Forecast for Tropical Areas of Interest
Forecast Synopsis 1600 UTC 16 August 2010
Author: Jason Dunion

Summary:
There are currently for systems of interest in the North Atlantic basin today (Fig. 1). From west to east, these include:

1. PGI29L: Ex-TD#5 has moved over the water and is positioned just off the FL panhandle. NOAA/NHC currently lists this system with a 60% chance for genesis as it slowly tracks to the WNW. There will be a small window of opportunity to fly this system in the next 12-24 hrs before it moves inland over southeast Louisiana.
2. PGI27L: continues to track quickly (~8-10 m/s) to the west and is now located over the northern Windward Islands. Though this system has likely been negatively influenced by dry mid-level air associated with the SAL, it appears that it is beginning to separate from the dry air and easterly surge as it begins to move into the Caribbean. This system will be in potential range of various aircraft as it tracks WNW through the Caribbean over the next few days.
3. PGI28L: is located a few hundred km northwest of the Cape Verdes and has moved into an area of cool SSTs and dry SAL and mid-latitude air. Development of this system in the coming days is very unlikely. This system is not a viable target and will not be in range of any aircraft for the next few days.
4. PGI30L: is about to emerge from the coast of Africa and is located ~100-200 km east of Dakar. This system is associated with a robust parent AEW, though the local deep layer flow appears to be steering the embedded MCS to the NW. The AEW axis is still located just inland over Africa behind the MCS. Models continue to develop this system in the long range, though it is unclear whether vorticity associated with NW moving MCS, the parent AEW to the southeast, or a combination of both will be responsible for the forecasted development of PGI30L. This system could be in range of the NOAA G-IV and PREDICT G-V aircraft as early as Saturday morning (21 Aug) when it is anticipated to be near 40W.

Discussion:

a. Synoptic

A large W-E oriented deep layer ridge is positioned over north central TX and extends well south into the Gulf of Mexico, and another large SW-NE oriented deep layer ridge is located in the central North Atlantic (Fig. 2a). A substantial weakness exists from ~ 60-80W between these ridges. A stationary front extends SW-NE from FL to the north central Atlantic. A large WSW-ENE oriented deep layer ridge is also located over the western Sahara and is currently inducing a steering pattern to the NW for any convective systems leaving the African coast (Fig. 2b). A weak upper-level cold low is positioned just southwest of Hispaniola and is evident in GOES 100-250 hPa water vapor winds (Fig. 3). Another cold low is apparent in the GOES water vapor wind field at ~45N 52W. Finally, another SW-NE oriented cold low may be forming at ~15N 45W.

b. PGI29L

PGI29L is currently located at ~28.5N 86W and is tracking slowly to the WNW (Fig. 1 & 4). The circulation center is also clearly evident in the Mobile WD-88 radar. Satellite imagery indicates the most of the deep convection is located southwest of the low-level circulation and is

being advected away from this low-level vorticity center by 20-40 kt upper-level flow (Fig. 5). High TPW, warm SSTs, 80+ KJ cm^{-2} ocean heat content and low to moderate vertical wind shear (5-20 kt) are all conducive for further development. However, the location of the upper level ridge to the northwest of the low-level center is not conducive at this time. This positioning is limiting upper level divergence and quickly shearing any deep convection that forms over the low-level center off to the southwest. However, the local environment is quite conducive for local convective development. The Lake Charles 12 UTC ROB from this morning shows a deep layer of moist air topped by a layer of dry air in the upper levels (likely associated with subsidence induced by the ridge). This sounding indicates TPW of >66 mm, CAPE of >3700 J kg^{-1}, lifted index of -6.9, and a K-index of >40. These values suggest a very moist and unstable environment just west of PGI29L. The less than ideal upper-level ridging pattern over the system and proximity to land are the main inhibiting factors for genesis. However, there is still a >50% that this system will under genesis in the next 12 hours or so before it moves over southeast LA. The deep layer ridge currently over north central TX is forecast to move eastward in the next 12-24 hr, inducing a more WNW, northwest and eventual north steering flow for PGI29L. Any aircraft operations into this system may want to consider departing as early as possible to take advantage of this short window of opportunity when the storm is over water. However, the upper-level wind patterns will likely continue to induce a flow that will advect the deep convection that forms over the vorticity center toward the WSW. This suggests that even as the center is moving over land tonight/early tomorrow, there will likely be convective features to target offshore to the WSW of the center.

c. PGI27L

PGI27 is currently located over the northern Windward Islands. This system has been embedded along the leading edge of a large SAL outbreak for the past few days and although dry air has likely inhibited convection (yesterday's 1 km visible imagery showed arc clouds pushing out from some of the convective areas, suggesting entrainment of mid-level dry air into the convection), it has been a persistent feature with a consistently trackable pouch. GOES infrared imagery shows relatively scattered convection, though cloudtops are as cold as -50 to -60C. Deep layer steering is generally WNW, though the weakness that extends from 60-80W north of PGI27 may help to pull the system to the north slightly as it tracks through the Caribbean (Fig. 2a). Storm relative TPW loops (not shown) from UW-CIMSS indicate that PGI27L may be starting to pull away from the SAL (positioned N and E of the system) as it tracks to the WNW and the SAL tracks more to the northwest. NRL NAAPS Model analyses support this more NW track of the SAL over the next few days (Fig. 8) as does the deep layer steering flow out ahead of the SAL (Fig. 2a). The environment ahead of PGI27L appears conducive for genesis as the wind shear remains low (~5-15 kt), SSTs remain warm, and the system likely begins separating from the SAL. This latter event would have 2 implications: the local environment around PGI27L would steadily moisten and the fast forward motion of 8-10 m s-1 (likely induced by the SAL easterly surge) would ease. The GFS pouch analysis indicates a more southerly track for PGI27L over the next several days with dry local environment until about 60 hr and fairly high vertical wind shear. This pattern suggests that the GFS is slower to separate the PGI27L from the SAL. The ECMWF pouch analysis suggests a more northerly track, a rapidly moistening environment, and low to moderate wind shear. This suggests a scenario where PGI27L more quickly separates from the SAL's dry air and easterly wind shear and is the more likely scenario. OW values are quite low (~<1) in both model forecasts. Still, this system warrants close

monitoring over the next few days. PGI27L's location makes it an easy target for PREDICT, though NASA and NOAA aircraft missions would require long ferries to the system from their current locations at Dryden, Ft. Lauderdale and Tampa, FL.

d. PGI28L

PGI28L is currently located at ~20 N 27W, a few hundred km NW of the Cape Verdes. PGI28L has moved into an environment of very dry stable air, cool (<25C) SSTs, and high vertical wind shear (20-25 kt). Given this an anticipated westward track over the next few days, this system has very little chance (<5%) of undergoing genesis. PGI28L is not within range of any aircraft over the next few days and will likely not be a viable target for aircraft missions down the road.

e. PGI30L

PGI30L is located ~100-200 km east of Dakar at ~17.5N 26W (Fig. 10). This system is associated with a robust parent AEW, though the local deep layer flow appears to be steering the embedded MCS to the NW (Fig. 2b). The AEW axis is still located just inland over Africa behind the MCS and its leading edge is starting to be discernable in TPW imagery (Fig. 11). Models continue to develop this system in the long range, though it is unclear whether vorticity associated with NW moving MCS, the parent AEW to the southeast, or a combination of both will be responsible for the forecasted development of PGI30L. Fig 12 shows that the GFS seems to be favoring formation from a more southerly vorticity center (likely from the parent AEW), while fig. 13 indicates that the ECMWF seems to be suggesting a Fujiwara between a northern vorticity center (likely the MCS currently tracking to the NW) and a more southerly vorticity center (likely from the parent AEW). Both models suggest that this system could be in range of the NOAA G-IV and PREDICT G-V aircraft as early as Saturday morning (21 Aug) when it is anticipated to be near 40W.

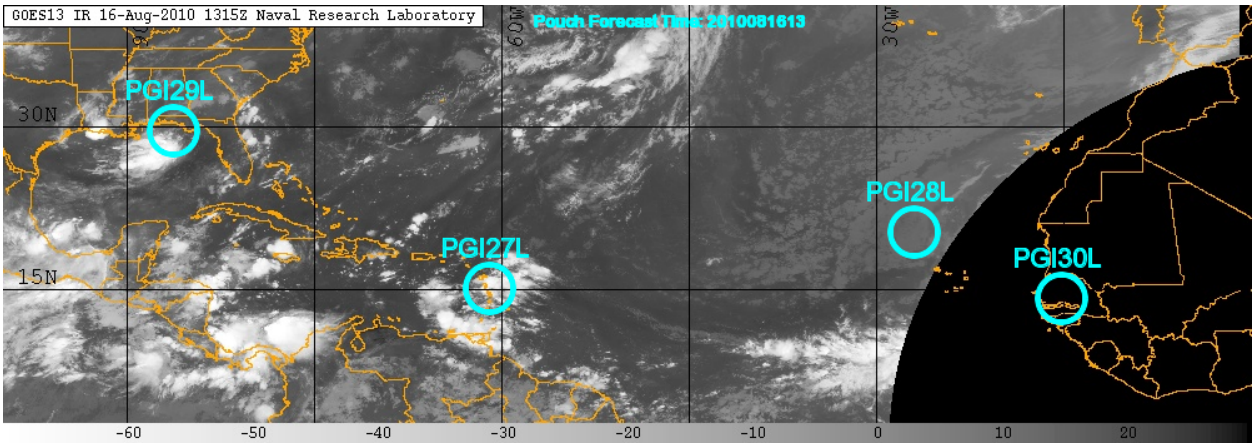
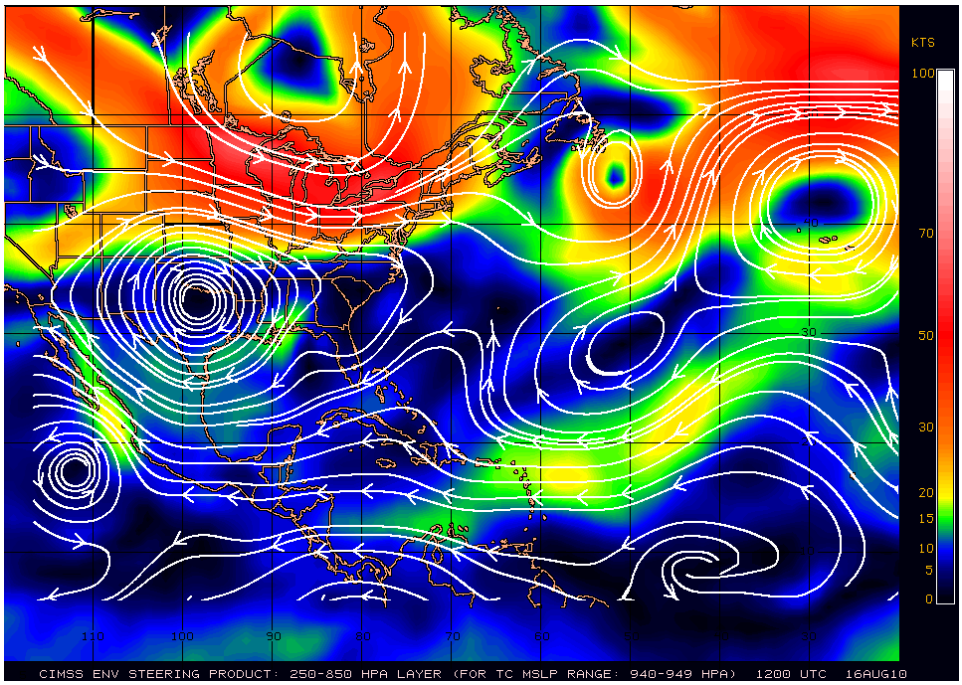
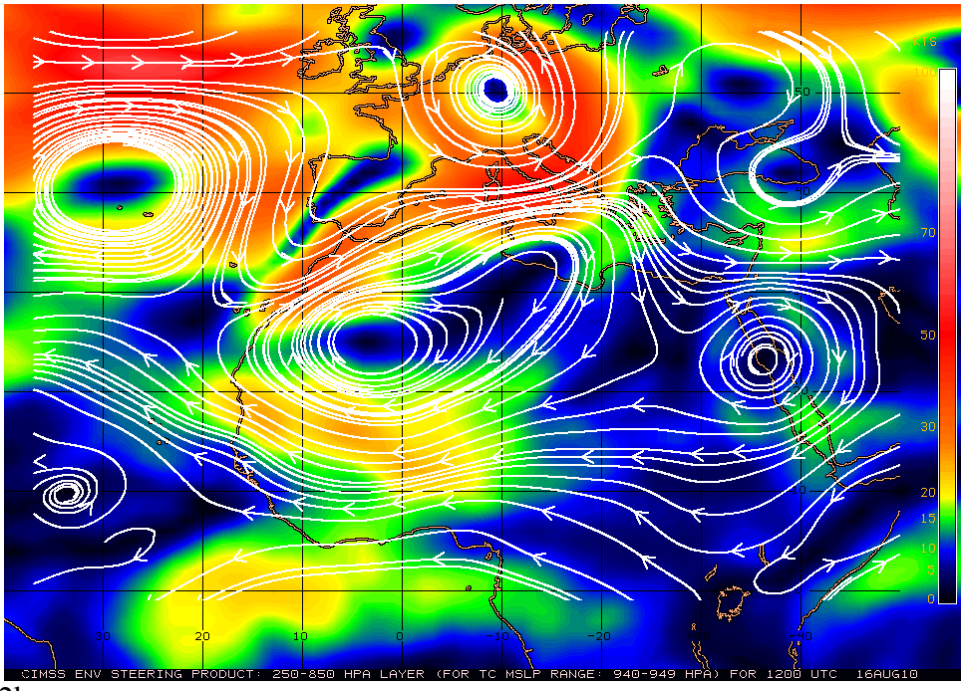
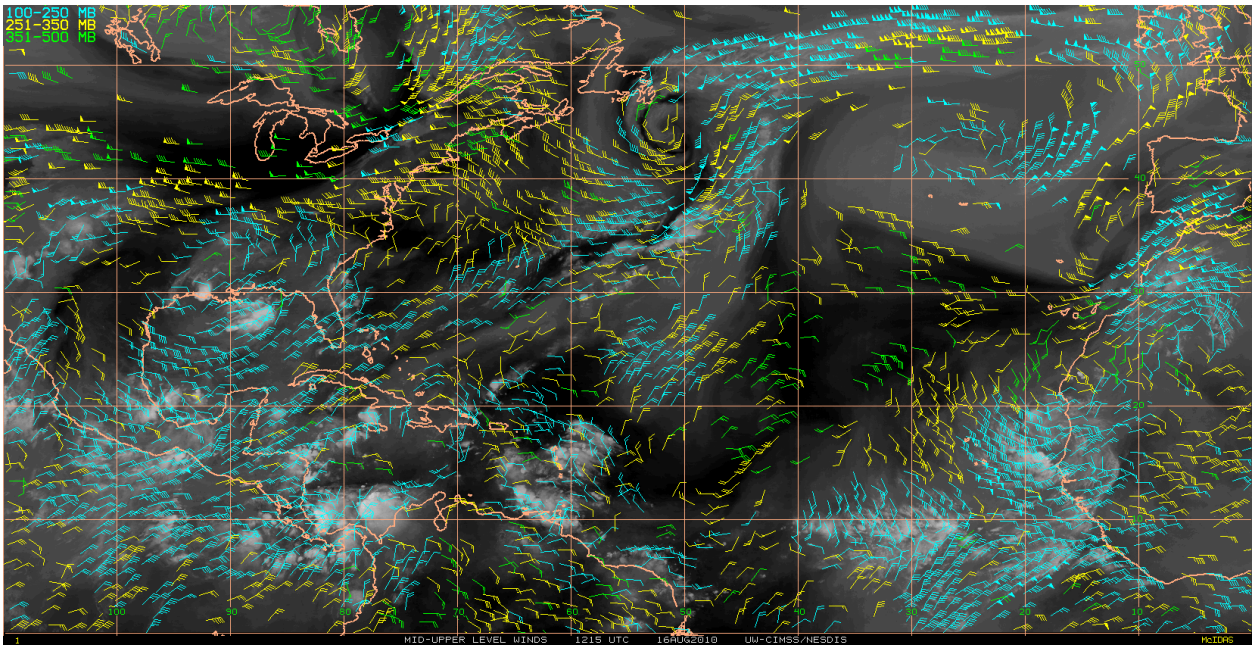


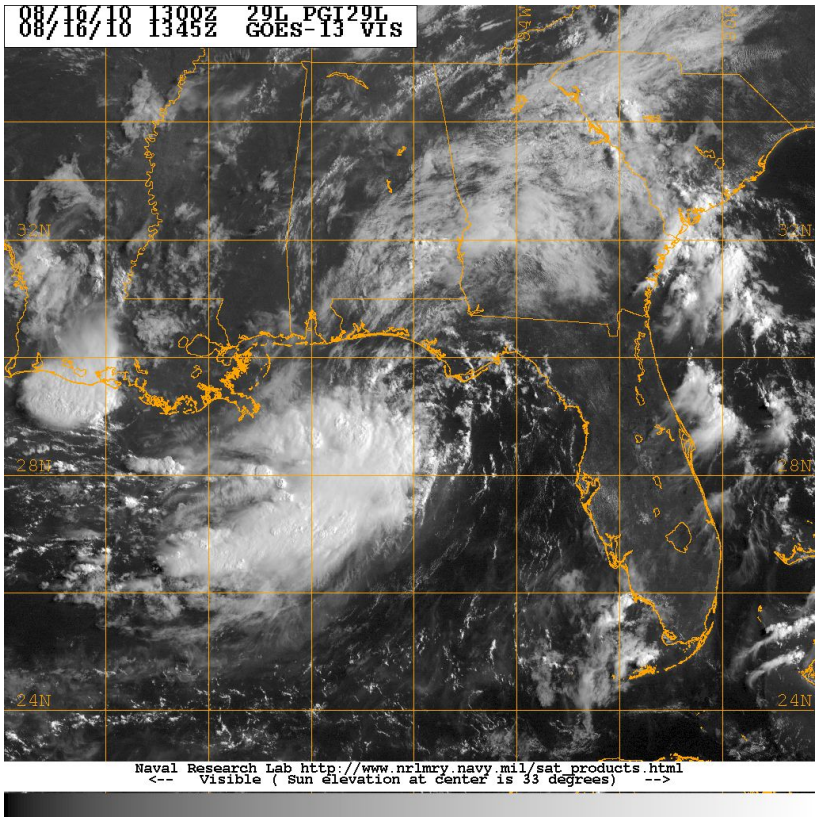
Fig. 1


KTS
100
70
50
30
20
15
10
5
0
CIMSS ENV STEERING PRODUCT: 250-850 HPA LAYER (FOR TC MSLP RANGE: 940-949 HPA) 1200 UTC 16AUG10


KTS
100
70
50
30
20
15
10
5
0
CIMSS ENV STEERING PRODUCT: 250-850 HPA LAYER (FOR TC MSLP RANGE: 940-949 HPA) FOR 1200 UTC 16AUG10

Figs. 2a & 2b


100-250 MB
251-350 MB
351-500 MB
MID-UPPER LEVEL WINDS 1215 UTC 16AUG2010 UW-CIMSS/NESDIS
McIDAS
Fig. 3


08/16/10 1300Z 29L PGI29L
08/16/10 1345Z GOES-13 VIS
32N
28N
24N
Naval Research Lab http://www.nrlmry.navy.mil/sat_products.html
<-- Visible (Sun elevation at center is 33 degrees) -->
Fig. 4

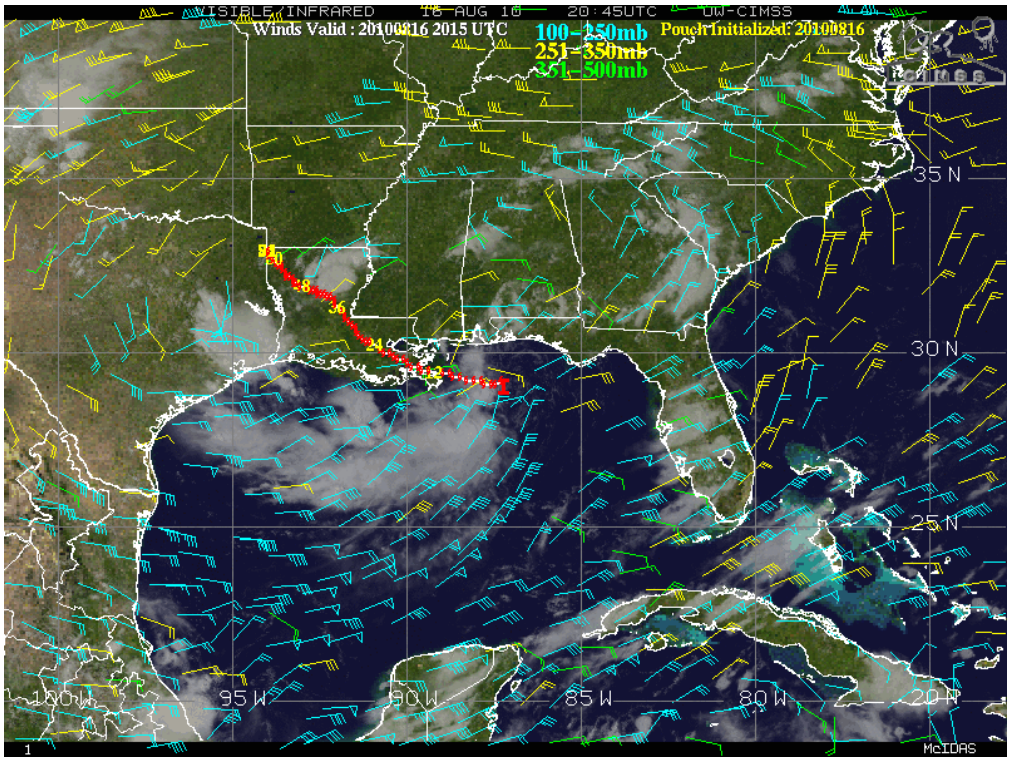

VISIBLE/INFRARED 16 AUG 10 20:45UTC UW-CIMSS
Winds Valid : 20100816 2015 UTC
100-250mb
251-350mb
351-500mb
Pouch Initialized: 20100816
35 N
30 N
25 N
100 W
95 W
90 W
85 W
80 W
20 N
McIDAS

Fig. 5

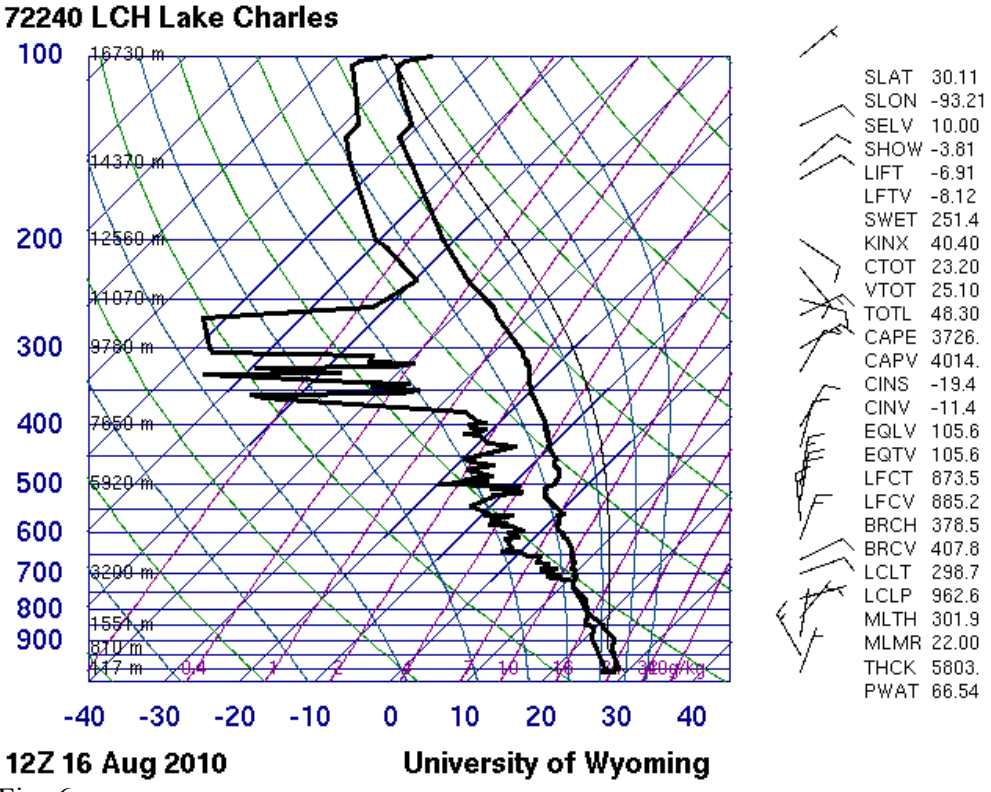

72240 LCH Lake Charles
100
200
300
400
500
600
700
800
900
16730 m
14370 m
12560 m
11070 m
9780 m
7850 m
6920 m
3200 m
1551 m
810 m
417 m
-40 -30 -20 -10 0 10 20 30 40
12Z 16 Aug 2010
University of Wyoming
SLAT 30.11
SLON -93.21
SELV 10.00
SHOW -3.81
LIFT -6.91
LFTV -8.12
SWET 251.4
KINX 40.40
CTOT 23.20
VTOT 25.10
TOTL 48.30
CAPE 3726.
CAPV 4014.
CINS -19.4
CINV -11.4
EQLV 105.6
EQTV 105.6
LFCT 873.5
LFCV 885.2
BRCH 378.5
BRCV 407.8
LCLT 298.7
LCLP 962.6
MLTH 301.9
MLMR 22.00
THCK 5803.
PWAT 66.54

Fig. 6

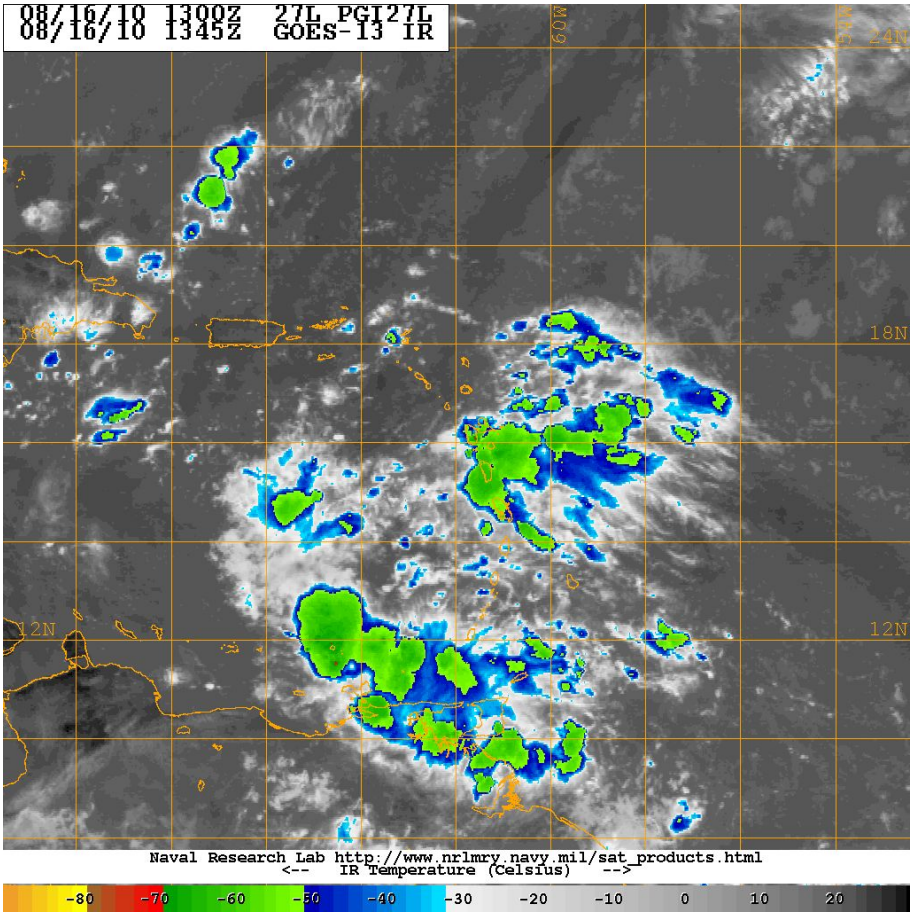

08/16/10 1300Z 27L PGI27L
08/16/10 1345Z GOES-13 IR
60W
24N
18N
12N
12N
Naval Research Lab http://www.nrlmry.navy.mil/sat_products.html
<-- IR Temperature (Celsius) -->
-80 -70 -60 -50 -40 -30 -20 -10 0 10 20

Fig. 7

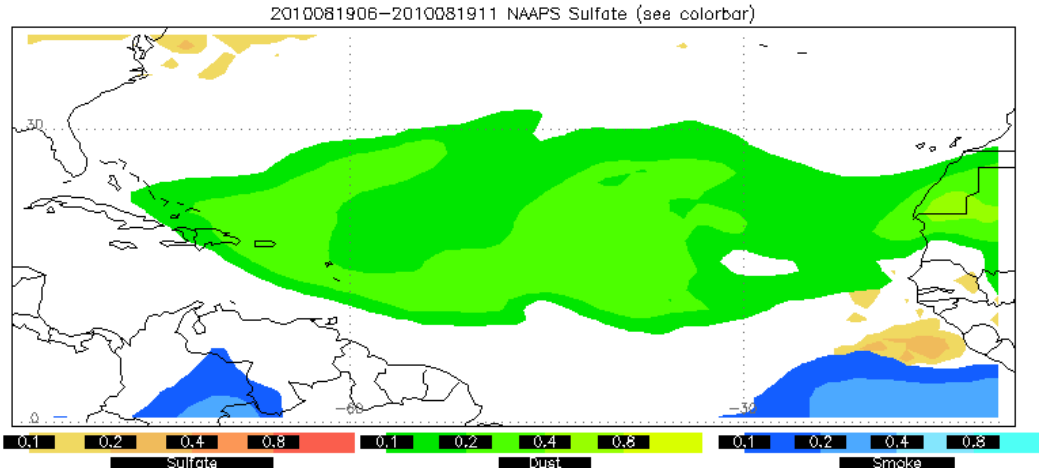
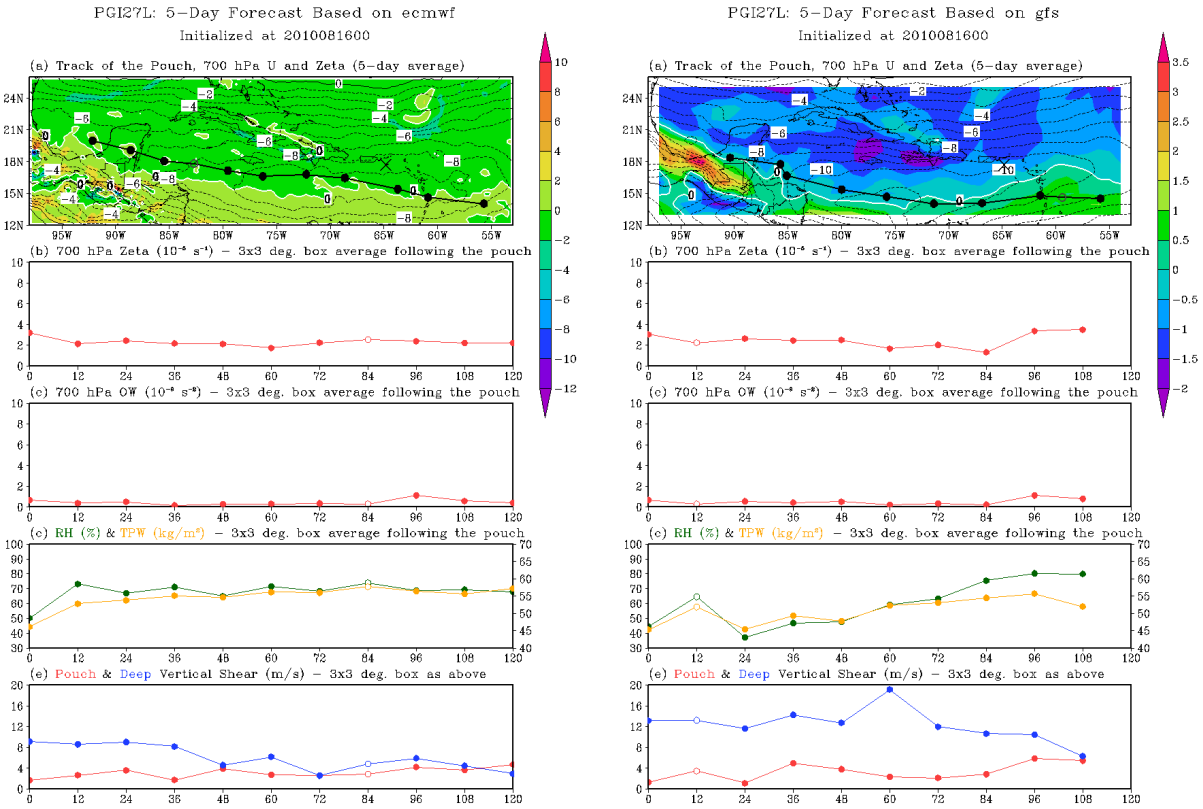

2010081906-2010081911 NAAPS Sulfate (see colorbar)
0.1 0.2 0.4 0.8
Sulfate
0.1 0.2 0.4 0.8
Dust
0.1 0.2 0.4 0.8
Smoke

Fig. 8



Figs. 9a & 9b

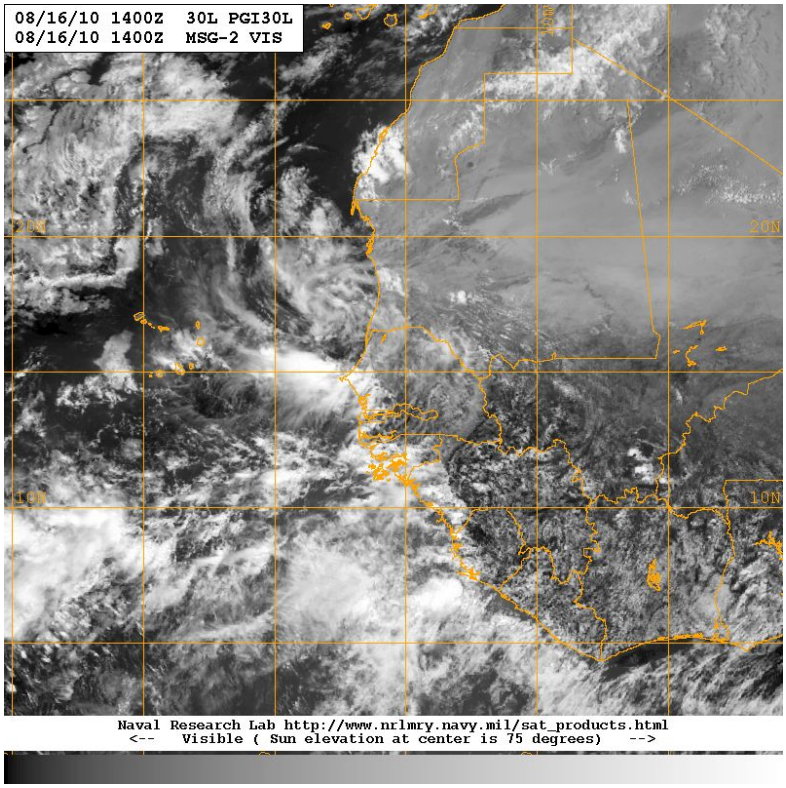


Fig. 10

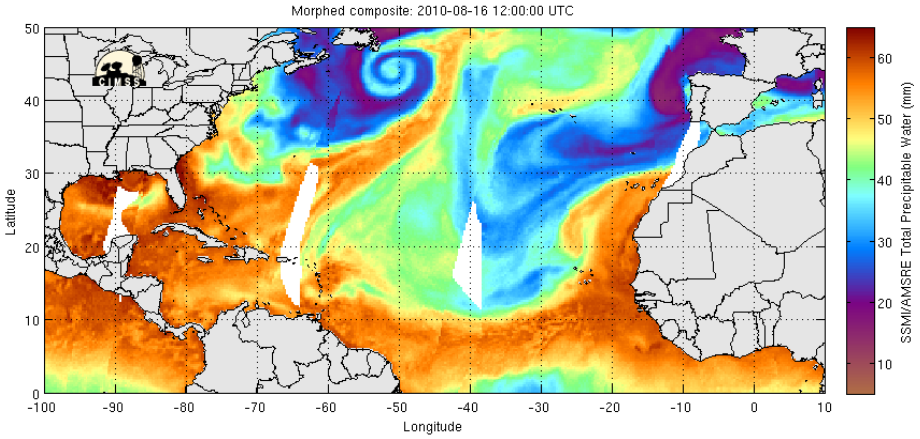
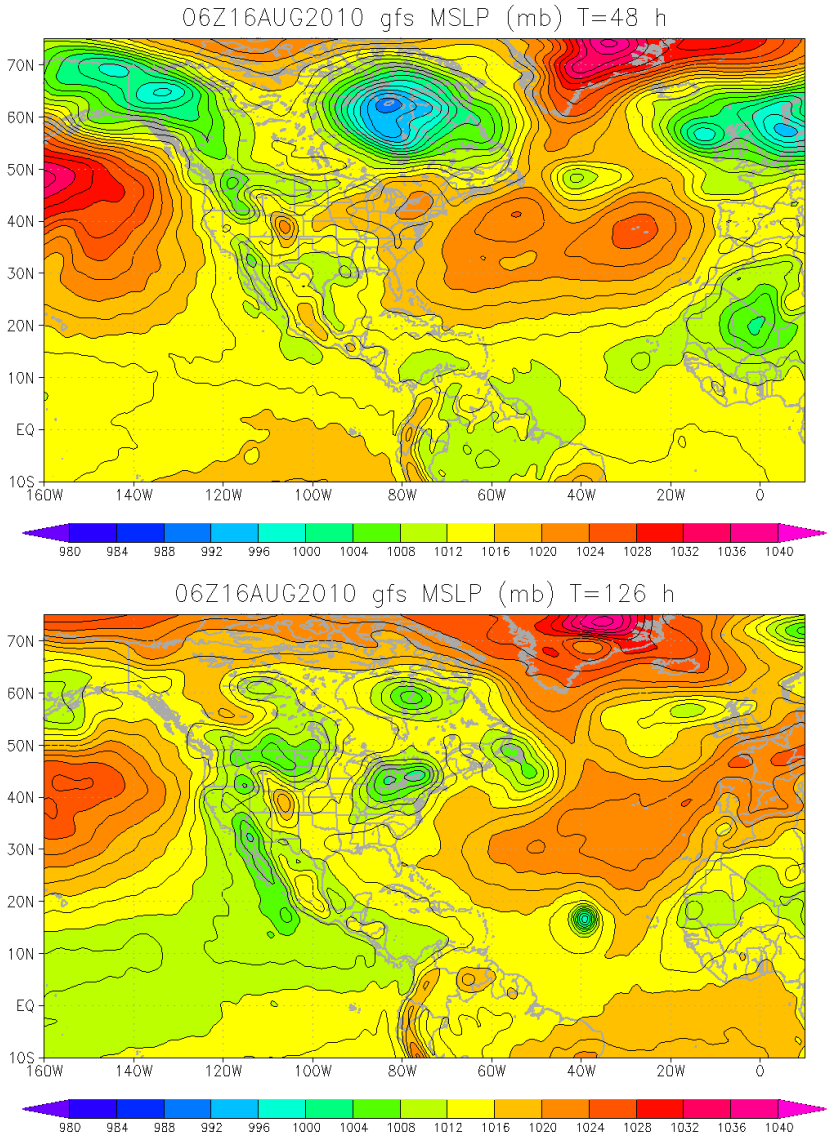
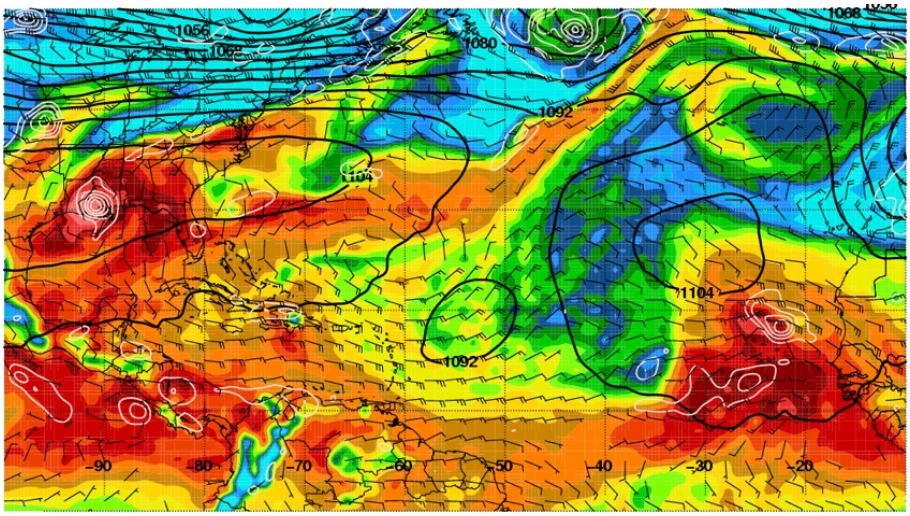


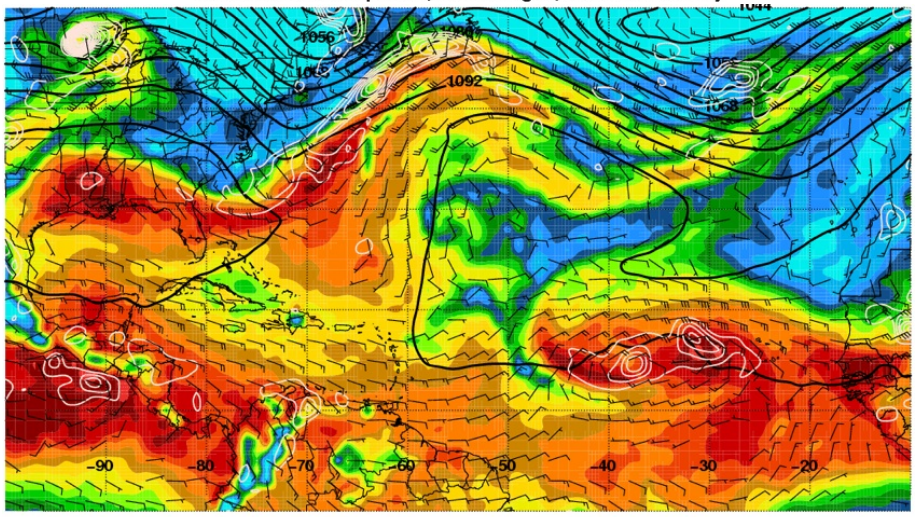
Fig. 11



Figs. 12a & b



100818/0000V048 Precip. Water, 250 hPa Heights, 925–850 hPa Vorticity



100821/0000V120 Precip. Water, 250 hPa Heights, 925–850 hPa Vorticity

Figs. 13a & b