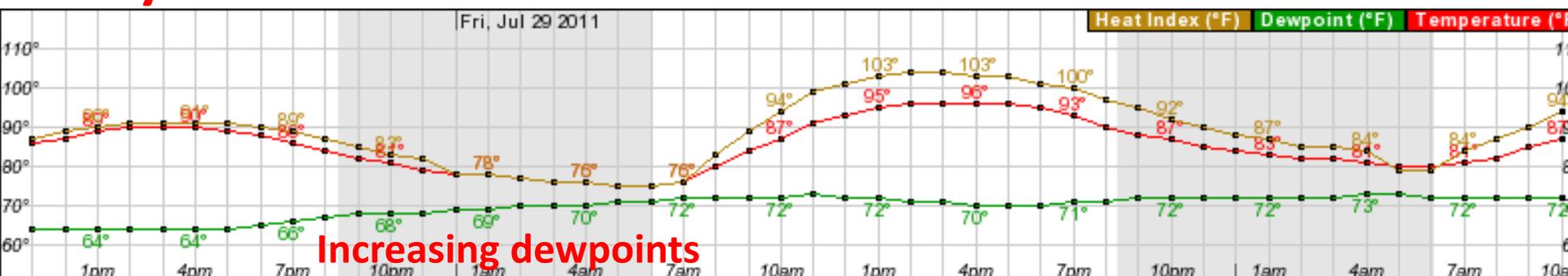


Today: Increasing humidity with southerly flow.

Tomorrow: Partly cloudy, hot, humid, and a chance of thunderstorms.

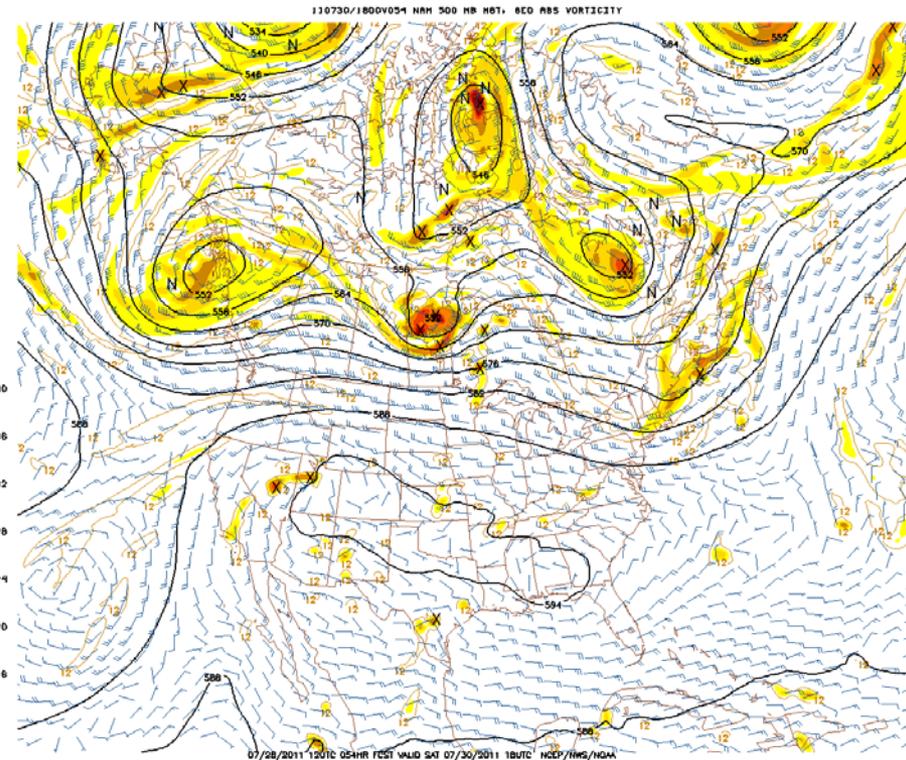
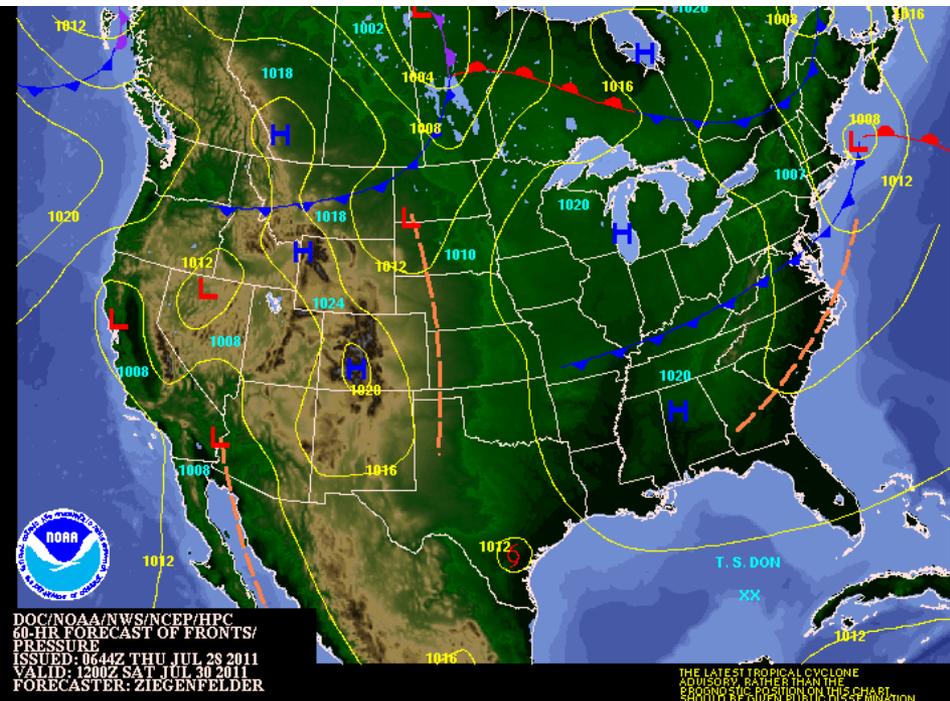
Today →

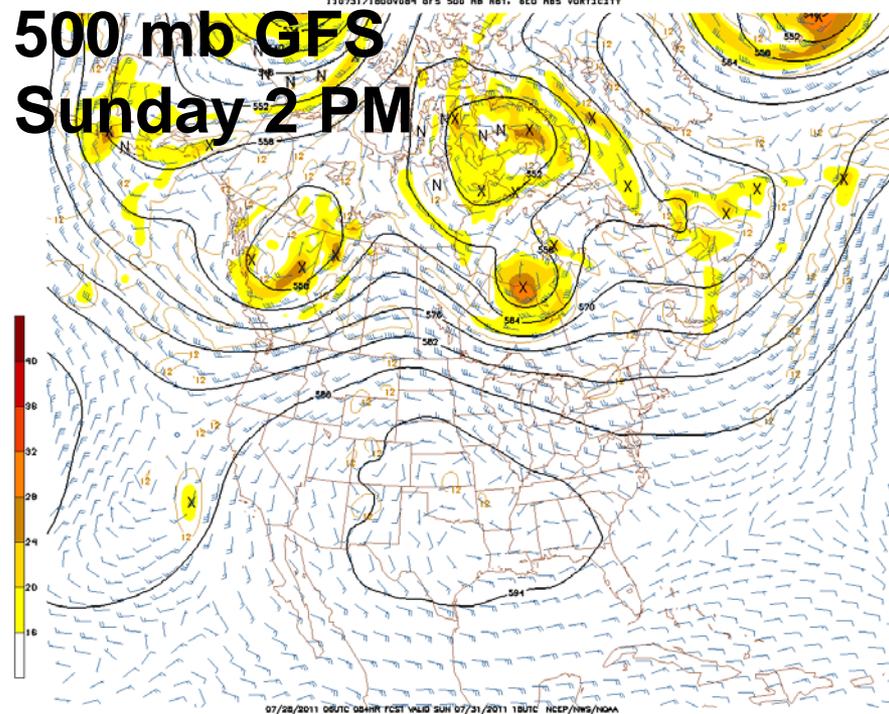
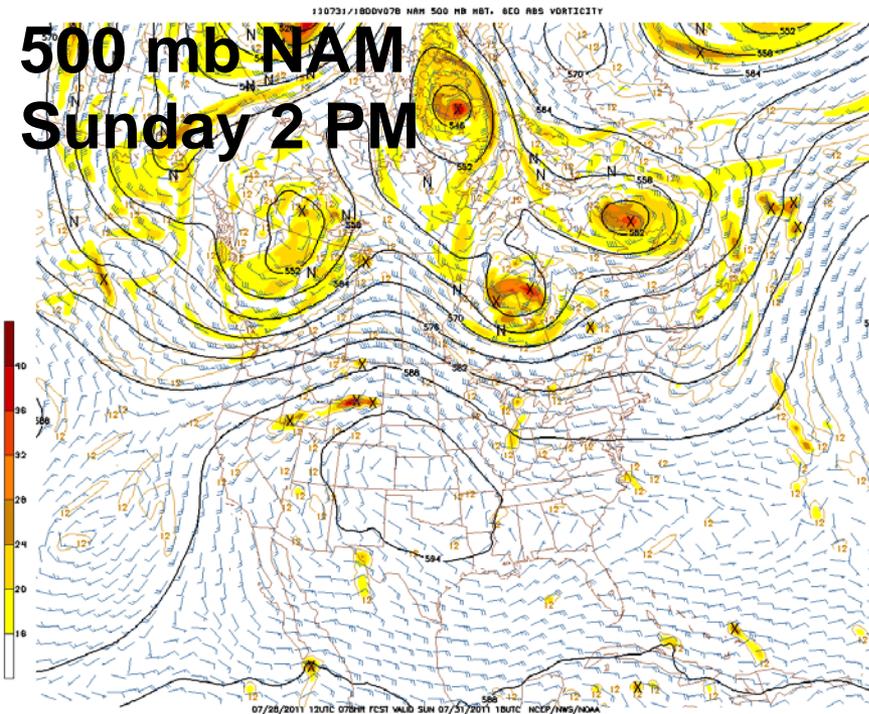
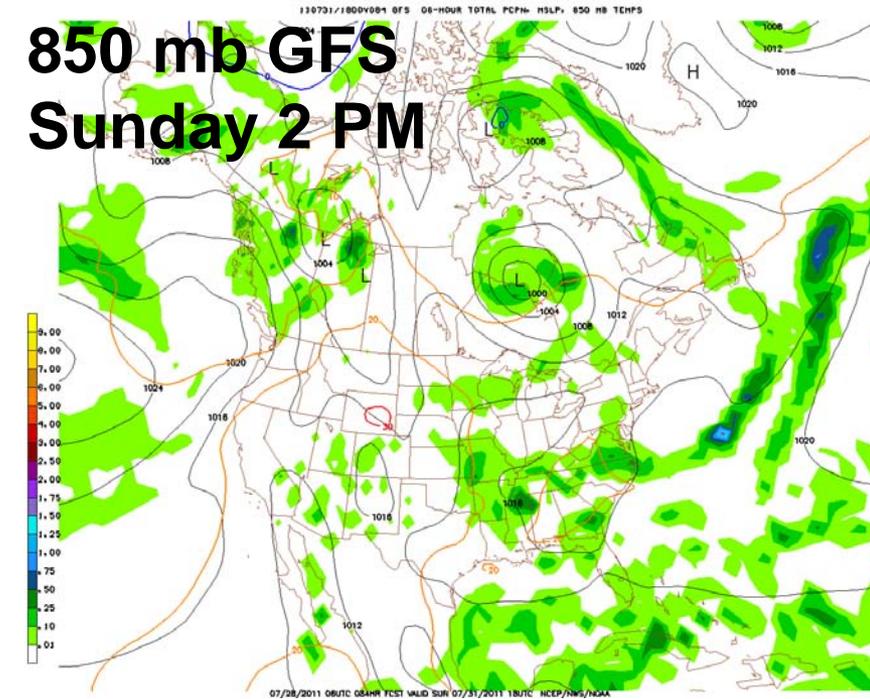
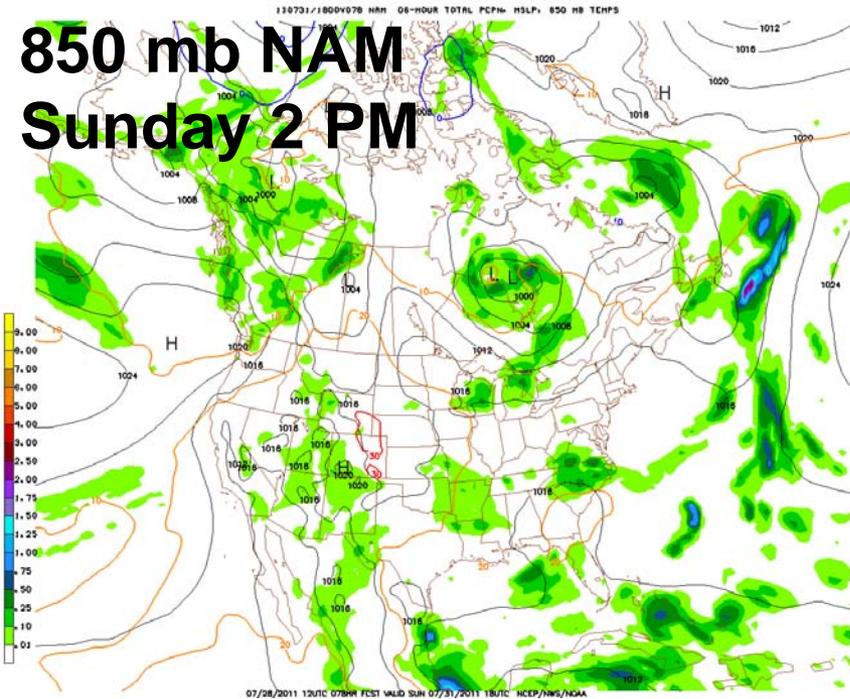
Tomorrow →



Saturday: Chance of thunderstorms as a cold front approaches and stalls over our region.

500 mb NAM at 2 PM.



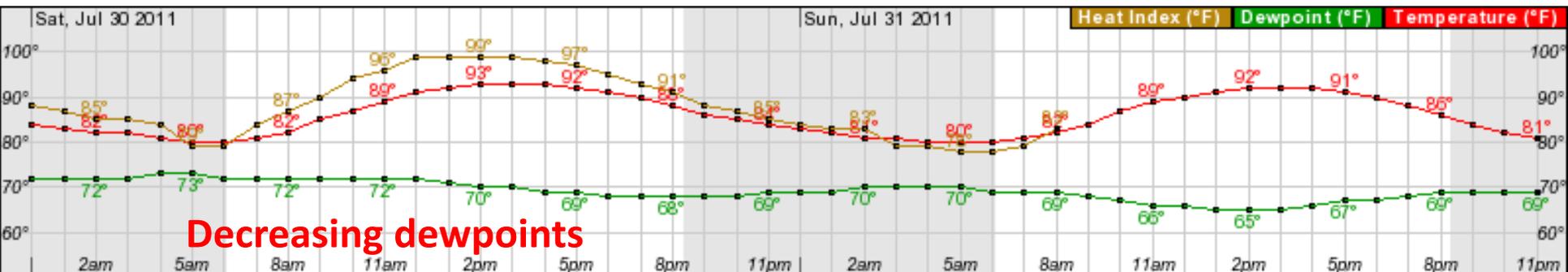


**Saturday: Mostly cloudy with front entering our region.**

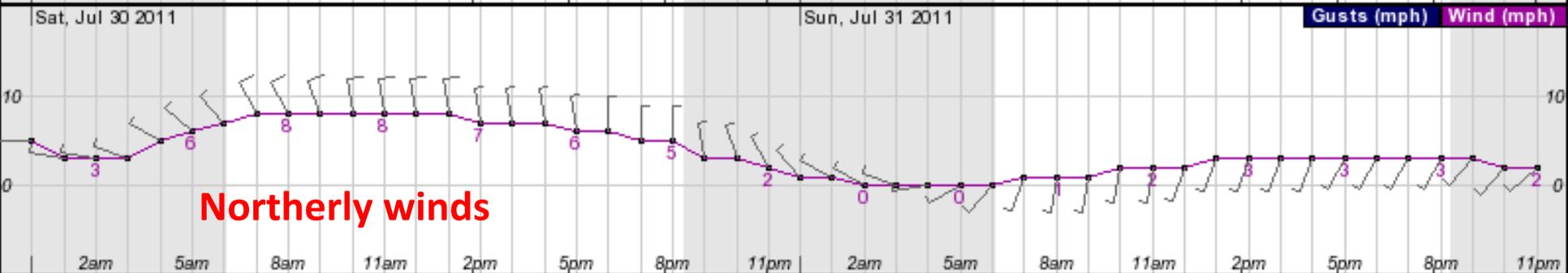
**Sunday: Front might be just south of our region.**

**Saturday →**

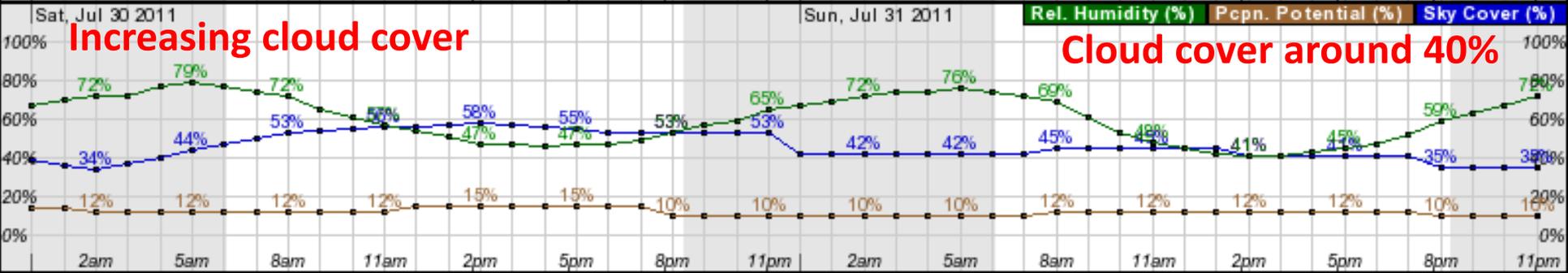
**Sunday →**



**Decreasing dewpoints**



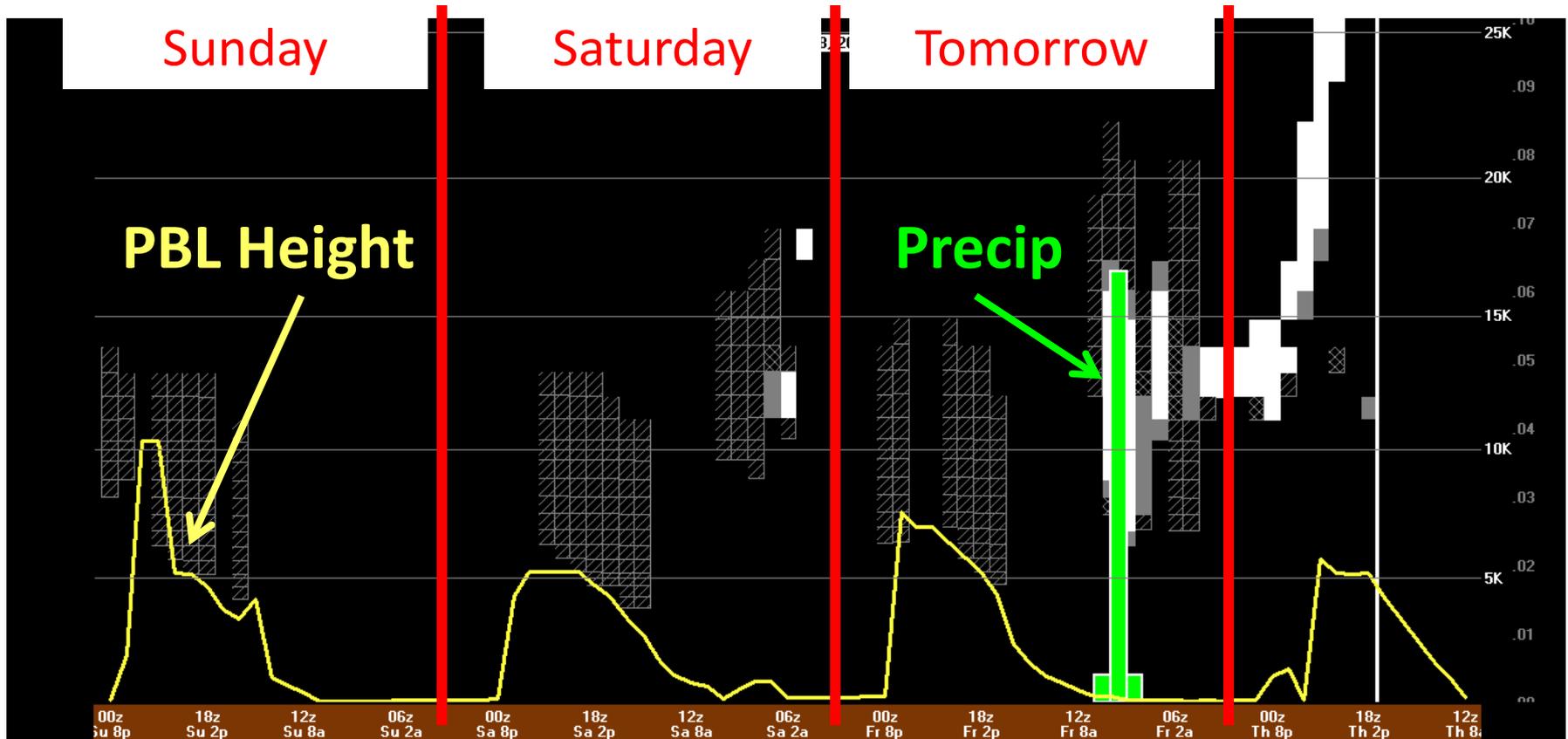
**Northerly winds**



**Increasing cloud cover**

**Cloud cover around 40%**

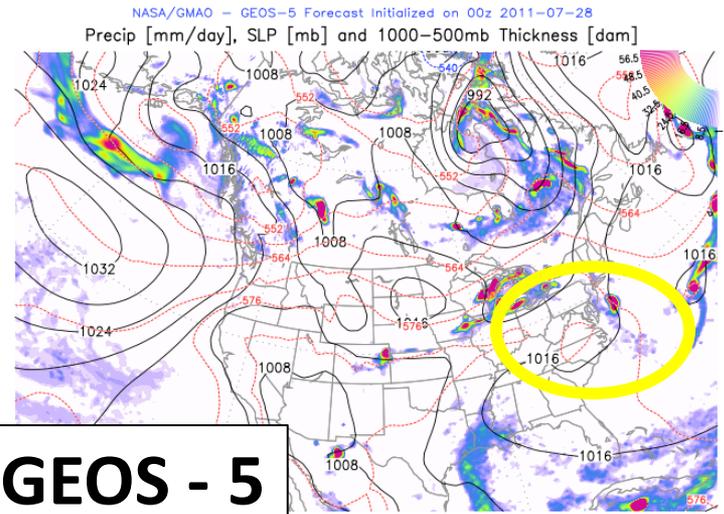
# BUFKIT – NAM (12 UTC 28 July)



- High and mid level clouds today.
- Partly cloudy Friday, Saturday, and Sunday.

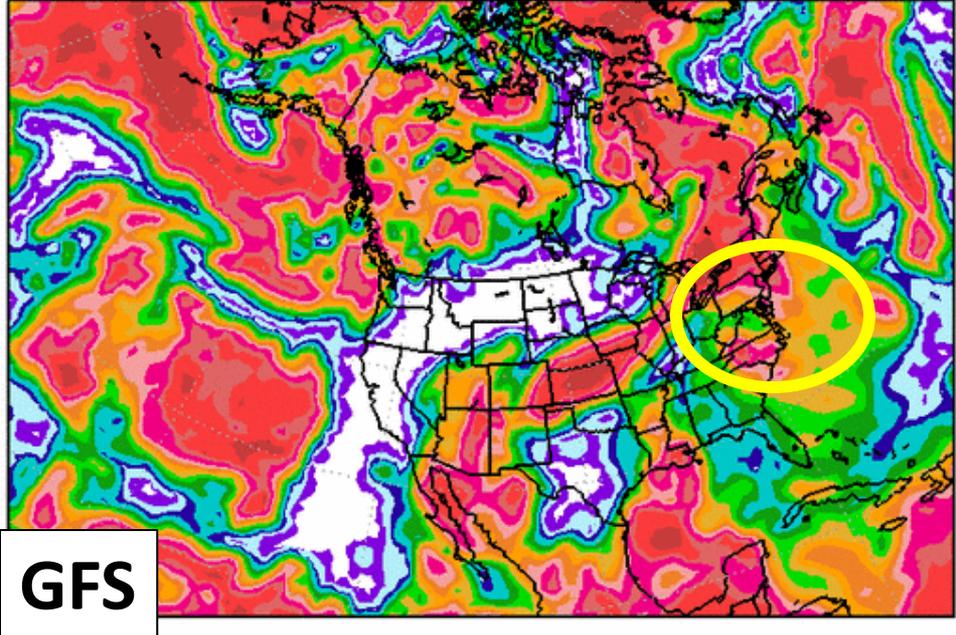
Friday 8 am: GFS – cloud cover near 50%; GEM – mostly cloudy; NAM – mostly sunny.

TOTAL CLD FRACT GFS 30H FCST VALID 12Z 29 JUL 2011

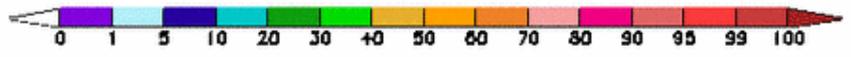


**GEOS - 5**

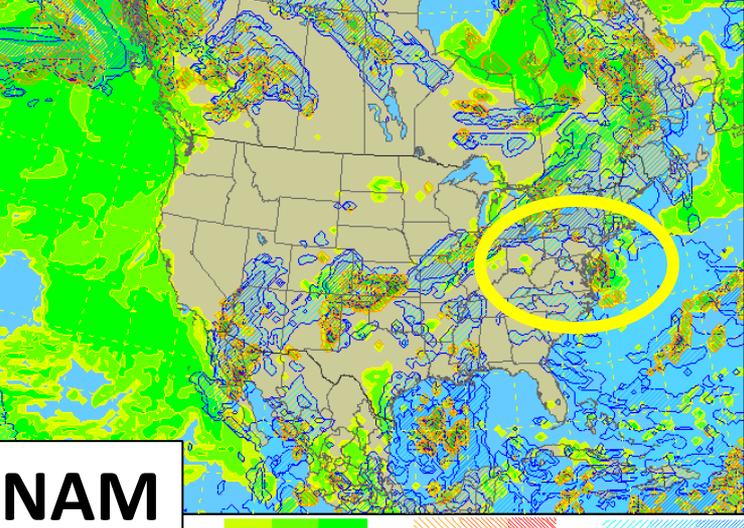
36-hr forecast valid Fri 12z 2011-07-29



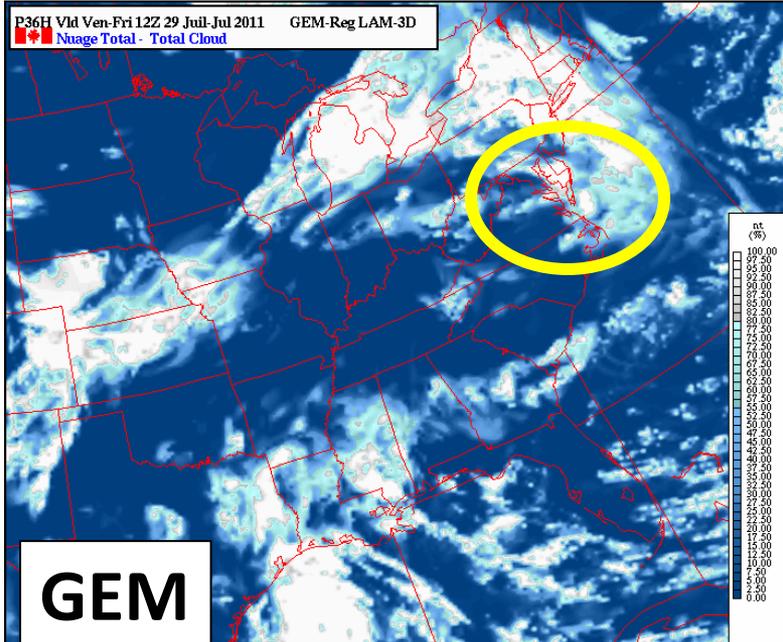
**GFS**



24-hour forecast valid 1200 UTC Fri 29 Jul 2011 NAM (MRF-NMM) (12z 28 Jul)



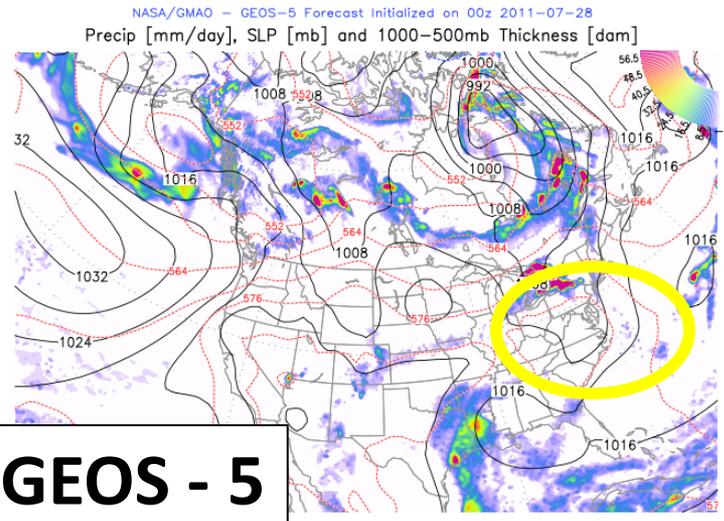
**NAM**



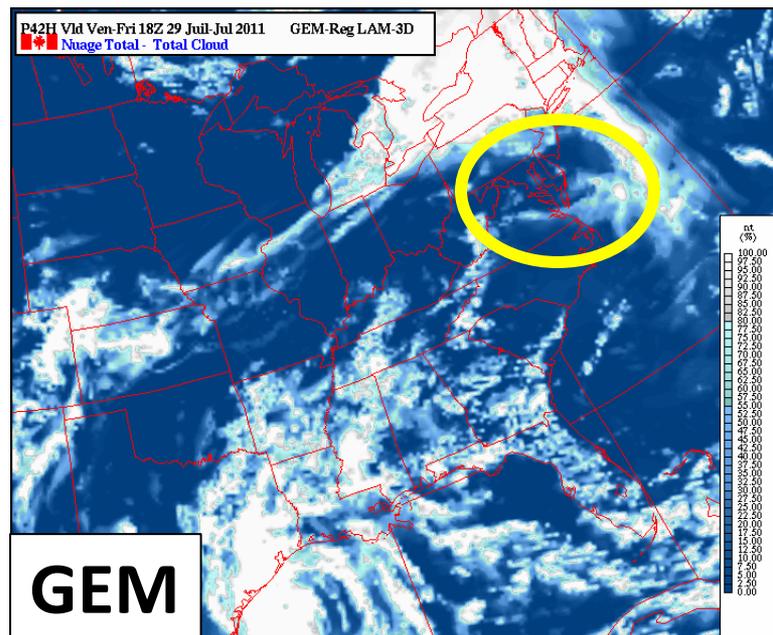
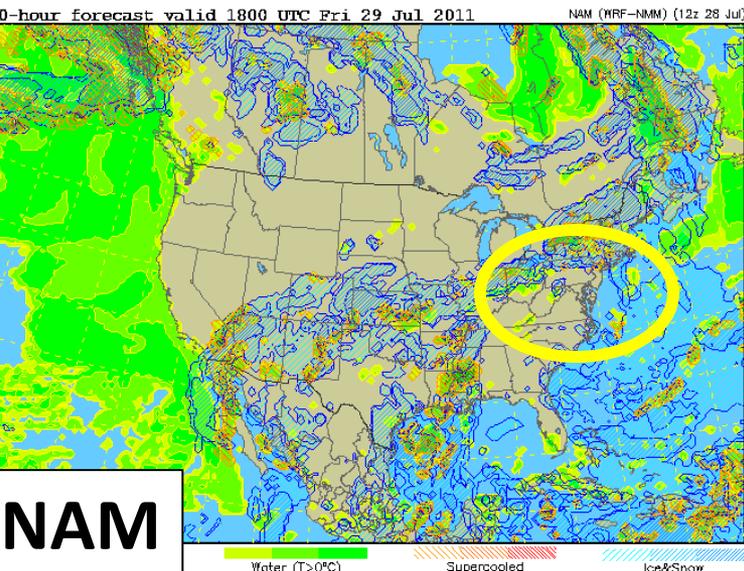
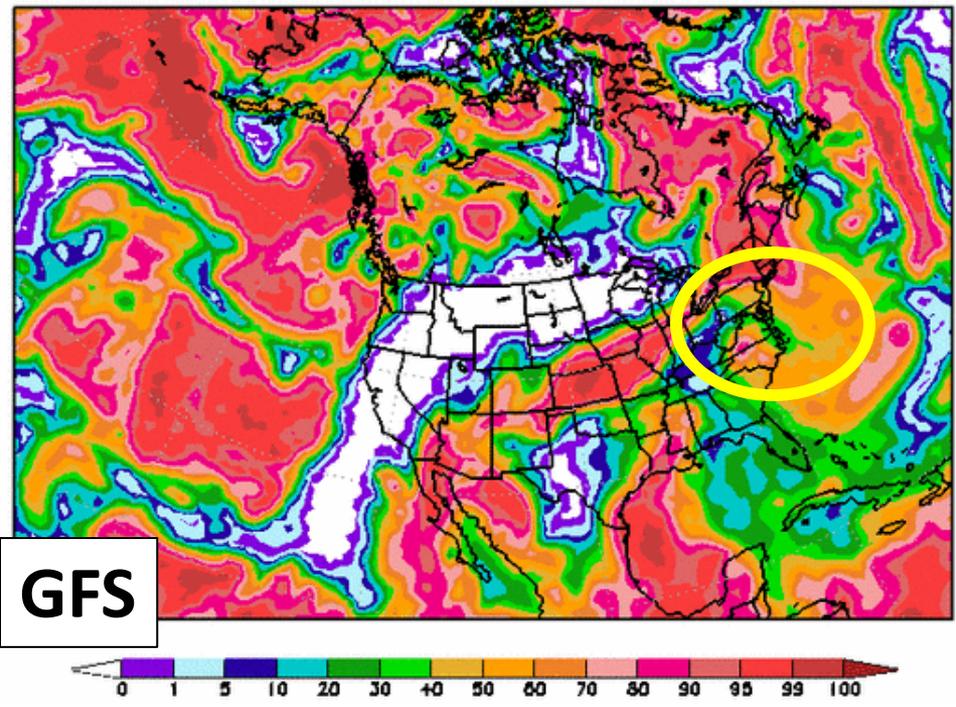
**GEM**

**Friday 2 pm: GFS – cloud cover near 50%; GEM – mostly sunny; NAM – mostly sunny.**

TOTAL CLD FRACT GFS 36H FCST VALID 18Z 29 JUL 2011

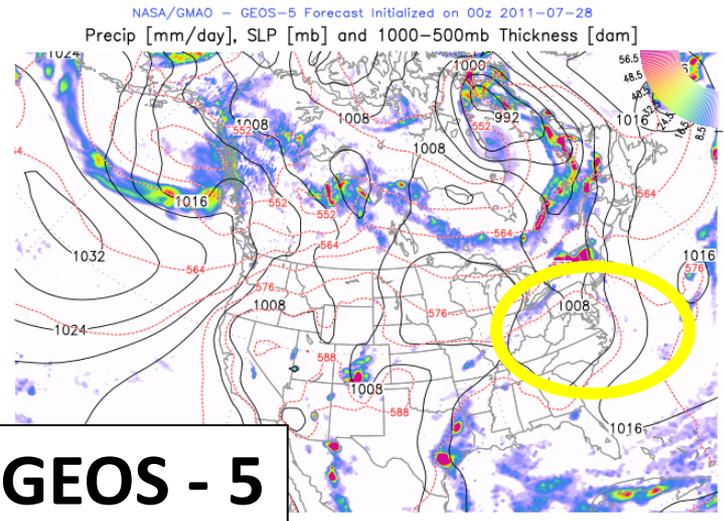


42-hr forecast valid Fri 18z 2011-07-29



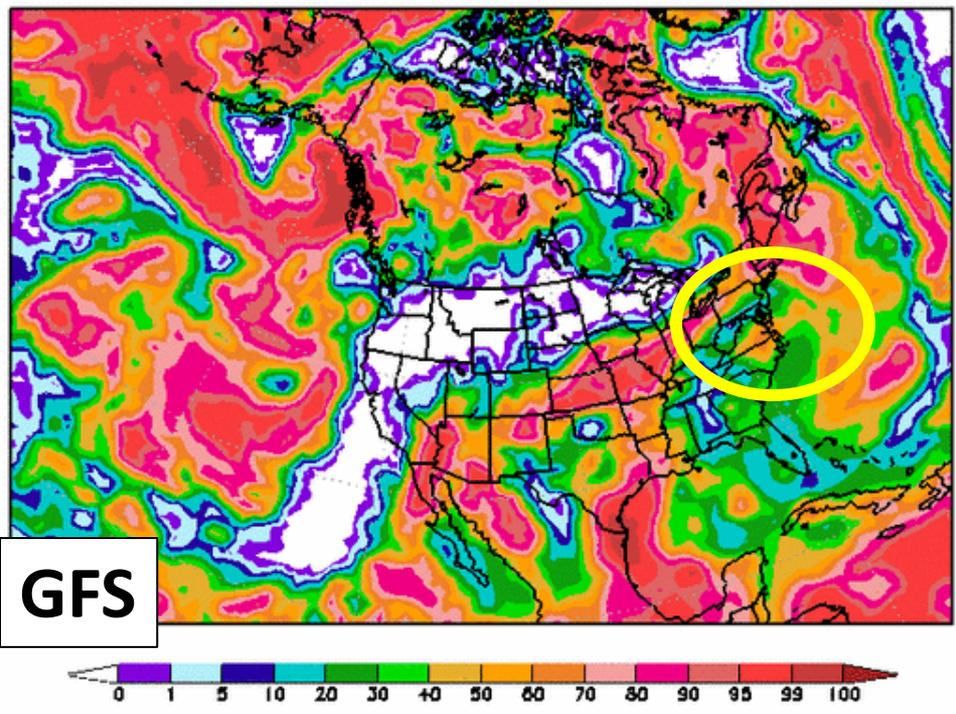
**Friday 8 pm: GFS – mostly sunny;  
 GEM – mostly sunny; NAM – mid and high level clouds.**

TOTAL CLD FRACT GFS 42H FCST VALID 00Z 30 JUL 2011

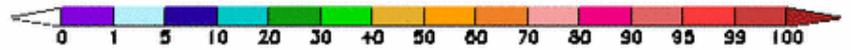


**GEOS - 5**

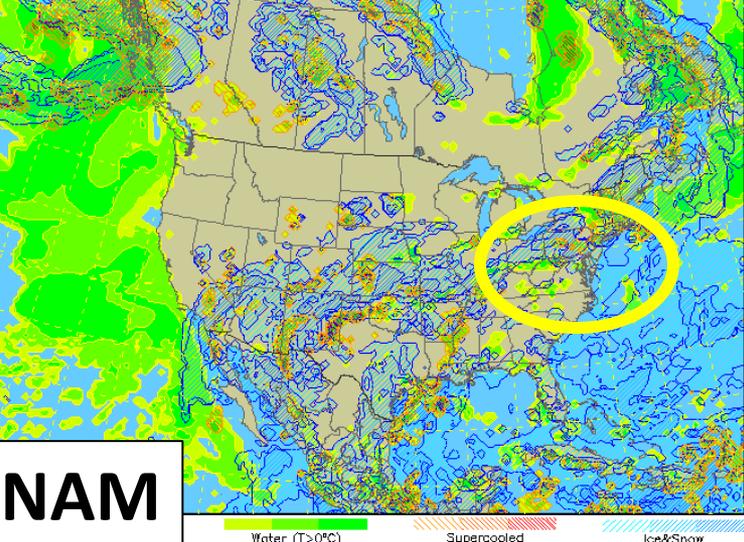
48-hr forecast valid Sat 00z 2011-07-30



**GFS**

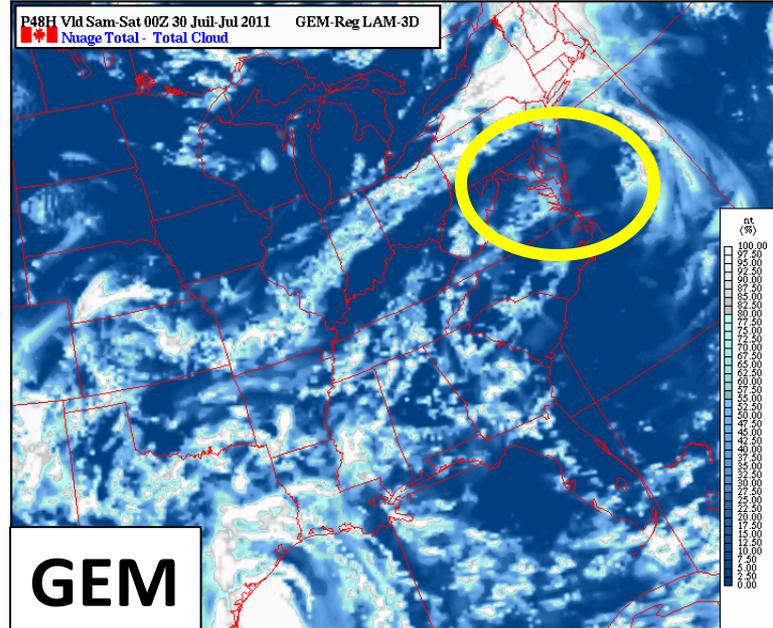


36-hour forecast valid 0000 UTC Sat 30 Jul 2011 NAM (MRF-NMM) (12z 28 Jul)



**NAM**

Water (T>0°C) Supercooled Ice&Snow

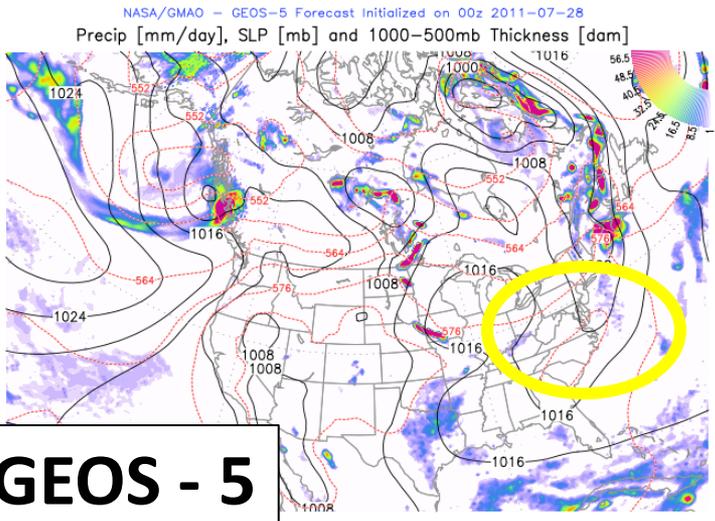


**GEM**



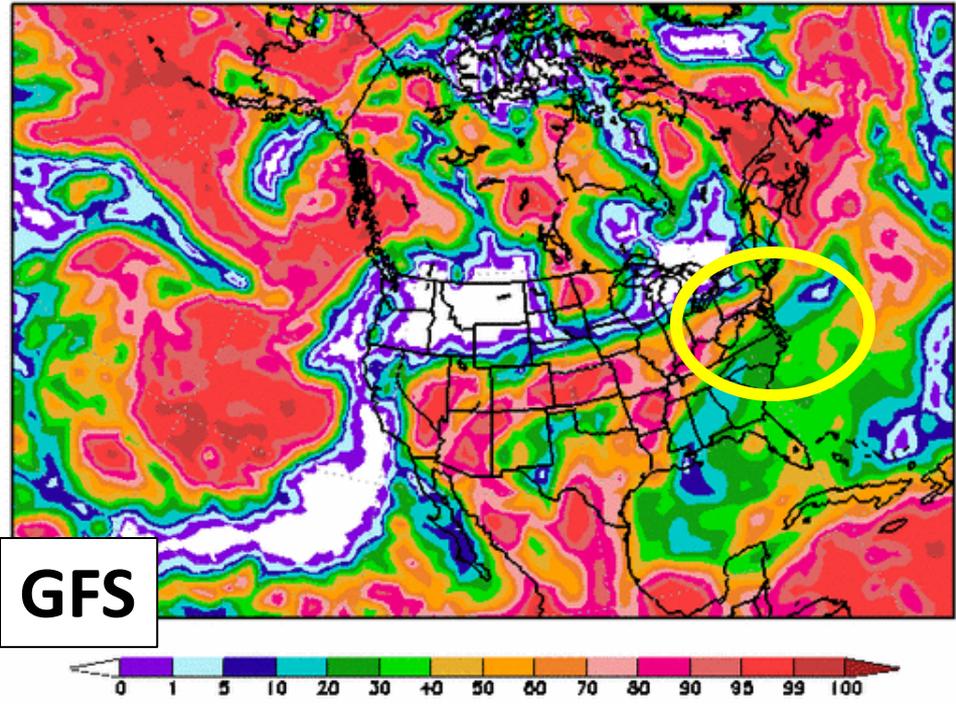
**Saturday 8 am: GFS – mostly cloudy;  
 NAM – mostly sunny.**

TOTAL CLD FRACT GFS 54H FCST VALID 12Z 30 JUL 2011

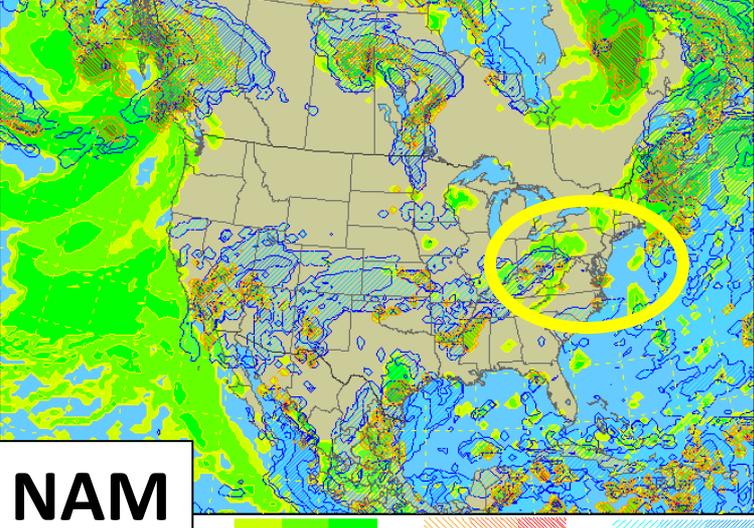


**GEOS - 5**

60-hr forecast valid Sat 12z 2011-07-30



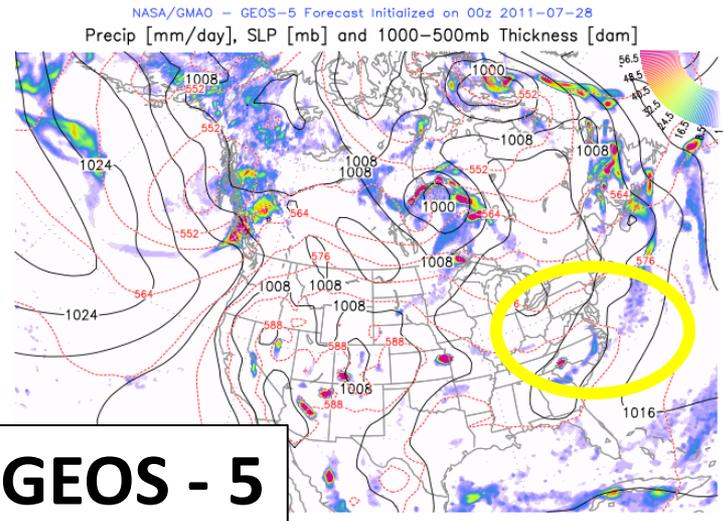
48-hour forecast valid 1200 UTC Sat 30 Jul 2011 NAM (MRF-NMM) (12z 28 Jul)



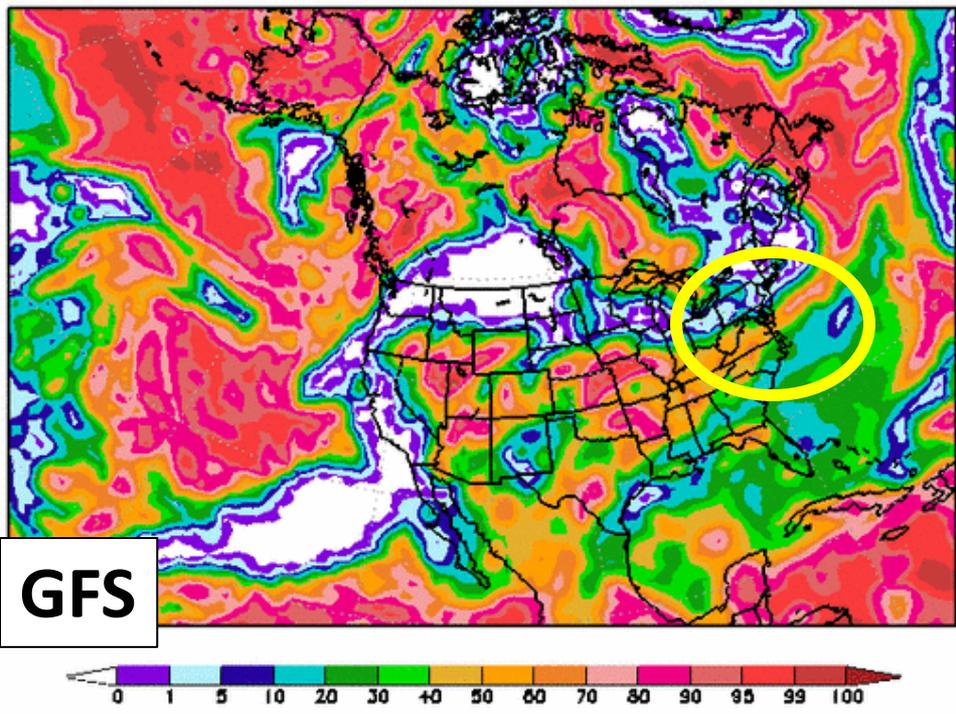


**Saturday 8 pm: GFS – cloud cover close to 50%; NAM – mid and high level clouds.**

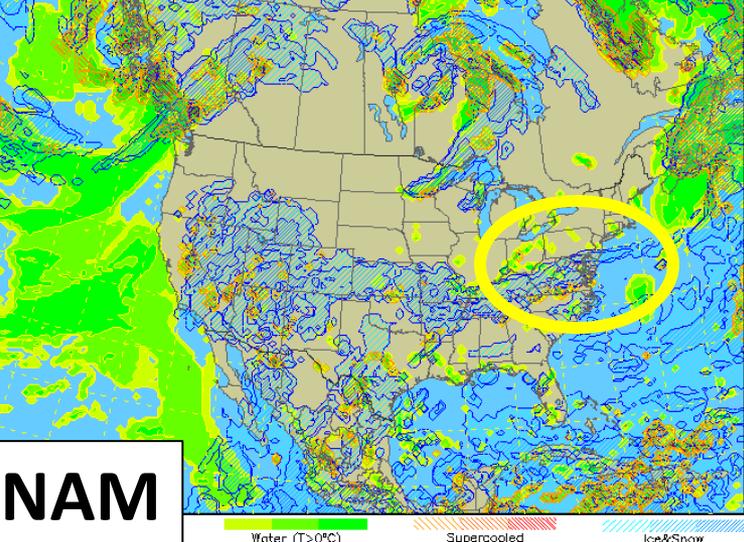
TOTAL CLD FRACT GFS 66H FCST VALID 00Z 31 JUL 2011



72-hr forecast valid Sun 00z 2011-07-31

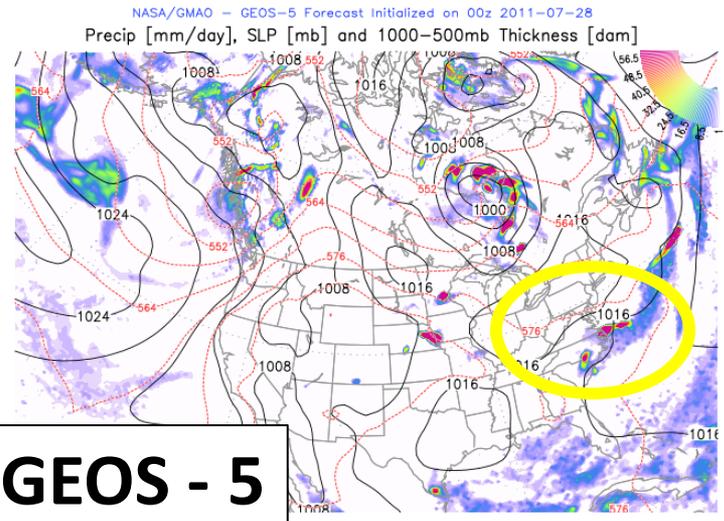


60-hour forecast valid 0000 UTC Sun 31 Jul 2011 NAM (MRF-NMM) (12z 28 Jul)



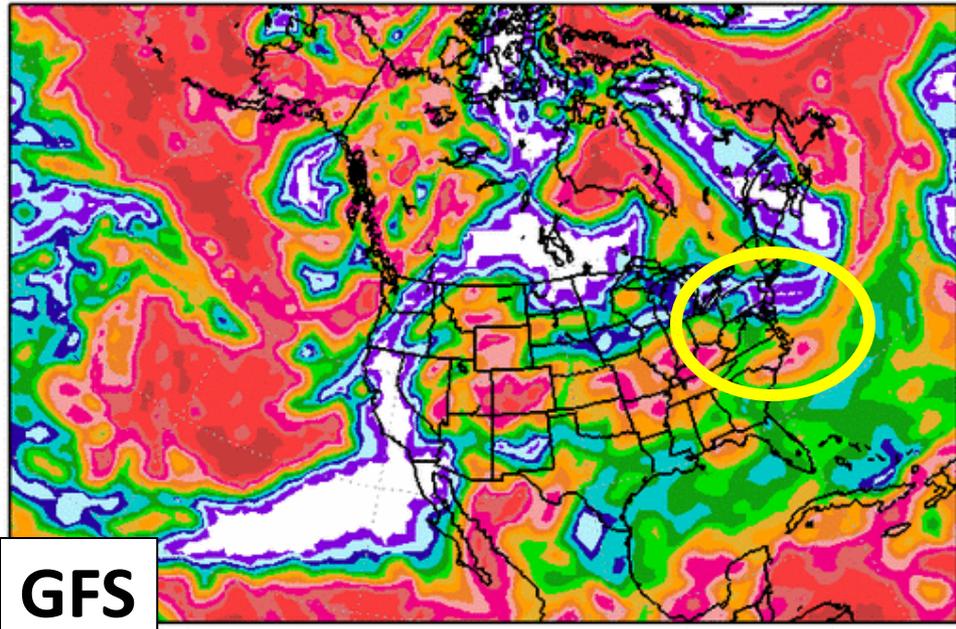
**Sunday 8 am: GFS – mostly sunny;  
 NAM – mostly sunny.**

TOTAL CLD FRACT GFS 78H FCST VALID 12Z 31 JUL 2011



**GEOS - 5**

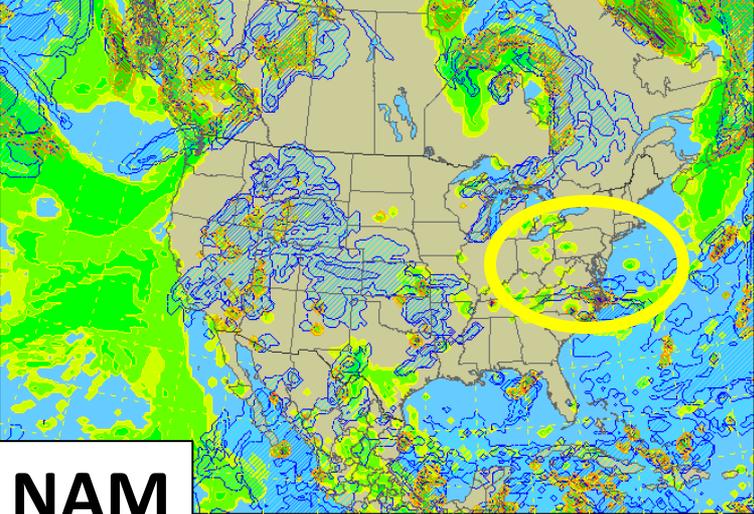
84-hr forecast valid Sun 12z 2011-07-31



**GFS**



72-hour forecast valid 1200 UTC Sun 31 Jul 2011 NAM (MRF-NMM) (12z 28 Jul)

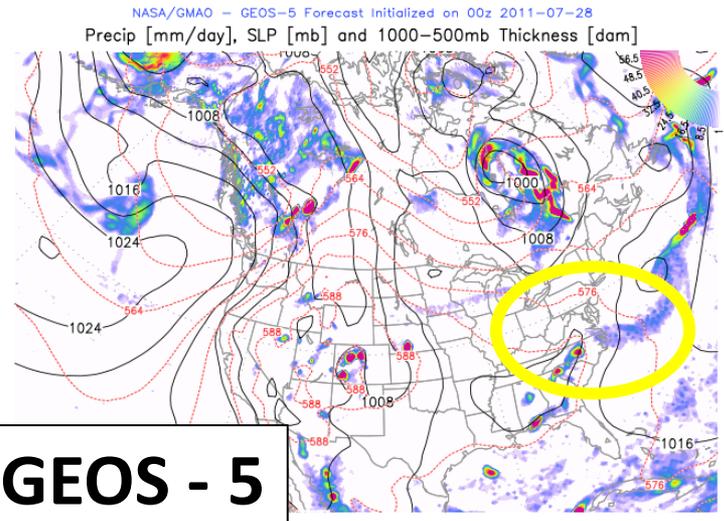


**NAM**

Water (T>0°C) Supercooled Ice&Snow

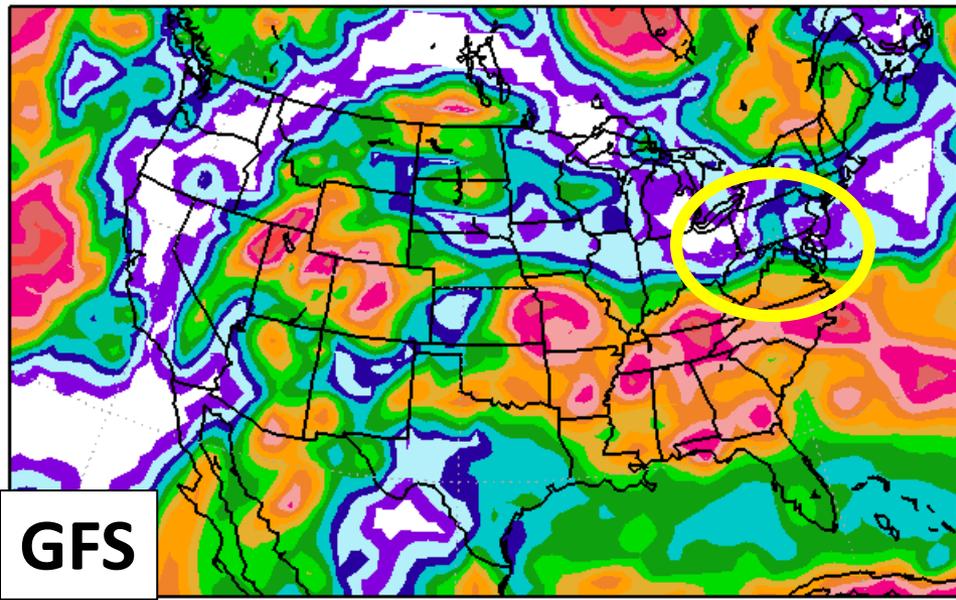
**Sunday 8 pm: GFS – mostly sunny;  
 NAM – low and mid level clouds.**

TOTAL CLD FRACT GFS 90H FCST VALID 00Z 01 AUG 2011



**GEOS - 5**

96-hr forecast valid Mon 00z 2011-08-01

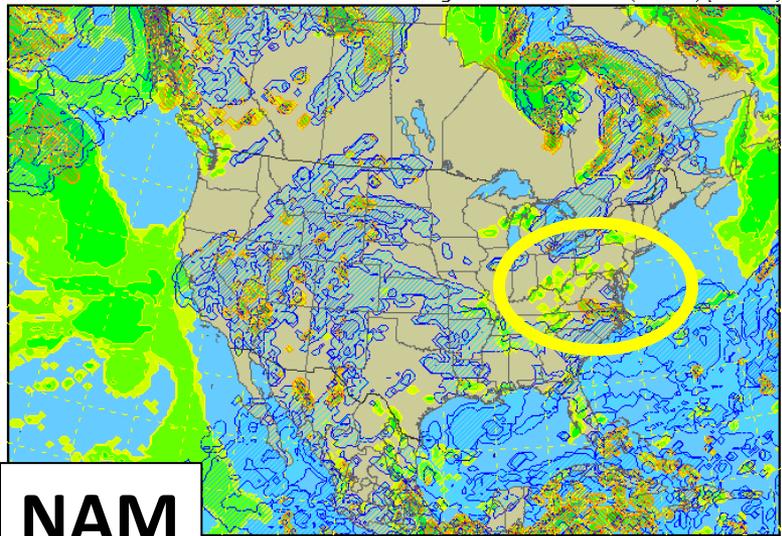


**GFS**

Initialization time = 06Z 28 JUL 2011



84-hour forecast valid 0000 UTC Mon 01 Aug 2011 NAM (MRF-NMM) (12z 28 Jul)



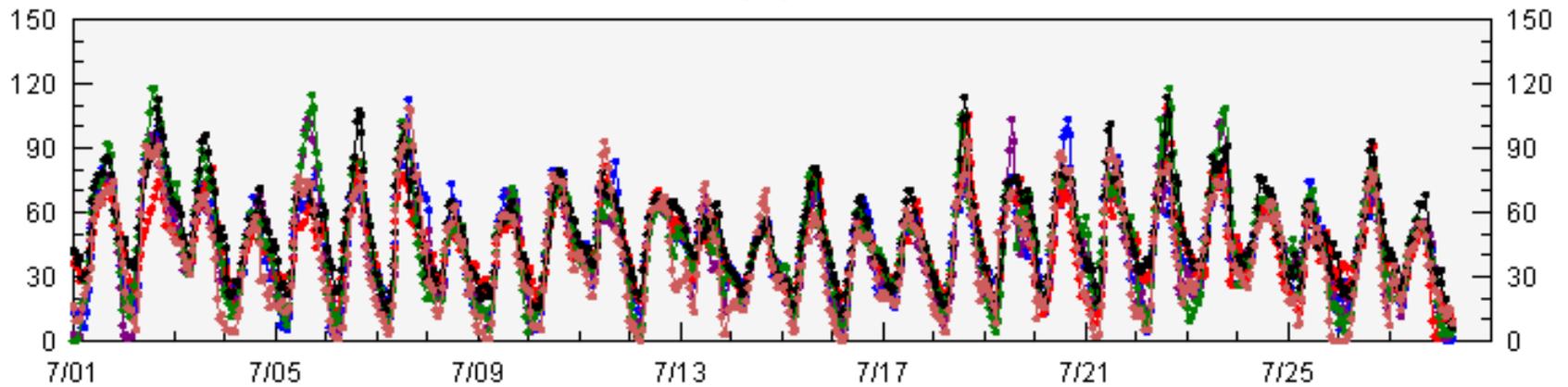
**NAM**

Water (T>0°C) Supercooled Ice&Snow

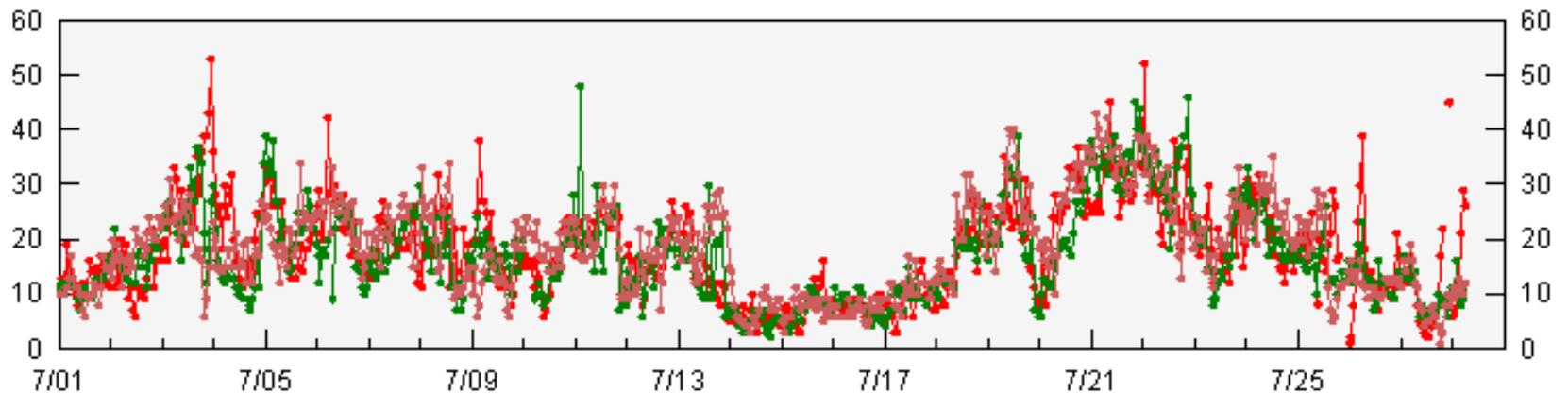
# MDE Surface Sites

Padonia    Beltsville    Edgewood    Aldino    Essex    Fairhill

## Ozone (ppbv) 1 hr

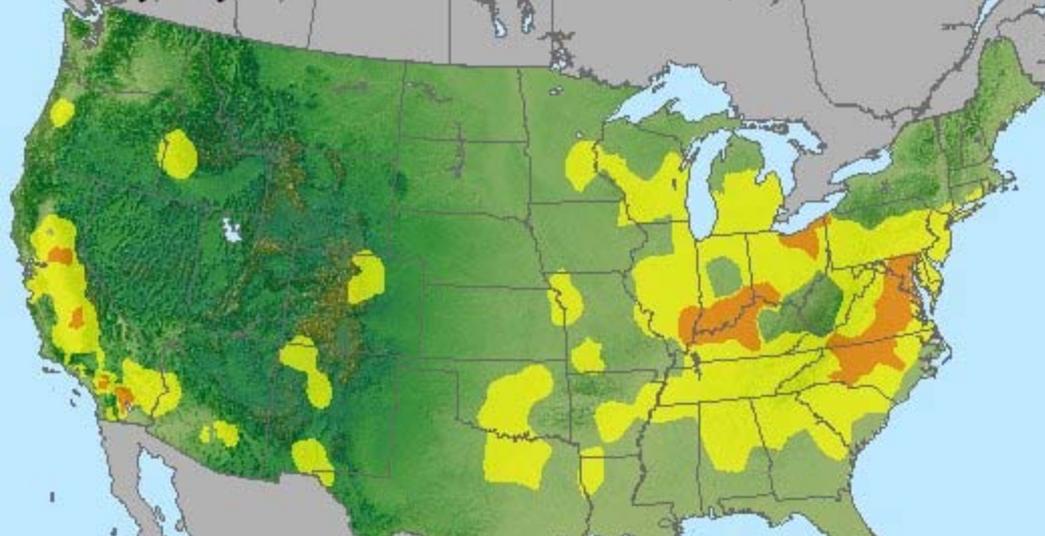


## PM2.5 ( $\mu\text{g}/\text{m}^3$ ) 1 hr



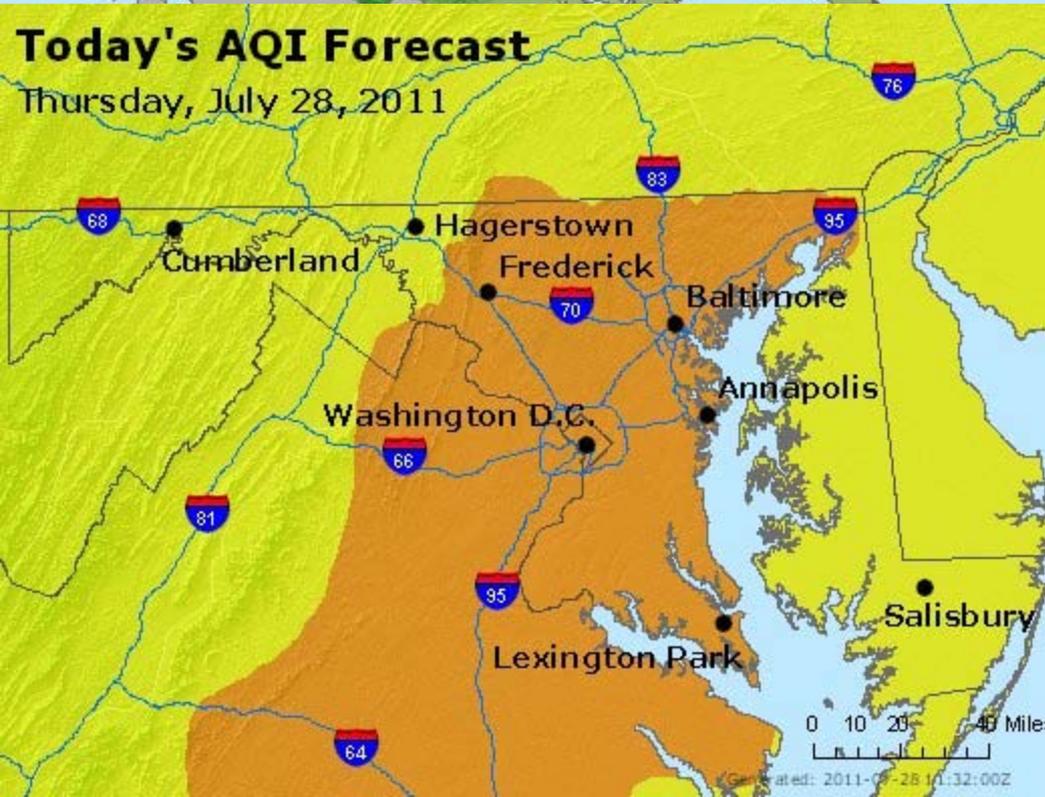
# Today's AQI Forecast

Thursday, July 28, 2011



# Today's AQI Forecast

Thursday, July 28, 2011



## Air Quality Forecast

### Today's High

### Tomorrow's High

#### Air Quality Index (AQI)

111

**Unhealthy for Sensitive Groups**

**Health Message:** Active children and adults, and people with lung disease, such as asthma, should reduce prolonged or heavy exertion outdoors.

#### Air Quality Index (AQI)

129

**Unhealthy for Sensitive Groups**

**Health Message:** Active children and adults, and people with lung disease, such as asthma, should reduce prolonged or heavy exertion outdoors.

### AQI - Pollutant Details

Ozone

111

Unhealthy for Sensitive Groups

Particles (PM2.5)

55

Moderate

Ozone

129

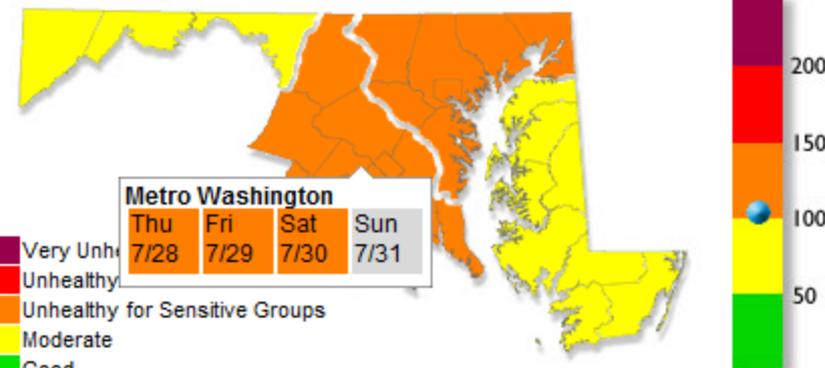
Unhealthy for Sensitive Groups

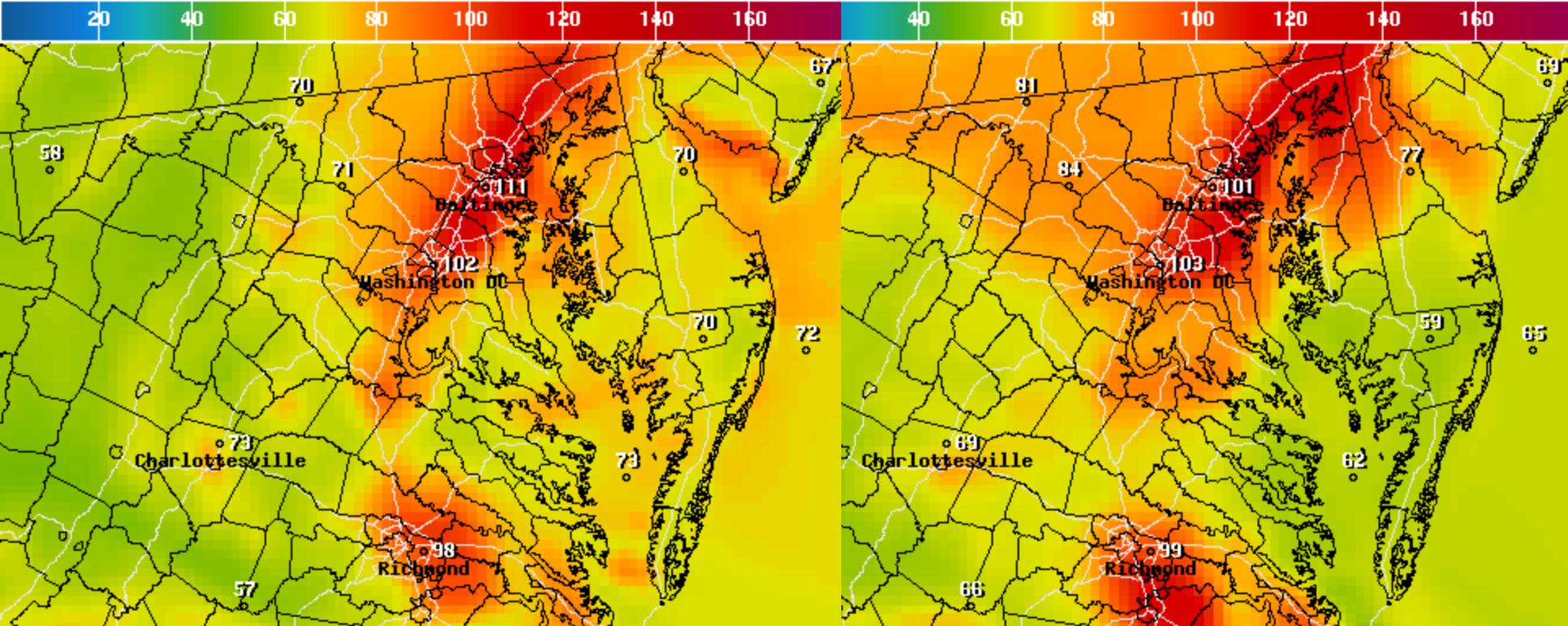
Particles (PM2.5)

67

Moderate

**Forecast Discussion:** On Thursday, a high pressure system directly overhead will bring light and re-circulating winds, mostly clear skies along with hot and humid conditions over the region. These conditions will likely cause ozone levels to be in the middle-upper Moderate range with areas along the Baltimore-Washington corridor reaching into the Unhealthy for Sensitive Groups (USG) category. Particle pollution will increase into the Moderate range in all areas. Friday will be the hottest day as this high pressure center moves offshore. Southwesterly flow behind this system will transport a hot and humid air-mass into the area. These conditions will cause more widespread USG ozone over the region. Particle pollution will further increase into the Moderate range. On Saturday, the approach of cold front introduces high uncertainty in the forecast. At this time, its not expected to cause a change of air-mass. Thus, isolated USG conditions could persist along the Baltimore-Washington corridor. - MDE





Maximum 1Hr Ozone (PPB) Ending Thu Jul 28 2011 11PM EDT  
(Fri Jul 29 2011 03Z)

Maximum 1Hr Ozone (PPB) Ending Sat Jul 30 2011 12AM EDT  
(Sat Jul 30 2011 04Z)



**National Digital Guidance Database**  
06z model run    Graphic created-Jul 28 6:44AM EDT



**National Digital Guidance Database**  
06z model run    Graphic created-Jul 28 6:44AM EDT

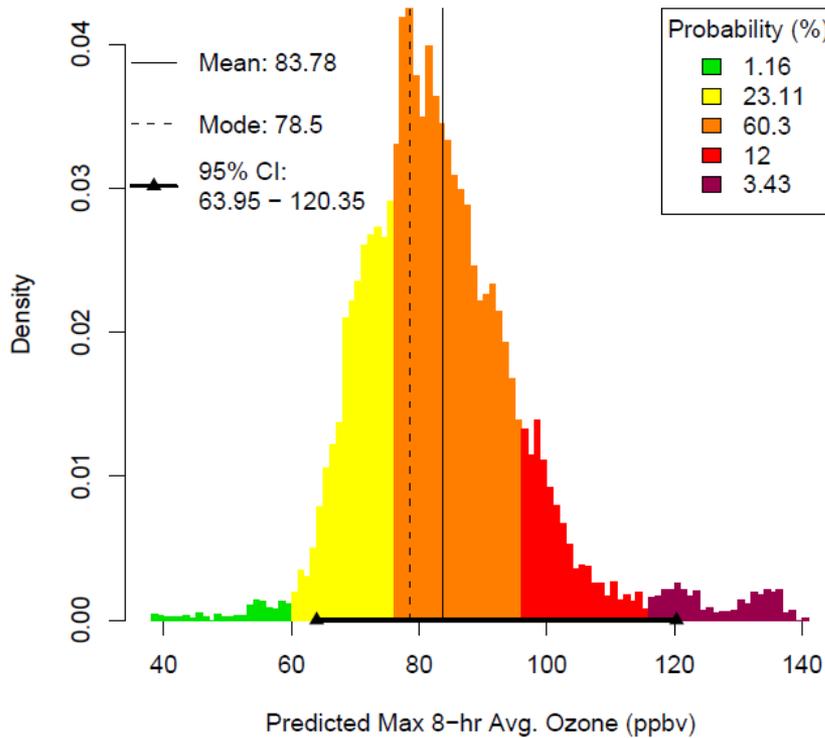


# 1-hr Max Ozone (ppbv) Today

# 1-hr Max Ozone (ppbv) Tomorrow

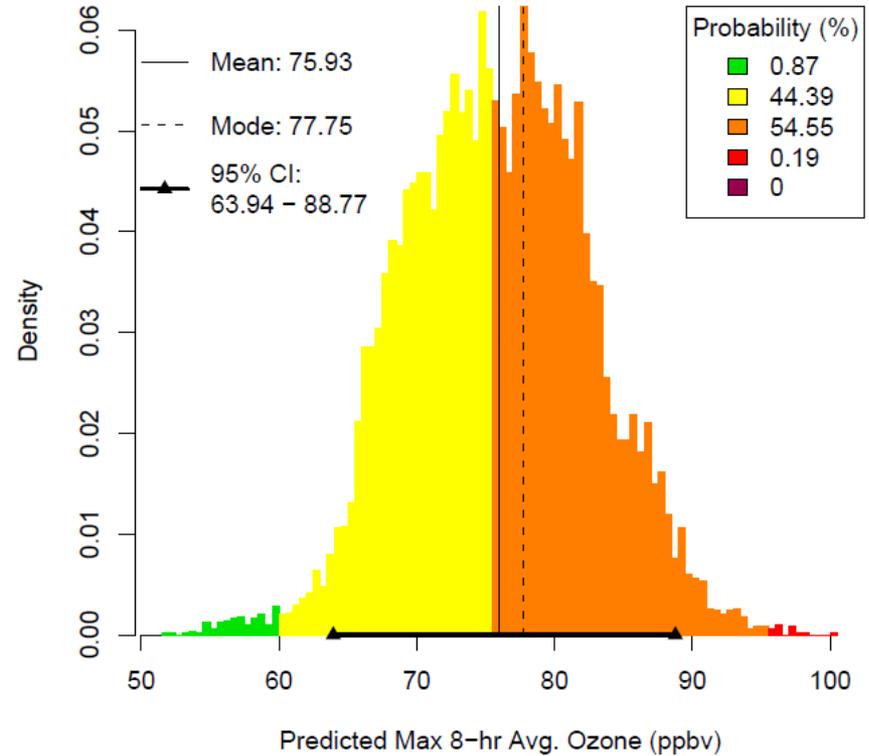
# NAQFC – MOS Forecast for Tomorrow

ID: 240251001 VALID: 2011-07-29



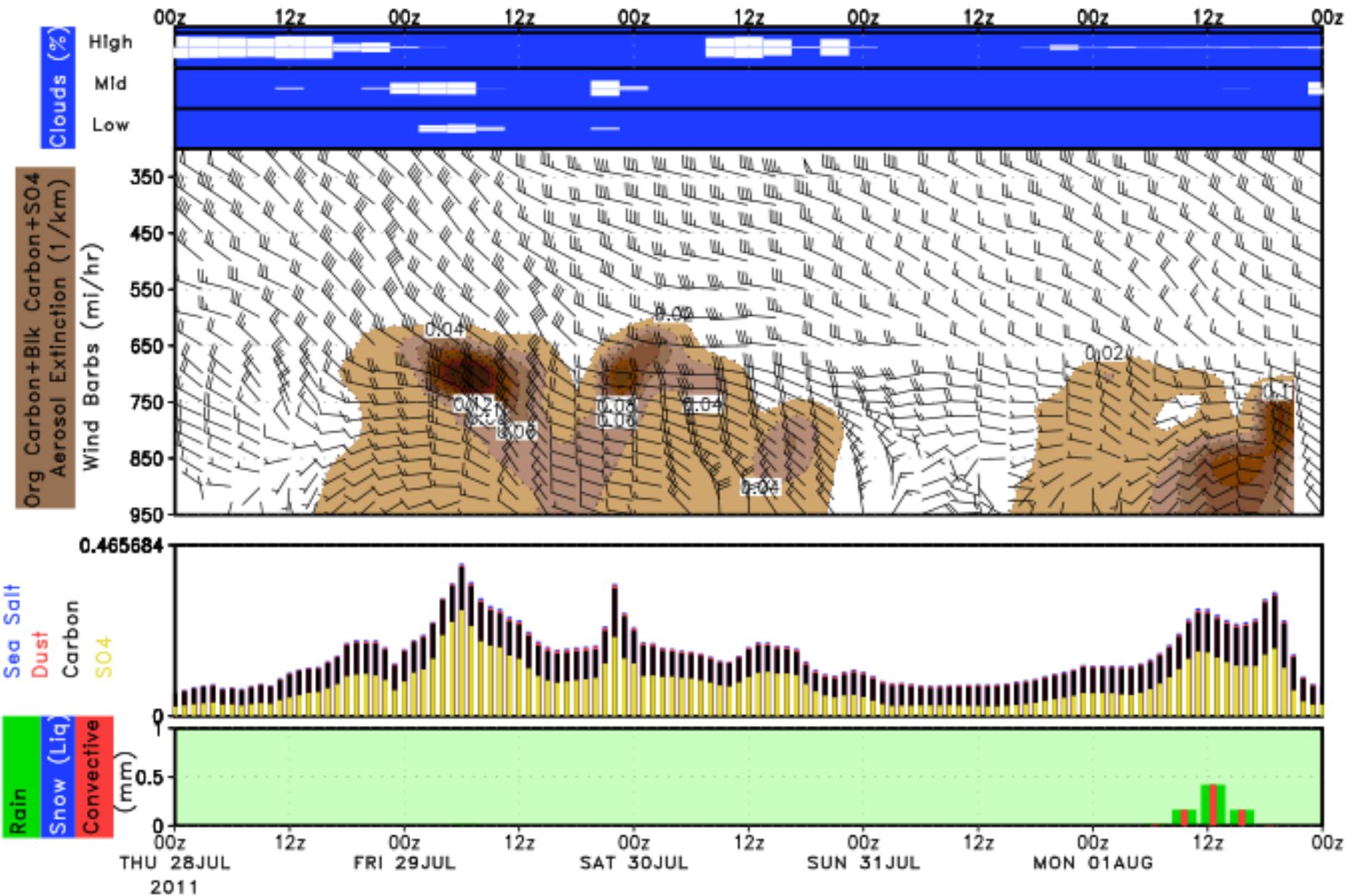
**Edgewood**

ID: 240330030 VALID: 2011-07-29

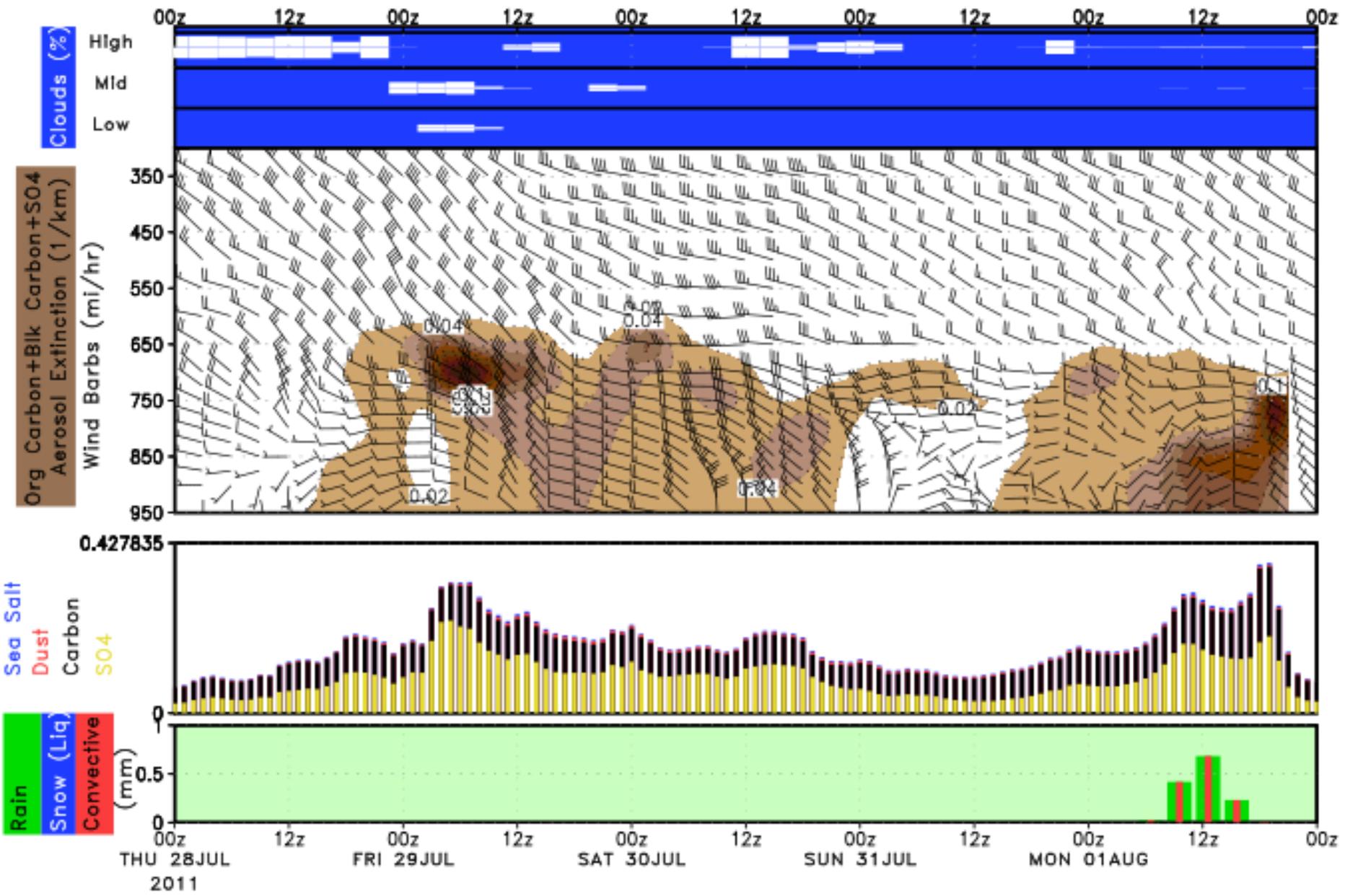


**Beltsville**

# Essex

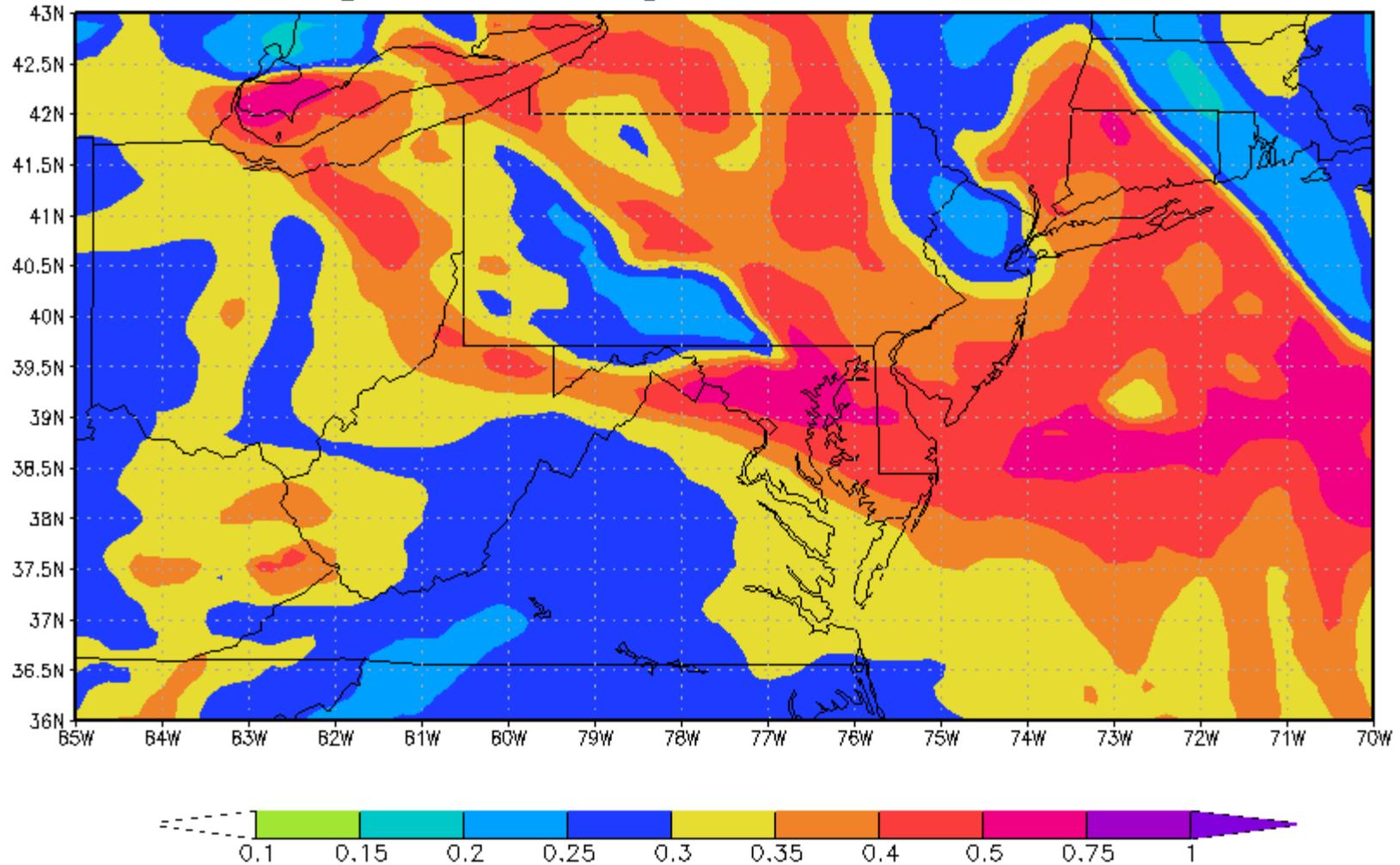


# Beltsville



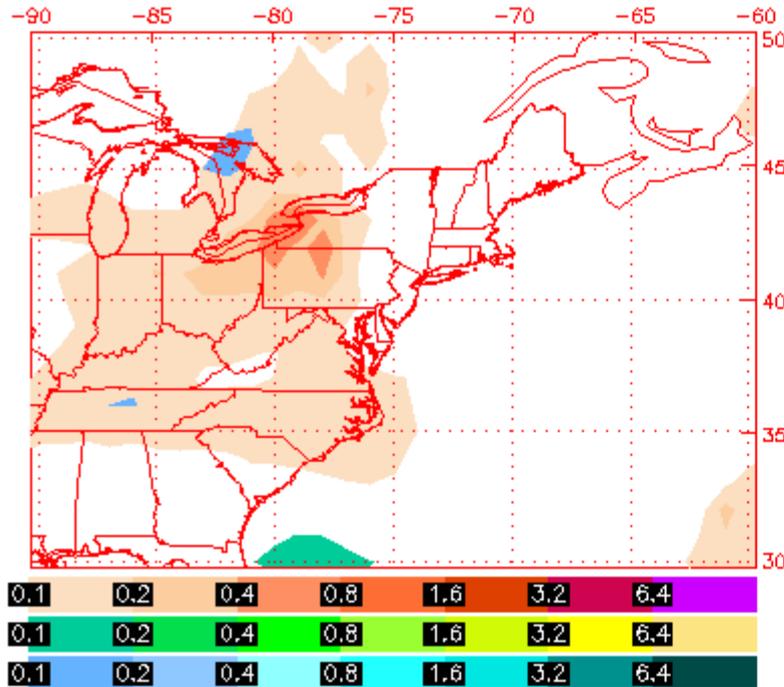
# CMAQ AOD at 7 AM Tomorrow

Column AOD [Dimensionless] at surface Valid 11 JUL 29 2011

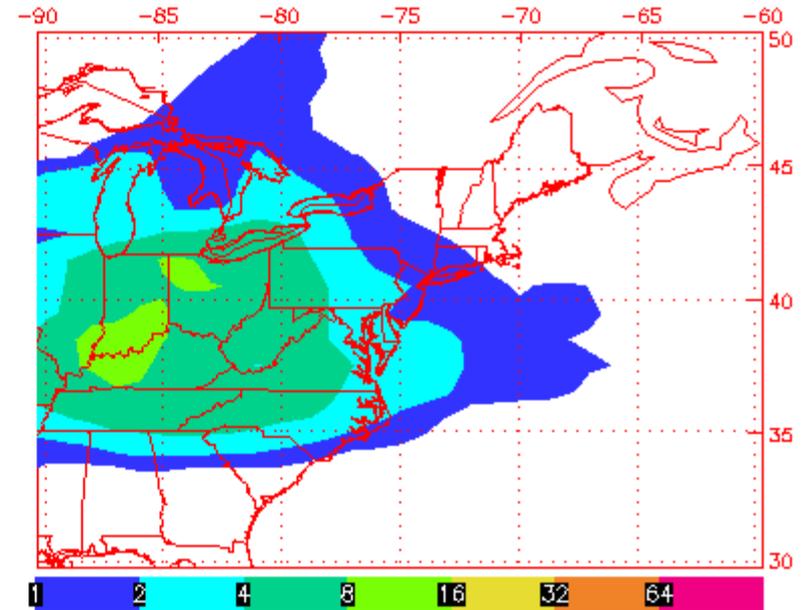


# Today 2 PM

NAAPS Total Optical Depth for 18:00Z 28 Jul 2011  
Sulfate: Orange/Red, Dust: Green/Yellow, Smoke: Blue

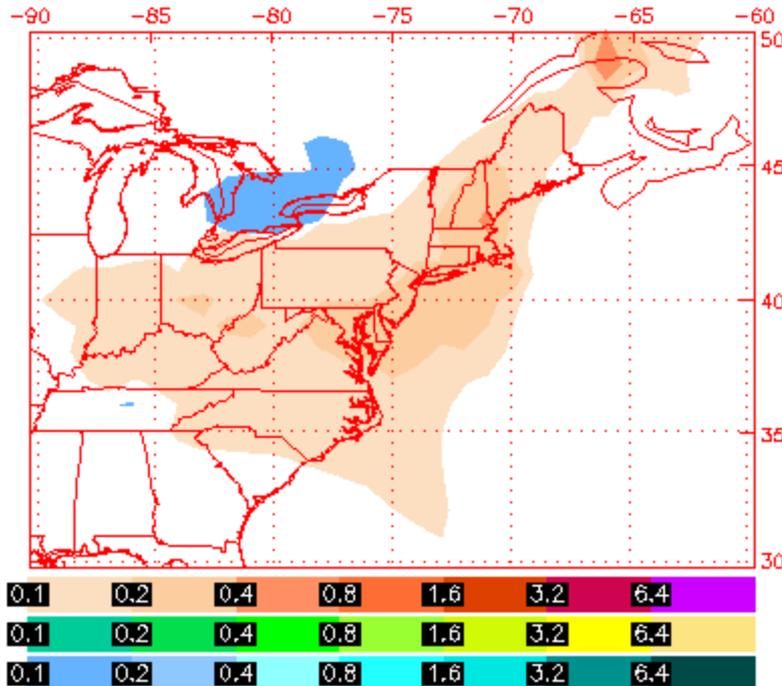


Sulfate Surface Concentration ( $\mu\text{g}/\text{m}^3$ )  
for 18:00Z 28 Jul 2011

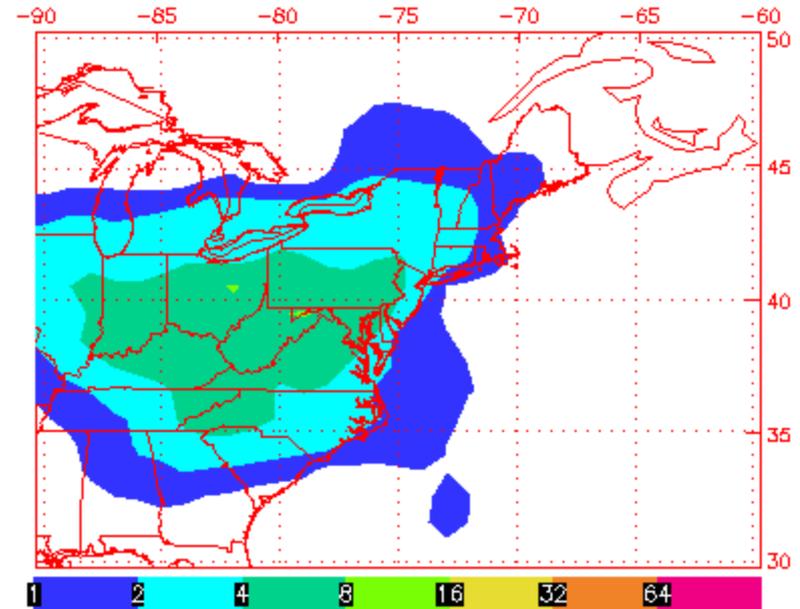


# Tomorrow 2 PM

NAAPS Total Optical Depth for 18:00Z 29 Jul 2011  
Sulfate: Orange/Red, Dust: Green/Yellow, Smoke: Blue

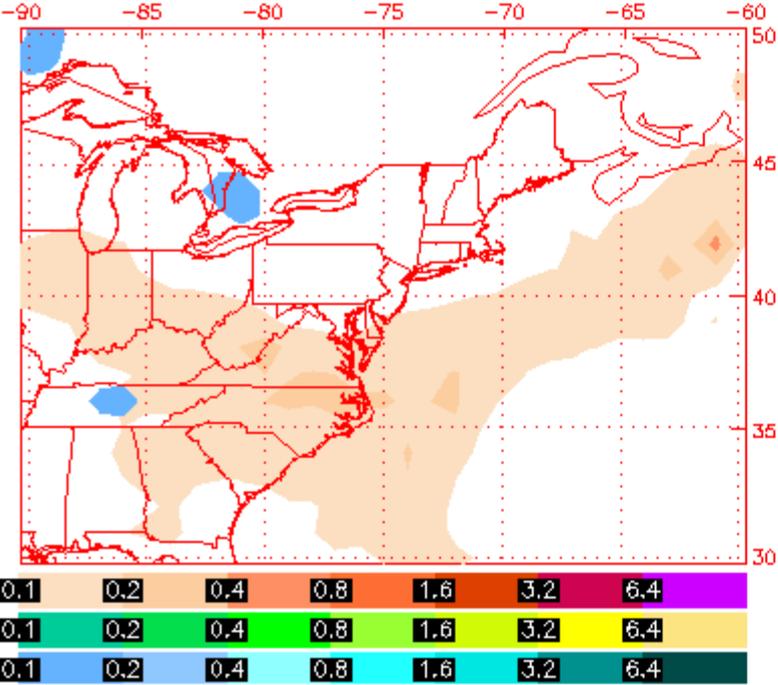


Sulfate Surface Concentration ( $\mu\text{g}/\text{m}^3$ )  
for 18:00Z 29 Jul 2011

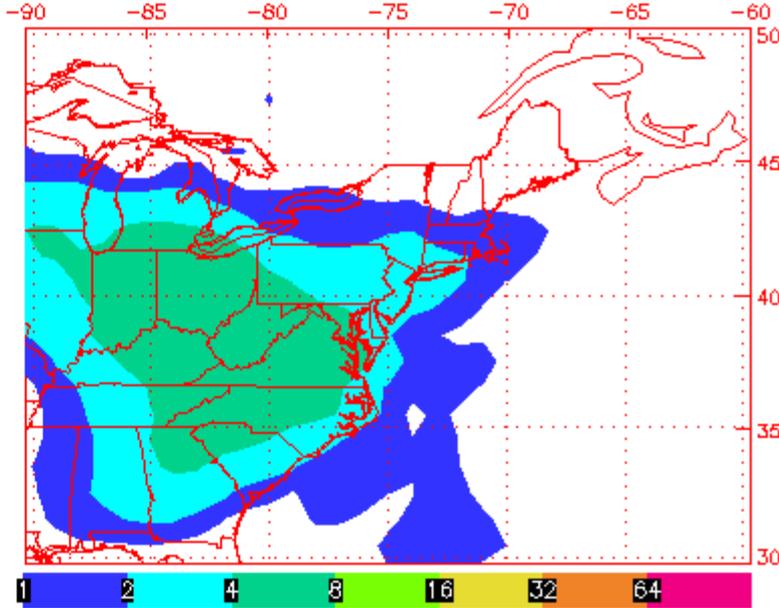


# Saturday 2 PM

NAAPS Total Optical Depth for 18:00Z 30 Jul 2011  
Sulfate: Orange/Red, Dust: Green/Yellow, Smoke: Blue

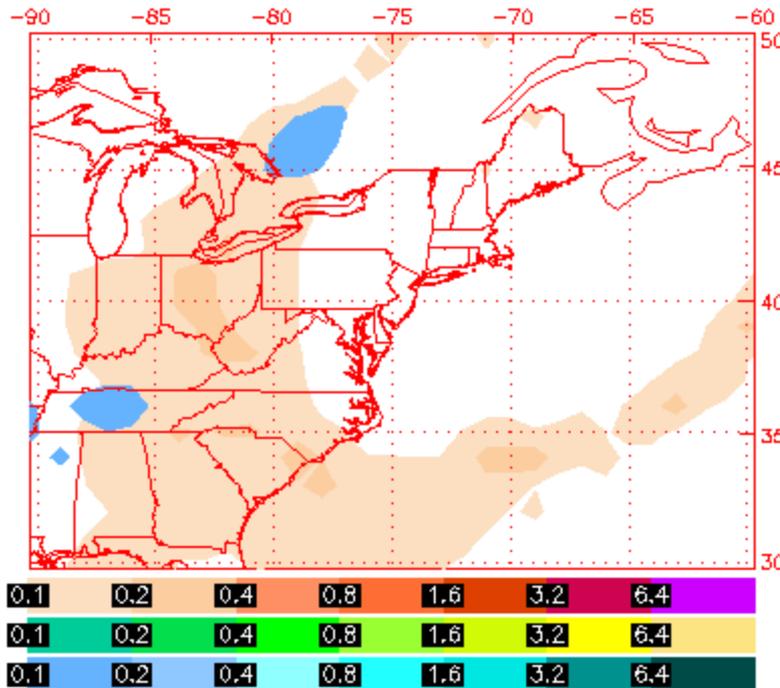


Sulfate Surface Concentration ( $\mu\text{g}/\text{m}^3$ )  
for 18:00Z 30 Jul 2011

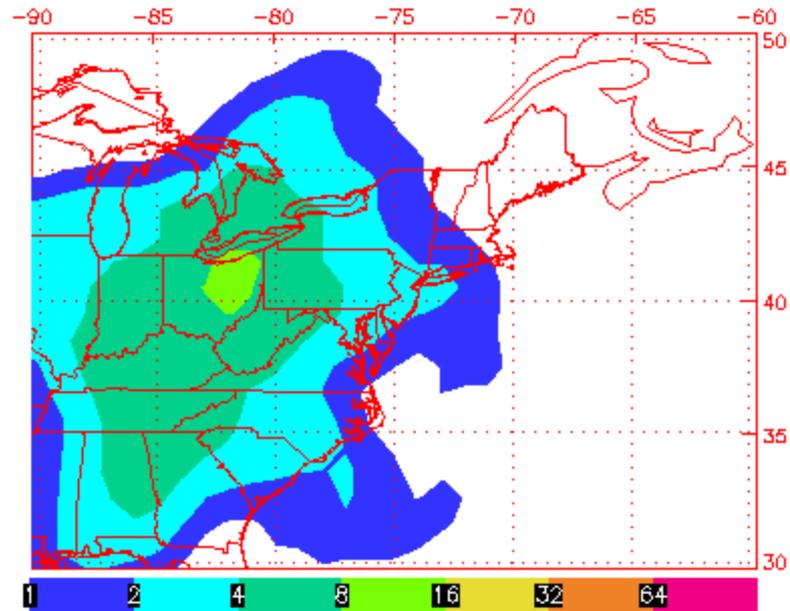


# Sunday 2 PM

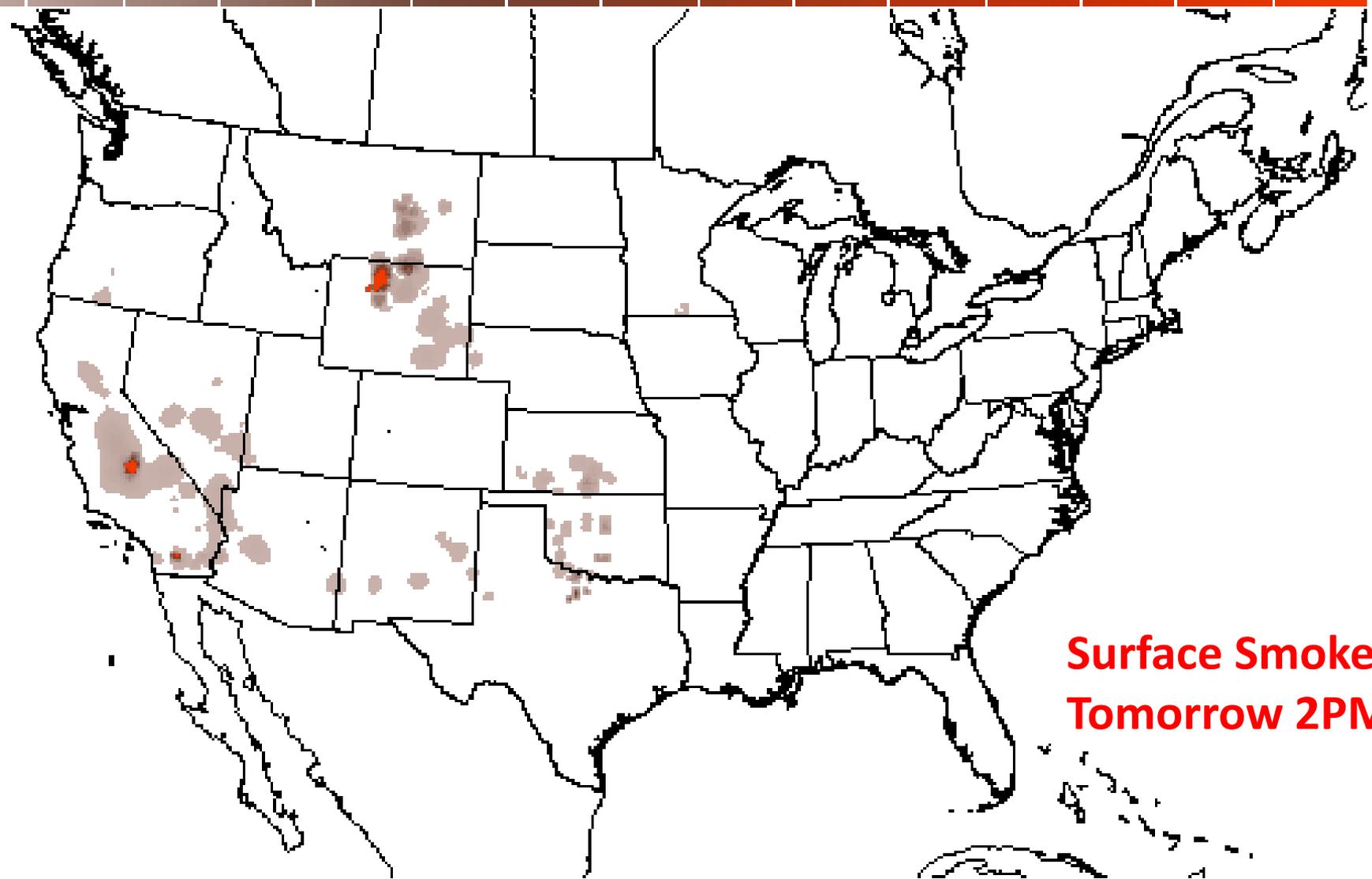
NAAPS Total Optical Depth for 18:00Z 31 Jul 2011  
Sulfate: Orange/Red, Dust: Green/Yellow, Smoke: Blue



Sulfate Surface Concentration ( $\mu\text{g}/\text{m}^3$ )  
for 18:00Z 31 Jul 2011



10 20 30 40 50 60 70 80 90 100 110 120 130 140



**Surface Smoke  
Tomorrow 2PM**

1Hr Surface Smoke (micrograms/m<sup>3</sup>) Fri Jul 29 2011 2PM EDT  
(Fri Jul 29 2011 18Z)



**National Digital Guidance Database**

06z model run      Graphic created-Jul 28 7:50AM EDT

AREA FORECAST DISCUSSION...UPDATED  
NATIONAL WEATHER SERVICE BALTIMORE MD/WASHINGTON DC  
1021 AM EDT THU JUL 28 2011

.SYNOPSIS... HIGH PRESSURE WILL MOVE OFF THE COAST THIS AFTERNOON AND TONIGHT. RETURN FLOW AROUND THE HIGH WILL USHER IN HOT AND HUMID CONDITIONS FRIDAY AND SATURDAY. A COLD FRONT MAY IMPACT THE AREA EARLY NEXT WEEK.

.NEAR TERM /THROUGH FRIDAY/... UPR RDG CNTRD OVER KY THIS MRNG...WITH NWLY FLOW OBSERVED IN MID- ATLC RGN. TRAIN OF SHRTWV TROFS EMBEDDED IN THIS FLOW AND IS SUPPORTING ONGOING SHWRS FROM CNTRL PA TO GRTLKS RGN. THESE WAVES WILL MOVE ESEWD TDA.

SGFNT DEBRIS CLDS FROM THE ONGOING SHWRS WILL IMPACT HEATING TDA...SPCLY NERN ZONES. MAXIMA FCSTD IN LWR-MID 90S THROUGHOUT FCST AREA.

PCPN CHCS ARE HIGHLY UNCERTAIN. LGT SHWRS OCCURRING ATTM IN N-CNTRL MD. THESE SHWRS LKLY WILL MAINTAIN THEIR WEAK INTENSITY AS THEY CONT EWD. A LULL XPCD LATE MRNG...WITH RENEWED SHWRS THIS AFTN AS A SECOND WAVE APRCHS.

MODELS INDICATE THAT A SHRTWV TROF WILL CROSS FCST AREA LATE THIS AFTN AND EARLY THIS EVE...WHICH MAY BE BEST CHC AT PCPN IN NRN ZONES CLOSE TO MASON-DIXON LN. SHARP GRADIENT IN SHWR CVRG XPCD... SO IT IS UNCLER HOW FAR SWD ANY SHWRS WILL BUILD. FCST CALLS FOR SHWRS TO CROSS N-CNTRL MD AND BUILD SEWD TWD WASHINGTON/BALTIMORE CORRIDOR.

PCPN MAY CONT TNGT...BUT SHUD WANE LATE. A LULL IS XPCD FRI MRNG AS UPR CLDS VACATE AND AMS ATTEMPTS TO RECOVER. WITH STRONG HEATING XPCD AND LGT WINDS...TERRAIN CIRCULATIONS AND BAY BRZ SHUD HELP INCITE A CU FIELD AND PSBL TSTMS BY FRI AFTN. WITH THE FCSTD SHRTWV TROF IN NRN PA...LMTD FORCING FOR ASCENT XPCD. THUS...CVRG OF ANY TSTMS WILL BE ISOLD-WDLY SCT...AND SHUD BE MOST FOCUSED NR MASON-DIXON LN AND ALONG WRN SHORE OF CHSPK BAY.

HEAT INDICES LKLY WILL EXCEED ADZY LVLS TMW AFTN AS TEMPS CLIMB INTO UPR 90S-NR 100. ALTHOUGH DEWPPTS WILL BE IN LWR-MID 70S DURG FRI MRNG...PROLONGED DOWNSLOPING FLOW MAY HELP OFFSET THIS MSTR AND SHUD PREVENT HEAT INDICES FROM REACHING WRNG THRESHOLDS. A HEAT ADZY LKLY WILL BE FORTHCOMING THIS AFTN.

.SHORT TERM /FRIDAY NIGHT THROUGH SUNDAY/... THE DAYTIME TEMPS WOULD BEGET ANOTHER NGT W/ VERY WARM FRI NGT TEMPS. ONCE AGN TEMPS IN THE CITIES WOULD LKLY RMN ABV 80 ALL NGT...W/ TEMPS IN THE 70S XCPT IN THE FARTHEST W.

THE FRONT THAT MOVES THRU FRI NGT MAY STALL NEAR OR JUST SOUTH OF THE AREA SAT AS THE FLOW BECOMES BLOCKED ON THE NRN PERIPHERY OF THE BROAD SOUTHEAST RIDGE. SCT CONVECTION WILL BE FOCUSED ALONG THE STALLED BOUNDARY THIS WEEKEND. ALTHOUGH IT IS UNCERTAIN EXACTLY WHERE THE BOUNDARY WILL RESIDE...THE FRONT WILL LIKELY BE LOCATED CLOSEST TO THE SRN TIER OF OUR CWA. W/ THE FNT OVR THE MID ATLC IT WOULD BE GRT IF RGN RCVD RAFL (AND CLDS) TO HELP KEEP TEMPS DOWN A FEG DEGS. THERE PRBLY WL BE AN INCRS IN CLD CVR BUT AM NOT OVERLY CONFIDENT ON PCPN CHCS. KEPT POPS IN THE 20/30 RANGE.

.LONG TERM /SUNDAY NIGHT THROUGH WEDNESDAY/... THE UPPER RIDGE OVER THE SOUTHEAST STATES WILL RETROGRADE INTO THE CENTRAL CONUS LATE THIS WEEKEND INTO ERY NEXT WEEK...ALLOWING THE STALLED BOUNDARY TO MOVE SOUTH OF THE MID-ATLANTIC STATES. NWLY FLOW ALOFT WILL DEVELOP BETWEEN THE CENTRAL CONUS RIDGE AND AN UPPER LOW OVER NERN CANADA. THIS WILL PUSH A COLD FRONT THRU THE AREA ERLY NEXT WEEK. STILL NO MAJOR RELIEF...BUT L90S IS BETTER THAN U90S.

IN AN INTERESTING SIDE NOTE - LAST SUMMER I DID A TEMP COMPARISON OF 5 OF THE HOTTEST SUMMERS ON DC RECORDS - 1930..1936..1980..1988.. AND 2010 AND LOOKED AT THOSE SLIDES. IN THE 1ST 4 OF THOSE THERE WAS A SIGNIFICANT COOL DOWN DURG MID AUG. THE XCPTN WAS LAST SUMMER WHICH KEPT UP W/ THE >90 TEMPS THRU THE END OF AUG. 1930'S DC JUL TEMPS ACTUALLY LOOK FAIRLY SIMILAR TO THIS MONTHS - THE AVG HIGH WAS 91.6 (THIS MONTH 92.8) ALTHO THE AVG LOW HAS BEEN 5 DEGS WARMER THIS MONTH. IN 1930 THE HIGH HEAT KEPT UP THRU 8/9...TOPPING 100 ON 5 MORE DAYS. BUT THEN TEMPS DROPPED DRAMATICALLY - AFTR A HIGH OF 102 ON 8/9 THERE WAS A LOW OF 56 ON THE 12TH AND 55 ON THE 13TH. BOTH THE 8/9 HIGH AND 8/13 LOW RMN AS RECORDS FOR THE DAY. THAT MUST'VE BEEN ONE HECK OF COLD FNT. NOW TO WAIT AND SEE IF HISTORY REPEATS ITSELF.