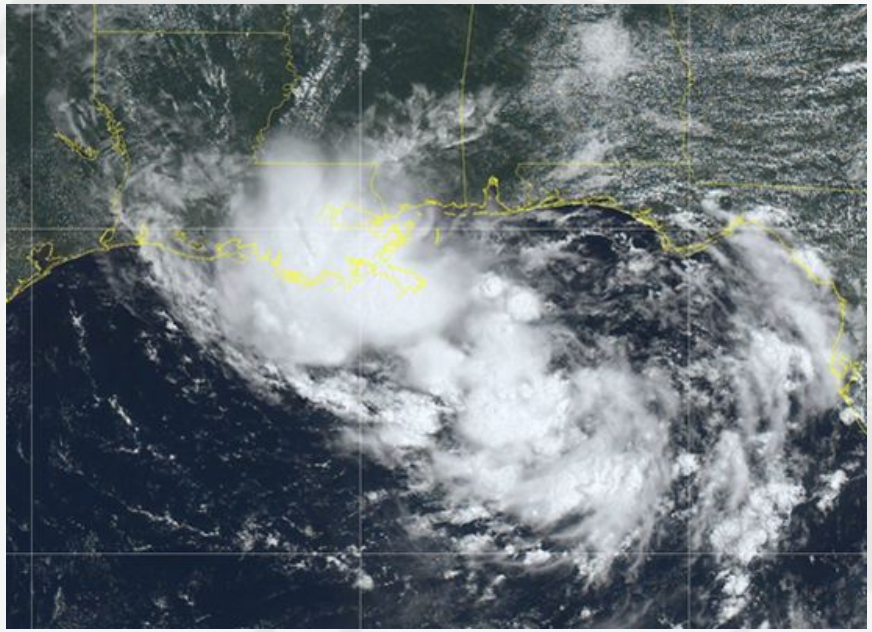
# Potential Tropical Cyclone (PTC) Advisories



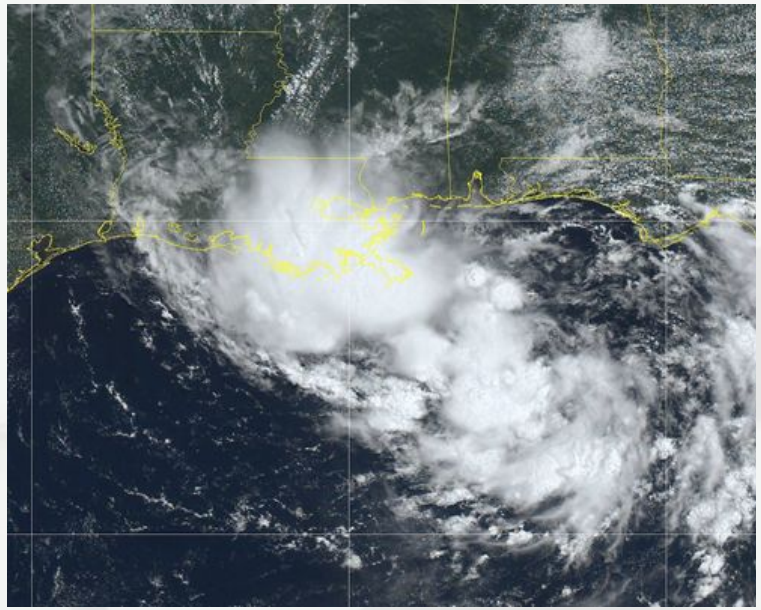
**Brad Reinhart**

Hurricane Specialist

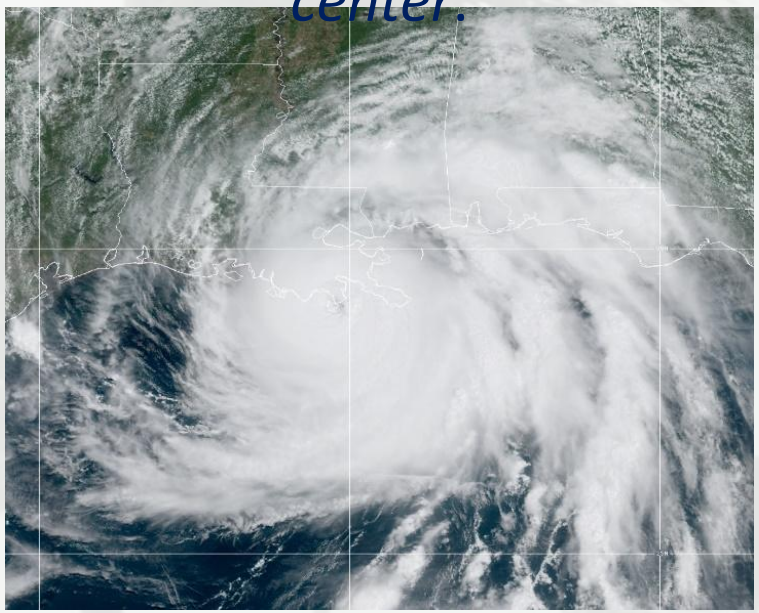
National Hurricane Center

# What is a potential tropical cyclone?

A **potential tropical cyclone (PTC)** is a disturbance that is not yet a tropical cyclone, but which poses the threat of bringing tropical storm or hurricane conditions to land areas within 48 h.

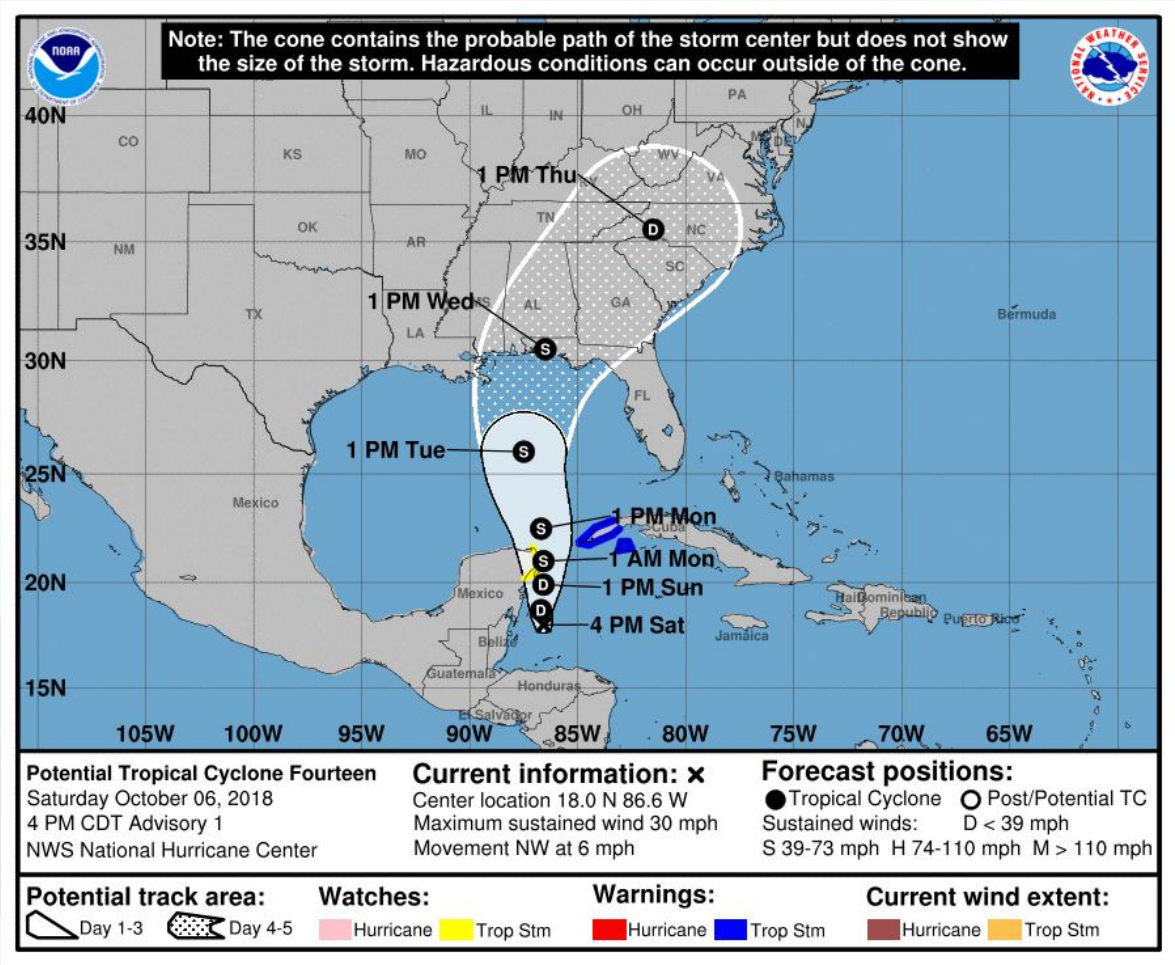


A **tropical cyclone (TC)** is a warm-core, non-frontal synoptic-scale cyclone, originating over tropical or subtropical waters, *with organized deep convection and a closed surface wind circulation about a well-defined center.*



# Potential Tropical Cyclone Advisories

- Standard suite of NHC text and graphical products that are *produced before a tropical cyclone forms*
- Issued at the regular advisory times (0300, 0900, 1500, 2100 UTC)
- Enable the NHC to issue tropical watches and warnings for developing systems with sufficient lead time
  - Watch: 48 h before arrival of TS-force winds
  - Warning: 36 h before arrival of TS-force winds



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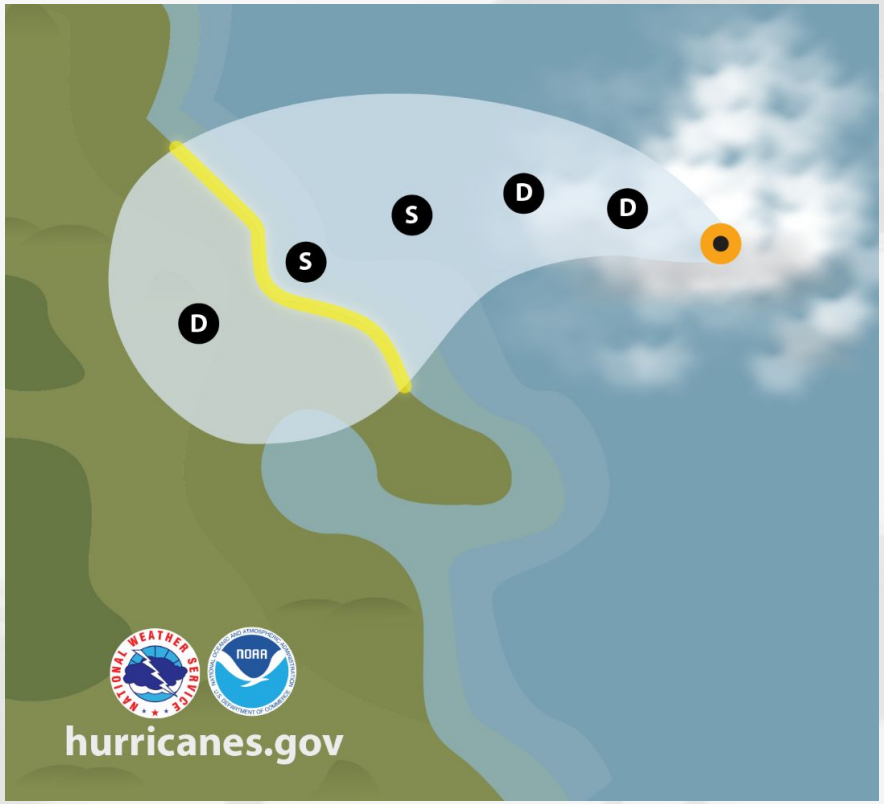
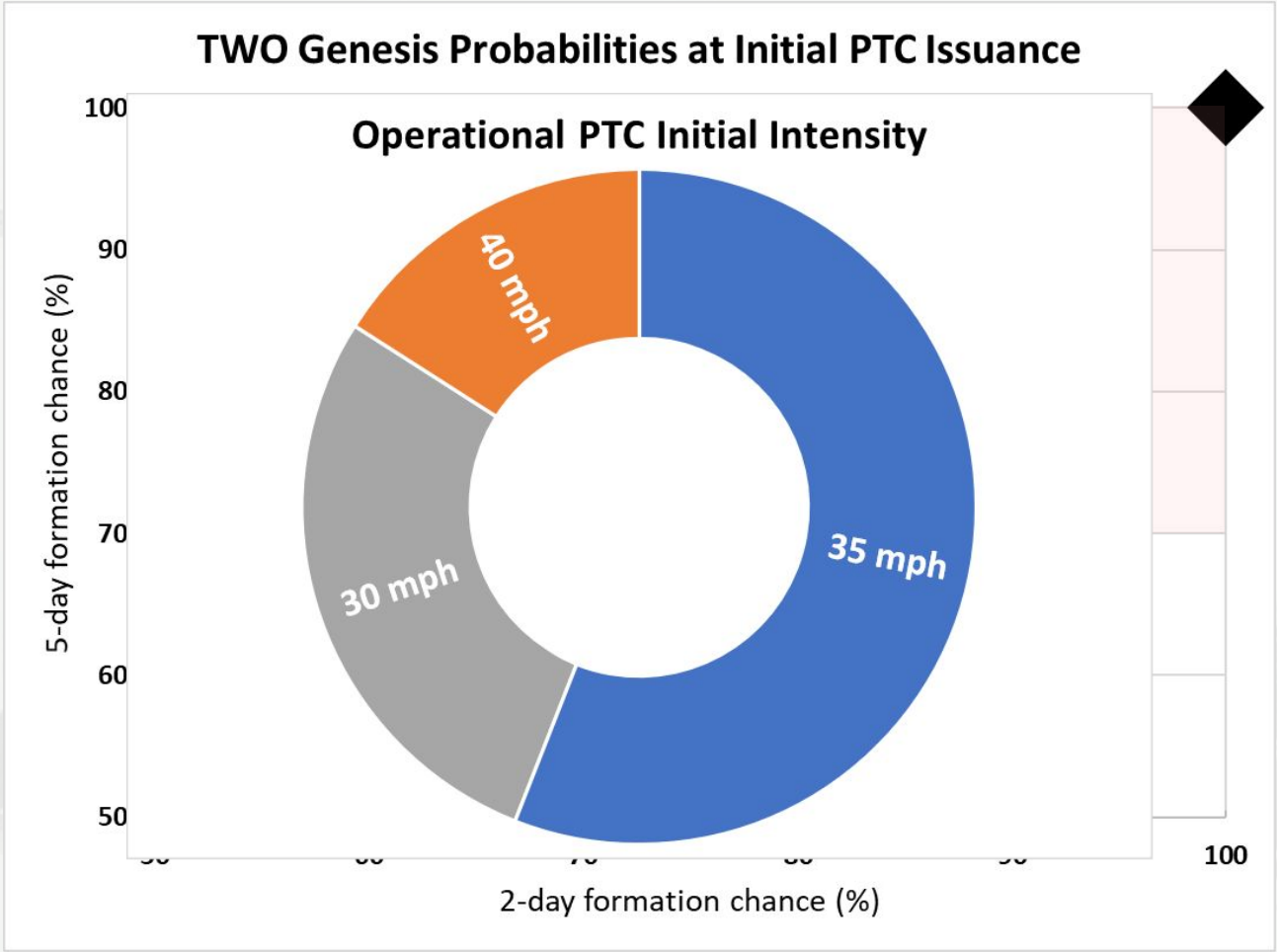



## NHC considerations for initiating PTC advisories:

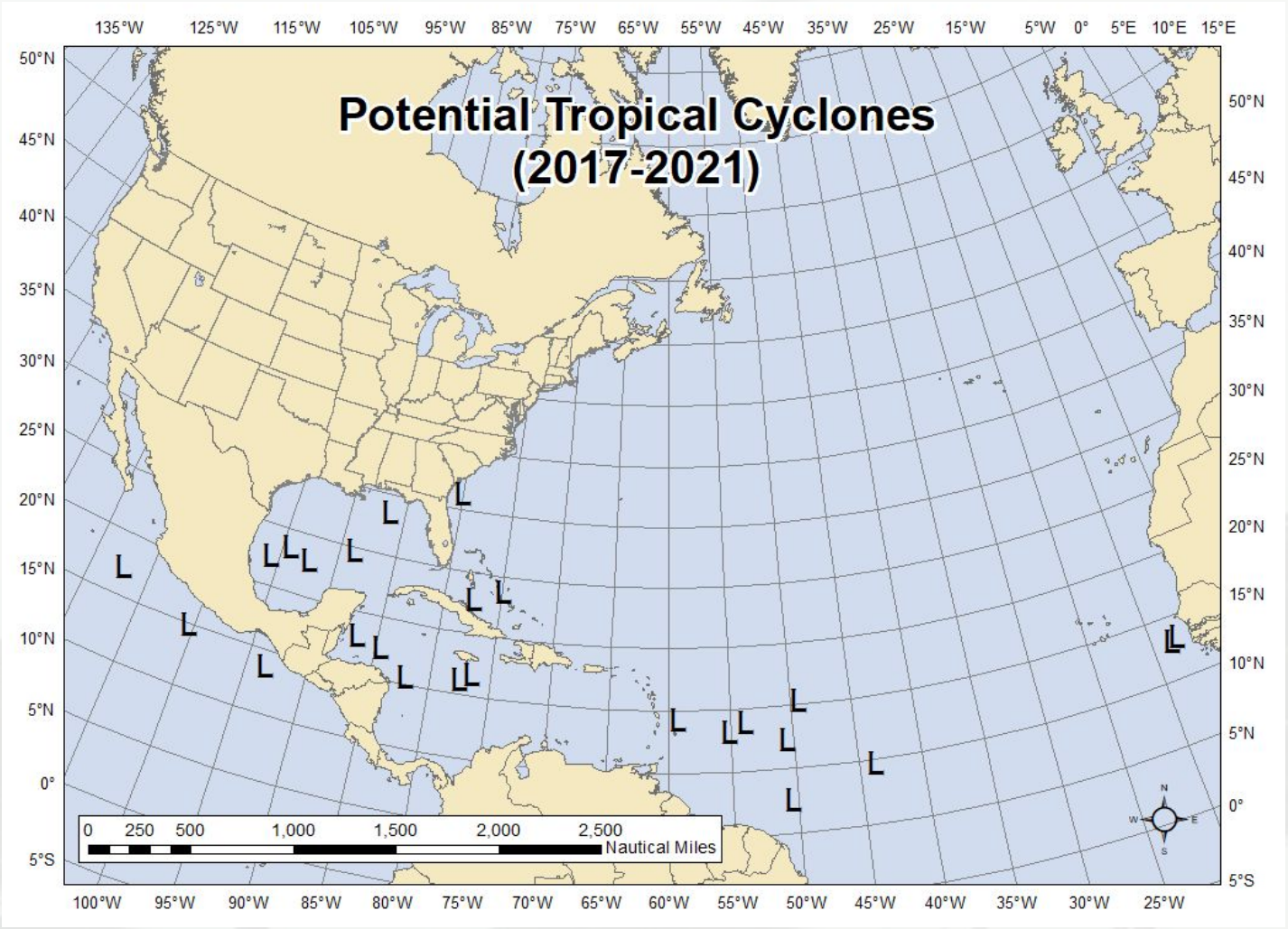
- Likelihood of tropical storm or hurricane-force winds occurring on land within 48 h
  - Only issued for near-term land threats!
- Likelihood of tropical cyclone development
  - Too many false alarms could reduce the long-term effectiveness of watches and warnings
- Presence of a “trackable” center feature to maintain forecast continuity

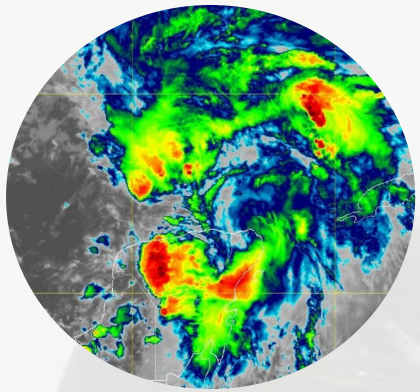
# Potential Tropical Cyclone Advisories

- The initial issuance of a PTC advisory is not directly tied to the system's formation chance in the Tropical Weather Outlook.
  - From 2017-2021, the 2-day TWO formation chances at the initial PTC issuance have ranged from 70-100% (high category).
- Most PTCs started as weaker systems (30-35 mph), but some had TS-force (40 mph) winds when advisories were initiated.

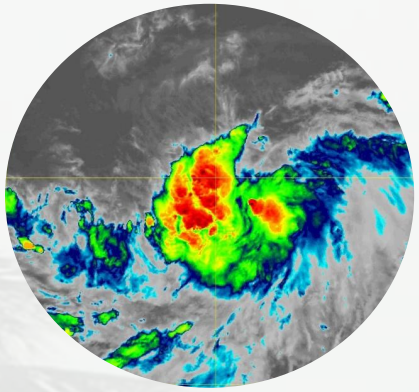


# Potential Tropical Cyclone Cases

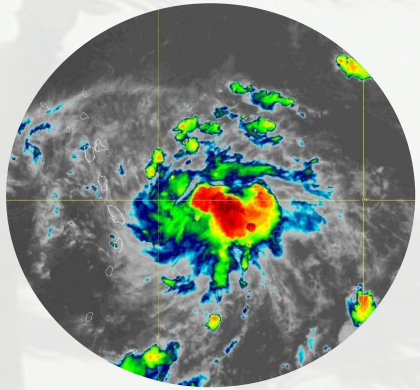


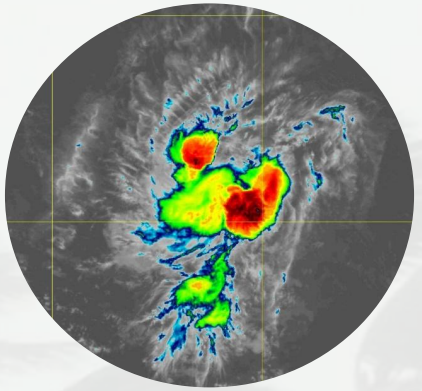
**PTC Three**
*Claudette*



**PTC Five**
*Elsa*



**PTC Six**
*Fred*



**PTC Seven**
*Grace*

# PTC Statistics (2017-2021)

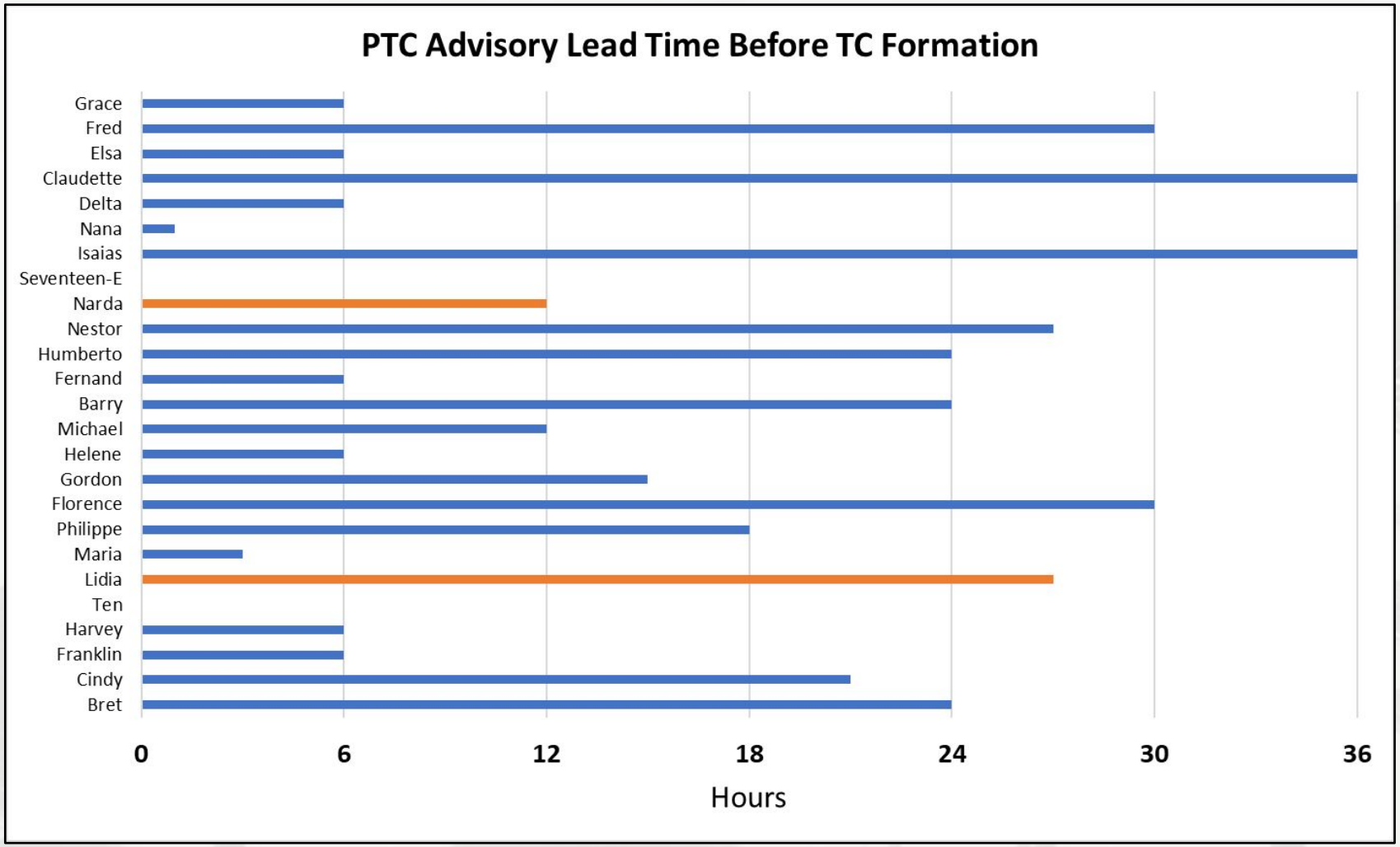
**Watch/Warning Occurrence with PTC Advisories (2017-2021; 25 cases)**

| | Watches | Warnings |
|---|---|---|
| Tropical Storm | 20 | 19 |
| Hurricane | 3 | 0 |
| Storm Surge | 3 | 1 |

76% of PTC advisories have resulted in the issuance of a watch or warning for international locations.

36% of PTC advisories have resulted in the issuance of a watch or warning for the United States (including Puerto Rico and the U.S. Virgin Islands).

# PTC Statistics (2017-2021)




**Lead Time (Time between 1st PTC advisory & operational TC formation)**

Mean lead time: **17 h**
Median lead time: **15 h**
Max lead time: **36 h**

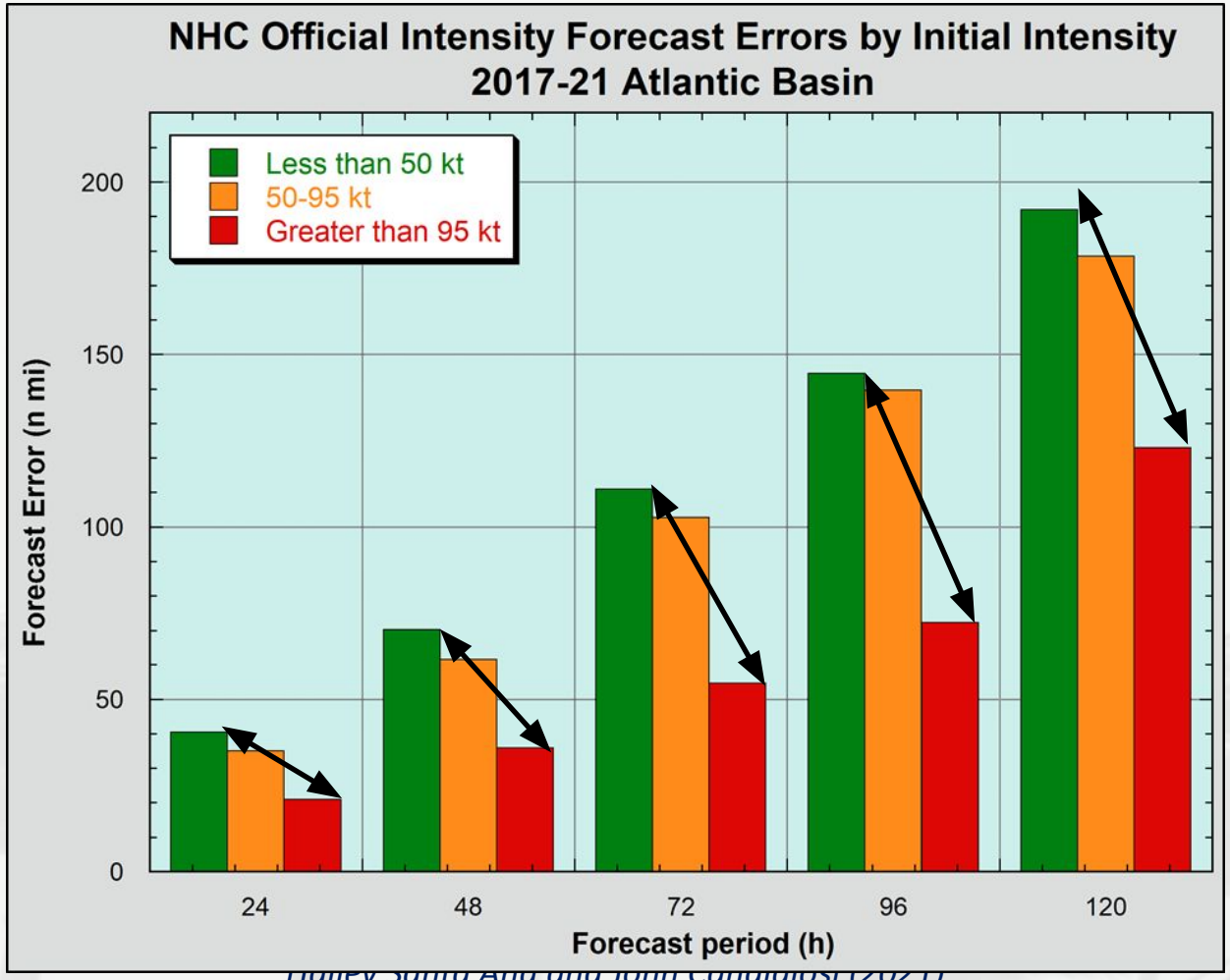
*Note: Two PTC systems failed to develop.*

# PTC Track Forecast Verification

## (Atlantic; 2017-2020)

- Average PTC track errors (blue) are higher than our overall official track errors (red) from 12–60 h and at 120 h.
  - PTCs lack a well-defined center
  - Poorly organized structure
  - Center re-formations occur

- Overall, we see larger track errors for weaker systems (< 50 kt, green) than for major hurricanes (> 95 kt, red).



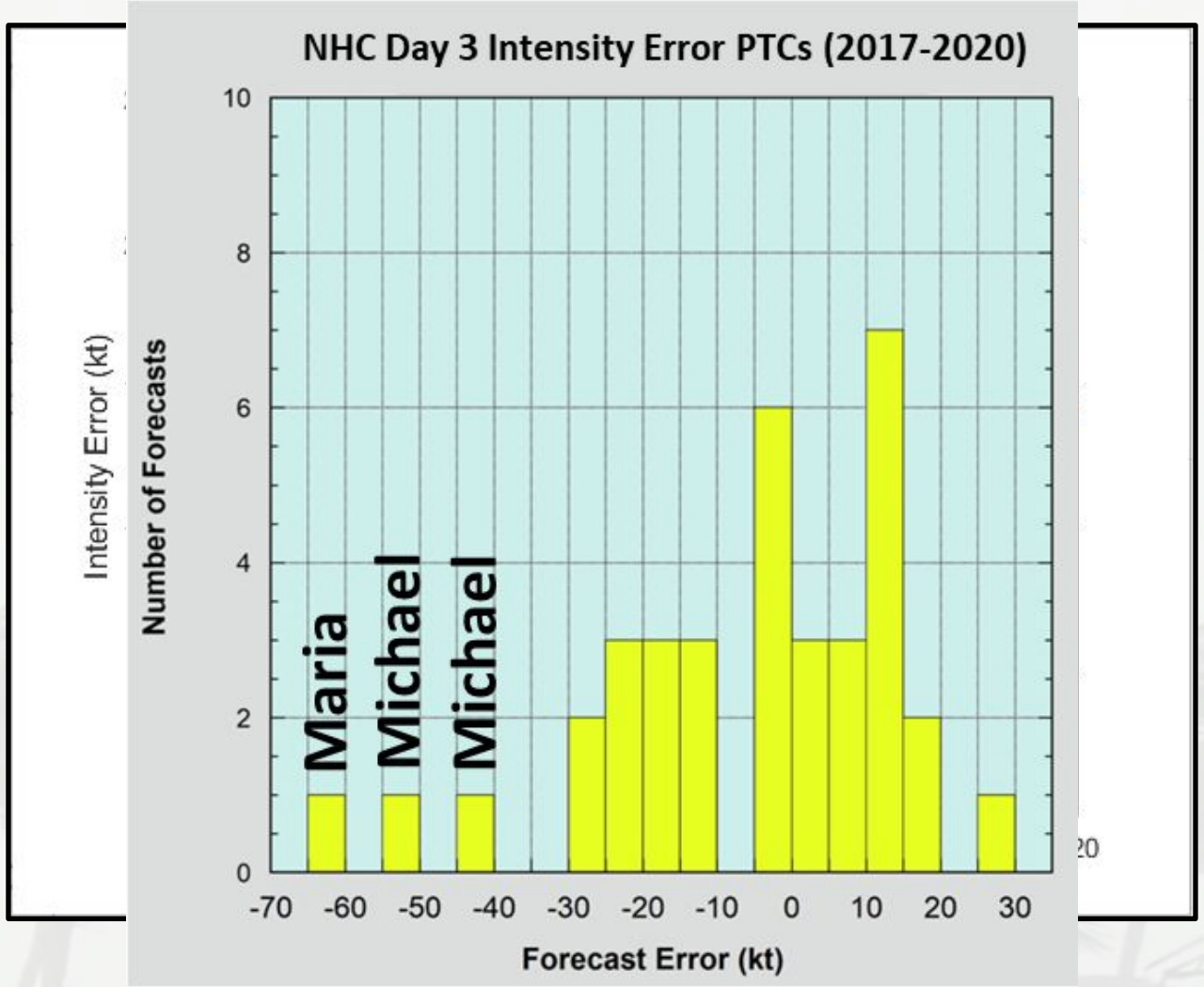

*Hulley Santa Ana and John Cangialosi (2021)*

# PTC Intensity Forecast Verification

## (Atlantic; 2017-2020)

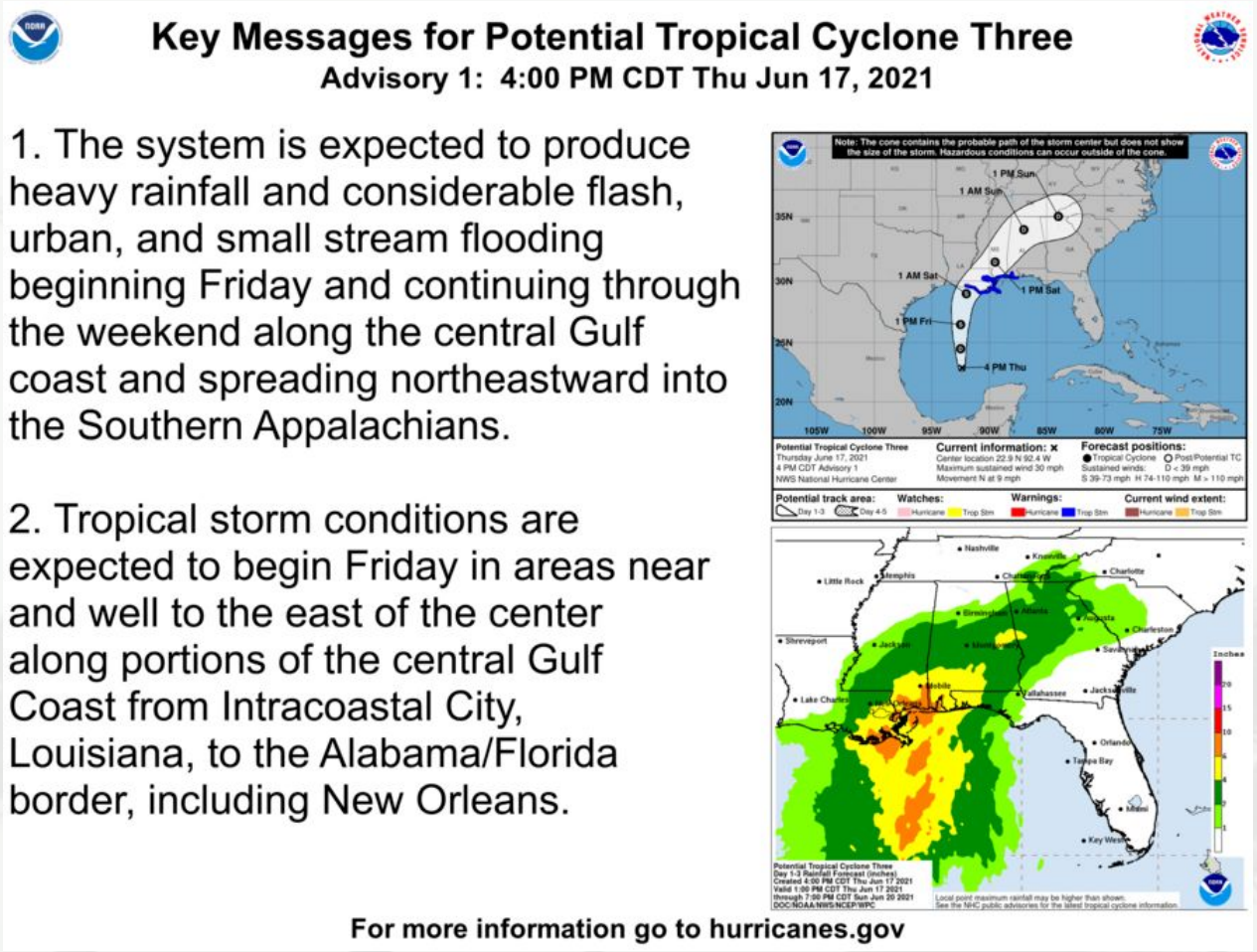
- Average PTC intensity errors (blue) are comparable to our overall intensity errors (red) through 60 h, but greater than the overall errors from 72–120 h.

- Why do our PTC intensity forecasts tend to be more conservative?
  - There is some uncertainty as to whether TC development will occur
  - Intensity guidance is likely to have a high bias since it assumes an existing TC structure



# PTC Messaging

- PTCs allow us to achieve consistent messaging and avoid switching between non-tropical and tropical warning types during an event.
- Since PTC forecasts are likely to have above average uncertainty, focus on hazards and potential impacts instead of the specific track and intensity.



**Key Messages for Potential Tropical Cyclone Three**
**Advisory 1: 4:00 PM CDT Thu Jun 17, 2021**

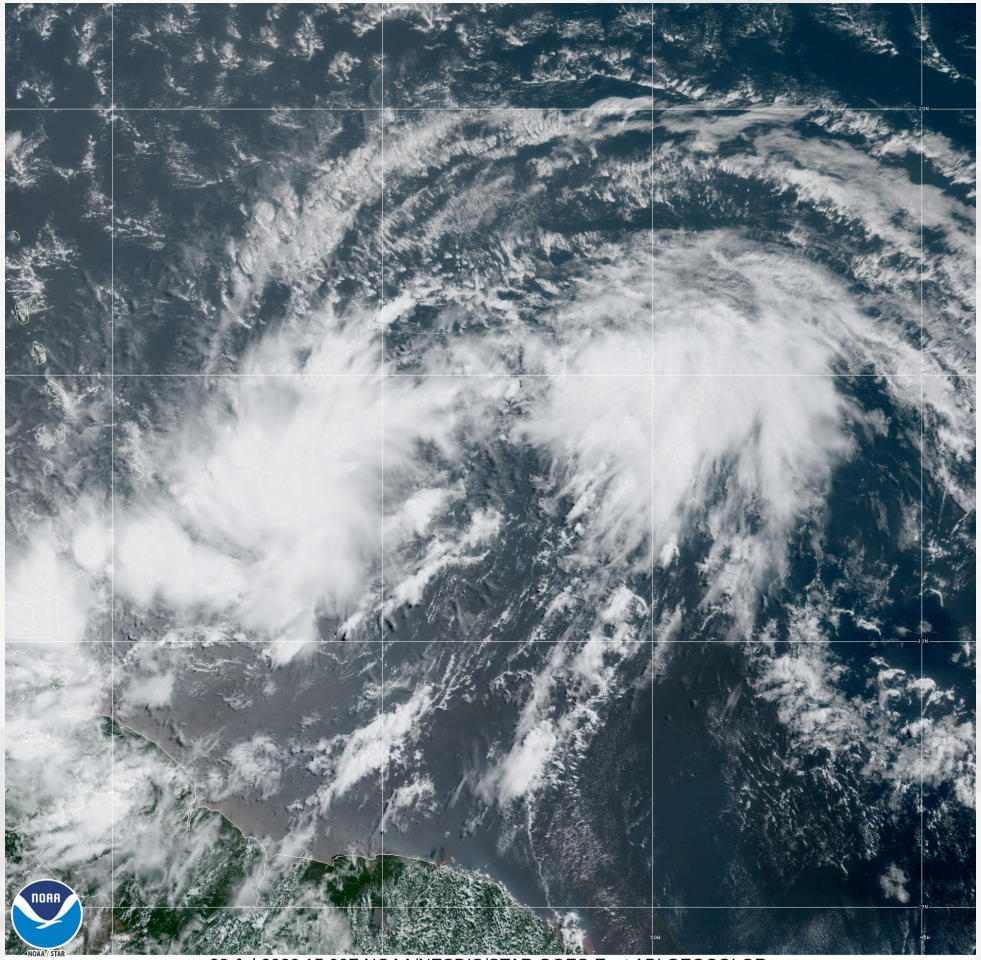
1. The system is expected to produce heavy rainfall and considerable flash, urban, and small stream flooding beginning Friday and continuing through the weekend along the central Gulf coast and spreading northeastward into the Southern Appalachians.

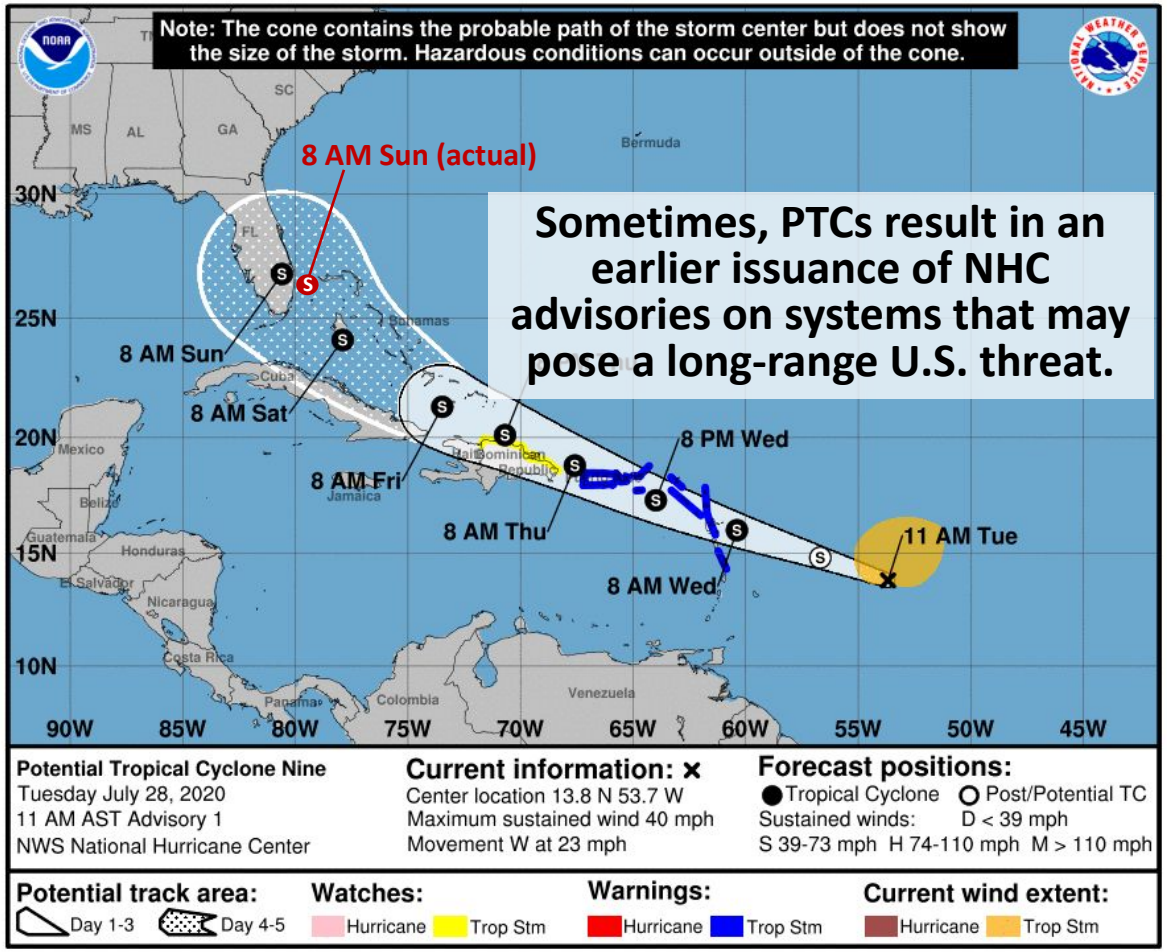
2. Tropical storm conditions are expected to begin Friday in areas near and well to the east of the center along portions of the central Gulf Coast from Intracoastal City, Louisiana, to the Alabama/Florida border, including New Orleans.



For more information go to hurricanes.gov

# Potential Tropical Cyclone Nine (2020)

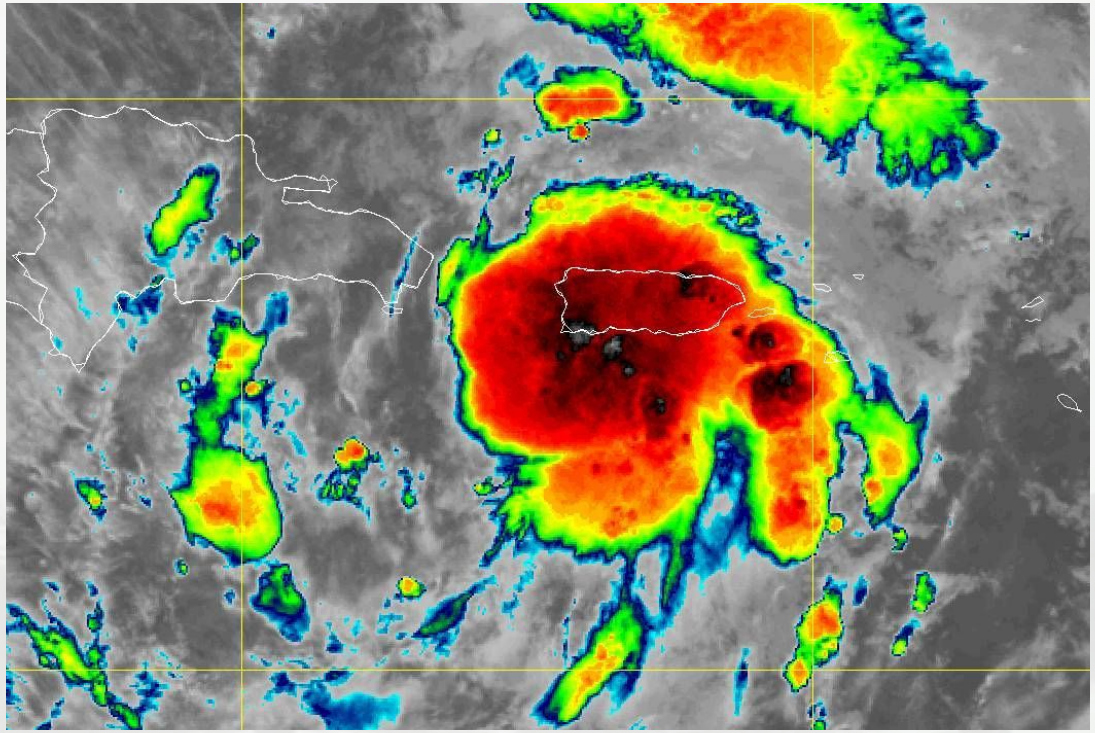


# PTC Nine  Isaias (2020)

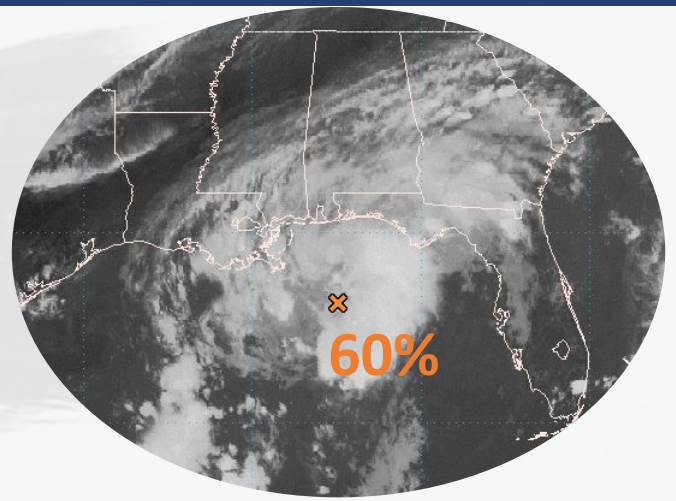
- Isaias developed into a tropical storm 36 h after the first PTC advisory, as it passed south of the U.S. Virgin Islands and Puerto Rico.

- A Tropical Storm Warning was issued for USVI/PR with the first PTC advisory, almost 2 days before the arrival of tropical-storm-force winds.
  - Actual Lead Time: 45 h
  - Lead Time Without PTCs: 9 h

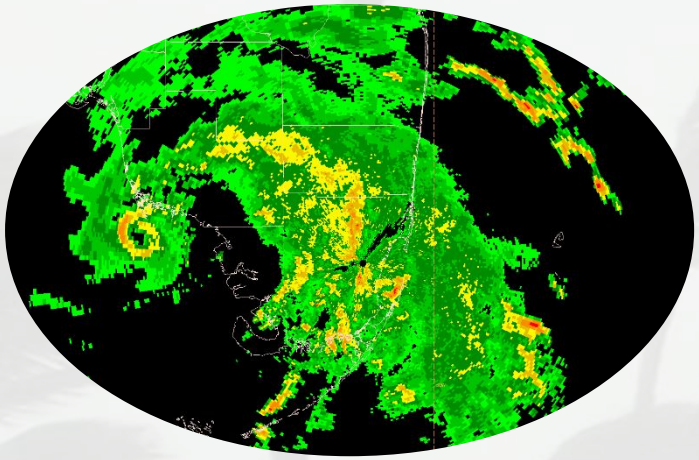


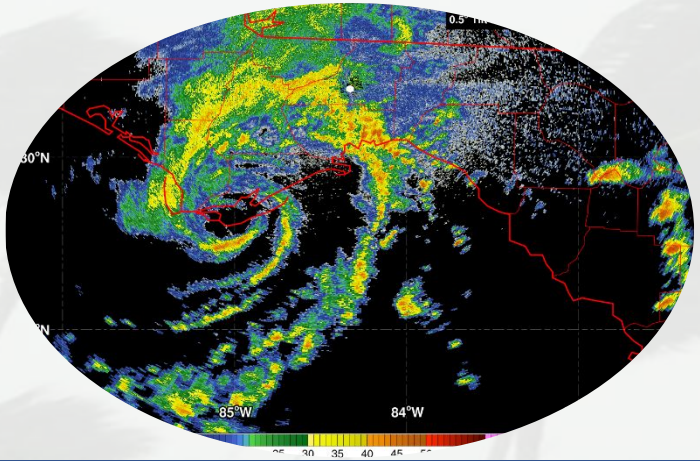
# Surprises Still Happen!


**Gordon (2018)**




**Mindy (2021)**






- Unexpected development still occasionally occurs near land.
- These situations require the issuance of advisories and warnings on short notice.
- For these events, rainfall is typically the primary threat and can be messaged with or without tropical advisories.

# Summary

- PTC advisories are a useful tool for the NHC to address the challenges posed by short-fused threats from developing TCs.

- Recent storms have highlighted the benefits of PTC advisories.
  - Increased watch & warning lead times
  - Consistent tropical hazard messaging
  - Enhanced service while staying true to the science