NOAA's Updated 2017 Atlantic Hurricane Season Outlook

Dr. Gerry Bell

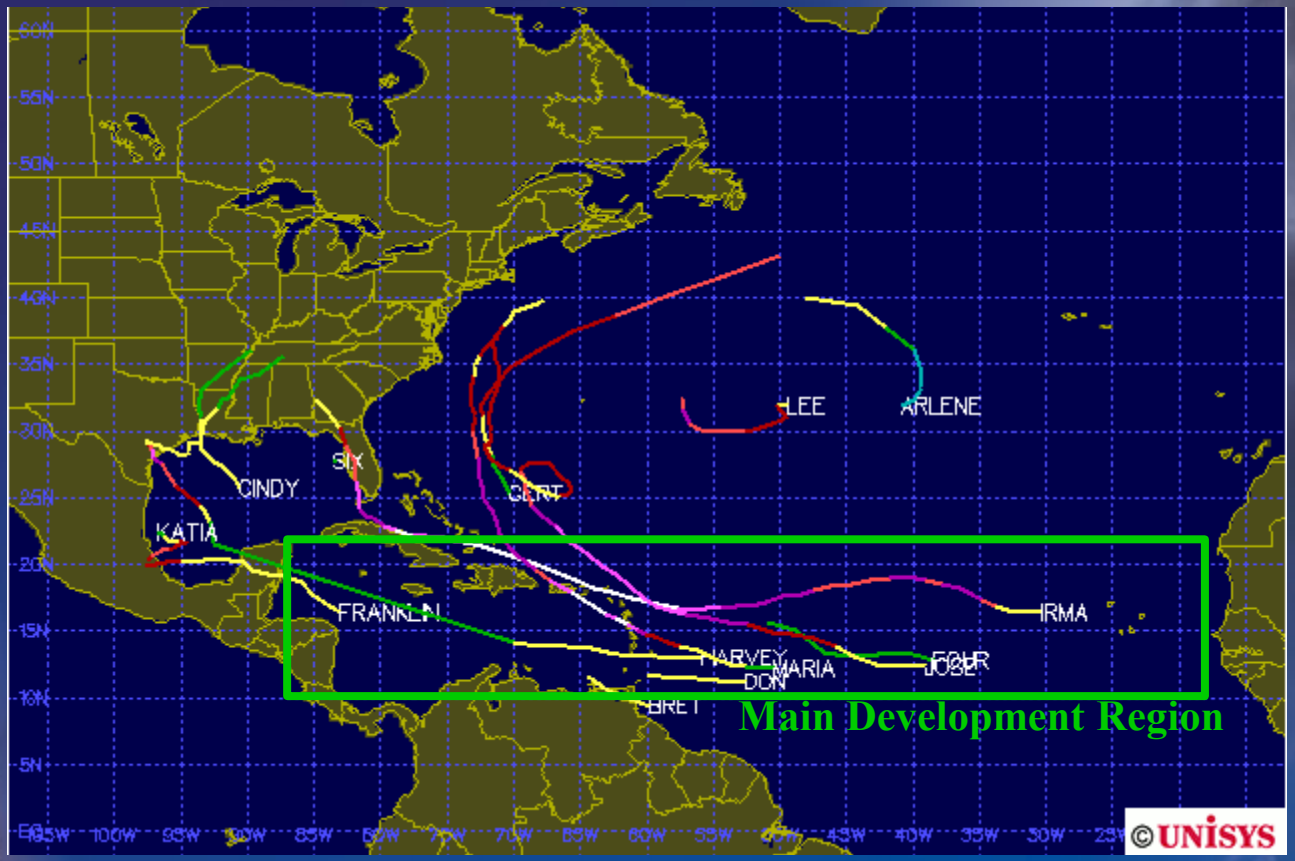
Lead Seasonal Hurricane Forecaster
Climate Prediction Center/ NOAA/NWS

Outlooks made in collaboration with:
National Hurricane Center
Hurricane Research Division

Presented to Hurricane Harvey Webinar
28 September, 2017

Gerry.bell@noaa.gov
http://www.cpc.ncep.noaa.gov/products/hurricane/

2017 Storm Track To Date



The activity in the Main Development Region (MDR) during August-October determines the strength of the hurricane season.

Aug-Sep 2017 featured 6 storms forming in the MDR. Five became major hurricanes.

Motivating Concept Behind Hurricane Season Outlooks

While hurricanes are ultimately a weather phenomena, the regional conditions within the MDR which largely control the number, strength, and duration of hurricanes, often last for months/ seasons at a time, and have strong climate links (Gray 1984; Bell and Chelliah 2006).

By predicting key climate patterns (ENSO and Atlantic Multi-Decadal Oscillation) and their combined impacts, we can often predict the regional hurricane-controlling conditions within the MDR and thus the strength of the upcoming hurricane season.

NOAA's Atlantic hurricane season outlook is updated in early August to coincide with peak months of the hurricane season (August-October), when 95% of all hurricanes and major hurricanes form.

Prepare for every hurricane season regardless of the outlook.

Preparedness situations can differ: Location, children, pets, finances, property, transportation, structure of home, etc.

Tropical storms and hurricanes have many different impacts.

Your preparedness plans must reflect both your personal situation and the storm conditions being predicted.

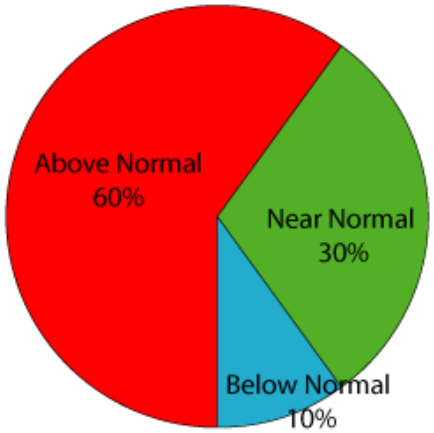
NOAA's Updated 2017 Atlantic Hurricane Season Outlook

Issued August 9, 2017

60% Chance of Above-Normal Season, Possibly Extremely Active

Probability of Season Type

Updated Outlook Issued 9 August



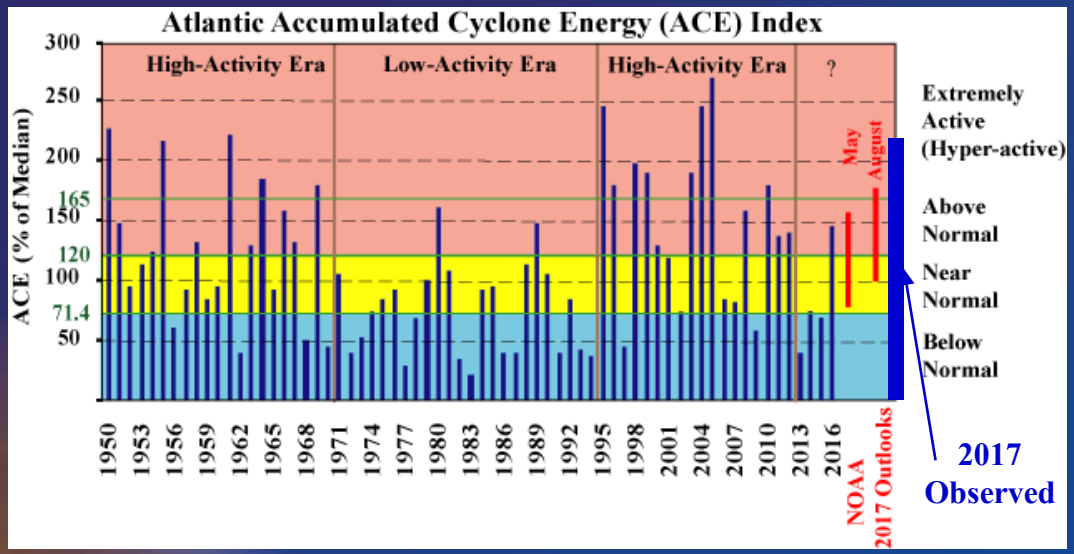
Predicted Activity

70% Probability For Each Range

	August Update	Observed
Named Storms	14-19	13
Hurricanes	5-9	8
Major Hurricanes	2-5	5
ACE (% median)	100-170%	219%

Outlook indicated that 2017 could be the most active season since 2010.

The 2017 Atlantic Outlook in a Historical Perspective

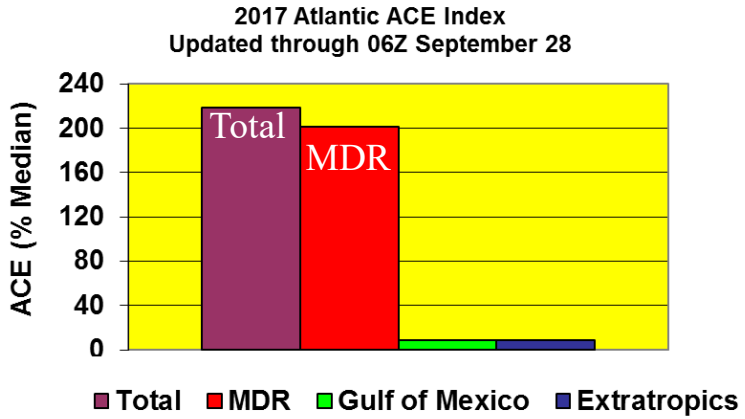


Based on ACE, 2017 is the most active Atlantic hurricane season since 2005, and the first extremely active season since 2010.

The overall 2017 activity is comparable to some of the stronger seasons seen since 1995.

Extremely active seasons typically have far more landfalling storms in the U.S. and Caribbean Sea regions.

ACE contribution from storms forming in different regions

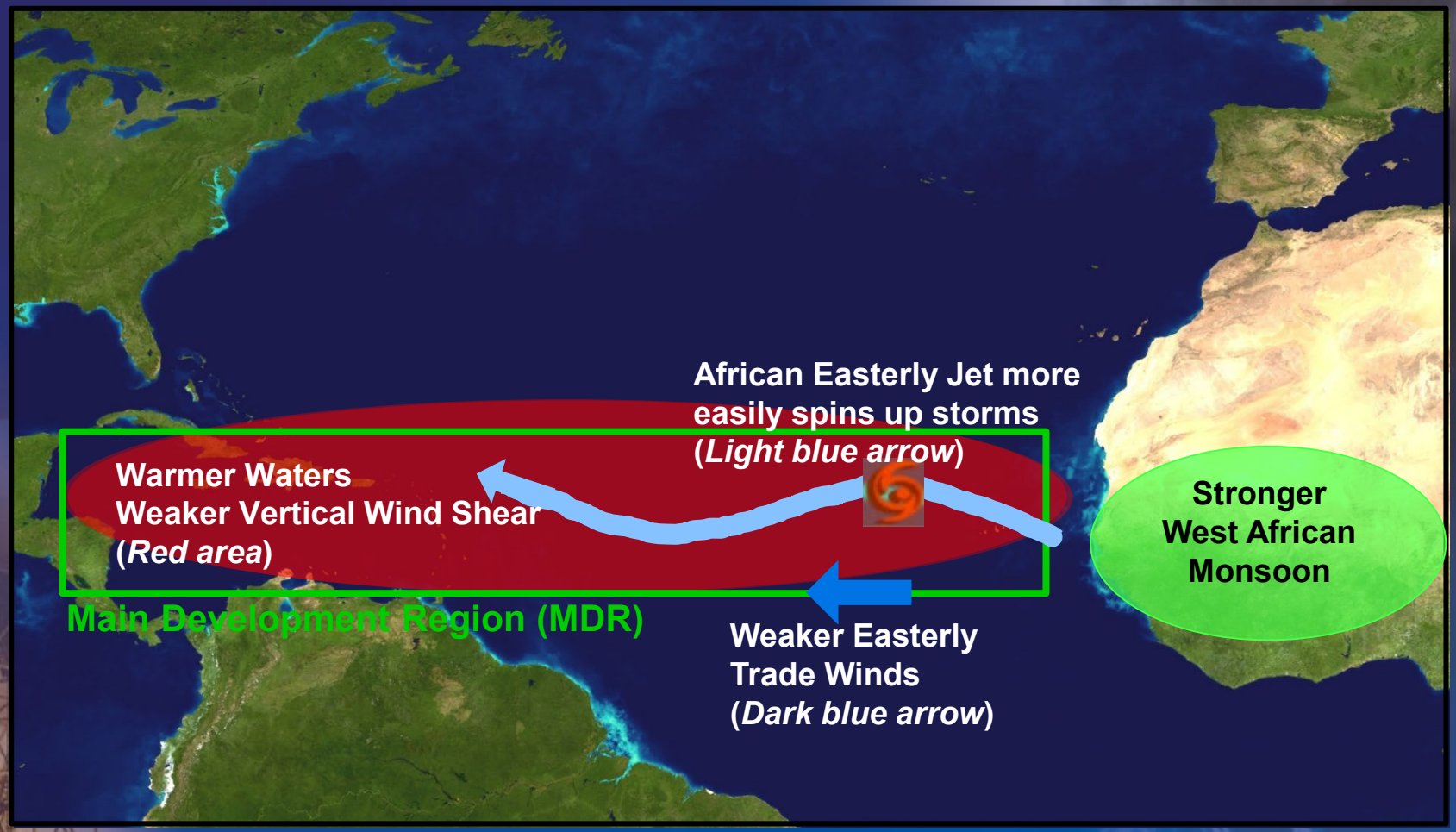


During 2017, storms first named in the MDR account for 92% of the total ACE.

The 5 MDR major hurricanes produced 90% of the seasonal ACE, especially, MH Irma, MH Jose, and MH Maria

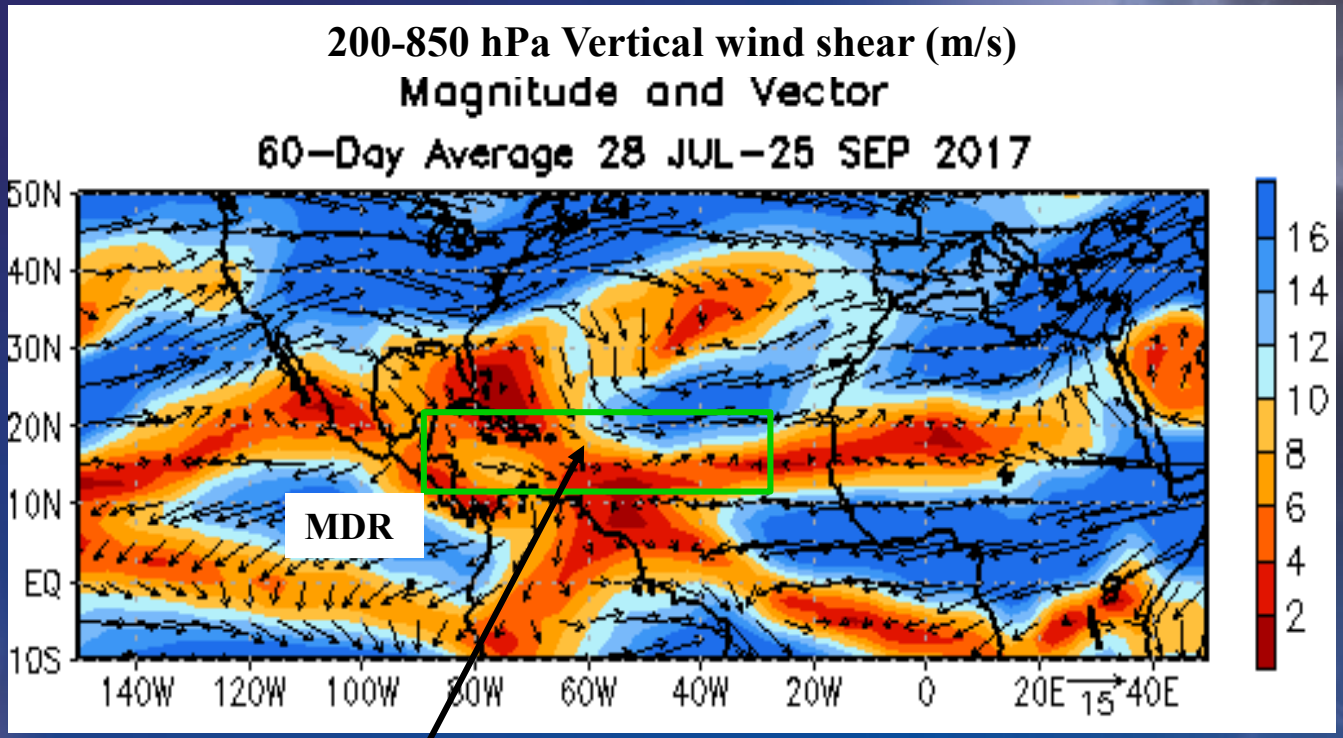
ACE index measures overall season strength by accounting for the combined intensity and duration of tropical storms and hurricanes.

Predicted Conditions During August-October 2017 Typify Warm Phase of Atlantic Multi-Decadal Oscillation (AMO)



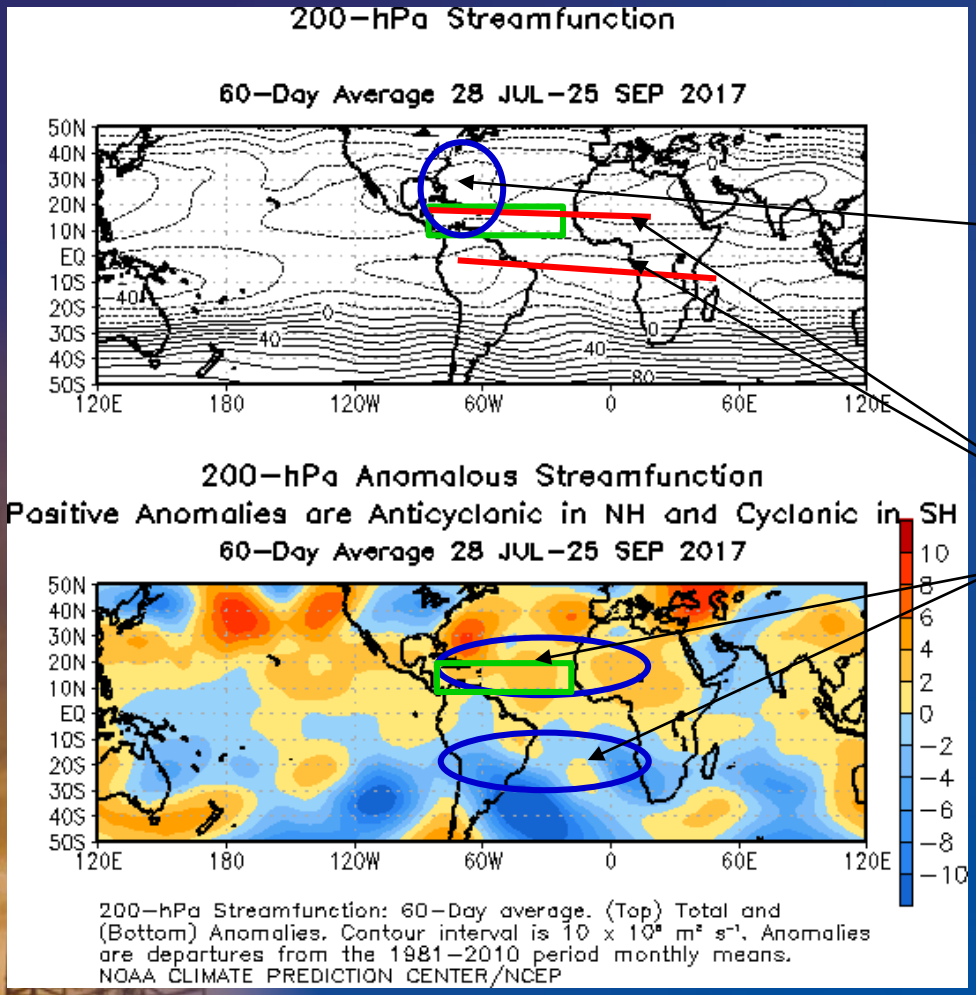
This inter-related set of conditions within the MDR is typical of other above-normal seasons, and is consistent with the warm phase of the AMO (Bell and Chelliah , JCLI, 2006)

Vertical Wind Shear During August-September 2017



Very weak vertical wind shear (orange/ red shading) covers nearly the entire MDR.

200-hPa Streamfunction During August-September 2017



- Strong ridge (instead of climatological trough) over western portion of hurricane basin produces extended area of weak vertical wind shear.
- Favors stronger hurricanes over western part of basin.
- Similar to 2003-2005 extremely active seasons.

Amplified upper-level subtropical ridges in both hemispheres typify extremely active seasons.

This inter-hemispheric symmetry indicates that the local circulation anomalies within MDR are associated with a **much large-scale signal** (Typical of stronger west African monsoon system and warm phase of AMO) (Bell and Chelliah 2006)

Dynamical Model Predictions of 2017 MH Activity and ACE

Dynamical Model predictions made in July

Model	Major Hurricanes	ACE (% Median)
CFS: Hi-Res T-382	No Forecast	67-106 (87)
CFS-V2 T126	2-4 (3)	104-154 (129)
NMME	2-3 (2.5)	86-147 (116.5)
GFDL FLOR-FA	No Forecast	119-221 (170)
ECMWF	No Forecast	81-154 (117.5)
Model Average	**2-3.5 (2.75)**	**91.4-156 (124)**
NOAA Outlook	2-5 (3.5)	100-170 (135)

- Predictions are made for ASON, and June-July activity in added in.
- Ranges indicate ± 1 std. dev range. Center of range is in parenthesis.

- Only one model strongly indicated the potential for ACE>165%.

Summary

NOAA correctly predicted the overall set of conditions within the MDR during Aug-Oct 2017, and also correctly anticipated the potential for an extremely active season.

NOAA under-predicted the extreme duration of some major hurricanes (Predicted ACE was too low).

The extreme MH durations are linked directly to very strong and persistent ridge in western portion of Atlantic hurricane basin (similar to 2003-2005), which is superimposed on warm AMO conditions.

The strength and persistence of that ridge is generally not predictable in the absence of La Niña.

It remains very challenging to correctly predict storm intensities and duration (especially of major hurricanes), which are key components of a seasonal hurricane outlook.

Gerry.bell@noaa.gov
http://www.cpc.ncep.noaa.gov/products/hurricane/