Tropical Areas of Interest Discussion for August 20, 2010

Created 1600 UTC August 20, 2010

GRIP Forecast Team: Cerese Inglish, Jon Zawislak, Andrew Martin, and Dan Halperin

Summary: It is a no-fly day for GRIP, but there has been a lot of activity today surrounding the possibility of a suitcase deployment to St Croix next week, or if there will be targets to fly in the Gulf of Mexico. The decision is also dependent on the potential for multi-agency coordination, and no firm decision to temporarily leave Ft Lauderdale has been made. The uncertainty in the models for potential targets has not made this decision any easier, but the best chances for genesis appear to be associated with PGI-31L, and a very low chance with a vorticity center the models predict will spin off of a cold front next week along the northern Gulf of Mexico. Other than these potential targets, there are three tropical waves in the Atlantic Basin, pouch PGI-27L exiting the Yucatan Peninsula and heading west without expected development, a cold low, PGI-30L which is not generating much convection at all, and PGI-33L which just exited Africa yesterday. Most models suggest that PGI-33L will combine with PGI-31L for the eventual formation of a TC. The expected track of PGI-31L, recently updated by the NHC this afternoon to AL95, is for it to become a tropical cyclone in the next 48+ hours as it moves further west, and finally, to turn north before 60W. A decision will need to be made by Monday.

Forecast for 1600 UTC 8/20/2010:

Synoptic Overview:

There are two broad areas of upper level low pressure in the Caribbean and north of it near the Bahamas (**3A, 3B**). These two lows continue to be impacting the lack of convection in the Caribbean today (**2A**), as well as dry air over the central Caribbean at low to mid levels, as seen in TPW imagery (**7**). The tropical wave extending north from 12N/88W to 21N/91W is exiting the Yucatán, and at the northern extent of this wave, PGI-27L is currently analyzed (**1, 4**). Though there is some deep convection, it is confined over land and over a very small area of water (**2A**). The steering flow (**9B**) in this area is expected to take the system across the Bay of Campeche on a west-northwest heading over the next 24 hours, but development is not expected. The subtropical high is strong across the mid-latitude central Atlantic. Weakening of this ridge over the next few days could impact the track of PGI-27L/AL95. The cold low to the north of Puerto Rico is wrapping dry air around it today, but good convection continues to fire to the southwest of the system today (**2A, 2B**). This low is best seen at 300 hPa, and is going to slowly track to the west-northwest and may interact in a few days with an emerging cold front leaving the US. There is a lack of low level vorticity across the Atlantic until the Eastern Atlantic (**3C**) in association with the most recently emerged waves and PGI-31L and PGI-33L (**4**). The waves analyzed in between there are very dry and devoid of deep convection (**1, 2A, 2B**). These waves are present along 62W extending north out of the ITCZ from 9N to 23N, and from 10N/40W to 25N/43W. PGI-30L is near 19N/41W associated with this second wave, and has little associated convection.

West Africa and the East Atlantic are under the influences of a monsoon trough regime with many exiting waves in deep layer moisture, and an upcoming SAL outbreak in northwest Africa

(**10, 6**). PGI-31L is ahead of PGI-33L, but these two systems are both high in low-level vorticity and high precipitable water (**7**). Both of these systems are being dominated by easterlies steering these systems on a due-westward track for the near future. PGI-31L/AL95 is beginning to better organize, and will likely wrap PGI-33L into it as the expected TC formation occurs in the next 48+hours (**11A, 11B**).

Features of Interest:

Dust/SAL:
As of 8/20 at 12 UTC there was widespread dry air with minor dust loading over the eastern Caribbean. According to the MODIS instrument on board Aqua, aerosol optical depths were greater than 0.8 for a wide swath located between 72W and 63W and between 10N and 20N. (See Aqua AOT for 8/20 ending at 0000 UTC, **5**) The MIMIC composite of total precipitable water from AMSU showed a surge in dry air accompanying the dust as it moved across the lesser Antilles on 8/18. (**7**) This dry air is now located to the southwest of an upper trough which contains a closed upper level low. The low is centered near 65W/23N and is moving to the northwest. This is creating subsidence in its wake and further drying the eastern Caribbean. Elsewhere in the Atlantic, a dusty plume has exited Africa's west coast. This event is not expected to be as strong as the SAL outbreak of last week. GEOS-5 predicts another SAL event exiting Africa late on 8/23. The mid-level potential vorticity forecast by the model suggests that this event as well as the current plume are the result of vigorous easterly wave activity. (See GEOS-5 forecast for dust AOT for 8/24 0000 UTC, **6**)

PGI-30L:
On 8/20 at 1200 UTC PGI-30L was located near 41W/19N. This feature is currently an open wave with very little associated convection. The GOES derived low level winds show a broad low level cyclonic circulation, while infrared imagery suggests some low level clouds at the leading edge of the wave. (See CIMSS multi-product with pouch track low-level winds and SWIR, **8**) The environment of the wave is quite dry, an AIRS sounding from 500 UTC near the wave showed a 700 mb dew point depression of nearly 12 degrees C. The pouch tracking forecast products from NRL are continuing to track a wave at 850 hPa out to 84 hours at least, however Okubo-Weiss values remain extremely low suggesting no increased curvature of the low level flow. The track is forecast to remain mostly westward with a slight southward component as the wave skirts the mid-Atlantic ridge. Given the dry nature of this wave, development is very unlikely. The wave may encounter a more favorable environment in several days, thus monitoring of this system will continue. The PREDICT team is scheduled to fly several investigative flights into this system beginning tomorrow.

PGI-27L
At 20/14Z, PGI27L was analyzed at 21N 91.5W, or just off the coast of the Yucatan peninsula (**4, 9A**). Since yesterday, the wave appears to be more disorganized with the bulk of the convection removed from the pouch itself. In fact, most of the convection is now either over land in southern Mexico or over the extreme southern Bay of Campeche (**2A**). While no conventional or satellite wind observations are available in the vicinity of the convection, visible and IR satellite animations suggest that there is no discernable cyclonic flow present. The 20/06Z GFS forecast valid at 20/12Z shows an elongated maximum of 850mb vorticity extending from near the convection, across the Yucatan and maintains it as the wave makes its

second landfall. However, this is not supported by the 20/14Z CIMMS 850mb vorticity analysis, which shows a weaker vorticity maximum that is offset and to the south of the convection (**3C, 9C**). Motion continues to be on a WNW track (**9B**) with an increase in forward speed overnight last night. This WNW movement is expected to continue as the wave passes along the SW side of a 700-850mb ridge near southern Florida. At this speed, expect the wave to make landfall in eastern Mexico in about 24 hours. Given its current disorganized state and the fact that none of the dynamical models (GFS, ECMWF, NOGAPS) develop the system into a tropical cyclone, genesis is not expected during the little remaining time that it is over water. As such, it does not appear to be a viable target, especially considering the long ferry time that would be necessary to reach it.

PGI-31L

PGI-31L is centered near 26.3W/11.6N and has maintained persistent convective activity over the past few days (**4**). There has been some organization/rotation indicated in the IR satellite imagery (**10**); however, the convection remains mostly ITCZ. The CIMSS 850 hPa vorticity analysis indicates a more intense vorticity maximum centered near 27W/12N with a similar location and intensity at 700 hPa. The magnitude is greater than the ambient vorticity associated with the ITCZ and monsoon trough. In addition to the low and mid-level center associated with the ITCZ, there is a dry (SAL) anticyclone to the north, centered near 43/20N. Overall, no distinct wave is identified; rather, in order to develop there must be spin-up of the ambient ITCZ/monsoon trough vorticity. There is a spread in model guidance for development of a hurricane (GFS, **11A,B**) to perhaps just a weakening tropical storm (ECMWF, **12**) to little development (NOGAPS). In fact, the NOGAPS does not develop 31L and instead slowly develops 33L. The following is the 06UTC GFS forecast for the 850 hPa vorticity maximum:

20/0600UTC: 27W/12N; 20/1200UTC: 27W/12N; 20/1800UTC: 28W/12N;
21/0000UTC: 28W/13N; 21/0600UTC: 29W/13N; 21/1200UTC: 30W/13N;
21/1800UTC: 32W/13N; 22/0000UTC: 33W/13N; 22/0600UTC: 35W/13N;
22/1200UTC: 36W/12N; 22/1800UTC: 38W/12N; 23/0000UTC: 38W/13N;
23/0600UTC: 39W/13N; 23/1200UTC: 39W/13N; 23/1800UTC: 40W/15N;
24/0000UTC: 41W/16N; 24/0600UTC: 42W/16N; 24/1200UTC: 44W/17N;
24/1800UTC: 46W/17N; 25/0000UTC: 47W/18N; 25/0600UTC: 48W/19N;
25/1200UTC: 50W/20N; 25/1800UTC: 51W/21N; 26/0000UTC: 52W/22N;
26/0600UTC: 53W/23N; 26/1200UTC: 54W/24N; 26/1800UTC: 54W/25N;
27/0000UTC: 54W/25N; 27/0600UTC: 54W/26N

The ECMWF initialized at 00UTC has the following forecast: 21/0000UTC: 27W/13N; 22/0000UTC: 28W/14N; 23/0000UTC: 34W/16N; 24/0000UTC: 42W/17N; 25/0000UTC: 48W/18N; 26/0000UTC: 53W/22N; 27/0000UTC: 56W/23N.

The consensus forecast track for the pouch is as follows (**12**): 21/0000UTC: 26.8W/11.9N; 21/1300UTC: 29.0W/12.2N; 22/0100UTC: 30.7W/13.2N; 22/1300UTC: 33.1W/14.1N; 23/0100UTC: 36.1W/15.1N; 23/1300UTC: 39.5W/15.7N; 24/0100UTC: 42.7W/17.0N; 24/1300UTC: 45.8/18.2N.

The steering flow late in the forecast indicates re-curving of the disturbance as the subtropical ridge will be quite weak on the western side. Shear is expected to not be a hindrance to the development and genesis should occur in the next 48 hours as the vorticity in the ITCZ spins up. The question remains what happens in the 5-7 day timeframe. If the subtropical ridge builds, then a more westward track will be expected. A similar forecast has been seen the past few days;

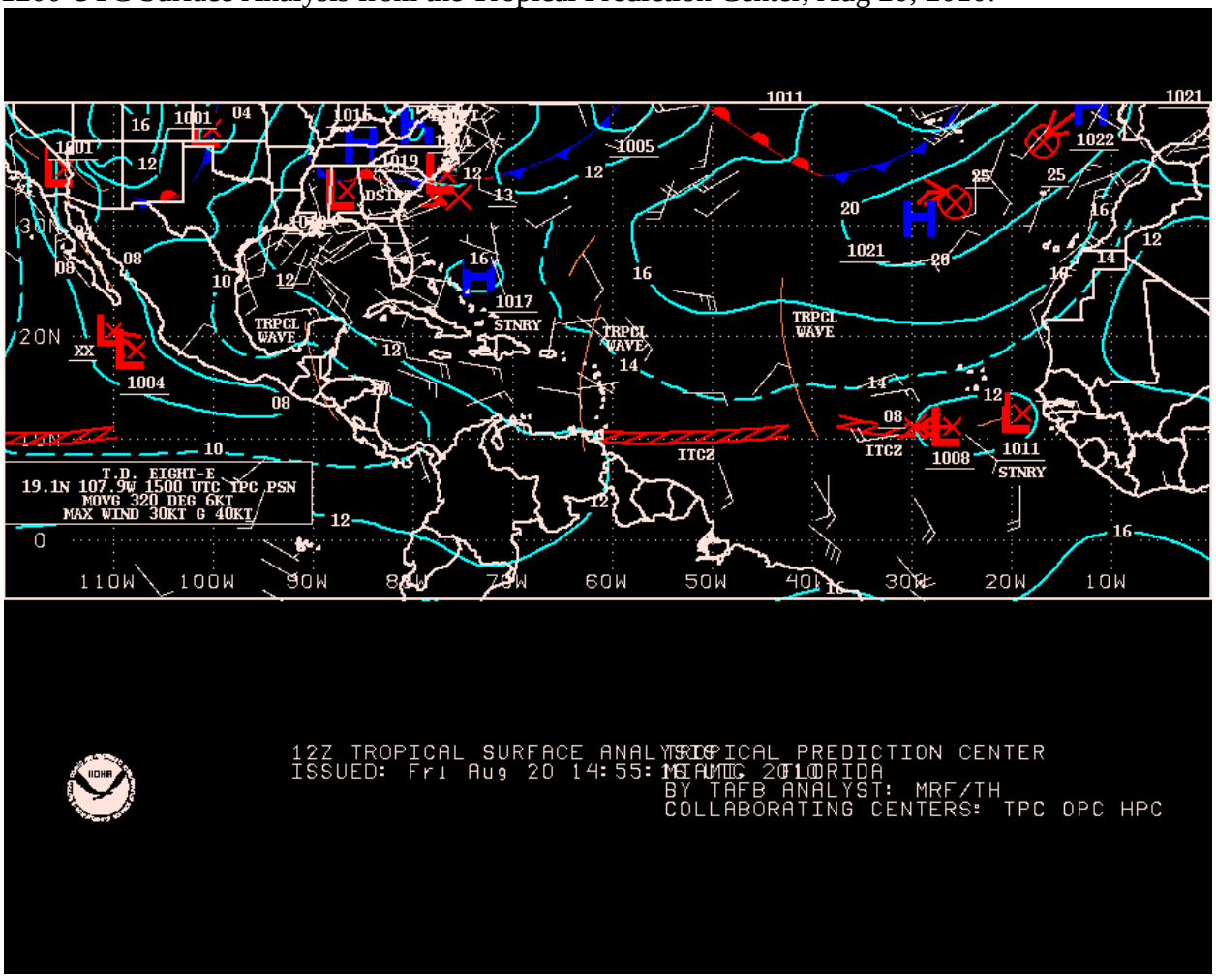
however the 06 GFS forecast locations from today are 8-10 degrees east of where they were yesterday.

PGI-33L

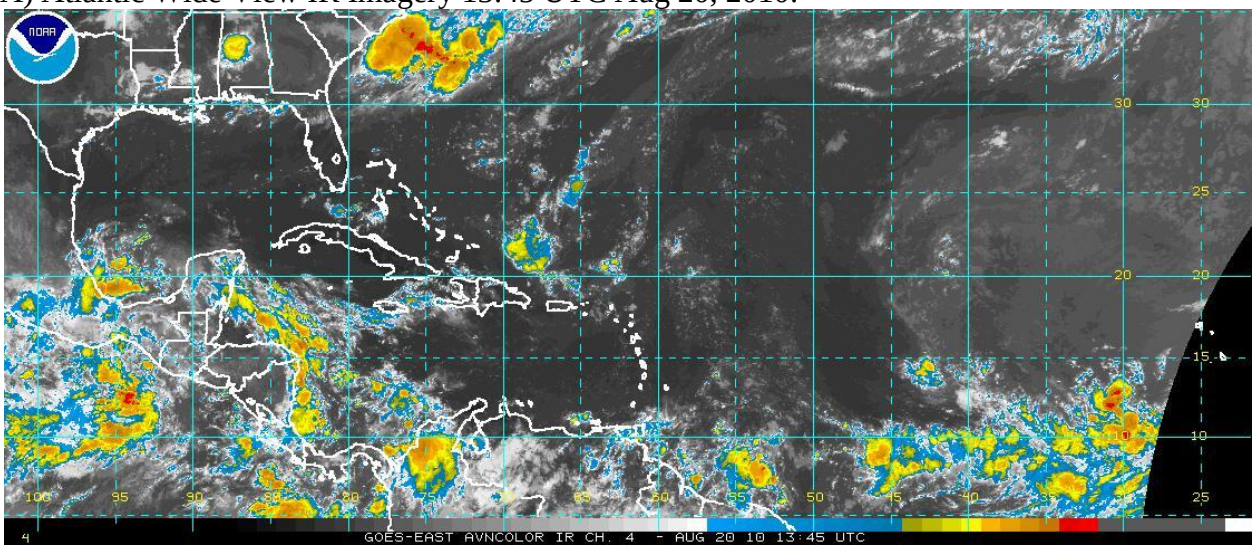
PGI-33L is located over the ocean just NW of the Guinea Highlands. There is plenty of convection and vorticity; however, given the proximity to possibly developing PGI-33L this may just get caught up into PGI-31L. The consensus forecast track for the pouch is the following (**13**): 20/1400UTC: 17.5W/12.2N; 21/0200UTC: 19.8W/13.8N then towards the Cape Verdes before no longer tracked.

Static Images used in discussion:

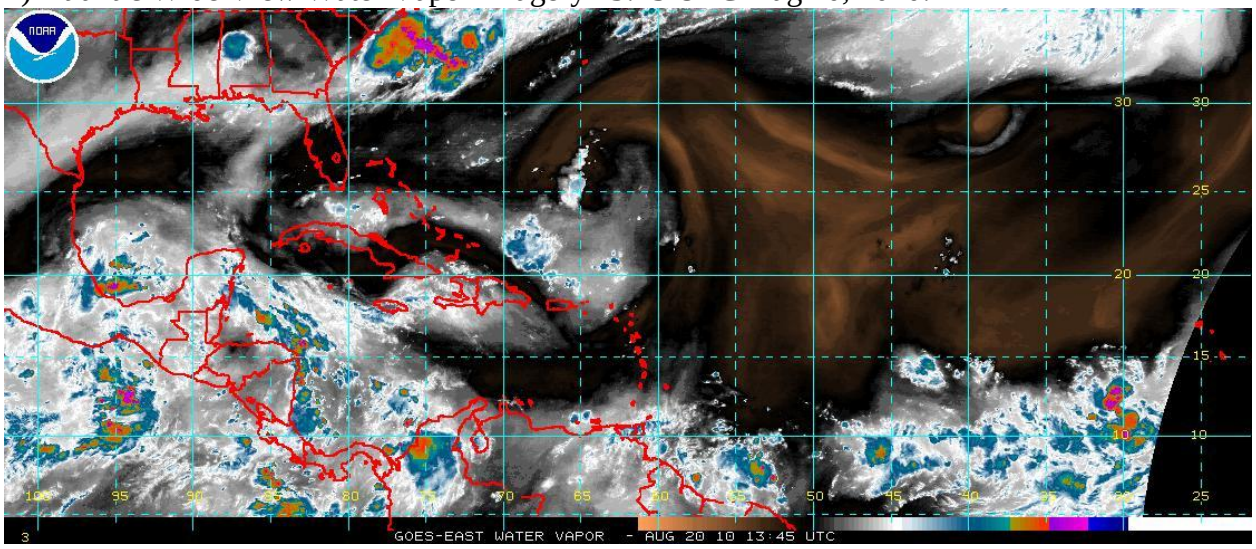
1) 1200 UTC Surface Analysis from the Tropical Prediction Center, Aug 20, 2010:



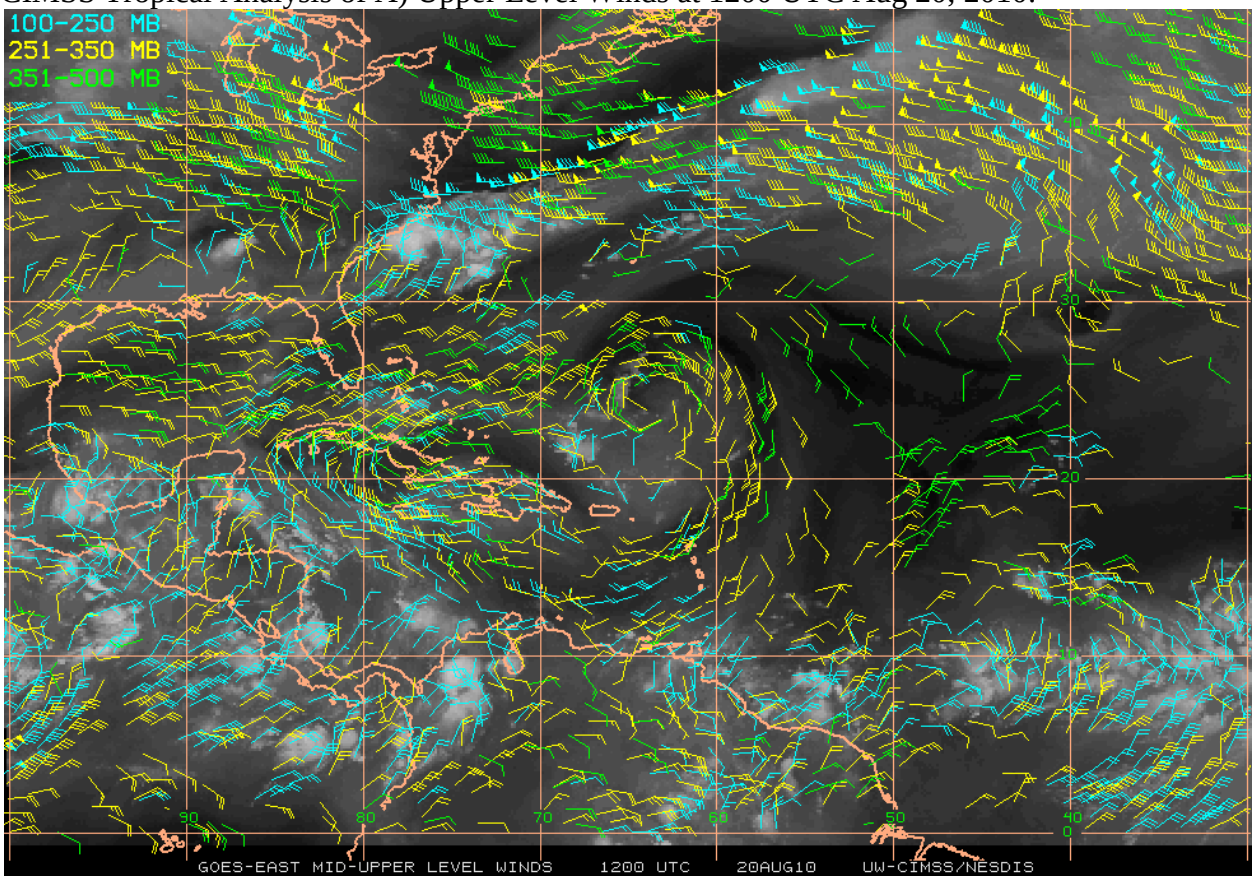
2) A) Atlantic Wide View IR Imagery 13:45 UTC Aug 20, 2010:



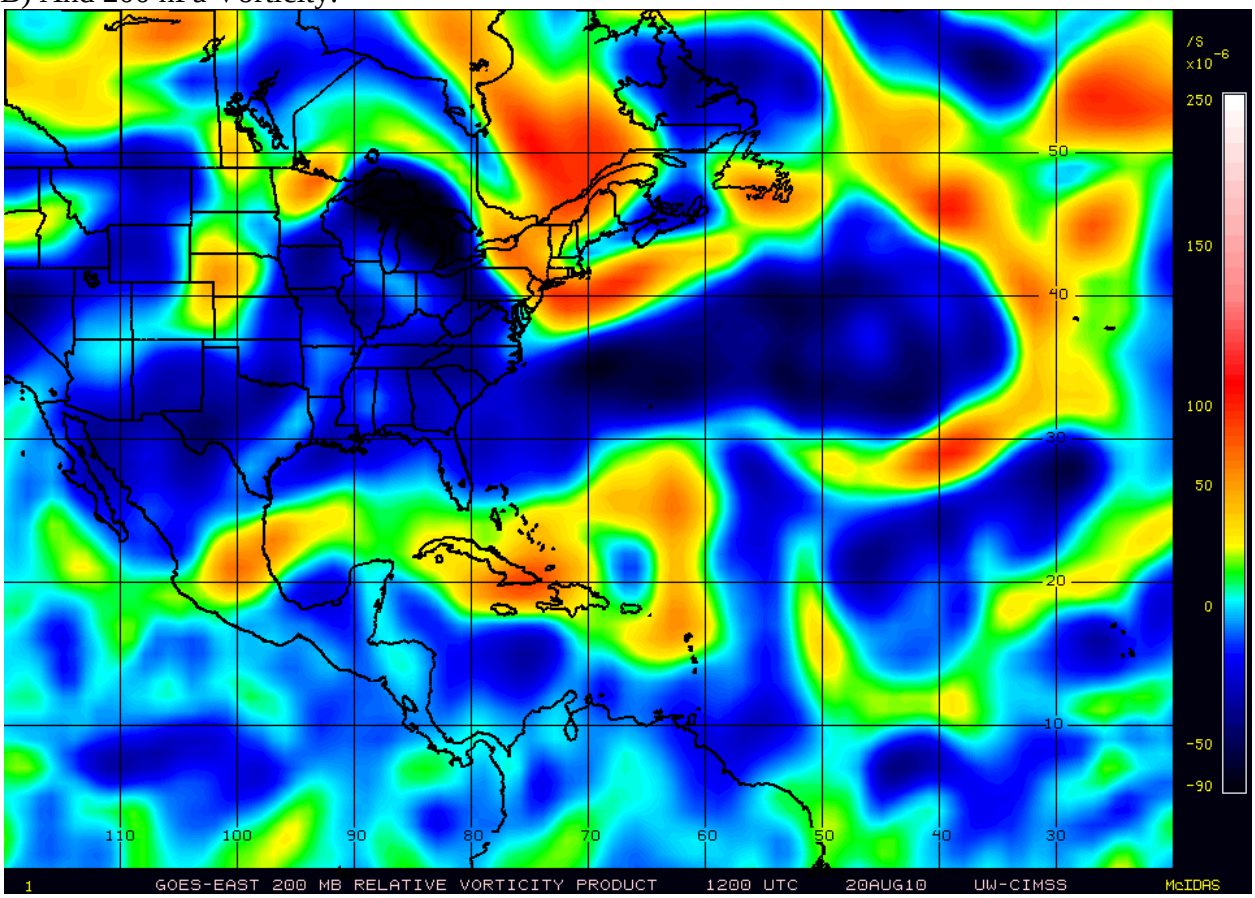
B) Atlantic Wide View Water Vapor Imagery 13:45 UTC Aug 20, 2010:



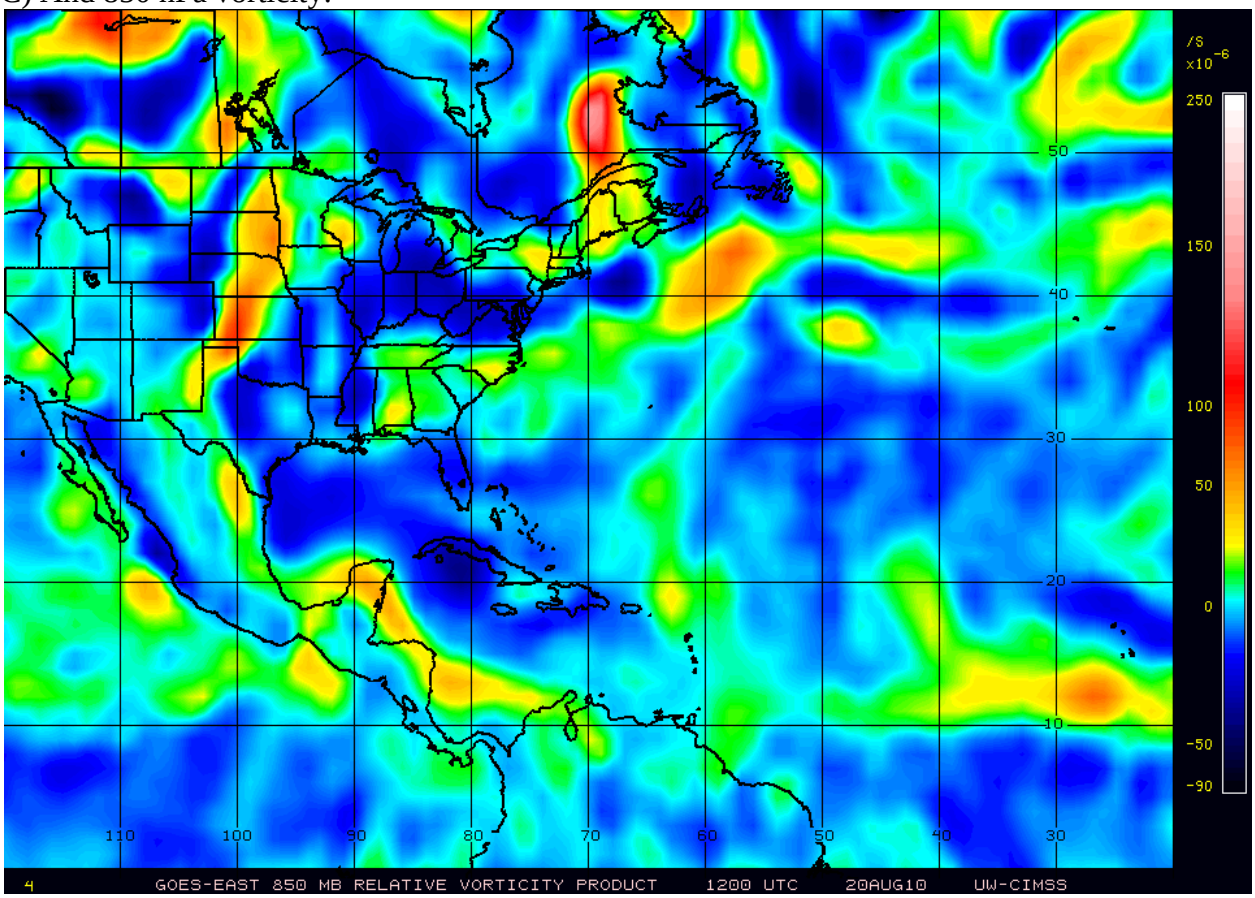
3) CIMSS Tropical Analysis of A) Upper Level Winds at 1200 UTC Aug 20, 2010:



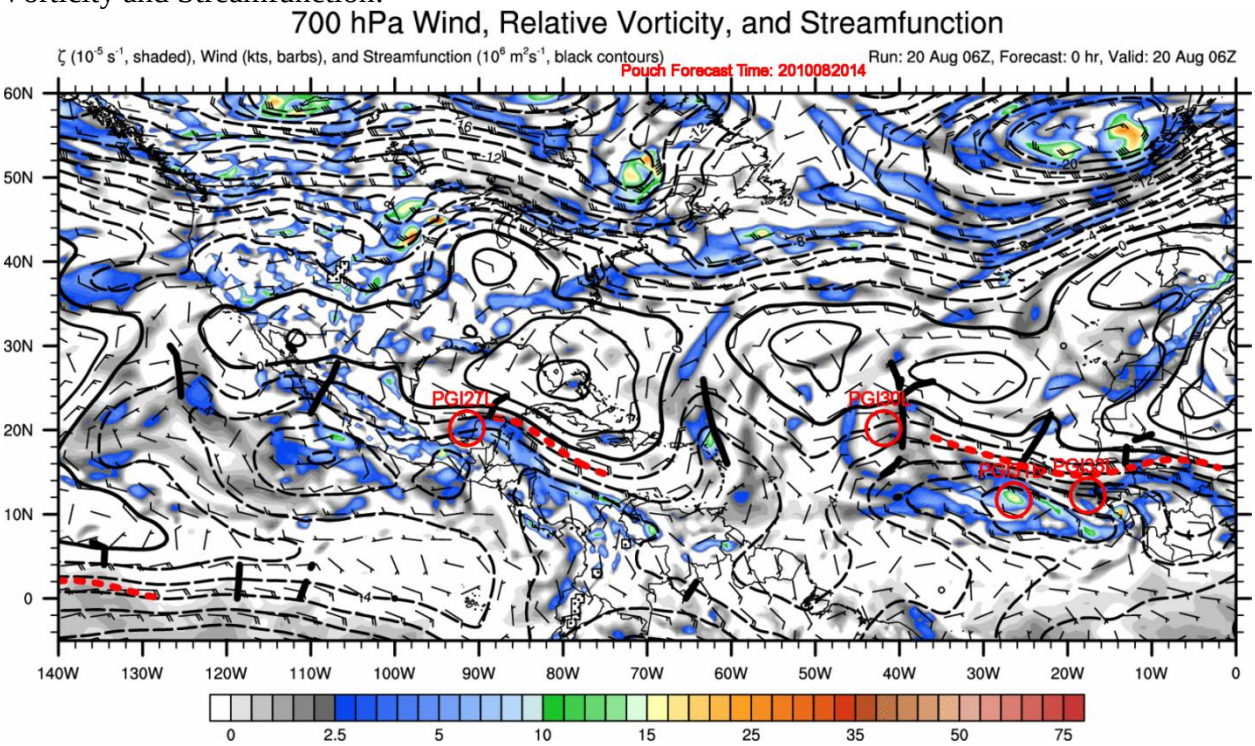
B) And 200 hPa Vorticity:



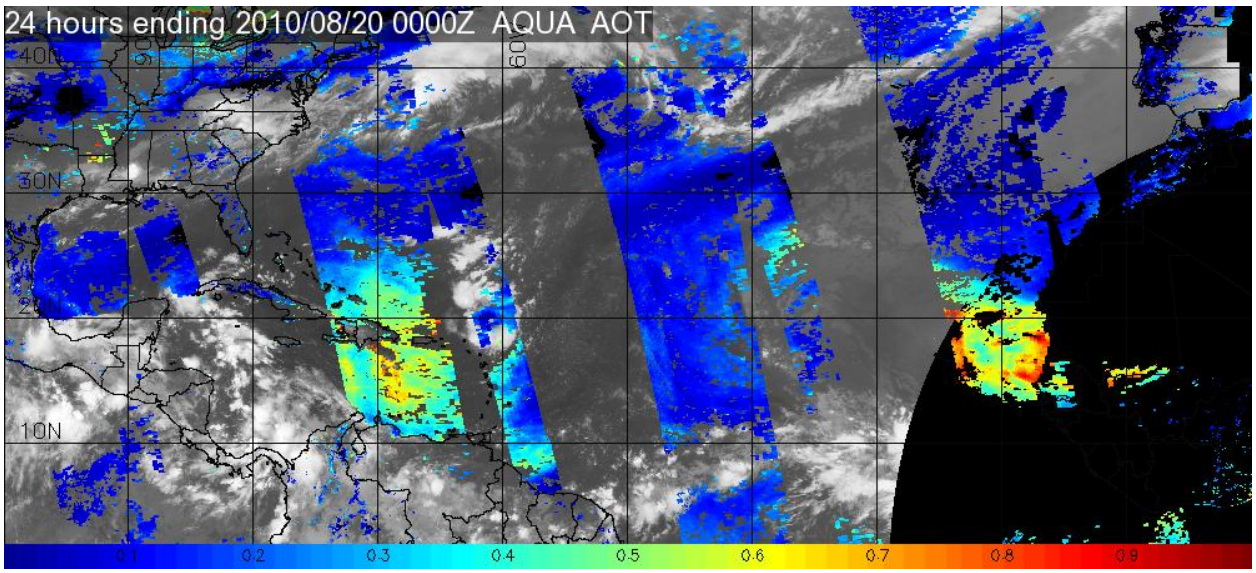
C) And 850 hPa vorticity:



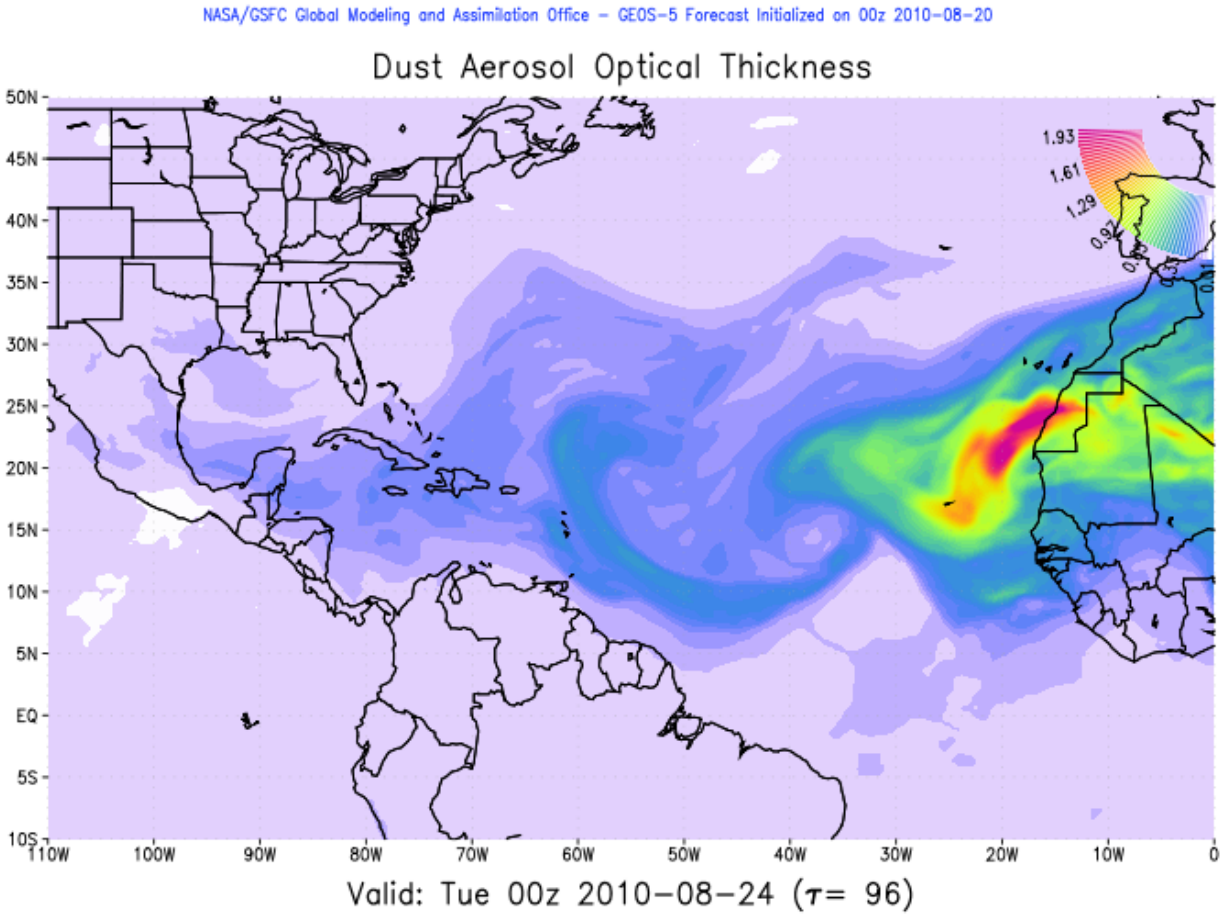
4) Pouches from Montgomery site for Aug 20, 2010 plotted on 700 hPa Winds, Relative Vorticity and Streamfunction:



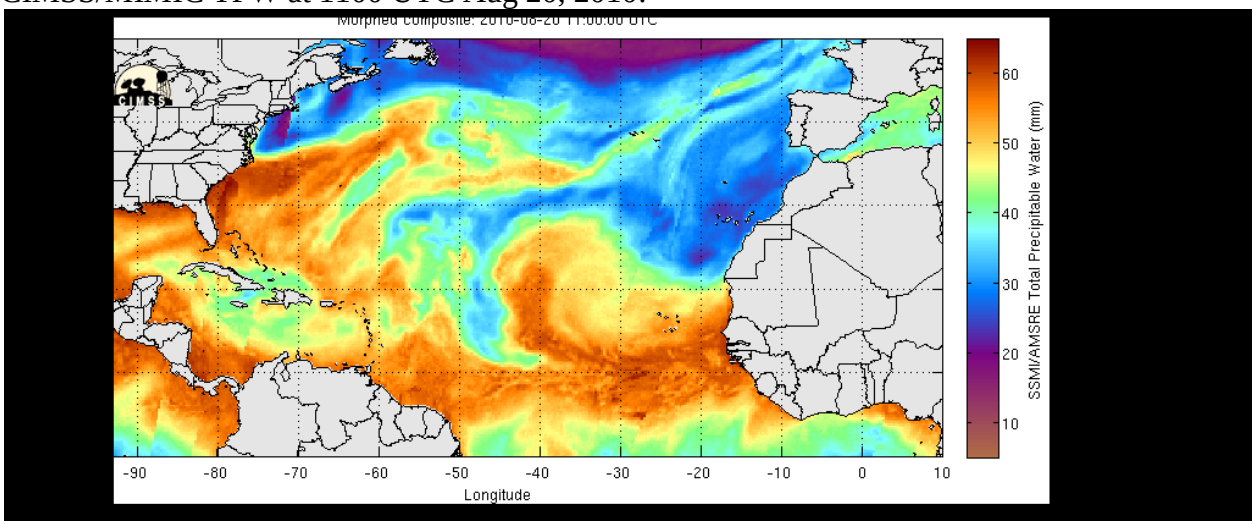
5) AQUA Aerosol Optical Thickness 24-hour composite plot from Aug 20, 2010 at 0000 UTC:



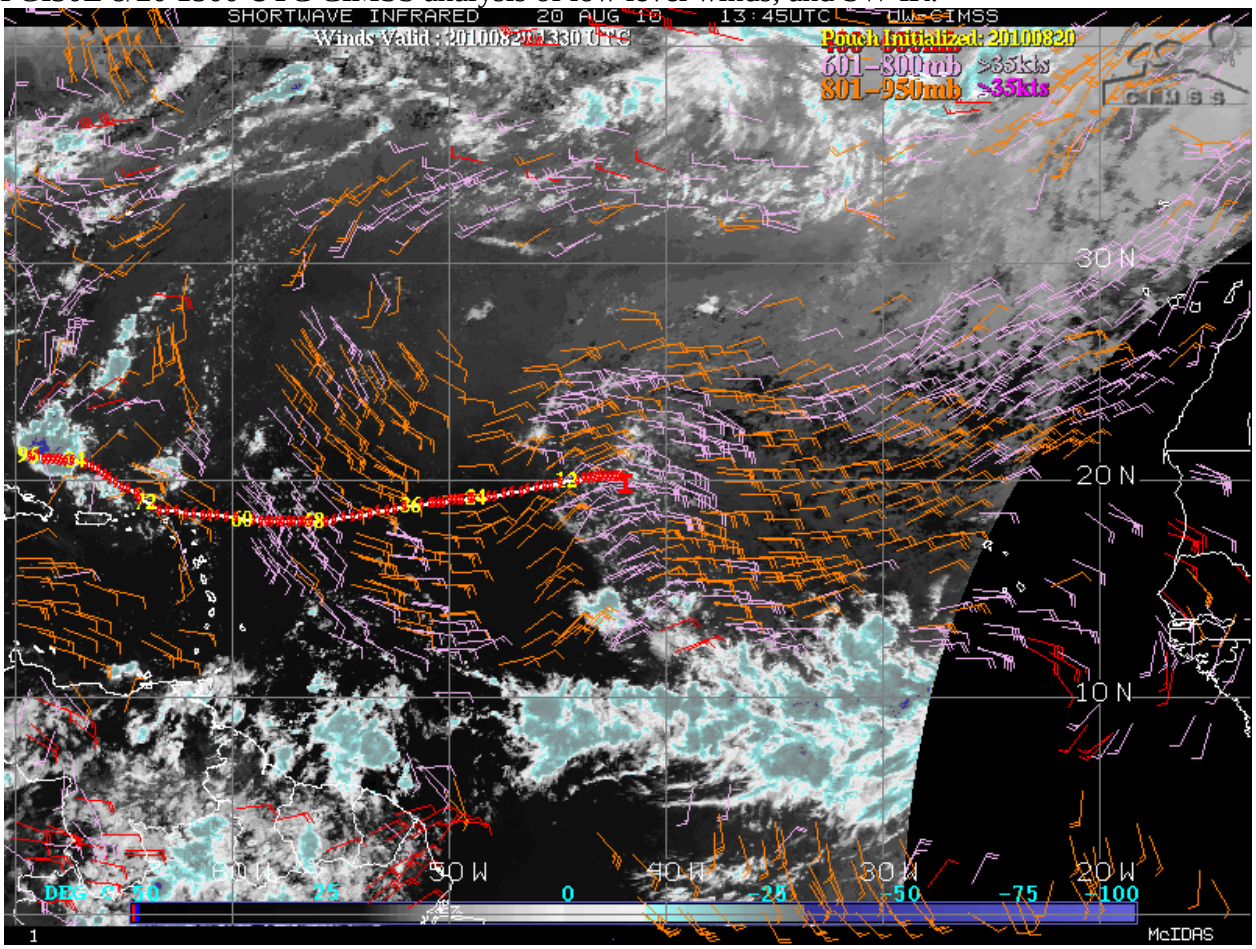
6) Dust Aerosol Optical Thickness 96-hr forecast from the GEOS-5 model run at 0000 UTC Aug 20, for 0000 UTC Aug 24 Dust Outbreak:



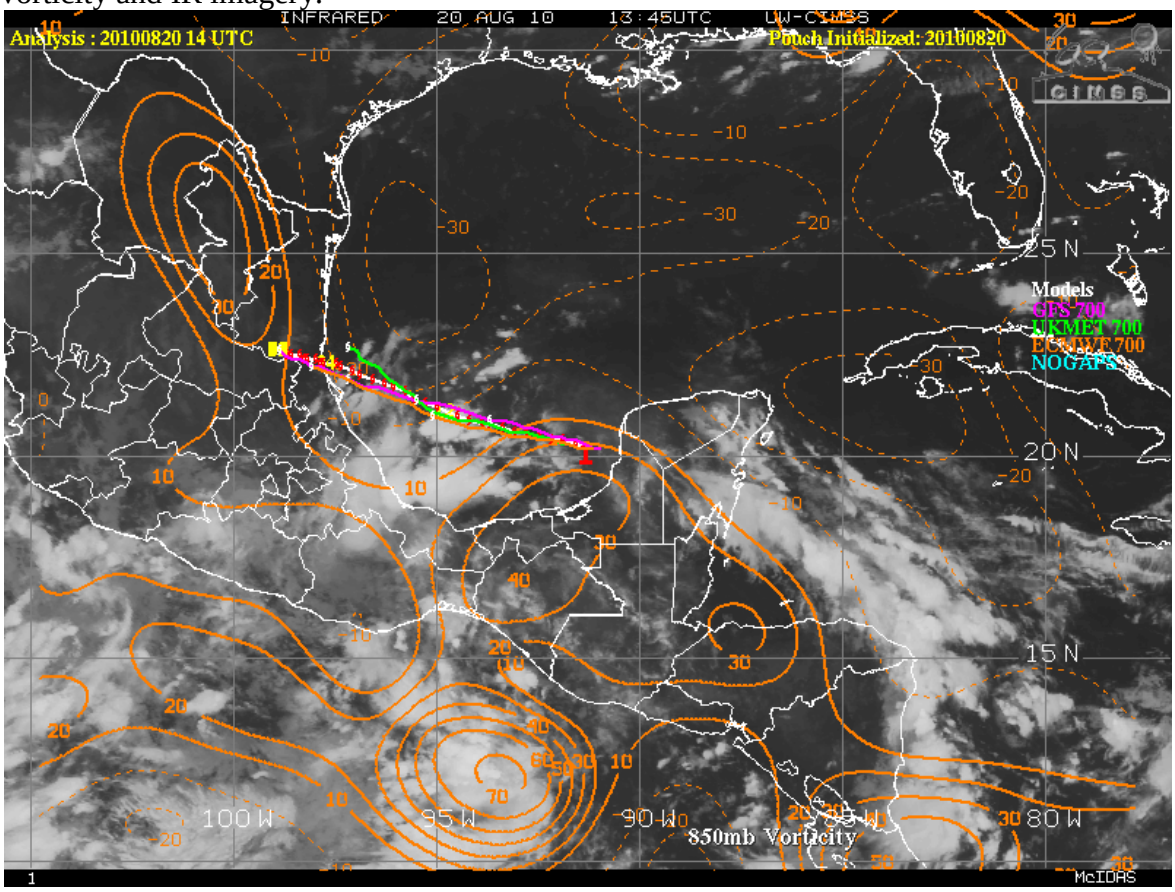
7) CIMSS/MIMIC TPW at 1100 UTC Aug 20, 2010:



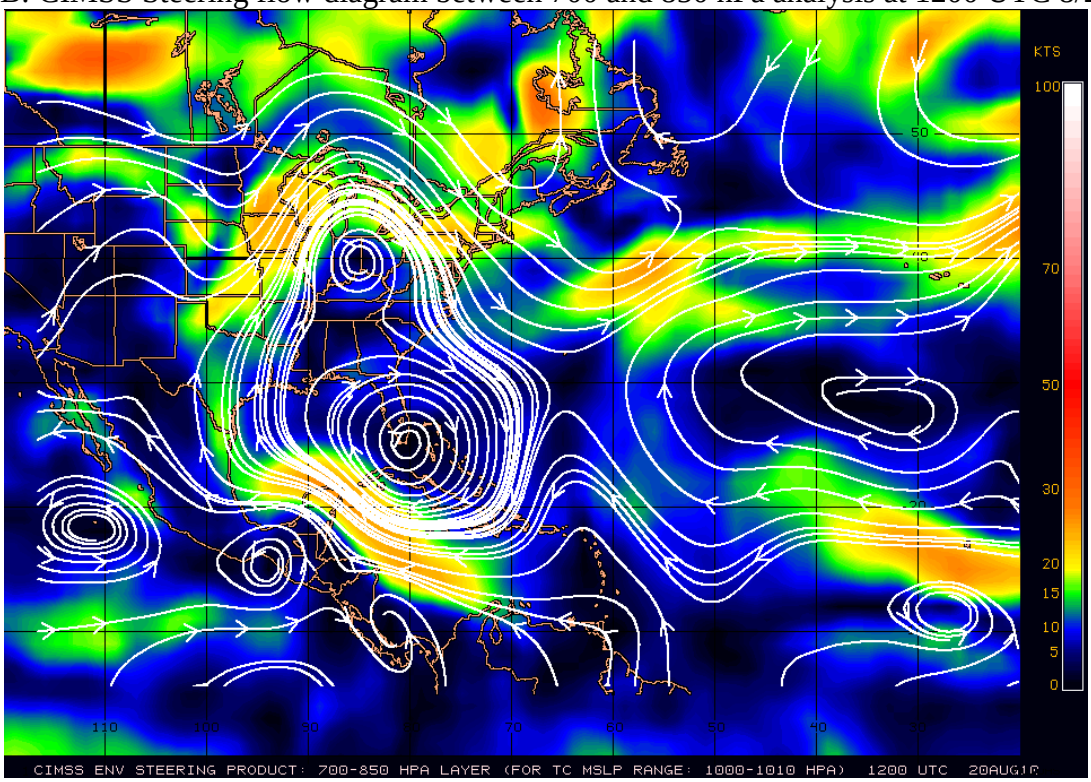
8) PGI30L 8/20 1500 UTC CIMSS analysis of low level winds, and SW IR.



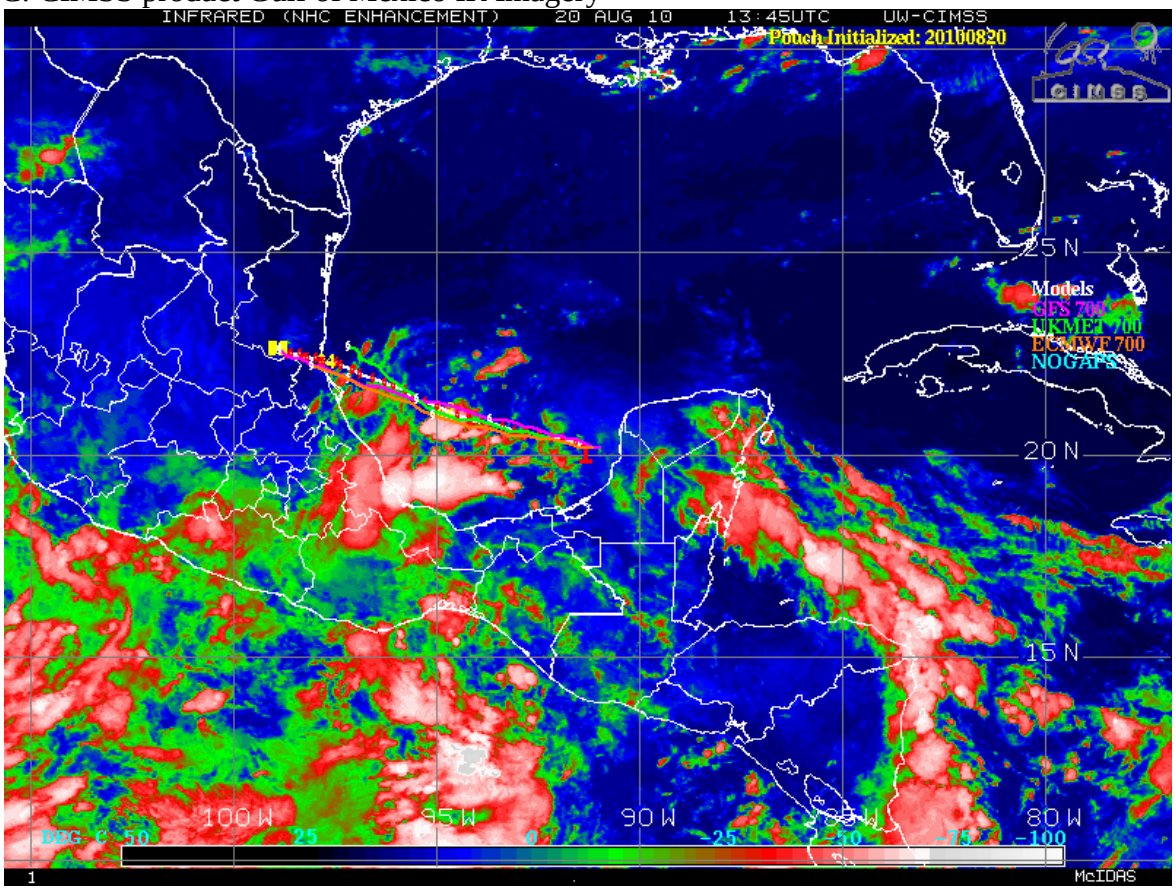
9) PGI-27L: A) CIMSS pouch track forecast product at 1400 UTC 8/20 with 850 hPa vorticity and IR imagery.



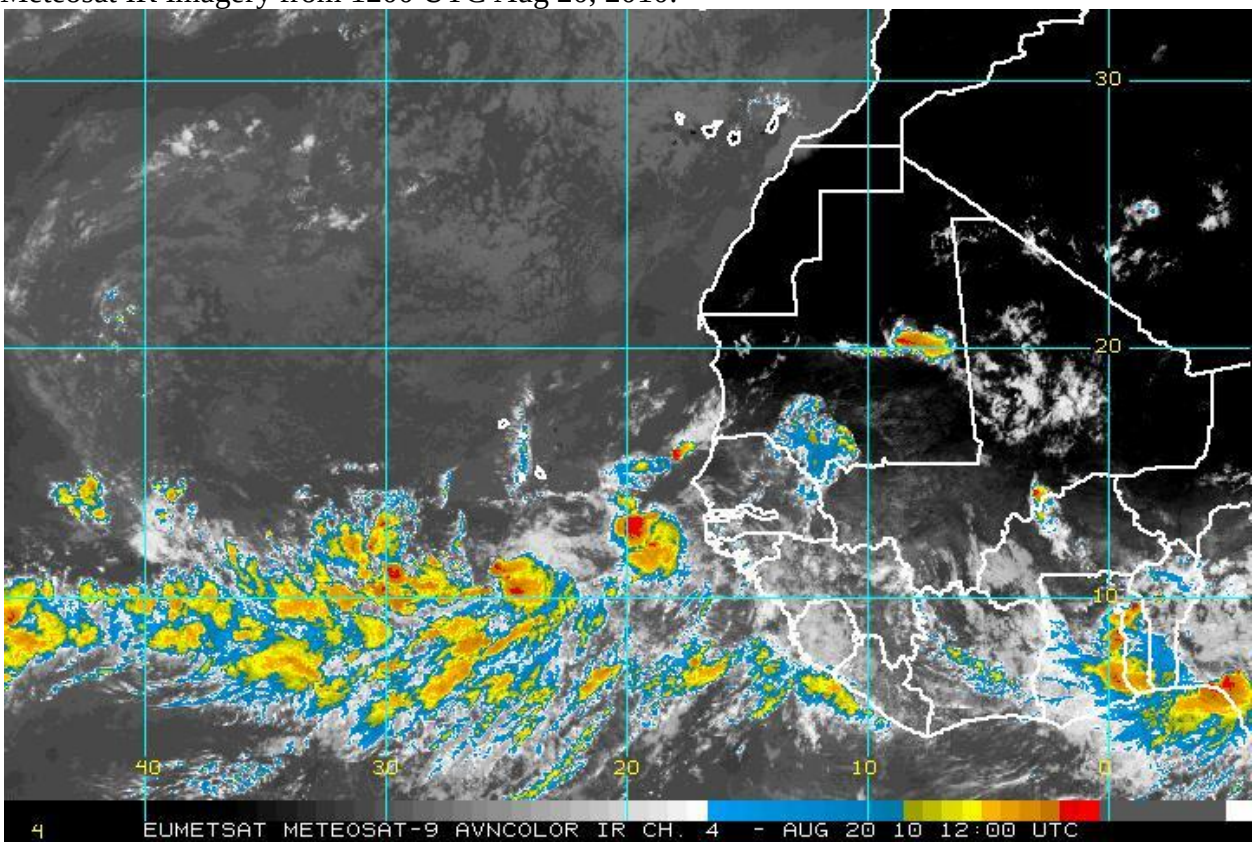
B: CIMSS Steering flow diagram between 700 and 850 hPa analysis at 1200 UTC 8/20.



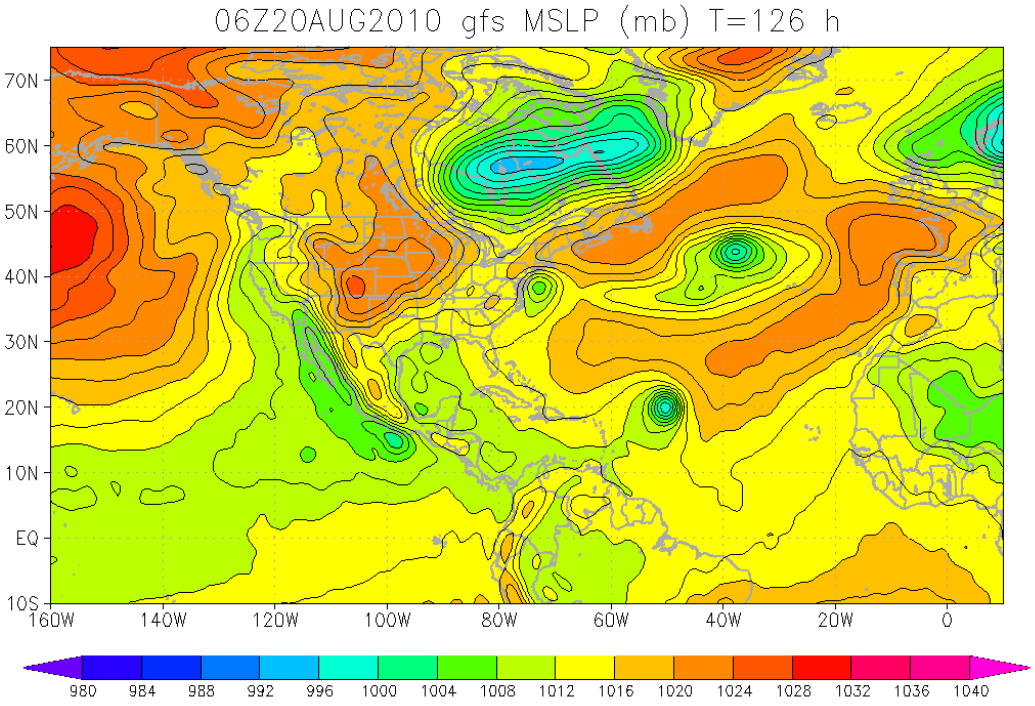
C: CIMSS product Gulf of Mexico IR Imagery



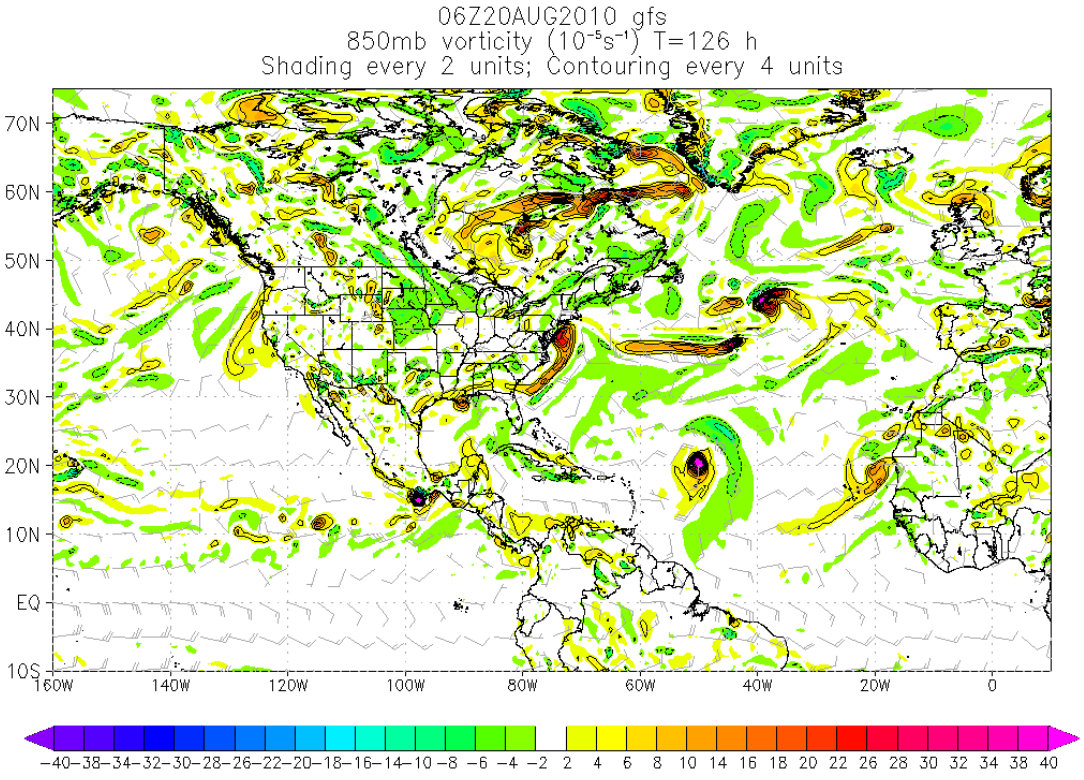
10) Meteosat IR Imagery from 1200 UTC Aug 20, 2010:



11) GFS Model run at 0600 UTC Aug 20, 2010: 126 hour forecast (time= 1200 UTC Aug 25, 2010) for sea level pressure (a) and 850 hPa vorticity (b). For consideration in possible DC-8 suitcase flight to St. Croix.

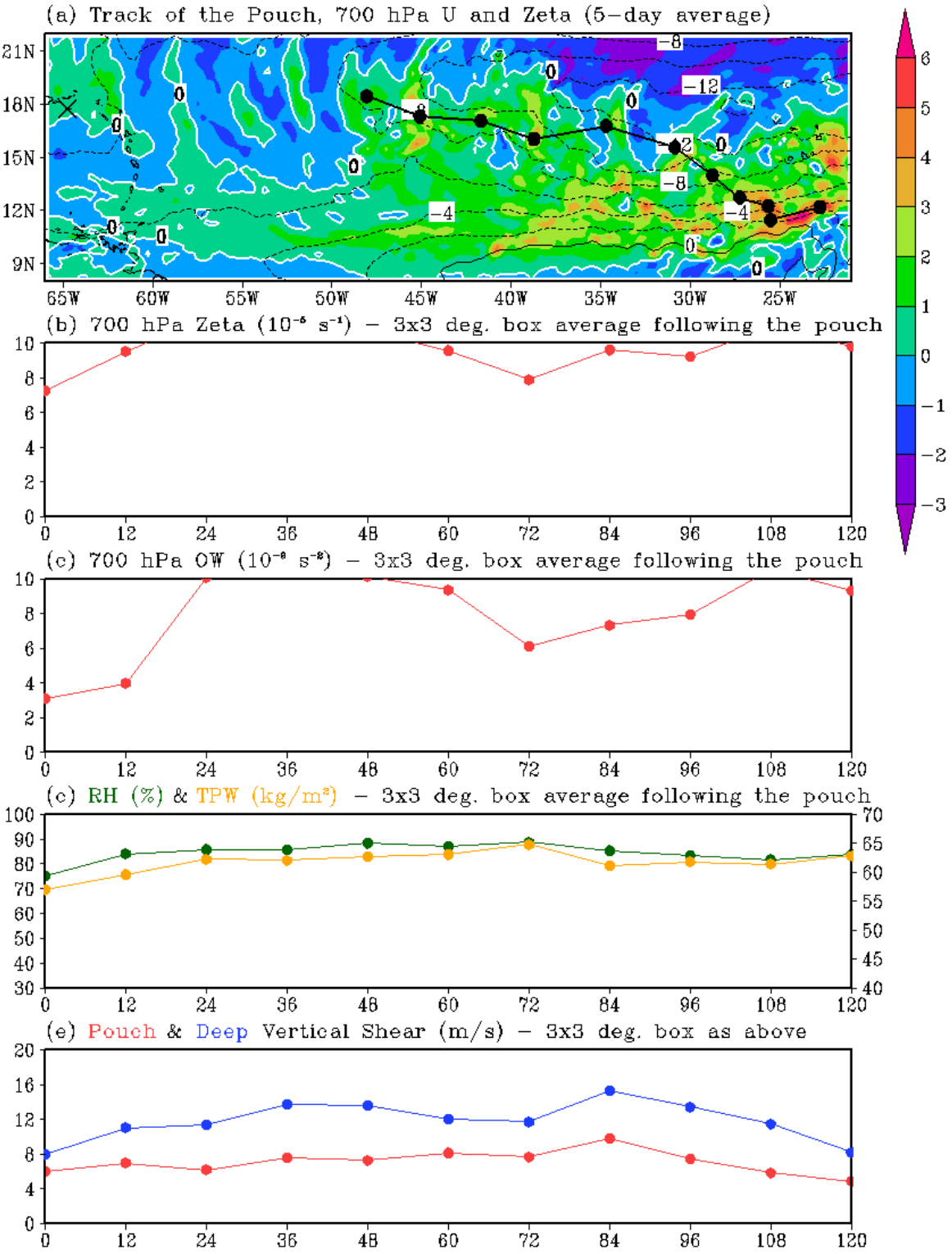


a.



b.

12) Pouch analysis of PGI31L initialized from the 8/20 0000 UTC ECMWF:



13) PGI33L 8/20 1500 UTC CIMSS analysis of 850 hPa vorticity ($x10^{-5}$ s^{-1}, orange contours), surface and bouy stations, and IR.