

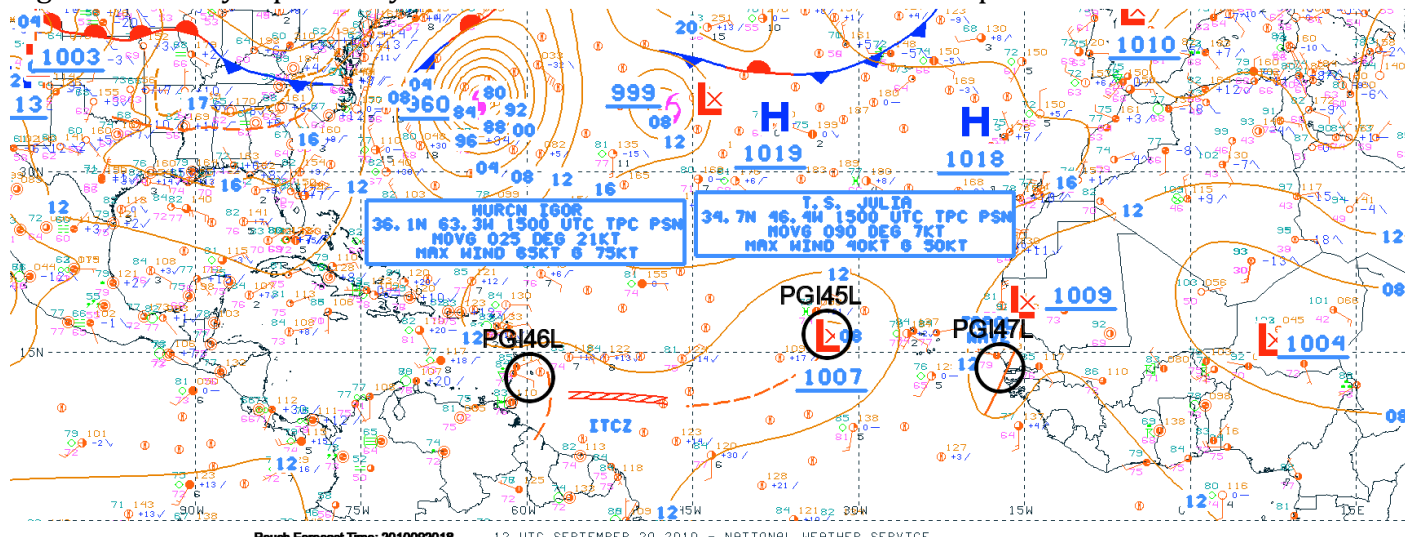
## Tropical Forecast Discussion for September 20, 2010

### Synoptic Overview:

At 1500UTC, 20 September, there were a total of 5 tropical cyclones and tropical disturbances in the Atlantic Basin. Hurricane Igor, a long-lived, large hurricane, was in the western North Atlantic, while further to the east was much smaller and weakening TS Julia. At lower latitudes, three invest areas were indentified: PGI46L centered near Barbados, PGI45L in the Eastern Atlantic, and PGI47L along the west coast of Africa. Only PGI45L, which had a well-defined low-level circulation, was identified by NHC in the tropical outlook as having a 70% chance of developing into a tropical cyclone over the next 48 hours.

Synoptic features included a ridge located over the SE U.S. and extending westward across the Gulf of Mexico, A broad and moderately-strong ridge of high pressure from the far eastern to mid-Atlantic basin, and a broad trough of low pressure that extended from the NE U.S. to just south of eastern Cuba. The trough off of the east coast of U.S. was responsible for steering and accelerating Igor northward while the ridge across most of the rest of the Atlantic caused the invest areas to move to the west or WNW.

Fig. 1: Surface synoptic analysis of the Atlantic basin at 1500 UTC 20 September.



Besides the areas just mentioned, the discussion also included a low center in the EPAC, just south of the Baha Peninsula. This low center appeared to include, at least partially, the remnants of former Hurricane Karl that traversed across Mexico over the weekend. NHC gave this disturbance a 50% chance of developing within the next 48 hours.

### Eastern Pacific Tropical Disturbance, EP96:

A vigorous tropical low was located south of the Baha peninsula, was producing deep convection (Fig. 2), and had a well-defined low-level circulation as evidenced by visible satellite imagery (Fig. 3) and an early morning ASCAT pass (not shown). Easterly shear was taking a toll on the convection, which was displaced to the SE of the vorticity center (Fig 4). This system was on the verge of developing but between the shear and cooler SSTs to its W and NW, the window of opportunity would be small and if it develops, it would likely be short lived.

Fig. 2: IR satellite image of EPAC tropical disturbance, EP96.

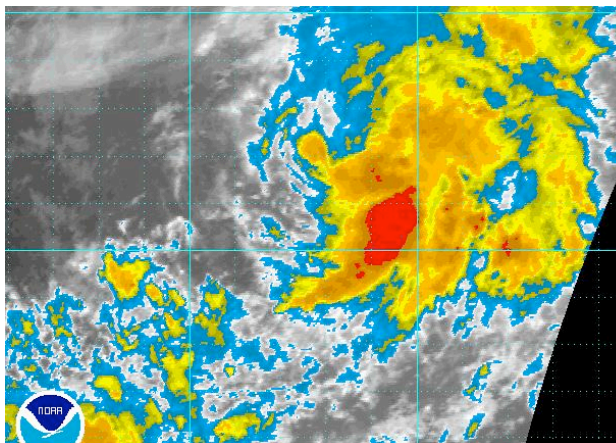


Fig. 3: Visible satellite image of EPAC tropical disturbance, EP96.

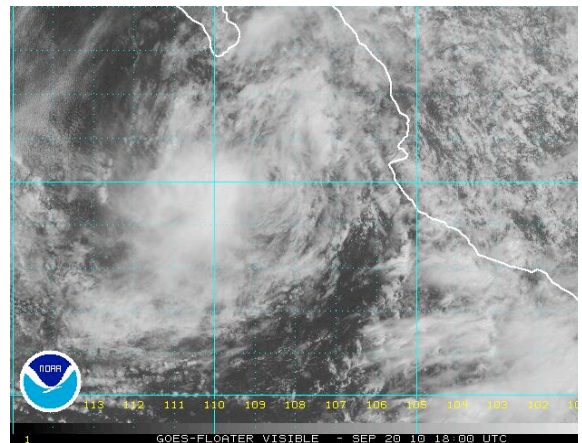
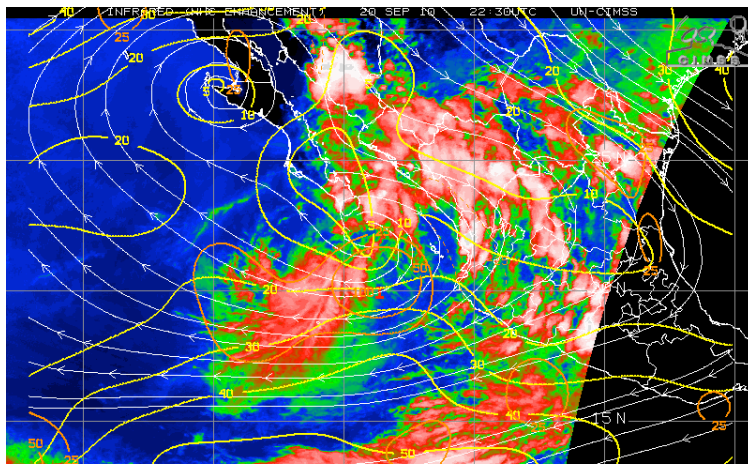


Fig. 4: CIMMS analyses of low-level vorticity and vertical wind shear overlaid on IR imagery of the EPAC tropical disturbance, EP96.



### Hurricane Igor:

NHC has been writing advisories for Hurricane Igor for nearly two weeks, and Igor was a large storm that was a major hurricane for nearly a week as it traversed westward across the Atlantic. The storm recurved ahead of a large mid-latitude trough and was now located to the north of Bermuda and accelerating further northward. Igor's intensity was now down to a Category 1 hurricane and was expected to begin extra-tropical transition within about 24 hours. Although the cloud shield was massive (Fig 5.), there was very little in the way of deep convection. Igor was not near any landmasses throughout its life until passing just west of Bermuda yesterday and, according to the NHC forecast, would make landfall as a large extra-tropical cyclone in Greenland by weeks end. (Fig. 6.)

Fig. 5: Visible Satellite image of Hurricane Igor

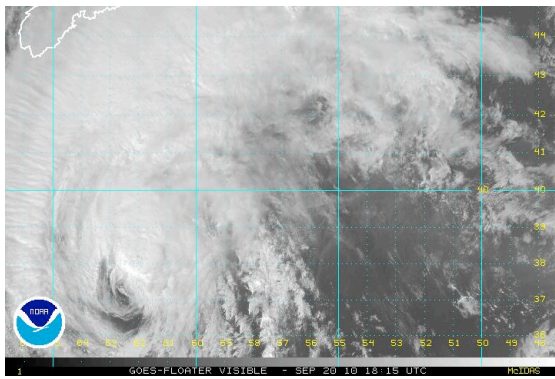
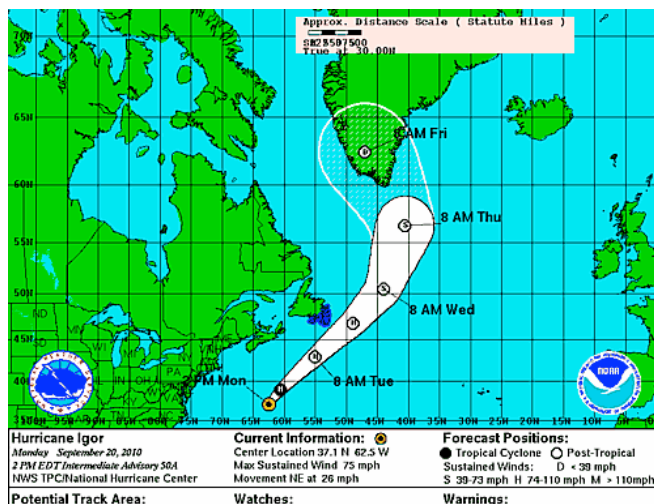


Fig. 6: NHC official 5-day track forecast for Hurricane Igor

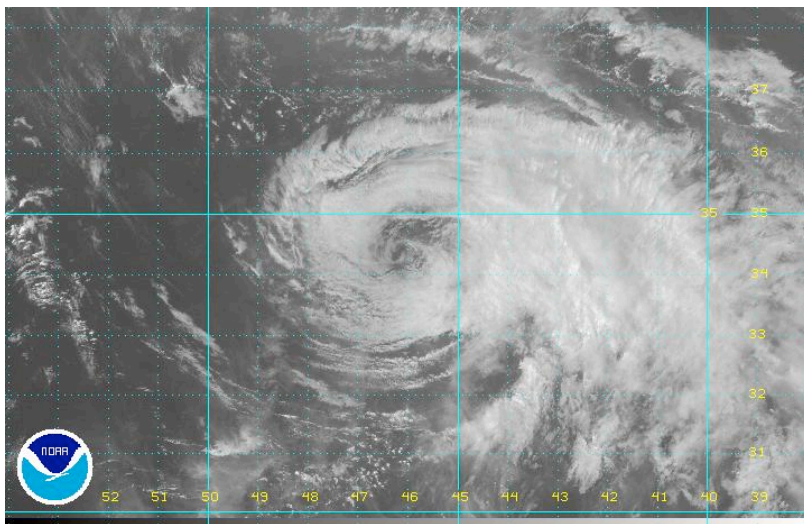




## Tropical Storm Julia:

Julia was much smaller than Igor but had also been a major hurricane last week before the outflow from Igor and other environmental factors cause Julia to weaken. Although expected to dissipate a couple of days earlier, Julia kept producing intermittent bursts of convection, allowing it to maintain itself as a TS. According to the NHC 1500 UTC discussion for Julia, the convection was located far to the east of the low-level center and the low-level center was becoming elongated west to east (Fig. 7). Because of the drastic changes in storm structure, this would be the last advisory written by NHC on Julia.

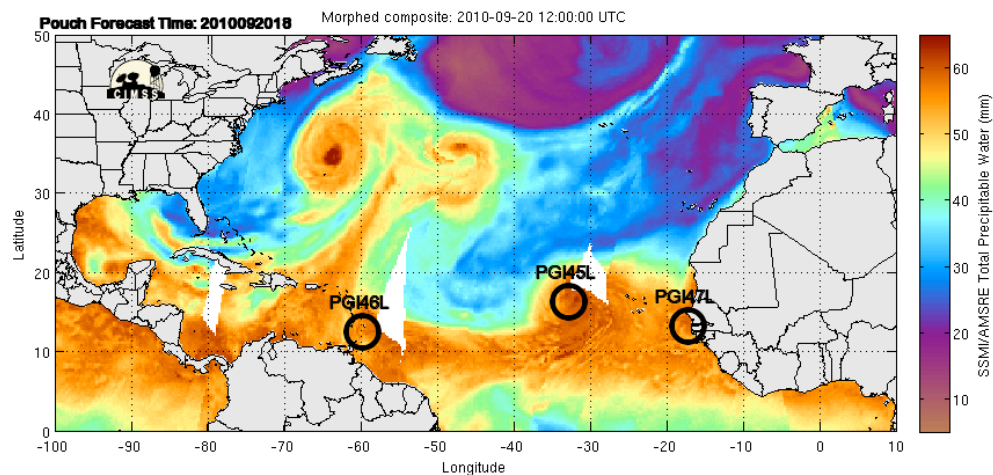
Fig. 7: Visible imagery of Tropical Storm Julia



## Invest areas:

There were three “pouches” identified by the PREDICT team, PGI45, PGI46, and PGI47 and are shown on the TPW image of Fig. 8, which also shows the moisture associated with the named storms further north. All three of the disturbances had “connections” to the deep tropical moisture of the ITCZ, and, PGI46 formed from a “roll-up” of the ITCZ a few days before.

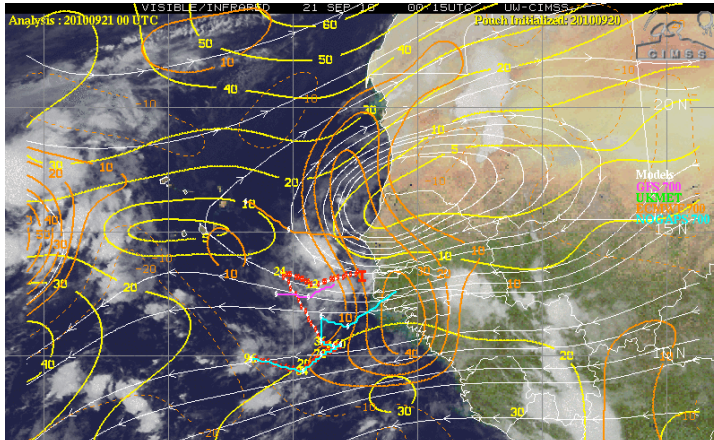
Fig. 8: TPW image of the Atlantic Basin



### PGI47L:

PGI47L was not discussed during the webinar because of time constraints and interests for operations further west, but a CIMMS analyses of low-level vorticity, vertical wind shear, and model forecast tracks are included here for completeness (Fig. 9). This system will be monitored and discussed, as appropriate, during the coming days.

Fig. 9: CIMMS analyses of low-level vorticity, vertical wind shear, and model forecast tracks for PGI47L.



### PGI45L:

PGI45L was a vigorous low-pressure system with areas of deep convection near but not totally coincident with the low-level center (Fig. 10). An ASCAT pass (not shown) revealed a well-defined low-level circulation. The shear pattern of PGI45L was quite complex, with westerly shear on the northern portions of the convection and easterly shear on the southern half. The net result was convection that was displaced to the east of the strong, low-level vorticity center (Fig. 11). The system appeared to be at or nearly at a tropical depression stage and NHC gave PGI45L a 70% chance of becoming a depression or storm within the next two days. Model guidance indicated that, in the short-term, PGI45L would track slowly to the west before being caught up in a weakness of the mid-Atlantic ridge and moving to the NW or even north.

Fig. 10: Visible satellite image of PGI45L

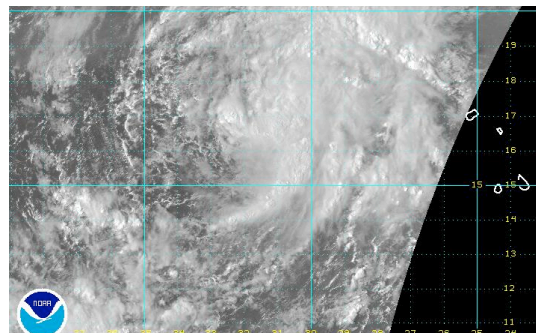
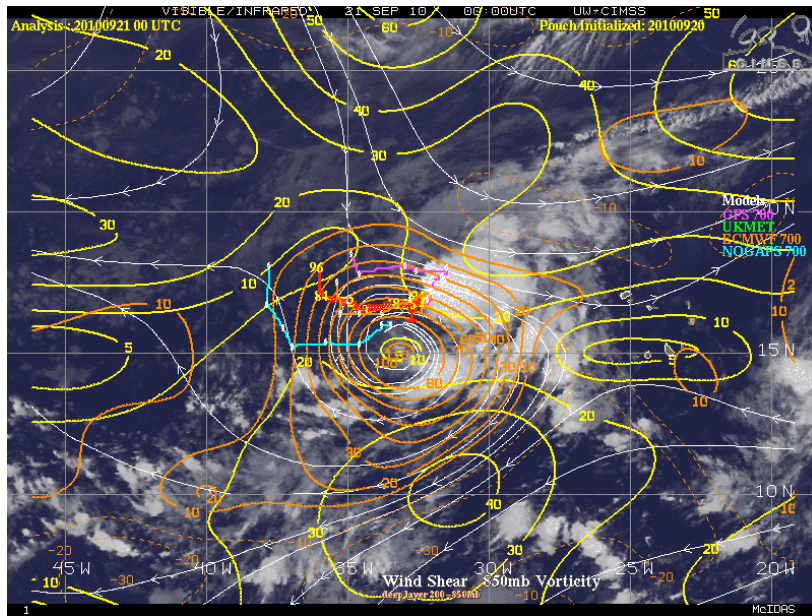




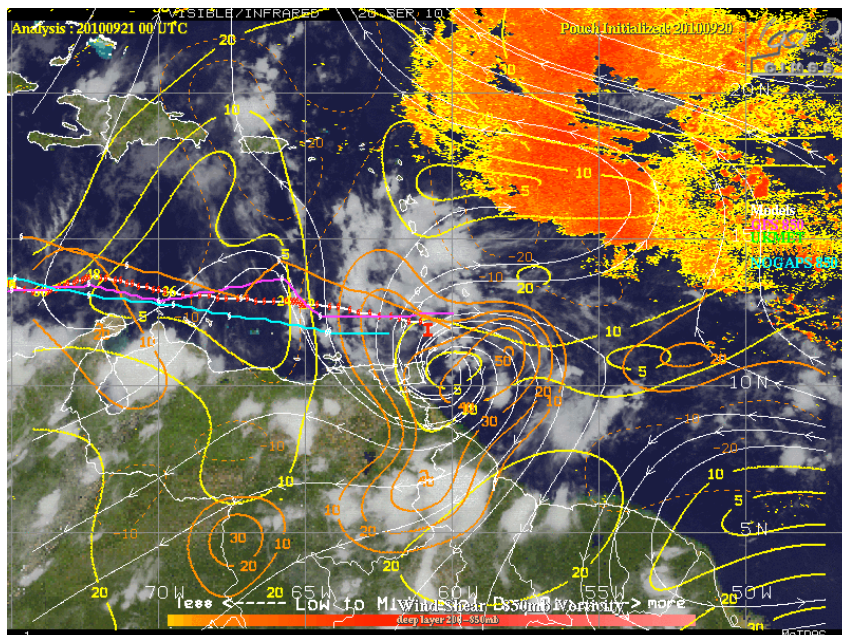
Fig. 9: CIMMS analyses of low-level vorticity, vertical wind shear, and model forecast tracks for PGI47L.



PGI46L:

The main area of interest for the tri-agency field campaigns was PGI46L, located near Barbados in the deep tropics and moving slowly westward. Environmental conditions (war SST, low shear) favor development of this system, but a lack of organization of this system would preclude any development in the short term. The system originated a few days ago from a “roll-up” of the ITCZ in the central Atlantic. It was comprised on a linear E – W disorganized clusters of convection and a vorticity field that was also elongated (Fig. 12).

Fig. 12: CIMMS analyses of vorticity, shear, dry air, and model forecast track for PGI46L



Model guidance was generally westward over the next several days, with the system, if still trackable, likely being located in the western Caribbean in 5 days. NHC did not have this system analyzed as a potential for genesis and model guidance was inconclusive as well. In fact, the synopsis of 46L by the PREDICT team indicated the lack of trackability and future development of this system:

PREDICT pouch synopsis

Date (UTC): 2010/09/20 12:50

Author: Boothe

Submitted at (UTC): 2010/09/20 12:55

Revised at(UTC): 2010/09/20 13:41

Pouch Name: PGI47L      Official Name:      Initial Center Point: 12N 14W

Notes:

Models all tell a different story!!

ECMWF: Phase Speed: -2.9      Determination: v700 only      Level tracked: 700 hPa

Track: 48h

Moves northwestward and dissipates quickly.

GFS:      Phase Speed: -2.7      Determination: v700 only      Level tracked: 700 hPa

Track: 48h, but uncertain at 48 hours.

Moves slowly west and dissipates quickly.

UKMET: Phase Speed: -2.5      Determination: v700 only      Level tracked: 700 hPa

Track: 96h, but only because the data stopped at 96 hours

Moves northwestward, with an early intensification followed by gradual weakening.

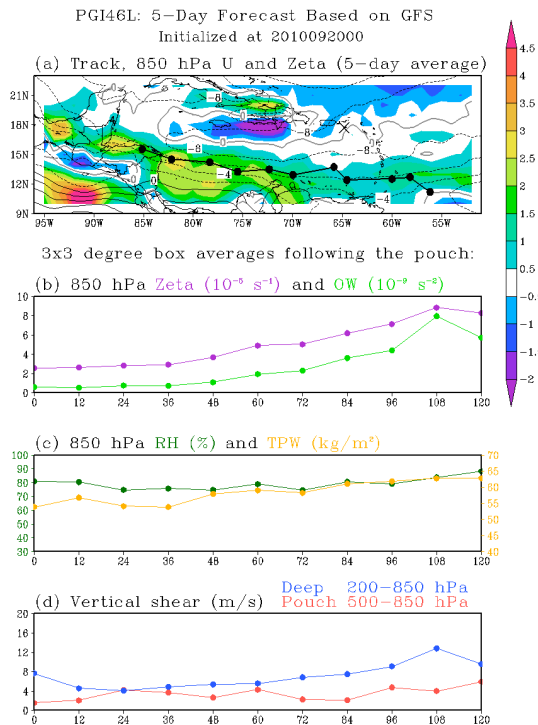
NOGAPS: Phase Speed: -1.0      Determination: v700 only      Level tracked: 700 hPa

Track: 120h

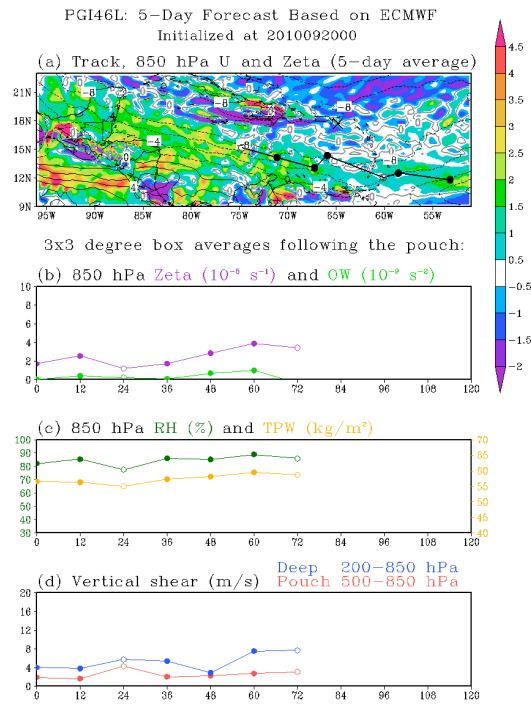
Loops, then moves slowly southwestward, with initial weakening followed by slight intensification.

Two of the pouch tracking products from the global models from the ECMWF and GFS models shows some of the variance and inconsistency of the forecasts for PGI46L (Fig. 13).

Fig.13: Pouch diagnostics based on GFS



Pouch diagnostics based on ECMWF



The GSF shows slowly-increasing values of vorticity and OW, high moisture values, and low but slowly increasing shear. This would indicate a possible slow-development of PGI46L. The ECMWF, however, shows small and nearly constant vorticity and almost undetectable values for the OW parameter, suggesting that PGI46L would not develop and may become untrackable in a few days.

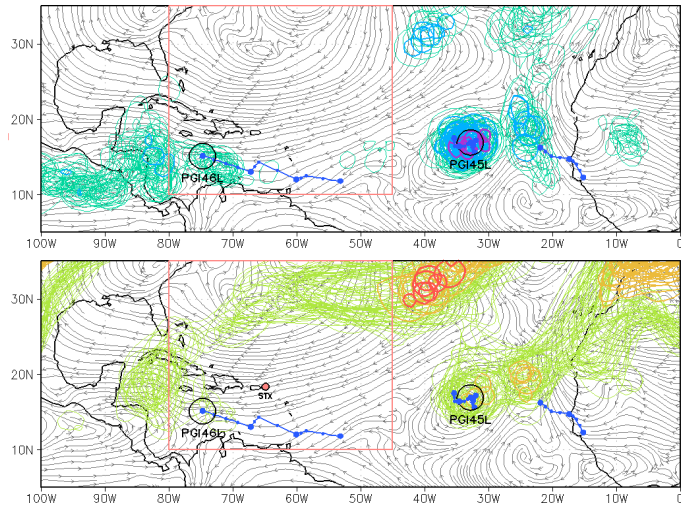
Finally, some of the ECMWF ensemble genesis products indicate the genesis is a distinct possibility, although probably not before 4-5 days from now. Fig. 14 shows the ensemble genesis product at 72, 96, and 120 hours. With time, there is an increasing likelihood of possible genesis in the western Caribbean or southern Gulf, although it is unclear from this product and operational runs of the global models as to whether the genesis is associated solely with PGI46L or is part of another system that may track into this region

PREDICT has begun flying PGI46L, NASA starts on 21 September so perhaps data from these missions will help the models with their initialization of the system and, perhaps, provide a more realistic and consistent forecast. Time will tell.



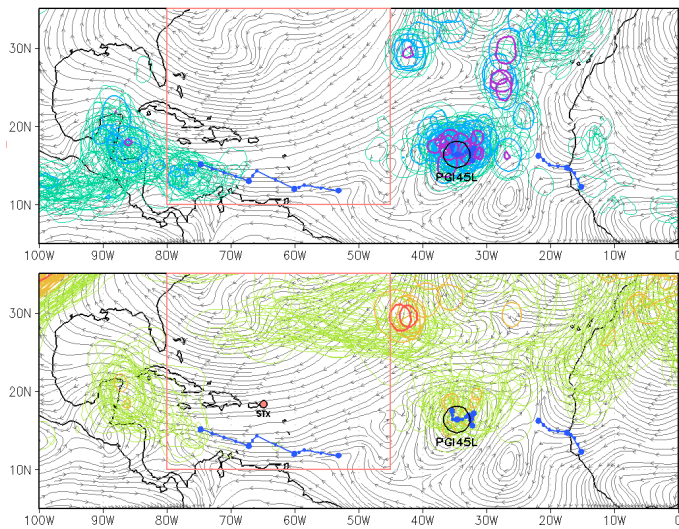
Fig. 14: ECMWF ensemble member possible genesis location, 72-hr forecast

Gray: ECMWF 72-hour CTRL streamlines of 700-850 hPa ave wind. Init. 2010092000, Valid 2010092300.  
Color: Contours of 700-850 hPa CIRC x  $2.5e-5 \text{ m}^{-2} \text{ s}^{-1}$  and 200-850 hPa THICK ANOM x 20 m. 50 members.



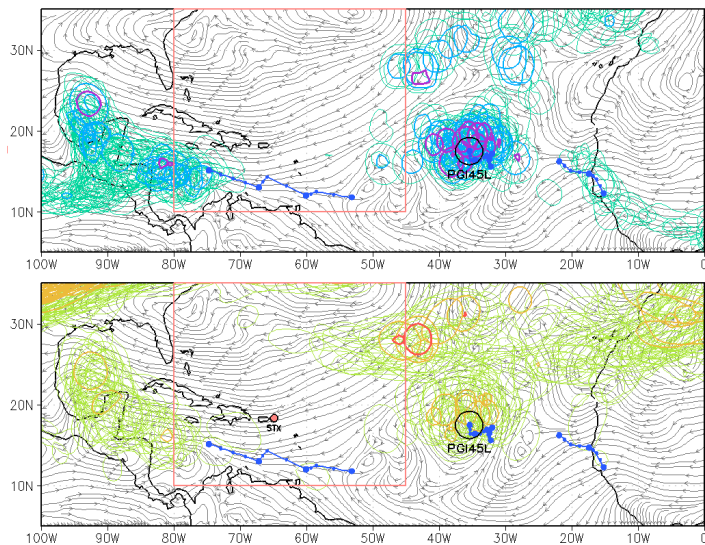
ECMWF ensemble member possible genesis location, 96-hr forecast

Gray: ECMWF 96-hour CTRL streamlines of 700-850 hPa ave wind. Init. 2010092000, Valid 2010092400.  
Color: Contours of 700-850 hPa CIRC x  $2.5e-5 \text{ m}^{-2} \text{ s}^{-1}$  and 200-850 hPa THICK ANOM x 20 m. 50 members.



## ECMWF ensemble member possible genesis location, 120-hr forecast

Gray: ECMWF 120-hour CTRL streamlines of 700-850 hPa ave wind. Init. 2010092000, Valid 2010092500.  
Color: Contours of 700-850 hPa CIRC  $\times 2.5e-5$   $m^{-2} s^{-1}$  and 200-850 hPa THICK ANOM  $\times 20$  m. 50 members.



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9/20/2010