Tri-Agency Weather Discussion: Forecast for Tropical Areas of Interest
Forecast synopsis 1600 UTC 21 August 2010
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Summary:
There are currently three systems of interest in the North Atlantic basin (Fig. 1). From west to east, these systems are:
1. PGI30L: Currently located along 20N at 50.5W and continuing to move west-southwest. The disturbance is mainly devoid of deep convection. TPW imagery indicates that the low to mid-level moisture field associated with the system is becoming increasingly smaller over time. Dry low to mid-level air with overlying subsidence is wrapping around the west and southwest side, while a SAL outbreak is overtaking it from the east. The system is being flown by PREDICT today, though prospects for follow-on missions are becoming unlikely. Although PGI 30L will be in range of most tri-agency aircraft over the coming days as it tracks generally west, genesis is extremely unlikely over the next 72 hr and it is quickly becoming a less viable target.

2. PGI31L: Remains located to the southwest of the Cape Verdes near 12N 28W embedded within a large band of low-level relative vorticity that appears to be consolidating near 10-11N 31W. PGI31L continues to be positioned in a favorable environment of shear, low to mid-level moisture and SSTs and convection associated with the system is finally showing signs of organization. It is highly likely that this system will undergo genesis in the next 48 hr or so. The GFDL, HWRF, and SHIPS models bring PGI31L to tropical storm strength within 18-24 and the global models continue to favor development of this system with a northwest track for the next several days. The GFS and ECMWF models suggest that this system could be in range of the G-V and G-IV aircraft sometime on the Monday (23 Aug) or Tues (24 Aug) and possibly in range of the P3-s and DC-8 in the Tues/Wed (24-25 Aug) timeframe for a few days before recurving to the NNW and out of range.

3. PGI34L: is located near ~11N 2E while the MCS associated with this AEW is ~5 deg to the west. The ECMWF model is suggesting that this system will emerge from the African coast sometime in the Tues (24 Aug) timeframe.

Discussion:
a. Synoptic
Broad upper-level ENE flow was observed over the Southeast U.S. and the Gulf of Mexico on the poleward side of a weak trough that's persisted over the Caribbean (Fig. 2). The cold low mentioned in previous discussions was located to the NNW of Puerto Rico and continues to show signs of shearing apart as it merges with cyclonic flow on the southwest portion of the upper-level trough. Mid to upper-level flow does seem to be favoring the development of cyclonic vorticity northwest of this cold low near ~23N 72W. Extremely dry mid to upper-level air in the central Atlantic is evident in GOES water vapor imagery (Fig. 2), while two main areas of low to mid-level dry air can be seem in TPW imagery: a mid-latitude dry air intrusion with subsidence above is located to the west and southwest of PGI30L, while a SAL outbreak is located just east of PGI30L and north of PGI31L (Fig. 1). A deep layer ridge is currently steering PGI30I to the WSW, while the persistent region of deep convection near PGI31L continues to favor development of this large area of elongated (though consolidating) vorticity centered ~500-600 km SW of PGI31L. Farther

east in the North Atlantic the weak shortwave over the western Sahara has lifted out and the ridge to the east has built westward. This has helped re-establish an E-W oriented subtropical anticyclone over western Africa, finally allowing for a more zonal flow over sub-Saharan Africa.

b. PGI30L

PGI30L is currently located along 20N at 50.5W and continuing to move west-southwest. The disturbance is mainly devoid of deep convection (Fig. 4). GOES water vapor imagery suggests that the mid to upper-levels (~450-500 mb) are extremely dry over PGI30L, while TPW imagery indicates that the low to mid-level moisture field associated with the system is becoming smaller over time. Dry low to mid-level air with overlying subsidence is wrapping around the west and southwest side, while a SAL outbreak is overtaking it from the east (Fig. 5; TPW ≤45 mm). A GPS dropsonde launched by the G-V this morning ~400 km south of the pouch center suggests the presence of mid-latitude dry air (~475-650 mb) with overlying subsidence (extending down to ~475 mb). The base of the subsidence layer is discerned by a marked temperature inversion at ~475 mb (Fig. 5, bottom left panel). Another GPS dropsonde launched ~300 km east of the system indicates a SAL layer from ~500-850 mb with a deep layer of subsiding air above 500 mb (another marked temperature inversion can be seen at this level; Fig. 5, lower right panel). Low-level vorticity (Fig. 4) is continuing to be less concentrated over the system and is generally oriented NNW-SSE. Although SSTs are continuing to warm along the track, the broad nature of the vorticity field and increasingly hostile thermodynamic environment are taking their toll on PGI30L. Analyzed low-level vorticity and OW values are quite low for this system in the ECMWF and GFS throughout the forecast period (Fig. 6). The system is being flown by PREDICT today, though prospects for follow-on missions are becoming unlikely. Although PGI 30L will be in range of most tri-agency aircraft over the coming days as it tracks generally west, genesis is extremely unlikely over the next 72 hr and it is quickly becoming a less viable target.

d. PGI31L

Remains located to the southwest of the Cape Verdes near 12N 28W embedded within a large band of low-level relative vorticity that appears to be consolidating near 10-11N 31W (Fig. 7). The system continues to be positioned in a favorable environment of shear, low to mid-level moisture and SSTs and convection associated with the system is finally showing signs of organization. Meteosat-9 SAL (Fig. 8) and visible imagery (not shown) indicates a large SAL outbreak just north of PGI31. Pouch analyses indicate steadily increasingly low-level vorticity and OW and extremely high TPW and RH (60-70 mm and 80-90% respectively). The SHIPS model indicates an increasingly dry surrounding environment as it recurves toward the SAL in the coming days. This suggests that the 3x3 deg analyses from the pouch products may not be catching the dryness that SHIPS sees out to radii of ~600-800 km. This implies that the size and development of the vortex as it moves out of its current high TPW region toward the dryer SAL could be an important factor in determining how well it is able to insulate itself form that dryer air. The GFDL, HWRF, and SHIPS models bring PGI31L to tropical storm strength within 18-24 and the global models continue to favor development of this system with a northwest track for the next several days. The GFS and ECMWF models suggest that this system could be in range of the G-V and G-IV aircraft sometime on the Monday (23 Aug) or Tues (24 Aug) and possibly in range of the P3-s and DC-8 in the Tues/Wed (24-25 Aug) timeframe for a few days before recurving to the NNW and out of range. Although both the GFS and ECMWF take PGI31L northwest toward a

weakness in the mid-Atlantic ridge that develops over the next several days in response to an east coast trough and developing low pressure system, the exact timing and location of these feature is still a question. Although the GFS has been fairly consistent over the past four cycles, the ECMWF had a large swing from a more northerly, recurving track yesterday to a more westward track yesterday back to a once again a more northerly, recurving track today (Fig. 10). There is still much uncertainty re: the exact track of this system and whether or not various tri-agency aircraft will be able to reach it and what intensity it will be when/if it is reachable from St. Croix and Barbados.

d. PGI34L

PGI34L: is located near ~11N 2E while the MCS associated with this AEW is ~5 deg to the west. The ECMWF model is suggesting that this system will emerge from the African coast sometime in the Tues (24 Aug) timeframe.

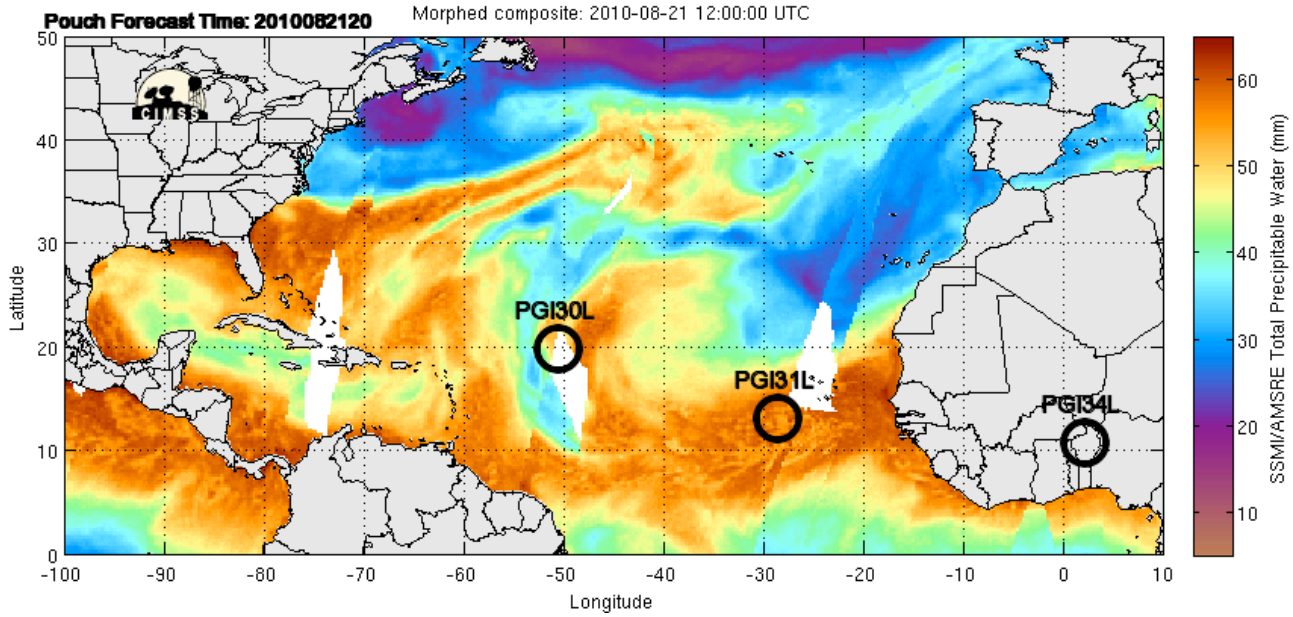

Pouch Forecast Time: 2010082120
Morphed composite: 2010-08-21 12:00:00 UTC
PGI30L
PGI31L
PGI34L
Latitude
Longitude
SSMI/AMSRE Total Precipitable Water (mm)

Fig. 1.

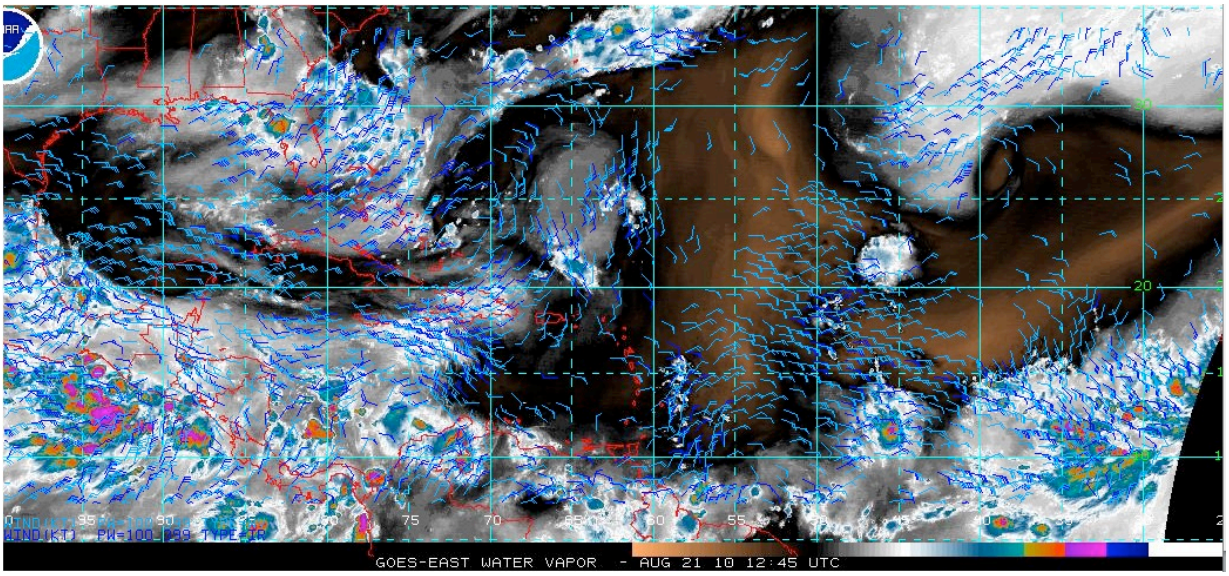

GOES-EAST WATER VAPOR - AUG 21 10 12:45 UTC

Fig. 2.

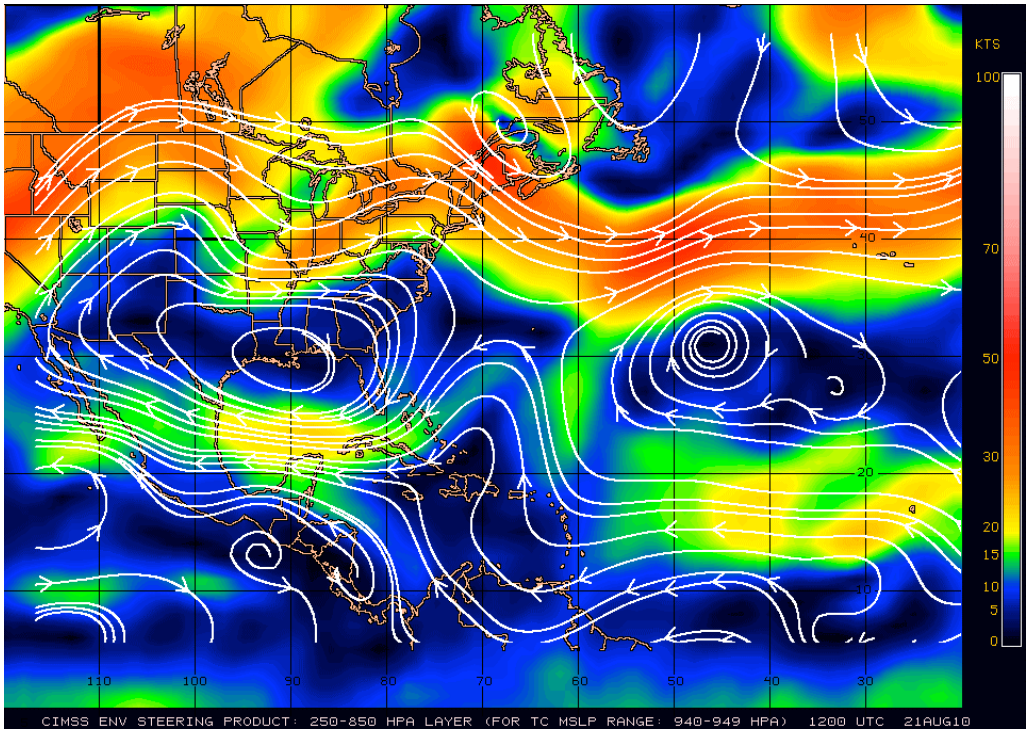

KTS
100
70
50
30
20
15
10
5
0
CIMSS ENV STEERING PRODUCT: 250-850 HPA LAYER (FOR TC MSLP RANGE: 940-949 HPA) 1200 UTC 21AUG10

Fig. 3.

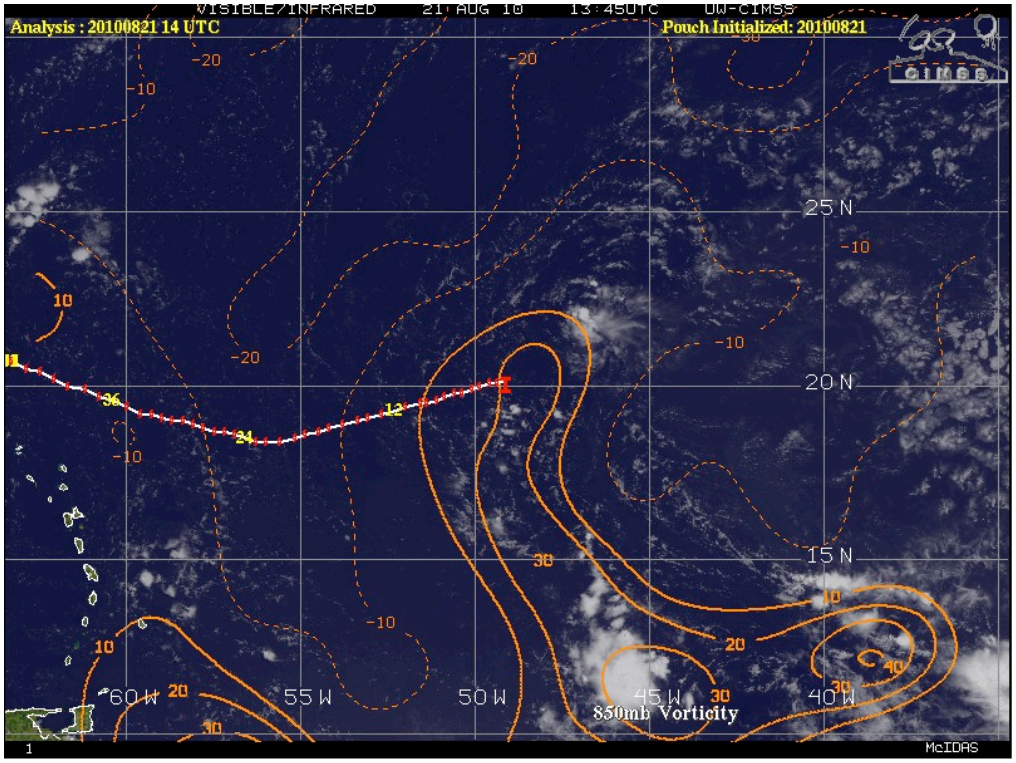

VISIBLE/INFRARED 21 AUG 10 13:45UTC UW-CIMSS
Analysis : 20100821 14 UTC
Pouch Initialized: 20100821
CIMSS
25 N
20 N
15 N
60 W
55 W
50 W
45 W
40 W
850mb Vorticity
McIDAS

Fig. 4

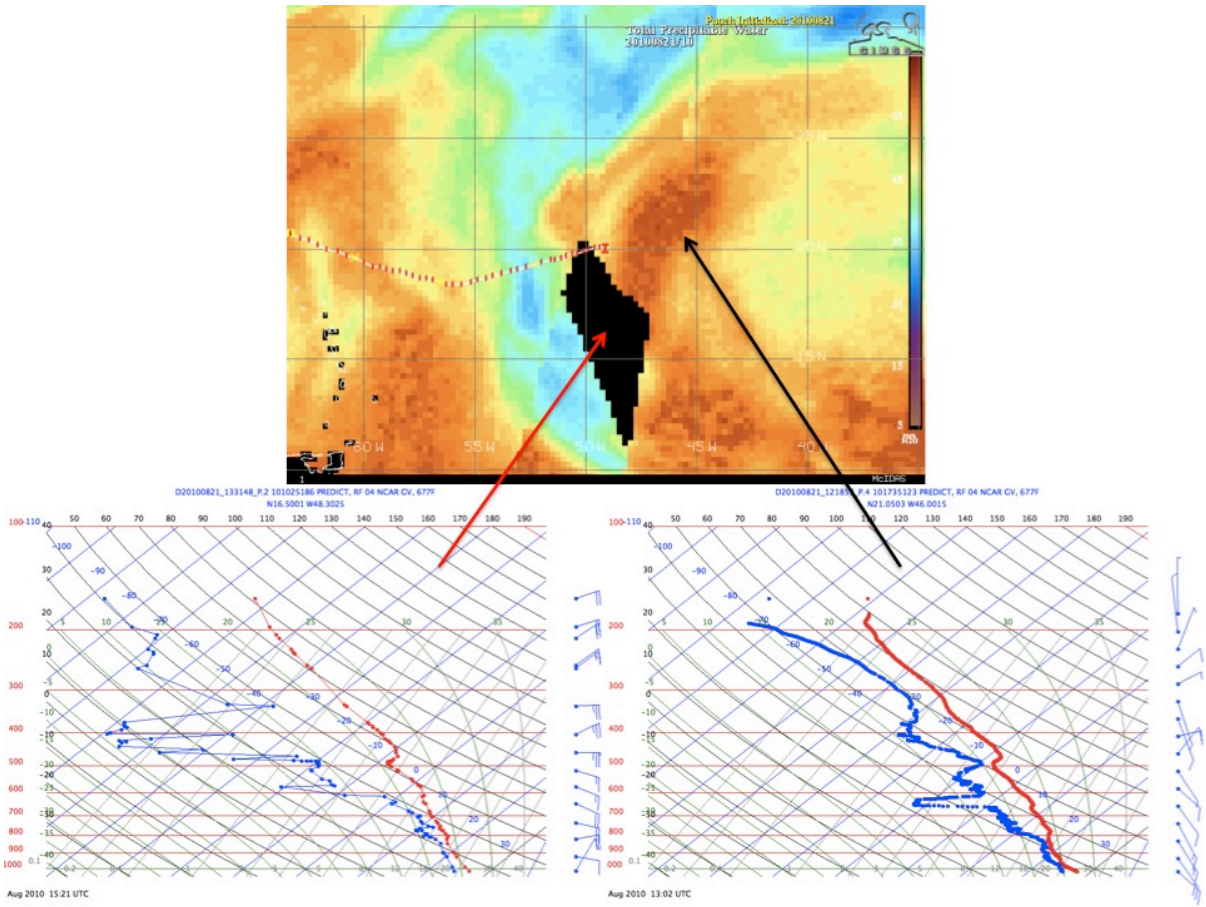

Total Precipitable Water
60 W
55 W
50 W
45 W
40 W
15 N
Aug 2010 15:21 UTC
Aug 2010 13:02 UTC

Fig. 5

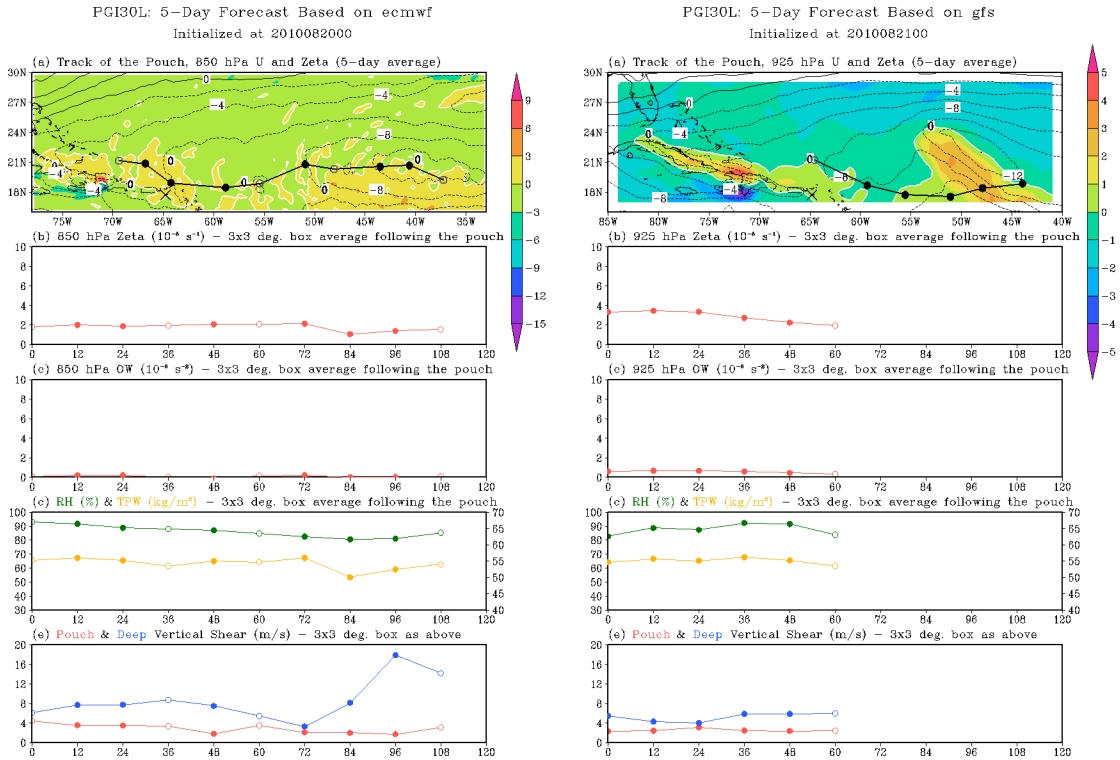

PGI30L: 5-Day Forecast Based on ecmwf
Initialized at 2010082000
PGI30L: 5-Day Forecast Based on gfs
Initialized at 2010082100
(a) Track of the Pouch, 850 hPa U and Zeta (5-day average)
(a) Track of the Pouch, 925 hPa U and Zeta (5-day average)
(b) 850 hPa Zeta (10⁻⁶ s⁻¹) - 3x3 deg. box average following the pouch
(b) 925 hPa Zeta (10⁻⁶ s⁻¹) - 3x3 deg. box average following the pouch
(c) 850 hPa OW (10⁻⁶ s⁻²) - 3x3 deg. box average following the pouch
(c) 925 hPa OW (10⁻⁶ s⁻²) - 3x3 deg. box average following the pouch
(c) RH (%) & TPW (kg/m²) - 3x3 deg. box average following the pouch
(c) RH (%) & TPW (kg/m²) - 3x3 deg. box average following the pouch
(e) Pouch & Deep Vertical Shear (m/s) - 3x3 deg. box as above
(e) Pouch & Deep Vertical Shear (m/s) - 3x3 deg. box as above

Fig. 6

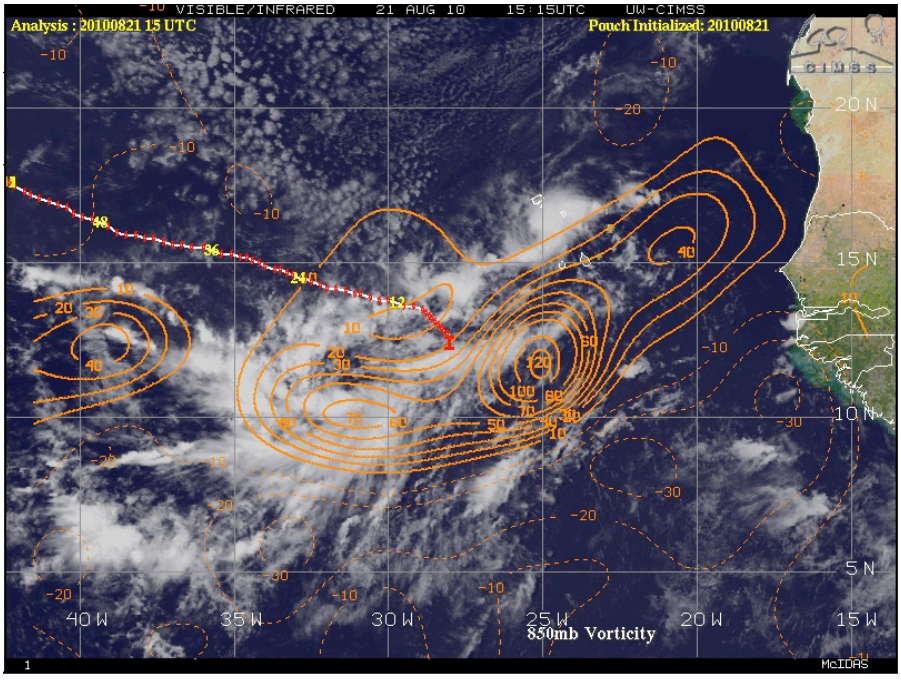

VISIBLE/INFRARED 21 AUG 10 15:15UTC UW-CIMSS
Analysis : 20100821 15 UTC
Pouch Initialized: 20100821
850mb Vorticity
McIDAS

Fig. 7

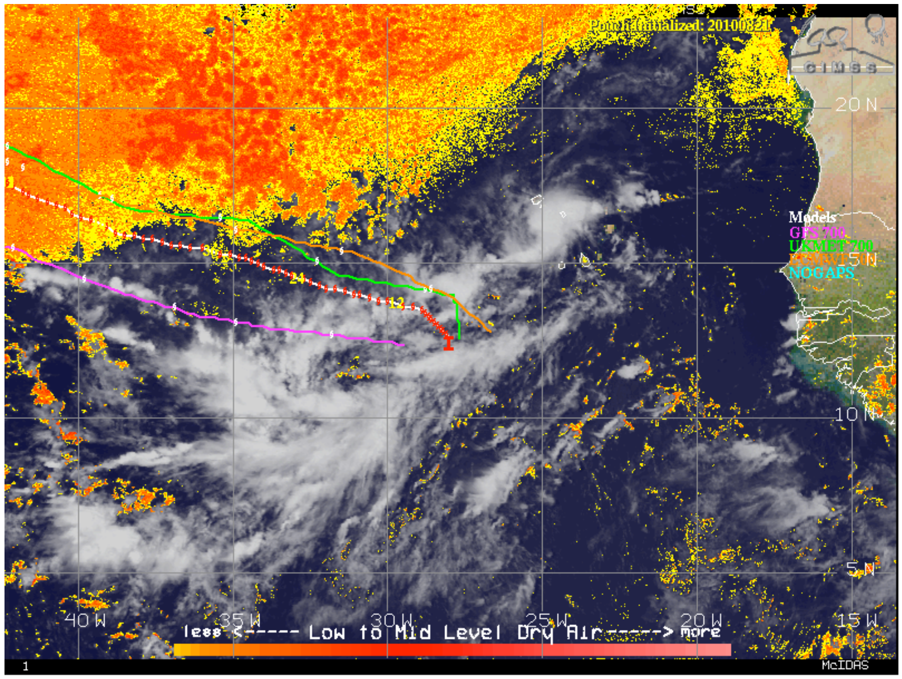

Pouch Initialized: 20100821
CIMSS
20 N
10 N
5 N
Models
GFS 700
UKMET 700
NOGAPS
40 W
35 W
30 W
25 W
20 W
15 W
less <----- Low to Mid Level Dry Air-----> more
McIDAS

Fig. 8

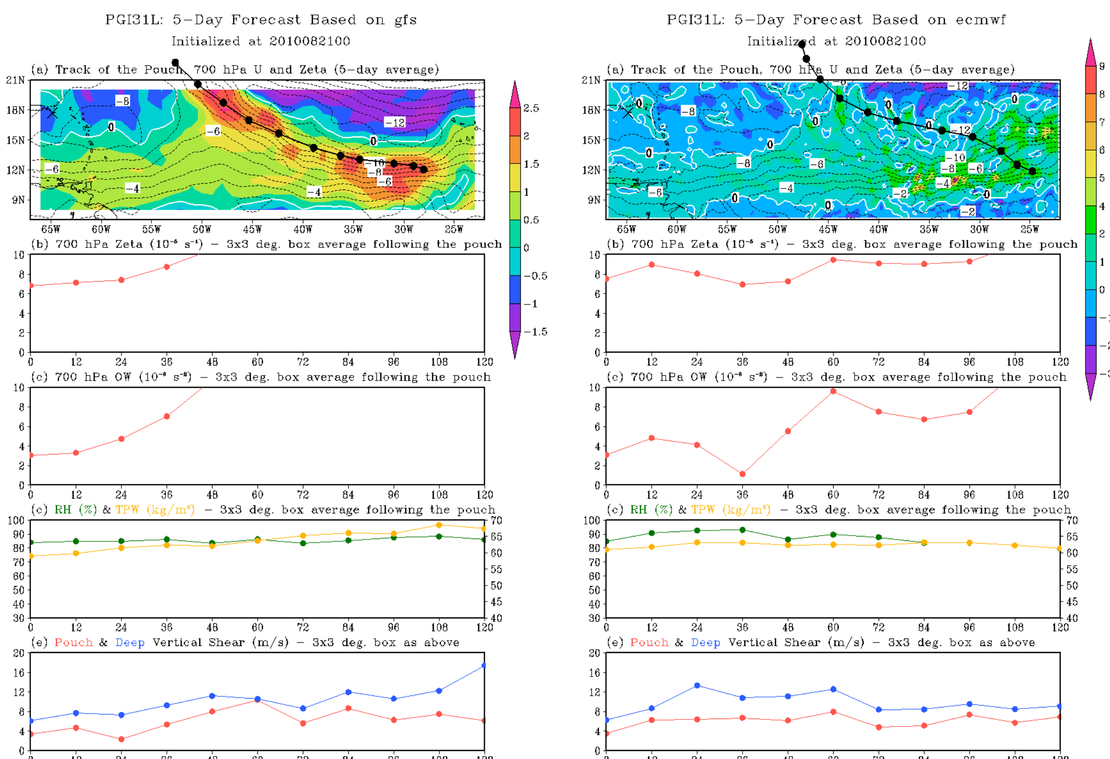
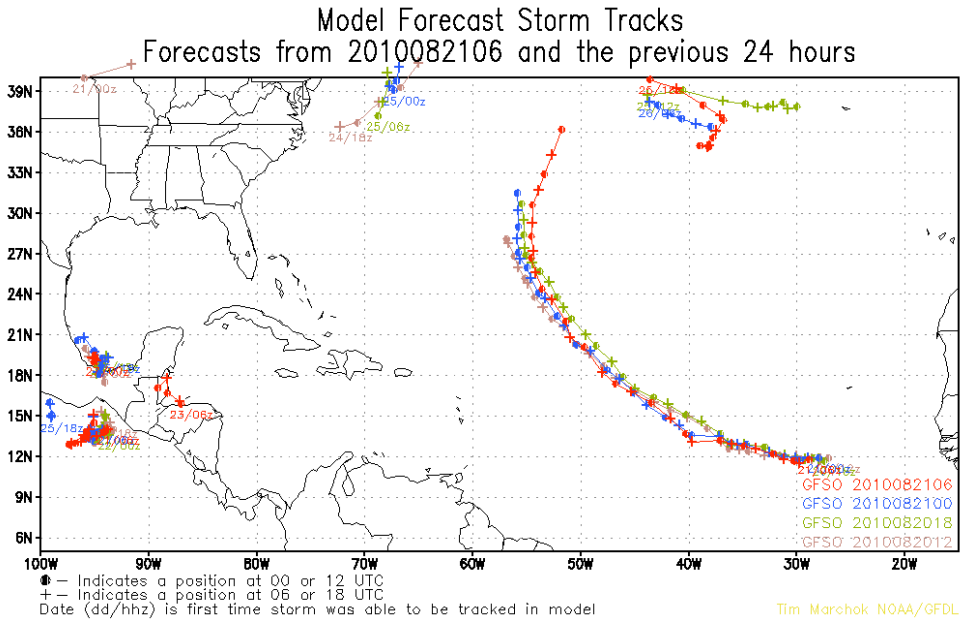

PGI31L: 5-Day Forecast Based on gfs
Initialized at 2010082100
(a) Track of the Pouch, 700 hPa U and Zeta (5-day average)
(b) 700 hPa Zeta (10⁻⁶ s⁻¹) - 3x3 deg. box average following the pouch
(c) 700 hPa OW (10⁻⁹ s⁻²) - 3x3 deg. box average following the pouch
(c) RH (%) & TPW (kg/m²) - 3x3 deg. box average following the pouch
(e) Pouch & Deep Vertical Shear (m/s) - 3x3 deg. box as above
PGI31L: 5-Day Forecast Based on ecmwf
Initialized at 2010082100
(a) Track of the Pouch, 700 hPa U and Zeta (5-day average)
(b) 700 hPa Zeta (10⁻⁶ s⁻¹) - 3x3 deg. box average following the pouch
(c) 700 hPa OW (10⁻⁹ s⁻²) - 3x3 deg. box average following the pouch
(c) RH (%) & TPW (kg/m²) - 3x3 deg. box average following the pouch
(e) Pouch & Deep Vertical Shear (m/s) - 3x3 deg. box as above

Fig. 9


Model Forecast Storm Tracks
Forecasts from 2010082106 and the previous 24 hours
GFSO 2010082106
GFSO 2010082100
GFSO 2010082018
GFSO 2010082012
● – Indicates a position at 00 or 12 UTC
+ – Indicates a position at 06 or 18 UTC
Date (dd/hhz) is first time storm was able to be tracked in model
Tim Marchok NOAA/GFDL

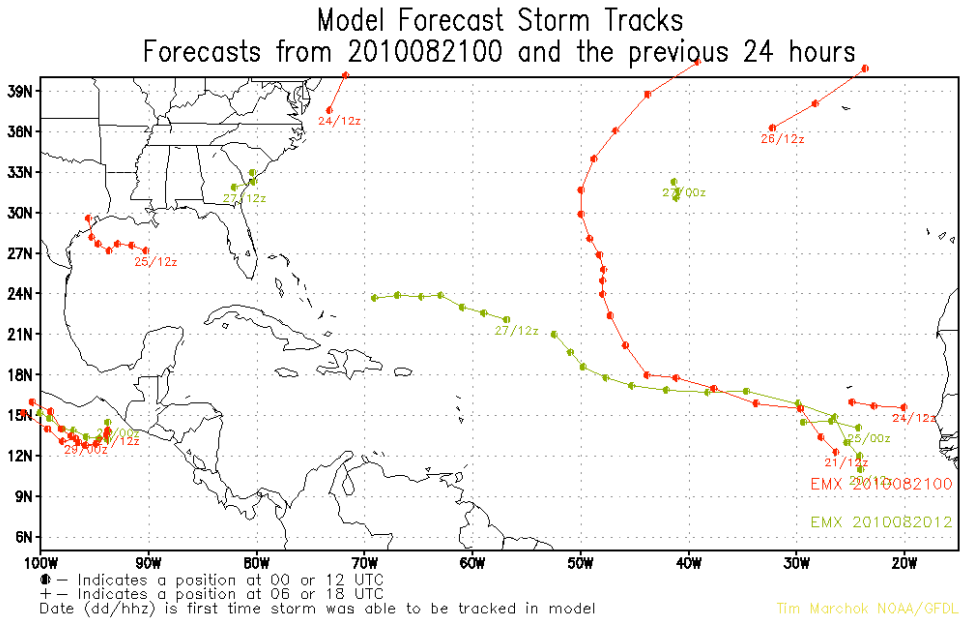

Model Forecast Storm Tracks
Forecasts from 2010082100 and the previous 24 hours
EMX 2010082100
EMX 2010082012
● – Indicates a position at 00 or 12 UTC
+ – Indicates a position at 06 or 18 UTC
Date (dd/hhz) is first time storm was able to be tracked in model
Tim Marchok NOAA/GFDL

Fig. 10

PGI positions based on 0000 UTC 21 August ECMWF

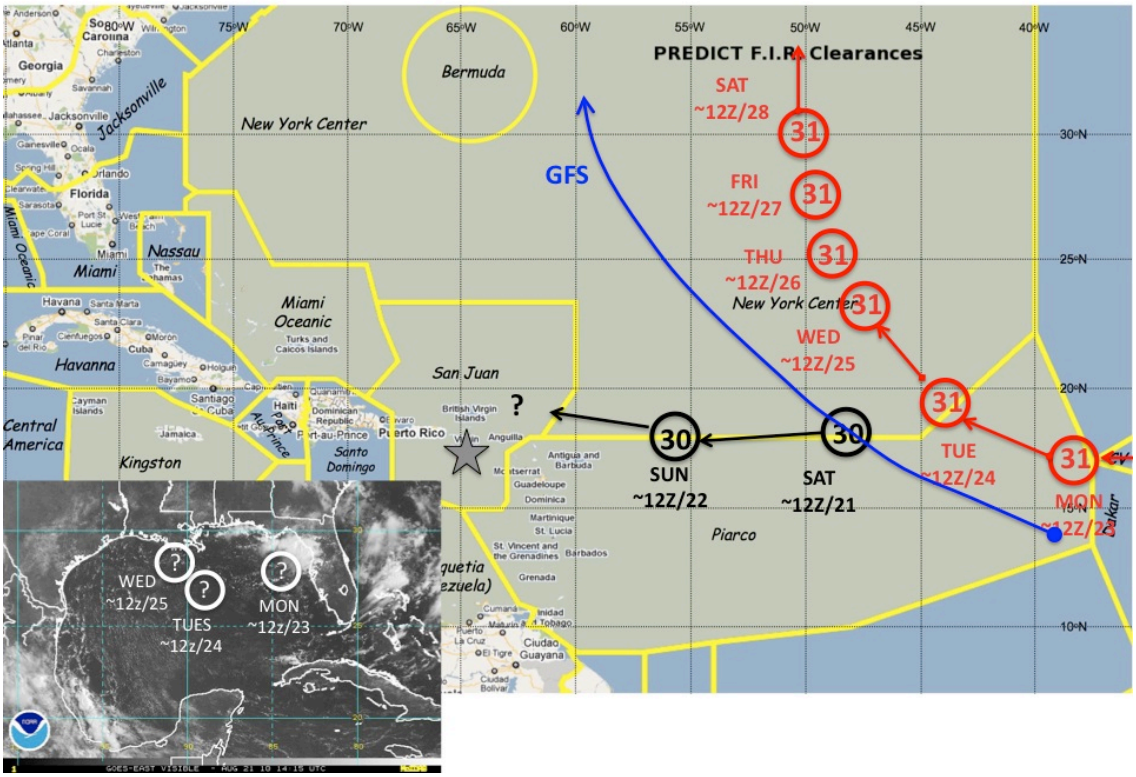


Fig. 11