

2023 HURREVAC Training Webinar Series

Day 2 – Wind Forecast Features

June 13, 2023



FEMA



NATIONAL HURRICANE PROGRAM



HURREVAC

HURRICANE DECISION SUPPORT TOOL

Administrative Details



Downloadable handouts

- Today's slides
- New HURREVAC Workspace Guide
- Also posted on hurrevac.com in the Learning Resources section

Live Transcription

- English and Español
- Links in the chat window

Questions

- Submit in the question box
- All attendees are muted

Registration

- Registration still open for Days 3 - 5

Feedback

- Daily survey launches after webinar

Certificate

- One for each day attended
- Emailed about **one hour** after conclusion
- Goes only to the email used for signup

Recording

- Posted to the HURREVAC YouTube channel later today
- Will remain available as a resource



THIS WEEK'S AGENDA

JUNE 12: Introduction to HURREVAC and General Overview of the Program

JUNE 13: Wind Forecast Features

JUNE 14: Evacuation Timing Features

JUNE 15: Storm Surge and Other Water Hazards

JUNE 16: Exercise Tools and Applying HURREVAC

All sessions begin at 2 PM EDT and run for approximately 90 minutes.

Registration is still open for Days 3, 4 & 5!

Today's Presenters



Dan Brown

Acting Hurricane Specialist Unit Branch Chief

National Hurricane Center

daniel.p.brown@noaa.gov

John Boyer

Sea Island Software

johnboyer@seaislandsoftware.biz



NATIONAL HURRICANE PROGRAM

HURREVAC WEBINAR SERIES

Day 2 – Wind Products

NHC WIND-RELATED PRODUCTS

- Tropical Weather Outlook
- Error Cone
- Forecast Advisory
- Wind Speed Probabilities
- Time of Arrival Graphics
- Watches and Warnings



TROPICAL OUTLOOK

Assessment of Tropical Activity



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TROPICAL WEATHER OUTLOOK
NWS NATIONAL HURRICANE CENTER MIAMI FL
800 PM EDT MON OCT 20 2014

For the North Atlantic...Caribbean Sea and the Gulf of Mexico:

Southwest Gulf of Mexico (AL92):

Showers and thunderstorms associated with an area of low pressure located over the southwestern Bay of Campeche have changed little in organization since this afternoon. This system has the potential to become a tropical cyclone during the next couple of days while it moves slowly eastward across the southern Bay of Campeche. Later in the week, the low is forecast to interact and possibly merge with a frontal system over the southeastern Gulf of Mexico or northwestern Caribbean Sea. An Air Force Reserve reconnaissance aircraft is scheduled to investigate the disturbance tomorrow afternoon, if necessary. Interests in the Yucatan Peninsula should monitor the progress of this system.

- * Formation chance through 48 hours...medium...50 percent.
- Formation chance through 7 days...medium...60 percent.

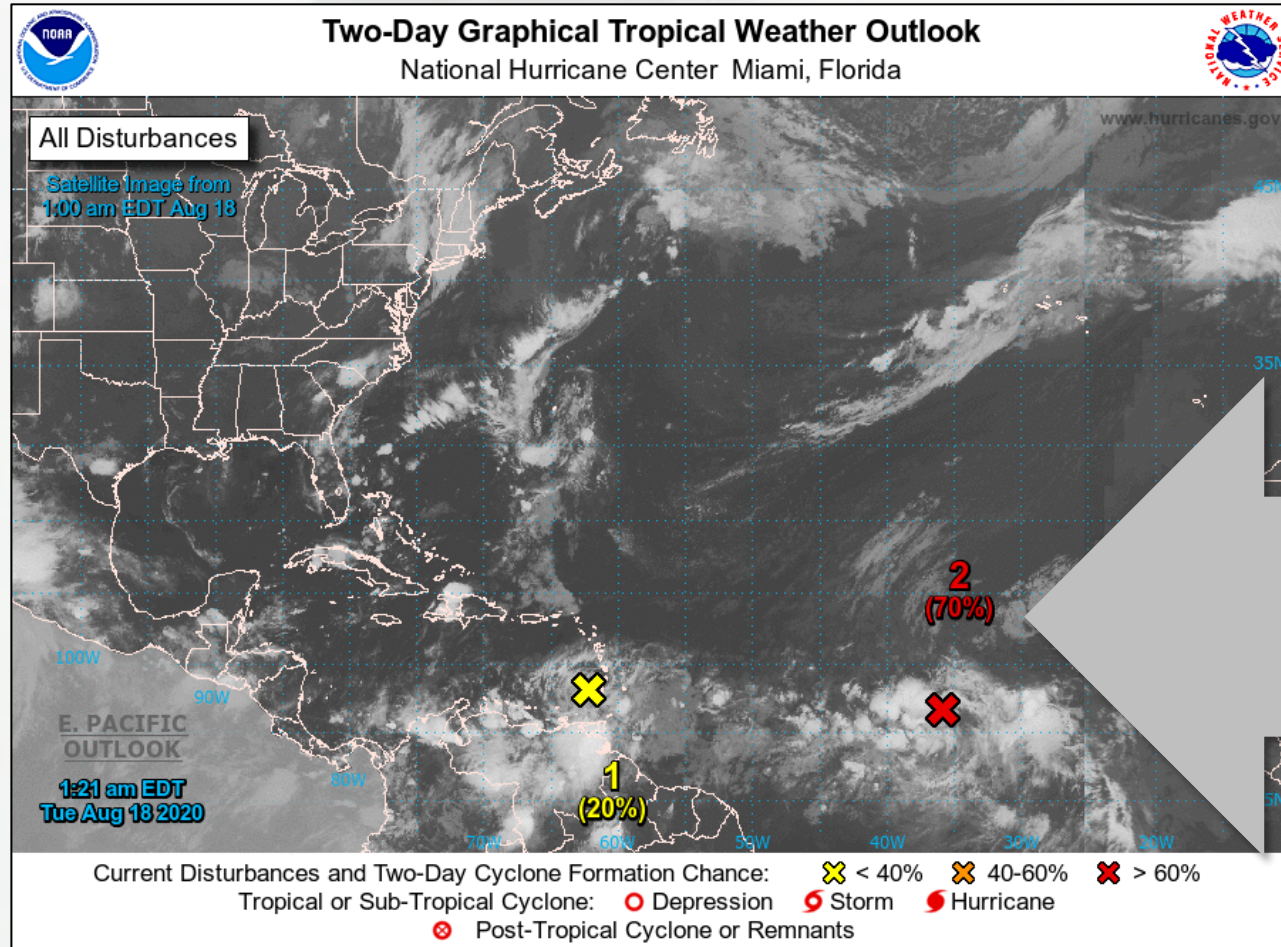
Forecaster Brown

Where is it located?

Potential for development?
Headed where?

TROPICAL OUTLOOK

2-Day Formation Potential

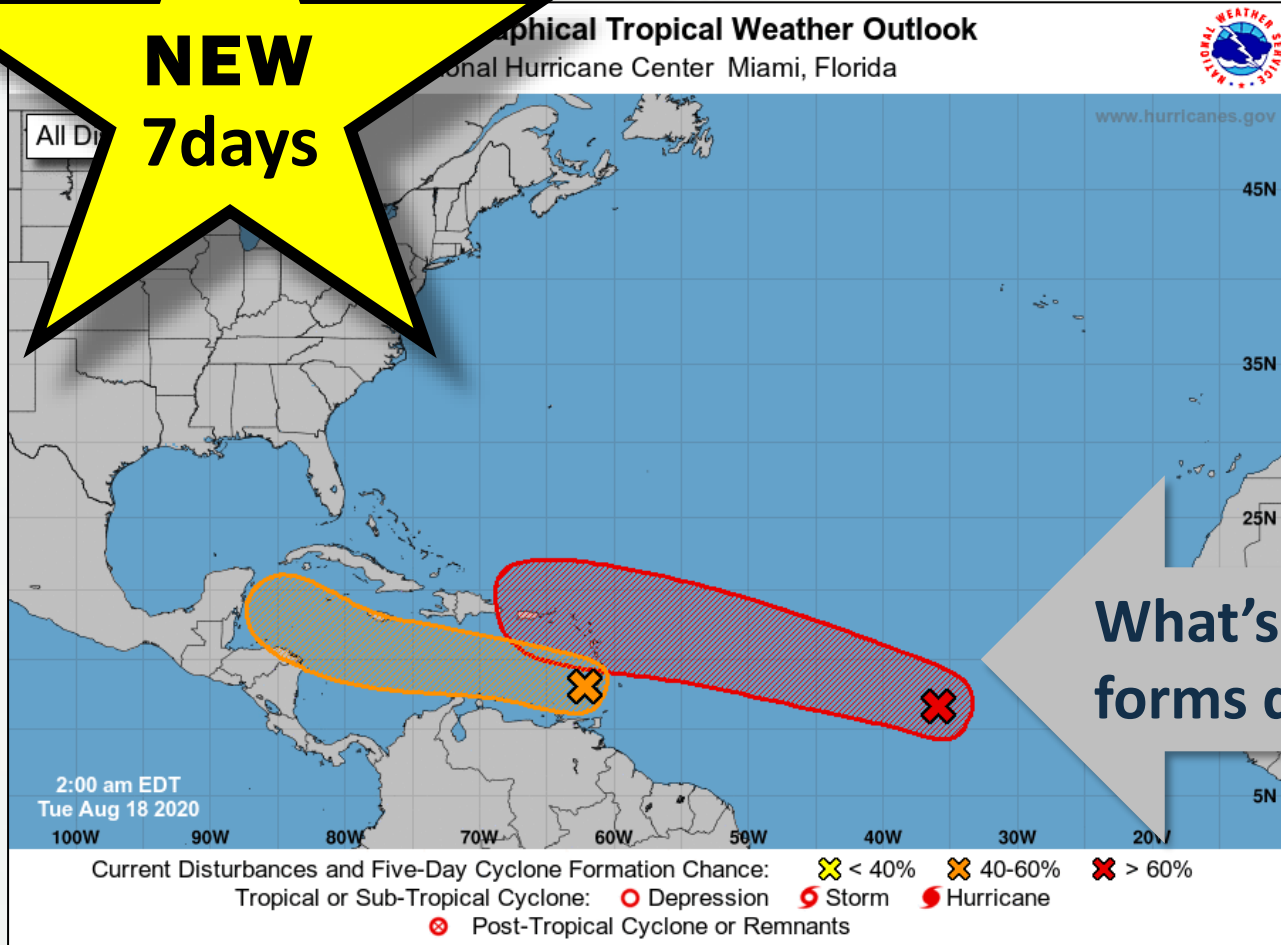


- Current location of disturbances
- Formation chance during the next 48 hrs

- **CATEGORICAL**
(Low, Medium, and High)
- **PROBABILITIES**

TROPICAL OUTLOOK

7-Day Formation Potential



- Initial location of disturbance (x) indicated
- Formation potential during the next 7 days
 - Shading represents formation area

What's the chance this area forms during the next 7 days?

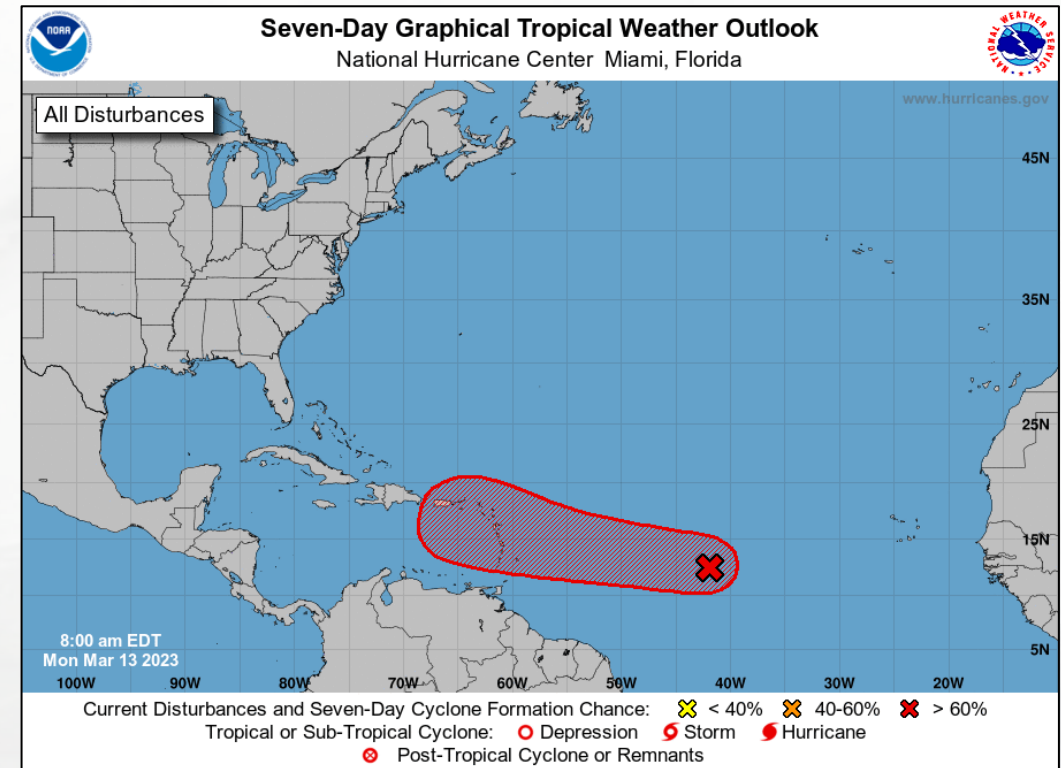
7-Day Graphical Tropical Weather Outlook

- What does a 7-day Tropical Weather Outlook mean for messaging pre-genesis disturbances?

- Systems likely to be introduced into the TWO sooner

- Systems likely to move into the medium and high categories earlier, producing longer lead times

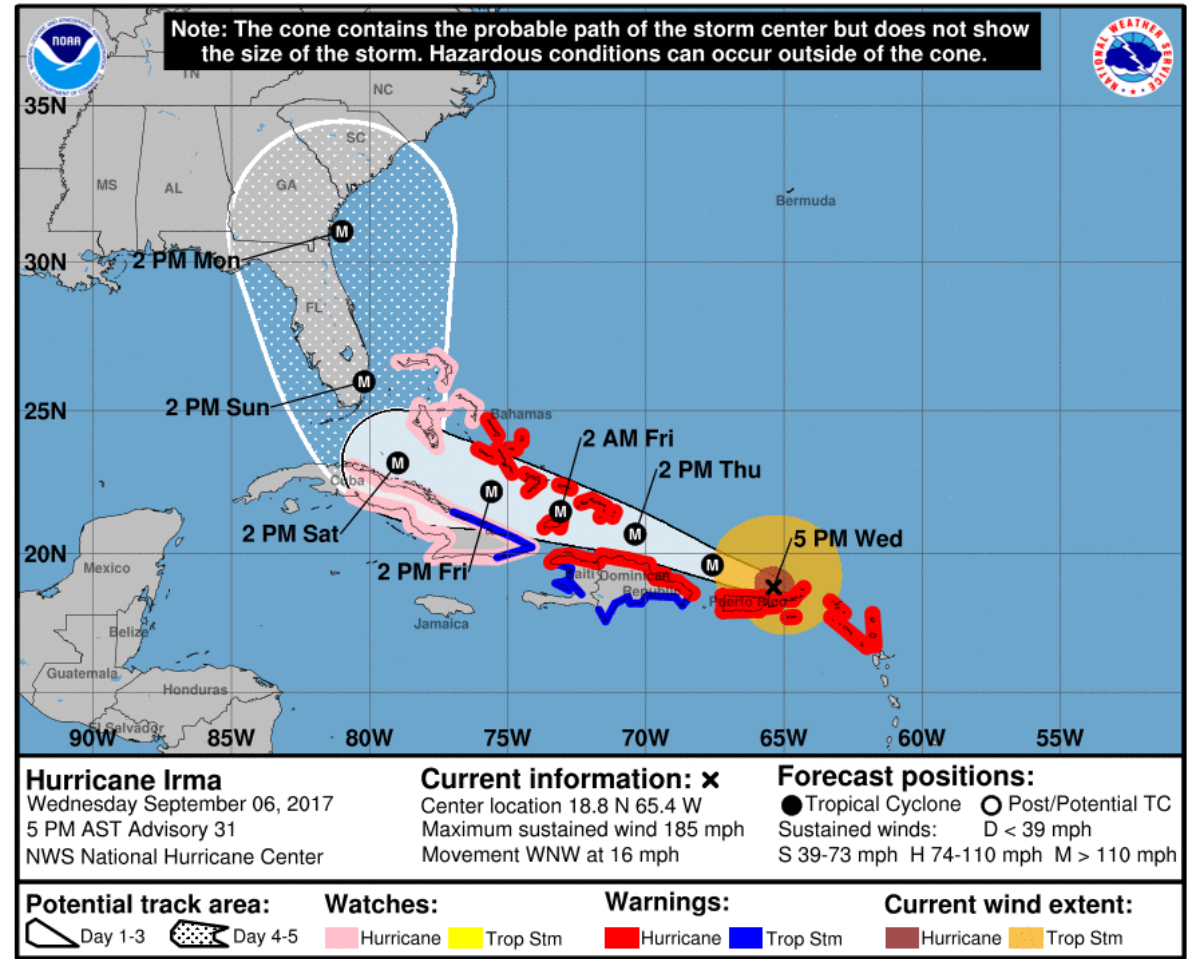
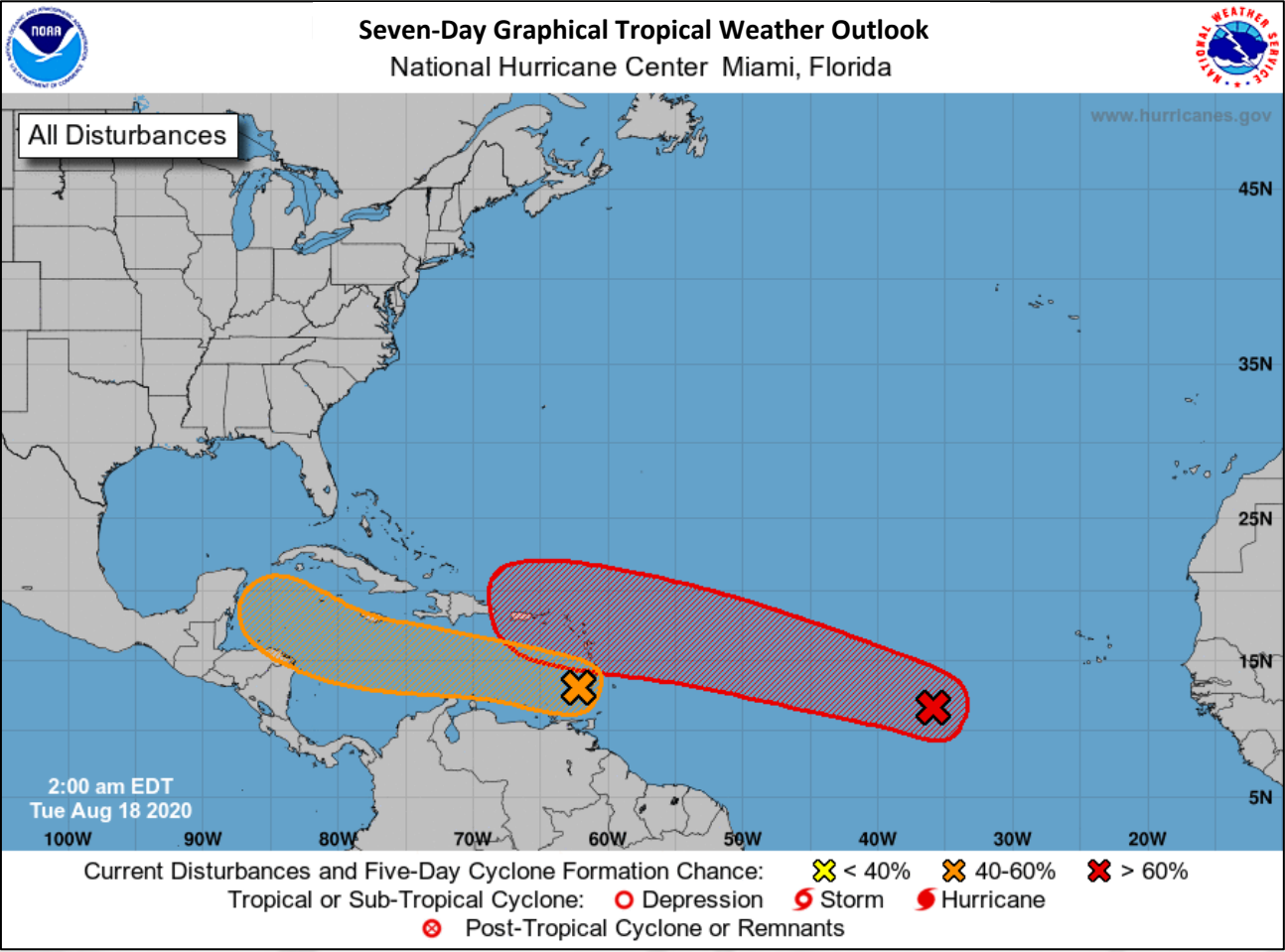
- Genesis areas are likely to be larger, especially for systems with a fast forward speed and uncertain formation timing



Example of a Seven-Day Graphical Tropical Weather Outlook

TIME COVERED BY NHC PRODUCTS

7-day Tropical Weather Outlooks vs. 5-Day Track/Intensity forecasts



The NHC Tropical Weather Outlook has been extended to 7-days. *This is new for 2023.*

NHC issues 5-day track and intensity forecasts for active systems. *This has not changed.*

HURREVAC WEBINAR SERIES

Day 2 – Wind Products

NHC WIND PRODUCTS

Critical for preparedness and evacuation decision making

- **Deterministic:**
 - Based on a Perfect NHC Track & Wind Radii Forecast
 - No forecast uncertainty
 - Only provides information out to 72 h
- **Wind Speed Probabilities:**
 - Accounts for Track, Intensity, and Size Uncertainty
 - Chance of TS, Strong TS, and Hurricane-force winds
 - Time of Arrival (TOA) of TS-force winds



HURREVAC WEBINAR SERIES

Day 2 – Wind Products



NATIONAL HURRICANE CENTER

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION



Tropical Storm Michael

...MICHAEL ALMOST A HURRICANE... ...HURRICANE WATCH ISSUED FOR THE FLORIDA PANHANDLE AND FLORIDA BIG BEND...

4:00 AM CDT Mon Oct 8

Location: 20.6°N 85.5°W

Moving: N at 7 mph

Min pressure: 983 mb

Max sustained: 70 mph

**Public
Advisory**

#7

400 AM CDT

**Aviso
Publico**

#7

400 AM CDT

**Forecast
Advisory**

#7

0900 UTC

**Forecast
Discussion**

#7

400 AM CDT

**Wind Speed
Probabilities**

#7

0900 UTC

**NWS Local
Products**

613 AM CDT

**US Watch/
Warning**

452 AM CDT



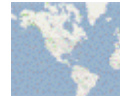
Wind Speed
Probabilities



Arrival Time
of Winds



Wind
History



Warnings/Cone
Interactive Map



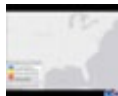
Warnings/Cone
Static Images



Warnings and
Surface Wind



Key
Messages



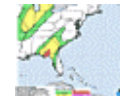
Storm Surge
Inundation



Storm Surge
Watch/Warning



U.S. Rainfall
Potential



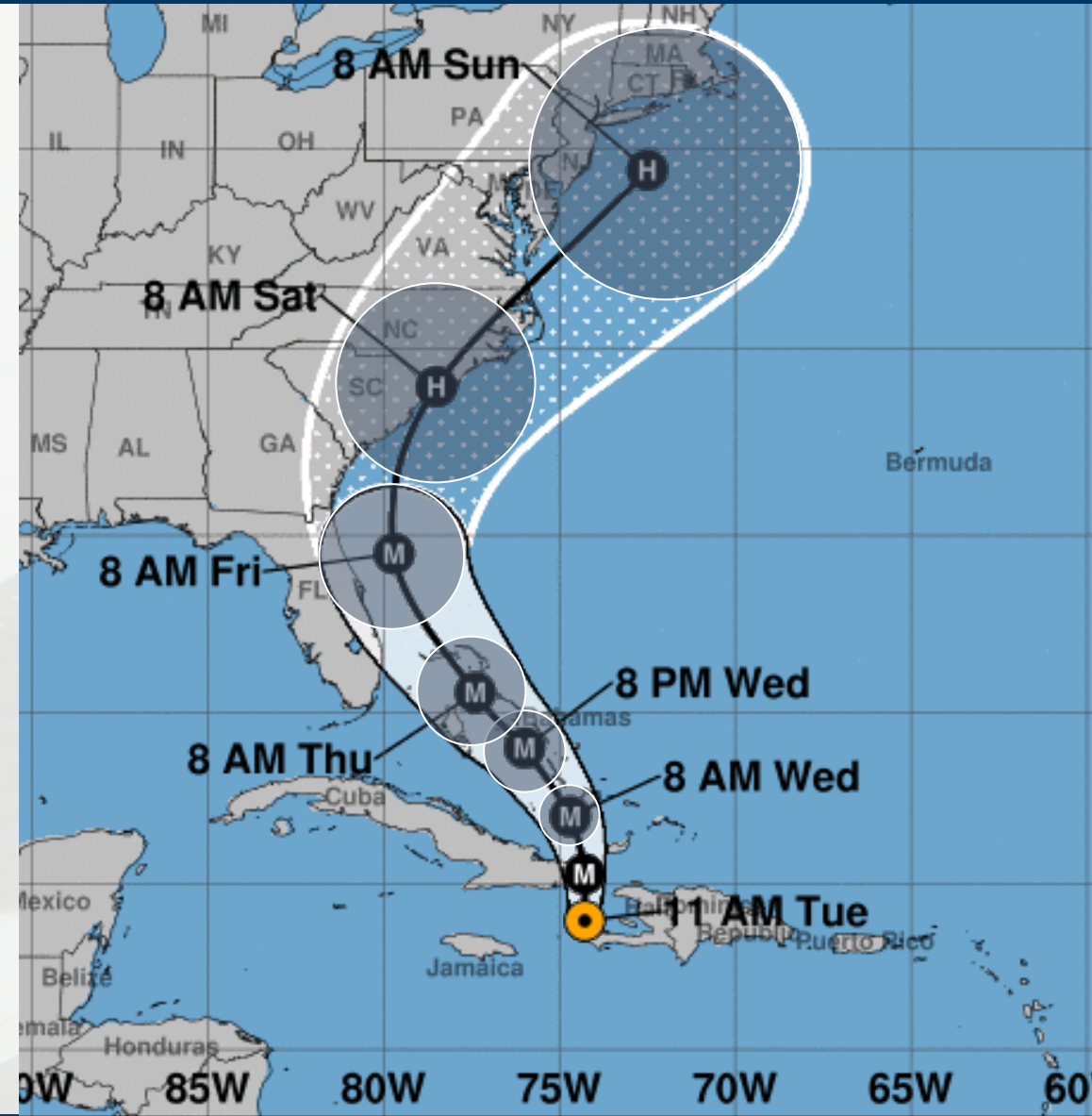
Flash Flood
Potential

FORECAST ERROR CONE

The cure for the skinny black line?

ERROR CONE

- Probable track of the center of the tropical cyclone
- Formed by connecting circles centered on each forecast point
- Each circle uses NHC historical (5-year) track errors
Actual storm position will be within the circle 67% of the time

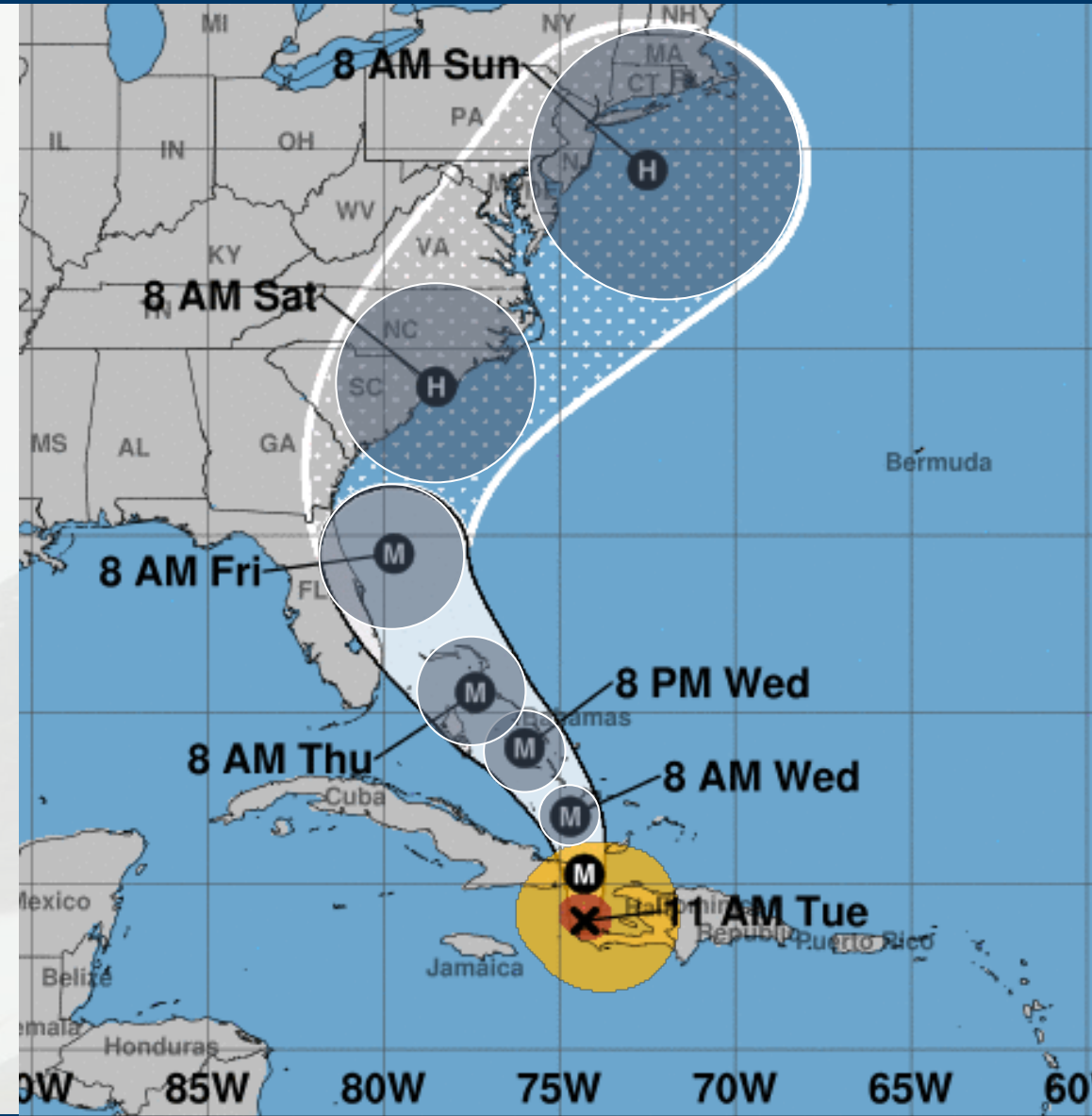


FORECAST ERROR CONE

No worries, not in the cone?

ERROR CONE

- Only displays information about track uncertainty
Nothing about specific impacts
- Impacts can occur well outside the area enclosed by the cone
Center is expected to be outside the cone about 1/3 of the time



FORECAST ADVISORY

Position. Size. Radii. Intensity.



NATIONAL HURRICANE CENTER

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION



TROPICAL STORM MICHAEL FORECAST/ADVISORY NUMBER 7
NWS NATIONAL HURRICANE CENTER MIAMI FL AL142018
0900 UTC MON OCT 08 2018

A TROPICAL STORM WATCH HAS BEEN ISSUED FROM THE SUWANEE RIVER TO ANNA MARIA ISLAND FLORIDA...INCLUDING TAMPA BAY.

PRESENT MOVEMENT TOWARD THE NORTH OR 360 DEGREES AT 6 KT

ESTIMATED MINIMUM CENTRAL PRESSURE 983 MB
MAX SUSTAINED WINDS 60 KT WITH GUSTS TO 75 KT.

50 KT..... 80NE 80SE 0SW 0NW.

34 KT.....120NE 150SE 90SW 100NW.

12 FT SEAS..135NE 120SE 30SW 60NW.

WINDS AND SEAS VARY GREATLY IN EACH QUADRANT. RADII IN NAUTICAL MILES ARE THE LARGEST RADII EXPECTED ANYWHERE IN THAT QUADRANT.

REPEAT...CENTER LOCATED NEAR 20.6N 85.5W AT 08/0900Z
AT 08/0600Z CENTER WAS LOCATED NEAR 20.2N 85.5W

FORECAST VALID 08/1800Z 21.7N 85.6W
MAX WIND 70 KT...GUSTS 85 KT.

64 KT... 30NE 30SE 0SW 0NW.

50 KT... 90NE 90SE 30SW 30NW.

34 KT...130NE 150SE 90SW 120NW.

FORECAST VALID 09/0600Z 23.5N 86.1W

Current wind radii

Forecast wind radii

FORECAST ADVISORY

Position. Size. Radii. Intensity.

WIND RADII

- NHC forecasts the wind radii in four quadrants



TROPICAL STORM MICHAEL FORECAST/ADVISORY NUMBER 7
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0500 FT MON OCT 08 2018

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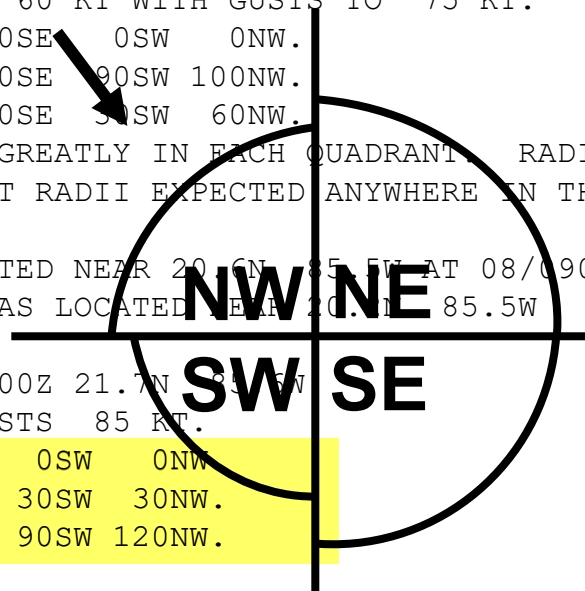
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FORECAST VALID 09/0600Z 23.5N 86.1W



Radii are the largest distance from the center in a quadrant

Leads to an inherent over-estimate of radii, especially near land

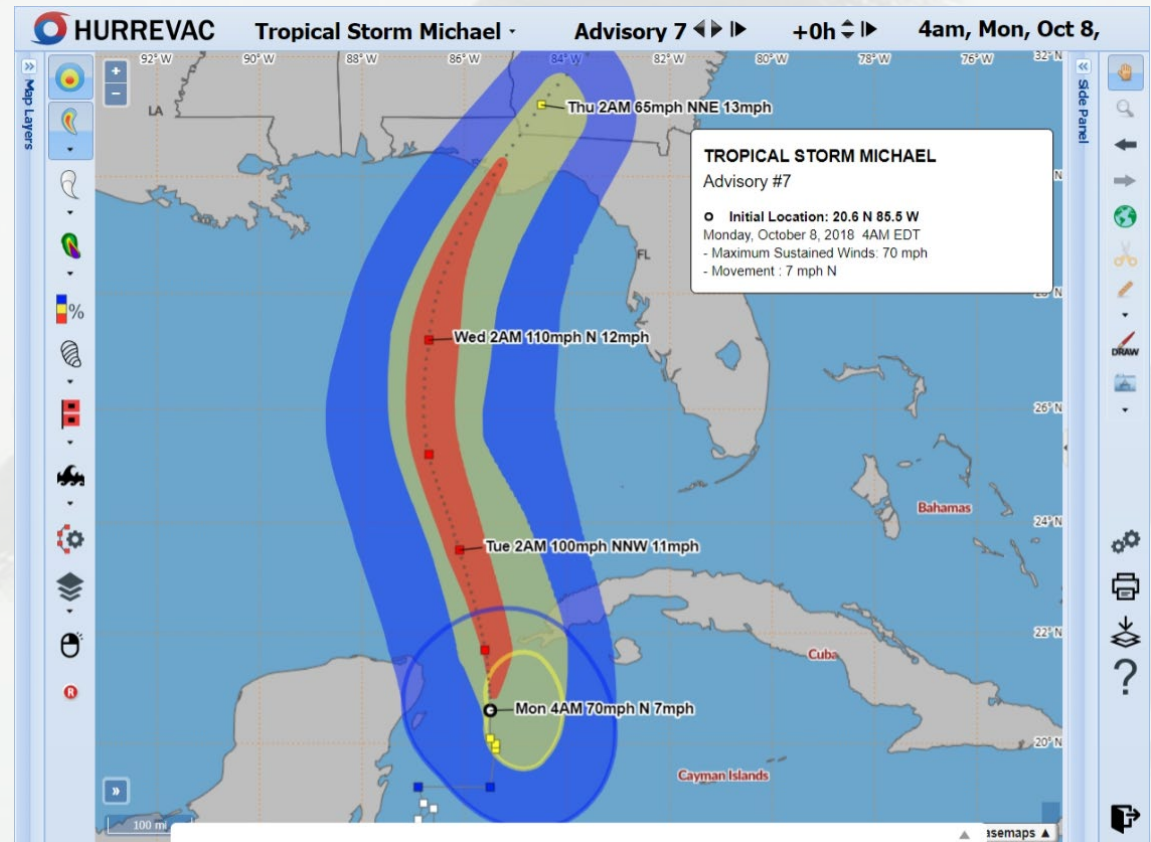
FORECAST ADVISORY

Position. Size. Radii. Intensity.

WIND RADII

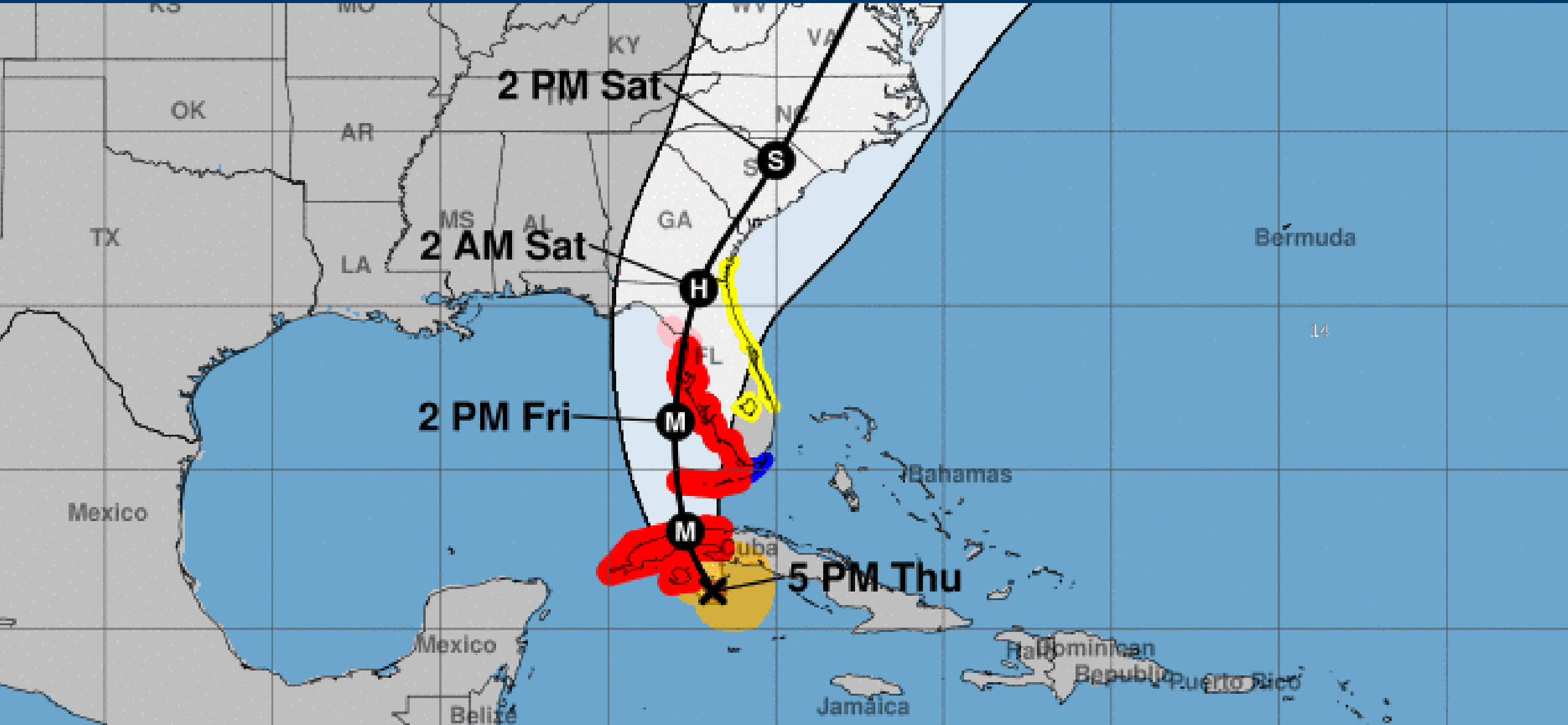
- NHC forecasts the wind radii in four quadrants

	34 kt	50 kt	64 kt
12 hr			
24 hr			
36 hr			
48 hr			
72 hr			N/A
96 hr	N/A	N/A	N/A
120 hr	N/A	N/A	N/A



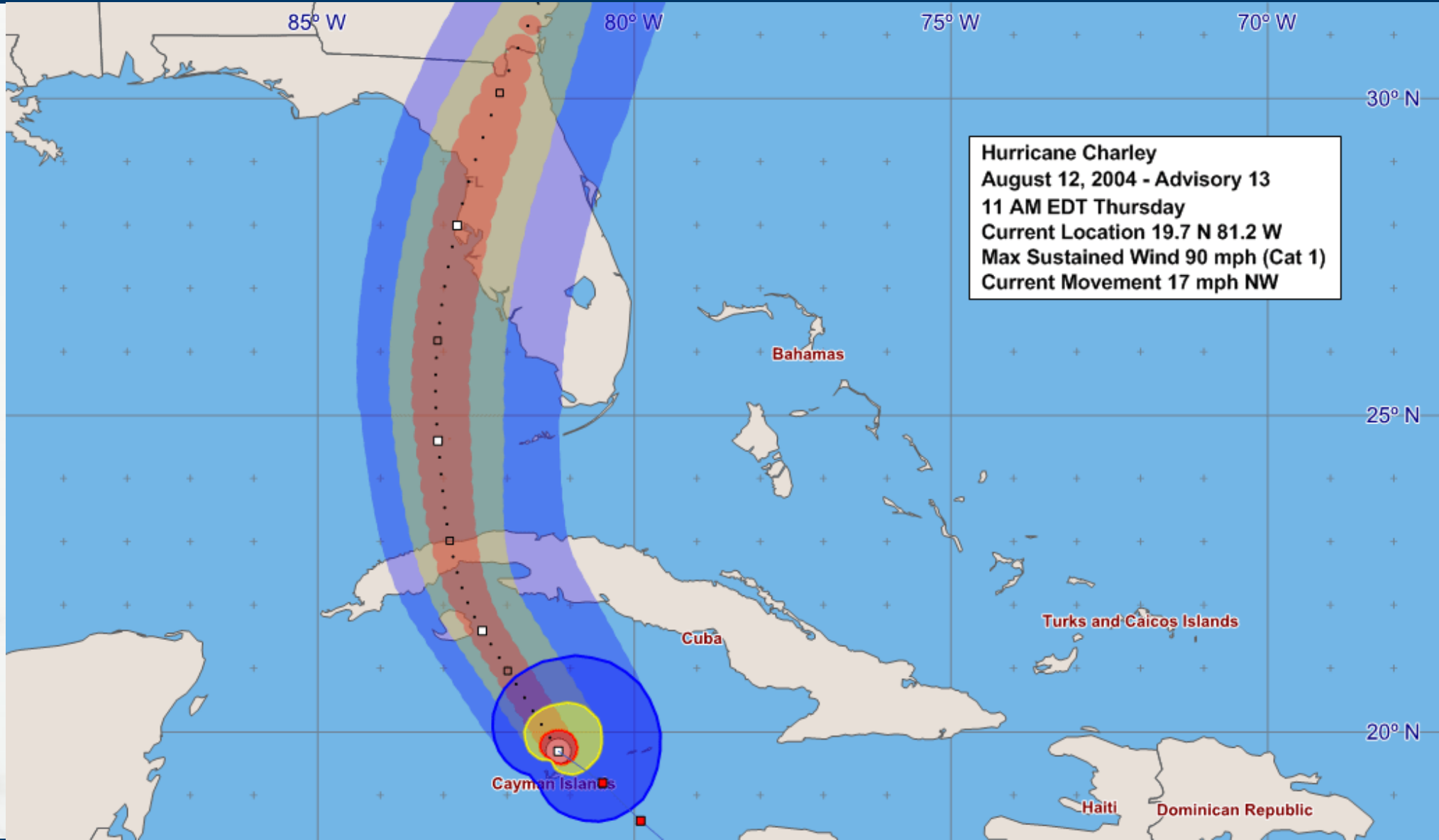
HURRICANE CHARLEY

Don't focus on the skinny black line.



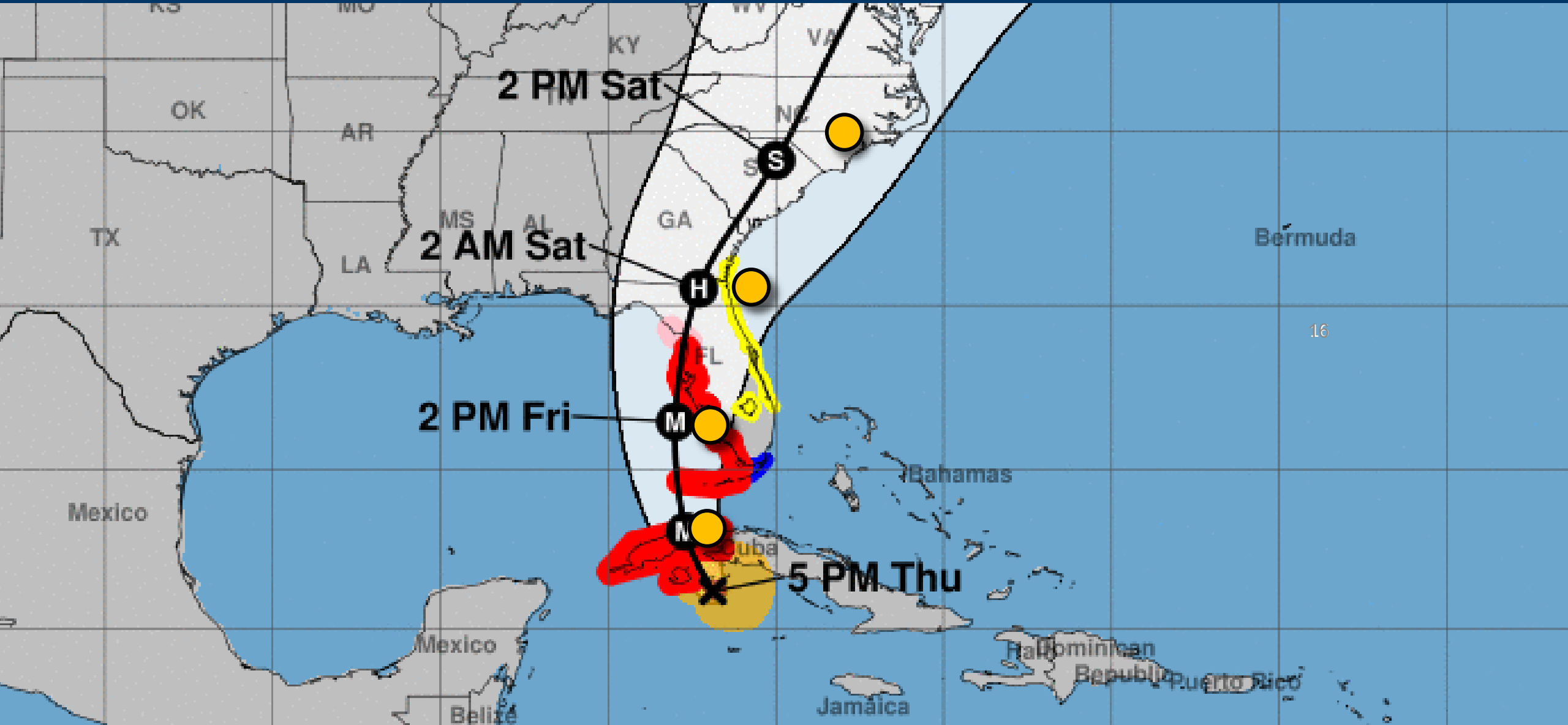
HURRICANE CHARLEY

Don't focus on the skinny black line.



HURRICANE CHARLEY

Don't focus on the skinny black line.



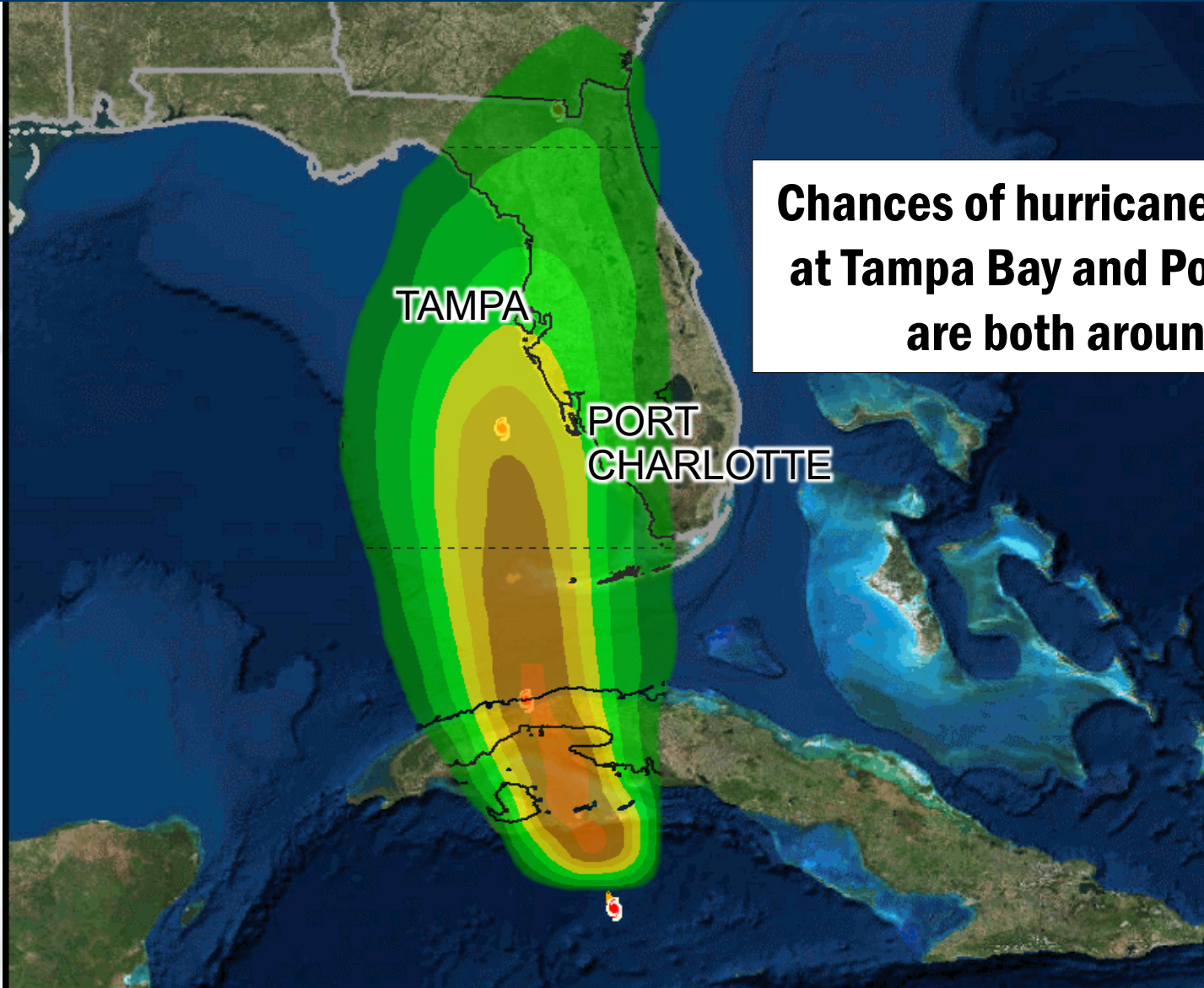
HURRICANE CHARLEY

Would alternate scenarios help?



HURRICANE CHARLEY

Would alternate scenarios help?



**Chances of hurricane-force winds
at Tampa Bay and Port Charlotte
are both around 30%**

WIND SPEED PROBABILITIES

Text Product



TROPICAL STORM MICHAEL WIND SPEED PROBABILITIES NUMBER 7
 NWS NATIONAL HURRICANE CENTER MIAMI FL AL142018
 0900 UTC MON OCT 08 2018

- - - - WIND SPEED PROBABILITIES FOR SELECTED LOCATIONS - - - -

TIME PERIODS	FROM 06Z MON TO 18Z MON	FROM 18Z MON TO 06Z TUE	FROM 06Z TUE TO 18Z TUE	FROM 18Z TUE TO 06Z WED	FROM 06Z WED TO 06Z THU	FROM 06Z THU TO 06Z FRI	FROM 06Z FRI TO 06Z SAT
FORECAST HOUR	(12)	(24)	(36)	(48)	(72)	(96)	(120)
LOCATION	KT						
TALLAHASSEE FL 34	X	X (X)	1 (1)	6 (7)	68 (75)	6 (81)	X (81)
TALLAHASSEE FL 50	X	X (X)	X (X)	1 (1)	41 (42)	6 (48)	X (48)
TALLAHASSEE FL 64	X	X (X)	X (X)	X (X)	20 (20)	4 (24)	X (24)
APALACHICOLA 34	X	X (X)	5 (5)	29 (34)	57 (91)	1 (92)	X (92)
APALACHICOLA 50	X	X (X)	X (X)	6 (6)	59 (65)	2 (67)	X (67)
APALACHICOLA 64	X	X (X)	X (X)	1 (1)	39 (40)	1 (41)	X (41)
PANAMA CITY FL 34	X	X (X)	4 (4)	26 (30)	60 (90)	1 (91)	X (91)
PANAMA CITY FL 50	X	X (X)	X (X)	6 (6)	57 (63)	1 (64)	X (64)
PANAMA CITY FL 64	X	X (X)	X (X)	1 (1)	37 (38)	X (38)	X (38)

Location-Specific Probabilities

- Tropical-Storm-Force
- 58 mph
- Hurricane-Force

WIND SPEED PROBABILITIES

Text Product



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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

TROPICAL STORM MICHAEL WIND SPEED PROBABILITIES NUMBER 7
 NWS NATIONAL HURRICANE CENTER MIAMI FL AL142018
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Onset Probabilities

- Timing information

WIND SPEED PROBABILITIES

Text Product



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Cumulative Probabilities
 • Total chance through the time period

WIND SPEED PROBABILITIES

5-Day Cumulative Graphic

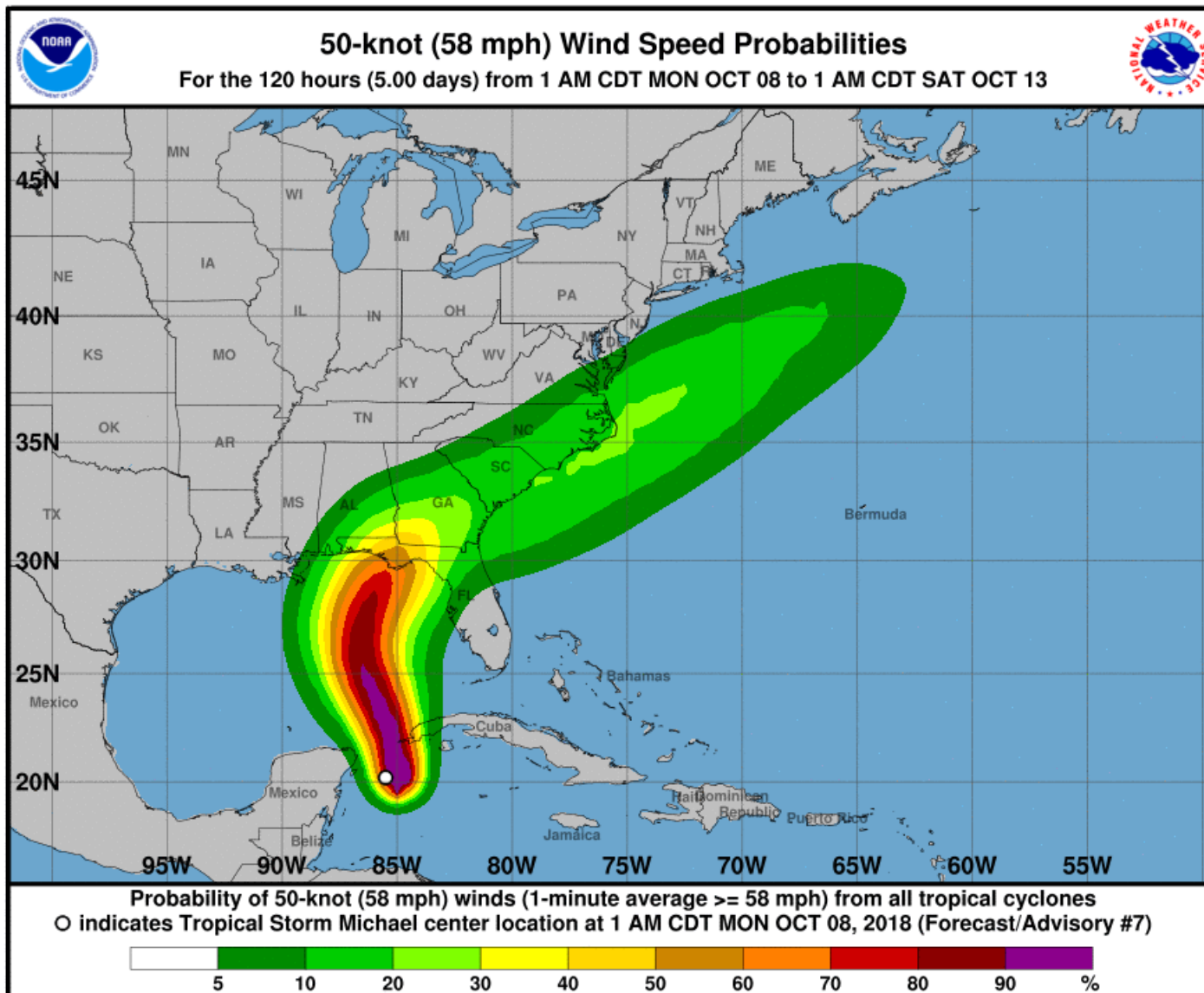


Location-Specific Probabilities

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- 58 mph
- Hurricane-Force

WIND SPEED PROBABILITIES

5-Day Cumulative Graphic



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WIND SPEED PROBABILITIES

5-Day Cumulative Graphic

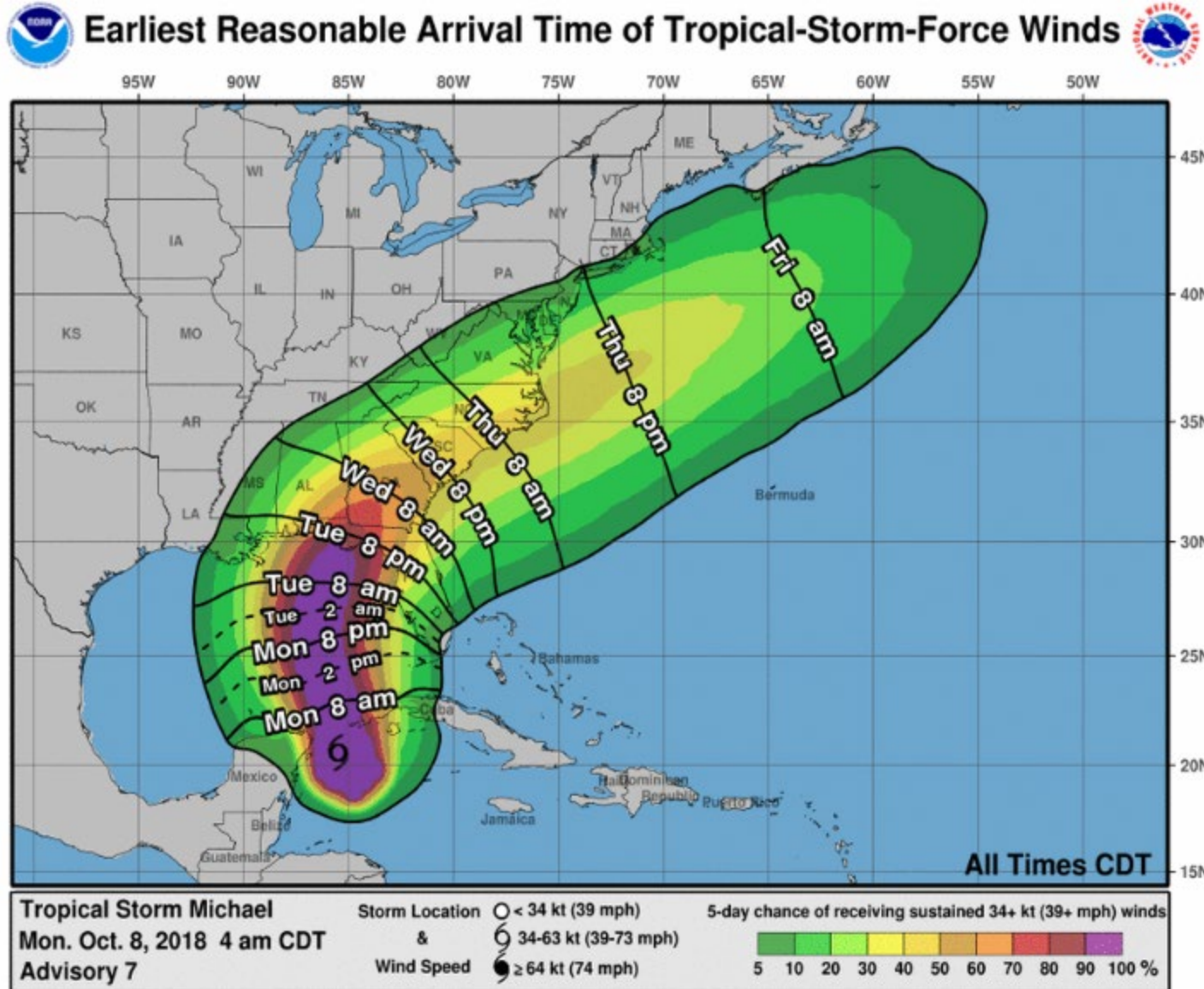


Location-Specific Probabilities

- Tropical-Storm-Force
- 58 mph
- Hurricane-Force

WIND SPEED PROBABILITIES

Time of Arrival of TS Winds

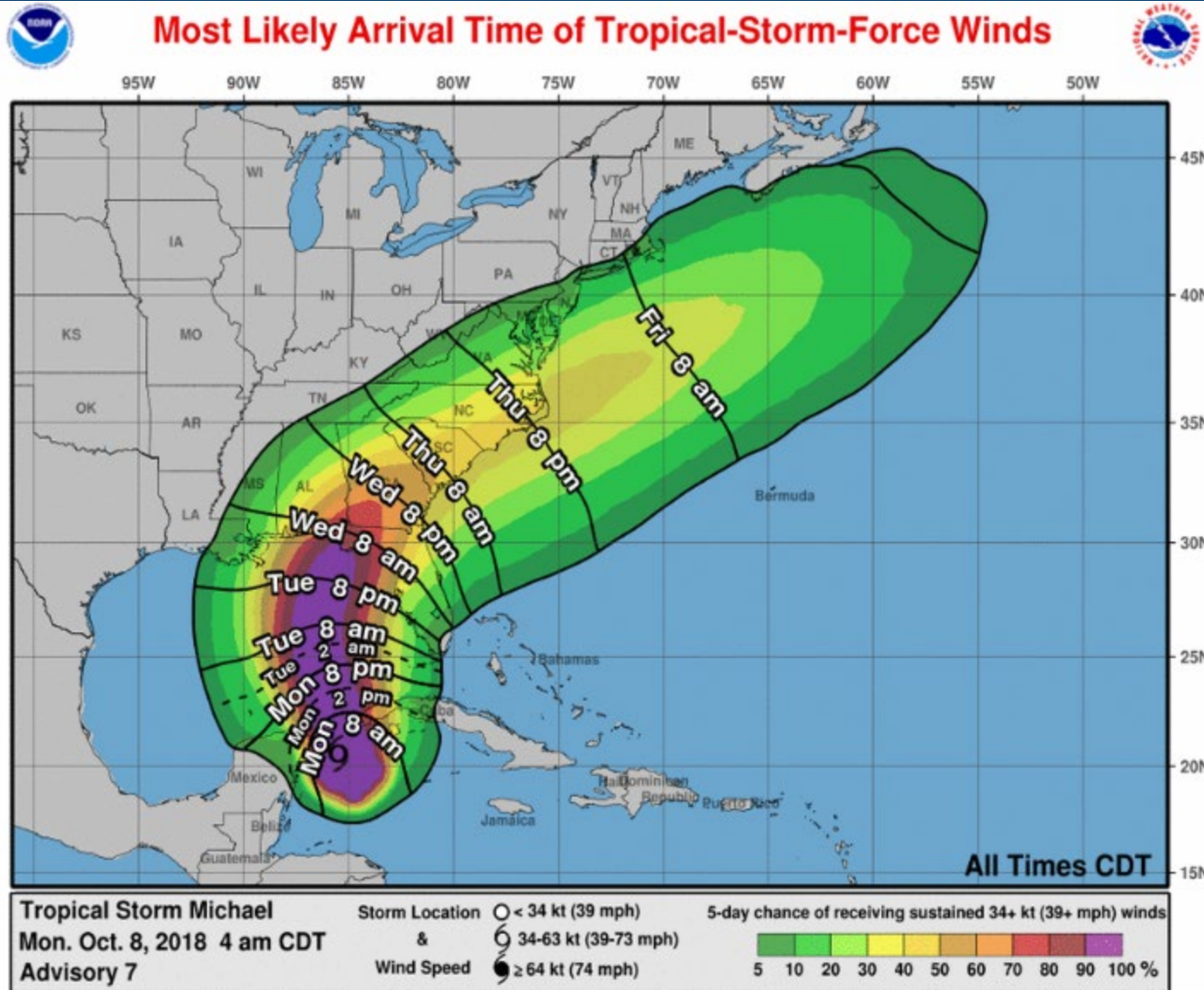


Time of Arrival of TS Winds

- Earliest Reasonable
- Most Likely

WIND SPEED PROBABILITIES

Time of Arrival of TS Winds



Time of Arrival of TS Winds

- Earliest Reasonable
- Most Likely

WATCHES & WARNINGS

Where. When. What. Action.



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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION



TROPICAL STORM WATCH

Tropical storm conditions are **possible** somewhere within the watch area, generally **within 48 hours**

TROPICAL STORM WARNING

Tropical storm conditions are **expected** somewhere within the warning area, generally **within 36 hours**



WATCHES & WARNINGS

Where. When. What. Action.



NATIONAL HURRICANE CENTER

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION



HURRICANE WATCH

Hurricane conditions are **possible** somewhere within the watch area, generally **within 48 hours**

HURRICANE WARNING

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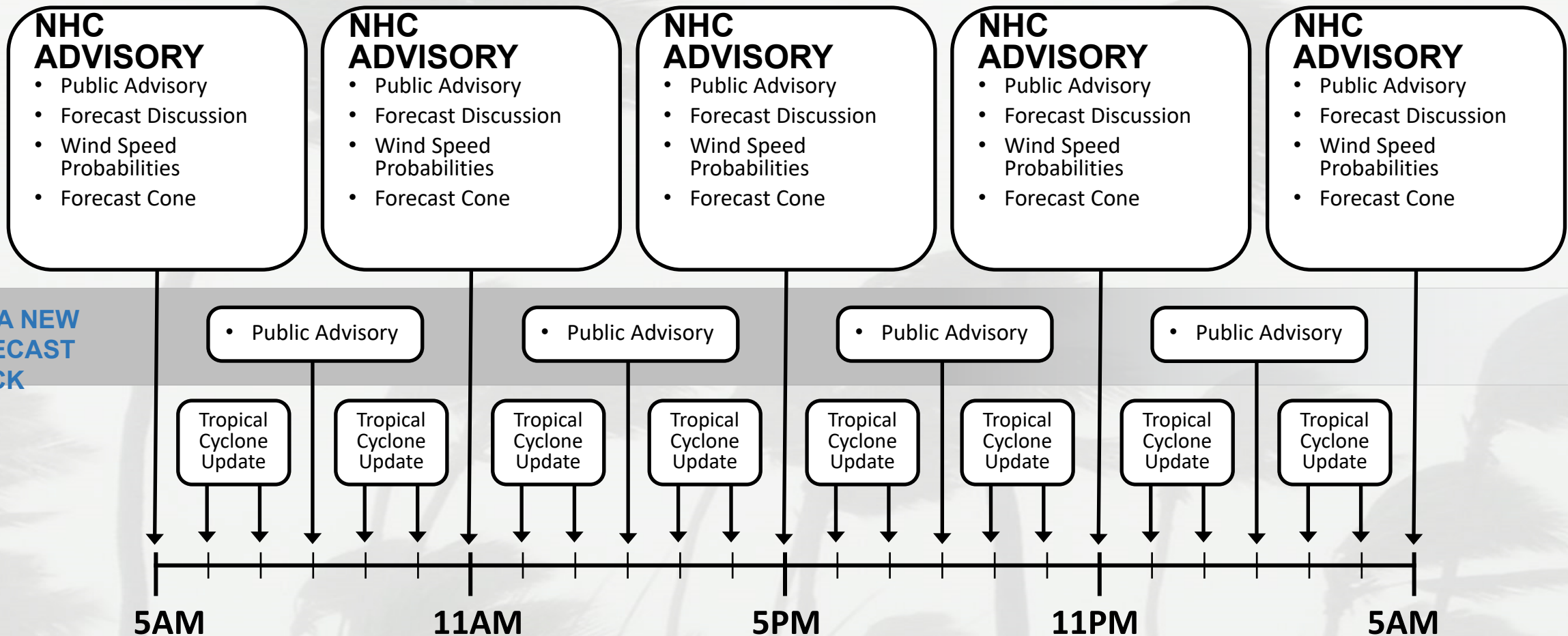
Note: The lead time for Hurricane Watches and Warnings is tied to the anticipated arrival time of tropical-storm-force winds



NHC ADVISORY TIMELINE

Scheduled Updates

~~WATCHES AND WARNINGS~~ *in effect and eye tracked by radar*



NOT A NEW
FORECAST
TRACK

Questions/Comments on NHC Products

Daniel Brown

**Warning Coordination Meteorologist and
Senior Hurricane Specialist
National Hurricane Center**

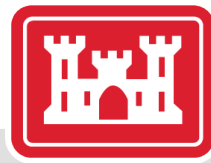
daniel.p.brown@noaa.gov

Thank you!

HURREVAC Support Team
support@hurrevac.com



FEMA



NATIONAL HURRICANE PROGRAM



HURREVAC

HURRICANE DECISION SUPPORT TOOL