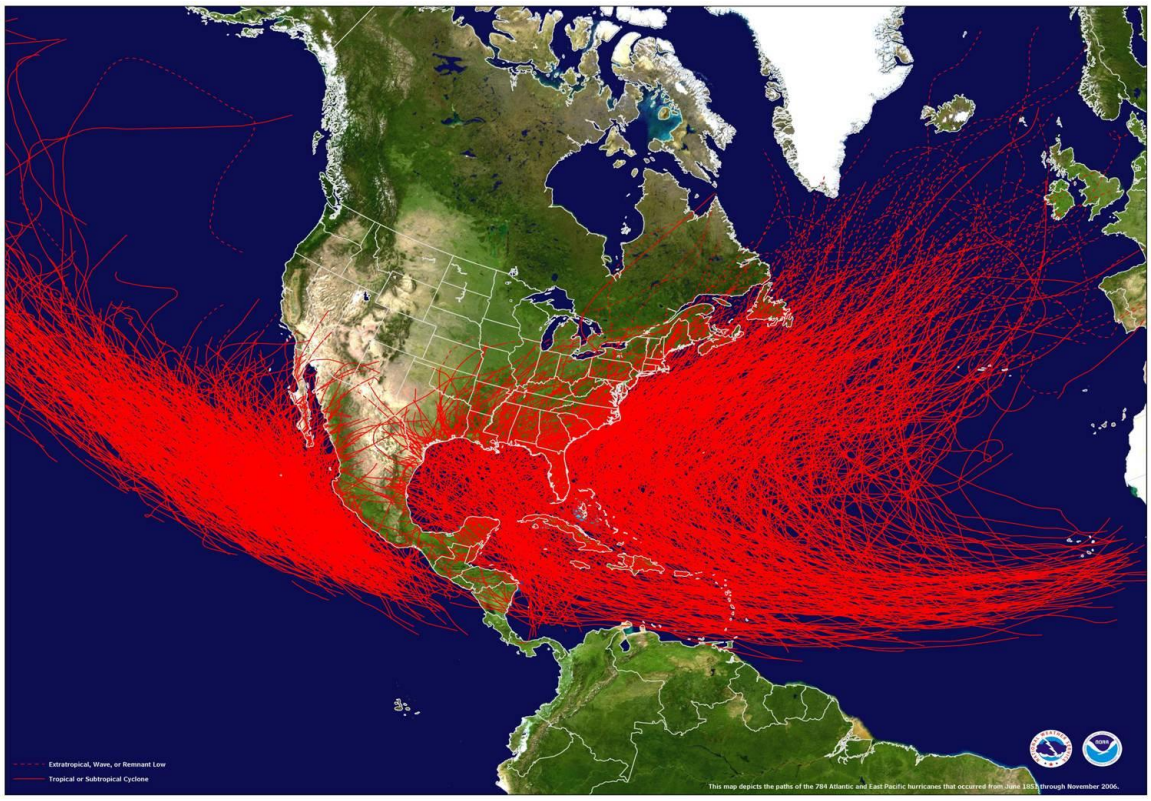
National Hurricane Center Product Description Document: A User's Guide to Hurricane Products

May 2024



Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Centers for Environmental Prediction
National Hurricane Center

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National Hurricane Center
Tropical Cyclone[1] Advisories

Whenever a tropical cyclone is active, the National Hurricane Center (NHC) issues tropical cyclone advisory packages comprising a suite of official text and graphical products. Advisory packages are also issued for certain post-tropical cyclones[2] and potential tropical cyclones[3]. This suite of advisory products is issued every 6 hours, at 0300, 0900, 1500, and 2100 UTC. Local issuance times are shown in the table below[4].

Basin	Advisory Issuance Times (UTC)	Local Issuance Times During Daylight Saving Time	Local Issuance Times During Standard Time
Atlantic	0300, 0900, 1500, 2100	5 am, 11 am, 5 pm, 11 pm EDT	4 am, 10 am, 4 pm, 10 pm EST
Eastern North Pacific	0300, 0900, 1500, 2100	2 am, 8 am, 2 pm, 8 pm PDT	1 am, 7 am, 1 pm, 7 pm PST

The primary text products are the Public Advisory, the Forecast/Advisory, the Tropical Cyclone Discussion, and the Wind Speed Probability product. Graphical products include the track forecast cone and watch/warning graphic, wind speed probability graphics, arrival of tropical-storm-force wind graphics, the tropical cyclone wind field graphic, and a cumulative wind history graphic. A Storm Surge Watch and Warning Graphic, a potential storm surge flooding map and a peak storm surge map will be available whenever life-threatening inundation from storm surge is possible along any portion of the Gulf or Atlantic coasts of the United States and along the coasts of Puerto Rico and the U.S. Virgin Islands within 48 hours.

Intermediate Public Advisories are issued at 3-hour intervals between regular advisory packages when coastal tropical cyclone watches or warnings are in effect. United States tropical cyclone watches or warnings can be issued with regular or intermediate Public

[1] Except when clear from context, in this document the term "tropical cyclone" is understood to also include subtropical cyclones, potential tropical cyclones, and post-tropical cyclones. The definition of these terms can be found in the NHC on-line glossary at: http://www.hurricanes.gov/aboutgloss.shtml

[2] Post-tropical cyclone advisories are issued when a post-tropical cyclone continues to pose a significant threat to life and property, and if the transfer or responsibility to another office would result in an unacceptable discontinuity of service.

[3] Advisories on potential tropical cyclones may be issued for disturbances that are not yet a tropical cyclone, but which pose the threat of bringing tropical storm or hurricane conditions to land areas within 48 hours.

[4] Local issuance times here are shown for the Eastern and Pacific time zones, however the time zone used in the advisory will vary depending on the initial location of the tropical cyclone at the advisory issuance time. Since most of Mexico no longer observes Daylight Saving Time, Central Standard and Mountain Standard time will be used when a tropical cyclone is located within those two time zones.

Advisories. A Special Advisory package may be issued at any time to advise of an unexpected significant change in the cyclone.

If a tropical cyclone dissipates, NHC advisories are typically discontinued. Under certain circumstances, advisory responsibility is transferred to the National Weather Service's Weather Prediction Center (WPC). This transfer will occur when a tropical depression or its remnants is inland over the conterminous United States or northern Mexico, poses a threat of heavy rains and flash floods in the United States, and is not forecast to regain tropical storm intensity or re-emerge over water.

NHC also has the option to continue issuing advisory packages after tropical cyclones have become post-tropical (a post-tropical cyclone is any area of low pressure that used to be a tropical cyclone but no longer is one). NHC will continue its advisory packages on post-tropical cyclones when they pose a significant threat to life and property, and when the transfer of responsibility to another office would result in an unacceptable discontinuity in service. In addition, hurricane and tropical storm watches and warnings can remain in place for these systems. For systems that become post-tropical over water and no longer pose a significant threat to life and property, the meteorological agency with marine warning responsibility will assume responsibility for the system.

NHC Text Product Descriptions

Tropical Cyclone Public Advisory (TCP)

Product Description: The Tropical Cyclone Public Advisory is the primary tropical cyclone information product intended for a general audience. It provides critical tropical cyclone watch, warning, and forecast information for the protection of life and property.

The Public Advisory has five sections:

1) A summary table of several cyclone parameters is placed at the top of the product in a fixed format that is suitable for parsing by computer software. This section contains the cyclone position in latitude and longitude coordinates, its distance from a well-known reference point, the maximum sustained winds, the cyclone's current direction and speed of motion, and the estimated or measured minimum central pressure.

2) A summary of all current coastal watches and warnings for the cyclone with recent changes to the watches and warnings highlighted at the top.

3) A discussion of the cyclone's current characteristics, including location, motion, intensity, and pressure and a general description of the predicted track and intensity of the cyclone over the next 72 hours. When conditions warrant, a discussion of the cyclone's forecast track and intensity through 5 days will be included. Any pertinent weather observations will also be included in this section.

4) A section that includes information on hazards to land, generally within the time period when watches and/or warnings are in effect. This section includes information on hazards such as storm surge, wind, rainfall, tornadoes, and rip currents associated with the cyclone. When numerous locations are affected by storm surge or rainfall, weblinks will be provided to direct users to pertinent graphical hazard information.

5) A section that states the time of the next advisory issuance.

Availability: Public Advisories are part of a suite of products issued for active cyclones every six hours at 0300, 0900, 1500, and 2100 UTC. Local issuance times are shown in the table on the following page. When coastal watches or warnings are in effect, Intermediate Public Advisories are issued at 3-hour intervals between the regular Public Advisories. Special Public Advisories may be issued at any time to advise of an unexpected significant change in the cyclone.

Basin	Advisory Issuance Times (UTC)	Local Issuance Times During Daylight Saving Time	Local Issuance Times During Standard Time
Atlantic	0300, 0900, 1500, 2100	5 am, 11 am, 5 pm, 11 pm EDT	4 am, 10 am, 4 pm, 10 pm EST
Eastern North Pacific	0300, 0900, 1500, 2100	2 am, 8 am, 2 pm, 8 pm PDT	1 am, 7 am, 1 pm, 7 pm PST

Product Headers: WMO and AWIPS headers for English and Spanish products are given in the table below. The final numeric digit in each header is assigned on a rotating basis by system number, i.e., WTNT31 KNHC would be used for the first, sixth, and eleventh Atlantic system that NHC has written advisories on in a given year, while WTNT32 KNHC would be used for the second, seventh, or twelfth system, and so on.

Basin	WMO Header(s)	AWIPS Header(s)
Atlantic (English)	WTNT31-5 KNHC	MIATCPAT1-5
Atlantic (Spanish)	WTCA41-5 KNHC	MIATASAT1-5
Eastern North Pacific (English)	WTPZ31-5 KNHC	MIATCPEP1-5
Eastern North Pacific (Spanish)	WTPZ11-5 KNHC	MIATASEP1-5

Example:

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ZCZC MIATCPAT5 ALL
TTAA00 KNHC DDHHMM

BULLETIN
Hurricane Idalia Advisory Number  14
NWS National Hurricane Center Miami FL       AL102023
1100 PM EDT Tue Aug 29 2023
```

Product header/valid time

```
...IDALIA STILL STRENGTHENING...
...FORECAST TO BE AN EXTREMELY DANGEROUS CATEGORY 4 INTENSITY AT
LANDFALL...
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Headline

```
SUMMARY OF 1100 PM EDT...0300 UTC...INFORMATION
-----------------------------------------------
LOCATION...27.7N 84.5W
ABOUT 125 MI...200 KM W OF TAMPA FLORIDA
ABOUT 185 MI...300 KM S OF TALLAHASSEE FLORIDA
MAXIMUM SUSTAINED WINDS...110 MPH...175 KM/H
PRESENT MOVEMENT...N OR 10 DEGREES AT 18 MPH...30 KM/H
MINIMUM CENTRAL PRESSURE...958 MB...28.29 INCHES
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Summary table formatted for parsing

Watch/Warning section with changes highlighted at the top

WATCHES AND WARNINGS

CHANGES WITH THIS ADVISORY:

The Tropical Storm Warning for the Dry Tortugas is discontinued, and the Tropical Storm Watch for the Lower Florida Keys is discontinued.

SUMMARY OF WATCHES AND WARNINGS IN EFFECT:

A Storm Surge Warning is in effect for...
* Englewood northward to Indian Pass, including Tampa Bay

A Hurricane Warning is in effect for...
* Middle of Longboat Key northward to Indian Pass, including Tampa Bay

A Tropical Storm Warning is in effect for...
* Chokoloskee northward to the Middle of Longboat Key
* West of Indian Pass to Mexico Beach
* Sebastian Inlet Florida to Surf City North Carolina

A Storm Surge Watch is in effect for...
* Bonita Beach northward to Englewood, including Charlotte Harbour
* Mouth of the St. Mary's River to South Santee River South Carolina
* Beaufort Inlet to Drum Inlet North Carolina
* Neuse and Pamlico Rivers North Carolina

A Hurricane Watch is in effect for...
* Mouth of the St. Mary's River to Edisto Beach South Carolina

A Tropical Storm Watch is in effect for...
* North of Surf City North Carolina to the North Carolina/Virginia border
* Pamlico and Albemarle Sounds

A Hurricane Warning means that hurricane conditions are expected somewhere within the warning area. Preparations to protect life and property should be rushed to completion.

A Storm Surge Warning means there is a danger of life-threatening inundation, from rising water moving inland from the coastline, during the next 36 hours in the indicated locations. For a depiction of areas at risk, please see the National Weather Service Storm Surge Watch/Warning Graphic, available at hurricanes.gov. This is a life-threatening situation. Persons located within these areas should take all necessary actions to protect life and property from rising water and the potential for other dangerous conditions. Promptly follow evacuation and other instructions from local officials.

A Tropical Storm Warning means that tropical storm conditions are expected somewhere within the warning area.

A Storm Surge Watch means there is a possibility of life-threatening inundation, from rising water moving inland from the coastline, in the indicated locations during the next 48 hours. For a depiction of areas at risk, please see the National Weather Service Storm Surge Watch/Warning Graphic, available at hurricanes.gov.

A Hurricane Watch means that hurricane conditions are possible within the watch area.

A Tropical Storm Watch means that tropical storm conditions are possible within the watch area, generally within 48 hours.

Additional warnings will likely be required tonight or on Wednesday.

For storm information specific to your area in the United States, including possible inland watches and warnings, please monitor products issued by your local National Weather Service forecast office.

DISCUSSION AND OUTLOOK

Storm discussion and outlook

At 1100 PM EDT (0300 UTC), the center of Hurricane Idalia was located near latitude 27.7 North, longitude 84.5 West. Idalia is moving toward the north near 18 mph (30 km/h). A northward to north-northeastward motion is expected through tonight, with Idalia's center forecast to reach the Big Bend coast of Florida on Wednesday morning. After landfall, the center of Idalia is forecast to turn toward the northeast and east-northeast, moving near or along the coasts of Georgia, South Carolina, and North Carolina late Wednesday and Thursday.

Location and movement

Hurricane Hunter aircraft data indicate that maximum sustained winds are near 110 mph (175 km/h) with higher gusts. Additional strengthening is forecast, and Idalia is expected to become a major hurricane during the next few hours before it reaches the Big Bend coast of Florida. Idalia is likely to still be a hurricane while moving across southern Georgia, and possibly when it reaches the coast of Georgia or southern South Carolina on Wednesday.

Intensity

Hurricane-force winds extend outward up to 25 miles (35 km) from the center and tropical-storm-force winds extend outward up to 160 miles (260 km).

Size

The estimated minimum central pressure based on Hurricane Hunter aircraft observations is 958 mb (28.29 inches).

Pressure

HAZARDS AFFECTING LAND

Key messages for Idalia can be found in the Tropical Cyclone Discussion under AWIPS header MIATCDAT5 and WMO header WTNT45 KNHC, and on the web at hurricanes.gov/text/MIATCDAT5.shtml

Hazards Section

STORM SURGE: The combination of a dangerous storm surge and the tide will cause normally dry areas near the coast to be flooded by

Storm surge

rising waters moving inland from the shoreline. The water could reach the following heights above ground somewhere in the indicated areas if the peak surge occurs at the time of high tide...

Wakulla/Jefferson County line, FL to Yankeetown, FL...12-16 ft
Ochlockonee River, FL to Wakulla/Jefferson County line, FL...8-12 ft
Yankeetown to Chassahowitzka, FL...7-11 ft
Chassahowitzka, FL to Anclote River, FL...6-9 ft
Carrabelle, FL to Ochlockonee River, FL...5-8 ft

For a complete depiction of areas at risk of storm surge inundation, please see the National Weather Service Peak Storm Surge Graphic, available at hurricanes.gov/graphics_at5.shtml?peakSurge.

The deepest water will occur along the immediate coast in areas of onshore winds, where the surge will be accompanied by large and dangerous waves. Surge-related flooding depends on the relative timing of the surge and the tidal cycle, and can vary greatly over short distances. For information specific to your area, please see products issued by your local National Weather Service forecast office.

Storm surge

WIND: Hurricane conditions are expected within the hurricane warning area in Florida early Wednesday morning, with tropical storm conditions beginning within the next few hours.

Tropical storm conditions will begin within the tropical storm warning area along the Florida Gulf coast and the Florida west coast soon.

Hurricane conditions are possible within the hurricane watch area along the coasts of Georgia and South Carolina Wednesday and Wednesday night.

Tropical storm conditions are expected to begin on Wednesday in the warning area along the east coast of Florida, Georgia, and South Carolina, and spread into North Carolina Wednesday night and Thursday. Tropical storm conditions are possible within the watch area in North Carolina by Thursday.

Wind

RAINFALL: Idalia is expected to produce a swath of 4 to 8 inches of rainfall with isolated maxima up to 12 inches from the Florida Big Bend through central Georgia and South Carolina, and through eastern North Carolina into Thursday. These rainfall amounts will lead to areas of flash, urban, and moderate river flooding, with locally considerable impacts.

For a complete depiction of forecast rainfall and flash flooding associated with Idalia, please see the National Weather Service Storm Total Rainfall Graphic, available at hurricanes.gov/graphics_at5.shtml?rainqpf and the Flash Flood Risk graphic at hurricanes.gov/graphics_at5.shtml?ero

Rainfall

SURF: Swells generated by Idalia are affecting the southwestern coast of Florida and will spread northward and westward to the north-central Gulf coast through Wednesday. These swells are likely to cause life-threatening surf and rip current conditions.

Surf

Please consult products from your local weather office.

TORNADOES: A few tornadoes are possible tonight from the coast of
west-central Florida northward into the Florida Big Bend region.
The tornado risk will shift into southeast Georgia and the coastal
Carolinas on Wednesday.

Tornadoes

NEXT ADVISORY

Next intermediate advisory at 200 AM EDT.
Next complete advisory at 500 AM EDT.

Information on next Advisory issuance

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Forecaster Pasch

NNNN

Tropical Cyclone Forecast/Advisory (TCM)

Product Description: The Tropical Cyclone Forecast/Advisory contains current and forecast storm information in a fixed format suitable for parsing by computer software. It contains the cyclone position, intensity, and direction and speed of motion. It also includes the current maximum radial extent of 12-ft seas, as well as the maximum radial extent of winds of 34, 50, and 64 kt in each of four quadrants around the storm. The Forecast/Advisory contains quantitative forecast information on the track, intensity, and size of the cyclone valid 12, 24, 36, 48, 60, 72, 96, and 120 h from the forecast's nominal initial time. Tropical storm and 50-kt wind radii are forecast out to 120 h and hurricane-force wind radii are forecast out to 48 h.

The Forecast/Advisory also contains the predicted status of the cyclone for each forecast time. This status may include any of the following: inland, dissipating, dissipated, or post tropical. "Post tropical" describes a cyclone that no longer possesses sufficient tropical characteristics to be considered a tropical cyclone; however these cyclones can continue to produce heavy rains and high winds. A remnant low is a post-tropical cyclone that no longer possesses the convective organization required of a tropical cyclone and has maximum sustained winds of less than 34 knots. An extratropical cyclone is a cyclone of any intensity for which the primary energy source results from the temperature contrast between warm and cold air masses.

Availability: Forecast/Advisories are part of a suite of products issued for active cyclones every six hours at 0300, 0900, 1500, and 2100 UTC. Local issuance times are shown in the table below. Special Forecast/Advisories may be issued at any time to advise of an unexpected significant change in the cyclone.

Basin	Advisory Issuance Times (UTC)	Local Issuance Times During Daylight Saving Time	Local Issuance Times During Standard Time
Atlantic	0300, 0900, 1500, 2100	5 am, 11 am, 5 pm, 11 pm EDT	4 am, 10 am, 4 pm, 10 pm EST
Eastern North Pacific	0300, 0900, 1500, 2100	2 am, 8 am, 2 pm, 8 pm PDT	1 am, 7 am, 1 pm, 7 pm PST

Product Headers: WMO and AWIPS headers are given in the table below. The final numeric digit in each header is assigned on a rotating basis by cyclone number, i.e., WTNT21 KNHC would be used for the first, sixth, and eleventh Atlantic cyclones, while WTNT22 KNHC would be used for the second, seventh, or twelfth cyclones, and so on.

Basin	WMO Header(s)	AWIPS Header(s)
Atlantic	WTNT21-5 KNHC	MIATCMAT1-5
Eastern North Pacific	WTPZ21-5 KNHC	MIATCMEP1-5

Example:

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ZCZC MIATCMAT3 ALL
TTAA00 KNHC DDHHMM

HURRICANE LEE FORECAST/ADVISORY NUMBER  22
NWS NATIONAL HURRICANE CENTER MIAMI FL       AL132023
2100 UTC SUN SEP 10 2023
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Product header/valid time

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HURRICANE CENTER LOCATED NEAR 22.1N  61.7W AT 10/2100Z
POSITION ACCURATE WITHIN  15 NM

PRESENT MOVEMENT TOWARD THE WEST-NORTHWEST OR 300 DEGREES AT   7 KT

ESTIMATED MINIMUM CENTRAL PRESSURE  954 MB
EYE DIAMETER  20 NM
MAX SUSTAINED WINDS 105 KT WITH GUSTS TO 120 KT.
64 KT....... 40NE  35SE  30SW  40NW.
50 KT....... 90NE  70SE  50SW  80NW.
34 KT.......150NE 140SE 100SW 140NW.
12 FT SEAS..300NE 180SE 240SW 300NW.
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 22.1N  61.7W AT 10/2100Z
AT 10/1800Z CENTER WAS LOCATED NEAR 21.9N  61.4W
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Current position, intensity, and structure

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FORECAST VALID 11/0600Z 22.7N  62.7W
MAX WIND 115 KT...GUSTS 140 KT.
64 KT... 50NE  40SE  35SW  50NW.
50 KT... 90NE  80SE  50SW  80NW.
34 KT...150NE 140SE 100SW 140NW.
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12 hour forecast

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FORECAST VALID 11/1800Z 23.3N  63.9W
MAX WIND 120 KT...GUSTS 145 KT.
64 KT... 50NE  50SE  35SW  50NW.
50 KT... 90NE  80SE  60SW  80NW.
34 KT...150NE 150SE 110SW 140NW.
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24 hour forecast

FORECAST VALID 12/0600Z 23.8N 65.1W
MAX WIND 120 KT...GUSTS 145 KT.
64 KT... 60NE 60SE 40SW 50NW.
50 KT... 90NE 90SE 70SW 80NW.
34 KT...150NE 150SE 120SW 140NW.

36 hour forecast

FORECAST VALID 12/1800Z 24.2N 66.2W
MAX WIND 115 KT...GUSTS 140 KT.
64 KT... 60NE 50SE 40SW 50NW.
50 KT... 90NE 90SE 70SW 80NW.
34 KT...160NE 160SE 120SW 150NW.

48 hour forecast

FORECAST VALID 13/0600Z 24.7N 67.0W
MAX WIND 105 KT...GUSTS 130 KT.
50 KT...100NE 100SE 80SW 80NW.
34 KT...170NE 170SE 130SW 160NW.

60 hour forecast

FORECAST VALID 13/1800Z 25.6N 67.6W
MAX WIND 100 KT...GUSTS 120 KT.
50 KT...100NE 90SE 80SW 90NW.
34 KT...180NE 180SE 140SW 180NW.

72 hour forecast

EXTENDED OUTLOOK. NOTE...ERRORS FOR TRACK HAVE AVERAGED NEAR 125 NM
ON DAY 4 AND 175 NM ON DAY 5...AND FOR INTENSITY NEAR 15 KT EACH DAY

OUTLOOK VALID 14/1800Z 28.9N 68.0W
MAX WIND 90 KT...GUSTS 110 KT.
50 KT...110NE 100SE 90SW 100NW.
34 KT...200NE 200SE 160SW 200NW.

96 hour forecast

OUTLOOK VALID 15/1800Z 33.6N 67.4W
MAX WIND 80 KT...GUSTS 100 KT.
50 KT...120NE 100SE 90SW 90NW.
34 KT...210NE 200SE 160SW 200NW.

120 hour forecast

REQUEST FOR 3 HOURLY SHIP REPORTS WITHIN 300 MILES OF 22.1N 61.7W

NEXT ADVISORY AT 11/0300Z

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FORECASTER BROWN

NNNN

Tropical Cyclone Discussion (TCD)

Product Description: The Tropical Cyclone Discussion describes the rationale for the forecaster's analysis and forecast of a tropical cyclone. It will typically discuss the observations justifying the analyzed intensity of the cyclone, a description of the environmental factors expected to influence the cyclone's future track and intensity, and a description of the numerical guidance models. It may also describe the forecaster's degree of confidence in the official forecast, discuss possible alternate scenarios, highlight unusual hazards, and provide a summary of key messages for select tropical cyclones. The product also includes a table of forecast positions and intensities in knots and miles per hour out to 120 h. This table also indicates the forecast status of the cyclone, which may include any of the following: inland, dissipated, or post tropical. "Post tropical" describes a cyclone that no longer possesses sufficient tropical characteristics to be considered a tropical cyclone; however these cyclones can continue to produce heavy rains and high winds. A remnant low is a post-tropical cyclone that no longer possesses the convective organization required of a tropical cyclone and has maximum sustained winds of less than 34 knots. An extratropical cyclone is a cyclone of any intensity for which the primary energy source results from the temperature contrast between warm and cold air masses.

Availability: Tropical Cyclone Discussions are part of a suite of products issued for active cyclones every six hours at 0300, 0900, 1500, and 2100 UTC. Local issuance times are shown in the table below. Special Discussions may be issued at any time to advise of an unexpected significant change in the cyclone.

Basin	Advisory Issuance Times (UTC)	Local Issuance Times During Daylight Saving Time	Local Issuance Times During Standard Time
Atlantic	0300, 0900, 1500, 2100	5 am, 11 am, 5 pm, 11 pm EDT	4 am, 10 am, 4 pm, 10 pm EST
Eastern North Pacific	0300, 0900, 1500, 2100	2 am, 8 am, 2 pm, 8 pm PDT	1 am, 7 am, 1 pm, 7 pm PST

Product Headers: WMO and AWIPS headers for English and Spanish products are given in the table at the top of the next page. The final numeric digit in each header is assigned on a rotating basis by cyclone number, i.e., WTNT41 KNHC would be used for the first, sixth, and eleventh Atlantic cyclones, while WTNT42 KNHC would be used for the second, seventh, or twelfth cyclones, and so on.

Basin	WMO Header(s)	AWIPS Header(s)
Atlantic (English)	WTNT41-5 KNHC	MIATCDAT1-5
Atlantic (Spanish)	WTNT51-5 KNHC	MIATDSAT1-5
Eastern North Pacific (English)	WTPZ41-5 KNHC	MIATCDEP1-5
Eastern North Pacific (Spanish)	WTPZ51-5 KNHC	MIATDSEP1-5

Example:

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ZCZC MIATCDAT3 ALL
TTAA00 KNHC DDHHMM
Hurricane Laura Discussion Number  26
NWS National Hurricane Center Miami FL       AL132020
400 AM CDT Wed Aug 26 2020
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Product header/valid time

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Satellite images indicate that Laura has become a formidable
hurricane since yesterday evening.  Deep convection has intensified
and become more symmetric, with an eye now trying to clear out.  An
earlier Air Force Hurricane Hunter mission found flight-level winds
of 104 kt, along with peak SFMR values of 86 kt, which supported the
90-kt intensity on the intermediate advisory.  Since that time,
however, the cloud pattern has only continued to improve, so the
initial wind speed is set to 95 kt for this advisory.  Notably, the
aircraft also recorded that the extent of the hurricane-force winds
have increased substantially northeast of the center. A pair of
Hurricane Hunter planes should be in the area within a couple of
hours.

The hurricane has intensified a remarkable 40 kt during the past 24
hours, and there are no signs it will stop soon, with shear
remaining low-to-moderate over the deep warm waters of the central
Gulf of Mexico.  Guidance is noticeably higher than before, so the
new peak intensity will be raised to 115 kt, and some models are
even a little higher.  Increasing shear is expected to slightly
weaken the hurricane close to landfall, so the new forecast keeps
the previous 105-kt intensity near the coast.  Laura will
weaken rapidly after landfall, but it will likely bring
hurricane-force winds well inland over western Louisiana and
eastern Texas.  In the extended range, there is some chance that
Laura re-intensifies as a tropical cyclone off the Mid-Atlantic
coast, instead of becoming part of a frontal system, but for now
the forecast will stay extratropical at 96 hours and beyond.

Recent satellite shows that Laura has turned northwestward, now
estimated at 13 kt.  There are no substantial changes to the track
forecast to report.  The hurricane should gradually turn toward the
northwest and north over the next day or two as it moves around the
western periphery of a mid-level high. The models are in very good
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Free form forecast discussion

agreement on the center of Laura moving into extreme southwestern Louisiana or southeastern Texas in about 24 hours, so no changes were made to the previous NHC forecast. Later in the forecast period the weakened cyclone should turn toward the east-northeast and move with increasing forward speed while embedded within the mid-latitude westerlies. The official track forecast is shifted southward at longer range, not too far from the latest consensus track model predictions.

It should be mentioned Laura is now a large hurricane, and wind, storm surge, and rainfall hazards will extend far from the center. Do not use the cone graphic for any representation of these hazards, it is just for the center uncertainty.

Key Messages:

1. Life-threatening storm surge with large and dangerous waves is expected to produce potentially catastrophic damage from San Luis Pass, Texas, to the Mouth of the Mississippi River, including areas inside the Port Arthur Hurricane Flood Protection system. This surge could penetrate up to 30 miles inland from the immediate coastline in southwestern Louisiana and southeastern Texas. Actions to protect life and property should be rushed to completion as water levels will begin to rise later today.

2. Hurricane-force winds are expected tonight in the warning area from San Luis Pass, Texas, to west of Morgan City, Louisiana, and the strongest winds associated with Laura's eyewall will occur somewhere within this area. Hurricane-force winds and widespread damaging wind gusts are also expected to spread well inland into portions of eastern Texas and western Louisiana early Thursday.

3. Widespread flash flooding along small streams, urban areas, and roadways is expected to begin this afternoon into Thursday from far eastern Texas, across Louisiana and Arkansas. This will also lead to minor to isolated moderate freshwater river flooding. The heavy rainfall threat and localized flash and urban flooding potential will spread northeastward into the middle-Mississippi, lower Ohio and Tennessee Valleys Friday night and Saturday.

Key Messages. Note that these are not provided with every discussion

FORECAST POSITIONS AND MAX WINDS

INIT	26/0900Z	26.1N	90.7W	95 KT	110 MPH
12H	26/1800Z	27.4N	92.4W	115 KT	130 MPH
24H	27/0600Z	29.7N	93.5W	105 KT	120 MPH...NEAR COAST
36H	27/1800Z	32.4N	93.7W	50 KT	60 MPH...INLAND
48H	28/0600Z	34.8N	92.9W	30 KT	35 MPH...INLAND
60H	28/1800Z	36.4N	91.0W	25 KT	30 MPH...INLAND
72H	29/0600Z	37.3N	87.3W	30 KT	35 MPH...INLAND
96H	30/0600Z	38.0N	74.5W	35 KT	40 MPH...POST-TROP/EXTRATROP
120H	31/0600Z	44.0N	60.0W	45 KT	50 MPH...POST-TROP/EXTRATROP

Forecast position and intensity table

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Forecaster Blake
NNNN

Tropical Cyclone Surface Wind Speed Probabilities

Product Description: The Tropical Cyclone Surface Wind Speed Probability product is a tabular text product that provides the likelihood (expressed as a percentage) of sustained (1-min average) winds meeting or exceeding specific thresholds at particular locations. There is also a graphical version of this product, described in part immediately below and more fully later in this document.

Location-specific information is given in the form of probabilities of sustained winds occurring at or above the thresholds of 34 kt (tropical storm force), 50 kt, and 64 kt (hurricane force), over specific periods of time as discussed below. These probabilities are provided for coastal and inland cities as well as for offshore locations (e.g., buoys). These probabilities are based on the track, intensity, and wind structure (size) forecasts from the National Hurricane Center and their historical error characteristics.

Two kinds of location-specific probabilities are defined below:

Cumulative occurrence probabilities – These values tell you the probability the wind event will *occur* sometime during the specified *cumulative* forecast period (0-12, 0-24, 0-36 hours, etc.) at each specific point. These values are provided in both the text and graphical form of the Surface Wind Speed Probability product. In the text product, the cumulative probabilities appear in parentheses (example provided below). The graphical products depict only cumulative values.

Onset probabilities – These values tell you the probability the wind event will *start* sometime during the specified individual forecast period (0-12, 12-24, 24-36 hours, etc.) at each specific point. These values are provided only in the text NHC product. They are the values outside of the parentheses.

Availability: This product is part of a suite of products issued for active cyclones every six hours at 0300, 0900, 1500, and 2100 UTC. Local issuance times are shown in the table below. Special Wind Speed Probability products may be issued at any time to advise of an unexpected significant change in the cyclone.

Basin	Advisory Issuance Times (UTC)	Local Issuance Times During Daylight Saving Time	Local Issuance Times During Standard Time
Atlantic	0300, 0900, 1500, 2100	5 am, 11 am, 5 pm, 11 pm EDT	4 am, 10 am, 4 pm, 10 pm EST
Eastern North Pacific	0300, 0900, 1500, 2100	2 am, 8 am, 2 pm, 8 pm PDT	1 am, 7 am, 1 pm, 7 pm PST

Product Headers: WMO and AWIPS headers are given in the table below. The final numeric digit in each header is assigned on a rotating basis by cyclone number, i.e., FONT11 KNHC would be used for the first, sixth, and eleventh Atlantic cyclones, while FONT12 KNHC would be used for the second, seventh, or twelfth cyclones, and so on.

Basin	WMO Header(s)	AWIPS Header(s)
Atlantic	FONT11-5 KNHC	MIAPWSAT1-5
Eastern North Pacific	FOPZ11-5 KNHC	MIAPWSEP1-5

Example:

```
ZCZC MIAPWSAT4 ALL
TTAA00 KNHC DDHHMM

TROPICAL STORM ISAAC WIND SPEED PROBABILITIES NUMBER  23
NWS NATIONAL HURRICANE CENTER MIAMI FL       AL092012
2100 UTC SUN AUG 26 2012

AT 2100Z THE CENTER OF TROPICAL STORM ISAAC WAS LOCATED NEAR
LATITUDE 24.2 NORTH...LONGITUDE 82.3 WEST WITH MAXIMUM SUSTAINED
WINDS NEAR 50 KTS...60 MPH...95 KM/H.

Z INDICATES COORDINATED UNIVERSAL TIME (GREENWICH)
   ATLANTIC STANDARD TIME (AST)...SUBTRACT 4 HOURS FROM Z TIME
   EASTERN  DAYLIGHT TIME (EDT)...SUBTRACT 4 HOURS FROM Z TIME
   CENTRAL  DAYLIGHT TIME (CDT)...SUBTRACT 5 HOURS FROM Z TIME

WIND SPEED PROBABILITY TABLE FOR SPECIFIC LOCATIONS

CHANCES OF SUSTAINED (1-MINUTE AVERAGE) WIND SPEEDS OF AT LEAST
   ...34 KT (39 MPH... 63 KPH)...
   ...50 KT (58 MPH... 93 KPH)...
   ...64 KT (74 MPH...119 KPH)...
FOR LOCATIONS AND TIME PERIODS DURING THE NEXT 5 DAYS

PROBABILITIES FOR LOCATIONS ARE GIVEN AS OP(CP) WHERE
    OP  IS THE PROBABILITY OF THE EVENT BEGINNING DURING
        AN INDIVIDUAL TIME PERIOD (ONSET PROBABILITY)
   (CP) IS THE PROBABILITY OF THE EVENT OCCURRING BETWEEN
        18Z SUN AND THE FORECAST HOUR (CUMULATIVE PROBABILITY)

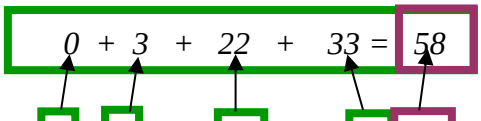
PROBABILITIES ARE GIVEN IN PERCENT
X INDICATES PROBABILITIES LESS THAN 1 PERCENT
PROBABILITIES FOR 34 KT AND 50 KT ARE SHOWN AT A GIVEN LOCATION WHEN
THE 5-DAY CUMULATIVE PROBABILITY IS AT LEAST 3 PERCENT.
PROBABILITIES FOR 64 KT ARE SHOWN WHEN THE 5-DAY CUMULATIVE
PROBABILITY IS AT LEAST 1 PERCENT.
```

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

TIME PERIODS		FROM 18Z SUN TO 06Z MON	FROM 06Z MON TO 18Z MON	FROM 18Z MON TO 06Z TUE	FROM 06Z TUE TO 18Z TUE	FROM 18Z TUE TO 18Z WED	FROM 18Z WED TO 18Z THU	FROM 18Z THU TO 18Z FRI
FORECAST HOUR		(12)	(24)	(36)	(48)	(72)	(96)	(120)
LOCATION	KT							
FT PIERCE FL	34	9	2(11)	X(11)	X(11)	X(11)	X(11)	X(11)
W PALM BEACH	34	14	2(16)	X(16)	X(16)	X(16)	X(16)	X(16)
MIAMI FL	34	99	X(99)	X(99)	X(99)	X(99)	X(99)	X(99)
MARATHON FL	34	99	X(99)	X(99)	X(99)	X(99)	X(99)	X(99)
MARATHON FL	50	14	X(14)	X(14)	X(14)	X(14)	X(14)	X(14)
KEY WEST FL	34	99	X(99)	X(99)	X(99)	X(99)	X(99)	X(99)
KEY WEST FL	50	99	X(99)	X(99)	X(99)	X(99)	X(99)	X(99)
MARCO ISLAND	34	99	X(99)	X(99)	X(99)	X(99)	X(99)	X(99)
FT MYERS FL	34	48	1(49)	2(51)	X(51)	X(51)	X(51)	X(51)
VENICE FL	34	37	5(42)	2(44)	1(45)	X(45)	1(46)	X(46)
TAMPA FL	34	18	8(26)	3(29)	2(31)	X(31)	1(32)	X(32)
TALLAHASSEE FL	34	X	7(7)	10(17)	6(23)	6(29)	1(30)	X(30)
ST MARKS FL	34	1	9(10)	9(19)	6(25)	5(30)	1(31)	1(32)
APALACHICOLA	34	3	11(14)	16(30)	9(39)	7(46)	1(47)	X(47)
APALACHICOLA	50	X	X(X)	2(2)	2(4)	1(5)	1(6)	X(6)
APALACHICOLA	64	X	X(X)	X(X)	1(1)	X(1)	X(1)	X(1)
PANAMA CITY FL	34	1	11(12)	20(32)	13(45)	7(52)	1(53)	1(54)
PANAMA CITY FL	50	X	X(X)	3(3)	4(7)	3(10)	1(11)	X(11)
PANAMA CITY FL	64	X	X(X)	X(X)	1(1)	1(2)	X(2)	X(2)
COLUMBUS GA	34	X	X(X)	3(3)	6(9)	11(20)	2(22)	1(23)
MONTGOMERY AL	34	X	X(X)	7(7)	10(17)	18(35)	3(38)	1(39)
MONTGOMERY AL	50	X	X(X)	X(X)	X(X)	5(5)	2(7)	X(7)
MONTGOMERY AL	64	X	X(X)	X(X)	X(X)	1(1)	1(2)	X(2)
PENSACOLA FL	34	X	6(6)	24(30)	25(55)	14(69)	2(71)	X(71)
PENSACOLA FL	50	X	X(X)	2(2)	14(16)	12(28)	1(29)	1(30)
PENSACOLA FL	64	X	X(X)	X(X)	4(4)	5(9)	2(11)	X(11)
MOBILE AL	34	X	3(3)	22(25)	31(56)	20(76)	2(78)	X(78)
MOBILE AL	50	X	X(X)	2(2)	15(17)	21(38)	2(40)	X(40)
MOBILE AL	64	X	X(X)	X(X)	3(3)	12(15)	1(16)	X(16)

Probability of winds of at least 34 kt beginning at Pensacola, FL during the 12-hour period from 06z Tuesday to 18z Tuesday

Cumulative probability of winds of at least 34 kt at Pensacola, FL for the 48-hour period ending at 18z Tuesday.



Note the sum of the onset probabilities from 0-48 hours is equal to the cumulative occurrence probability at 48 hours

```
GULFPORT MS     34  X   3( 3)  22(25)  33(58)  21(79)   2(81)   X(81)
GULFPORT MS     50  X   X( X)   2( 2)  19(21)  22(43)   2(45)   X(45)
GULFPORT MS     64  X   X( X)   X( X)   5( 5)  13(18)   2(20)   X(20)

STENNIS SC      34  X   2( 2)  19(21)  32(53)  23(76)   3(79)   1(80)
STENNIS SC      50  X   X( X)   1( 1)  15(16)  22(38)   2(40)   X(40)
STENNIS SC      64  X   X( X)   X( X)   4( 4)  12(16)   1(17)   X(17)

BURAS LA        34  X   5( 5)  29(34)  33(67)  14(81)   2(83)   1(84)
BURAS LA        50  X   X( X)   5( 5)  25(30)  15(45)   2(47)   X(47)
BURAS LA        64  X   X( X)   1( 1)   8( 9)  11(20)   1(21)   X(21)

JACKSON MS      34  X   X( X)   3( 3)  11(14)  33(47)   6(53)   1(54)
JACKSON MS      50  X   X( X)   X( X)   X( X)  12(12)   4(16)   X(16)
JACKSON MS      64  X   X( X)   X( X)   X( X)   3( 3)   2( 5)   X( 5)

NEW ORLEANS LA  34  X   1( 1)  16(17)  29(46)  23(69)   3(72)   1(73)
NEW ORLEANS LA  50  X   X( X)   1( 1)  10(11)  18(29)   3(32)   1(33)
NEW ORLEANS LA  64  X   X( X)   X( X)   1( 1)   9(10)   1(11)   X(11)

BATON ROUGE LA  34  X   X( X)   9( 9)  18(27)  24(51)   6(57)   X(57)
BATON ROUGE LA  50  X   X( X)   X( X)   2( 2)  14(16)   3(19)   X(19)
BATON ROUGE LA  64  X   X( X)   X( X)   X( X)   5( 5)   2( 7)   X( 7)

NEW IBERIA LA   34  X   X( X)   7( 7)  12(19)  20(39)   7(46)   X(46)
NEW IBERIA LA   50  X   X( X)   X( X)   1( 1)   9(10)   2(12)   1(13)
NEW IBERIA LA   64  X   X( X)   X( X)   X( X)   3( 3)   2( 5)   X( 5)

SHREVEPORT LA   34  X   X( X)   X( X)   1( 1)   9(10)   6(16)   1(17)

PORT ARTHUR TX  34  X   X( X)   X( X)   3( 3)  10(13)   5(18)   X(18)
PORT ARTHUR TX  50  X   X( X)   X( X)   X( X)   1( 1)   2( 3)   1( 4)
PORT ARTHUR TX  64  X   X( X)   X( X)   X( X)   X( X)   1( 1)   X( 1)

$$
FORECASTER PASCH
NNNN
```

Tropical Cyclone Update (TCU)

Product Description: The Tropical Cyclone Update (TCU) is issued to inform users of significant changes in a tropical cyclone between regularly scheduled public advisories. Such uses include:

- To provide timely information of an unusual nature, such as the time and location of landfall, or to announce an expected change in intensity that results in an upgrade or downgrade of status (e.g., from a tropical storm to a hurricane).
- To provide a continuous flow of information regarding the center location of a tropical cyclone when watches or warnings are in effect and the center can be easily tracked with land-based radar.
- To provide advance notice that significant changes to storm information will be conveyed shortly, either through a subsequent TCU or Special Advisory.
- To announce changes to international watches or warnings made by other countries, or to cancel U.S. watches or warnings.
- To issue a U.S. watch or warning, but only if the TCU precedes a special advisory that will contain the same watch/warning information, and indicates the special advisory will be issued shortly.

When a TCU is issued and any storm summary information has changed from the previous Public Advisory (e.g., upgrade from tropical storm to hurricane), a storm summary section identical in format to that found in the Public Advisory will also be included. If new data suggest that a change in status of the tropical cyclone has occurred, but the forecaster is not prepared to update all of the storm information, a TCU can be issued without the storm summary information and indicate that another TCU or special advisory changing the storm status will be issued shortly. In that case, the first TCU will not officially change the storm status, but will simply provide users with the information that a change in status is forthcoming. If a TCU is issued to only modify watches and warnings and there are no changes to the storm summary information (e.g., position, intensity, movement, pressure, etc.) from the previous NHC public advisory, then the storm summary information will not be included in the TCU.

Availability: TCUs issued to provide updated center position information when watches/warnings are in effect are issued in between scheduled TCPs near the beginning of each hour. All other TCUs are issued on an event-driven basis.

Product Headers: WMO and AWIPS headers for English and Spanish products are given in the table at the top of the next page. The final numeric digit in each header is assigned on a rotating basis by cyclone number, i.e., WTNT61 KNHC would be used for the first, sixth, and eleventh Atlantic cyclones, while WTNT62 KNHC would be used for the second, seventh, or twelfth cyclones, and so on.

Basin	WMO Header(s)	AWIPS Header(s)
Atlantic (English)	WTNT61-5 KNHC	MIATCUAT1-5
Atlantic (Spanish)	WTNT71-5 KNHC	MIATUSAT1-5
Eastern North Pacific (English)	WTPZ61-5 KNHC	MIATCUEP1-5
Eastern North Pacific (Spanish)	WTPZ71-5 KNHC	MIATUSEP1-5

Example 1: TCU to provide a continuous flow of information when watches or warnings are in effect and the center can be easily tracked with land-based radar.

```
ZCZC MIATCUAT4 ALL
TTAA00 KNHC DDHHMM

Hurricane Isaac Tropical Cyclone Update
NWS National Hurricane Center Miami FL       AL092012
1100 AM CDT Wed Aug 29 2012

...11 AM POSITION UPDATE...

A gust to 67 mph was recently reported at Shell Beach Louisiana.
Tropical storm conditions are continuing along the Mississippi and
Alabama coasts.

SUMMARY OF 1100 AM CDT...1600 UTC...INFORMATION
-----------------------------------------------
LOCATION...29.6N 90.7W
ABOUT 1 MI...2 KM W OF HOUMA LOUISIANA
ABOUT 45 MI...75 KM SW OF NEW ORLEANS LOUISIANA
MAXIMUM SUSTAINED WINDS...75 MPH...120 KM/H
PRESENT MOVEMENT...NW OR 310 DEGREES AT 6 MPH...9 KM/H
MINIMUM CENTRAL PRESSURE...972 MB...28.70 INCHES

$$
Forecaster Stewart
```

Product header/valid time

Free form discussion

Summary Table Formatted for Parsing

Example 2: TCU to change the status of a tropical cyclone

```
ZCZC MIATCUAT4 ALL
TTAA00 KNHC DDHHMM

Hurricane Isaac Tropical Cyclone Update
NWS National Hurricane Center Miami FL       AL092012
1120 AM CDT Tue Aug 28 2012

...RECONNAISSANCE DATA INDICATE ISAAC FINALLY ACHIEVES HURRICANE
STATUS...
```

Product header/valid time

Free form discussion

```
Reports from and Air Force Reserve Hurricane Hunter Aircraft indicate
that maximum winds associated with Isaac have increased to 75 mph (120
km/h).  On this basis, Isaac is being upgraded to a hurricane

SUMMARY OF 1120 AM CDT...1620 UTC...INFORMATION
-----------------------------------------------
LOCATION...28.1N 88.6W
ABOUT 75 MI...115 KM SSE OF THE MOUTH OF THE MISSISSIPPI RIVER
ABOUT 160 MI...250 KM SE OF NEW ORLEANS LOUISIANA
MAXIMUM SUSTAINED WINDS...75 MPH...120 KM/H
PRESENT MOVEMENT...NW OR 310 DEGREES AT 10 MPH...17 KM/H
MINIMUM CENTRAL PRESSURE...975 MB...28.79 INCHES
```

Summary Table Formatted for Parsing

```
$$
Forecaster Stewart/Beven
```

Example 3 - TCU to notify users that change in status is forthcoming

```
ZCZC MIATCUAT2 ALL
TTAA00 KNHC DDHHMM

Tropical Depression Seven Tropical Cyclone Update
NWS National Hurricane Center Miami FL   AL072008
200 PM EDT Mon Aug 25 2008

Preliminary reports from an Air Force Hurricane Hunter aircraft
indicate that Tropical Depression Seven has strengthened. A Special
Advisory will be issued within the next 30 minutes to update the
intensity forecast and watches and warnings for Hispaniola.

$$
Forecaster Pasch
```

Product header/valid time

Free form discussion

Example 4 - TCU to update watches or warnings (no change in storm summary information)

```
ZCZC MIATCUAT4 ALL
TTAA00 KNHC DDHHMM

Hurricane Ike Tropical Cyclone Update
NWS National Hurricane Center Miami FL   AL092008
600 PM AST Fri Sep 05 2008

At 600 PM AST (2200 UTC), the Government of the Bahamas has issued a
Hurricane Watch for the Southeastern Bahamas, including the Acklins,
Crooked Island, the Inaguas, Mayaguana, and the Ragged Islands, as well
as for the Turks and Caicos Islands.

No other changes are required from the 500 PM AST Advisory.

$$
Forecaster Blake/Beven
```

Product header/valid time

Free form discussion

Tropical Cyclone Watch Warning Product

Product Description: The Tropical Cyclone Watch Warning product summarizes all new, continued, and canceled tropical cyclone wind and storm surge watches and warnings for the U.S. Atlantic, Gulf, and Pacific coasts, Puerto Rico, and the U.S. Virgin Islands, in a form suitable for decoding by computer software.

Availability: This product is issued concurrently with all Tropical Cyclone Public Advisories (whether routine, Intermediate, or Special) for which a U.S. watch or warning is continued, posted, changed, or cancelled.

Product Headers: WMO and AWIPS headers are given in the table below. The final numeric digit in each header is assigned on a rotating basis by cyclone number, i.e., WTNT81 KNHC would be used for the first, sixth, and eleventh Atlantic cyclones, while WTNT82 KNHC would be used for the second, seventh, or twelfth cyclones, and so on.

Basin	WMO Header(s)	AWIPS Header(s)
Atlantic	WTNT81-5 KNHC	MIATCVAT1-5
Eastern North Pacific	WTNT81-5 KNHC	MIATCVEP1-5

Example:

```
000
WTNT84 KNHC 081457
TCVAT4

MICHAEL WATCH/WARNING ADVISORY NUMBER 8
NWS NATIONAL HURRICANE CENTER MIAMI FL     AL142018
1057 AM EDT MON OCT 8 2018

.HURRICANE MICHAEL

CAUTION...THIS PRODUCT ONLY APPROXIMATELY CONVEYS THE EXTENT OF
TROPICAL CYCLONE WIND AND SURGE WATCHES AND WARNINGS. PLEASE SEE THE
LATEST PUBLIC ADVISORY FROM THE NATIONAL HURRICANE CENTER FOR THE
PRECISE LATERAL EXTENT OF WIND WATCHES AND WARNINGS ALONG THE
COAST...AS WELL AS THE APPROXIMATE LATERAL EXTENT OF SURGE WATCHES AND
WARNINGS. THE PRECISE EXTENT OF SURGE WATCHES AND WARNINGS CAN BE FOUND
IN THE NWS NATIONAL DIGITAL FORECAST DATABASE HAZARD GRIDS.

FLZ014-015-027-108-112-114-115-118-127-128-134-204-206-082300-
/O.CON.KNHC.HU.A.1014.000000T0000Z-000000T0000Z/
/O.CON.KNHC.SS.A.1014.000000T0000Z-000000T0000Z/
1057 AM EDT MON OCT 8 2018 /957 AM CDT MON OCT 8 2018/

$$
```

```
FLZ050-139-142-148-149-151-155-082300-
/O.CON.KNHC.SS.A.1014.000000T0000Z-000000T0000Z/
/O.CON.KNHC.TR.A.1014.000000T0000Z-000000T0000Z/
1057 AM EDT MON OCT 8 2018

$$

FLZ007>013-016>018-026-028-034-201>203-205-GAZ155>157-082300-
/O.CON.KNHC.HU.A.1014.000000T0000Z-000000T0000Z/
1057 AM EDT MON OCT 8 2018 /957 AM CDT MON OCT 8 2018/

$$

GAZ123-125-127-142>146-158-159-082300-
/O.UPG.KNHC.TR.A.1014.000000T0000Z-000000T0000Z/
/O.EXA.KNHC.HU.A.1014.000000T0000Z-000000T0000Z/
1057 AM EDT MON OCT 8 2018

$$

ALZ055>060-065>069-262>266-FLZ019-029-239-242-248-249-251-
GAZ120>122-124-126-128>131-147-148-160-161-082300-
/O.CON.KNHC.TR.A.1014.000000T0000Z-000000T0000Z/
1057 AM EDT MON OCT 8 2018 /957 AM CDT MON OCT 8 2018/

$$

ATTN...WFO...MOB...TAE...TBW...
```

Aviation Tropical Cyclone Advisory

Product Description: The Aviation Tropical Cyclone Advisory is issued to provide short-term tropical cyclone forecast guidance for international aviation safety and routing purposes. The Aviation Advisory lists the current cyclone position, motion, and intensity, and includes forecast positions and intensities valid 3, 9, 15, 21, and 27 h after the advisory issuance time (0300, 0900, 1500, or 2100 UTC). This is in contrast to the forecast positions provided in the Tropical Cyclone Discussion and Forecast/Advisory, which are relative to the nominal initial times of 0000, 0600, 1200, and 1800 UTC. It is important to note that forecast values in the Aviation Tropical Cyclone Advisory are obtained by interpolation from the values contained in the Forecast/Advisory.

Availability: This product is part of a suite of products issued for active cyclones every six hours at 0300, 0900, 1500, and 2100 UTC. Local issuance times are shown in the table below. Special Aviation Tropical Cyclone Advisory products may be issued at any time to advise of an unexpected significant change in the cyclone.

Basin	Advisory Issuance Times (UTC)	Local Issuance Times During Daylight Saving Time	Local Issuance Times During Standard Time
Atlantic	0300, 0900, 1500, 2100	5 am, 11 am, 5 pm, 11 pm EDT	4 am, 10 am, 4 pm, 10 pm EST
Eastern North Pacific	0300, 0900, 1500, 2100	2 am, 8 am, 2 pm, 8 pm PDT	1 am, 7 am, 1 pm, 7 pm PST

Product Headers: WMO and AWIPS headers are given in the table below. The final numeric digit in each header is assigned on a rotating basis by cyclone number, i.e., FKNT21 KNHC would be used for the first, sixth, and eleventh Atlantic cyclones, while FKNT22 KNHC would be used for the second, seventh, or twelfth cyclones, and so on.

Basin	WMO Header(s)	AWIPS Header(s)
Atlantic	FKNT21-5 KNHC	MIATCANT1-5
Eastern North Pacific	FKPZ21-5 KNHC	MIATCAPZ1-5

Example:

```
FKNT24 KNHC 280310
TCANT4

HURRICANE IAN ICAO ADVISORY NUMBER  20
NWS NATIONAL HURRICANE CENTER MIAMI FL       AL092022
0300 UTC WED SEP 28 2022

TC ADVISORY
DTG:                      20220928/0300Z
TCAC:                     KNHC
TC:                       IAN
ADVISORY NR:              2022/020
OBS PSN:                  28/0300Z N2454 W08254
MOV:                      NNE 09KT
INTST CHANGE:             NC
C:                        0952HPA
MAX WIND:                 105KT
FCST PSN +3 HR:           28/0600Z N2515 W08245
FCST MAX WIND +3 HR:      110KT
FCST PSN +9 HR:           28/1200Z N2600 W08230
FCST MAX WIND +9 HR:      115KT
FCST PSN +15 HR:          28/1800Z N2636 W08212
FCST MAX WIND +15 HR:     115KT
FCST PSN +21 HR:          29/0000Z N2712 W08154
FCST MAX WIND +21 HR:     110KT
FCST PSN +27 HR:          29/0600Z N2742 W08139
FCST MAX WIND +27 HR:     085KT
RMK:                      THE FORECAST POSITION INFORMATION IN
                          THIS PRODUCT IS INTERPOLATED FROM
                          OFFICIAL FORECAST DATA VALID AT 0000...
                          0600...1200...AND 1800Z.
NXT MSG:                  20220928/0900Z
```

Tropical Weather Outlook (TWO)

Product Description: The Tropical Weather Outlook discusses significant areas of disturbed weather and their potential for development during the next 7 days, including a categorical forecast of the probability of tropical cyclone formation during the first 48 hours, and during the entire 7-day forecast period. The 48 h and 7-day probabilities of formation for each disturbance are given to the nearest 10% and expressed in terms of one of the following categories: low probability of development (0-30%), medium probability (40-60%), and high probability of development (70-100%). The Outlook also includes a general description of locations of any active cyclones and their WMO and AWIPS headers during the first 24 hours of their existence.

Availability: Tropical Weather Outlooks are issued every six hours from 15 May–30 November for the Atlantic Basin and the eastern North Pacific Basin, at 0000, 0600, 1200, and 1800 UTC. Local issuance times are shown in the table below.

Basin	Outlook Issuance Times (UTC)	Local Issuance Times During Daylight Saving Time	Local Issuance Times During Standard Time
Atlantic	0000, 0600, 1200, 1800	2 am, 8 am, 2 pm, 8 pm EDT	1 am, 7 am, 1 pm, 7 pm EST
Eastern North Pacific	0000, 0600, 1200, 1800	5 am, 11 am, 5 pm, 11 pm PDT	4 am, 10 am, 4 pm, 10 pm PST

Product Headers: WMO and AWIPS headers for English and Spanish products are given in the table below.

Basin	WMO Header	AWIPS Header
Atlantic (English)	ABNT20 KNHC	MIATWOAT
Atlantic (Spanish)	ACCA62 KNHC	MIATWOSAT
Eastern North Pacific (English)	ABPZ20 KNHC	MIATWOEP
Eastern North Pacific (Spanish)	ABPZ21 KNHC	MIATWOSEP

Example:

```
ZCZC MIATWOAT ALL
TTAA00 KNHC DDHHMM

Tropical Weather Outlook
NWS National Hurricane Center Miami FL
800 PM EDT Mon Oct 14 2022

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

Active Systems:
The National Hurricane Center is issuing advisories on newly formed
Tropical Depression Eleven, located in the central Gulf of Mexico.

Southwestern Caribbean Sea (AL90):
A broad area of low pressure located a couple of hundred miles south-
southwest of Jamaica is accompanied by showers and thunderstorms.
This disturbance remains disorganized, and development, if any, should
be slow to occur over the next couple of days while it moves slowly
northwestward.  Environmental conditions are expected to be marginally
conducive for some development when the system moves over the
northwestern Caribbean Sea and the southern Gulf of Mexico later this
week.
* Formation chance through 48 hours...low...10 percent.
* Formation chance through 7 days...low...30 percent.

Southwestern Gulf of Mexico:
A trough of low pressure could form over the extreme southwestern Gulf
of Mexico and Bay of Campeche in a few days...and some development of
this system is possible by late week.
* Formation chance through 48 hours...low...near 0 percent.
* Formation chance through 7 days...low...20 percent.

$$
Public advisories on Tropical Depression Eleven are issued under
WMO header WTNT31 KNHC and under AWIPS header MIATCPAT1.
Forecast/Advisories on Tropical Depression Eleven are issued under
WMO Header WTNT22 KNHC and under AWIPS header MIATCMAT1.

$$
Forecaster Brown
NNNN
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Product header/valid time

Section header with invest identifier (AL90-99), if available. Note free form discussion about existing disturbances

Product header information for active tropical cyclones that have formed within the past 24 h

Special Tropical Weather Outlook

Product Description: A Special Tropical Weather Outlook is issued when there have been important changes with areas of disturbed weather over tropical or subtropical waters that need to be conveyed before the next scheduled release of the Tropical Weather Outlook. The potential for tropical cyclone formation for each disturbance within the next 48 hours, and 7 days is given to the nearest 10% and expressed in terms of one of the following categories: low probability of development (0-30%), medium probability (40-60%), and high probability of development (70-100%). The Special Tropical Weather Outlook can be used to report the findings of reconnaissance aircraft missions, and can also be used to discuss disturbances when Tropical Weather Outlooks are not routinely issued. The disturbance being updated in the Special Tropical Weather Outlook will be highlighted at the top of the product, and other systems discussed in previous Tropical Weather Outlooks will also be included.

Availability: This is an event-driven product issued as needed.

Product Headers: WMO and AWIPS headers are given in the table below.

Basin	WMO Header	AWIPS Header
Atlantic (English)	ABNT20 KNHC	MIATWOAT
Atlantic (Spanish)	ACCA62 KNHC	MIATWOSAT
Eastern North Pacific (English)	ABPZ20 KNHC	MIATWOEP
Eastern North Pacific (Spanish)	ABPZ21 KNHC	MIATWOSEP

Example

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Special Tropical Weather Outlook
NWS National Hurricane Center Miami FL
530 PM EDT Wed Jun 5 2013

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

Special Outlook issued to update discussion on the low pressure
area in the Gulf of Mexico.
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Product header/valid time

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Gulf of Mexico (AL90):
Updated...An Air Force reconnaissance aircraft was able to identify a
well-defined circulation in the low pressure area over the east-central
Gulf of Mexico late this afternoon. Based on this finding, the National
Hurricane Center will initiate advisories on Tropical Storm Andrea
within the next hour or so.
* Formation chance through 48 hours...high...near 100 percent.
* Formation chance through 7 days...high...near 100 percent.

Central Tropical Atlantic:
Although the shower activity associated with a tropical wave located a
little less than 1000 miles east of the Lesser Antilles has increased
some, the wave is heading westward toward a region where the upper
level winds are not favorable for development.
* Formation chance through 48 hours...low...10 percent.
* Formation chance through 7 days...low...20 percent.
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Free form discussion

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$$
Forecaster Berg
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Monthly Tropical Weather Summary

Product Description: The Monthly Tropical Weather Summary briefly describes the previous month's tropical cyclone activity and provides a summary table for all of the season's tropical cyclones to date.

Availability: The Monthly Tropical Weather Summary is issued at 8 am local time on the first day of the month following each month of the hurricane season. The Tropical Weather Summary issued on 1 December will give a brief account of the entire season.

Product Headers: WMO and AWIPS headers are given in the table below.

Basin	WMO Header	AWIPS Header
Atlantic	ABNT30 KNHC	MIATWSAT
Eastern North Pacific	ABPZ30 KNHC	MIATWSEP

Example:

```
ABNT30 KNHC 011156
TWSAT

Monthly Tropical Weather Summary
NWS National Hurricane Center Miami FL
800 AM EDT Fri Oct 01 2010

For the North Atlantic, Caribbean Sea, and the Gulf of Mexico

Eight tropical storms formed in the Atlantic Basin during the month of
September.  Three of these storms, Igor, Julia, and Karl, became major
hurricanes, and Lisa reached hurricane status.  These numbers are well
above the long-term (1944-2009) averages of 4 tropical storms, 2
hurricanes, and about 1 major hurricane for the month of September.
Also, the formation of eight named storms ties 2002 for the record
number of named storms formation in the month of September. In terms of
accumulated cyclone energy (ACE), which measures the combined strength
and duration of tropical storms and hurricanes, tropical cyclone
activity in September was about 78 percent above average.

So far this season, overall tropical cyclone activity to date is about
53 percent above the long-term median.

Reports on individual cyclones, when completed, are at the web site of
the National Hurricane Center:  www.hurricanes.gov/2014atlan.shtml
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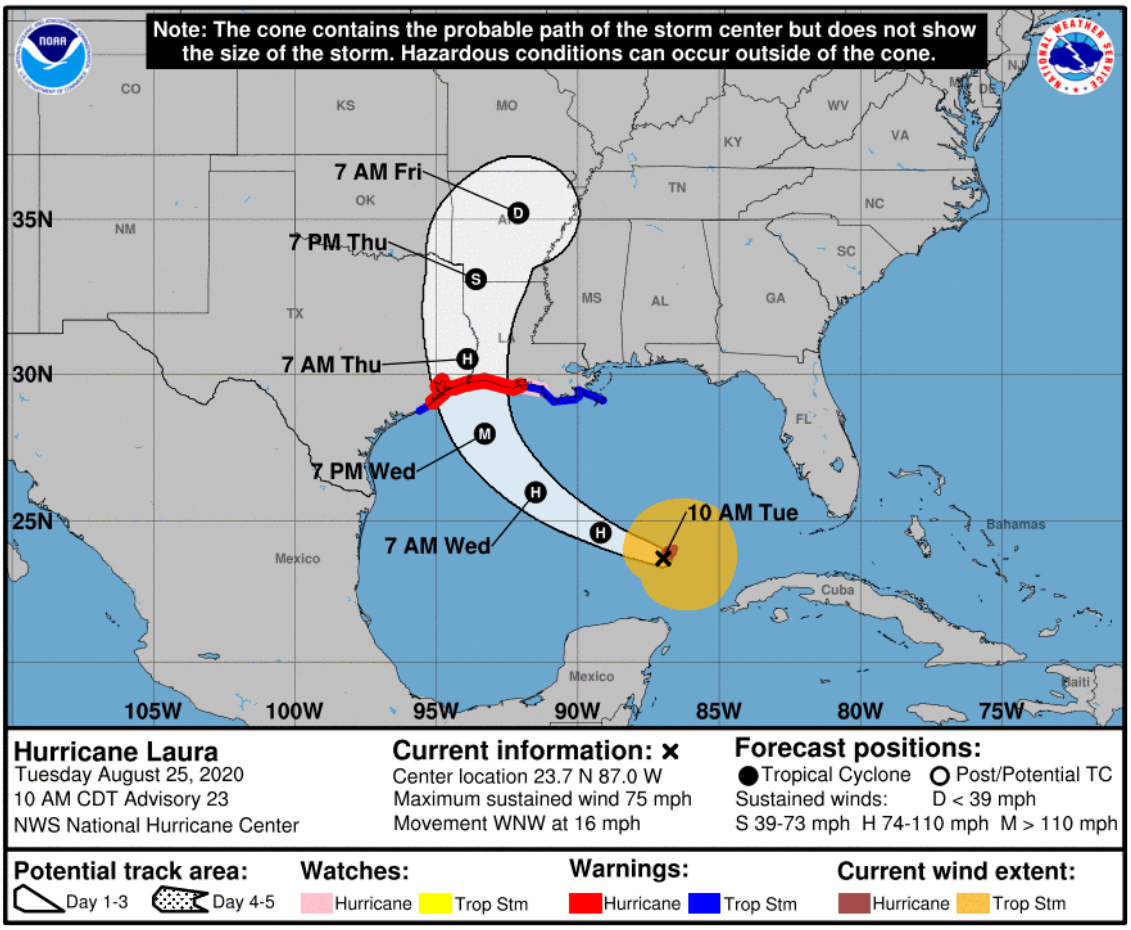
SUMMARY TABLE

Name	Dates	Max Wind (MPH)
H Alex	25 Jun-2 Jul	105
TD Two	7-8 Jul	35
TS Bonnie	22-24 Jul	40
TS Colin	2-8 Aug	60
TD Five	10-11 Aug	35
MH Danielle	21-31 Aug	135
MH Earl	25 Aug-5 Sep	145
TS Fiona	30 Aug-4 Sep	60
TS Gaston	1-2 Sep	40
TS Hermine	6-8 Sep	65
MH Igor	8-21 Sep	155
MH Julia	12-20 Sep	135
MH Karl	14-18 Sep	120
H Lisa	21-26 Sep	80
TS Matthew	23-26 Sep	60
TS Nicole	28-29 Sep	40

$$
Hurricane Specialist Unit

NHC Graphical Product Descriptions

Tropical Cyclone Track Forecast Cone and Watch/Warning Graphic



Product Description: This graphic depicts the most recent NHC track forecast of the center of a tropical cyclone along with an approximate representation of associated coastal areas under a hurricane warning (red), hurricane watch (pink), tropical storm warning (blue) and tropical storm watch (yellow). The "X" indicates the current position of the center of the tropical cyclone. The black dots show the NHC forecast position of the center at the times indicated. The letter inside the dot indicates the forecast strength of the cyclone category: (D)epression, (S)torm, (H)urricane, (M)ajor hurricane, or remnant (L)ow. Systems forecast to be post-tropical are be indicated by white dots with black letters indicating intensity using the thresholds given above. For example, a post-tropical system forecast to have winds of 75 mph would be depicted by a black H inside a white dot, even though it is not a hurricane.

The cone represents the probable track of the center of a tropical cyclone, and is formed by enclosing the area swept out by a set of circles (not shown) along the forecast track (at 12, 24, 36 hours, etc.). The size of each circle is set so that two-thirds of historical official forecast errors over a 5-year sample fall within the circle. The circle radii defining the cones in 2023 for the Atlantic and eastern North Pacific basins are given in the table below.

Radii of NHC forecast cone circles for 2024, based on error statistics from 2019–2023:

Forecast Period (hours)	2/3 Probability Circle, Atlantic Basin (nautical miles)	2/3 Probability Circle, Eastern North Pacific Basin (nautical miles)
12	26	26
24	41	39
36	55	53
48	70	65
60	88	76
72	102	92
96	151	119
120	220	152

One can also examine historical tracks to determine how often the *entire* 5-day path of a cyclone remains completely within the area of the cone. This is a different perspective that ignores most timing errors. For example, a storm moving very slowly but in the expected direction would still be within the area of the cone, even though the track forecast error could be very large. Based on forecasts over the previous 5 years, the entire track of the tropical cyclone can be expected to remain within the cone roughly 60-70% of the time.

It is important to remember that tropical cyclones are not a point. Their effects can span many hundreds of miles from the center. The area experiencing hurricane force (one-minute average wind speeds of at least 74 mph) and tropical storm force (one-minute average wind speeds of 39-73 mph) winds can extend well beyond the white areas shown enclosing the most likely track area of the center. A version of this graphic also shows the areas potentially being affected by the sustained (1-min average) winds of tropical storm force (in orange) and hurricane force (in red) at the time of the advisory issuance. Users are reminded that the wind radii represent the maximum possible extent of a given wind speed within particular quadrants around the tropical cyclone. As a result, not all locations falling within the orange or red shaded areas will be experiencing sustained tropical storm or hurricane force winds, respectively.

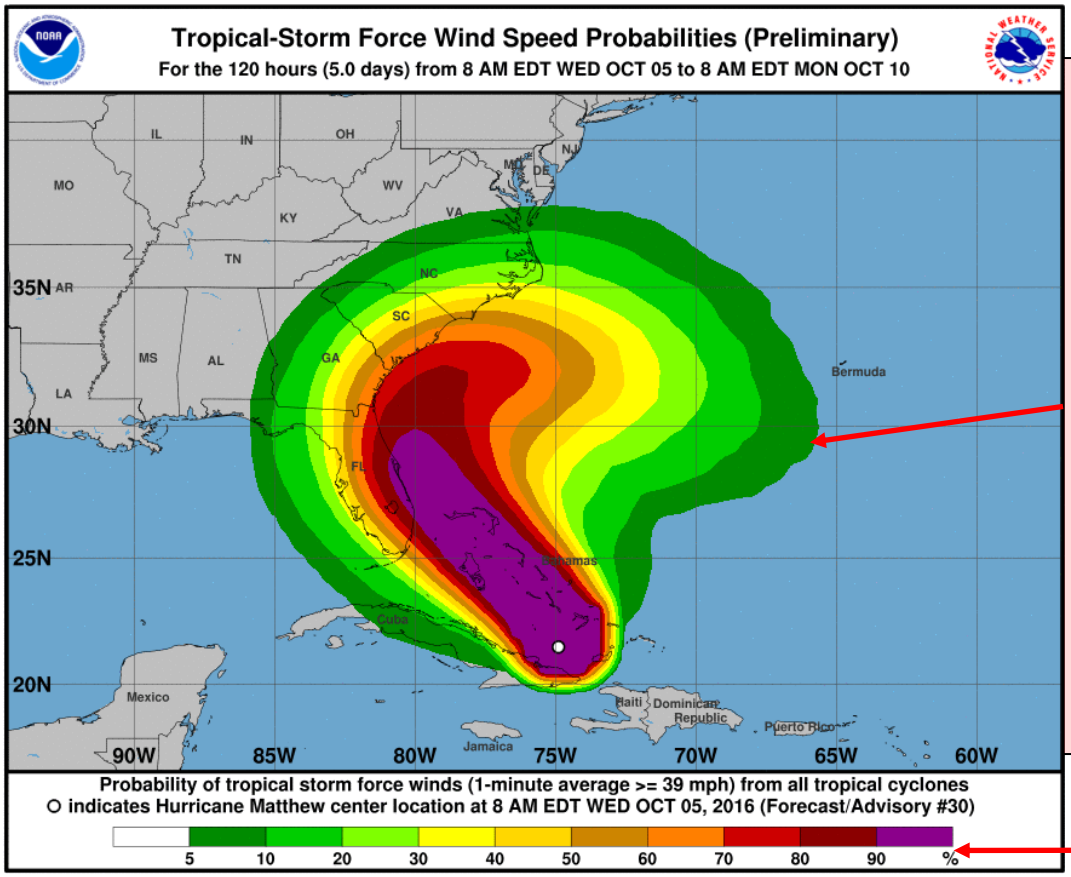
The distribution of hurricane and tropical storm force winds in this tropical cyclone can be seen in the Cumulative Wind Distribution graphic described below.

Availability: This graphic is part of a suite of products issued for active cyclones every six hours at 0300, 0900, 1500, and 2100 UTC. Local issuance times are shown in the table on

the next page. When coastal watches or warnings are in effect, the graphic will be updated at three-hour intervals concurrent with the issuance of Intermediate Public Advisories. The graphic will also be updated with the issuance of Special Advisories.

Basin	Graphic Issuance Times (UTC)	Local Issuance Times During Daylight Saving Time	Local Issuance Times During Standard Time
Atlantic	0300, 0900, 1500, 2100	5 am, 11 am, 5 pm, 11 pm EDT	4 am, 10 am, 4 pm, 10 pm EST
Eastern North Pacific	0300, 0900, 1500, 2100	2 am, 8 am, 2 pm, 8 pm PDT	1 am, 7 am, 1 pm, 7 pm PST

Tropical Cyclone Surface Wind Speed Probabilities



To determine the probability of sustained winds exceeding a threshold (in this example 39 mph or tropical storm force) for a particular location, match the colors depicted on the map with the corresponding probability ranges below.

Product Description: This graphic depicts the probability (likelihood, expressed as a percentage) that sustained (1-min average) winds meeting or exceeding specific thresholds will occur at particular locations over particular intervals of time. These probabilities are based on the track, intensity, and wind structure (size) forecasts from the National Hurricane Center and their historical error characteristics. Separate graphics are provided for the 34 kt (tropical storm force), 50 kt, and 64 kt (hurricane force) wind thresholds.

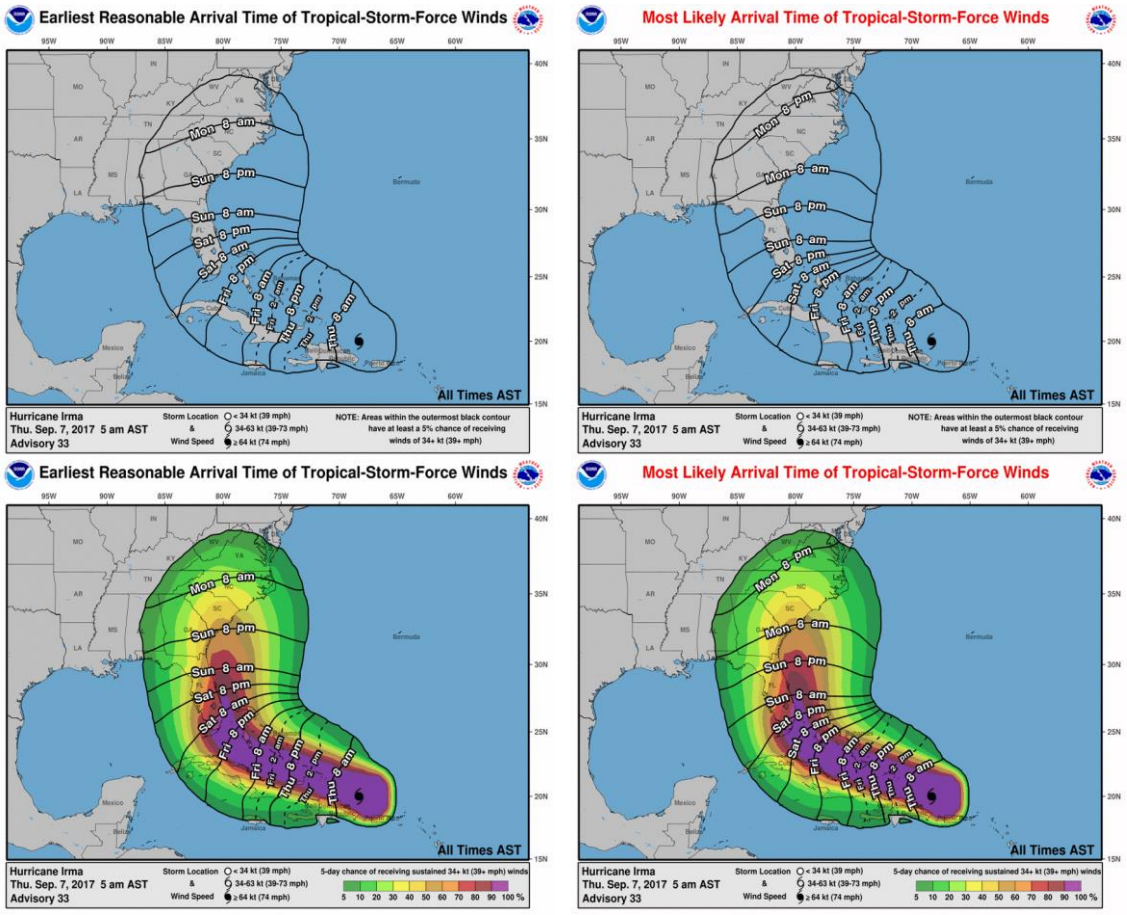
The graphic provides location-specific c*umulative occurrence probabilities* – these values tell you the probability the wind event will occur sometime during the specified cumulative forecast period (0-12, 0-24, 0-36 hours, etc., out to 0-120 h) at each specific point. The images can be looped to show how the threat evolves over the five-day period of the forecast.

It is important for users to realize that probabilities that may seem relatively small (e.g., 5-10%) may still be quite significant. Users are urged to consider the potentially large costs (in terms of lives, property, etc.) of not preparing for an extreme event.

Availability: This graphic is part of a suite of products issued for active cyclones every six hours at 0300, 0900, 1500, and 2100 UTC. Local issuance times are shown in the table below. The graphic will also be updated with the issuance of Special Public Advisories.

Basin	Graphic Issuance Times (UTC)	Local Issuance Times During Daylight Saving Time	Local Issuance Times During Standard Time
Atlantic	0300, 0900, 1500, 2100	5 am, 11 am, 5 pm, 11 pm EDT	4 am, 10 am, 4 pm, 10 pm EST
Eastern North Pacific	0300, 0900, 1500, 2100	2 am, 8 am, 2 pm, 8 pm PDT	1 am, 7 am, 1 pm, 7 pm PST

Tropical-Storm-Force Wind Time-of-Arrival Graphics



Product Description: These graphics depict the earliest reasonable and most likely arrival times of sustained (1-min average) tropical storm force winds at a particular location on the map. These probabilities are based on the track, intensity, and wind structure (size) forecasts from the National Hurricane Center and their historical error characteristics. For many users, preparations for hazardous winds ideally should be completed by the earliest reasonable arrival time.

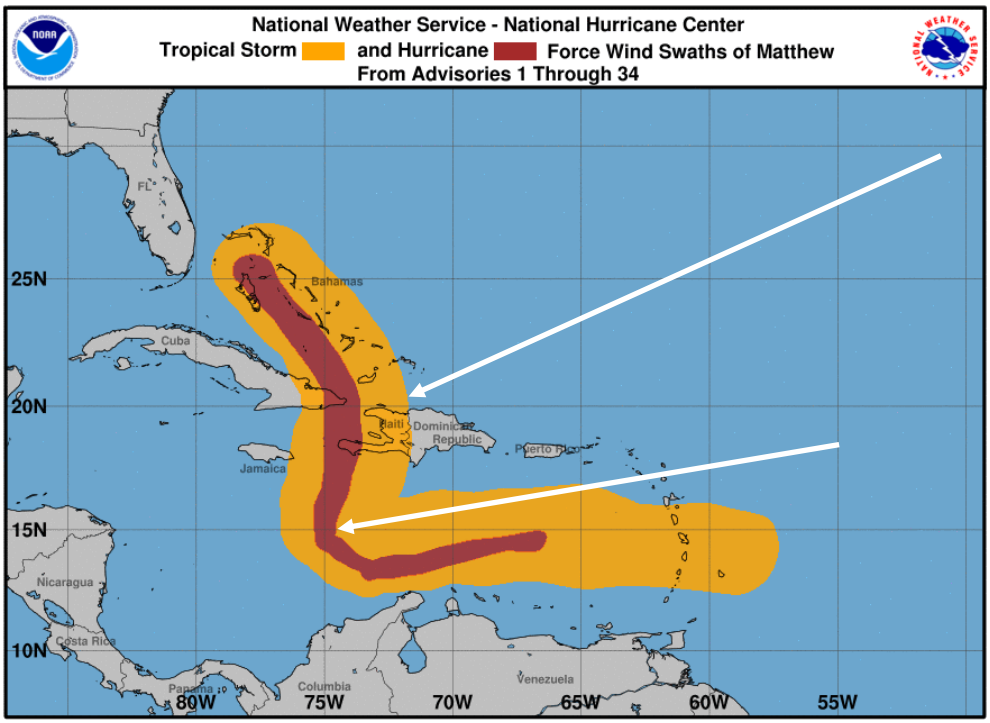
The earliest reasonable arrival time is based on the time at which the first 10% of the wind speed probability realizations bring tropical-storm force winds to a given location. The most likely time of arrival is the time at which the arrival of tropical storm force winds at a given location is equally likely to occur before or after the indicated time. The arrival times are shown along a series of black contours with the times depicted in local time, with the time zone based on the initial location of the cyclone.

A second version of the graphics also depicts the cumulative probability likelihood, expressed as a percentage) that sustained (1-min average) 34-kt winds thresholds will occur at particular locations during the next 5 days in color filled contours.

Availability: This graphic is part of a suite of products issued for active cyclones every six hours at 0300, 0900, 1500, and 2100 UTC. Local issuance times are shown in the table below. The graphic will also be updated with the issuance of Special Public Advisories.

Basin	Graphic Issuance Times (UTC)	Local Issuance Times During Daylight Saving Time	Local Issuance Times During Standard Time
Atlantic	0300, 0900, 1500, 2100	5 am, 11 am, 5 pm, 11 pm EDT	4 am, 10 am, 4 pm, 10 pm EST
Eastern North Pacific	0300, 0900, 1500, 2100	2 am, 8 am, 2 pm, 8 pm PDT	1 am, 7 am, 1 pm, 7 pm PST

Tropical Cyclone Cumulative Wind History

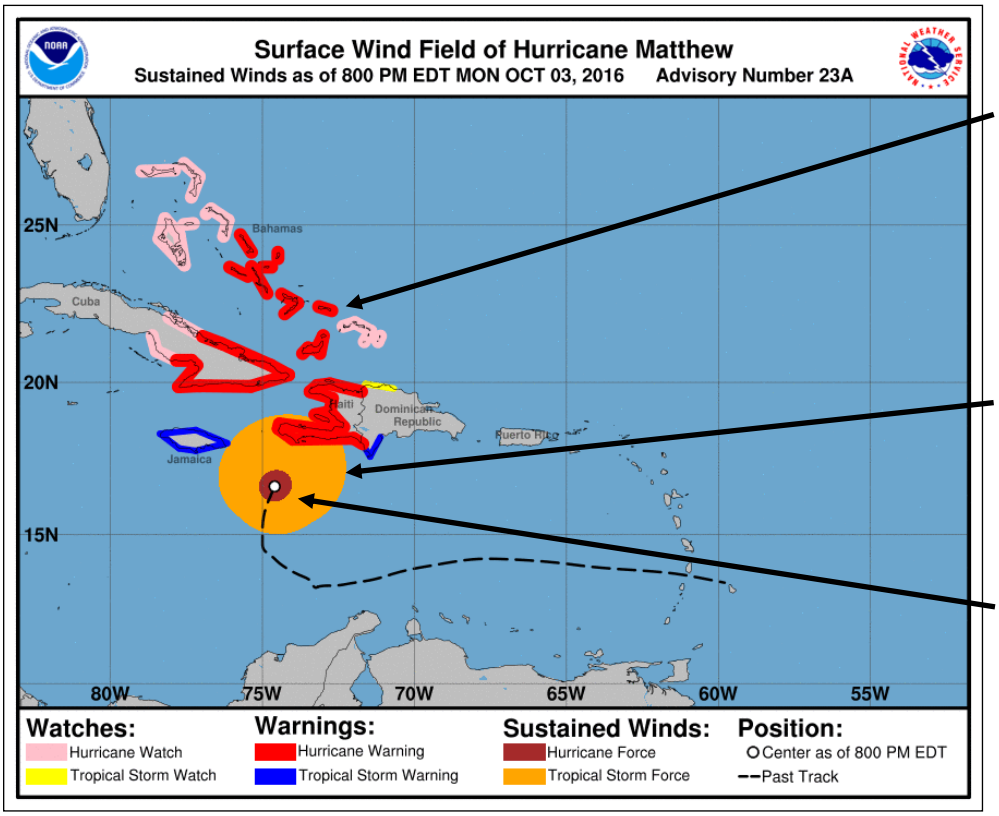


Product Description: This graphic shows how the size of the storm has changed, and the areas potentially affected so far by sustained winds of tropical storm force (in orange) and hurricane force (in red). The display is based on the wind radii contained in the set of Forecast/Advisories indicated at the top of the figure. Users are reminded that the Forecast/Advisory wind radii represent the maximum possible extent of a given wind speed within particular quadrants around the tropical cyclone. As a result, not all locations falling within the orange or red swaths will have experienced sustained tropical storm or hurricane force winds, respectively.

Availability: This graphic is part of a suite of products issued for active cyclones every six hours at 0300, 0900, 1500, and 2100 UTC. Local issuance times are shown in the table at the top of the following page. The graphic will also be updated with the issuance of Special Public Advisories.

Basin	Graphic Issuance Times (UTC)	Local Issuance Times During Daylight Saving Time	Local Issuance Times During Standard Time
Atlantic	0300, 0900, 1500, 2100	5 am, 11 am, 5 pm, 11 pm EDT	4 am, 10 am, 4 pm, 10 pm EST
Eastern North Pacific	0300, 0900, 1500, 2100	2 am, 8 am, 2 pm, 8 pm PDT	1 am, 7 am, 1 pm, 7 pm PST

Tropical Cyclone Wind Field Graphic



- Includes representation of coastal areas under a hurricane warning (red), hurricane watch (pink), tropical storm warning (blue) and tropical storm watch (yellow).
- Graphic shows the areas potentially being affected by the sustained winds of tropical storm force (in orange) and hurricane force (in red)
- Current position of the center of the tropical cyclone shown with white dot while the past track is shown with a dashed line.

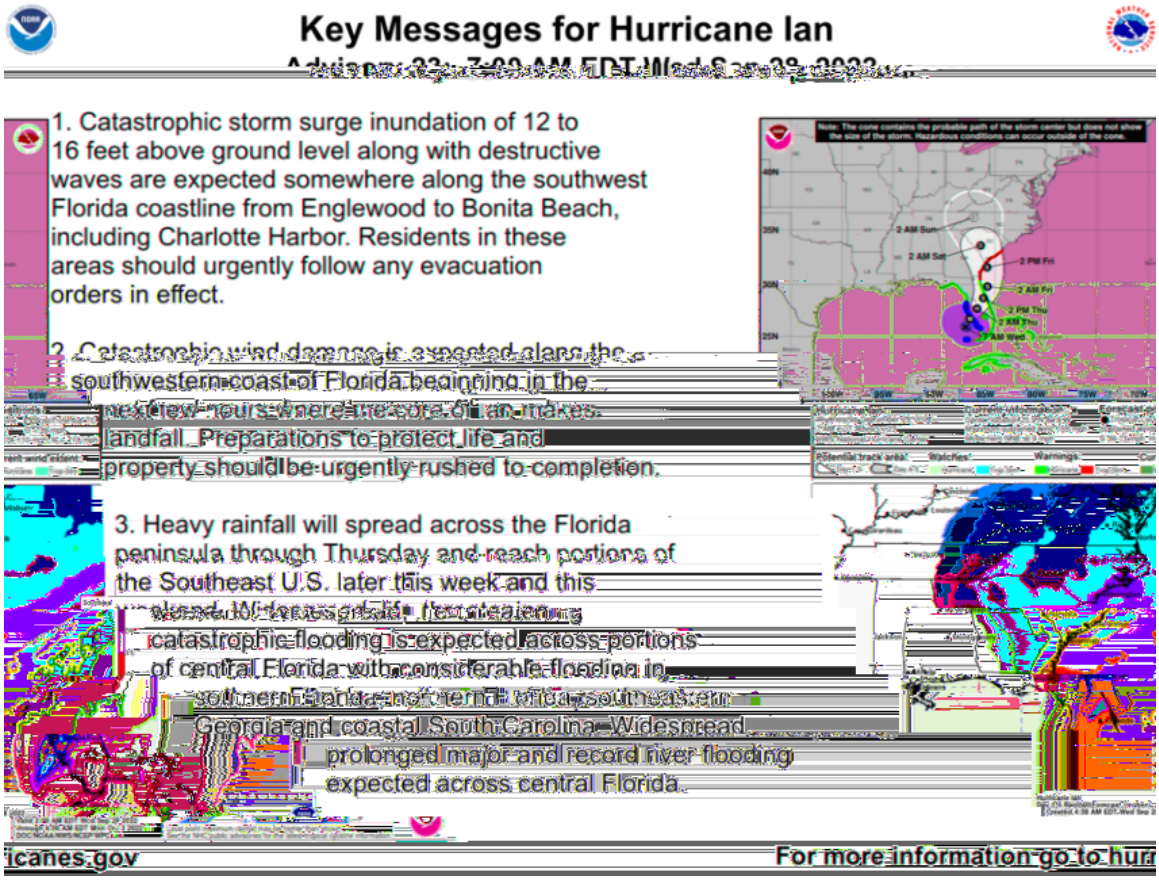
Product Description: This graphic shows the areas potentially being affected by the sustained (1 min average) winds of tropical storm force (in orange) and hurricane force (in red). The display is based on the wind radii contained in the latest Forecast/Advisory (indicated at the top of the figure). Users are reminded that the Forecast/Advisory wind radii represent the maximum possible extent of a given wind speed within particular quadrants around the tropical cyclone. As a result, not all locations falling within the orange or red shaded areas will be experiencing sustained tropical storm or hurricane force winds, respectively.

In addition to the wind field, this graphic shows an approximate representation of coastal areas under a hurricane warning (red), hurricane watch (pink), tropical storm warning (blue) and tropical storm watch (yellow). The white dot indicates the current position of the center of the tropical cyclone, and the dashed line shows the previous track of the center of the tropical cyclone.

Availability: This graphic is part of a suite of products issued for active cyclones every six hours at 0300, 0900, 1500, and 2100 UTC. Local issuance times are shown in the table at the top of the next page. The graphic will also be updated with the issuance of Special Public Advisories.

Basin	Graphic Issuance Times (UTC)	Local Issuance Times During Daylight Saving Time	Local Issuance Times During Standard Time
Atlantic	0300, 0900, 1500, 2100	5 am, 11 am, 5 pm, 11 pm EDT	4 am, 10 am, 4 pm, 10 pm EST
Eastern North Pacific	0300, 0900, 1500, 2100	2 am, 8 am, 2 pm, 8 pm PDT	1 am, 7 am, 1 pm, 7 pm PST

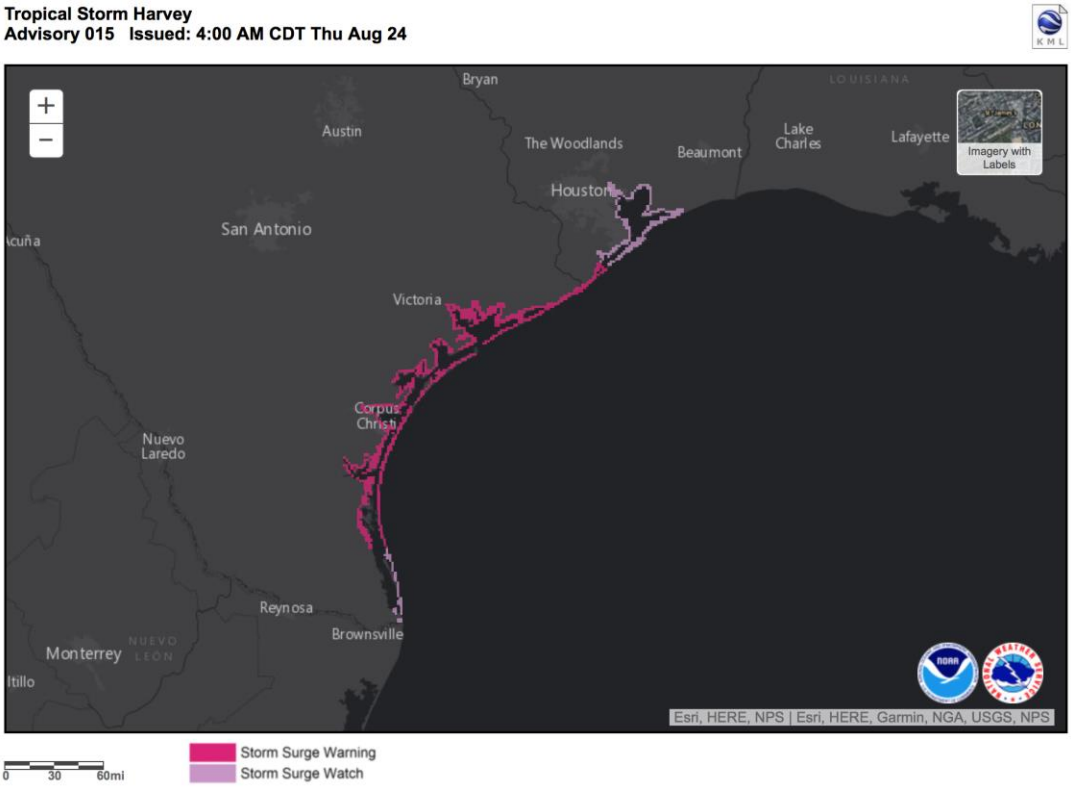
Key Messages Graphic



Product Description: The Key Messages Graphic highlights essential points about hazards and forecast uncertainty for select tropical cyclones. The graphic includes the text of the Key Messages from the Tropical Cyclone Discussion and relevant tropical cyclone graphics. These may include the cone graphic, the 34-kt cumulative wind speed probability graphic, arrival of tropical-storm-force winds graphic, peak storm surge graphic, or a rainfall graphic provided by the Weather Prediction Center.

Availability: This graphic is part of a suite of products issued for select active tropical cyclones every six hours at 0300, 0900, 1500, and 2100 UTC whenever Key Messages are included in the Tropical Cyclone Discussion text product.

Storm Surge Watch and Warning Graphic

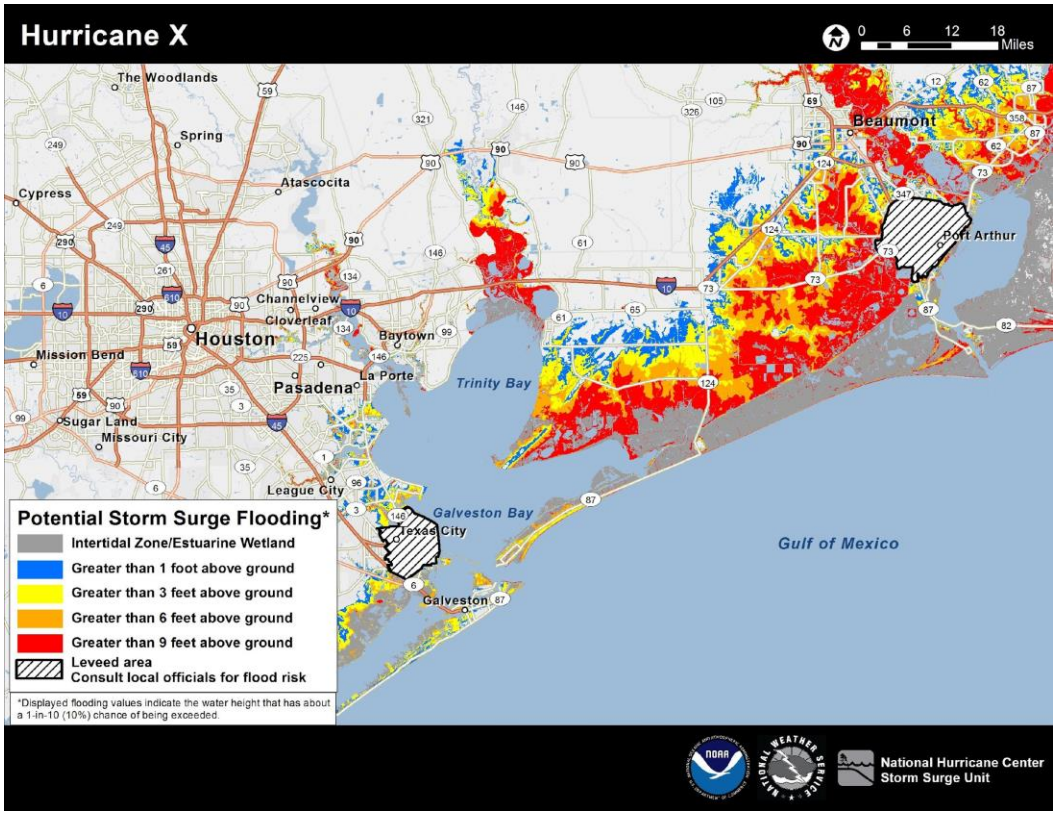


Product Description: Storm surge is rising water moving inland from the shoreline, pushed by the force of the wind. The Storm Surge Watch and Warning Graphic displays areas under a storm surge watch or warning. A storm surge warning means that there is a danger of life-threatening inundation from rising water moving inland from the shoreline somewhere within the specified area, generally within 36 hours. A storm surge watch means that life-threatening inundation is possible somewhere within the specified area, generally within 48 hours.

The graphic is intended to help users visualize areas most at risk from life-threatening surge, and serve as a call to action. All persons, regardless of whether or not they are in the highlighted areas shown by the graphic, should promptly follow evacuation orders and other instructions from local emergency management officials. The graphic is the results of a collaborative process between the National Hurricane Center and local Weather Forecast Offices.

Availability: This graphic is part of a suite of products issued for active tropical cyclones every six hours at 0300, 0900, 1500, and 2100 UTC whenever storm surge watches or warnings are in effect along any portion of the United States Gulf or Atlantic coasts, Puerto Rico, or the U.S. Virgin Islands. The graphic can be updated with any changes in the intermediate advisory package or with a special advisory. When active, the Storm Surge Watch and Warning Graphic will be available on the NHC website in a web map viewer.

Potential Storm Surge Flooding Map

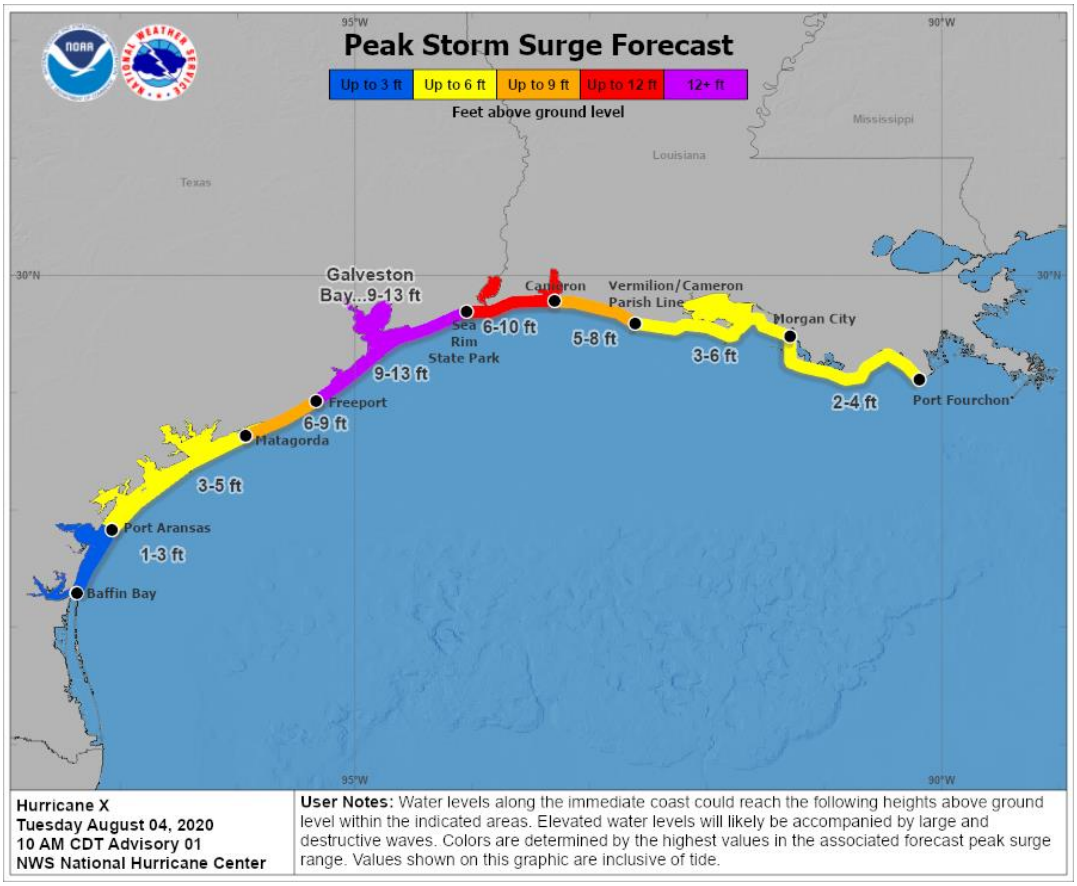


Product Description: The Potential Storm Surge Flooding Map shows geographical areas where inundation from storm surge could occur and how high above ground the water could reach in those areas. The map is based on the Probabilistic Tropical Cyclone Storm Surge and Tides (P-Surge) model that uses the latest NHC official forecast and historical forecast errors to create an ensemble of simulations that accounts for uncertainty related to the storm's landfall location and forward speed, intensity, and size. The shading on Potential Storm Surge Flooding Map represents inundation levels that have a 10 percent chance of being exceeded, which can therefore be thought of as representing a reasonable worst-case scenario for any individual location. The map is subject to change every six hours in association with a new NHC full advisory package.

Availability: This graphic is part of a suite of products issued for active tropical cyclones every six hours at 0300, 0900, 1500, and 2100 UTC, whenever a storm surge watch or warning is in effect for any portion of the United States Gulf or Atlantic coasts, Puerto Rico, or the U.S. Virgin Islands. The graphic can be issued at other times as appropriate, including for hurricane or tropical storm wind watches or warnings. The first map will usually be issued along with the first issuance of the storm surge watch, approximately 48 hours prior to hazardous weather conditions, but, in some cases, it can be issued as early as 72 hours in advance when confidence in the forecast and storm surge guidance is high. When active, the Potential Storm Surge Flooding Map will be available on the NHC website in a web map viewer, for GeoTIFF data download for viewing in local GIS, and

as a map service on NOAA nowCOAST OGC Map Services (WMS). *Due to the processing time required to produce the map, there will generally be a delay of an hour or more in the posting of this graphic to the NHC website, or soon after the availability of the P-Surge products.*

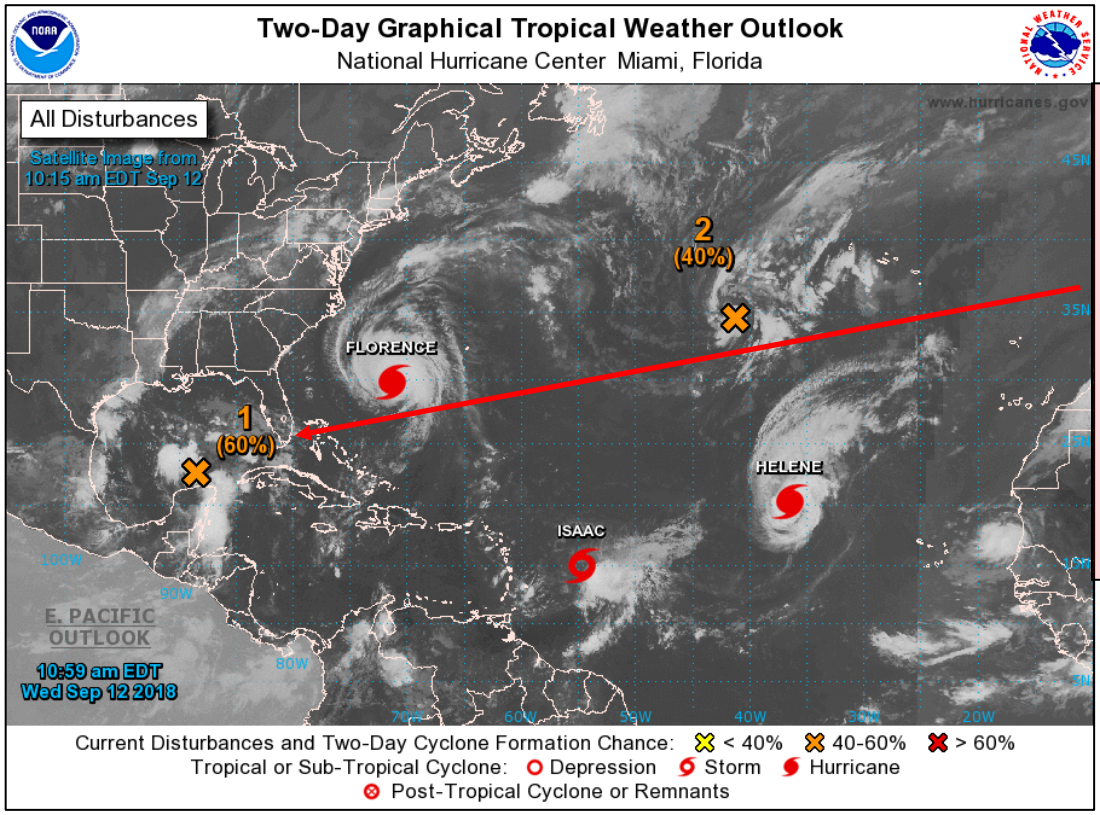
Peak Storm Surge Forecast Graphic



Product Description: The Peak Storm Surge Forecast Graphic shows the expected inundation along the immediate coast from storm surge and tides that are provided in the tropical cyclone public advisory (TCP). These values represent the height that water could reach above normally dry ground somewhere within the specified areas. A range of values is given to express forecast uncertainty and to account for varying coastal geography. Colors are based on the highest value in the associated forecast range, thus different forecast ranges can appear as the same color (e.g. 3-5 ft, 3-6 ft, and 2-4 ft all appear as yellow in the example graphic because the highest value in the range is 'Up to 6 ft'). The graphic is subject to change every three hours in association with a new NHC full or intermediate advisory package.

Availability: This graphic is part of a suite of products issued for active cyclones every six hours at 0300, 0900, 1500, and 2100 UTC, whenever a storm surge watch or warning is in effect for any portion of the United States Gulf or Atlantic coasts, Puerto Rico, or the U.S. Virgin Islands. The graphic can be issued at other times as appropriate, including for hurricane or tropical storm wind watches or warnings. The graphic can be updated with changes in the intermediate advisory or with a special advisory. When active, the Peak Storm Surge Forecast Graphic will be available on the NHC website and for KML data download.

48-Hour Graphical Tropical Weather Outlook



Area 1 in the graphic corresponds with area 1 discussed in the text below. Users can also mouse over the disturbance in the graphic and a pop-up window will appear providing the same text as below.

ZCZC MIATWOAT ALL
TTAA00 KNHC DDHHMM

Tropical Weather Outlook
NWS National Hurricane Center Miami FL
800 AM EDT Wed Sep 12 2018

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

Active Systems:
The National Hurricane Center is issuing advisories on Hurricane Florence, located over the western Atlantic Ocean, on Hurricane Helene, located over the eastern Atlantic, and on Tropical Storm Isaac, located several hundred miles east of the Lesser Antilles.

Southern Gulf of Mexico (AL91):
1. Cloudiness and showers associated with a trough of low pressure over the south-central Gulf of Mexico have decreased since yesterday and the Air Force reconnaissance plane scheduled to investigate the system for today will likely be cancelled. However, upper-level winds are forecast to become a little more conducive for development, and a tropical depression could still form Thursday or Friday before the system reaches the western Gulf Coast. Regardless of development, heavy rainfall and gusty winds are expected across portions of northeastern Mexico, Texas, and Louisiana late this

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week, and interests there should monitor the progress of this
system.
* Formation chance through 48 hours...medium...60 percent.
* Formation chance through 7 days...medium...60 percent.

Northeastern Atlantic Ocean (AL93):
2. A non-tropical area of low pressure located several hundred
miles west-southwest of the Azores is producing a large area of
showers and thunderstorms and gale-force winds. This system could
gradually acquire tropical or subtropical characteristics during the
next couple of days while it meanders over the northeastern Atlantic
Ocean, and before it becomes absorbed by a larger trough of low
pressure. For more information, see High Seas Forecasts issued by
the National Weather Service.
* Formation chance through 48 hours...medium...40 percent.
* Formation chance through 7 days...medium...50 percent.

Central Subtropical Atlantic Ocean:
3. An area of low pressure is expected to develop near Bermuda late
this weekend or early next week. Some gradual development is
possible after that time while the system drifts westward over the
western Atlantic.
* Formation chance through 48 hours...low...near 0 percent.
* Formation chance through 7 days...low...20 percent

High Seas Forecasts issued by the National Weather Service are under
AWIPS header NFDHSFAT1, WMO header FZNT01 KWBC, and available on the
Web at https://ocean.weather.gov/shtml/NFDHSFAT1.shtml.

Forecaster Pasch
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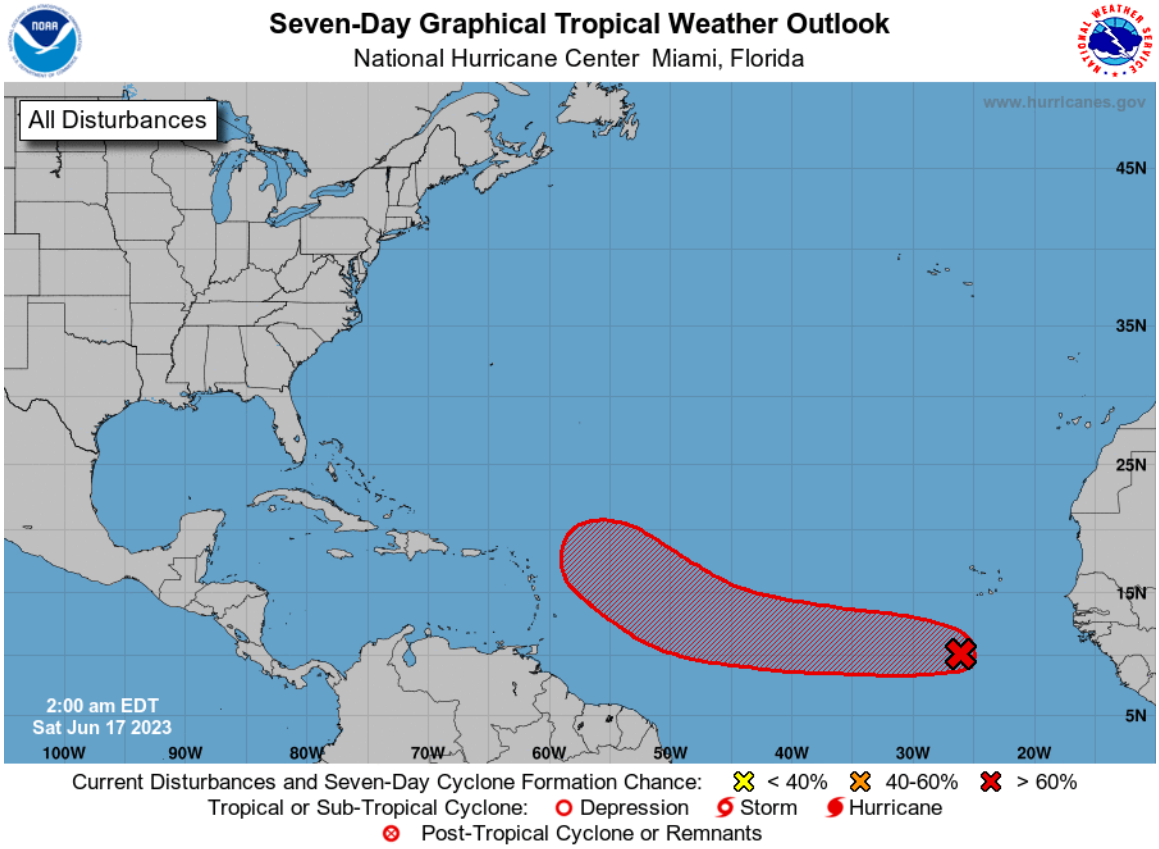
Product Description: The 48-hour Graphical Tropical Weather Outlook depicts significant areas of disturbed weather and their potential for development during the next 48 hours. The Outlook also shows the locations of any active tropical cyclones and potential tropical cyclones that NHC is issuing advisories on. The location of areas of disturbed weather on the graphic are denoted by an X and numbered, with text discussions for each disturbance given beneath the graphic. The potential for tropical cyclone formation for each disturbance within the next 48 hours will be indicated by the color of the X: yellow indicates a low probability of development (0-30%), orange indicates medium likelihood (40-60%), and red indicates a high likelihood of development (70-100%). Potential tropical cyclones that NHC is issuing advisories on will be denoted by an X color-coded by the probability of development, and the number of the potential tropical cyclone will be shown above the X. The graphic is interactive; users can mouse over cyclones or disturbances in the graphic and pop-up windows will appear with cyclone advisory information or the text Outlook discussion for that disturbance. Clicking on a tropical cyclone symbol or a potential tropical cyclone will take the user to a new web location that contains all advisories and products for that system.

Information on the motion and potential impacts of each disturbance is available in the text descriptions but is not displayed graphically.

Availability: Graphical Tropical Weather Outlooks are issued every six hours from 15 May–30 November for the Atlantic Basin and the eastern North Pacific Basin, at 0000, 0600, 1200, and 1800 UTC. Local issuance times are shown in the table at the top of the next page. The Graphical Tropical Weather Outlook is also updated whenever a Special Tropical Weather Outlook is issued.

Basin	Outlook Issuance Times (UTC)	Local Issuance Times During Daylight Saving Time	Local Issuance Times During Standard Time
Atlantic	0000, 0600, 1200, 1800	2 am, 8 am, 2 pm, 8 pm EDT	1 am, 7 am, 1 pm, 7 pm EST
Eastern North Pacific	0000, 0600, 1200, 1800	5 am, 11 am, 5 pm, 11 pm PDT	4 am, 10 am, 4 pm, 10 pm PST

7-Day Graphical Tropical Weather Outlook



ZCZC MIATWOAT ALL
TTAA00 KNHC DDHHMM

Tropical Weather Outlook
NWS National Hurricane Center Miami FL
200 AM EDT Sat Jun 17 2023

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

1. Eastern Tropical Atlantic (AL92):
A tropical wave located several hundred miles south-southwest of the Cabo Verde Islands continues to produce a broad area of disorganized showers and thunderstorms. Environmental conditions appear conducive for additional development, and a tropical depression is likely to form by the early to middle portion of next week while the system moves westward at 15 to 20 mph across the eastern and central tropical Atlantic.
* Formation chance through 48 hours...medium...40 percent.
* Formation chance through 7 days...high...70 percent.

Forecaster Papin

Product Description: The 7-day Graphical Tropical Weather Outlook provides formation potential for individual disturbances during the next 7-day period. The areas enclosed on the graph represent the potential formation area during the forecast period[5]. The areas are color-coded based on the potential for tropical cyclone formation during the next 7-days. Areas in yellow indicate a low probability of development (0-30%), orange indicates medium likelihood (40-60%), and red indicates a high likelihood of development (70-100%). The location of existing disturbances is indicated by an X. If the formation potential of an existing disturbance does not include the area in which the disturbance is currently location, an arrow will connect the current location of the disturbance to its area of potential formation. Areas without an X or connected by an arrow to an X indicate that the disturbance does not currently exist, but is expected to develop during the 7-day period. Potential tropical cyclones that NHC is issuing advisories on will be denoted by a X and the number of the potential tropical cyclone will be shown above the X; note, however, that formation areas are not provided for potential tropical cyclones. The graphic is interactive; users can mouse over disturbances in the graphic and pop-up windows will appear with the text Outlook discussion for that disturbance. Clicking on a disturbance will take the user to a graphic that shows only that disturbance. Active tropical cyclones and potential tropical cyclones are depicted on this graphic. Clicking on a tropical cyclone symbol or a potential tropical cyclone will take the user to a new web location that contains all advisories and products for that system.

Availability: Graphical Tropical Weather Outlooks are issued every six hours from 15 May–30 November for the Atlantic Basin and the eastern North Pacific Basin, at 0000, 0600, 1200, and 1800 UTC. Local issuance times are shown in the table on the next page. The Graphical Tropical Weather Outlook is also updated whenever a Special Tropical Weather Outlook is issued.

Basin	Outlook Issuance Times (UTC)	Local Issuance Times During Daylight Saving Time	Local Issuance Times During Standard Time
Atlantic	0000, 0600, 1200, 1800	2 am, 8 am, 2 pm, 8 pm EDT	1 am, 7 am, 1 pm, 7 pm EST
Eastern North Pacific	0000, 0600, 1200, 1800	5 am, 11 am, 5 pm, 11 pm PDT	4 am, 10 am, 4 pm, 10 pm PST

[5] Development areas for potential tropical cyclones that NHC is issuing advisories on will not be depicted on the graphic.

NHC Non-Operational Product Descriptions

Tropical Cyclone Reports


NATIONAL HURRICANE CENTER
TROPICAL CYCLONE REPORT

HURRICANE IDALIA
(AL102023)

26–31 August 2023

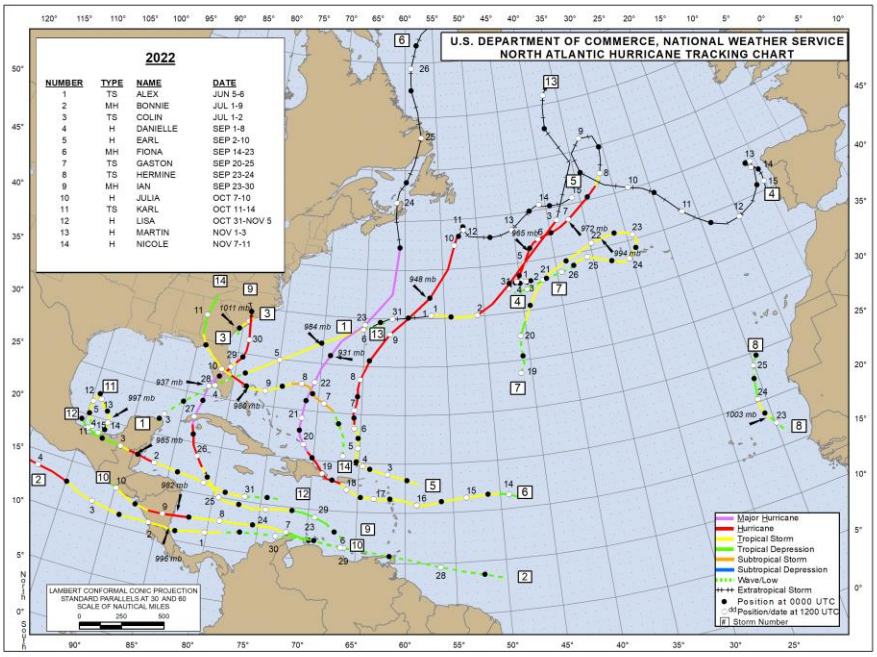
John P. Cangialosi and Laura Alaka
National Hurricane Center
13 February 2024

GOES-16 GEOCOLOR IMAGE OF HURRICANE IDALIA AT 0715 UTC 30 AUGUST 2023.
IMAGE COURTESY OF NOAA/NESDIS/STAR.

Product Description: The National Hurricane Center's Tropical Cyclone Reports (TCRs) contain information on all tropical (and subtropical) cyclones that have occurred within the Atlantic and eastern Pacific basins, including synoptic history, meteorological statistics, casualties and damages, and the post-analysis best track (six-hourly positions and intensities). Comprehensive versions of these reports are provided for all tropical cyclones in which coastal watches or warnings were in effect or direct fatalities were reported, and for other select storms with significant public or research interest (e.g., storms investigated via research field campaigns). Otherwise, abbreviated TCRs will be produced that include a short description of the cyclone's origin, justification of the analyzed maximum winds and minimum pressure, noteworthy statistics, and the post-analysis best track.

Availability: TCRs are available in the data archive portion of the NHC website (www.nhc.noaa.gov/data#tcr) in pdf format. The time to prepare a TCR after the tropical cyclone has ended can vary from a couple of weeks to several months, depending on the longevity of the cyclone, available data, and the extent of the cyclone's impacts.

Seasonal Summary Table and Track Maps



Product Description: The National Hurricane Center publishes a seasonal summary table and seasonal track map near the beginning of each month from July through December. The table provides a summary of all of the season's tropical cyclones to date and the map shows the tracks of all of the season's tropical cyclones. The data for each tropical cyclone are considered preliminary until the Tropical Cyclone Report is issued. The seasonal summary table and track maps can be found in the archive section of the NHC website with the season's tropical cyclone reports.