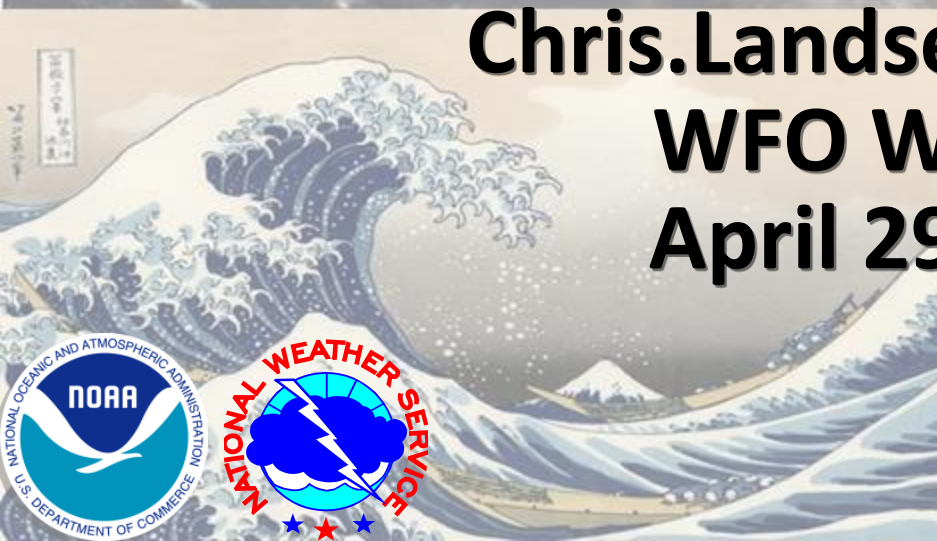


Future Tropical Analysis and Forecast Branch Products and Services – Your Feedback Requested

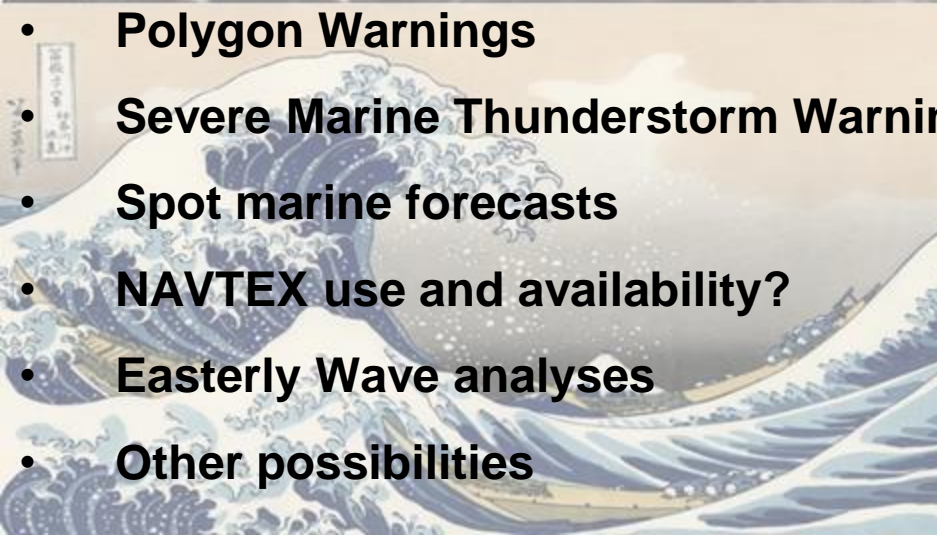
**Chris Landsea
Chief, TAFB**

**Chris.Landsea@noaa.gov
WFO Workshop
April 29th, 2019**



Future Tropical Analysis and Forecast Branch Products and Services – Your Feedback Requested

- **East Pacific Offshore Zones**
- **Redesigned Graphics (Sea State, Wind/Waves, Surface Progs, Wave Period/Direction)**
- **Elimination of Marine Weather Discussion**
- **Surface Progs beyond Day 3**
- **Marine Composite Page beyond Day 3**
- **Spanish Language Offshore Zones**
- **Weekly Weather Briefings**
- **Polygon Warnings**
- **Severe Marine Thunderstorm Warning**
- **Spot marine forecasts**
- **NAVTEX use and availability?**
- **Easterly Wave analyses**
- **Other possibilities**



Summary of Current Marine “Blue Water” Products

From "Maritime
Transportation
Extreme Weather
Task Force: A
Report to
Congress"
February 2018

Figure 7. Representative NOAA Marine Weather Products

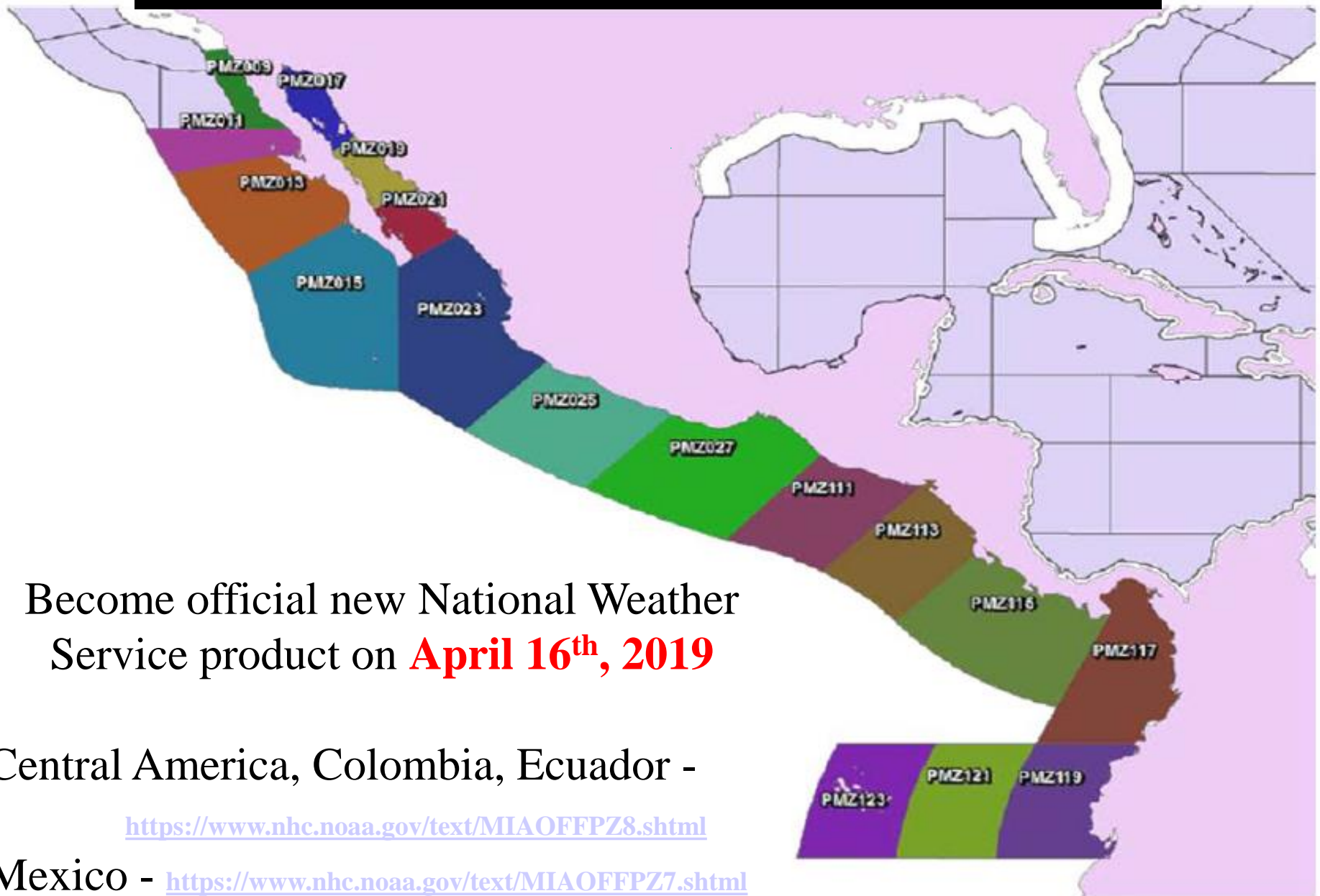
Category	Product	Update Frequency	Warning/ Forecast Period	Broadcast	Transmission	Coverage
Text	High Seas Forecast	6 hourly / as needed	2 days	GMDSS Safetynet	Satellite, Inmarsat-C	METAREAs IV and XI
Text	NAVTEX	6 hourly / as needed	5 days	NAVTEX	USCG MF	Coastal and Offshore to the Exclusive Economic Zone
Text	Tropical Cyclone Forecast/ Advisory	6 hourly / as needed	5 days	GMDSS Safetynet	Satellite, Inmarsat-C	North Atlantic Eastern/ Central Pacific
Graphical	Surface Analyses Surface Forecasts	6 hourly 12 hourly	00 hour 24/48/72*/96 [^] Hour	HF Radiofacsimile	USCG HF	North Atlantic North Pacific
Graphical	Wind/Wave Forecasts	12 hourly	24/48/72*/96 [^] Hour	HF Radiofacsimile	USCG HF	North Atlantic North Pacific
Gridded Forecasts	Wind speed/direction Wave heights	6 hourly / as needed	7 days 3 hourly (through 72 hours) 6 hourly beyond 72 hours	Available via internet access or email request	N/A	North Atlantic ¹ North Pacific ²

* - 72 hour forecast by NHC and MWS Honolulu

[^] - 96 hour forecast by OPC, once per day

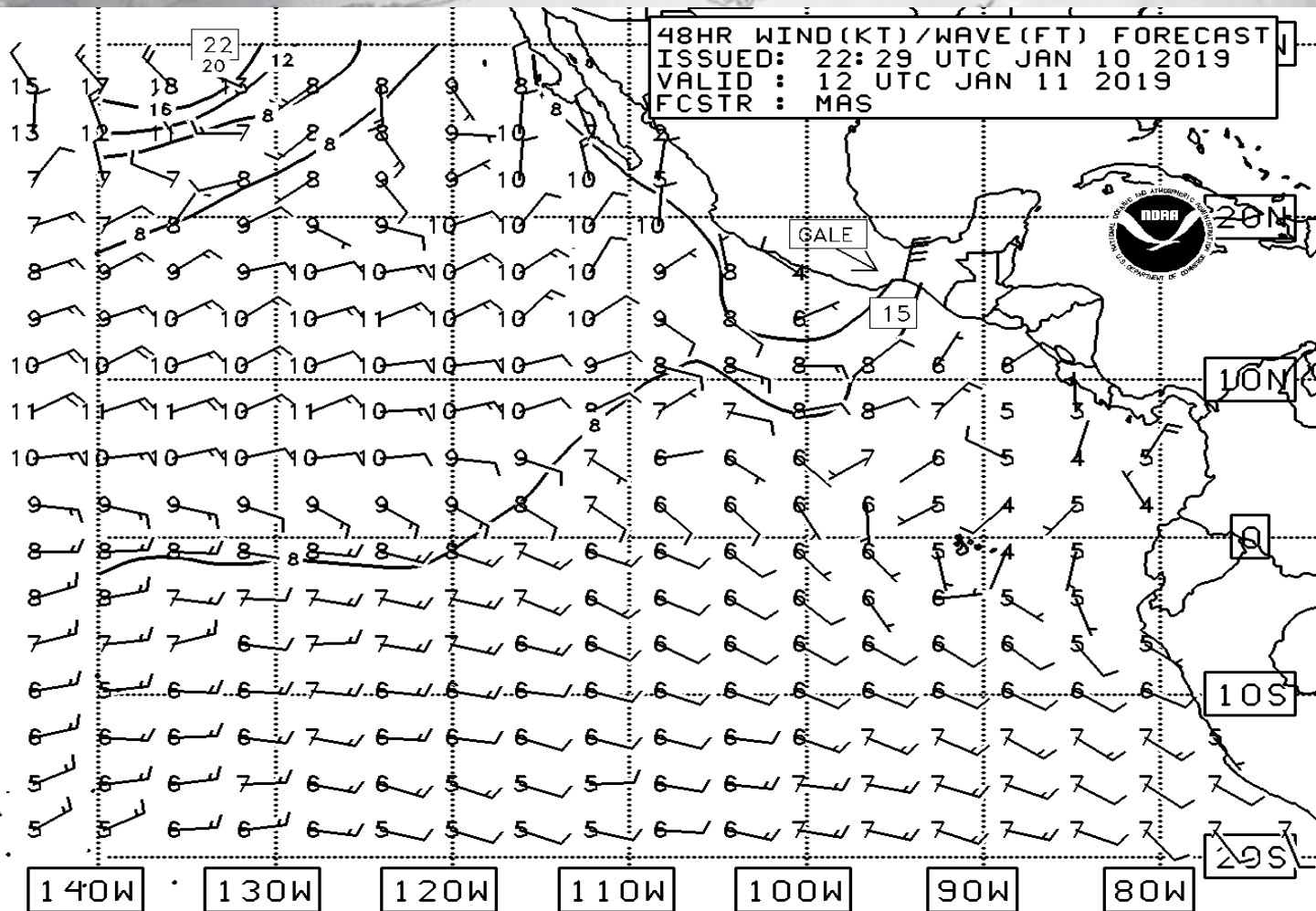
¹ - western North Atlantic from OPC, full Atlantic for NHC portion

TAFB Offshore Zones



Graphical Product Revisions – Removing the South Pacific, Providing more detail in Northeast Pacific

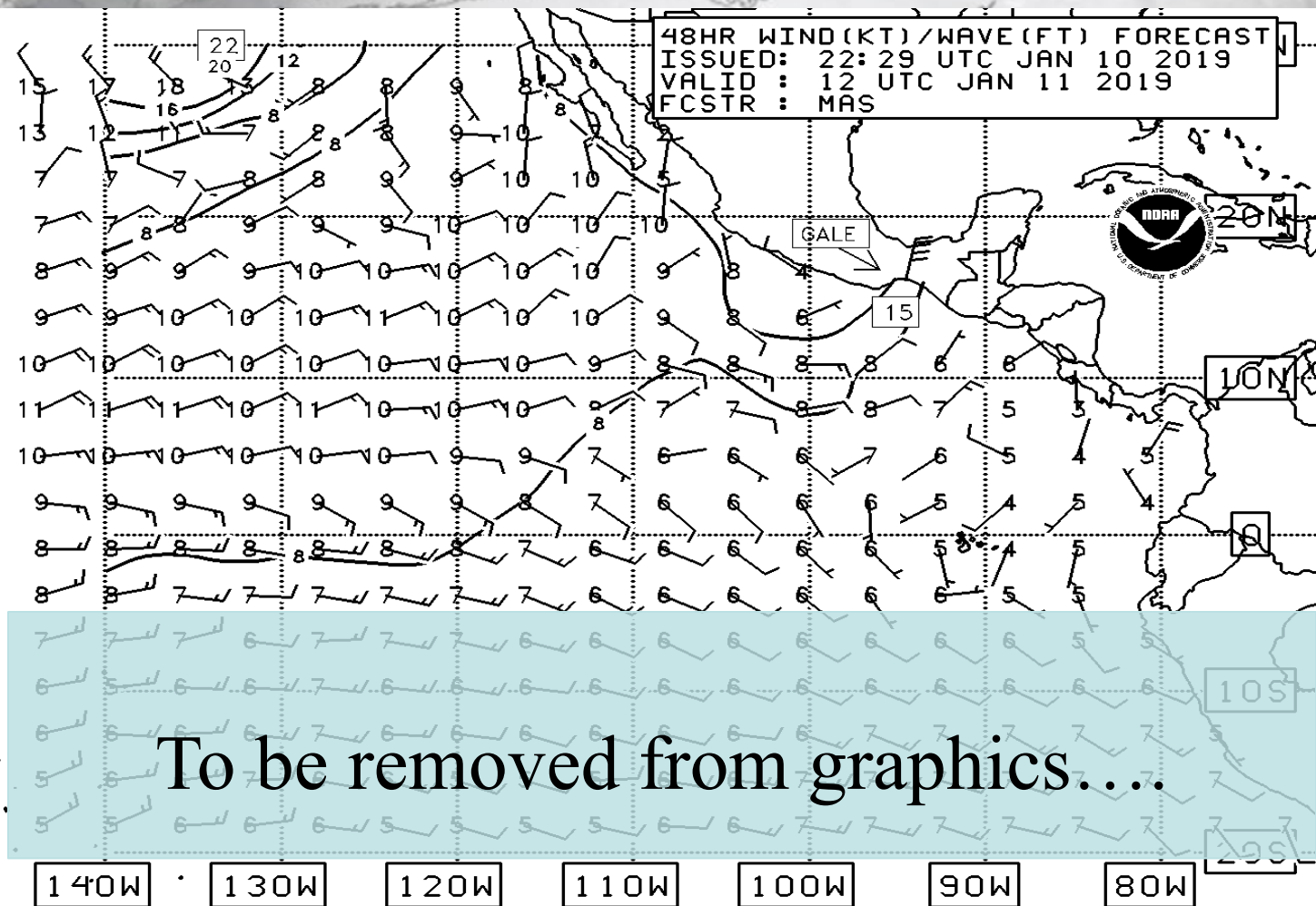
Legacy
Wind/
Wave
Forecasts



NWS/NHC/TROPICAL ANALYSIS AND FORECAST BRANCH
SIG WAVE HT IS SHOWN (THE AVG HT OF THE HIGHEST 1/3 OF THE WAVES)

Graphical Product Revisions – Removing the South Pacific, Providing more detail in Northeast Pacific

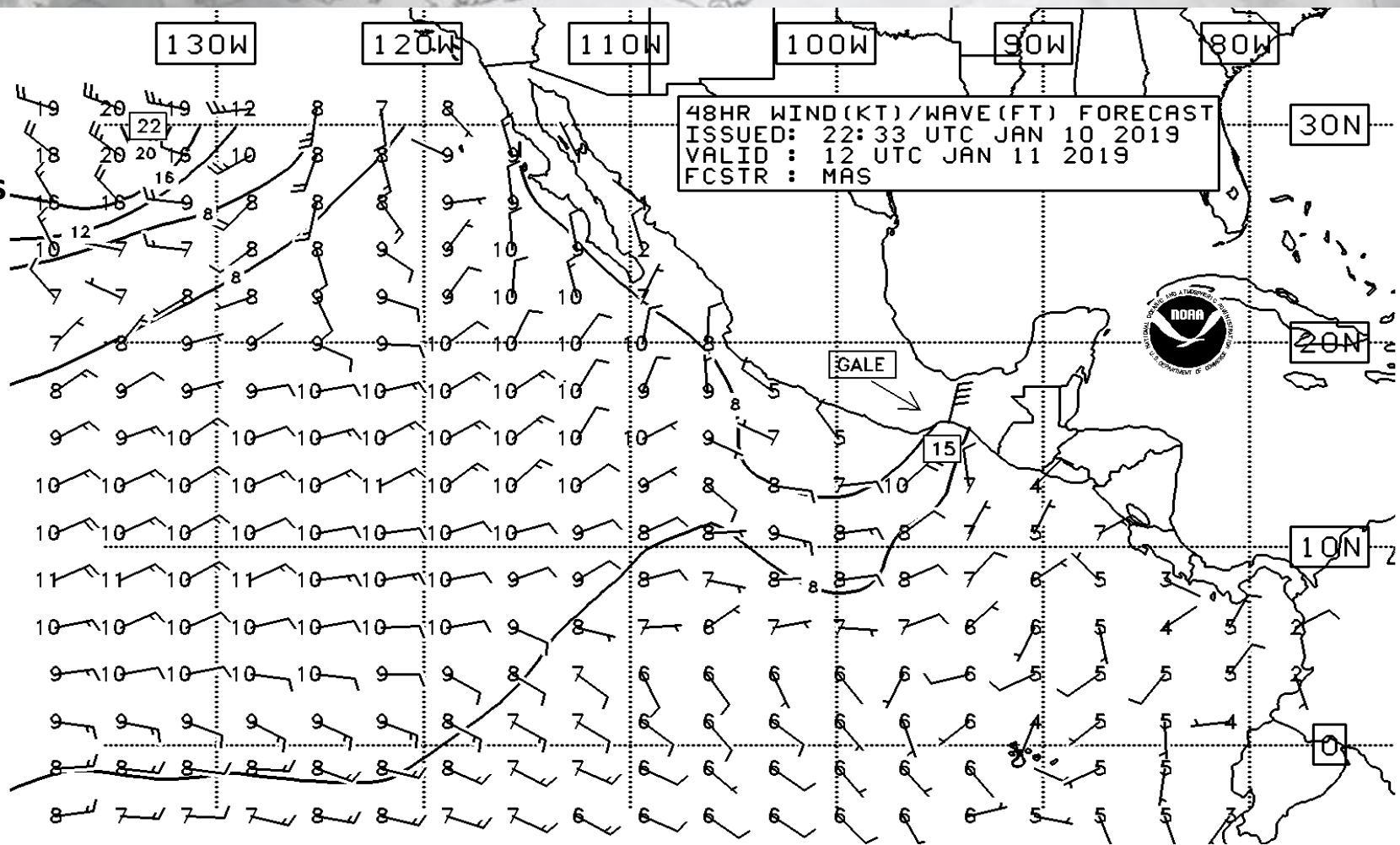
Legacy
Wind/
Wave
Forecasts



NWS/NHC/TROPICAL ANALYSIS AND FORECAST BRANCH
SIG WAVE HT IS SHOWN (THE AVG HT OF THE HIGHEST 1/3 OF THE WAVES)

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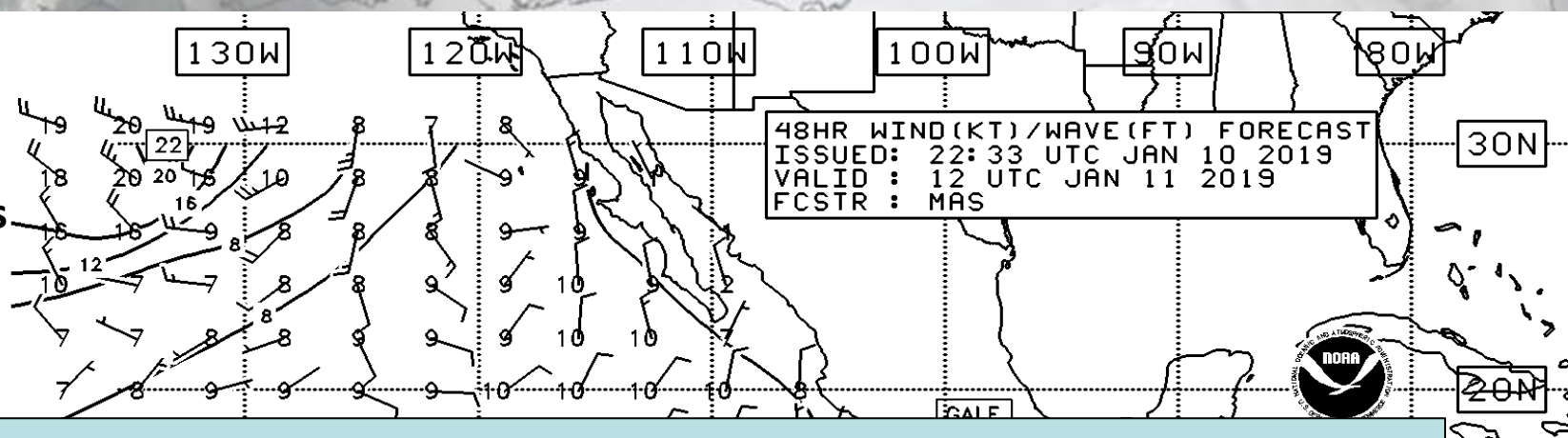
Revised
**Wind/
Wave
Forecasts**



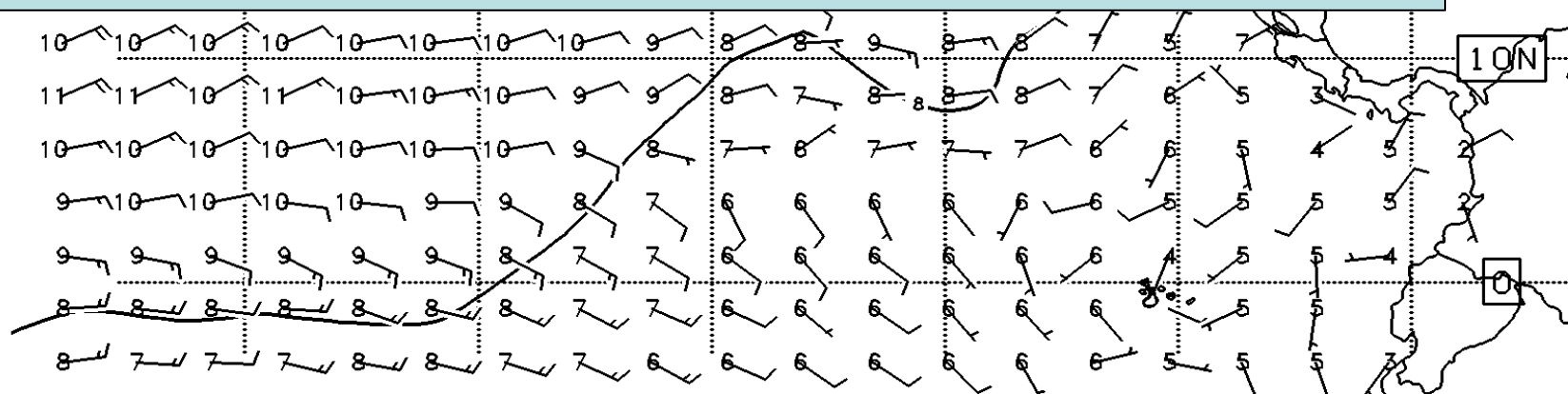
NWS/NHC/TROPICAL ANALYSIS AND FORECAST BRANCH
SIG WAVE HT IS SHOWN (THE AVG HT OF THE HIGHEST 1/3 OF THE WAVES)

Graphical Product Revisions – Removing the South Pacific, Providing more detail in Northeast Pacific

**Revised
Wind/
Wave
Forecasts**



To be Transitioned in the Spring



NWS/NHC/TROPICAL ANALYSIS AND FORECAST BRANCH
SIG WAVE HT IS SHOWN (THE AVG HT OF THE HIGHEST 1/3 OF THE WAVES)

Marine Weather Discussion

AGXX40 KNHC 181014 AAA
MIMATS Marine Weather Discussion
NWS National Hurricane Center Miami FL
514 AM EDT Mon Mar 18 2019

Marine Weather Discussion for the Gulf of Mexico, Caribbean Sea, and Tropical North Atlantic from 07N to 19N between 55W and 64W and the Southwest North Atlantic including the Bahamas

...GULF OF MEXICO...The cold front of the previous days has become stationary from just north of the northwestern coast of Cuba to 23N88W to a weak 1016 mb low at 22N94W and southeast from there to just inland the coast of Mexico at 19N91W. Strong high pressure is present to the northwest and north of the front/low. A recent Ascat pass revealed strong to near gale force northwest winds over the far SW Gulf where the gradient is the tightest between the front/low and the aforementioned high pressure that is ridging southward along eastern Mexico. Winds elsewhere across the Gulf are in the strong range and northeast in direction. Per latest buoy reports, seas across the Gulf are in the 4-6 ft range, except for much higher seas of 8-11 ft in the SW Gulf with the strong to near gale force northwester winds. Seas are low, in the 2-4 ft range in the far northwest, north-central and northeast sections of the Gulf...

<https://www.nhc.noaa.gov/text/MIAMIMATS.shtml>



Marine Weather Discussion

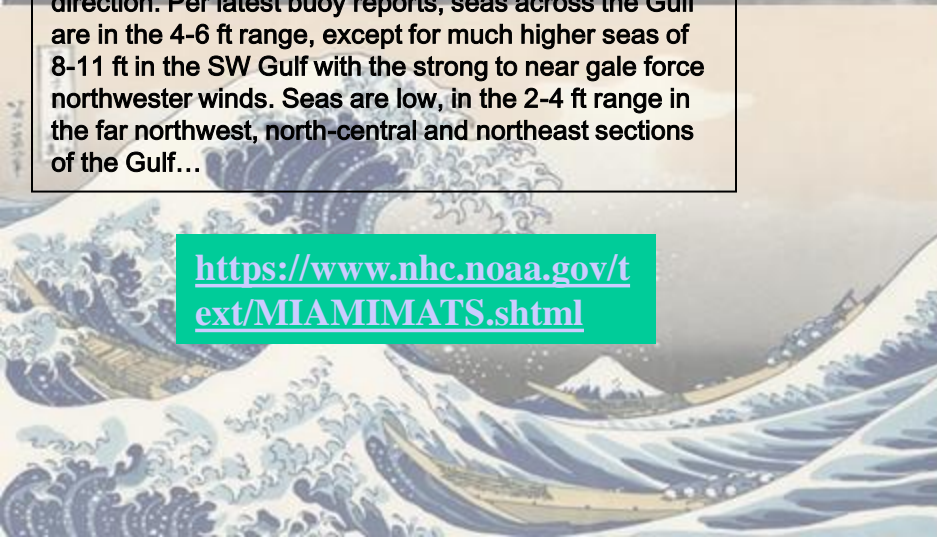
AGXX40 KNHC 181014 AAA
MIMATS Marine Weather Discussion
NWS National Hurricane Center Miami FL
514 AM EDT 18 04 2019

Marine Weather Discussion for the Gulf of Mexico,
Caribbean Sea, and Atlantic Ocean from 07N to
19N between 105W and 80W, and North
Atlantic from 10W to 30W.

...GULF OF MEXICO...
days has become stationary
northwestern coast of Cuba to 25
mb low at 22N94W and southeast from
inland the coast of Mexico at 19N91W. Strong
pressure is present to the northwest and north of the
front/low. A recent Ascat pass revealed strong to near
gale force northwest winds over the far SW Gulf where
the gradient is the tightest between the front/low and
the aforementioned high pressure that is ridging
southward along eastern Mexico. Winds elsewhere
across the Gulf are in the strong range and northeast in
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northwester winds. Seas are low, in the 2-4 ft range in
the far northwest, north-central and northeast sections
of the Gulf...

<https://www.nhc.noaa.gov/text/MIAMIMATS.shtml>

To Be Discontinued



Marine Weather Discussion

AGXX40 KNHC 181014 AAA
MIMATS Marine Weather Discussion
NWS National Hurricane Center Miami FL
514 AM EDT Mon Mar 18 2019

Marine Weather Discussion for the Gulf of Mexico, Caribbean Sea, and Tropical North Atlantic from 07N to 19N between 55W and 64W and the Southwest North Atlantic including the Bahamas

...GULF OF MEXICO...The cold front of the previous days has become stationary from just north of the northwestern coast of Cuba to 23N88W to a weak 1016 mb low at 22N94W and southeast from there to just inland the coast of Mexico at 19N91W. Strong high pressure is present to the northwest and north of the front/low. A recent Ascat pass revealed strong to near gale force northwest winds over the far SW Gulf where the gradient is the tightest between the front/low and the aforementioned high pressure that is ridging southward along eastern Mexico. Winds elsewhere across the Gulf are in the strong range and northeast in direction. Per latest buoy reports, seas across the Gulf are in the 4-6 ft range, except for much higher seas of 8-11 ft in the SW Gulf with the strong to near gale force northwester winds. Seas are low, in the 2-4 ft range in the far northwest, north-central and northeast sections of the Gulf...

<https://www.nhc.noaa.gov/text/MIAMIMATS.shtml>

Tropical Weather Discussion

AXNT20 KNHC 181733
TWDAT Tropical Weather Discussion
NWS National Hurricane Center Miami FL
133 PM EDT Mon Mar 18 2019

Tropical Weather Discussion for North America, Central America Gulf of Mexico, Caribbean Sea, northern sections of South America, and Atlantic Ocean to the African coast from the Equator to 32N. The following information is based on satellite imagery, weather observations, radar and meteorological analysis.

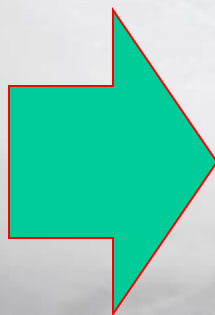
Based on 1200 UTC surface analysis and satellite imagery through 1715 UTC.

...SPECIAL FEATURES... Caribbean Sea Gale Warning... NE gale-force winds are expected again tonight near the coast of Colombia from 19/0000 UTC to 19/1500 UTC. Thereafter, a low developing near the Bahamas will weaken the ridge over the western Atlantic and allow the nocturnal gale winds to diminish. Please read the latest High Seas Forecast issued by the National Hurricane Center under the AWIPS/WMO header MIAHSFAT2/FZNT02 KNHC or the website <https://www.nhc.noaa.gov/text/MIAHSFAT2.shtml>, for more details.

...MONSOON TROUGH/ITCZ... The monsoon trough extends SW from the coast of Sierra Leone near 07N12W to 02N17W. The ITCZ continues from 02N17W to 03S30W to the coast of Brazil near 03S43W...

<https://www.nhc.noaa.gov/text/MIATWDAT.shtml>

<https://www.nhc.noaa.gov/text/MIATWDEP.shtml>



Marine Weather Discussion

AGXX40 KNHC 181014 AAA
MIMATS Marine Weather Discussion
NWS National Hurricane Center Miami FL
514 AM EDT Mon Mar 18 2019

Marine Weather Discussion for the Gulf of Mexico, Caribbean Sea, and Tropical North Atlantic from 07N to 19N between 55W and 64W and the Southwest North Atlantic including the Bahamas

...GULF
days has
northwest
mb low a
inland th

pressure is present to the northwest and north of the front/low. A recent Ascat pass revealed strong to near gale force northwest winds over the far SW Gulf where the gradient is the tightest between the front/low and the aforementioned high pressure that is ridging southward along eastern Mexico. Winds elsewhere across the Gulf are in the strong range and northeast in direction. Per latest buoy reports, seas across the Gulf are in the 4-6 ft range, except for much higher seas of 8-11 ft in the SW Gulf with the strong to near gale force northwester winds. Seas are low, in the 2-4 ft range in the far northwest, north-central and northeast sections of the Gulf...

<https://www.nhc.noaa.gov/text/MIAMIMATS.shtml>

Tropical Weather Discussion

AXNT20 KNHC 181733
TWDAT Tropical Weather Discussion
NWS National Hurricane Center Miami FL
133 PM EDT Mon Mar 18 2019

Tropical Weather Discussion for North America, Central America Gulf of Mexico, Caribbean Sea, northern sections of South America, and Atlantic Ocean to the African coast from the Equator to 32N. The following information is based on satellite imagery, weather observations, radar and

To be Transitioned in the Summer

...SPECIAL FEATURES... ..Caribbean Sea Gale Warning... NE gale-force winds are expected again tonight near the coast of Colombia from 19/0000 UTC to 19/1500 UTC. Thereafter, a low developing near the Bahamas will weaken the ridge over the western Atlantic and allow the nocturnal gale winds to diminish. Please read the latest High Seas Forecast issued by the National Hurricane Center under the AWIPS/WMO header MIAHSFAT2/FZNT02 KNHC or the website <https://www.nhc.noaa.gov/text/MIAHSFAT2.shtml>, for more details.

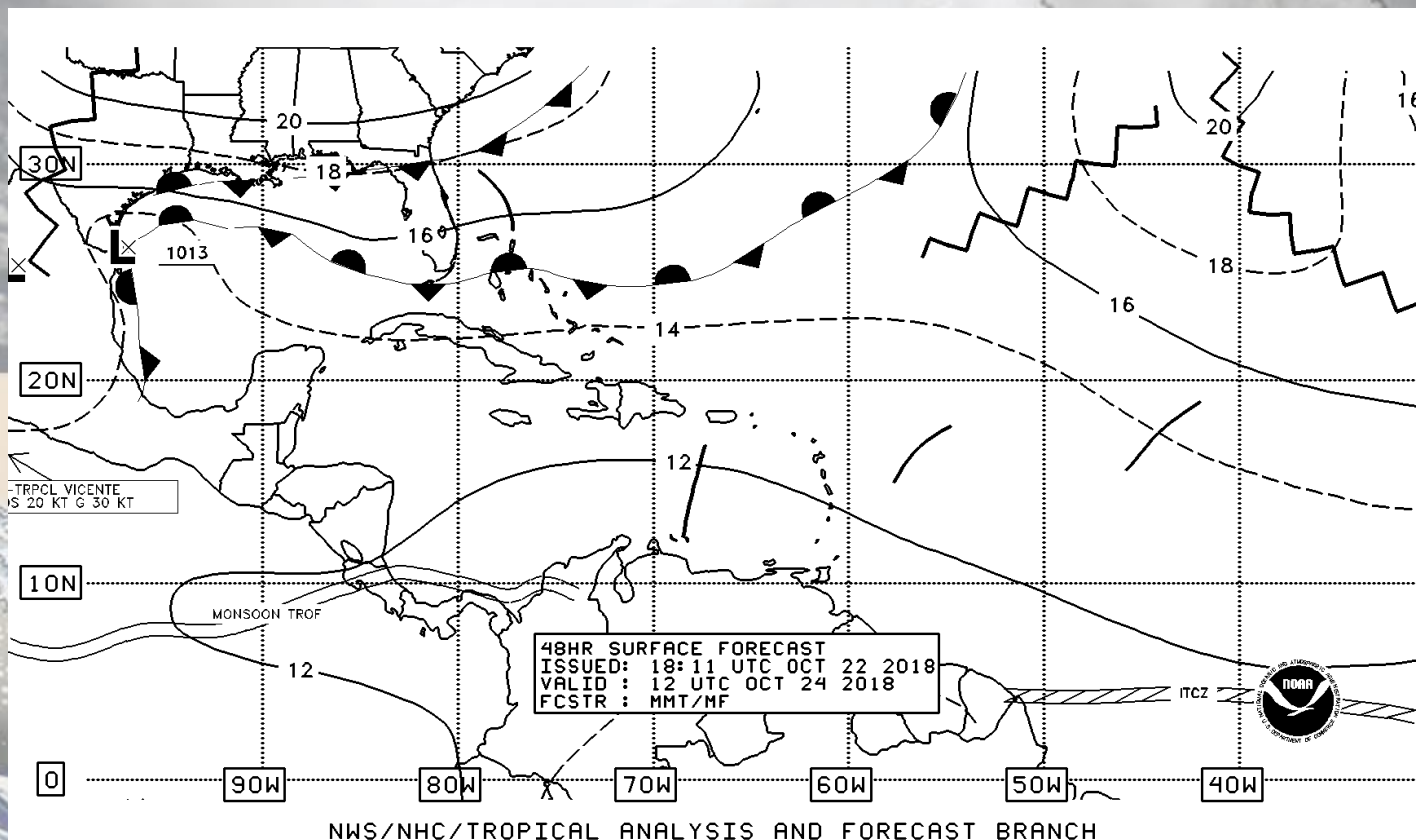
...MONSOON TROUGH/ITCZ...
The monsoon trough extends SW from the coast of Sierra Leone near 07N12W to 02N17W. The ITCZ continues from 02N17W to 03S30W to the coast of Brazil near 03S43W...

<https://www.nhc.noaa.gov/text/MIATWDAT.shtml>

<https://www.nhc.noaa.gov/text/MIATWDEP.shtml>

Surface Prog Graphics

- Fronts, troughs, tropical cyclones, tropical waves, ridges
- 24, 48, and 72 hr Forecasts
- W. Atlantic, Caribbean, Gulf of Mexico, and E. Pacific
- Issued twice daily



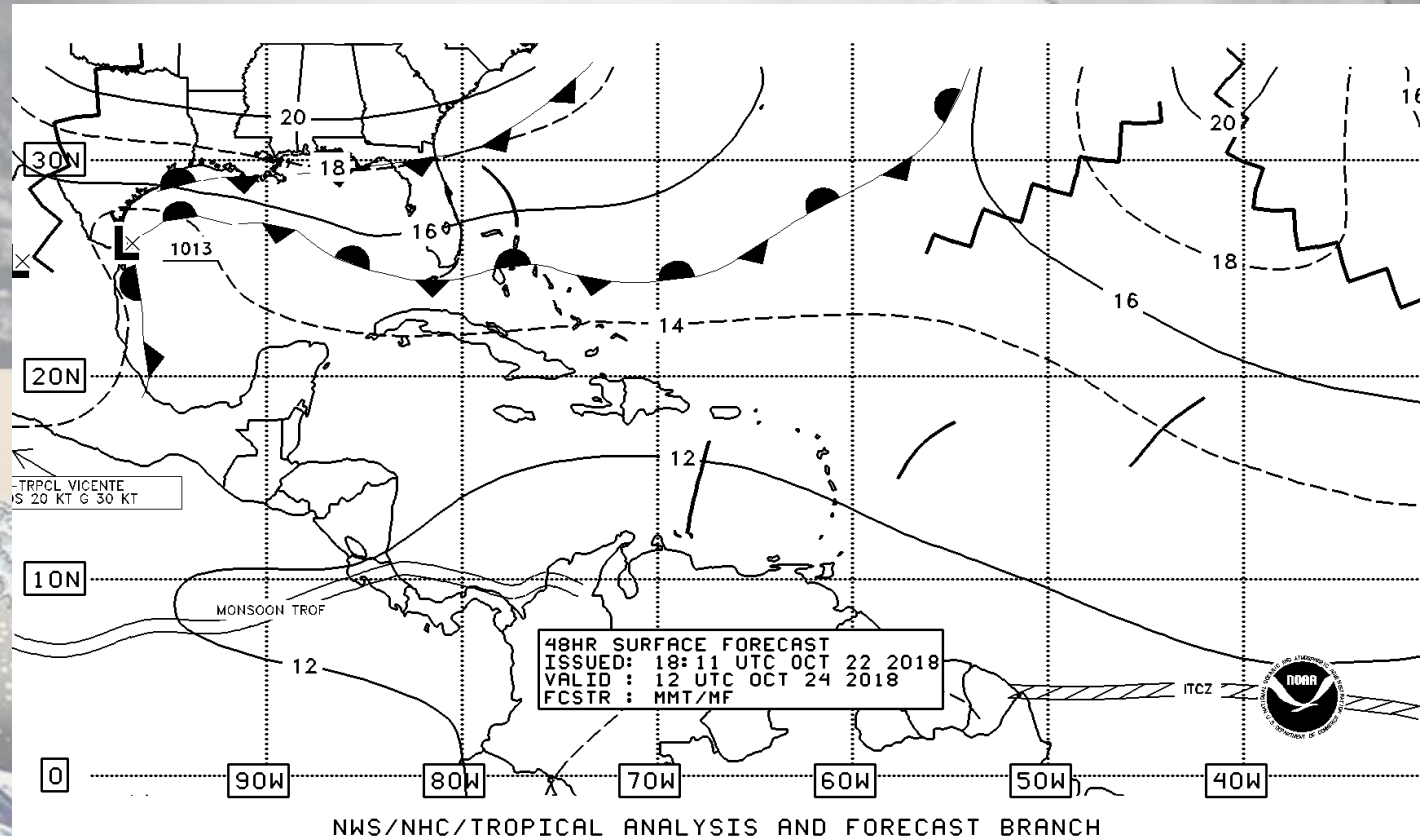
https://www.nhc.noaa.gov/tafb_latest/atlsfc72_latestBW.gif

Surface Prog Graphics

- Fronts, troughs, tropical cyclones, tropical waves, ridges
- 24, 48, and 72 hr Forecasts
- W. Atlantic, Caribbean, Gulf of Mexico, and E. Pacific
- Issued twice daily

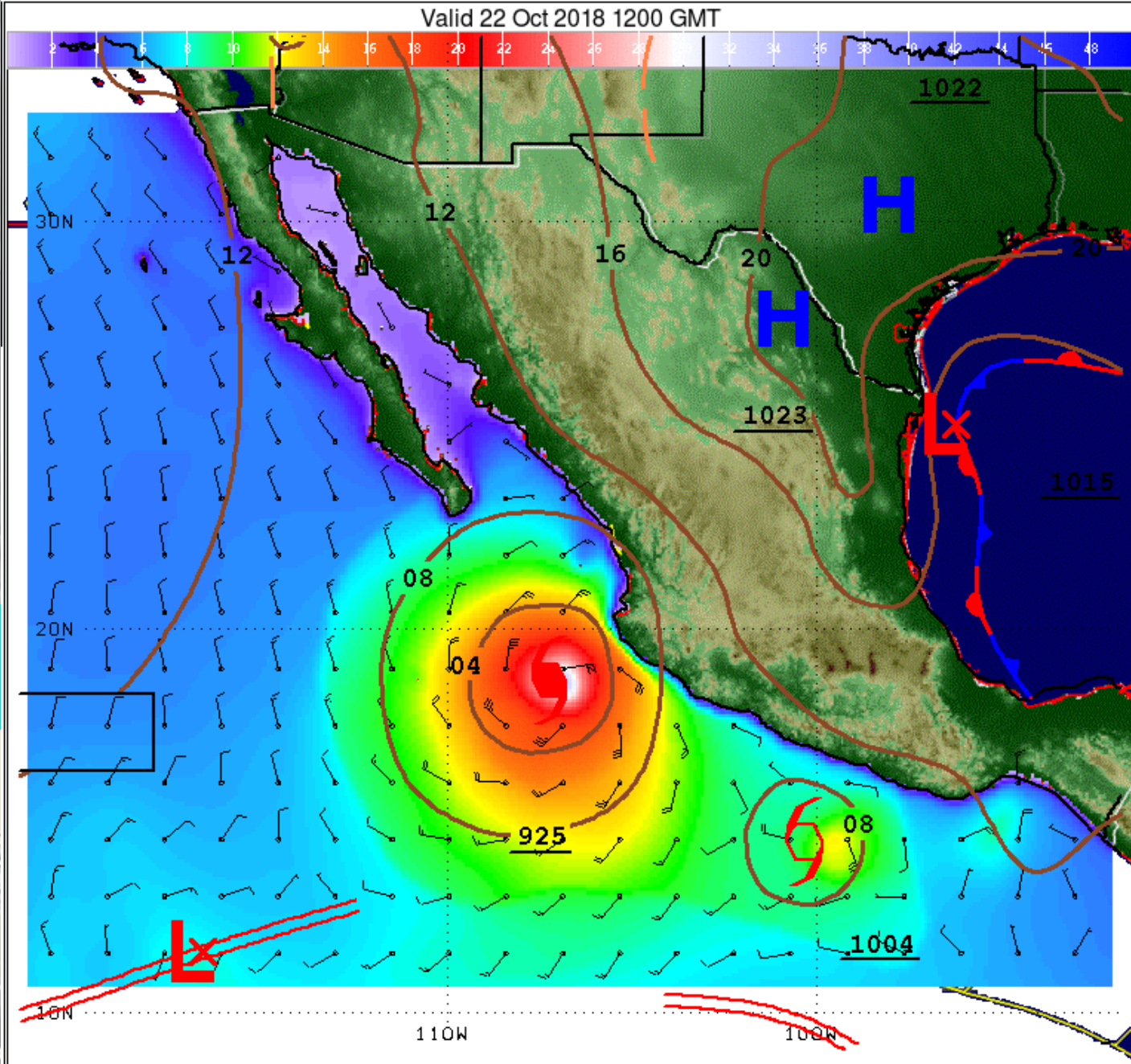
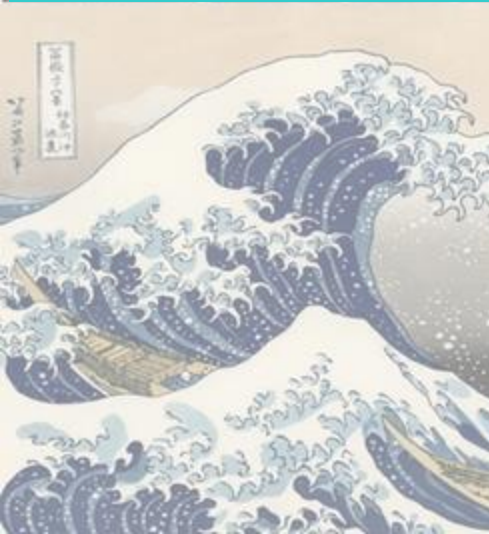
Is there
interest/use
in going to
5 days? To
7 days?

https://www.nhc.noaa.gov/tafb_latest/atlsfc72_latestBW.gif



Marine Composite Page – Winds, Waves, and Features

<https://www.nhc.noaa.gov/marine/forecast/enhanced/atcfull.php>



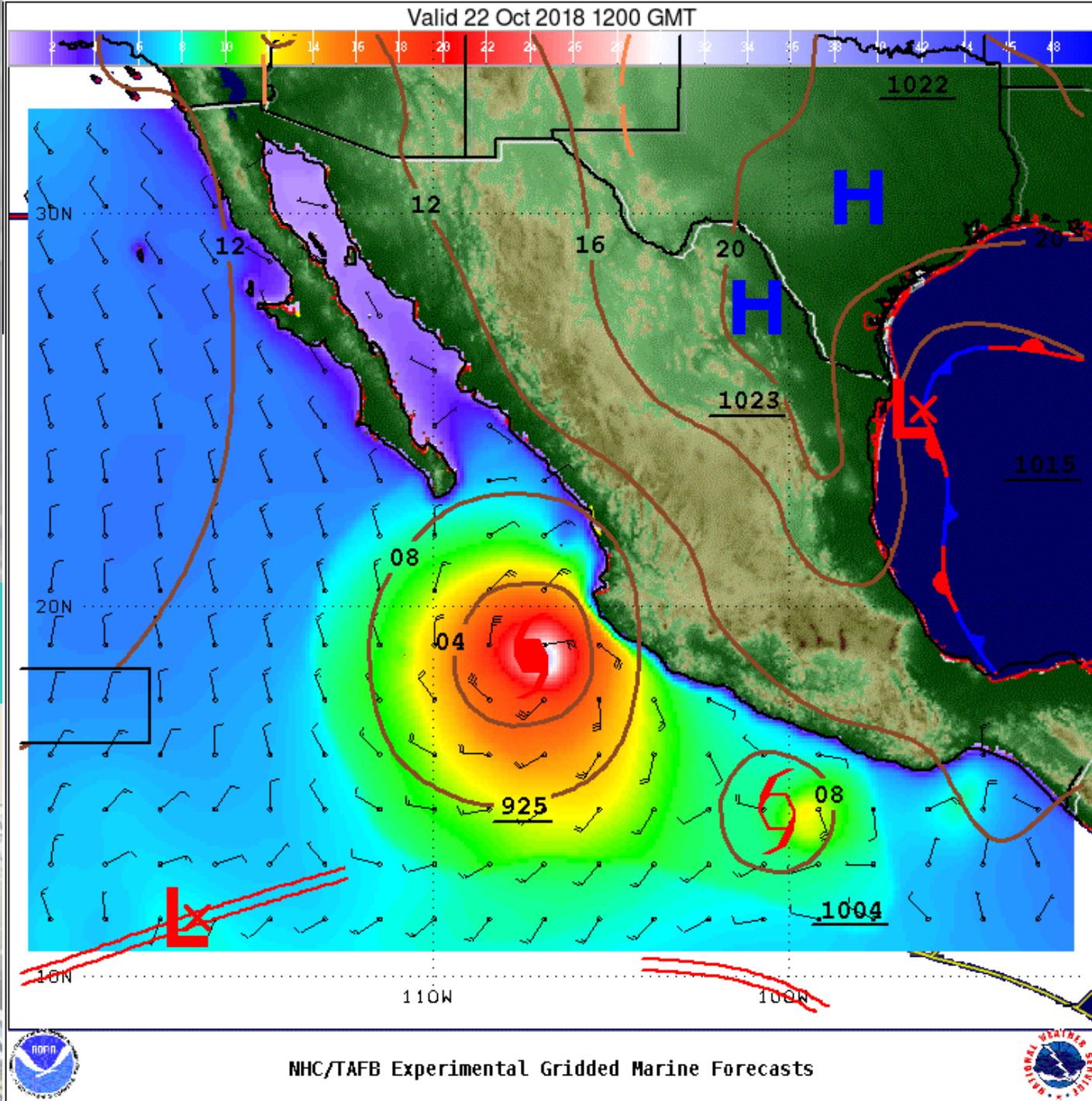
NHC/TAFB Experimental Gridded Marine Forecasts



Marine Composite Page – Winds, Waves, and Features

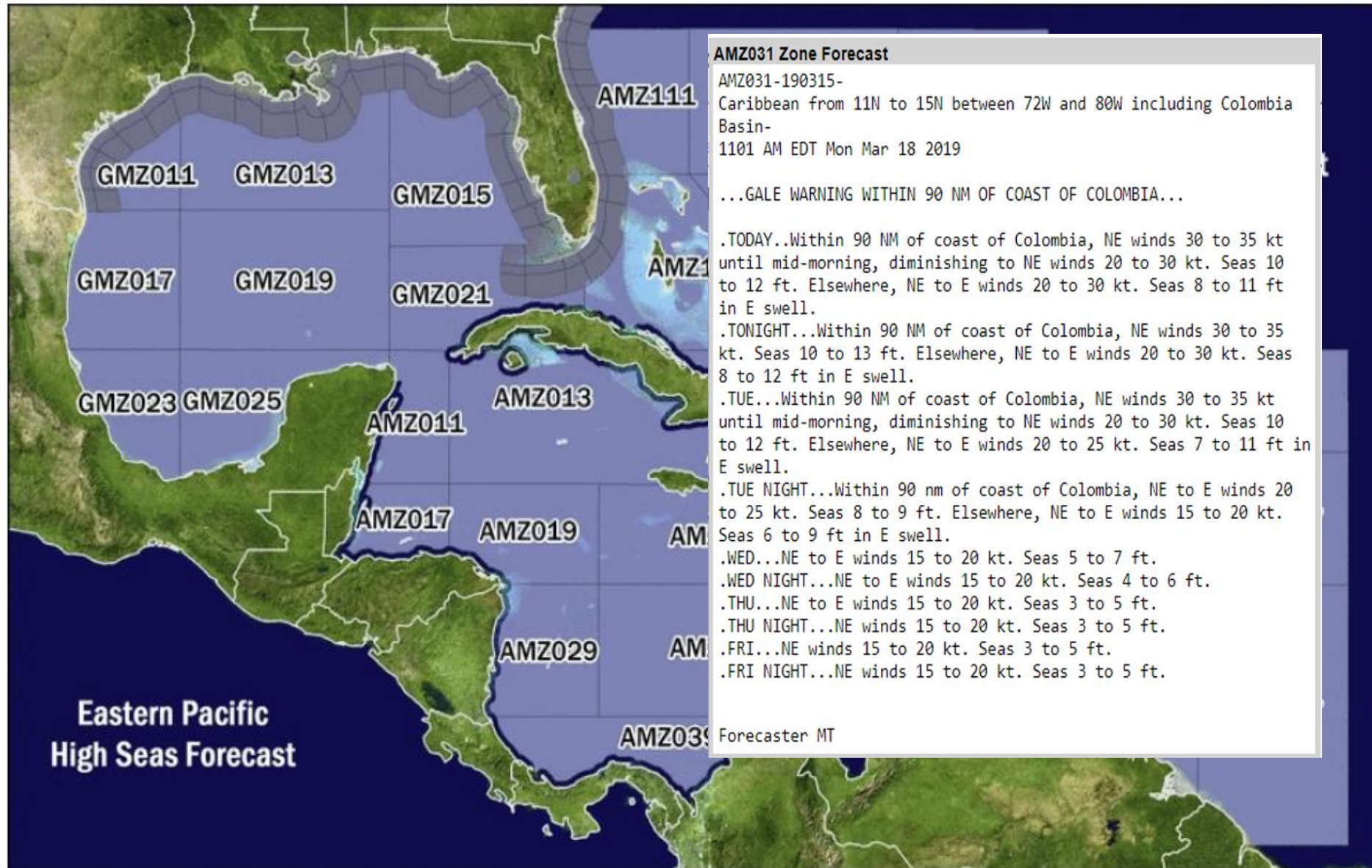
<https://www.nhc.noaa.gov/marine/forecast/enhanced/atcfull.php>

Is there
interest/use in
going to 5
days? To 7
days?



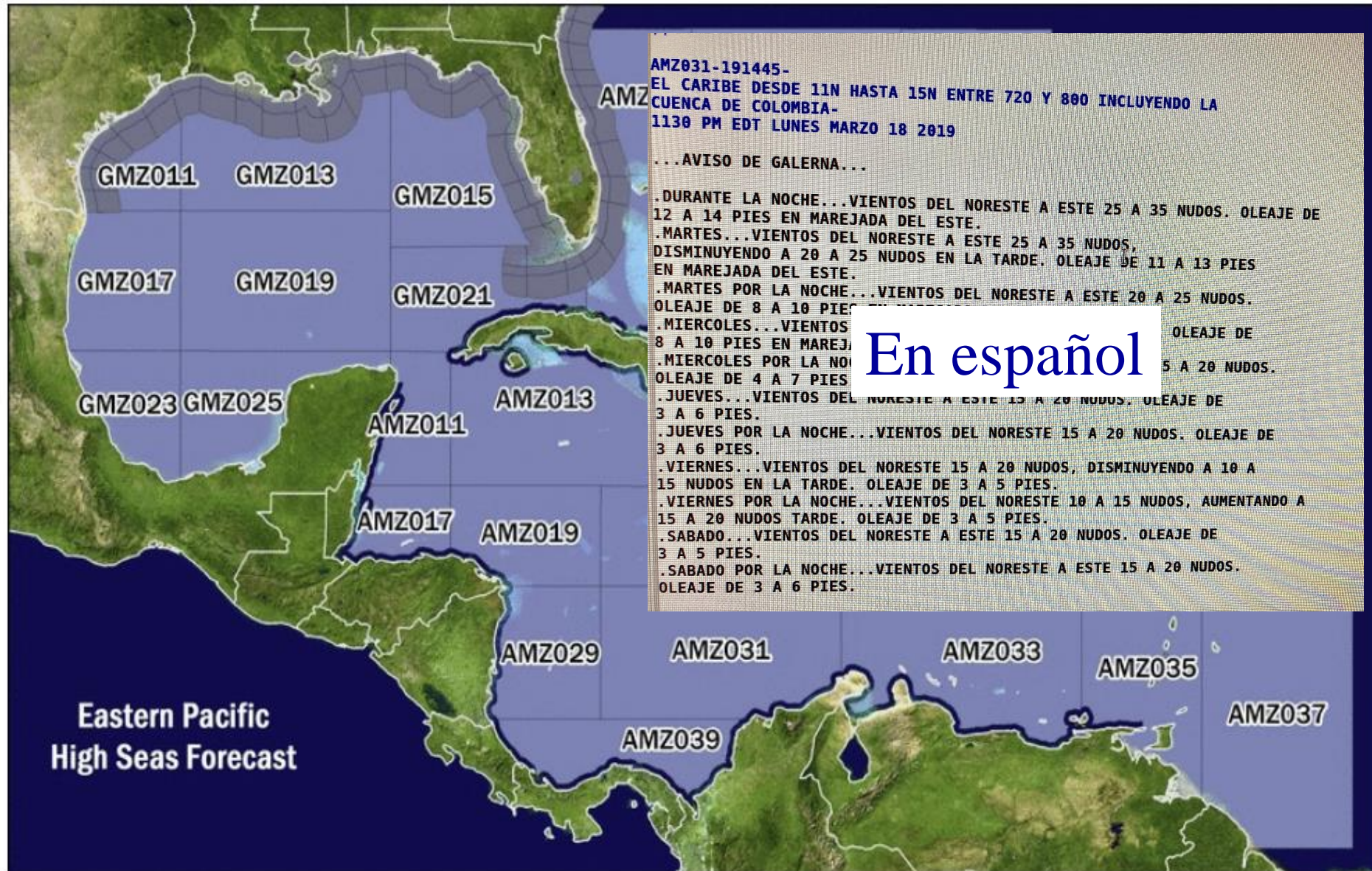
Spanish Language Version of Offshore Zones

[Marine Forecasts](#) | [Gridded Marine](#) | [Resources](#) | [Radiofax](#) | [About Marine](#) | [Outreach](#)



Spanish Language Version of Offshore Zones

[Marine Forecasts](#) | [Gridded Marine](#) | [Resources](#) | [Radiofax](#) | [About Marine](#) | [Outreach](#)



Existing Wave Products for Tropical Cyclones

High Seas and Offshores Text Forecasts

HIGH SEAS FORECAST
NWS NATIONAL HURRICANE CENTER
1030 UTC FRI OCT 02 2015

SUPERSEDED BY NEXT ISSUANCE IN 6 HOURS

SEAS GIVEN AS SIGNIFICANT WAVE HEIGHT...WHICH IS THE AVERAGE HEIGHT OF THE HIGHEST 1/3 OF THE WAVES. INDIVIDUAL WAVES MAY BE MORE THAN TWICE THE SIGNIFICANT WAVE HEIGHT.

PAN PAN

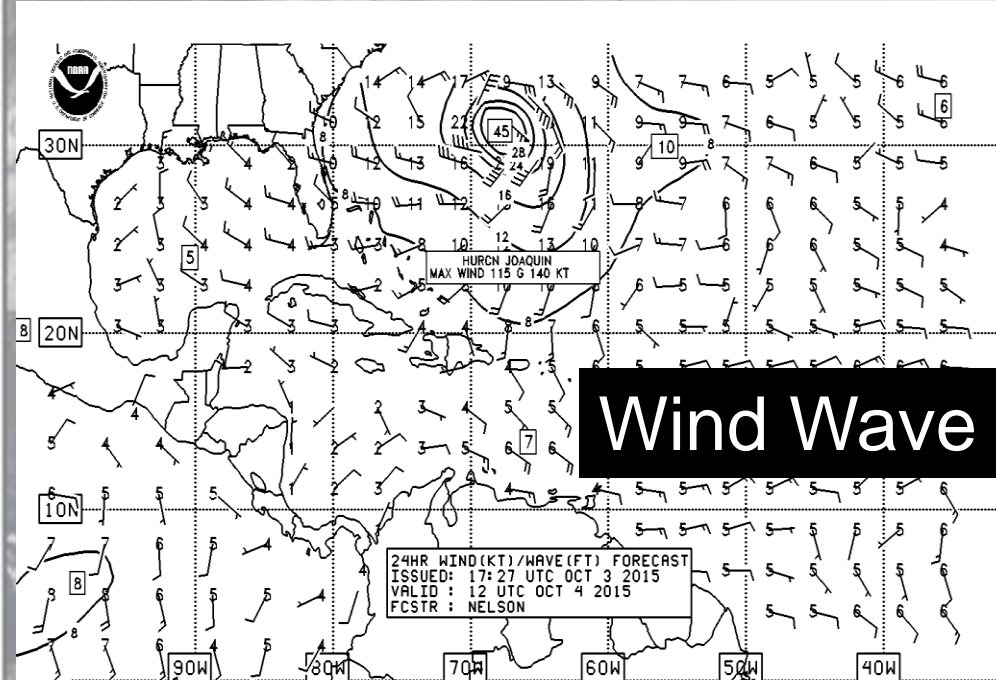
ATLANTIC FROM 07N TO 31N W OF 35W INCLUDING CARIBBEAN SEA AND GULF OF MEXICO.

SYNOPSIS VALID 0600 UTC FRI OCT 02.
24 HOUR FORECAST VALID 0600 UTC SAT OCT 03.
48 HOUR FORECAST VALID 0600 UTC SUN OCT 04.

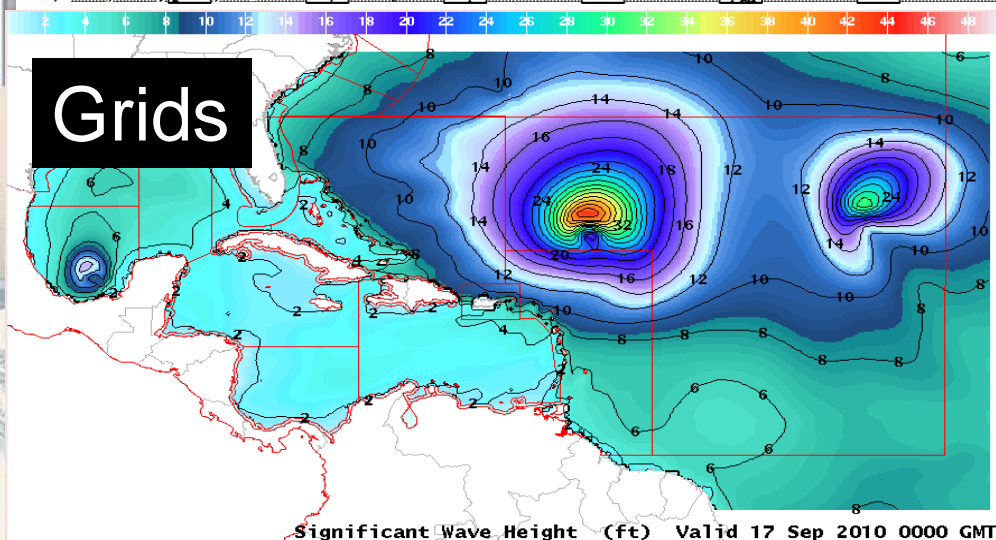
.WARNINGS.

...HURRICANE WARNING...
HURRICANE JOAQUIN NEAR 23.3N 74.7W 935 MB AT 0900 UTC OCT 02 MOVING NW OR 315 DEG AT 3 KT. MAXIMUM SUSTAINED WINDS 115 KT GUSTS 140 KT. TROPICAL STORM FORCE WINDS WITHIN 160 NM W SEMICIRCLE...140 NM NE QUADRANT AND 180 NM SE QUADRANT. SEAS 12 FT OR GREATER WITHIN 400 NM NE QUADRANT...150 NM SE QUADRANT...120 NM SW QUADRANT...AND 300 NM NW QUADRANT WITH SEAS TO 39 FT. ELSEWHERE S OF 28N BETWEEN 70W AND 78W WINDS 20 TO 33 KT. SEAS 9 TO 12 FT. N OF 28N BETWEEN 70W AND 75W E WINDS 20 TO 25 KT SEAS 8 TO 10 FT. REMAINDER OF AREA N OF 21N BETWEEN 65W AND 78W AND OUTSIDE OF THE BAHAMAS WINDS 20 KT OR LESS. SEAS 8 TO 11 FT IN MIXED SWELL.

Wind Wave



Grids



Existing Wave Products for Tropical Cyclones

High Seas and Offshores Text Forecasts

HIGH SEAS FORECAST
NWS NATIONAL HURRICANE CENTER
1030 UTC FRI OCT 02 2015

SUPERSEDED BY NEXT ISSUANCE IN 6 HOURS

...GIVEN AS SIGNIFICANT WAVE HEIGHT...WHICH IS THE AVERAGE
OF THE HIGHEST 1/3 OF THE WAVES. INDIVIDUAL WAVES MAY BE
...TWICE THE SIGNIFICANT WAVE HEIGHT.

...65W INCLUDING CARIBBEAN SEA AND

**All Wave Forecasts are
Deterministic (Exact)**

Grids

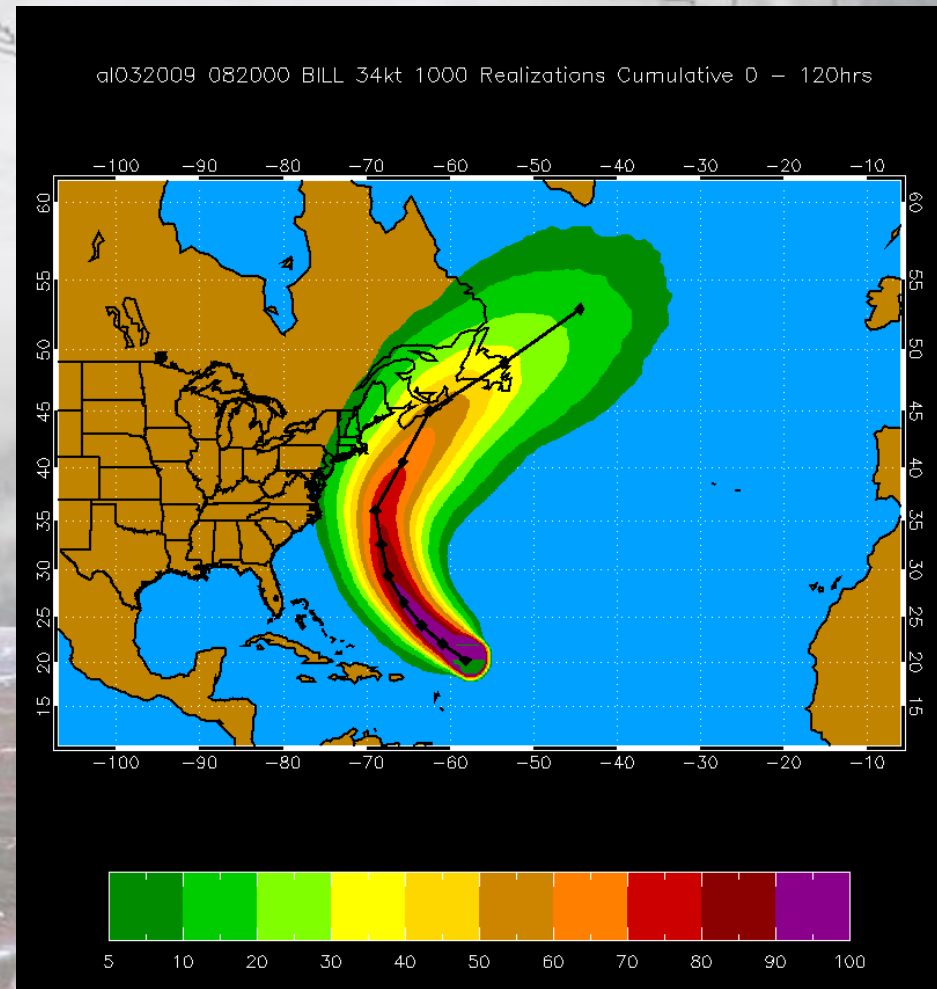
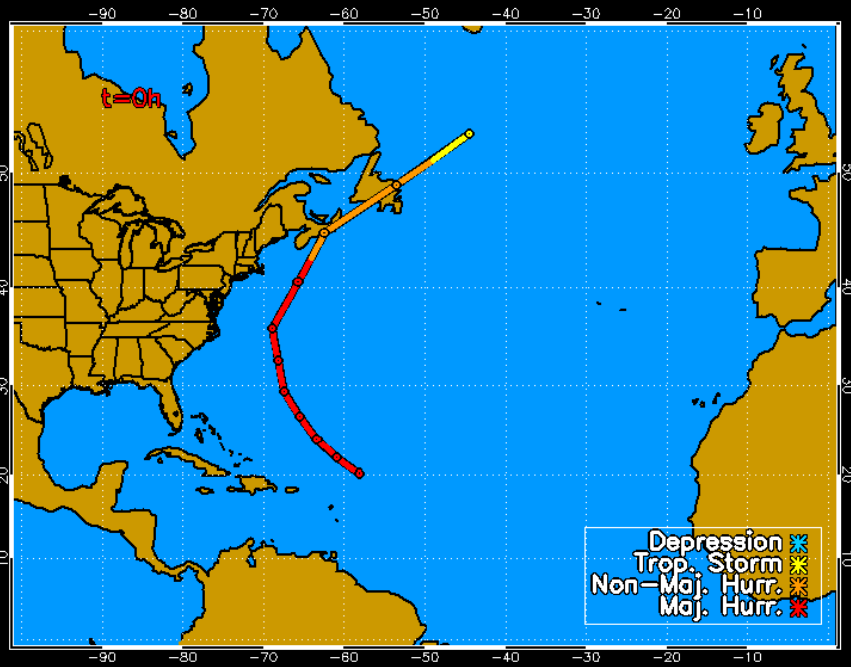
Significant Wave Height (ft) Valid 17 Sep 2010 0000 GMT

NHC/TAFB Experimental Gridded Marine Forecasts

...CT 02
...115 KT
...M W
...ANT. SEAS 12
...QUADRANT WITH SEAS
...WINDS 20 TO 33
...E WINDS 20 TO
...BETWEEN 65W
...T OR LESS. SEAS 8
...TO 11 FT IN MIXED SWELL.

Wind Speed Probabilities

Hurricane Bill 20 Aug 2009 00 UTC



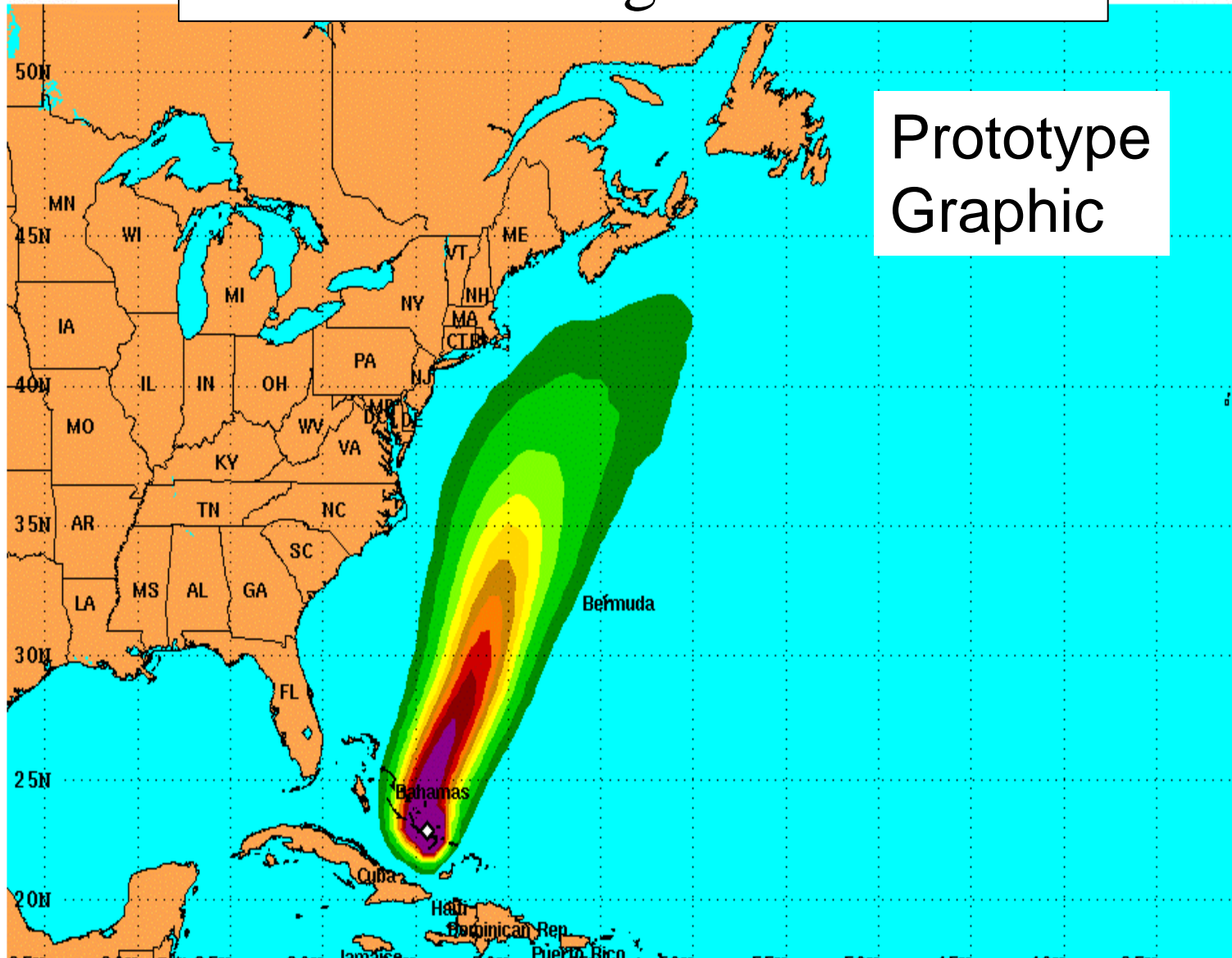
1000 Track Realizations

34 kt 0-120 h Cumulative Probabilities



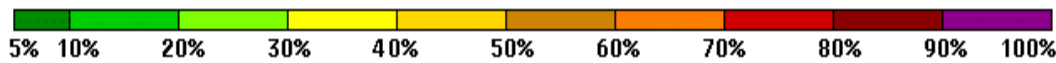
24-ft Wave Height Probabilities

Prototype
Graphic



Probability of 24-ft Significant Wave Height (the average height of the highest 1/3 of the waves) from all tropical cyclones

◇ indicates HURRICANE JOAQUIN center location at 8 PM EDT Thu Oct 1 2015 (Forecast/Advisory #17)

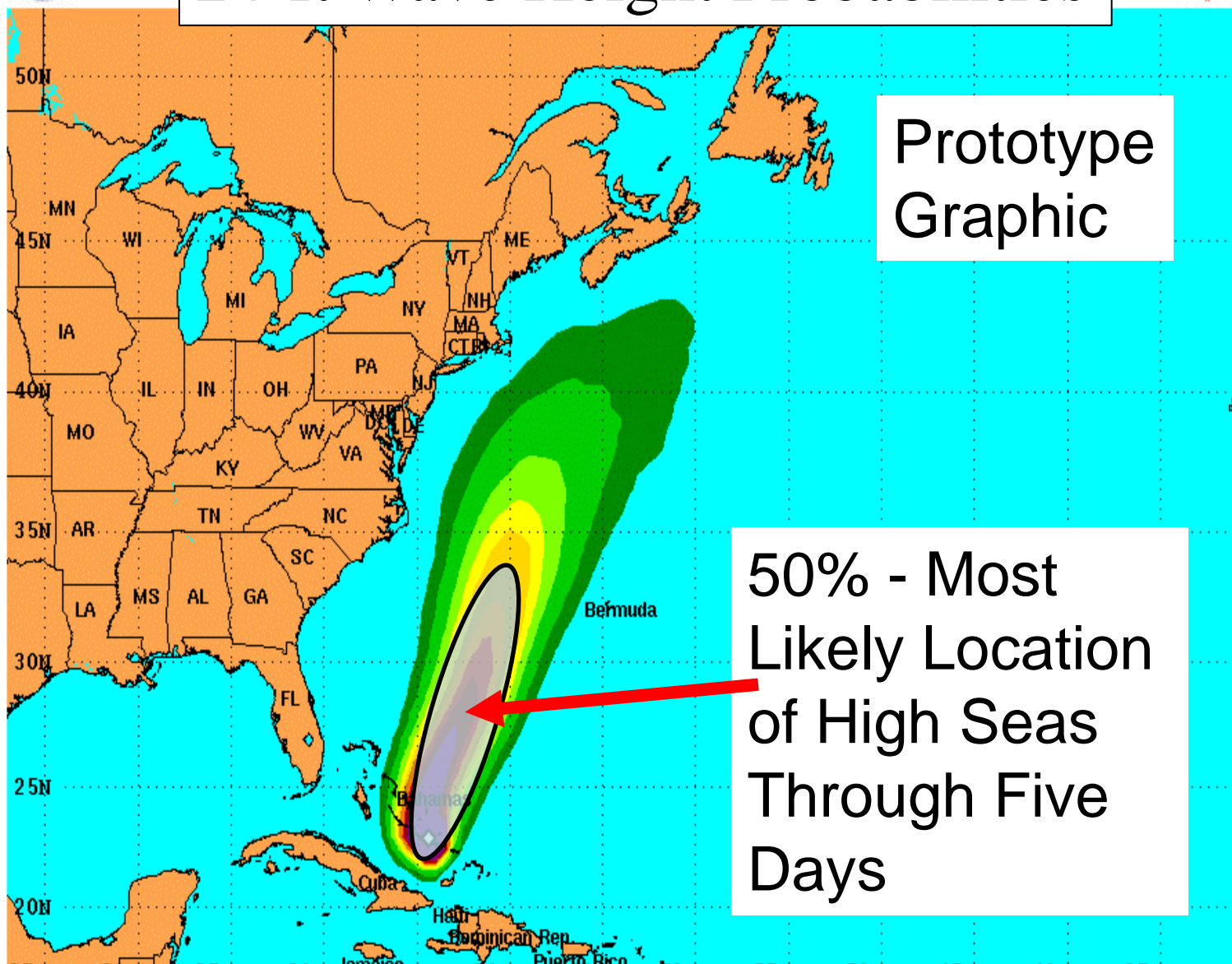




24-ft Wave Height Probabilities

Prototype
Graphic

50% - Most
Likely Location
of High Seas
Through Five
Days



Probability of 24-ft Significant Wave Height (the average height of the highest 1/3 of the waves) from all tropical cyclones

◇ indicates HURRICANE JOAQUIN center location at 8 PM EDT Thu Oct 1 2015 (Forecast/Advisory #17)





24-ft Wave Height Probabilities

Prototype
Graphic

10% - Reasonable
Worst Case Scenario
for Location of High
Seas Through Five
Days

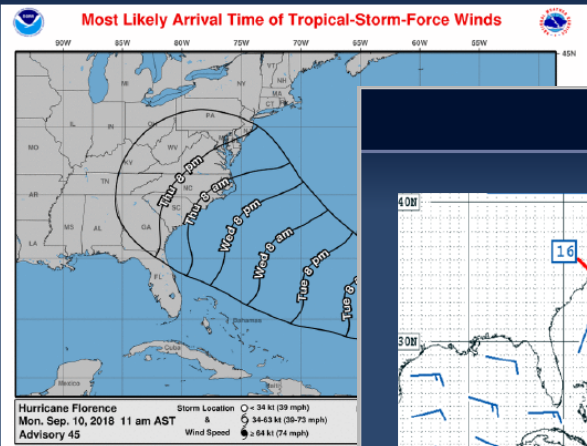
Probability of 24-ft Significant Wave Height (the average height of the highest 1/3 of the waves) from all tropical cyclones

◇ indicates HURRICANE JOAQUIN center location at 8 PM EDT Thu Oct 1 2015 (Forecast/Advisory #17)



Weekly Weather Briefings

Outlook for Western Atlantic

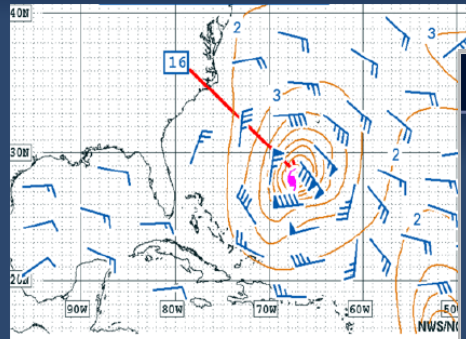


NHC graphic of most-likely arrival of tropical storm-f

**Florence Rapidly Strengthens
to a Major Hurricane**

Outlook for Western Atlantic

**Florence Rapidly Strengthens to a
Major Hurricane**



Wind/wave forecast (meters) valid 00 UTC September 12.

National Weather Service

Outlook for Western Atlantic

Gales off parts of the East Coast Today

Key messages:

- *Unrelated to Florence*, north of a warm front gale-force winds will occur off of the mid-Atlantic and southern New England coasts today.
- The threat of gales should linger into Tuesday along the front well east of the East Coast.
- Waves north of the front off of the East Coast will be 12 to 15 feet through tonight.
- Keep abreast of the latest high seas marine weather information at hurricanes.gov and ocean.weather.gov
- An updated briefing focused on Florence will be issued Tuesday, September 11.

OPC surface analysis valid 12 UTC Sept. 10 (top) and surface analysis forecast valid 00 UTC (bottom) valid 00 UTC Sept. 11.

Slides issued 16 UTC September 10, 2018

National Weather Service



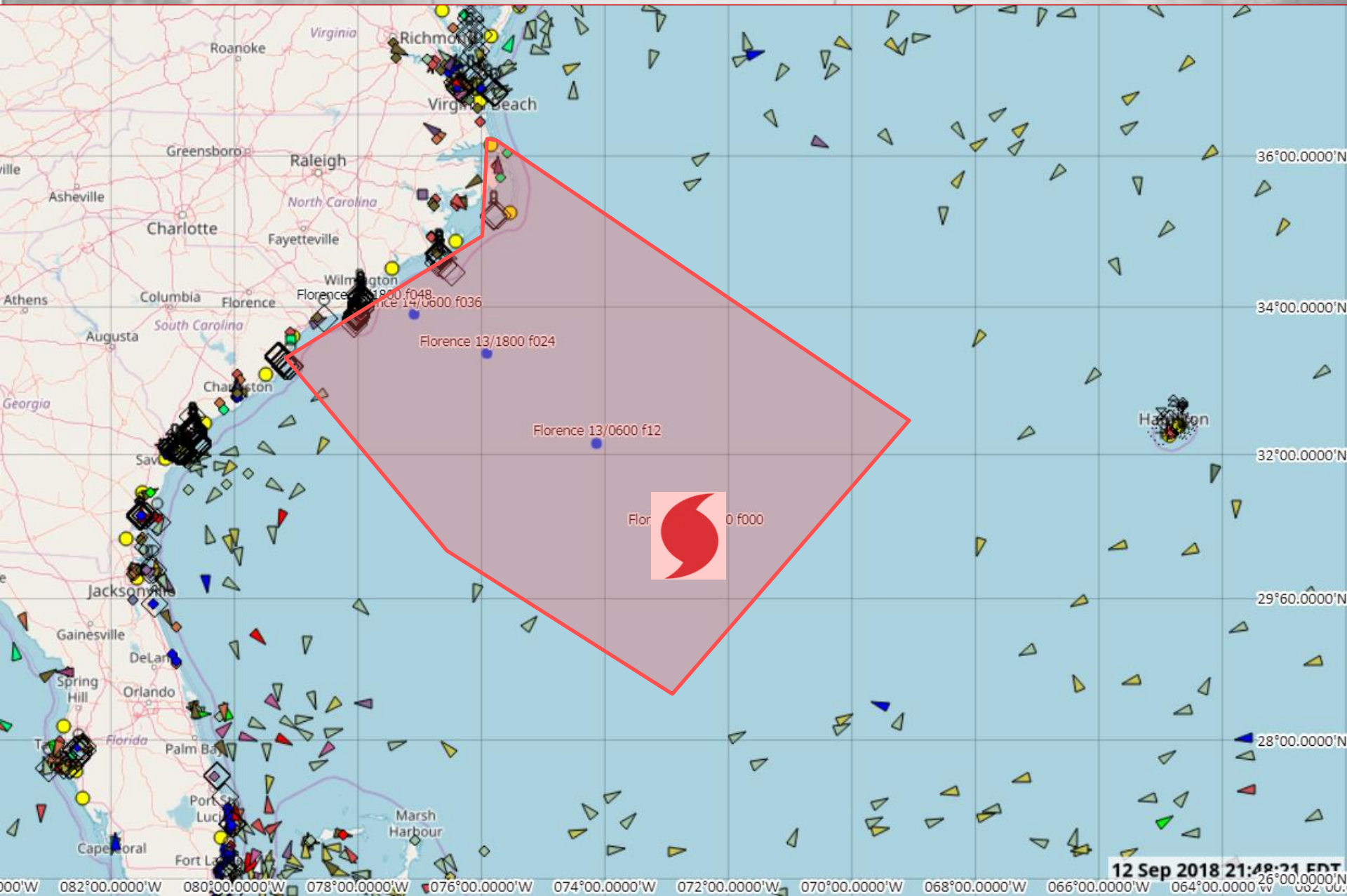
The Ocean Prediction Center has taken the lead on weekly briefings provided to the US Coast Guard District 5 for the Western Atlantic. These are then made available to the marine community.

Should a similar service be made available for Gulf of Mexico? Eastern North Pacific?

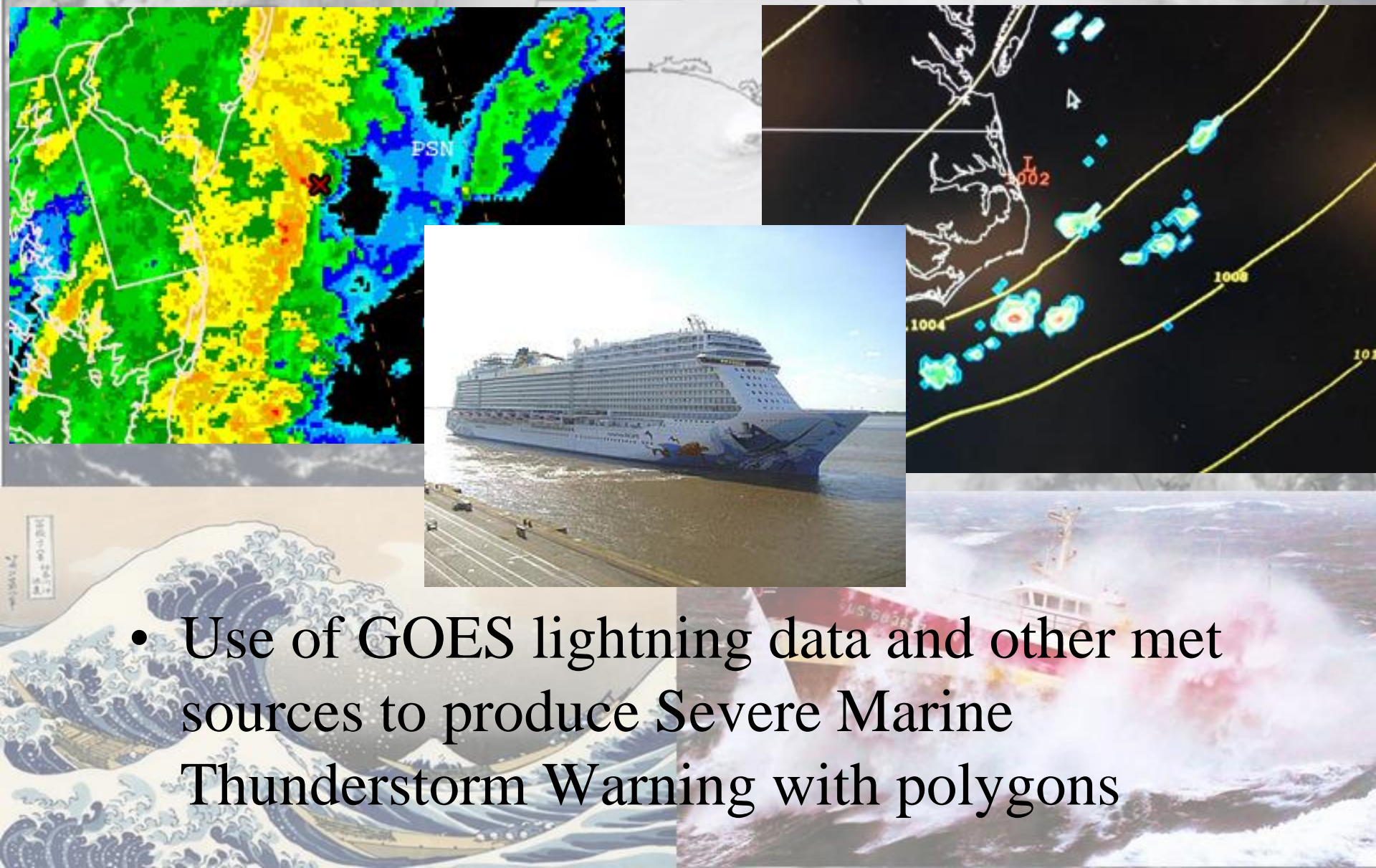
Weekly Weather Briefings



Polygon Warnings



Severe Marine Thunderstorm Warning



- Use of GOES lightning data and other met sources to produce Severe Marine Thunderstorm Warning with polygons

Spot Marine Forecasts

- **Point-n-click** available for all WFO land and coastal locations
- **Not available yet for NHC/Tropical Analysis and Forecast Branch, Ocean Prediction Center, or Honolulu Forecast Office**

21NM ESE Miami Beach FL
Marine Point Forecast

[NOTICE]

Tonight



NE 12kt
5ft

Thursday



N 12kt
5ft

Thursday
Night



↑NW 19kt
4-5ft

Friday



N 15kt
4-5ft

Friday
Night



Light Wind
3ft

Saturday



NE 7kt
3ft

Saturday
Night



E 13kt
2-3ft

Sunday



E 13kt
3ft

Sunday
Night



E 14kt
3ft

Tonight NE wind 10 to 12 kt. A chance of showers. Seas around 5 ft with occasional seas up to 6 ft. Dominant period 8 seconds. .

Thursday N wind 10 to 12 kt. A chance of showers, mainly before 11am. Seas around 5 ft with occasional seas up to 6 ft. Dominant period 8 to 10 seconds. .

Thursday Night NW wind 7 to 12 kt increasing to 14 to 19 kt after midnight. Winds could gust as high as 25 kt. A slight chance of showers before 11pm. Seas 4 to 5 ft with occasional seas up to 6 ft. Dominant period 10 seconds decreasing to 5 seconds. .

Friday N wind 9 to 15 kt. Sunny. Seas 4 to 5 ft with occasional seas up to 6 ft. Dominant period 5 to 7 seconds. .

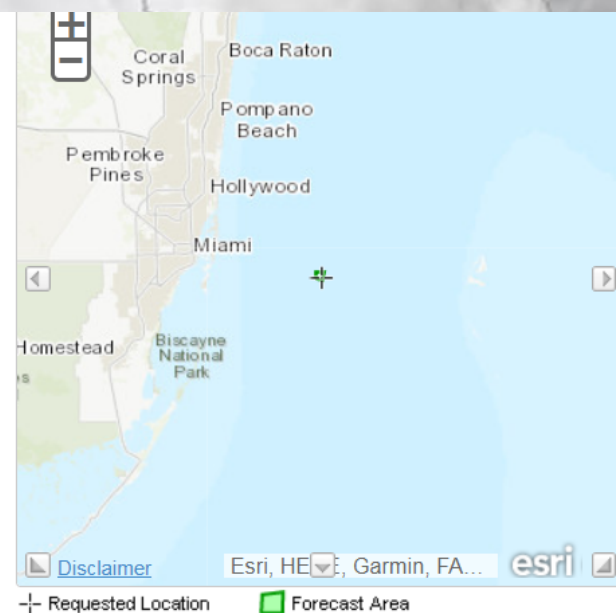
Friday Night Variable winds 5 kt or less. Clear. Seas around 3 ft with occasional seas up to 4 ft. .

Saturday NE wind 5 to 7 kt. Sunny. Seas around 3 ft with occasional seas up to 4 ft. .

Saturday Night E wind 8 to 13 kt. Mostly clear. Seas 2 to 3 ft with occasional seas up to 4 ft. .

Sunday E wind around 13 kt. Mostly sunny. Seas around 3 ft with occasional seas up to 4 ft. .

Sunday Night E wind around 14 kt. Partly cloudy. Seas around 3 ft with occasional seas up to 4 ft. .



ABOUT THIS FORECAST

Point Forecast: 25.72°N 79.78°W

Last Update: 8:46 pm EDT Mar 20, 2019

Forecast Valid: 10pm EDT Mar 20, 2019-6pm EDT Mar 27, 2019

[Forecast Discussion](#)

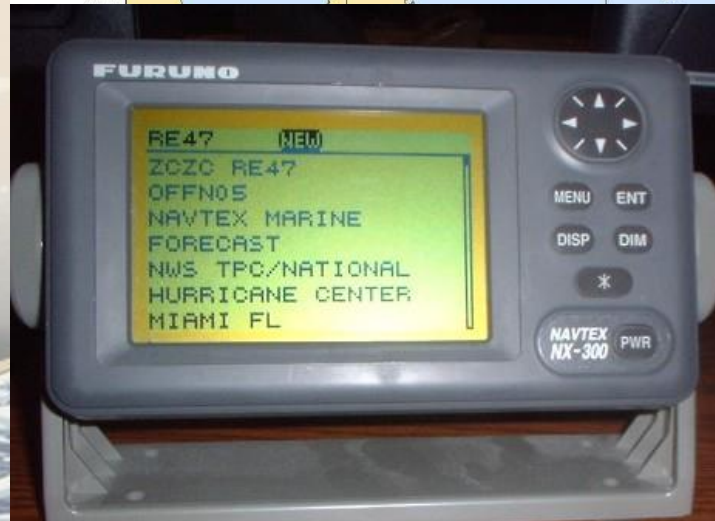
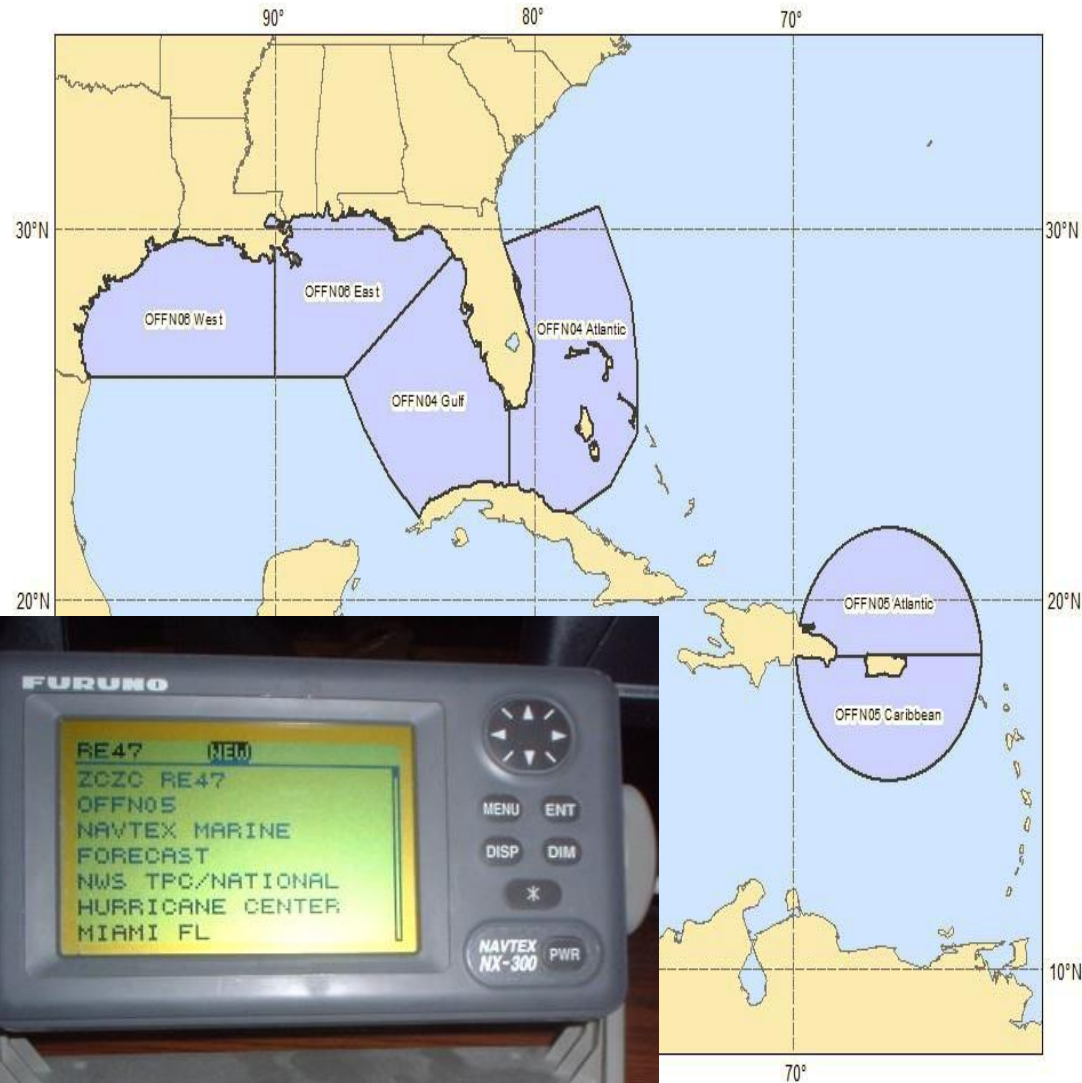
Navigational Telex (NAVTEX)

NAVTEX is an internationally required broadcast of coastal urgent marine safety information to ships.

In the United States there are 12 U.S. Coast Guard transmitter locations. TAFB products are transmitted from Miami, San Juan, and New Orleans, and contribute to the Charleston broadcast.

<https://www.nhc.noaa.gov/text/MIAOFFN04.shtml>

NAVTEX Zones



Navigational Telex (NAVTEX)

NAVTEX is an
international
broadcast

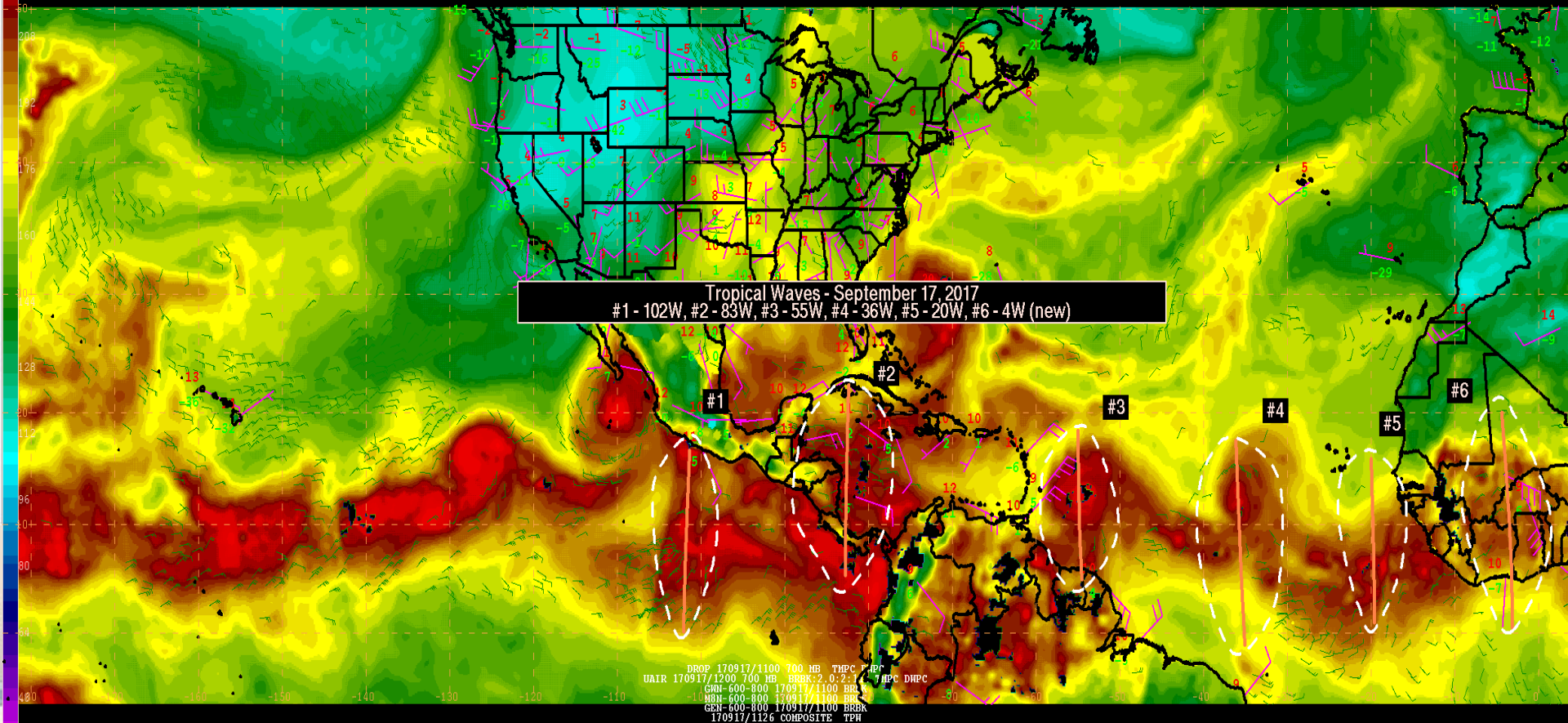
In the United States
there are 12 U.S.
Coast Guard transmitter
locations. TAFB
products are
transmitted from
Miami, San Juan, and
New Orleans, and
contribute to the
Charleston broadcast.

<https://www.nhc.noaa.gov/text/MIAOFFN04.shtml>

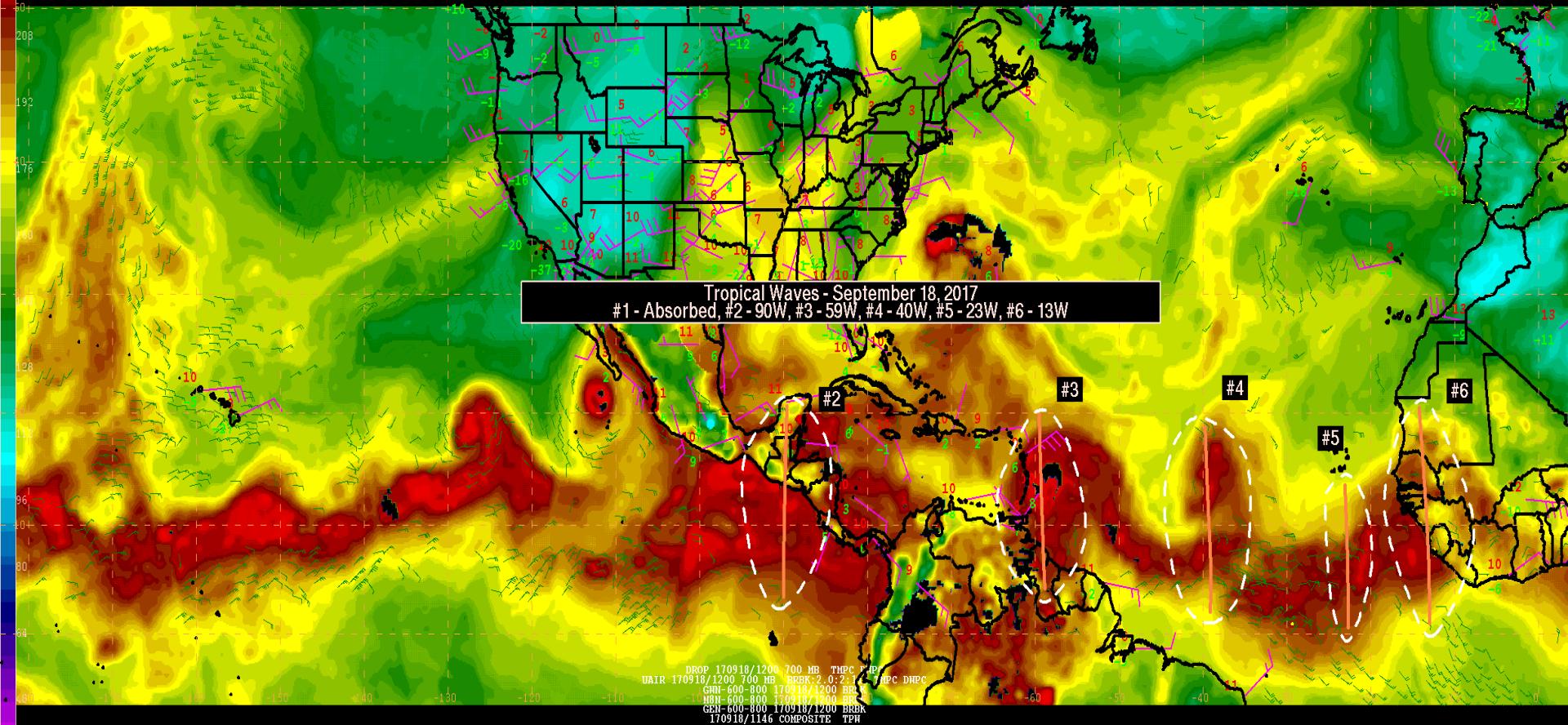
NAVTEX Zones



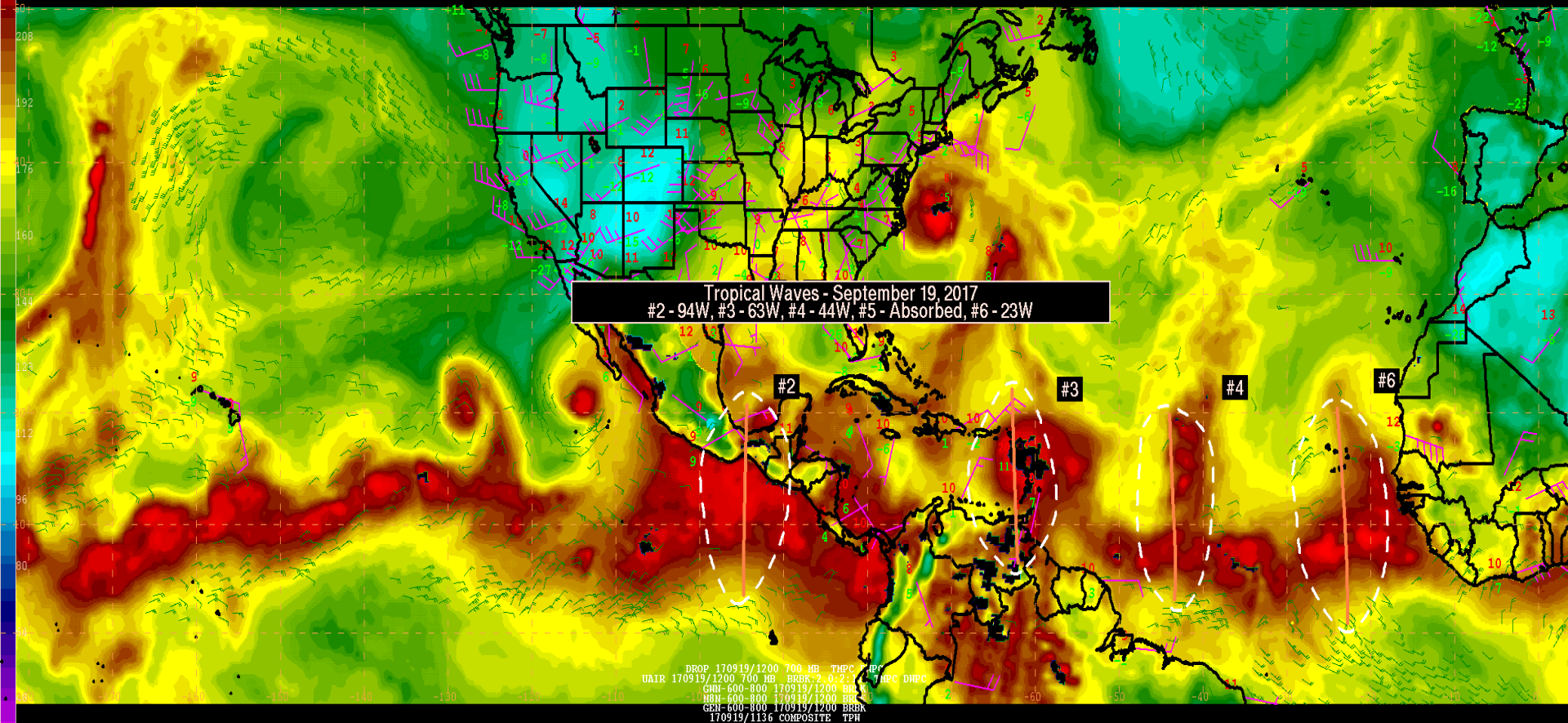
Easterly Wave Analyses



Easterly Wave Analyses



Easterly Wave Analyses



Other Possibilities...

- **Provide ocean winds higher than 10 m above the surface (30 m? 50 m?)**
- **Provide all “blue water” Sea State and Forecast Seas in meters?**
- **Bring back GovDelivery-type service (email list serve for products)**



Future Tropical Analysis and Forecast Branch Products and Services – Your Feedback Requested

- **East Pacific Offshore Zones**
- **Redesigned Graphics (Sea State, Wind/Waves, Surface Progs, Wave Period/Direction)**
- **Elimination of Marine Weather Discussion**
- **Surface Progs beyond Day 3**
- **Marine Composite Page beyond Day 3**
- **Spanish Language Offshore Zones**
- **Weekly Weather Briefings**
- **Polygon Warnings**
- **Severe Marine Thunderstorm Warning**
- **Spot marine forecasts**
- **NAVTEX use and availability?**
- **Easterly Wave analyses**
- **Other possibilities**

