Tropical Areas of Interest Discussion for August 17, 2010

Created 1400 UTC August 17, 2010

GRIP Forecast Team: Cerese Inglish, Jon Zawislak, Andrew Martin, and Matt Janiga

Summary: The DC-8 is scheduled to fly a short run to test instruments and run a microphysics module. Following up with last night's intermediate discussion on Ex-TD05, which was never upgraded again to depression status, the center of circulation has moved over land this morning. While the majority of the associated convection is to the south of the center along the southern LA coast, the 20kt low is tracking to the WNW today and should still provide some fly-able convection for a microphysics test module for the DC-8. A stationary front across south FL will also provide convection to the west of FL that the DC-8 could encounter on its transit to the northern GOM. PGI-27L has impressive convection today compared to yesterday as it progresses westward, and it is the subject of study today by the Predict G-V. It could become a potential target for GRIP as well, and it will be monitored carefully. Though the system has good convection associated with the wave axis, it isn't yet showing organization of a circulation, and with some favorable environmental conditions for genesis, it remains a potential target for Friday operations. The SAL outbreak over the central Atlantic is strong and forecast to push westward eventually entering the GRIP study domain. The latest AEW emerges from Africa today, associated with PGI-30L/PGI-31L, and as of the 0600 UTC, some global models are developing this at about 72 hours out (later than yesterday's forecast). The models are spread quite a bit on the predicted phase speed and so there is a bit of uncertainty surrounding when this system could be investigated by tri-agency operations. It is possible that the DC-8 could seek to take a suitcase flight out to St. Croix to investigate this if it looks favorable for genesis a few days out, but much remains to be seen with how this system actually organizes over water.

Forecast for 1400 UTC 8/17/2010:

Synoptic Overview:

The tropical Atlantic Basin has several interesting features dominating the GRIP field domain today (**1**). Ex-TD05 is over southern Louisiana today and the remnant convection associated with it to the south is the subject of a microphysics module today that the DC-8 will fly (**4A, 4B**). The system has been consistently steered by an upper level anticyclone which will move further east pushing the remnant system toward Mississippi (**3A, 6**). A stationary front near Florida for the last few days has begun to dissolve, and the region west of FL is currently dominated by 20kt northeasterly shear, though scattered convection exists in that area. Another feature in the NE Gulf that the DC-8 will likely observe is an area of Fine Aerosol Optical Depth that can be seen in AQUA imagery (**8**). This is likely industrial pollution that has been imported into this atypical region. The large and significant SAL outbreak continues to move further west and is expected to make it into the fly-able region for GRIP soon. There are four tropical waves in the basin. The first is located in the western Caribbean approaching the Yucatan Peninsula between 9N/89W and 21N/85W and has good convection associated with it to near Nicaragua (**2**). A second tropical wave associated with PGI-27L is displaying vigorous convection today south of Puerto Rico, and is located between 10N/69W and 22N/76W. The third tropical wave is located in the central Atlantic between 10N/40W and 24N/32W and has no deep convection associated with it.

A fourth tropical wave is approaching the Cape Verde Islands along 22W between 10N and 24N and is associated with the PGI-30L pouch. The PGI-31L pouch analyzed today appears to be associated primarily with ITCZ vorticity and convective flare-ups. These two pouches are forecast by the models to merge and form a TC at 72 hrs and beyond. All Atlantic Ocean AEW's right now are on a due westward heading because of the dominant ridge to the north, however some models are forecasting a weakening of this ridge which could alter the path of a potential TC.

Features of Interest:

PGI-29L/Ex-TD5 has once again made landfall, this time around 0600 – 0800 UTC early this morning just north of New Orleans (**5**). 0900 UTC NEXRAD imagery showed a distinct circulation with scattered weak convection southward into the Gulf (**4B**). Otherwise, IR imagery indicates mostly cirrus cover with some additional convective initiation in the southwest quadrant of the disturbance (**4A**). As has been observed over the past few days, an upper-level anticyclone is centered over the south central U.S. (**3A**); a consequence is 20-30 kt vertical wind shear over the low-level center (**3B**), as well as the initiation of the convection downshear of the low-level center. The DC-8 will be flying a mission into convection just off the coast of Louisiana. As of 1430 UTC new convective initiation was observed in the target area. The DC-8 transit route to the target area has relatively low total precipitable water (**7**) and mid-level subsidence, which has lead to mostly clear conditions with just some shallow convection just off the Gulf coast of Florida (**4A**). The consensus forecast track over the next few days is for the vertically stacked low- to mid-level vorticity maximum/pouch to track northward farther inland (**6**), and is therefore no longer of interest after today's flight.

Dust/SAL discussion: As of 1200 UTC on 8/17, dusty Saharan air was present over much of the central Atlantic Ocean. This includes much of the ten degree by ten degree box extending from 60W to 40W and from 10N to 30N. The aerosol optical thickness values are staying very strong, with maximum AOT exceeding 0.9. (See Aqua course AOT ending on 8/18 0000 UTC, **9**) The dust is being advected by moderate low level easterlies and northeasterlies which are also bringing dry air from high latitudes in the northeast Atlantic. (See CIMMS TPW image for 1200 UTC 8/18, **7**) The GEOS-5 global model forecasts high dust concentrations over the Windward Islands, U.S. Virgin Islands and Puerto Rico by 0000 UTC on 8/19.

PGI-27L: Convection flared in the early morning hours near PGI-27L again on 8/17 (See CIMMS predict-support product with consensus track, SWIR, upper convergence and 850 hPa vorticity, **11**). At 0000 UTC PGI-27L was located near 66W/16N. Shower activity was oriented in a line north to south trailing the wave axis. The location of any vortex is somewhat nebulous based on any surface observations, satellite winds or CIMSS vorticity analysis (**3B**). PGI-27L has moved into an environment with better TPW values (**7**). AMSU shows values near the system of greater than 55 mm, (**7**) and a sounding from 0000 UTC at San Juan showed 54 mm total precipitable water. Low to moderate values of westerly deep layer shear are located over the system with an upper level trough located to the northwest of the system over southeastern Cuba (**3A**). This low is forecast by the NCEP ensemble suite to lift to the northwest, and total shear over the system is forecast to decrease and remain low. PGI-27L is forecast by the global models analyzed by the PREDICT group to stay on a largely westerly track (**11**). The most recent ECMWF pouch analysis is the first forecast in many days to amplify the Okubo-Weiss values.

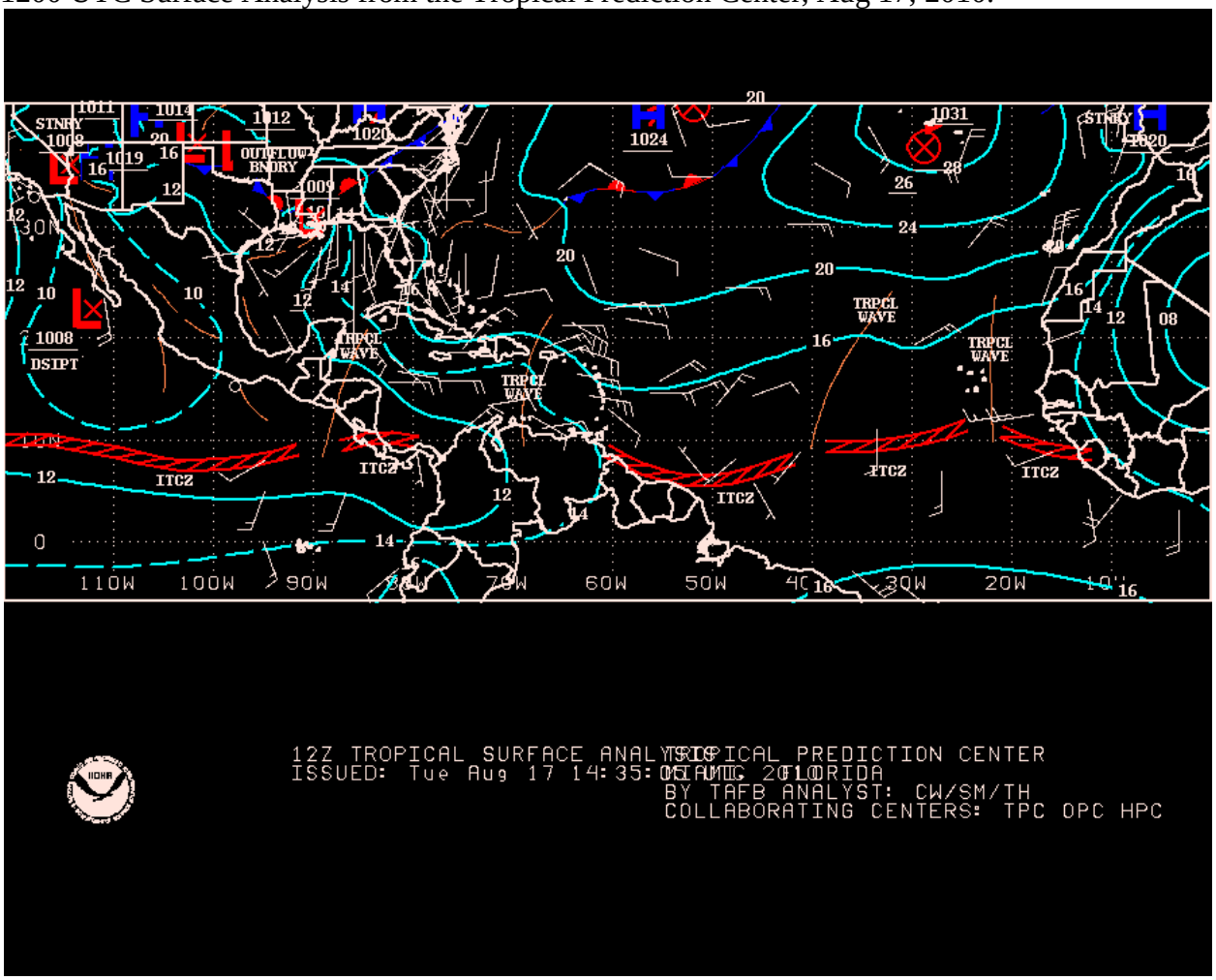
(See pouch tracking product ECMWF initialized at 1200 UTC on 8/17, **10**) but the amplification is still not impressive. Because the convective organization with this system is still linear, and there are not yet signs of a low-level vorticity maximum, TC genesis is not expected from PGI-27L in the next 48 hours. The system now has a much more favorable environment for sustaining convection, and thus should be monitored as it moves through the Caribbean.

PGI30L: A hovmöller diagram of the 700 hPa vorticity shows a weak, sometimes-difficult-to-track disturbance forming at 8/11 0000 UTC at 30E and moving westwards until the present. The current analyzed pouch position is 16N/21W. A broad area of 850 hPa vorticity extends from 12N/25W to 18N/18W with associated with the disturbance moving off of Africa; a second area of vorticity is associated with the Atlantic ITCZ and extends from 8N/45W to 13N/32W **(3B)**. Convection on the northern side of PGI30L has weakened over the last 48 hr associated with dry air.

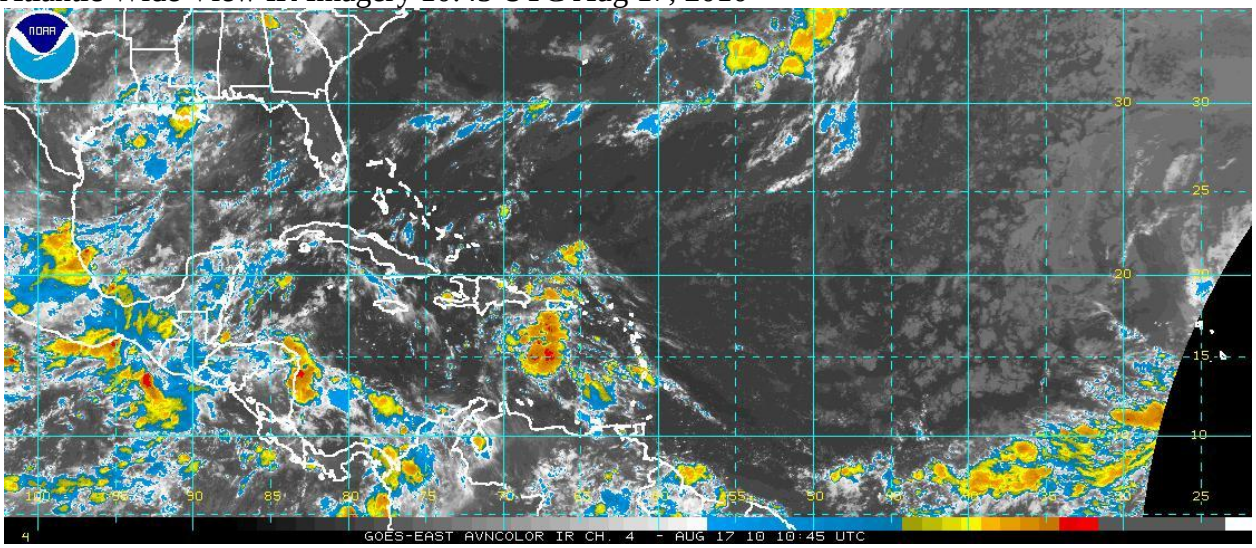
The 0600 UTC GFS is forecasting a slow merger of PGI30L with the ITCZ vorticity (PGI-31L) which results in a dominant circulation by 8/19 0000 UTC at 15N/26W. A 200 hPa anticyclone is currently centered at 24N/22W the westward progression and orientation of this feature relative to PGI30L will play an important role in determining the evolution of the deep shear that it experiences. In the GFS model a tropical cyclone which develops from this combination of disturbances reaches 20N/50W by 8/23 0000 UTC. The 0000 UTC ECMWF also develops this system but has a slightly slower westward progression reaching 50W by 8/24 0000 UTC. The consensus pouch forecast is given as well below (**12**).

Static Images used in discussion:

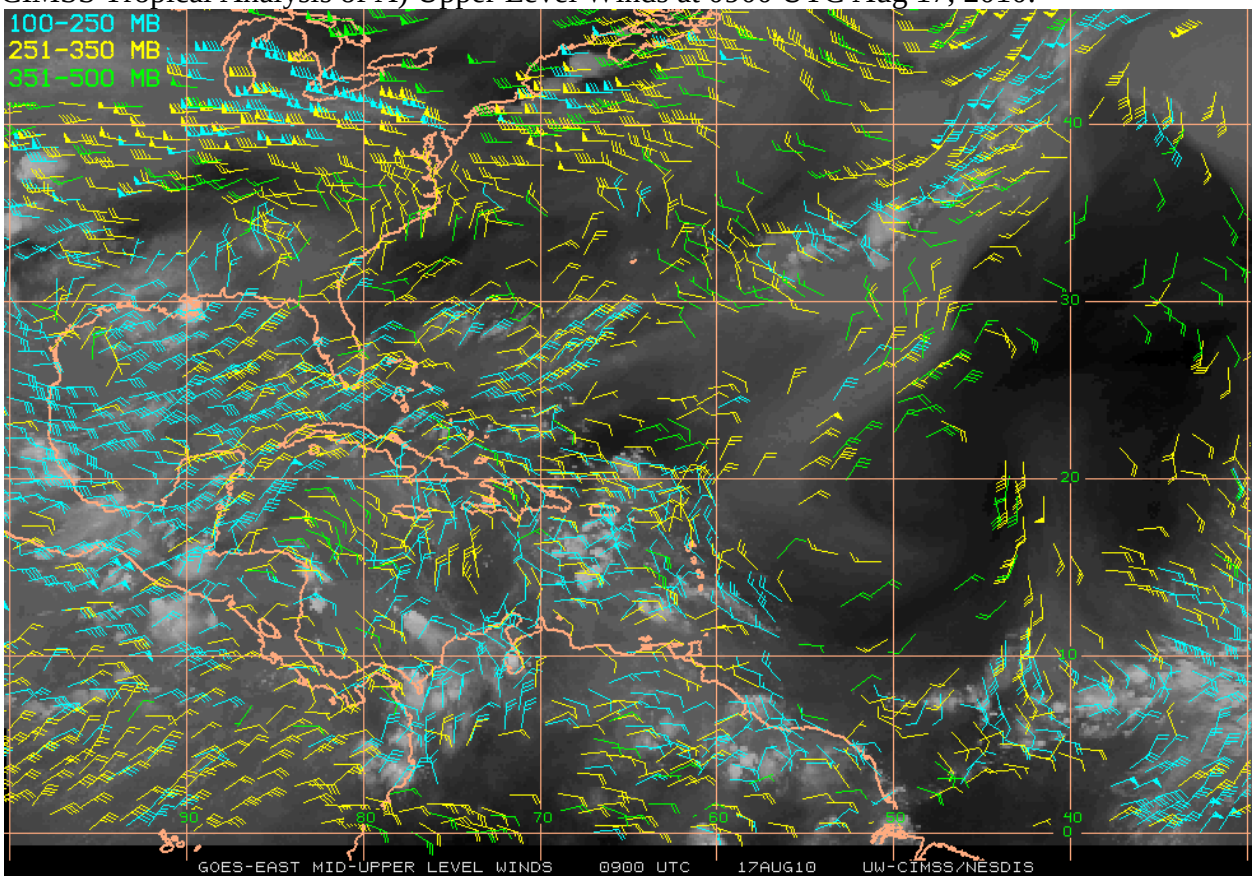
1) 1200 UTC Surface Analysis from the Tropical Prediction Center, Aug 17, 2010.



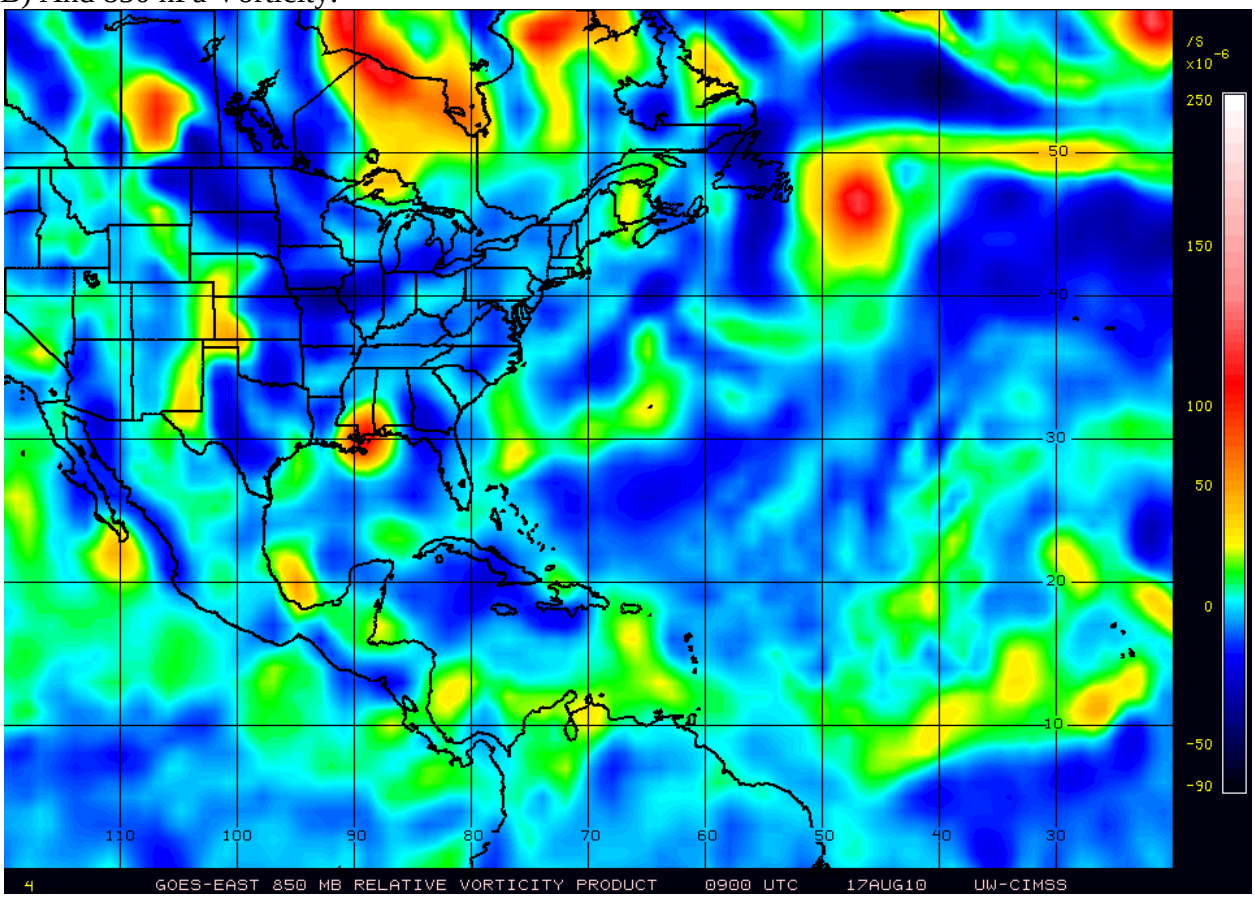
2) Atlantic Wide View IR Imagery 10:45 UTC Aug 17, 2010



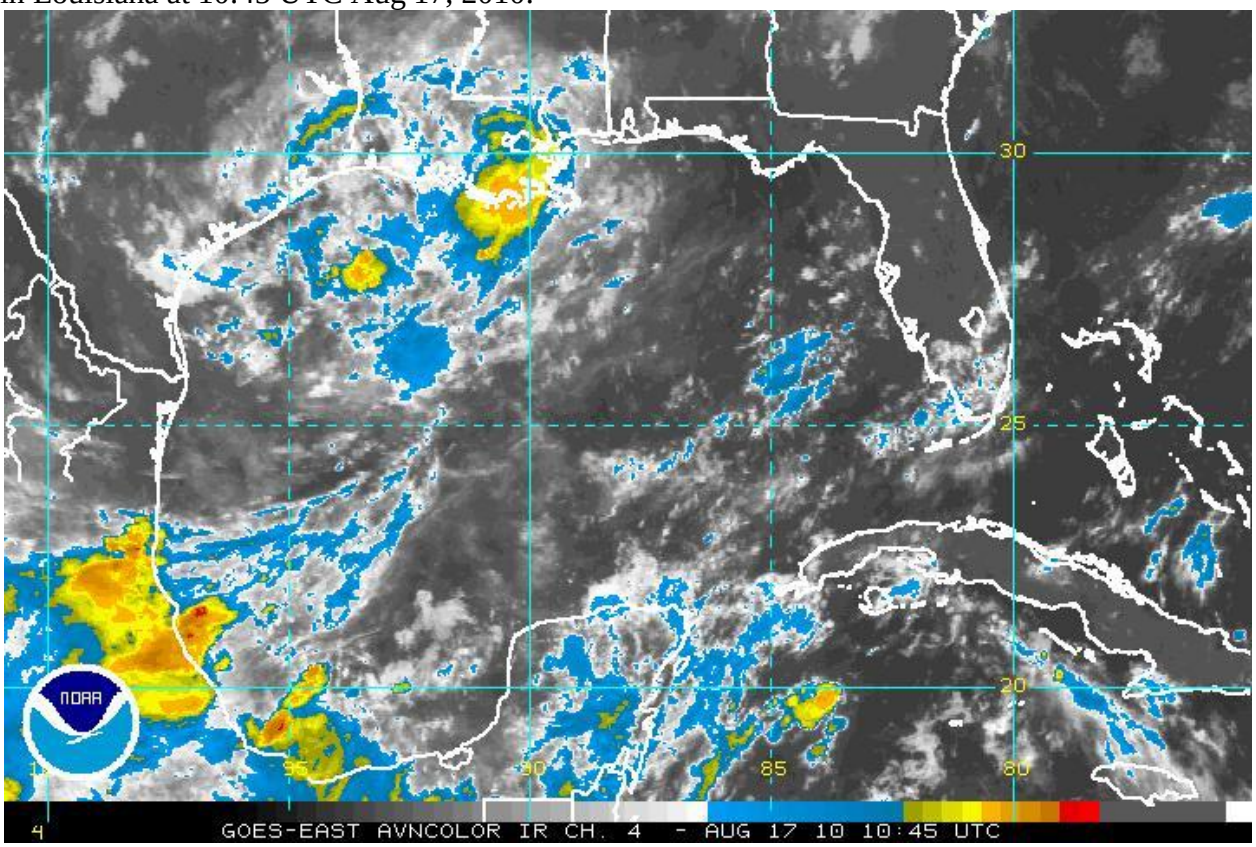
3) CIMSS Tropical Analysis of A) Upper Level Winds at 0900 UTC Aug 17, 2010:



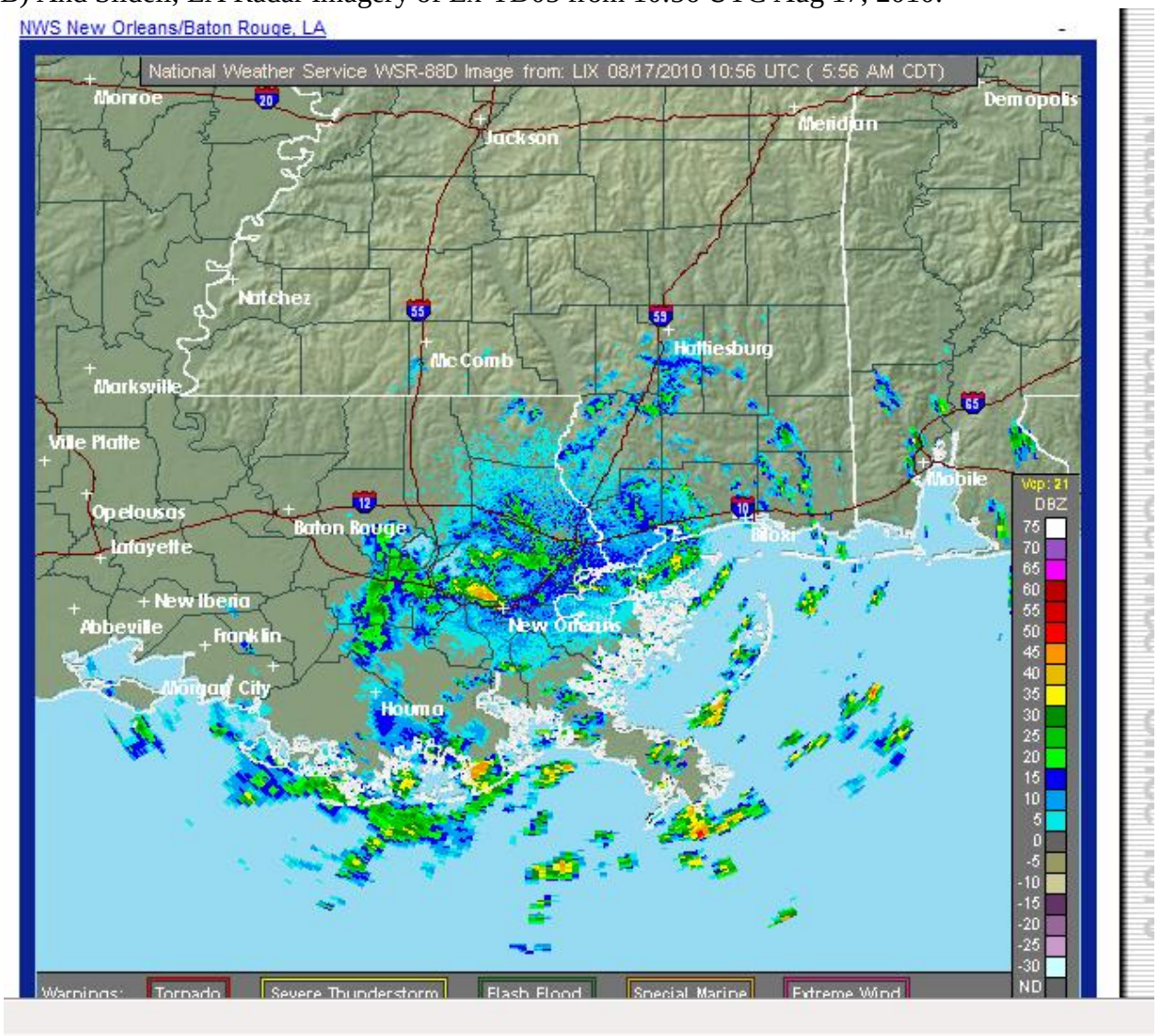
B) And 850 hPa Vorticity:



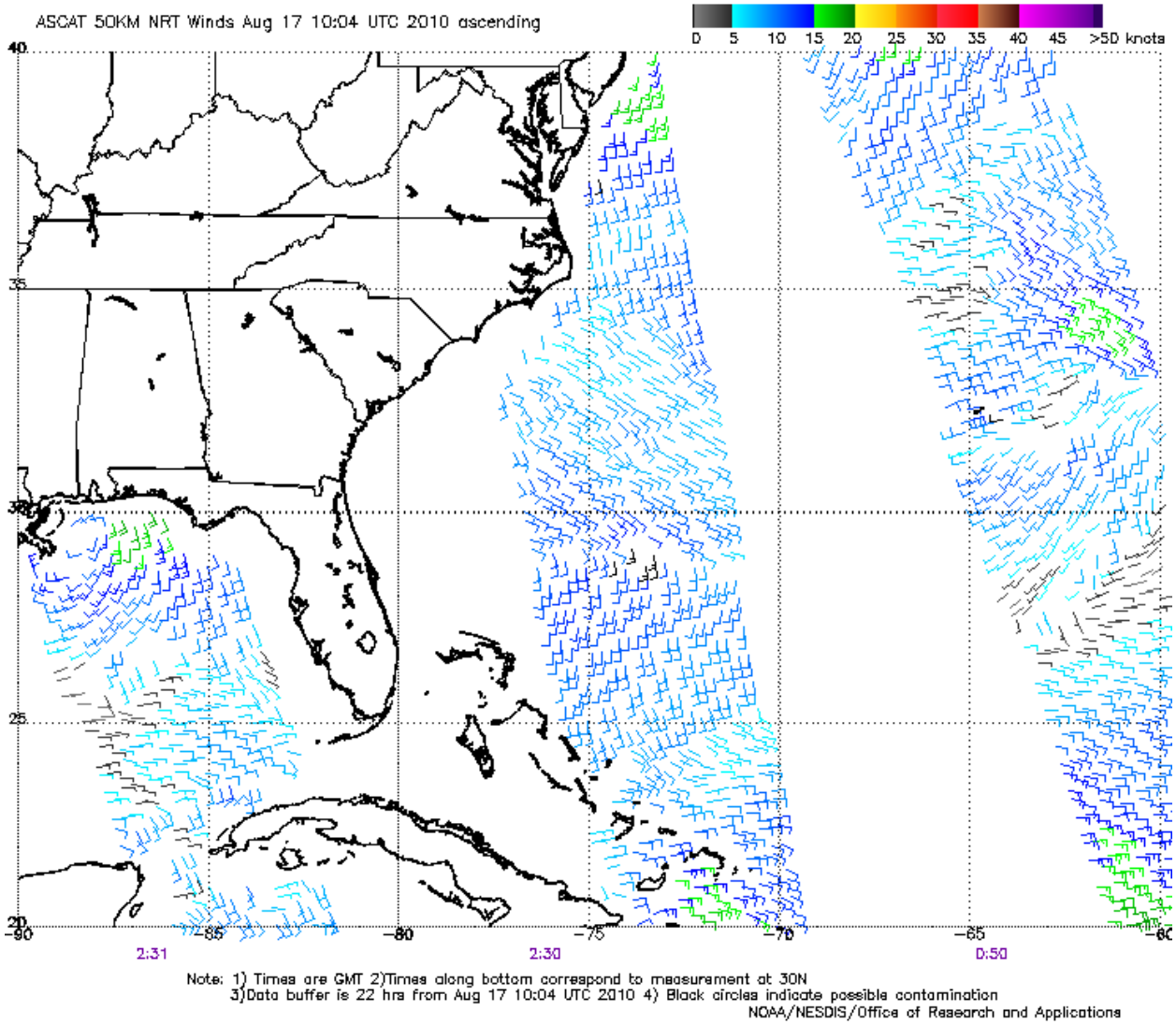
4) A) Gulf of Mexico IR AVN Enhanced Imagery showing the remnants of TD05 onshore in Louisiana at 10:45 UTC Aug 17, 2010:



B) And Slidell, LA Radar Imagery of Ex-TD05 from 10:56 UTC Aug 17, 2010:



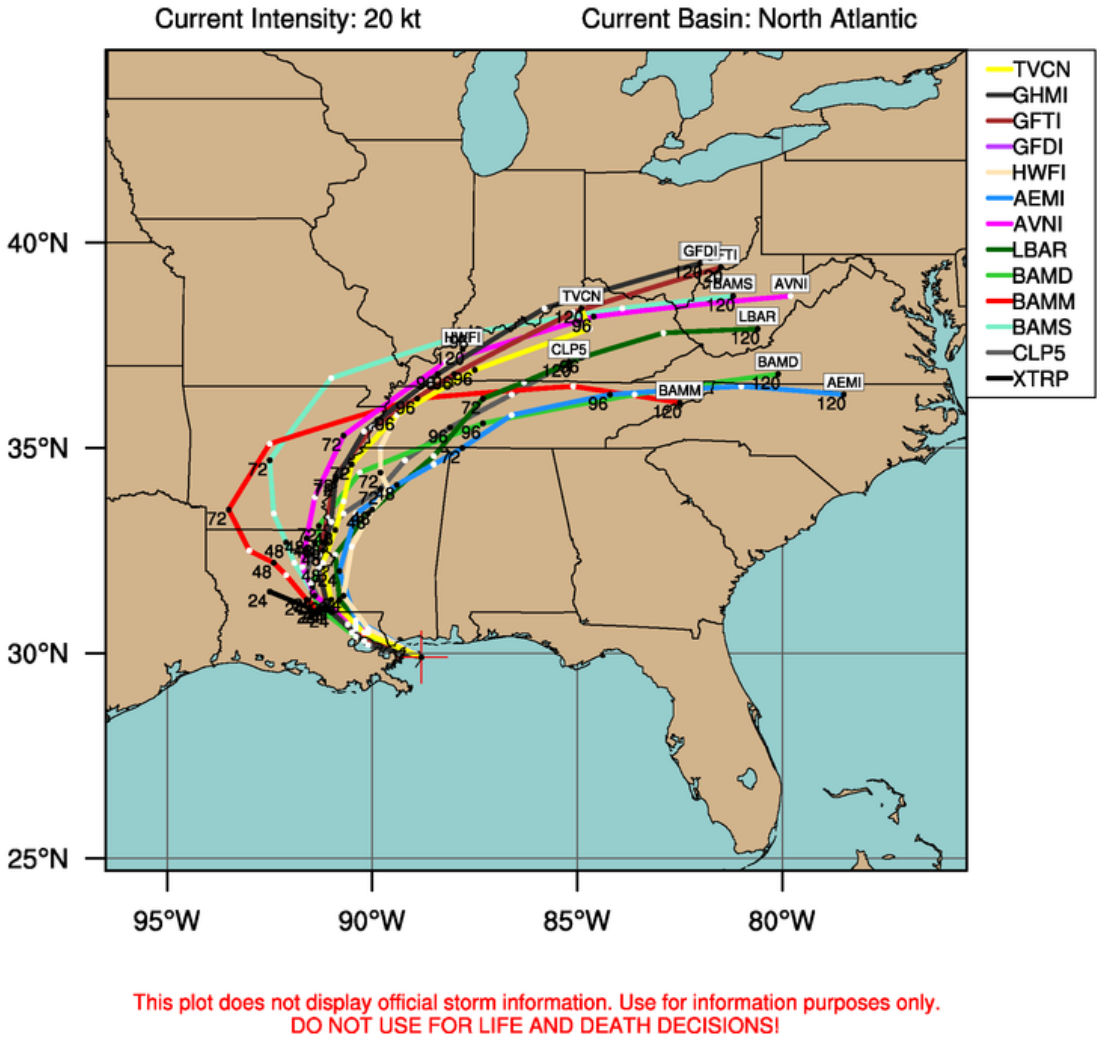
5) ASCAT winds for a 02:30 UTC pass Aug 17, 2010, showing the center of circulation at the surface, as well as how weak the winds were overnight:



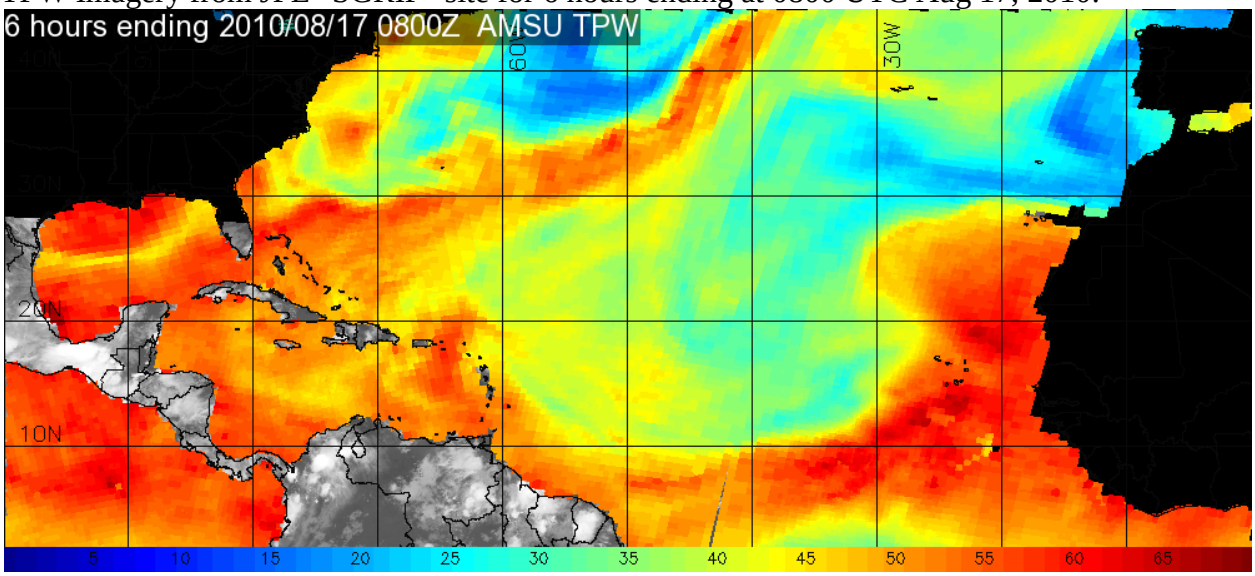
6) Model Early-cycle track guidance as of 0600 UTC Aug 17, 2010 for Ex-TD05.

LOW FIVE (AL05)

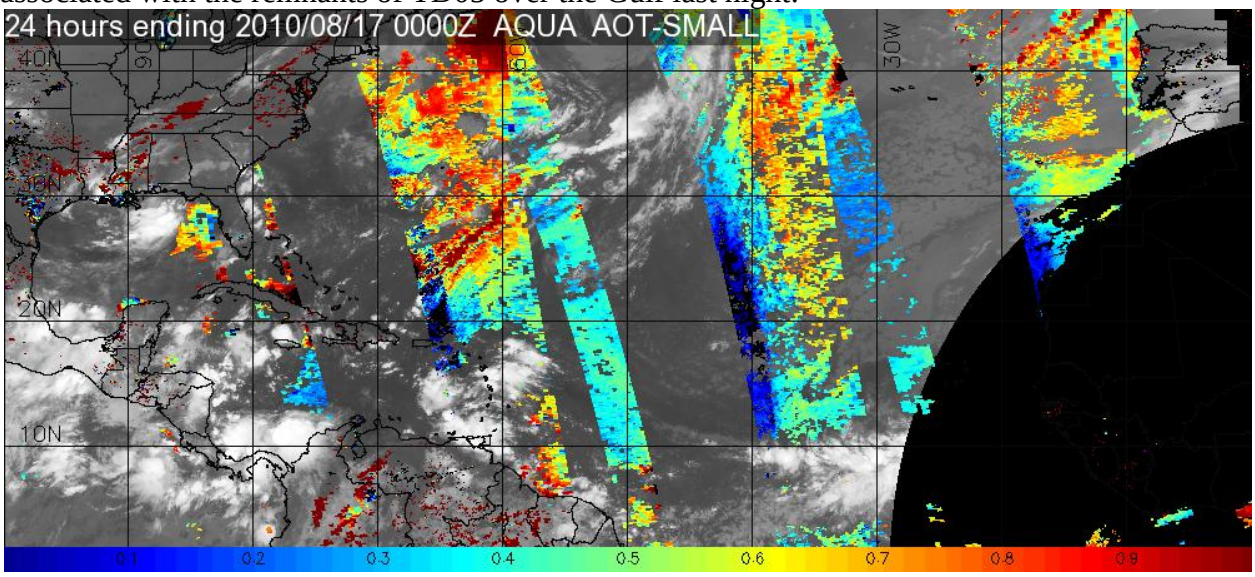
Early-cycle track guidance valid 0600 UTC, 17 August 2010



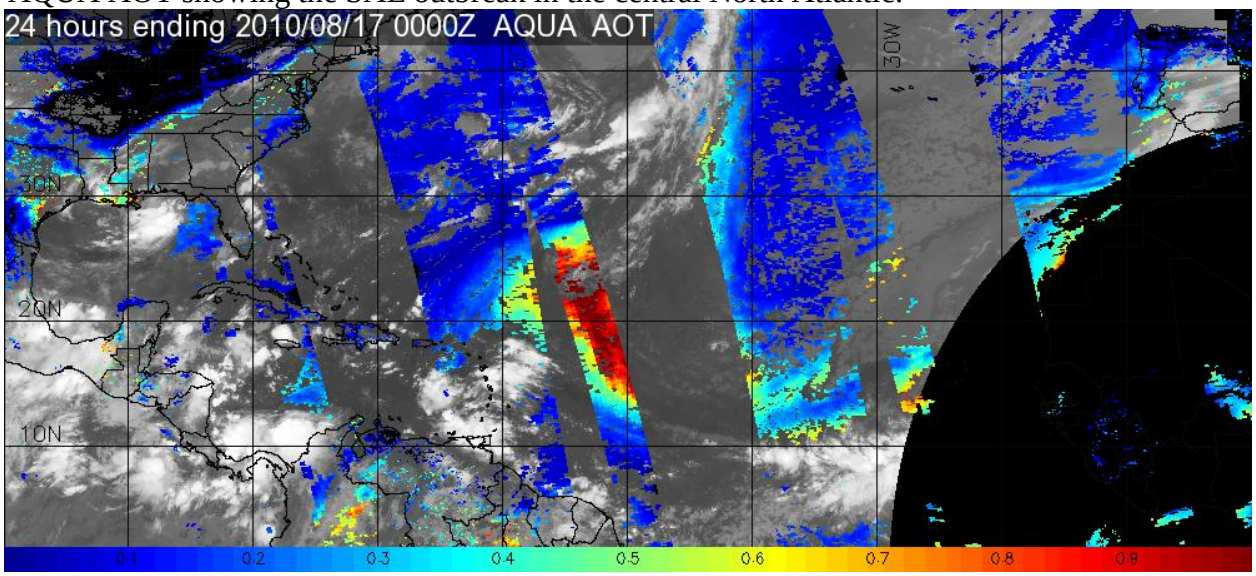
7) TPW Imagery from JPL “SGRIP” site for 6 hours ending at 0800 UTC Aug 17, 2010:



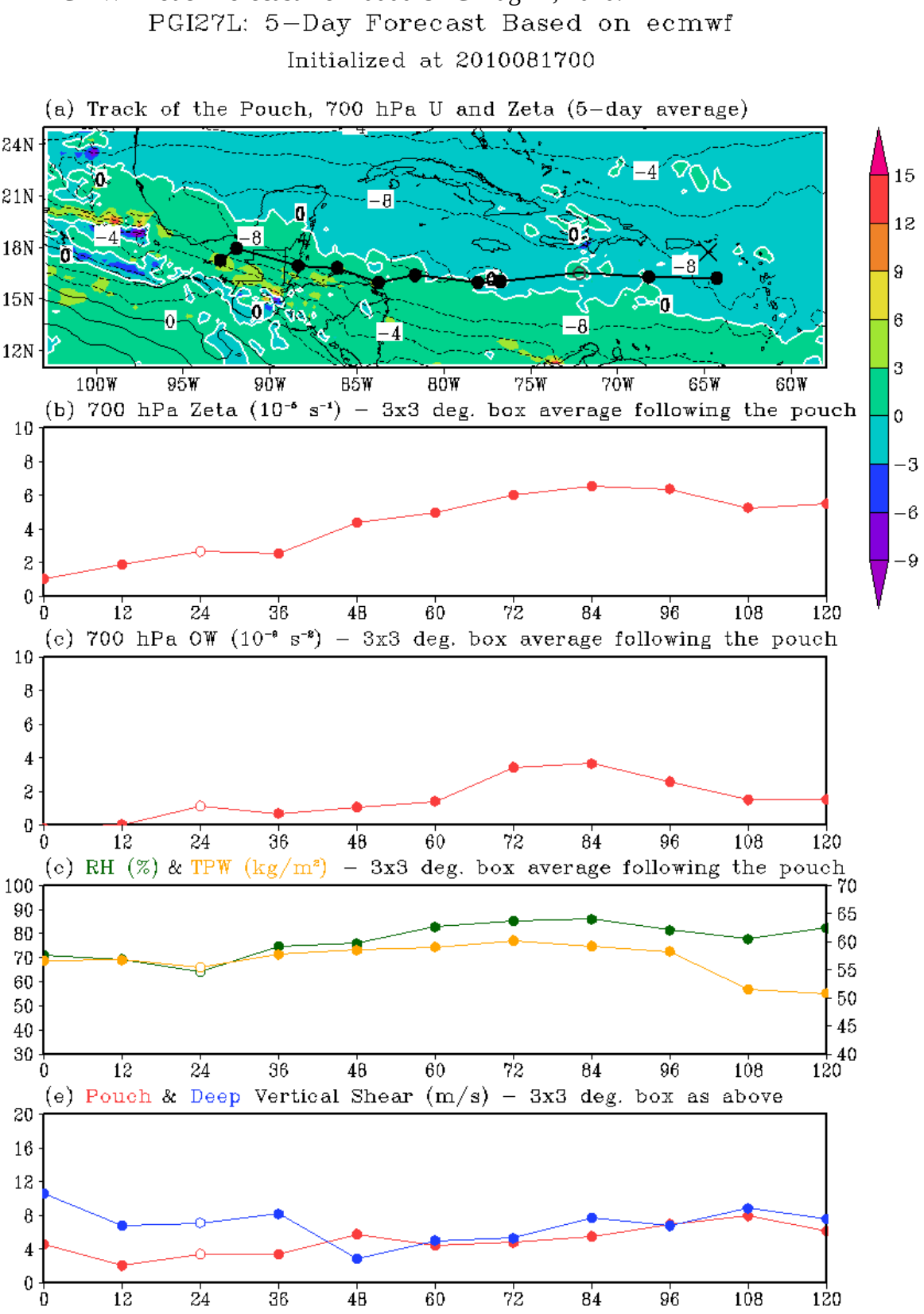
8) AQUA Fine Aerosol Optical Thickness 24-hour composite plot from Aug 17, 2010 at 0000 UTC, showing the dry air with fine aerosols in the area trailing the convection associated with the remnants of TD05 over the Gulf last night:



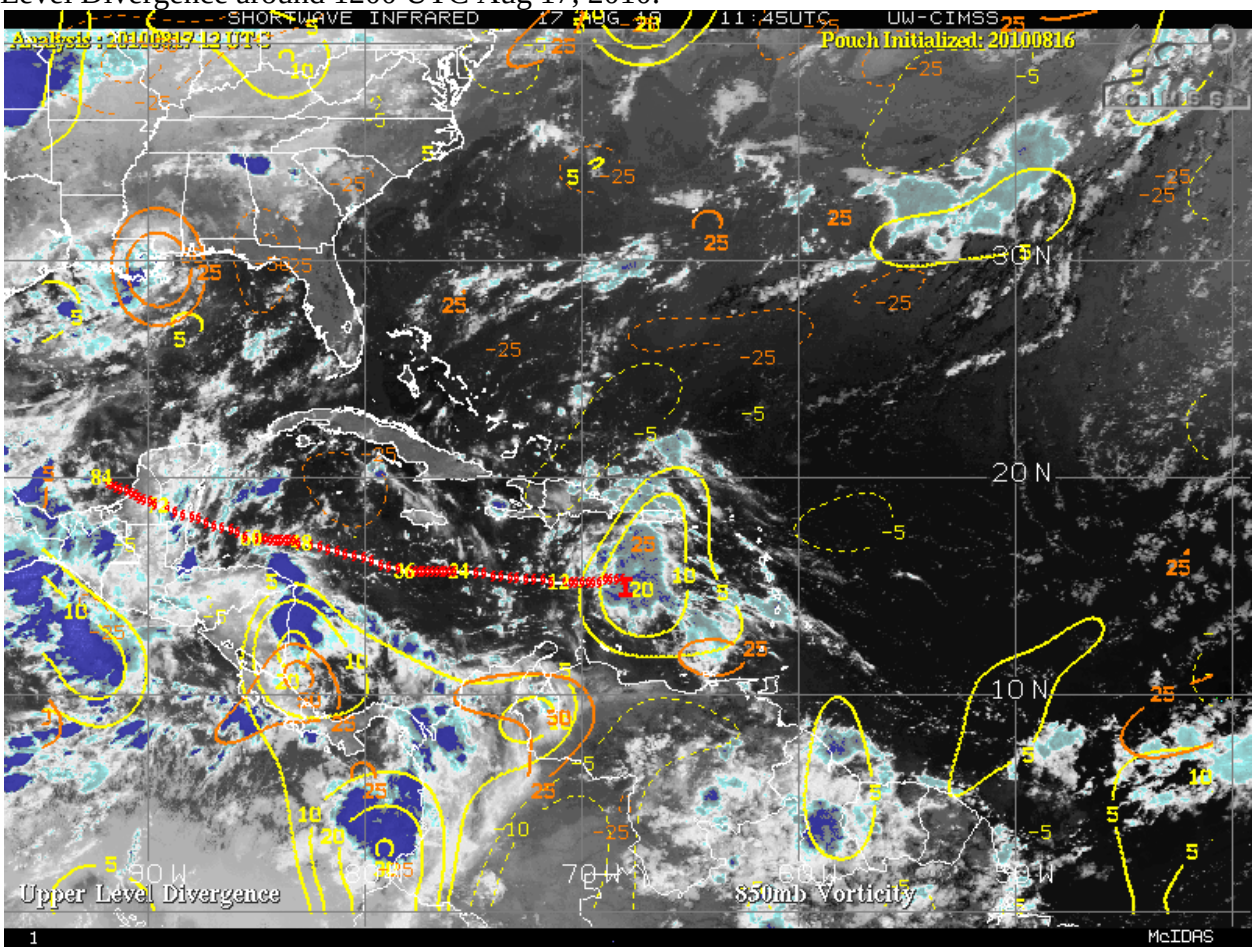
9) AQUA AOT showing the SAL outbreak in the central North Atlantic:



10) PGI-27L ECMWF Pouch Forecast from 0000 UTC Aug 17, 2010:



11) PGI-27L CIMSS Pouch forecast with overlain SW IR imagery and Vorticity and Upper Level Divergence around 1200 UTC Aug 17, 2010.



12) PGI-30L Pouch forecast, Surface, Ships and 850 hPa vorticity analysis around 1710 UTC overlain on IR imagery at 10:30 UTC Aug 17, 2010.