

Hurricane! *An Early Look Ahead*

Florida Municipal Electric Association

May 1, 2024

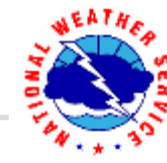


Will Ulrich

Warning Coordination Meteorologist

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- National Weather Service Overview
- Tropical Storms & Hurricanes Basics
- What About This Year?
- NWS/NHC Tropical Products & Services
- A Personal Plea...



An Overview



Weather Forecast Offices

...a total of **122** across the country.

...each staffed with **20-25** employees.

...operates **24** hours a day, **7** days a week.





Our Mission & Vision

The Mission

“Providing weather, water, and climate data, forecasts, warnings, and impact-based decision support services for the protection of life and property...”



*“A Weather-Ready Nation where **society is prepared for and responds to** weather, water, and climate-dependent events.”*

The Vision



START

<https://www.weather.gov>

END

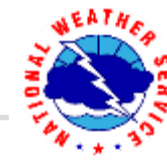
<https://www.weather.gov/MLB>





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Tropical Cyclones 101

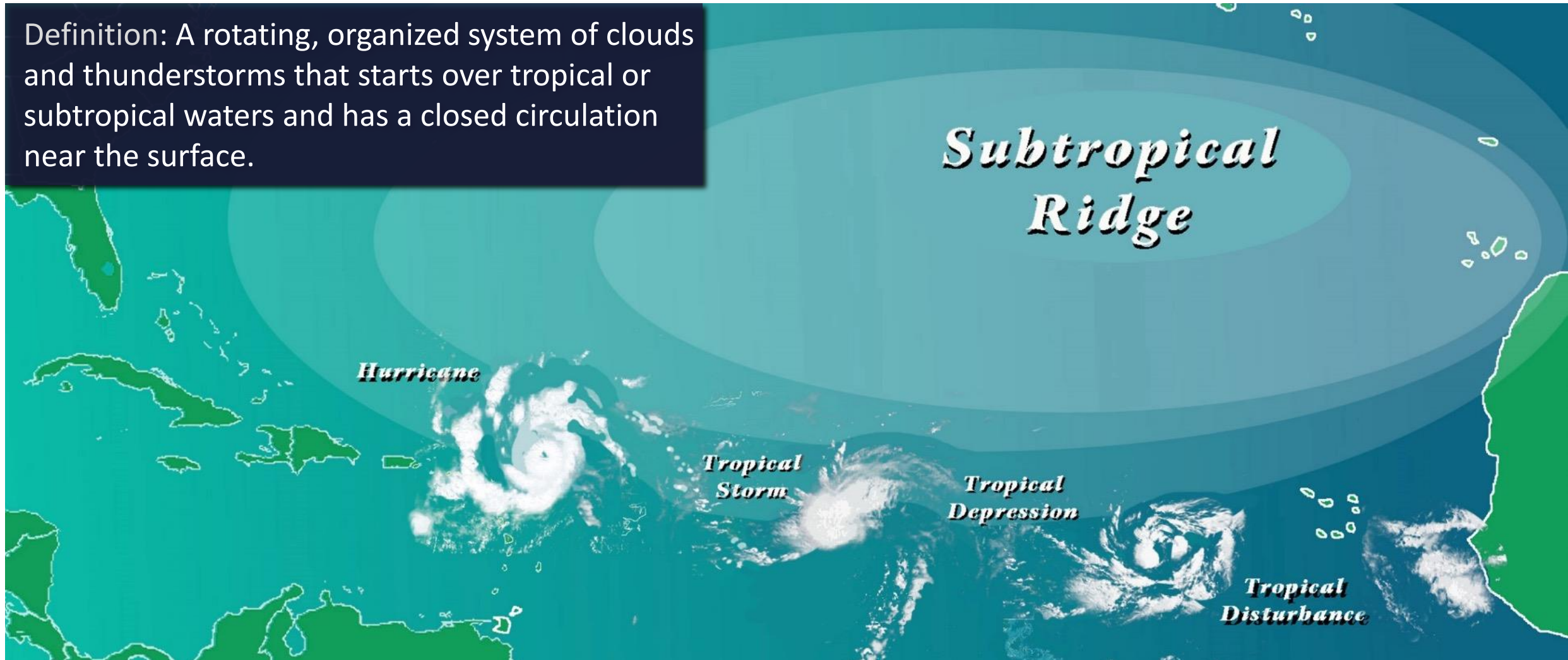


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Definition

Definition: A rotating, organized system of clouds and thunderstorms that starts over tropical or subtropical waters and has a closed circulation near the surface.



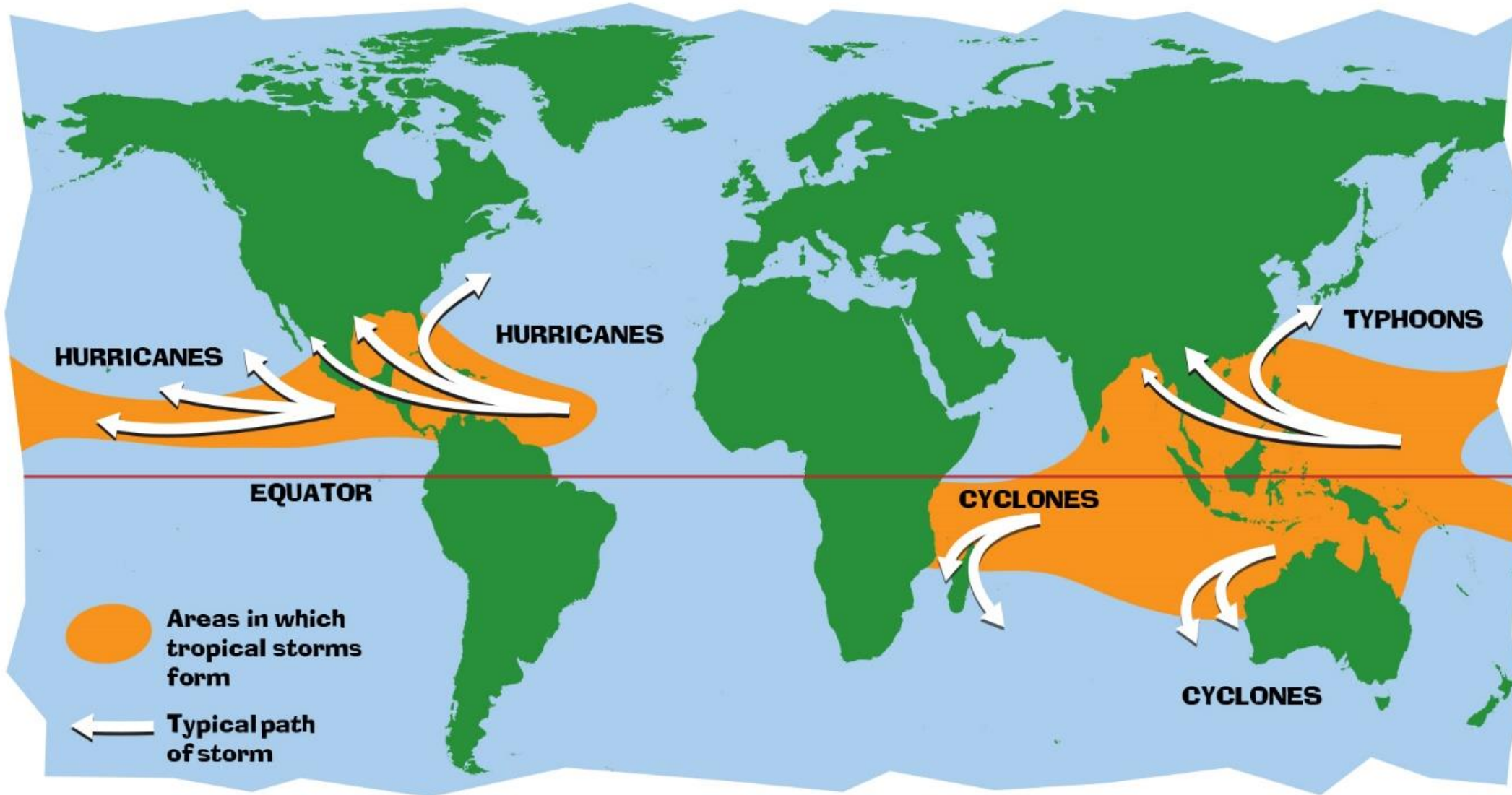
Tropical Cyclones 101



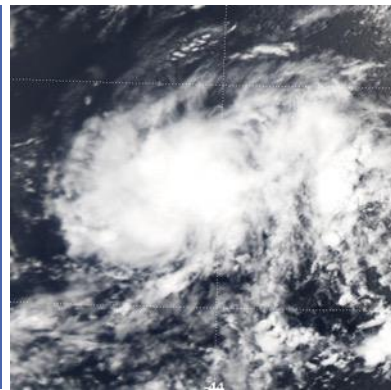
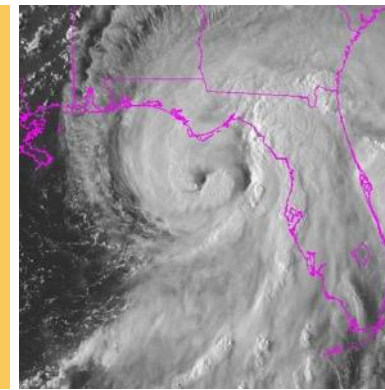


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Development Regions



Tropical Cyclone Come in All Shapes & Sizes!

<p>Tropical Depression (winds at or below 38 mph)</p>		<p>Hurricane (winds at or above 74 mph)</p>	
<p>Tropical Storm (winds between 39 – 73 mph)</p>		<p>Major Hurricane (winds at or above 111 mph)</p>	



Saffir-Simpson Wind Scale

Saffir-Simpson Hurricane Wind Scale



WIND: 74-95 mph

DAMAGE: Very dangerous winds will produce some damage



WIND: 96-110 mph

DAMAGE: Extremely dangerous winds will cause extensive damage



WIND: 111-129 mph

DAMAGE: Devastating damage will occur



WIND: 130-156 mph

DAMAGE: Catastrophic damage will occur



WIND: 157 mph or higher

DAMAGE: Catastrophic damage will occur



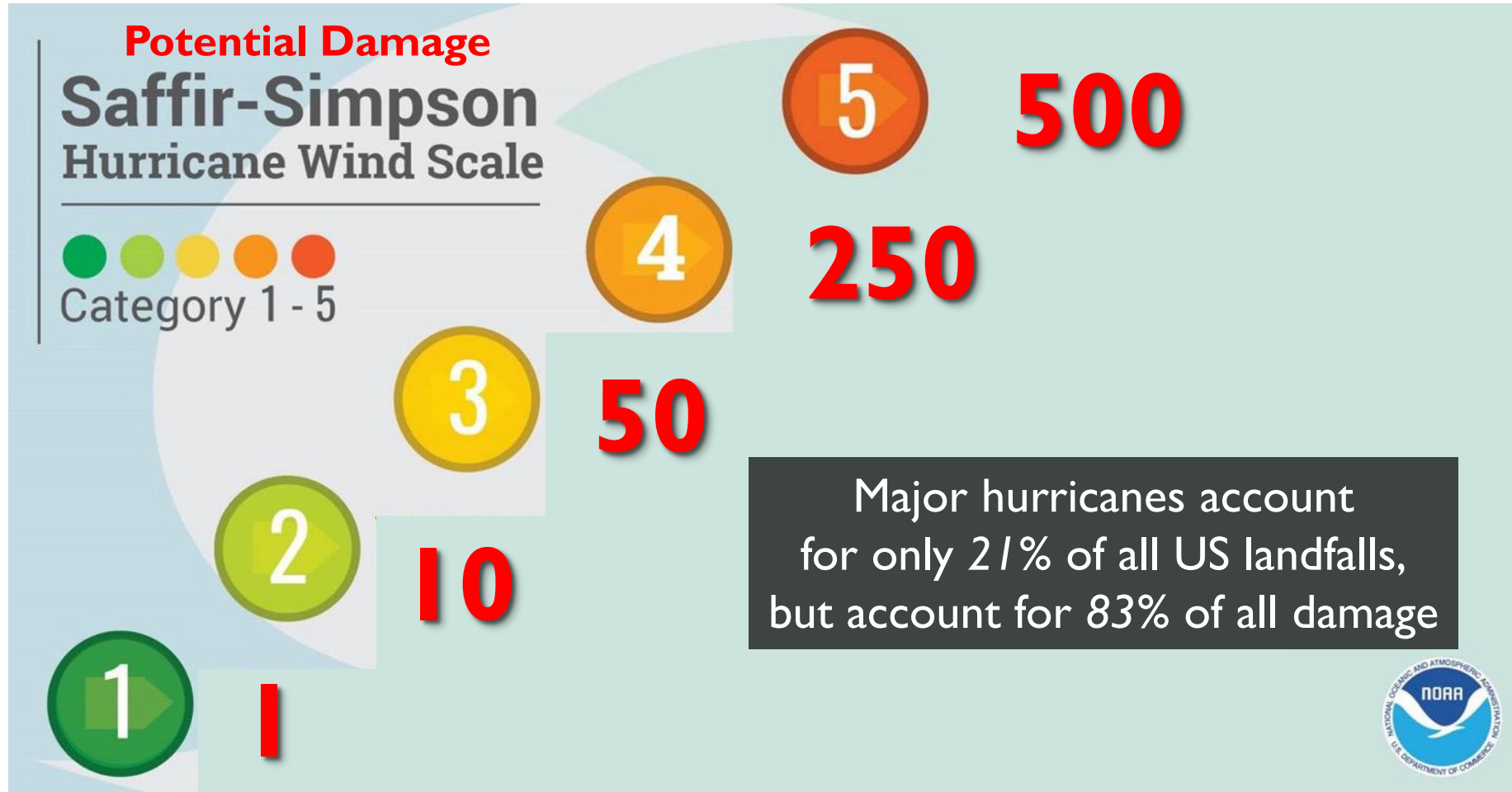
Tropical Cyclones 101



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Saffir-Simpson Wind Scale



Tropical Cyclones 101

Hazards



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All tropical cyclones can produce one or combination of these!



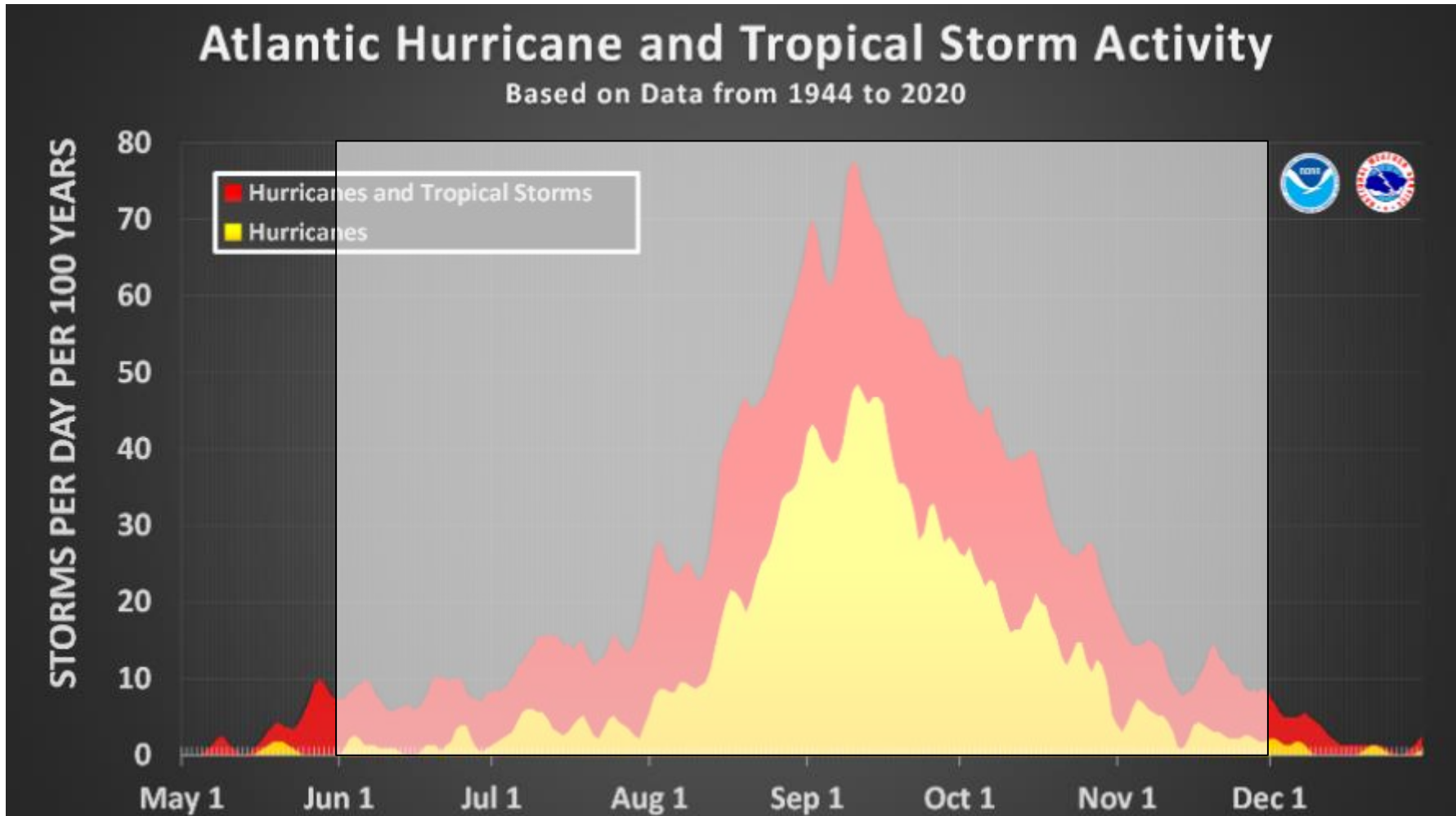
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Hurricane Season



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June 1st-November 30th
Encompasses 97% of All Activity



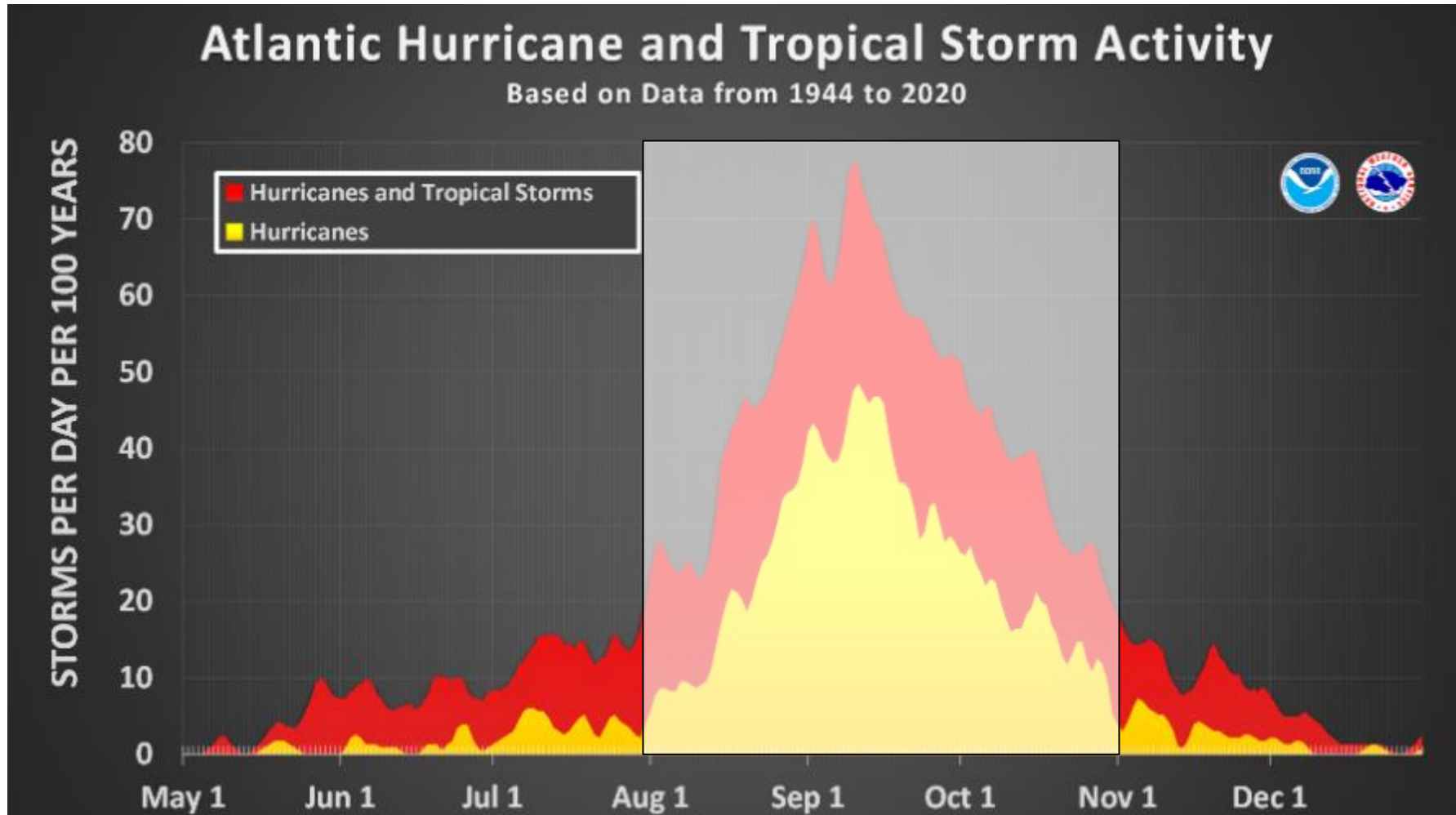
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Hurricane Season



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August 1st - October 31st

92% of Tropical Storms & Hurricanes Form in Aug, Sep, Oct

Tropical Cyclones 101

June Hurricanes (1851-2020)

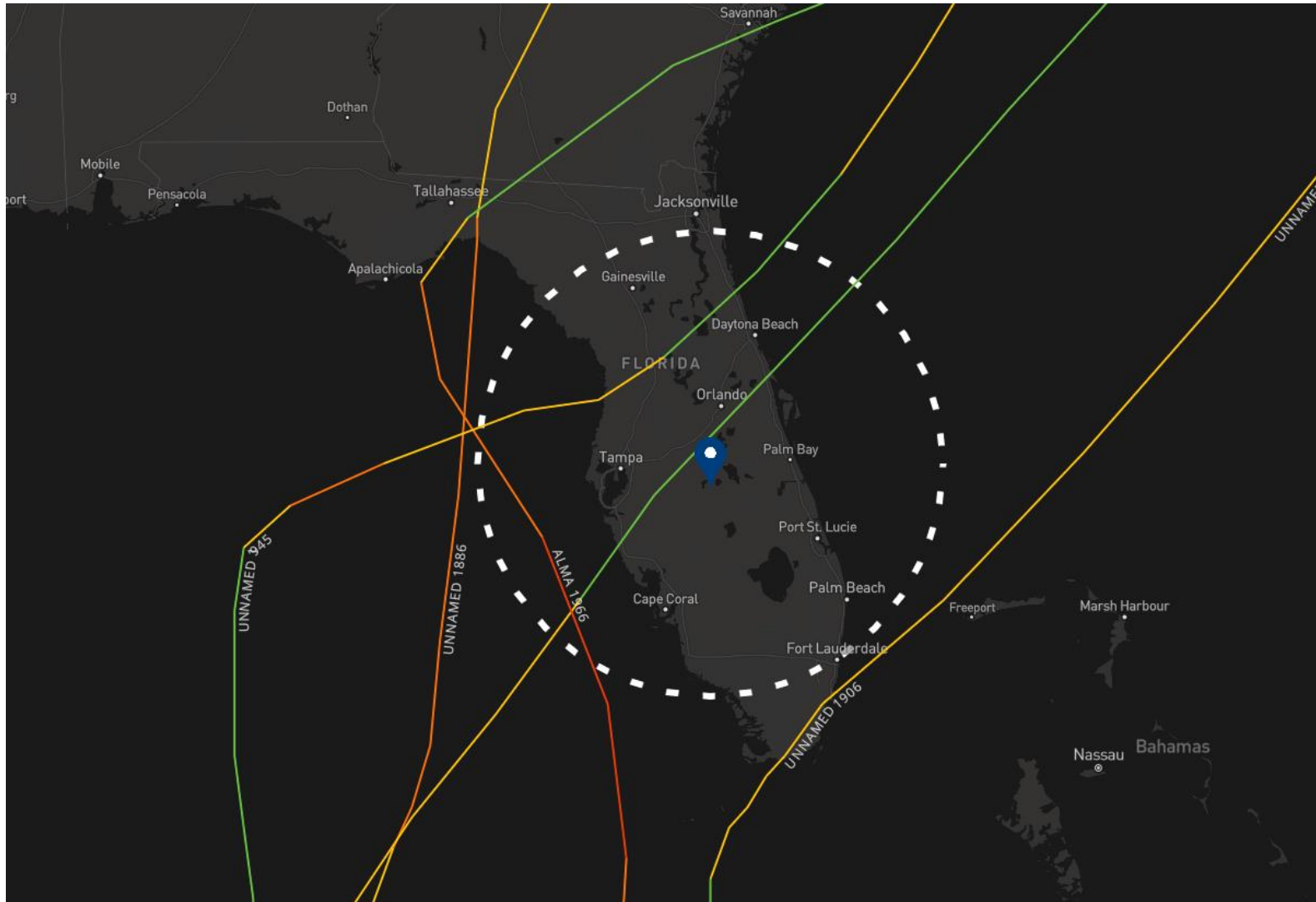


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2 Hurricanes
16 TS (not shown)

- Category 5
- Category 4
- Category 3
- Category 2
- Category 1
- Tropical Storm
- Tropical Depression
- Extratropical Storm



Tropical Cyclones 101

July Hurricanes (1851-2020)

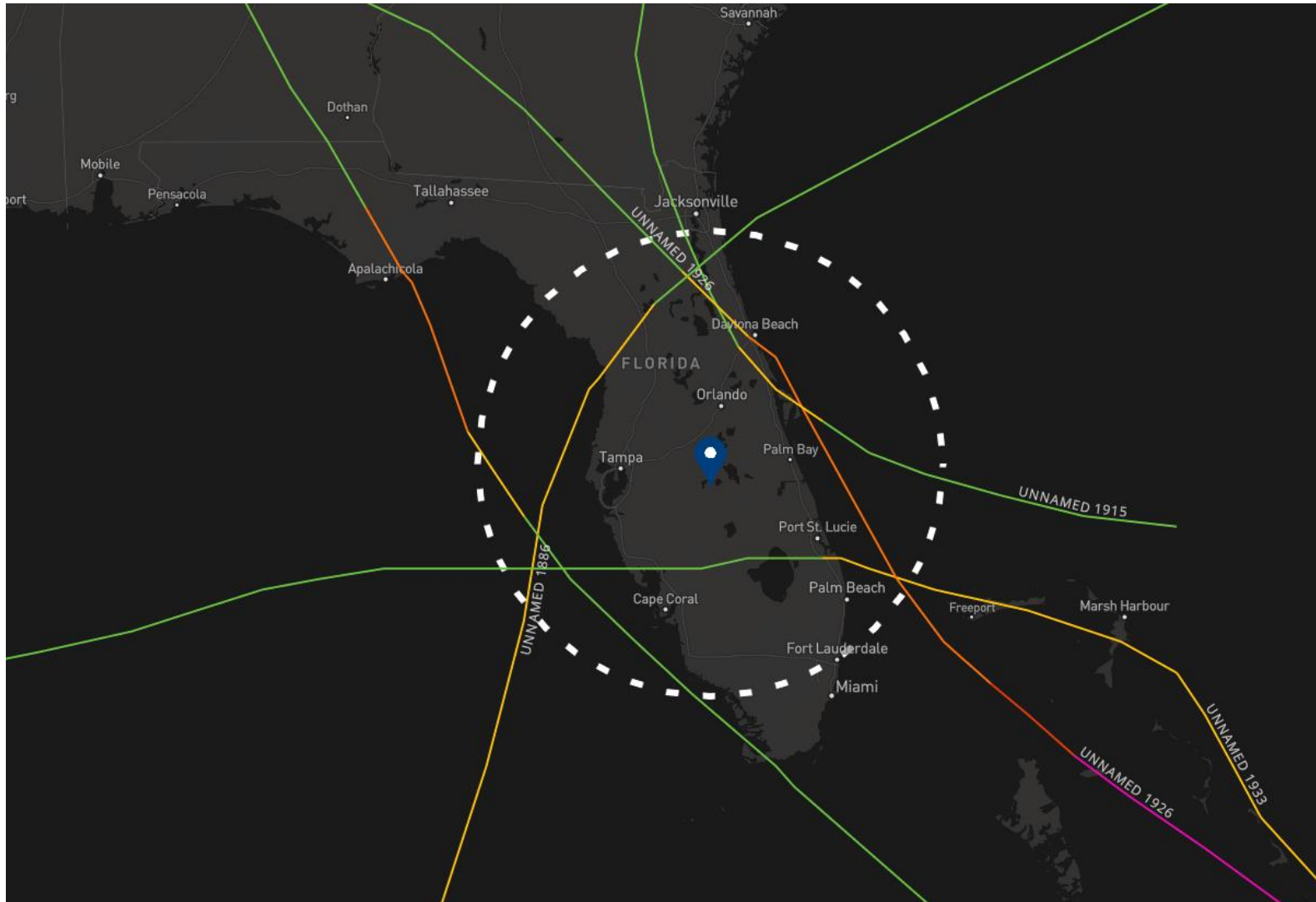


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5 Hurricanes
12 TS (not shown)

- Category 5
- Category 4
- Category 3
- Category 2
- Category 1
- Tropical Storm
- Tropical Depression
- Extratropical Storm



Tropical Cyclones 101

August Hurricanes (1851-2020)

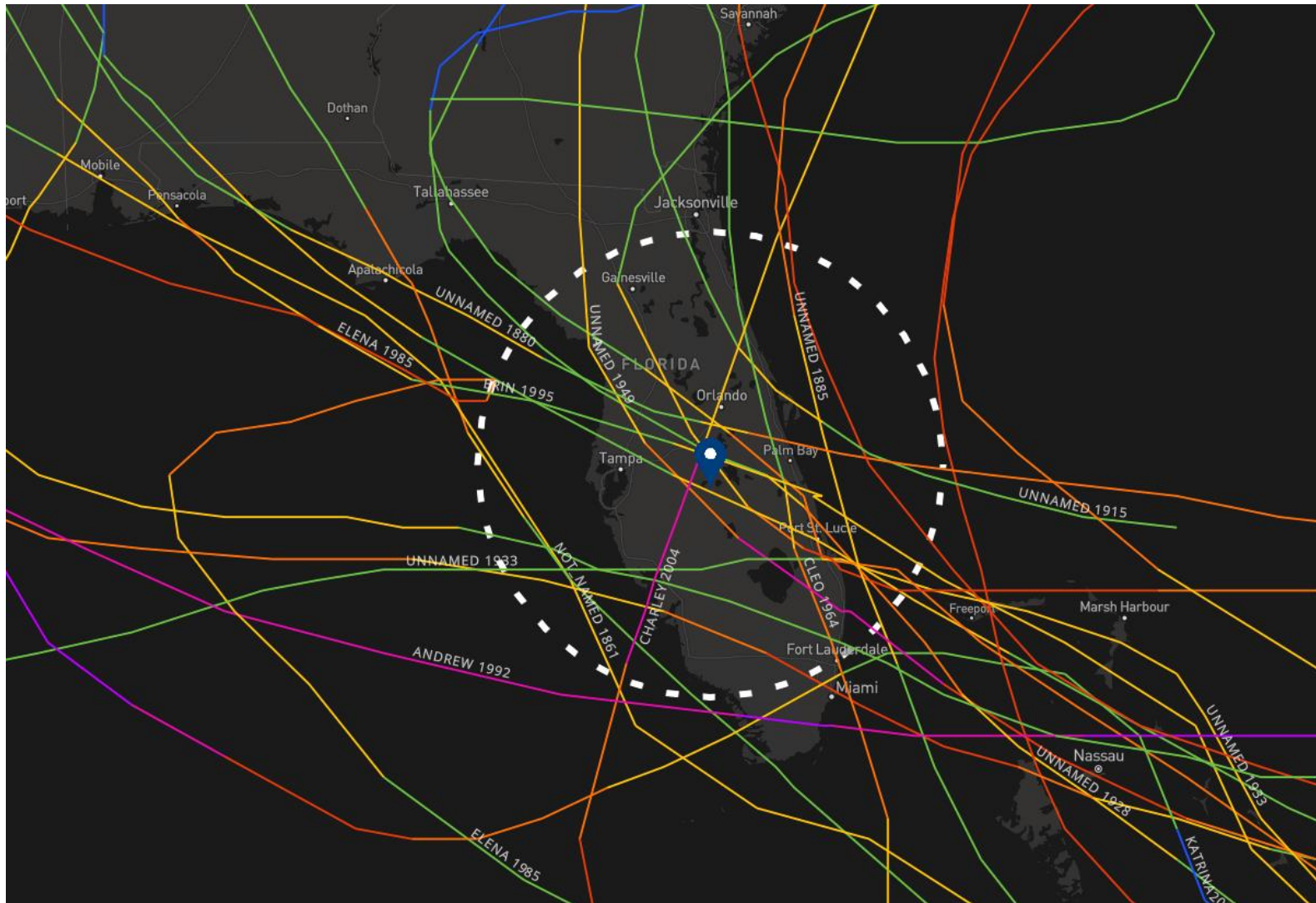


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22 Hurricanes
27 TS (not shown)

- Category 5
- Category 4
- Category 3
- Category 2
- Category 1
- Tropical Storm
- Tropical Depression
- Extratropical Storm



Tropical Cyclones 101

October Hurricanes (1851-2020)

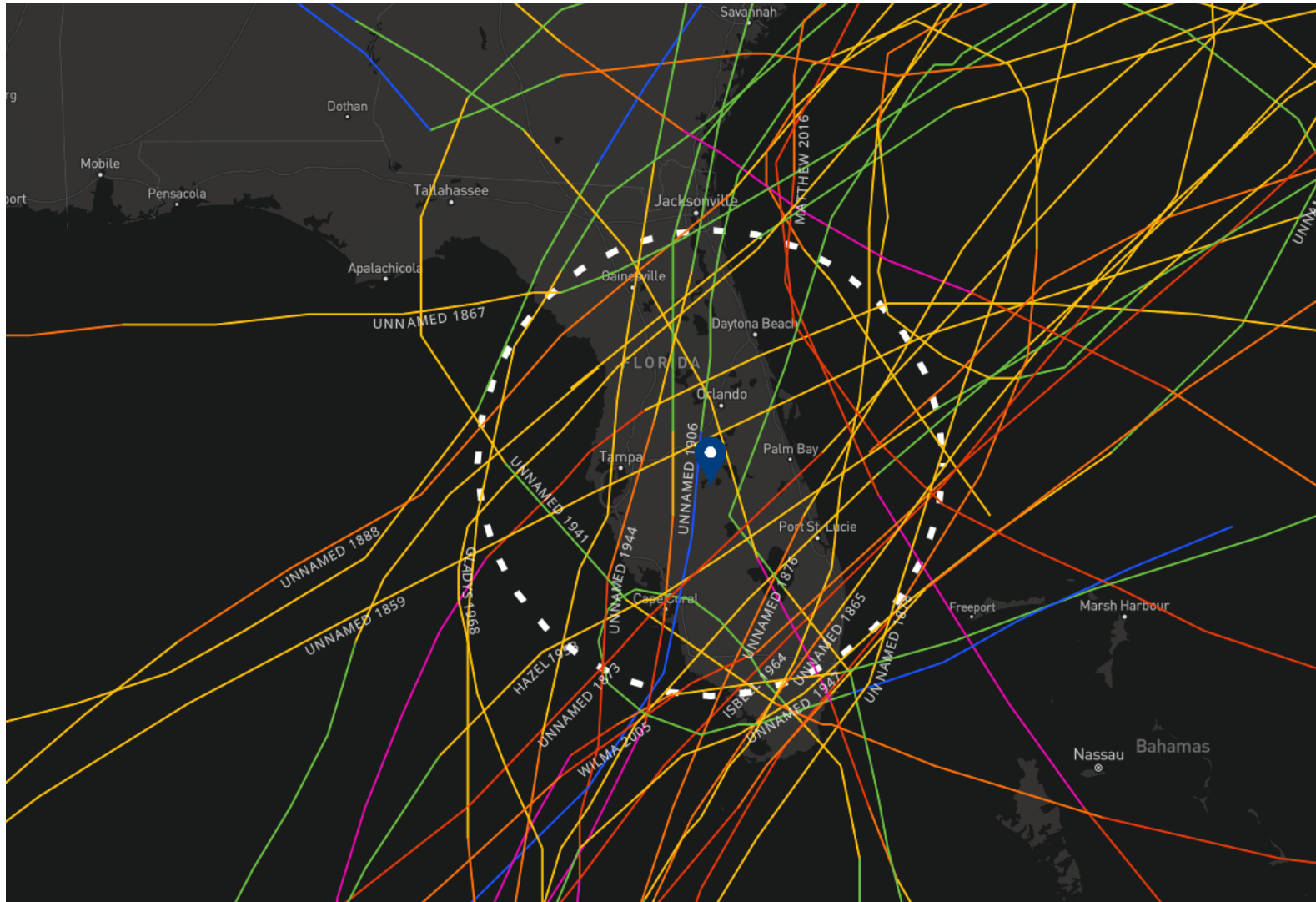


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34 Hurricanes
26 TS (not shown)

- Category 5
- Category 4
- Category 3
- Category 2
- Category 1
- Tropical Storm
- Tropical Depression
- Extratropical Storm



Tropical Cyclones 101









November Hurricanes (1851-2020)

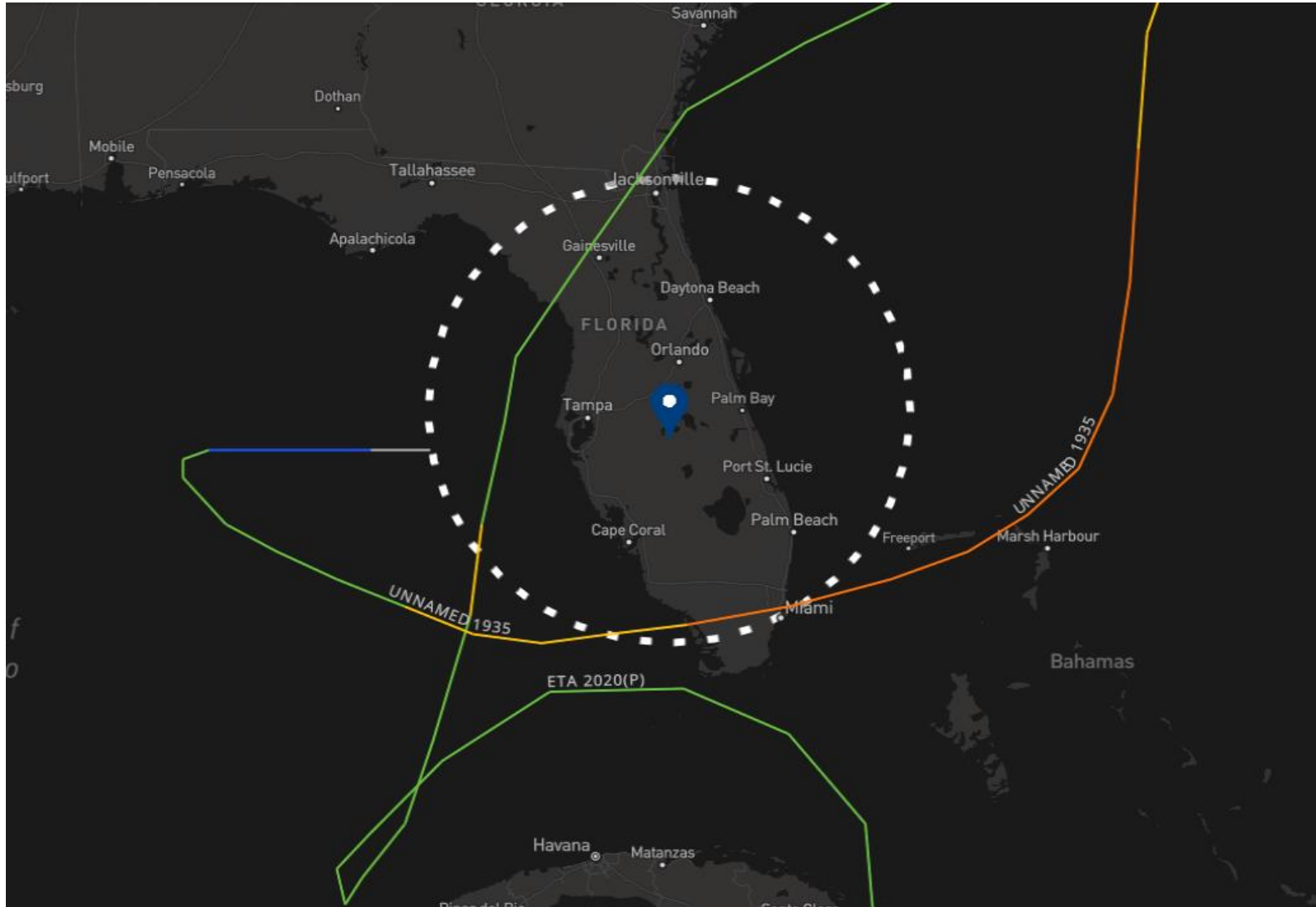


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2 Hurricanes
7 TS (not shown)

-  Category 5
-  Category 4
-  Category 3
-  Category 2
-  Category 1
-  Tropical Storm
-  Tropical Depression
-  Extratropical Storm





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A Look Ahead

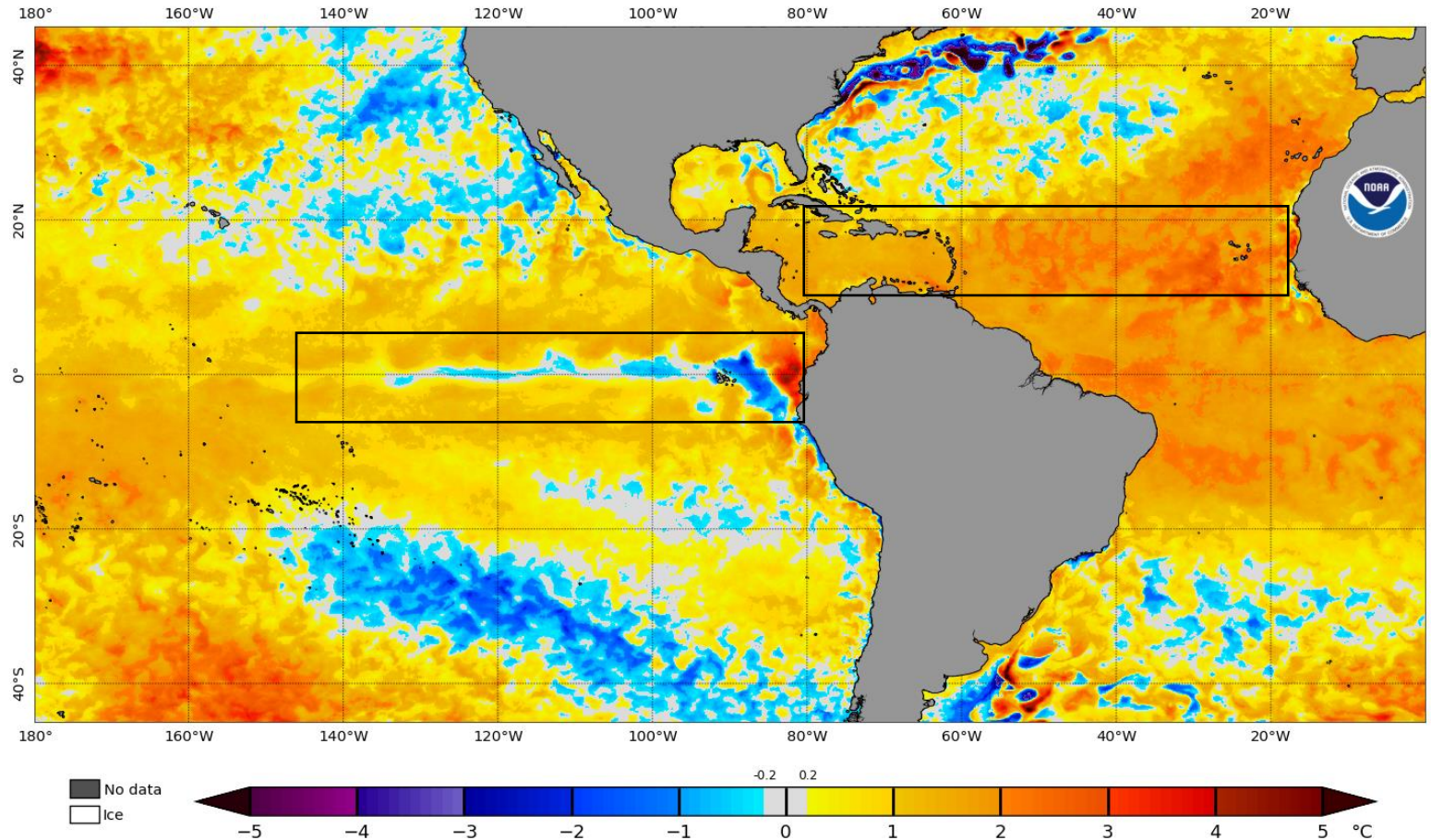
Hurricane Season



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NOAA Coral Reef Watch Daily 5km SST Anomalies (v3.1) 24 Apr 2024



- A combination of factors (including La Niña and very warm water temperatures in the main development region of the Atlantic) suggest the upcoming hurricane season could be busy.

A Look Ahead

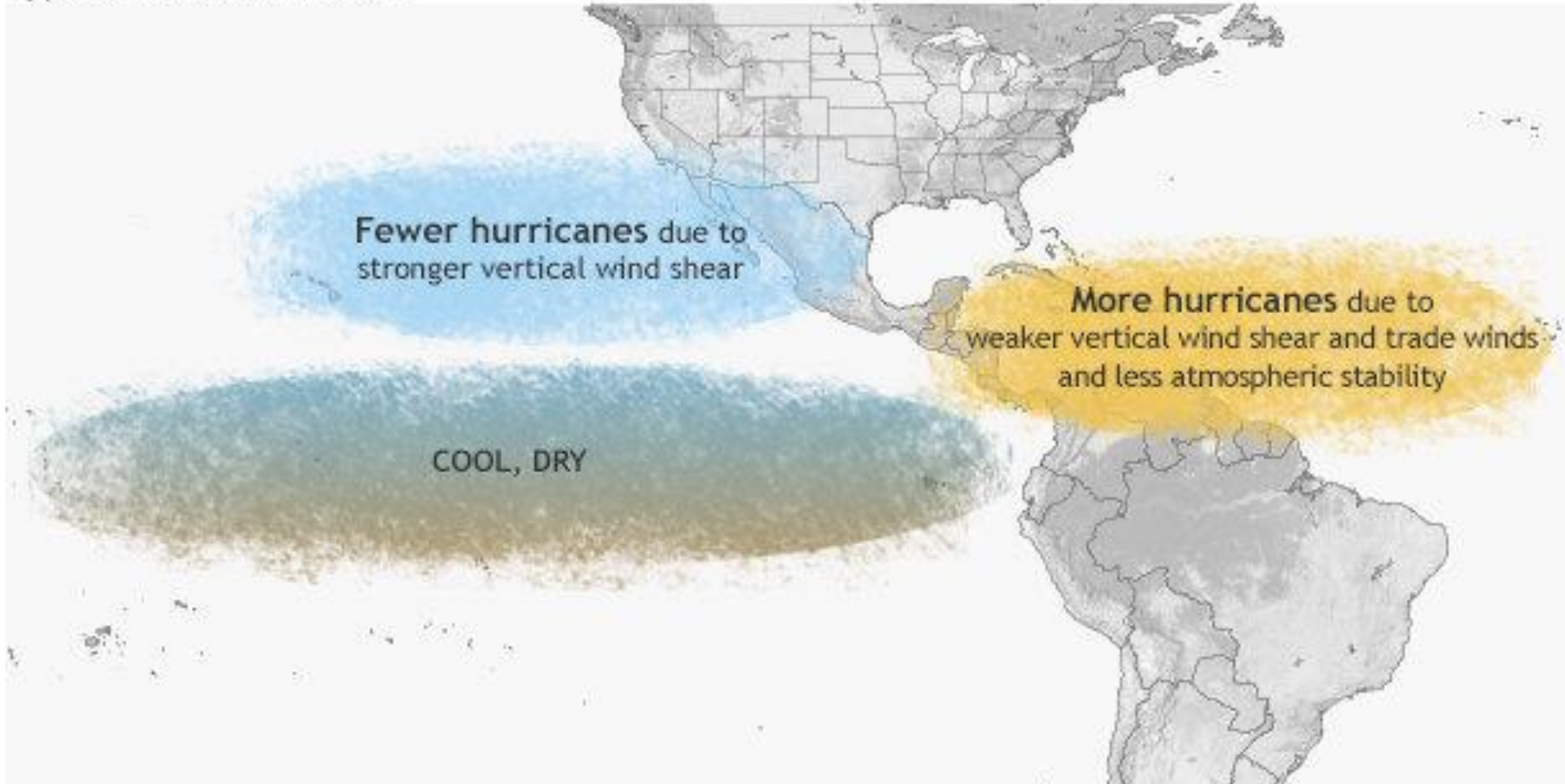
Hurricane Season



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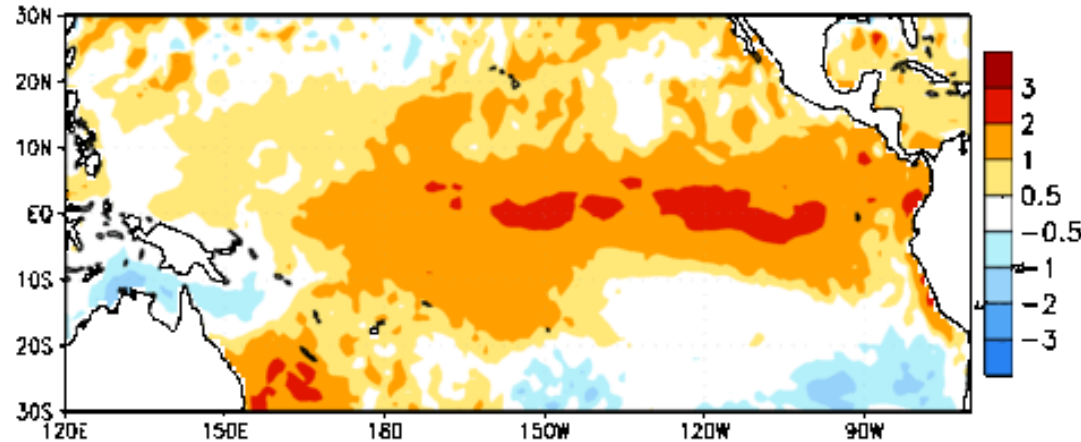
— Melbourne 🌴 Florida —

Typical La Niña influence

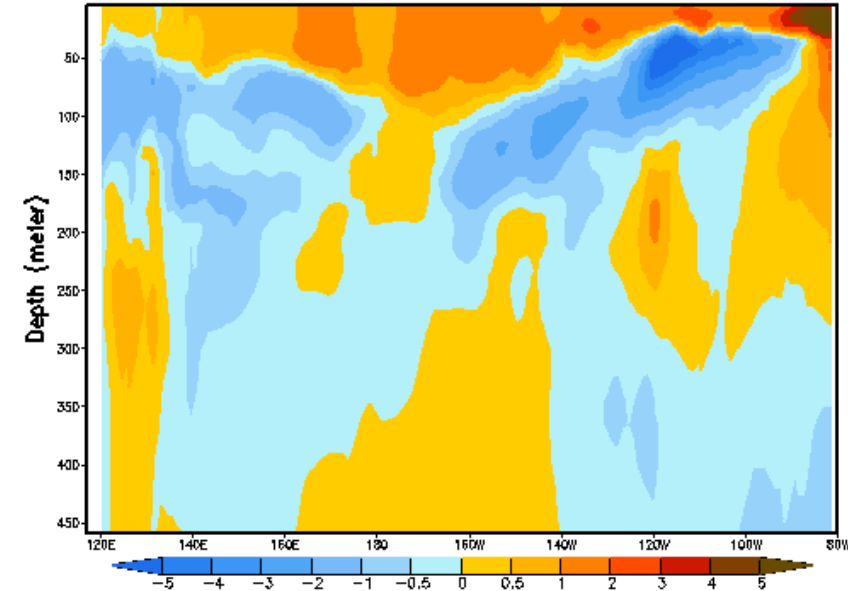




Week centered on 31 JAN 2024
SST Anomalies (°C)



Equatorial Temperature Anomaly (°C)
Pentad centered on 17 FEB 2024



- Warm temperature anomalies over the eastern Pacific Ocean are **quickly being erased** by cooler sub-surface waters
- The anticipated transition from El-Niño to La-Niña has started

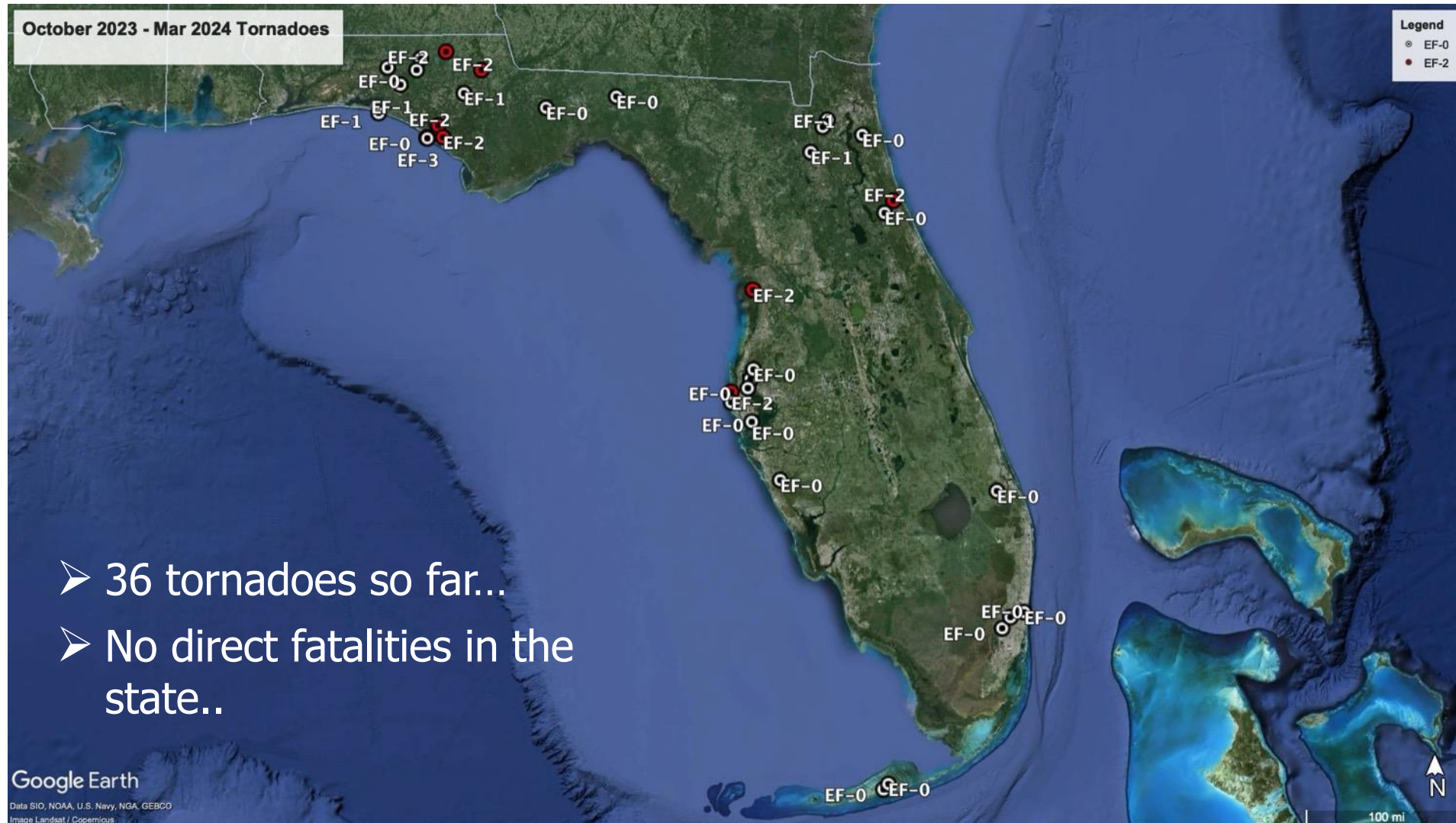
ENSO Impact



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Tornado Touchdowns Since October 1



- 36 tornadoes so far...
- No direct fatalities in the state..

ENSO Forecast

La-Niña Expected to Develop

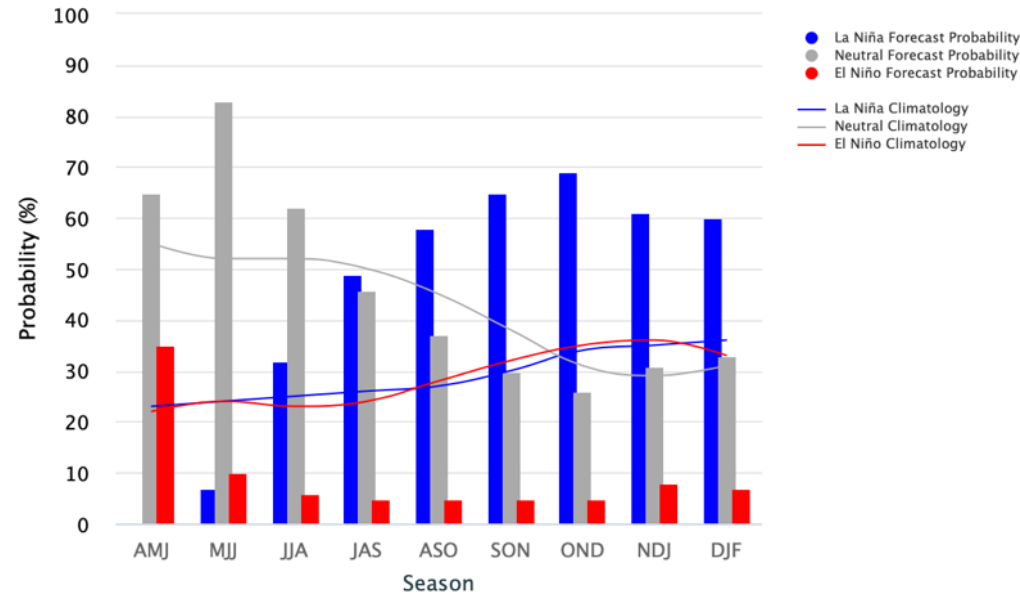


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Mid-April 2024 IRI Model-Based Probabilistic ENSO Forecasts

ENSO state based on NINO3.4 SST Anomaly Neutral ENSO: -0.5 °C to 0.5 °C



- A transition from El Niño to ENSO-neutral is likely by April-June 2024, with **increasing odds of La Niña** developing this summer (> 50% chance).

The Forecast



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The Season is Brewing...

	Climatology	Forecast	
	Average	Colorado State	NOAA/NWS*
Named Storms	14	23	--
Hurricanes	7	11	--
Major Hurricanes	3	5	--

*NOAA/NWS Forecast Will Be Released on May 23

- An above normal hurricane season is **likely**
- Busier than usual seasons are often associated with more/greater impacts from landfalling systems in the U.S.



- National Weather Service Overview
- Tropical Storms & Hurricanes Basics
- What About This Year?
- NWS/NHC Tropical Products & Services
- Hurricane Preparedness & Safety

Tropical Products & Services



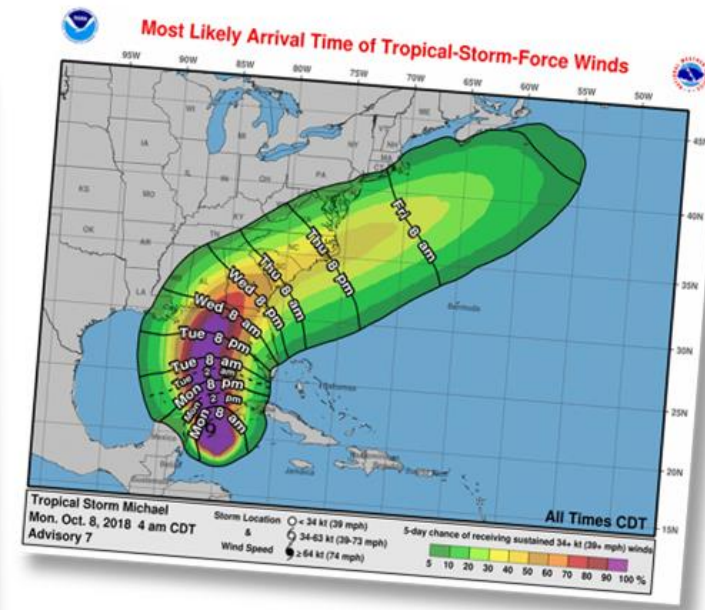
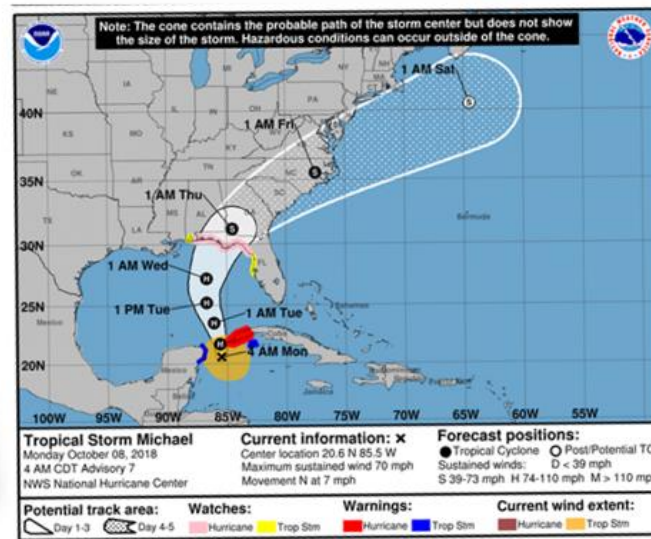
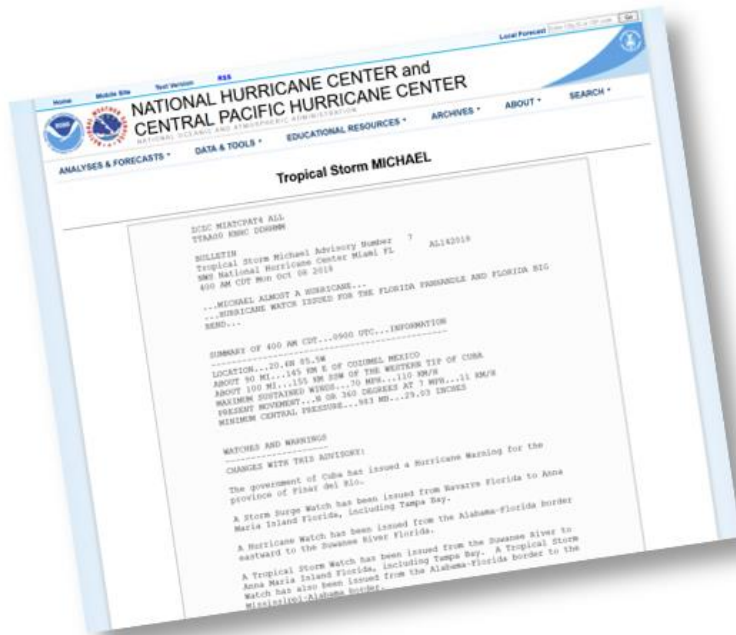
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National Center(s) Role

- National Hurricane Center
- Weather Prediction Center
- Storm Prediction Center
- National Water Center

...provide the 'big picture' that complements and guides local NWS forecast office products



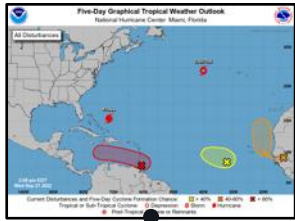
Tropical Products & Services



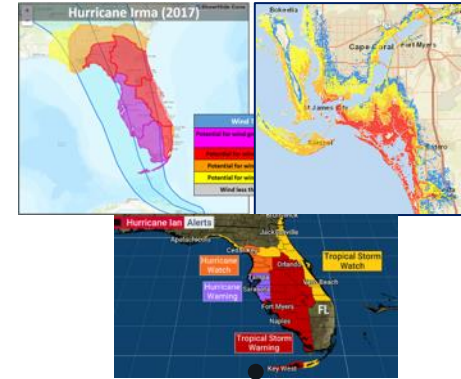
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Timeline



- Tropical Weather Outlook



- Tropical Watches & Warnings
- Potential & Expected Storm Surge
- Hurricane Threats & Impacts

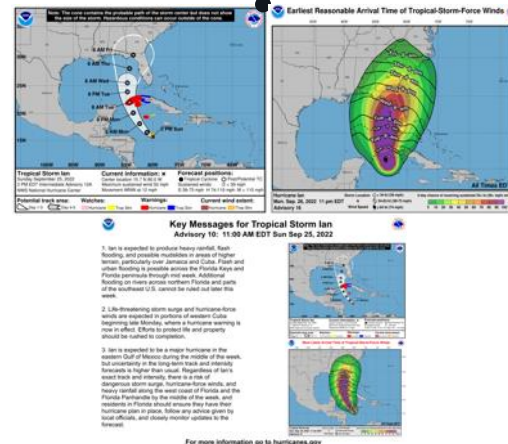
Days 6-7

Day 3-5

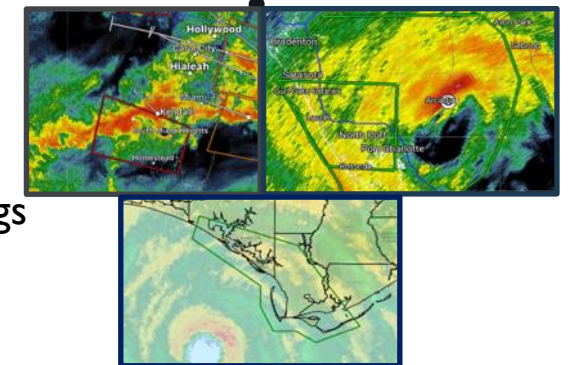
Days 1-2

Impact Day

- Potential Track Forecast
- Wind Speed Probabilities
- Time of Arrival Graphics
- NHC Key Messages



- Tornado Warnings
- Extreme Wind Warnings
- Flash Flood Warnings



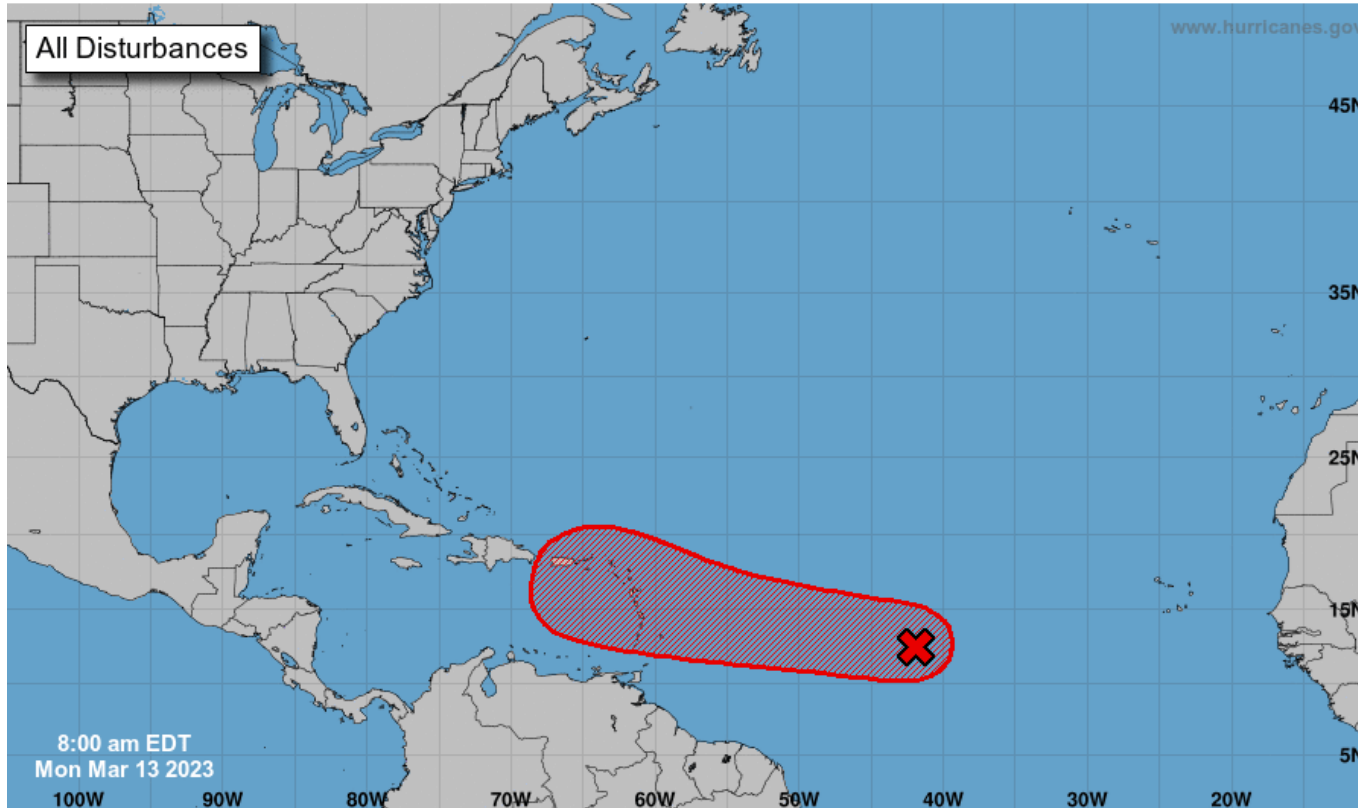


Tropical Weather Outlook



Seven-Day Graphical Tropical Weather Outlook

National Hurricane Center Miami, Florida



- Highlights area of potential tropical development over the next 7 days
- Shading represents the potential formation area and NOT the track of the system

Current Disturbances and Seven-Day Cyclone Formation Chance: < 40% 40-60% > 60%
Tropical or Sub-Tropical Cyclone: Depression Storm Hurricane
 Post-Tropical Cyclone or Remnants

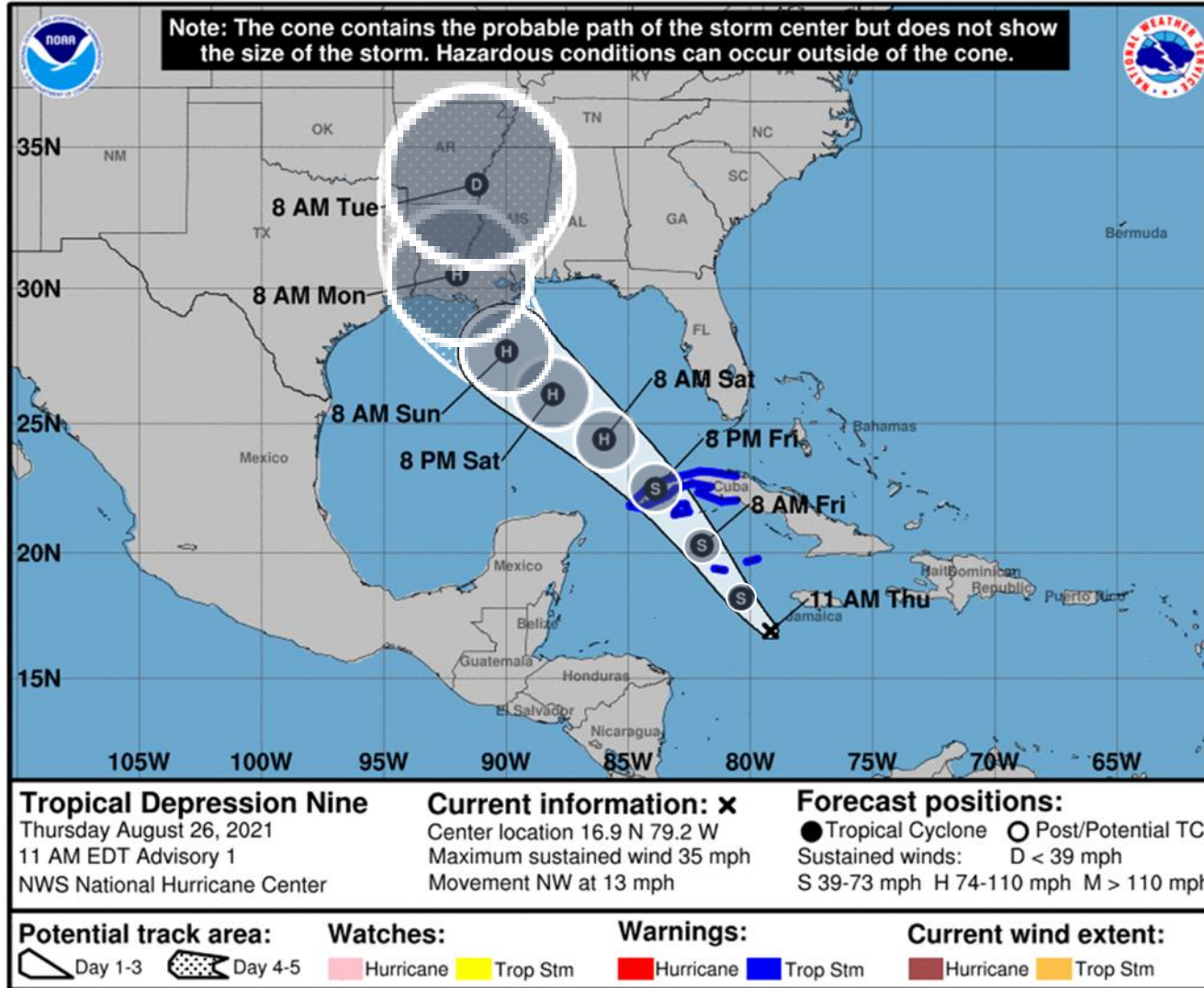
Tropical Products & Services



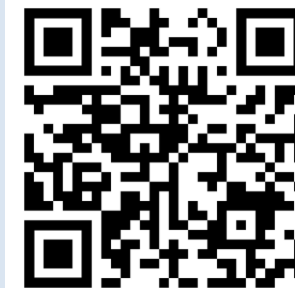
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Potential Track Forecast



- Depicts the most likely track (2/3rd of the time) of the center of the storm
- Based on NHC's performance over the past five years
- Does NOT convey impacts



Information about the NHC cone and reminders

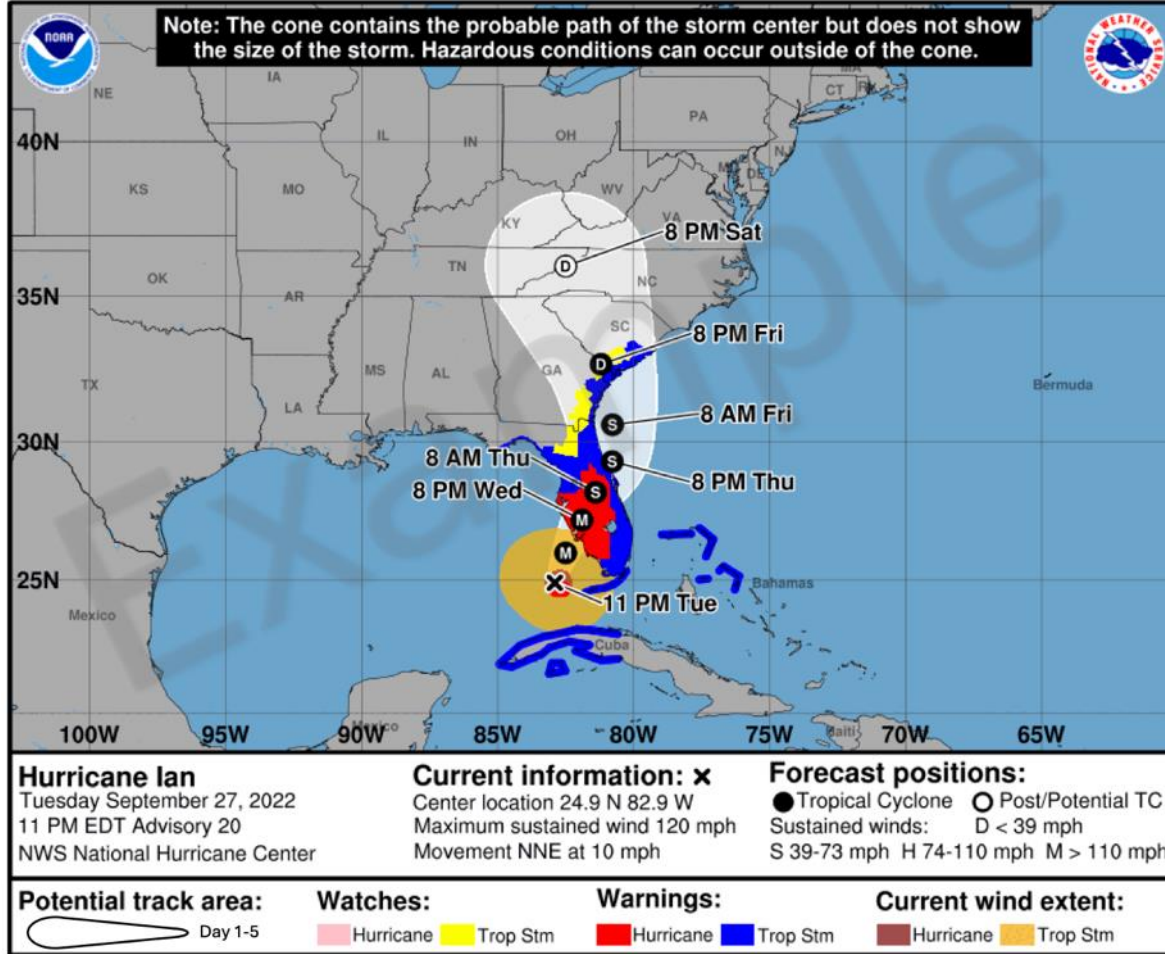
Ahead of the Season



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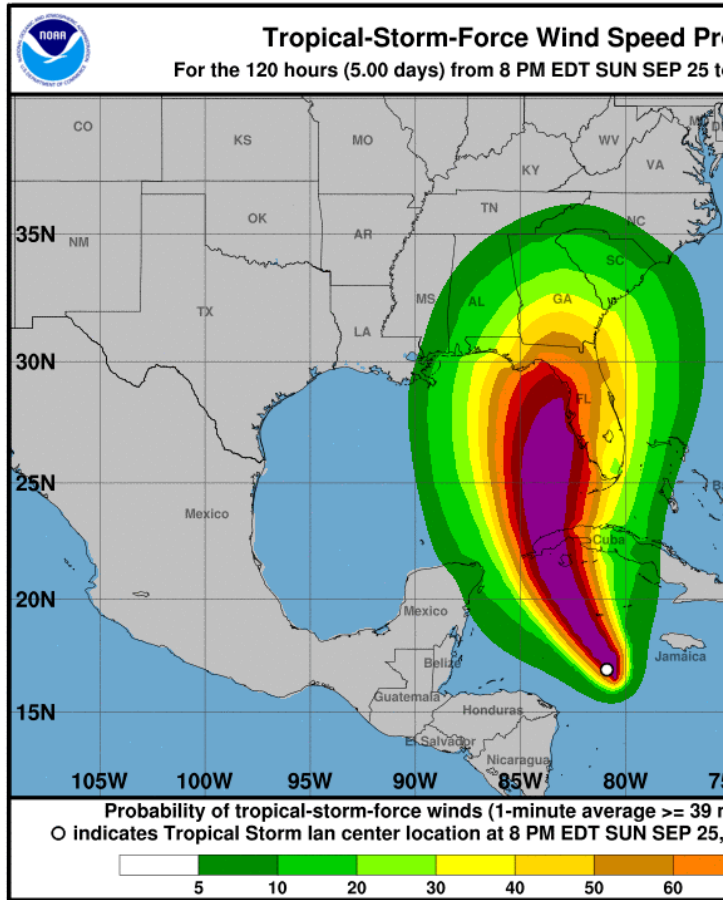
Biggest Change From NHC



- New experimental cone graphic will depict wind watches and warnings beginning on or around August 15, 2024
- Goal is to help convey wind hazard risk over land (taking away attention from cone graphic to focus on impacts)



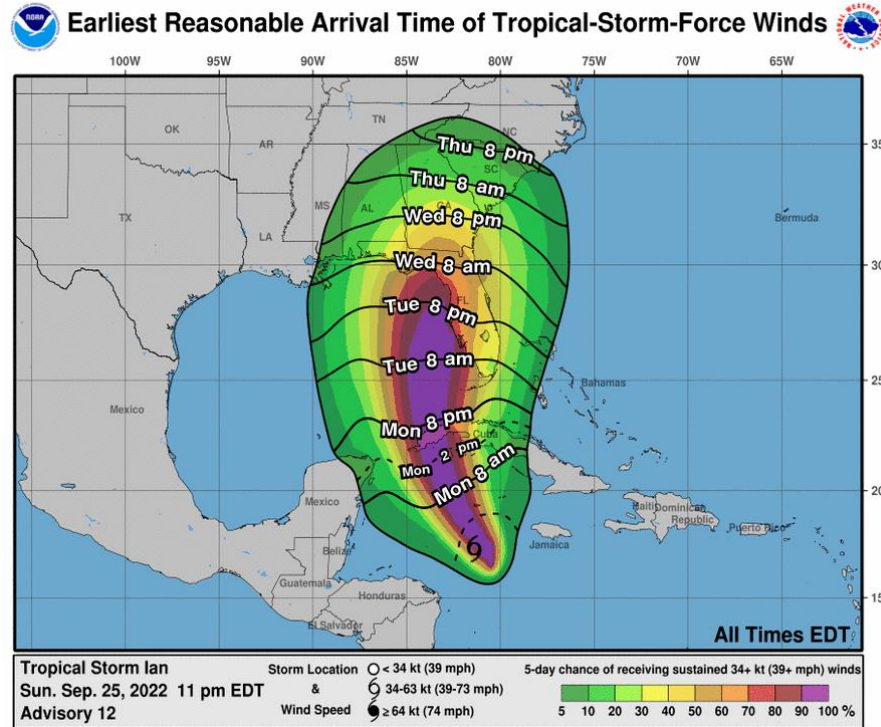
Wind Speed Probabilities



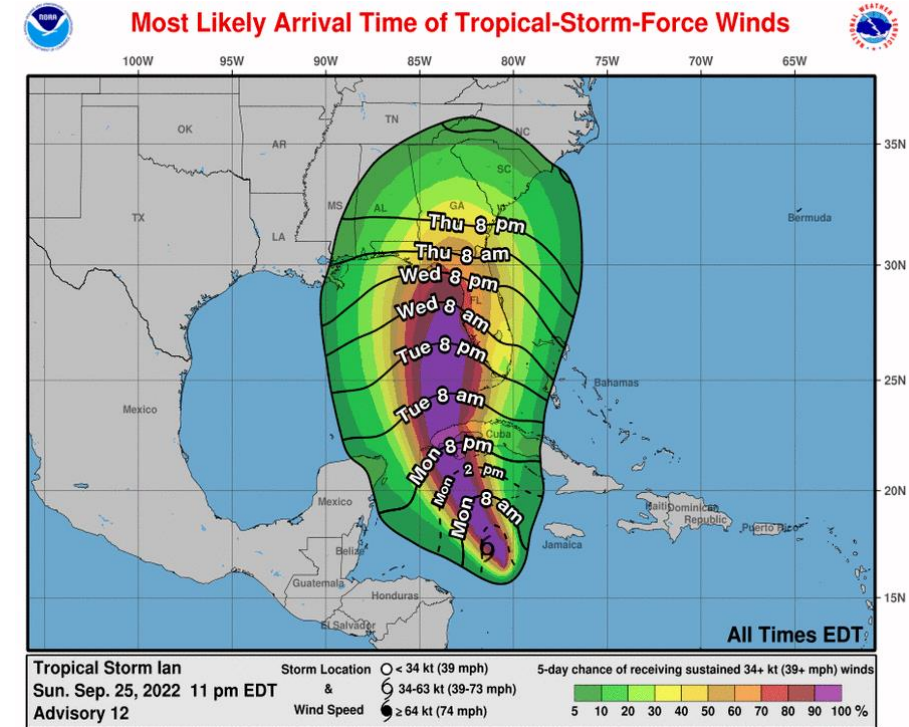
- Depicts cumulative probability of tropical winds for a specific location over the next 5 days
- Based on 1,000 realistic alternative scenarios that takes into account more than just the forecast track and intensity including:
 - Climatology
 - Past track and intensity forecasts
 - Forecast model spread (uncertainty)



Time of Arrival Graphics



- Only 1 in 10 chance (10%) of tropical storm force winds arriving earlier than noted time
- Best for users with low risk tolerance

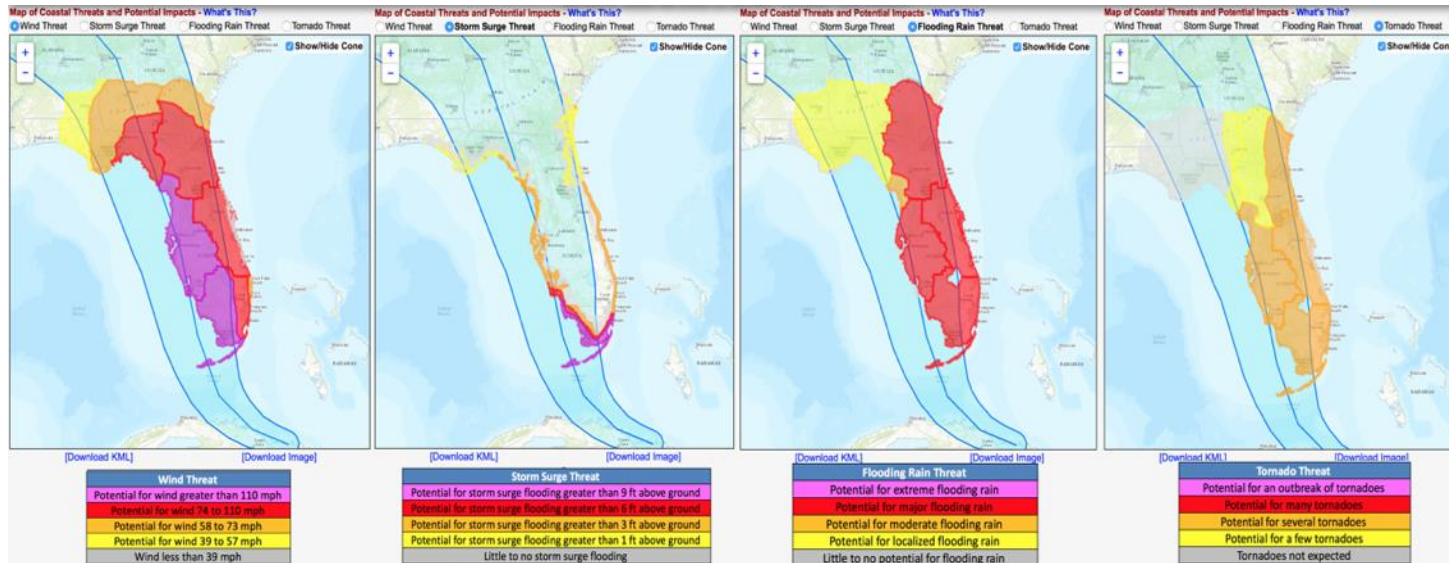


- Equal chances (50%) of tropical storm force winds arriving before or after the time listed
- Preparations should be completed by this time



Hurricane Threats & Impacts (HTI)

- Generated during the watch / warning phase and updated every six hours
- Considers uncertainty in the forecast track



Responsible forecast information to account for reasonable uncertainty

Answers the Question:
“What Should We Prepare For?”
NOT
“~~What Can We Expect?~~”



Wireless Emergency Alerts

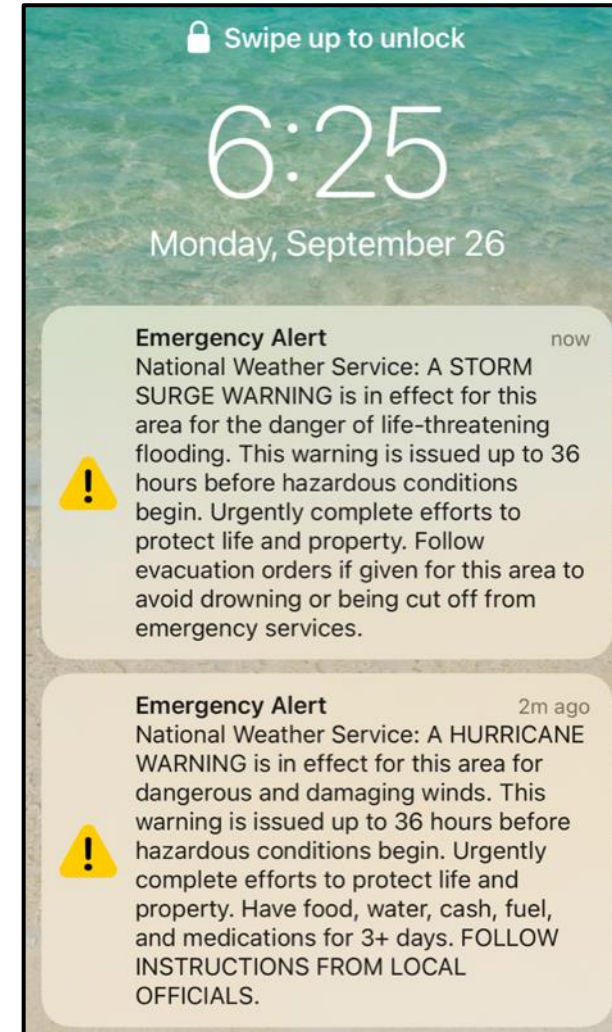
- Wireless Emergency Alert (WEA) is an alerting network in the United States designed to disseminate emergency alerts to mobile devices

Tropical WEA Types

Hurricane Warnings

Storm Surge Warnings

Extreme Wind Warnings





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Ahead of the Season

Stick With Trusted Sources



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BLOG BRIEFING ROOM

Nearly half of men think they can safely land a plane in an emergency, survey finds

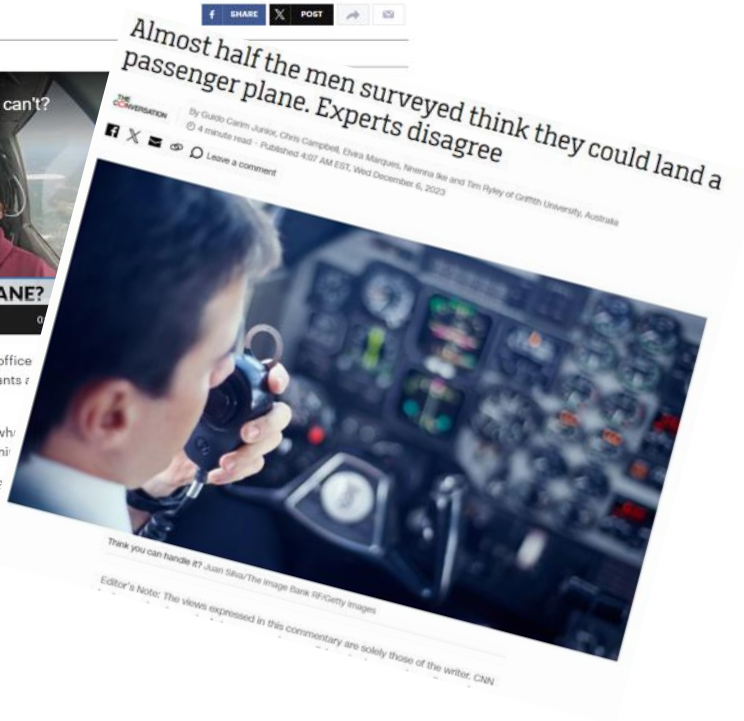
BY MAYCAY BEELER · 12/08/23 6:00 PM ET



CHARLOTTE (WJZY) – It's the formula for a box office hit: What happens when pilots become incapacitated, and flight attendants can land the plane.

It's a dramatic scenario on the big screen. But what about the average person, with no previous flight training?

Quite a few people, according to a poll by YouGov survey published in January shows about one-third of men think they can safely land an airliner with the help of flight attendants.





Track Forecast Errors

- Year to year, NHC consistently outperforms individual computer models (GFS, ECMWF, UKMET) and their corresponding ensemble members



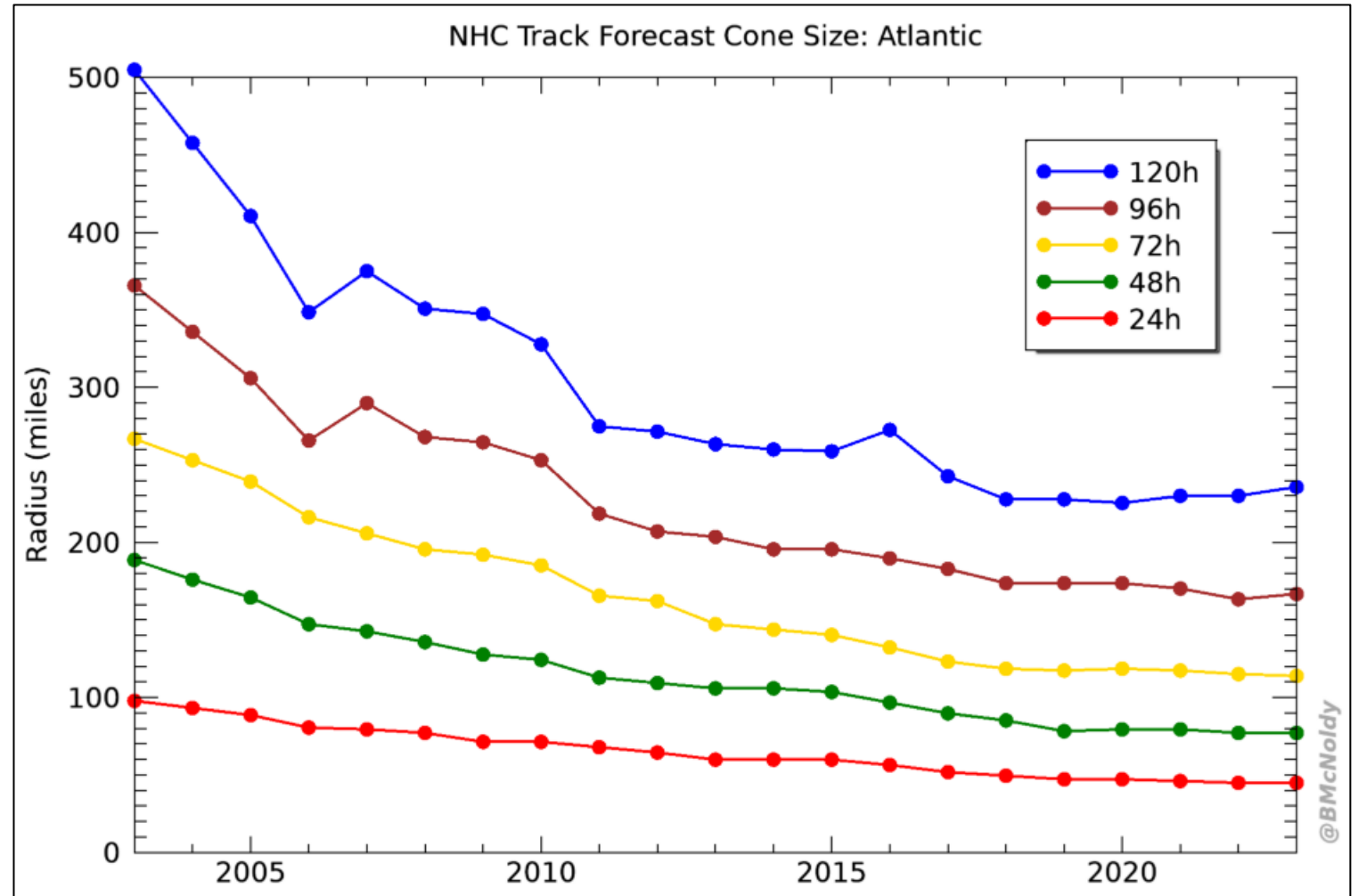


Track Forecast Errors

- The size of the 5-day potential track forecast cone has decreased dramatically from its inception
- Recently, only small fluctuations in size have been seen year-to-year

Key Message

Impacts will occur further outside of the forecast cone as it gets smaller!



@BMcNoldy

Ahead of the Season

Stick With Trusted Sources



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18z hurricane models are in - HWRF and CMC track #Ian near/over Tampa and UKMET has a track over Naples. Most other models are clustered around Venice. #HurricaneIan #flwx

Hurricane IAN Model Track Guidance
Initialized at 18z Sep 27 2022

Big differences with GFS and the hurricane models vs ECMWF, UKMET and ICON, ECMWF having none of what the gfs and hurricane models predict and going into Florida. We shall see what the 12z models bring today #Ian

Interesting look at latest HWRF and HAFS. Kinda heavier top and left. Reminds me of Ian some. spaghettimodels.com

Replying to @tropicalupdate
The GFS model showing a possible cat 4 hurricane 2 weeks out. I know a lot will change by then, but if it does come up the coast like the model currently shows, it will devastate Volusia county. We still haven't recovered from Ian and Nicole last year

It's about time that we started talking about precipitation estimates along the path of soon to be Hurricane Idalia and what better way to start than the fresh ECMWF run. It landfalls at 971 mb just south of the Big Bend and treks through the Deep South before moving out to sea.

A Look Ahead

Hurricane Awareness Tour (HAT)



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- The Hurricane Awareness Tour is coming to the Orlando Sanford International Airport on Friday, May 10, 2024 (9:00 a.m. – 4:00 p.m.)
- <https://www.weather.gov/mlb/2024hat>



2024 Atlantic Tropical Cyclone Names

Alberto

Beryl

Chris

Debby

Ernesto

Francine

Gordon

Helene

Isaac

Joyce

Kirk

Leslie

Milton

Nadine

Oscar

Patty

Rafael

Sara

Tony

Valerie

William

Questions?

...

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