



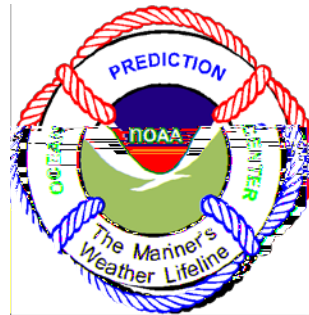
# WEATHER AWARENESS

Joe Sienkiewicz, Chief, Ocean Applications Branch

Paul Vukits, Senior Marine Forecaster

## NOAA National Weather Service

### Ocean Prediction Center



College Park, MD

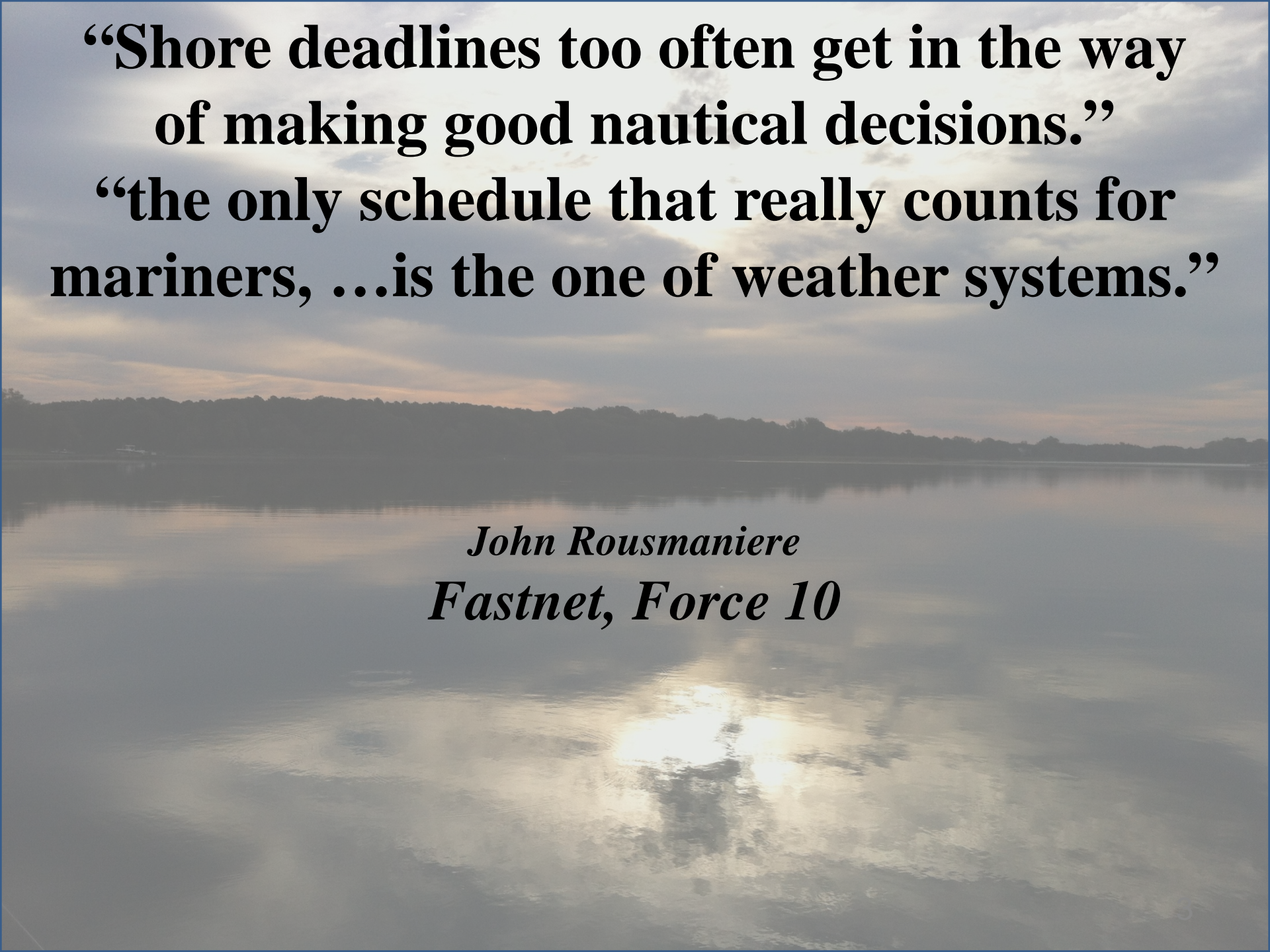
<http://www.opc.ncep.noaa.gov/>

<http://www.facebook.com/OceanPredictionCenter>

**You just got on the boat.**

**What do you do with these, and why?**





**“Shore deadlines too often get in the way  
of making good nautical decisions.”**  
**“the only schedule that really counts for  
mariners, ...is the one of weather systems.”**

*John Rousmaniere*  
*Fastnet, Force 10*





# NWS / Ocean Prediction Center

## mission/responsibility

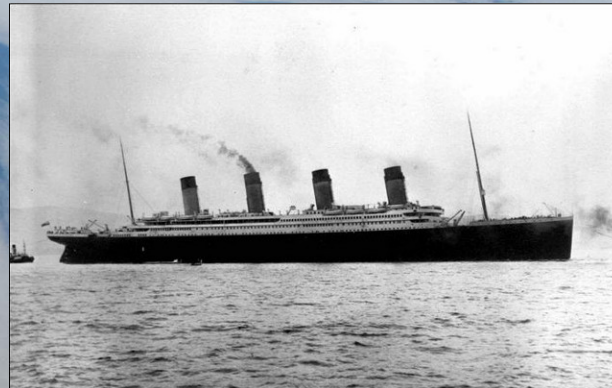
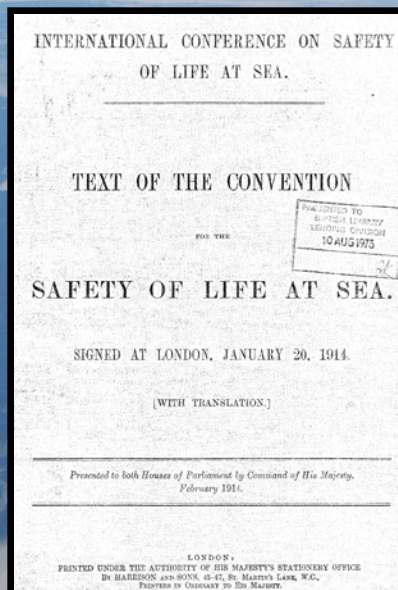


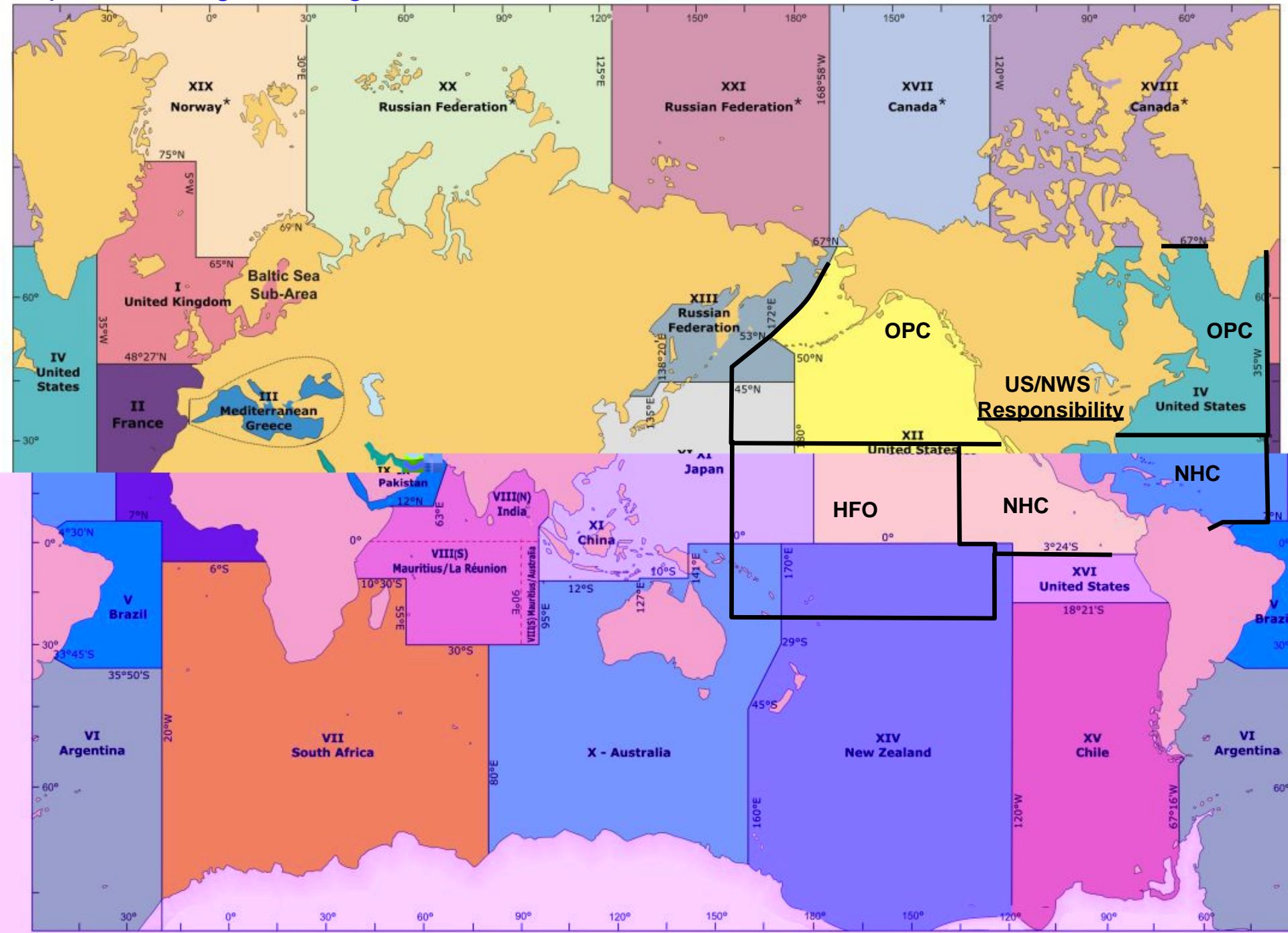
- **Protection of life and property, safety at sea, and enhancement of economic opportunity**
  - **Issue Warnings and Forecasts**
- Partially fulfill U.S. responsibilities with the World Meteorological Organization and Safety of Life at Sea Convention (SOLAS)
  - Global Maritime Distress Safety System \*GMDSS\*  
(<http://www.gmdss.com/>)
- Forecast support
  - Government incident response (USCG,NOAA)
  - Government operations (USCG, Navy, NOAA)
- **Science AND service** based organization

# Safety of Life At Sea, 1914

<http://www.imo.org>

- Chapter III – Safety of Navigation
  - Part I – Ice and Derelicts
  - Part II – Meteorological Information
- Chapter V - Radiotelegraphy





# NOAA/NWS Marine Responsibility

High Seas - HSF

Offshore - OFF

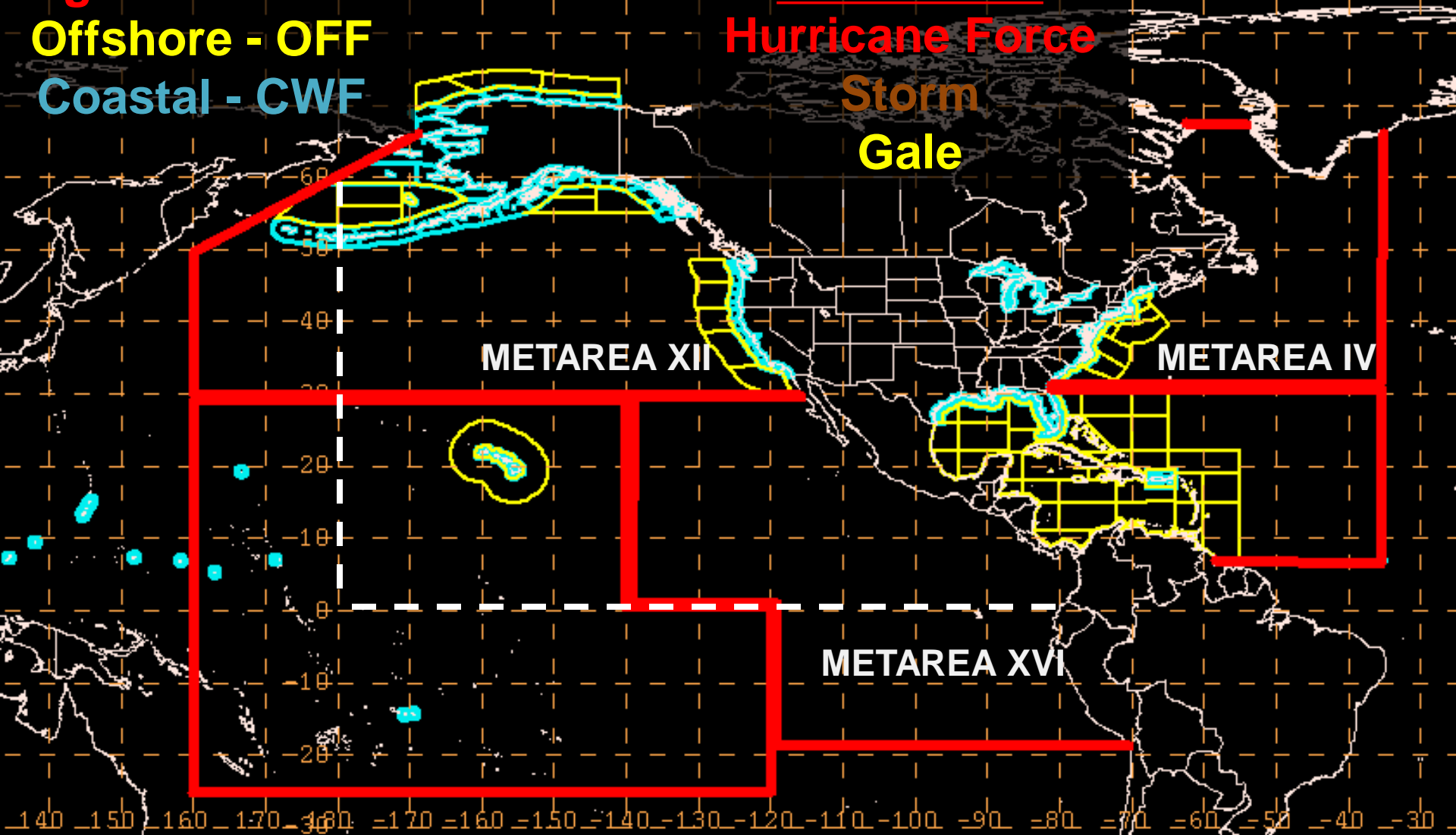
Coastal - CWF

WARNINGS

Hurricane Force

Storm

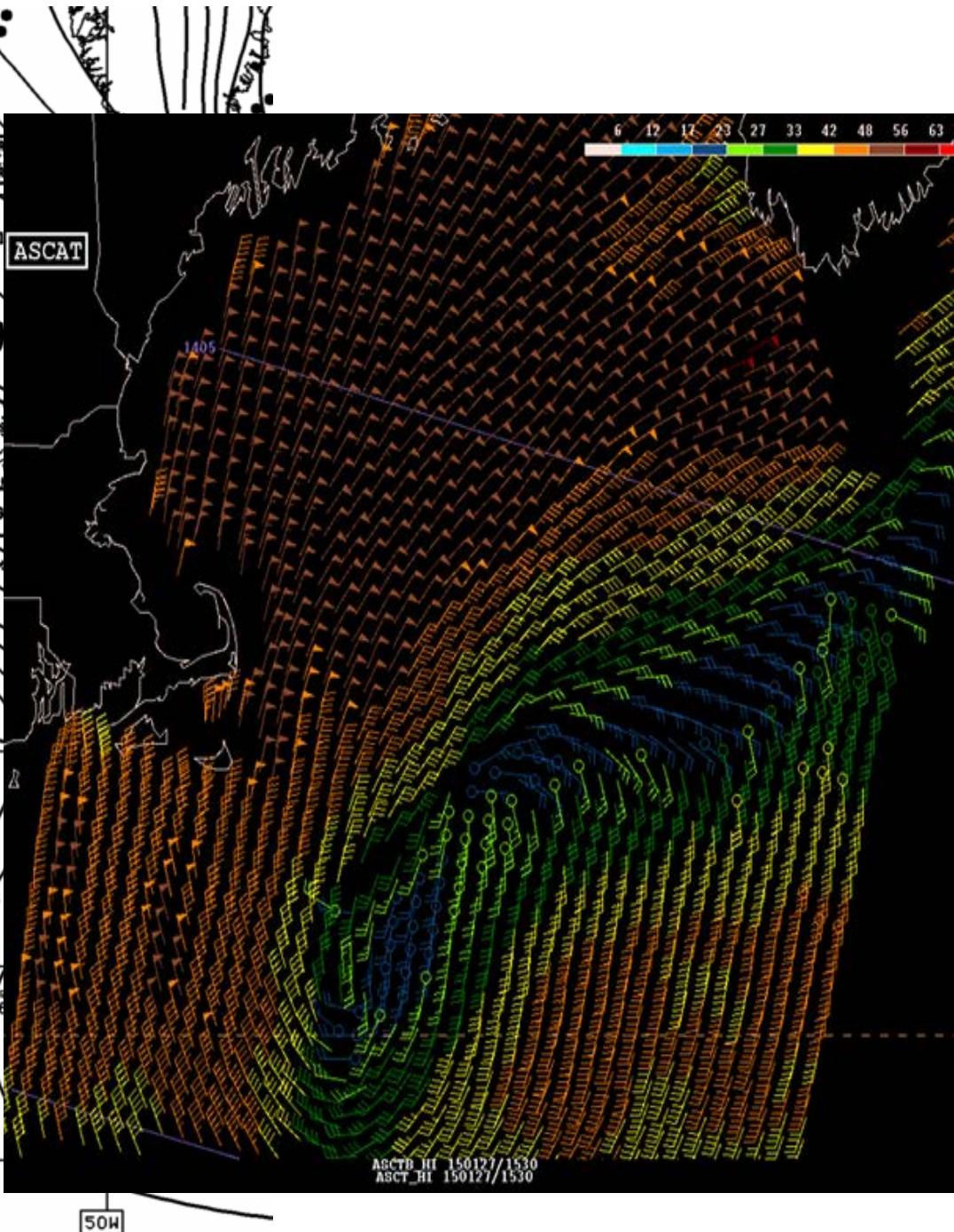
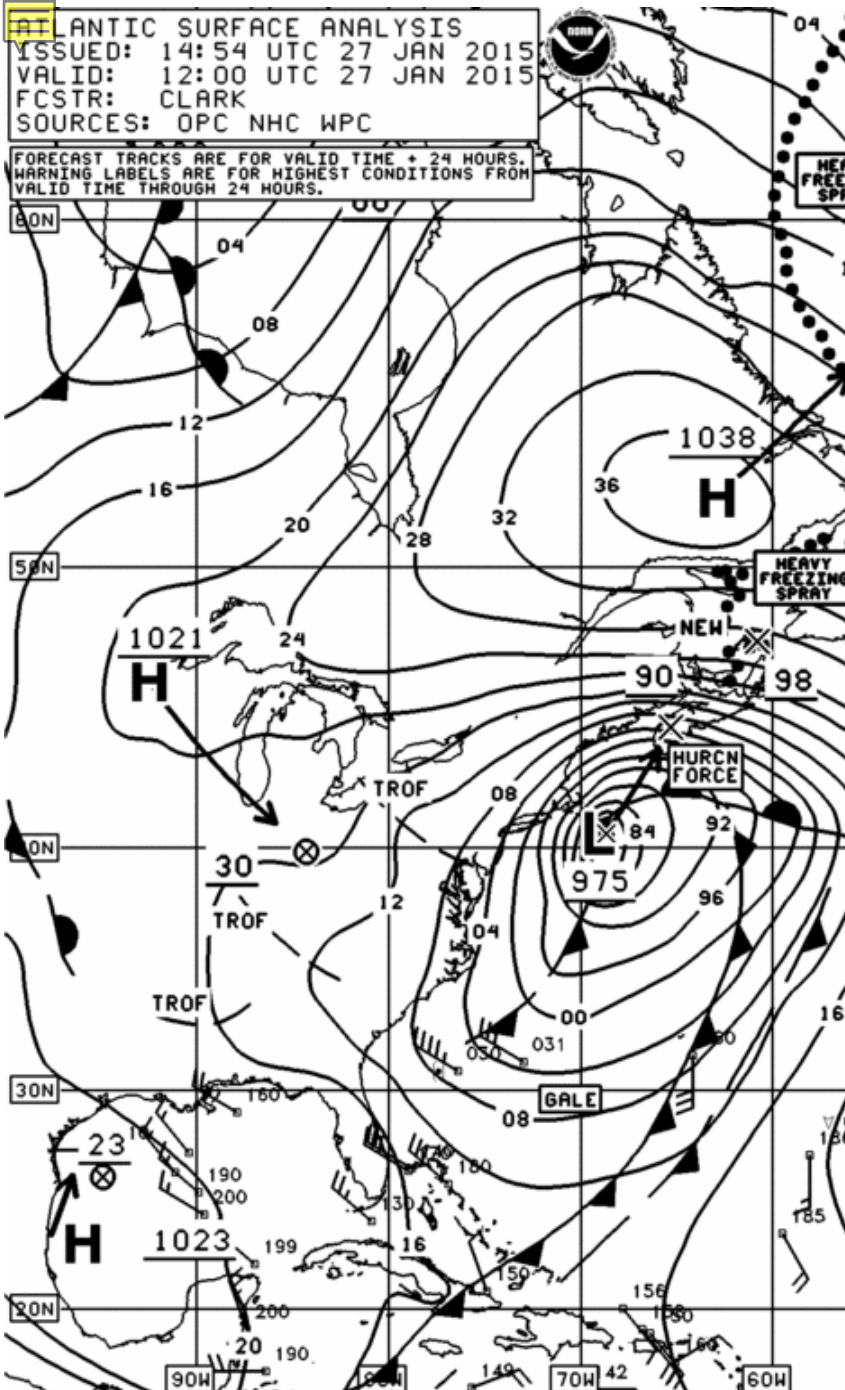
Gale



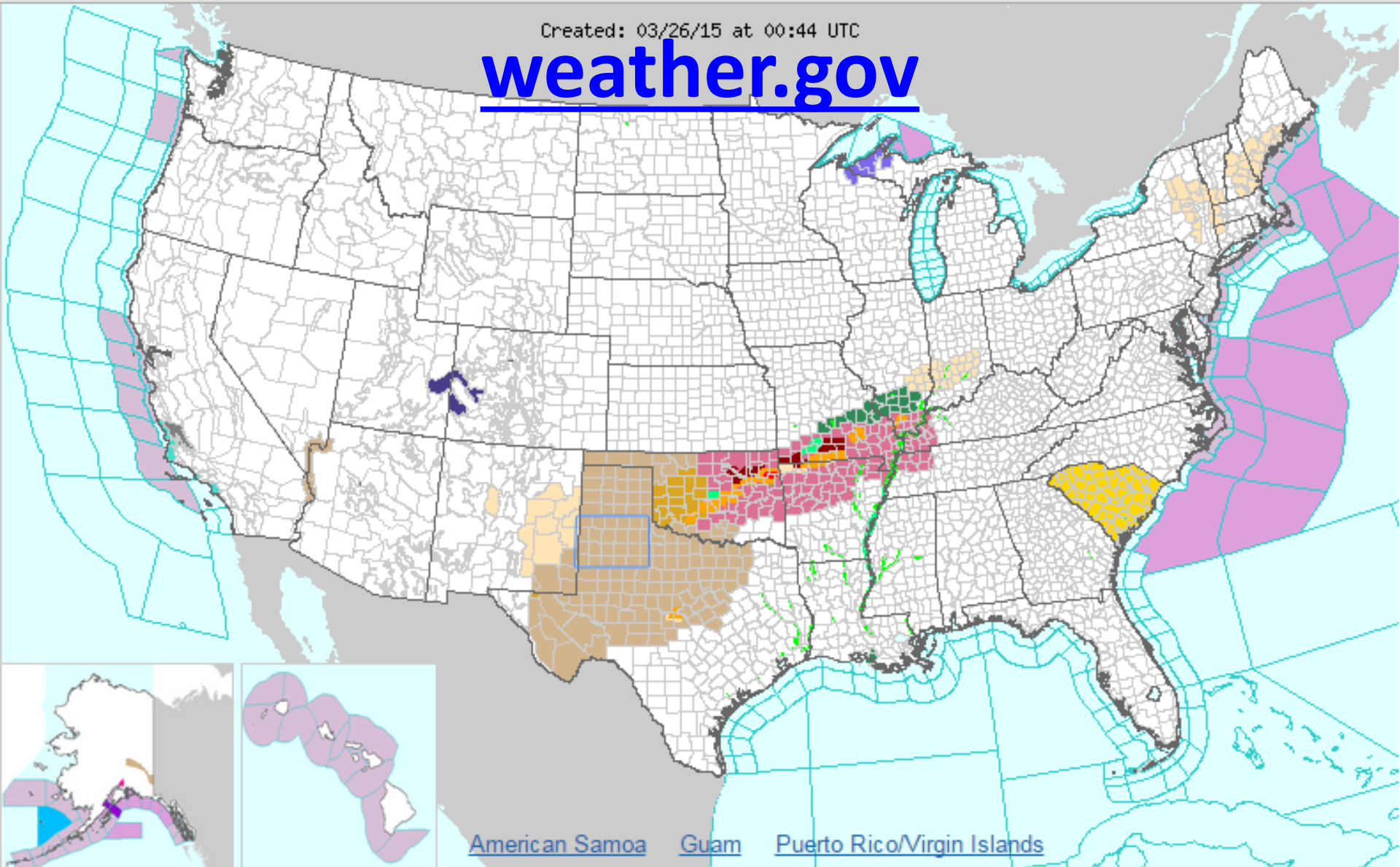


ATLANTIC SURFACE ANALYSIS  
ISSUED: 14:54 UTC 27 JAN 2015  
VALID: 12:00 UTC 27 JAN 2015  
FCSTR: CLARK  
SOURCES: OPC NHC WPC

FORECAST TRACKS ARE FOR VALID TIME + 24 HOURS.  
WARNING LABELS ARE FOR HIGHEST CONDITIONS FROM  
VALID TIME THROUGH 24 HOURS.



# [weather.gov](http://weather.gov)



[American Samoa](#) [Guam](#) [Puerto Rico/Virgin Islands](#)

Click on the map above for detailed alerts or [Warnings By State](#)

[Tornado Alerts](#) [Severe Thunderstorm Alerts](#) [Heavy Freezing Spray Alerts](#) [Beach Hazards Alerts](#)

 [Tornado Warning](#)

 [Severe Thunderstorm Watch](#)

 [Heavy Freezing Spray Warning](#)

 [Beach Hazards Statement](#)



# NATIONAL WEATHER SERVICE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

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Local forecast by  
"City, St" or ZIP code

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[Location Help](#)

## News Headlines

- [NWS Wakefield Public Zone Changes - Effective April 7, 2015](#)
- [Spring Severe Weather Season Upon Us](#)

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[Privacy Policy](#)

## NWS Forecast Office Wakefield, VA

[Weather.gov](#) > Wakefield, VA

[Current Hazards](#)

[Current Conditions](#)

[Radar](#)

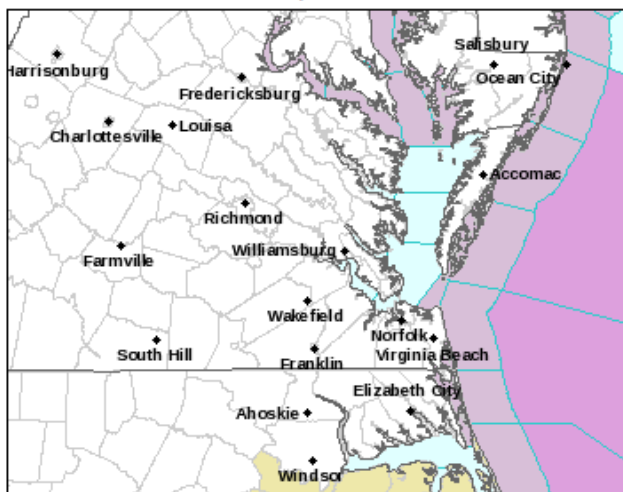
[Forecasts](#)

[Rivers and Lakes](#)

[Climate and Past Weather](#)

[Local](#)

Click on the map below to zoom in.



[Watches,  
Warnings &  
Advisories](#)



[Gale Warning](#)



[Small Craft Advisory](#)



[Hazardous Weather  
Outlook](#)



Last Map Update: Wed, Mar. 25, 2015 at 8:52:04 pm EDT



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[Weather Information  
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[Local Forecast](#)

Location Help

- [NWS Wakefield Public Zone Changes - Effective April 7, 2015](#)
- [Spring Severe Weather Season Upon Us](#)

### HAZARDOUS WEATHER CONDITIONS

- Small Craft Advisory in effect from March 26, 06:00 AM EDT until March 27, 06:00 AM EDT

Last Update: 700 PM EDT WED MAR 25 2015

[View Nearby Observations](#)

## 4NM NE RUDEE INLET VA

For More Weather Information:  
[Wakefield, VA Local Forecast Office](#)

### MARINE ZONE FORECAST

...SMALL CRAFT ADVISORY IN EFFECT FROM 6 AM EDT THURSDAY THROUGH LATE THURSDAY NIGHT...

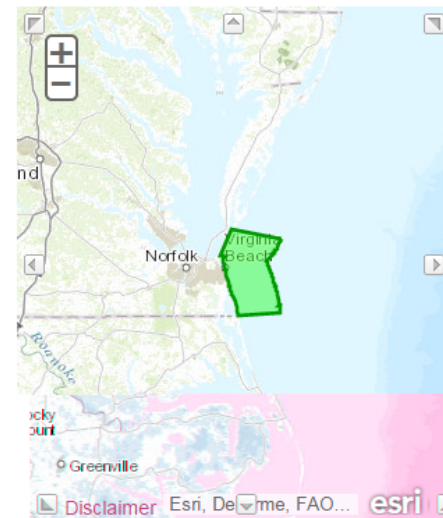
**Synopsis:** A WARM FRONT LIFTS NORTH OF THE WATERS THROUGH THIS EVENING. A STRONG COLD FRONT CROSSES THE WATERS THURSDAY NIGHT. HIGH PRESSURE BUILDS IN FROM THE NORTHWEST OVER THE WEEKEND.

<b>Tonight</b>	S winds 10 to 15 kt...increasing to 15 to 20 kt late. Seas 3 ft with a dominant period of 4 seconds. A slight chance of showers after midnight.
<b>Thu</b>	S winds 15 to 20 kt. Seas 4 to 5 ft with a dominant period of 7 seconds. A slight chance of showers until late afternoon.
<b>Thu Night</b>	S winds 15 to 20 kt...becoming SW after midnight. Seas 5 to 6 ft. Showers after midnight.
<b>Fri</b>	N winds 15 to 20 kt. Seas 4 to 5 ft. Showers.
<b>Fri Night</b>	N winds 10 to 15 kt...increasing to 15 to 20 kt after midnight. Seas 3 to 4 ft. Showers likely early in the evening...then a chance of showers in the late evening and early morning.
<b>Sat</b>	NW winds 15 to 20 kt. Seas 4 to 5 ft.
<b>Sat Night</b>	NW winds 10 to 15 kt...increasing to 15 to 20 kt after midnight. Seas 4 to 5 ft.
<b>Sun</b>	N winds 15 to 20 kt...becoming NW 10 to 15 kt in the afternoon. Seas 4 to 5 ft...subsiding to 3 ft in the afternoon.
<b>Sun Night</b>	S winds 5 to 10 kt...becoming SW 10 to 15 kt after midnight. Seas 3 to 4 ft.
<b>Mon</b>	SW winds 10 to 15 kt. Seas 3 to 4 ft.

### ADDITIONAL FORECASTS AND INFORMATION

ZONE AREA FORECAST FOR COASTAL WATERS FROM CAPE CHARLES LIGHT TO VIRGINIA-NORTH CAROLINA BORDER OUT TO 20 NM

Topographic  [Click Map For Detailed Forecast](#)



Requested Location  Forecast Area

### ABOUT THIS FORECAST

Last Update: 700 PM EDT WED MAR 25 2015

[Forecast Discussion](#)

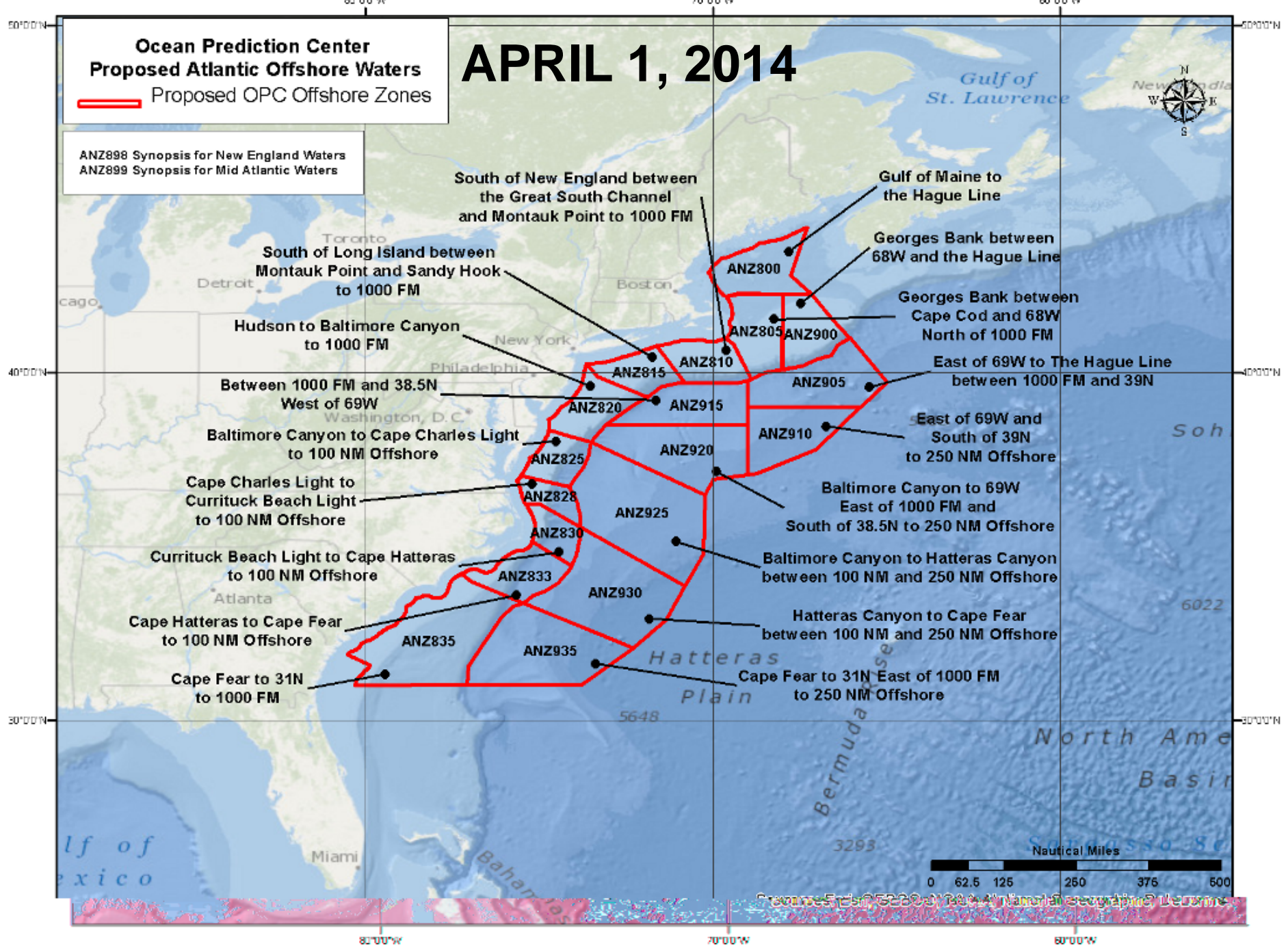


# Ocean Prediction Center Proposed Atlantic Offshore Waters

 Proposed OPC Offshore Zones

ANZ898 Synopsis for New England Waters  
ANZ899 Synopsis for Mid Atlantic Waters

# APRIL 1, 2014



- South of New England between the Great South Channel and Montauk Point to 1000 FM
- Gulf of Maine to the Hague Line
- Georges Bank between 68W and the Hague Line
- Georges Bank between Cape Cod and 68W North of 1000 FM
- South of Long Island between Montauk Point and Sandy Hook to 1000 FM
- Hudson to Baltimore Canyon to 1000 FM
- Between 1000 FM and 38.5N West of 69W
- Baltimore Canyon to Cape Charles Light to 100 NM Offshore
- Cape Charles Light to Currituck Beach Light to 100 NM Offshore
- Currituck Beach Light to Cape Hatteras to 100 NM Offshore
- Cape Hatteras to Cape Fear to 100 NM Offshore
- Cape Fear to 31N to 1000 FM
- East of 69W to The Hague Line between 1000 FM and 39N
- East of 69W and South of 39N to 250 NM Offshore
- Baltimore Canyon to 69W East of 1000 FM and South of 38.5N to 250 NM Offshore
- Baltimore Canyon to Hatteras Canyon between 100 NM and 250 NM Offshore
- Hatteras Canyon to Cape Fear between 100 NM and 250 NM Offshore
- Cape Fear to 31N East of 1000 FM to 250 NM Offshore

# Ocean Prediction Center

- Role of forecaster changing
  - Forecaster tools allow
    - Direct interaction with model forecasts
    - Production of forecaster generated grids
      - GRIBs
    - Offshore bulletins from grids
    - Potential for growth and new products





<http://new.nowcoast.noaa.gov/>

nowCOAST 5.0 Beta  
\*\* EXPERIMENTAL \*\*

Left-Click on Map for data values, hyperlinks or more information

Right-Click on Map for Weather Forecast at Inland & Coastal Locations

Layer Menu Legend

Current map scale: 1:9,244,649

Gridded Forecasts (NDFD)

Wind Velocity (Barbs)

- 5-knot Winds coming from West
- 15-knot Winds coming from East
- 50-knot Winds coming from West

Wind Speed



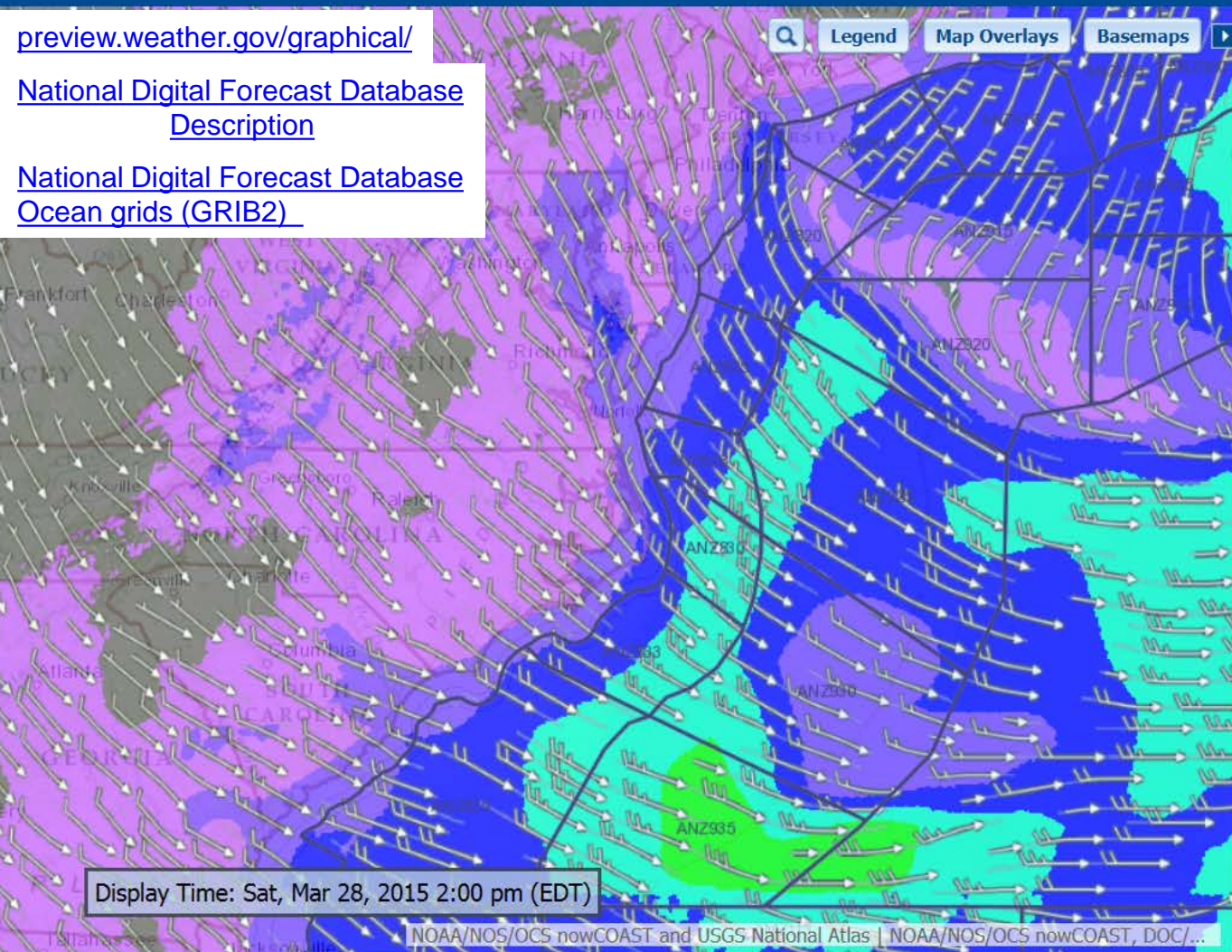
Tropical Cyclone Forecast & Observed Track

No active Tropical Cyclones at this time

U.S. Maritime Limits/Boundaries

- Overview
- Territorial Sea
- Contiguous Zone
- 🐟 US EEZ
- + Int'l Maritime Boundary
- 🚩 Int'l Maritime Boundary N' EEZ
- Eastern Special Area
- Territorial Sea
- + Int'l Boundary

[preview.weather.gov/graphical/](http://preview.weather.gov/graphical/)  
[National Digital Forecast Database Description](#)  
[National Digital Forecast Database Ocean grids \(GRIB2\)](#)



Display Time: Sat, Mar 28, 2015 2:00 pm (EDT)

Time Control

3/28 2:00 pm (EDT)





<http://new.nowcoast.noaa.gov/>

**nowCOAST 5.0 Beta**  
**\*\* EXPERIMENTAL \*\***

Left-Click on Map for data values, hyperlinks or more information

Right-Click on Map for **Weather Forecast** at Inland & Coastal Locations

**Layer Menu** **Legend**

Current map scale: 1:9,244,649

**Gridded Forecasts (NDFD)**

Significant Wave Height  
Forecast Issuance:  
Wed, Mar 25 8:00 pm (EDT)



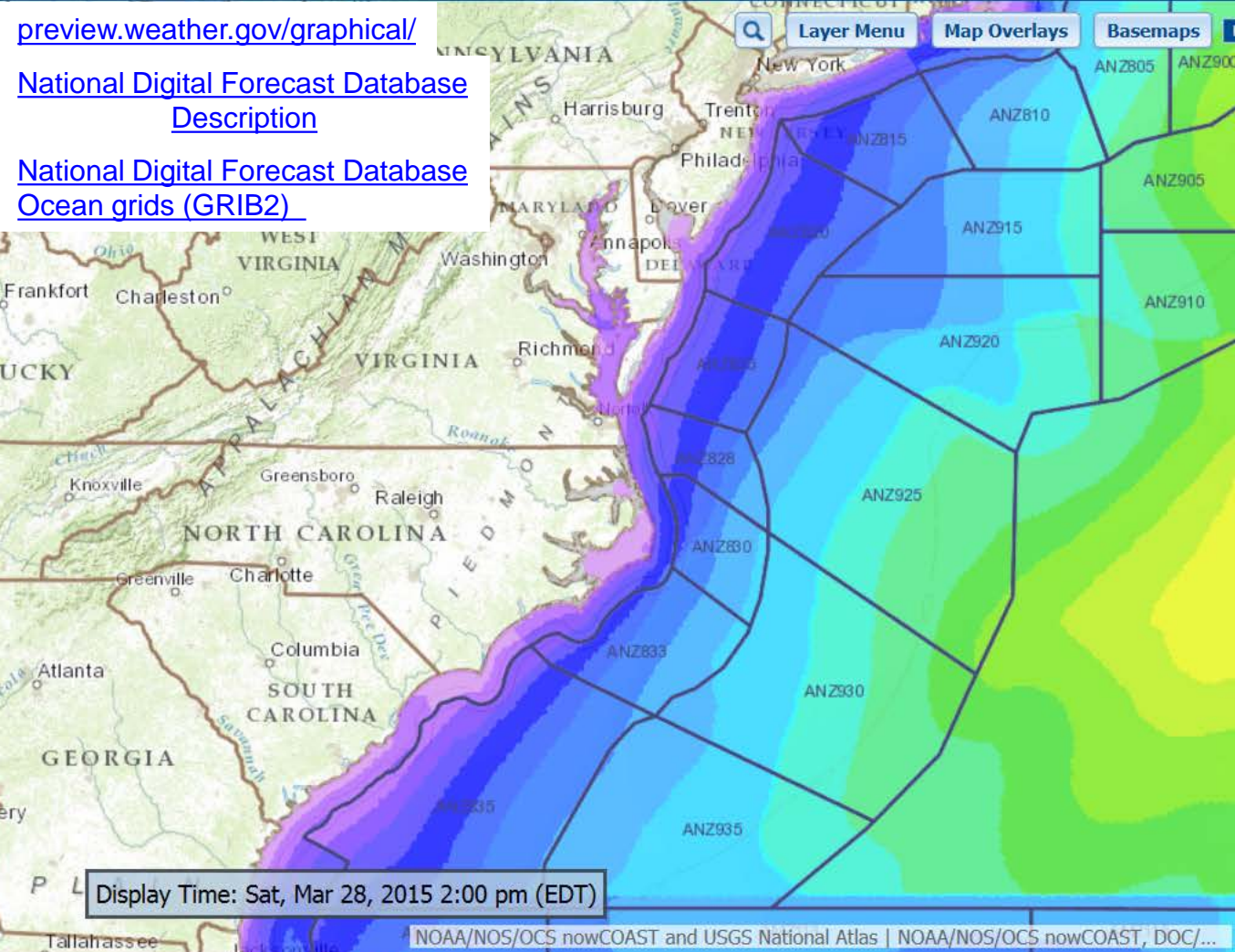
**Tropical Cyclone Forecast & Observed Track**

Observed Tracks are presently not available for storms in the Central Pacific  
Latest Issuance or Update Time:  
Wed, Mar 25 8:40 pm (EDT)  
No active advisories at this time

**U.S. Maritime Limits/Boundaries**

- Overview
- Territorial Sea
- Contiguous Zone
- US EEZ
- Int'l Maritime Boundary
- Int'l Maritime Boundary N' EEZ
- Eastern Special Area
- Territorial Sea
- Int'l Boundary

[preview.weather.gov/graphical/](http://preview.weather.gov/graphical/)  
[National Digital Forecast Database Description](#)  
[National Digital Forecast Database Ocean grids \(GRIB2\)](#)



Display Time: Sat, Mar 28, 2015 2:00 pm (EDT)

**Time Control**

3/28 2:00 pm (EDT)



**Viewer Settings** [star icon] [layers icon]







Local forecast by "City, St" or "ZIP"

Go

NCEP Newsletter

Marine Weather

- OPC Products
- Atlantic | Pacific
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- Special Support
- Experimental
- GRIB/GRIB2 data
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- Marine Weather Sites
- Forecast Support
- Quality Control
- Satellite Imagery
- Verification

Ocean Products

Coastal Guidance

Probabilistic Guidance

Environmental Prediction Guidance

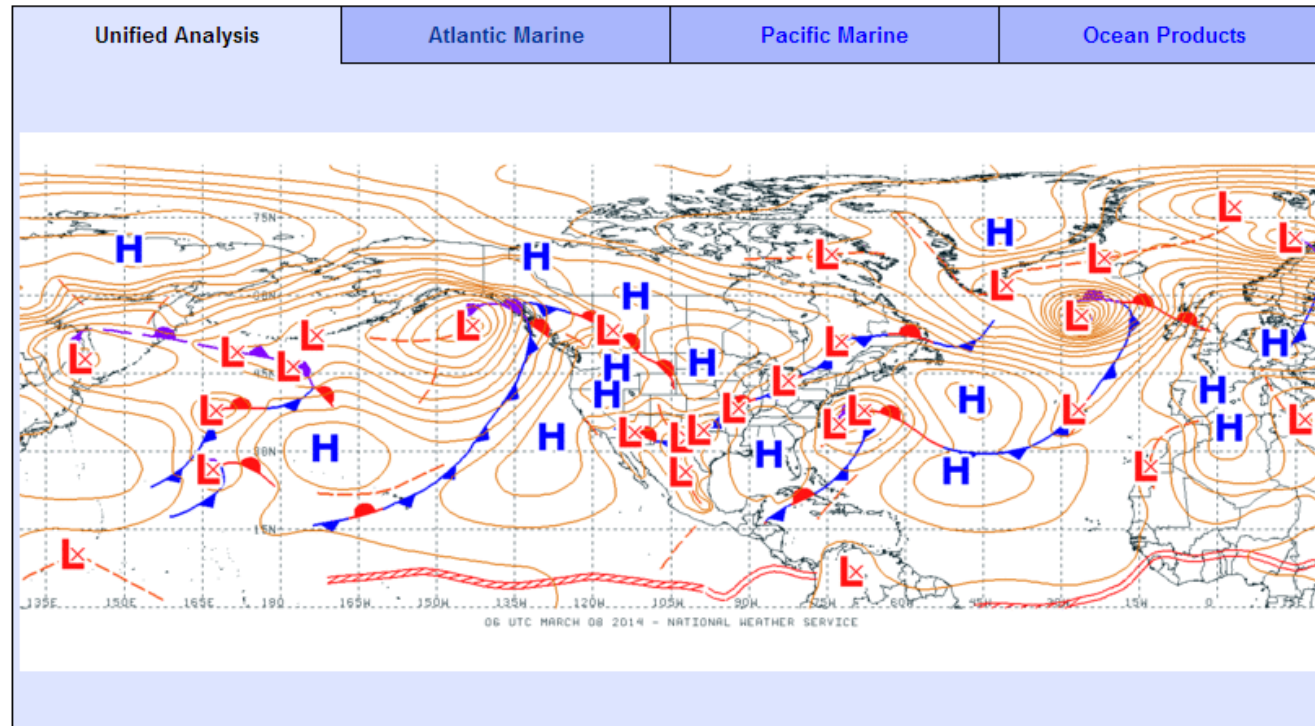
General Information

Contact Us



### Top News at the Ocean Prediction Center

- The SEVIRI RGB Airmass Product and the 00Z OPC Atlantic Surface... [\(see our March 08 Facebook post for more\)](#)
- Please note OPC's Facebook URL has changed to [www.facebook.com/NWSOPC](http://www.facebook.com/NWSOPC)
- Experimental lightning strike density product a useful tool for mariners
- New & smaller zones for the Offshore Waters Forecasts will be implemented April 1, 2014
- The Ocean Prediction Center has joined Twitter! Please follow us at: <https://twitter.com/NWSOPC>
- [News archive](#)



Last Update: Saturday, 08-Mar-2014 10:00:04 UTC

Click on the map above or choose from:

Unified Analysis Loops: Loop: [3] [7] [14] Days

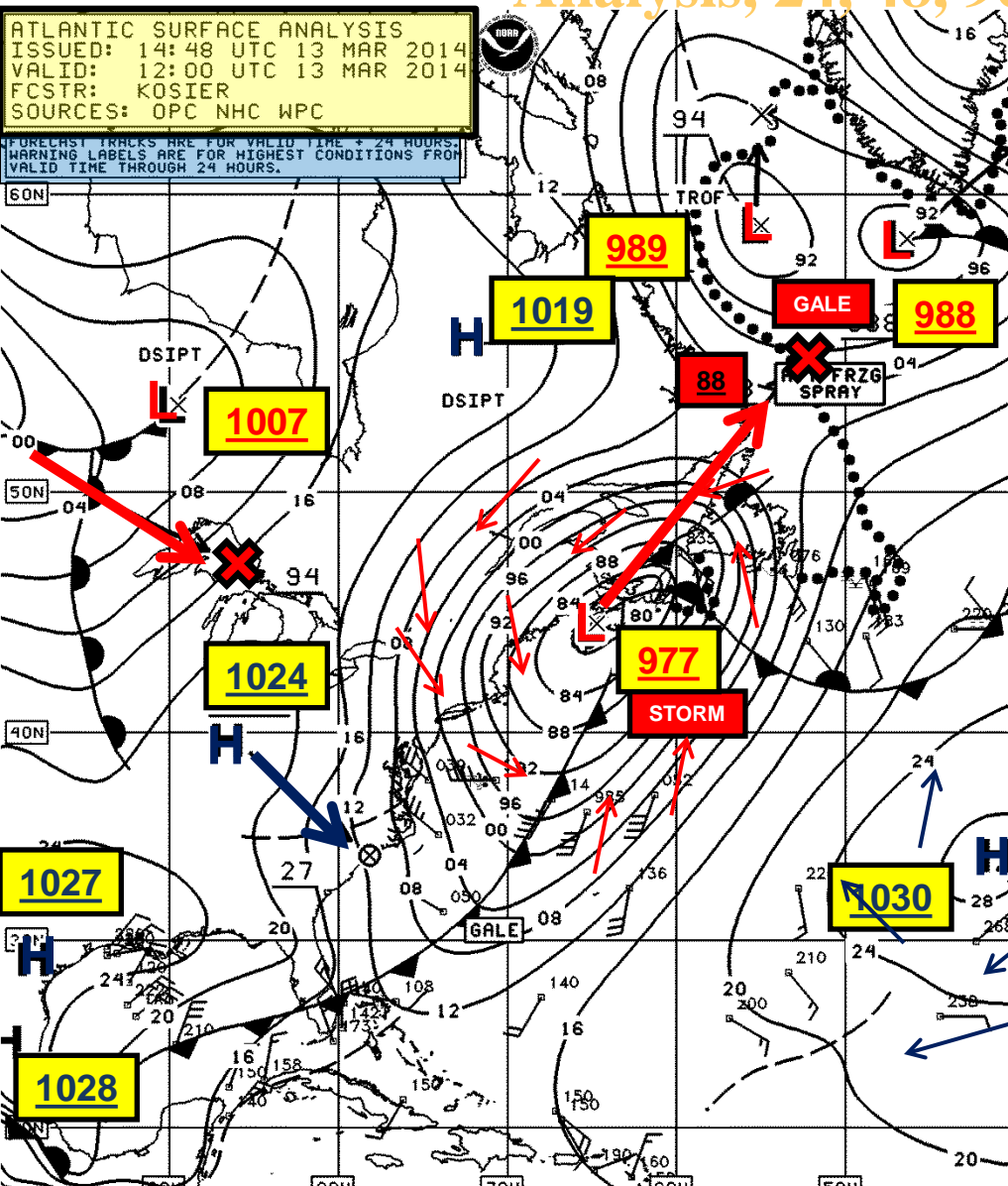
[Unified Surface Analysis Manual-PDF](#)

# Surface Charts

Analysis, 24, 48, 96 HR Forecasts

ATLANTIC SURFACE ANALYSIS  
 ISSUED: 14: 48 UTC 13 MAR 2014  
 VALID: 12: 00 UTC 13 MAR 2014  
 FCSTR: KOSIER  
 SOURCES: OPC NHC WPC

FORECAST TRACKS ARE FOR VALID TIME + 24 HOURS.  
 WARNING LABELS ARE FOR HIGHEST CONDITIONS FROM  
 VALID TIME THROUGH 24 HOURS.



**Fronts**  
**Observations**  
**Isobars**

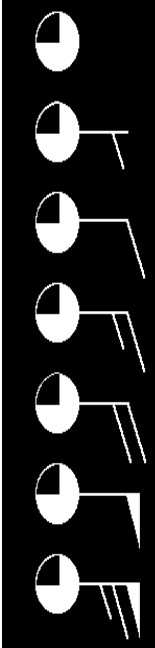
**Pressure Centers L, H**  
 L – rising air  
 converging  
 H- sinking air  
 diverging

**24 hr forecast position/  
 intensity**

**WARNINGS**

**Fronts** – warm, cold, occluded  
 boundaries between air of different temperature  
 - Pressure trough  
 - Wind shift  
 - Weather (rain, clouds)

**Global average sea level pressure**  
**1013.2 millibars**



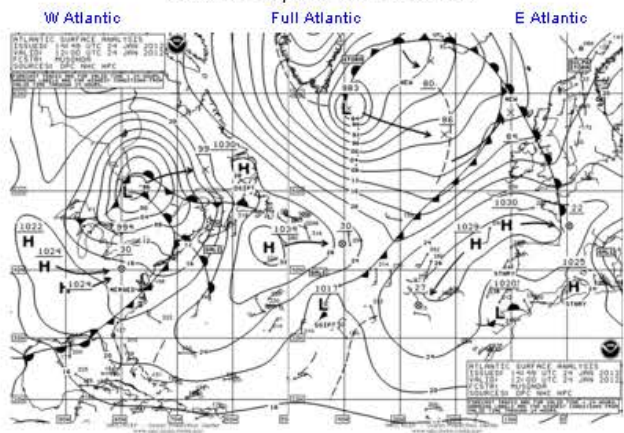
Calm  
 5 Knots  
 10 Knots  
 15 Knots  
 20 Knots  
 50 Knots  
 65 Knots

- OPC Products
- Atlantic | Pacific
- Mobile
- Experimental
- GRIB/GRIB2 data
- Product Guides
- Product Archive
- Fax Schedules
- Marine Weather Sites
- Forecast Support
- Quality Control
- Satellite Imagery
- Verification
- Ocean Products
- Coastal Guidance
- Probabilistic Guidance
- General Information
- Contact Us

### Atlantic Analysis

<http://www.opc.ncep.noaa.gov/shtml/atlsch.shtml>

Click on the map below or choose from:



Surface Analysis

W Atlantic Loop:  
[3] [7] [14] Days

Updated: Tue, 24-Jan-2012 15:00:13 UTC

E Atlantic Loop:  
[3] [7] [14] Days

Updated: Tue, 24-Jan-2012 15:00:13 UTC



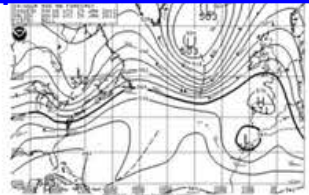
Wind and Wave Analysis

B&W Loop:  
[3] [7] [12] Days

Updated: Tue, 24-Jan-2012 16:04:11 UTC

### Atlantic Graphical Forecasts

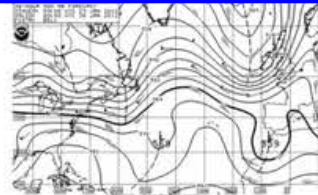
[http://www.vos.noaa.gov/MWL/dec\\_08/milibar\\_chart.shtml](http://www.vos.noaa.gov/MWL/dec_08/milibar_chart.shtml)



24-hour 500 mb

Loop: [3] [7] [14] Days

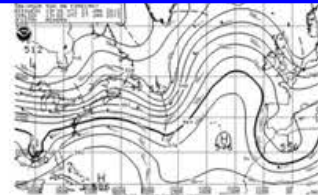
Updated: Tue, 24-Jan-2012 04:13:12 UTC



48-hour 500 mb

Loop: [3] [7] [14] Days

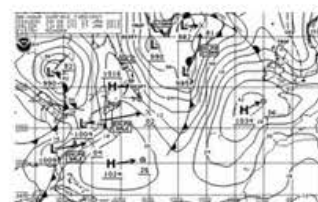
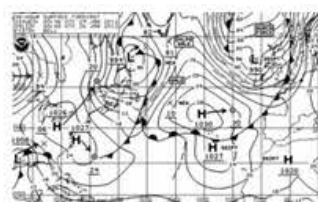
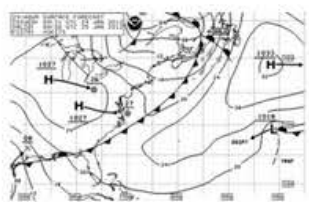
Updated: Tue, 24-Jan-2012 04:08:45 UTC



96-hour 500 mb

Loop: [3] [7] [14] Days

Updated: Mon, 23-Jan-2012 19:40:35 UTC



USA.gov  
Government Made Easy

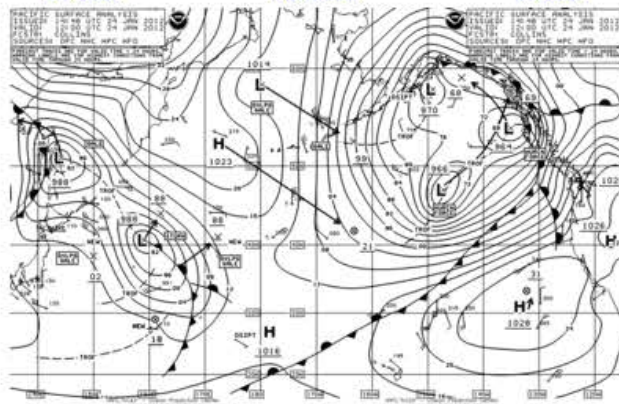
Find us on Facebook

### Pacific Analysis

<http://www.opc.ncep.noaa.gov/shtml/pacsch.shtml>

Click on the map below or choose from:

W Pacific      Full Pacific      E Pacific



Surface Analysis

W Pacific Loop:  
[3] [7] [14] Days

Updated: Tue, 24-Jan-2012 14:57:54 UTC

E Pacific Loop:  
[3] [7] [14] Days

Updated: Tue, 24-Jan-2012 14:57:53 UTC



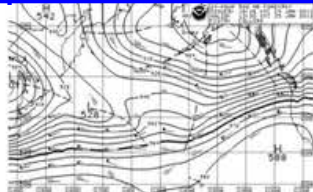
Wind and Wave Analysis

B&W Loop:  
[3] [7] [12] Days

Updated: Tue, 24-Jan-2012 15:36:03 UTC

### Pacific Forecasts

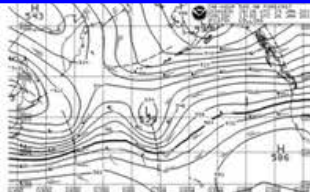
[http://www.vos.noaa.gov/MWL/dec\\_08/milibar\\_chart.shtml](http://www.vos.noaa.gov/MWL/dec_08/milibar_chart.shtml)



24-hour 500 mb

Loop: [3] [7] [14] Days

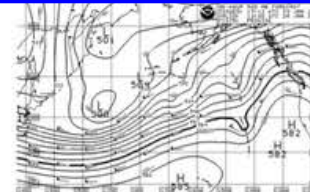
Updated: Tue, 24-Jan-2012 16:34:21 UTC



48-hour 500 mb

Loop: [3] [7] [14] Days

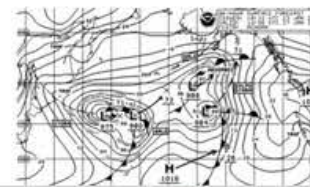
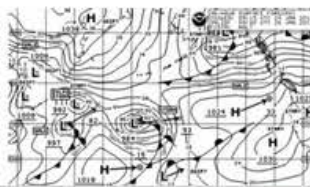
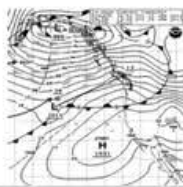
Updated: Tue, 24-Jan-2012 16:29:47 UTC



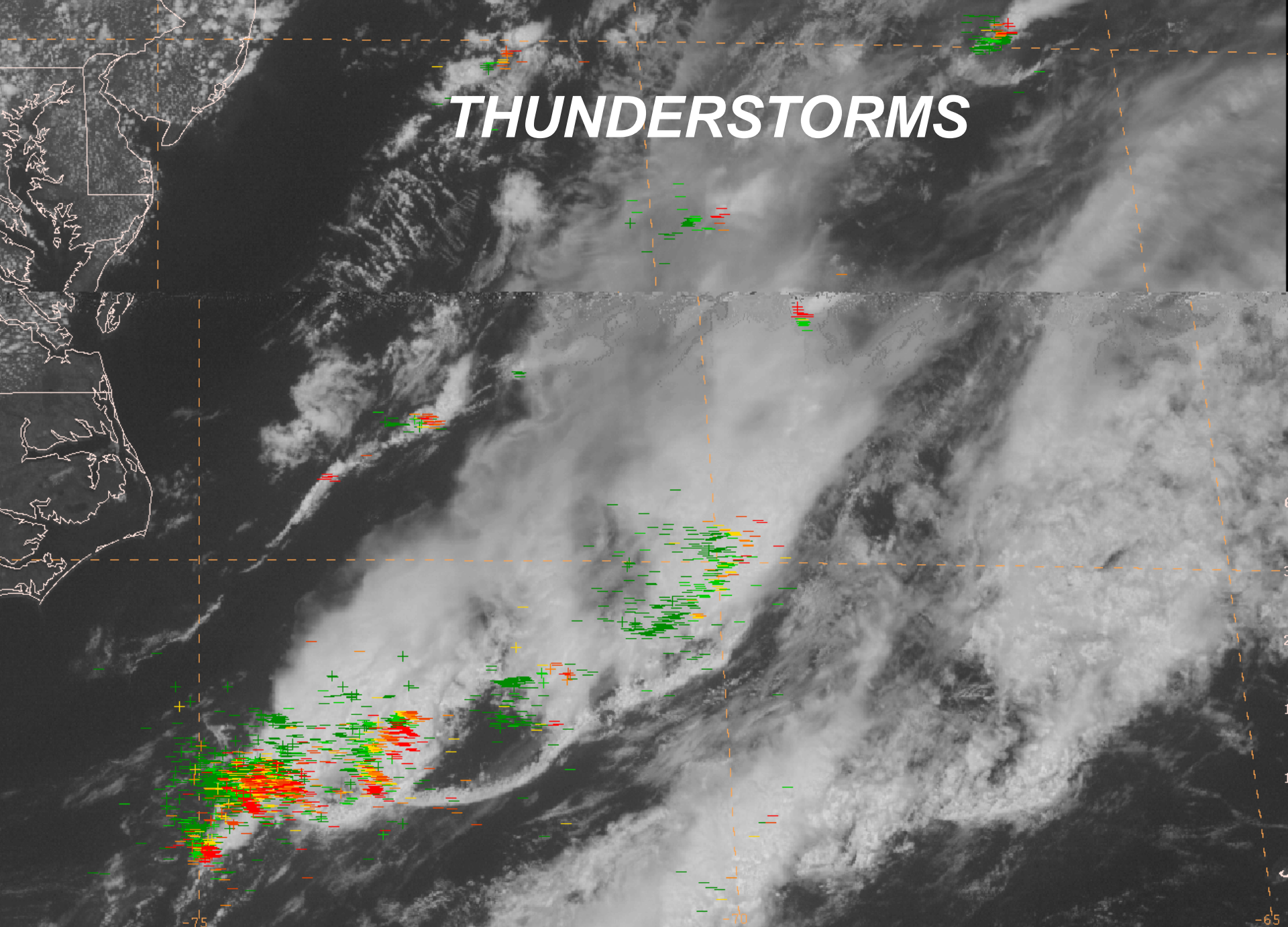
96-hour 500 mb

Loop: [3] [7] [14] Days

Updated: Tue, 24-Jan-2012 17:18:39 UTC



# THUNDERSTORMS



LTNG 090703/1645  
090703/1645 GOES12 VIS

-75

-70

-65

## Single Cell Storm

## Multicell cluster storm

## Multicell line storm

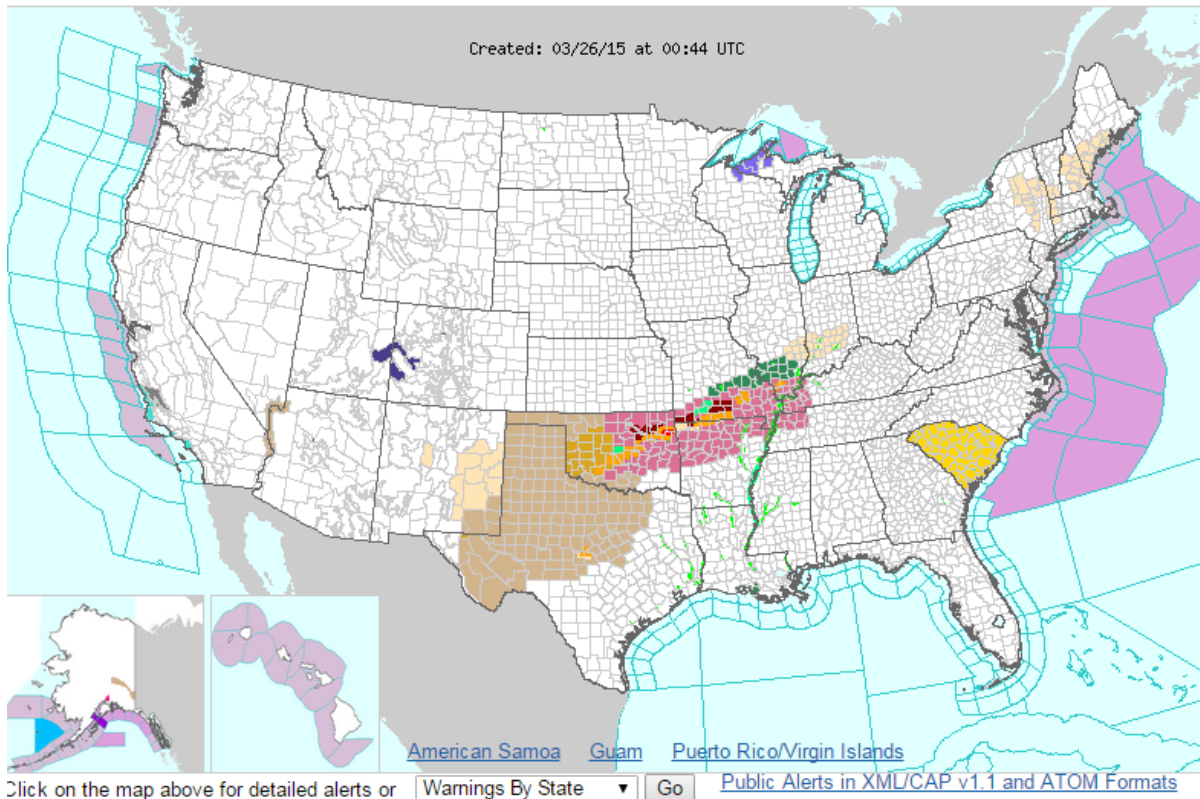
## Supercell storm

<https://www.meted.ucar.edu/>  
<http://www.nssl.noaa.gov/education/svrwx101/>  
<http://www.srh.noaa.gov/oun/?n=stormspotting-basics>  
[http://ww2010.atmos.uiuc.edu/\(Gh\)/guides/mtr/svr/home.rxml](http://ww2010.atmos.uiuc.edu/(Gh)/guides/mtr/svr/home.rxml)

## INCREASING

- **Shear**
  - Wind direction and speed with height
  - Separate up and down draft
- **Instability**
  - Potential
  - Fuel
- **Organization**
  - Structure
- **Lifespan**
  - Minutes to hours
- **Severity**
  - Minor damage
  - Catastrophic

2009 7 25



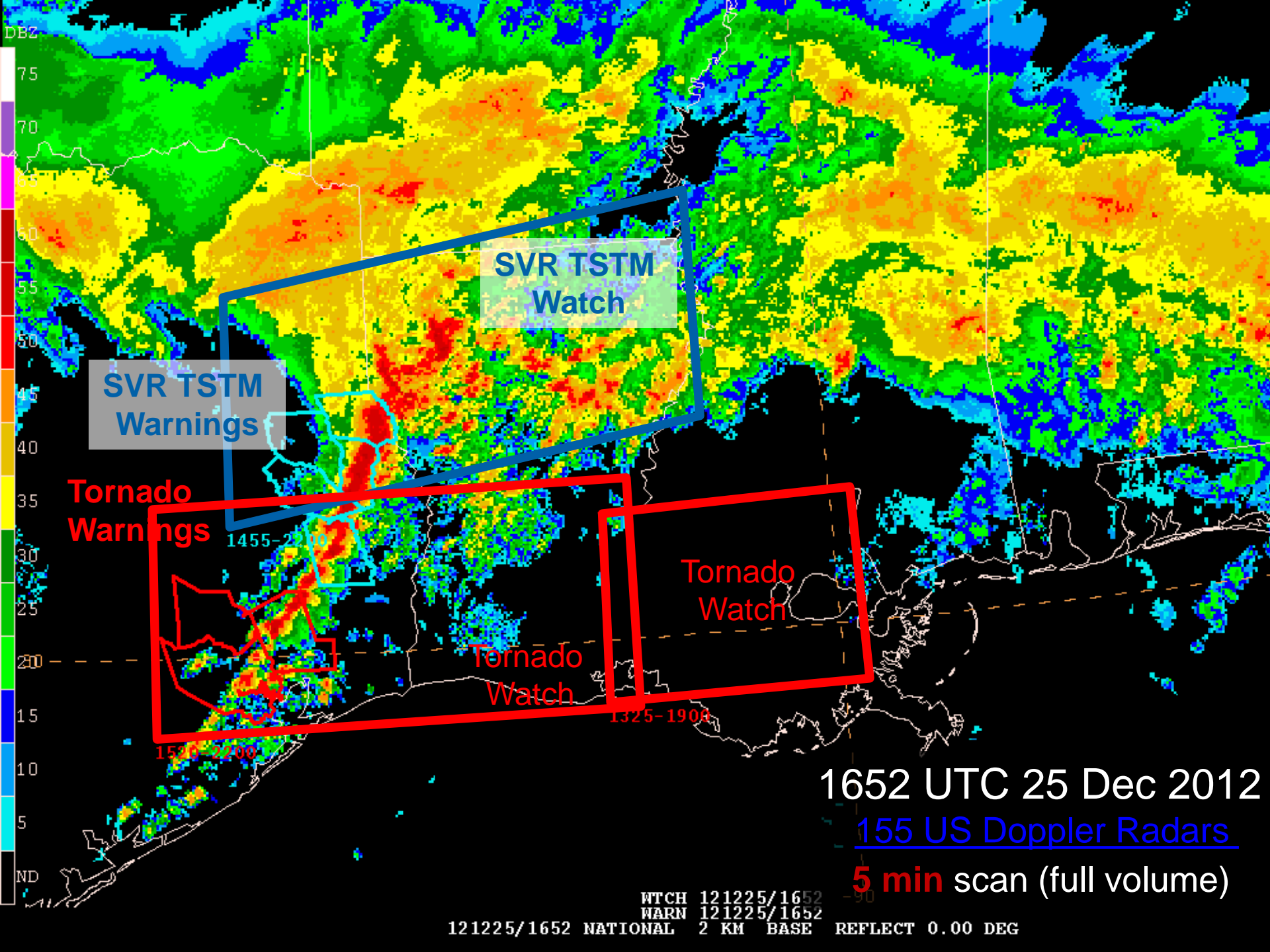
- |                             |                           |                                    |                           |
|-----------------------------|---------------------------|------------------------------------|---------------------------|
| Tornado Warning             | Severe Thunderstorm Watch | Heavy Freezing Spray Warning       | Beach Hazards Statement   |
| Severe Thunderstorm Warning | Flash Flood Watch         | Small Craft Advisory For Rough Bar | Flood Watch               |
| Flash Flood Warning         | Gale Warning              | Small Craft Advisory For Winds     | Special Weather Statement |
| Severe Weather Statement    | Freeze Warning            | Small Craft Advisory               | Air Quality Alert         |
| High Wind Warning           | Red Flag Warning          | Brisk Wind Advisory                |                           |
| Storm Warning               | Winter Weather Advisory   | Wind Advisory                      |                           |
| Flood Warning               | Flood Advisory            | Child Abduction Emergency          |                           |

**WATCH** - the **risk** of a hazardous weather event **has increased significantly**, but its occurrence, location, and/or timing is still uncertain. It is intended to provide enough lead time so that those who need to set their plans in motion can do so..

**Tornado Severe Thunderstorm Storm Prediction Center**

**WARNING** - hazardous weather ***is occurring, is imminent, or has a very high probability of occurring.*** A warning is used for conditions posing a **threat to life and property.**

**Tornado Severe Thunderstorm Local Weather Forecast Office**



SVR TSTM  
Watch

SVR TSTM  
Warnings

Tornado  
Warnings

Tornado  
Watch

Tornado  
Watch

1652 UTC 25 Dec 2012

155 US Doppler Radars

5 min scan (full volume)

WTCH 121225/1652  
WARN 121225/1652  
121225/1652 NATIONAL 2 KM BASE REFLECT 0.00 DEG



# *CUMULUS CLOUDS*

## *Cumulonimbus*

**MATURING**

**GROWING**

**GROWING**

**GROWING**

**NEW**

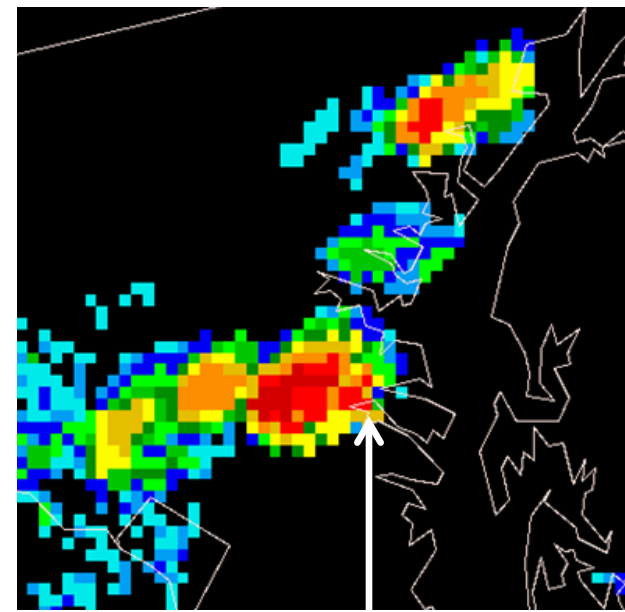


**MATURING**  
**Spreading out**

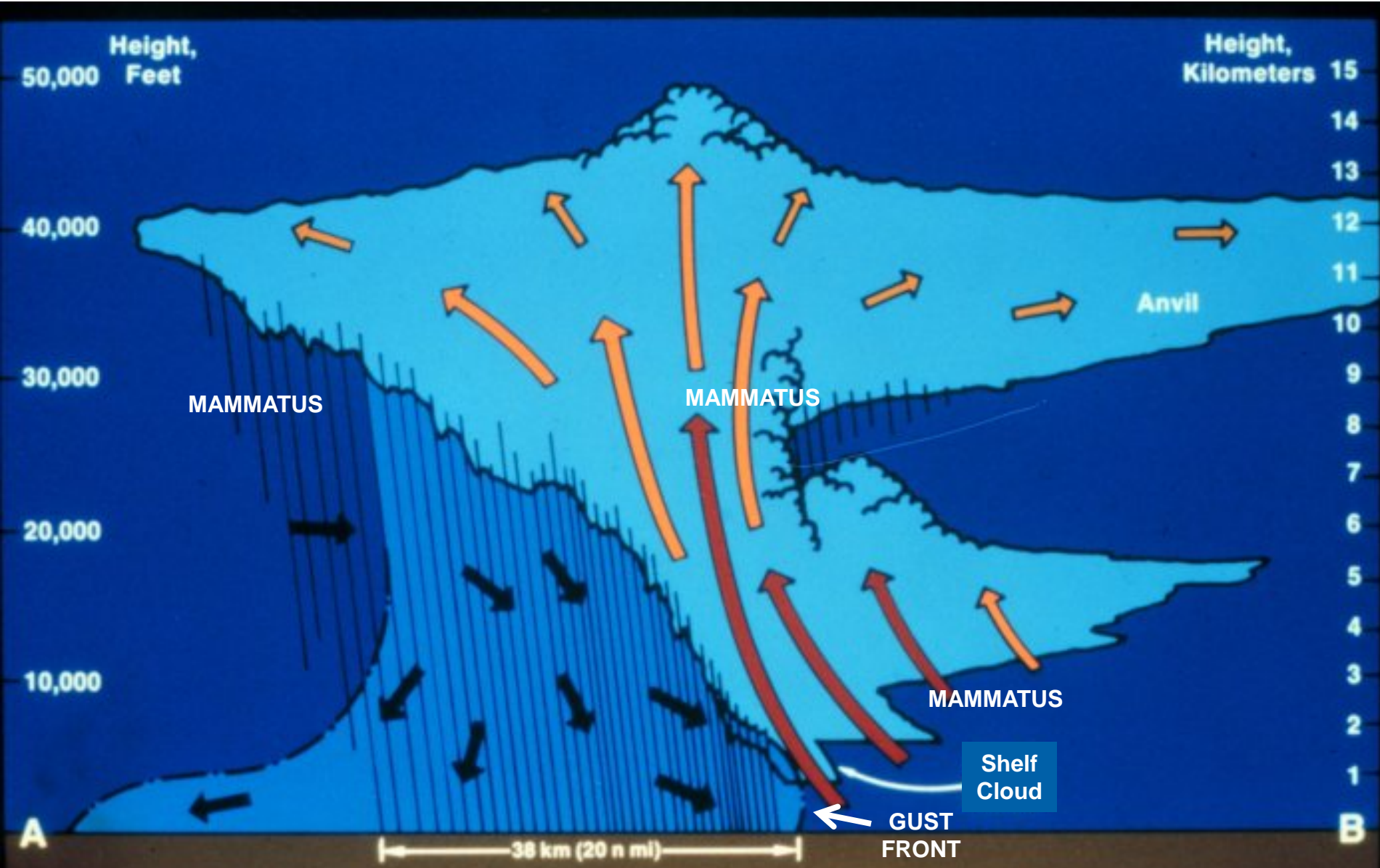
**GROWING**

**Anvil**  
**Ice cloud**

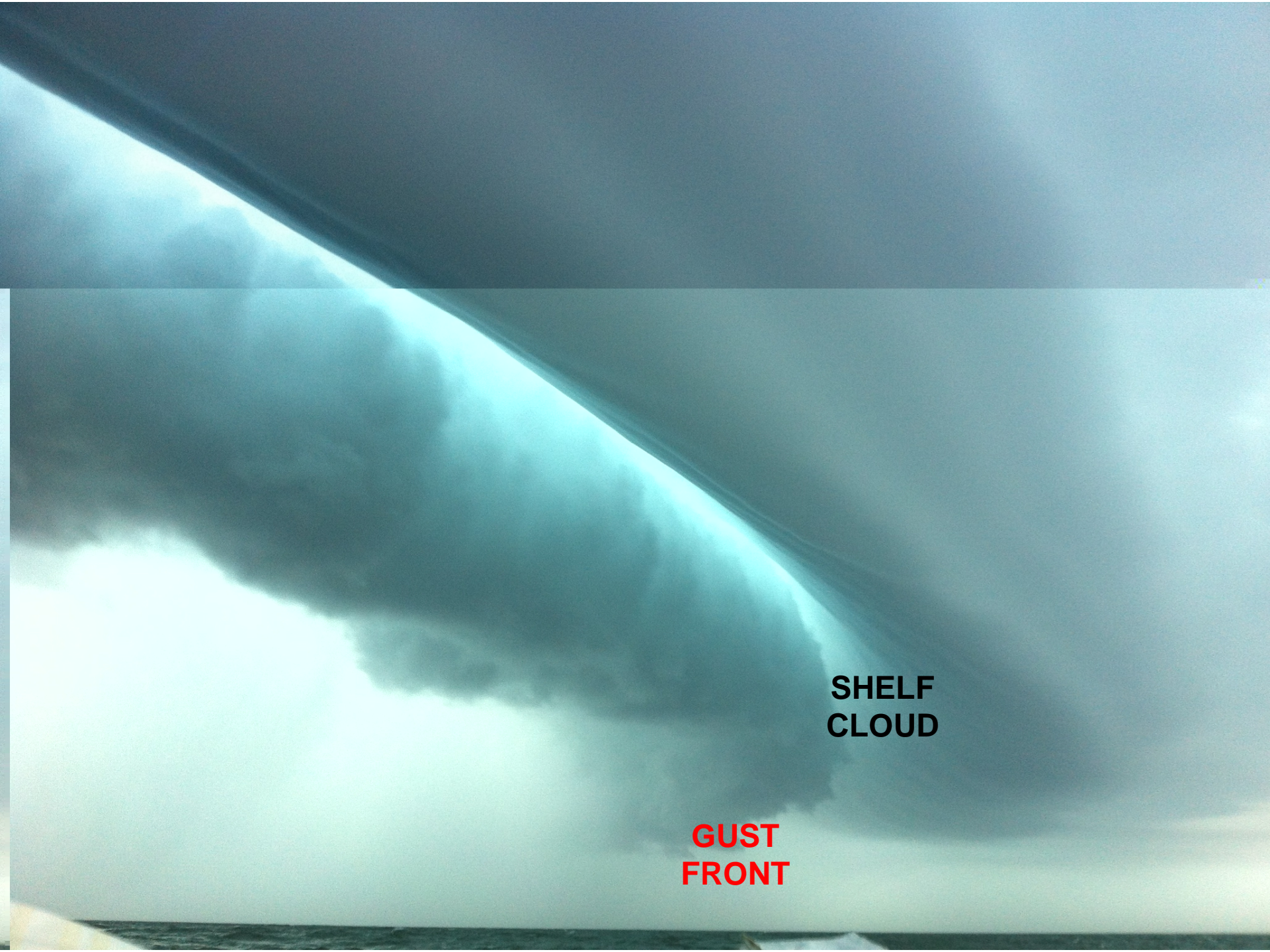
**GROWING**



# SQUALL LINES



**SCHEMATIC CROSS SECTIONAL VIEW OF SQUALL LINE**



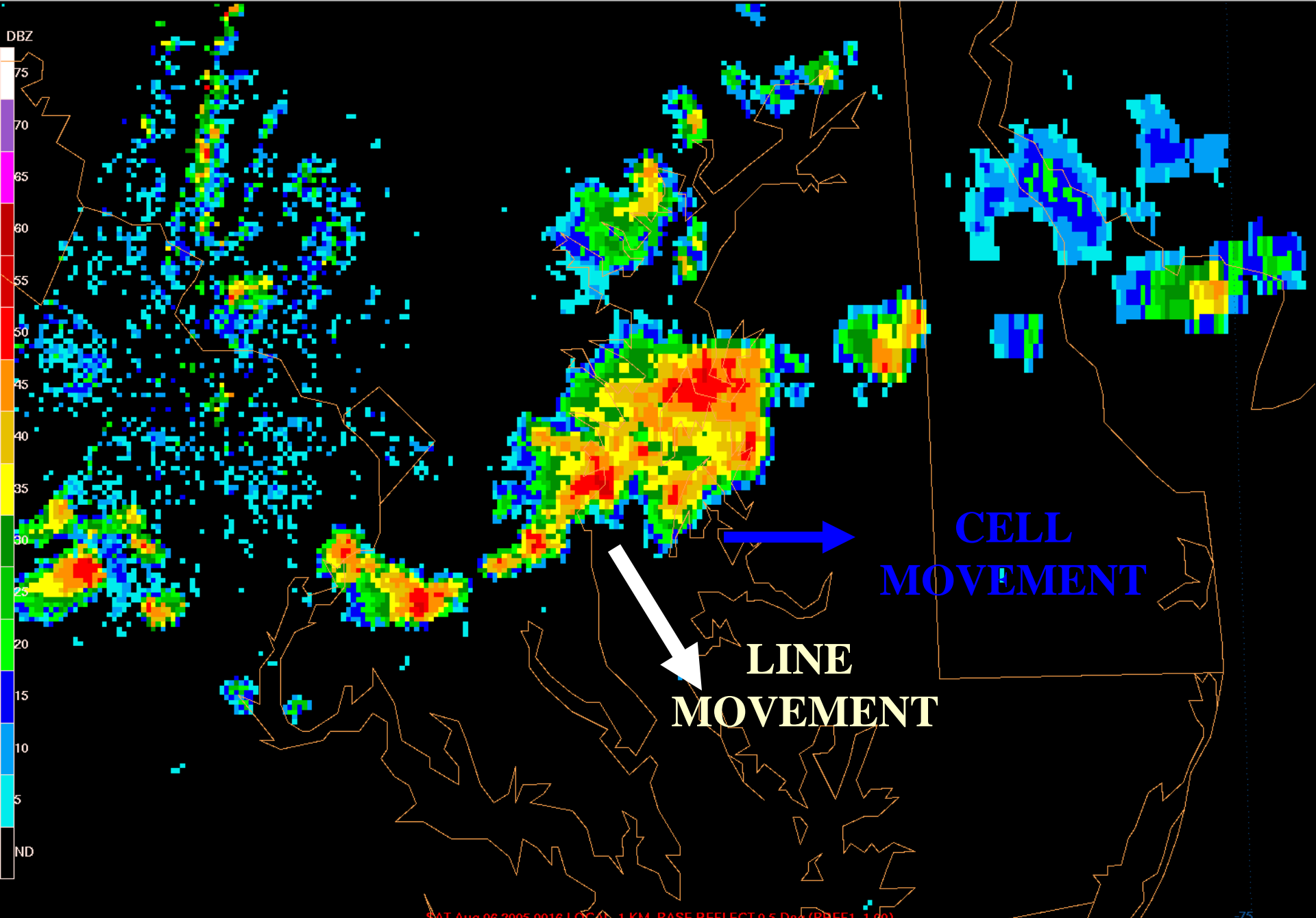
**SHELF  
CLOUD**

**GUST  
FRONT**

# MAMMATUS



**GREEN TINGE – potential for HAIL**<sup>30</sup>



SAT Aug 06 2005 0016 LOCAL 1 KM BASE REFLECT 0.5 Deg (BREF1\_1.00)



# THUNDERSTORM TIPS



**Know the forecast!**

**NOAA WX Radio, [weather.gov](http://weather.gov)**

**Fronts, troughs, boundaries**

**Watch the sky!!! ACT EARLY!!!!**

**Smart phone, laptop (NWS radar), Satellite Radio**

***Beware of false sense of security!***

**Gulf Stream**

**Flow parallel to the Stream**

**Maximum activity at night**

**AM Radio, Radar (rain clutter/sea clutter)**

**Squall Drill?**

2009 7 25



A satellite image of the Atlantic Ocean showing several tropical weather systems. The image is overlaid with a dashed orange grid. The systems are labeled in red text: Hurricane "Danielle" (top left), Tropical Storm "Earl" (center), Tropical Wave became T.S. Fiona Aug 30th (bottom center), and Wave over Africa (bottom right). The landmasses of North and South America are visible on the right side of the image.

# Tropical Storms and Hurricanes

<http://www.nhc.noaa.gov/>

**Hurricane  
"Danielle"**

**Tropical Storm  
"Earl"**

**Tropical Wave  
became T.S. Fiona  
Aug 30th**

**Wave over Africa**



# Average Atlantic Hurricane Season

9.8 named storms

5.8 Hurricanes

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

**2014**

8 “named” storms

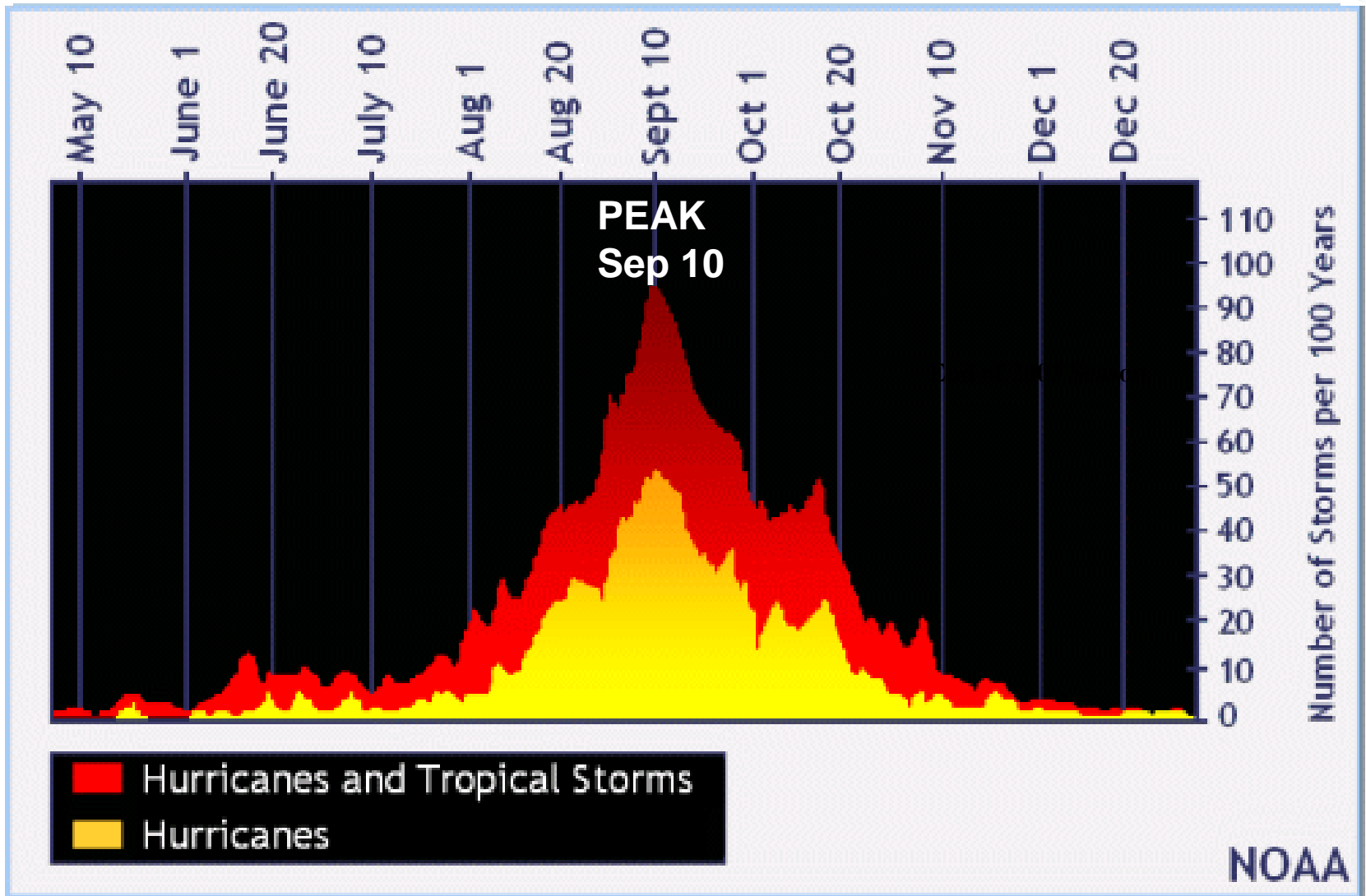
4 Hurricanes

**A Slightly Below Average Season**



<http://www.nhc.noaa.gov/data/tracks/tracks-at-2013.png>





<http://www.nhc.noaa.gov/climo/>



# Dealing with Hurricane Season

- **Know the climatology...formation areas and favored tracks**

<http://www.nhc.noaa.gov/pastprofile.shtml>

- **Know where to receive latest information, continue to monitor!!!**

<http://www.weather.gov>

- **We continue to get better at forecasting track and formation!**

[http://www.nhc.noaa.gov/verification/figs/OFCL\\_ATL\\_trk\\_error\\_trend.gif](http://www.nhc.noaa.gov/verification/figs/OFCL_ATL_trk_error_trend.gif)

- **Intensity still a big challenge!!!**

[http://www.nhc.noaa.gov/verification/figs/OFCL\\_ATL\\_int\\_error\\_trend.gif](http://www.nhc.noaa.gov/verification/figs/OFCL_ATL_int_error_trend.gif)

- **Have seen more cyclones later in season...**

- **Hurricanes are just as dangerous in the northern latitudes**

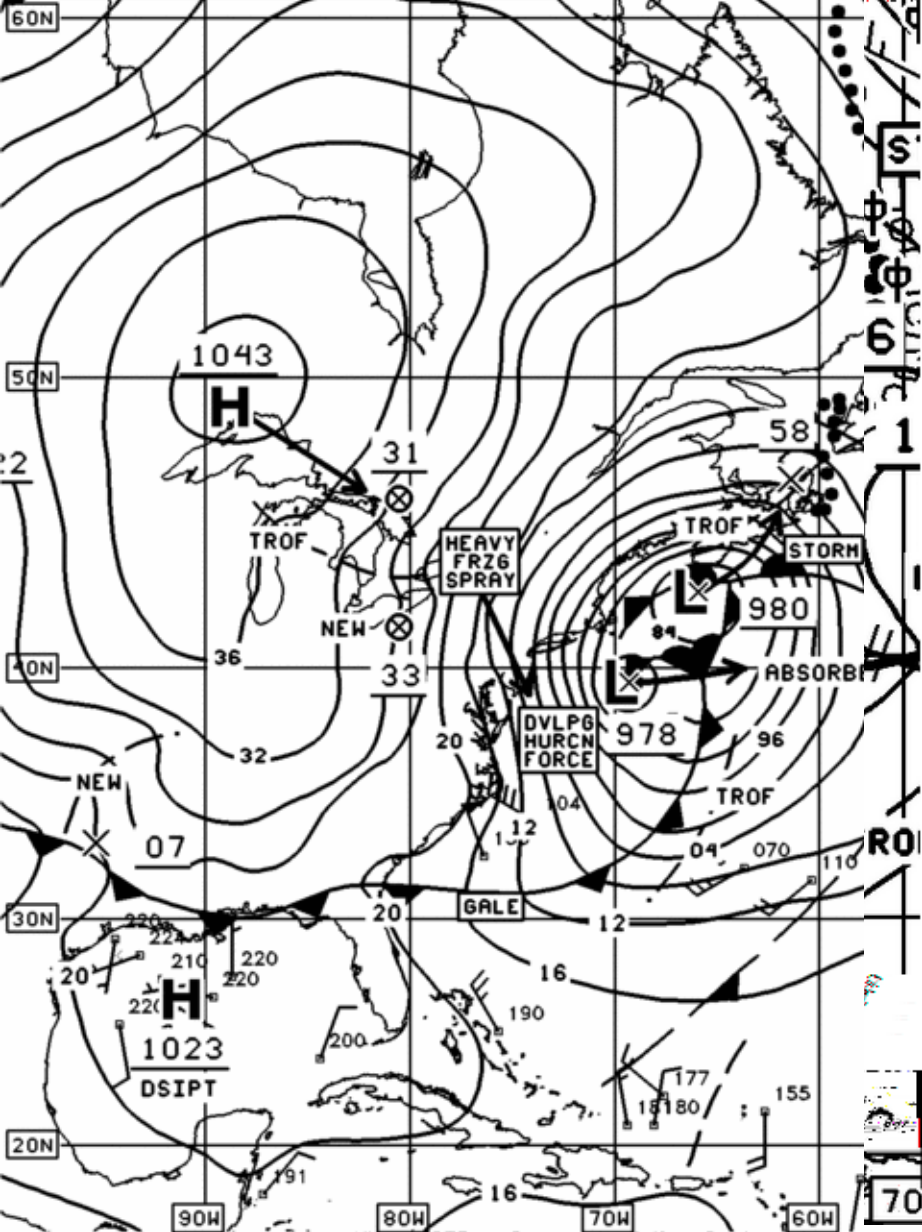
- **They move faster and are more efficient wave producers**

# USCG Search and Rescue 15 February 2015

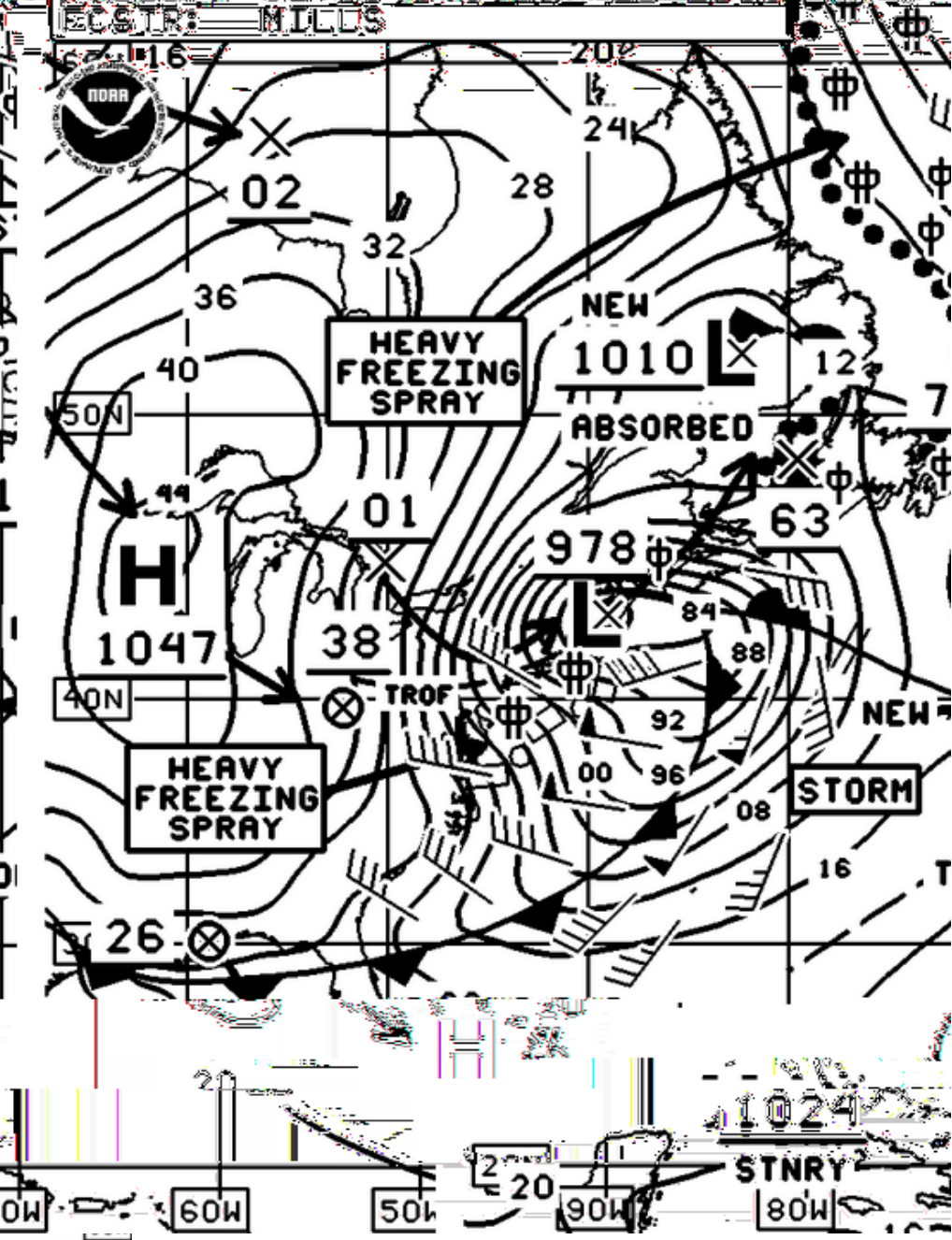


**ANTIC SURFACE ANALYSIS**  
 ISSUED: 15:04 UTC 15 FEB 2015  
 VALID: 12:00 UTC 15 FEB 2015  
 FCSTR: COLLINS  
 SOURCES: OPC NHC WPC

FORECAST TRACKS ARE FOR VALID TIME + 24 HOURS.  
 WARNING LABELS ARE FOR HIGHEST CONDITIONS FROM  
 VALID TIME THROUGH 24 HOURS.



**96-HOUR SURFACE FORECAST**  
 ISSUED: 17:59 UTC 11 FEB 2015  
 VALID: 12:00 UTC 15 FEB 2015  
 FCSTR: MILLS





## **Before departing**

- **Departure time may be the single most important decision.**
- **Know the forecast...and update!**
- **Monitor the weather via Internet....same products...get in rhythm**
- **Private weather routing service?**
- **Know your limitations (criteria)!**

## **Underway**

- **Monitor the weather...**
  - **watch keeping/navigation**
  - **wind speed and/or direction changes, barometer, seas**
  - **know what to anticipate**
- **Is the weather evolving as planned?**
  - **If not...determine and redefine options**
- **KNOW THE CURRENT FORECAST!!!**
  - **Weatherfax, SSB, NOAA WX RADIO, ftpmail, etc...**

