

## Tri-Agency Forecast Discussion for September 19, 2010

Created 1600 UTC September 19, 2010

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**Summary:** Today is a no-fly day for all tri-agency aircraft. There are currently no targets of interest to the campaign within flight range, but that could change shortly as PGI-46L moves closer to the Caribbean. PGI-46L has more convection associated with it today, however there is a lot of disagreement in the models about whether this system will undergo genesis or not. One very interesting feature with this potential target is the heavy dust load to the north of the system that is expected to be advected all the way into the Caribbean, and could even be near Puerto Rico in 60 hours from now. PREDICT has plans to fly PGI-46L tomorrow at 1200 UTC, and it will be interesting to see what they find. With the end of the tri-agency participation approaching, it will be interesting to see if PGI-45L can make it across the Atlantic or if it will recurve north to the west of the Cape Verde islands and remain out of reach. Other than these two potential targets, the tri-agency domain remains fairly inactive for the coming days.

### **Forecast for 1600 UTC 9/19/2010:**

#### **Synoptic Overview:**

The western Atlantic Basin is fairly quiet today. The 0600 UTC surface analysis (**S1**) indicates a small surface trough along the coast of Texas (left behind from a disturbance that propagated with Karl), and a stalled stationary front across the southern US. Aside from some convection near Texas associated with that trough, the Gulf of Mexico is devoid of any deep convection (**S2, S3**). Except for near the trough, the rest of the Gulf of Mexico is under the influence of dry air at low levels (**S4**). The Caribbean is similarly quiet except for the far East Caribbean where convection associated with a band of ITCZ moisture that was pulled north by immense Igor's circulation over the last few days (**S4**) continues to fire to the west of an upper level low. Besides this feature, there is an upper level ridge located over the Gulf of Mexico and a small upper level cold low near Belize. Water Vapor Imagery indicates that the Caribbean is dry at upper levels north of 15N, but very moist to the south (**S6**). Wind shear is presently high over the Gulf and near the Yucatan Peninsula, but low over the Caribbean (**C2**).

The eastern portion of the central Atlantic continues to be dominated by flow associated with Igor and Julia throughout the troposphere, and the western portion of the central Atlantic is dominated by the 1024 hPa ridge to the north and the developing PGI-45L to the south embedded in deep layer easterlies (**C1, C5, C7**). Correspondingly, wind shear is high across the central Atlantic except for a narrow latitude band (**C2**) where PGI-46L and PGI-45L are transiting in good low level moisture (**S4**). Igor's influence continues to cause widespread subsidence and wind shear inhibiting convection around The other interesting feature in the eastern and central Atlantic is the powerful SAL outbreak that continues to be advected to the west. Visible imagery shows the baroclinic boundary of the SAL's west side with a line of cumulus defining the boundary well along

52W, and the deep convection is firing on the southern boundary of the SAL along 13N (S2). AOT values (S5) are very high associated with this SAL outbreak and it is interacting with convection associated with PGI-46L. It will be interesting to see if the GEOS-5 forecast for the dust verifies and it is advected into the Caribbean as far as Puerto Rico in 60 hours. Based on the synoptic flow that should prevail as Igor moves north, this is a distinct possibility.

In the East Atlantic and West Africa, PGI-45L is located to the west of the Cape Verde Islands and PGI-47L is entering Senegal (S4), and an upper level low is approaching Europe (C5). A moisture maximum extends to 20N with PGI-45L and PGI-47L remains embedded in deep layer moisture (S4, C5). At low levels, winds indicate the continued flow of monsoonal moisture into West Africa (C7) but wind shear values over southern portions of West Africa are high (C8). Steering flow (C9) for the region indicates that AEWs should move west on a southerly track, and that is a semi permanent feature this time of year.

### **Features of Interest:**

#### **Hurricane Igor:**

Igor has been downgraded to a category 1 storm with a central pressure is 949 hPa, maximum sustained winds estimated to be 75 knots, and a radius of gale force winds at about 500 km (NHC/I1). TPW imagery shows dry air to starting to entrain into the center of the storm which will help to weaken it as it moves into an area of high wind shear. The first signs of extratropical transition are becoming apparent with the structure of the inner-core becoming asymmetrical and an undetectable eyewall according to NHC aircraft reports. It will be considered extratropical within the next 24 hours (I1). Currently, Igor is on a NNW track moving at 10 knots but is expected to start a northeastern track as it gets caught into the outer flow of the subtropical ridge. ECMWF and GFS expect it to merge with Julia in the next 48 hours but it should remain a large and relatively strong extratropical cyclone as it makes this transition (I2).

#### **Tropical Storm Julia:**

Julia remained consistent overnight with an estimated central pressure of 998 hPa with maximum sustained winds of 45 kts. The system's course has transitioned from a NNW heading (330) to a N heading (360) and slowed substantially from 17 kts to 12 kts. This morning the system deepened slightly to an estimated minimum central pressure of 995 hPa continuing northward at 14 kts with a heading of 355. As of 0900 UTC Julia was located at 33.6N/51.8W appearing as a broad area of low pressure with its center not clearly visible and it is continuing out of the tropics (J1).

Early-cycle track guidance shows very little consensus with ensemble members varying from extreme re-curvature with Julia to straight northward tracks and Julia dissipating in the North Atlantic (J2). ECMWF has Julia becoming absorbed by Igor at 72 hrs and then re-emerging as an independent low pressure system again at 96 hrs before dissipating, while the GFS has Julia dissipating almost completely by 54 hrs with a small area of low pressure joining the massive low pressure center of Igor. Early-cycle intensity guidance

shows good consensus among ensemble members with Julia rapidly weakening and the majority of members estimating the system to be degraded from tropical storm status within 48 hrs (**J2**).

**PGI-45L/ AL94:**

As of 1200 UTC, Invest 94L is centered near 15N 31W. This system has become better organized in the past 24 hours, with the NHC forecasting a 70% chance of tropical cyclone formation within 48 hours and a 65% chance of development in 48 hours based on a Dvorak T-Number of 2.0 from TAFB at 1145 UTC. Westerly motion in low cloud elements is apparent in morning visible satellite imagery (**45A**), and the feature's broad surface circulation now appears closed, though elongated southwest to northeast. 94L is located in a narrow band of reasonably favorable 10-15 knot westerly shear sandwiched between much stronger westerly shear to the north driven by an upper-level trough axis and some easterly shear south of 10N (**45A**). Sea surface temperatures exceed 28C, and there is low-level convergence and upper-level divergence co-located with 94L (**45B**). Dry air remains a concern as precipitable water is low north and west of the system but adequate within the circulation envelope itself and to the south and east of the invest (**S4, S6**).

Though cloud tops have warmed somewhat this morning, 94L is one decent convective burst away from genesis and some development now appears likely as most global models now support modest intensification. Hurricane dynamical and statistical-dynamical models unanimously bring 94L to tropical storm intensity within 36 hours and the consensus is that it will plateau in intensity at around 55 knots between 72 and 120 hours (**45C**). The solution broadly makes physical sense as increasing the strength of 94L's circulation will likely result in the ingestion of mid-level dry air into the core and act as a check on future intensification.

While 94L is a good candidate to become Tropical Storm Lisa by mid-week, the track forecast remains unusual and problematic. This system is caught in an area of weak low- and mid-level steering currents between ridging centered near 34N/45W and a mid- and upper-level trough extending north-northeastward from roughly 20N/20W (**45D**). The invest has moved WNW at around 5 knots over the last 24 hours, and as the ridging and troughing both build and shift westward over the next four days, 94L will move even more glacially WNW/NW through the middle of next week. While there is significant spread in the 0000 UTC model solutions, it is worth noting that most of the guidance holds 94L east of 35W through 120 hours and none of the models move the system past 40W by Wednesday (**45C**).

**PGI-46L:**

Convection fired overnight in association with PGI-46L, however it remains very unorganized (**46A**). Lower level winds indicate the presence of slight cyclonic turning, but the system remains little more than a weak wave. The western component of PGI-46L has entirely separated from the eastern component which is now being stretched along the ITCZ.

The prospects of development for PGI-46L are very low. No models develop PGI-46L into any kind of a tropical cyclone at this time, however the GFS and ECMWF both at least strengthen the wave in the Caribbean after 48 hours (**46B**). The Caribbean should continue to be favorable for development, so if the wave strengthens, it is within the realm of possibility that it could develop further into a TC. However, none of the models indicate that at this time. However, PGI-46L may still provide a target due to extensive interaction with dust. A heavy dust layer to the north is interacting with PGI-46L today, and this layer is forecasted to move westward along with PGI-46L.

The track forecast for PGI-46L is far less uncertain today, and the models are handling the initialization far better than yesterday (**46A**). However, there is still some discrepancy as to the initial position of the pouch, by several hundred kilometers (compared to near 1,000 yesterday). Based on the low level winds and vorticity analysis, the consensus position seems fairly reasonable. The consensus track takes 46L generally westward, reaching 60W in 36 hours, and 65W in 60 hours. This would put PGI-46L in the same general location as Karl was when flights began into that system out of FLL. The GEOS-5 forecasts that a fairly high concentration of dust will continue to move westward along the northern edge of PGI-46L for at least the next 3-4 days (**D5**).

#### **PGI-47L:**

The fight for dominant PGI-47L pouch (**S1**) in the Senegal/Guinea region seems to be going to the western convective cluster, which is emerging into the Atlantic near 12N/16W (**S7**). The currently tracked eastern pouch (**47A**, center marked 'I') has not sustained significant convection for the past 12-24 hours. Thus, products may be moved to the coastal convection. If this area indeed emerges as the focal point for PGI-47L, diffluent flow in the upper troposphere (**C5**) and continuing low wind shear (**C8**) would allow slow development of the vorticity maximum beyond current diurnal convective phases. An ASCAT pass this morning (**47B**) suggests a surface convergence zone, co-located with the vorticity maximum, helping to sustain convection. Other potentially nurturing factors for the southwestern cluster include high local TPW and a reasonable distance away from the drier, dusty air around 20N/20W (**47C**).

With the caveat that the pouch tracks likely initialize too far east, model forecasts largely disagree on the short term evolution of PGI-47L. The European model (**47D**) shows merger with another vorticity maximum to the north and general movement to the northwest. The NCEP ensemble (**47E**) portrays a weaker signature and a more westerly route. NOGAPS shows a stronger signal with an NCEP-like solution, while UKMET favors a European scenario. At this time, most 5-day forecasts preserve a wave axis, but lose PGI-47L. Again, a continuing favorable environment and relocation of pouch initialization supports monitoring PGI-47L.

#### **SAL/Dust:**

Today, there is a large area of dry air that extends across the central and eastern Atlantic (**C10**) as well as a small area along the east coast of the United States. The dry air across the Atlantic can be attributed to the African dust and Saharan air layer (**D1**). The dust mass shows that the dust extends along the northern periphery of the ITCZ and then turns to the north and wraps into Tropical Storm Julia. The dust can clearly be seen in the visible imagery (**D2**), and the interaction of the dust with PGI-46 makes this an

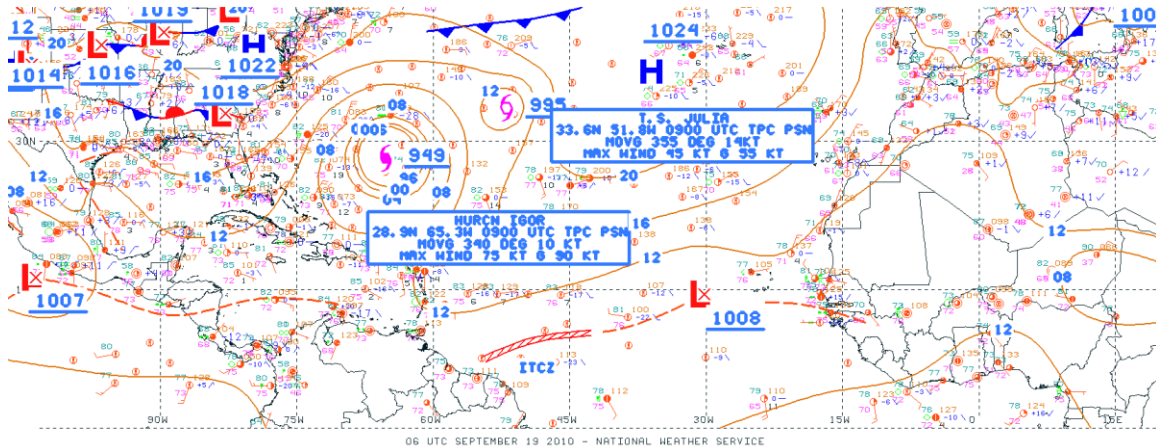
interesting scenario. The 24-h forecast of the dust mass (**D3**) shows that the dust will be influenced by the trade winds and continue to track to the west in conjunction with PGI-46. After 48 hours, the dust mass (**D4**) persists and continues to be advected by the easterly trade winds. Some of the dust will be wrapped along the northern and western sides of PGI-45, but the majority of the dust mass will be located in the eastern Caribbean extending north into the central Atlantic. At this time, it also appears that another SAL outbreak is beginning to come off the western coast of Africa. At 72 hours, the dust (**D5**) continues to persist and move to the west. However, the area of highest dust mass remains just to the north of the Windward Islands. Also, the newest SAL outbreak is off of the western African coast at this time, but it appears that it is not a particularly strong outbreak.

*Forecasters: Albers-English, Zawislak, Zelinsky, Cossuth, Truchelut, Kofron, Leary, Stovern*

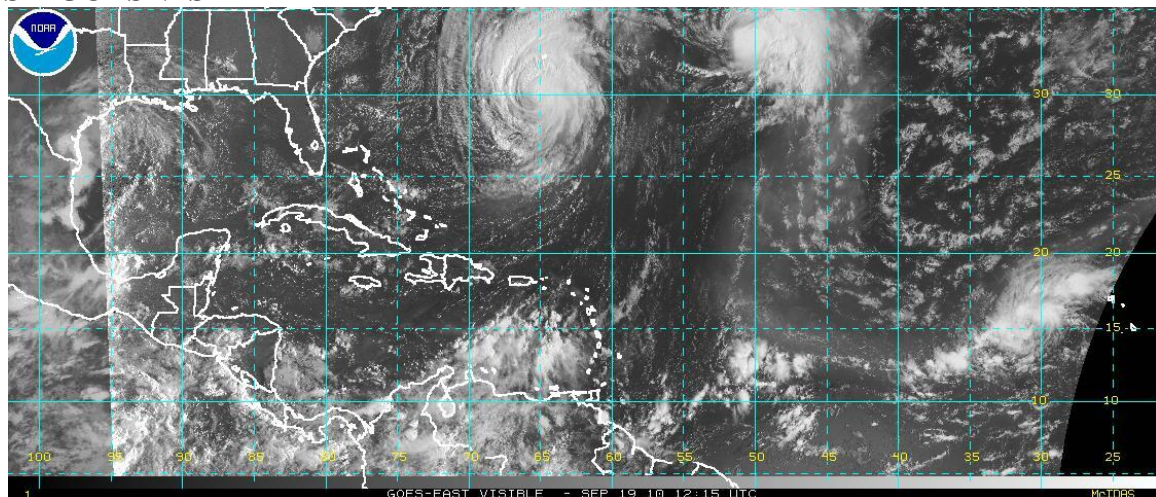
## Images used in discussion:

### Synoptic Overview Images

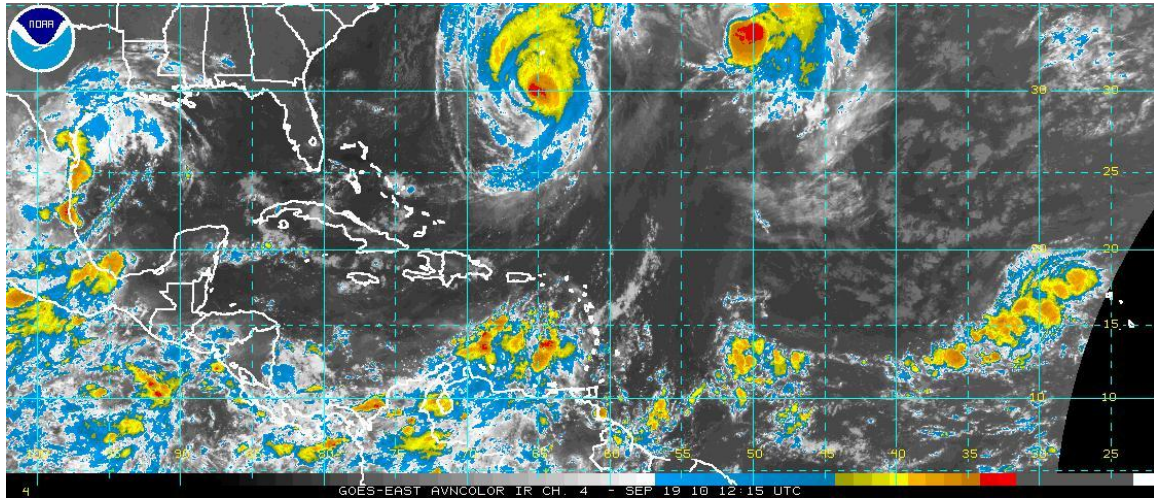
S1



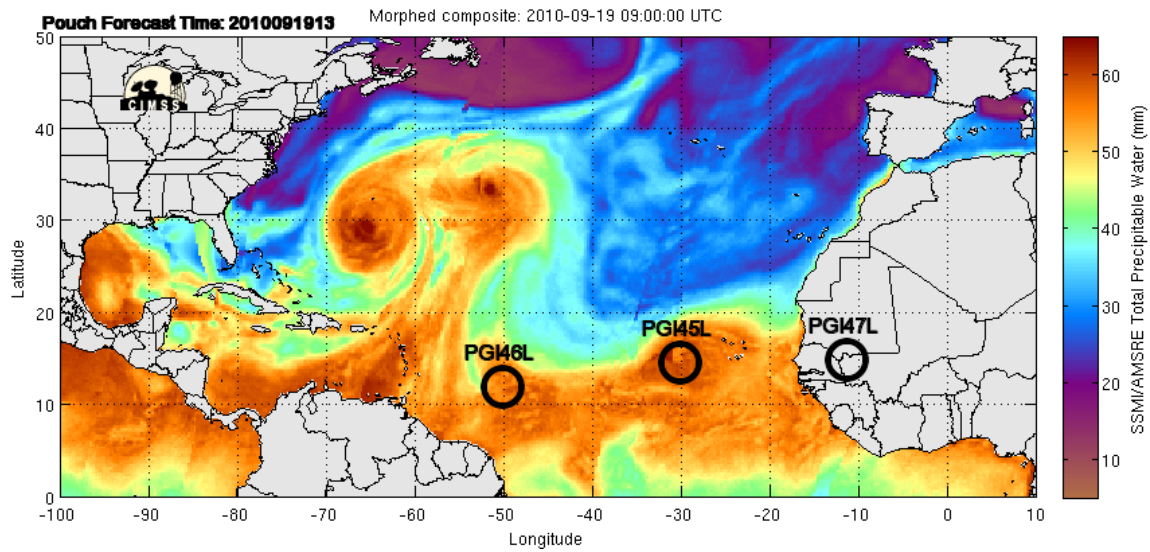
S2- GOES VIS



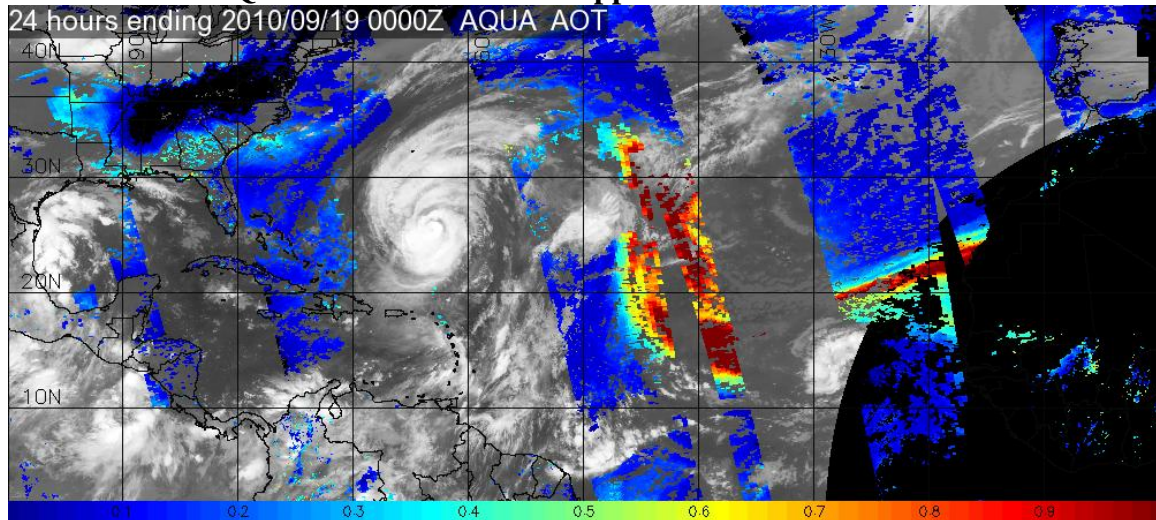
### S3- GOES IR



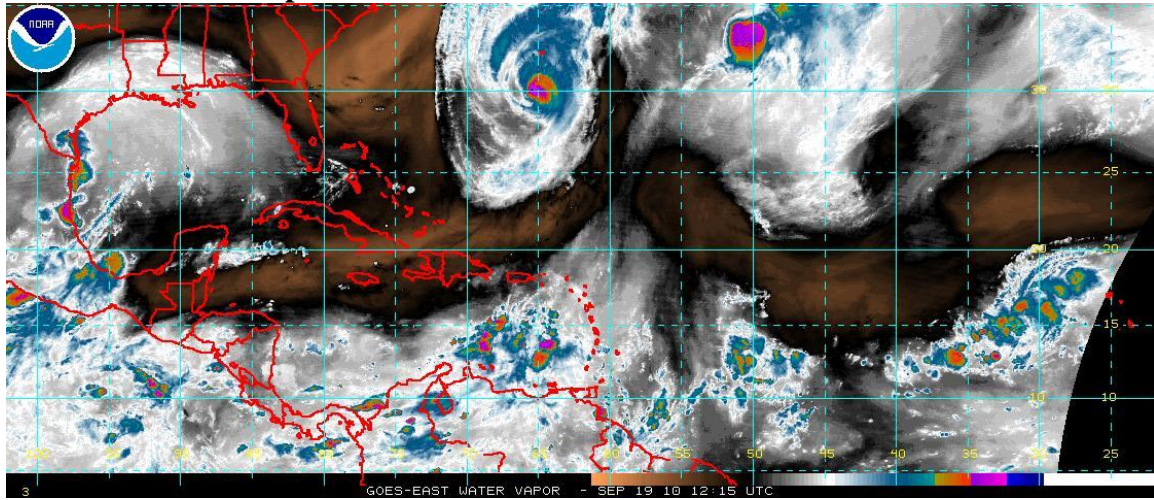
### S4- CIMSS TPW with Pouch Positions



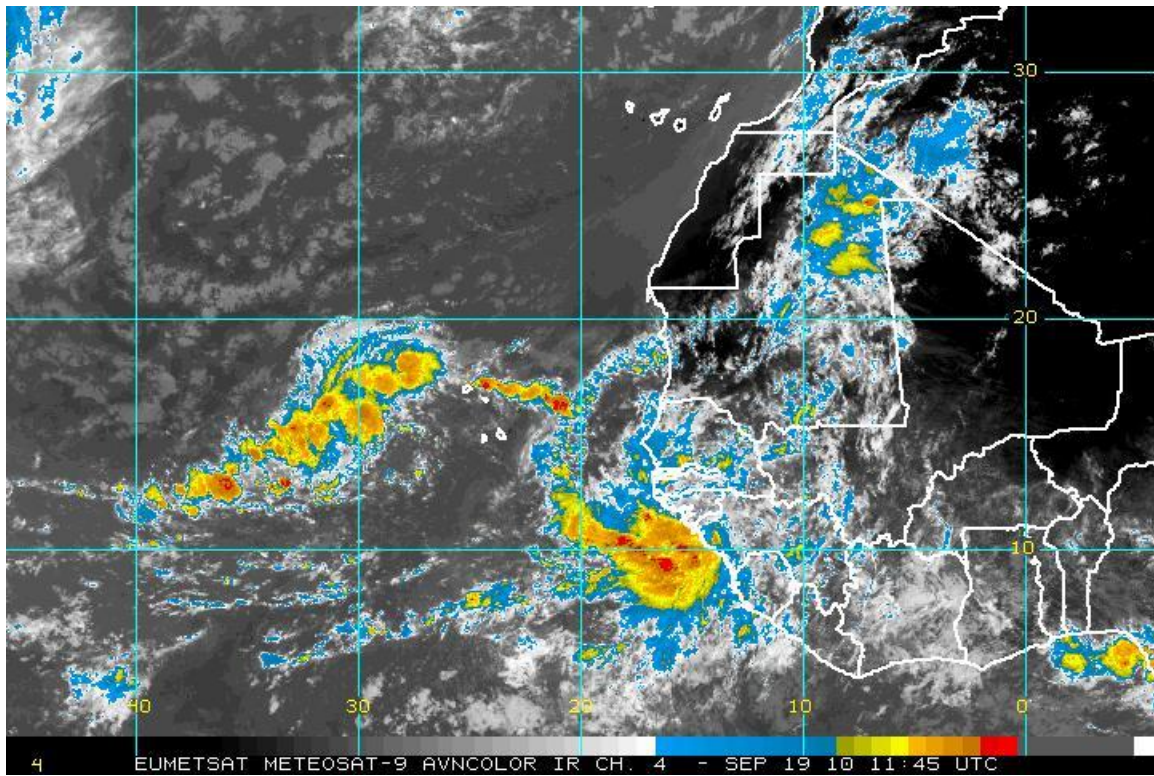
### S5- AOT from AQUA via the JPL GRIP support site:



**S6- GOES Water Vapor:**

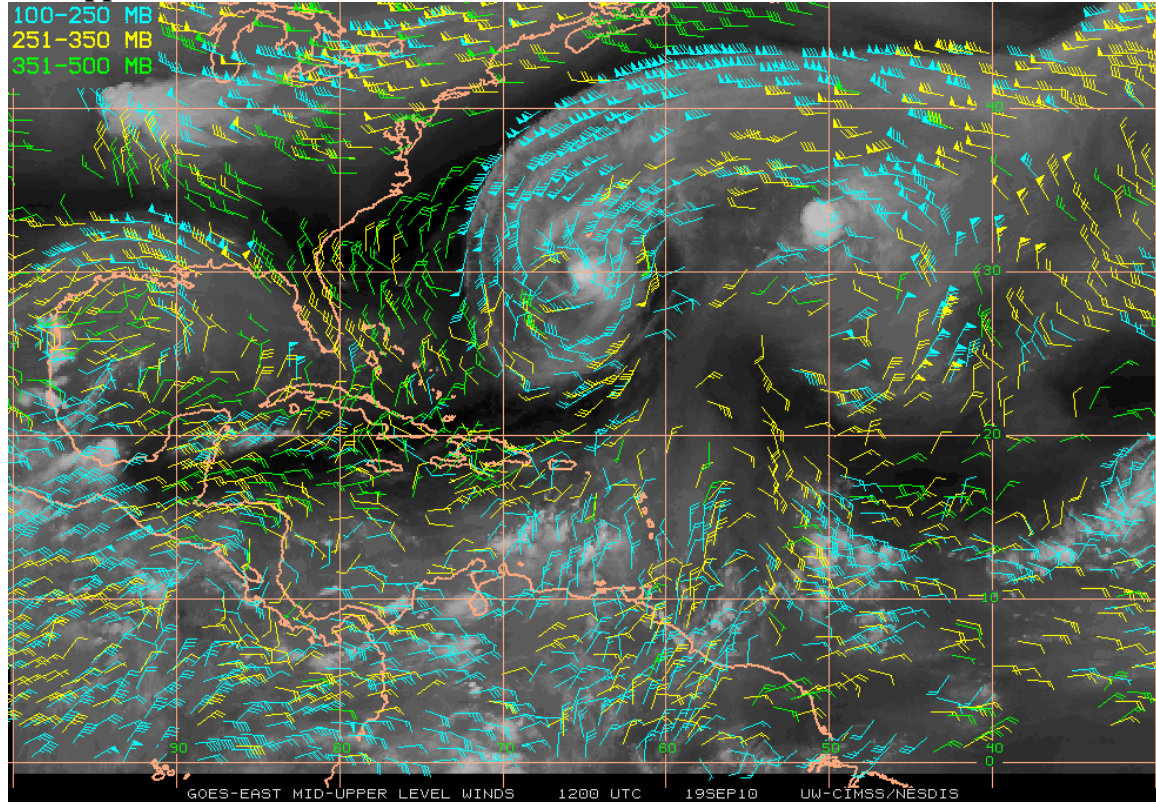


**S7- METEOSAT IR**

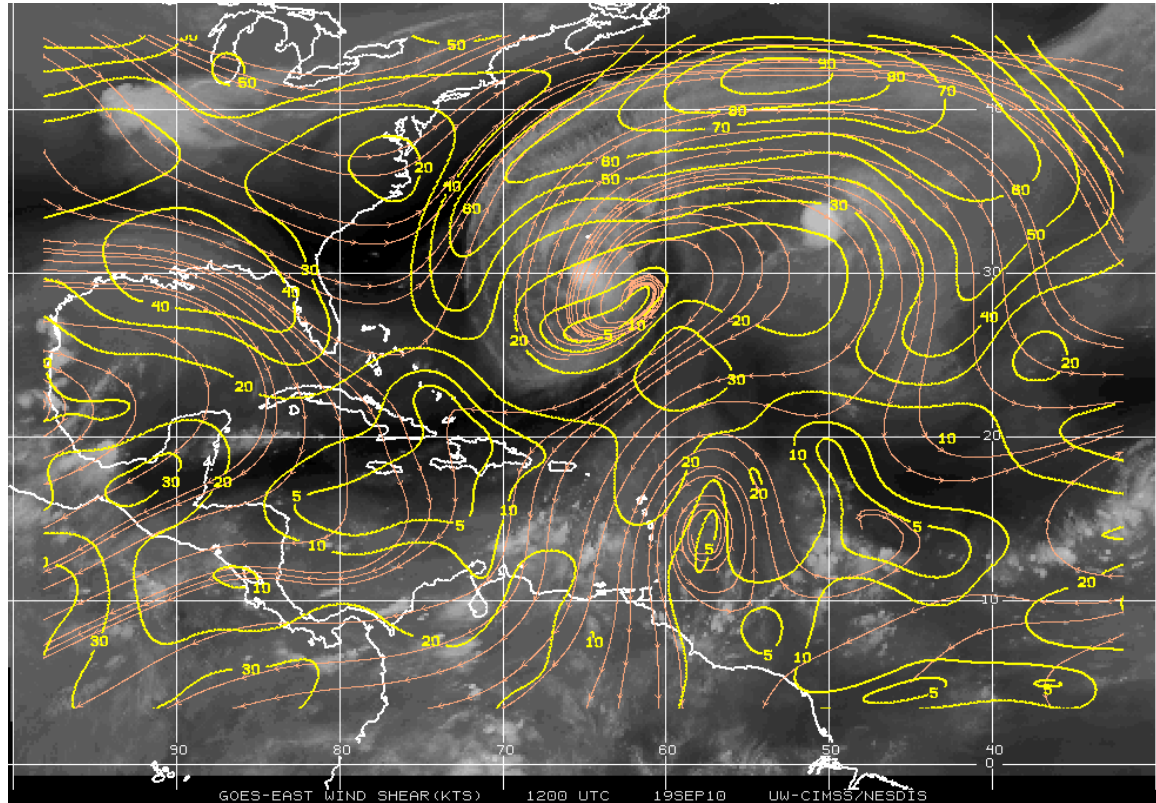


**CIMSS Analyses:**

**C1- Upper Level Winds**

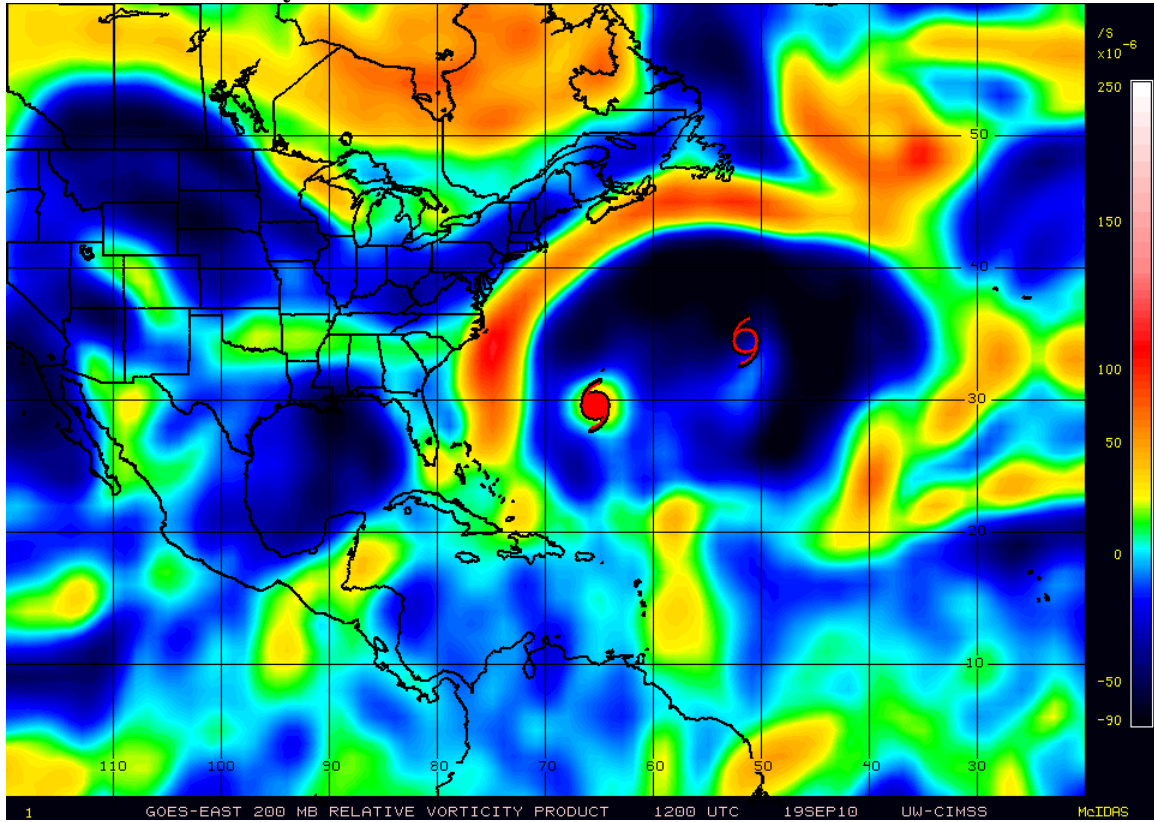


**C2- Wind Shear**

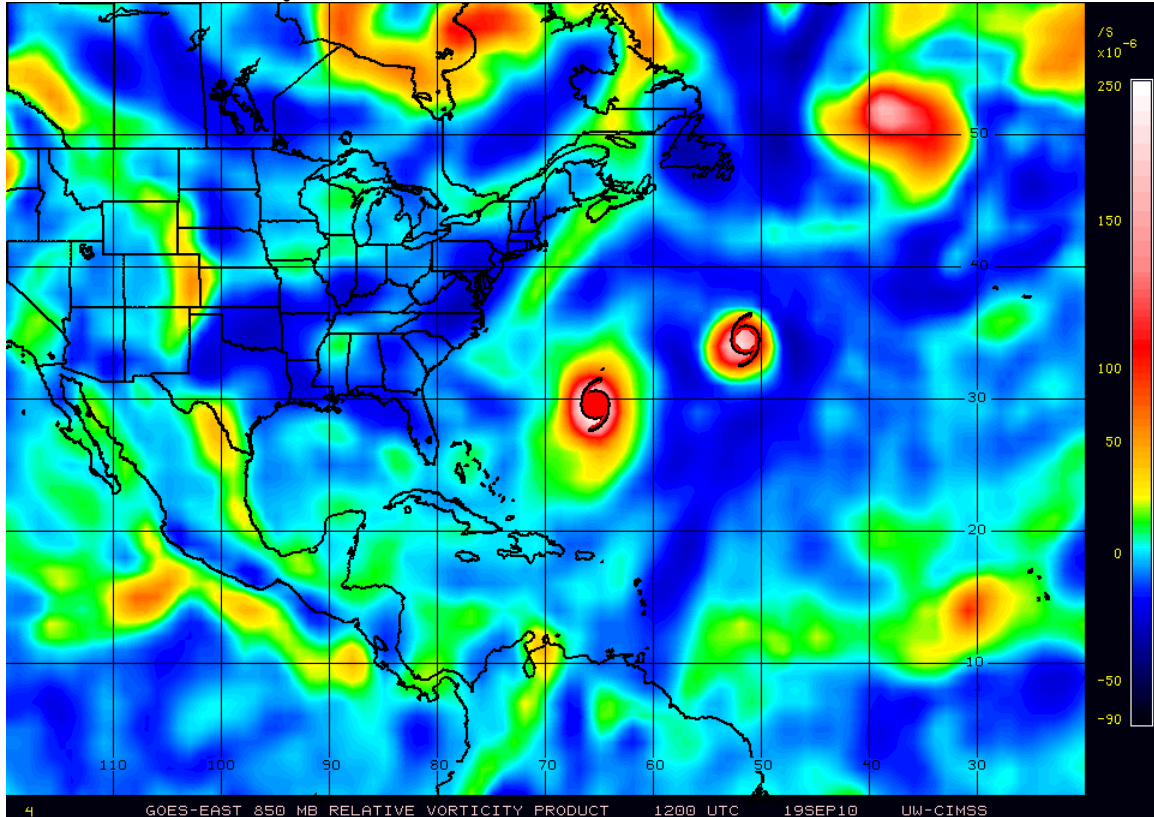




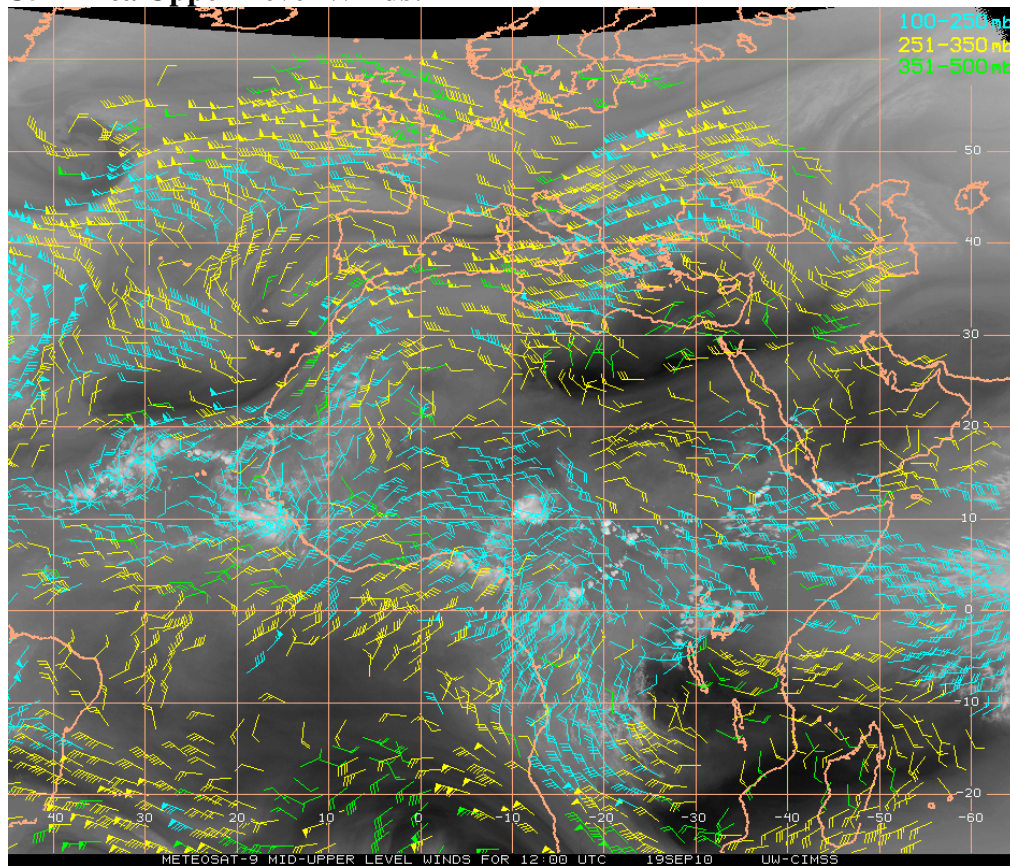
### C3- 200 hPa Vorticity



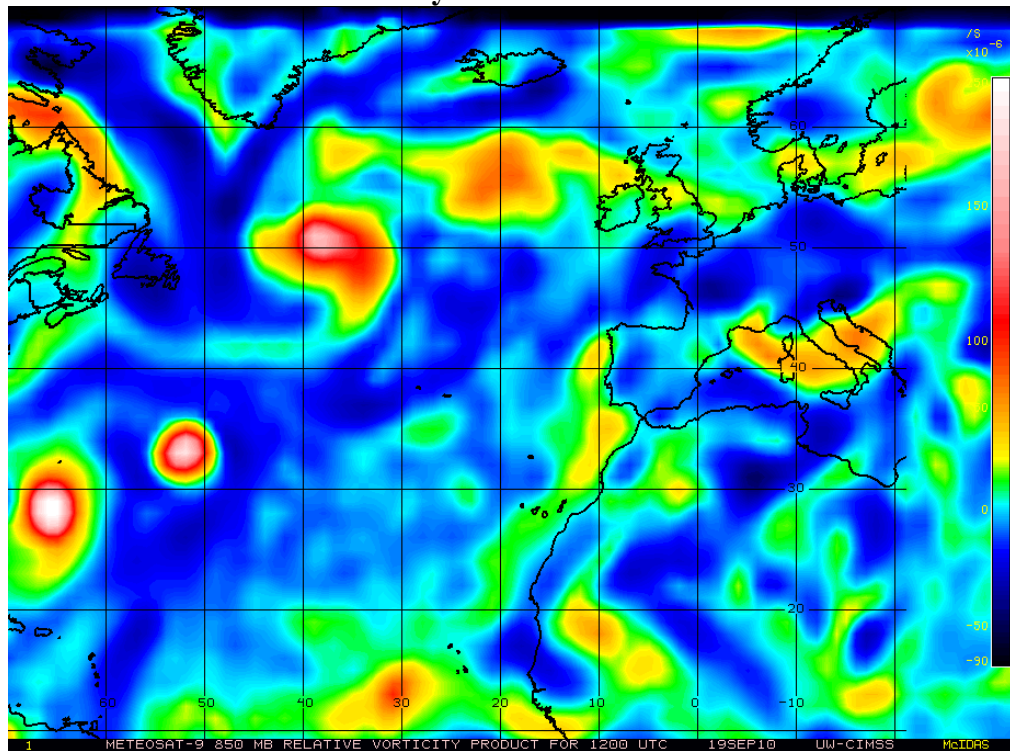
### C4- 850 hPa Vorticity



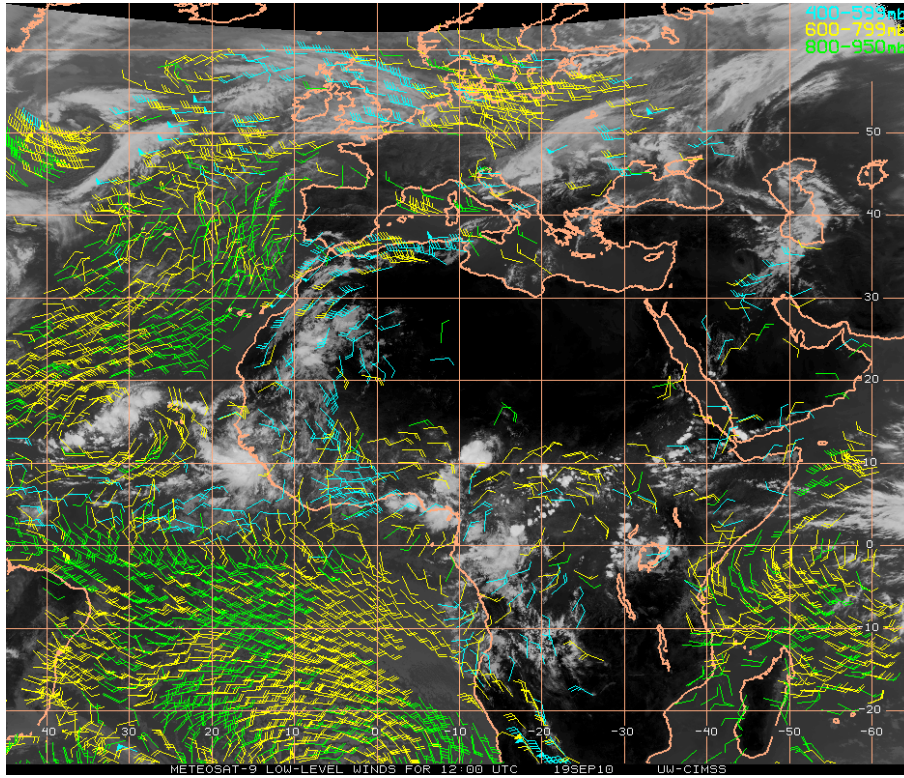
### C5 Africa Upper Level Winds:



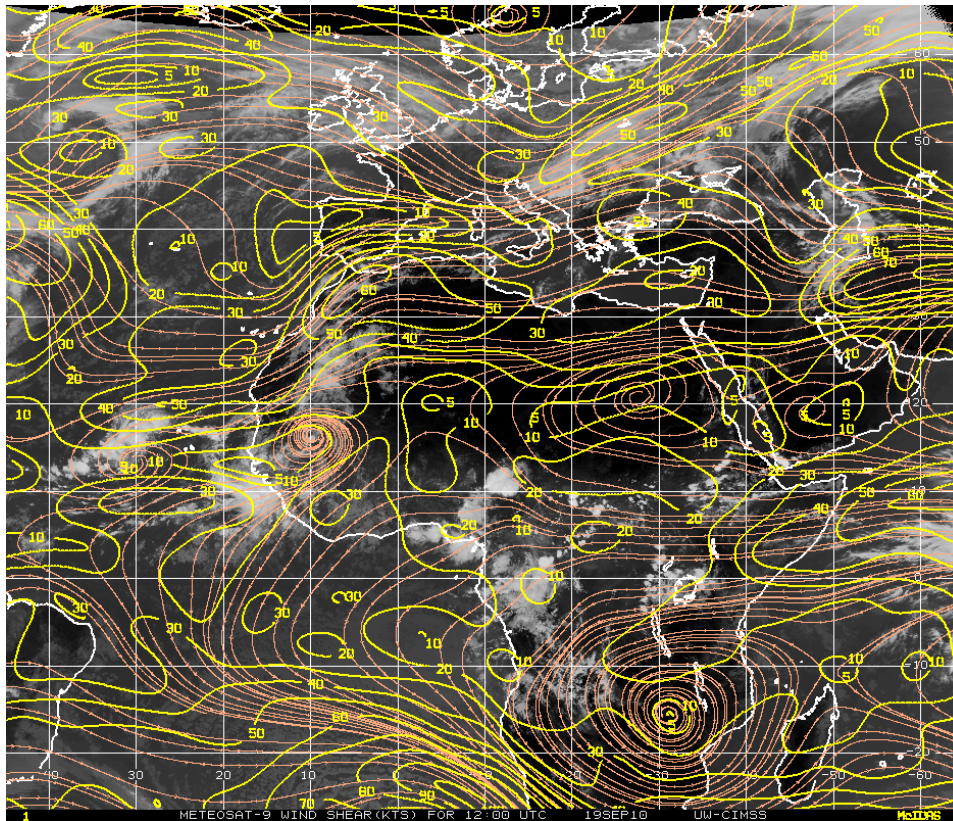
### C6 Africa Lower Level Vorticity



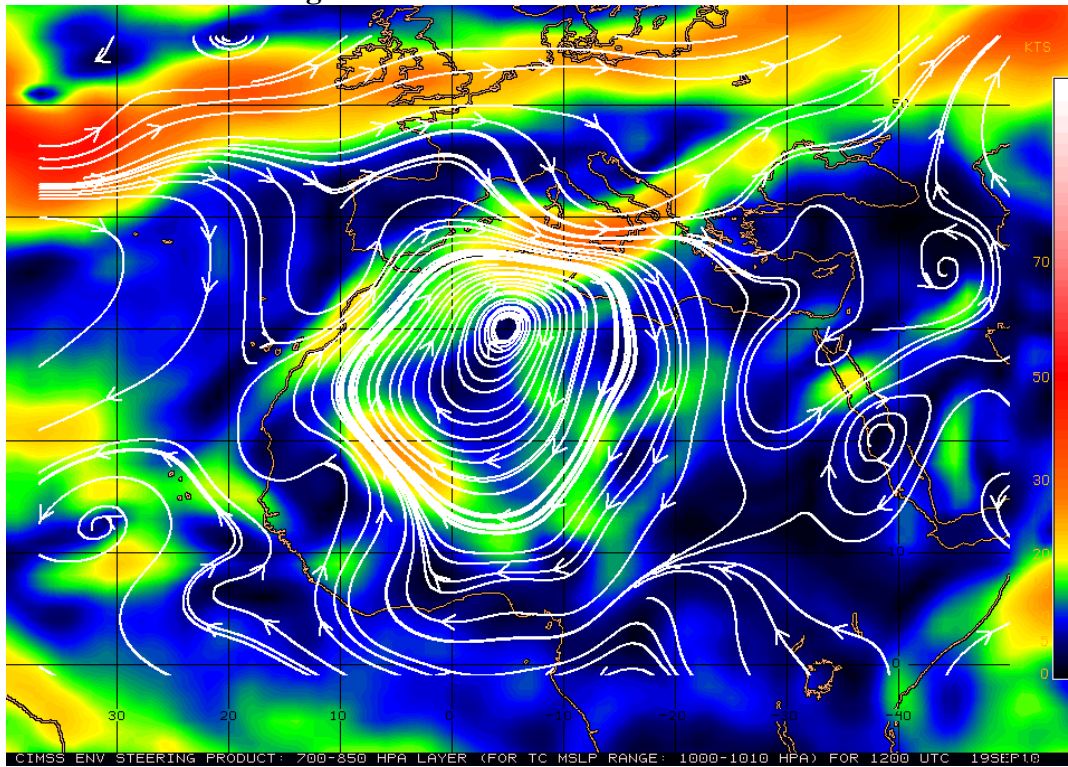
### C7 Africa Lower Level Winds



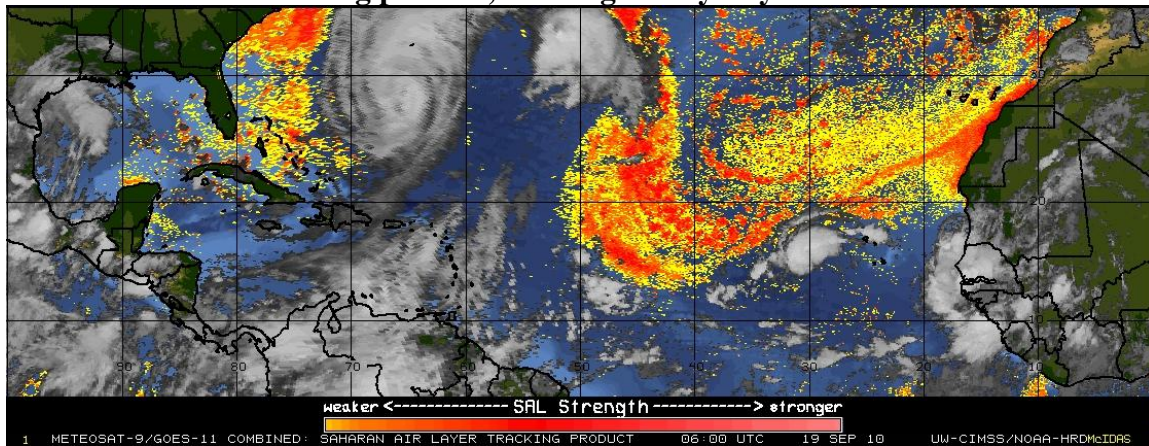
### C8 Africa Wind Shear



**C9 700-850mb Steering Flow over Africa**



**C10- CIMSS SAL tracking product, showing mostly Dry Air locations.**



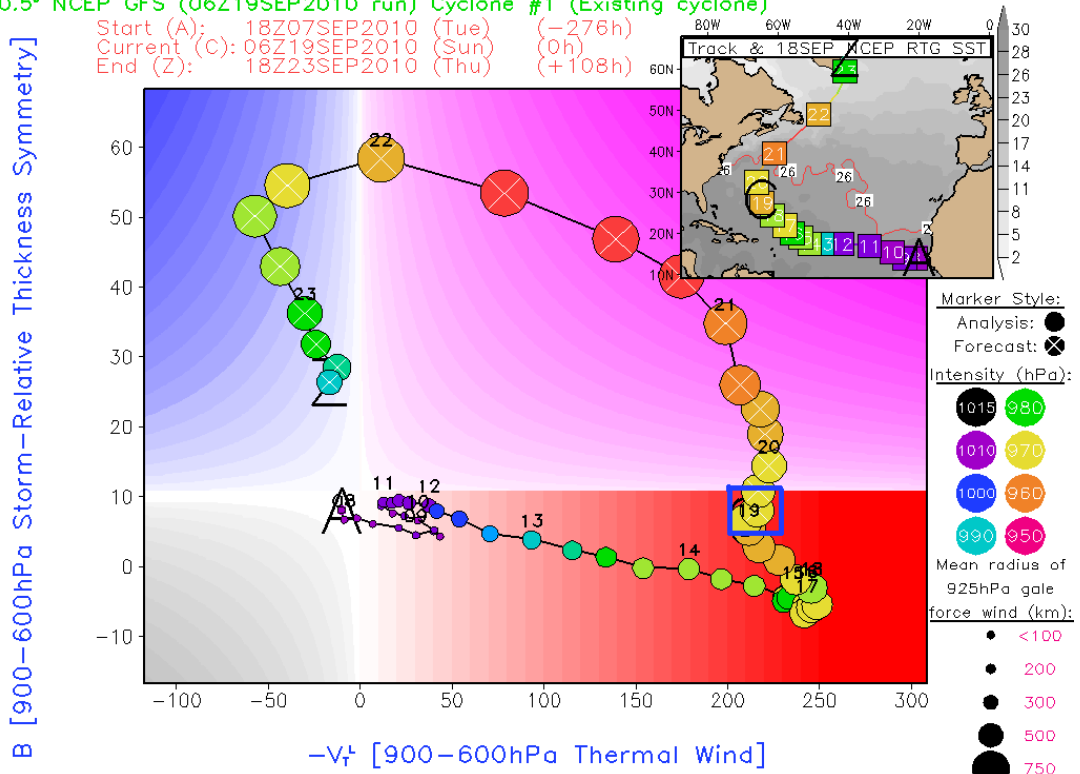
# Features of Interest Images

PGI-41L...Igor:

I1

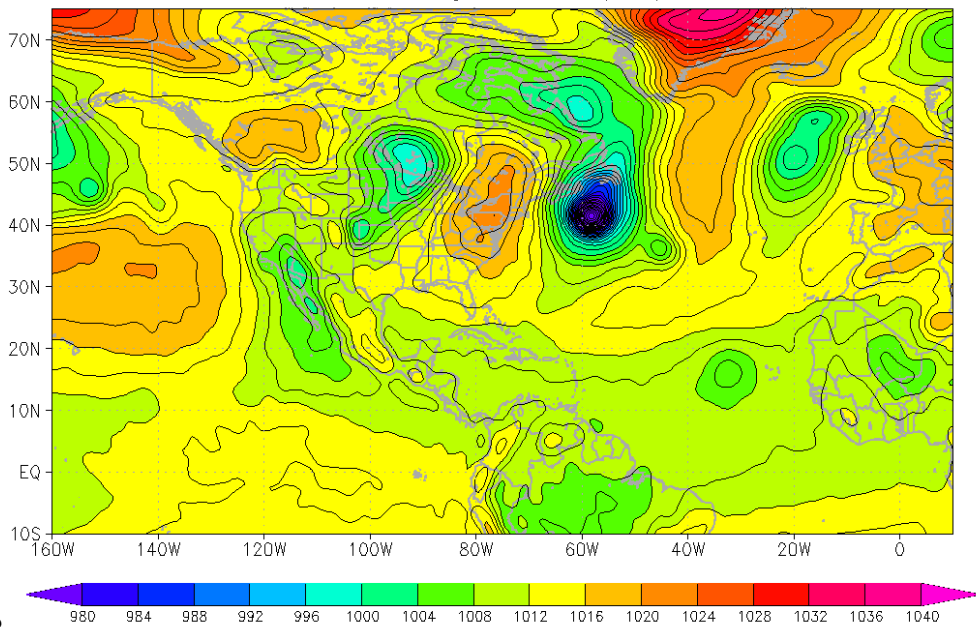
0.5° NCEP GFS (06Z19SEP2010 run) Cyclone #1 (Existing cyclone)

Start (A): 18Z07SEP2010 (Tue) (-276h)  
 Current (C): 06Z19SEP2010 (Sun) (0h)  
 End (Z): 18Z23SEP2010 (Thu) (+108h)



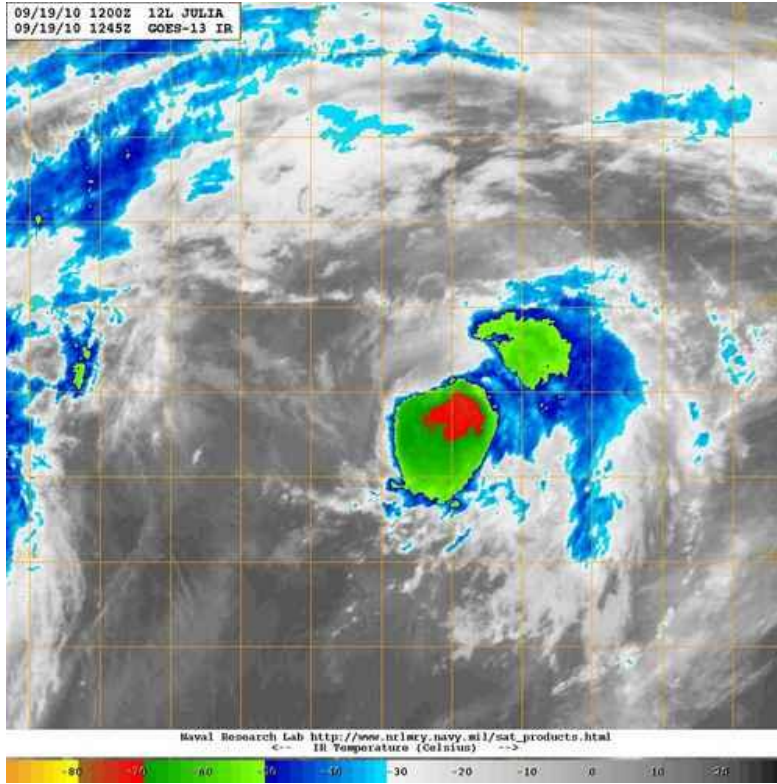
NOTE: A 24hr running mean smoother is applied to the GPS trajectory.

06Z19SEP2010 gfs MSLP (mb) T=48 h



I2

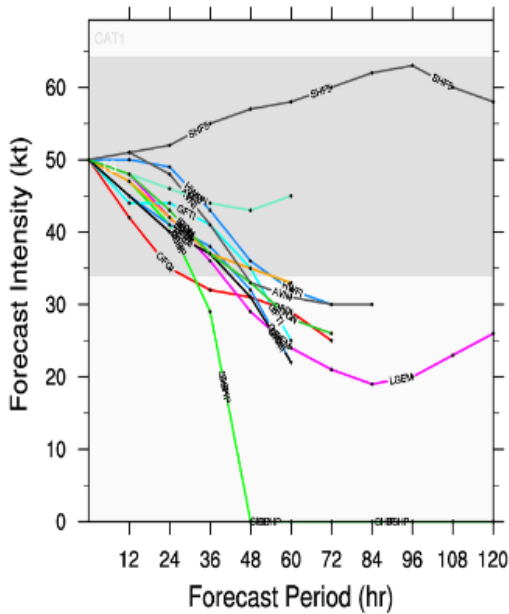
**PGI-43L...Julia:  
J1**



**J2**

**TROPICAL STORM JULIA (AL12)**

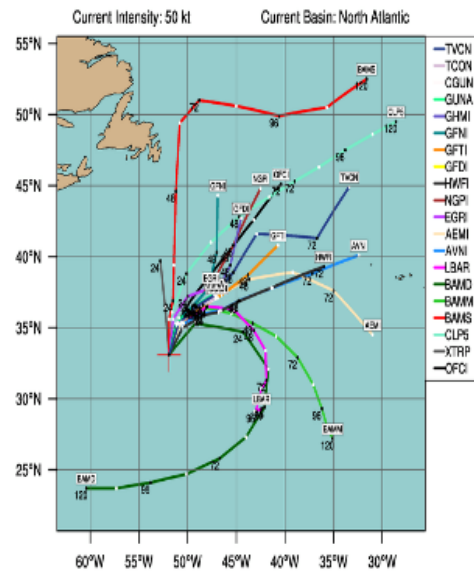
Early-cycle intensity guidance  
valid 0600 UTC, 19 September 2010



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

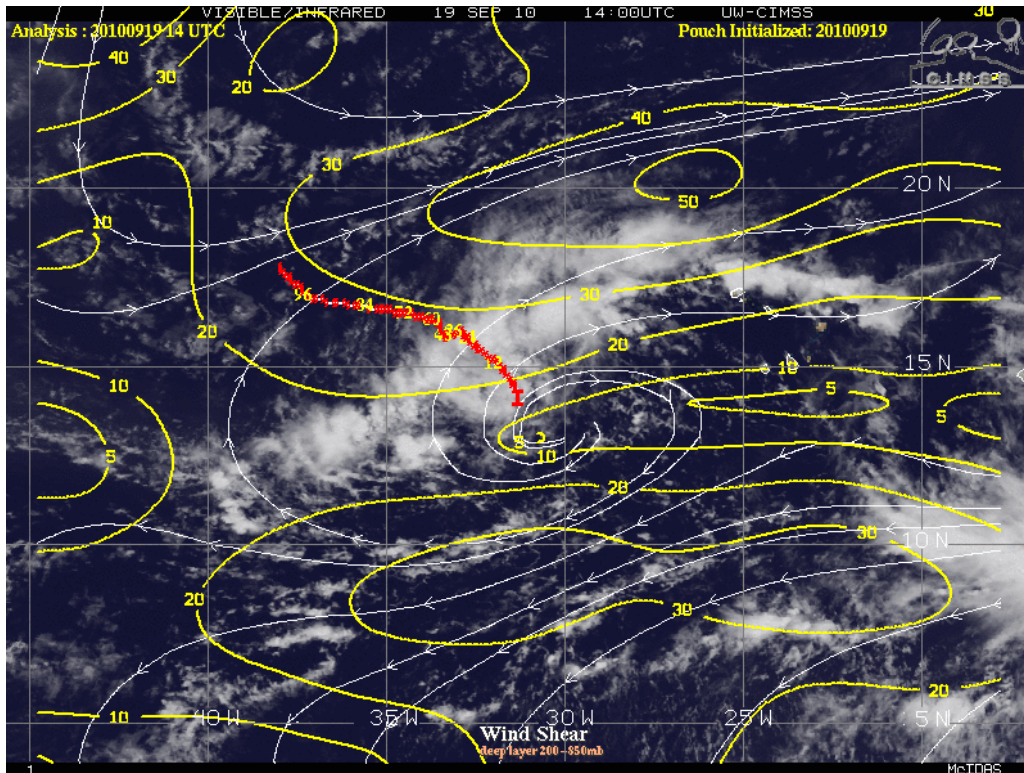
**TROPICAL STORM JULIA (AL12)**

Early-cycle track guidance valid 0600 UTC, 19 September 2010

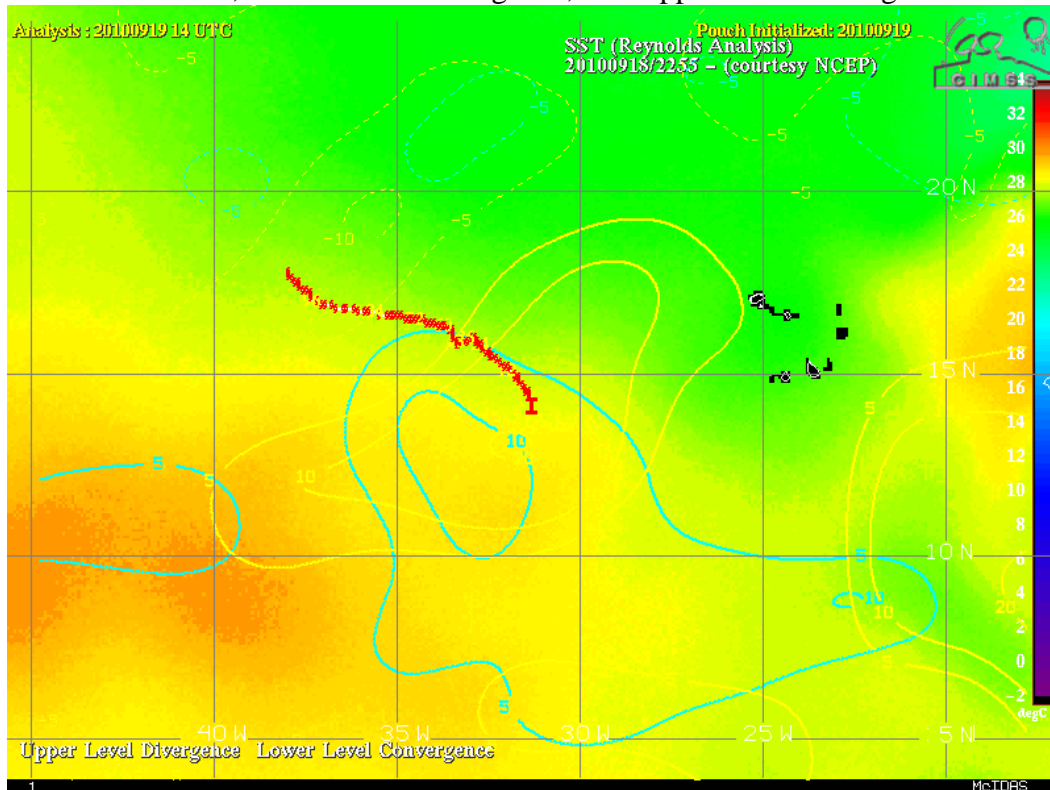


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**PGI-45L:**  
**45A: CIMSS Shear and Visible**

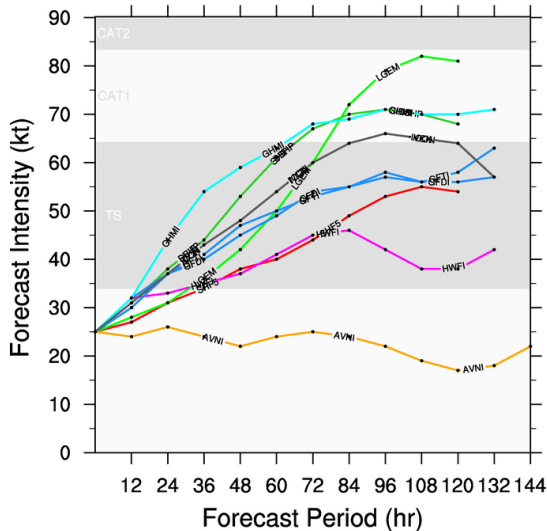


**45B: CIMSS SST, Low-Level Convergence, and Upper-Level Divergence**



### 45C: 9/19/12Z Intensity and Track Guidance from Colorado State DISTURBANCE INVEST (AL94)

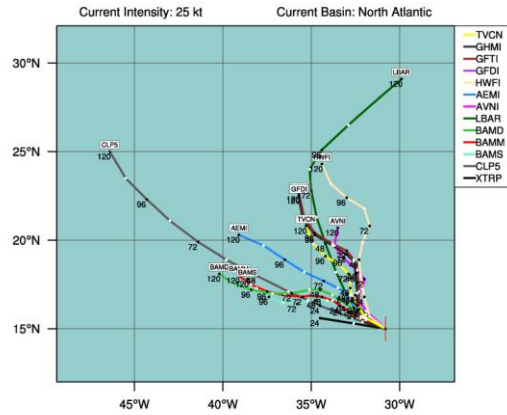
Early-cycle intensity guidance  
valid 1200 UTC, 19 September 2010



This plot does not display official storm information. Use for information purposes only.  
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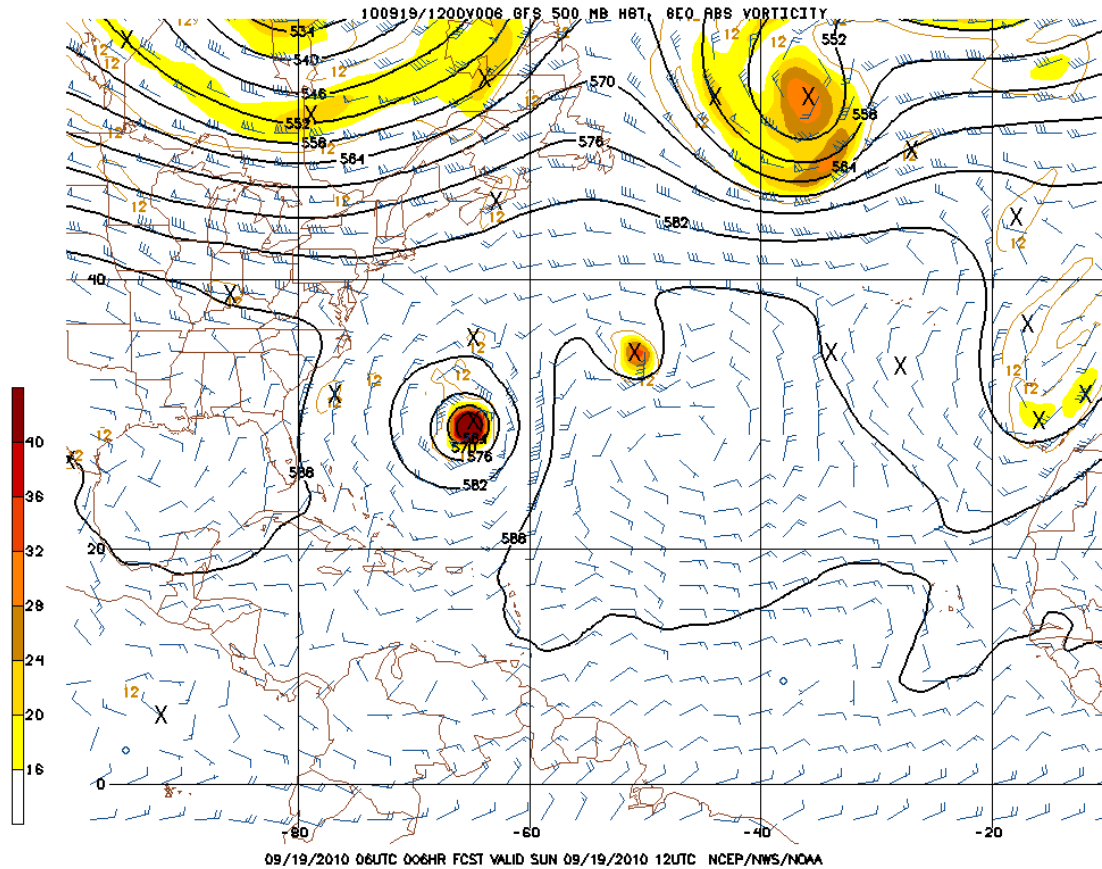
### DISTURBANCE INVEST (AL94)

Early-cycle track guidance valid 1200 UTC, 19 September 2010



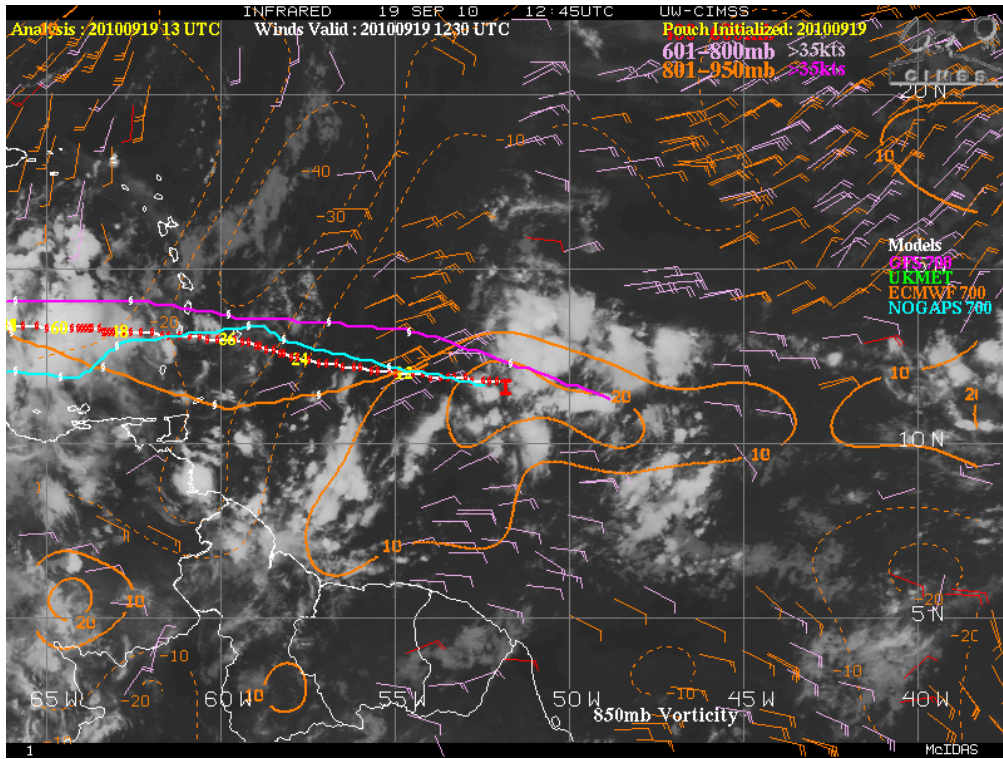
This plot does not display official storm information. Use for information purposes only.  
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### 45D: 9/19/12Z GFS 500hPa Height and Vorticity Analysis

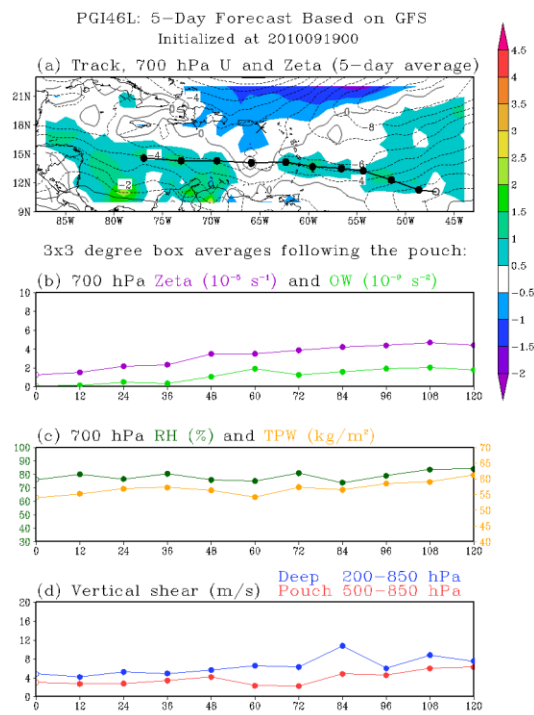
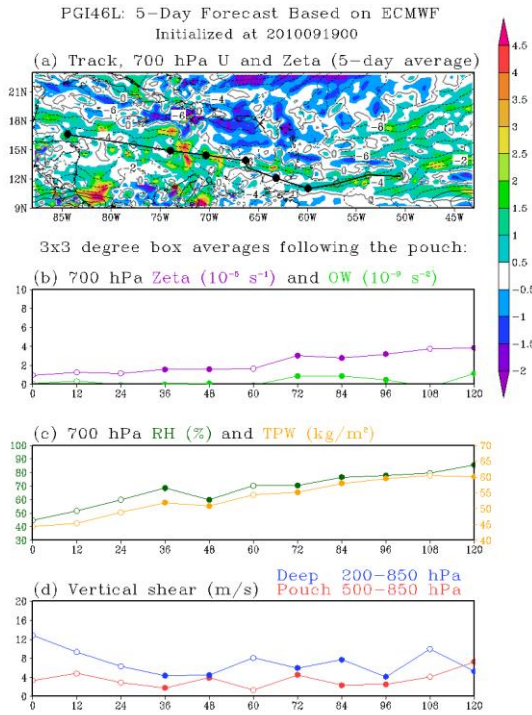




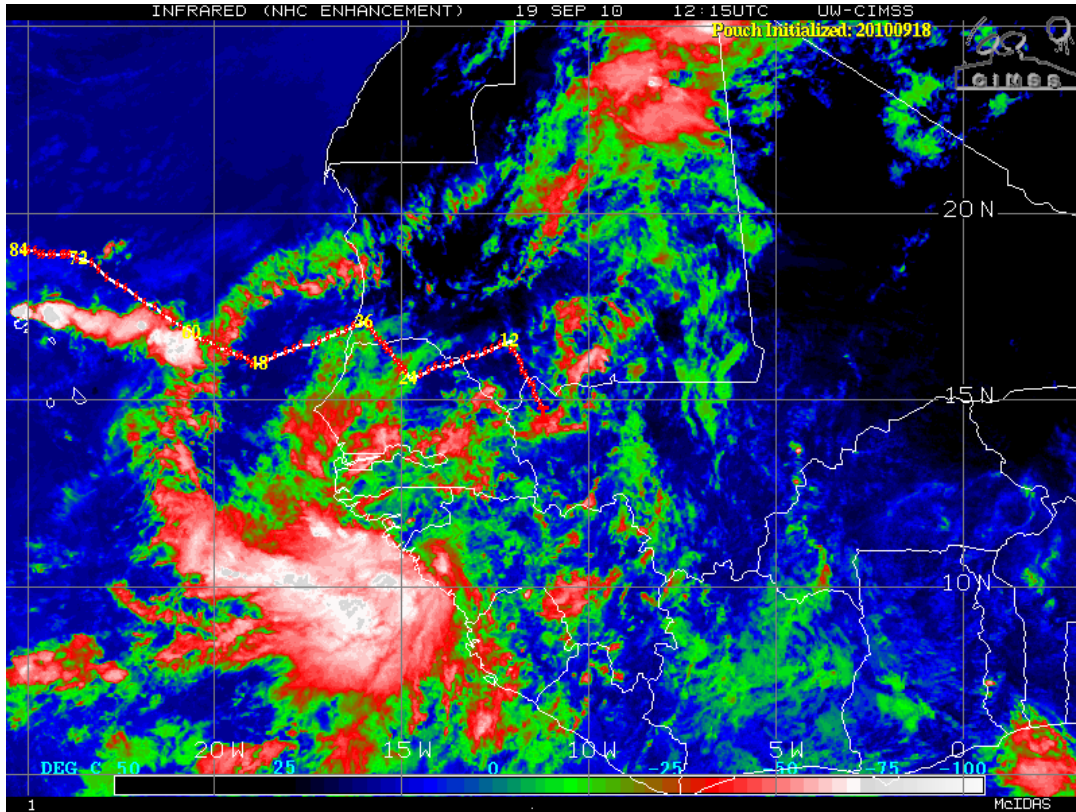
**PGI-46L:  
46A**



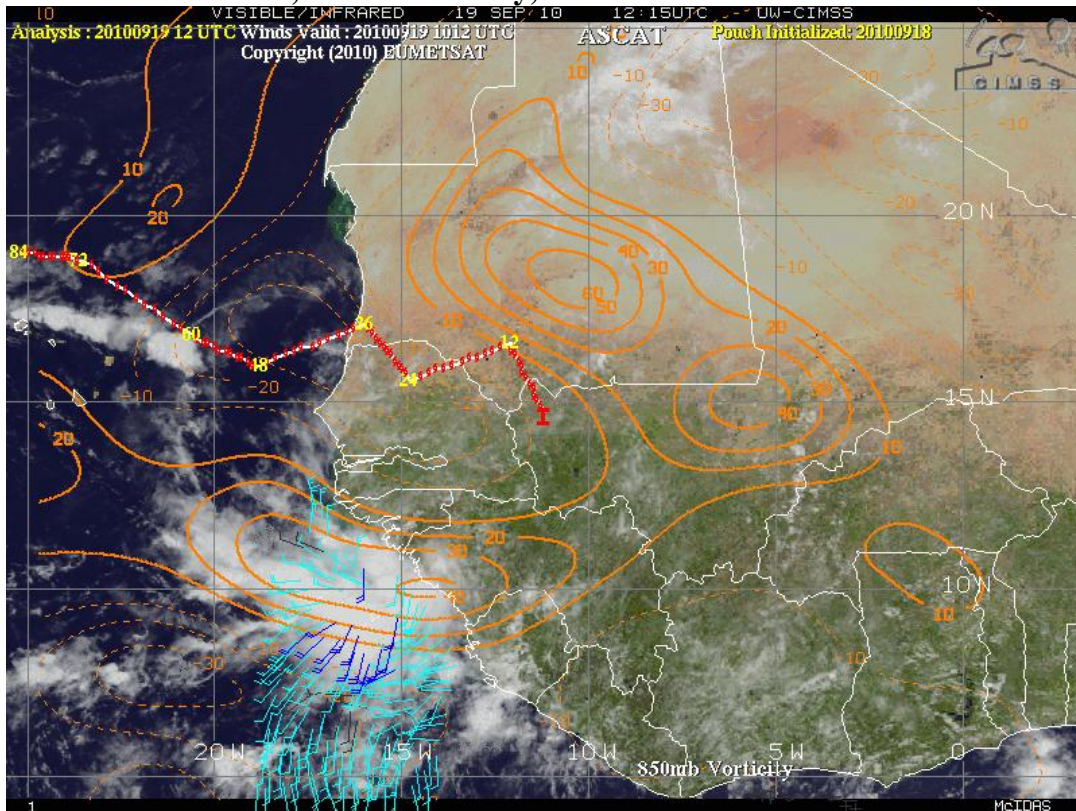
**46B**



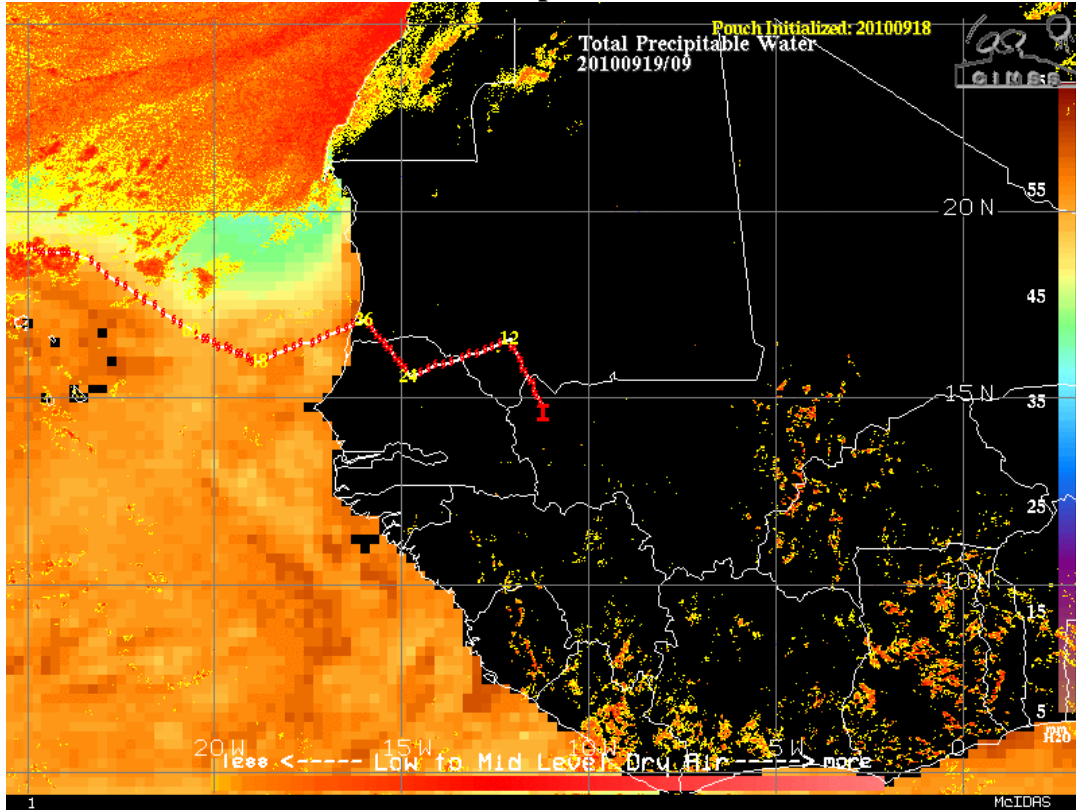
**PGI-47L:**  
**47A – CIMSS Infrared**



**47B – CIMSS Visible, 850mb Vorticity, and 10Z ASCAT Pass**

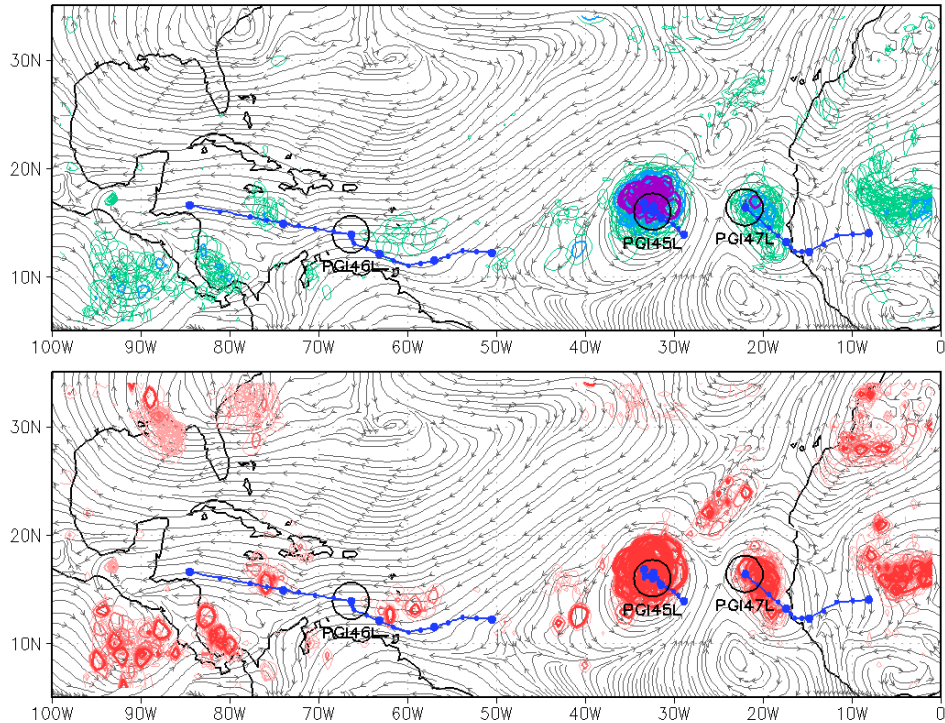


**47C – CIMSS TPW overlaid with SAL product**



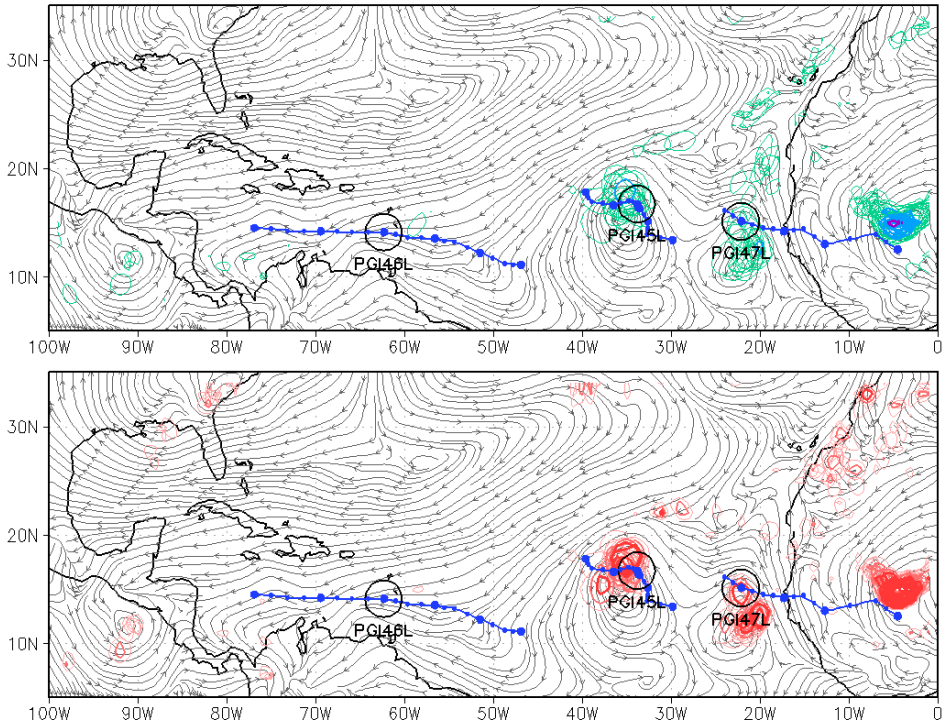
**47D – RSMAS ECMWF Ensemble (72h 850mb vorticity)**

Gray: ECMWF 72-hour CTRL streamlines at 850 hPa. Init. 2010091900, Valid 2010092200.  
 Color: Spaghetti contours of ZETA x 5e-5 s<sup>-2</sup> and 0W x 2e-9 s<sup>-2</sup>. 50 members.



### 47E – RSMAS NCEP Ensemble (72h 850mb vorticity)

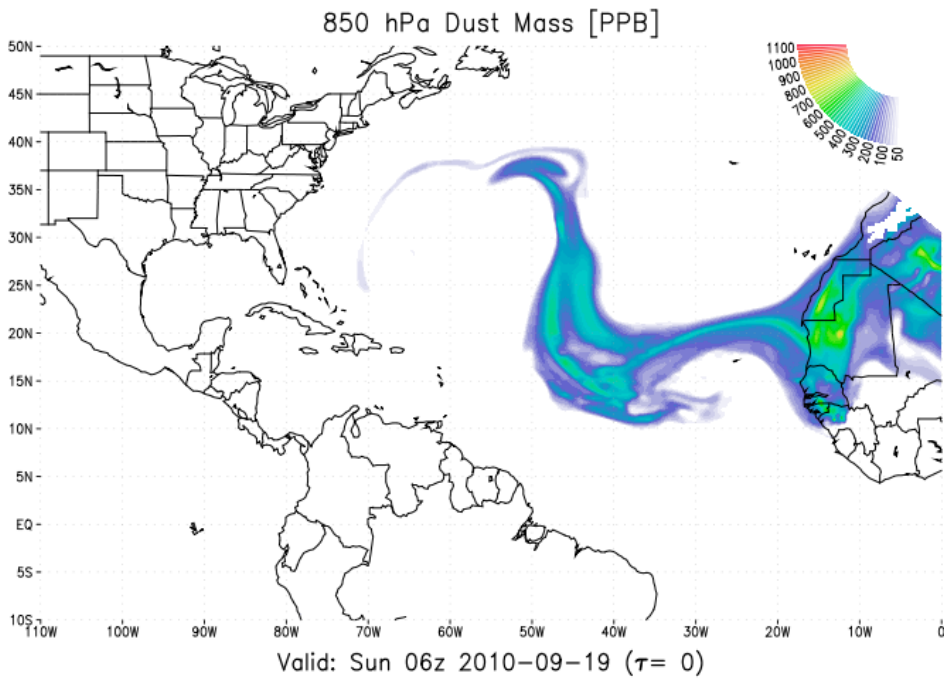
Gray: NCEP 72-hour CTRL streamlines at 850 hPa. Init. 2010091900, Valid 2010092200.  
Color: Spaghetti contours of ZETA x 5e-5 s^-1 and 0W x 2e-9 s^-2. 20 members.



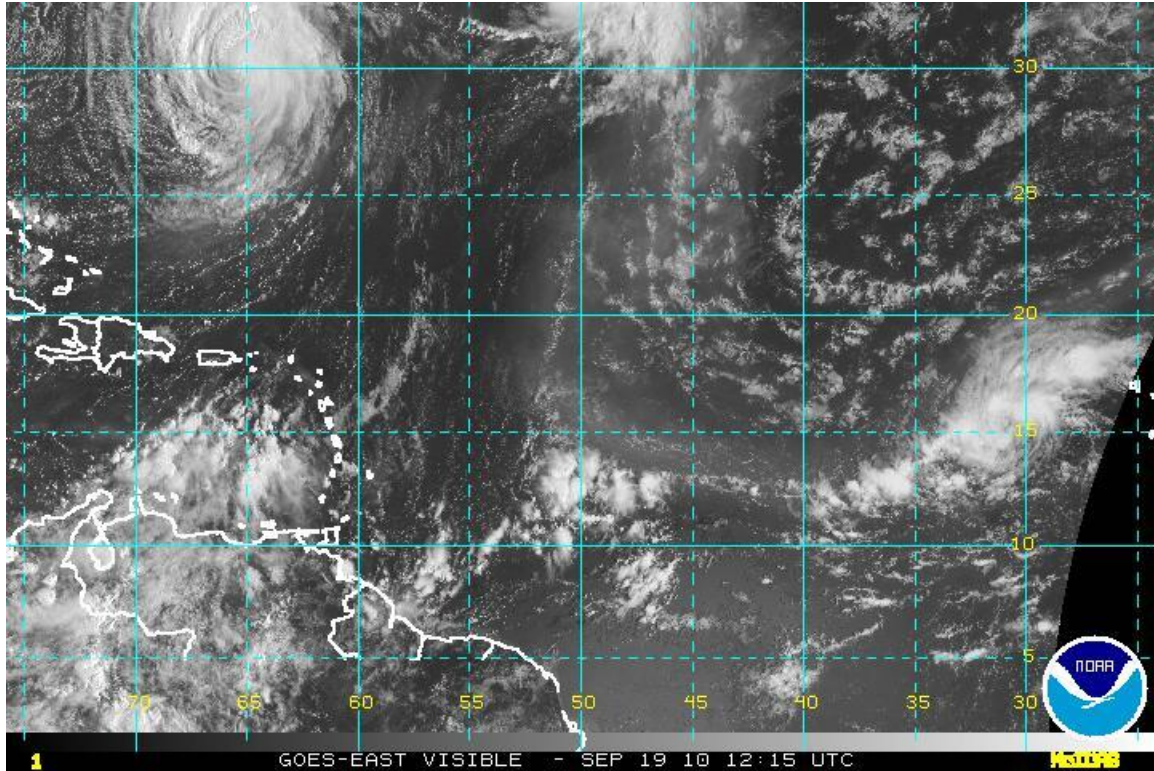
### Dust/SAL:

#### D1 – GEOS-5 00h 850 hPa Dust Mass

NASA/GSFC Global Modeling and Assimilation Office – GEOS-5 Forecast Initialized on 06z 2010-09-19

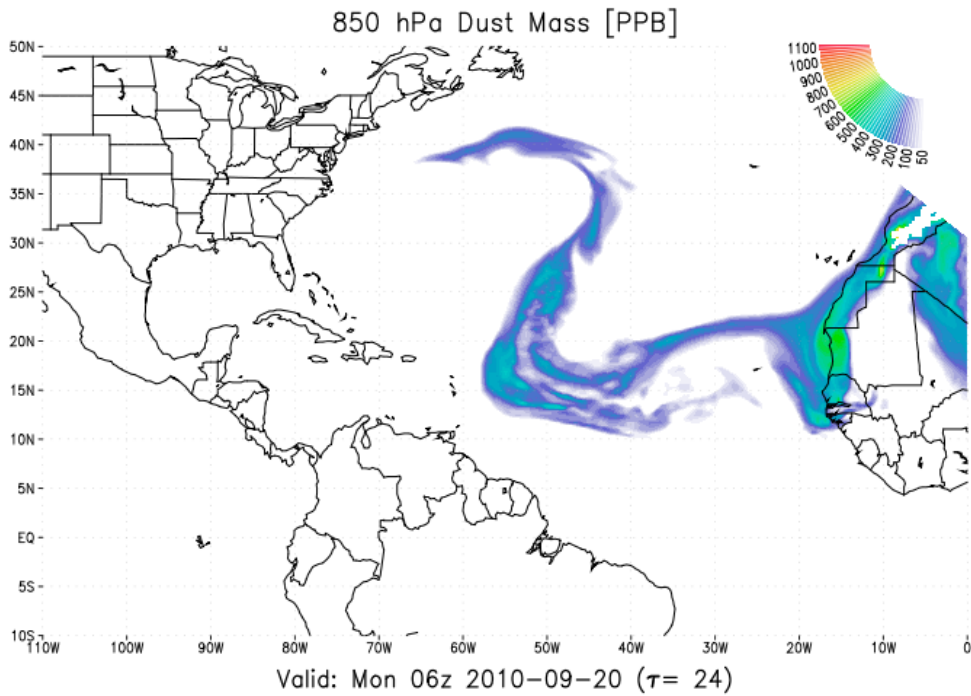


### D2 – GOES-E Central Atlantic Visible



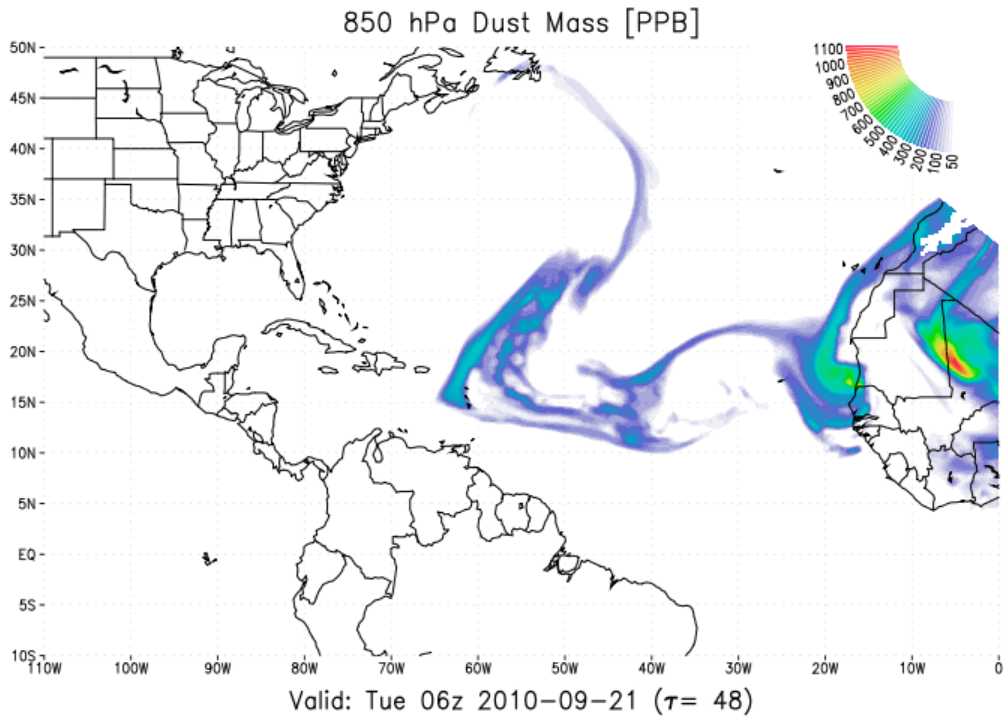
### D3 – GEOS-5 24h 850 hPa Dust Mass Forecast

NASA/GSFC Global Modeling and Assimilation Office – GEOS-5 Forecast Initialized on 06z 2010-09-19



### D4 – GEOS-5 48h 850 hPa Dust Mass Forecast

NASA/GSFC Global Modeling and Assimilation Office – GEOS-5 Forecast Initialized on 06z 2010-09-19



### D5 – GEOS-5 72h 850 hPa Dust Mass Forecast

NASA/GSFC Global Modeling and Assimilation Office – GEOS-5 Forecast Initialized on 00z 2010-09-19

