



National Weather Service Tallahassee, FL Marine Forecast Program



Outline

- **NWS Background**
- **Wave Generation Basics**
- **Marine Forecast Tools**
- **Common Weather Patterns**
- **Rare Weather Events**
- **Marine Reports and Warnings**



Importance



- More than 90% of goods imported into US arrive via oceans.
- Maritime commerce worth about \$80 billion annually.
- About 80 million Americans are involved in recreational boating

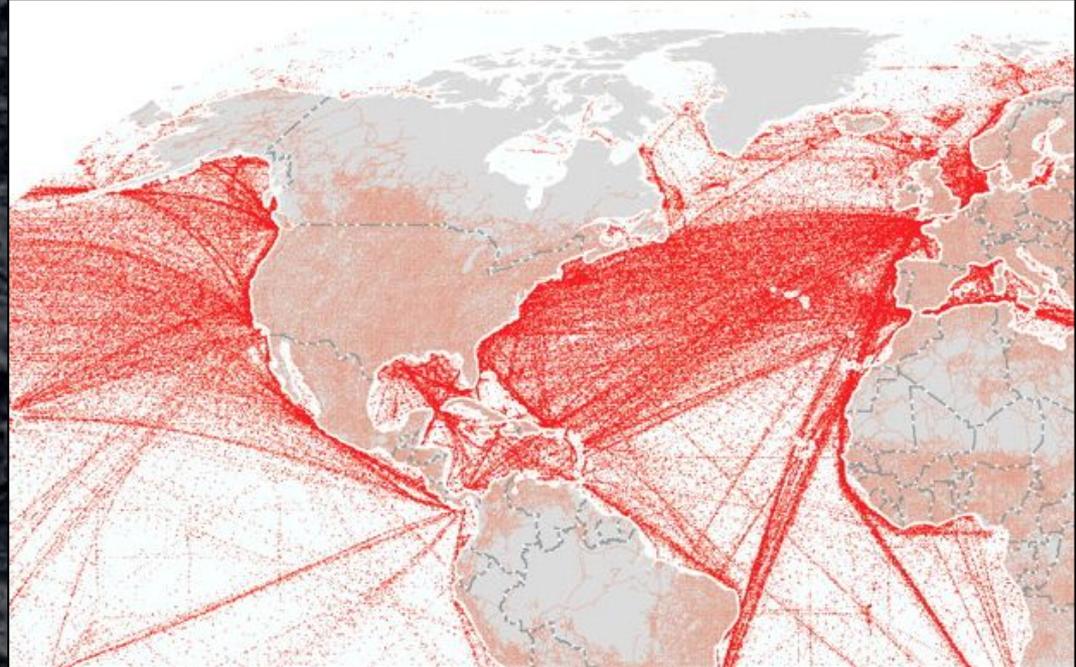
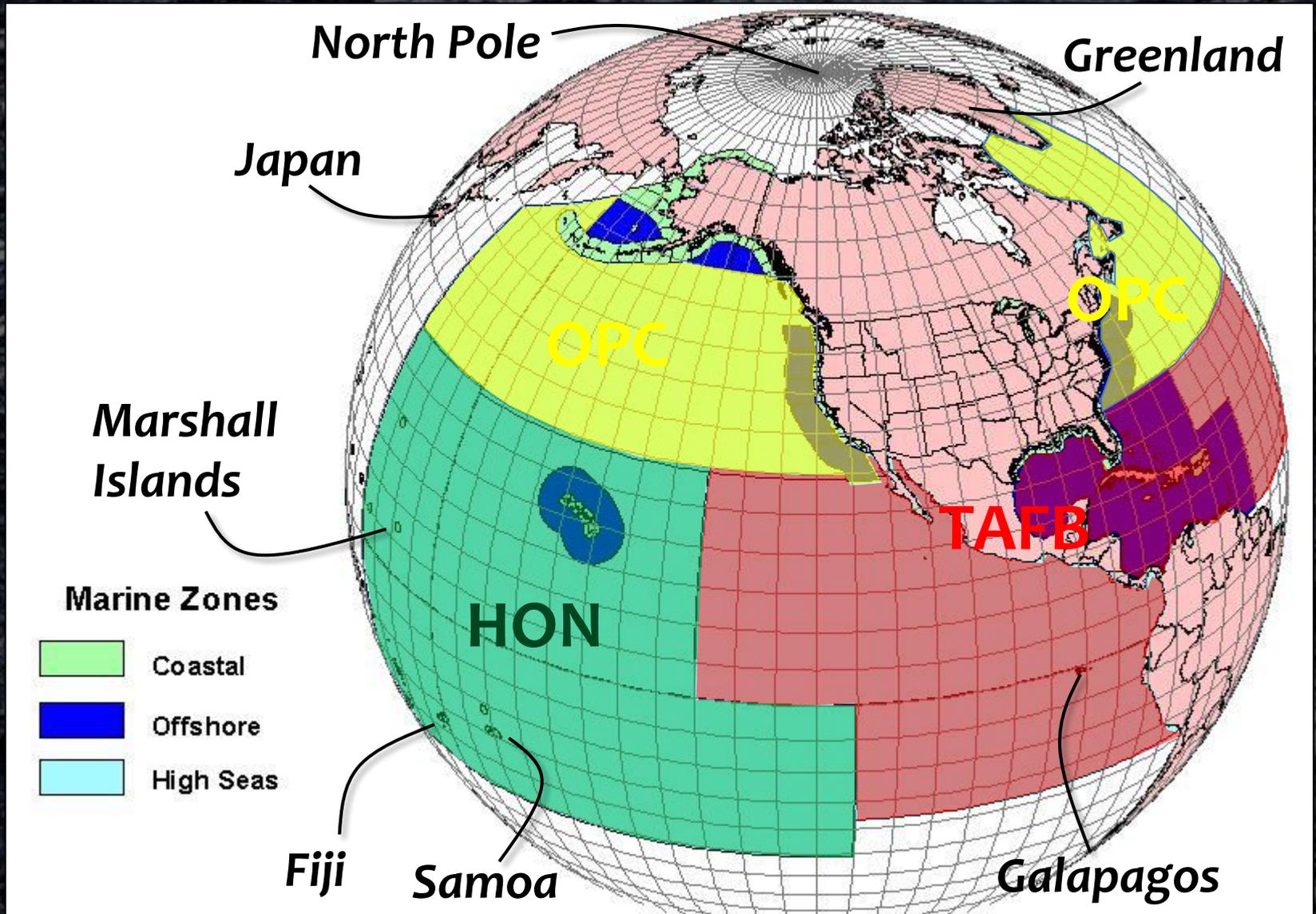
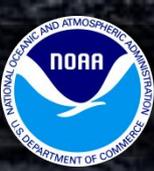


Image Source: <http://billjaquette.net/top-major-shipping-lanes-and-ports-in-the-world>
Information from NWS Office of Climate, Water, and Weather Services.

Accurate marine forecasts have a lot of value

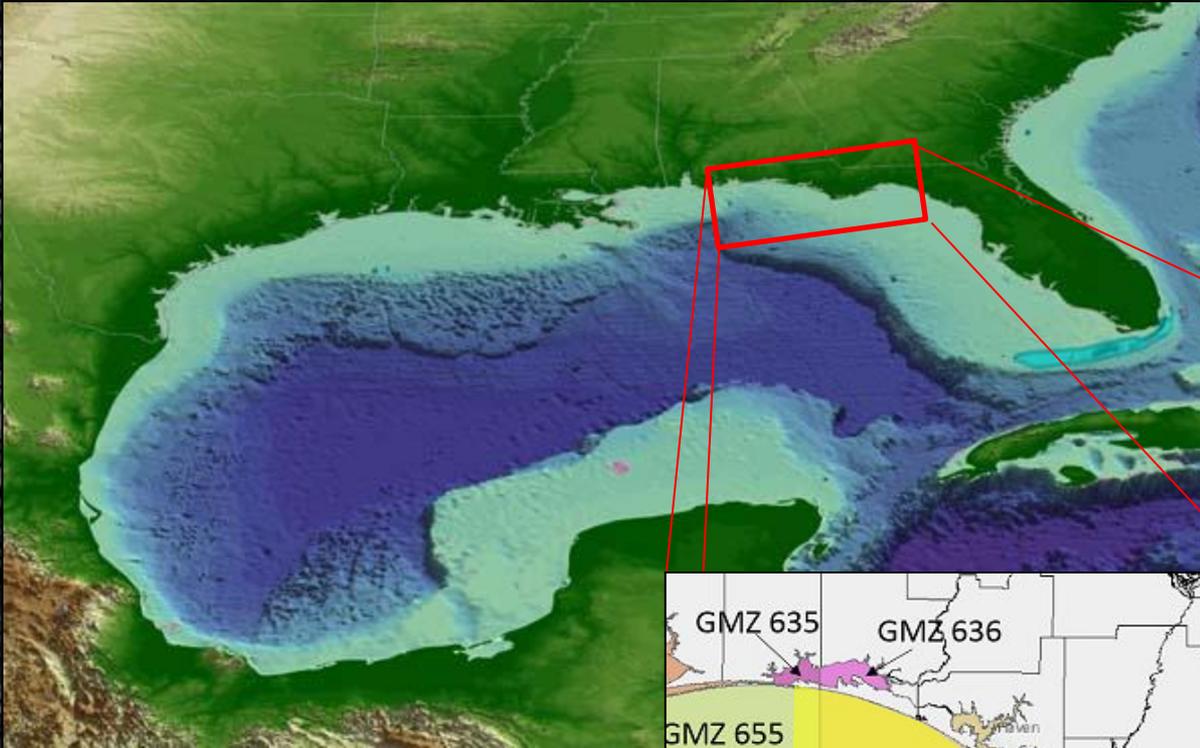


NWS Marine Forecast Areas



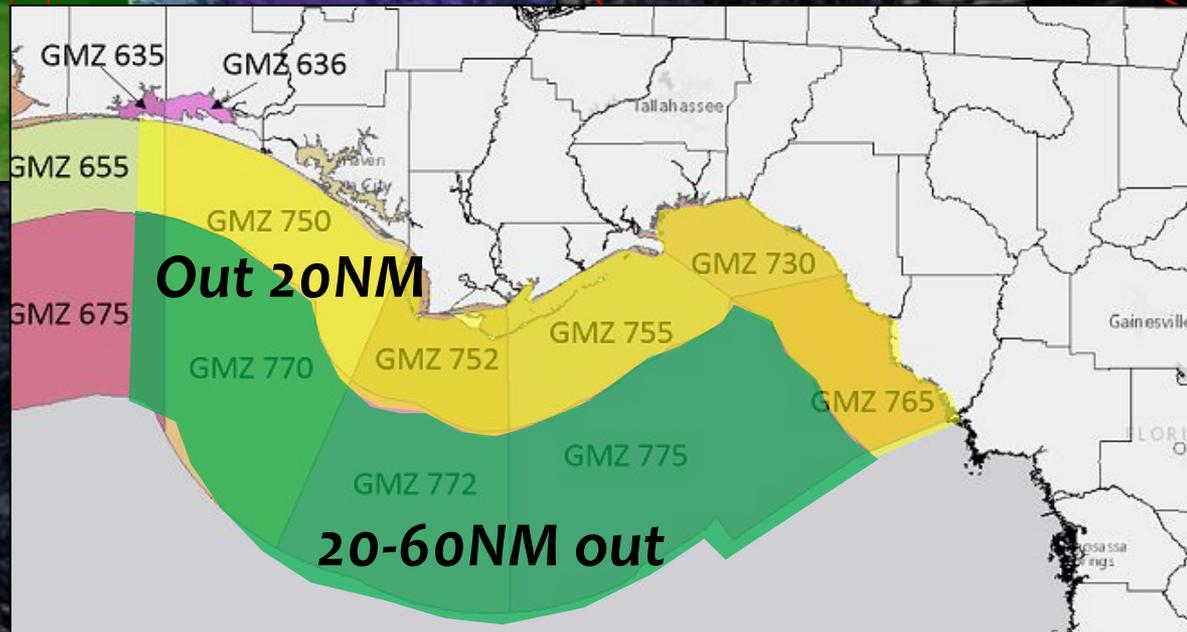


NWS Tallahassee Area



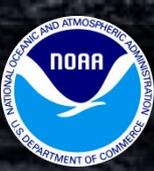
One of 46 NWS offices with local marine responsibility (out of 122)

37% of NWS offices have marine responsibility.

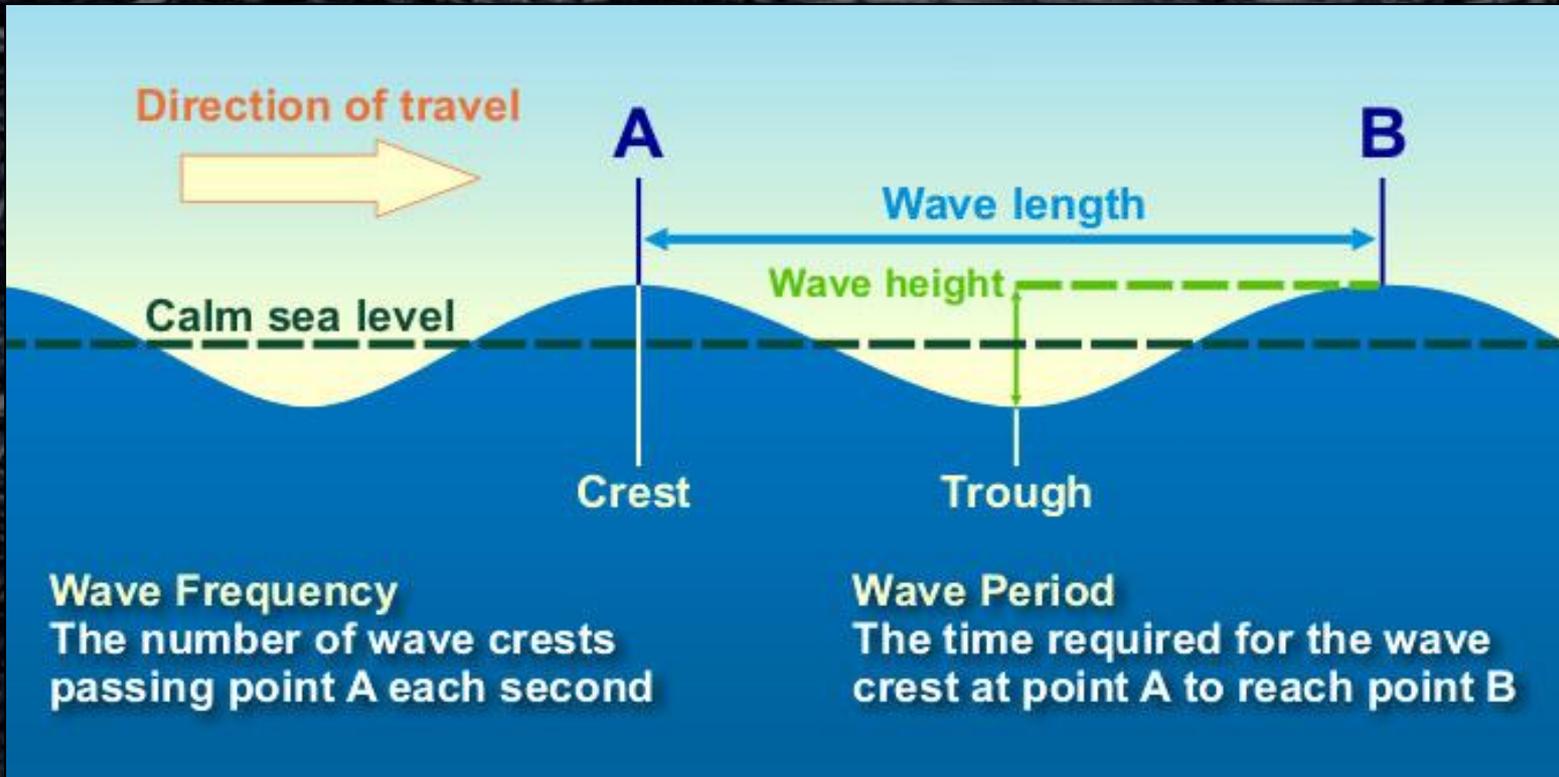




Wave Generation Basics



Anatomy of a Wave



**THREE THINGS
CONTRIBUTE TO
WAVE GROWTH**

- 1. Wind speed**
- 2. Wind duration**
- 3. Wind “fetch”**



Some Definitions



Wind Waves

- Short period (4-8 seconds) waves generated from the action of the wind on the local water surface.

Swell

- Wind generated waves that have traveled out of their source region. Swells are characterized as having smoother, more uniform crests, and longer periods (8+ seconds) than wind waves.

Seas

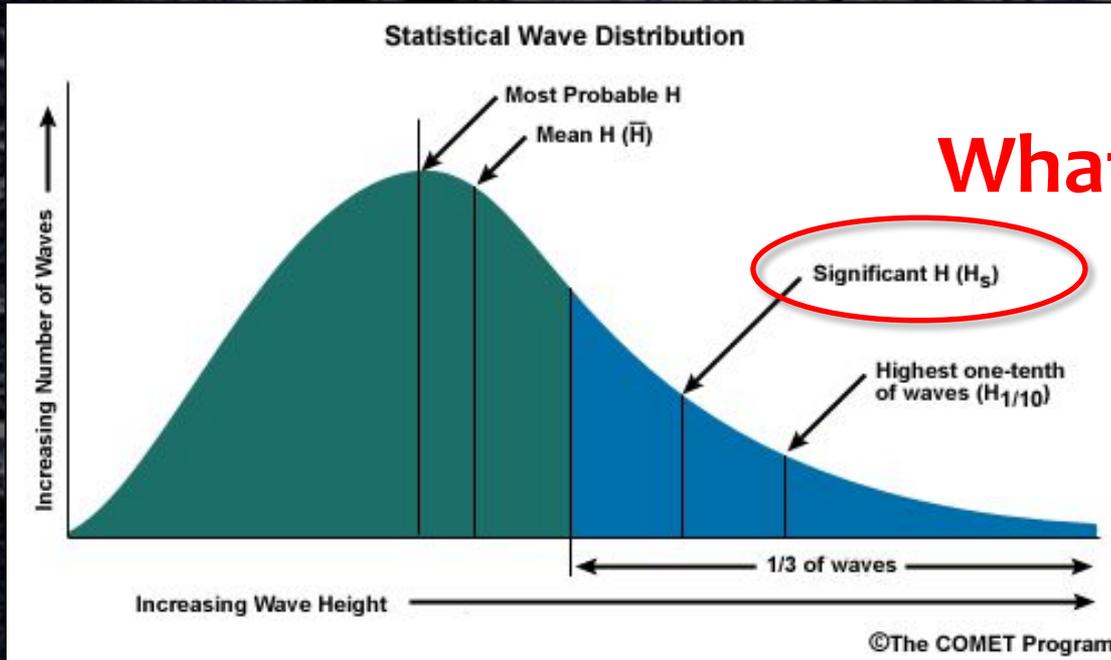
- The combination of wind waves and swell.

Fetch

- An area of uniform wind speed and direction over a water body. Also, the distance over water that a fetch of wind travels.



Rayleigh Distribution

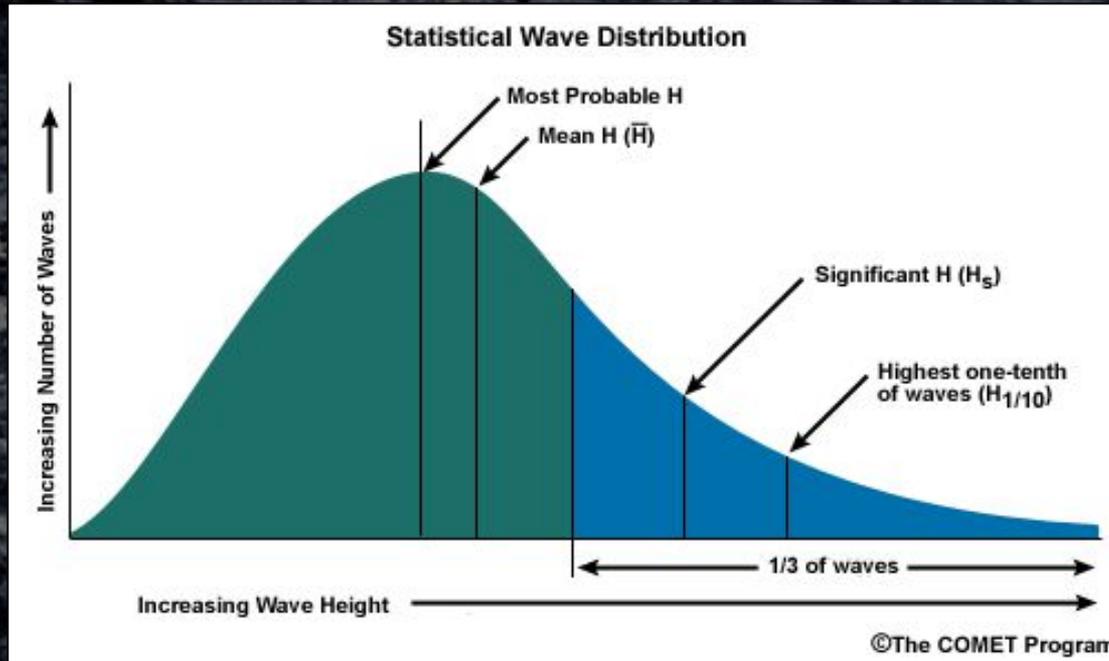


What we forecast

Description	Percentage of H_s	If $H_s = 5$ feet
Mean wave height	64%	3.2 feet
Significant wave height	---	5 feet
Highest 10% of waves	127%	6.4 feet
Highest 1% of waves	167%	8.4 feet
Theoretical maximum	~190%	9.5 feet



Think of the 'Wave Spectrum'



- Mariners should prepare for a range of wave heights, rather than focusing on the one value in the forecast.
- For a 5-second period, highest 1% wave will occur on average every 10 mins.



Enhanced CWF



...SMALL CRAFT ADVISORY IN EFFECT FROM 10 PM EST THIS EVENING THROUGH FRIDAY AFTERNOON...

.TONIGHT...NORTH WIND 5 TO 10 KNOTS INCREASING TO AROUND 20 KNOTS. SEAS 2 TO 3 FEET BUILDING TO 5 TO 6 FEET OCCASIONALLY UP TO 8 FEET. **DOMINANT PERIOD 4 SECONDS.** PROTECTED WATERS SMOOTH INCREASING TO CHOPPY.

.FRIDAY...NORTHEAST WIND AROUND 20 KNOTS BECOMING 5 TO 10 KNOTS. SEAS 4 TO 6 FEET **OCCASIONALLY UP TO 8 FEET.** DOMINANT PERIOD 4 SECONDS. PROTECTED WATERS CHOPPY BECOMING SMOOTH.

.FRIDAY NIGHT...EAST WIND AROUND 10 KNOTS BECOMING SOUTHWEST AFTER MIDNIGHT. SEAS 1 TO 2 FEET. DOMINANT PERIOD 4 SECONDS. PROTECTED WATERS SMOOTH.

.SATURDAY...WEST WIND 10 TO 15 KNOTS INCREASING TO AROUND 20 KNOTS IN THE AFTERNOON. SEAS 3 TO 4 FEET OCCASIONALLY UP TO 5 FEET. DOMINANT PERIOD 3 SECONDS. PROTECTED WATERS A LIGHT TO MODERATE CHOP INCREASING TO CHOPPY IN THE AFTERNOON. A SLIGHT CHANCE OF RAIN IN THE AFTERNOON.

.SATURDAY NIGHT...WEST WIND AROUND 20 KNOTS BECOMING NORTHWEST 10 TO 15 KNOTS AFTER MIDNIGHT...THEN BECOMING NORTH 5 TO 10 KNOTS LATE. SEAS 4 TO 5 FEET OCCASIONALLY UP TO 6 FEET. DOMINANT PERIOD 4 SECONDS. PROTECTED WATERS CHOPPY BECOMING A LIGHT TO MODERATE CHOP AFTER MIDNIGHT...THEN BECOMING SMOOTH LATE. A CHANCE OF RAIN AFTER MIDNIGHT.

.SUNDAY...NORTHEAST WIND AROUND 10 KNOTS BECOMING SOUTH IN THE LATE MORNING AND AFTERNOON. SEAS 2 TO 3 FEET. PROTECTED WATERS SMOOTH. A CHANCE OF RAIN.

New Parameters Added:

- Dominant wave period
- Height of the highest 1/10 of the waves (occasional wording)



Marine Forecast Tools

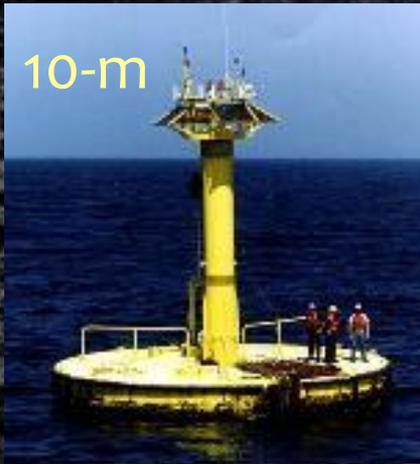


Marine Observing Platforms



Buoys

C-MAN Stations



CDRF1
Cedar Key



SGOF1
Air Force Tower N4

42039 & 42036

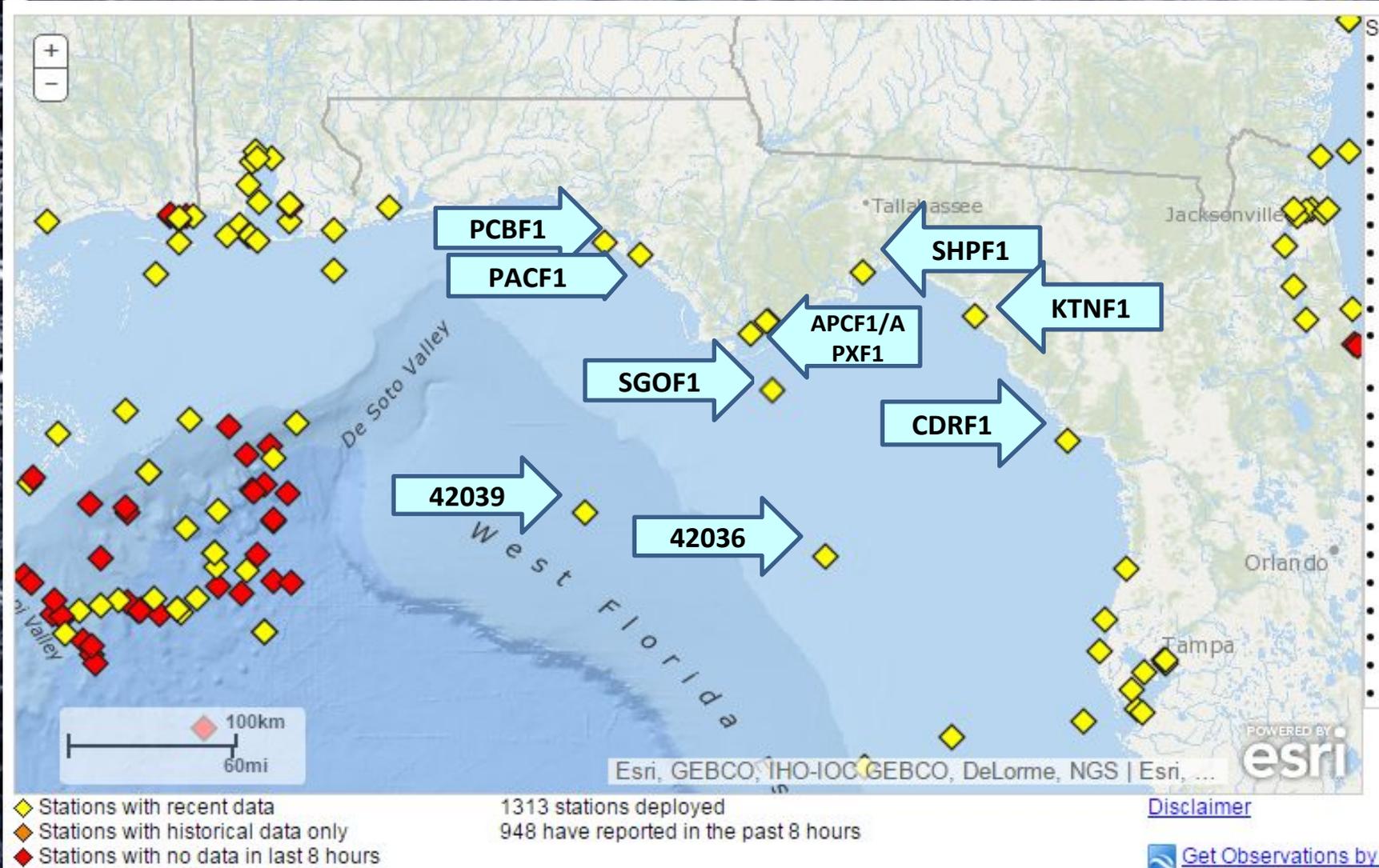
Deep-ocean Assessment
& Reporting of Tsunamis

3m, 6m, 10m? What does that mean? Refers to the diameter of round buoys or length of NOMAD (ship) buoys.





Marine Observations

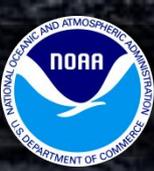


<https://www.ndbc.noaa.gov/>

Dial-a-Buoy: **888-701-8992** and then punch in the ID [example: 42039]

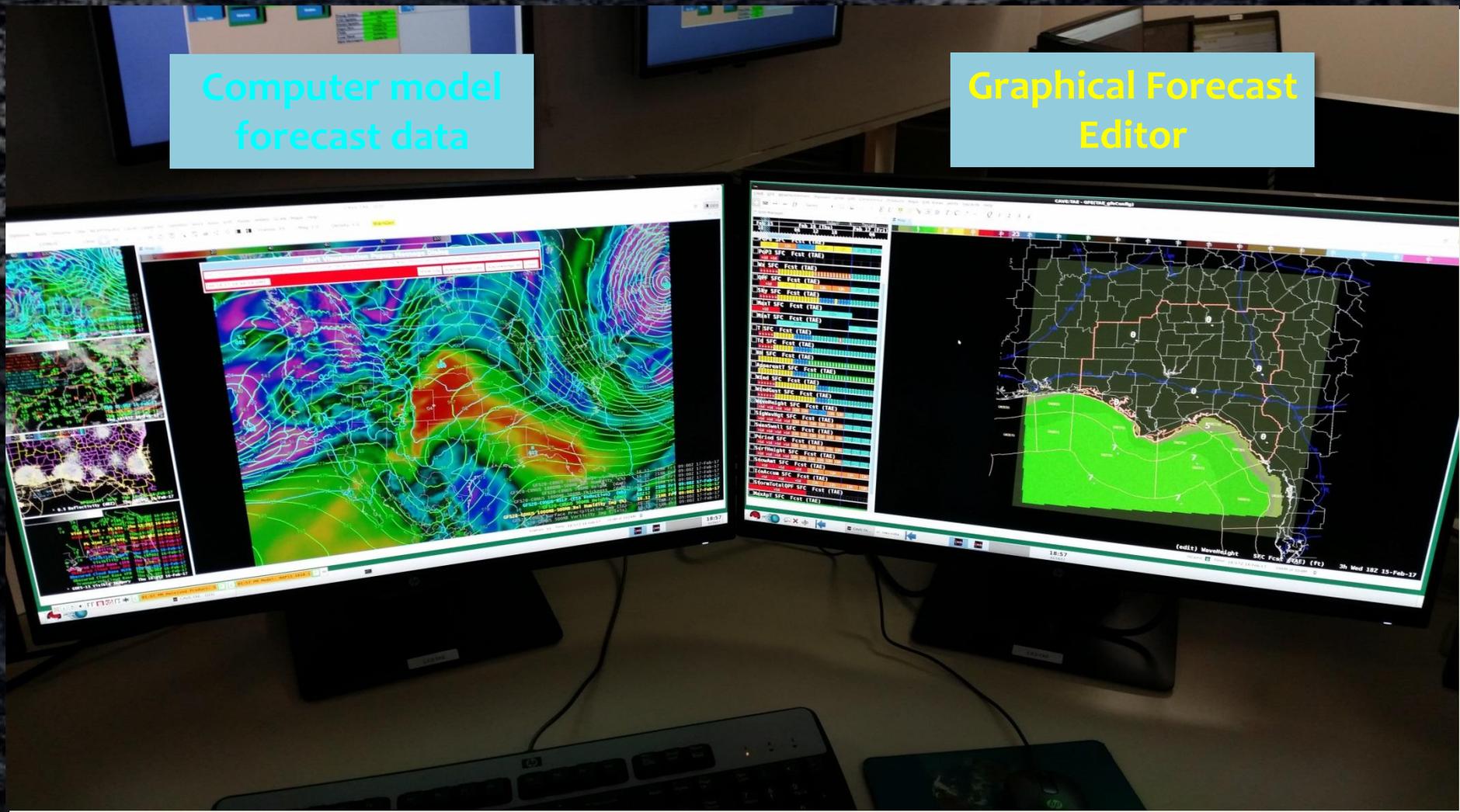


AWIPS Workstation



Computer model
forecast data

Graphical Forecast
Editor





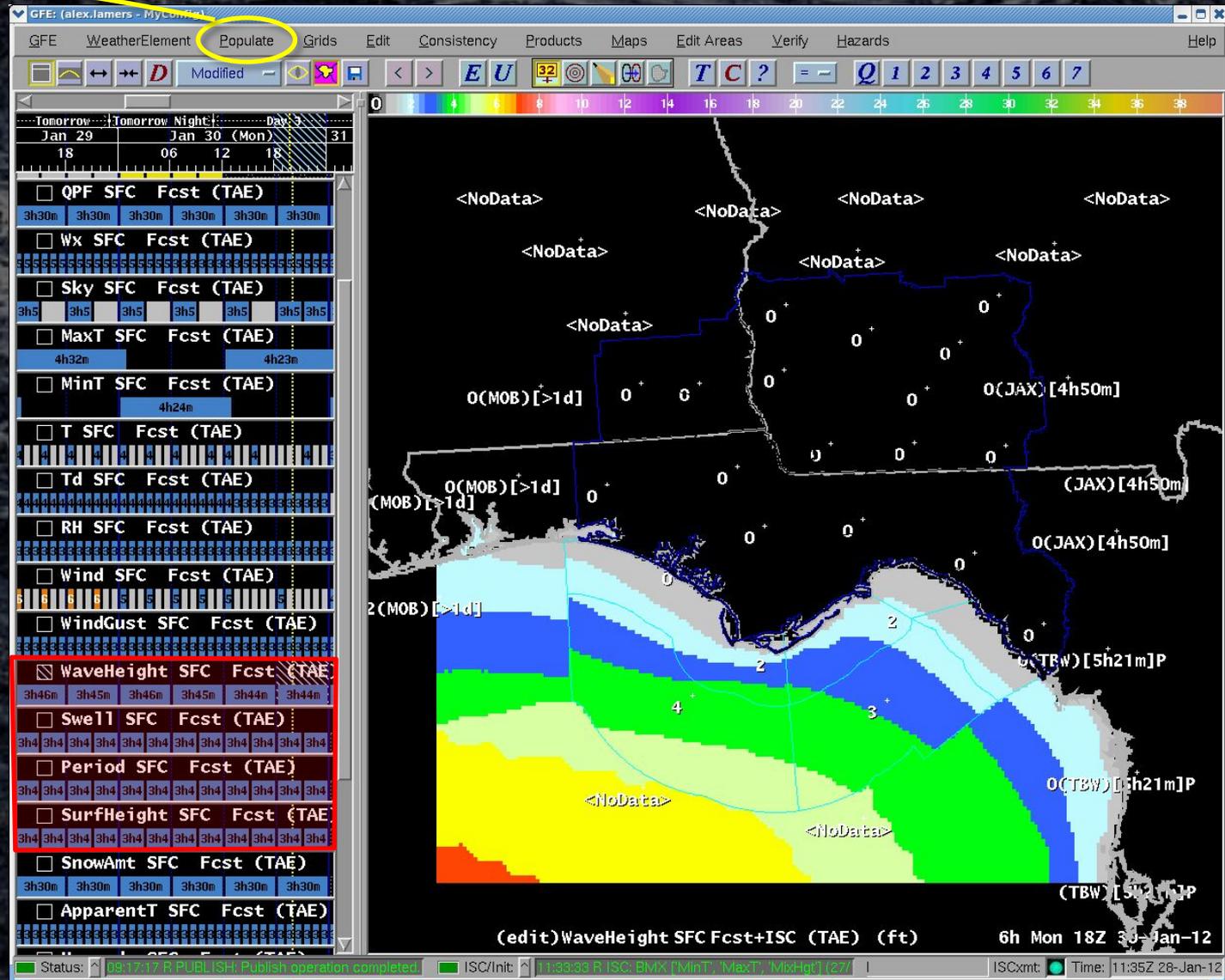
Graphical Forecast Editor



We can load model data and then manipulate it graphically

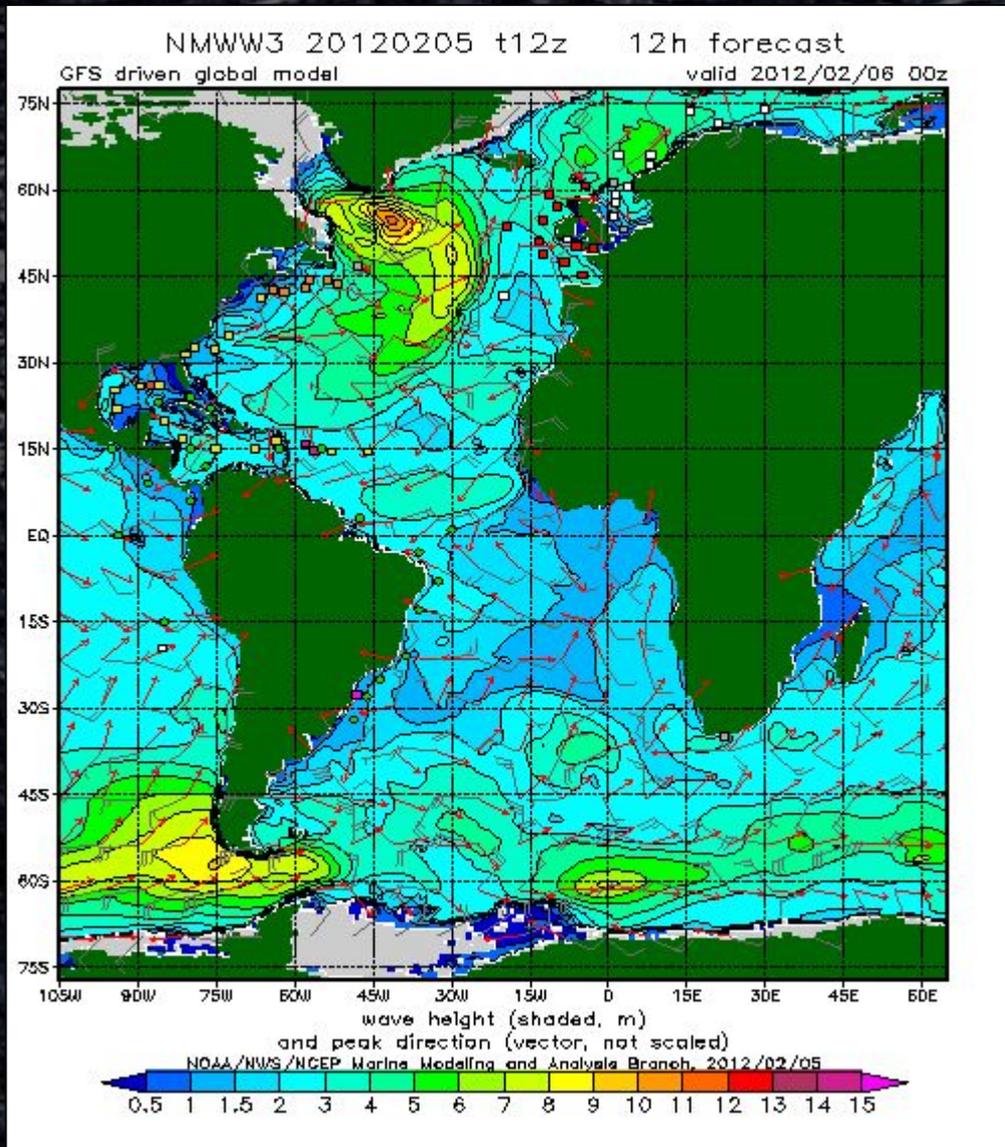
Editing is sort of like a “fancy coloring book”

We produce grids of wave height, swell, wave period, and surf height





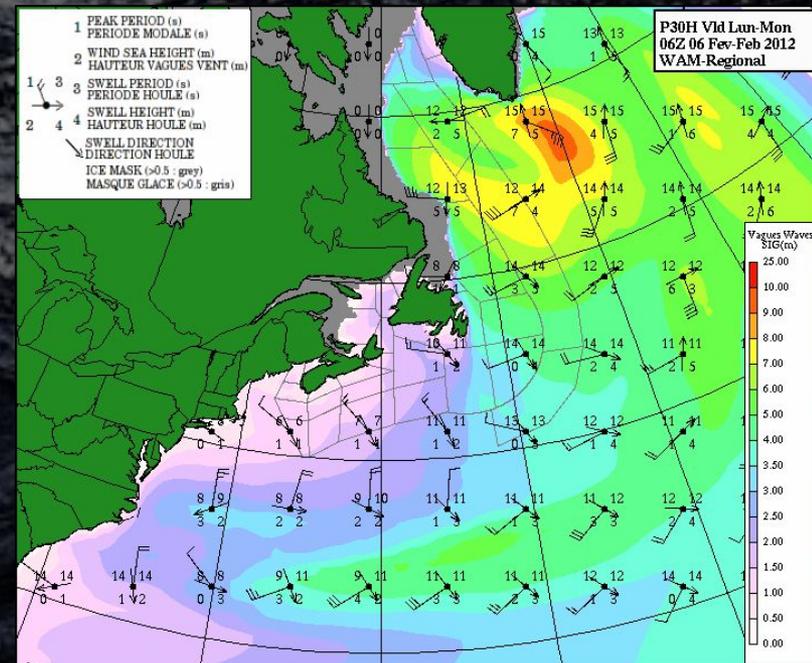
Global Wave Models



Primarily used by NWS:



Other wave models do exist, including this one from Environment Canada





Nearshore Wave Prediction System

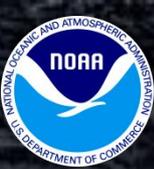


Generates waves by wind stress, propagation, shoaling, refraction, bottom friction, and breaking.

Produces forecasts of...

- significant wave height
- primary swell height and direction
- primary period

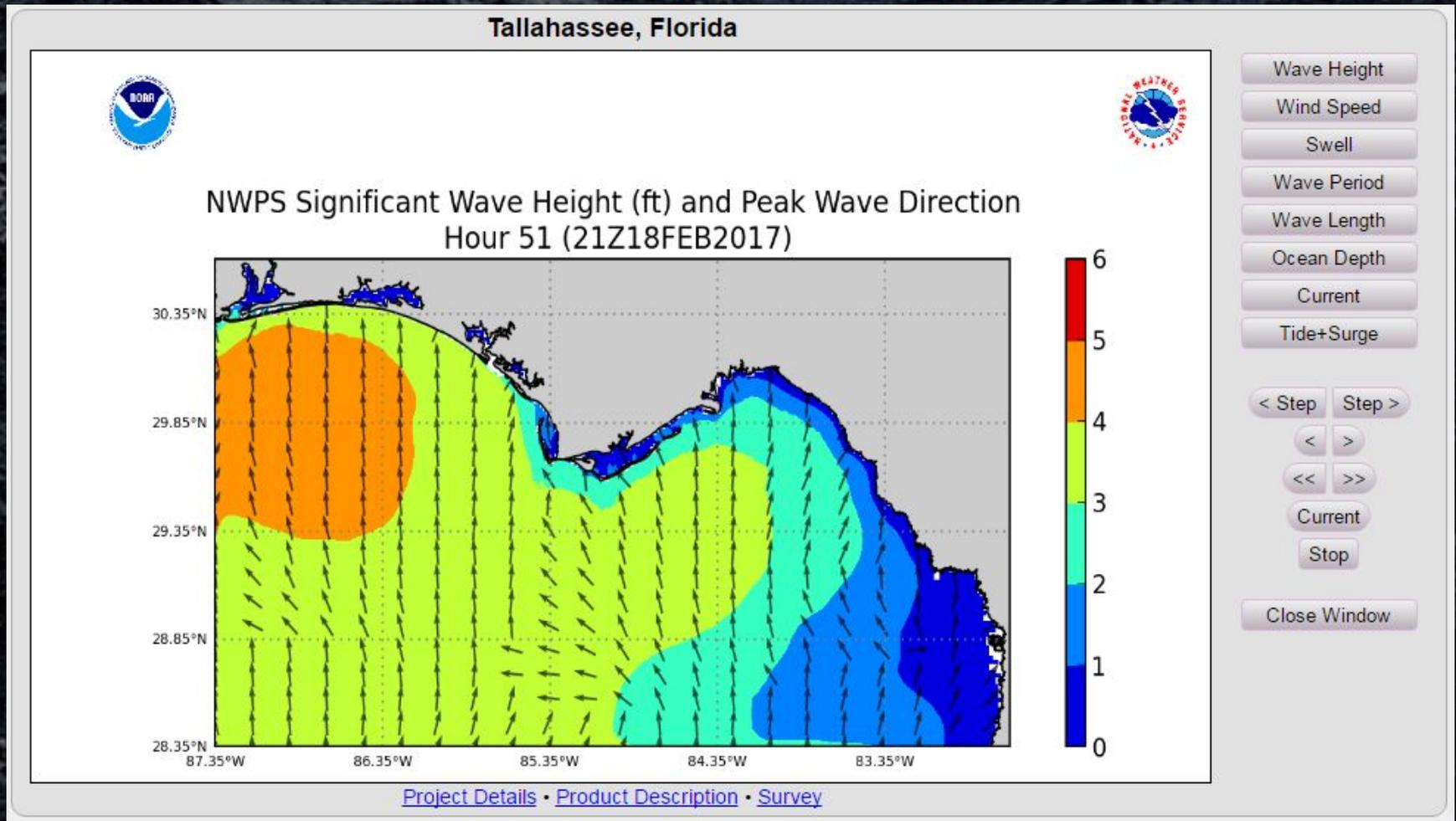
Surf heights are then calculated and used to assess rip current risk



Nearshore Wave Prediction System

<https://polar.ncep.noaa.gov/nwps/viewer.shtml>

Zoom in and select a domain for model field animations





Marine Products We Issue...



Coastal Waters Forecast (CWF)

- Tailored to a wide variety of users. Issued 4x/day. Goes out 5 days.

Area Forecast Discussion (AFD)

- Regularly includes a marine section to describe the reasoning behind the forecast.

Surf Zone Forecast (SRF)

- Forecasts of surf heights, beach conditions, and rip current risk. Issued once a day in the pre-dawn hours. Goes out 2 days.



Find It On Our Website

weather.gov/tae

NATIONAL WEATHER SERVICE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

HOME FORECAST PAST WEATHER SAFETY INFORMATION EDUCATION NEWS SEARCH ABOUT

Local forecast by "City, St" or ZIP code
Enter location ...
[Location Help](#)

News Headlines

- Flood Stage Changes for the Choctawhatchee River at Caryville (US-90) take effect February 8th. [Click here for more.](#)
- Tornadoes and Damaging Wind Event - January 2, 2017

NWS Forecast Office Tallahassee, FL
[Weather.gov](#) > Tallahassee, FL

Tallahassee, FL
Weather Forecast Office

Current Hazards Current Conditions Radar **Forecasts** Rivers and Lakes Climate and Past Weather Local Programs

Today Tomorrow

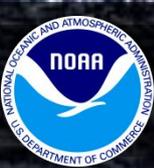
Today 1/15/2017

Fire
Forecaster's Discussion
Activity Planner
Hourly View
Marine
Tropical
Aviation
Local Models

70 Panama City
76 Tallahassee
75 Valdosta
20%
20%

Area Forecast Discussion (AFD)

Coastal Waters Forecast (CWF)
and Surf Zone Forecast (SRF)



Further Down The Page...

Point-and-Click Map

Click on a point over the marine areas to get a marine forecast!

weather.gov/tae

Navigate to a Neighboring WFO

Click a location below for detailed forecast.



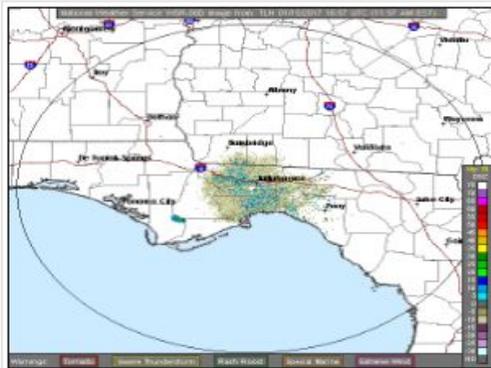
Last Map Update: Sun, Jan. 15, 2017 at 12:57:33 pm EST

Watches, Warnings & Advisories



Hazardous Weather Outlook

Active Hazard Products Across The Area



Local Radar



Weather Map



Tropical Weather



Hazardous Wx: Winds/Seas



Small Craft Exercise Caution (Headline in CWF)

- Winds of 15-20 knots, and/or seas of 6 feet.

Small Craft Advisory

- 20 to 33 knot winds, and/or seas of at least 7 feet.

Higher End Wind Threat

- Gale Warning: winds of 34 to 47 knots expected.
- Storm Warning: winds of 48 to 63 knots expected.

Tropical Cyclone Watches and Warnings



Other Hazardous Weather



Special Marine Warning

- Thunderstorms with wind gusts of at least 34 knots, hail of at least $\frac{3}{4}$ inch in diameter, or waterspouts.

Dense Fog Advisory

- Visibility in fog one nautical mile or less.

High Surf Advisory

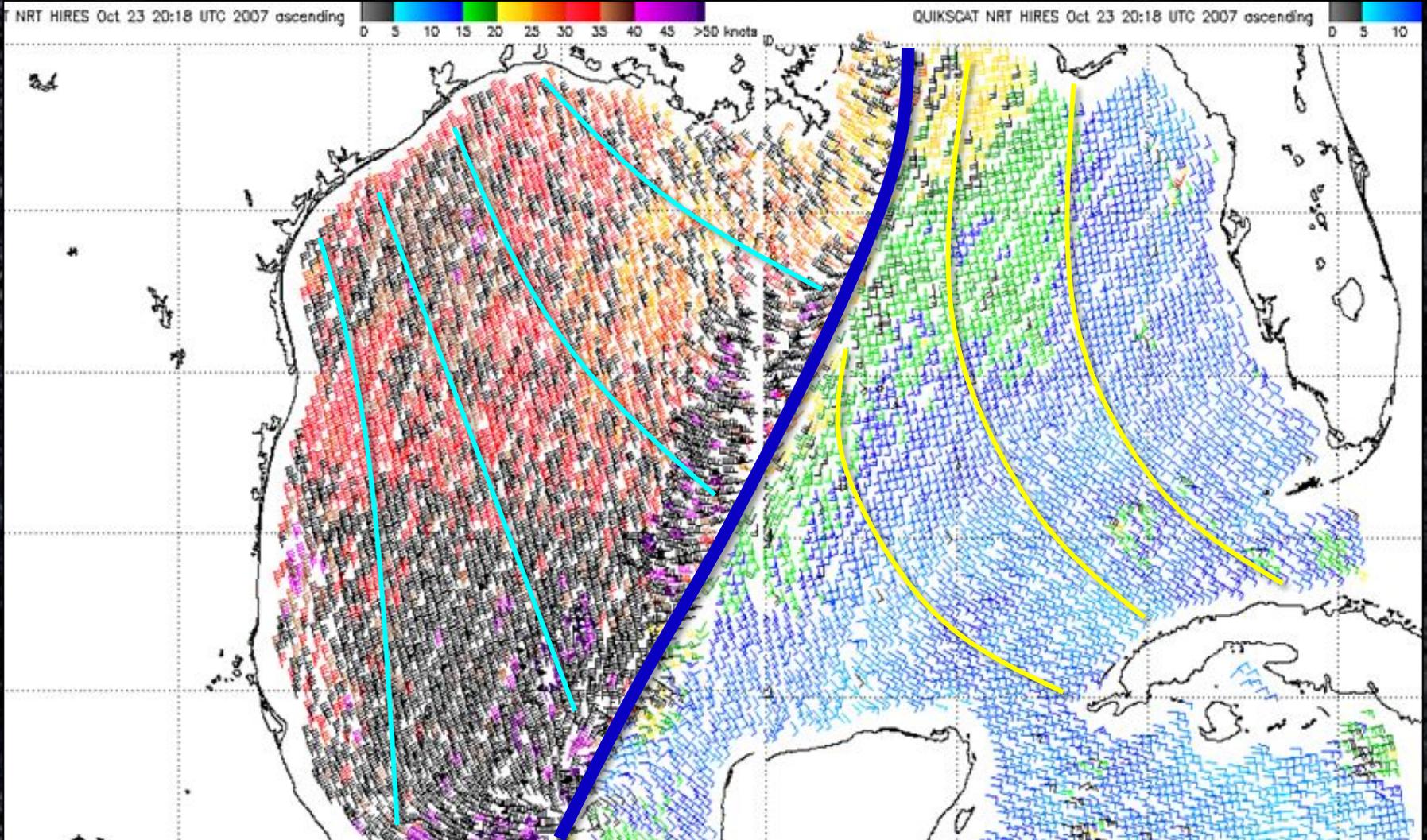
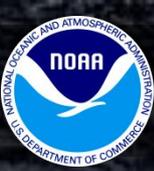
- Issued when surf heights are expected to reach 6 feet or higher along the coastline.



Common Weather Patterns That Favor Elevated Winds and Seas

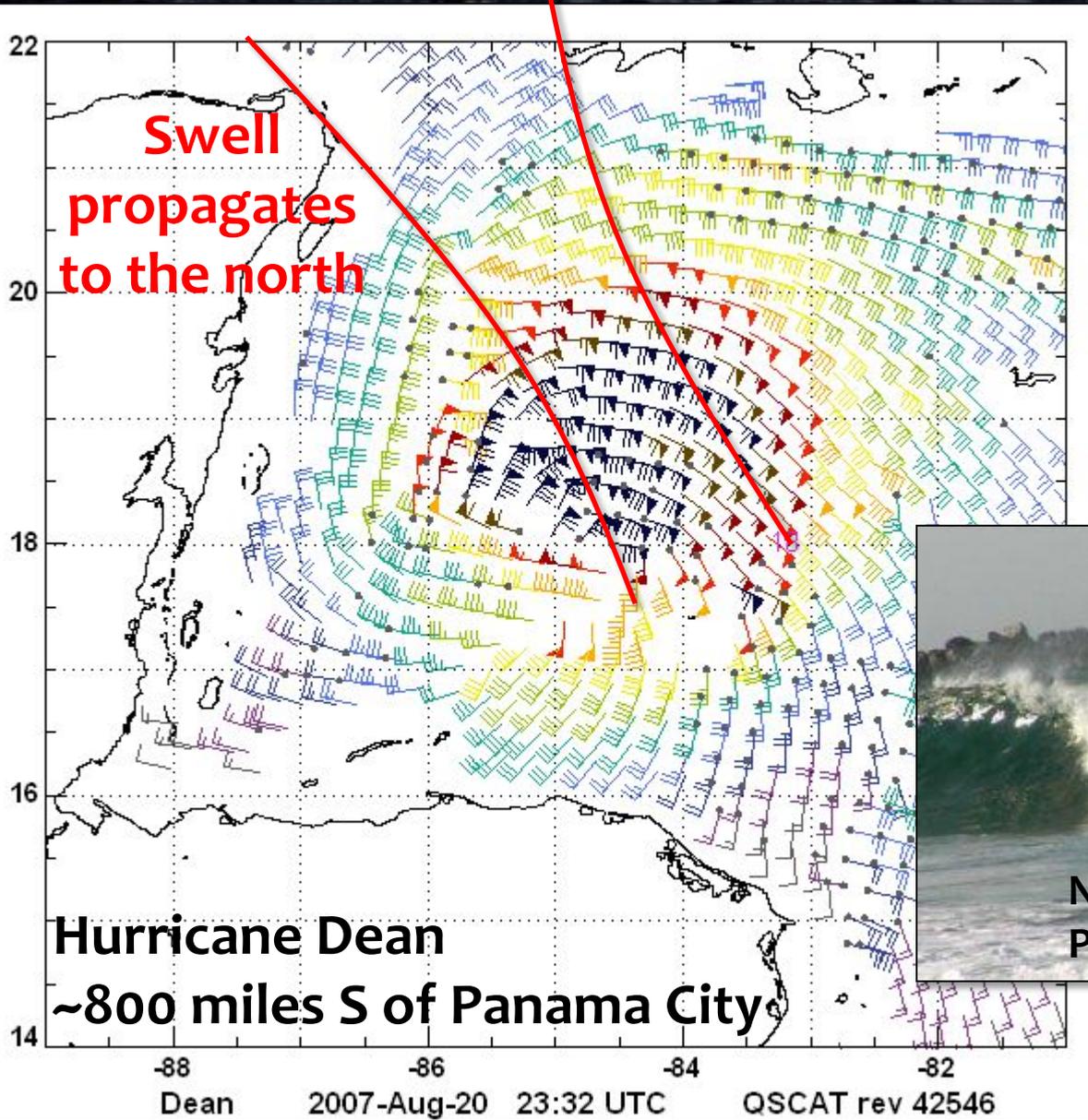


Cold Fronts





Tropical Cyclones



**Swell
propagates
to the north**

**Hurricane Dean
~800 miles S of Panama City**

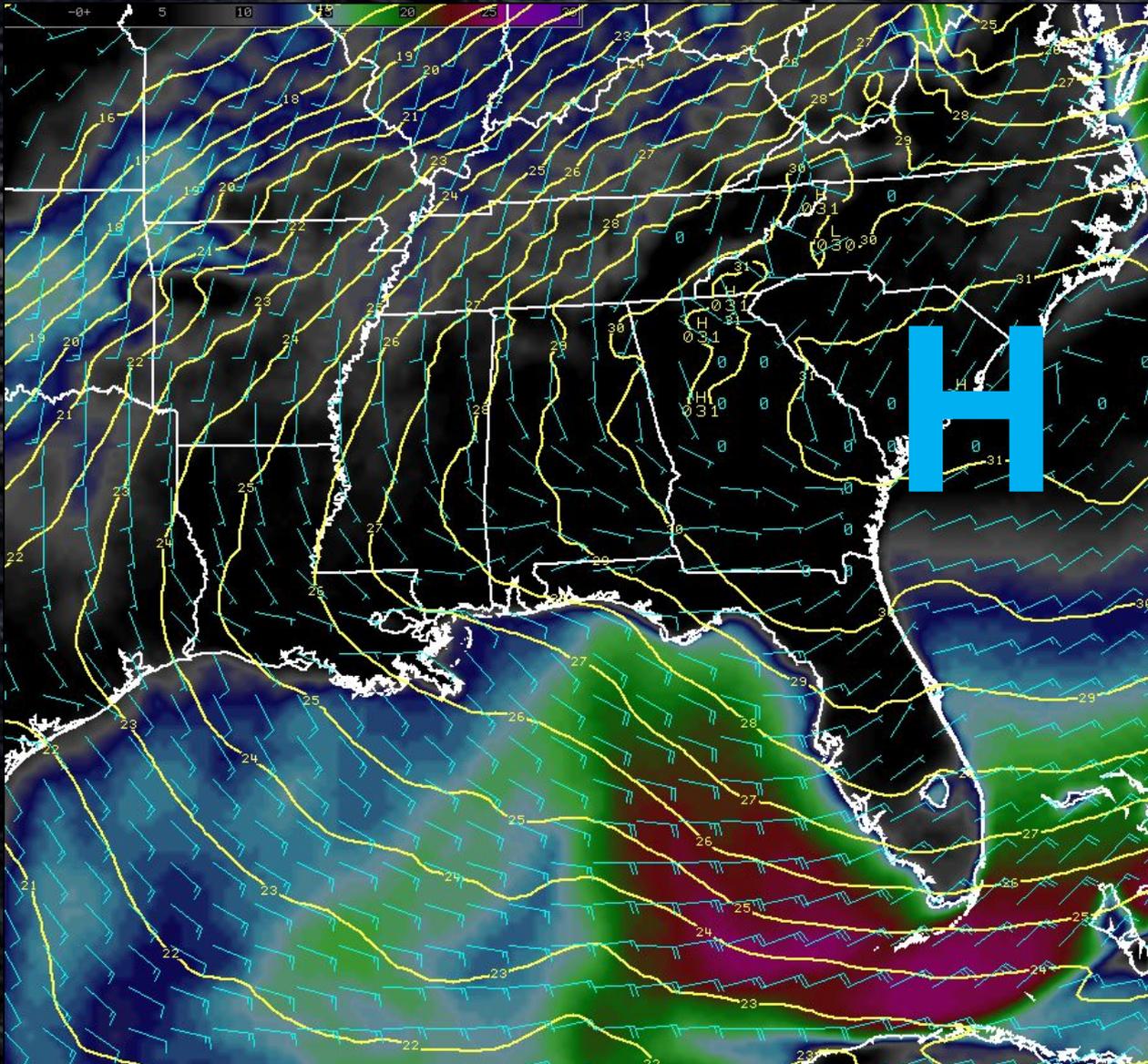
Even a tropical cyclone in western Caribbean can generate swell that will reach Florida Panhandle



Near Panama City, 8/22/2007
Photo: mrsurfs.com



Easterly Flow Regime



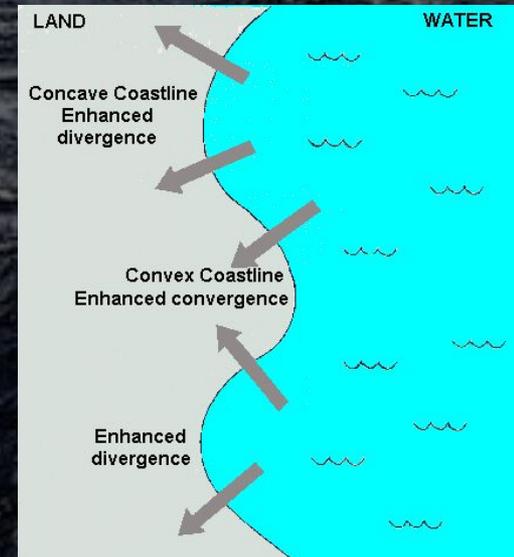
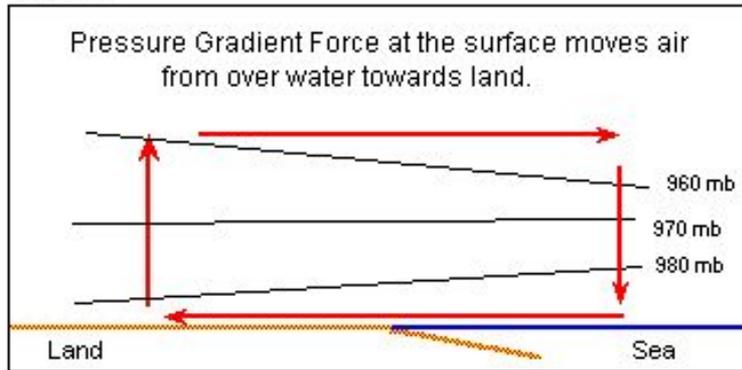
- Ridge of high pressure across the Southeast.
- Typical lower pressures in Caribbean and southern Gulf
- Increases the pressure gradient in our area.
- Maximizes at night & in a.m.



Local Effects (Sea Breeze)



Figure 5.





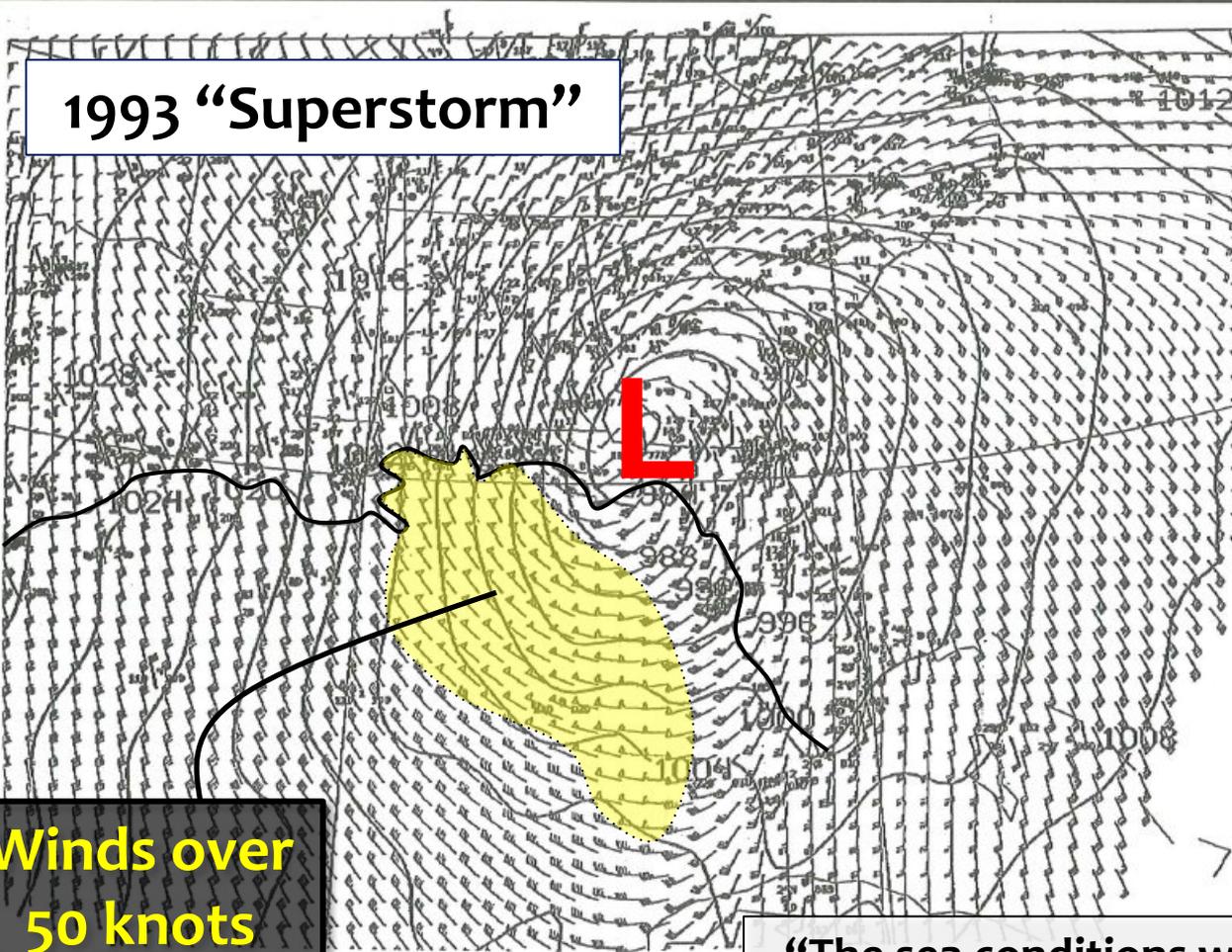
Rare Weather Events



Storm Force Winds Rare



1993 “Superstorm”



Winds over
50 knots

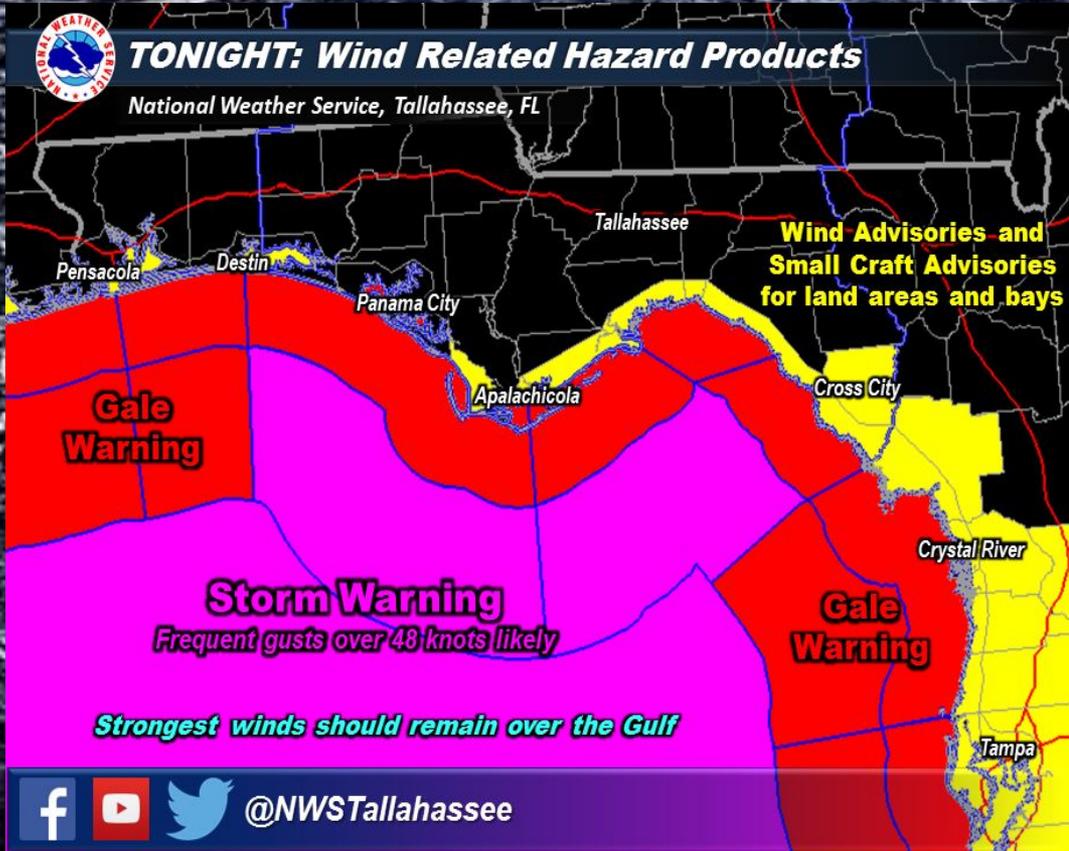
Figure 2-8. ETA Model Mesoscale Surface Analysis

- March 1993 Superstorm is one example.
- Popular Mechanics Article (2009): “200-ft freighter sunk 70 miles off Ft. Myers, FL” AND “Coast Guard rescued 235 people on more than 100 boats”

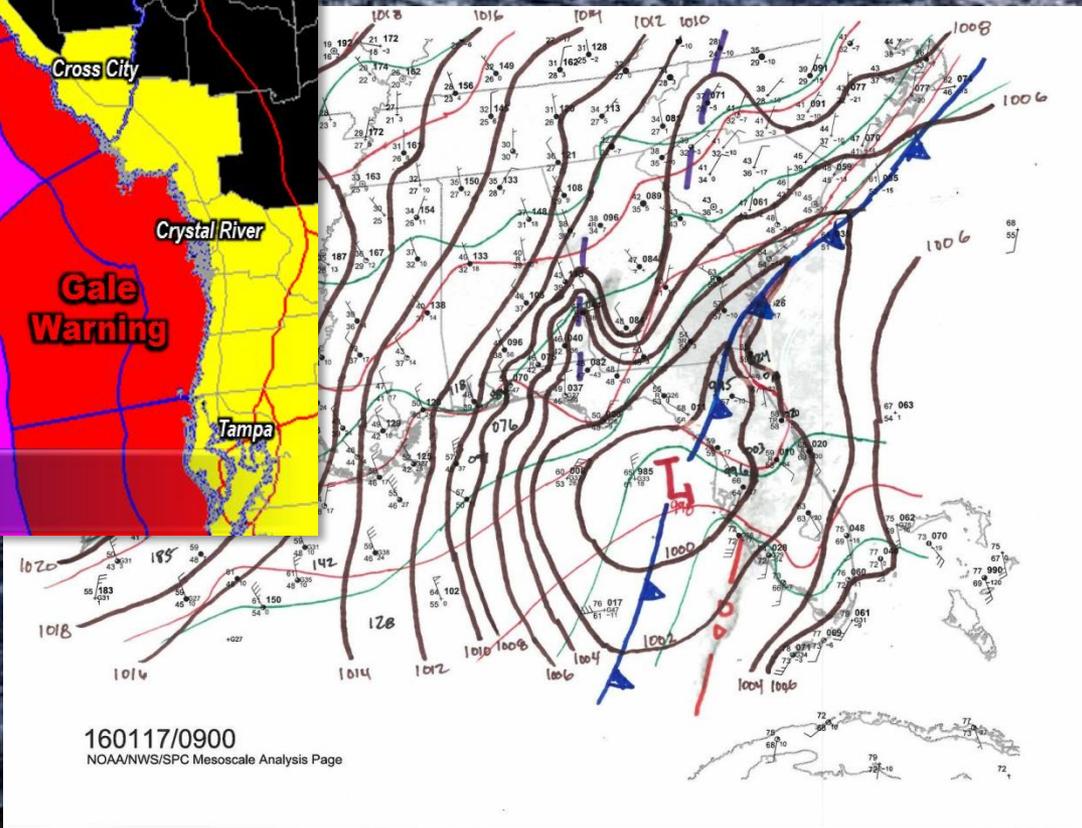
“The sea conditions were absolutely incredible, unbelievable,” Coast Guard Petty Officer Rob Wyman told the *Washington Post*. “It looked like a big washing machine. There were huge waves”



January 16, 2016 998-mb Gulf Low



- Buoy 42036 (eastern buoy)
Max gust 41 kts
- Buoy 42039 (western buoy)
Max gust 47 kts

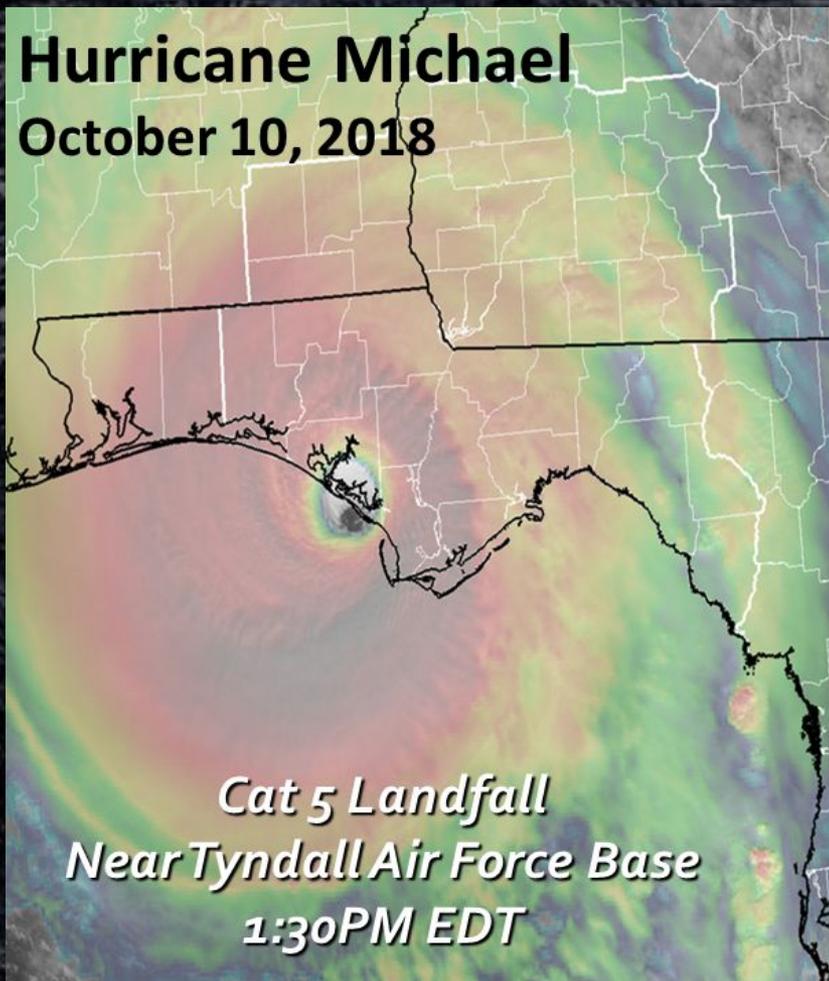




Hurricane Michael



Hurricane Michael October 10, 2018



Strongest hurricane on record to make landfall in the Florida Panhandle



Maximum Sustained Winds: 140 KTS
161 MPH



Minimum Pressure: 919 mb



Peak Storm Surge Inundation:
9-14 feet Mexico Beach to Indian Pass



NWS Tallahassee
weather.gov/tallahassee



Hurricane Michael



504
WHUS72 KTAE 100443
MWWTAE

URGENT - MARINE WEATHER MESSAGE
National Weather Service Tallahassee FL
1243 AM EDT Wed Oct 10 2018

...HURRICANE WARNING IN EFFECT...

.Winds and seas rapidly increasing with hurricane conditions expected as major hurricane Michael moves into the coastal waters. The most significant conditions are expected through Wednesday night. This is an extremely dangerous life threatening situation for mariners. All vessels should remain in port, or take shelter as soon as possible, until the hurricane passes.

...HURRICANE WARNING REMAINS IN EFFECT...

* WINDS...Tropical storm force winds continue to overspread the waters with hurricane force winds overspreading the waters around daybreak. Maximum sustained winds up to 115 knots with gusts to 140 knots on Wednesday. Hurricane force winds will persist through Wednesday and are not expected to subside below tropical storm force until Wednesday night.

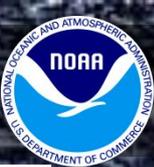
* WAVES/SEAS...Building to 60 feet on the gulf waters south of Apalachicola on Wednesday and 15 to 20 feet in Apalachee Bay.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

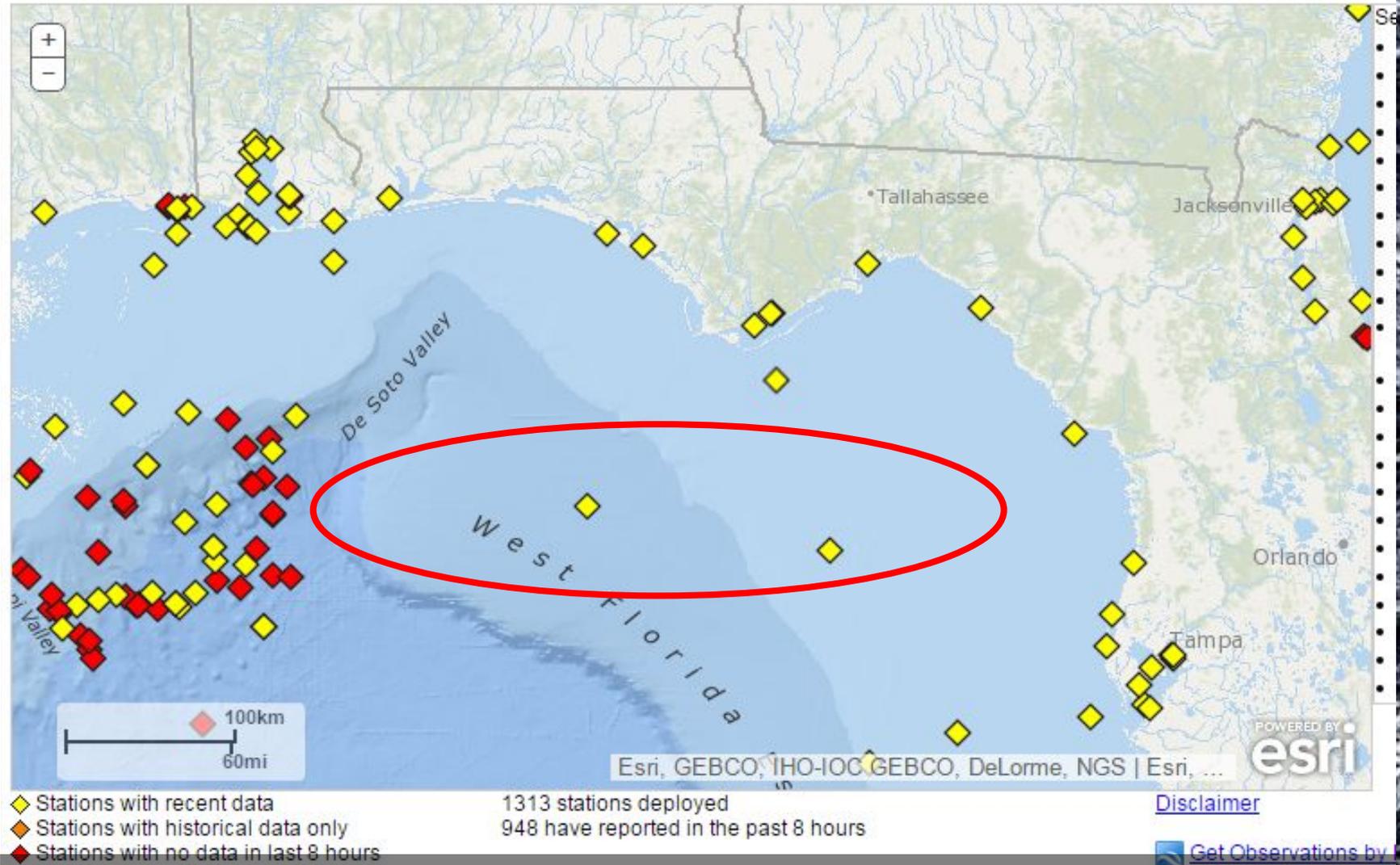
A Hurricane Warning means sustained winds of 64 kts or 74 mph or higher associated with a hurricane are expected within 36 hours. A Hurricane Warning can remain in effect when dangerously high water or a combination of dangerously high water and exceptionally high waves continue, even though winds may be less than hurricane force.



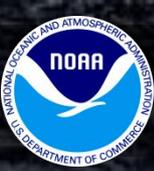
Marine Reports & Warnings



Why we need reports:

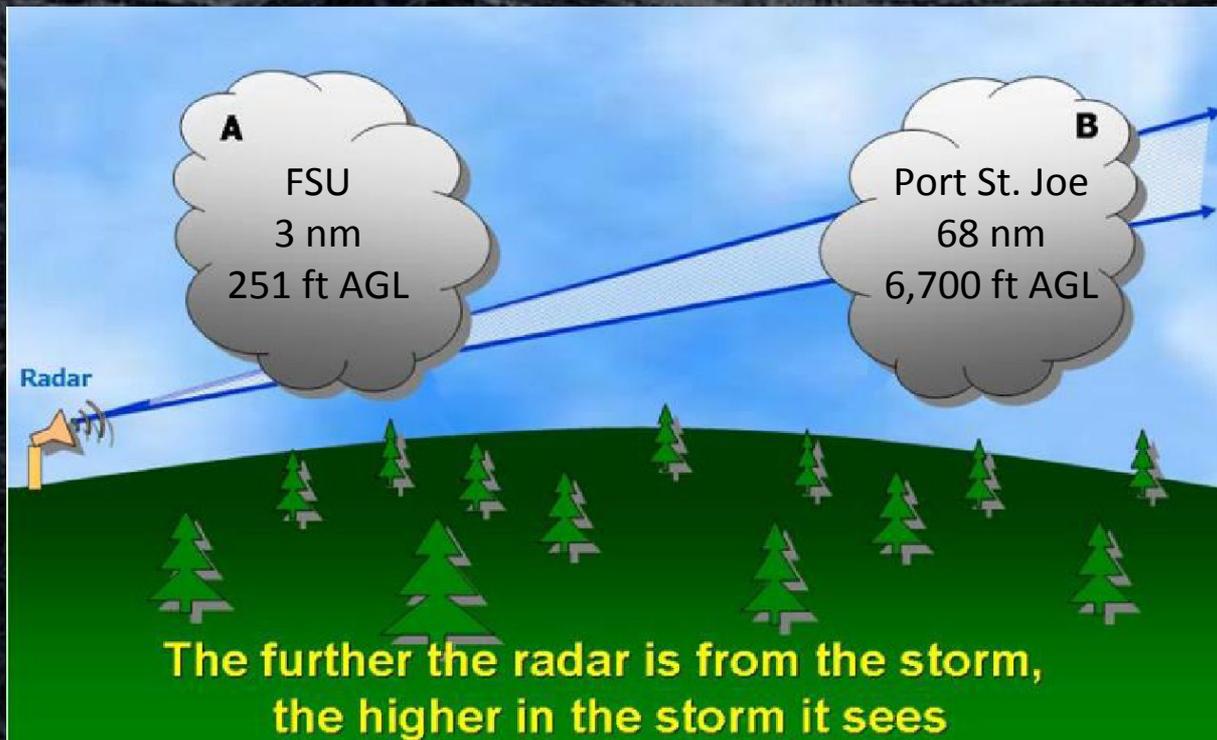


- Very few marine observations
- Forecast validation



Why we need reports:

- Storms can form very quickly, especially in summer
- The further storm is from radar, the harder it is to see lower levels of storm
- Waterspouts form in these lower levels, spin up quickly and can be hard to detect on radar





Storm Report Form



NATIONAL WEATHER SERVICE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION



- HOME
- FORECAST
- PAST WEATHER
- SAFETY
- INFORMATION
- EDUCATION
- NEWS
- SEARCH
- ABOUT

Local forecast by "City, St" or ZIP code

[Location Help](#)

News Headlines

- [TAE Spring Spotter Class Registration](#)
- [Alabama Severe Weather Awareness Week - February 18-23](#)

Customize Your Weather.gov

Enter Your City, ST or ZIP Code

 Remember Me

[Privacy Policy](#)

NWS Forecast Office Tallahassee, FL

[Weather.gov](#) > Tallahassee, FL

Tallahassee, FL

Weather Forecast Office

- Current Hazards
- Current Conditions
- Radar
- Forecasts
- Rivers and Lakes
- Climate and Past Weather
- Local Programs

Graphical Hazardous Weather Outlook

Outlooks

Submit a Storm Report

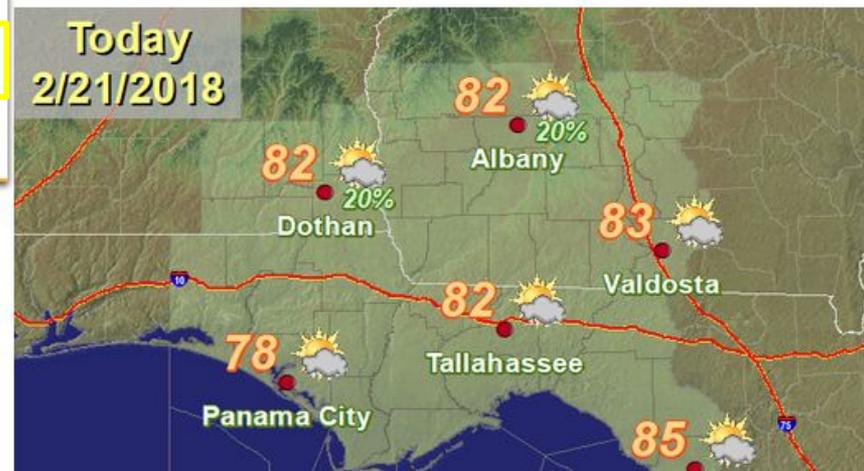
Local Storm (Damage) Reports

day

Tonight

Tomorrow

Today
2/21/2018





Storm Report Form



- <http://www.weather.gov/tae/StormReports>

Storm Report

This interface is intended to be used solely for the relay of storm information to the NWS. Other comments or information should be sent to the National Weather Service Tallahassee, FL at tae.webmaster@noaa.gov.

County
Choose County from drop menu
Choose ▾

Location (7 NW Albany)
Your answer _____

Event Date
Date
mm/dd/yyyy

Event Time
Time
: AM ▾

Time Zone
 Eastern Time
 Central Time

NEXT

Never submit passwords through Google Forms.

Storm Report

Event Type (Select all that apply)

Click box next to events you observed. Next, select appropriate sub-descriptor in pull down menus to describe event.

Flood
Choose ▾

Hail
Choose ▾

High Wind Speed
Choose ▾

Tornado / Funnel Cloud
Choose ▾

Wind Damage
Choose ▾

Winter Precipitation
Choose ▾

Snow
Choose ▾

Freezing Rain/Icing
Choose ▾

Heavy Rain
Choose ▾

Additional Details
Provide any additional information that you feel is pertinent to your submission (500 characters maximum). You may also pass along additional information by e-mailing them to the national weather service Tallahassee, FL, separately: tae.webmaster@noaa.gov.

Your answer _____

BACK **NEXT**

Never submit passwords through Google Forms.



mPING

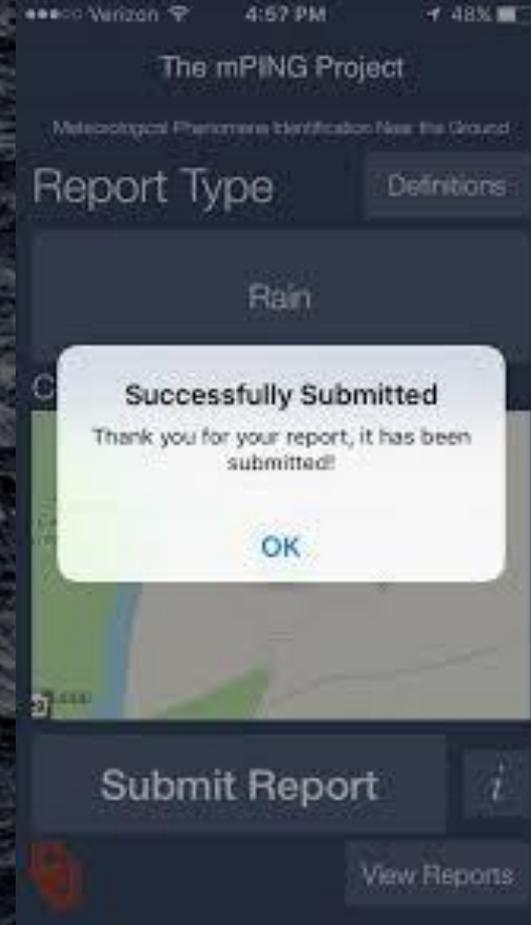
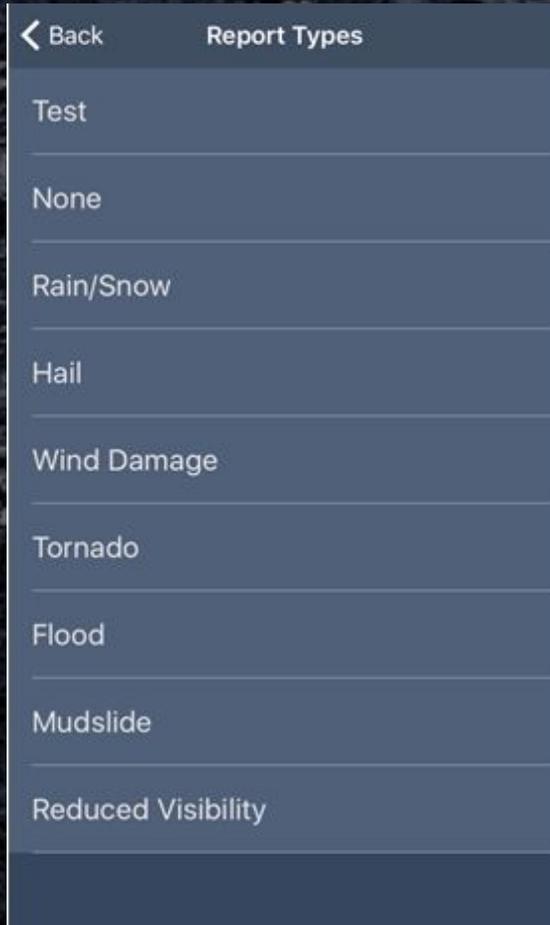


- Free app created by the National Severe Storms Lab
- Available in the Apple App store and Google Play
- <http://mping.nssl.noaa.gov/>





mPING



When reports are sent using the mPING app, forecasters are alerted immediately on their workstations.



Social Media

NWS Tallahassee is active on Facebook and Twitter. The best way to send reports is to tweet @NWSTallahassee or use the #TLHspotter hashtag.

#TLHspotter

Be Sure To Include

What, When, and Where

...and photos if you have them

Join the conversation and send us your weather reports! On social media, add the hashtag **#TLHspotter**

 On Twitter, you can use the hashtag, or simply mention us in your tweet: @NWSTallahassee

 On Facebook, it is best to post directly to our page, but you can add the hashtag too. If you are posting on your own account and using the hashtag, the privacy must be set to "public" for us to be able to see it.



Get the latest weather info on the go at mobile.weather.gov

 NWS Tallahassee
weather.gov/tallahassee

 @NWSTallahassee

 www.facebook.com/NWSTallahassee

Or you can call...
850-942-8833



Things to include in reports



- Location
- Time
- Type of weather
- Magnitude (wave height, wind speed estimate)
- Duration
- Direction of storms or waterspouts



Thanks!



“Ground truth” from boaters like you helps us to continue to improve our forecasts and warnings.

Help us keep everyone safe by being our eyes and ears on the water!



How to get warnings



To receive marine weather statements and special marine warnings:

Turn VHF to WX channel

Panama City: WX1 (162.550 MHz)

East Point: WX6 (162.500 MHz)

Tallahassee: WX2 (162.400 MHz)

Salem: WX4 (162.425 MHz)

NOAA Weather Radio Frequencies
162.400 MHz (WX2)
162.425 MHz (WX4)
162.450 MHz (WX5)
162.475 MHz (WX3)
162.500 MHz (WX6)
162.525 MHz (WX7)
162.550 MHz (WX1)

Wireless Emergency Alerts

- Most smartphones set up, make sure under settings
- Will alarm for hurricane and tsunami warnings





Information & Contacts



NWS Tallahassee: www.weather.gov/tae

Buoys: <http://www.ndbc.noaa.gov>

Wavewatch: <http://polar.ncep.noaa.gov/waves/viewer.shtml?-gmex->

NWPS: <https://polar.ncep.noaa.gov/nwps/viewer.shtml>

mPING: <http://mping.nssl.noaa.gov/>

Storm Reports: <http://www.weather.gov/tae/StormReports>

NWS Tallahassee - 850-942-8833 (answered 24/7; press 9 to ring through)

Dial-A-Buoy - 888-701-8992 (Buoy ID: e.g., 42039 or 42036)

NWR (recording) - 850-942-8851

Social Media - @NWSTallahassee (#TLHSpotter)

Marine Focal Point blair.scholl@noaa.gov

Marine Asst. Focal Point lance.franck@noaa.gov

Marine Asst. Focal Point federico.dicatarina@noaa.gov

Warning Coordination Met. mark.wool@noaa.gov