

Tri-Agency Forecast Discussion for September 17, 2010

Created 1600 UTC September 17, 2010

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Summary:

Today is the last of a series of investigations by the three agencies into Hurricane Karl. While IFEX and PREDICT will not be flying the storm today, GRIP will fly the WB57 and the DC8 into Karl as it is making landfall. This is one of the most continuously studied storms of the whole tri-agency coordination, and much of the life cycle of Karl has been captured since it was just an incipient disturbance in the southeastern Caribbean Sea. PREDICT is looking ahead to its next pouch target: PGI-46L in the central Atlantic. IFEX does not currently have any flights planned, similar to GRIP. GRIP may consider yet another ferry to St Croix if it appears over the weekend that PGI-46L becomes better organized, but the system currently has a vague future in the models and only time will tell if this system will be the next tri-agency target. Elsewhere, Igor is a category 3 storm today, and Julia is weakening under the influences of high shear and dry air. PGI-45L was also given a low probability of formation today by the NHC, and will be monitored closely as some global models develop the system near the Cape Verde Islands.

Forecast for 1600 UTC 9/17/2010:

Synoptic Overview:

The tropical Atlantic basin continues to be active in the height of hurricane season. Active systems include Hurricane Karl, Hurricane Igor, Hurricane Julia, PGI-45L, and PGI-46L (**S4**). As of 11am AST, Karl is a category 3 storm with winds of 105 kt and a minimum central pressure of 967 hPa on a westward heading at 7 kt. Igor is headed NW at 8 kt as a category 3 storm, and Julia is a category 1 hurricane headed WNW at 17 kt (**S1**). Also, PGI-45L has been highlighted by the NHC as having a 10% chance of formation in the next 48 hours, and is about to be declared an invest.

In the western half of the basin, there is an upper level low to the north of Karl in the area sandwiched between Karl's outflow and a jet over the south central United States (**C1**). There is also an upper level trough from Panama extending north to eastern Cuba and Haiti (**C3**). Convection is associated with Karl's circulation all across the western Gulf of Mexico, and also near the South American coast (**S3**). Otherwise, the Caribbean Sea is quiet and those same conditions extend north to Florida and the Bahamas (**S2**). Additionally, dry air from low to upper levels accompanies these inactive areas (**S4, S6**).

In the Central Atlantic, dry air at low levels only seems to be an issue for Julia, but so far Igor has been overcoming dry air entrainment (**S4**). At upper levels, water vapor imagery (**S6**) indicates that dry air is all around Julia, but only ahead of Igor. Upper level winds show that outflow from Igor is being both pulled to the NE by a trough in the

north central Atlantic (**C1**), and also flowing south along Julia's western side causing an unfavorable wind shear environment for Julia (**C2**). Igor is not currently experiencing unfavorable wind shear (**C2**), but should later in its lifecycle. Also, 850 hPa vorticity shows a low level area of ITCZ vorticity coincident with the PGI-46L pouch (**C4**).

Focusing further east to West Africa and the Eastern Atlantic, IR imagery shows the AEW wave train moving along with Julia, PGI-45L, and another burst of convection behind that associated with the next wave (**S7**). TPW imagery (**S4**) shows the dry air outbreak that exited the coast of Africa beginning to separate from the coast. This is due to the influences of a cyclonic turn of the winds to the north and the easterlies to the south at mid- to upper-levels (**C5**), and weaker convergent flow at low levels below (**C7**). Classic moisture to the south and dry conditions to the north are typical of Africa and AEW components this time of year, and that is exactly the pattern that remains in place today.

Features of Interest:

Hurricane Karl:

Hurricane Karl/AL92/PGI-44L is located near 19d 25m N/95d 32m W with a central pressure of 957hPa. The estimated forward speed is west at 8kt. Deep convection overnight in all quadrants around the eye seems to have resulted in its (perhaps) rapid intensification to category 3 early morning (**K1**). The current state of convection is warming cloud tops near the center; while the eye is not as clear. There was an SSMIS PCT 91Ghz image from an overpass around 1238 UTC this morning that showed that the eyewall was not as strong as it had once been (**K3**). The consensus for model intensity is for intensification (remaining a cat 3) before rapidly weakening over land (**K2**). The estimated locations at 18Z (arrival in storm for DC8) is 19.6N/96.3W and at 21Z, 19.6N/96.7W. The consensus track forecast have the following locations: 0600Z/18th: 98W/19.7N (over land); 0600/19th: 101.0W/20.0N; 0600/20th: west of Mexico and in Pacific (**K2**). There is a remote possibility that this storm's vorticity at mid levels could combine with another forecasted system in the East Pacific to regenerate as a new storm after three days of passage over Mexico, as some models currently suggest.

Hurricane Igor:

Hurricane Igor has undergone some weakening over the past 24 hours. The minimum central pressure remains relatively low at 940 mb, but the maximum sustained winds are down to 105 kt. The low central pressure is simply a reflection of the size of Igor, which has a circulation that spans roughly 15° latitude-longitude. In the past 6 hours, the eye of Hurricane Igor has covered over (**I1**), and some of the cloud tops have warmed. However, Igor remains a well organized hurricane and remains in a generally low shear environment (**C2**). The SHIPS report (**I2**) also confirms the low shear environment and also shows that the SSTs and ocean heat content remain high. The forward progress of Hurricane Igor has remained somewhat slow at 8 kt to the northwest as the weakness along the western side of the ridge is still in place. Although Hurricane Julia's center has now moved within an 850 nm proximity of Igor, it is unlikely that Julia

is having any affect on the motion (or intensity) of Igor because the size of Igor dwarfs Julia. However, Hurricane Julia remains on the southern periphery of the ridge in place over the eastern Atlantic and continues to track at a much faster pace than Igor (west-northwest at 21 kt).

The forecast model guidance tracks (**I3**) are in very good agreement that Igor will continue a northwest track for the next 48 hours with a turn to the north in 72 hour and finally recurving out to sea thereafter. The center of Igor will be tracking very close to Bermuda around 72 hours, and regardless of the intensity at the time, Igor will likely have a strong impact on Bermuda. As mentioned above, the most interesting aspect about the forecasting of Igor is what will happen to Julia as it begins to more strongly interact with Igor. The models are generally in good agreement that Julia will continue to track closer to Hurricane Igor and then have a short-lived recurvature around the ridge before Igor finally begins to absorb Julia into its circulation. The timing at which Igor absorbs Julia has some discrepancy between models, but the absorption should occur some time after 96 (**I5**) and before 120 hours (**I6** at 108 hours). After absorbing Hurricane Julia's remnants, Hurricane Igor is forecast to undergo extratropical transition and track across Newfoundland, Canada.

As with the model guidance track forecasts, the model guidance intensity forecasts (**I4**) are in generally good agreement that Hurricane Igor will continue as a major hurricane for the next 60 to 72 hours. In fact, the forecast (**I2**) may indicate that some restrengthening over that time could occur, and certainly little weakening, if any, will occur. After 72 hours, there will be a gradual decrease in intensity as Igor encounters cooler SSTs and a higher wind shear environment provided by the mid-latitude west-southwesterly flow. After recurving and undergoing extratropical transition over the northern Atlantic, Hurricane Igor is forecast to absorb the remnants of Hurricane Julia. Also, there seems to be a general model consensus that Igor will undergo a reintensification as an extratropical cyclone after extratropical transition.

Hurricane Julia:

Hurricane Julia remained fairly constant overnight with only slight deviations in minimum central pressure, maximum sustained wind speeds, heading and speed of propagation. At 2100 UTC yesterday Julia was a category 1 hurricane with estimated minimum central pressure of 981 mb, maximum sustained winds of 75 kts and was rapidly moving at 22 kts on a WNW track or a heading of 295. By 0300 UTC the system weakened slightly with the minimum central pressure increasing to 983 mb, maximum sustained winds decreasing to 70 kts, and a minor variation in heading to 290. This weakening was reversed this morning as Julia returned to a minimum central pressure of 981 mb, estimated maximum sustained winds of 75 kts with gusts up to 90 kts, and has maintained the WNW course at the 290 heading moving along at 21 kts. As of 1245 UTC Julia was located at 24.23N/45.71W with the storm rapidly approaching interaction with Igor's outflow (**J1**). The system continues to remain under an area of unfavorable environmental shear of approximately 20 kts to the East of the storm and 30 kt of shear to the West of it (**C2**).

Hurricane Julia is expected to continue to slowly weaken. Even though it is currently within a region of moderate wind shear, it is projected to move into an area of high wind shear associated with an upper-level jet formed from the outflow of hurricane Igor (**J2**). Most of the ensemble members agree that Julia will be downgraded to tropical storm strength within the next 72 hours (**J3**). By 2 am AST Sunday, maximum sustained winds are projected to be less than 73 mph. Both the GFS and ECMWF have Julia making extra tropical transition within the next 48 hours where it is expected to get swept into the mean flow of the subtropical high and take a curved path to the northeast (**J3**). Within 96 hours, GFS and ECMWF have Julia interacting with hurricane Igor before completely dissipating 120 hours from now (**J4**).

PGI-45L:

PGI-45L has moved northwestward to 11.0° N and 22.8° W as of 1100 UTC today. Low-level vorticity has increased and become more symmetric, with a more circular pattern and the vorticity maximum displaced just to the southeast of the pouch center (**45A**). 20 kt shear continues to impact the southern side of PGI-45L, but the system's motion is slowly bringing it into a lower shear environment. Convection has weakened, with a sharp reduction in the number of overshooting tops within 200 km of the center (**45B**). The 0600 UTC GFS solution continues to forecast minimal development, showing PGI-45L forming into a weak closed low that varies in size. The pouch tracks mostly west after a short jog north before turning to the north around 4 days out (**45C**). The 0000 UTC ECMWF run still intensifies the system much more than the GFS. The shape of the ECMWF track through 5 days is fairly similar to the GFS solution, though the timing of the turn to the north varies between the runs. The nearby environment is moist, but SSTs along the projected tracks are not conducive to rapid development of the system. ECMWF 850mb vorticity also shows PGI-45L interacting with vorticity from PGI-46L; see the PGI-46L discussion for more details.

PGI-46L:

The global models have backed off of the development of PGI-46L, and no models are developing it today. Instead, several of the models are forecasting interaction with PGI-45L. The ECMWF develops PGI-45L, turns it northeastward, and wraps PGI-46L into that circulation (**46A**). The GFS does not have as strong of an interaction, however some vorticity is still wrapped into PGI-45L, while some progresses into the Caribbean as nothing more than a wave (**46B**). If that portion remains true, then it would be near Barbados by Tuesday at 2pm AST. Regardless, the system needs to be watched for the next couple days because the environment will not be overly hostile, and it would not be unheard of for the models to begin developing PGI-45L instead of PGI-46L.

SAL/Dust:

Today's 0600 CIMSS SAL analysis shows abundant dry air off the coast of Africa extending westward towards Julia (**D1**). It does not appear, however, that the dry air has yet impinged the circulation of the storm. Current water vapor imagery shows dry air across the same region (**S6**). GEOS-5 model analysis suggests much of the dry air

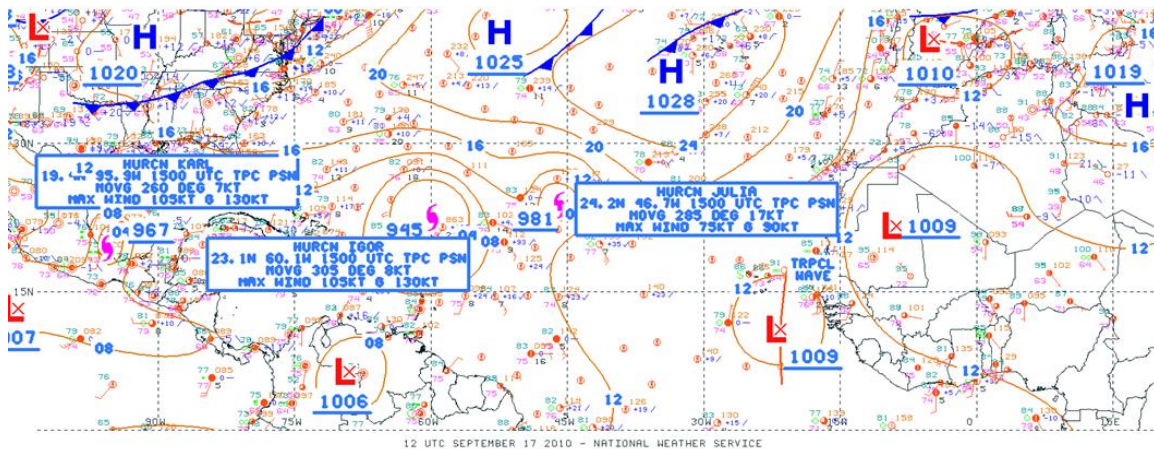
across the eastern Atlantic is associated with activity in the SAL. The 850-hPa analysis shows large quantities of dust over Africa extending eastward and wrapping around Julia (D3). Over time, dust continues to move off of the African coast, and some dust continues to surround Julia 24 hours from now (D4). The dust concentrations increase at 700-hPa (D2), and decrease at 500-hPa, compared to lower pressure levels. Current concentrations of dust at 200-hPa increase slightly from the 500-hPa but are nowhere near those of the lower atmosphere. At middle and upper levels, concentrations surrounding Julia are much lower. Furthermore, dust should not impede development of PGI-45L in the near term, as much of the higher concentrations are to the north of this system.

Forecasters: English, Wood, Kofron, Leary, Stovern, Zawislak, Zelinsky, Maliawco

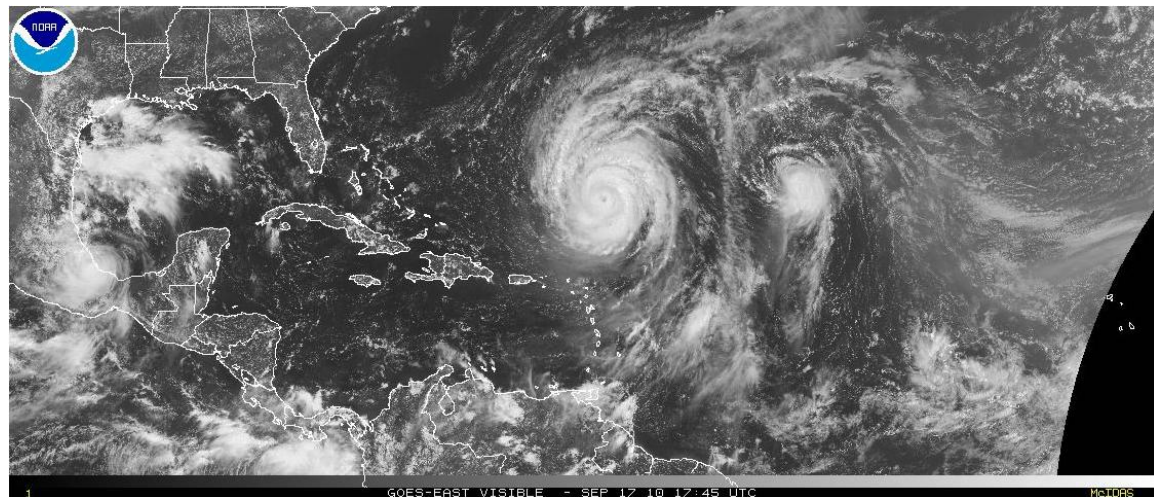
Images used in discussion:

Synoptic Overview Images

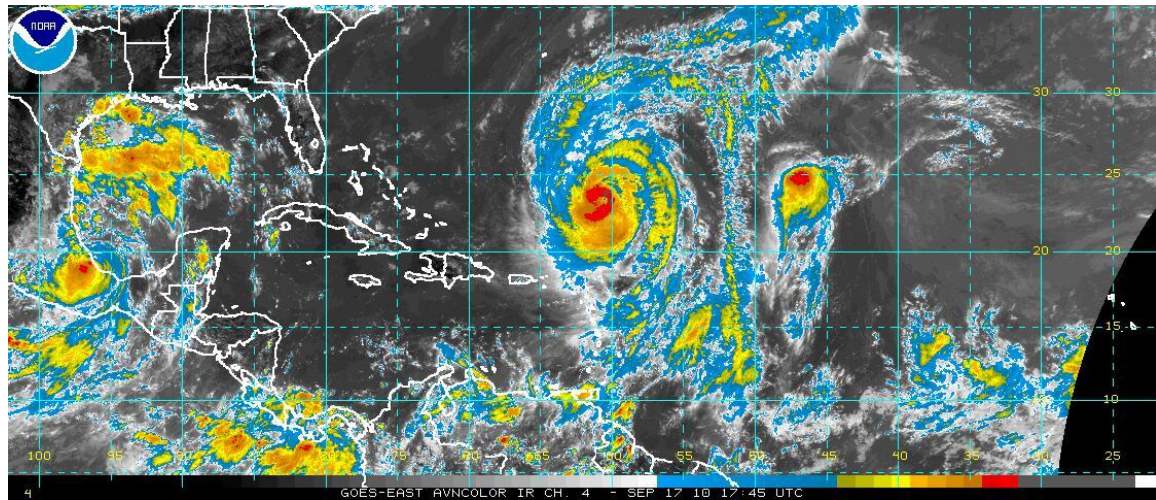
S1



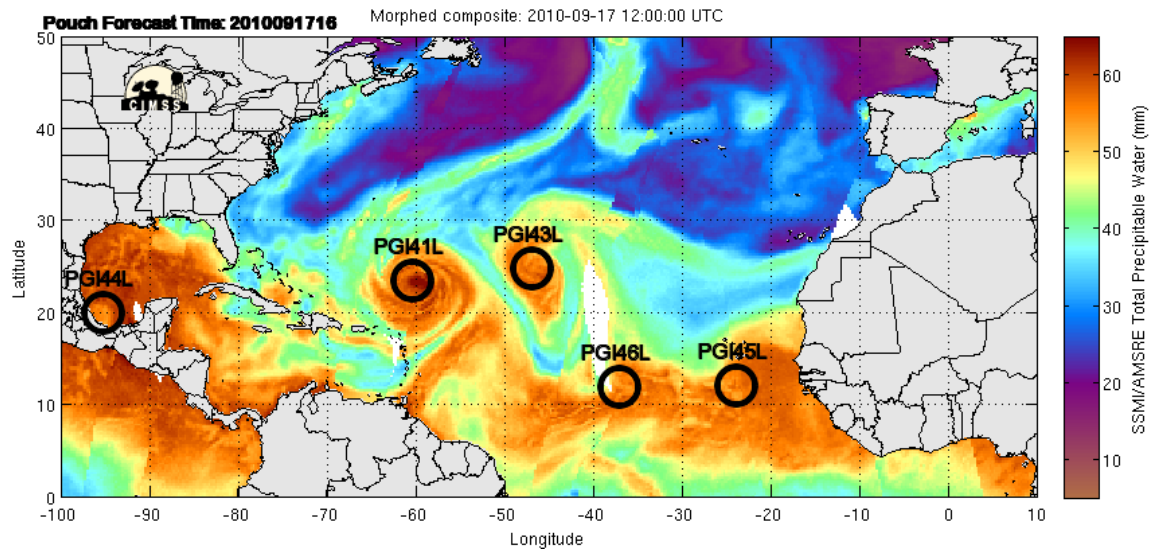
S2- GOES VIS



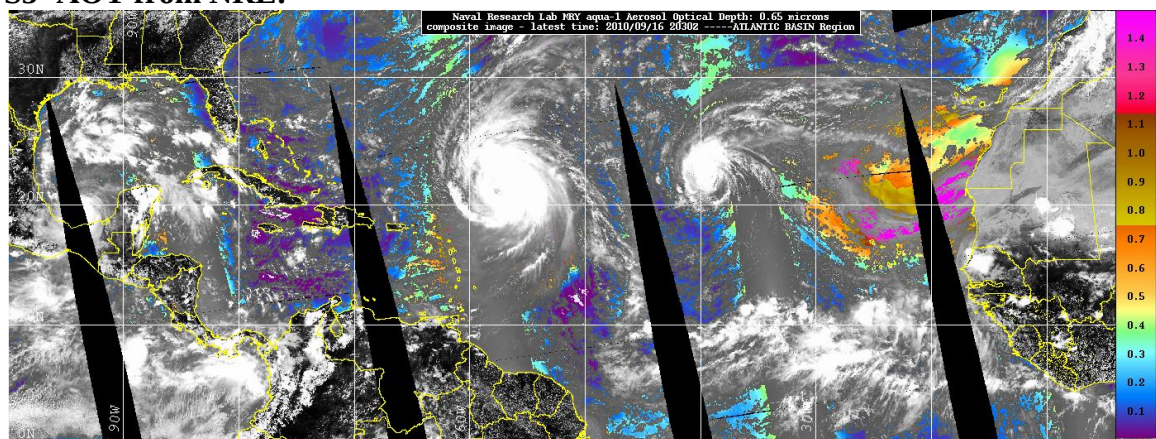
S3- GOES IR



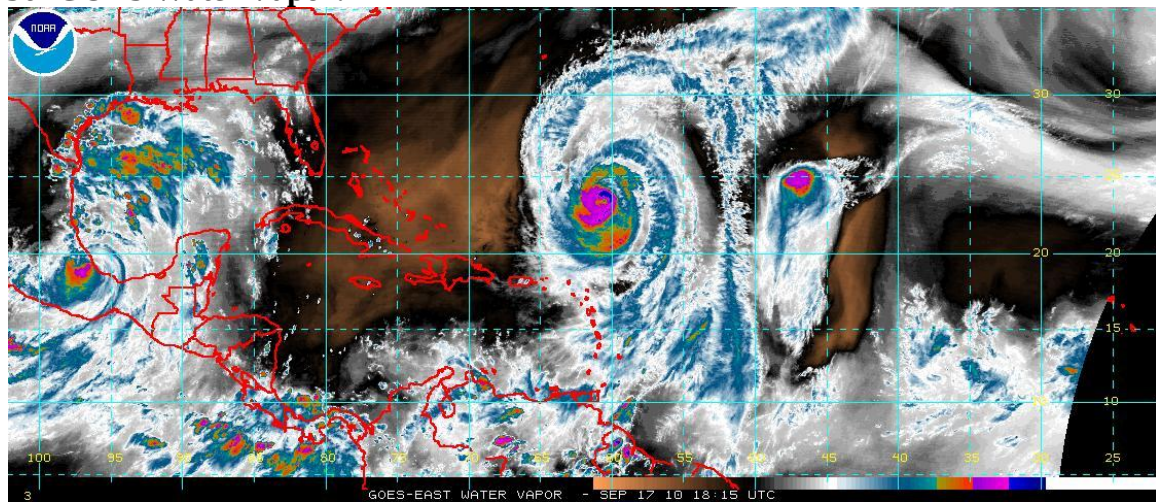
S4- CIMSS TPO with Pouch Positions



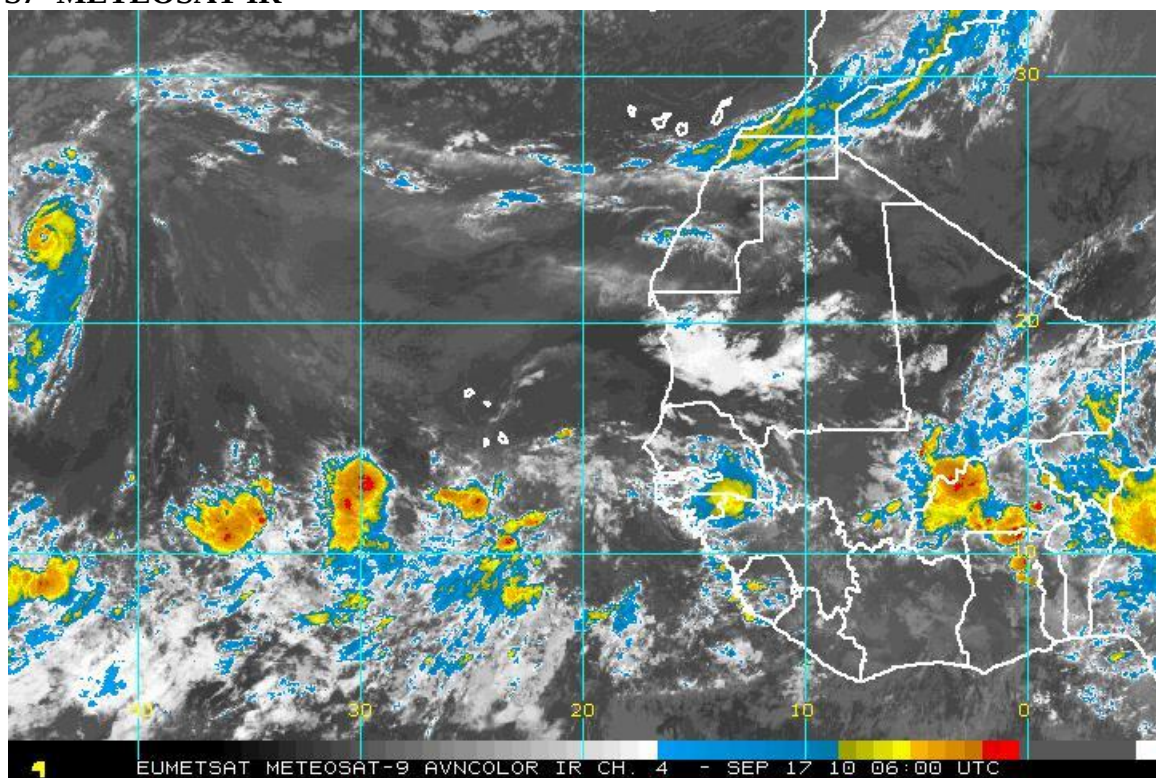
S5- AOT from NRL:



S6- GOES Water Vapor:

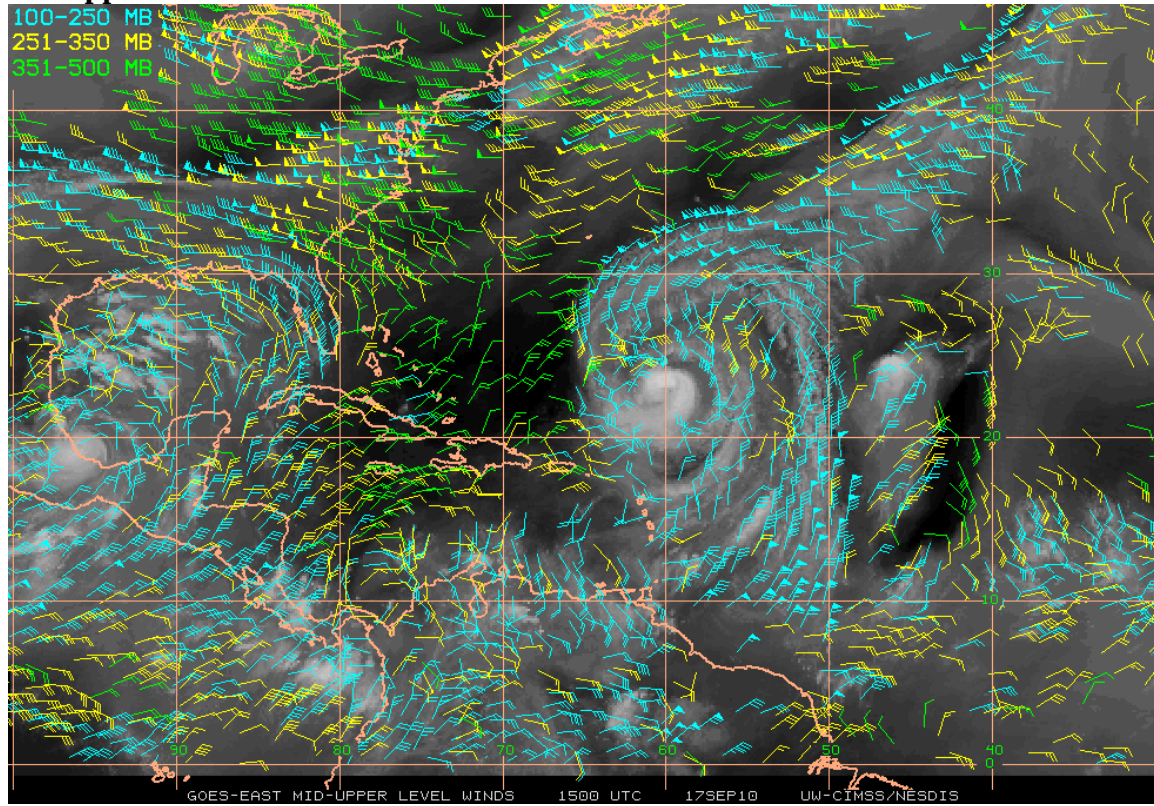


S7- METEOSAT IR

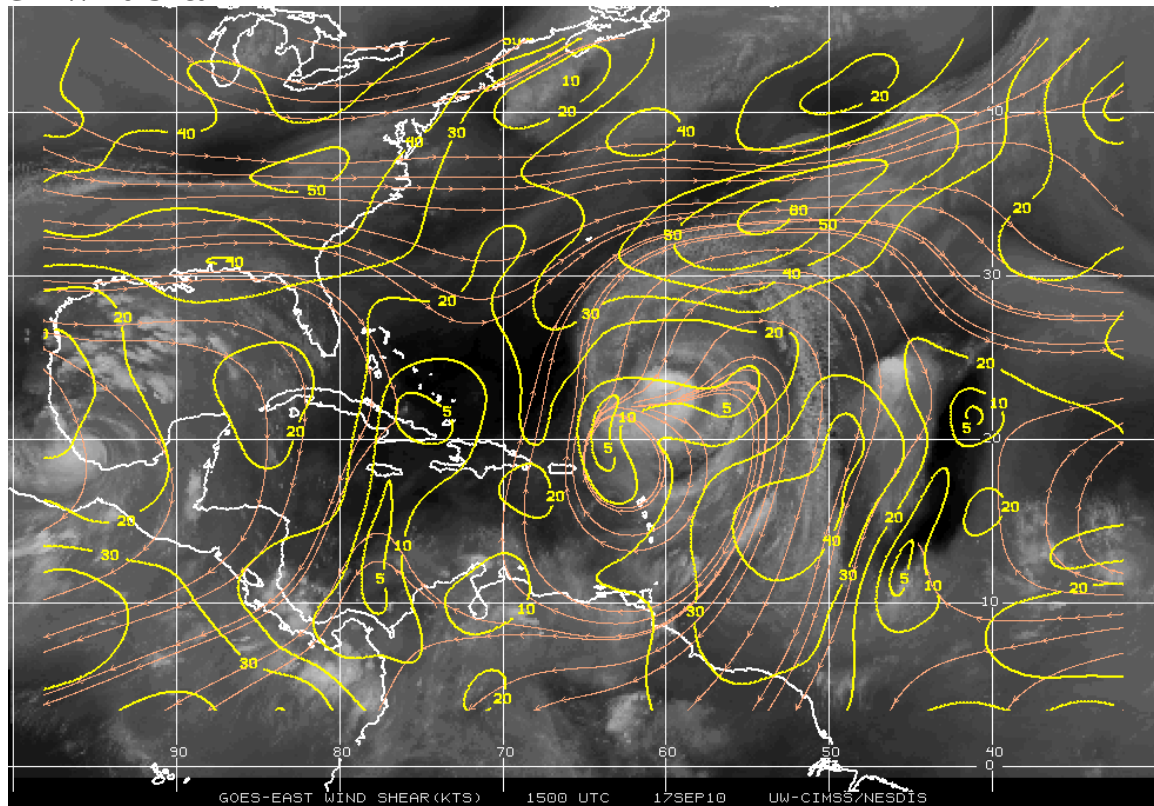


CIMSS Analyses:

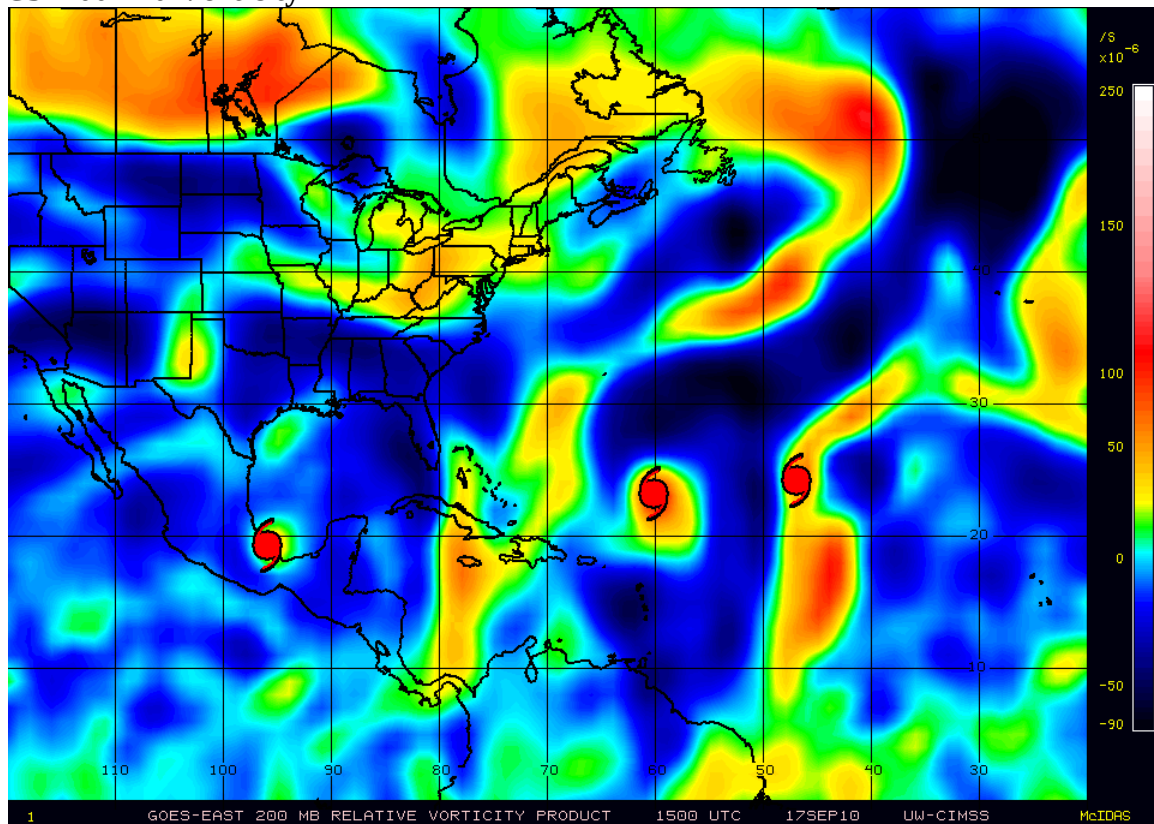
C1- Upper Level Winds



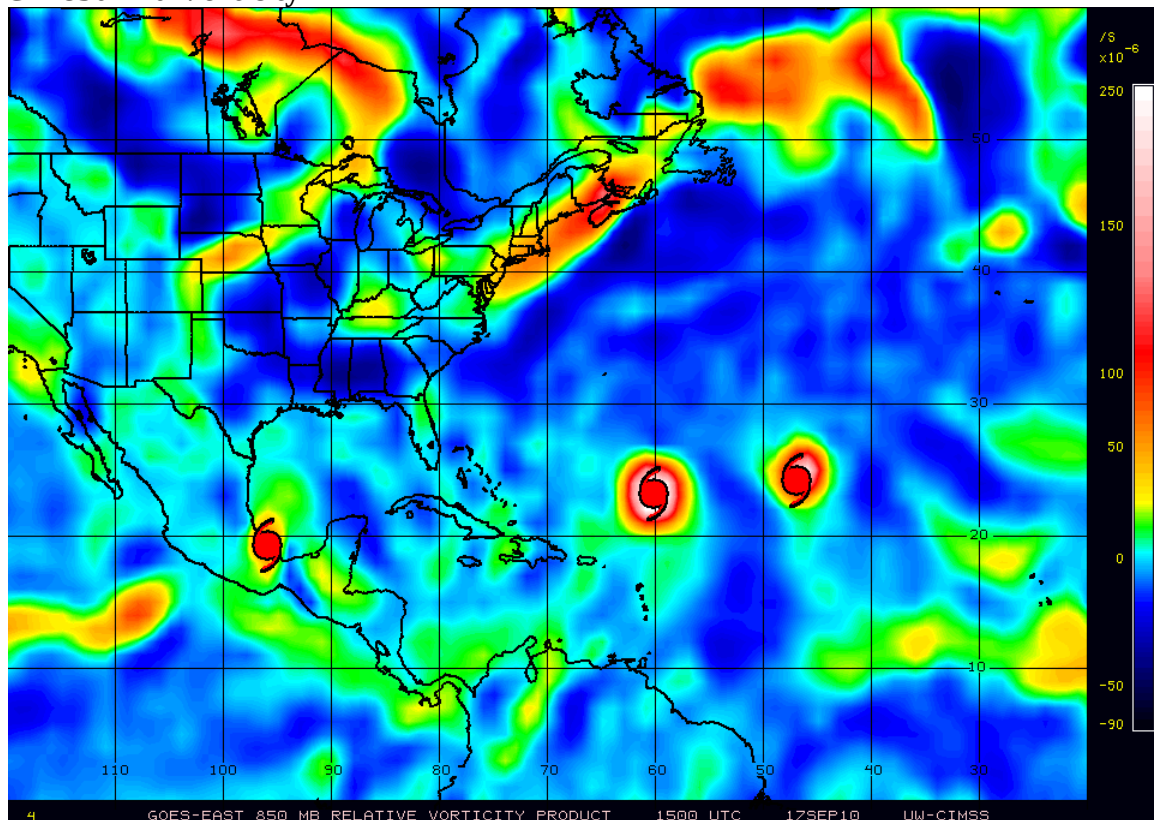
C2- Wind Shear



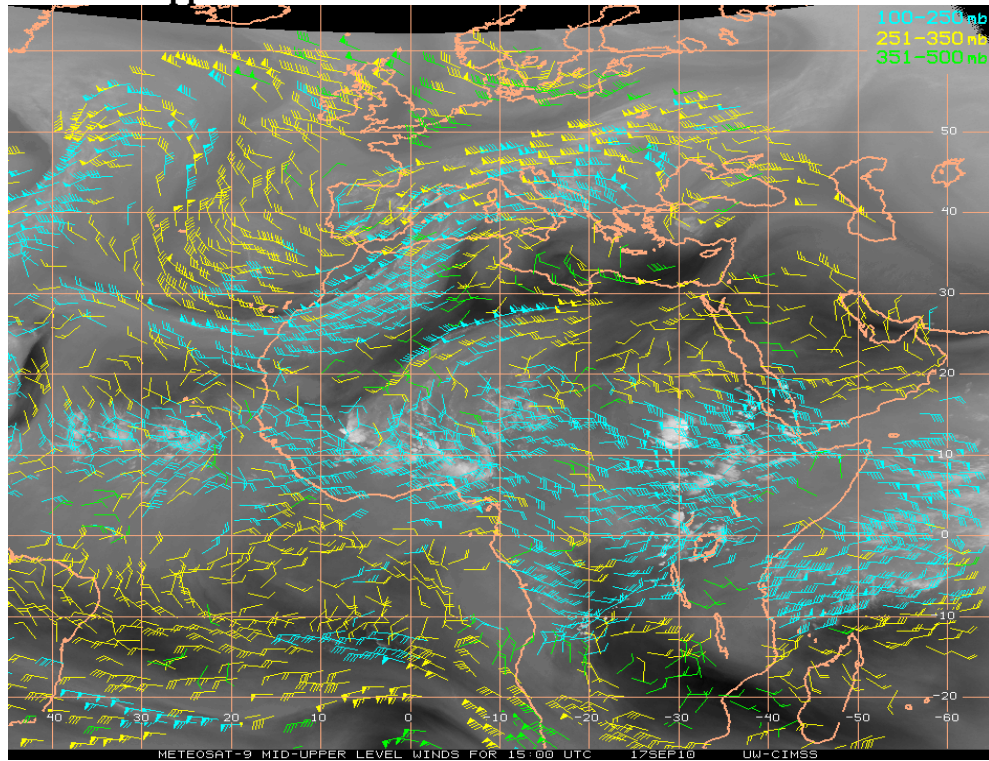
C3- 200 hPa Vorticity



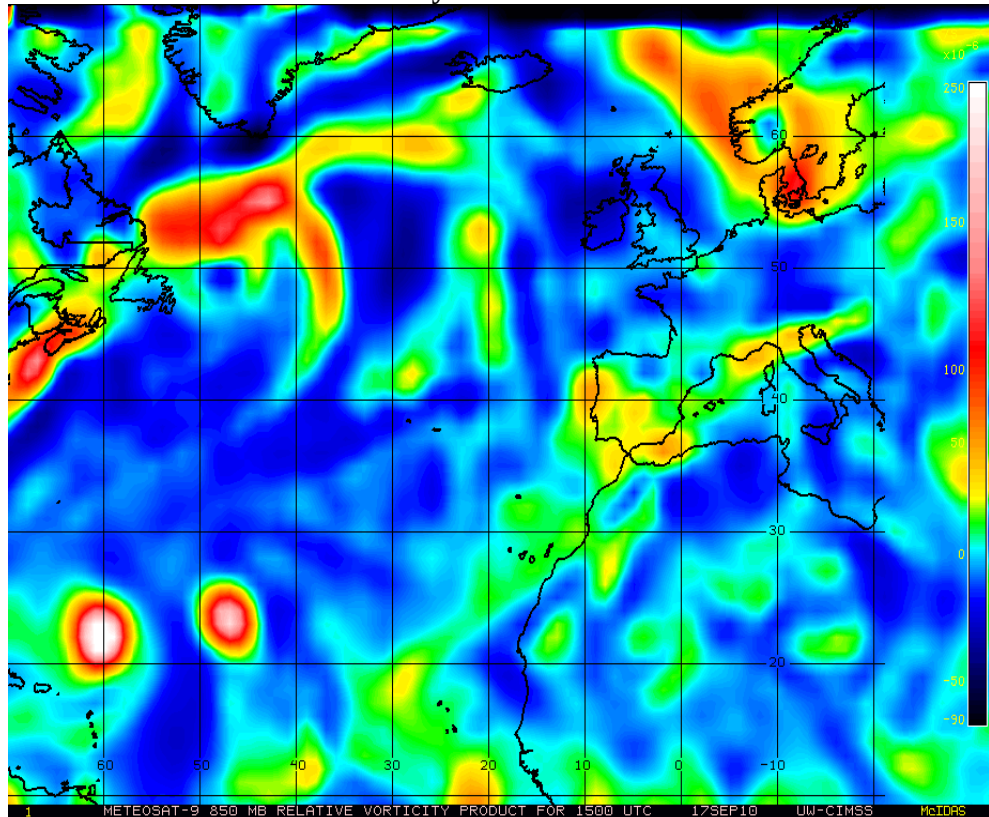
C4- 850 hPa Vorticity



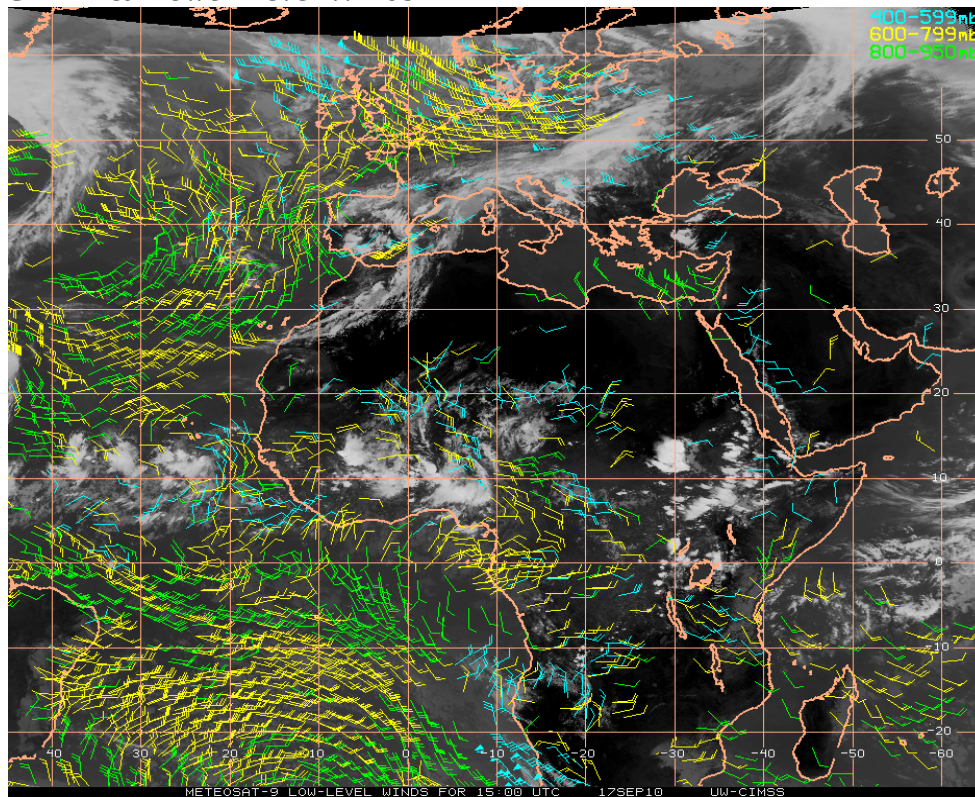
C5 Africa Upper Level Winds:



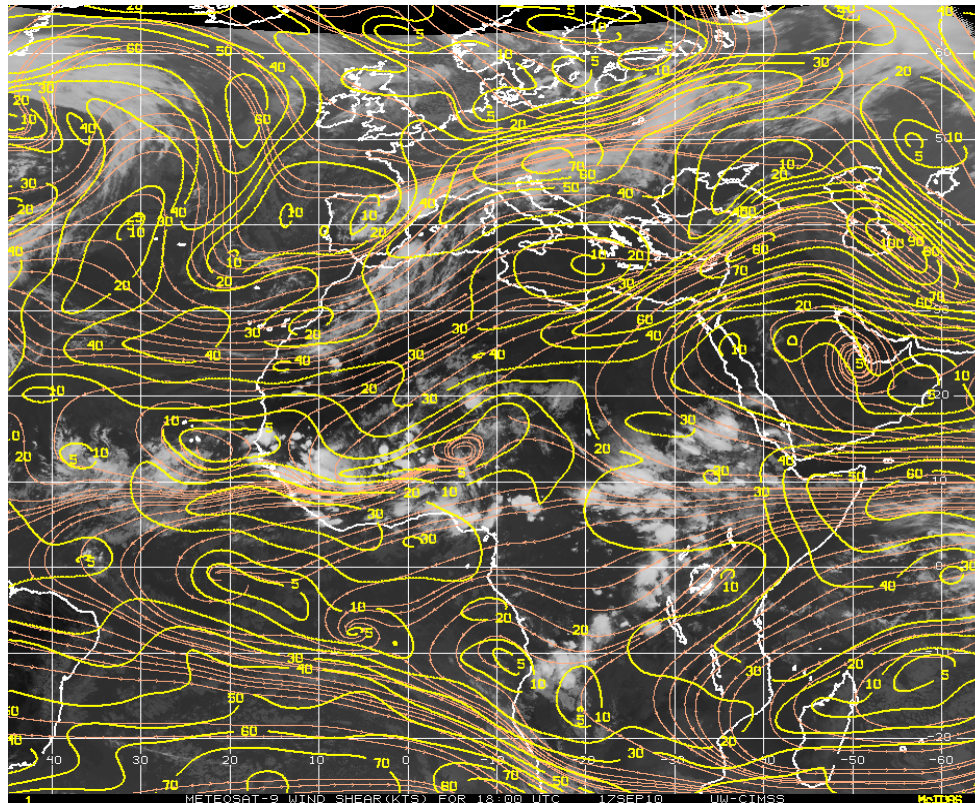
C6 Africa Lower Level Vorticity



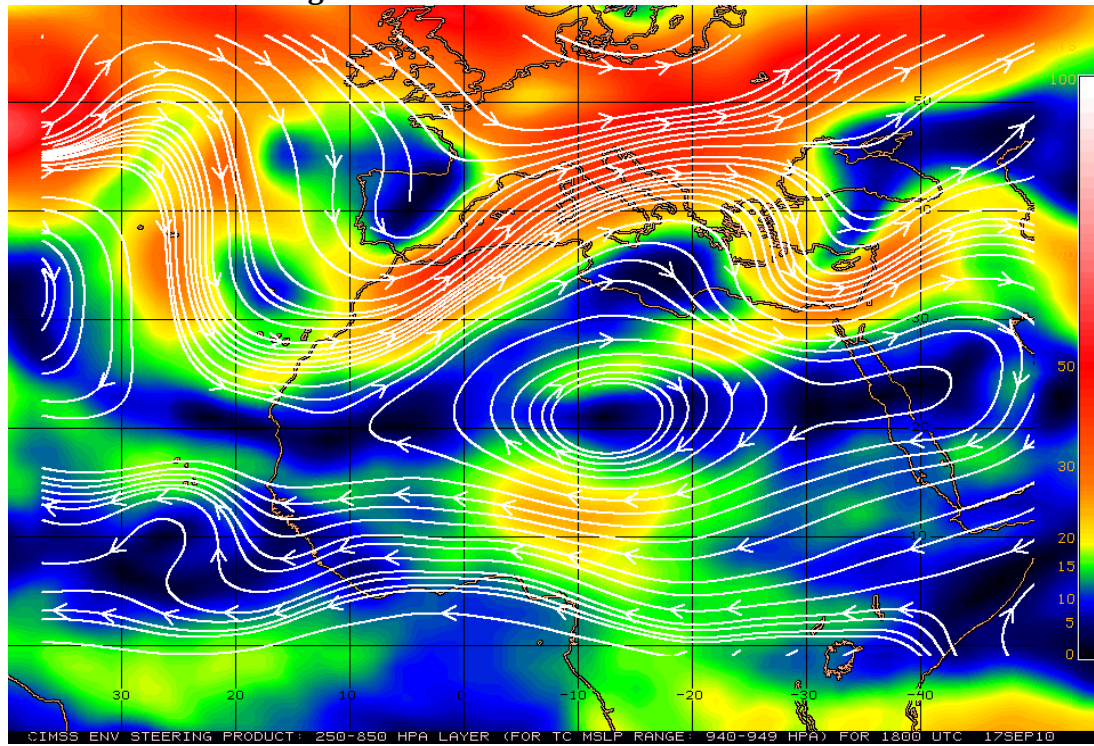
C7 Africa Lower Level Winds



C8 Africa Wind Shear



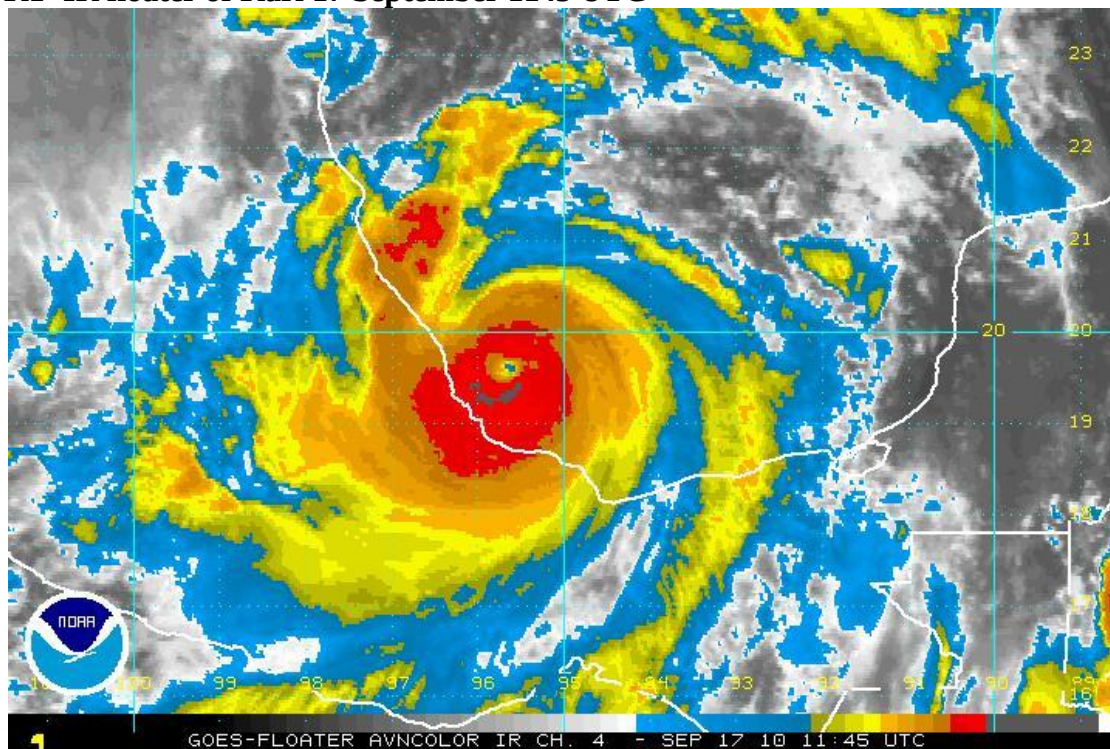
C9 850-200mb Steering Flow over Africa



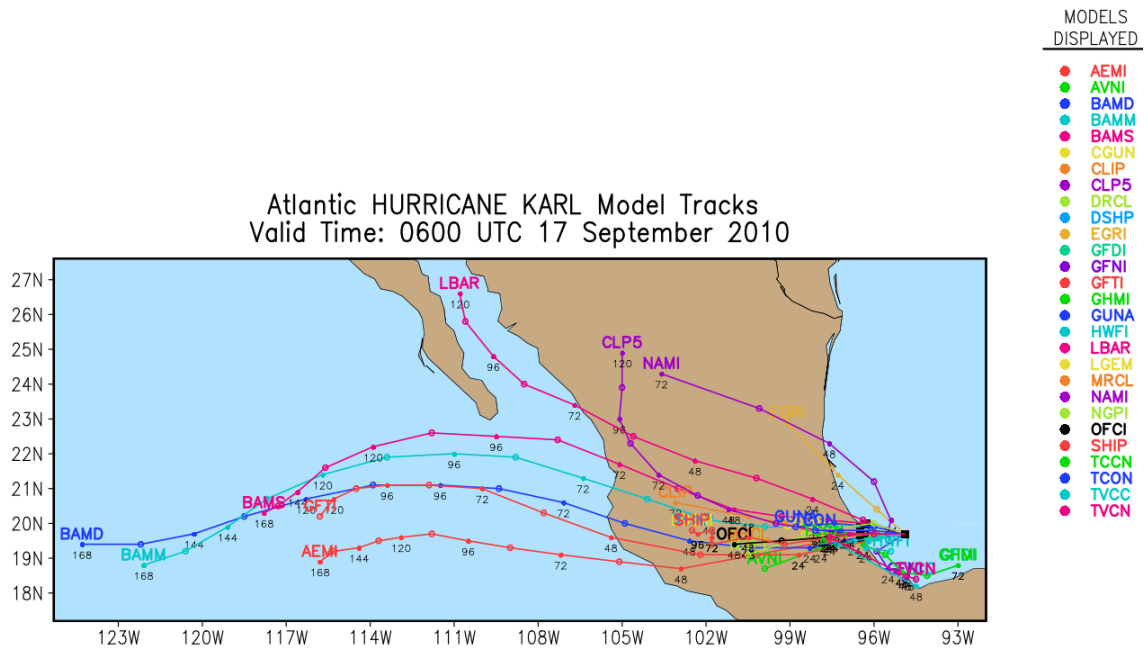
Features of Interest Images

Hurricane Karl

K1- IR floater of Karl 17 September 1145 UTC

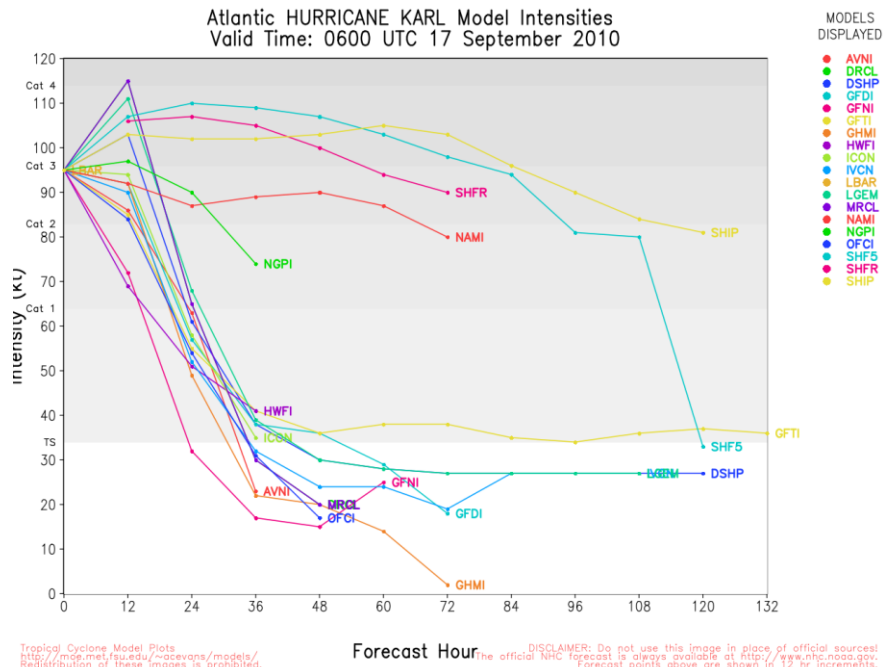


K2- 0600 UTC 17 September Karl model tracks and intensity



Tropical Cyclone Model Plots
http://moe.met.fsu.edu/~acevans/models/
Redistribution of these images is prohibited.

DISCLAIMER: Do not use this image in place of official sources!
The official NHC forecast is always available at <http://www.nhc.noaa.gov>.
Forecast points above are shown in 12 hr increments. Initial points denoted by black squares.

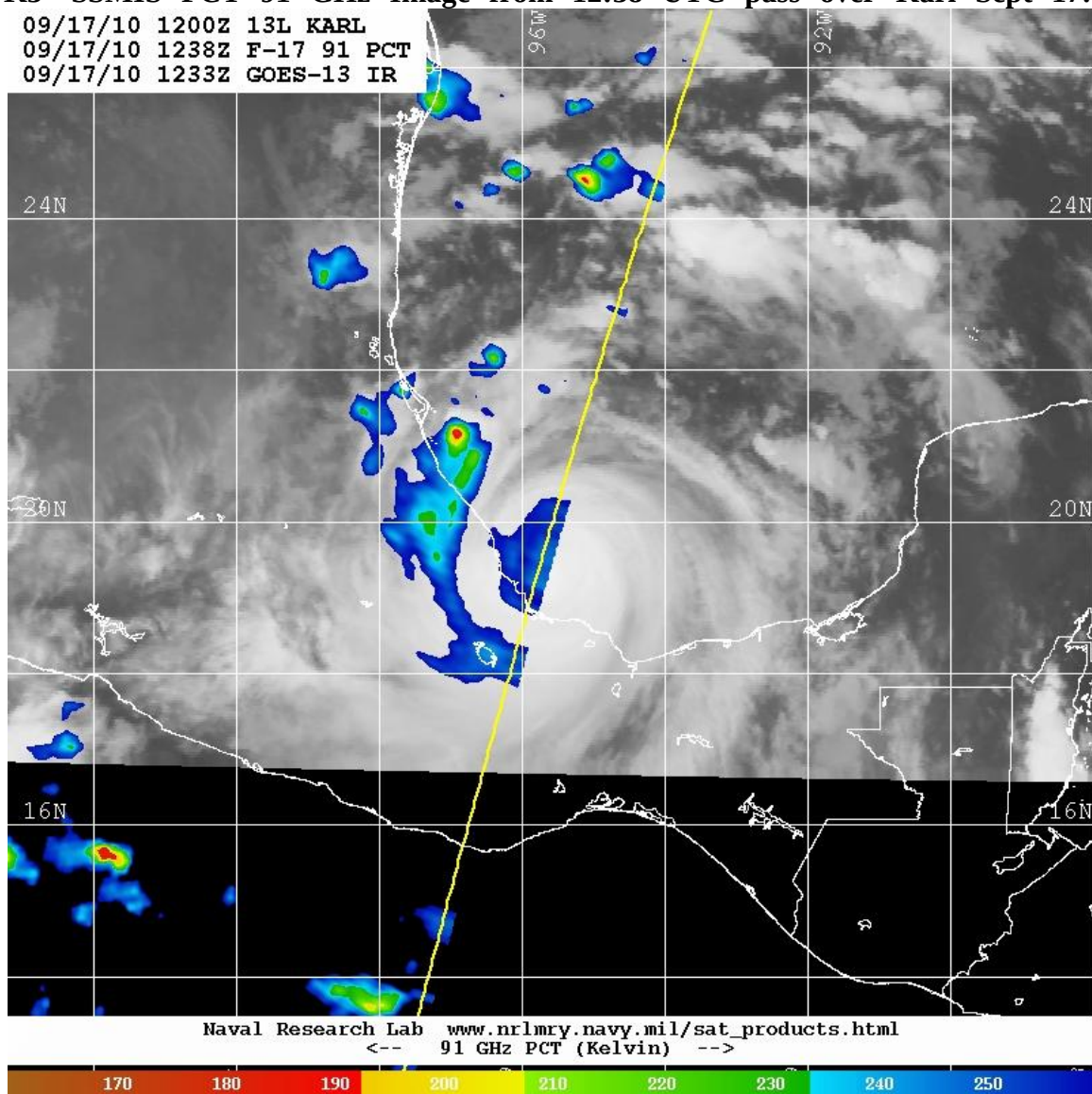


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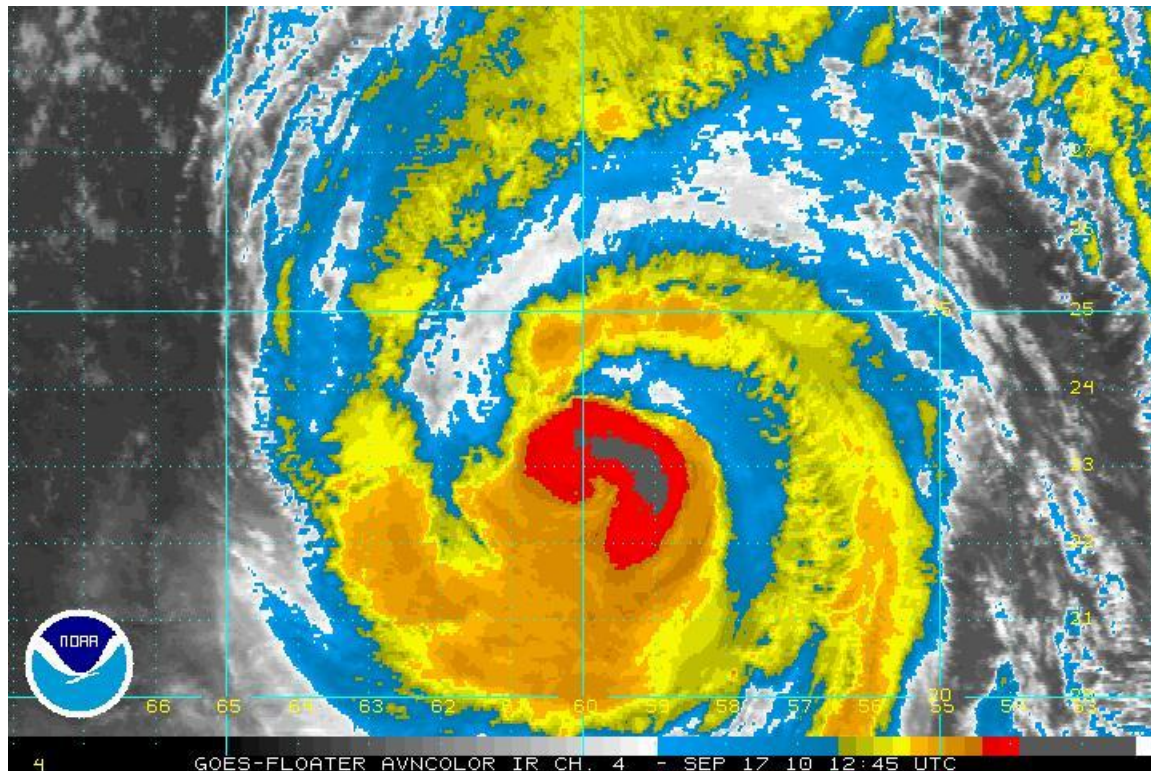
K3- SSMIS PCT 91 GHz Image from 12:38 UTC pass over Karl Sept 17:

09/17/10 1200Z 13L KARL
09/17/10 1238Z F-17 91 PCT
09/17/10 1233Z GOES-13 IR



PGI-41L...Igor:

I1



I2

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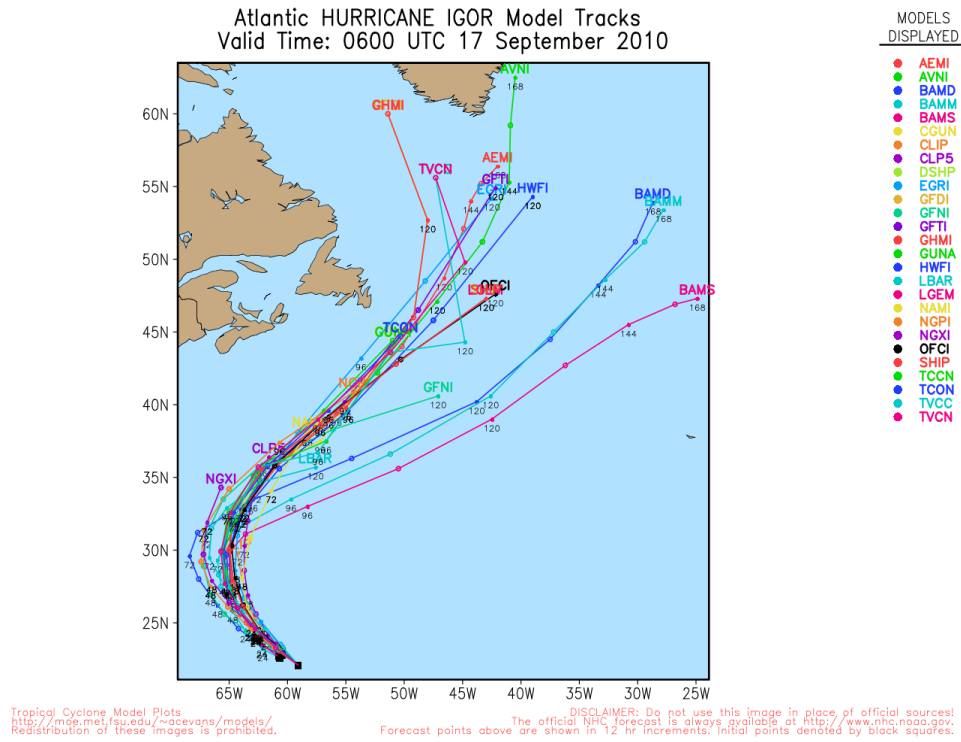
*   ATLANTIC SHIPS INTENSITY FORECAST   *
*   GOES DATA AVAILABLE                 *
*   OHC DATA AVAILABLE                  *
*   IGOR          AL112010 09/17/10 12 UTC *

TIME (HR)      0    6    12   18   24   36   48   60   72   84   96  108  120
V (KT) NO LAND 100   98   99  104  107  107  103  100  93   87   80   72   58
V (KT) LAND    100   98   99  104  107  107  103  100  93   87   80   72   58
V (KT) LGE mod 100   96   94   95   96   97   97   94   88   79   67   54   48

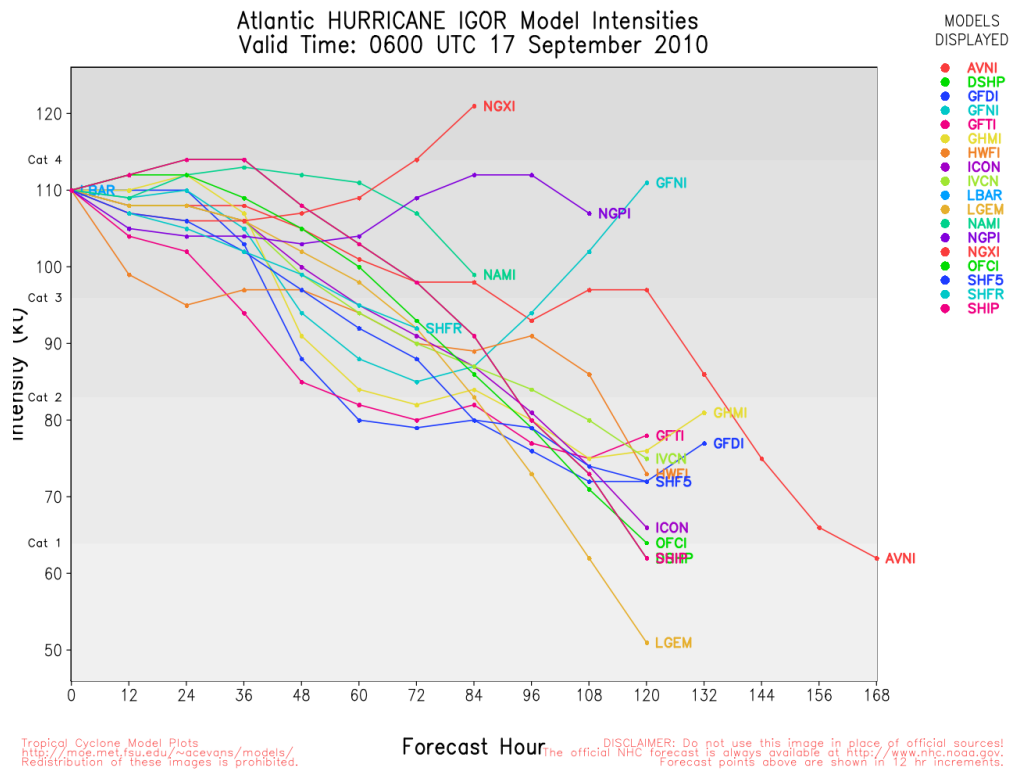
SHEAR (KT)      9    4    6    1    3   12   17   26   26   38   48   41   28
SHEAR ADJ (KT)  6    4    3    3    0    1   -3    4    6    4   -2    2    9
SHEAR DIR      220  195  188  164   14  151  184  184  204  220  250  207  186
SST (C)        29.2  29.2  29.2  29.1  28.9  28.6  28.6  28.4  27.6  26.3  20.2  14.1  13.8
POT. INT. (KT)  154  155  155  154  150  145  145  144  135  123   87   74   73
ADJ. POT. INT.  140  139  140  140  135  128  127  127  122  114   82   71   70
200 MB T (C)   -50.1 -49.0 -49.2 -48.6 -48.2 -47.7 -47.2 -47.2 -46.6 -46.9 -47.3 -46.4 -46.6
TH_E DEV (C)    10   10   10   10   11   11   10    9    6    4    0    0    0
700-500 MB RH   55   55   55   51   50   49   52   52   62   63   66   65   54
GFS VTGX (KT)   44   45   42   46   47   48   48   52   50   48   50   54   49
850 MB ENV VOR  146  164  172  159  169  168  167  172  164  176  237  256  218
200 MB DIV      81   69   10    0   25   35   63   91  125   90  132   86  130
LAND (KM)       784  767  762  778  812  962  1121 1141 1059  826  493  443  836
LAT (DEG N)     22.7  23.3  23.8  24.6  25.3  27.0  28.7  31.1  34.1  37.9  42.3  47.4  52.5
LONG(DEG W)     59.8  60.6  61.3  62.2  63.1  64.2  64.9  64.8  63.1  59.0  52.3  46.9  42.7
STM SPEED (KT)   9    9   10   11   10    9   10   14   21   30   33   30   28
HEAT CONTENT     59   58   63   55   44   24   19   20   14    1    0    0    0

FORECAST TRACK FROM OFCI      INITIAL HEADING/SPEED (DEG/KT):305/ 8      CX,CY: -6/ 5
T-12 MAX WIND: 115            PRESSURE OF STEERING LEVEL (MB): 609 (MEAN=624)
GOES IR BRIGHTNESS TEMP. STD DEV. 50-200 KM RAD: 12.3 (MEAN=14.5)
% GOES IR PIXELS WITH T < -20 C 50-200 KM RAD: 90.0 (MEAN=65.0)
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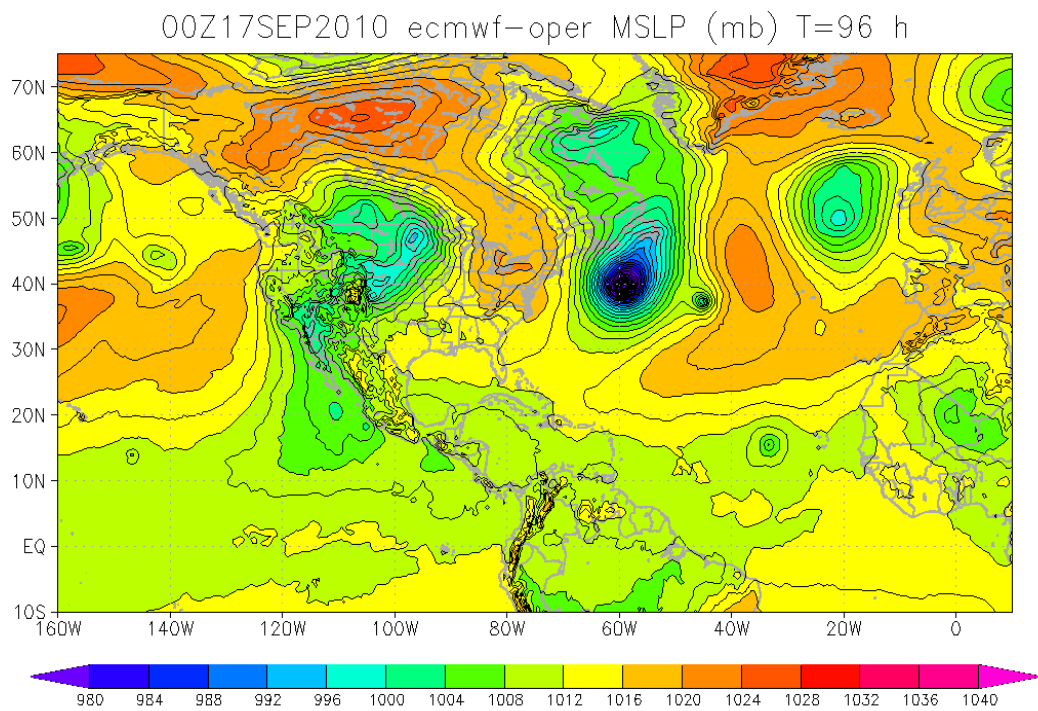
I3



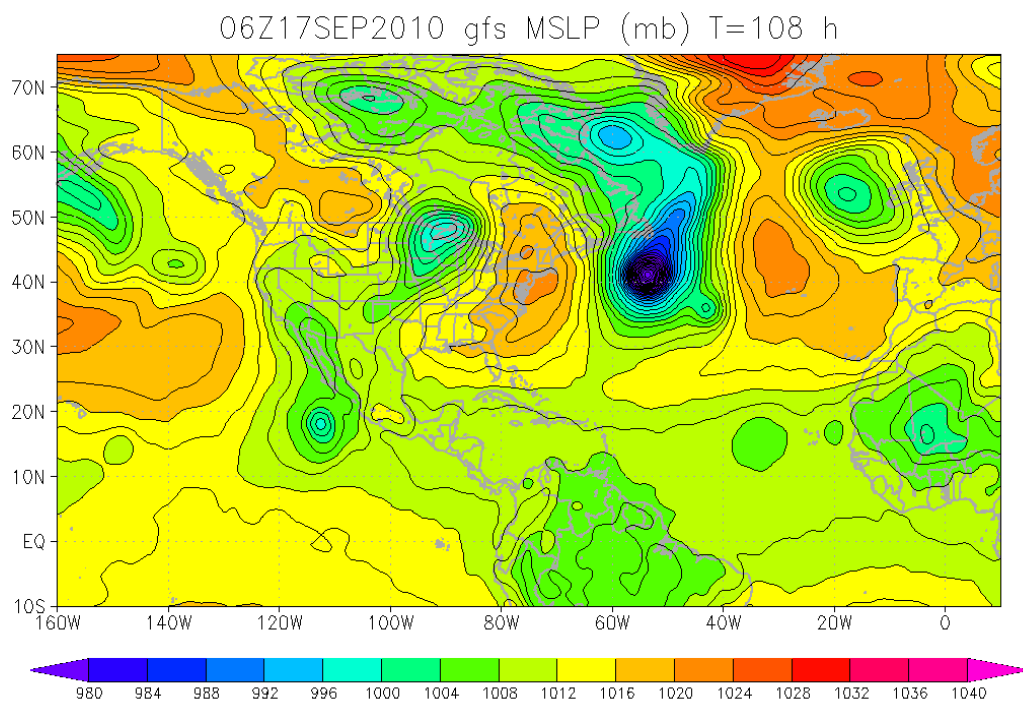
I4



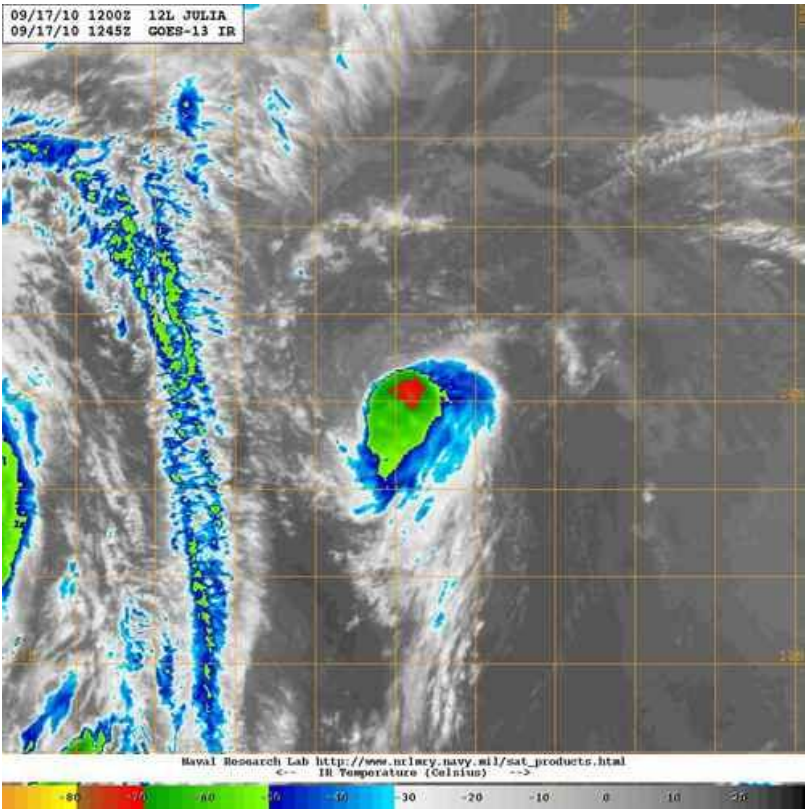
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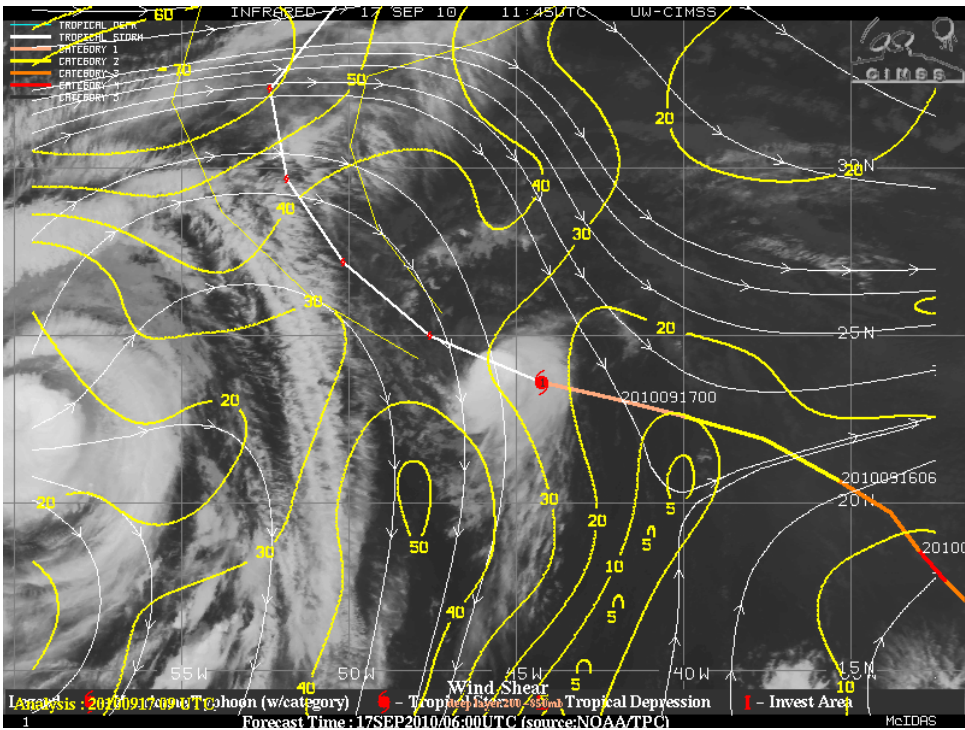
I6



PGI-43L...Julia:
J1



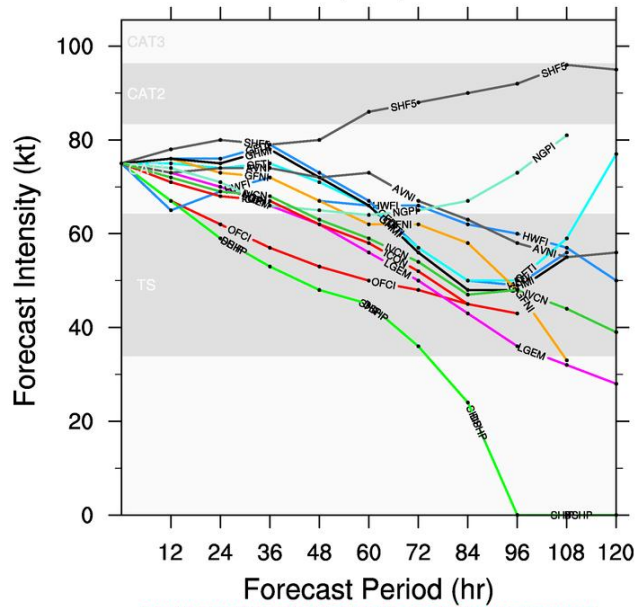
J2



HURRICANE JULIA (AL12)

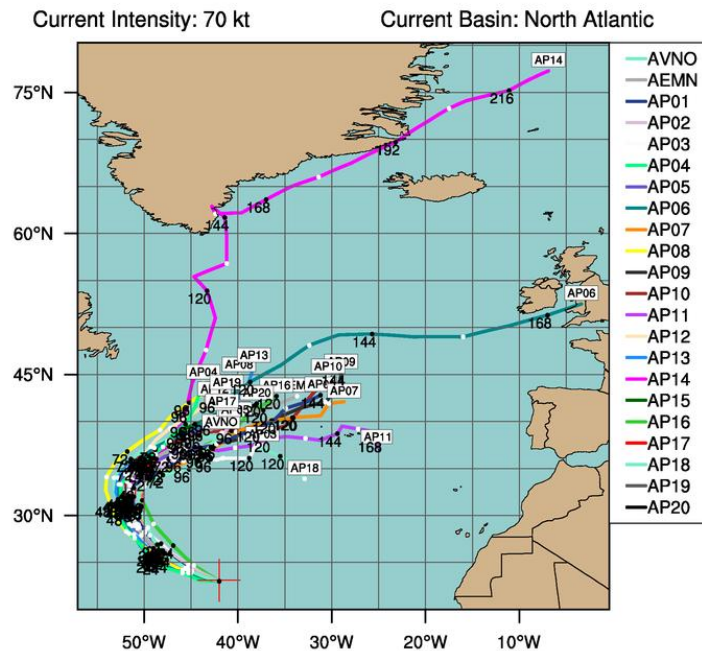
Early-cycle intensity guidance

valid 0600 UTC, 17 September 2010



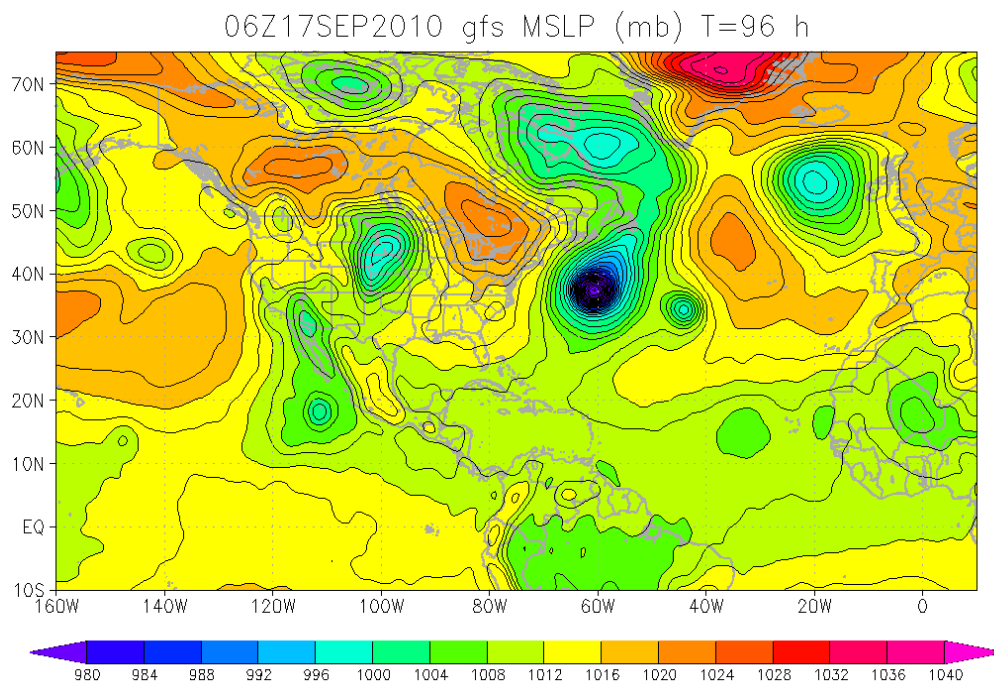
HURRICANE JULIA (AL12)

NCEP GFS Ensemble track guidance valid 0000 UTC, 17 September 2010



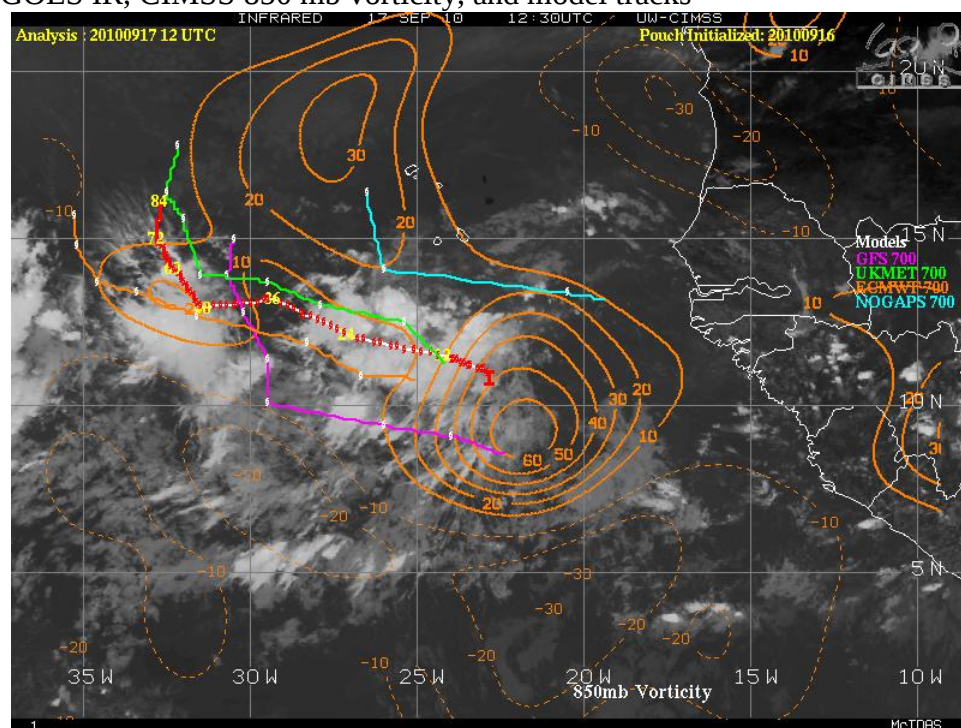
This plot does not display official storm information. Use for information purposes only.
DO NOT USE FOR LIFE AND DEATH DECISIONS!

J4

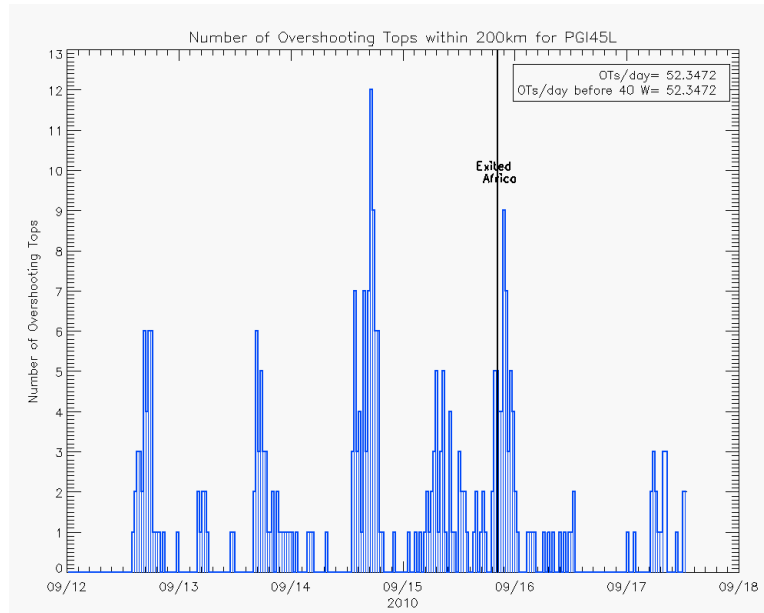


PGI-45L:

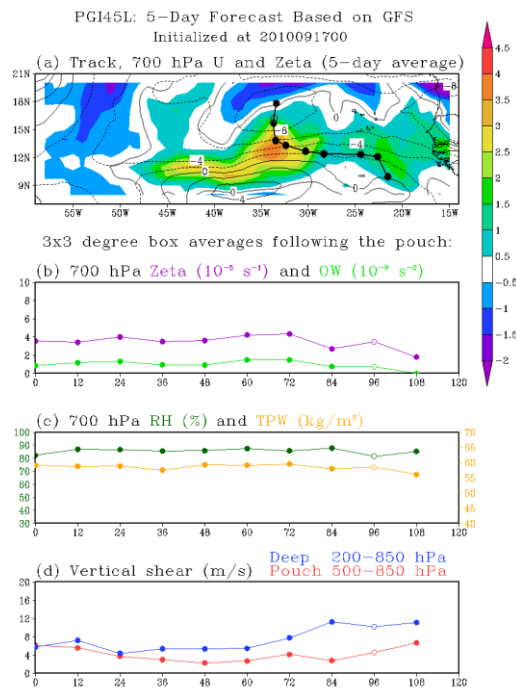
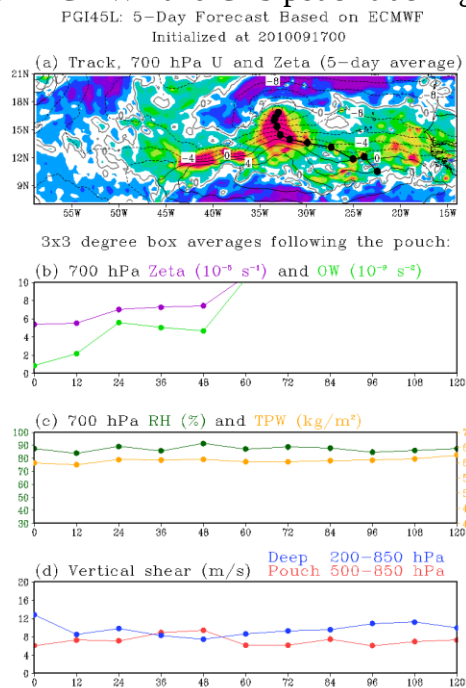
45A – GOES IR, CIMSS 850 mb vorticity, and model tracks



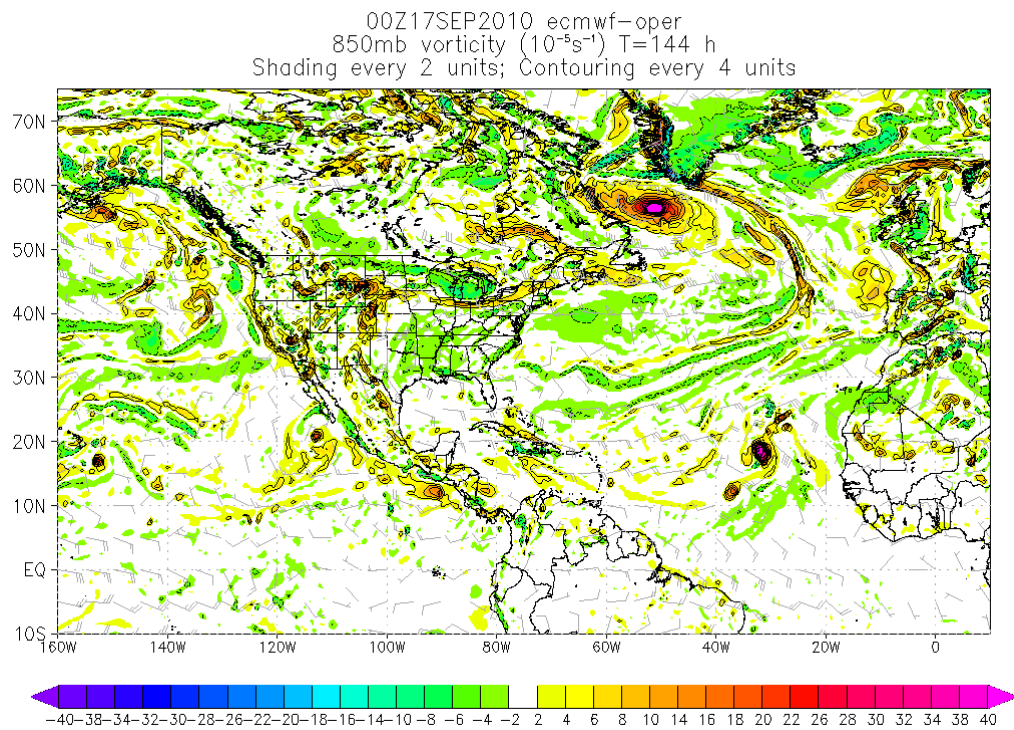
45B



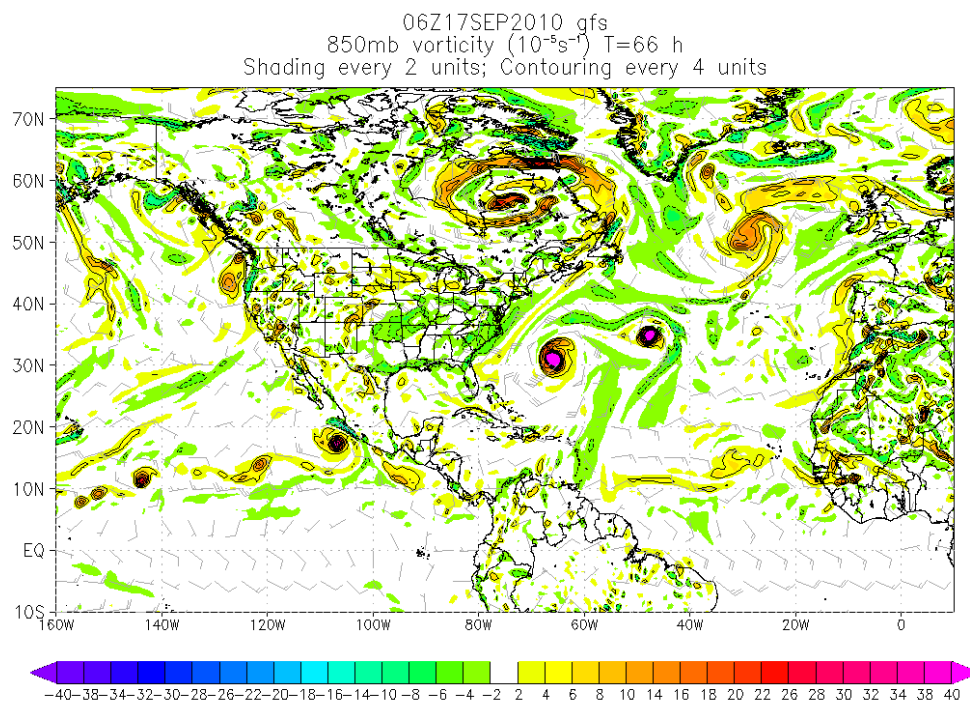
45C – ECMWF and GFS pouch tracking



PGI-46L:
46A

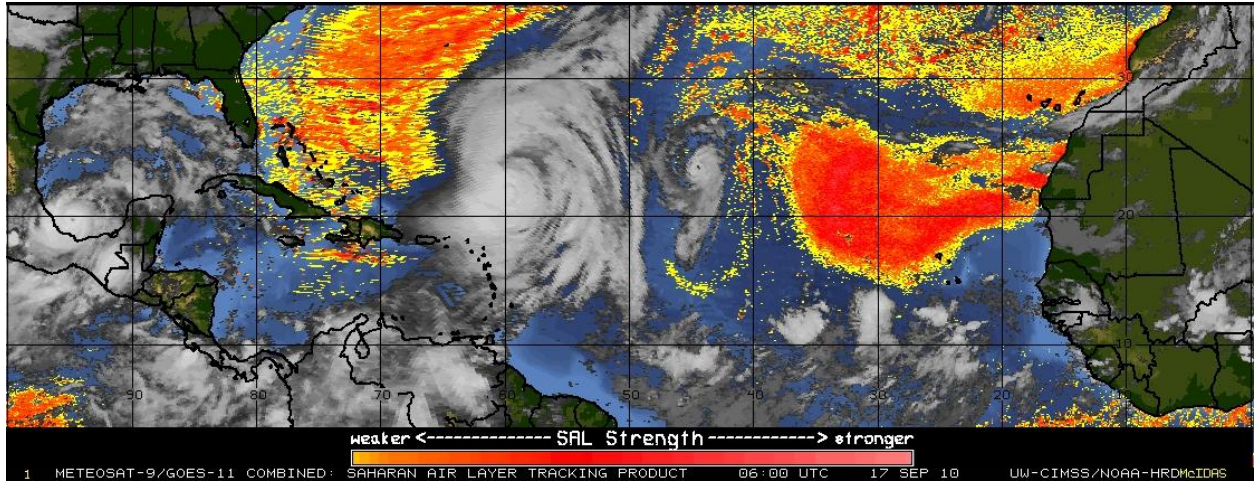


46B

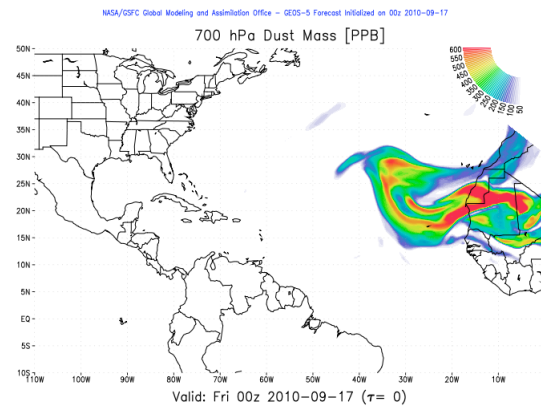


Dust/SAL:

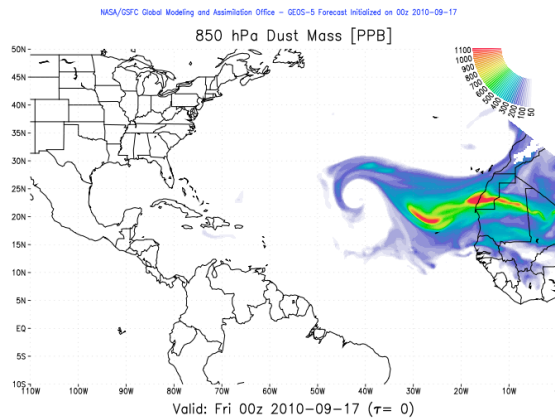
D1



D2- 700 hPa Dust Mass



D3- 850 hPa Dust Mass



D4- 24 hour forecast for 850 hPa Dust Mass

