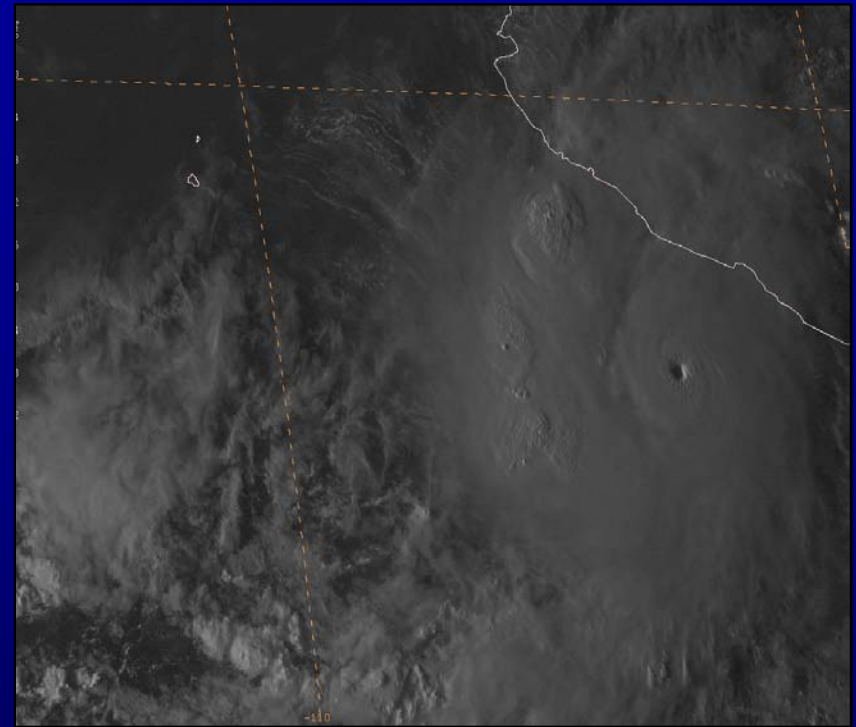
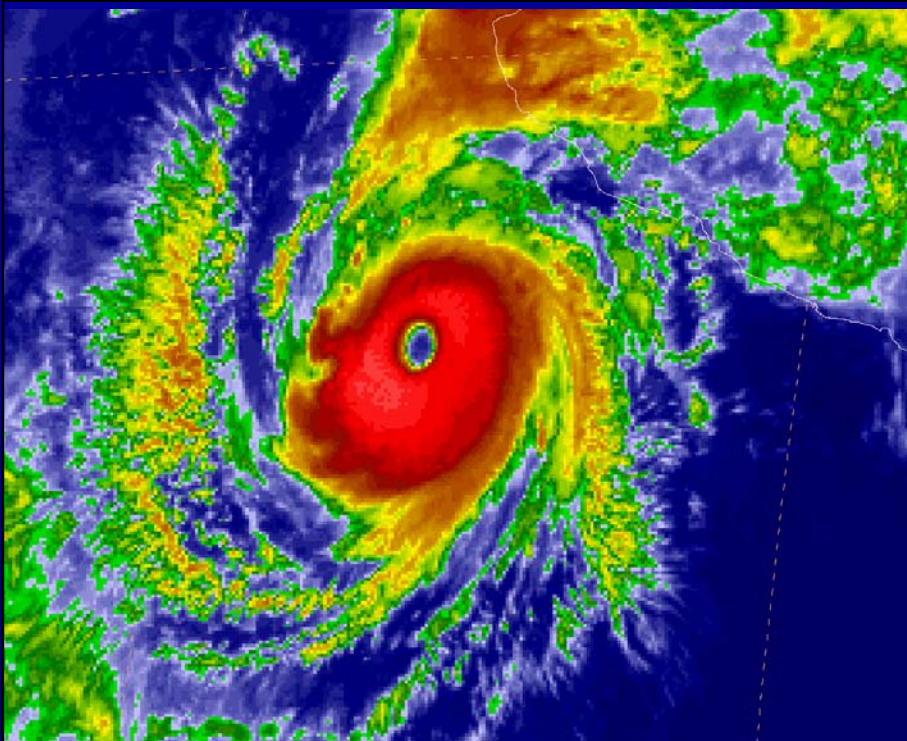


2011 Eastern Pacific Hurricane Season

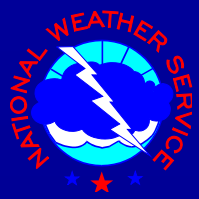


Todd B. Kimberlain and Eric S. Blake

National Hurricane Center

Interdepartmental Hurricane Conference

March 5, 2012

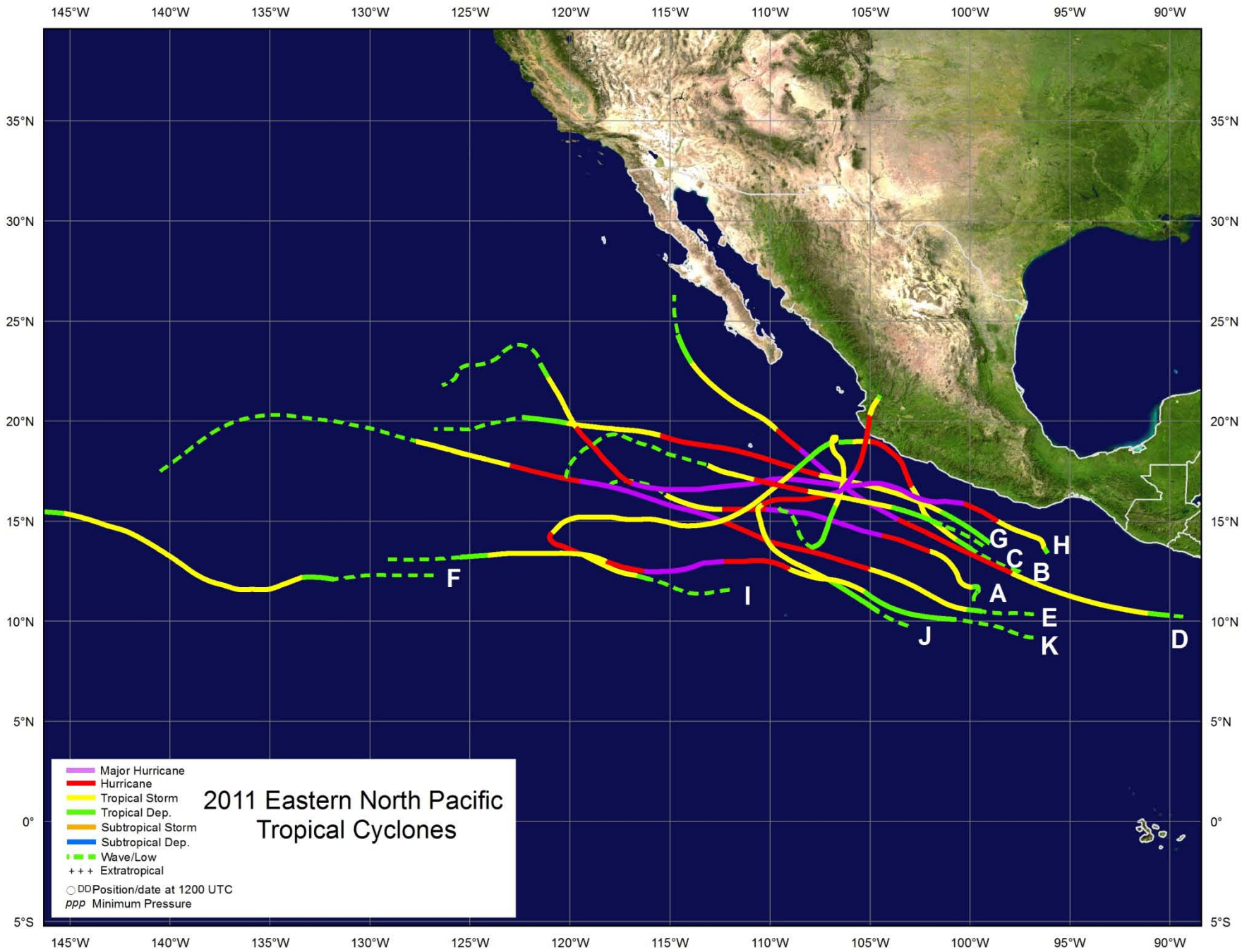


Summary Table

Name	Dates	Min Pressure (mb)	Max Winds (kt)	Direct Deaths
MH Adrian	7-12 Jun	944	120	0
H Beatriz	19-22 Jun	977	80	1
H Calvin	7-10 Jul	984	70	0
MH Dora	18-24 Jul	929	135	0
MH Eugene	31 Jul-6 Aug	942	120	0
TS Fernanda	15-19 Aug	992	60	0
H Greg	16-21 Aug	979	75	0
MH Hilary	21-30 Sep	940	125	3
H Irwin	6-16 Oct	977	80	0
MH Jova	6-12 Oct	955	110	6
MH Kenneth	19-25 Nov	940	125	0

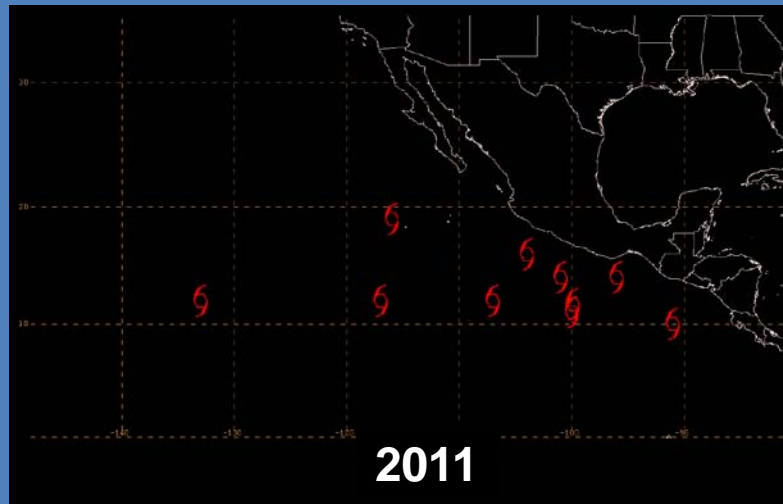
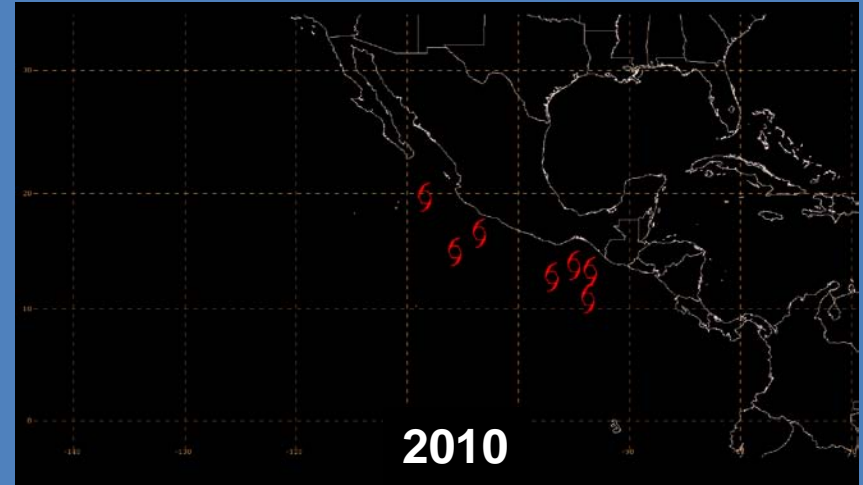
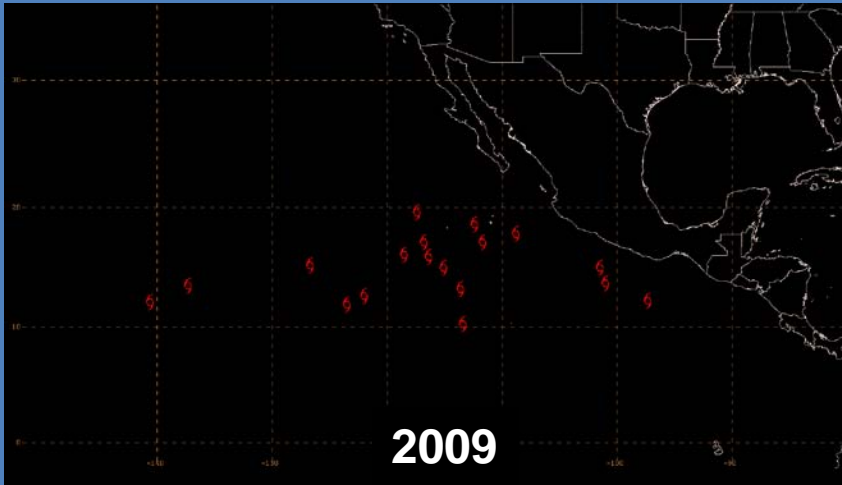
Verification of NOAA's 2011 Eastern Pacific Hurricane Outlook

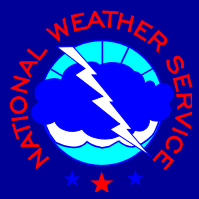
<u>Season and Activity Type</u>	<u>Outlook</u>	<u>Observed</u>	<u>Climatological Mean</u>
Chance Above Normal	5%		33%
Chance Near Normal	25%	Near Normal	33%
Chance Below Normal	70%		33%
Tropical Storms	9-15	11	15
Hurricanes	5-8	10	9
Major Hurricanes	1-3	6	4
ACE % of Median	45-105	113	~100





Points of Origin





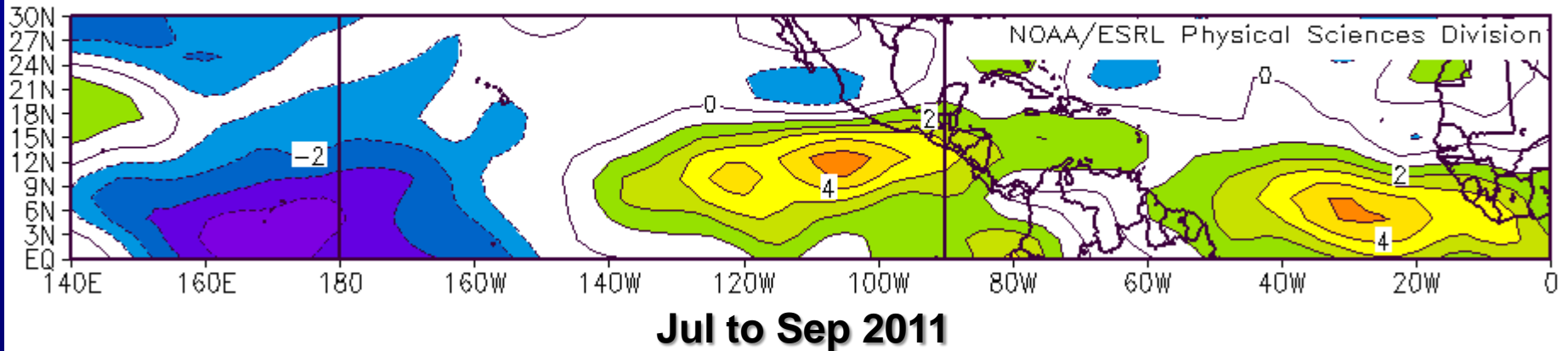
Environmental Anomalies

2010 and 2011

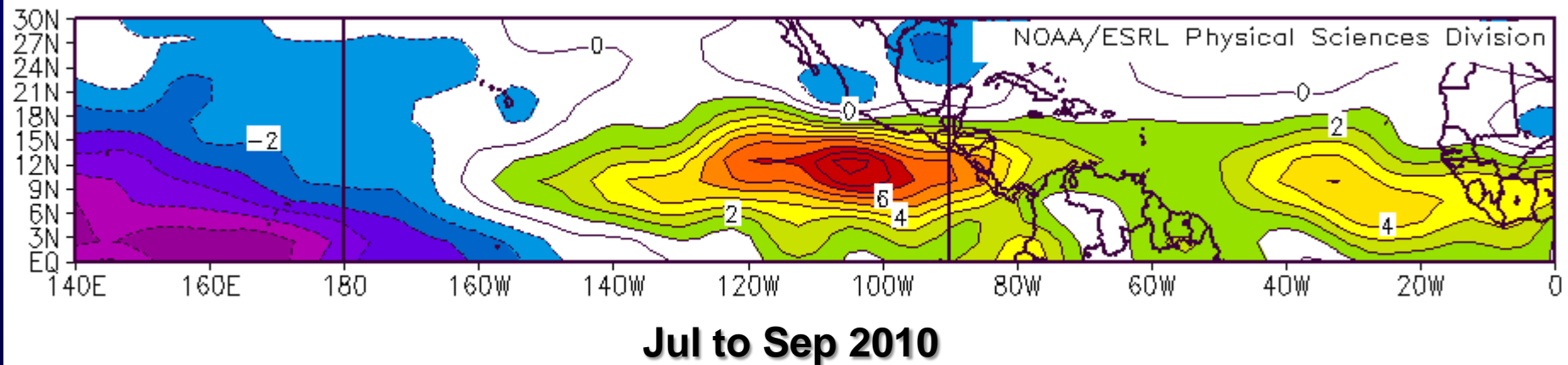


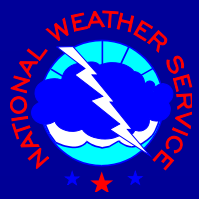
850mb u-wind anomalies

850mb Zonal Wind (m/s) Composite Anomaly 1981–2010 climo



850mb Zonal Wind (m/s) Composite Anomaly 1981–2010 climo





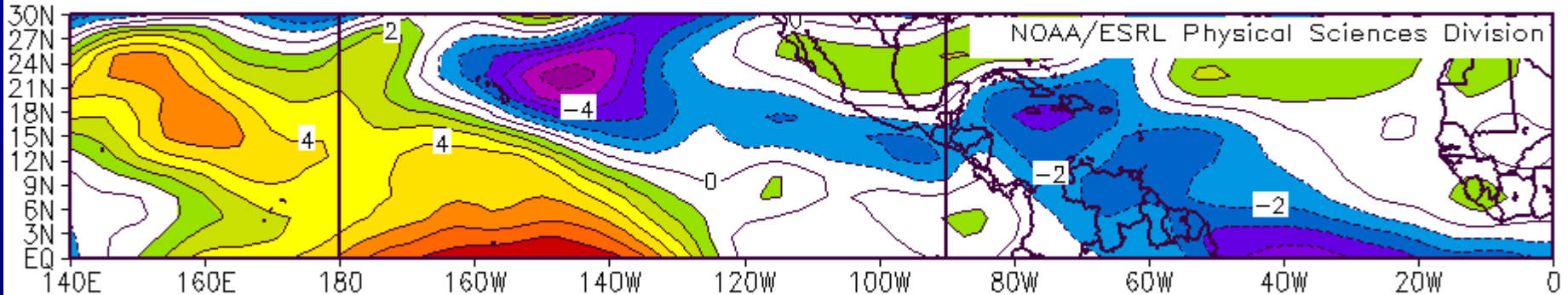
Environmental Anomalies

2010 and 2011



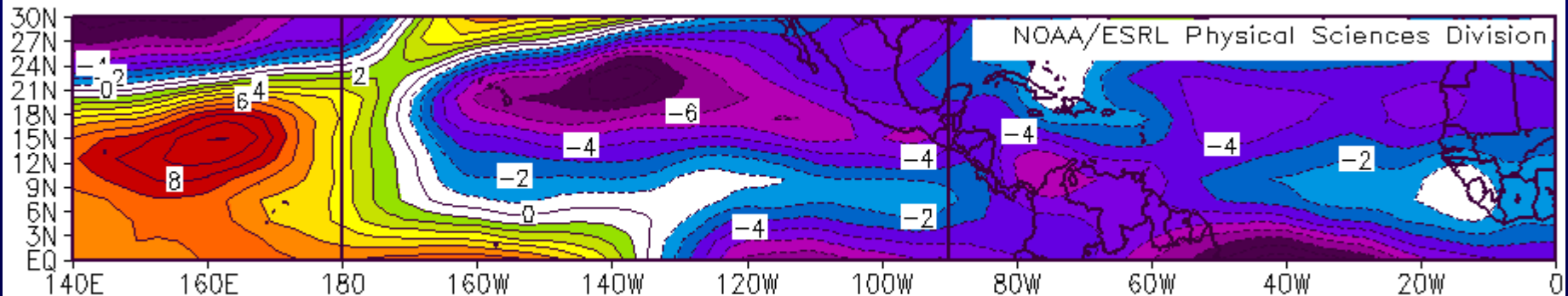
200mb u-wind anomalies

200mb Zonal wind (m/s) Composite Anomaly 1981–2010 climo

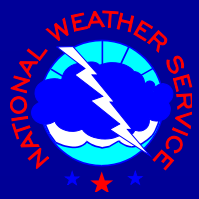


Jul to Sep 2011

200mb Zonal Wind (m/s) Composite Anomaly 1981–2010 climo



Jul to Sep 2010



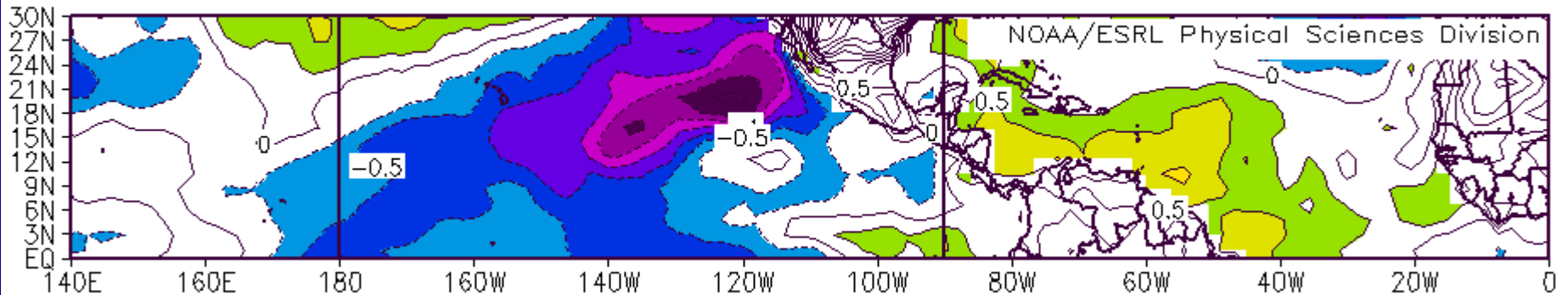
Environmental Anomalies

2010 and 2011



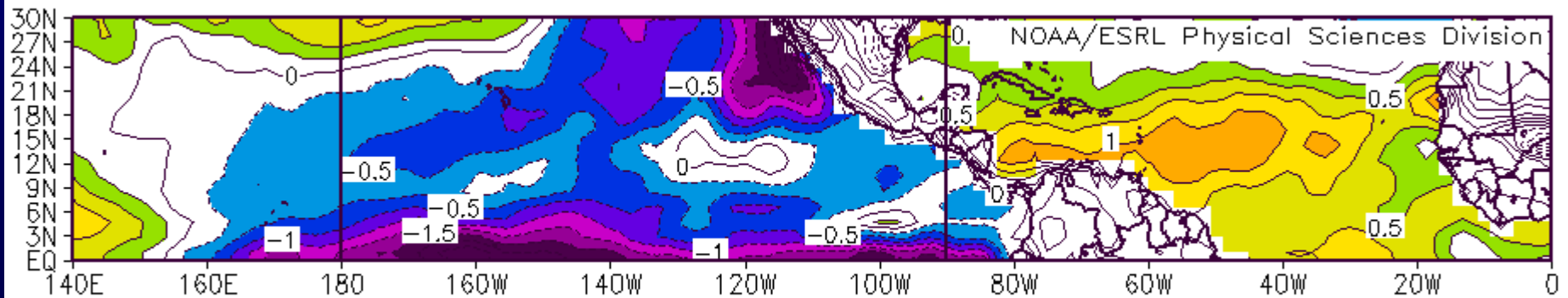
SST anomalies

Surface Skin Temperature (SST) (°C) Composite Anomaly 1981–2010 climo



Jul to Sep 2011

Surface Skin Temperature (SST) (K) Composite Anomaly 1981–2010 climo



Jul to Sep 2010

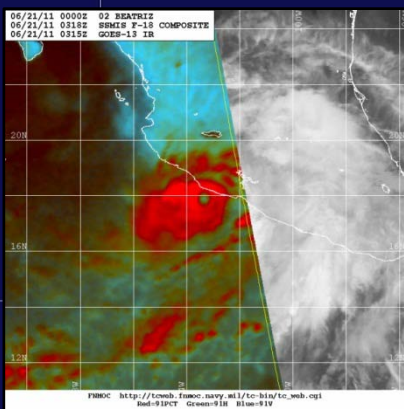
110°W

105°W

EXCERPT FROM NHC DISCUSSION

IF THE CENTER DOES NOT CROSS THE COAST...THE ATMOSPHERIC AND OCEANIC ENVIRONMENT SHOULD PERMIT SOME ADDITIONAL INTENSIFICATION. AN ALTERNATE SCENARIO...HOWEVER...IS FOR BEATRIZ TO MOVE INLAND...IN WHICH CASE CONSIDERABLE WEAKENING OVER THE MOUNTAINOUS TERRAIN OF MEXICO WOULD BE LIKELY. THE OFFICIAL WIND SPEED FORECAST PRESUMES THE FORMER SCENARIO AND IS ONLY SLIGHTLY ABOVE THE SHIPS/LGEM GUIDANCE.

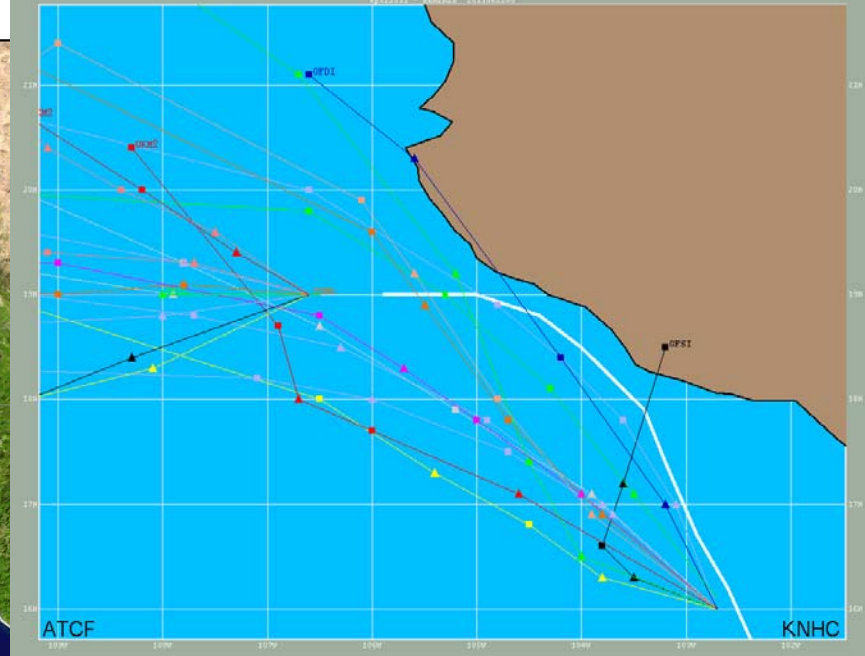
20°N



21
977 mb

20

19



Hurricane Beatriz

19-22 June 2011

90 mph

- Major Hurricane
- Hurricane
- Tropical Storm
- Tropical Dep.
- Subtropical Storm
- Subtropical Dep.
- - - Wave/Low
- + + + Extratropical
- DD Position/date at 1200 UTC
- ppp Minimum Pressure

15°N

15°N

10°N

10°N

110°W

105°W

100°W

95°W

Impacts from Beatriz in Mexico



Acapulco, Mexico
Reuters/Stringer



Acapulco, Mexico
Reuters/Stringer



AP Photo/Bernardino Hernandez



Acapulco, Mexico
Reuters/Stringer

115°W 110°W 105°W 100°W 95°W 90°W

25°N

25°N

20°N

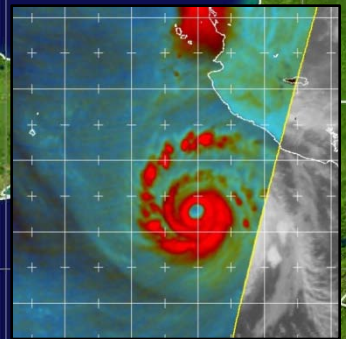
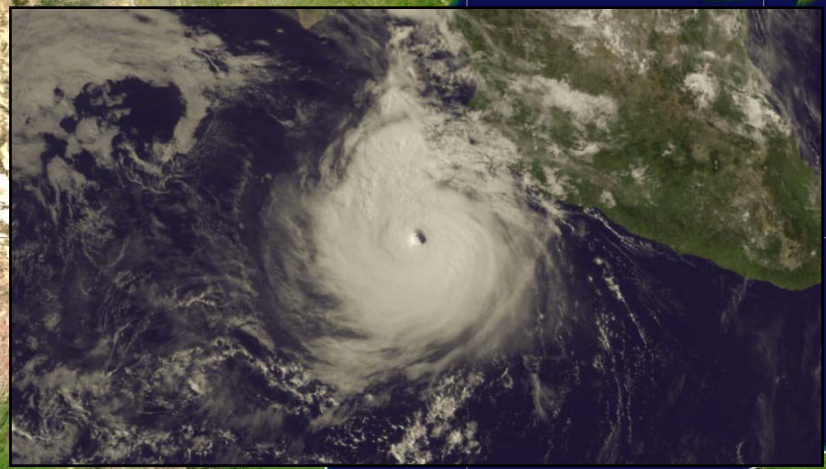
20°N

15°N

15°N

10°N

10°N



25

24

23

22

21

20

19

18

929 mb

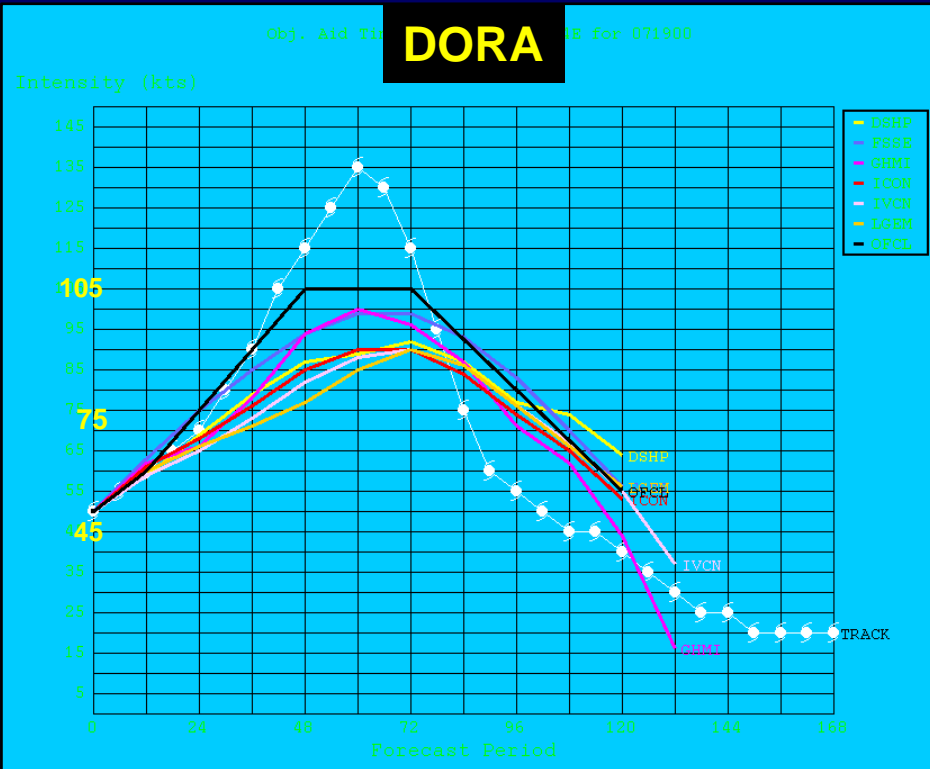


Hurricane Dora
18-24 July 2011
155 mph

- Major Hurricane
- Hurricane
- Tropical Storm
- Tropical Dep.
- Subtropical Storm
- Subtropical Dep.
- - - Wave/Low
- +++ Extratropical
- Position/date at 1200 UTC
- ppp Minimum Pressure

115°W 110°W 105°W 100°W 95°W 90°W

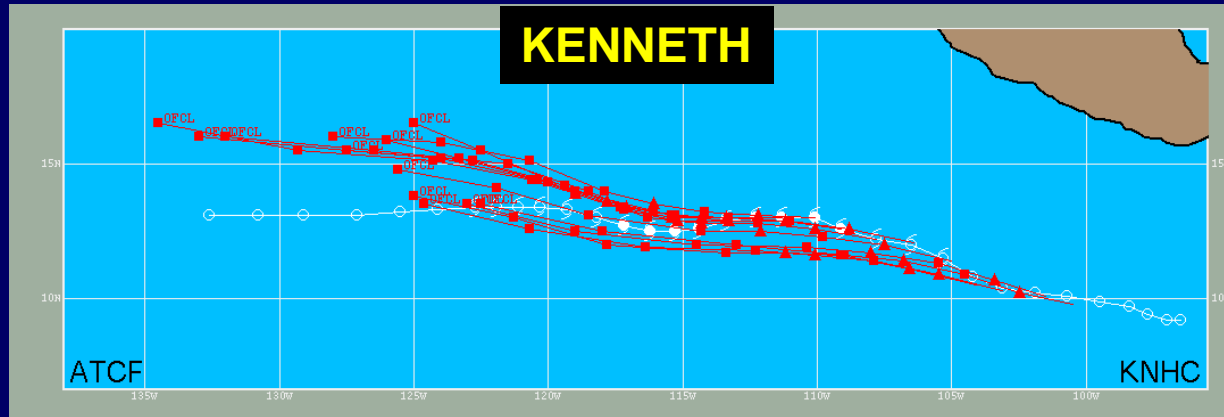
Here We Go Again...



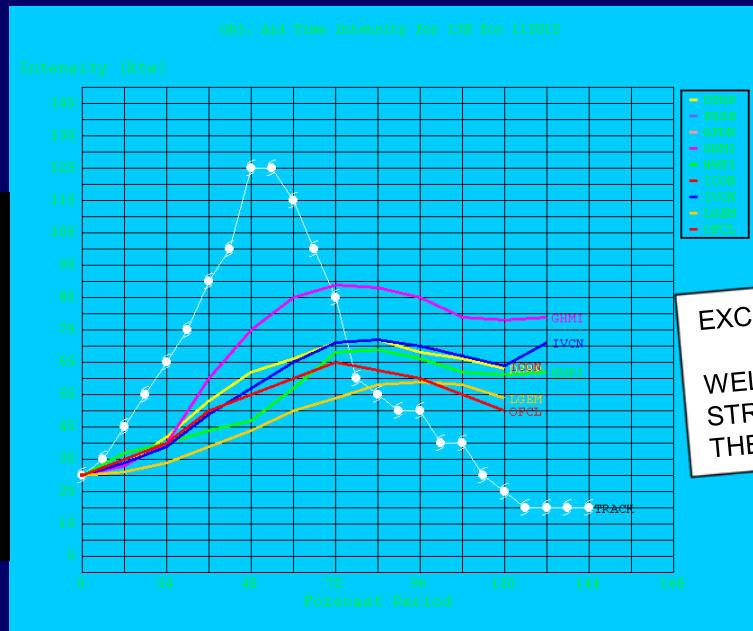
Challenges with intensity forecasts

Track errors for Dora were some of the lowest on record (e.g., 60 n mi error on day 5)

Same ol' story...



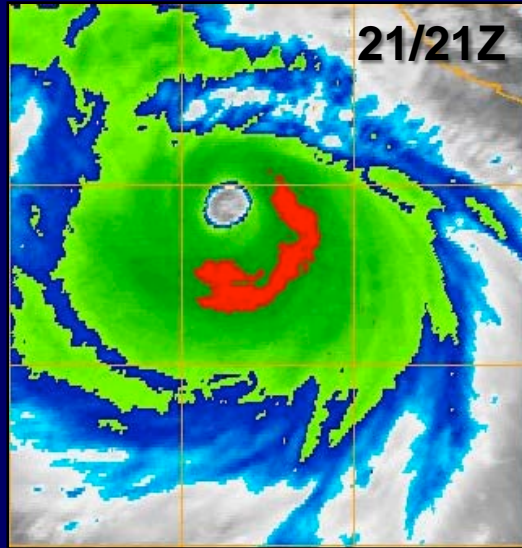
More than half the systems this year experienced a period of rapid intensification or weakening



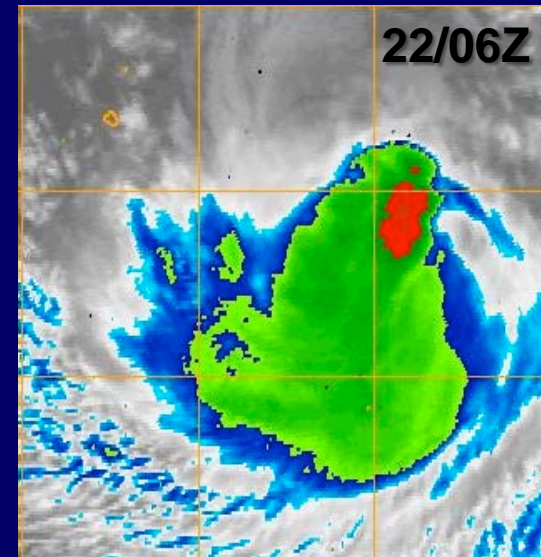
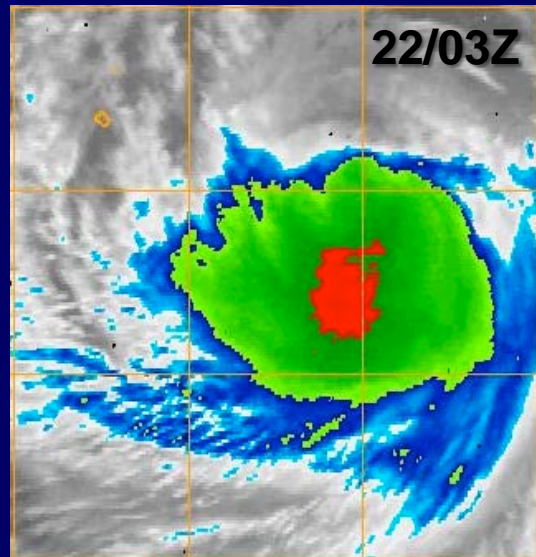
EXCERPT FROM NHC DISCUSSION

WELL...SO MUCH FOR THE SLOW STRENGTHENING THAT WAS FORECAST IN THE PREVIOUS ADVISORY.

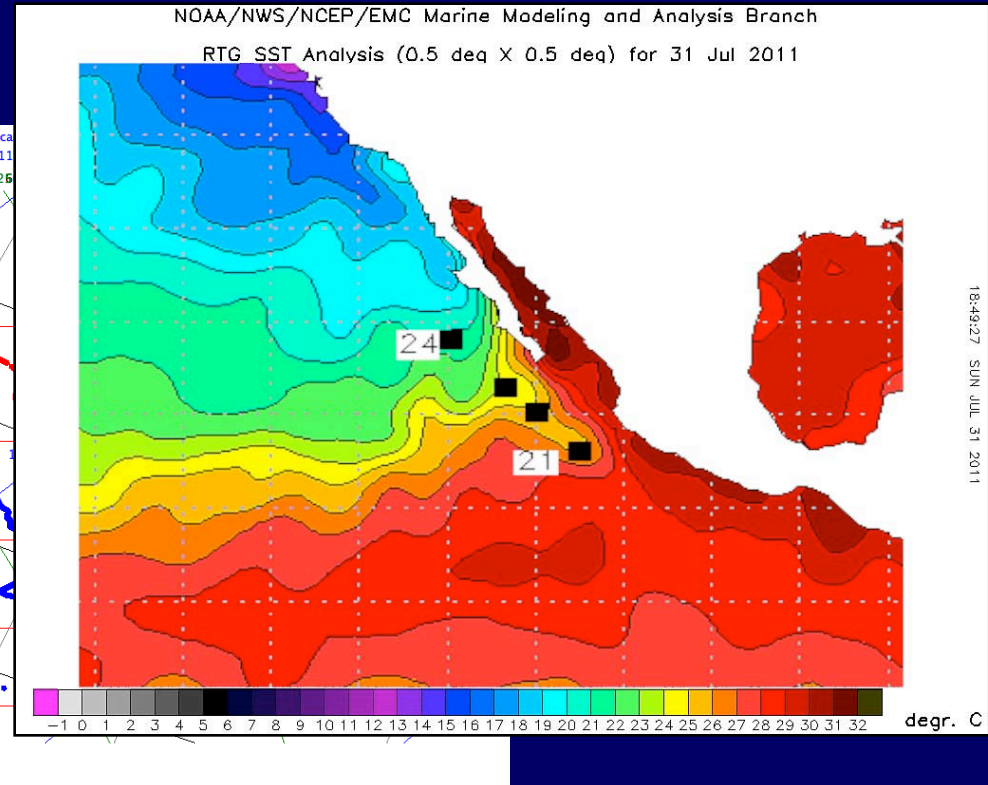
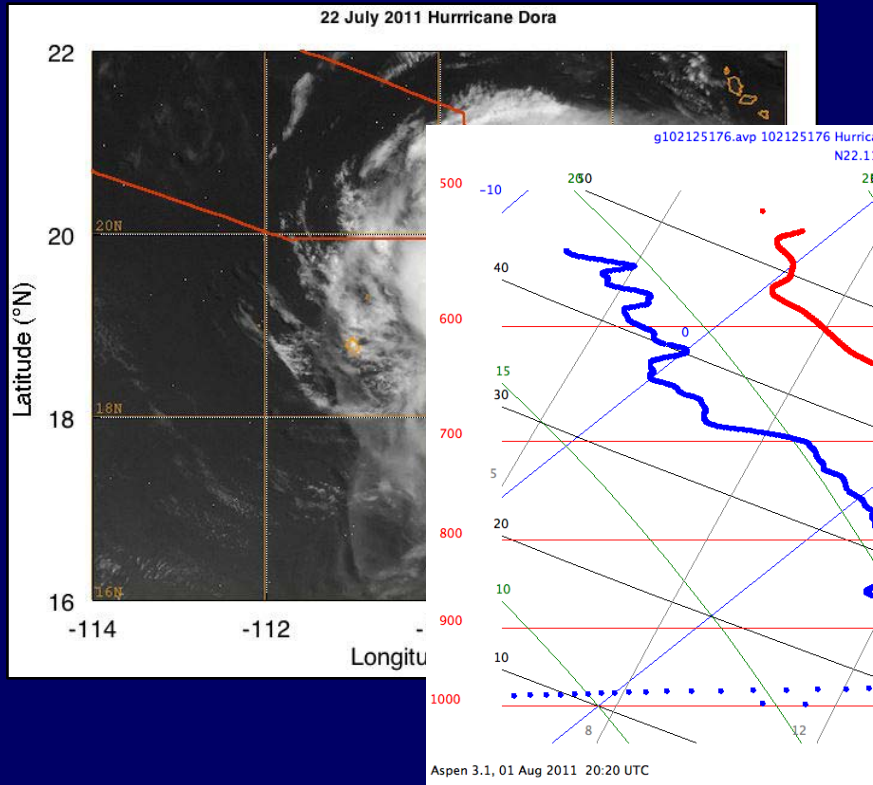
A vivid example of Rapid Weakening



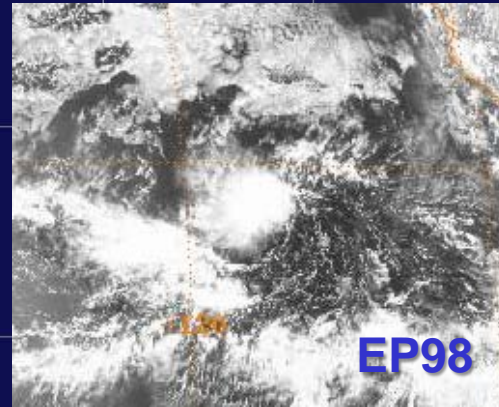
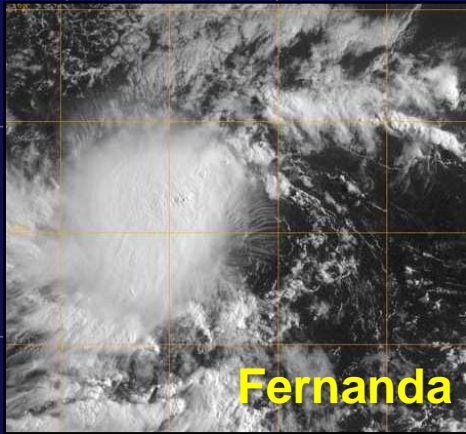
From 130 to 60 kt in 24 hours



Special HRD Flights into Dora



- HRD flew 3 missions as part of an EPAC Decay Experiment 7/22-24
- Captured decay of Dora from weak hurricane to a remnant low with three consecutive daily P3 flights
- Unique data set to study decoupling of a tropical cyclone moving over progressively cooler waters

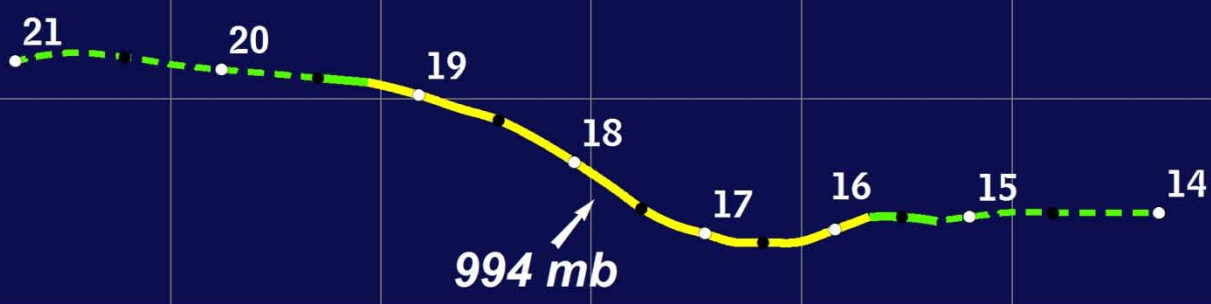


and

**Invest system 2 weeks before
Fernanda**



35°N
30°N
25°N
20°N
15°N
10°N
5°N

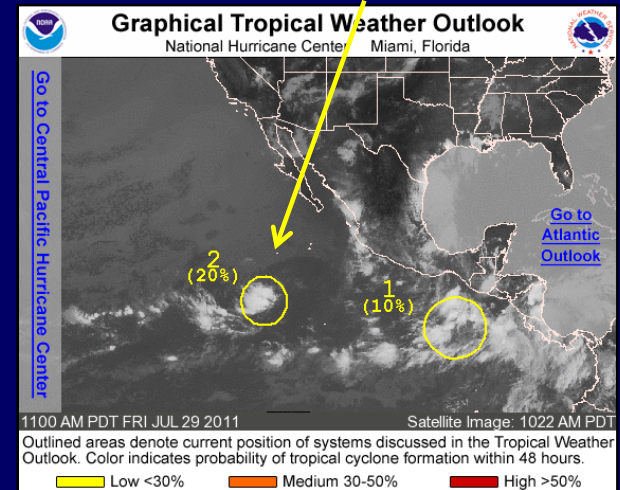
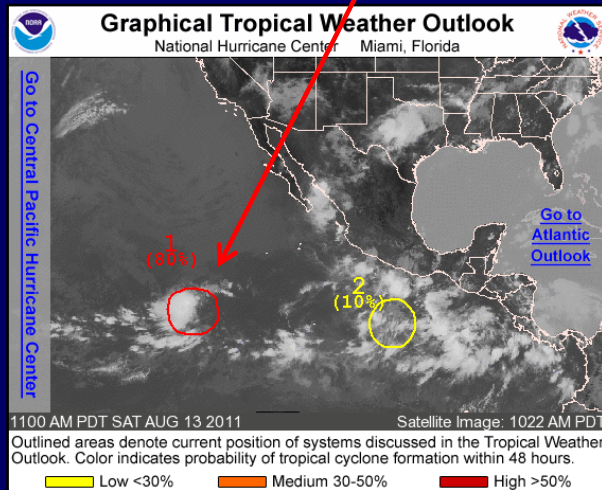
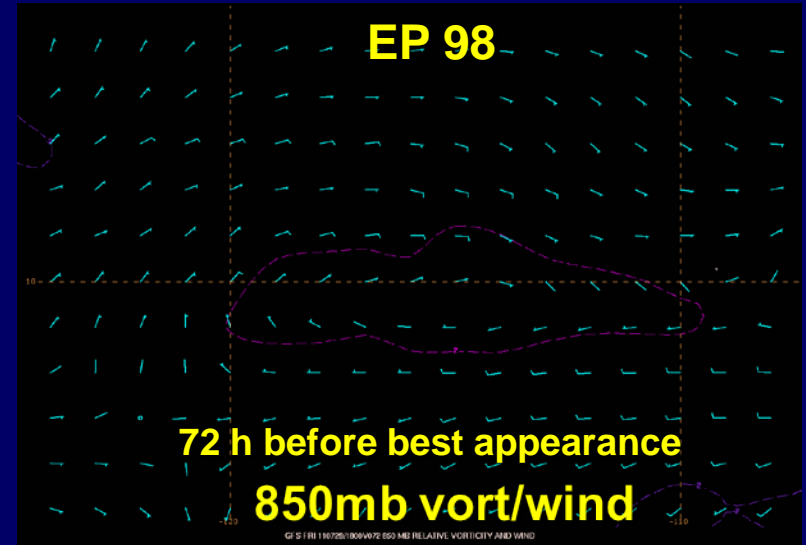
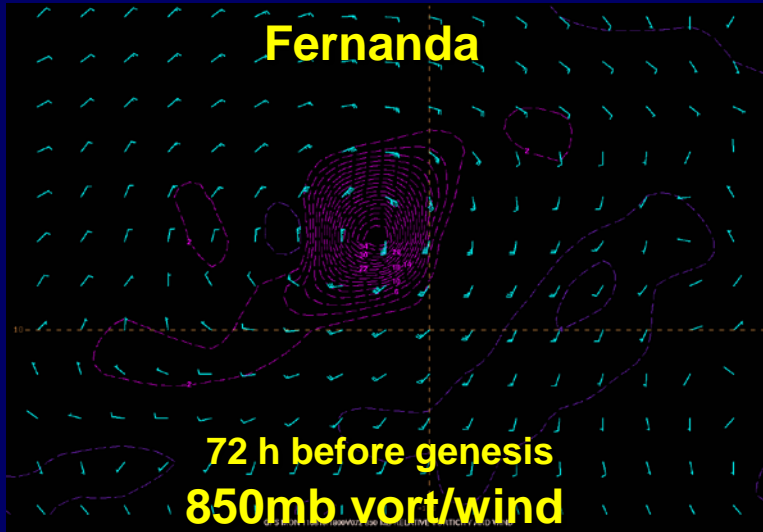


T.S Fernanda
15-19 August 2011
70 mph

- Major Hurricane
- Hurricane
- Tropical Storm
- Tropical Dep.
- Subtropical Storm
- Subtropical Dep.
- - - Wave/Low
- + + + Extratropical

○ DD Position/date at 1200 UTC
 ppp Minimum Pressure

A Tale of Two Different Geneses



- Two Similar disturbances and environments
- Dynamical guidance crucial for distinguishing between candidate disturbances

130°W 125°W 120°W 115°W 110°W 105°W 100°W 95°W 90°W 85°W

35°N

30°N

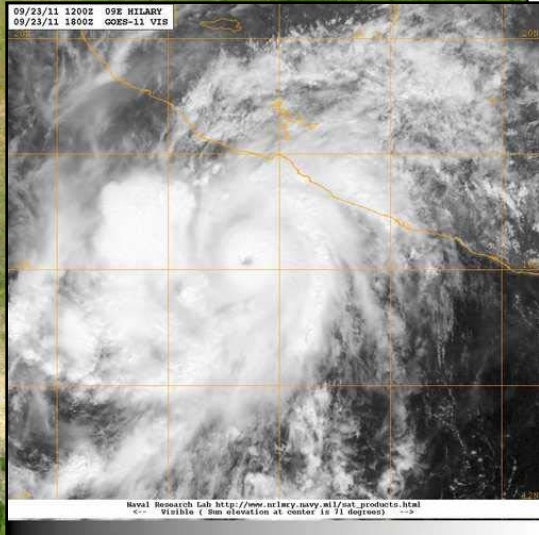
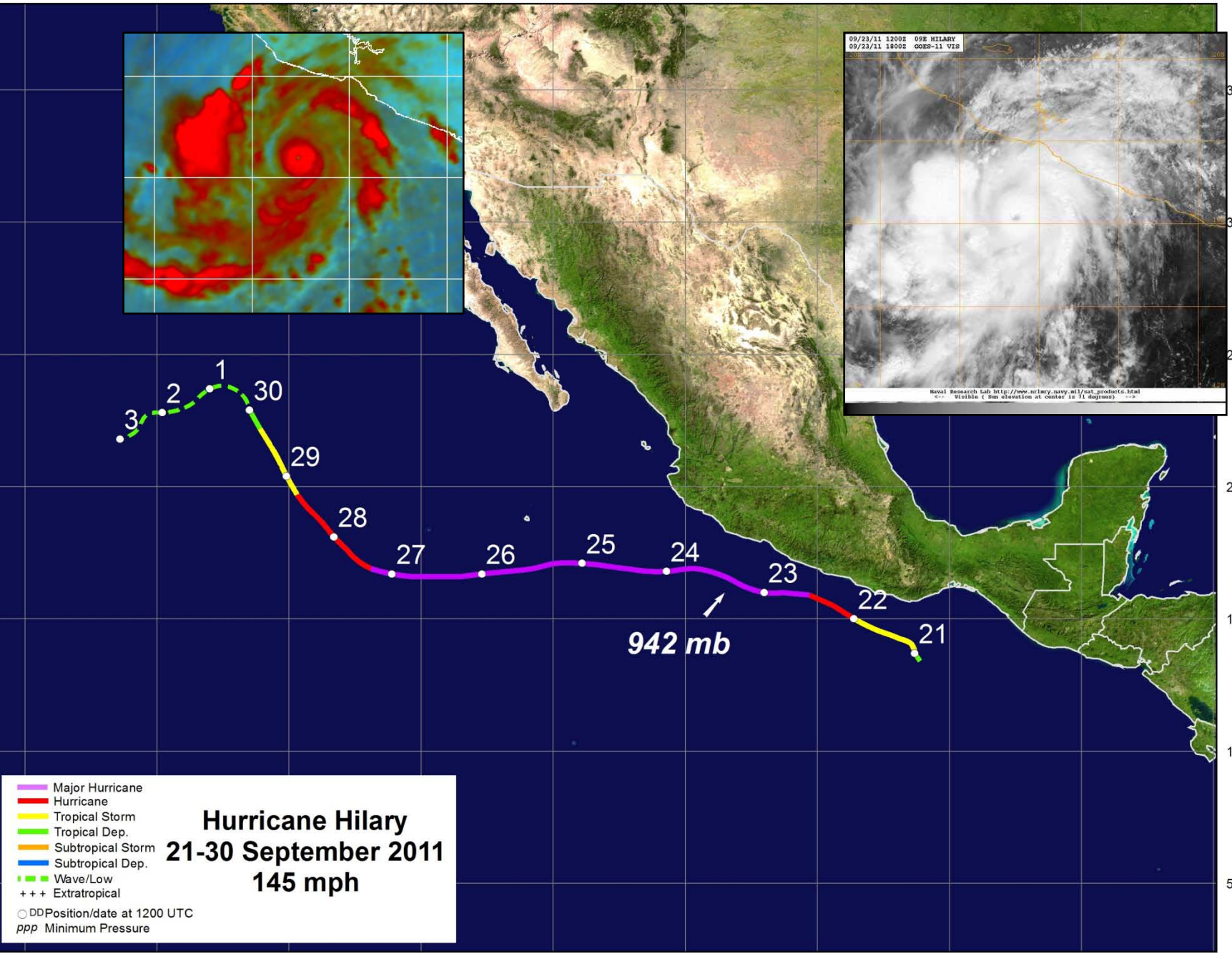
25°N

20°N

15°N

10°N

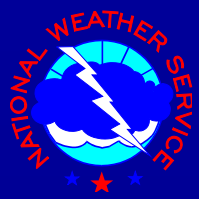
5°N



Hurricane Hilary
21-30 September 2011
145 mph

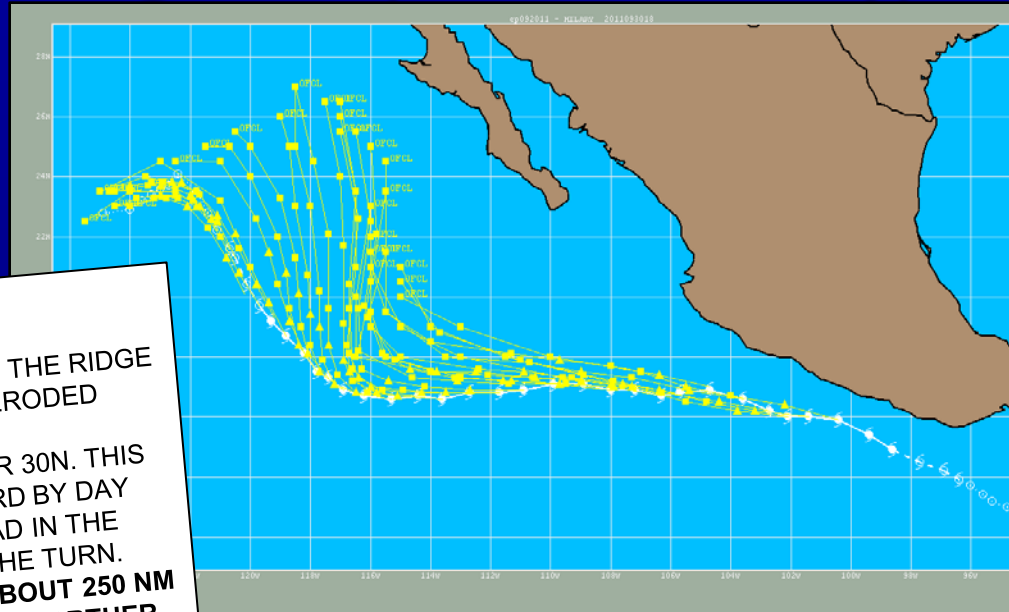
- Major Hurricane
- Hurricane
- Tropical Storm
- Tropical Dep.
- Subtropical Storm
- Subtropical Dep.
- - - Wave/Low
- +++ Extratropical
- DD Position/date at 1200 UTC
- ppp Minimum Pressure

130°W 125°W 120°W 115°W 110°W 105°W 100°W 95°W 90°W 85°W

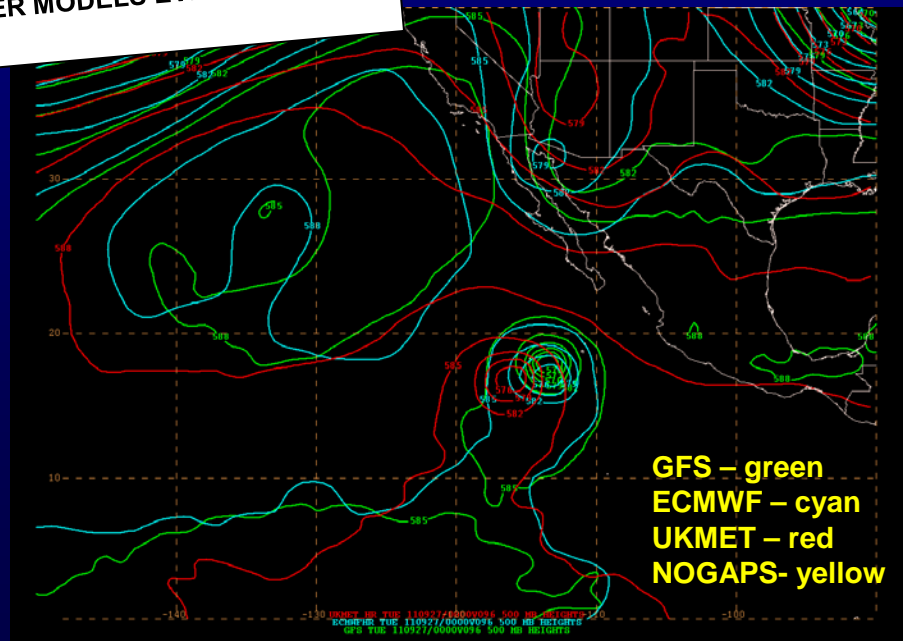


Go West, Young Man (I mean, Hilary) !

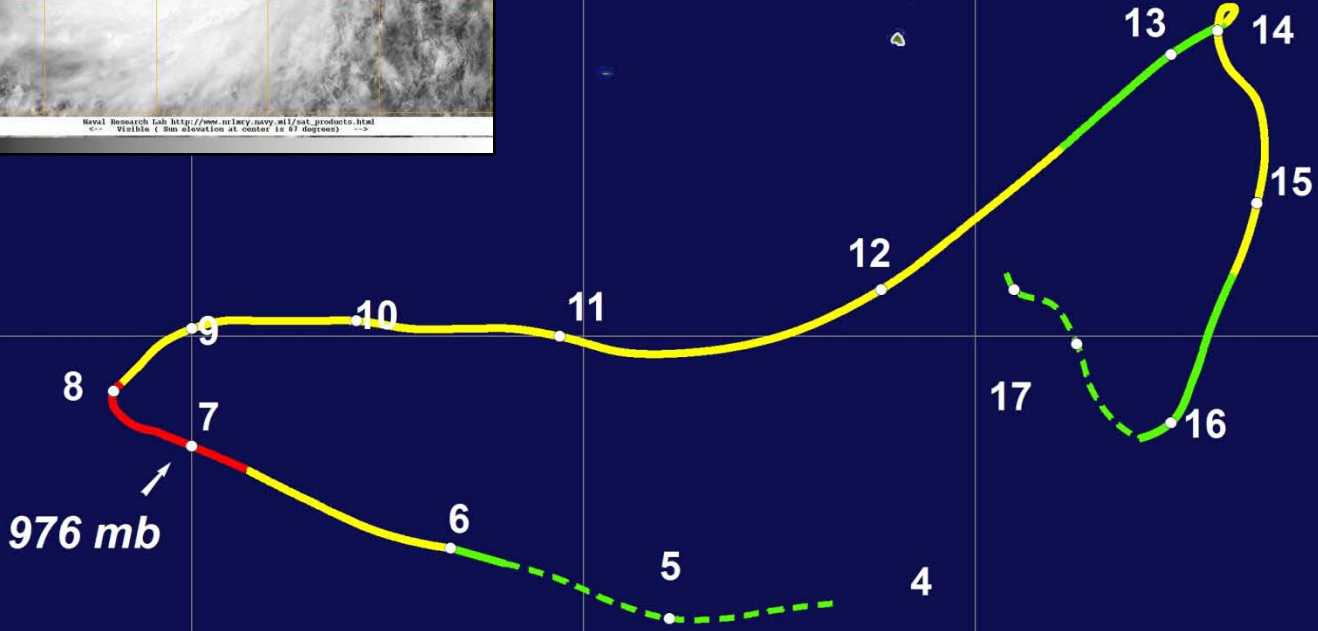
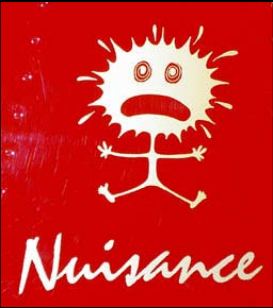
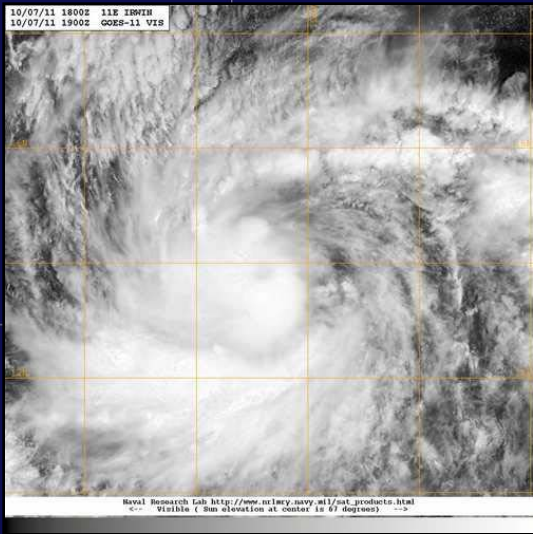
Track adjusted westward each forecast cycle but not enough



EXCERPT FROM NHC DISCUSSION
IN ABOUT 3 DAYS THE GLOBAL MODELS SHOW THE RIDGE NORTH OF HILARY BREAKING DOWN AS IT IS ERODED FROM THE EAST AND THE WEST BY A PAIR OF MID/UPPER-LEVEL LOWS THAT DEVELOP NEAR 30N. THIS SHOULD ALLOW HILARY TO TURN NORTHWARD BY DAY 5...BUT THE GUIDANCE SHOWS LARGE SPREAD IN THE DETAILS OF THE TIMING AND LOCATION OF THE TURN. FOR EXAMPLE...THE GFS AND ECMWF ARE ABOUT 250 NM APART AT DAY 5...WITH OTHER MODELS EVEN FARTHER APART THAN THAT.



A variety of model solutions regarding interaction of upper-level low and Hilary

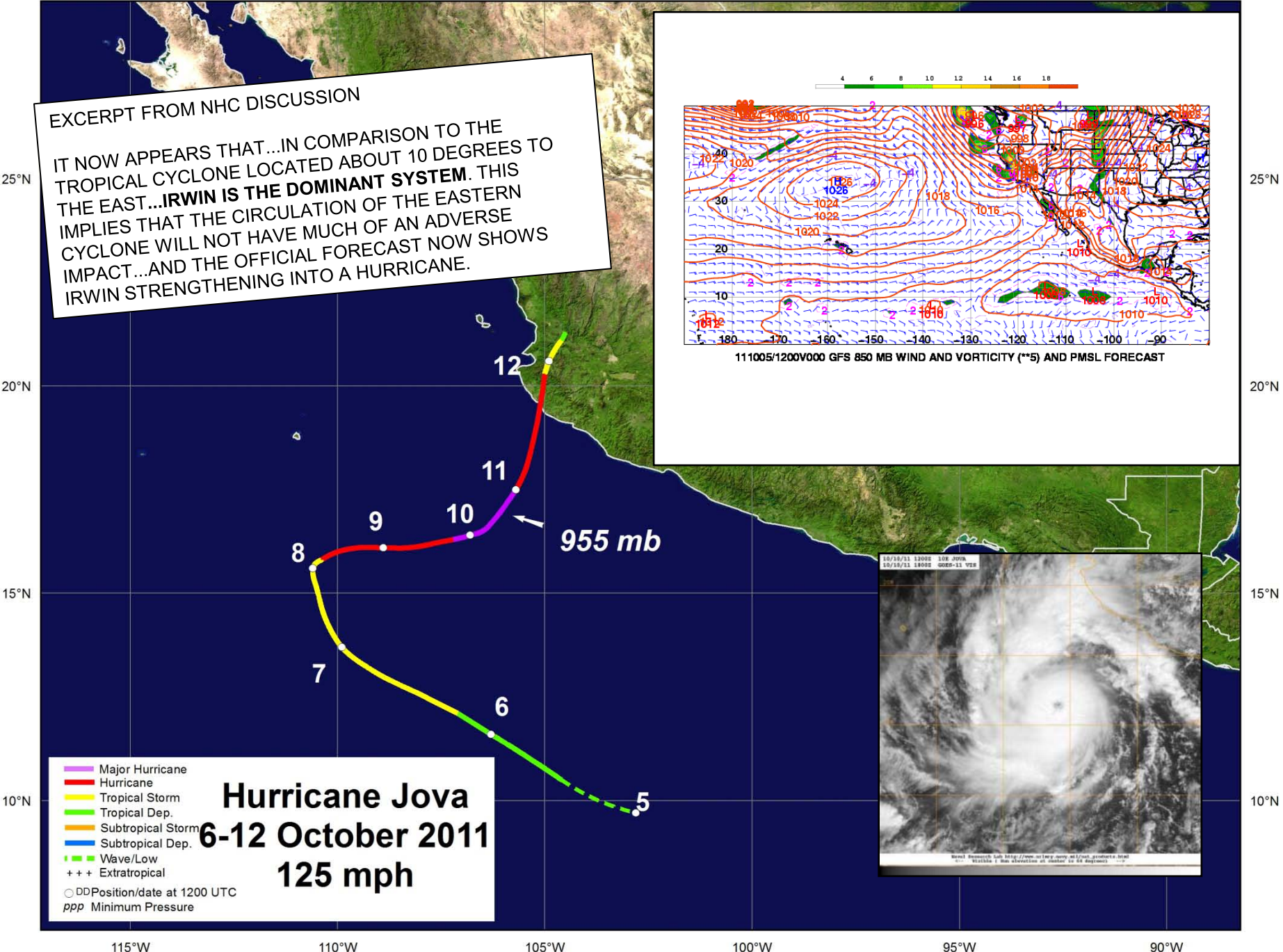
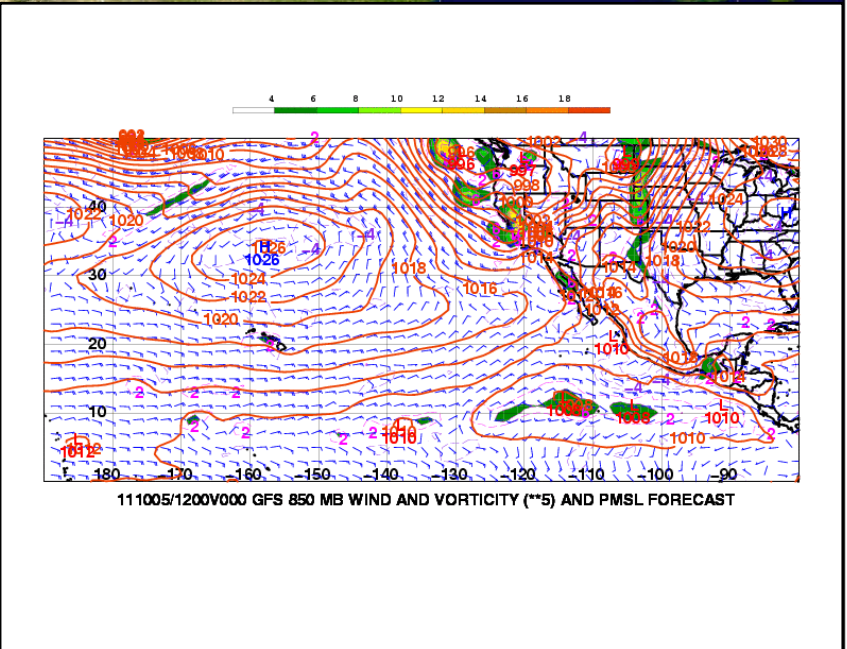


— Major Hurricane
— Hurricane
— Tropical Storm
— Tropical Dep.
— Subtropical Storm
— Subtropical Dep.
- - - Wave/Low
+ + + Extratropical
○ DDPosition/date at 1200 UTC
ppp Minimum Pressure

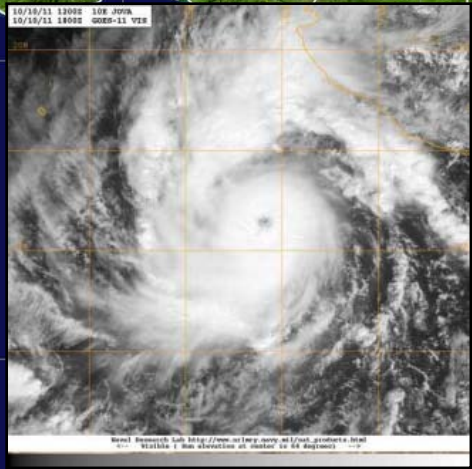
Hurricane Irwin
6-16 October 2011
100 mph

EXCERPT FROM NHC DISCUSSION

IT NOW APPEARS THAT...IN COMPARISON TO THE TROPICAL CYCLONE LOCATED ABOUT 10 DEGREES TO THE EAST...**IRWIN IS THE DOMINANT SYSTEM**. THIS IMPLIES THAT THE CIRCULATION OF THE EASTERN CYCLONE WILL NOT HAVE MUCH OF AN ADVERSE IMPACT...AND THE OFFICIAL FORECAST NOW SHOWS IRWIN STRENGTHENING INTO A HURRICANE.



- Major Hurricane
- Hurricane
- Tropical Storm
- Tropical Dep.
- Subtropical Storm
- Subtropical Dep.
- Wave/Low
- +++ Extratropical
- DD Position/date at 1200 UTC
- ppp Minimum Pressure



Impacts from Jova in Mexico



Acknowledgements

- **HSU unit (John Cangialosi and Mike Brennan for technical assistance and Dan Brown for useful insights)**
- **Mike Black at HRD for summary slides on Dora flights**

