

## Tri-Agency Forecast Discussion for August 25, 2010

Created 1600 UTC August 25, 2010

GRIP Forecast Team: Cerese English, Jon Zawislak, Andrew Martin, Matt Janiga, Ellen Ramirez, Amber Reynolds, Dan Halperin, and Karry Liu

**Summary:** All three agencies are keeping a close watch on TD7 and the African wave behind it, analyzed as PGI-36L. While hurricane Danielle remains out of reach, these other two systems are on a westward track, and expected to stay to the south of Danielle's track. NASA is considering a suitcase flight to St Croix to possibly coordinate on flights into these systems with IFEX and PREDICT. Simultaneously, GRIP is looking to possibly fly the Global Hawk over Hurricane Frank in the East Pacific. In the mean time, it will be a Hard Down day for GRIP tomorrow with a no-fly day on Friday as well. Saturday would be the earliest possible ferry to St Croix for GRIP, but that decision will be made tomorrow. The Gulf of Mexico trough that GRIP sampled yesterday showed evidence of a low level circulation from dropsonde data during the flight, and today a circulation is evident in the western GOM close to Texas. While this system is not expected to become a TD, its environment was well-sampled yesterday in a pre-genesis-like mission. Hurricane Danielle should still continue to intensify gradually, TD7 will intensify a little more rapidly, and the wave behind it is forecast to emerge from Africa in 36 hours and will be carefully monitored as well.

### **Forecast for 1600 UTC 8/25/2010:**

#### **Synoptic Overview:**

At the lower-levels, an elongated trough extends from New England southwestward to offshore of the Outer Banks, NC and into the northern Gulf of Mexico, as shown by the CIMSS 850 hPa vorticity analysis (**2a**). This is all due to a low pressure area off New England and its associated cold front (**3a**). The front has stalled and two surface low pressure centers have developed along it. Convective flare-ups are occurring again this morning in the Gulf along this trough, and there are indications that there is a closed circulation at the western end near the newly designated PGI-37L (**3a, 4**). The elongated cyclonic PV anomaly that has been producing convection in the S.E. United States and the N.E. Gulf of Mexico is pinching off from the parent trough (seen in dynamic tropopause pressure analysis, **13**). Remnant convection still exists beneath the FL panhandle (**4**). The resultant stationary front draped across the N. Gulf coast is still separating an extremely dry air mass to the north from a regenerating line of convection to the south (**4**). In the western Gulf a weak surface low (**6b**) is expected to track westward and move over land near the Texas-Mexico border. Circulation does not appear at upper levels in the winds or the vorticity (**1a, 1b**).

At the upper-levels, there is some very dry air over the SE US and the extreme northern Gulf of Mexico, just north of the aforementioned elongated trough. There is an upper-level low just to the north of Danielle, near 28N/53W (**1a**). This feature has not strengthened as much as was originally forecasted, and it is currently moving to the NNW.

Meanwhile, a strengthening Canadian cyclone is digging into the Midwest U.S. ahead of a building ridge in the central CONUS creating a N-S oriented frontal boundary (**3a**). The cold front is not expected to affect the S.E. United States as the high pressure system will build eastward forcing the cyclone to stay north.

A tropical wave was analyzed just east of the Bahamas near 26N/72W (**3a**), which was the formerly-designated PGI-30L. The subtropical ridge remains in place and continues to steer Danielle (located at 19.6N/52.3W) and TD 7 (located at 14.3N/30.8W) (**2b**). Danielle has re-strengthened to hurricane status with a northwest heading turning. Both Hurricane Danielle and PGI-34L/TD-7 are contained in very high TPW (**3b**) and each has convection surrounding its center (**8a, 9a**). However, the 1300 UTC CIMSS analysis of TPW indicates that dry air continues to wrap around the west and south sides of Danielle, and another area of dry air is wrapping around the western side of TD 7. Fortunately, it does not appear that either area is actually making it into the centers of the tropical cyclones. Meanwhile, two new pouches have been analyzed; PGI-36L which is located off the coast of West Africa near Senegal, and PGI-35L which is analyzed south of Ghana (**3a**).

### **Features of Interest:**

#### **Possible GOM Development/PGI-37L:**

An elongated trough observed in the Gulf of Mexico yesterday appears to be more organized (**2a, 4**), in terms of a circulation today (near 94W/26N). A convective area in the western Gulf (**4**) indicates some low-level rotation, and surface observations confirm this circulation (**6a**); a pouch, PGI-37L, in this area has been identified (initial location is 92.4W/26N). Convection associated with the newly isolated low-level vorticity maximum is not particularly deep. Otherwise, convection is located along the elongated trough, which has pushed somewhat southward. Yesterday's mission confirmed the presence of a tight horizontal wind shear zone in the central Gulf, with evidence for a circulation present at 700 hPa near 90W/27N. The vertical wind shear is weak, 5-10kt, and is easterly (**5**). It now appears that this situation was well forecasted; an isolated low-level vortex has pinched off as the elongated trough moves south and eastward, as has been forecasted for the past few days in the global models. Potential genesis is low (~10%), as none of the models intensify a surface low or increase the low-level vorticity. The consensus forecast track for PGI-37L is as follows (**6b, 7**): initial 1500UTC: 92.4W/26N; 26/0300UTC: 93.5W/25.5N; 26/1500UTC: 94.8W/25.7N; 27/0300UTC: 95.5W/25.4N; 27/1500UTC: 96.6W/25.3N; 28/0300UTC: 97.2W/25.5N (over land); 28/1500UTC: 98.3W/25.5N; 29/0300UTC: 99.4W/26.9N.

#### **Hurricane Danielle:**

After strengthening to a Category 2 hurricane at 0600 UTC early yesterday morning, Hurricane Danielle weakened to a Category 1 at the next analysis time, and has remained so due to its presence in a relatively high shear environment (**5**). An upper level cyclone to the N/NW has imparted a moderate amount of shear that has kept Danielle from further intensification. Danielle showed some weakening overnight, however another convective burst occurred slightly after 1200 UTC today. Following yesterday's better organization, Danielle has become asymmetric with stronger convection in the NE quadrant with 75 knot winds (**8a, 8b**).

As of 1300 UTC 25 August 2010, the current location of Hurricane Danielle was 19.4N/52W. The future of Danielle will depend how much dry air entrainment and hostile shear environment it can survive (**8c**). ECMWF, GFS, and UKMET show a slight weakening of deep layer shear down to approximately 15 m/s (from current approx. 20 m/s) at 48 hours but then another increase in wind shear thereafter. However, if the upper level cyclone moves further to the SW in the next 48 hours, shear could weaken and create an environment more conducive to limited additional strengthening. Additionally, Danielle should move into slightly warmer (+1°C) SSTs. There is a good model consensus that the hurricane will shift further north after 72 hours, and the model prediction for intensity change strengthens Hurricane Danielle to a Category 2 again at 36 hours (initialized at 0600 UTC 25 August 2010), but then weakens it again after 96 hours.

#### **TD7/PGI34L:**

Former AL96L was named Tropical Depression Seven at 1445 UTC on Wednesday 8/25. An ASCAT pass at 1000 UTC showed a closed cyclonic circulation with about 25 kt winds. At 1600 UTC, TD7 was located near 28W/14N (**9b**). 85 GHz microwave imagery from SSMI showed cold brightness temperatures of less than 190K clustered to the west of the center of the vortex (see 85GHz H-pol SSMI image from 1000 UTC, **9a**). These cloud tops were not well organized yet, and it is unlikely that a deep-tropospheric symmetric circulation will form in the next 24 hours. Shear over the system is moderate with an upper level ridge to the east of the system over Africa and an upper level low to the north of TD-7 separated by approximately 5 degrees of latitude (**1b, 5**). As the storm grows in strength, outflow will be restricted to a channel to the southwest. This upper level setup will only be marginally favorable for development. The environment in TD-7 is very moist with Total Precipitable Water values greater than 65 mm. There is a high moisture gradient to the storm's west, with TPW values less than 35 mm here. The northerly flow on this side of the storm is beginning to wrap this dry air around to its south (**3b, 14**). AIRS soundings from 0600 UTC contrasting the southern and northern side of the storm show that mid and high levels are quite dry to the south, while the northeastern side of the storm is much more moist (**14**).

Model track guidance suggests that this storm will move on a primarily west-northwesterly track for the next 96 hours (**9c, 9d**). The factors of low to moderate shear, constricted outflow, and dry air intrusion will only limit the storm's development to a small degree. The internal organization and deep convection already present will be able to slowly overcome these factors, and most models forecast the storm to steadily intensify over the next 96 hours and beyond, eventually becoming a category 1 or 2 hurricane by the end of the model solutions (**9e**).

The following are the forecast MSLP locations from the GFS initialized at 1200 UTC on 8/25: 8/25 at 1200 UTC: 28W/14N; 8/26 at 0000 UTC: 33W/14N; 8/26 at 1200 UTC: 38W/16N; 8/27 at 0000 UTC: 40W/17N; 8/27 at 1200 UTC: 42W/17N; 8/28 at 0000 UTC: 48W/17N; 8/28 at 1200 UTC: 50W/17N; 8/29 at 0000 UTC: 52W/18N.

The following are the forecast MSLP locations from the ECMWF operational model initialized at 1200 UTC on 8/25: 8/25 at 0000 UTC: 27W/14N; 8/26 at 0000 UTC: 32W/24N; 8/27 at 0000 UTC: 39W/15N; 8/28 at 0000 UTC: 43W/17N; 8/29 at 0000 UTC: 51W/19N.

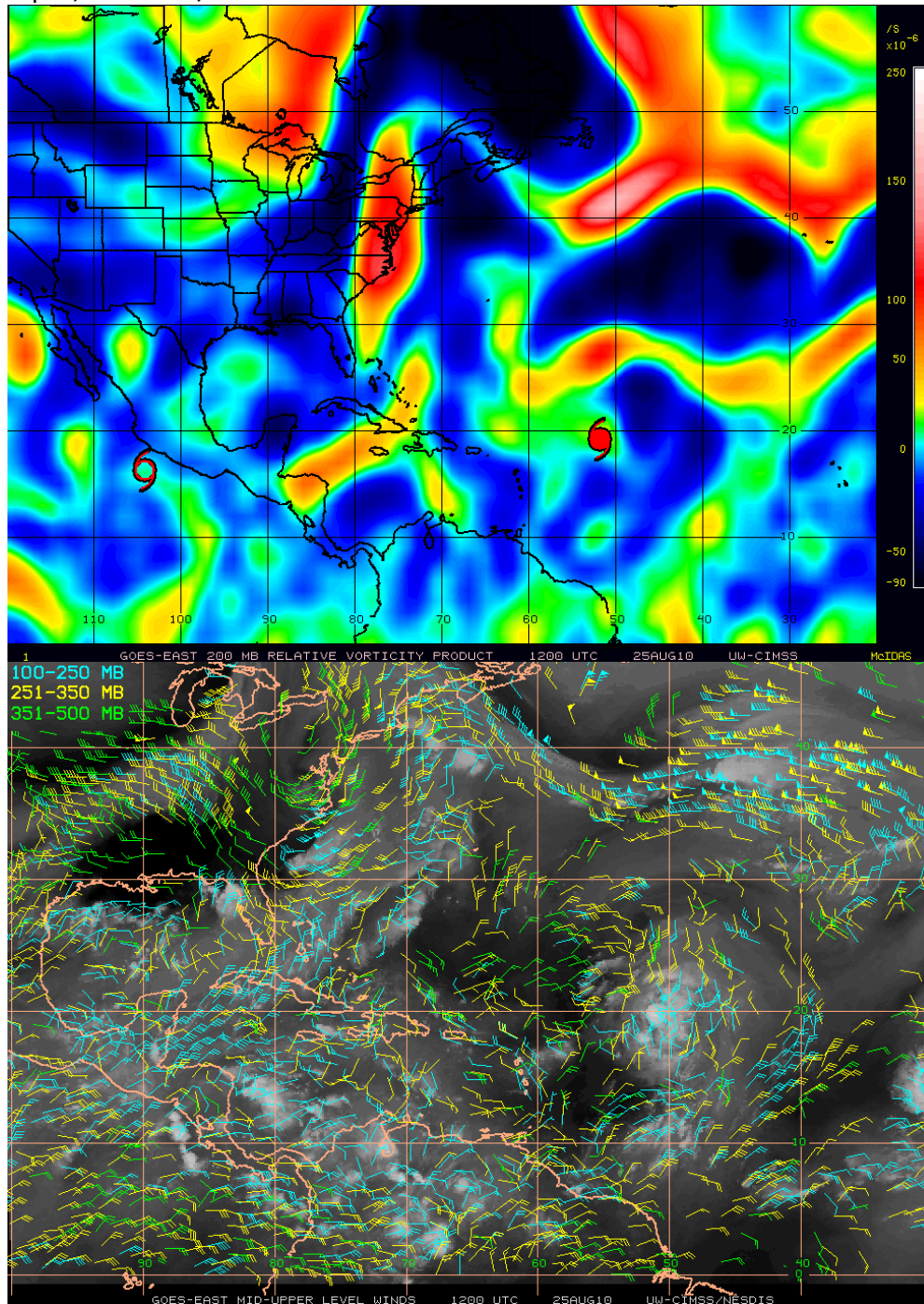
**PGI-36L:**

At 8/25 0000 UTC a pouch was analyzed at 10N/6W. Ongoing deep convection has been occurring on the western side of the low-mid level vorticity maxima associated with PGI-36L (10). A large north-south elongated outbreak of convection began 8/24 1500 UT and became fairly dissipated by 8/25 1200 UTC. The ITF is displaced well to the north near 25N as the baroclinic zone and Saharan heat low were significantly weakened by the strong surge of monsoon southerlies following the easterly wave containing PGI-34L which has now become TD-7. Associated with this disruption of the baroclinic zone, PGI-36L lacks the intense northern vortex which PGI-34L possessed.

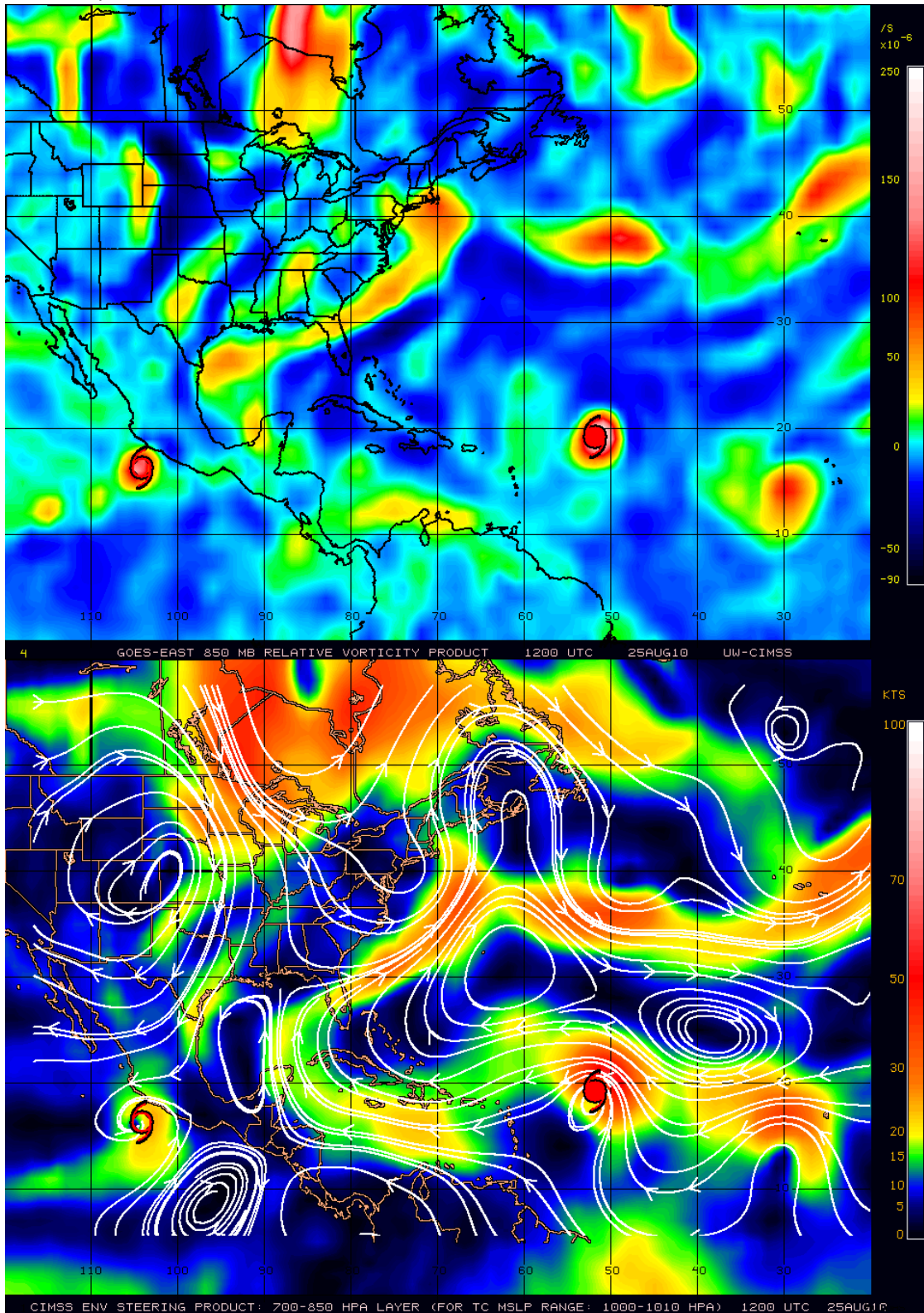
There is still a disagreement between the 8/25 0000 UTC GFS and ECMWF analyses of the mid-level vorticity structure associated with PGI-36L. The GFS analyzes the disturbance as a NW-SE orientated strip of 700 hPa vorticity maxima moving westward along 9N while the ECMWF quickly wraps up the mid-level vorticity taking it toward the coast closer to 13N. Attention should be paid over the next 24 hr to the structural evolution of this system, and the global models should get a better handle on the adjustment to the large convective outbreak which occurred yesterday. The 8/25 0000 UTC GFS and ECMWF take the system on a WNW heading over the next 120 hr with steadily increasing vorticity and moisture (11). Considerable uncertainty exists in the future track of PGI-36L at long ranges with the ECMWF and NCEP ensembles suggesting a range of possible locations extending from 10N-22.5N and 60W-50W (12).

## Images used in discussion:

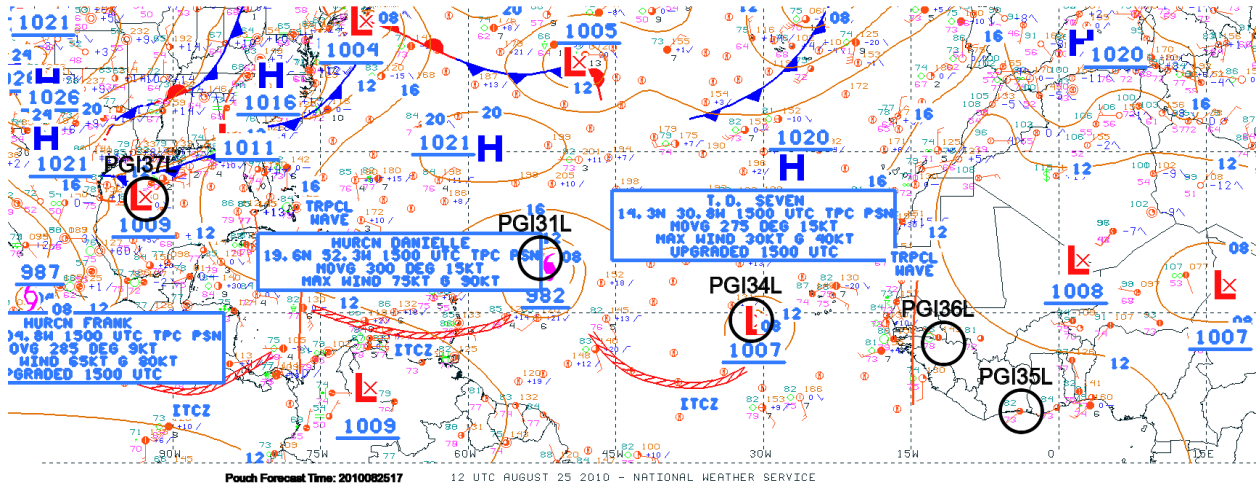
1) (a) CIMSS analyzed 200 hPa vorticity (b) CIMSS satellite-derived upper-level winds and water vapor, both at 8/25 1200 UTC.



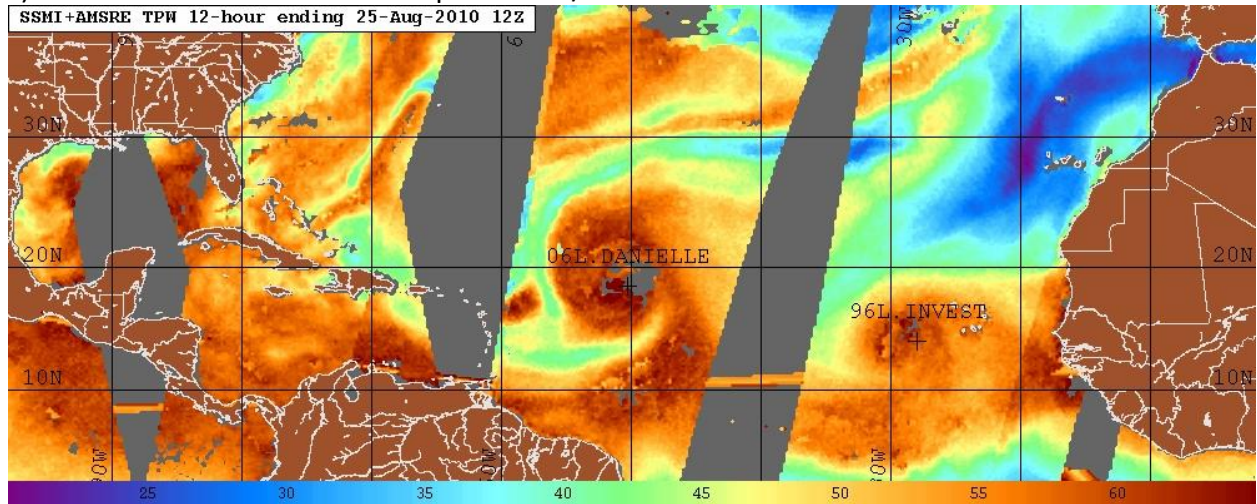
2) (a) CIMSS analyzed 850 hPa vorticity (b) CIMSS satellite derived steering-level winds and IR both at 8/25 1200 UTC.



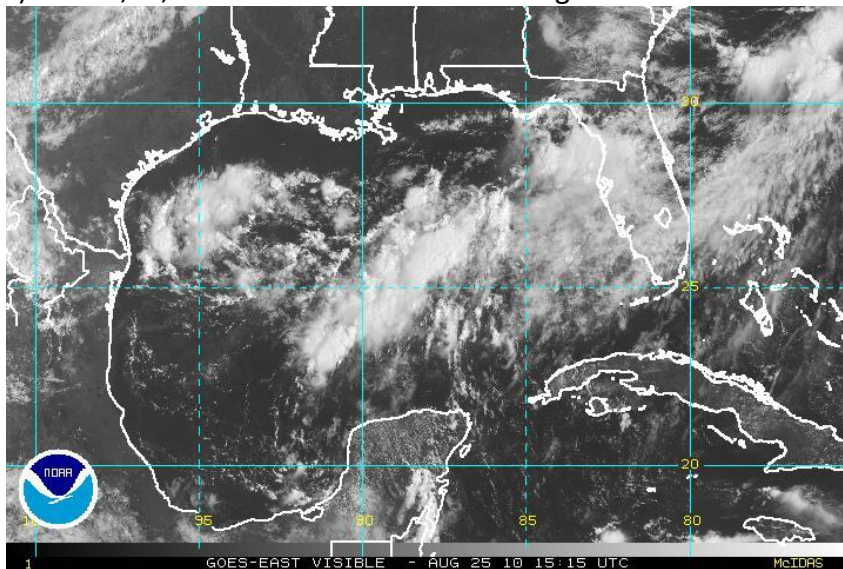
3.) a) Pouch locations on 0000 UTC Forecast map

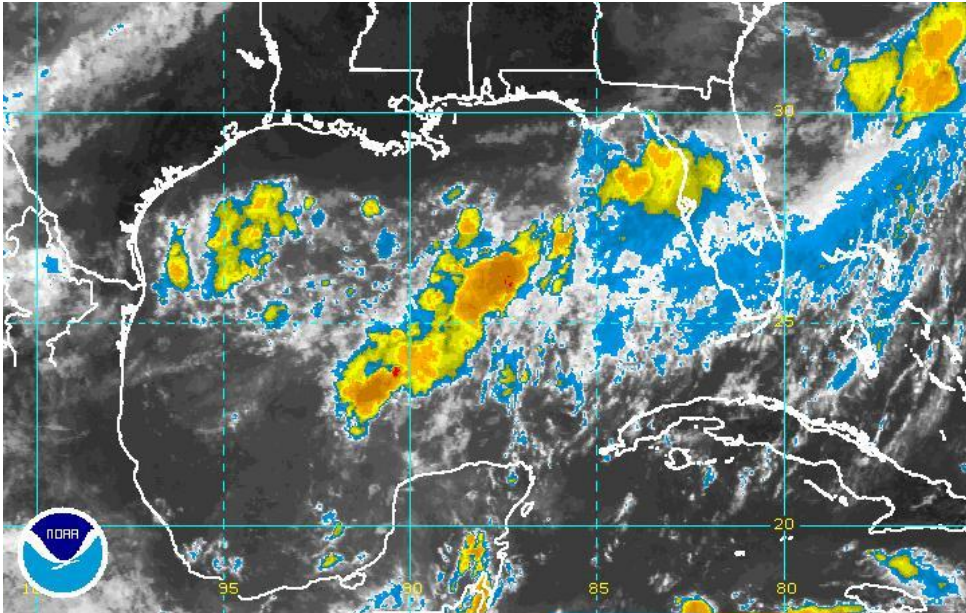


b) SSMI + AMSRE TPW 12-hr composite at 8/25 1200 UTC:

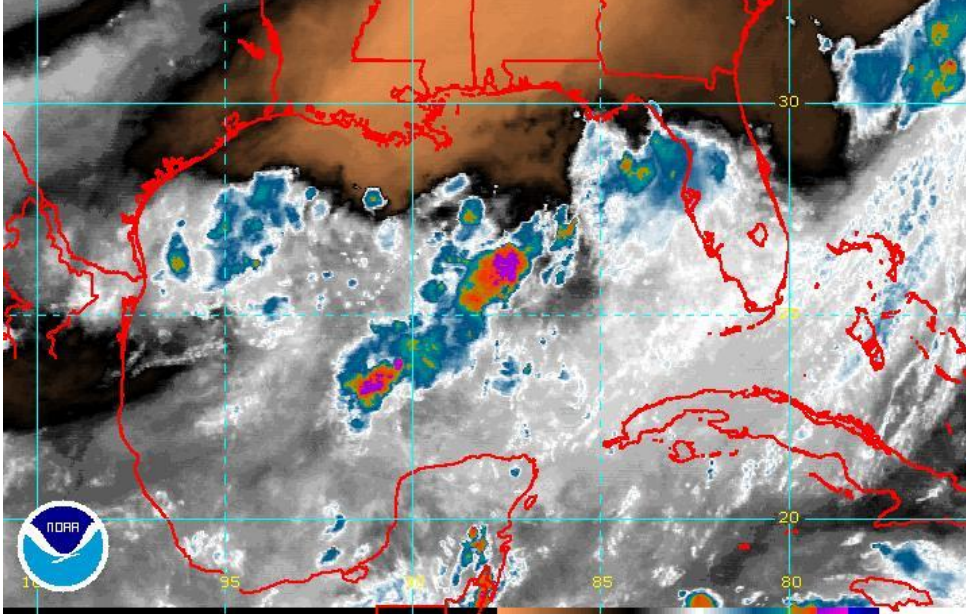


4) Visible, IR, and WV channel satellite images valid at 15:15 UTC Aug 25 over the GOM:





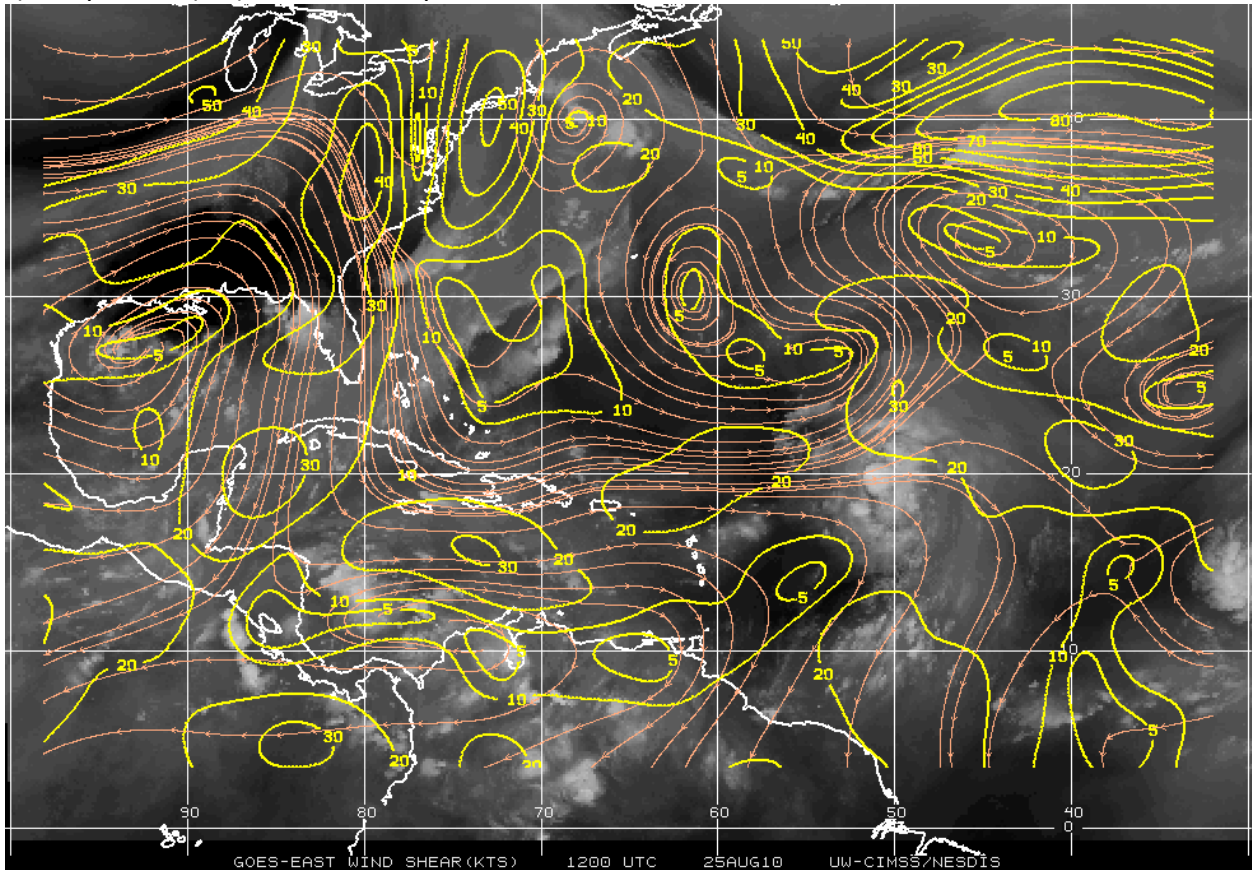
4 GOES-EAST AVNCOLOR IR CH. 4 - AUG 25 10 15:15 UTC



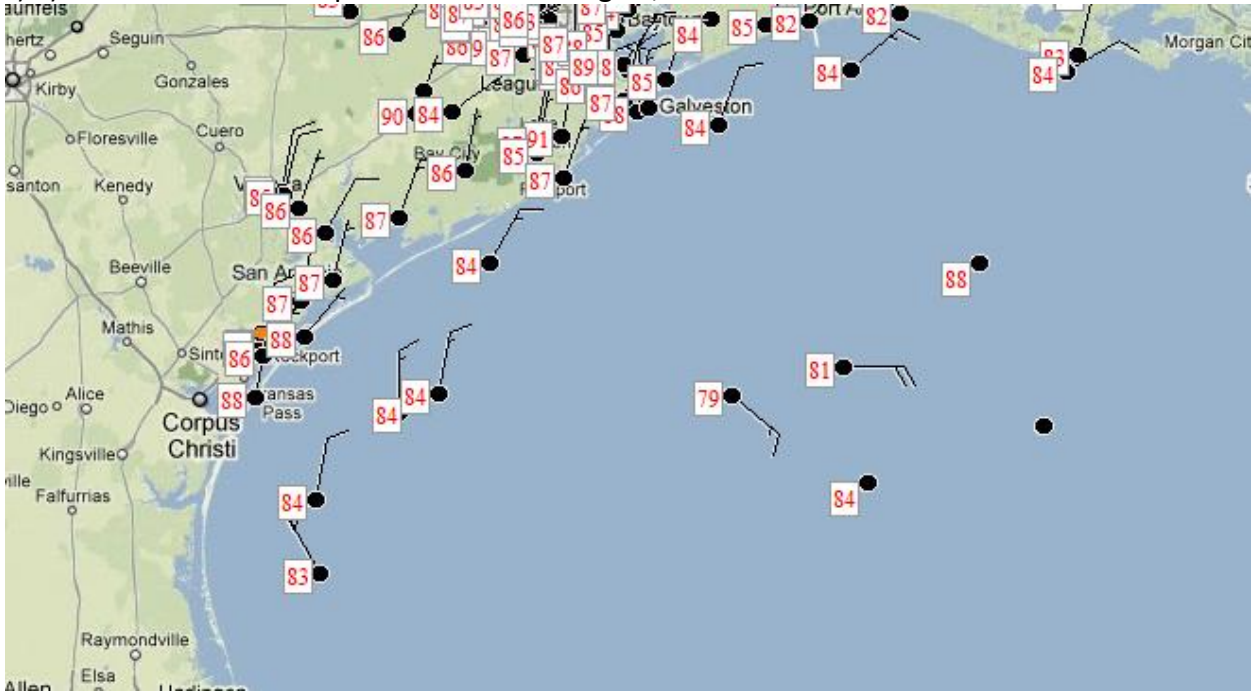
3 GOES-EAST WATER VAPOR - AUG 25 10 15:15 UTC



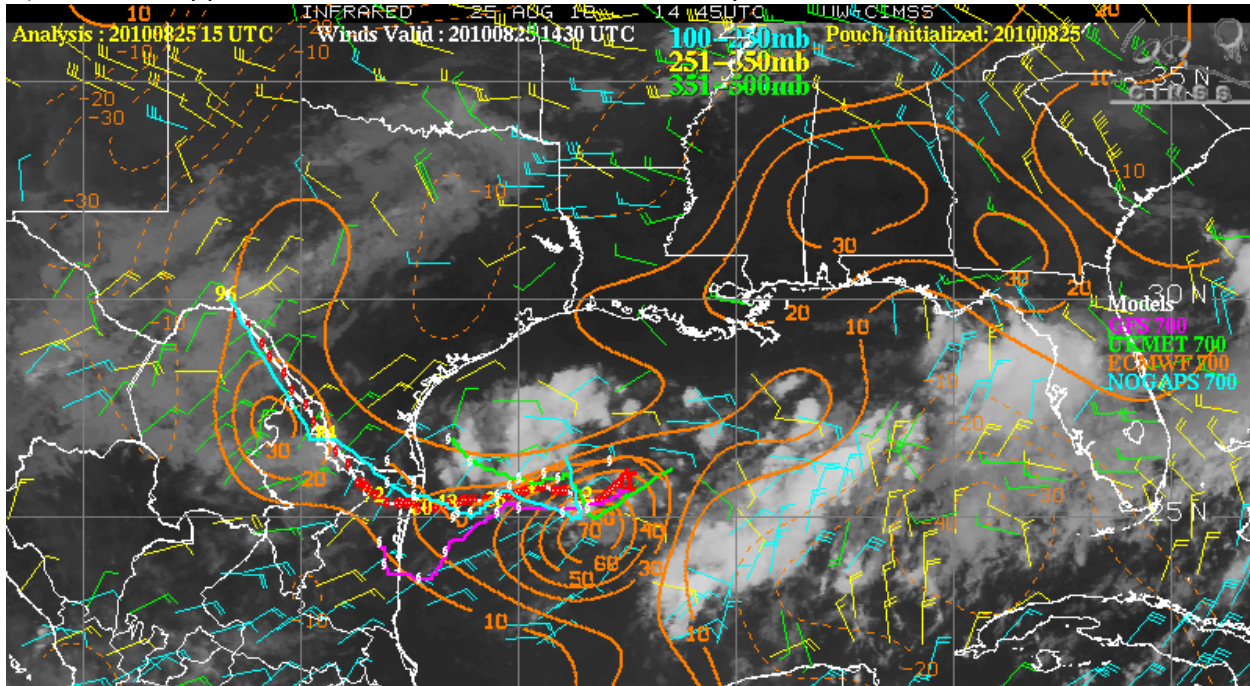
5) Deep shear (kts) and water vapor valid at 8/25 1200 UTC:



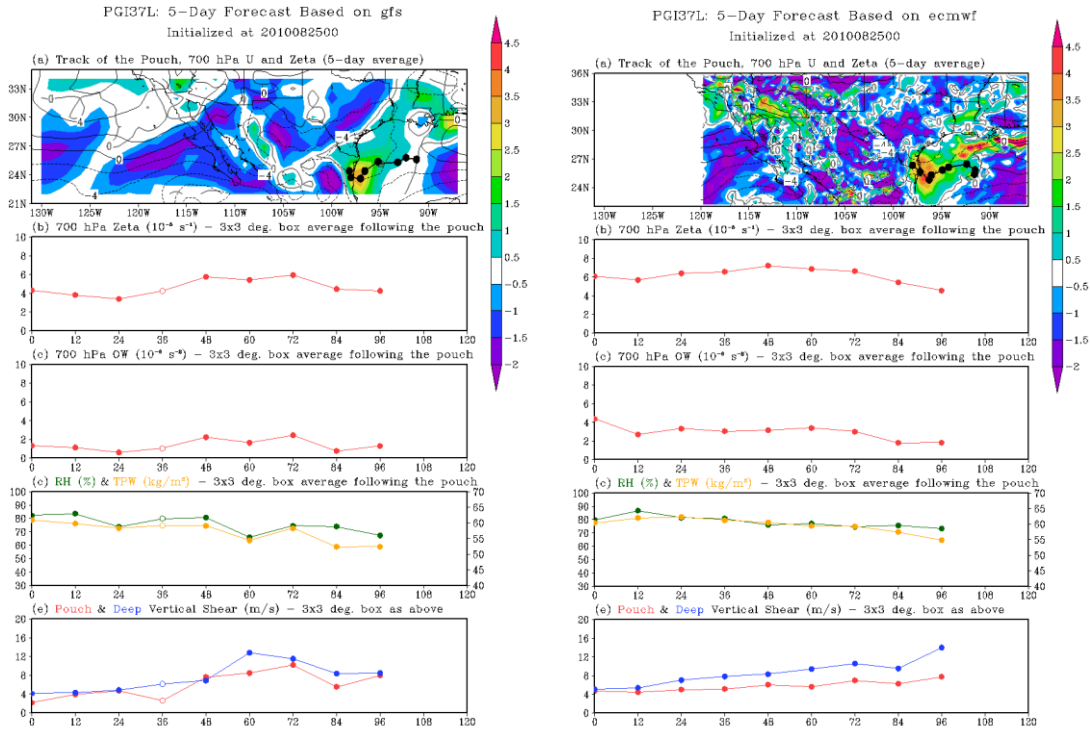
6) a) Gulf Winds 1-hr composite 15:20 UTC Aug 25, 2010:



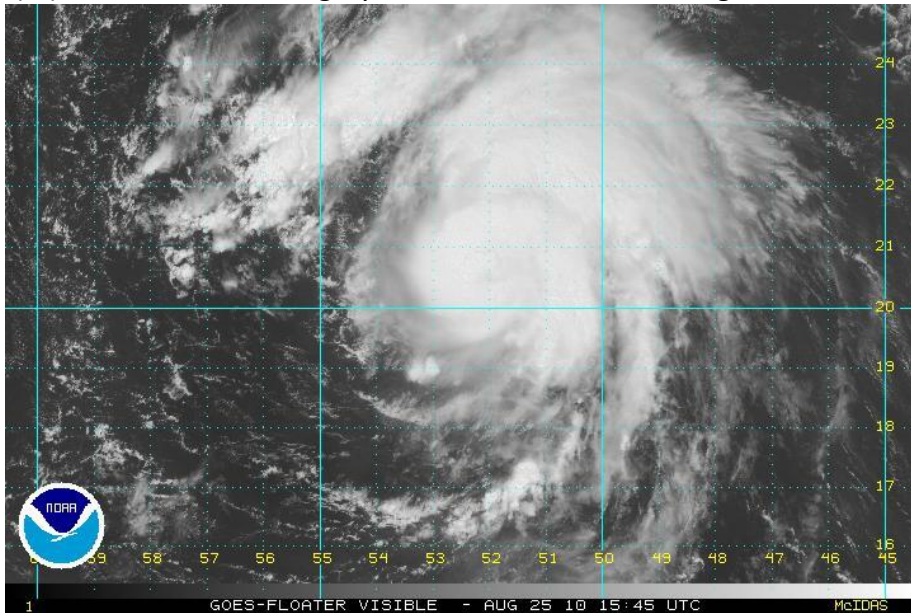
b) CIMSS IR, upper-level winds, 850 hPa relative vorticity, and PGI-37L model/consensus tracks



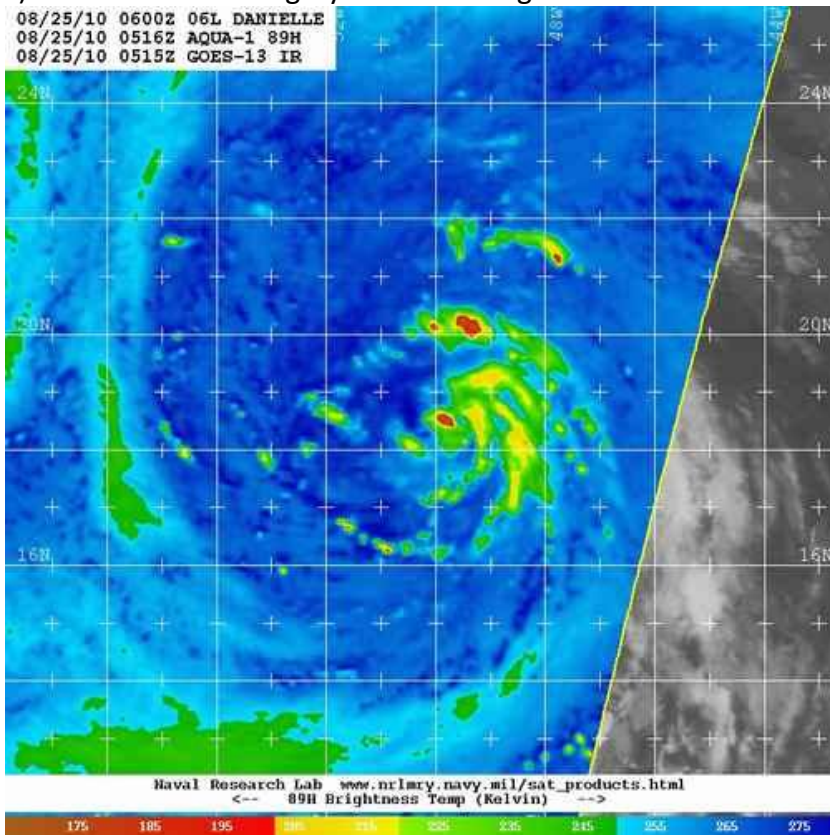
7) Pouch analysis for PGI-37L valid at 8/25 0000 UTC from (left) the GFS and (right) the ECMWF:



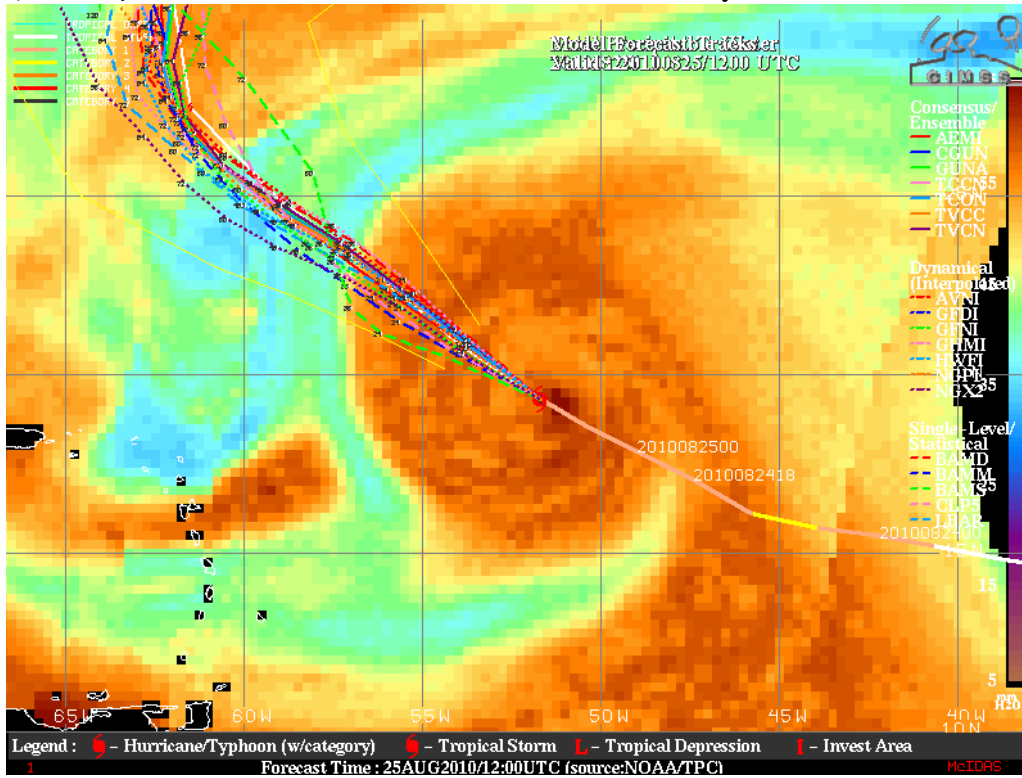
8) a) Visible satellite imagery for Danielle 15:45 UTC Aug 25.



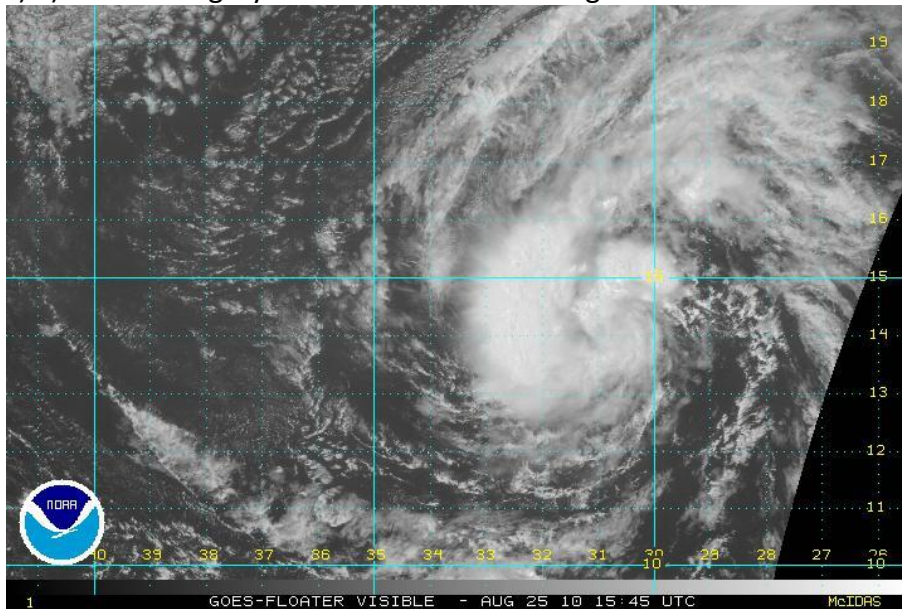
b) Danielle 85 Ghz imagery 0600 UTC Aug 25:



c) Close up TPW on Danielle with consensus/ensemble, dynamic, and statistical model tracks.

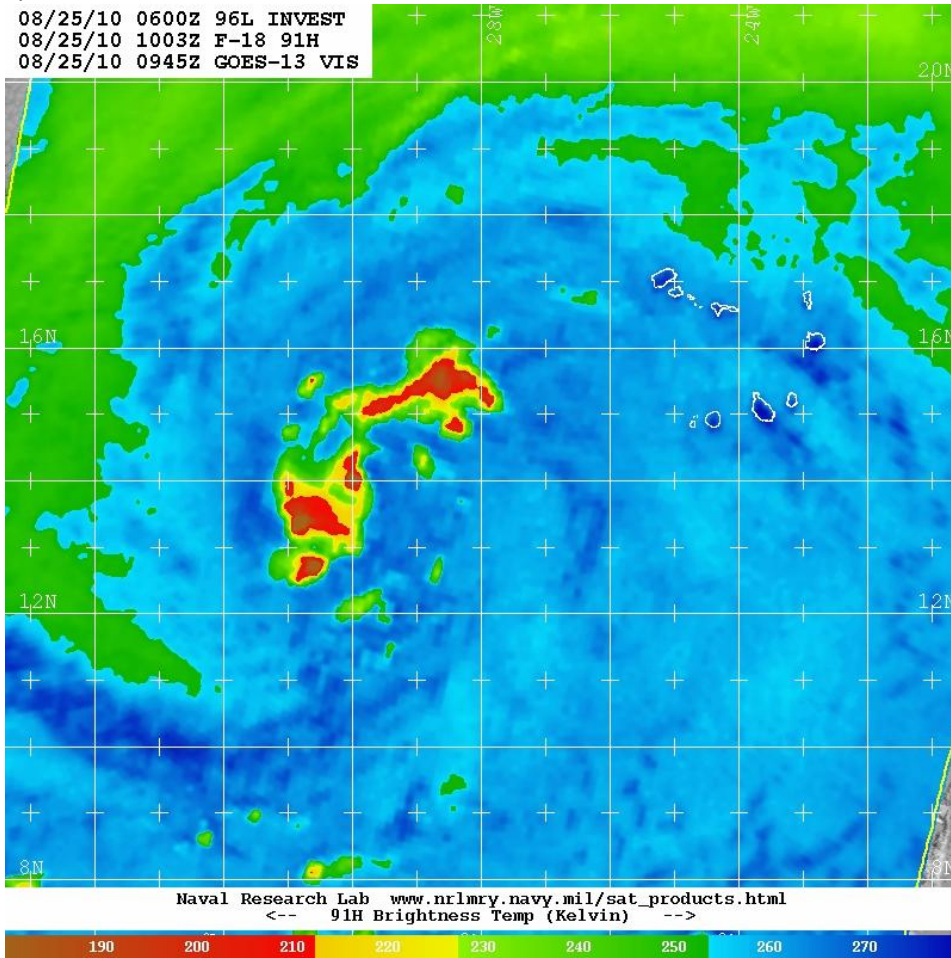


9) a) Visible imagery for ED7 at 15:45 UTC Aug 25:



b) 85 GHz SSM/I for TD7 on 08/25/10

08/25/10 0600Z 96L INVEST  
 08/25/10 1003Z F-18 91H  
 08/25/10 0945Z GOES-13 VIS

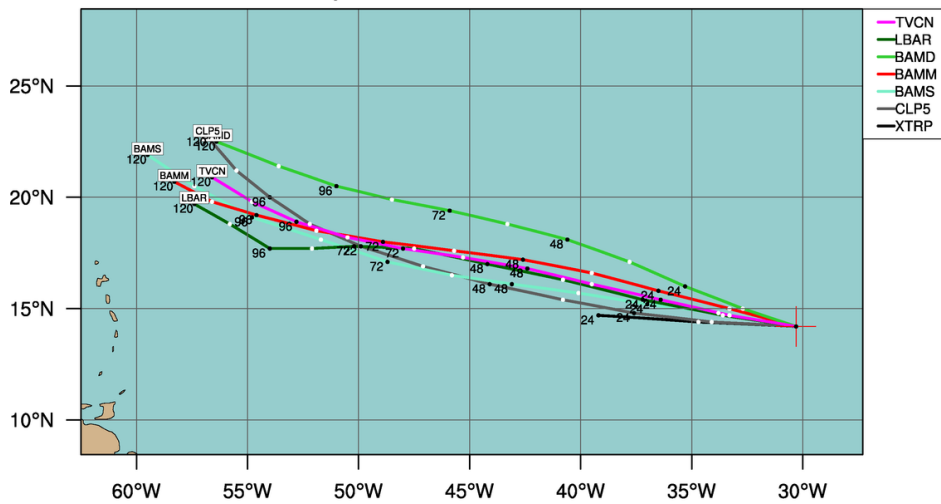


c) Track guidance for TD7 8/25 1200 UTC:

**TROPICAL DEPRESSION SEVEN (AL07)**

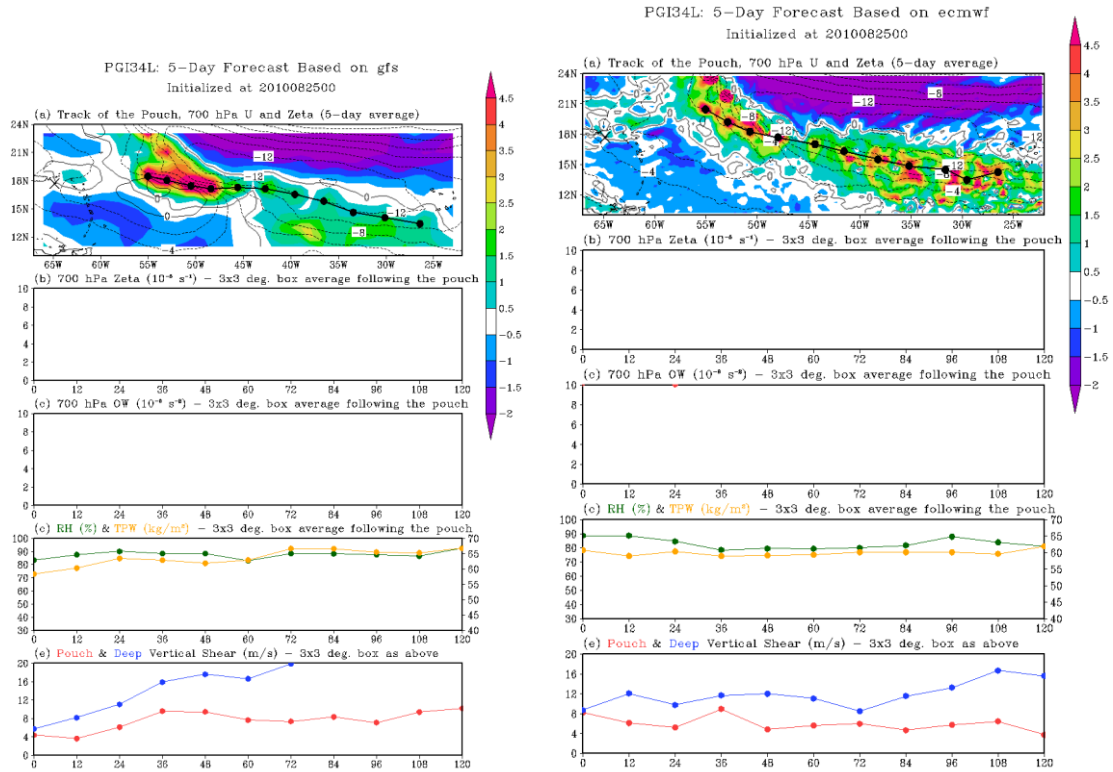
Early-cycle track guidance valid 1200 UTC, 25 August 2010

Current Intensity: 30 kt      Current Basin: North Atlantic

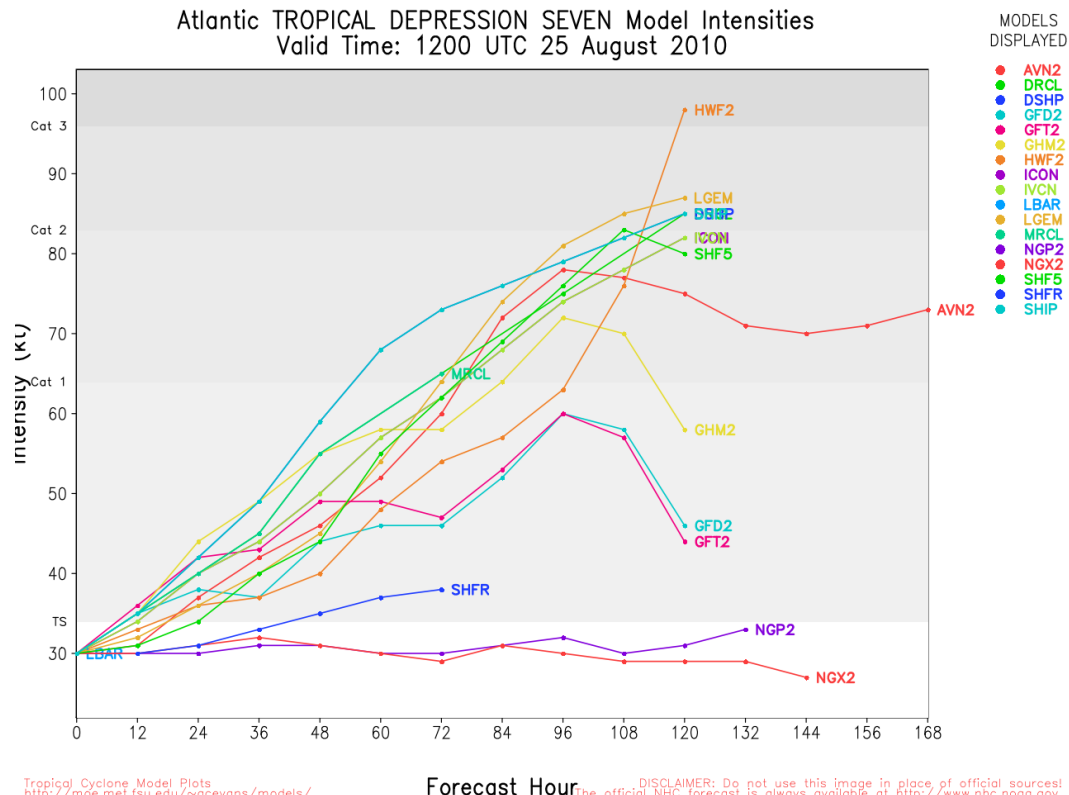


This plot does not display official storm information. Use for information purposes only.  
 DO NOT USE FOR LIFE AND DEATH DECISIONS!

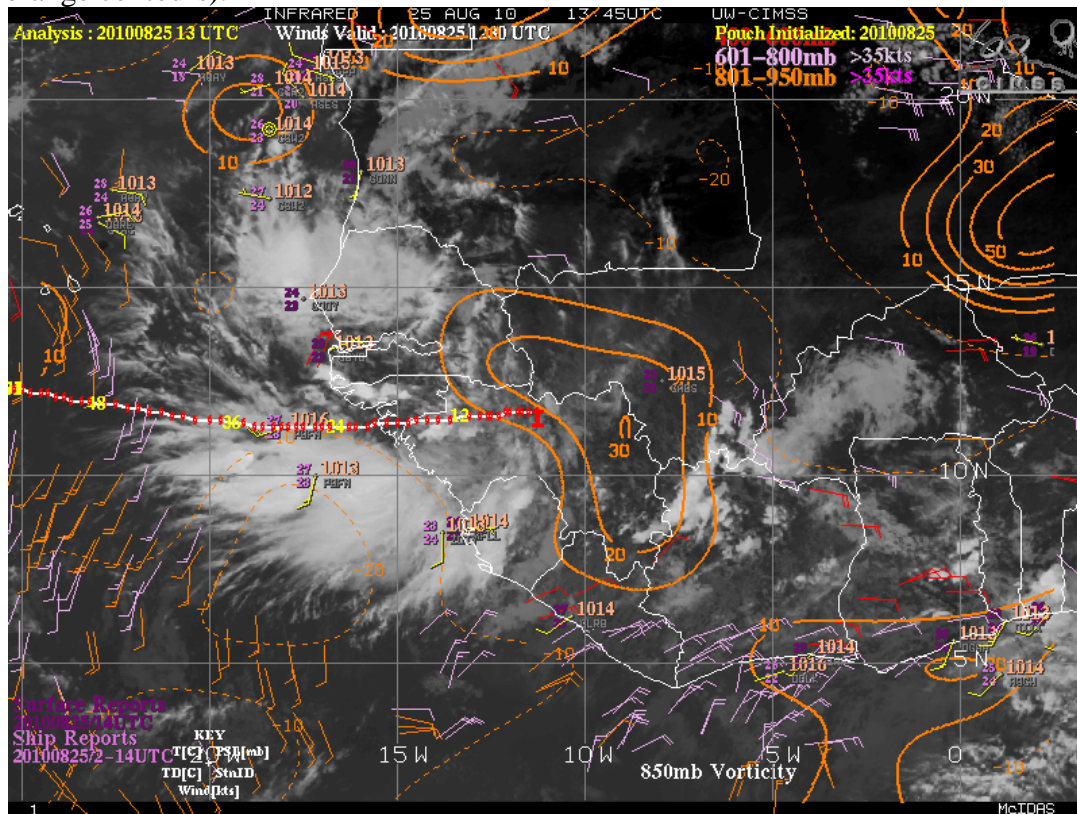
d) TD7 Pouch forecasts for 0000 UTC initialized GFS (right) and ECMWF (left):



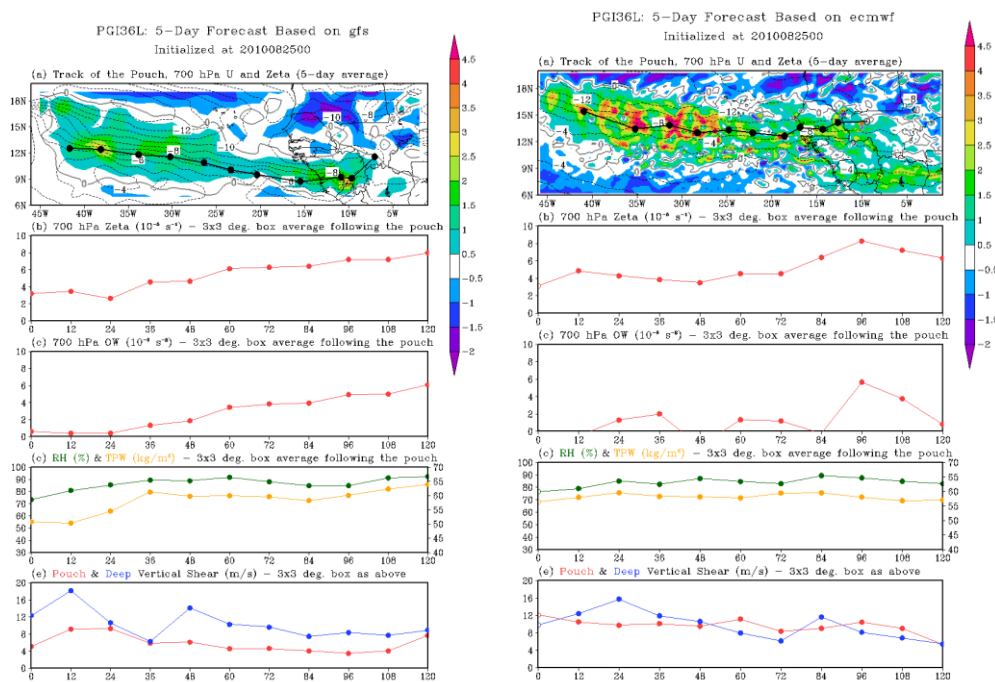
e) TD 7 Intensity forecast spread in the models from 1200 UTC Aug 25



10) PGI-36L CIMSS analysis of IR, low-level and surface winds, and 850 hPa vorticity ( $\times 10^{-6} \text{ s}^{-1}$ , orange contours).

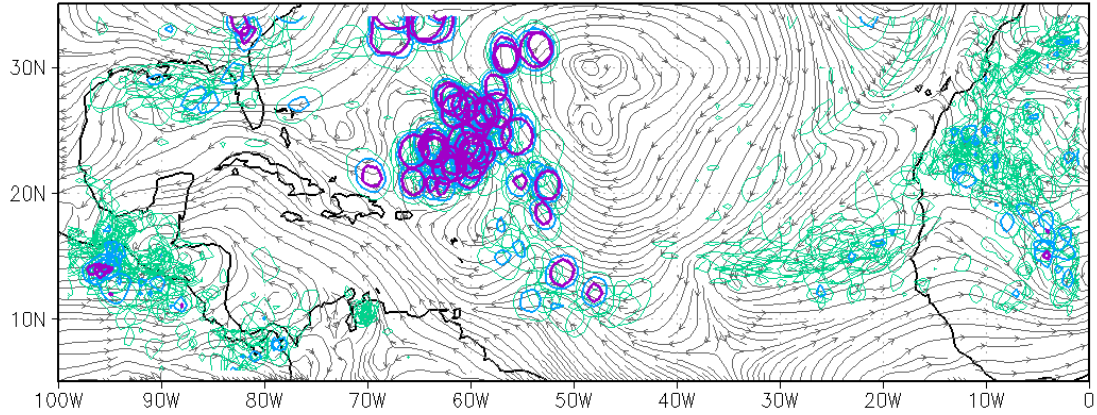


11) Pouch track forecast for PGI-36L from the 8/25 0000 UTC GFS (left) and ECMWF (right).

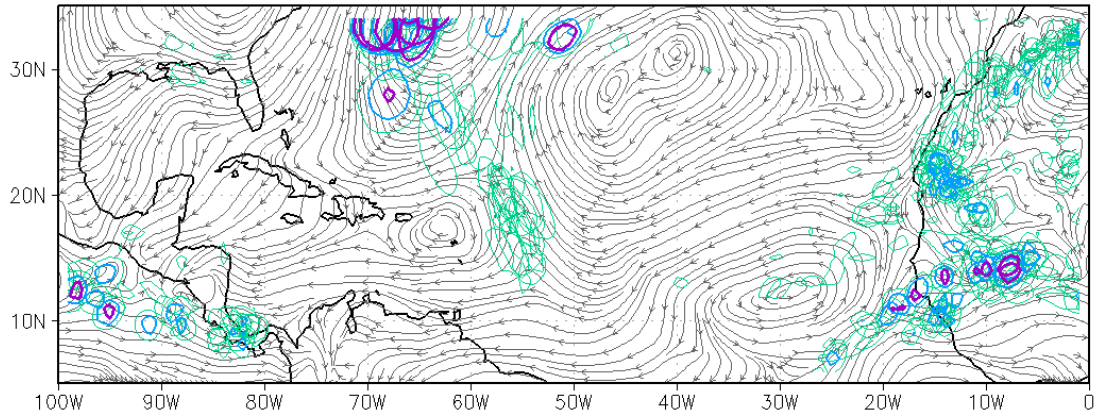


12) Ensemble forecasts of 850 hPa vorticity valid 9/1 0000 UTC from the ECMWF (top) and NCEP (bottom).

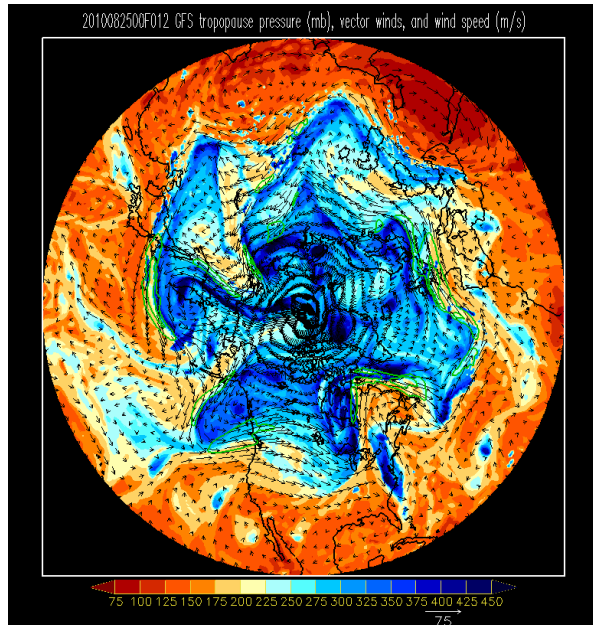
Gray: ECMWF 168-hour CTRL streamlines at 850 hPa. Init. 2010082500, Valid 2010090100.  
Color: Spaghetti contours of ZETA x 5e-5 s^-1 and OW x 2e-9 s^-2. 50 members.



Gray: NCEP 168-hour CTRL streamlines at 850 hPa. Init. 2010082500, Valid 2010090100.  
Color: Spaghetti contours of ZETA x 5e-5 s^-1 and OW x 2e-9 s^-2. 20 members.



13) 12 hr GFS forecast of dynamic tropopause pressure valid at 8/25 0000 UTC.

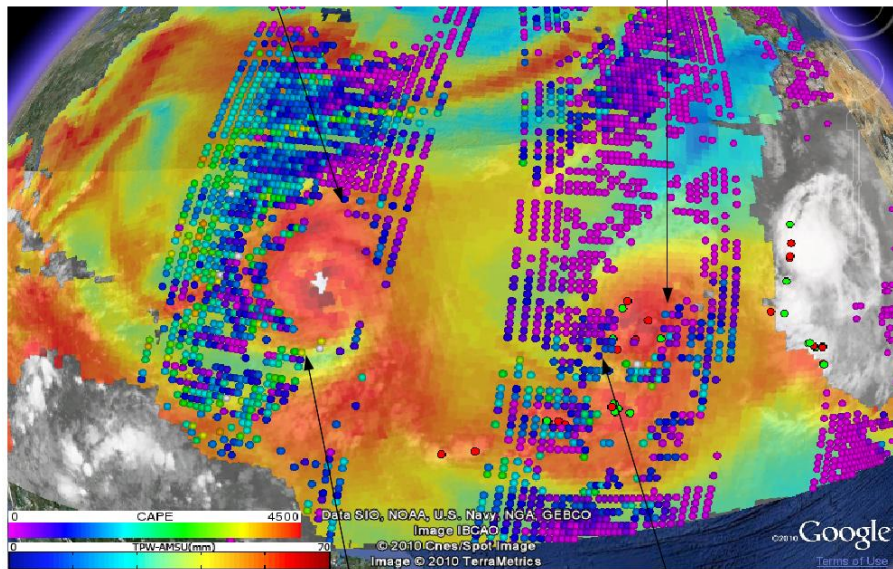




# 14) AIRS CAPE data and derived Skew-T's overlain on TPW imagery on Google Earth

North (moist)

North (moist)



South (drier)

South (drier)

