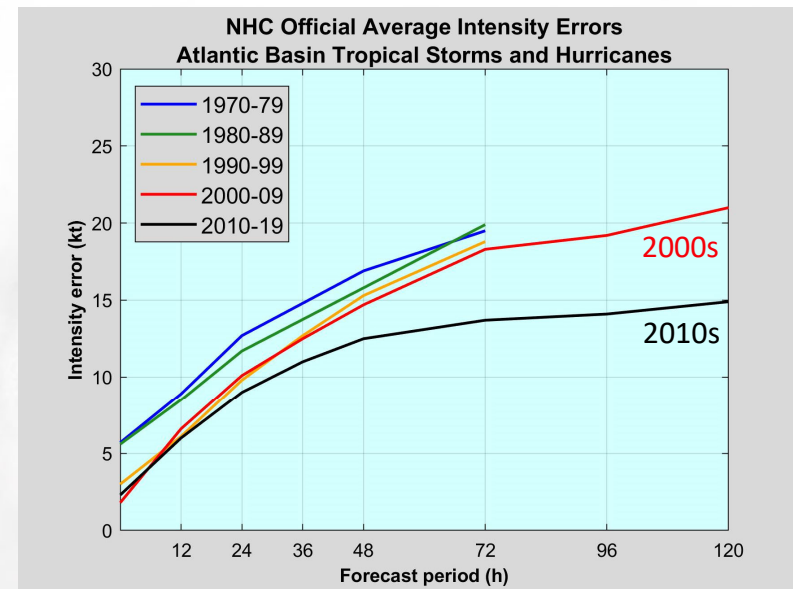
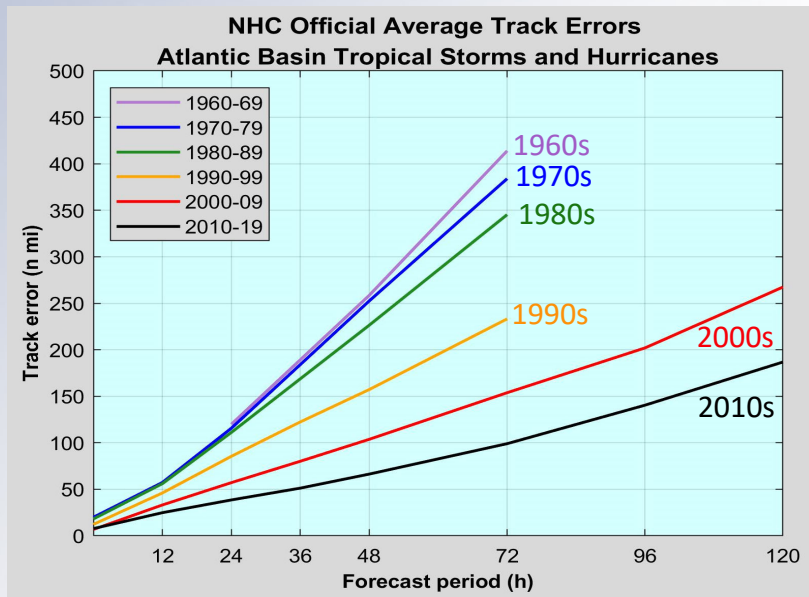


A satellite image of a large hurricane with a distinct eye, swirling over the Gulf of Mexico. The outlines of the Gulf of Mexico, Central America, and the northern coast of South America are visible in the lower-left portion of the image. The text is overlaid in yellow.

# **National Hurricane Center: International Coordination and Collaboration**

**Daniel Brown  
Warning Coordination Meteorologist  
National Hurricane Center**

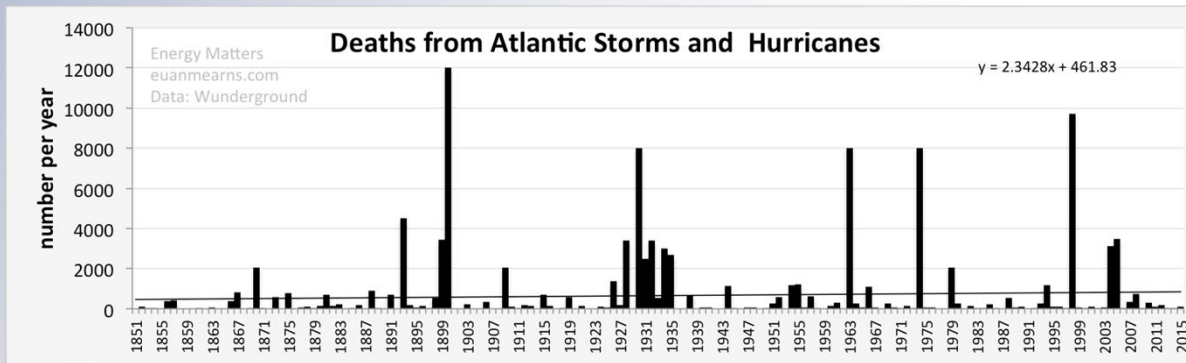
# Improvements in Forecast Abilities



**Scientific Accomplishment:** Significant reduction in track forecast errors and a more recent improvement in intensity forecasts.

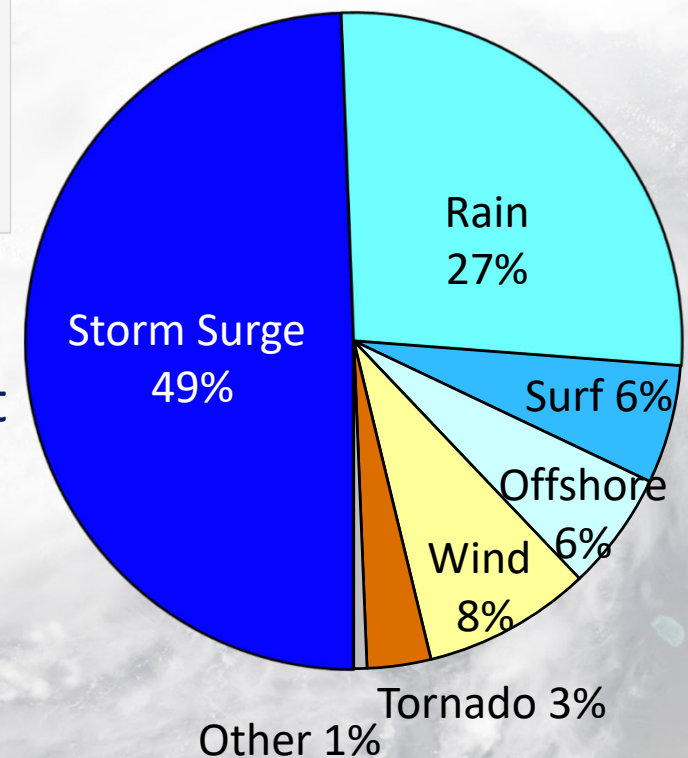


# Large Loss of Life Can Still Occur



**Challenge:** Despite forecast improvements, large numbers of fatalities can still occur. Most direct fatalities are from water, not wind. Can be as many indirect fatalities as direct and many indirect fatalities occur in the older, more vulnerable population.

## U.S. Tropical Cyclone Fatalities



# National Hurricane Center



## Mission:

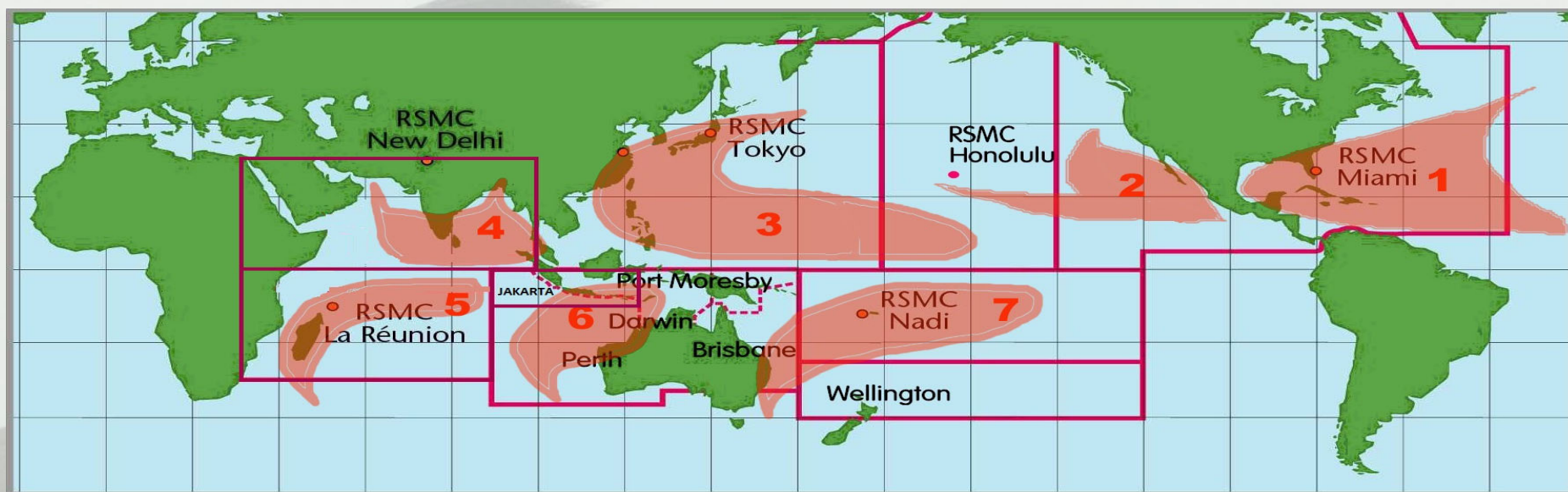
Save lives, mitigate property loss, and improve economic efficiency by issuing the best watches, warnings, and forecasts of hazardous tropical weather and by increasing understanding of these hazards





# World Meteorological Organization

## Regional Specialized Meteorological Centers (RSMC)



- NHC is one of 7 RSMCs that produce and coordinate tropical cyclone forecasts for various ocean basins.
- NHC is responsible for both the Atlantic & eastern North Pacific Ocean basins.





# NHC's International Coordination



## World MET. ORGANIZATION - Regional Association IV Coordination



**RSMC= Regional Specialized Meteorological Center**

**RA-IV countries include Caribbean area, Central America, Mexico, Canada, and Bermuda.**

## Saving Lives Starts Long Before the Hurricane

- Open exchange of meteorological data
- NHC provides forecasts and guidance on watches and warnings to 28 member nations
- Coordination governed by a Regional “Hurricane Operational Plan”
- The plan is updated at the annual WMO RA-IV Hurricane Committee Meeting



Regional Association IV –  
Hurricane Operational Plan  
for North America, Central America  
and the Caribbean

Tropical Cyclone Programme  
Report No. TCP-30



## Caribbean Hurricane Awareness Tour & WMO Workshop on Hurricane Forecasting

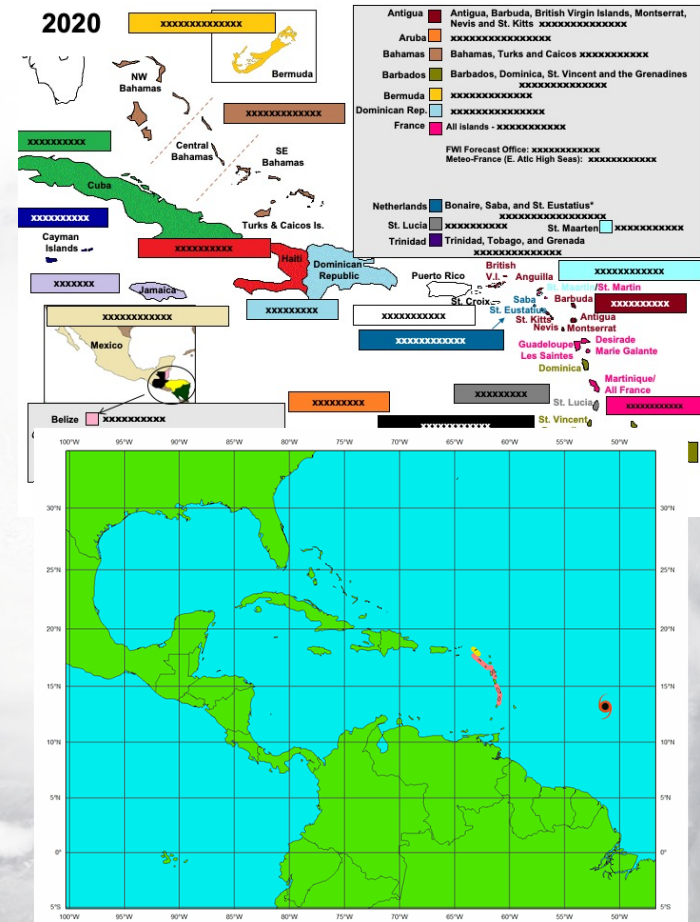
- Awareness Tour brings together disaster officials, media, and meteorological services, to plan and increase preparedness
- WMO Workshop builds relationships between RSMC Miami and forecasters within the Region





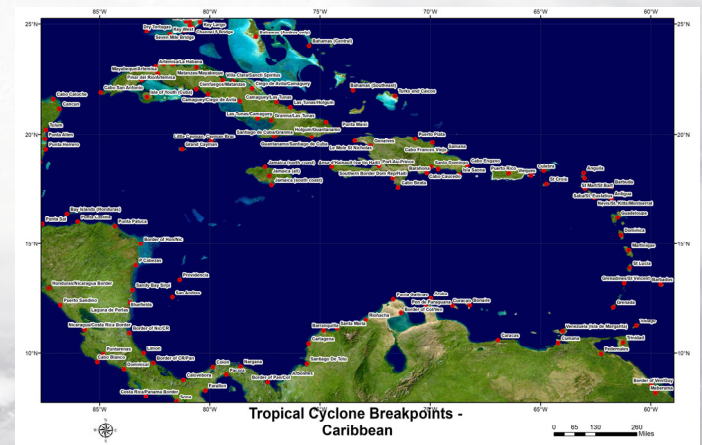
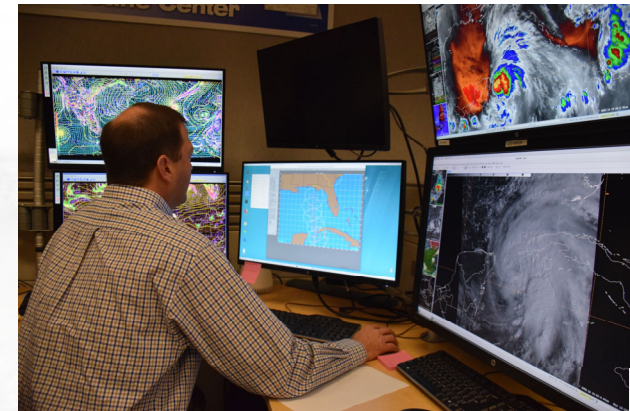
# Coordination of Watches and Warnings

- Coordination occurs with each country's meteorological office
- Coordination can be complex when many countries are involved, especially neighboring countries or jurisdictions
- NHC always has at least two forecasters on duty during watch and warning situations
- Coordination can occur by phone or email



# Coordination of Watches and Warnings

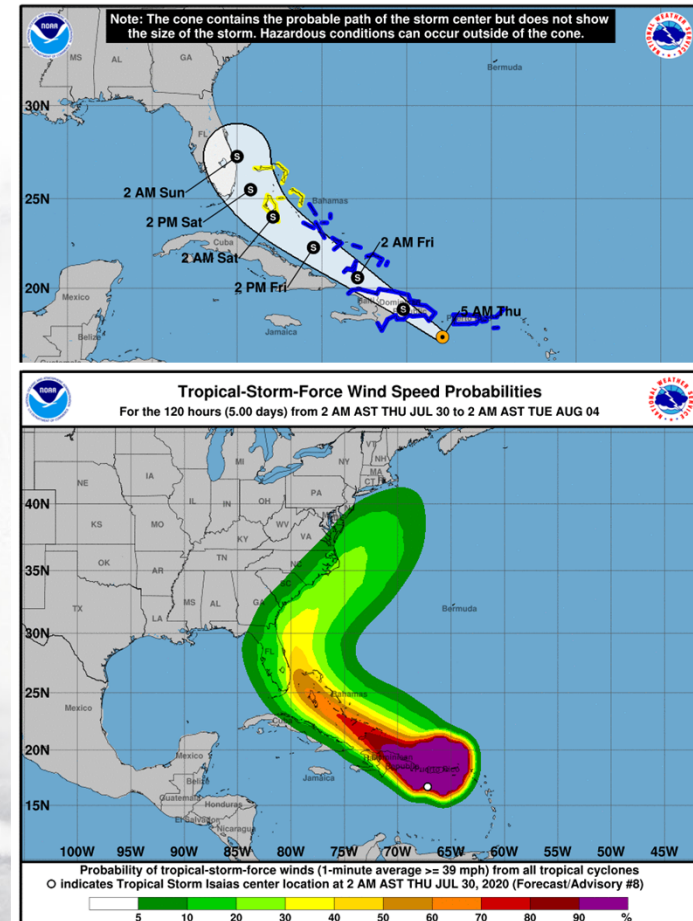
- Each country responsible for issuing watches & warning for their respective country or jurisdiction
- NHC will recommend the placement of tropical storm and hurricane watches & warnings
- Watches issued 48 h prior to the anticipated arrival of tropical-storm-force winds
- Warnings issued 36 h prior to the arrival of tropical-storm-force winds





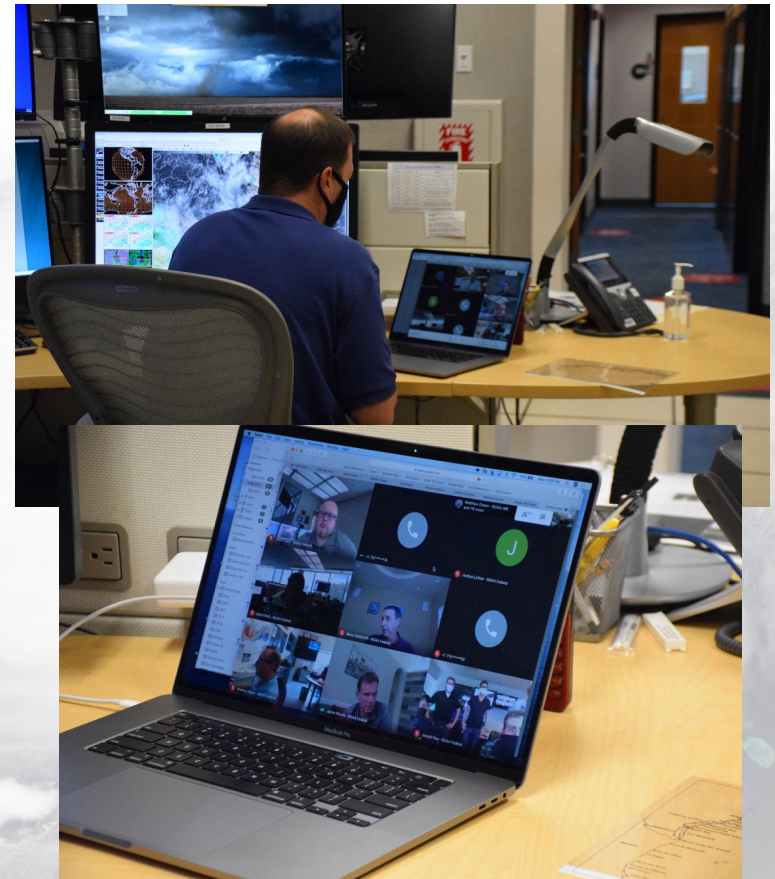
# Watch/Warning Philosophy

- Watches and warnings are tools used to *convey risk* – telling users what they should be *prepared for* in terms of hazards
- Proper issuance of watches and warnings must account for uncertainty in the forecast and have enough lead time for preparations to occur before the onset of hazards
- Considerations include:
  - Maintaining continuity, expectations of future changes to the forecast, assessment of forecast uncertainty, vulnerability of the area, time of day/day of week, and other non-meteorological factors



## Enhancing Real-Time Coordination in RA-IV

- NHC began using video conferencing to coordinate forecasts & warnings within the U.S. in 2020, and experimented with video conferencing with international met services in 2021
  - Enabled face-to-face coordination and data/screen sharing
  - Allowed nation-to-nation coordination by increased understanding of Watch/Warning decisions of neighboring countries

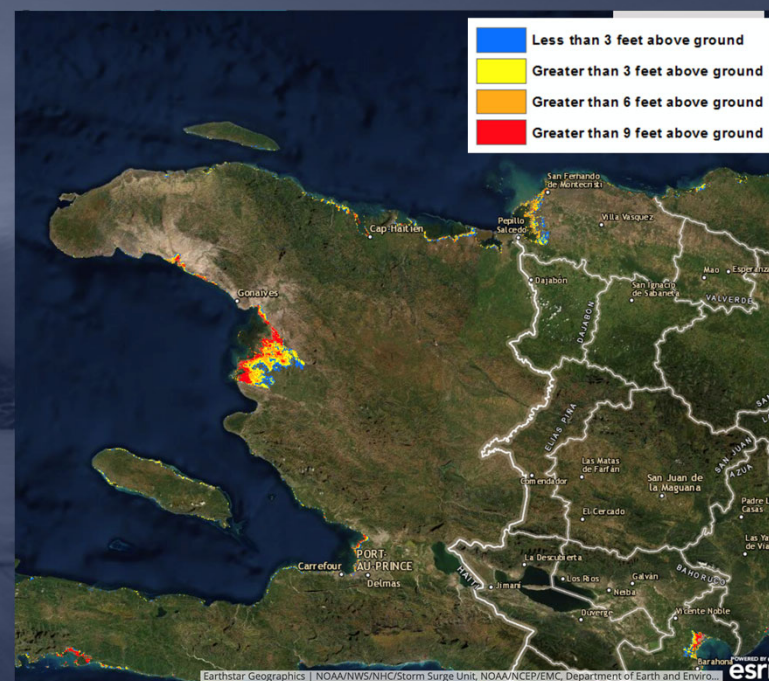




# Storm Surge Flood Risk – Expanding to the Caribbean

- Storm Surge Risk Maps
  - Maps depict storm surge vulnerability
  - Composite of hundreds of storm scenarios based on storm category
  - *In the U.S. these are used to help define evacuation zones*

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



# Saving Lives!!!

- Effective Regional Coordination
- Public Hazard-Based Warnings
- Actionable Impact- Based Hazard Information
- Coordinated Messaging





*Questions?*

