



# NOAA's Updated 2017 Atlantic Hurricane Season Outlook

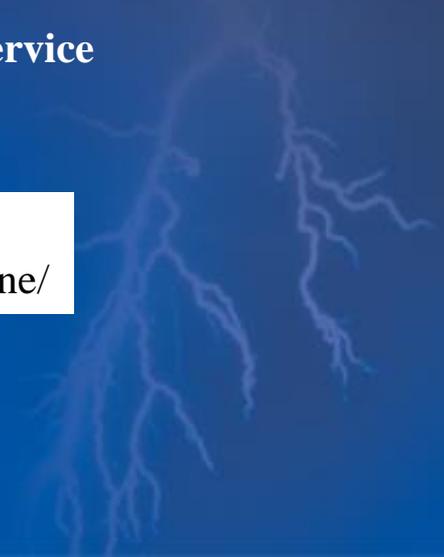
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Climate Prediction Center/ NOAA/NWS**

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

**Presented to NOAA Eastern Region Climate Service  
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<http://www.cpc.ncep.noaa.gov/products/hurricane/>





Atlantic hurricane season outlook is updated early August to coincide with peak months of the hurricane season (August-October).

95% of all hurricanes and major hurricanes form during Aug.-Oct. Must be prepared. [ready.gov](http://ready.gov), [nhc.noaa.gov](http://nhc.noaa.gov)

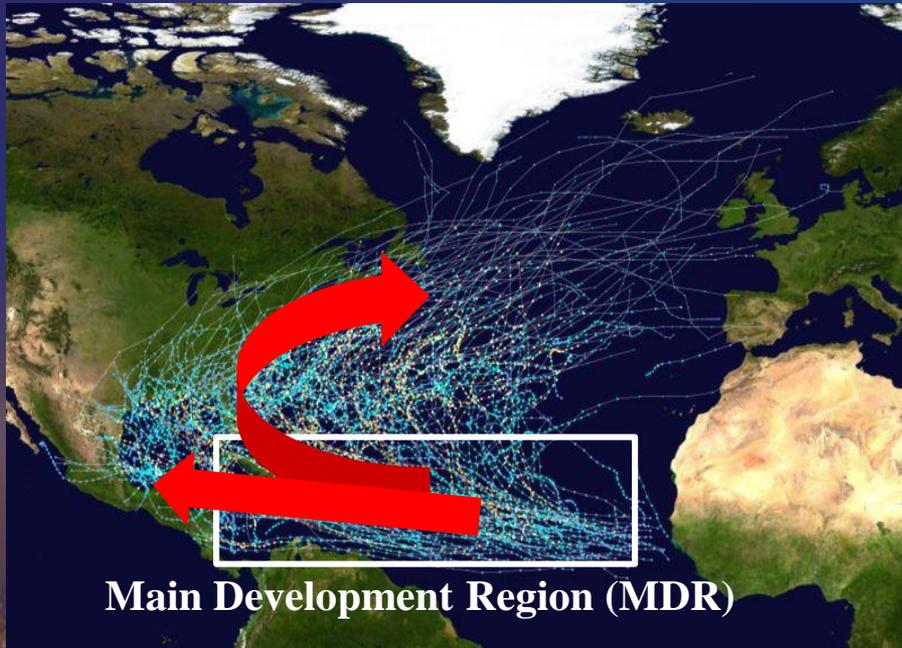
## Outline

1. Historical storm tracks and the Atlantic Main Development Region (MDR)
2. Updated 2017 Atlantic hurricane season outlook
3. Hurricane preparedness
4. Summary



# Historical Atlantic Basin Storm Tracks and the Main Development Region (MDR)

## Atlantic Basin Storm Tracks 1980-2005



Main Development Region (MDR)

Figure Courtesy of Wikipedia

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

NOAA's seasonal outlooks are based on predicting conditions within the MDR during August-October.

During above-normal seasons, storms typically have longer westward storm tracks, which means an increased threat of landfall.

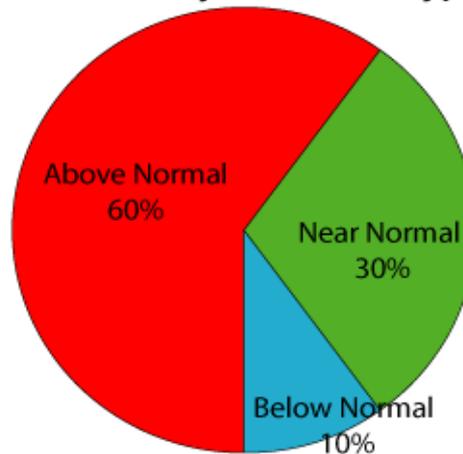
# NOAA's Updated 2017 Atlantic Hurricane Season Outlook



Issued August 9, 2017

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

**Probability of Season Type**



*70% Probability For Each Range*

**August Update**

<b>Named Storms</b>	<b>14-19</b>
<b>Hurricanes</b>	<b>5-9</b>
<b>Major Hurricanes</b>	<b>2-5</b>
<b>ACE (% median)</b>	<b>100-170%</b>

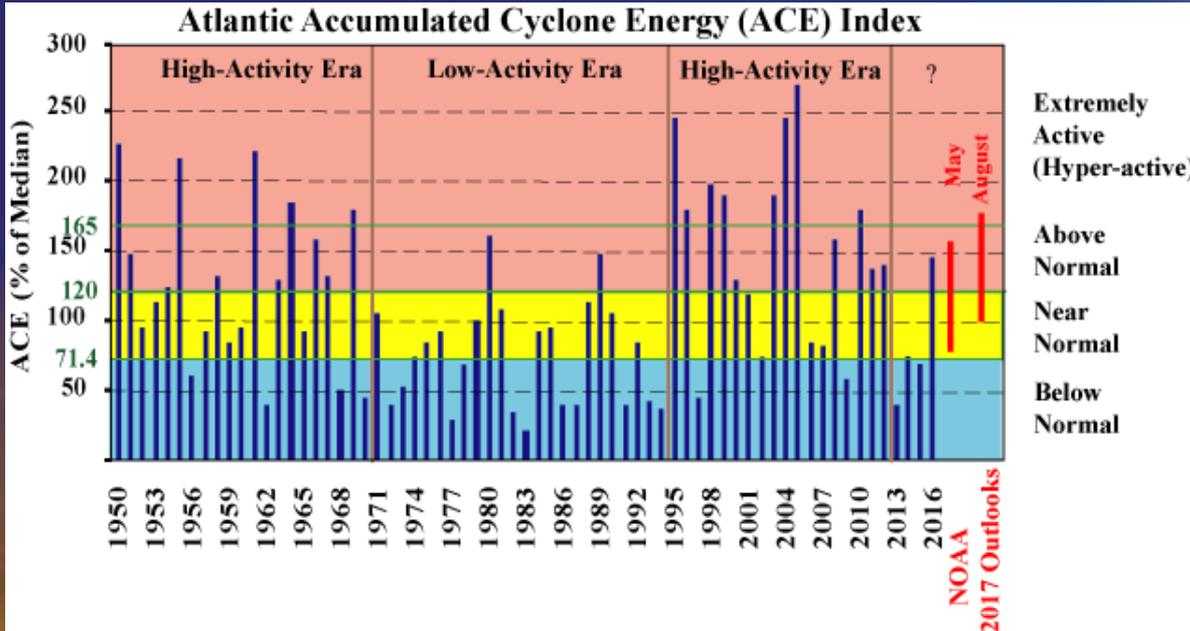
Extremely active seasons typically have far more landfalling storms in the U.S. and Caribbean Sea regions.

Storms to date:

8 Named Storms  
3 Hurricanes  
1 Major Hurricane (Harvey)



# The 2017 Atlantic Outlook in a Historical Perspective



If 2017 activity is at high end of predicted ranges, then season will be

- More active than predicted in May
- Extremely active ( $ACE \geq 165\%$ )
- Most active since 2010

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

• *ACE = Sum of squares of maximum sustained surface wind speed (measured 6-hourly) for all named storms while at least tropical storm strength.*



## 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).

Therefore, by predicting key climate patterns, we can often predict these regional hurricane-controlling conditions, and therefore predict the strength of the upcoming hurricane season.

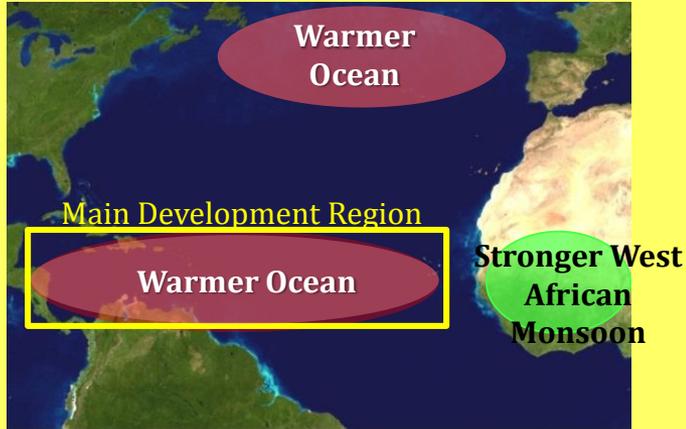




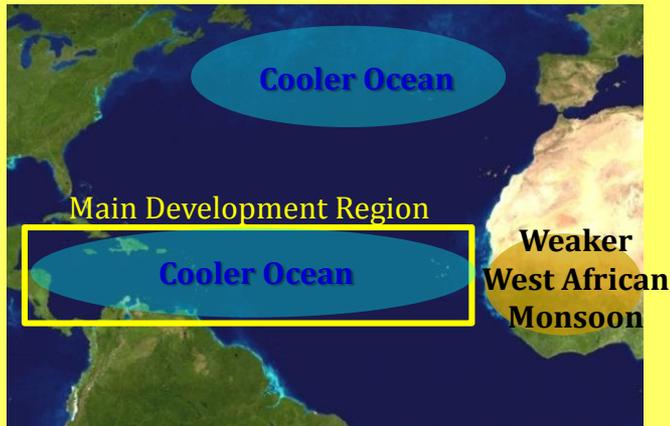
# Dominant Climate Patterns For Predicting Atlantic Hurricane Season

Atlantic Multi-Decadal Oscillation (AMO):  
Multi-Decadal Variability

**Warm (Positive) Phase of AMO**  
**High-Activity Eras (1950-70, 1995-pres)**

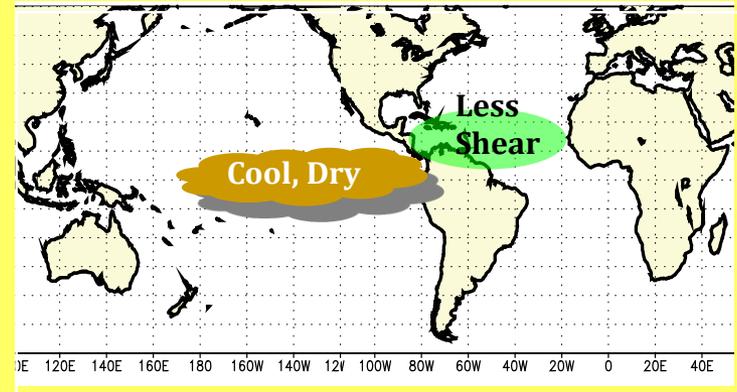


**Cold (Negative) Phase of AMO**  
**Low-Activity Era (1971-1994)**

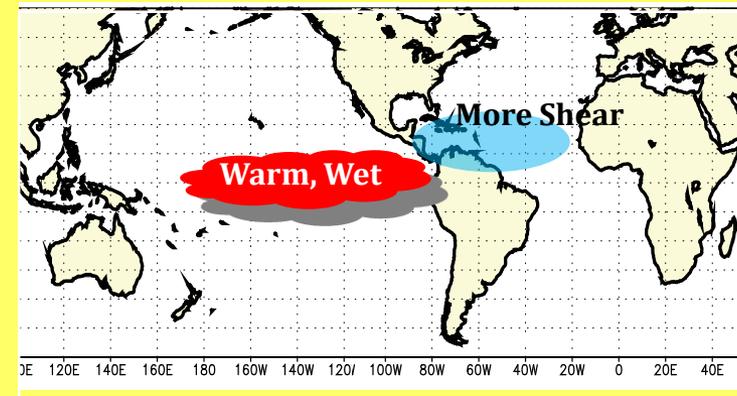


El Niño/ Southern Oscillation (ENSO):  
Inter-Annual Variability

**La Niña: More Hurricanes**



**El Niño: Fewer Hurricanes**



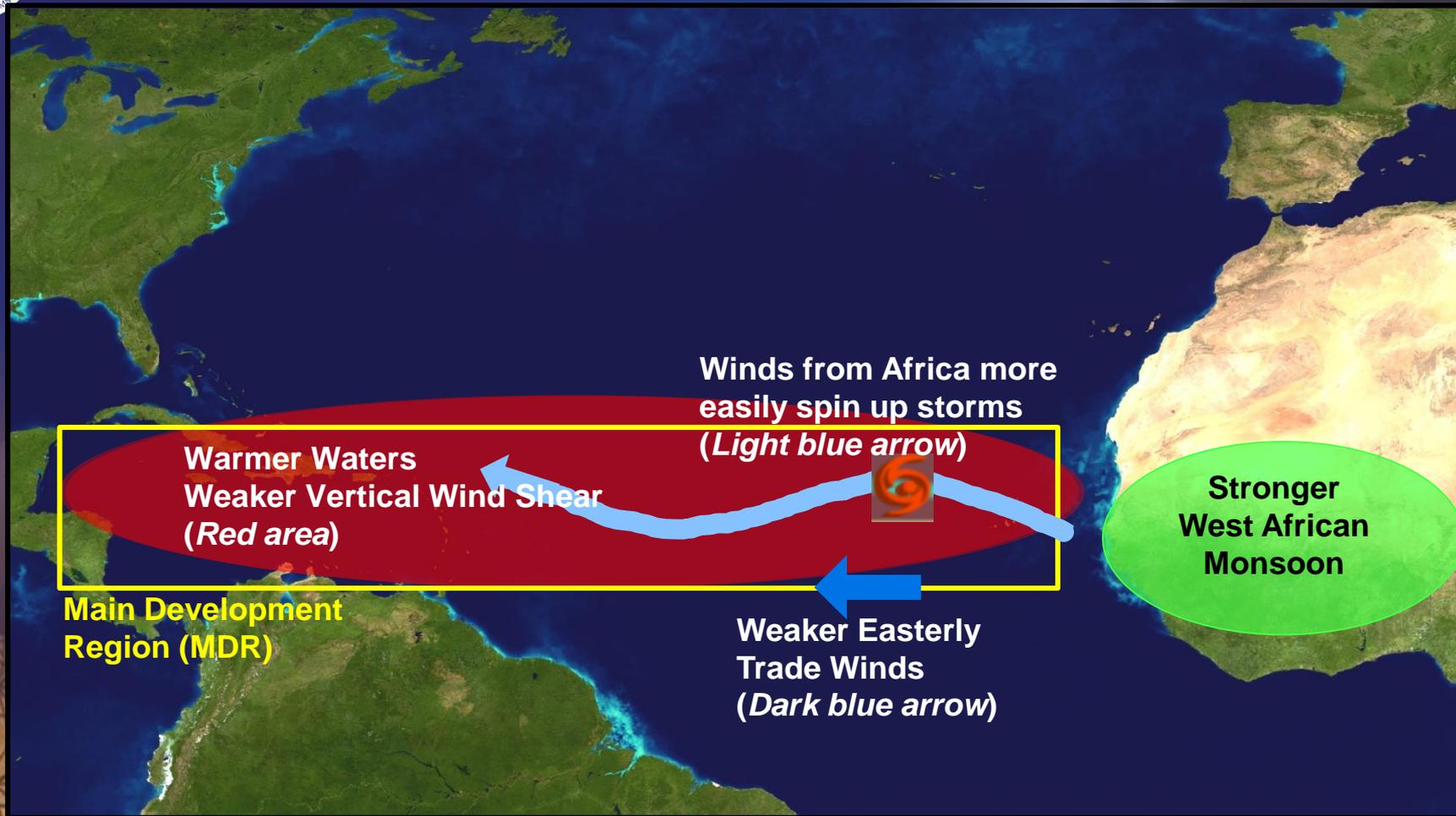
Predicting these climate patterns, their interaction, and their combined impacts, is an under-lying basis for NOAA's seasonal Atlantic hurricane outlooks.



## Guiding Factors for Updated 2017 Atlantic Hurricane Season Outlook

- Warm phase of AMO: Conducive atmospheric conditions and above-average SST across MDR
- El Niño will not develop and suppress the season.
- Models predict a more active season than they did in May.
- Enhanced June-July activity in the MDR (TS Bret and TS Don)

# Conducive Conditions During the Peak Months (August-October) of the 2017 Atlantic Hurricane Season



This set of conditions within the Main Development Region (MDR) is typical of other above-normal seasons, and is consistent with the warm phase of the AMO.



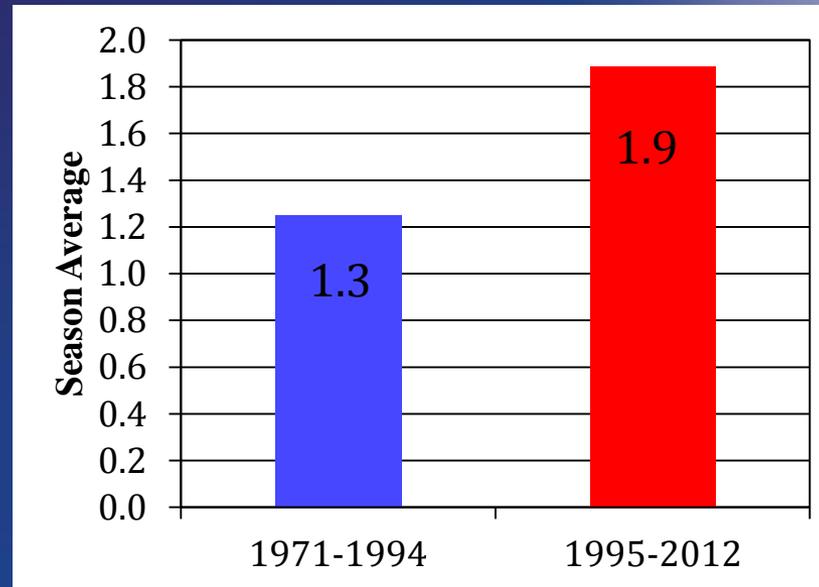
# Landfalling Storms





# U.S. Hurricane Landfalls During High- and Low-Activity Eras

## U.S. Hurricane Landfalls



Since 1995 the U.S. has averaged almost two hurricane landfalls per season, nearly a 50% increase from 1971-1994.

2017 to date: 3 U.S. landfalling storms (2 TS and 1 MH)

- MH Harvey: catastrophic damage and flooding in Texas

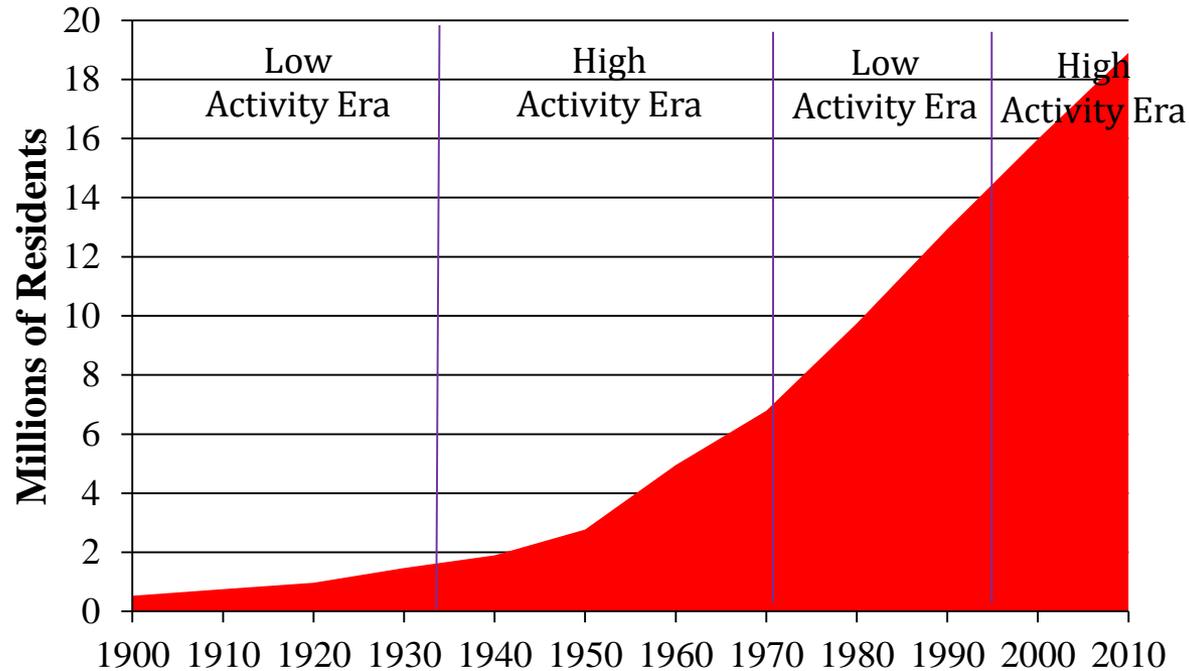
Last year's above normal season:

- 5 U.S. landfalling storms (3 TS and 2H): Most since 2008.
- H Matthew struck South Carolina, H Hermine struck Florida



# Coastal Population Growth

## Florida Population



Exponential growth along the Atlantic and Gulf Coasts has put far more people and property (\$\$\$) in harm's way. 80+ million people are considered Atlantic or Gulf Coast residents.

# Seasonal Hurricane Outlooks Are Also About Preparedness

[www.ready.gov](http://www.ready.gov), [www.nhc.noaa.gov](http://www.nhc.noaa.gov)

**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.

- Immediate coastal impacts- Storm surge, evacuation, complete destruction
- Non-coastal impacts
- Inland flooding
- Strong winds/ downed trees and power lines
- Tornadoes

A slow-moving tropical storm or a hurricane can cause tremendous damage, flooding, death. Look at Hermine and Matthew last year, and Harvey this year

**Emergency planning/ execution is far more challenging, demands much longer forecast lead times.**





## Summary

Expect another above-normal Atlantic hurricane season this year. Season could be the most active since 2010.

More active seasons  $\Rightarrow$  More storms in MDR  $\Rightarrow$  Higher threat to U.S. and entire region around Caribbean Sea.

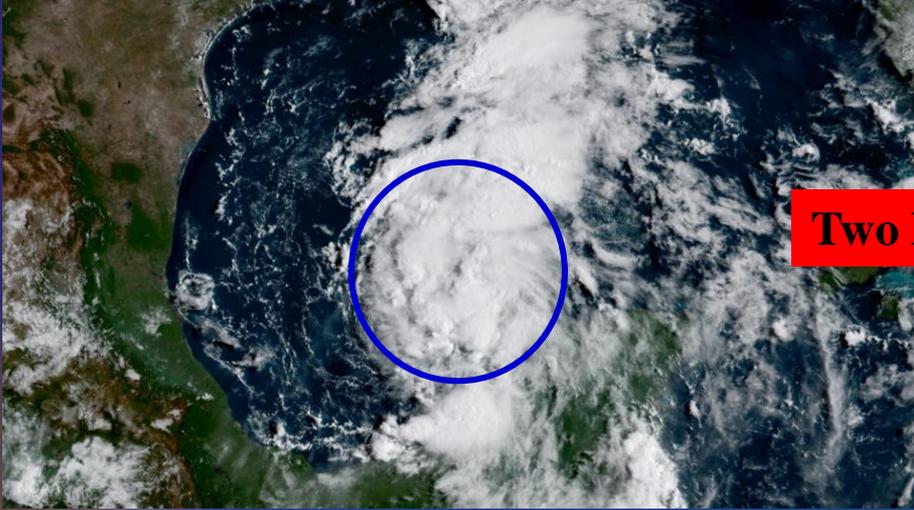
Must be prepared for the peak months of the hurricane season (Aug.-Oct), when 95% of all hurricanes and major hurricanes form. [ready.gov](http://ready.gov), [nhc.noaa.gov](http://nhc.noaa.gov)

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# Major Hurricane Harvey

00Z August 24th  
Tropical Depression



0600Z August 26th  
Harvey: Cat-4 Major Hurricane (130 mph)



Two Days Later

MH Harvey's Many Worst Case Scenario's

1. Major hurricane landfall
2. Rapidly developing storm with limited lead time for evacuations
3. Many with mandatory evacuations DID NOT evacuate
4. Overall impacts worsen (not improve) in the days after landfall
5. Slow-moving/ stalled hurricane after landfall
6. Widespread, record, catastrophic flooding from 20-40+ inches of rain
7. Catastrophic flooding inundates major city (Houston)