2012 Hurricane Season Overview

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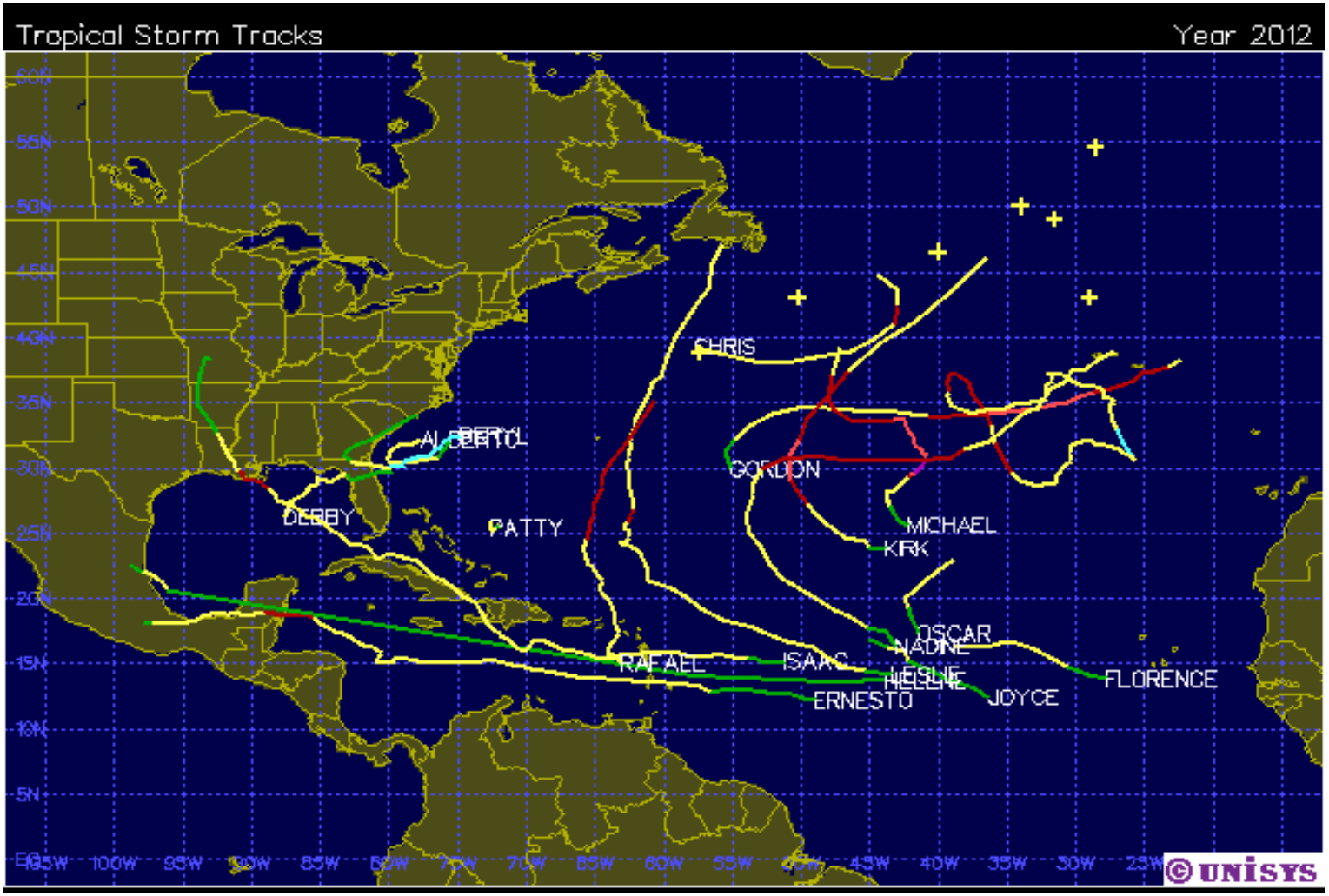
37th Climate Diagnostics and Prediction Workshop

October 22, 2012

Overview outline

1. Current status for the Atlantic, Eastern Pacific basins
2. NOAA hurricane season outlooks
3. Climate factors influencing this season
4. Summary

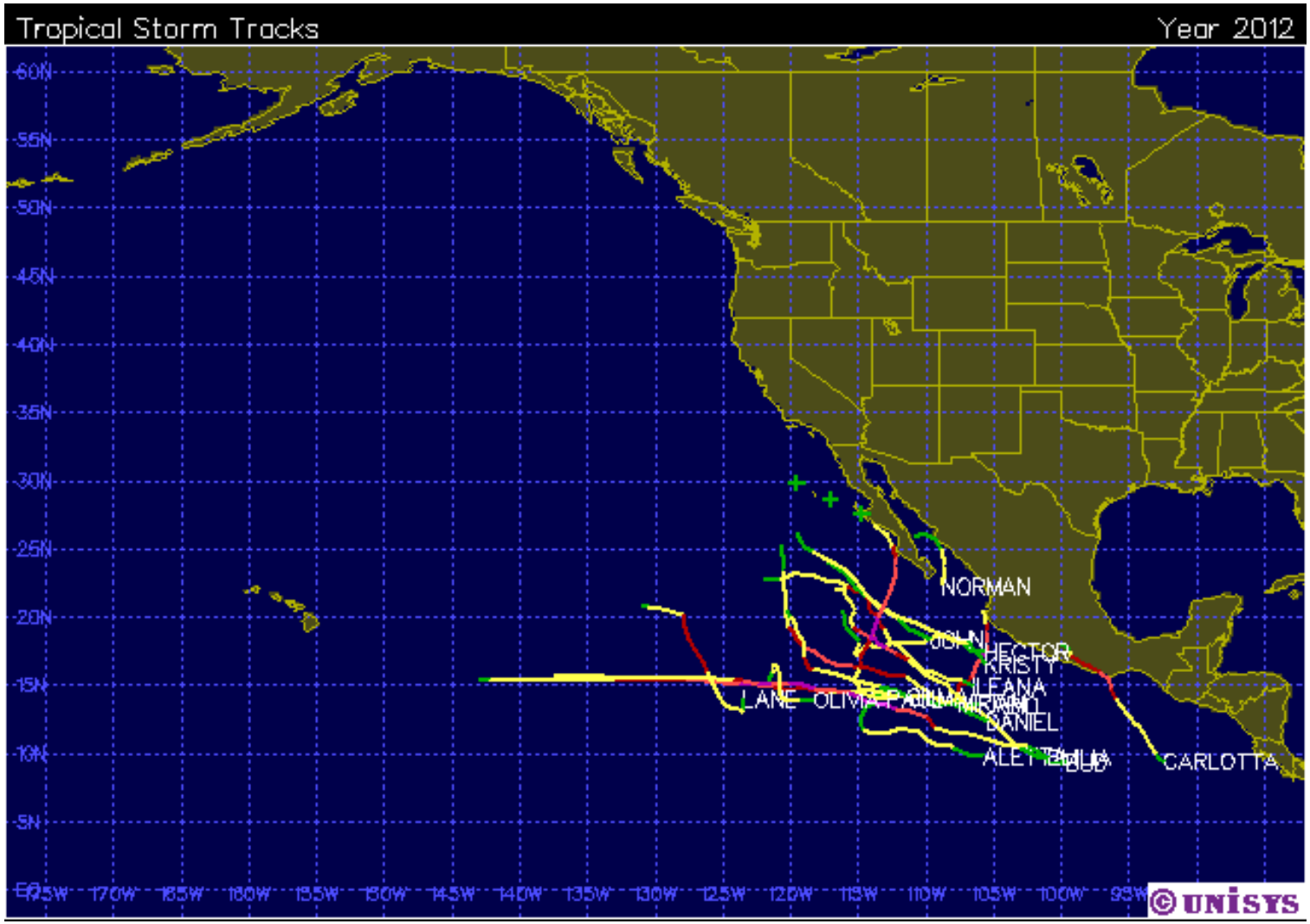
Atlantic TC Tracks During 2012



As of Oct. 19, 2012, 17 named storms, 9 formed in the MDR, 1 in GOM and 7 over the subtropical Atlantic Ocean.

Figure Courtesy of Unisys Weather

Eastern Pacific Basin TC Tracks during 2012



16 named storms as of Oct. 19, 2012

NOAA 2012 Atlantic Hurricane Season Outlooks

Season and Activity Type	August Update	May Outlook	Observed
Chance Above Normal	35%	25%	
Chance Near Normal	50%	50%	
Chance Below Normal	15%	25%	
Named Storms (NS)	12-17	9-15	17
Hurricanes (H)	5-8	4-8	9
Major Hurricanes (MH)	2-3	1-3	1
ACE (% Median)	75%-135%	65%-140%	123%

NOAA's Seasonal Hurricane Outlook is a general guide to the expected overall strength of the hurricane season. It is not a seasonal hurricane landfall forecast, and does not imply levels of activity for any particular region.

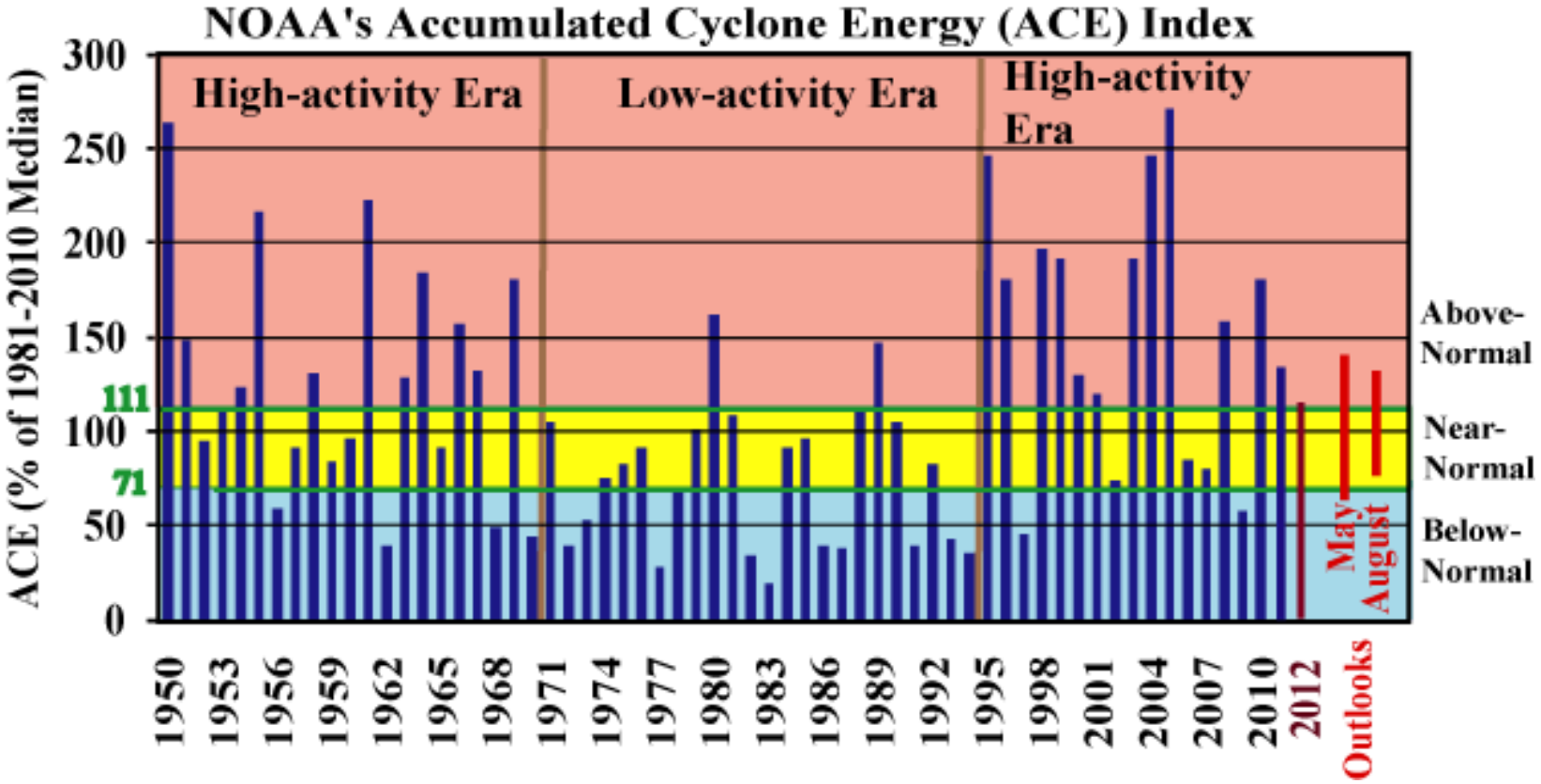
The predicted ranges of NS, H, MH, and ACE reflect a 70% probability of occurrence.

NOAA 2012 East Pacific Hurricane Outlook

Season and Activity Type	2012 Outlook	Normals	Observed
Chance Above Normal	20%		
Chance Near Normal	50%		
Chance Below Normal	30%		
Tropical Storms	12-18	15-16	16
Hurricanes	5-9	9	10
Major Hurricanes	2-5	4-5	5
ACE (% Median)	70%-130%	100%	

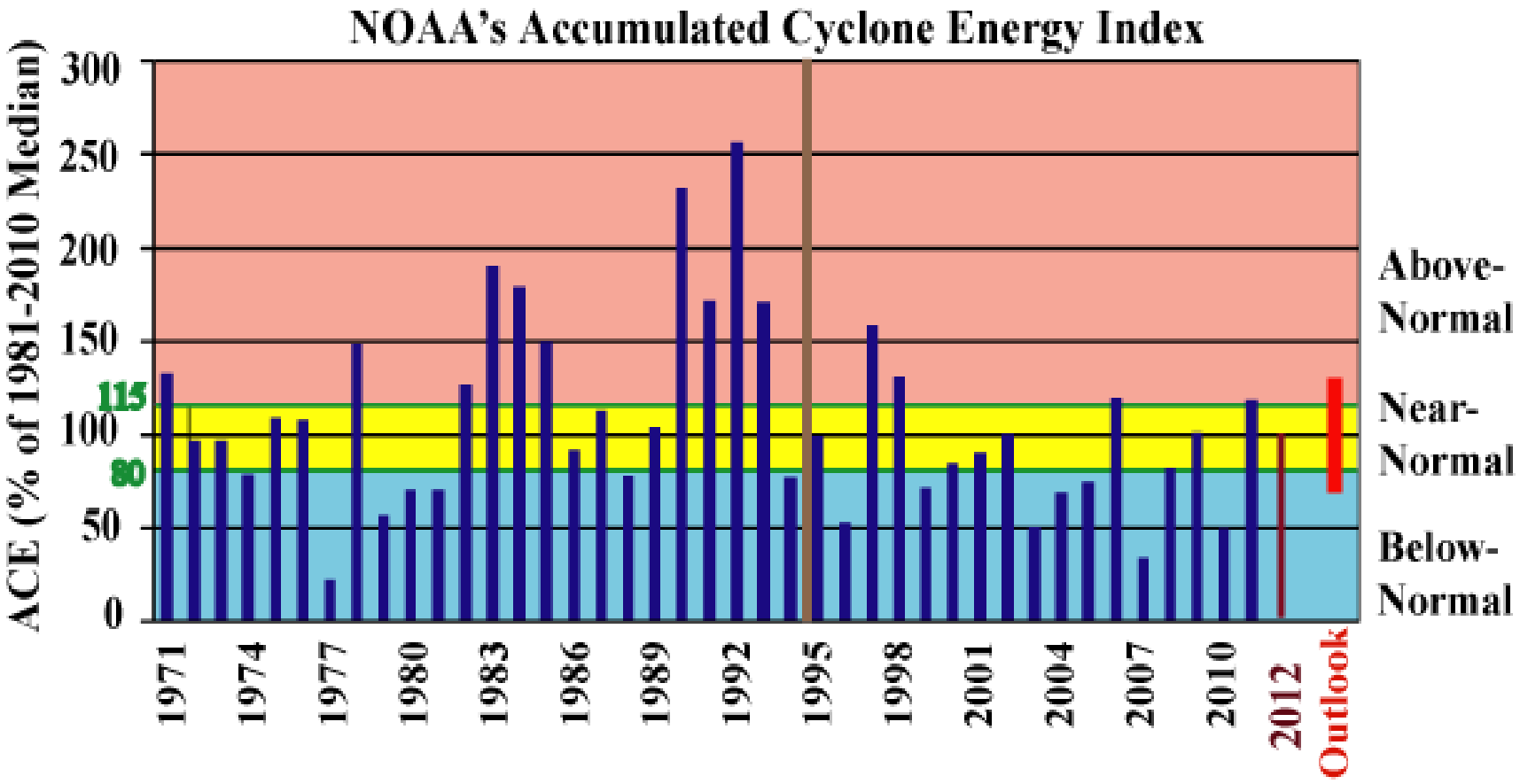
Based on past seasons with similar climate conditions, we estimate a 70% probability for each range. Historically, roughly two-thirds of similar seasons had activity in these ranges.

NOAA 2012 Atlantic Outlooks in a Historical Perspective



To date, the 2012 Atlantic Basin ACE value is 123% of the median. The 2012 activity is consistent with ongoing climate patterns that suggest the current the high-activity era for Atlantic hurricanes continues.

NOAA 2012 Eastern Pacific Hurricane Outlook in a Historical Perspective



To date, the 2012 Eastern Pacific ACE value is 100% of the median. This values is nearly centered on NOAA predicted 70% probability range (Red).

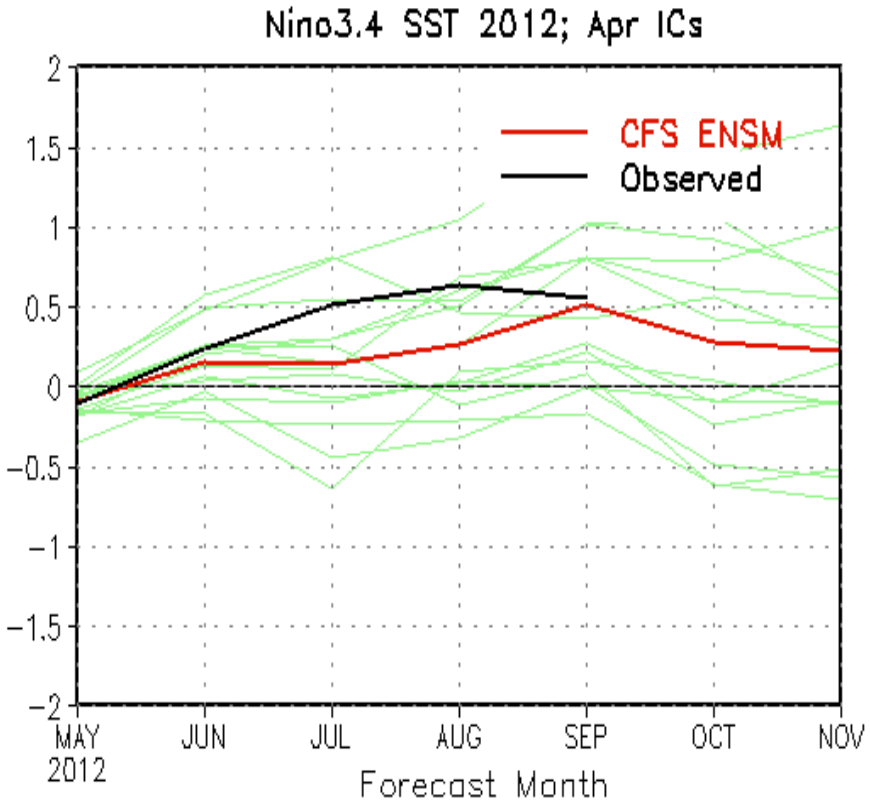
Model Summary: NOAA August 2012 Atlantic Outlook

Predicted range (± 1 σ) and mean (in parenthesis)

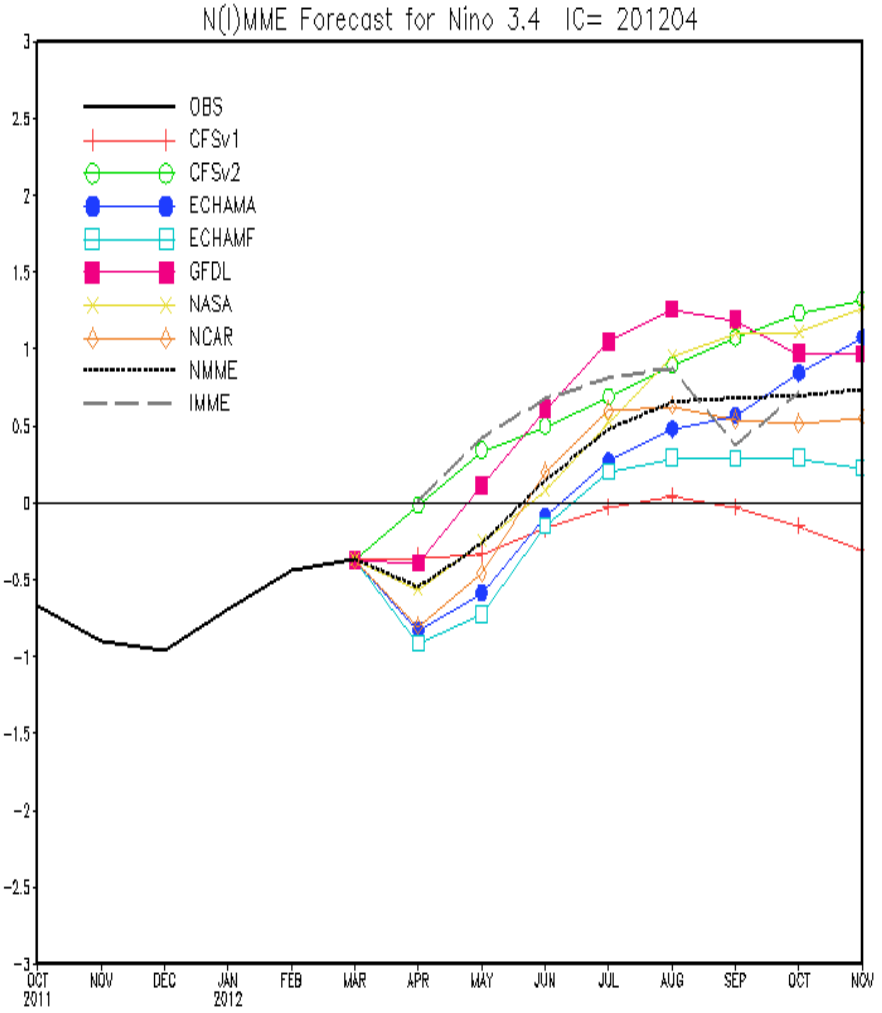
Model	Named Storms	Hurricanes	Major Hurricanes	ACE (% Median)
CPC Regression:	11-13.7 (12.4)	5.2-7 (6.1)	2.2-3.1 (2.7)	91-131 (111)
CPC Binning : Nino 3.4+SSTA	9.2-16.3 (12.8)	2.9-9.4 (6.2)	1.7-4.6 (3.2)	70-156 (113)
CPC Binning ENSO+SSTA	7.9-14.9 (11.4)	2.5-8.9 (5.7)	1.2-4.2 (2.7)	56-149 (103)
CFS: Hi-Res T-382 (bias corrected)	11.3-14.9 (13.1)	4.2-7.8 (6)		54-113 (84)
CFS T62 Hybrid: 1	11-13 (12)	5-7 (6)	3-3 (3)	93-130 (112)
CFS T62 Hybrid: 2	11-13 (12)	6-7 (6.5)	3-4 (3.5)	103-141 (122)
CFS T62 Hybrid: 3	11-13 (12)	5-7 (6)	3-4 (3.5)	101-140 (121)
GFDL CFS.V1 Regress		2-6 (4)		
GFDL: HiRam		(6.8)		
ECMWF:	10.4-16.2 (13.3)	4.3-9.1 (6.7)		70-140 (105)
EUROSIP:	10.6-17 (13.8)			
UKMET	9.5-12.5 (11)	3-5 (4)	1-3 (2)	50-80 (65)
Guidance Means	**10.3-14.5 (12.4)**	**4-7.4 (5.7)**	**2.2-3.7 (3)**	**76-124 (100)**
NOAA August Update	**12-17**	**5-8**	**2-3**	**75-135**
NOAA May Outlook	**9-15**	**4-8**	**1-3**	**65-140**

Forecast Nino 3.4 SSTA; 201204 IC

T382 CFS

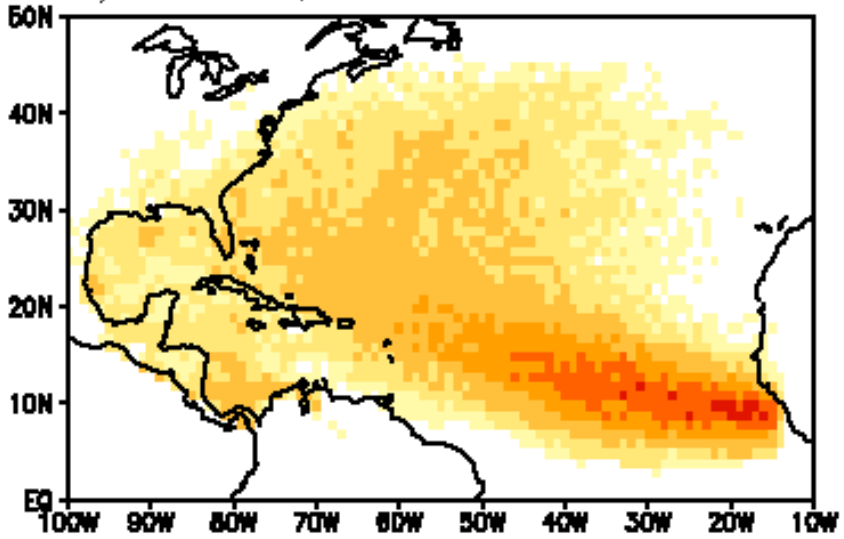


N(I)MME

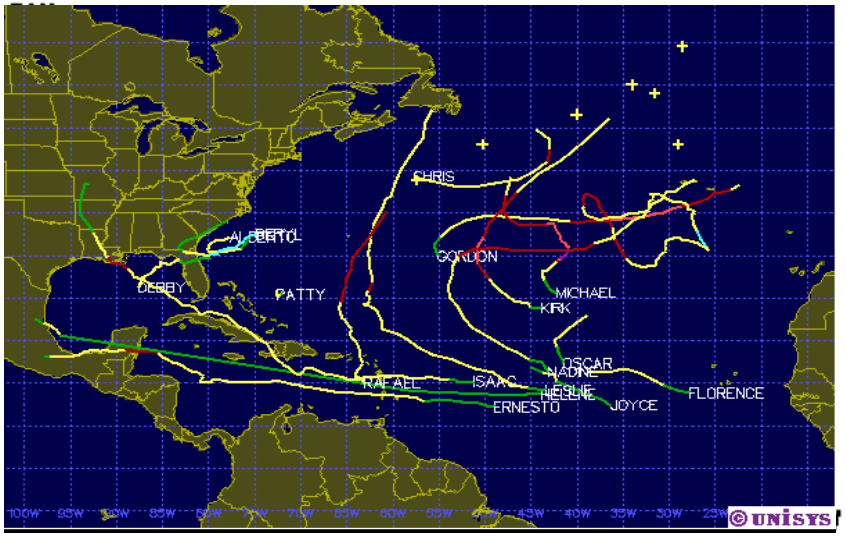


Atlantic Storm Track Density Distribution

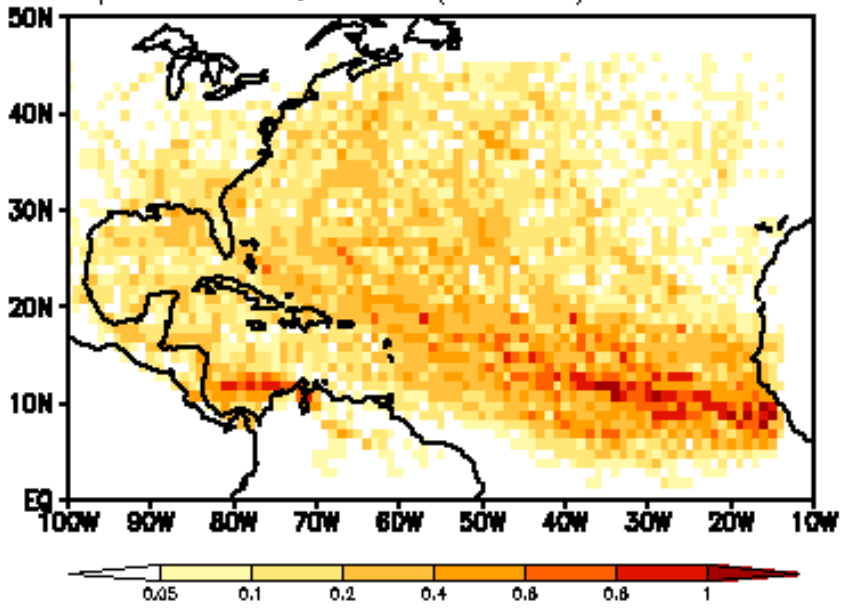
a) CFS T382, 1981–2008 Clim



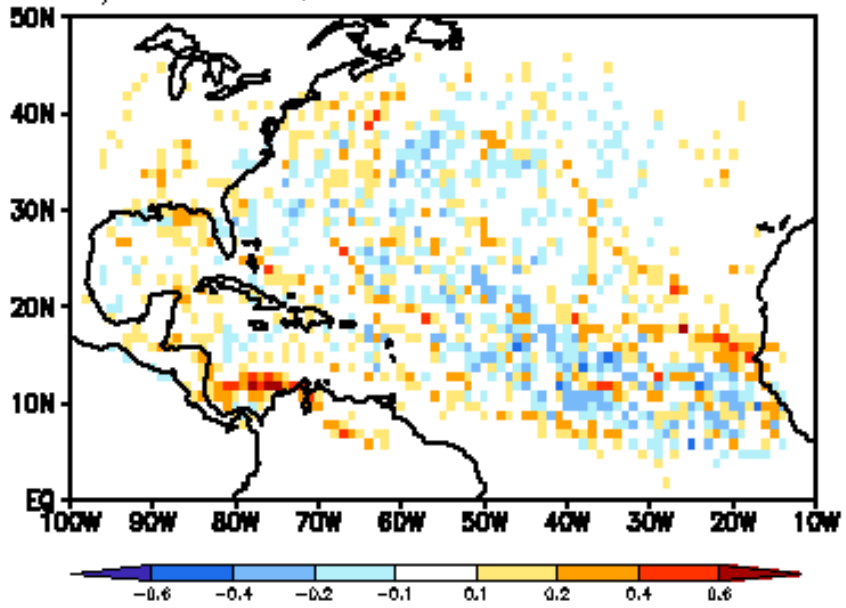
2012 tracks



c) CFS T382, 2012 (17mem)



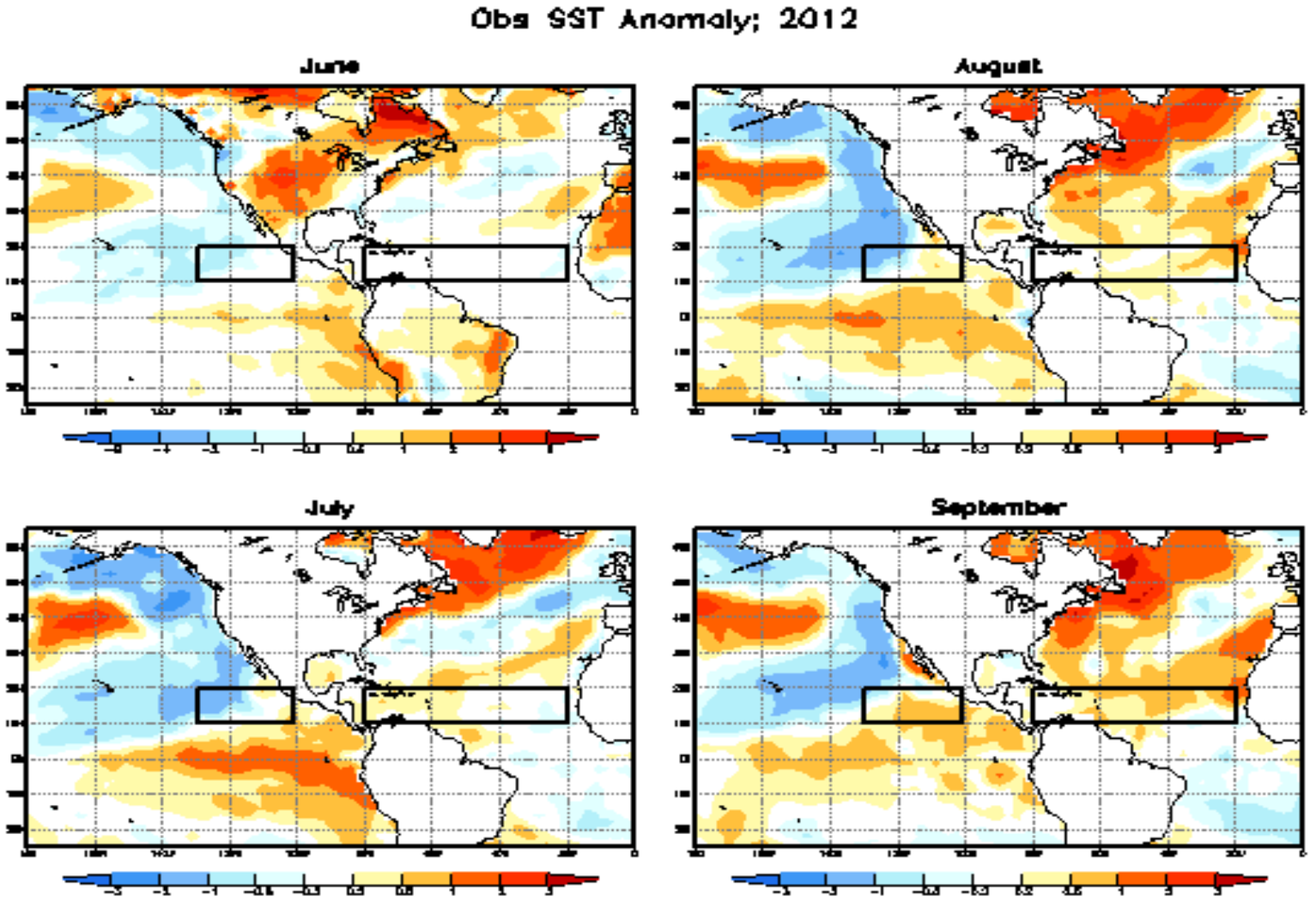
d) CFS T382, 2012–Clim



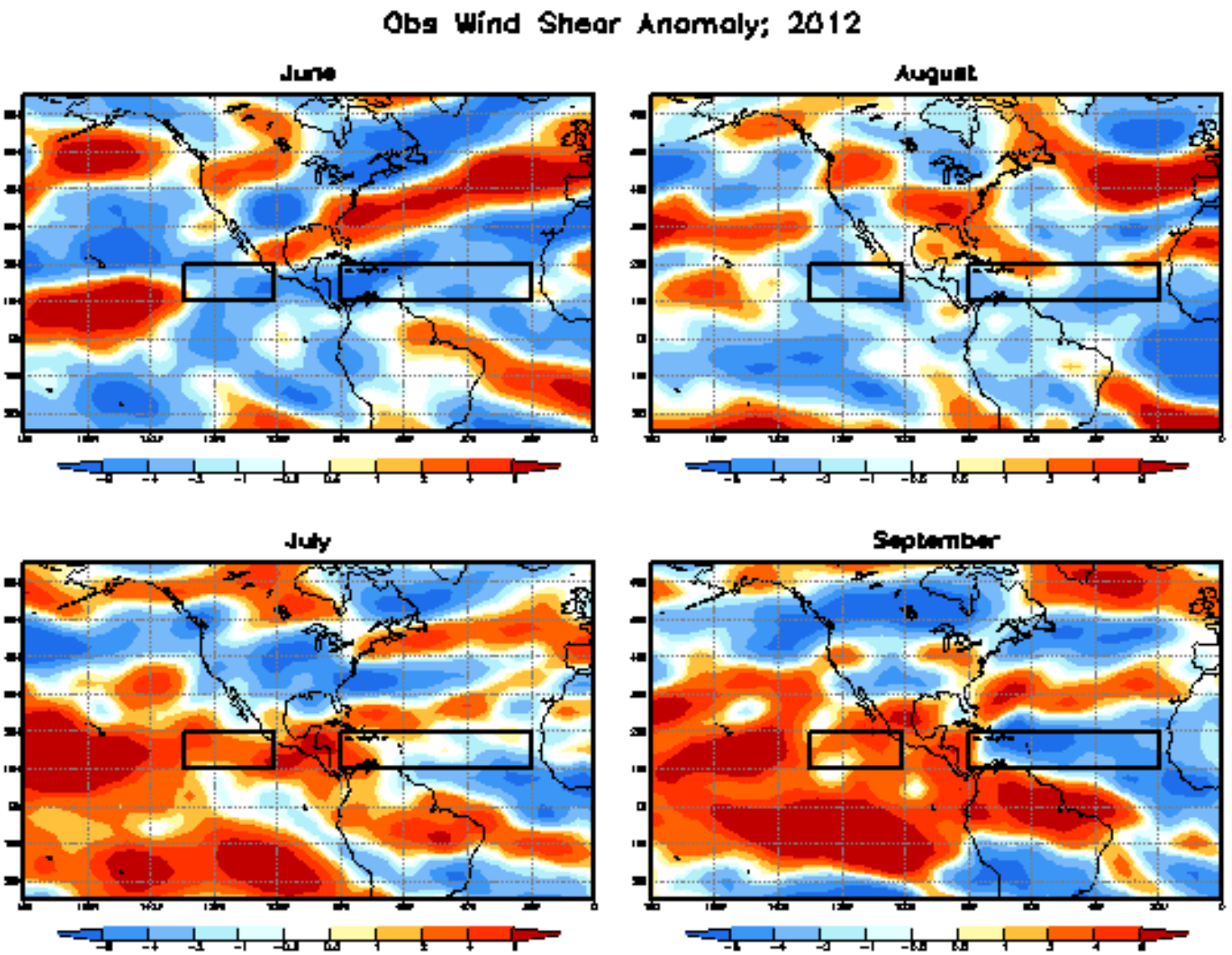
Climate Factors Influencing the 2012 Hurricane Season

- **Near neutral/weak El Nino condition during the season**
- **Strong MJO activity modulating the TS activities**
- **Conditions associated with ongoing high-activity era**

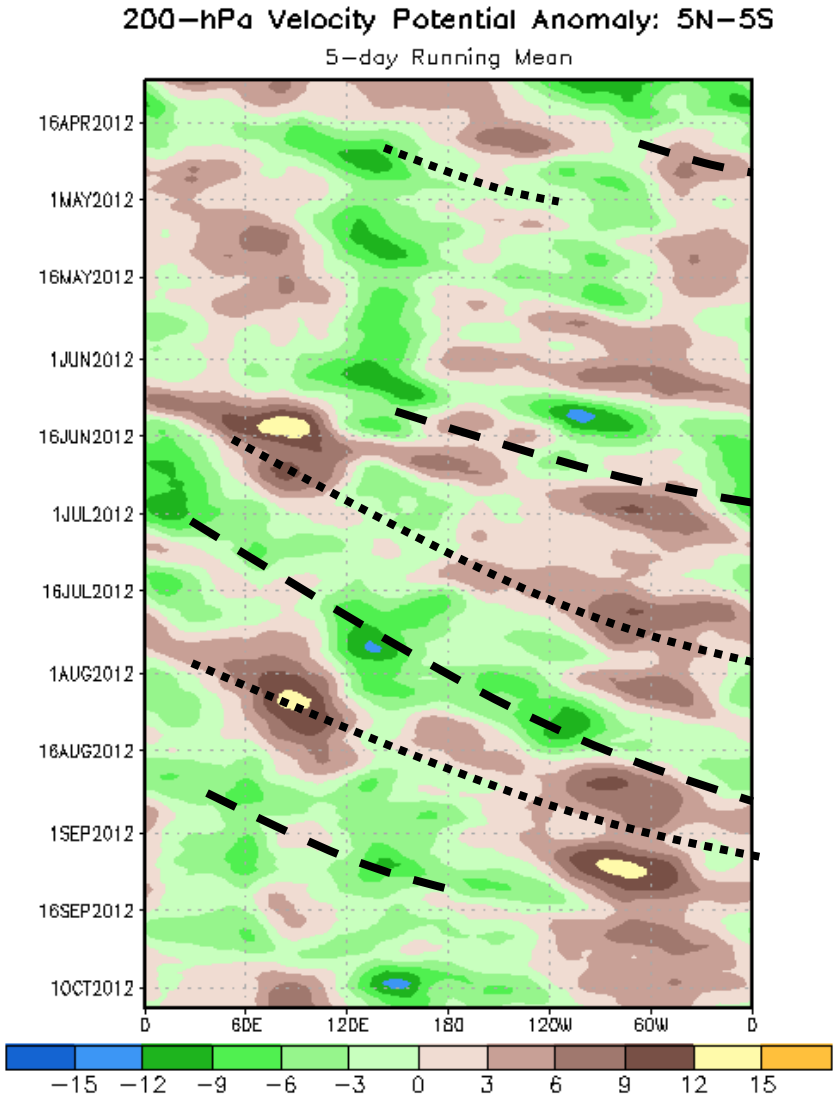
Observed SST anomalies for June - Sept. 2012



Observed Wind Shear Anomaly for June – Sept. 2012



200-hPa Velocity Potential Anomalies (5° S-5° N)



Time

Longitude

Beginning in late April, VP anomalies became weaker and less coherent than earlier in the year.

Eastward propagation was once again evident from late May into September associated with the MJO, as well as atmospheric Kelvin wave activity, which at times resulted in fast eastward propagation of observed anomalies.

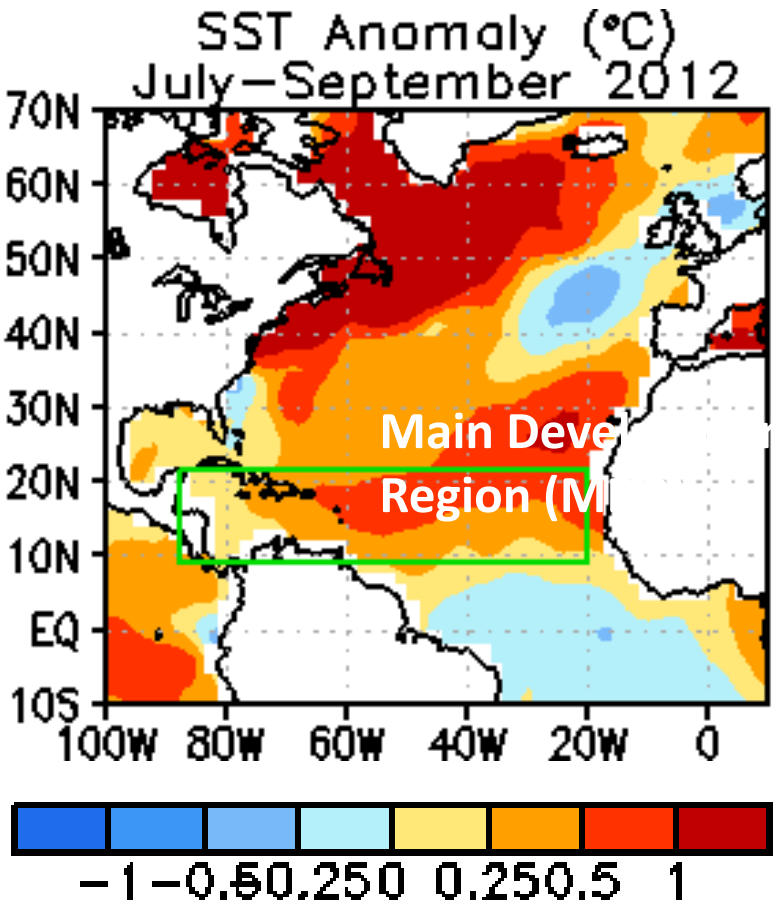
In mid-September, anomalies decreased and eastward propagation less clear. Most recently, upper-level divergence increased over the western Pacific in early October.

Conditions Associated with Atlantic High Activity Season

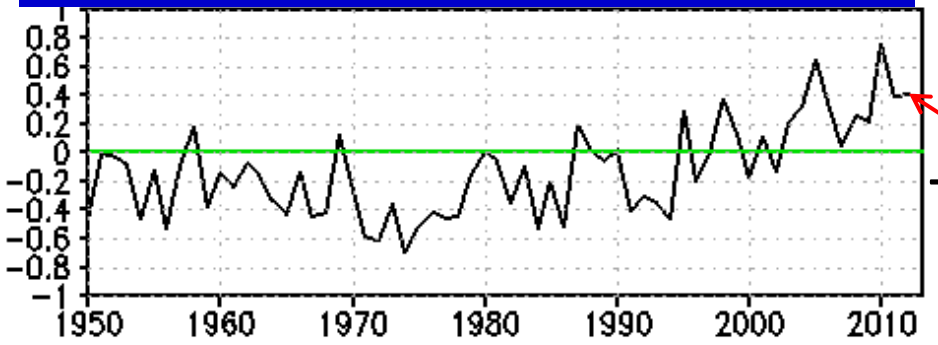
1. No evidence that ongoing high-activity era for seasonal Atlantic hurricane activity has ended.
   - Ongoing warm phase of AMO
   - Enhanced west African monsoon system
   - Weaker trade winds, weaker vertical wind shear across MDR

2. Specifics features of the 2012 Atlantic hurricane season
   - Anomalous wave pattern keeps many hurricanes well out to sea
   - Stronger vertical wind shear in western Caribbean Sea
   - Anomalously dry in central and western MDR due to low-level northerly flow

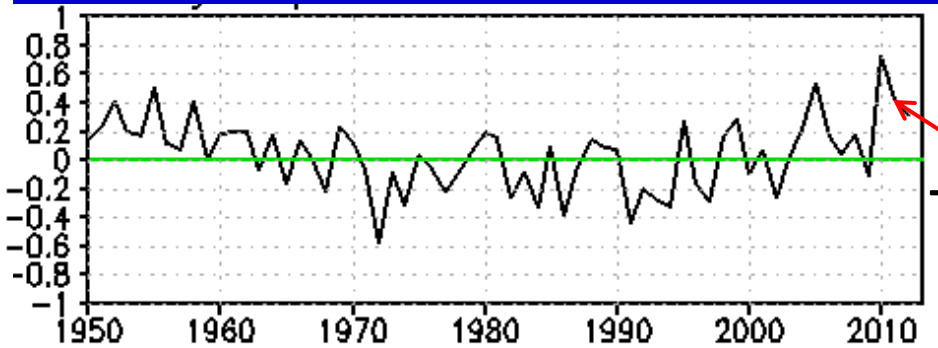
SST Anomaly: July-September 2012



Area-Averaged SSTA in MDR



MDR minus Global Tropics



Warm phase of AMO continues from 1995.

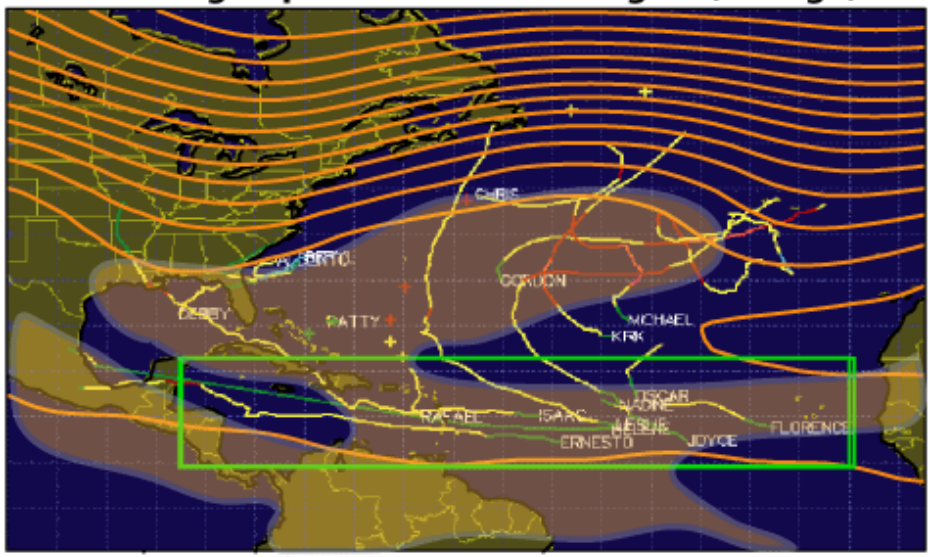
SSTA in Main Development Region (MDR) remains well above that of the global tropics.

Conditions Associated with US Hurricane Landfalls

2012 Steering Current and Storm Tracks

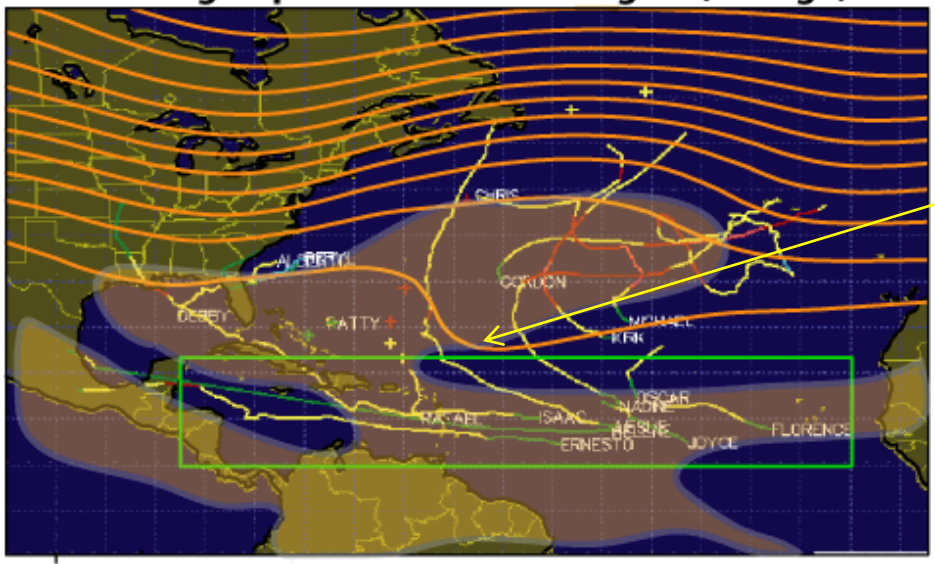
2012 Atlantic Basin TC Tracks

Aug-Sep 2012: 500-hPa Heights (Orange)



Many hurricanes stayed over central Atlantic beneath mean upper-level ridge.
Eastern U.S. trough again prominent, helping to keep approaching storms from making U.S. landfall.

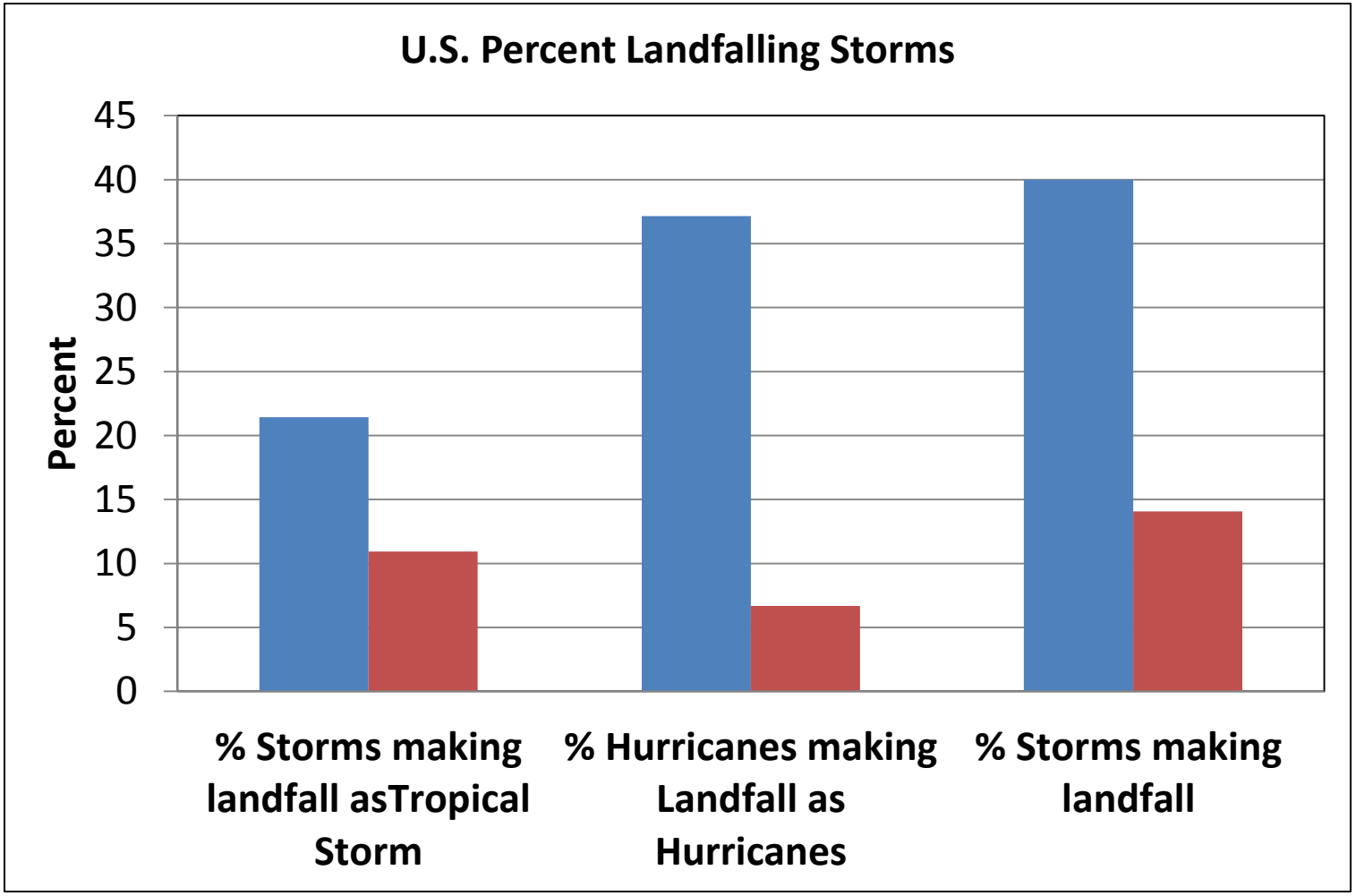
Aug-Sep 2012: 200-hPa Heights (Orange)



200-hPa TUTT is well east of normal, acting to re-curve storms over the central Atlantic instead of much farther west.

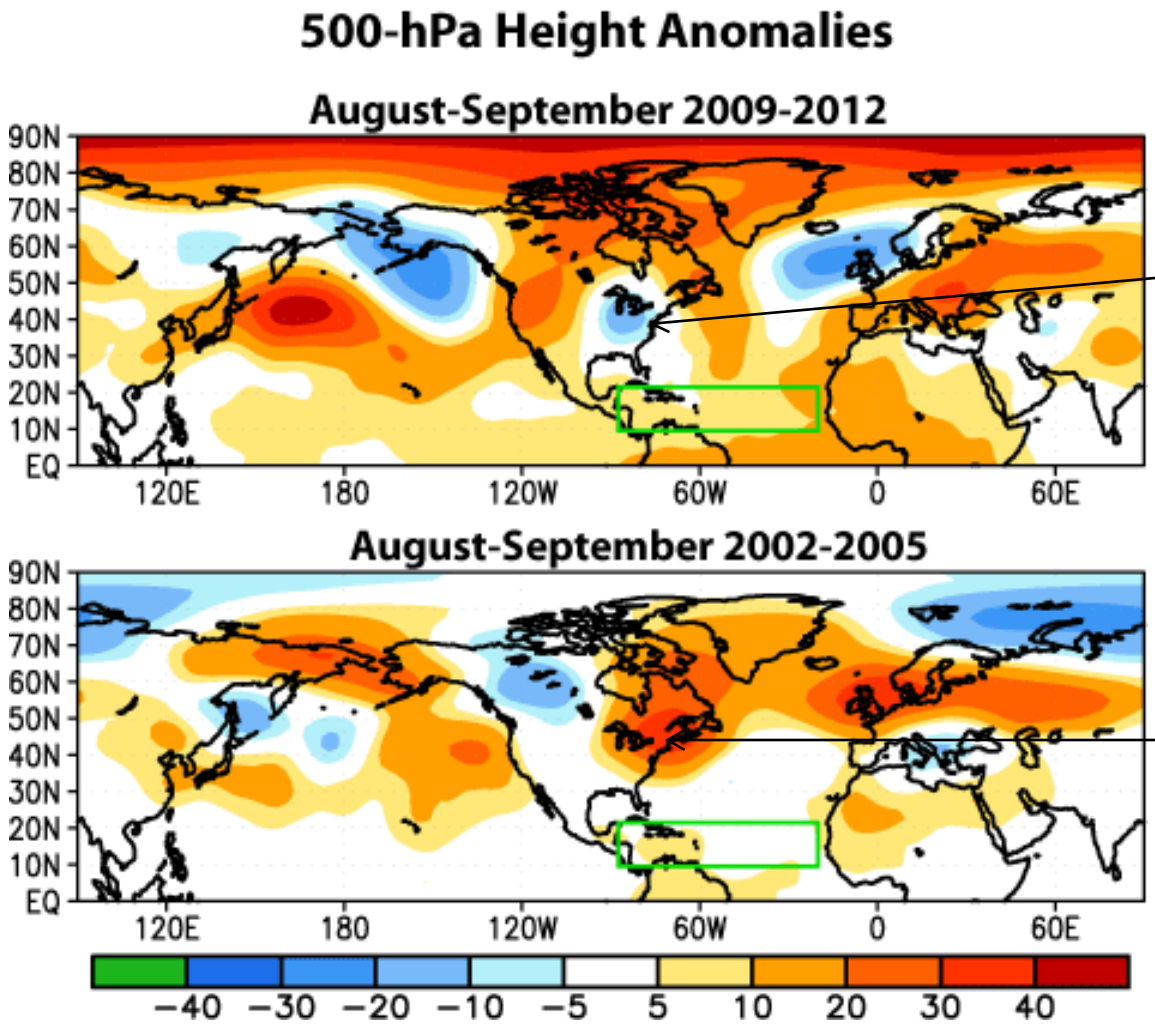
Orange shading indicates vertical wind shear less than 8 m/s.

U.S. Percent Landfalling Storms: 2009-12 vs. 2002-2005



Similar results are seen for both the Gulf Coast and Atlantic Coast.

Comparing 500-hPa Height Anomalies: 2009-12 vs 2002-05



Few U.S. Hurricane Landfalls

Amplified trough helps to re-curve hurricanes before striking U.S. Also, very few storms in Gulf of Mexico.

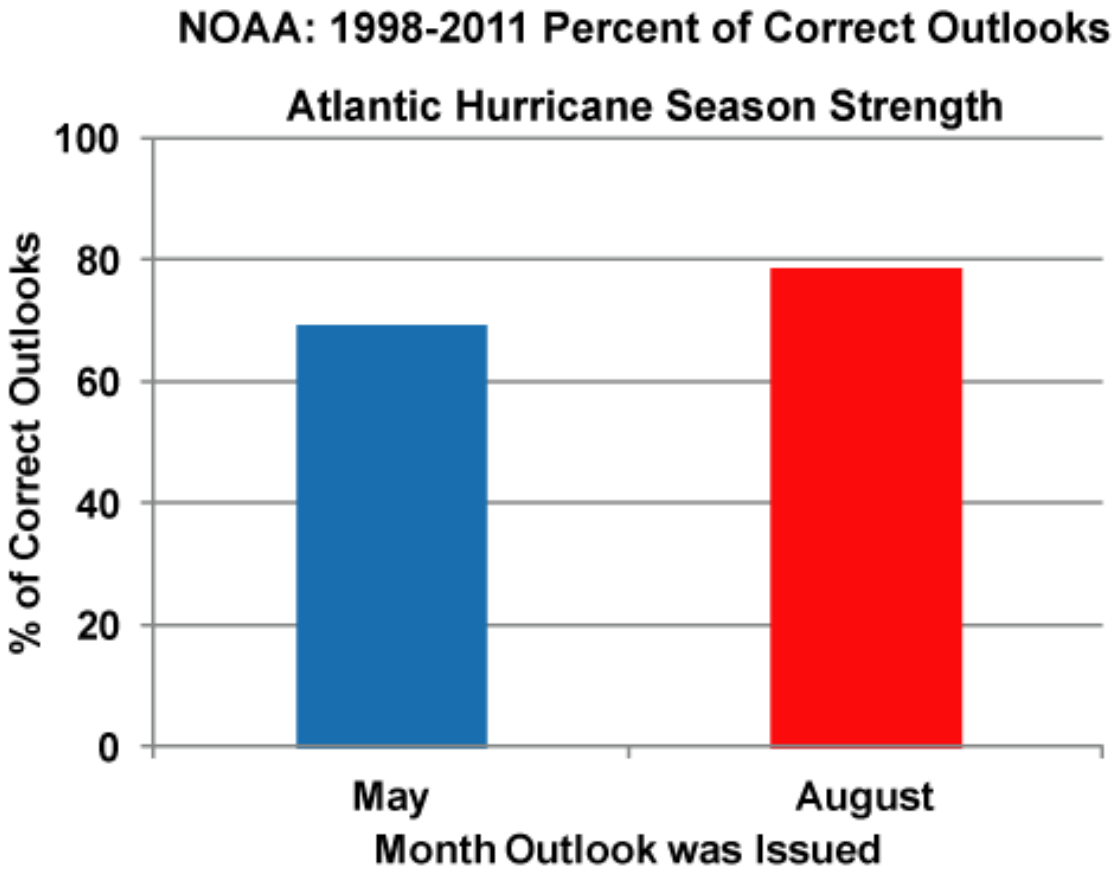
Many U.S. Hurricane Landfalls

Anomalous ridge indicates disappearance of mean trough from eastern U.S.

Anomalous wave train from central Pacific to Europe differs in sign between the 2009-12 period of few U.S. landfalling hurricanes and the 2002-2005 period of more landfalling hurricanes.

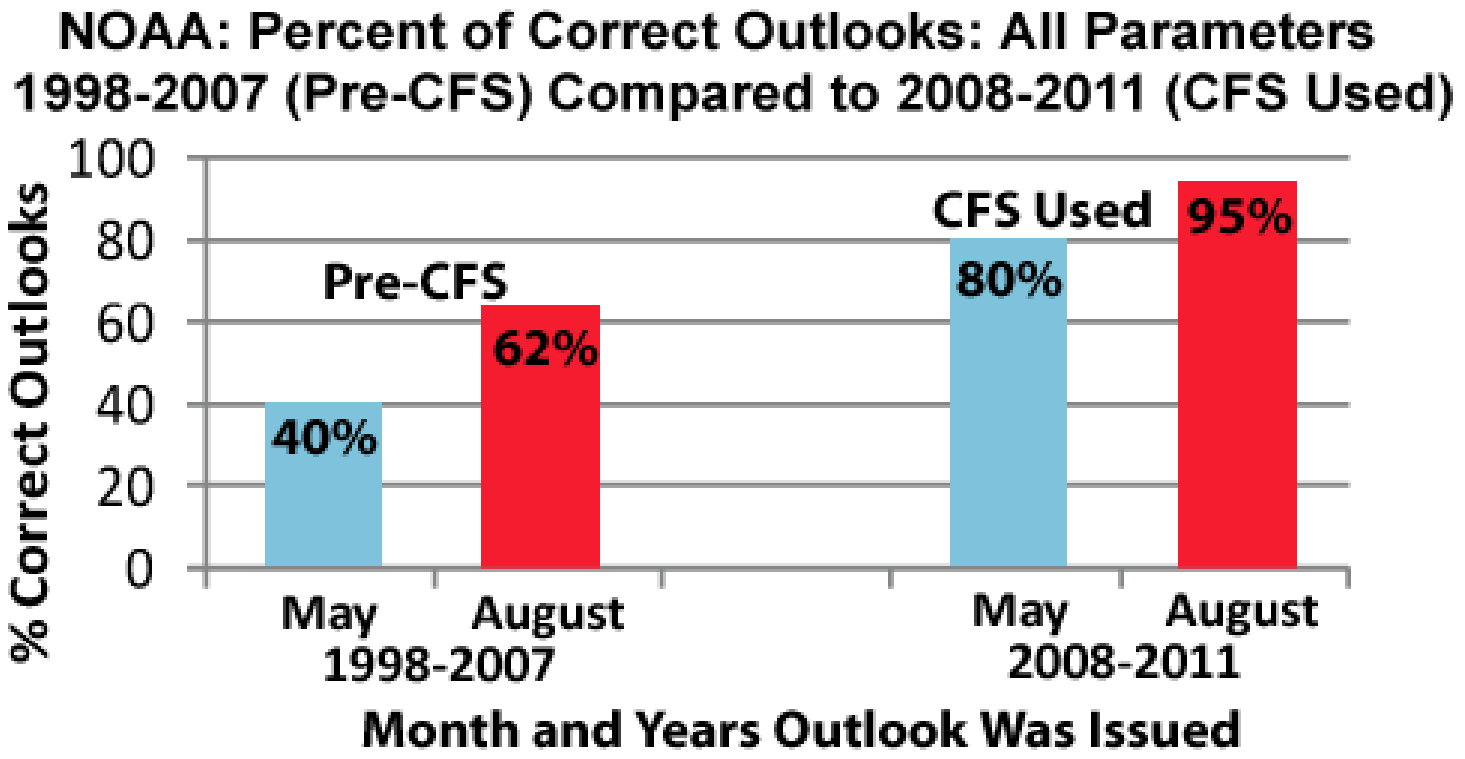
NOAA Atlantic Hurricane Season Outlook Verifications

Verification for Hurricane Season Strength



NOAA' Atlantic hurricane season outlooks issued in May have correctly predicted the season strength (Above-, near-, or below-normal) 70% of the time. Outlooks issued in August were correct 79% of the time.

Atlantic Outlook Verification: All Parameters



The use of dynamical models since 2008, especially the CFS, has contributed to a large improvement in outlook accuracy.

Summary

1. **Anticipated El Niño condition has not developed throughout the season.**

2. **The above normal 2012 Atlantic hurricane season reflects warm Atlantic SST anomaly, weak vertical wind shear over the MDR and enhanced west African monsoon system.**

3. **MJO activity was strong, modulating intraseasonal TC activities.**

4. **Conditions associated with the ongoing high-activity era in the tropical Atlantic are still present (stronger African monsoon system, warm SST anomaly and weaker trade winds in MDR). There is no indication that this period of increased activity, which began in 1995, has ended.**

5. **Extratropical circulation pattern over US and the Atlantic sector contributed to fewer number of landfalls over the continental US.**