WEATHER AWARENESS

Joe Sienkiewicz

Chief, Ocean Applications Branch

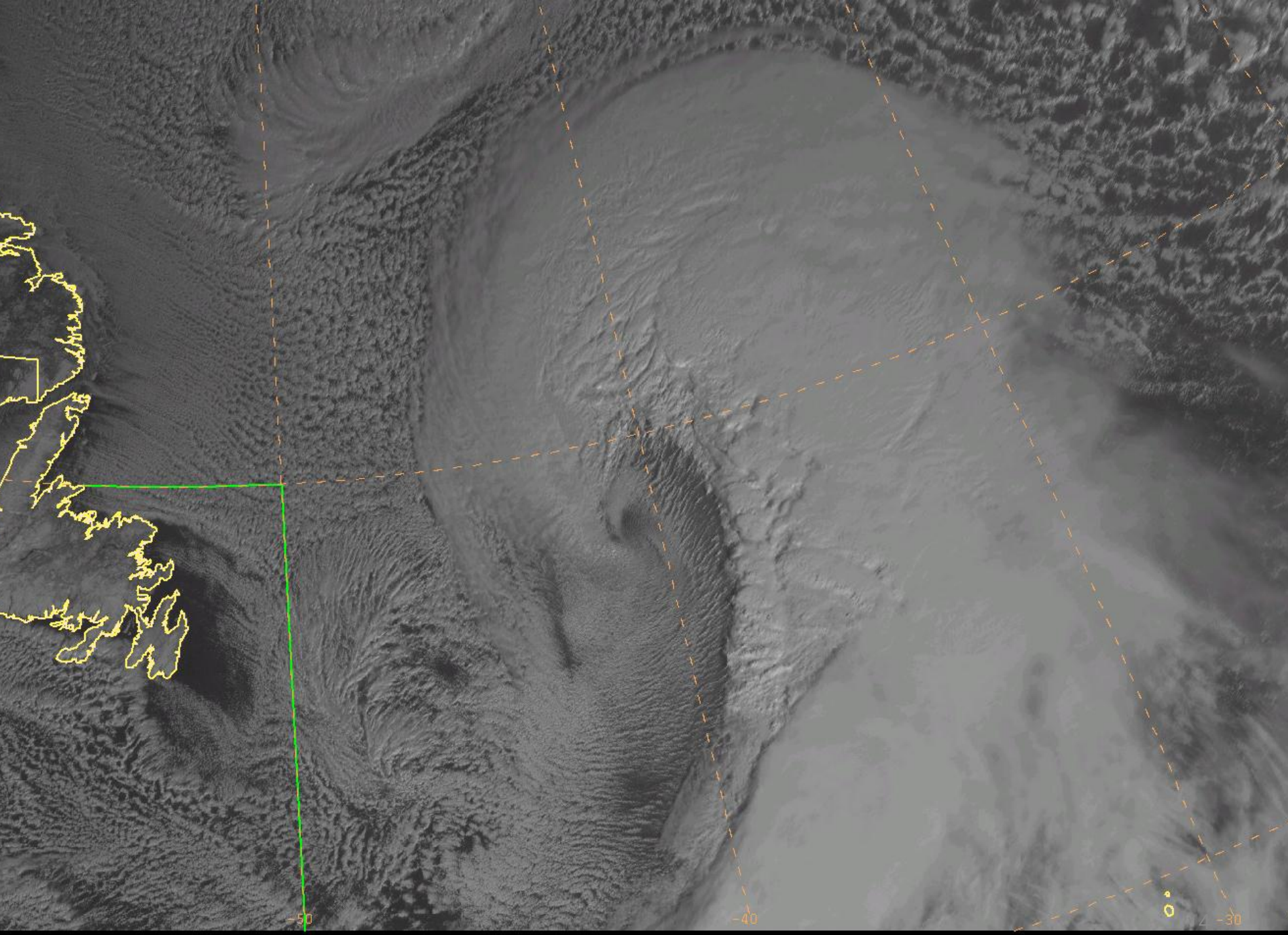
Science and Operations Officer

NOAA National Weather Service

Ocean Prediction Center

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

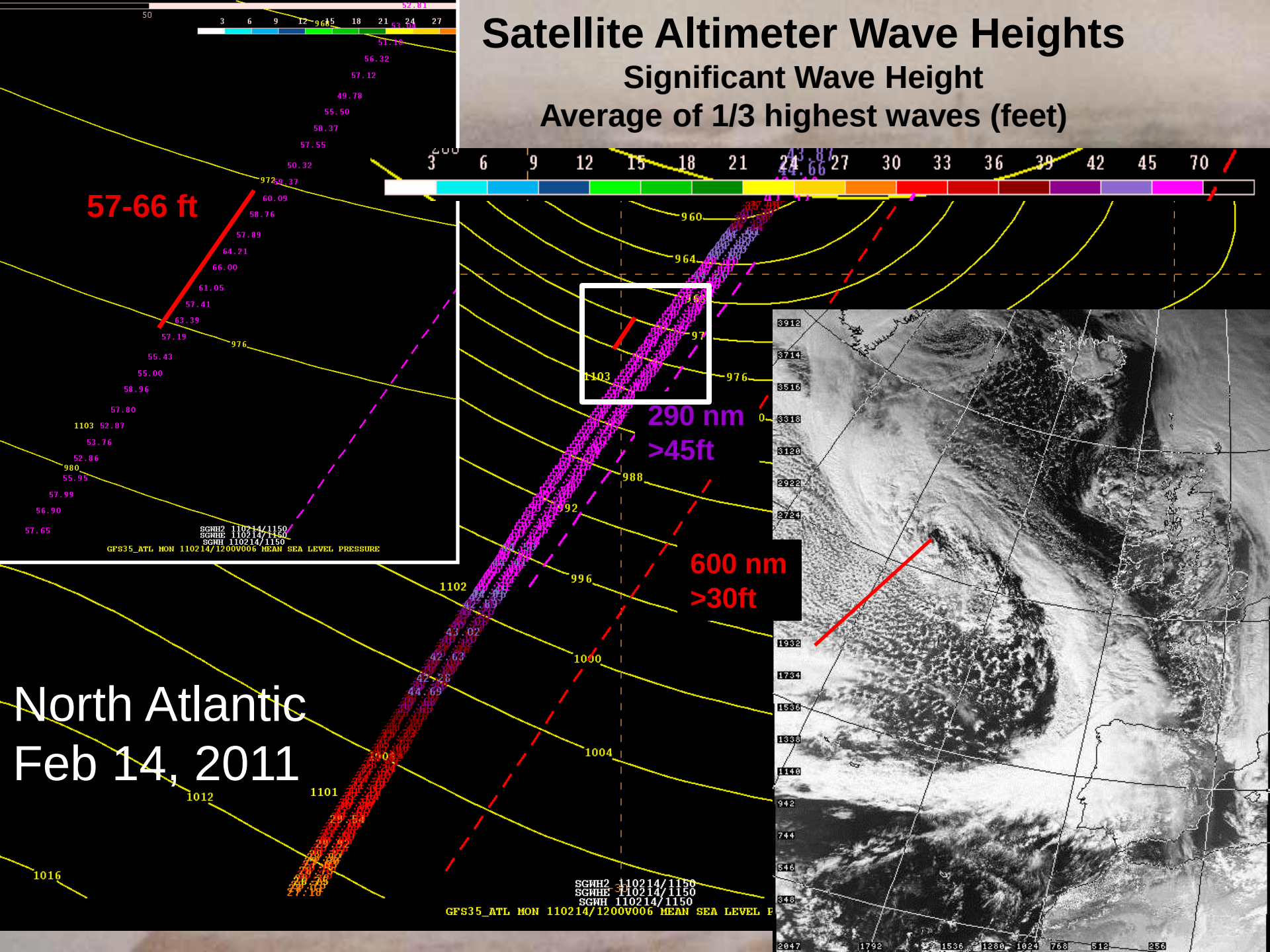
http://www.facebook.com/OceanPredictionCenter



110211/1315 GOES13 VIS

Satellite Altimeter Wave Heights

Significant Wave Height
Average of 1/3 highest waves (feet)



NWS / Ocean Prediction Center
mission/responsibility

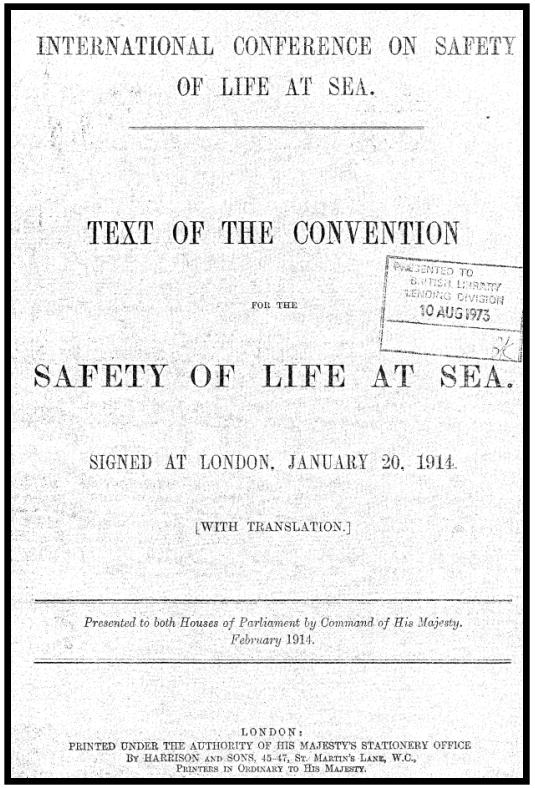
- Protection of life and property, safety at sea, and enhancement of economic opportunity
  - Issue Warnings and Forecasts

- 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



INTERNATIONAL CONFERENCE ON SAFETY OF LIFE AT SEA.

TEXT OF THE CONVENTION

FOR THE

SAFETY OF LIFE AT SEA.

SIGNED AT LONDON, JANUARY 20, 1914.

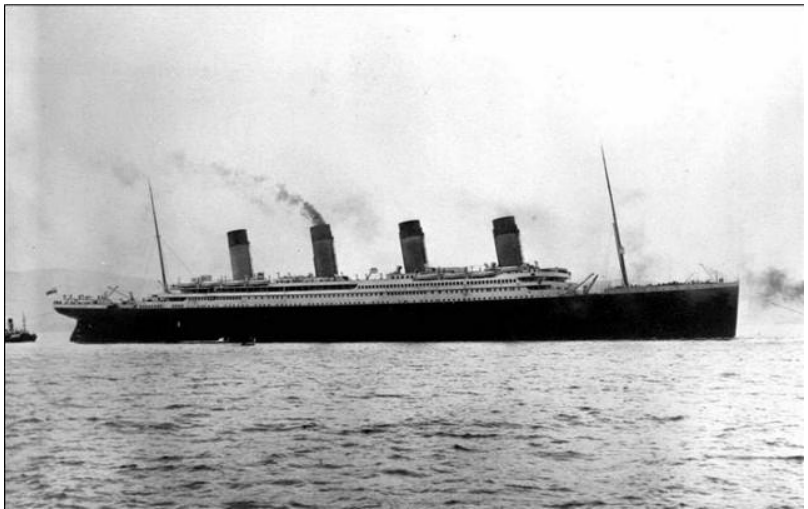
[WITH TRANSLATION.]

Presented to both Houses of Parliament by Command of His Majesty. February 1914.

LONDON:
PRINTED UNDER THE AUTHORITY OF HIS MAJESTY'S STATIONERY OFFICE
BY HARRISON AND SONS, 45-47, ST. MARTIN'S LANE, W.C.,
PRINTERS IN ORDINARY TO HIS MAJESTY.

PRESENTED TO BRITISH LIBRARY LENDING DIVISION 10 AUG 1973

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



Safety of Life At Sea, 1974

http://www.imo.org

- Chapter IV – Radio Communication
  - GMDSS

    http://www.navcen.uscg.gov/?pageName=GMDSS
- Chapter V – Safety of Navigation
  - Meteorological services

www.opc.ncep.noaa.gov

National Oceanic and Atmospheric Administration's

National Weather Service

Site Map | News | Organization | Search

Local forecast by "City, St"

City, St Go

Sign-up for Email Alerts

XML RSS Feeds

Warnings
- Current
- By State/County...
- UV Alerts

Observations
- Radar
- Satellite
- Snow Cover
- Surface Weather...
- Observed Precip

Forecasts
- Local
- Graphical
- Aviation
- Marine
- Hurricanes
- Severe Weather
- Space Weather
- Fire Weather

Text Bulletins
- By State
- By Message Type
- National

Forecast Models
- Numerical Models
- Statistical Models...
  - MOS Prod
  - GFS-LAMP Prod

Climate
- Past Weather
- Predictions

Weather Safety
- Weather Radio
- Hazard Assmt...
- StormReady / TsunamiReady
- Skywarn™

Education/Outreach

Information Center
- Tsunamis
- Publications...

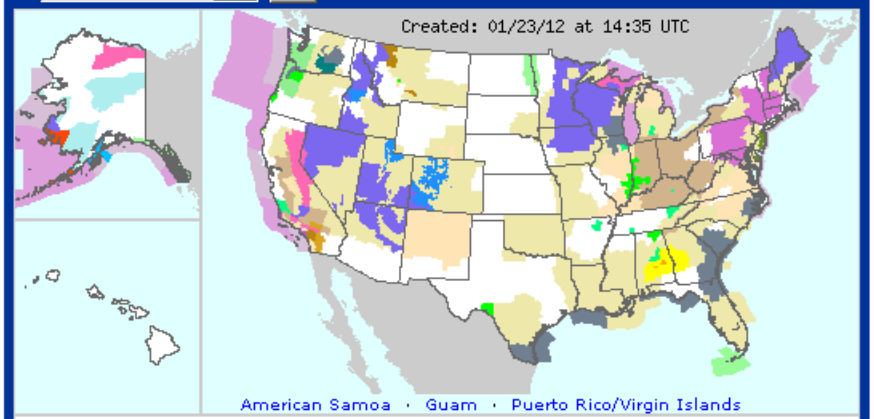
...Rare Wintertime Severe Thunderstorm Outbreak Possible in the Mid-South...

Published: Sun, 22 Jan 2012 18:29:10 EST

The NWS Storm Prediction Center is forecasting the development of tornadoes, widespread damaging winds and hail over parts of the Mississippi Valley, Lower Ohio Valley and Tennessee Valley through early Monday. Eastern Arkansas, northern Mississippi and western Tennessee could potentially see strong tornadoes. The storms will be especially dangerous since they will occur after dark. Details...

Warnings & Forecasts | Graphical Forecasts | National Maps | Radar | Water | Air Quality | Satellite | Climate

Warnings By State Go — Click Below To Zoom In. — Tabs At A Glance



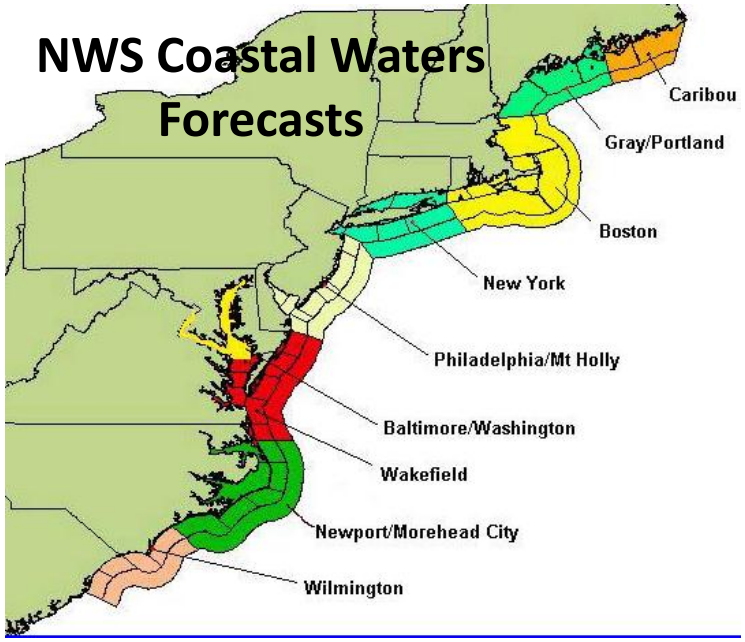
- Severe Thunderstorm Warning
- Flash Flood Warning
- Blizzard Warning
- Winter Storm Warning
- High Wind Warning
- Avalanche Warning
- Tornado Watch
- Severe Weather Statement
- Flood Warning
- Hazardous Seas Warning
- Gale Warning
- Wind Chill Warning
- Freezing Rain Advisory
- Winter Weather Advisory
- Wind Chill Advisory
- Flood Advisory
- Coastal Flood Advisory
- High Surf Advisory
- Heavy Freezing Spray Warning
- Small Craft Advisory
- Brisk Wind Advisory
- Dense Fog Advisory
- Lake Wind Advisory
- Wind Advisory
- Freezing Fog Advisory
- Coastal Flood Watch
- High Wind Watch
- Gale Watch
- Air Quality Alert
- Coastal Flood Statement
- Special Weather Statement
- Marine Weather Statement
- Hazardous Weather Outlook
- Hydrologic Outlook
- Short Term Forecast

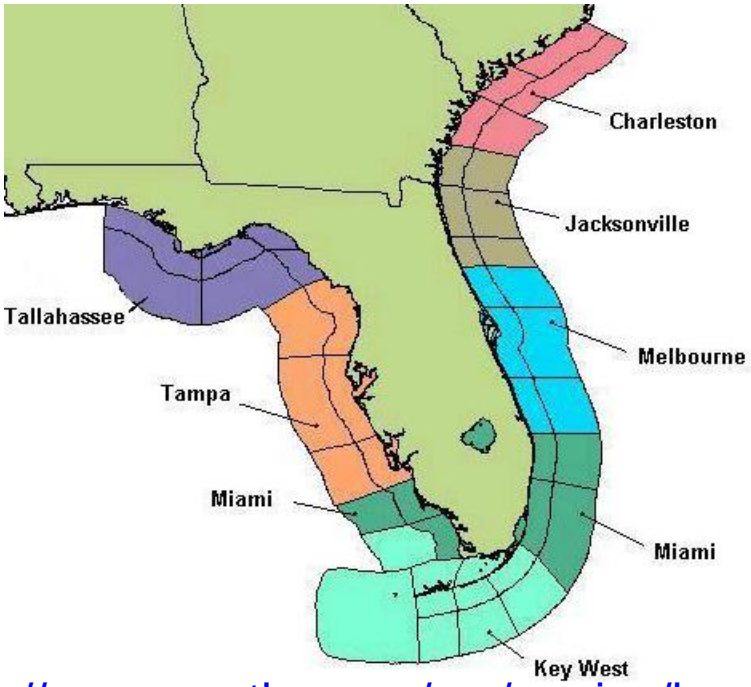
High Res | Map FAQ | Map Comments | What is UTC?

Warnings	Forecasts	Climate	Information Center	Administrative
Current	Local	Past Weather	Tsunamis	Headquarters
State/County	Graphical	Predictions	Publications	For NWS

weather.gov

NWS Coastal Waters Forecasts





http://www.weather.gov/om/marine/home.htm

Your National Weather Service forecast

Coastal waters from Cape Charles Light VA to NC VA border out 20 nm (ANZ656) - Atlantic Ocean

Enter Your "City, ST" or zip code | Go | BOOKMARK

NWS Wakefield, VA

Zone Forecast: Coastal waters from Cape Charles Light VA to NC VA border out 20 nm (ANZ656)

Mobile Weather Information

Last Update: 712 PM EDT WED MAR 28 2012

Marine Zone Forecast

Hazardous marine condition(s):

Hazardous Weather Outlook
Small Craft Advisory

Synopsis...A COLD FRONT CROSSES THE MARINE AREA TONIGHT. HIGH PRESSURE RETURNS THURSDAY THROUGH FRIDAY. A FRONTAL BOUNDARY WITH LOW PRESSURE MOVING ALONG IT MOVES ACROSS THE AREA FRIDAY NIGHT THROUGH SATURDAY. HIGH PRESSURE ARRIVES AGAIN SUNDAY AND MONDAY.

Tonight...SW winds 15 to 20 kt with gusts to around 30 kt...becoming W late. Seas 3 ft with a dominant period of 4 seconds. A slight chance of showers and tstms until early morning.

Thu...NW winds 20 kt. Seas 4 to 5 ft with a dominant period of 4 seconds.

Thu Night...N winds 10 to 15 kt. Seas 4 to 5 ft...subsiding to 3 ft after midnight.

Fri...N winds 5 to 10 kt...becoming E in the afternoon. Seas 2 to 3 ft.

Fri Night...S winds 10 to 15 kt...becoming SW after midnight. Seas 2 ft.

Sat...W winds 10 to 15 kt...becoming NW in the afternoon. Seas 2 to 3 ft. A chance of showers.

Sat Night...N winds 10 to 15 kt. Seas 3 to 4 ft. A chance of showers.

Sun...NE winds 5 to 10 kt...becoming SE in the afternoon...then becoming S 10 to 15 kt. Seas 3 to 4 ft... Subsiding to 2 ft.

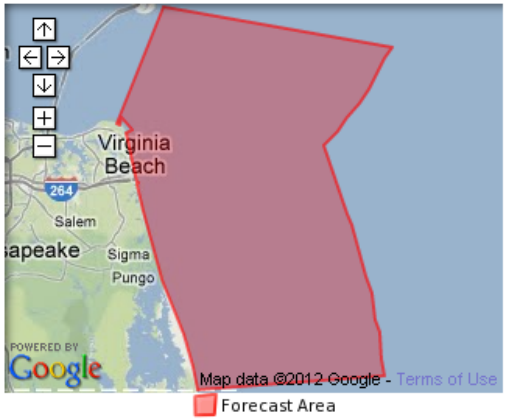
Mon...SW winds 10 to 15 kt...increasing to 15 to 20 kt. Seas 2 to 3 ft.

winds and seas higher in and near tstms.

Detailed Point Forecast

[Move Down]

Click for Point Specific Forecast | Disclaimer



Current Conditions

[Move Up]

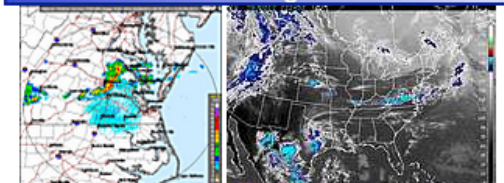
44099 Cape Henry, VA (147)
Lat: 36.9°N Lon: 75.76°W Elev: 0
Last Update on Mar 28, 6:52 pm EDT

Nearby Observations

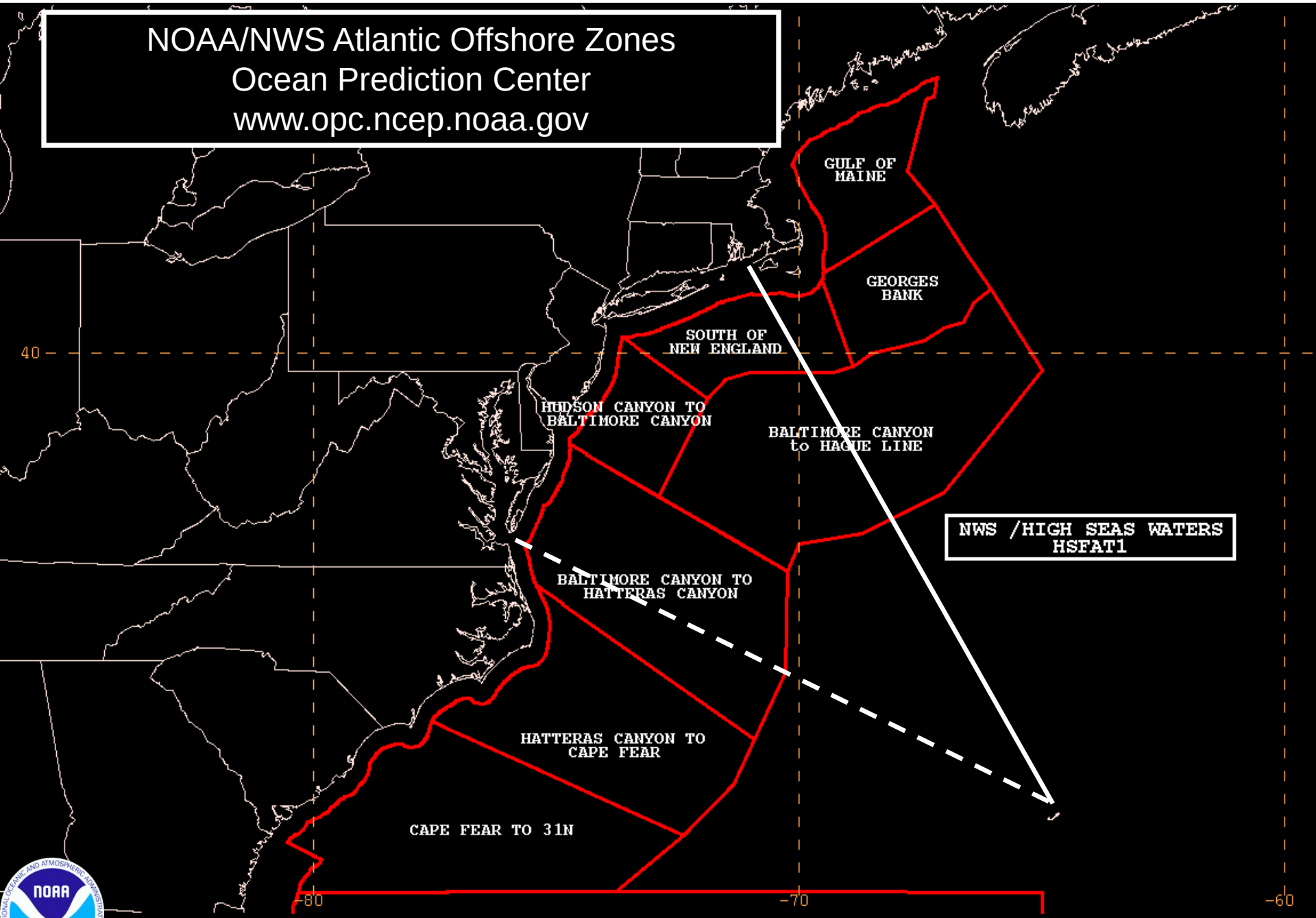
Past Observations

Wind:	NA
Pressure:	NA
Air Temperature:	NA
Water Temperature:	55 °F (13 °C)
Dewpoint:	NA
Wave Hgt/Dir:	3 ft/SE
Dominant Wave Period:	5 sec
Visibility:	NA

Radar and Satellite Images



NOAA/NWS Atlantic Offshore Zones
Ocean Prediction Center
www.opc.ncep.noaa.gov



http://www.opc.ncep.noaa.gov/shtml/NFDOFFNT2.shtml

Offshore Waters Forecast

ANZ089-182030- 500 AM EDT TUE MAR 29 2011

.**SYNOPSIS** FOR MID ATLC WATERS...

…DEVELOPING LOW PRES WILL MOVE OFF THE CAROLINA COAST WED NIGHT AND PASS NE ACROSS THE CENTRAL WATERS WED NIGHT INTO THU.

A SECOND LOW WILL MOVE NE NEAR THE CAROLINA COAST THU…THEN INTENSIFY WHILE CONTINUING NE ACROSS THE NRN WATERS FRI…

Offshore Waters Forecast

BALTIMORE CANYON TO HAGUE LINE S OF 1000 FM
500 AM EDT TUE MAR 29 2011

...GALE FORCE WINDS EXPECTED WED NIGHT INTO THU...

.TODAY...NW WINDS 20 TO 25 KT. SEAS 7 TO 11 FT...EXCEPT W OF 70W 5 TO 8 FT. HIGHEST WINDS AND SEAS E.

.TONIGHT...NW WINDS 15 TO 20 KT. SEAS SUBSIDING TO 4 TO 9 FT... HIGHEST SE.

.WED...NW WINDS DIMINISHING TO 10 TO 15 KT...EXCEPT W OF 69W TO VARIABLE 10 KT OR LESS. SEAS BUILDING TO 2 TO 4 FT...EXCEPT E OF 70W 4 TO 7 FT...HIGHEST SE.

.WED NIGHT...E TO NE WINDS INCREASING TO 15 TO 25 KT...**EXCEPT FAR S PART TO 25 TO 35 KT**. SEAS BUILDING TO 4 TO 8 FT. HIGHEST WINDS AND SEAS S. SCATTERED SHOWERS S PORTION.

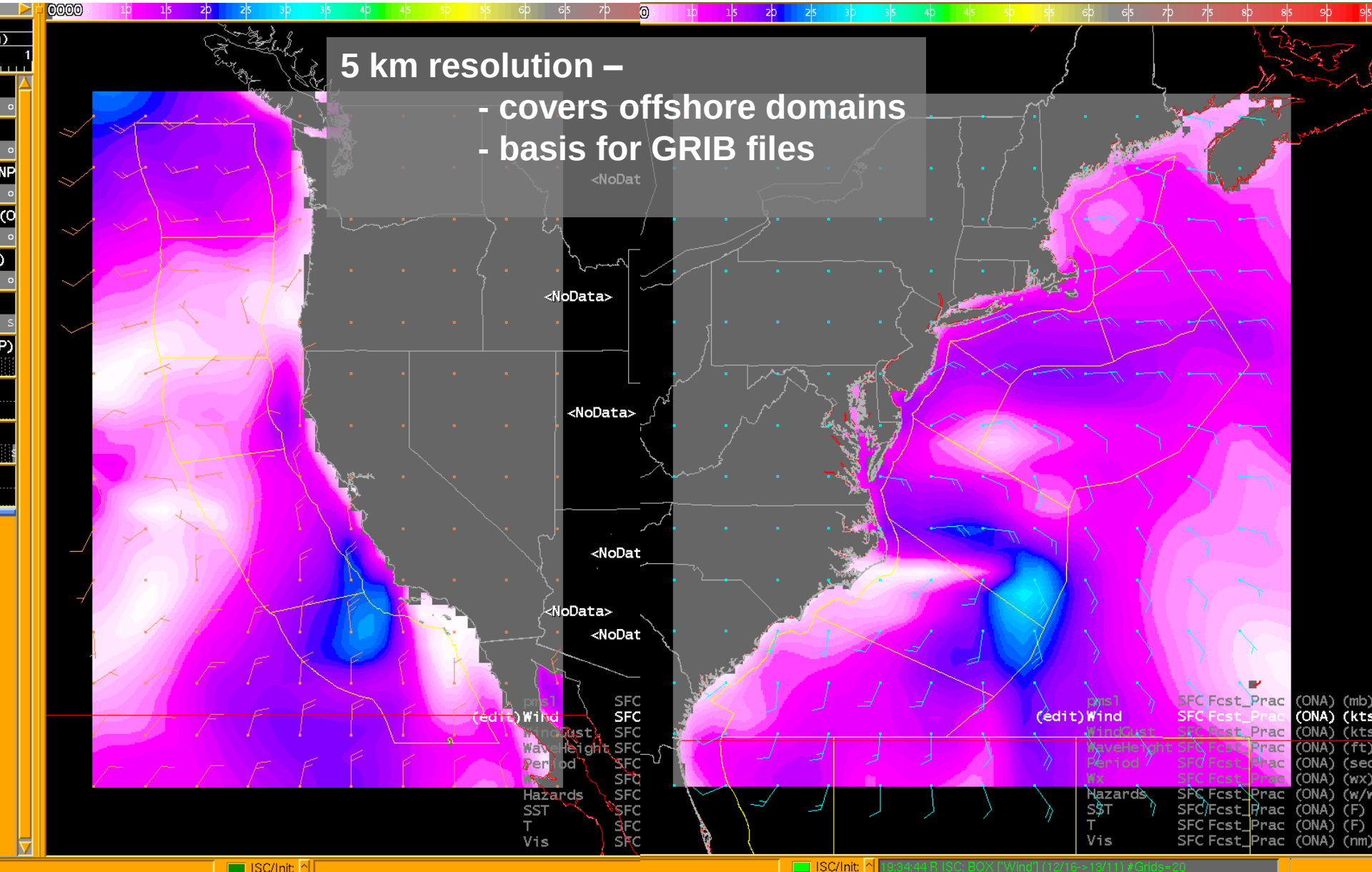
.THU...E TO NE WINDS 20 TO 30 KT**...EXCEPT FAR S PART TO 35 KT** EARLY. SEAS 4 TO 8 FT...EXCEPT SW PORTION BUILDING TO 7 TO 11 FT...HIGHEST SW.

.FRI...E TO SE WINDS INCREASING TO 25 TO 35 KT THEN BECOMING SW TO W. SEAS BUILDING TO 9 TO 15 FT...HIGHEST SE.

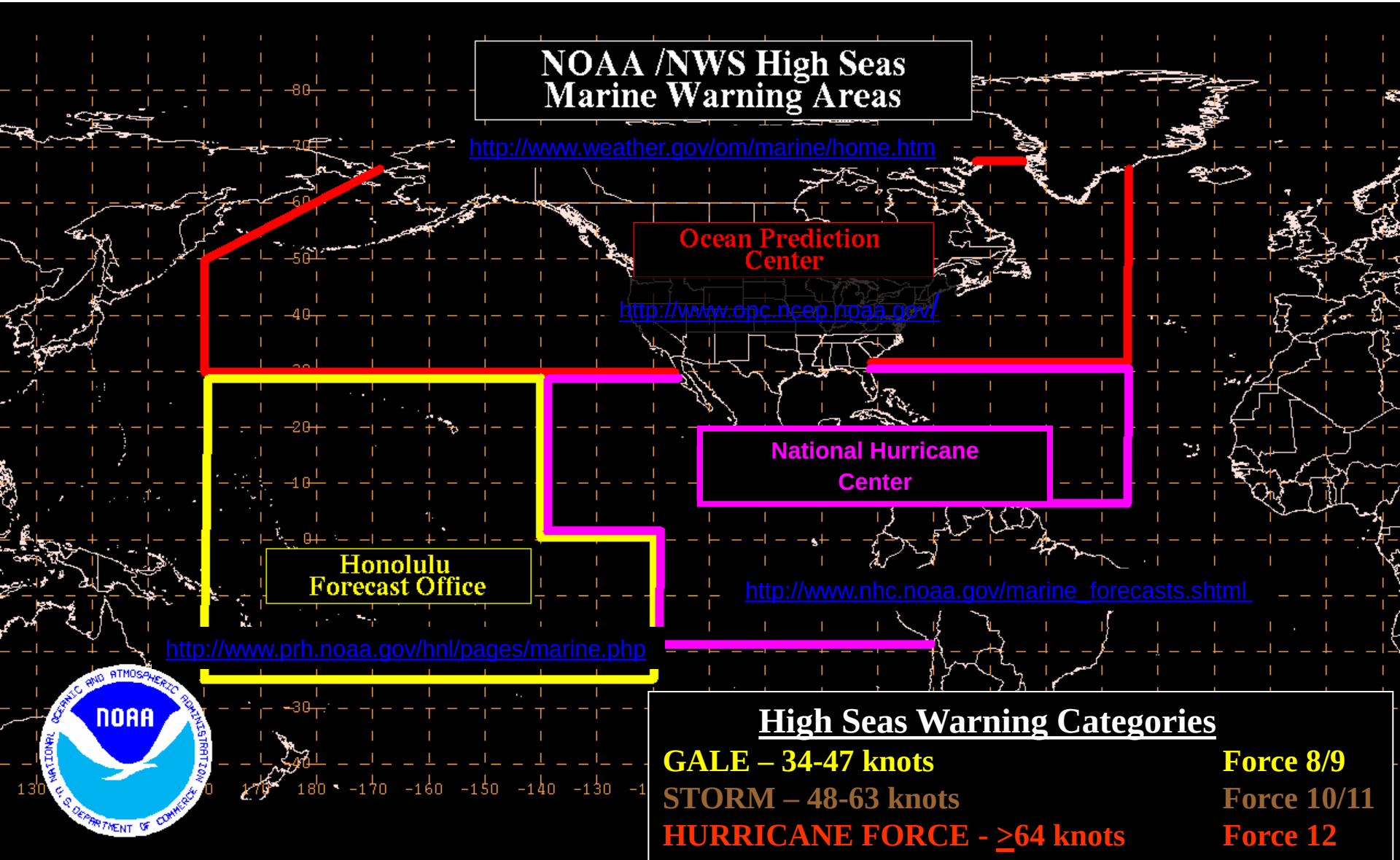
.SAT...W TO NW WINDS 25 TO 30 KT. SEAS 8 TO 15 FT...HIGHEST SE.

$$

Grid Domains



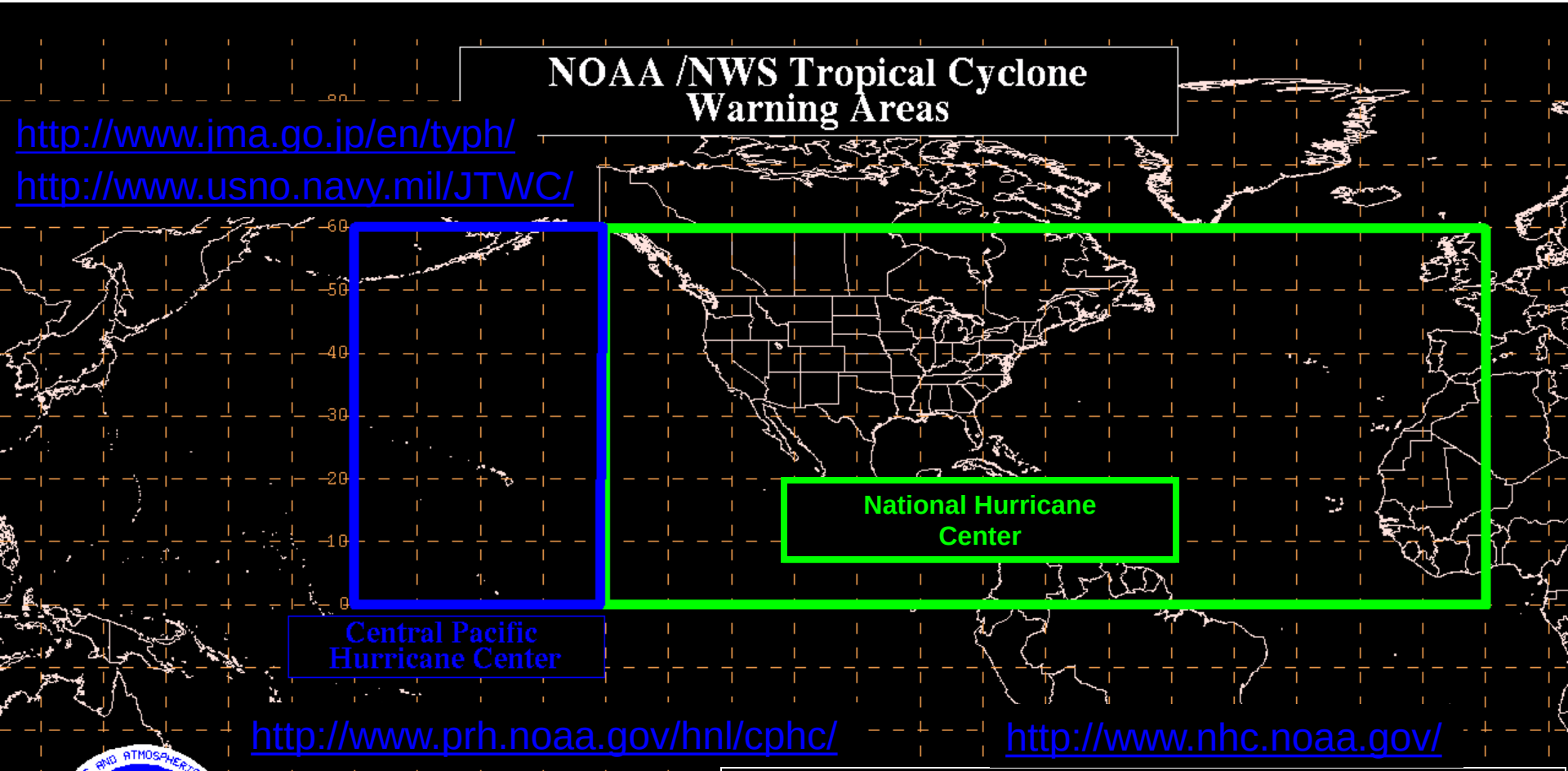
NOAA Forecast Responsibility



High Seas Warning Categories

GALE – 34-47 knots	Force 8/9
STORM – 48-63 knots	Force 10/11
HURRICANE FORCE - ≥64 knots	Force 12

NOAA Forecast Responsibility



Tropical Cyclone Warning Categories

TROPICAL STORM – 34-63 knots	Force 8-11
HURRICANE - ≥64 knots	Force 12

www.opc.ncep.noaa.gov

National Weather Service

Ocean Prediction Center

Site Map | News | Organization

- Home
- Local forecast by "City, St" or "ZIP" Go
- NCEP Newsletter
- Marine Weather
  - 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

USA.gov Government Made Easy

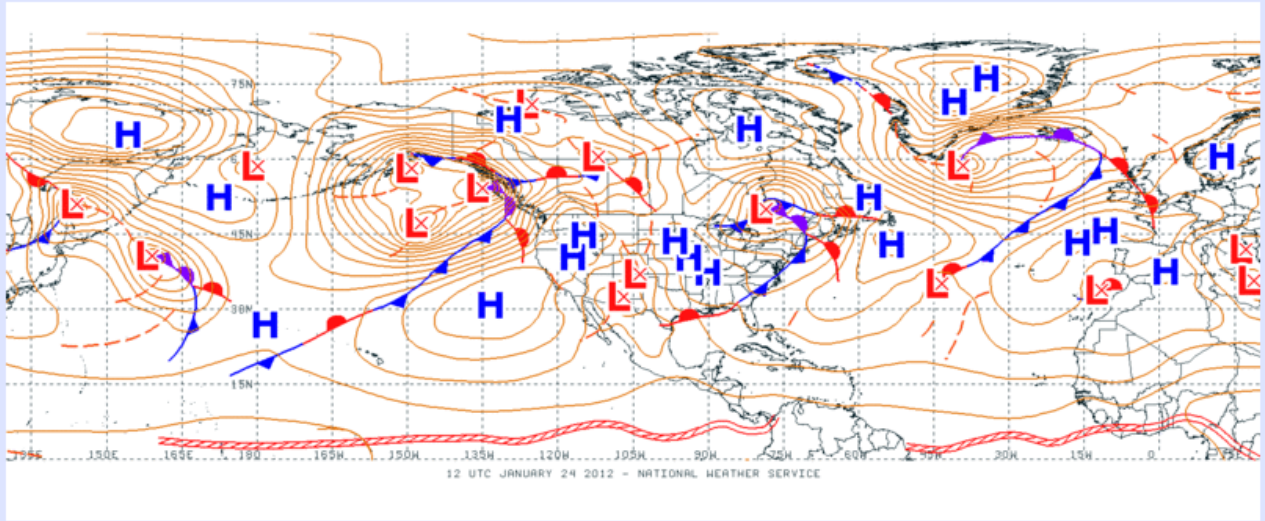
Find us on Facebook

Top News at the Ocean Prediction Center

- The 2010 OPC Accomplishments report is now available (pdf)
- Follow OPC on Facebook
- News archive

NOAA>NWS>NCEP>OPC>Unified Analysis

Unified Analysis	Atlantic Marine	Pacific Marine	Ocean Products



Last Update: Tuesday, 24-Jan-2012 16:00:40 UTC

Click on the map above or choose from:

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

Unified Surface Analysis Manual-PDF

Continental USA

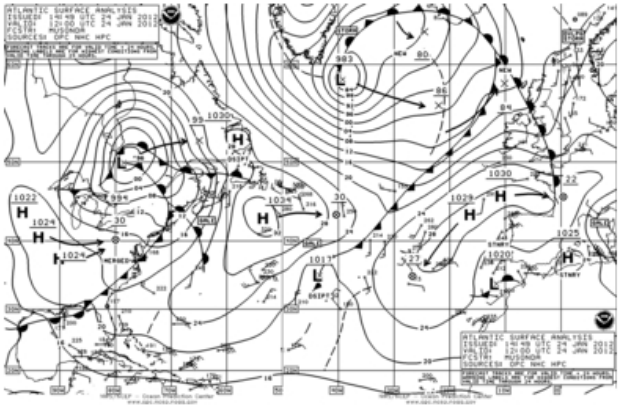
www.opc.ncep.noaa.gov/Atl_tab.shtml

Atlantic Analysis

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

Click on the map below or choose from:

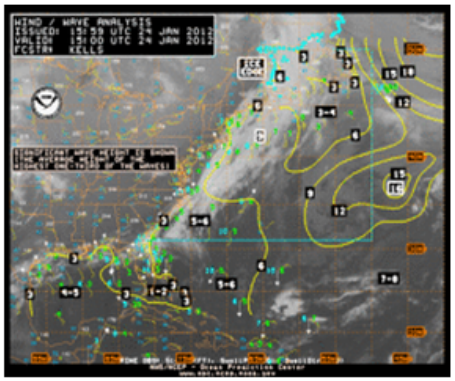
W Atlantic | Full Atlantic | E Atlantic



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

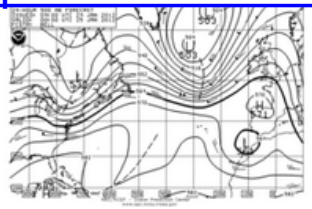


Wind and Wave Analysis

B&W Loop:
[3] [7] [12] Days
Updated: Tue, 24-Jan-2012 16:04:11 UTC

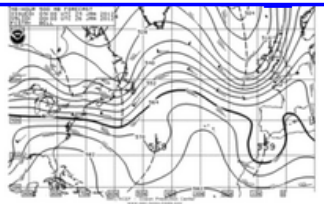
Atlantic Graphical Forecasts

http://www.vos.noaa.gov/MWL/dec_08/milibar_chart.shtml



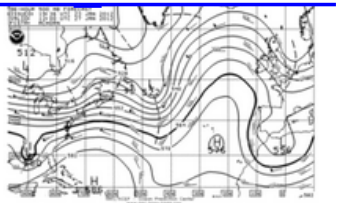
24-hour 500 mb

Loop: [3] [7] [14] Days
Updated: Tue, 24-Jan-2012 04:13:12 UTC



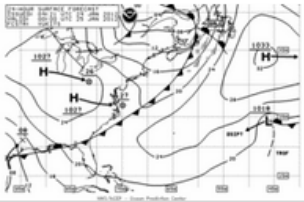
48-hour 500 mb

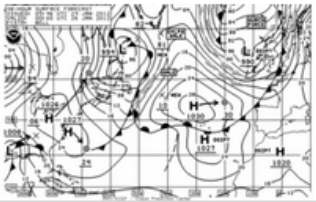
Loop: [3] [7] [14] Days
Updated: Tue, 24-Jan-2012 04:08:45 UTC

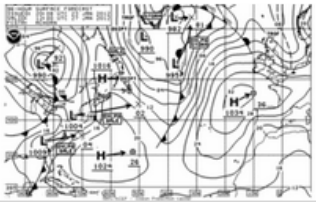


96-hour 500 mb

Loop: [3] [7] [14] Days
Updated: Mon, 23-Jan-2012 19:40:35 UTC







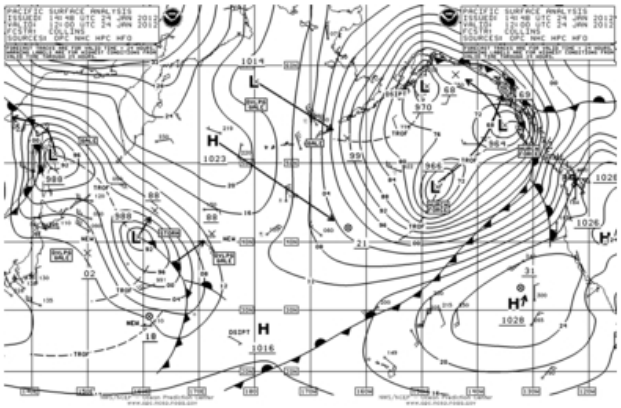
www.opc.ncep.noaa.gov/Pac_tab.shtml

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

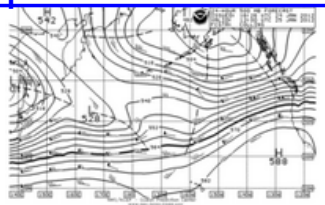
E Pacific Loop:
[3] [7] [14] Days
Updated: Tue, 24-Jan-2012 14:57:53 UTC

Wind and Wave Analysis

B&W Loop:
[3] [7] [12] Days
Updated: Tue, 24-Jan-2012 15:36:03 UTC

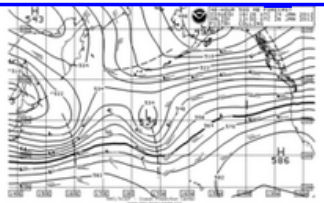
Pacific Forecasts

http://www.vos.noaa.gov/MWL/dec_08/milibar_chart.shtml



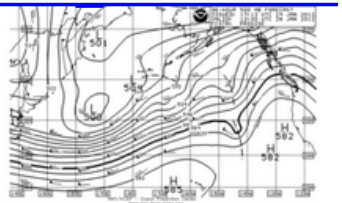
24-hour 500 mb

Loop: [3] [7] [14] Days
Updated: Tue, 24-Jan-2012 16:34:21 UTC



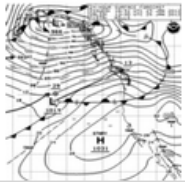
48-hour 500 mb

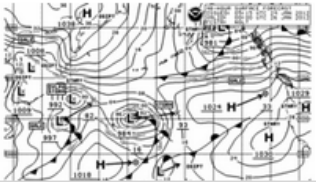
Loop: [3] [7] [14] Days
Updated: Tue, 24-Jan-2012 16:29:47 UTC

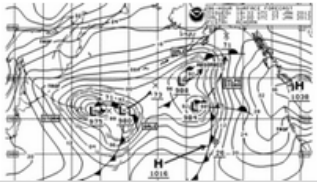


96-hour 500 mb

Loop: [3] [7] [14] Days
Updated: Tue, 24-Jan-2012 17:18:39 UTC







www.opc.ncep.noaa.gov/OceanProd_tab.shtml

National Weather Service

Ocean Prediction Center

Site Map | News | Organization

Home

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

Go

NCEP Newsletter

Marine Weather

Ocean Products
- Ocean Analysis
- Ocean Forecasts
- Model Evaluation

Coastal Guidance

Probabilistic Guidance

General Information

Contact Us

USA.gov Government Made Easy

Find us on Facebook

Top News at the Ocean Prediction Center

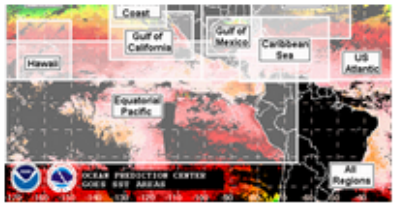
- The 2010 OPC Accomplishments report is now available (pdf)
- Follow OPC on Facebook
- News archive

NOAA>NWS>NCEP>OPC>Ocean Products

Unified Analysis	Atlantic Marine	Pacific Marine	Ocean Products

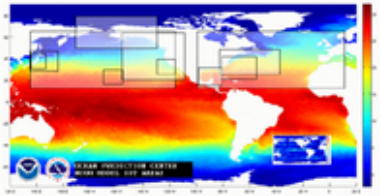
Ocean Products

Analysis



Sea Surface Temperature
Satellite-derived data (GOES)
Naval Oceanographic Office Gulf Stream

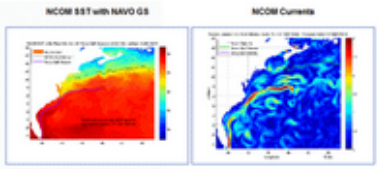
Forecasts



Currents
Global Ocean Model output

Sea Surface Temperature
Global Ocean Model output

Model Evaluation



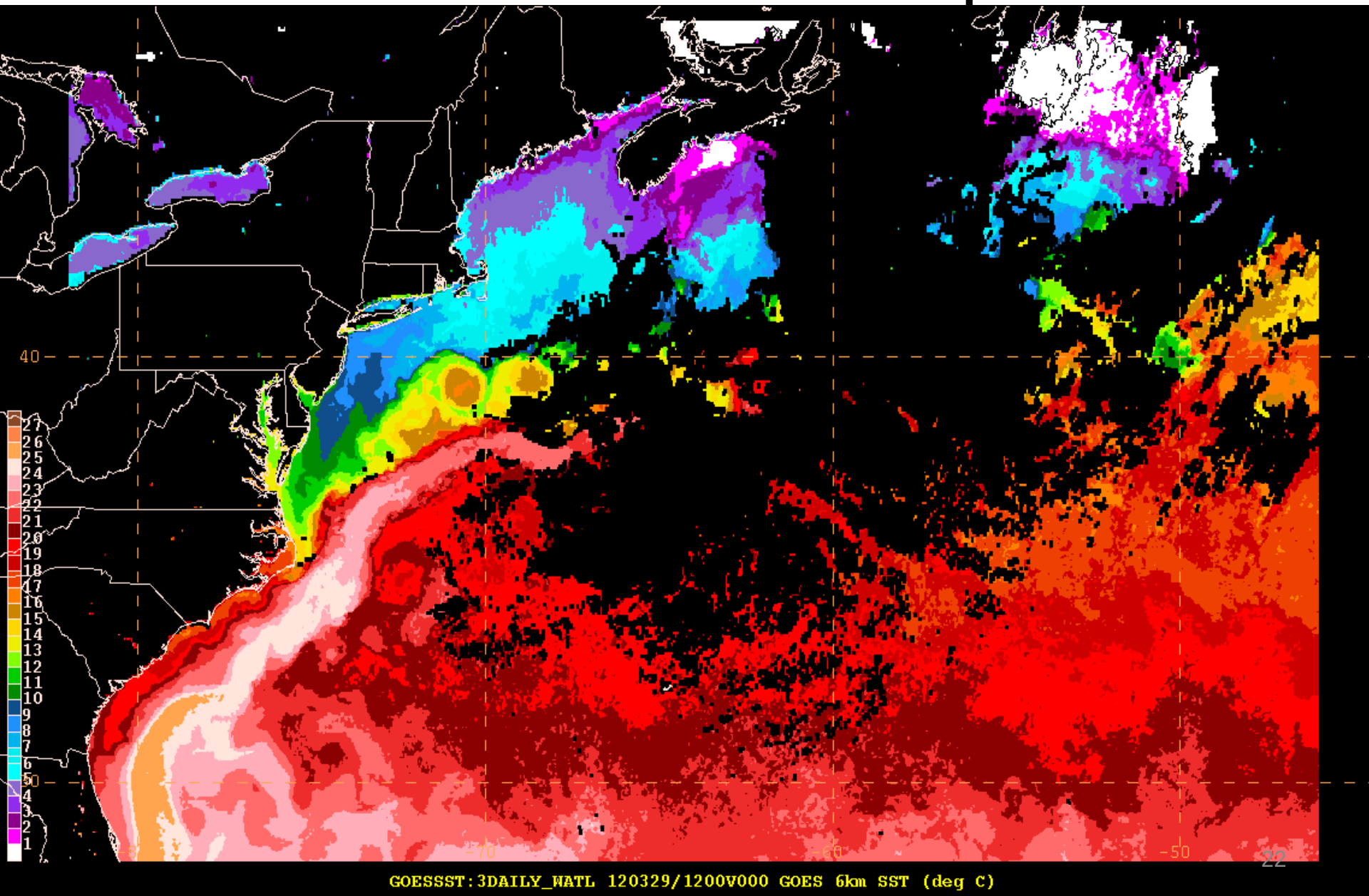
Model Comparisons
Sea Surface Temperatures
Gulf Stream location

NOAA/ National Weather Service
National Centers for Environmental Prediction
Ocean Prediction Center

Disclaimer
Credits
Information Quality

Privacy Policy
Freedom of Information Act (FOIA)
About Us

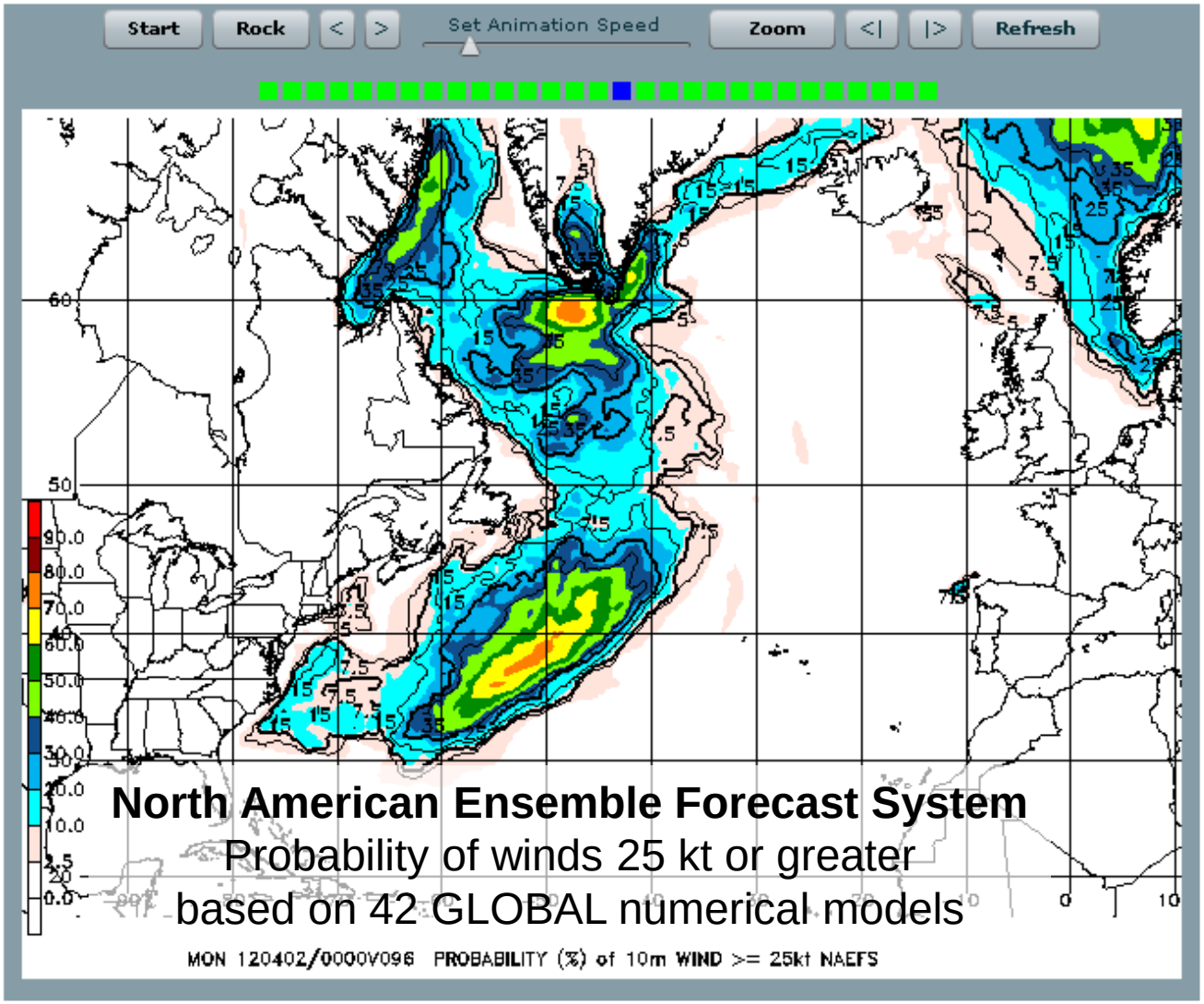
Satellite Sea Surface Temperature



NAEFS Probabilistic Guidance

http://www.opc.ncep.noaa.gov/windprob.shtml

Basin: Atlantic Pacific **Cycle:** 00Z 12Z **Wind (KT):** 20 25 30 34 40 48 60 **Loop:** Off On



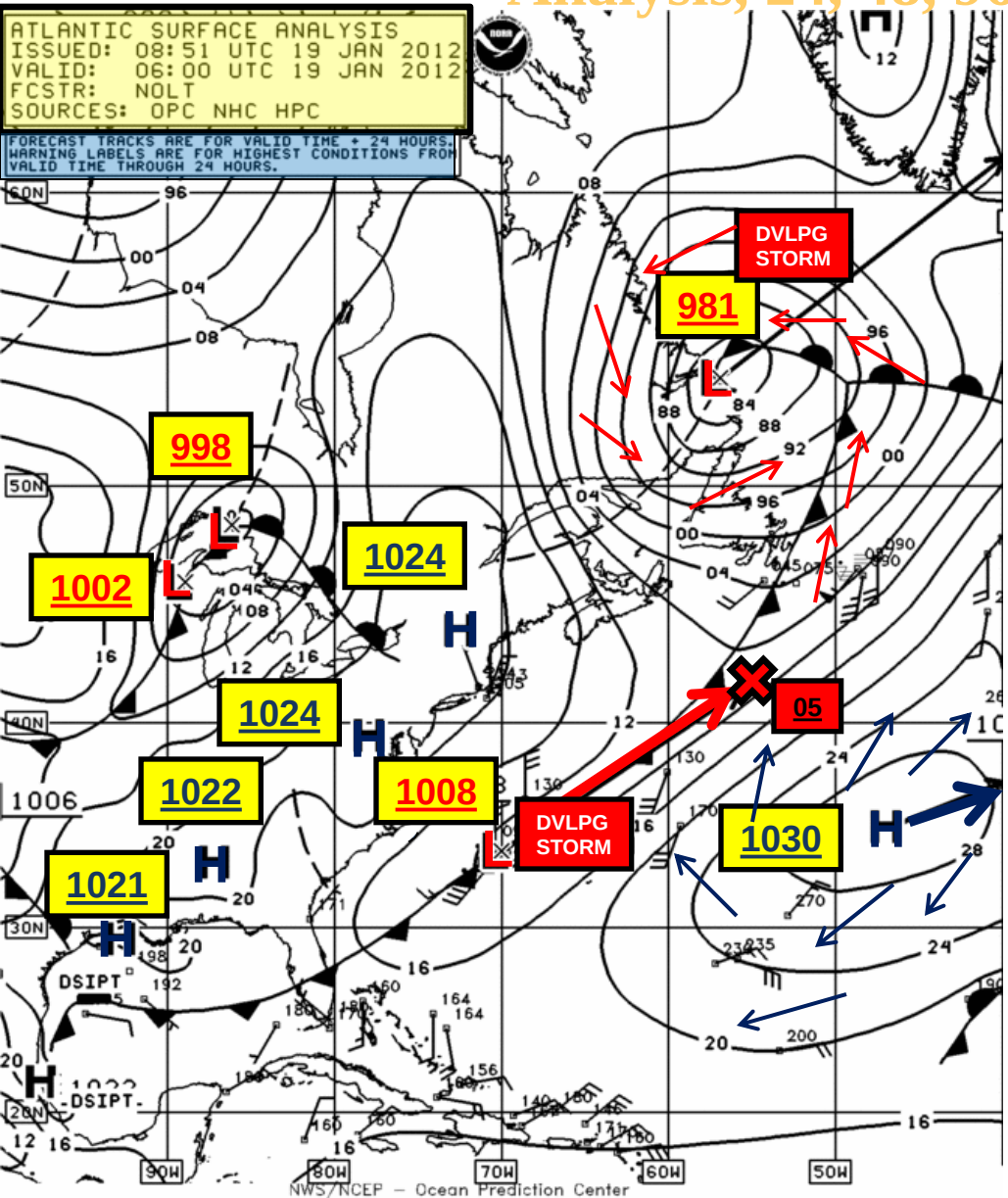
North American Ensemble Forecast System
Probability of winds 25 kt or greater
based on 42 GLOBAL numerical models

If you are having problems seeing these loops (requiring the Adobe Flash Player plugin) try the static images link.

The North American Ensemble Forecast System (NAEFS) is a weather modeling system run jointly by the Meteorological Service of Canada (MSC) and the U.S. National Weather Service (NWS) to provide numerical weather prediction (NWP) products to weather forecasters in both countries for a forecast period that runs out to 2 weeks in the future.

Surface Charts

Analysis, 24, 48, 96 HR Forecasts



Fronts

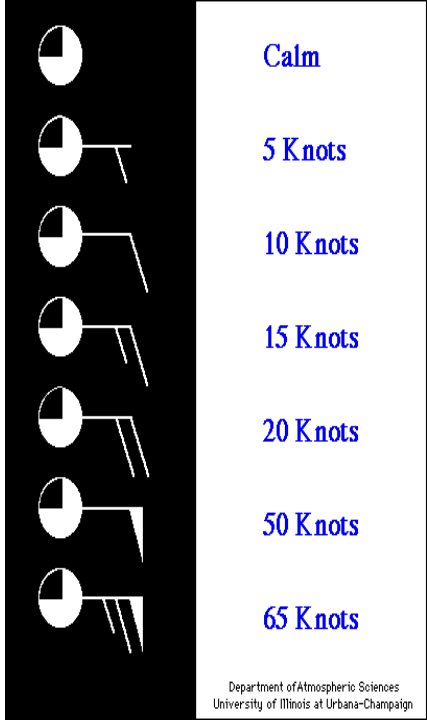
Observations

Isobars

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

24 hr forecast position/ intensity

WARNINGS



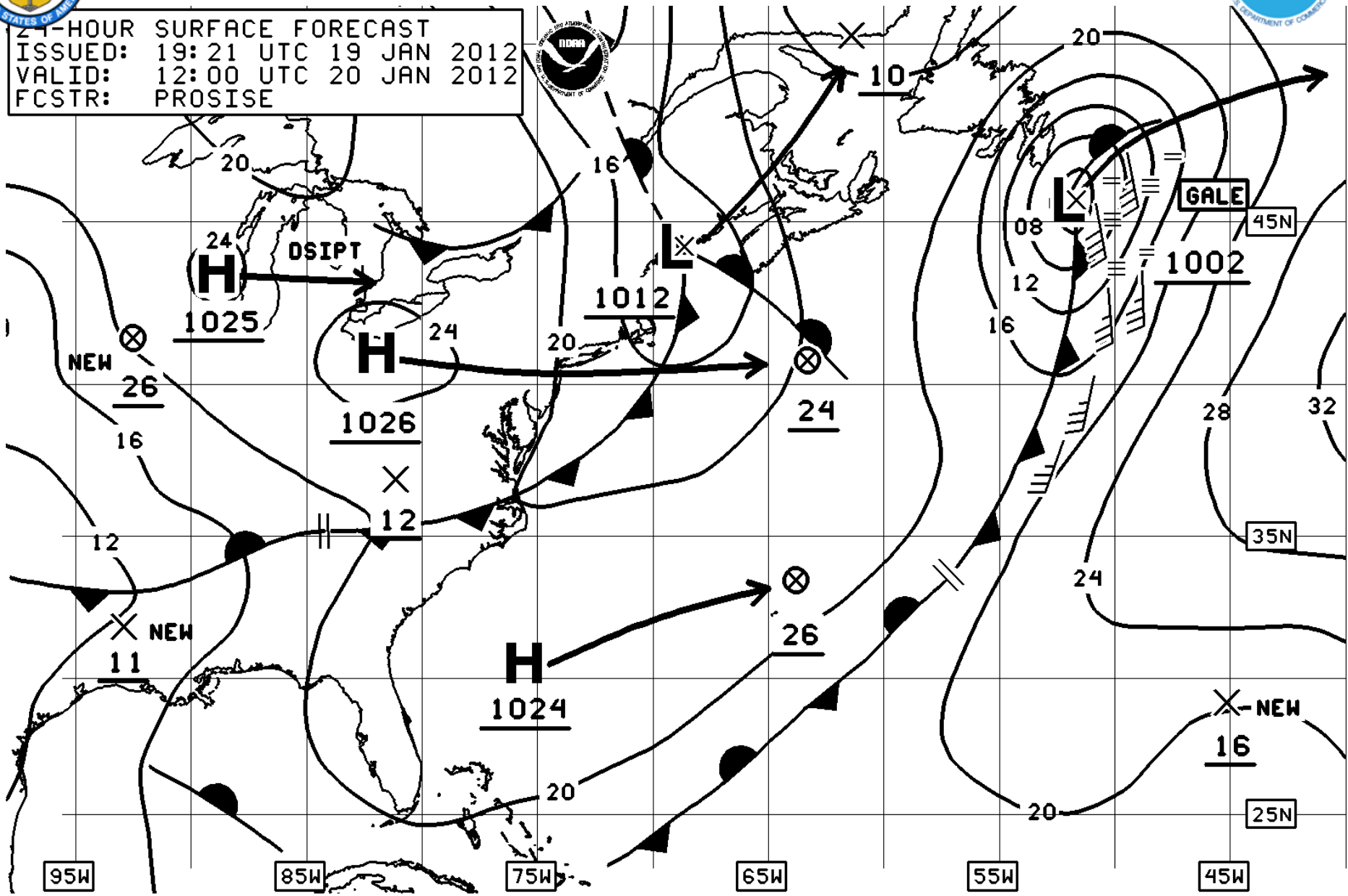
Fronts – **warm, cold, occluded**

boundaries between air of different temperature

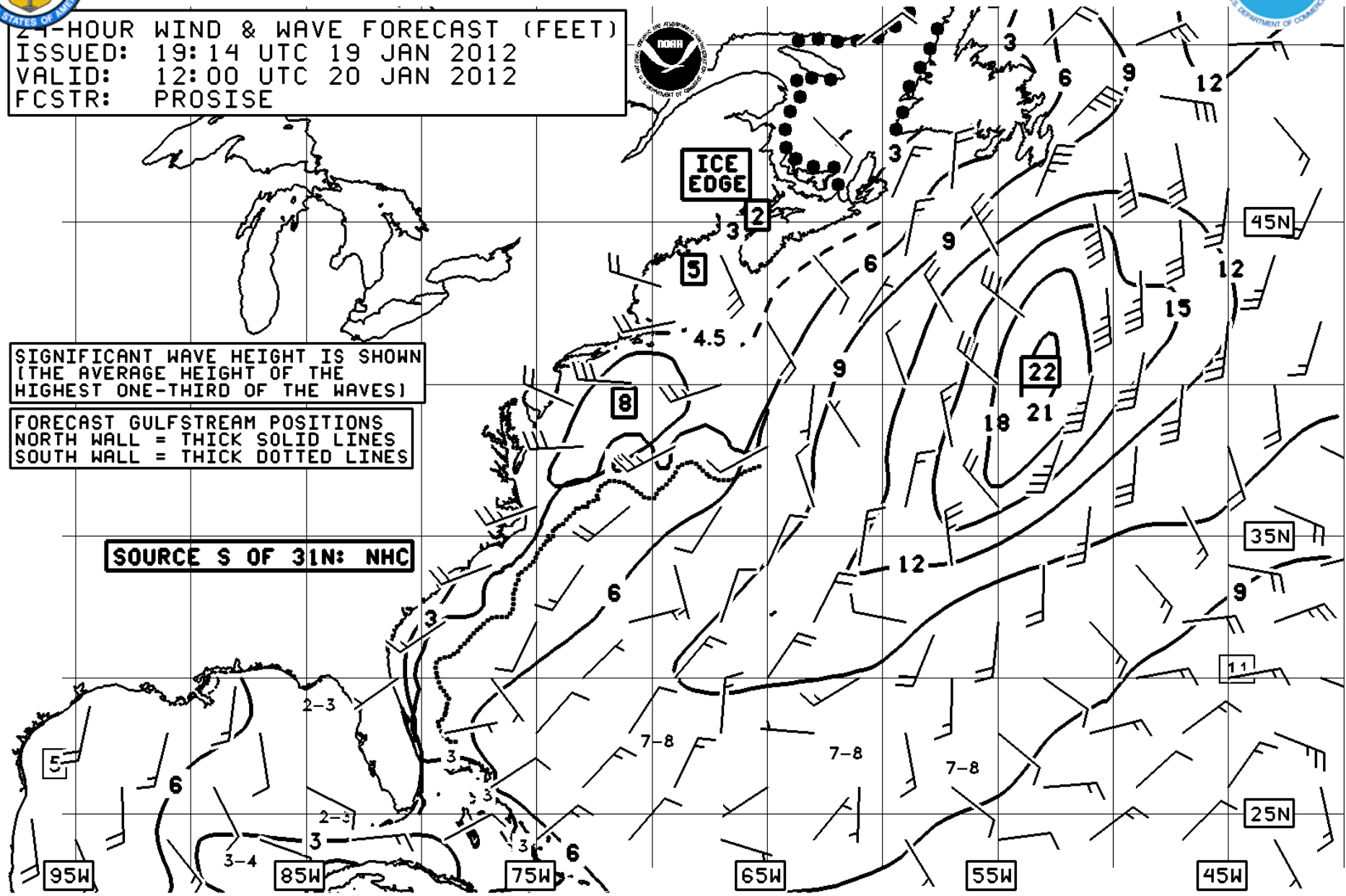
- **Pressure trough**
- **Wind shift**
- **Weather (rain, clouds)**

Global average sea level pressure

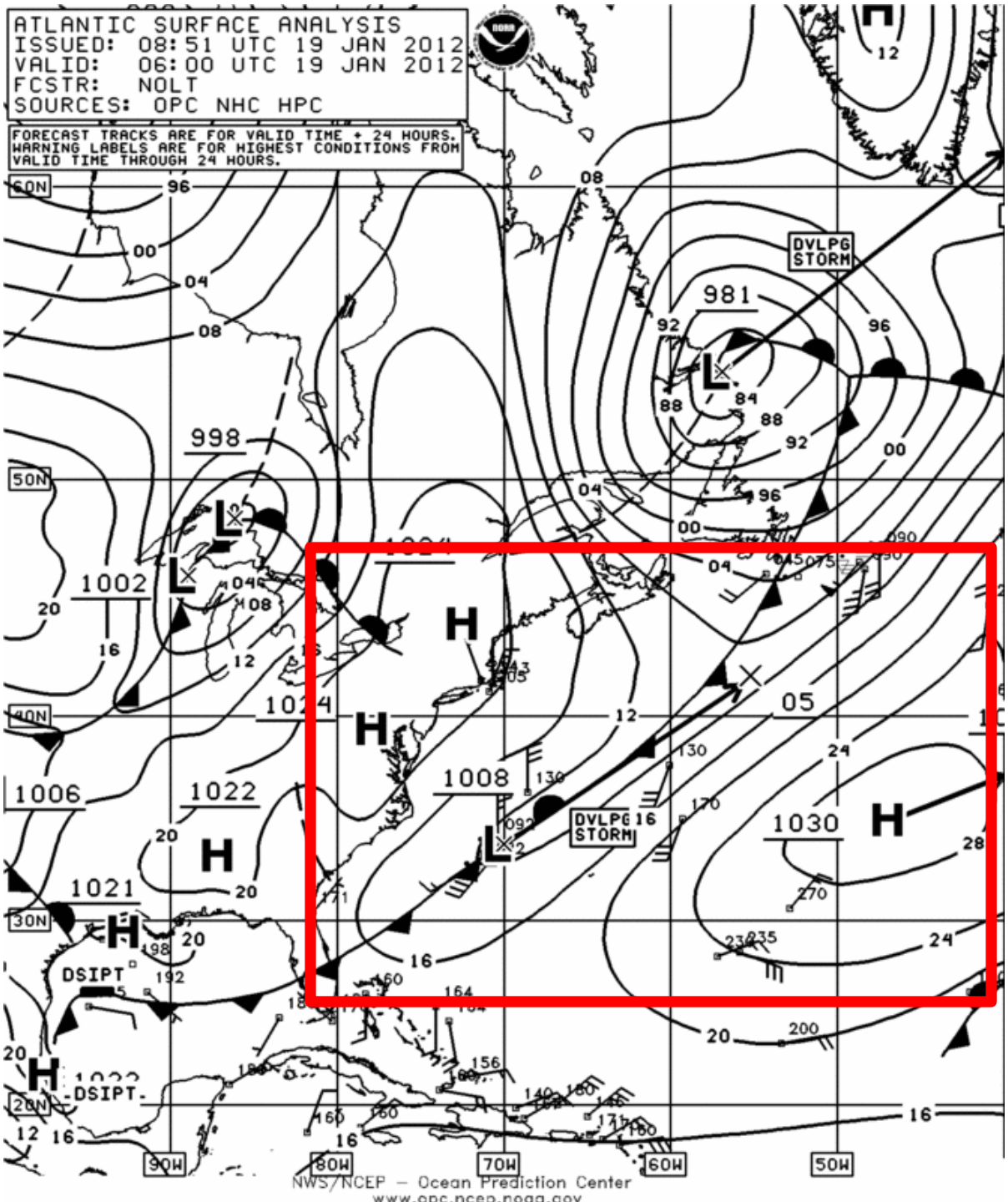
1013.2 millibars



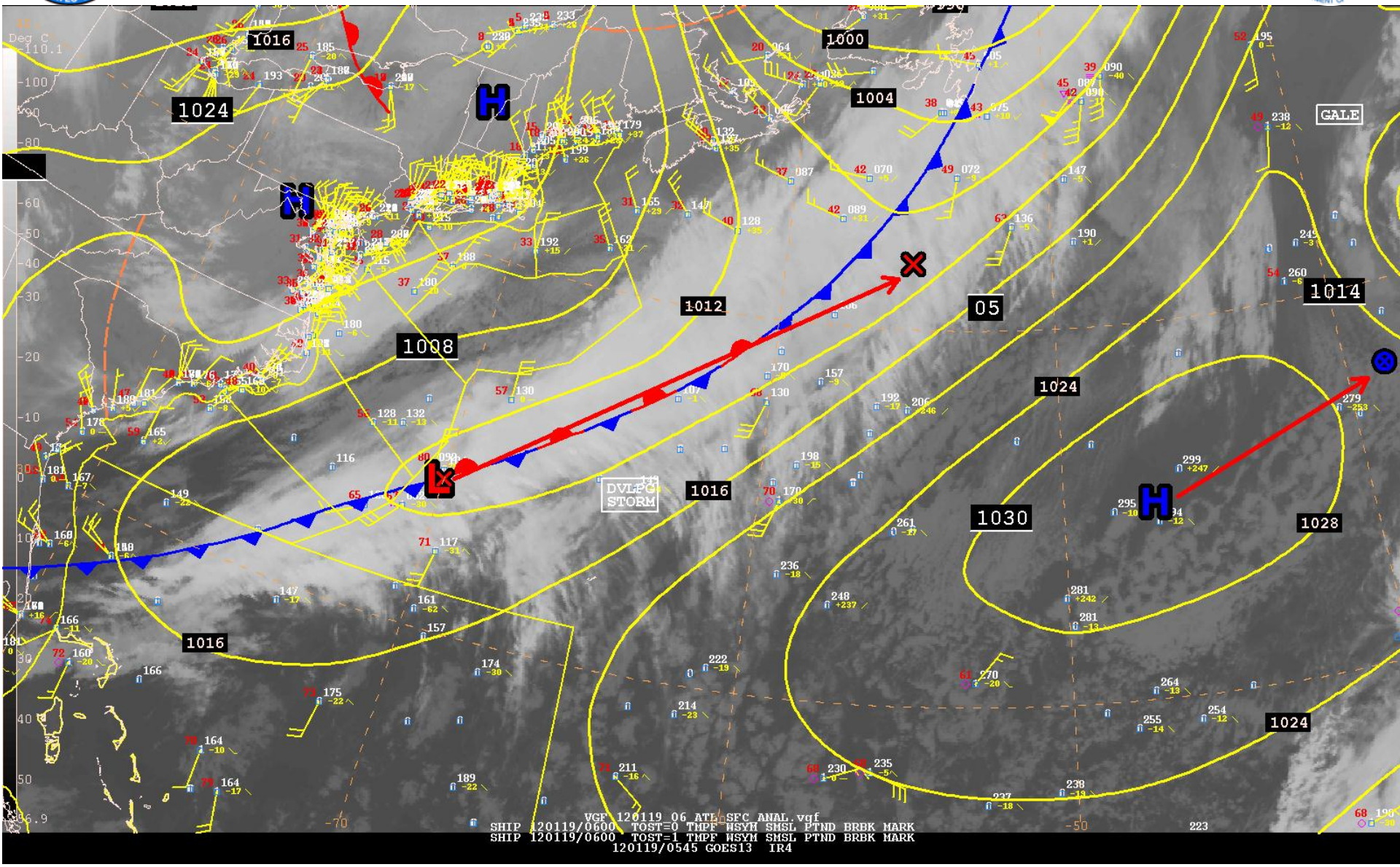
NWS/NCEP – Ocean Prediction Center
www.opc.ncep.noaa.gov



NWS/NCEP – Ocean Prediction Center
www.opc.ncep.noaa.gov

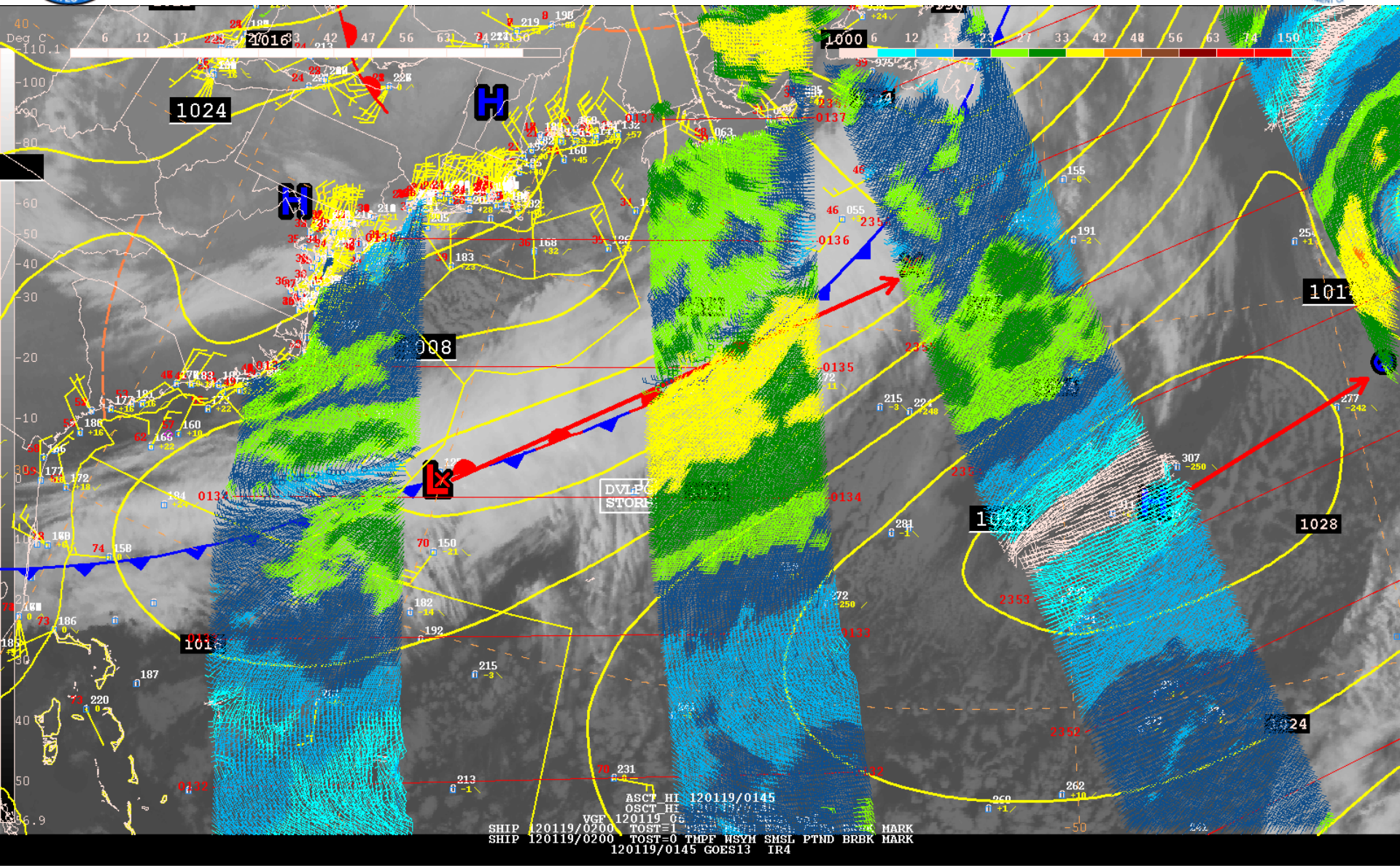

ATLANTIC SURFACE ANALYSIS
ISSUED: 08:51 UTC 19 JAN 2012
VALID: 06:00 UTC 19 JAN 2012
FCSTR: NOLT
SOURCES: OPC NHC HPC
FORECAST TRACKS ARE FOR VALID TIME + 24 HOURS.
WARNING LABELS ARE FOR HIGHEST CONDITIONS FROM VALID TIME THROUGH 24 HOURS.
DVLPG STORM
981
998
1002
1006
1008
1021
1022
1024
1030
DSIPT
60N
50N
40N
30N
20N
90W
80W
70W
60W
50W
NWS/NCEP – Ocean Prediction Center
www.opc.ncep.noaa.gov

Clouds (Infrared Image)



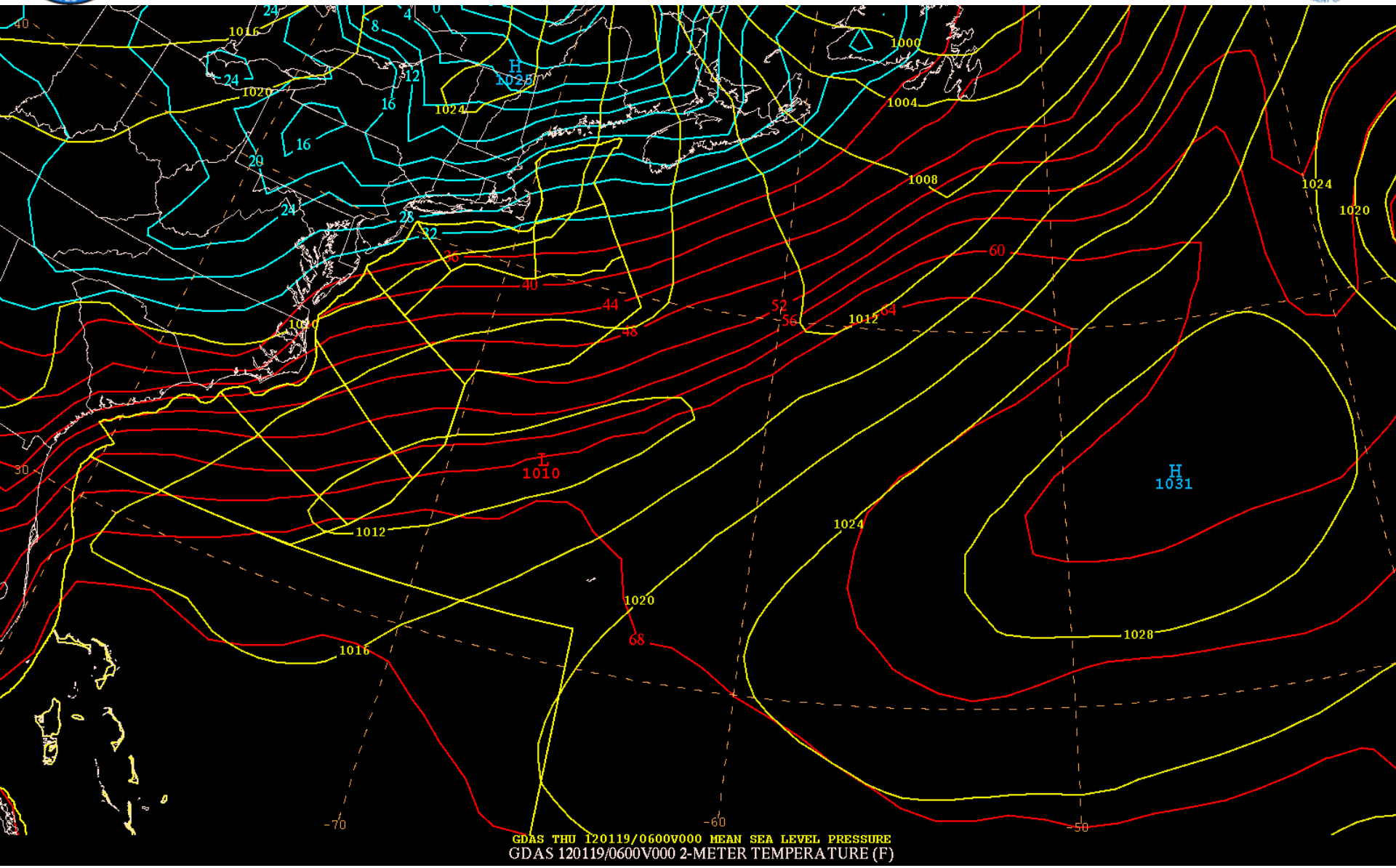
Satellite derived winds – ASCAT, OSCAT

http://manati.orbit.nesdis.noaa.gov/datasets/ASCATData.php/

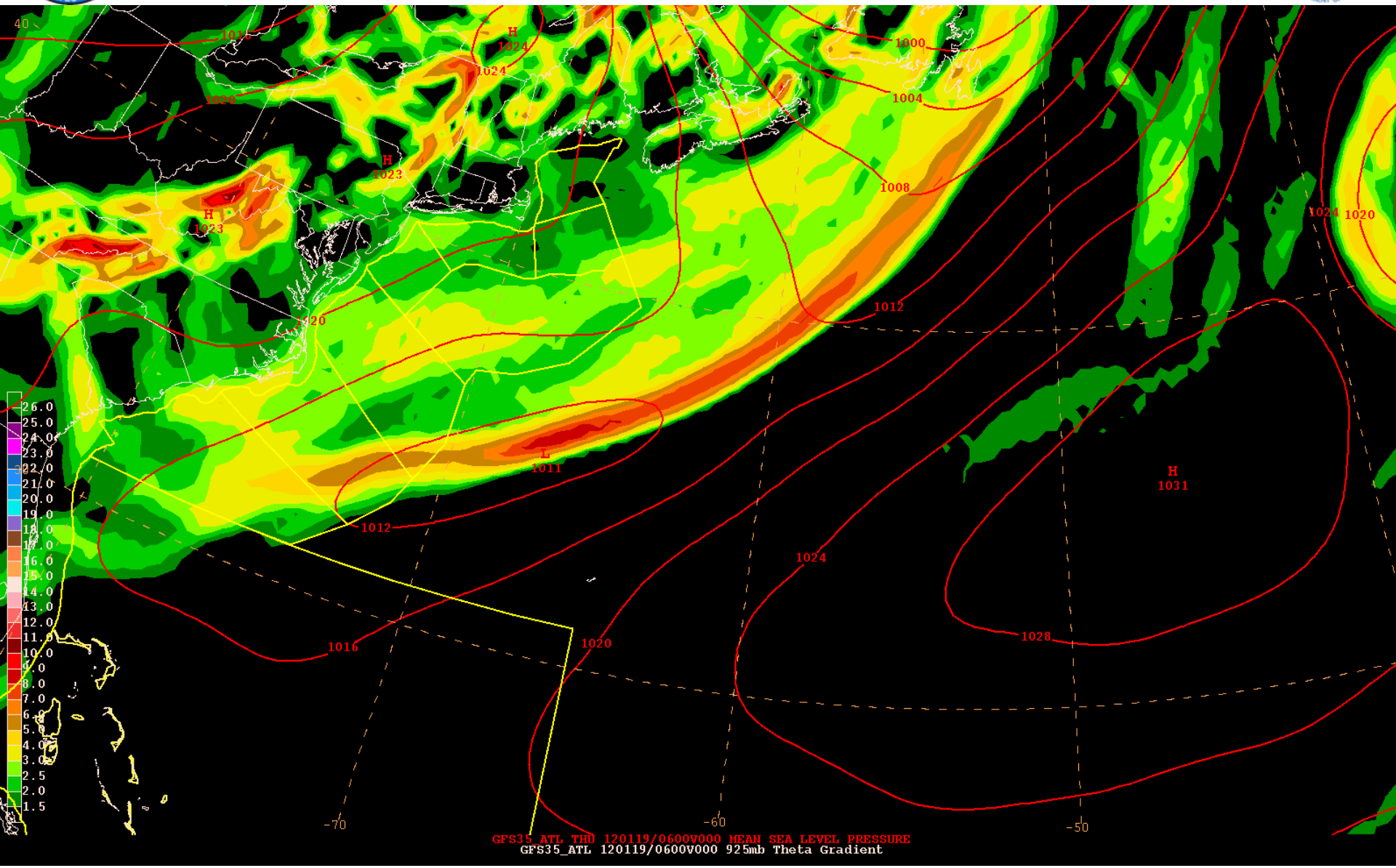


http://manati.orbit.nesdis.noaa.gov/datasets/OSCATData.php/

Temperature (deg F)

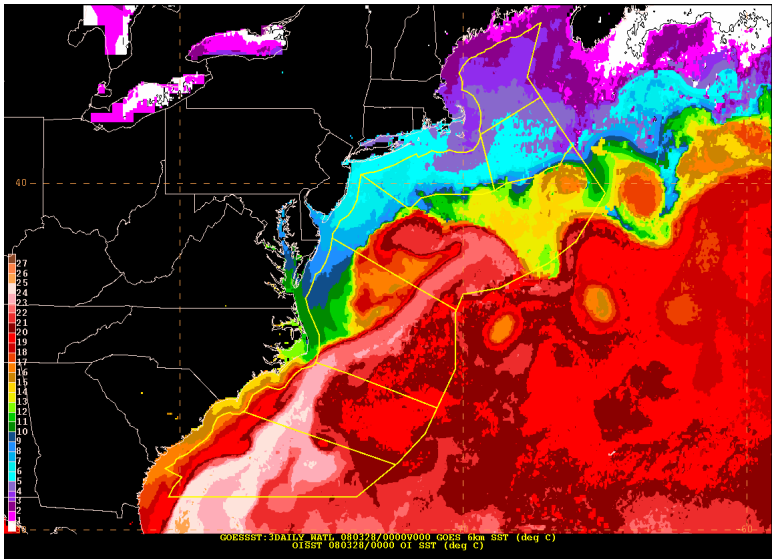


Temperature Gradient deg/100 km

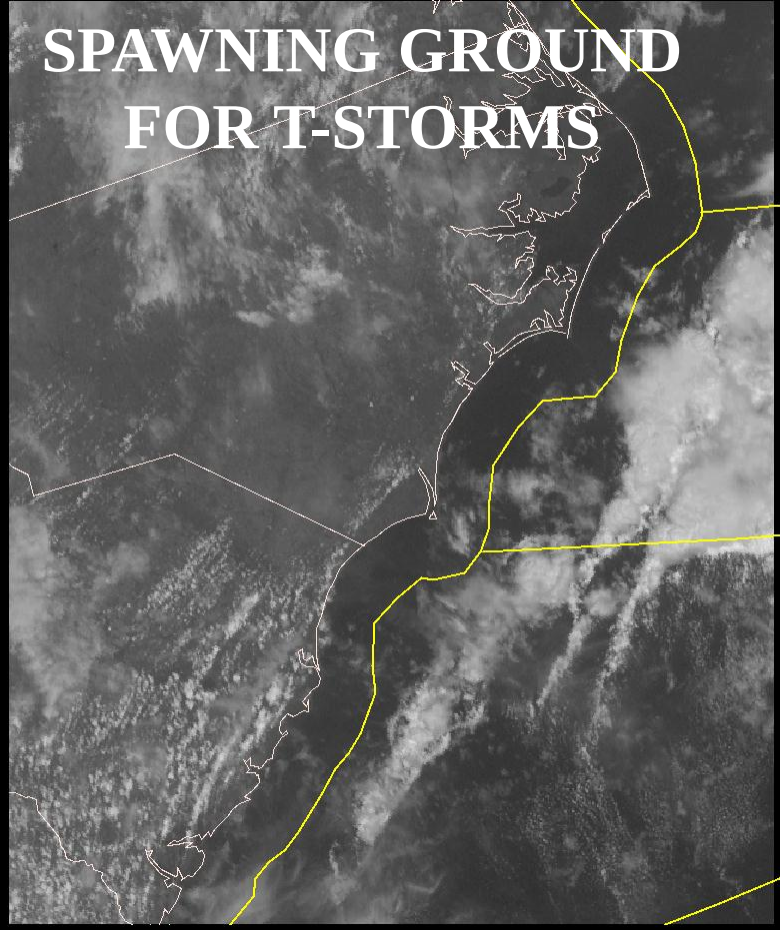


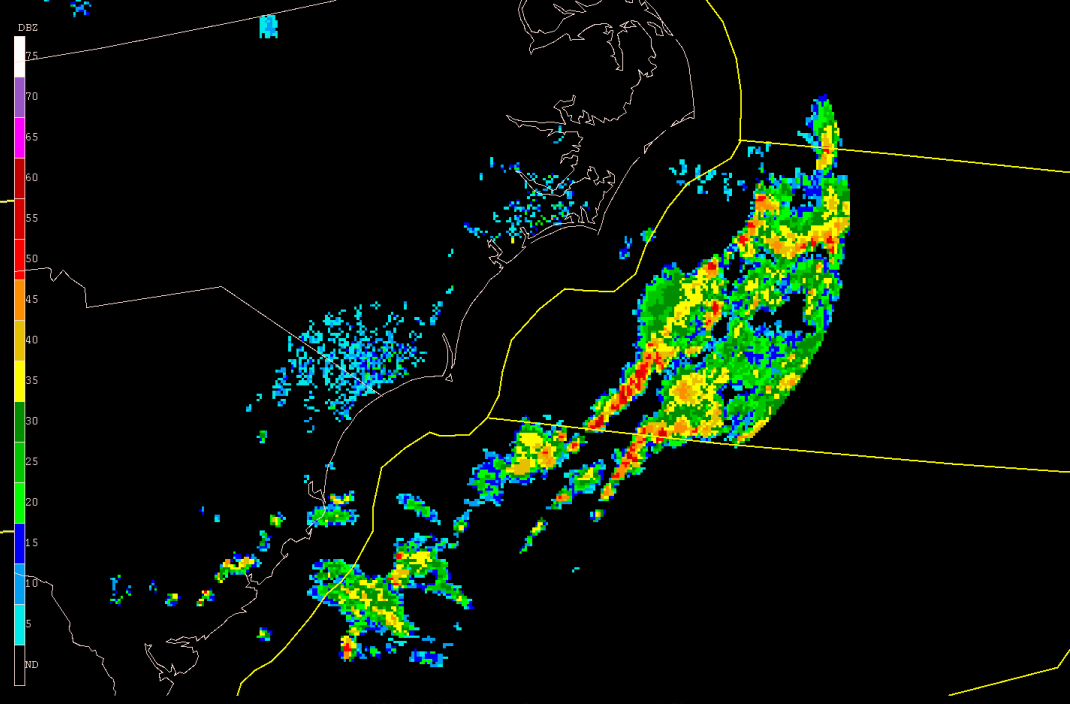
Gulf Stream

- **Weather maker / changer**
  - Natural front (ocean and atmosphere)
  - Stronger winds over warmer water
  - Thunderstorms and squalls
- **Extremely sharp transition – North Wall**
  - Wind against current – can generate breaking seas
  - Eddies (Rings) as significant as Stream

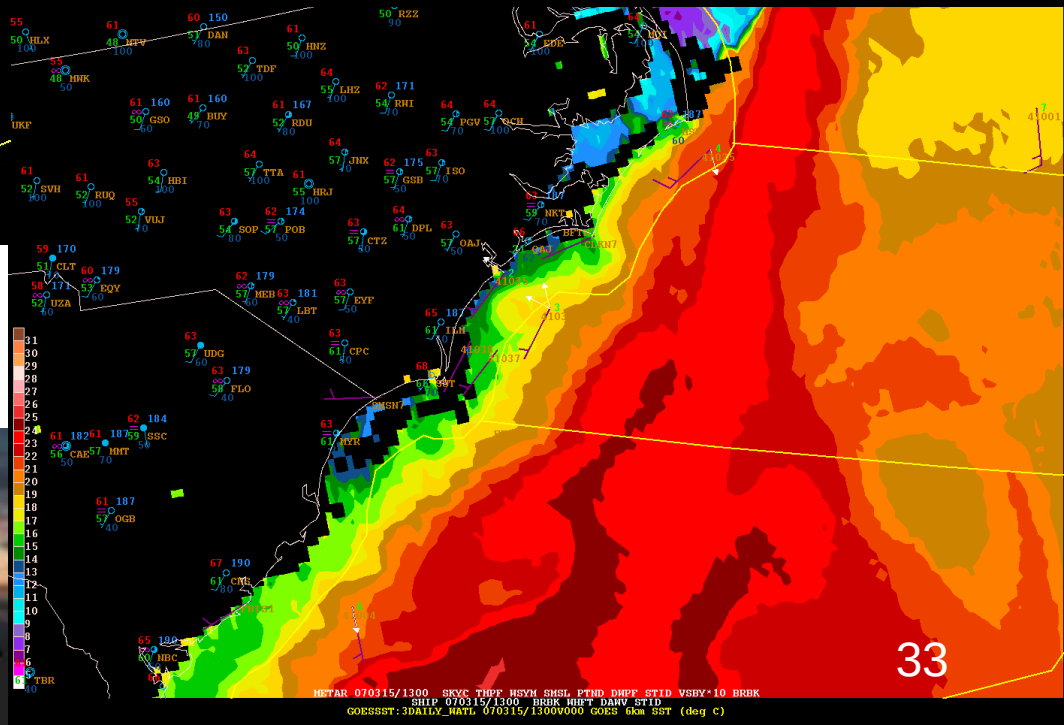


SPAWNING GROUND FOR T-STORMS





THE GULF STREAM

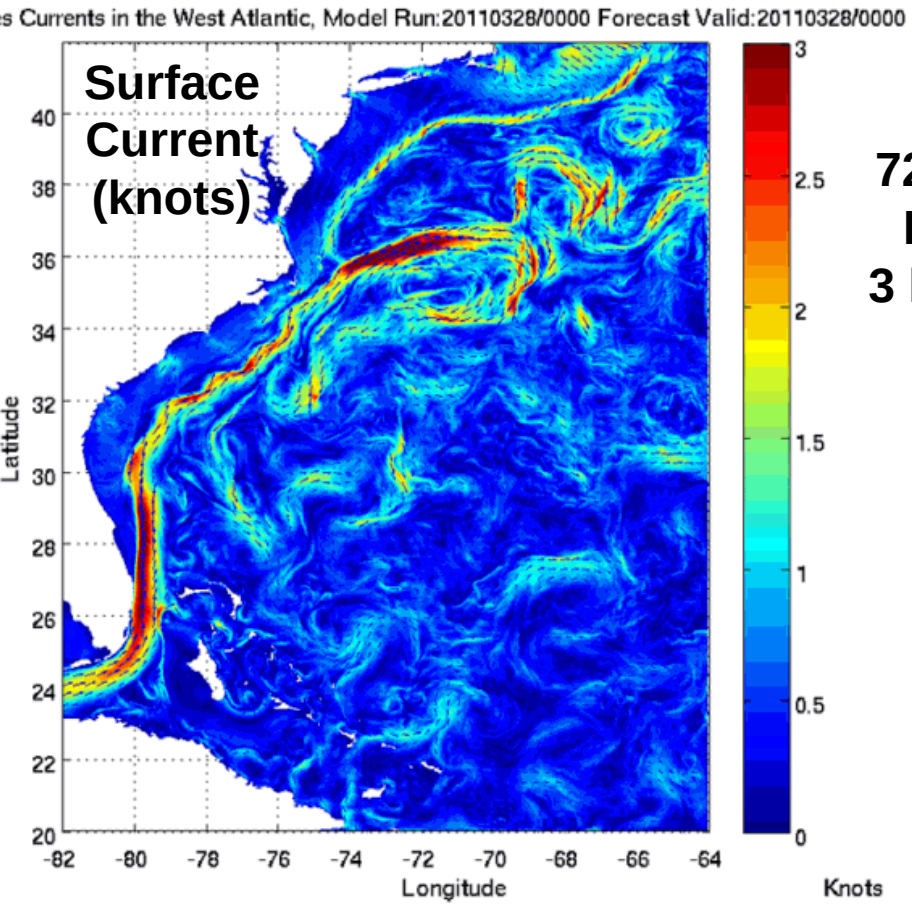


Wind Against Current

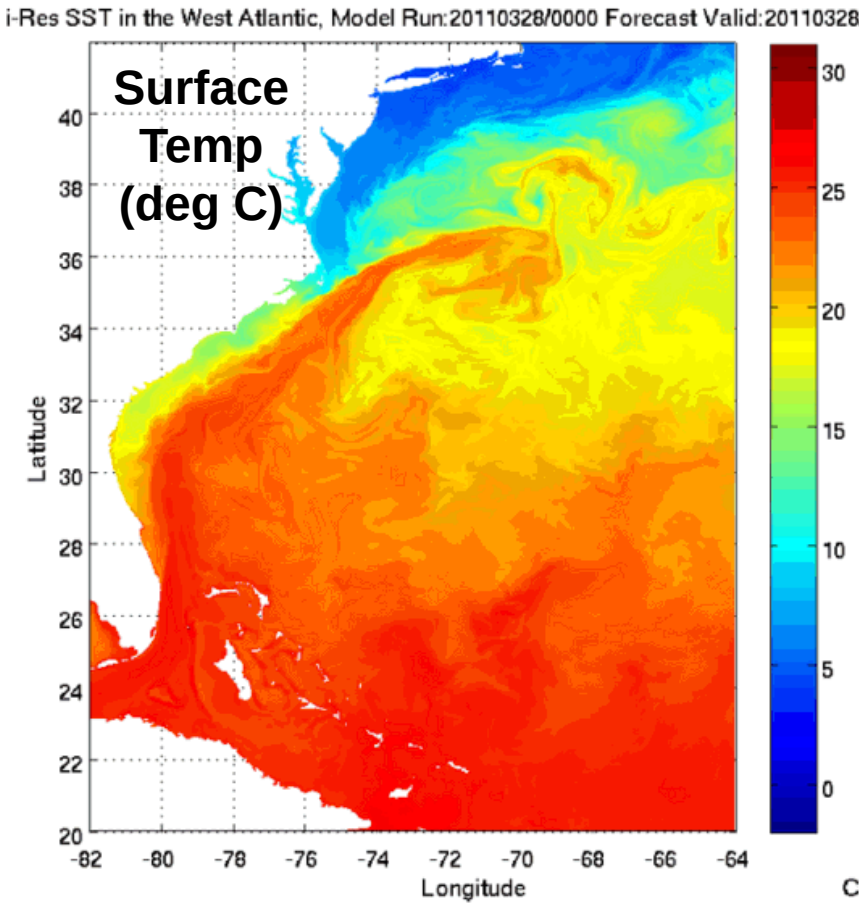
Plum Gut, NY

NAVY Coastal Ocean Model

http://www.opc.ncep.noaa.gov/newNCOM/NCOM_currents.shtml



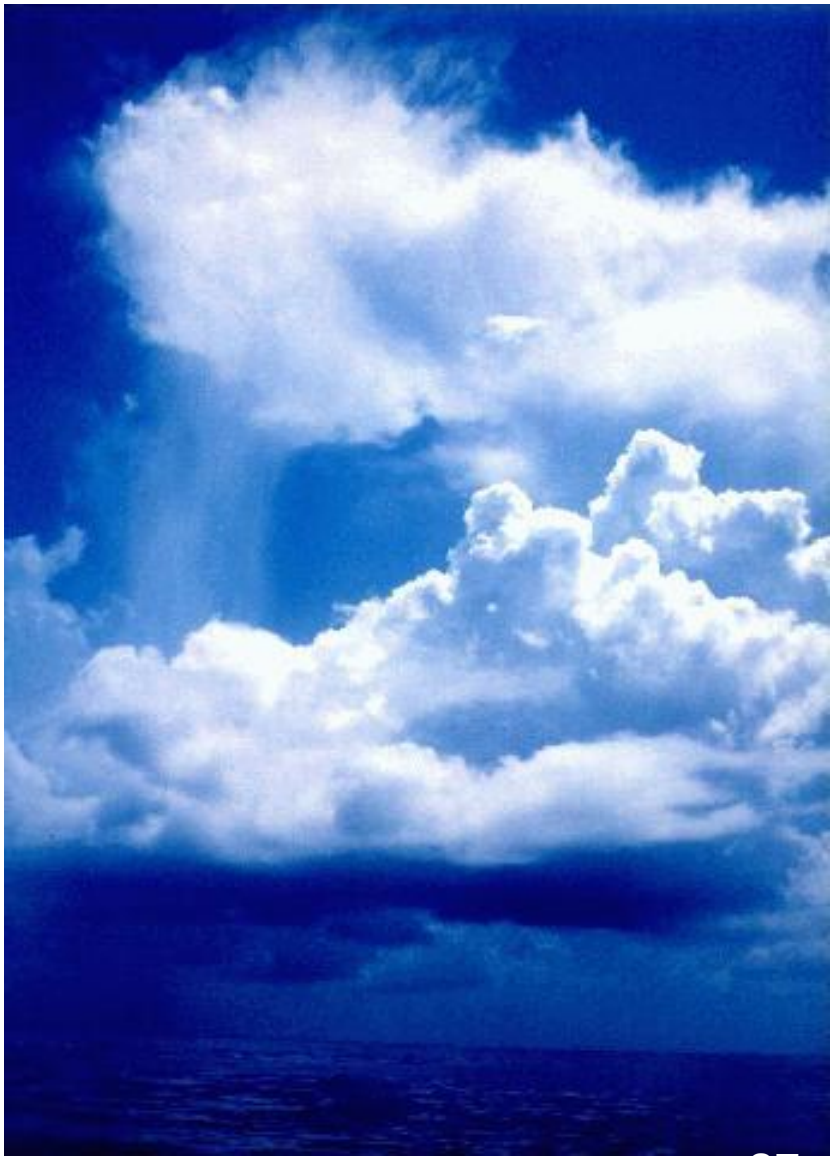
72 hour
Loop
3 hourly

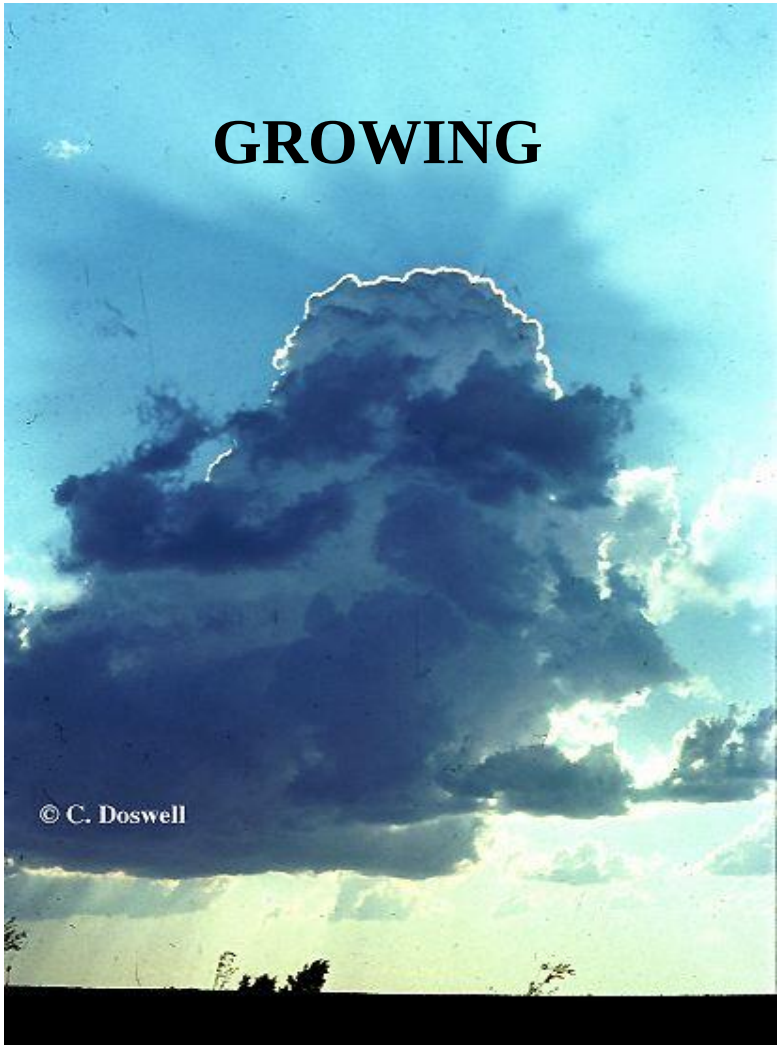


THUNDERSTORMS

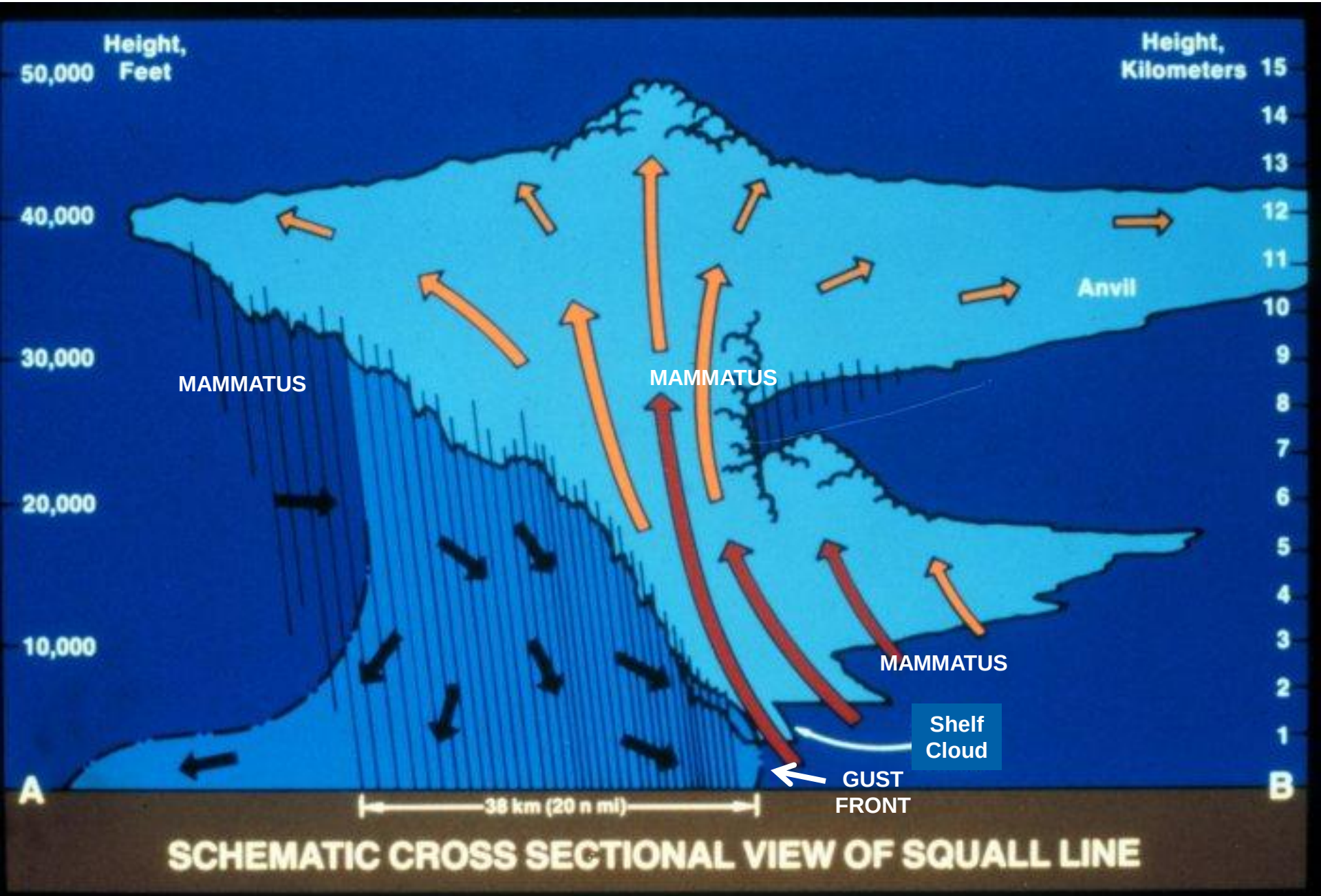
CUMULUS CLOUDS

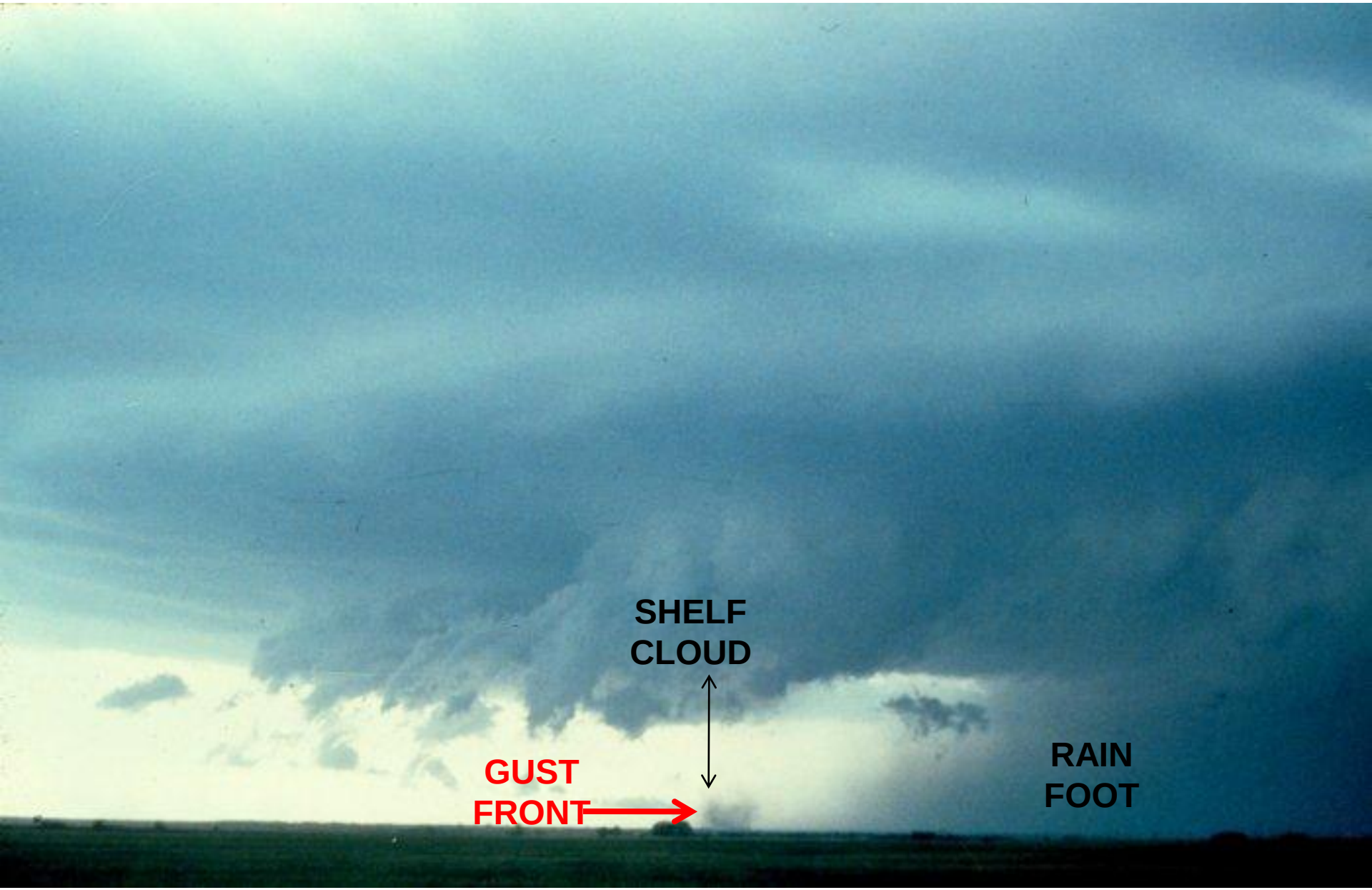
MATURE





SQUALL LINES



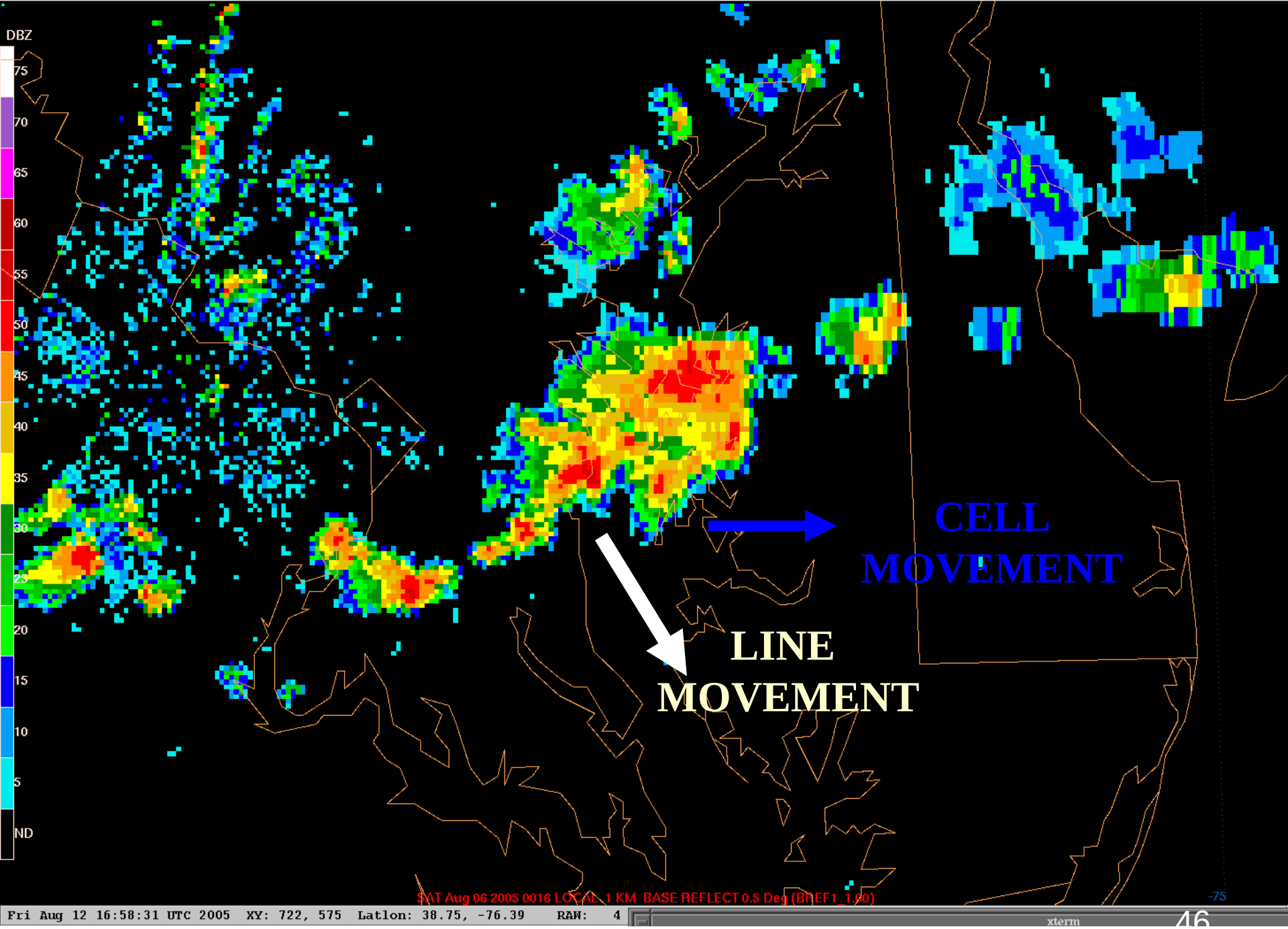

SHELF
CLOUD
GUST
FRONT
RAIN
FOOT

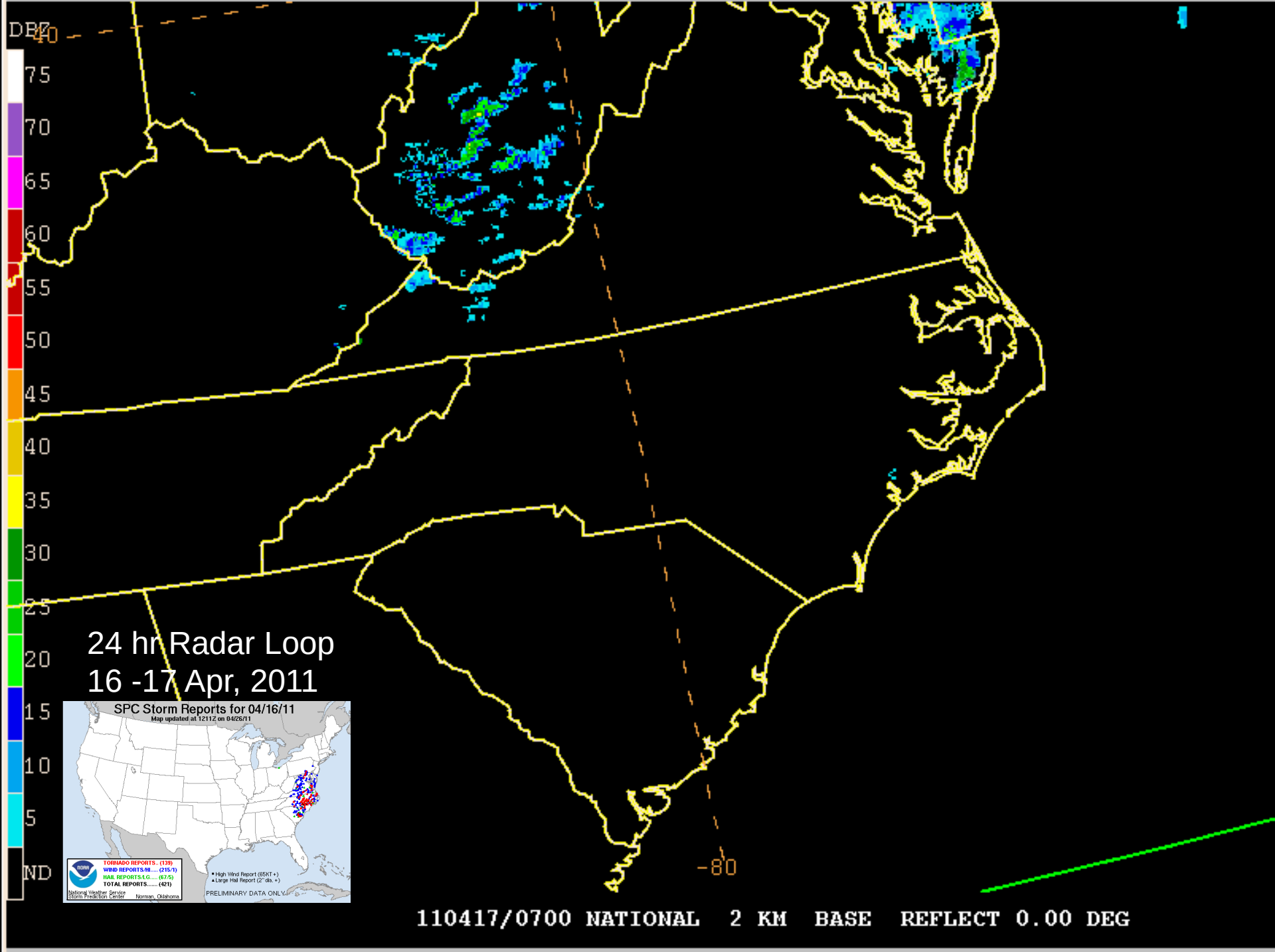
SHELF
CLOUD

MAMMATUS

GREEN TINGE – potential for HAIL

MICROBURST


DBZ
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
ND
CELL
MOVEMENT
LINE
MOVEMENT
SAT Aug 06 2005 0016 LOCAL 1 KM BASE REFLECT 0.5 Deg (BREF1_1.00)
Fri Aug 12 16:58:31 UTC 2005 XY: 722, 575 Latlon: 38.75, -76.39 RAW: 4
xterm


DBZ
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
ND
-80
110417/0700 NATIONAL 2 KM BASE REFLECT 0.00 DEG
24 hr Radar Loop
16 -17 Apr, 2011
SPC Storm Reports for 04/16/11
Map updated at 1211Z on 04/26/11
TORNADO REPORTS...(139)
WIND REPORTS/HI.....(215/1)
HAIL REPORTS/LG.....(67/5)
TOTAL REPORTS.....(421)
National Weather Service
Storm Prediction Center
Norman, Oklahoma
* High Wind Report (65KT+)
▲ Large Hail Report (2" dia. +)
PRELIMINARY DATA ONLY

THUNDERSTORM TIPS

Know the forecast!

- **NOAA WX Radio**
- **Fronts, troughs, boundaries**

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

PDA, Cell phone, laptop (NWS radar), Satellite Radio

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

Gulf Stream

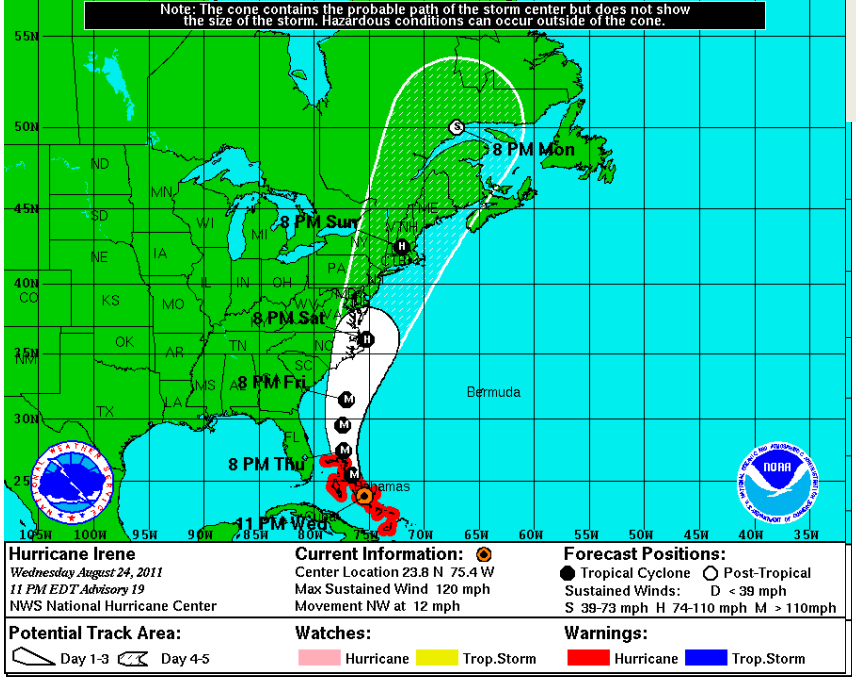
- **Flow parallel to the Stream**
- **Maximum activity at night**

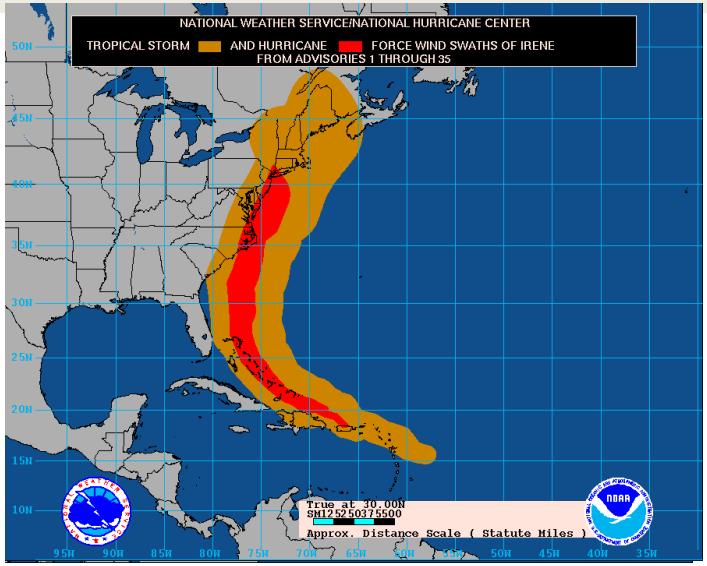
AM Radio, Radar (rain clutter/sea clutter)

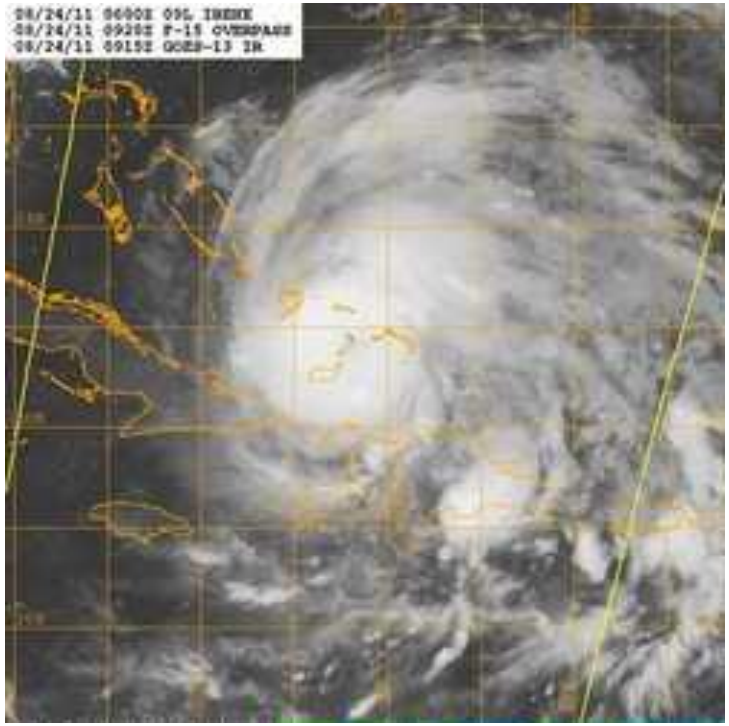
Squall Drill

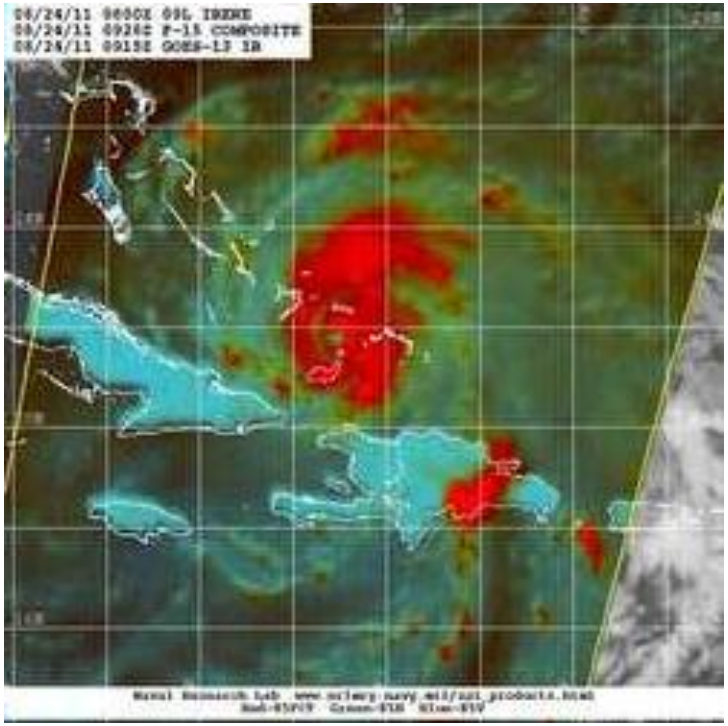
- **Sails down and stowed**
- **Anchor (s) (holding ground)**
- **Jacklines with harnesses - ahead of time**
- **Assigned tasks**

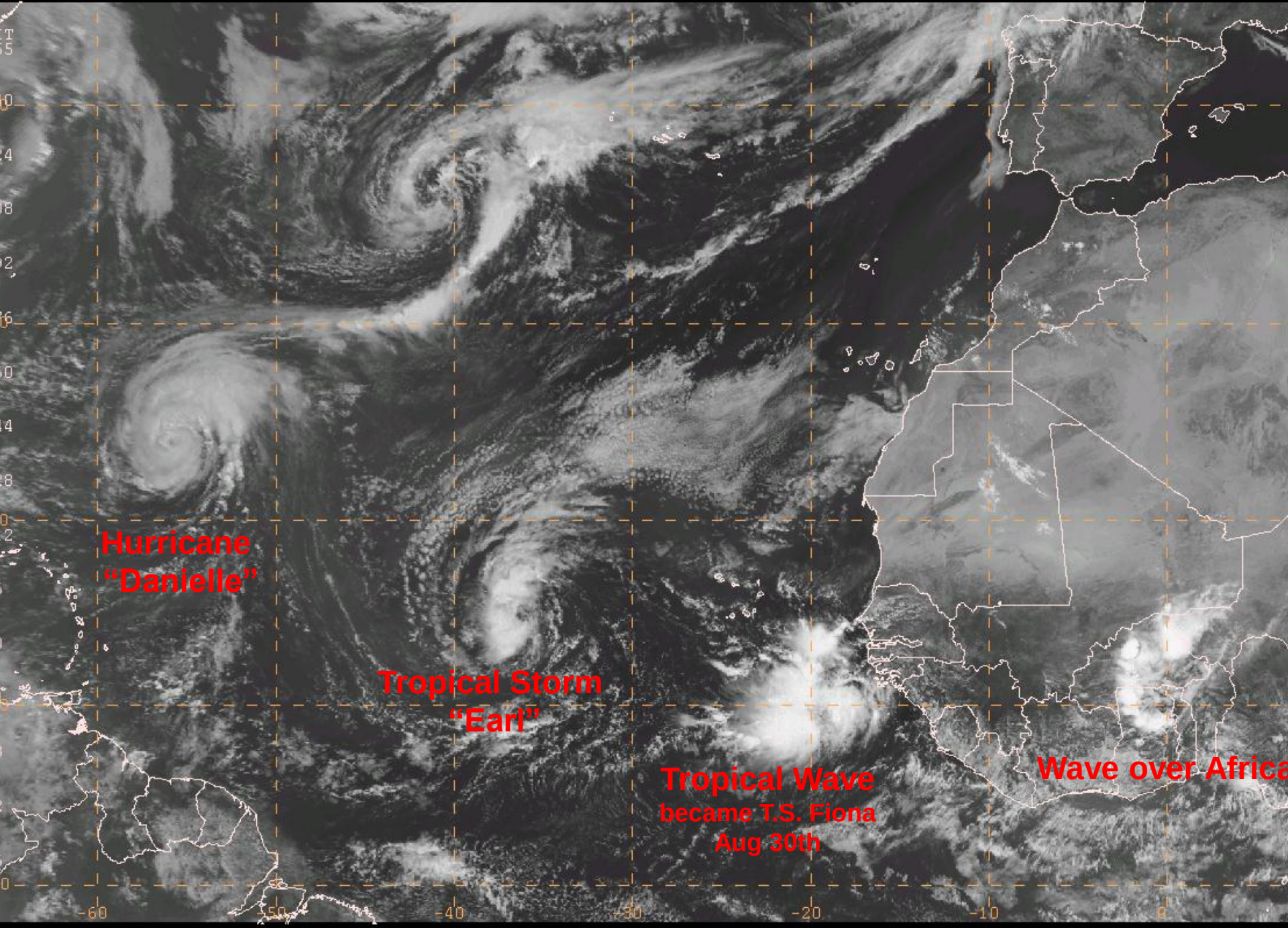
TROPICAL CYCLONES

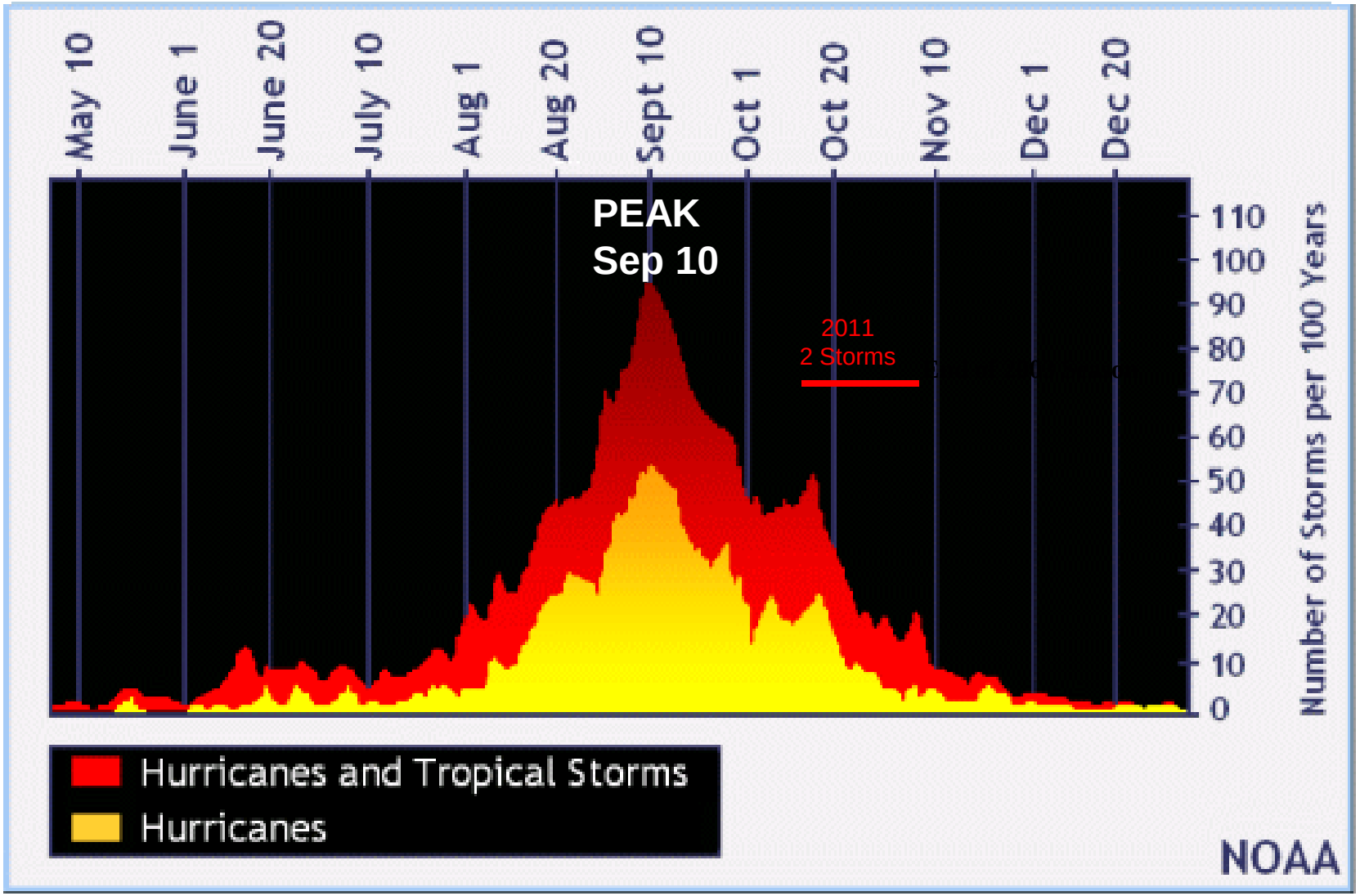




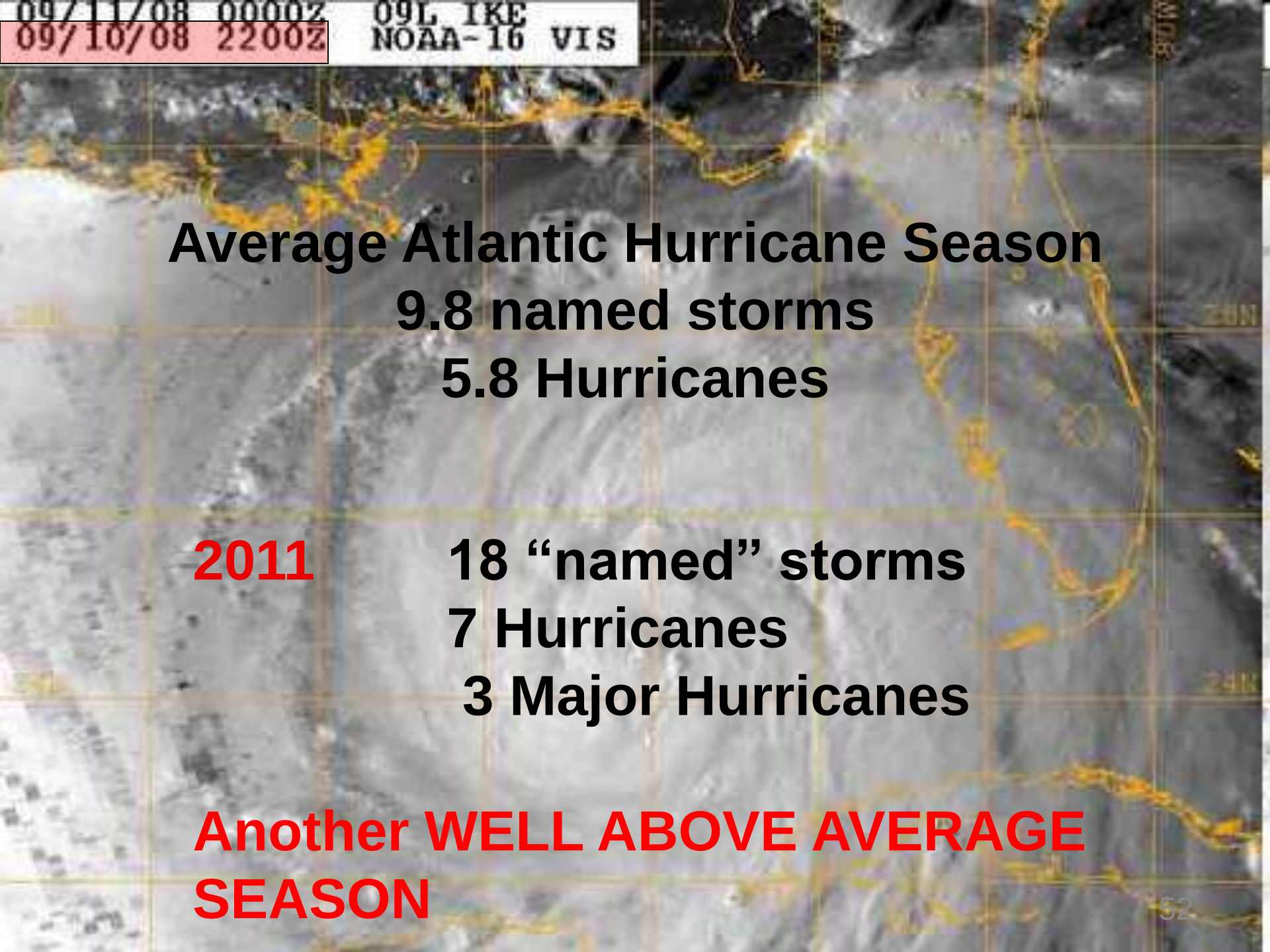





Hurricane
"Danielle"
Tropical Storm
"Earl"
Tropical Wave
became T.S. Fiona
Aug 30th
Wave over Africa
-60
-50
-40
-30
-20
-10
0
100826/1215 METEOSAT9 VIS_0.6



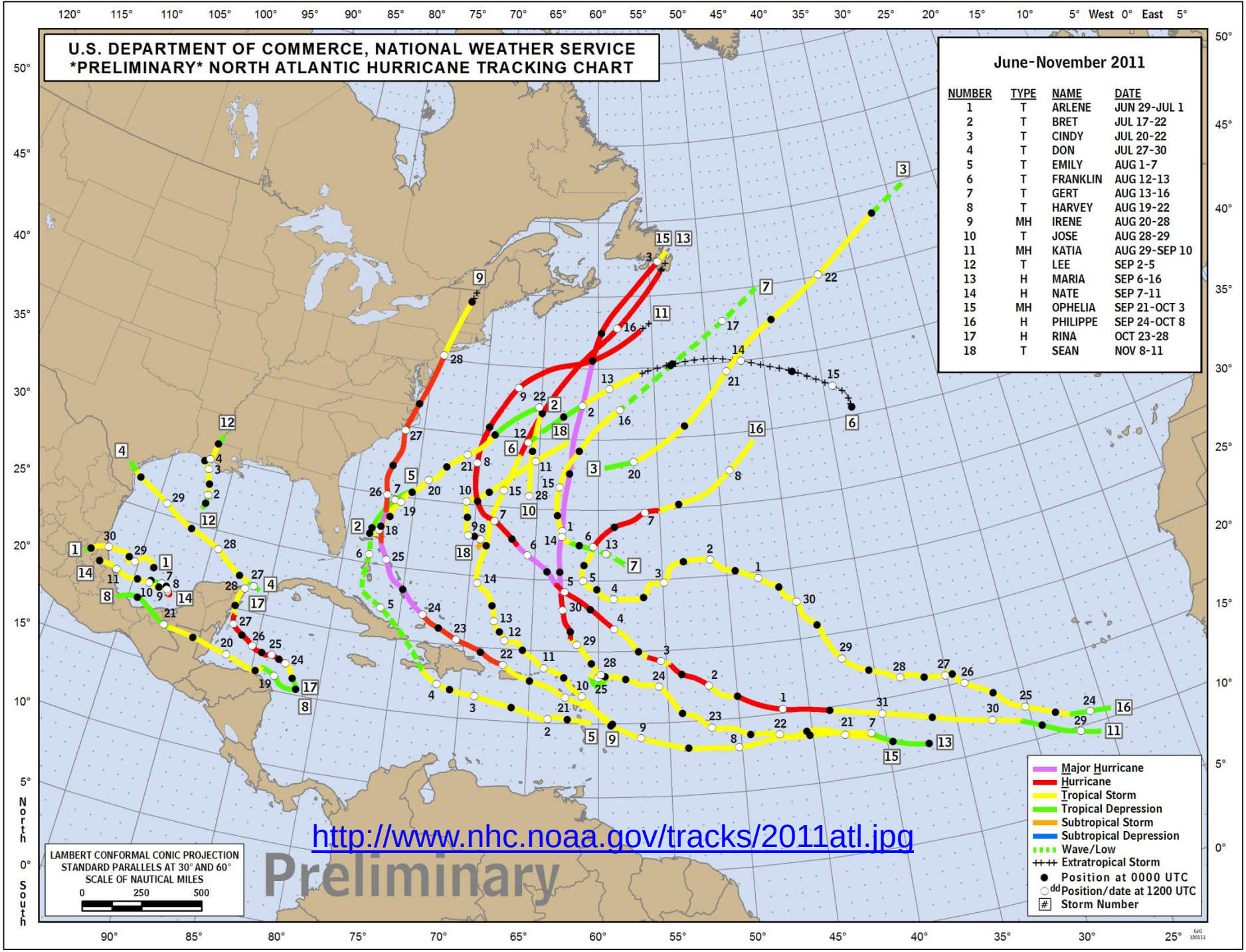
http://www.nhc.noaa.gov/climo/



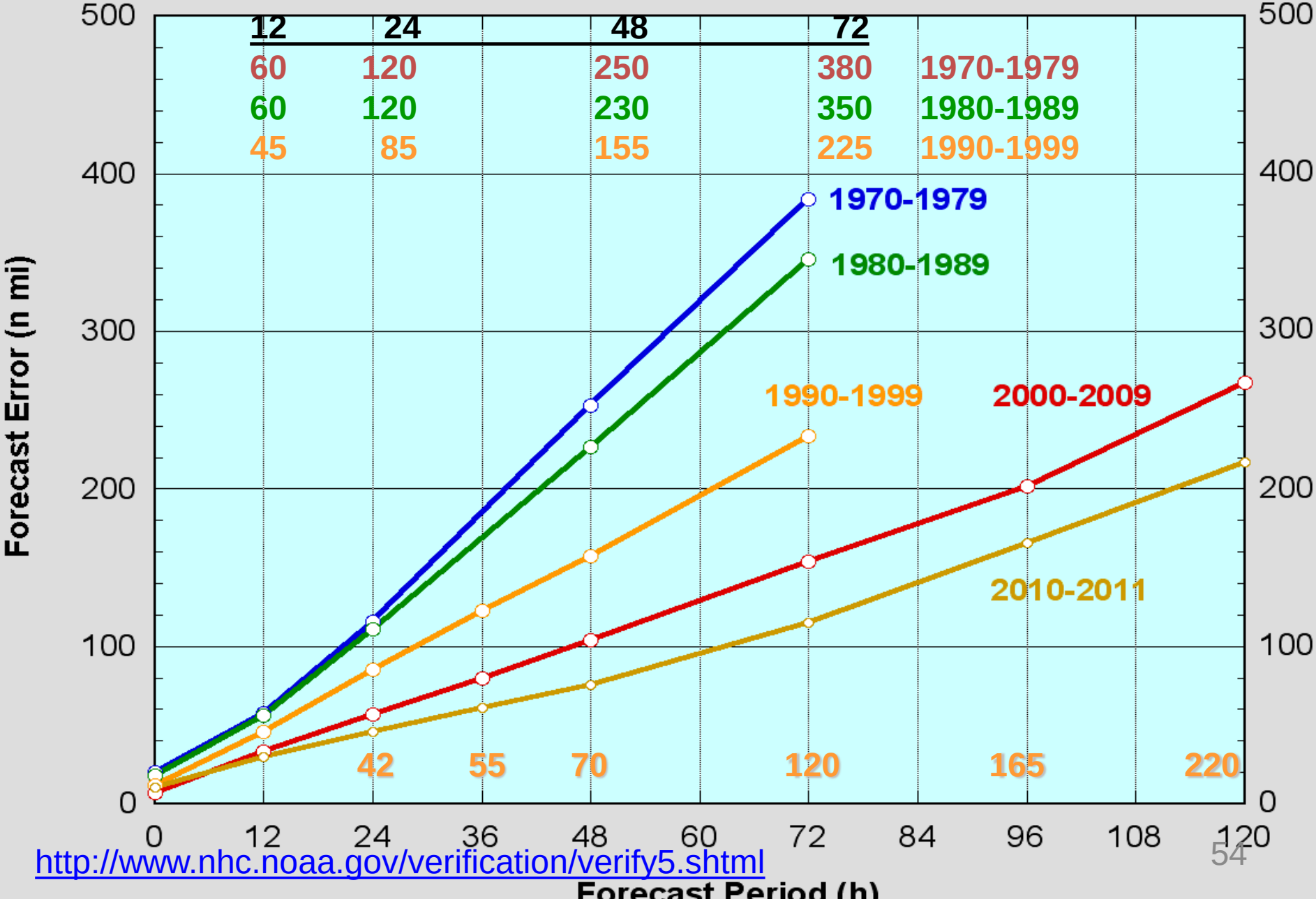
Average Atlantic Hurricane Season
9.8 named storms
5.8 Hurricanes

2011 **18 “named” storms**
7 Hurricanes
3 Major Hurricanes

Another WELL ABOVE AVERAGE SEASON


U.S. DEPARTMENT OF COMMERCE, NATIONAL WEATHER SERVICE
PRELIMINARY NORTH ATLANTIC HURRICANE TRACKING CHART
June-November 2011
NUMBER TYPE NAME DATE
1 T ARLENE JUN 29-JUL 1
2 T BRET JUL 17-22
3 T CINDY JUL 20-22
4 T DON JUL 27-30
5 T EMILY AUG 1-7
6 T FRANKLIN AUG 12-13
7 T GERT AUG 13-16
8 T HARVEY AUG 19-22
9 MH IRENE AUG 20-28
10 T JOSE AUG 28-29
11 MH KATIA AUG 29-SEP 10
12 T LEE SEP 2-5
13 H MARIA SEP 6-16
14 H NATE SEP 7-11
15 MH OPHELIA SEP 21-OCT 3
16 H PHILIPPE SEP 24-OCT 8
17 H RINA OCT 23-28
18 T SEAN NOV 8-11
Major Hurricane
Hurricane
Tropical Storm
Tropical Depression
Subtropical Storm
Subtropical Depression
Wave/Low
Extratropical Storm
Position at 0000 UTC
Position/date at 1200 UTC
Storm Number
LAMBERT CONFORMAL CONIC PROJECTION
STANDARD PARALLELS AT 30° AND 60°
SCALE OF NAUTICAL MILES
0 250 500
Preliminary
http://www.nhc.noaa.gov/tracks/2011atl.jpg
West 0° East
North
South

NHC Official Average Track Errors
Atlantic Basin Tropical Storms and Hurricanes

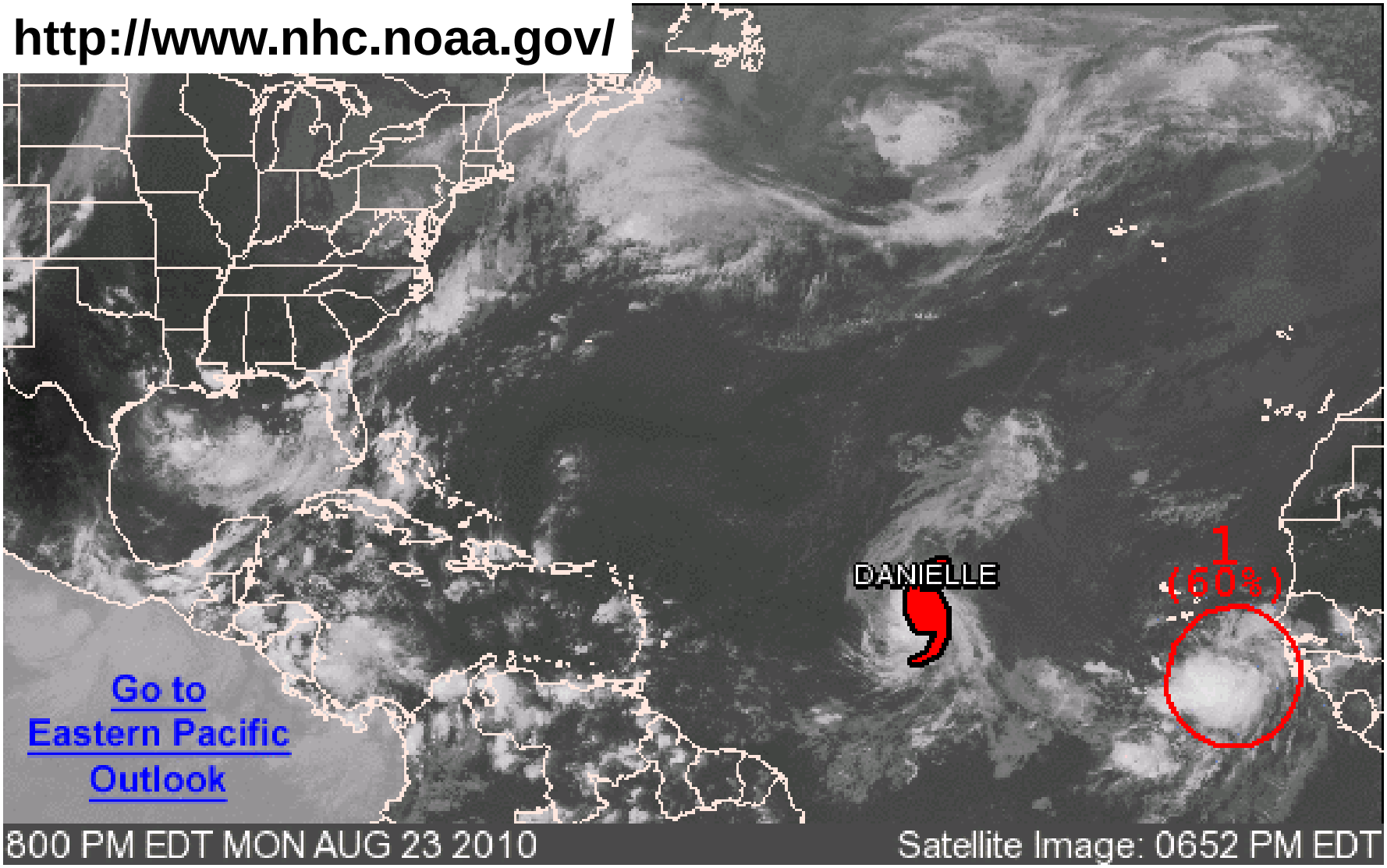


http://www.nhc.noaa.gov/verification/verify5.shtml

Graphical Tropical Weather Outlook

National Hurricane Center Miami, Florida

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



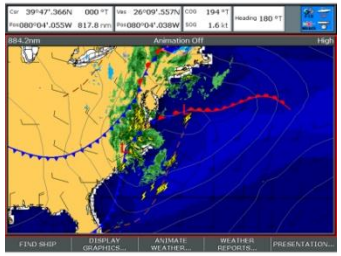
Outlined areas denote current position of systems discussed in the Tropical Weather Outlook. Color indicates probability of tropical cyclone formation within 48 hours.

Low <30% Medium 30-50% High >50%

Dealing with Hurricane Season

- **Know where to receive latest information, continue to monitor!!!**
  http://www.weather.gov/om/marine/home.htm
- **We continue to get better at forecasting track and formation!**
  http://www.nhc.noaa.gov/verification/figs/OFCL_ATL_trk_error_trend.gif
- **Intensity still a big problem!!!**
  http://www.nhc.noaa.gov/verification/figs/OFCL_ATL_int_error_trend.gif
- **Have seen more cyclones later in season…well into October November and December**
- **Know the climatology…formation areas and favored tracks**
  http://www.nhc.noaa.gov/pastprofile.shtml
- **Hurricanes are just as dangerous in the northern latitudes**
  - **They move faster and are more efficient wave producers**

Communications



http://weather.noaa.gov/pub/fax/ftpmail.txt

E-mail

Before departing

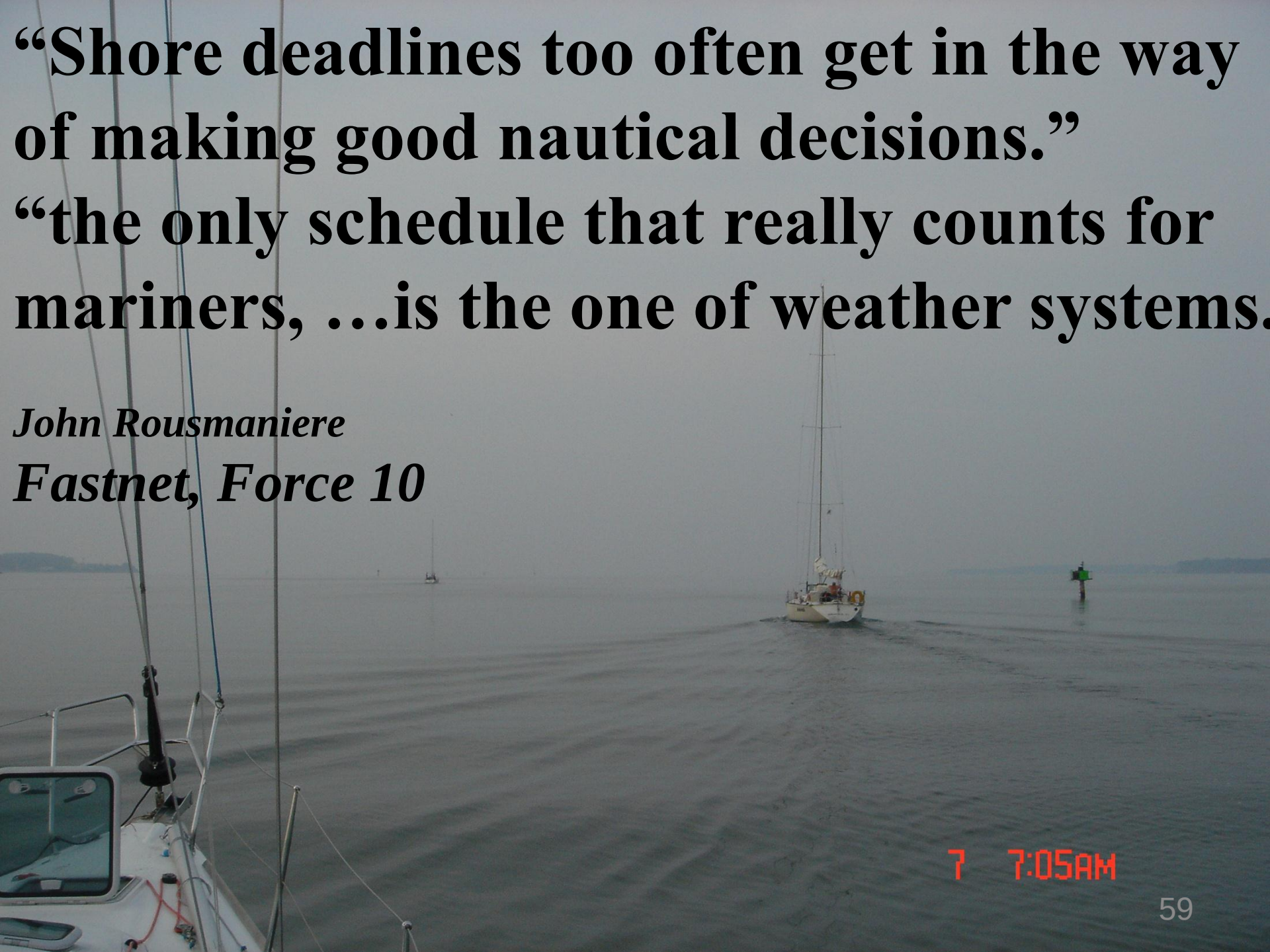
- Departure time may be the single most important decision for a successful voyage.
- Know the forecast…and update!
- Monitor the weather via Internet….same products…get in rhythm
- Private weather routing service?
- Know your limitations!

Underway

- Monitor the weather…
  - watch keeping/navigation
  - wind speed and/or direction changes, barometer, seas

- Is the weather evolving as planned?
  If not…determine and redefine options

- KNOW THE CURRENT FORECAST!!!
  - Weatherfax, SSB, NOAA WX RADIO, ftpmail, etc…

“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