



# Hurricane Season is Here

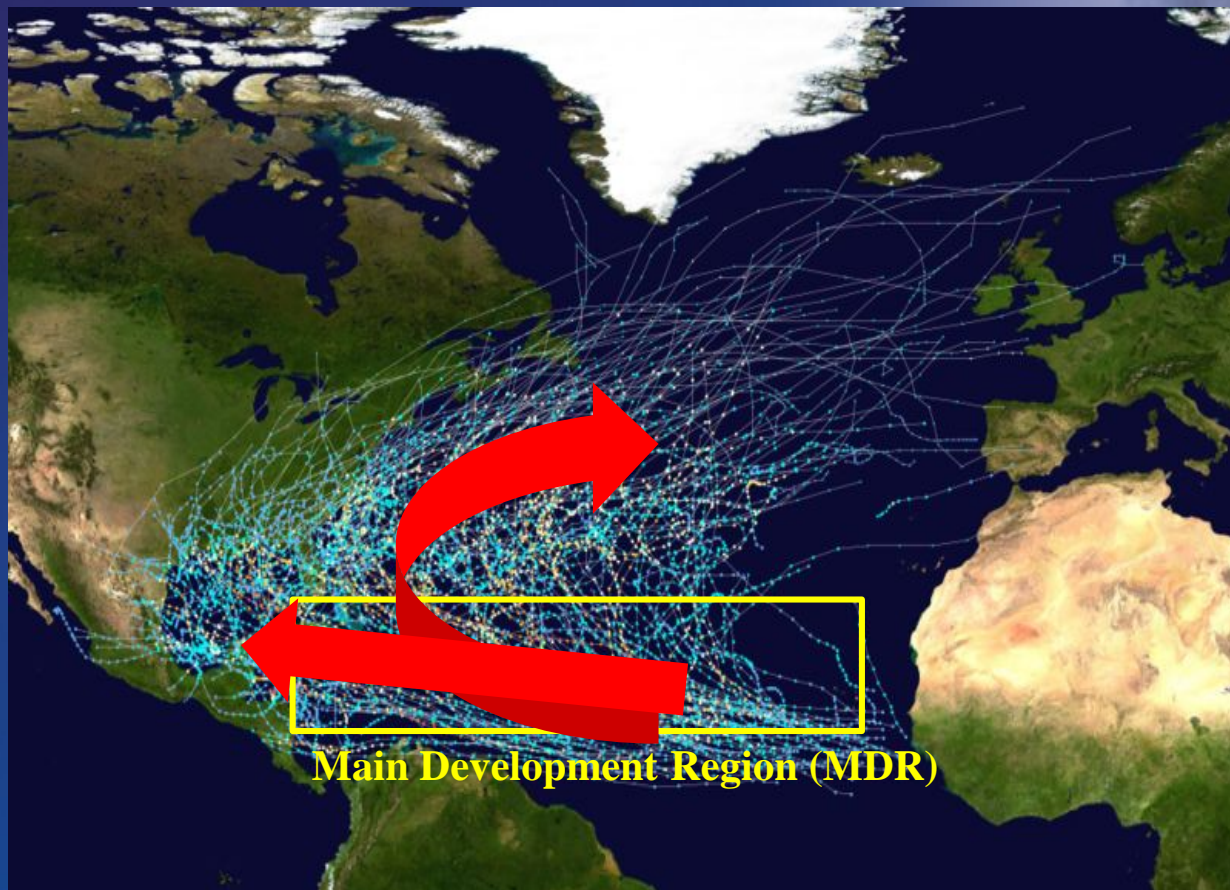
## NOAA 2019 Atlantic Hurricane Season Outlook

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Lead Seasonal Forecaster  
NOAA Climate Prediction Center

Presented to  
Texas General Land Office Webinar  
June 4, 2019



## Historical Atlantic Basin Storm Tracks



**Main Development Region (MDR)**

The Atlantic hurricane season runs from June 1<sup>st</sup> through November 30<sup>th</sup>.



## **NOAA's 2019 Outlook for the Atlantic Basin:**

**A near-normal season is most likely in 2019.**

**9-15 Named Storms (39+ mph)**

**4-8 Hurricanes (74+ mph)**

**2-4 Major Hurricanes (111+ mph)**

1981-2010 Season Averages

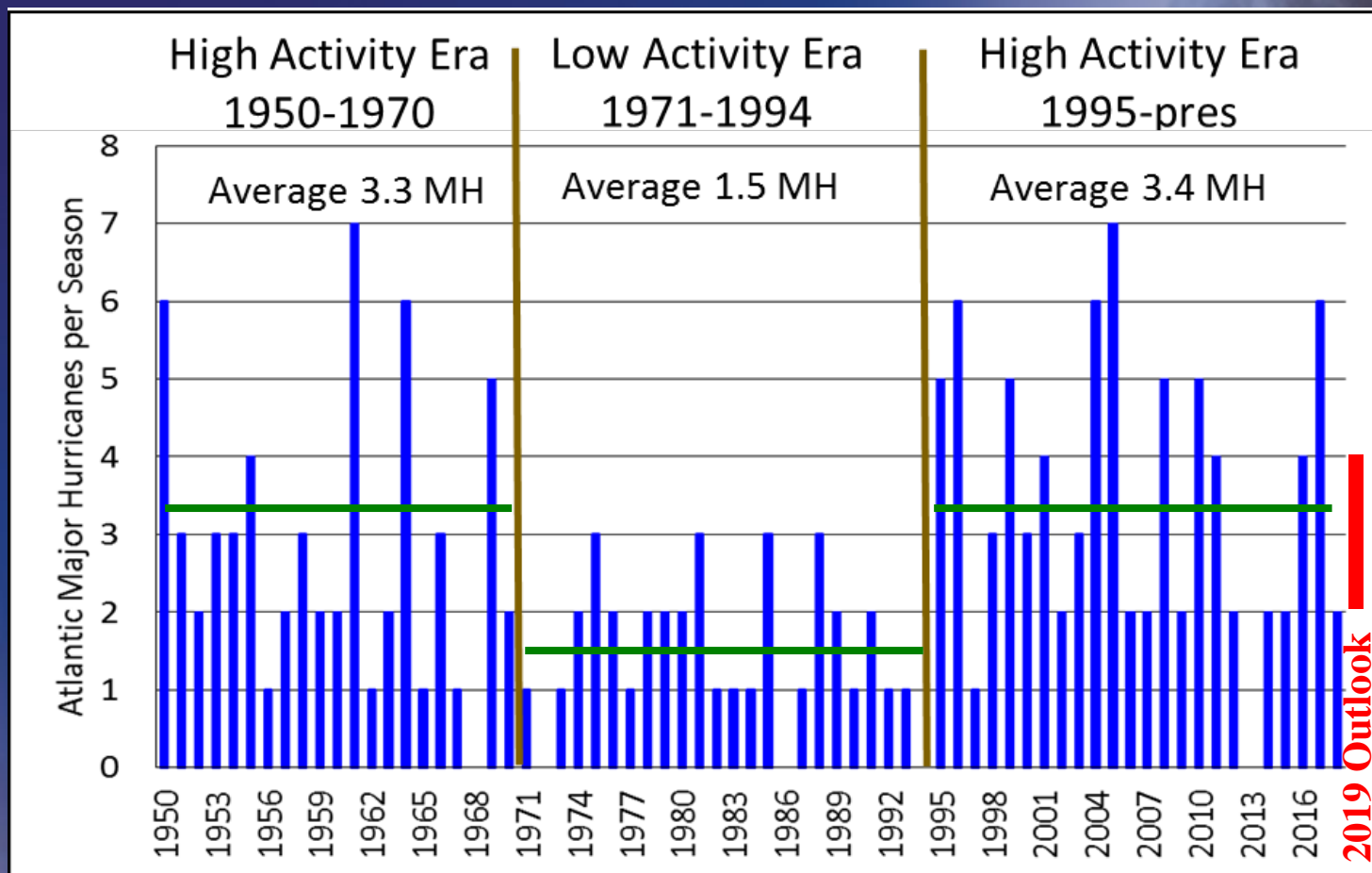
12 Named Storms, 6 Hurricanes, 3 Major Hurricanes

A near-normal season is a lot of activity.

This outlook is for the overall seasonal activity. It is not a hurricane landfall forecast.



## Time series of Atlantic Major Hurricanes since 1950



We are still likely in a high-activity era for Atlantic hurricanes that began in 1995.



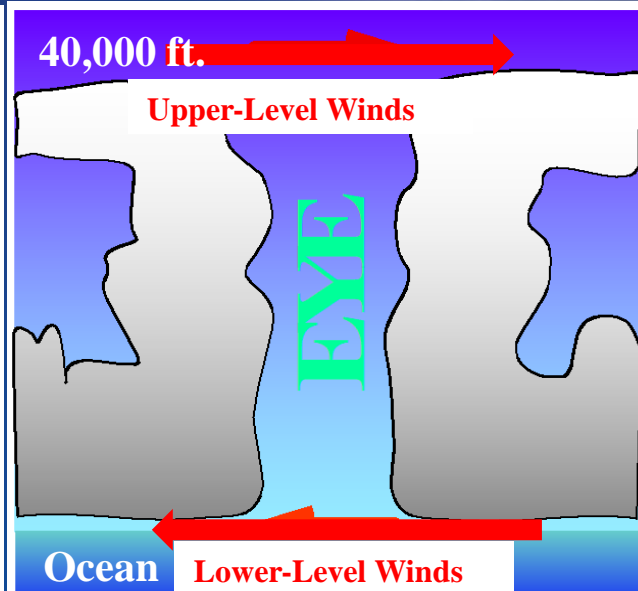
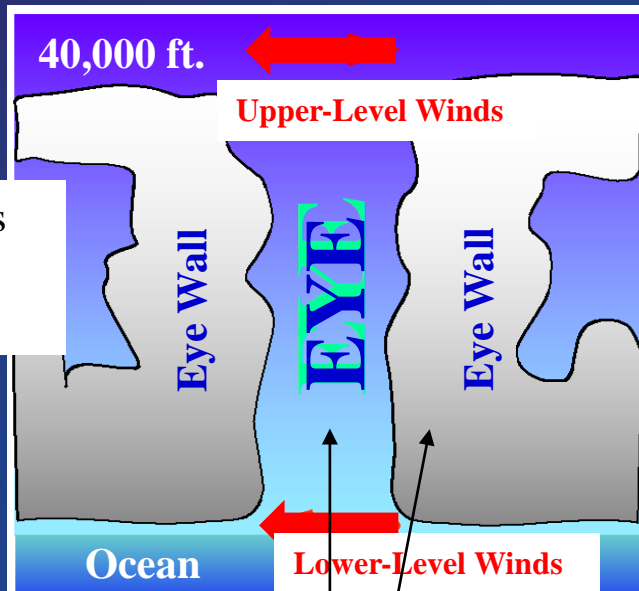


# Hurricanes Require Weak Vertical Wind Shear

Vertical wind shear refers to the change in wind speed and direction going up through the atmosphere.

Hurricanes need weak shear-  
little change in winds.

Hurricanes destroyed by strong  
shear-large change in winds



Looking sideways  
through storm  
clouds



Lower clouds  
and  
circulation

Upper clouds

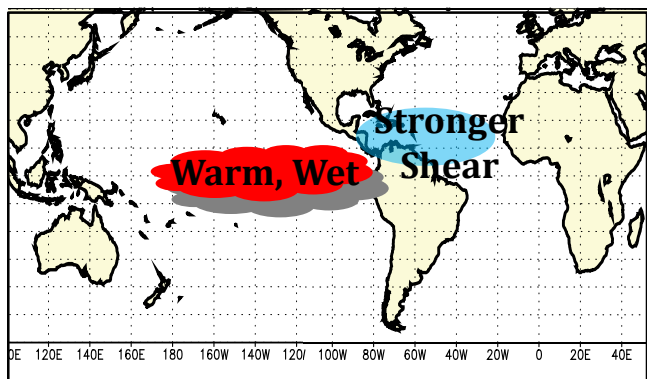
Looking down  
on storm clouds



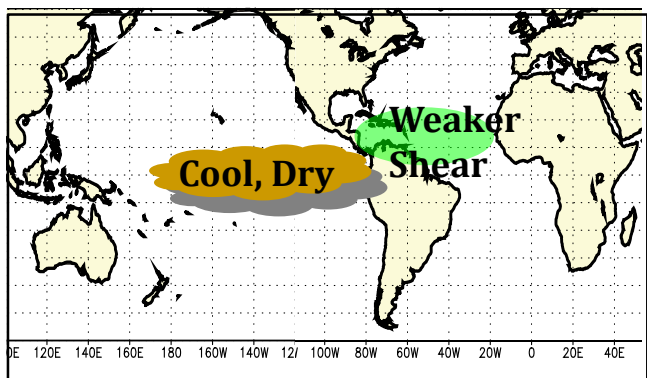
# These Climate Patterns Strongly Influence Atlantic Hurricane Season

El Niño/ La Niña: Year-to-year changes in Atlantic hurricanes

## El Niño: Fewer Hurricanes



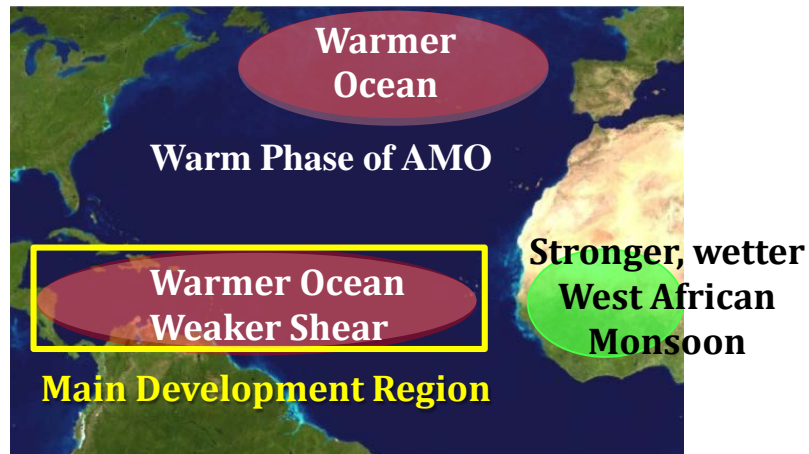
## La Niña: More Hurricanes



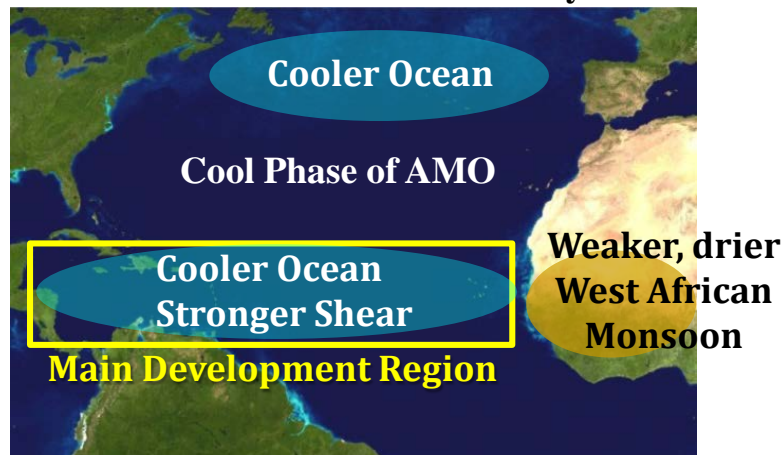
Predicting these climate patterns and their interaction is the basis for making NOAA's seasonal hurricane outlook.

Atlantic Multi-Decadal Oscillation (AMO): Multi-decadal cycles in Atlantic hurricanes

## Climate Pattern for High-Activity Era



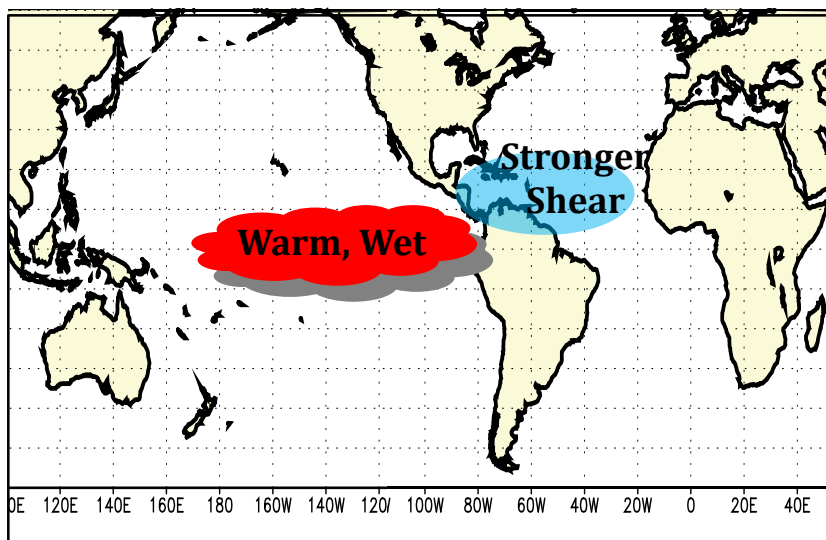
## Climate Pattern for Low-Activity Era



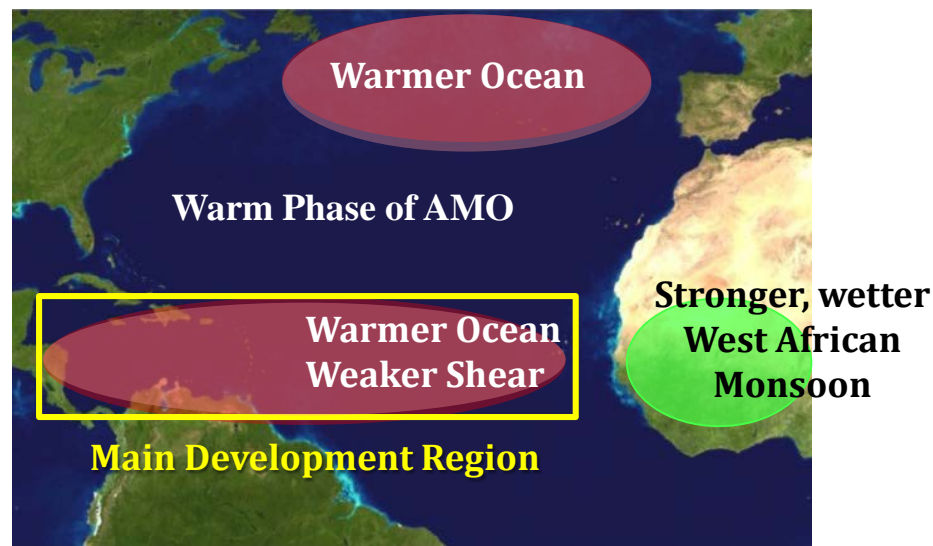


# Competing Factors for the 2019 Atlantic Hurricane Season

## El Niño: Fewer Hurricanes



## Climate Pattern for High-Activity Era

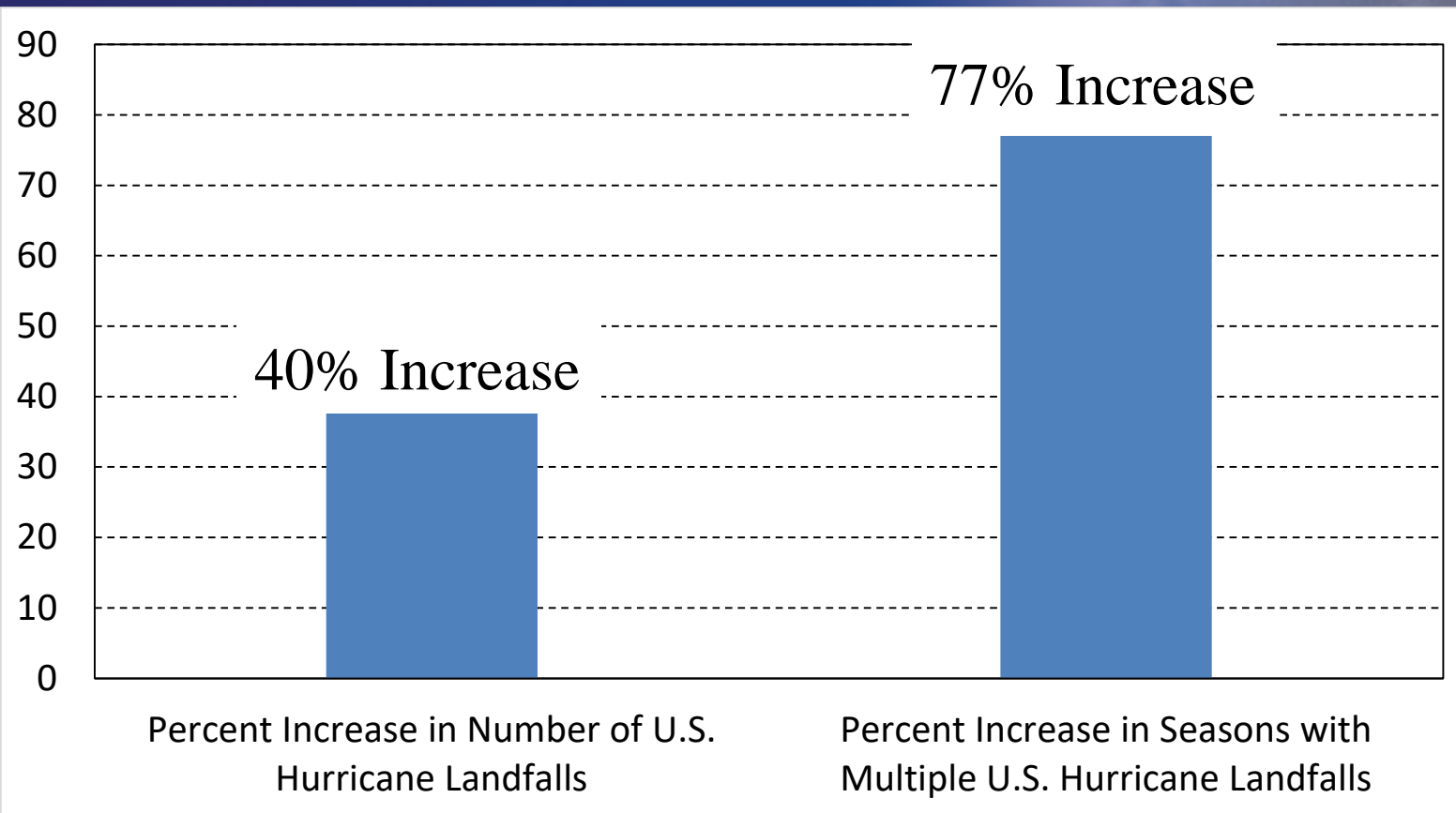


We expect a near-normal Atlantic hurricane season because of these competing climate factors.





## The U.S. Sees More Landfalling Hurricanes During High-Activity Eras







**Did you know?**

**80+ million people live in areas that can be impacted by a tropical storm or hurricane.**





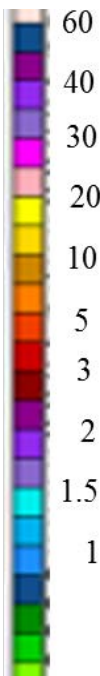
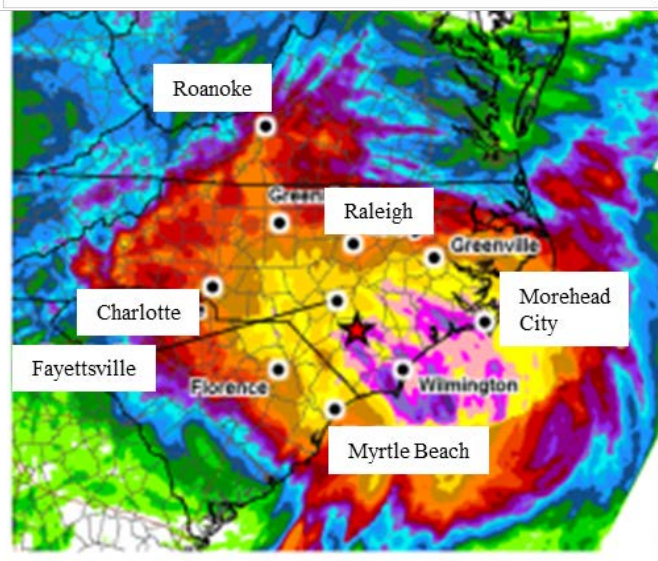
# U.S. Hurricanes Last Year

Hurricanes Florence and Michael  
Caused \$50+ Billion in Damage, 100+ lives lost

Each had different characteristics and impacts.

## Hurricane Florence

Total Rainfall (inches): Sep. 13-17



Massive inland flooding.

Typical of a slow-moving tropical storm or a hurricane with long overland track.

## Hurricane Michael (160 mph winds)



Significant coastal impacts: Storm surge, sometimes complete destruction.

Pre-storm preparedness and evacuations saved un-tolled number of lives





**Prepare for every hurricane season  
regardless of seasonal outlook**





*Your hurricane preparedness plans should reflect both **your personal situation** and the **storm conditions you might expect.***



BOLIVAR PENINSULA IN TEXAS AFTER HURRICANE IKE (2008)

**Storm Surge**



**Inland Flooding**

**Devastating Winds**



**Tornadoes**

**Rip Currents**

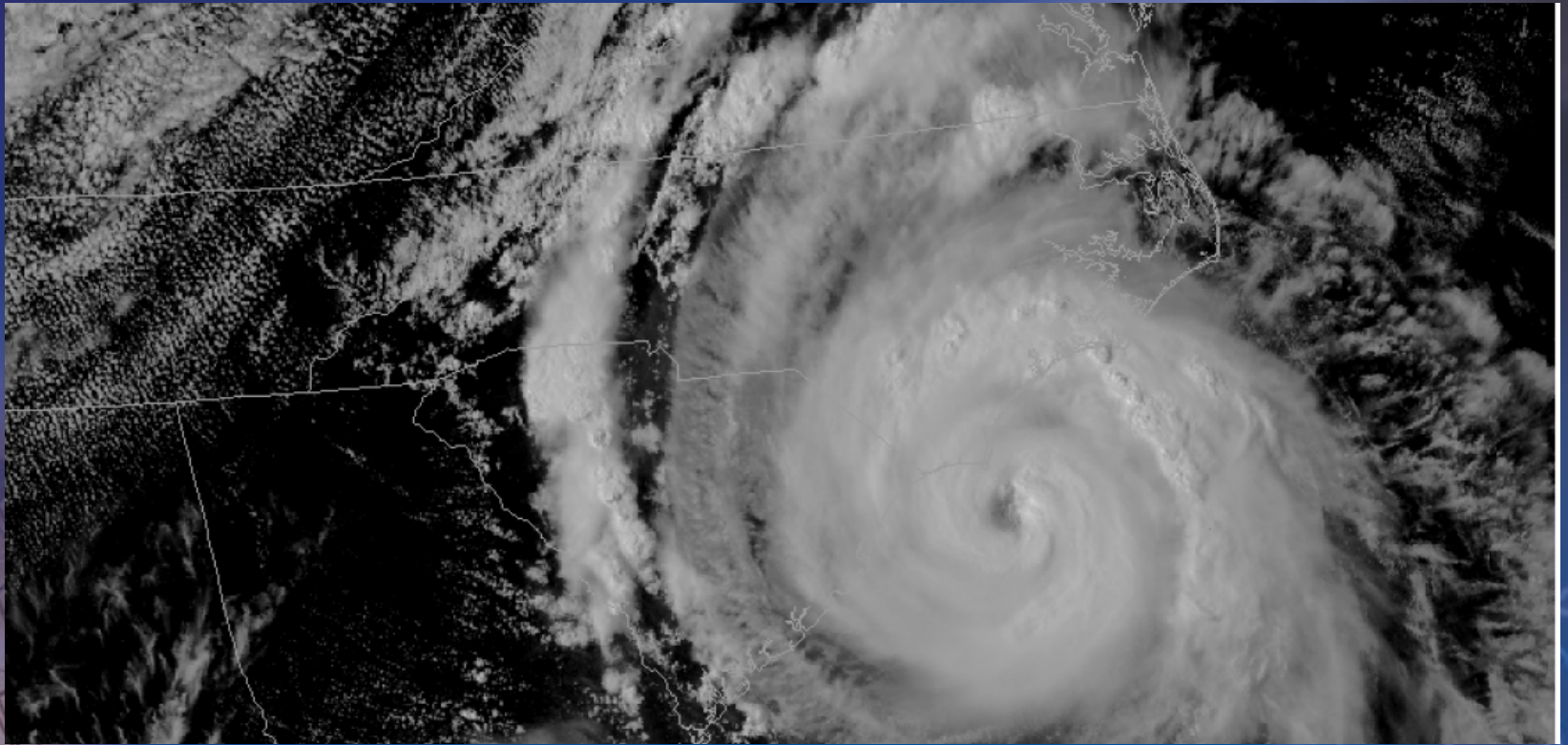
**Downed Trees and Power Lines**





**Great web sites for  
hurricane preparedness**

**Ready.gov**  
**Hurricanes.gov**



**You are your first line of defense if a hurricane strikes**



**Prepare for every hurricane season  
regardless of seasonal outlook**

**Remember...  
*It Only Takes One!***

***Be Ready! Take Action!***

