Advanced Marine Weather

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Landfall Navigation
Marine Training Center (MTC)
Stamford CT
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Overview of the Course

Using the knowledge gained in the Basic and Intermediate Marine Meteorology courses, you will learn to diagnose and understand a weather-related boating misadventure of your own choosing using, as a model, an infamous misadventure. Surface, upper-air and satellite data will be collected from on-line meteorological and oceanographic archives of the National Oceanic and Atmospheric Administration (NOAA). The data will be analyzed to produce a 4-D image of the weather (N-S, E-W, vertical, time). Using this information, decisions that led to the misadventure will be reviewed and revised to avoid a future incident. Current on-line NOAA weather information and forecasts will be used to plan a future voyage.

Goal of the Course

To *weatherproof* you: recognize, understand, act!

Advanced Marine Weather Topics

- **Diagnose and understand** your own weather-related boating misadventure using, as a model, an infamous misadventure

- **Obtain the data**, surface, upper-air and satellite from on-line archives of the NOAA

- **Analyze the data** to produce a 4-D image of the weather

- **Review and revise decisions** that led to the misadventure

- **Plan a future voyage** using current on-line NOAA weather information and forecasts

This presentation is at www.sci.ccny.cuny.edu/~hindman

Certification
Upon completion of the course, you will receive a
Landfall Navigation-Marine Training Center
Certificate of Completion in Advanced Marine Weather

References
Reeds Maritime Meteorology 3rd edition, Cornish & Ives
(ISBN: 0713676353, available from Amazon.com)

Weather at Sea 4th edition, Houghton
(ISBN: 1904475167, available from Landfall Navigation)

North U Weather for Sailors 2nd edition, Biewenga

(ISBN: 097446760X, available from Landfall Navigation)

Your course expectations?

Diagnose and understand:

An infamous misadventure:

Sunk - The incredible truth about a ship that never should have sailed
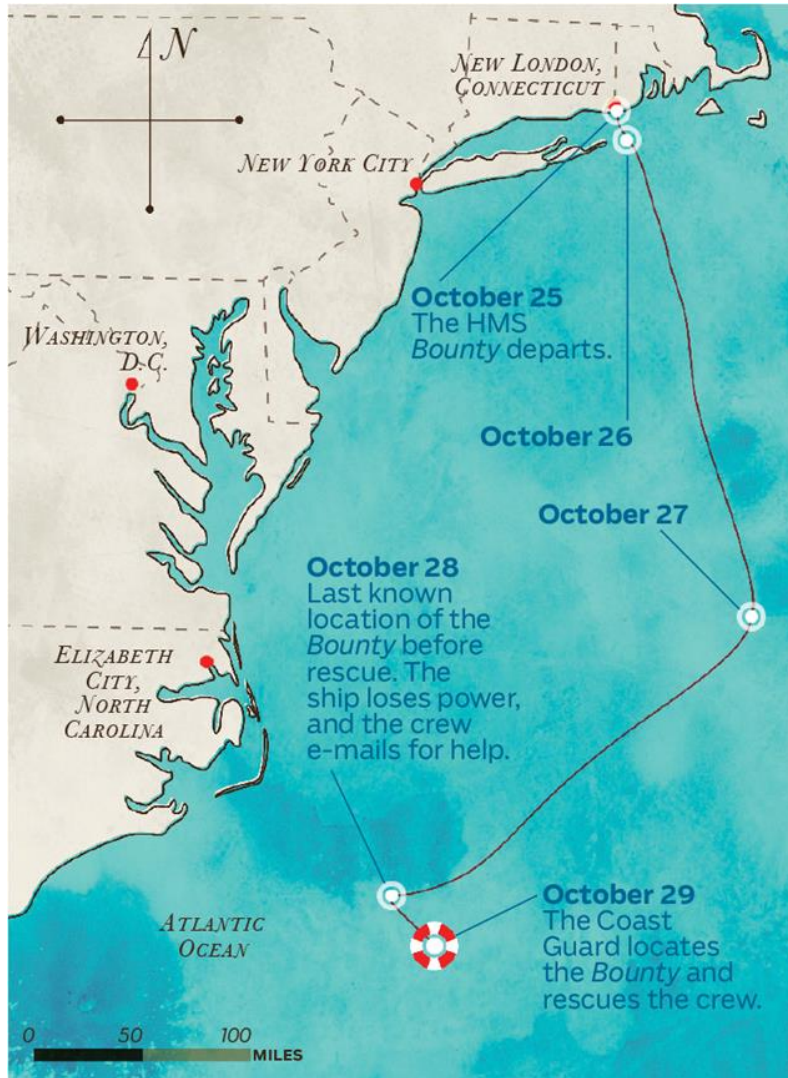
Kathryn Miles
'Outside' Magazine, 11 February 2013

When the HMS *Bounty* went down during Hurricane Sandy in October 2012, millions watched on TV as the Coast Guard rescued 14 survivors—but couldn't save the captain and one of his crew. A huge question lingered in the aftermath: what was this vessel—a leaking replica built in 1960 for the film 'Mutiny on the Bounty'—doing in the eye of the storm?

Diagnose and understand :

October 25
The HMS *Bounty* departs.

October 26

October 27

October 28
Last known location of the *Bounty* before rescue. The ship loses power, and the crew e-mails for help.

October 29
The Coast Guard locates the *Bounty* and rescues the crew.

NEW LONDON, CONNECTICUT

NEW YORK CITY

WASHINGTON, D.C.

ELIZABETH CITY, NORTH CAROLINA

ATLANTIC OCEAN

0   50   100   MILES

Why did the ship depart for St. Petersburg FL?

Why did it change course on 27 October?

Why the 'late' abandon ship command on 29 October?

Obtain the data:

The following slides depict the surface analysis and forecast charts and the upper-air analysis and forecast charts and the satellite images that the skipper of the *Bounty* could have obtained on the day of the sailing (25 October 2012) to help with his go-no-go decision. The charts and images could have been obtained from the NOAA-OPC over the ship's WeatherFax. Also, from the Internet, the charts could have been obtained at www.opc.ncep.noaa.gov/Atl_tab.shtml and the images at www.aviationweather.gov/adds/satellite/.

The charts used in this presentation were retrieved from the on-line archive nomads.ncdc.noaa.gov/ncep/NCEP.

The satellite images in this presentation were retrieved from the on-line archive www.nsof.class.noaa.gov/saa/products/search?datatype_family=GVAR_IMG.

I will use the charts and images in an attempt to understand the skippers three pivotal decisions. First, the decision to sail.
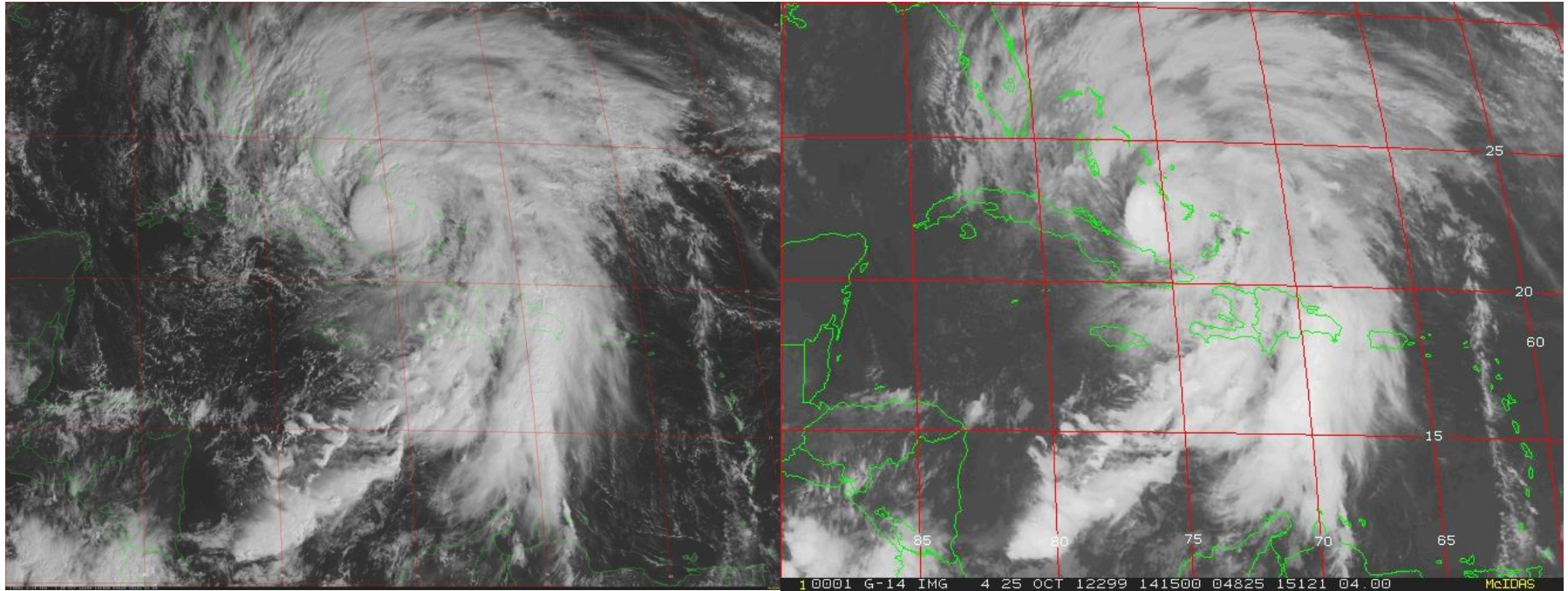
Obtain the data: Surface analysis
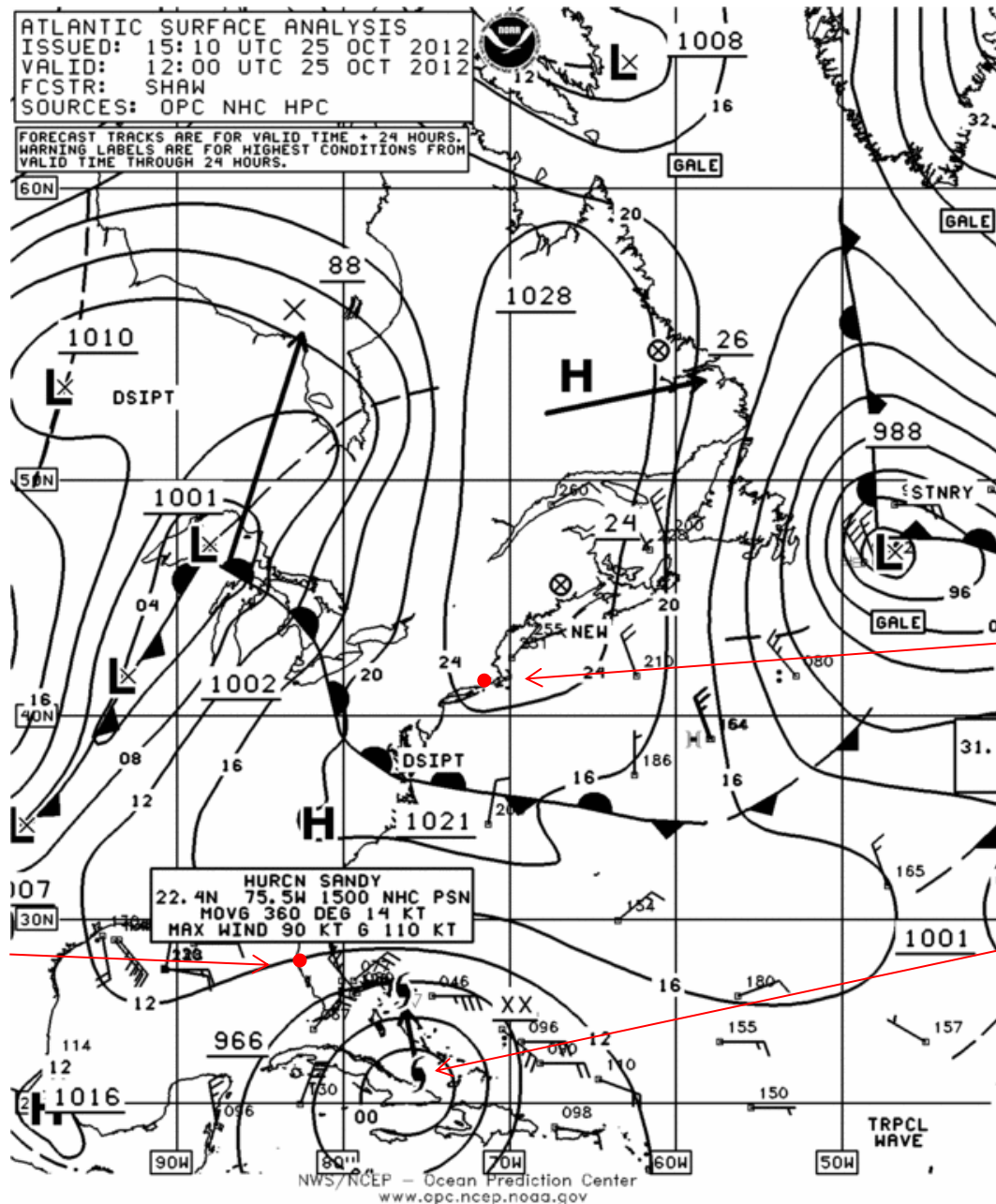
New London CT

St. Petersburg FL

Hurricane Sandy had maximum winds of 90 KT with gusts to 110 KT
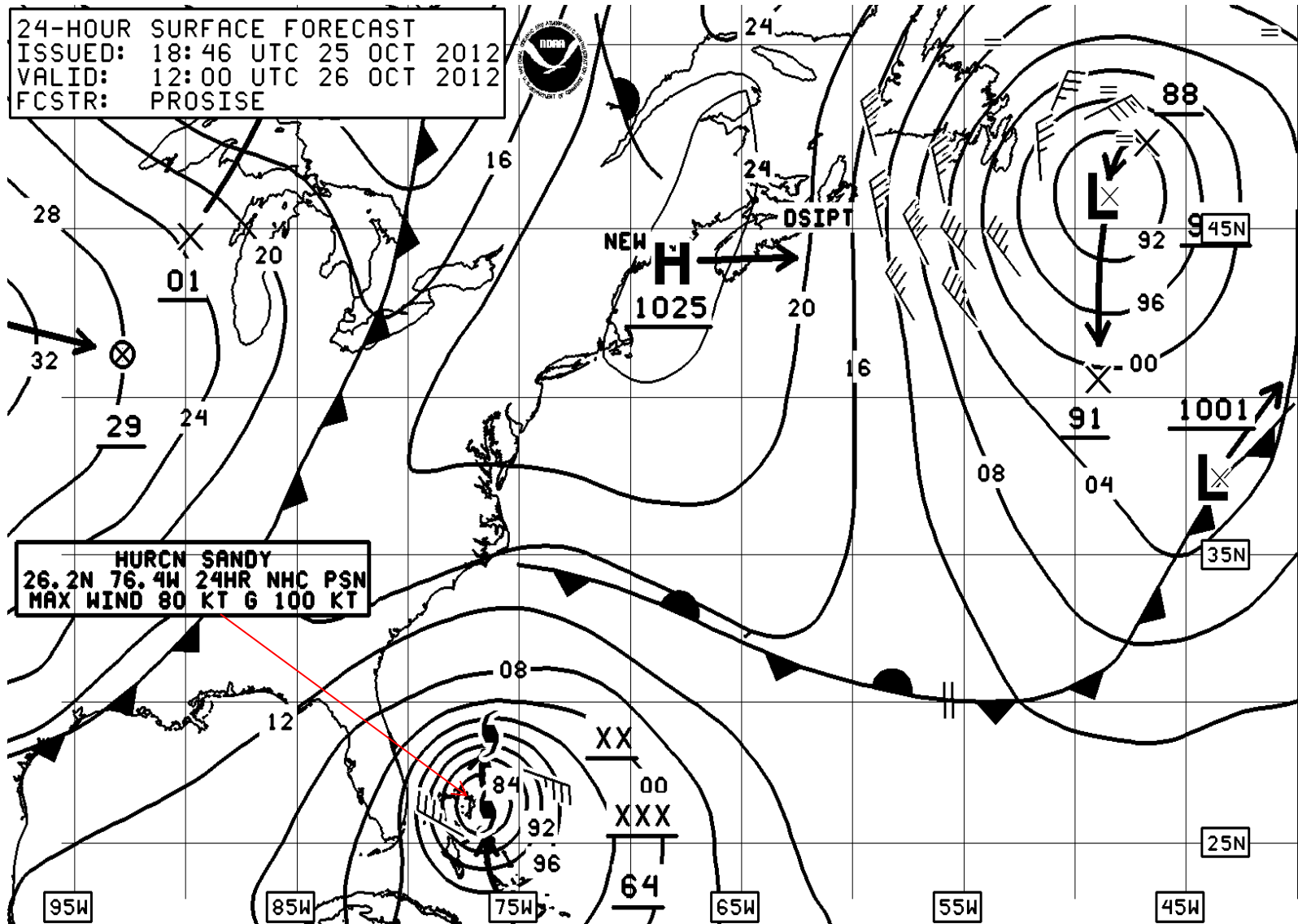
Obtain the data: Satellite images

1415UTC, 25 October 2012, visible   1415UTC, 25 October 2012, infrared

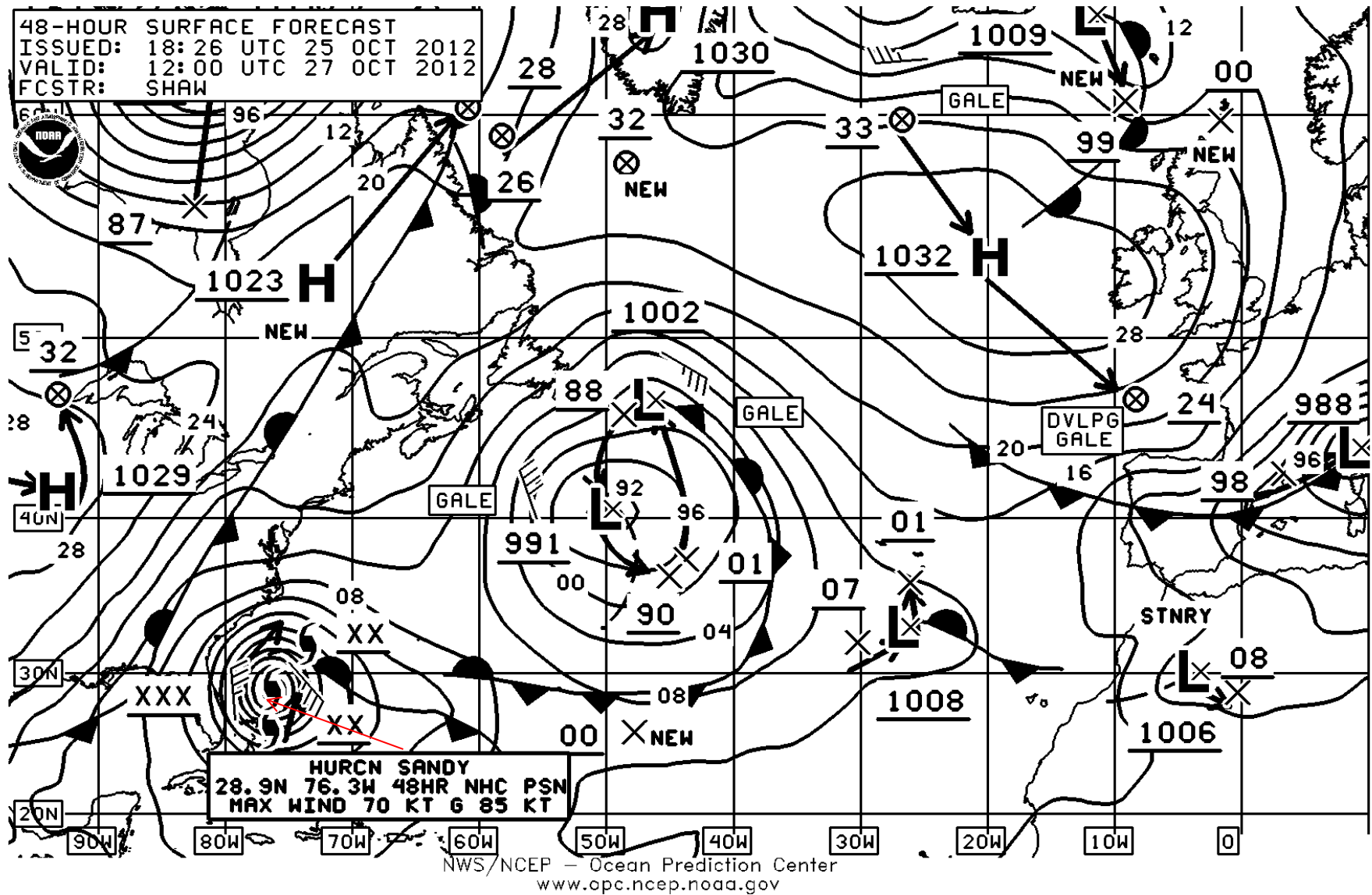Sandy had neither a clear eye nor a significant outflow cloud shield.

Obtain the data: Surface forecasts

24-HOUR SURFACE FORECAST
ISSUED: 18:46 UTC 25 OCT 2012
VALID: 12:00 UTC 26 OCT 2012
FCSTR: PROSISE

HURCN SANDY
26.2N 76.4W 24HR NHC PSN
MAX WIND 80 KT G 100 KT

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

Sandy was predicted to continue northward and, by the morning of 26 October,
weaken a bit: maximum winds decreasing from 90 to 80 KT, gusts from 110 to 100 KT
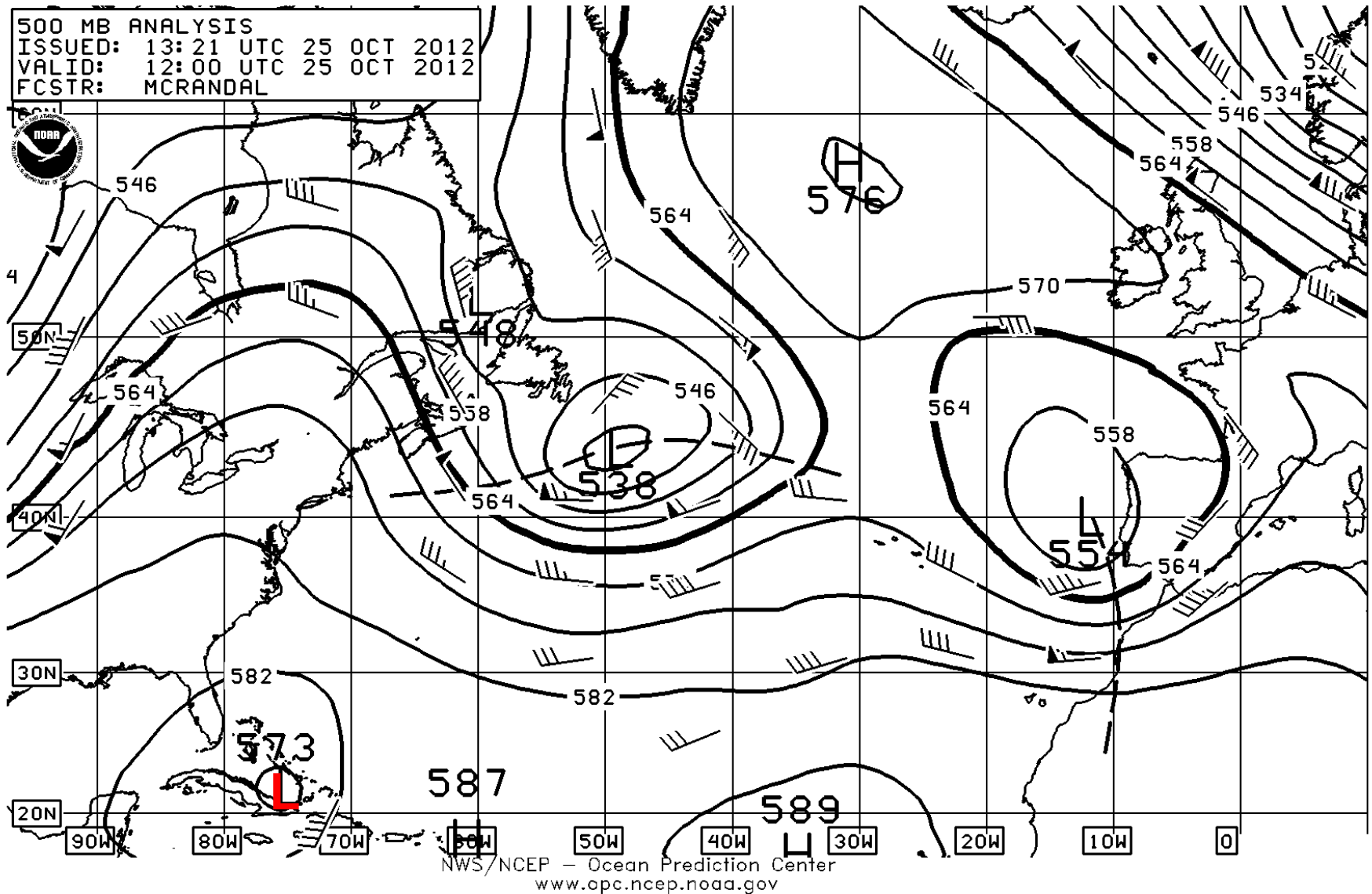
Obtain the data: Surface forecasts

48-HOUR SURFACE FORECAST
ISSUED: 18:26 UTC 25 OCT 2012
VALID: 12:00 UTC 27 OCT 2012
FCSTR: SHAW

HURCN SANDY
28.9N 76.3W 48HR NHC PSN
MAX WIND 70 KT G 85 KT

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

By the morning of 27 October, Sandy was predicted to change from a northerly track to a NNE track and weaken further: maximum winds of 80 KT decreasing to 70 KT and gusts decreasing from 100 KT to 85 KT.

11

Obtain the data: Surface forecasts

96-HOUR SURFACE FORECAST
ISSUED: 20:46 UTC 25 OCT 2012
VALID: 12:00 UTC 29 OCT 2012
FCSTR: MCRANDAL

HURCN SANDY
36.0N 72.0W 96HR NHC PSN
MAX WIND 65 KT G 80 KT

NWS/NCEP – Ocean Prediction Center
www.opc.ncep.noaa.gov
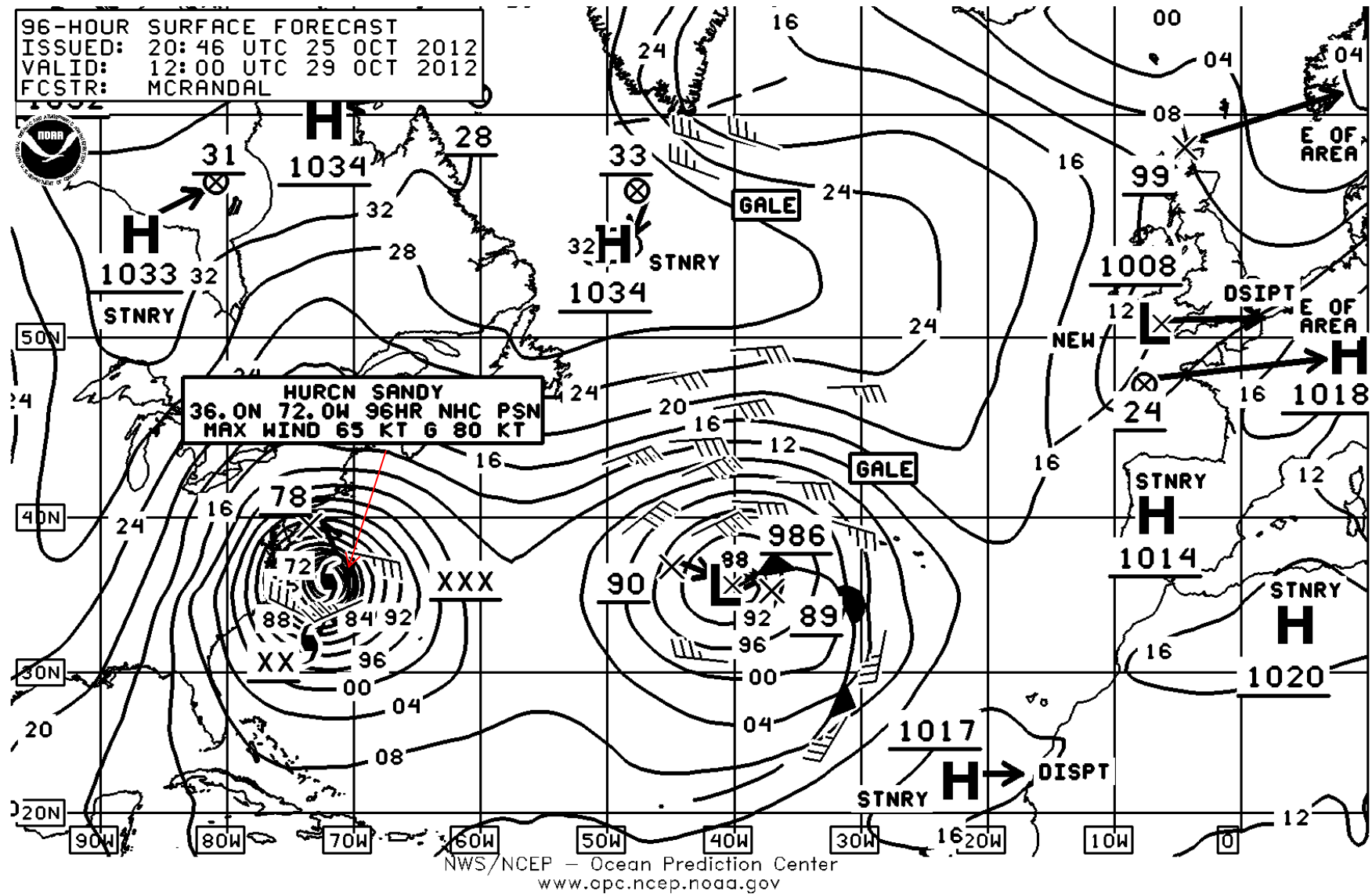
By the morning of 29 October, Sandy was predicted to continue to track NNE
and continue to weaken: maximum winds decreasing from
70 KT to 65 KT and gusts from 85 KT to 80 KT

12

Obtain the data: Upper-air analysis

On the morning of 25 October, Sandy was under a ridge of high pressure.

Obtain the data: Upper-air forecasts
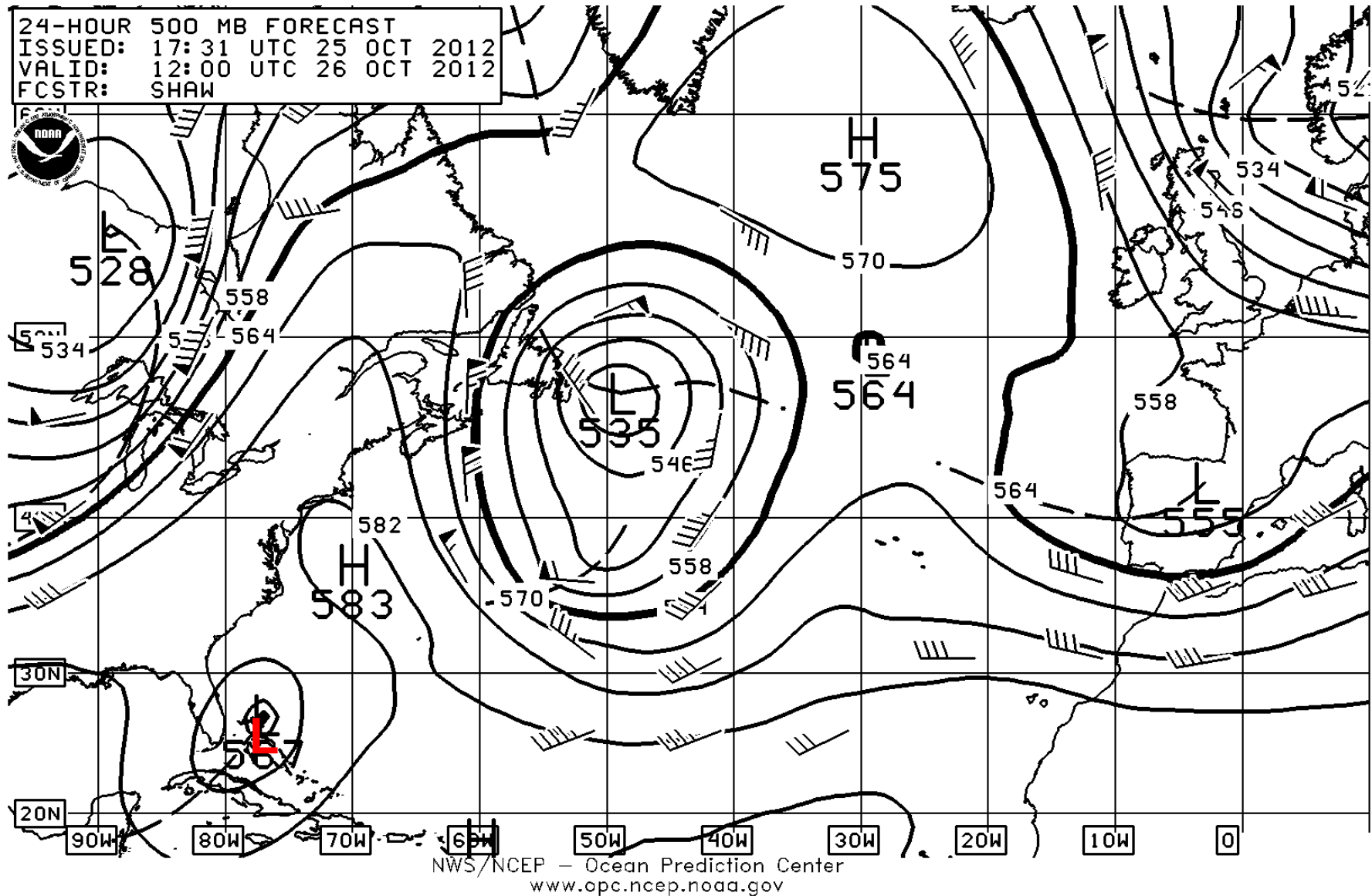
By the morning of 26 October, a trough in the Westerlies was predicted to approach Sandy with the low to the east cutting off from the Westerlies

Obtain the data: Upper-air forecasts

48-HOUR 500 MB FORECAST
ISSUED: 17:31 UTC 25 OCT 2012
VALID: 12:00 UTC 27 OCT 2012
FCSTR: SHAW
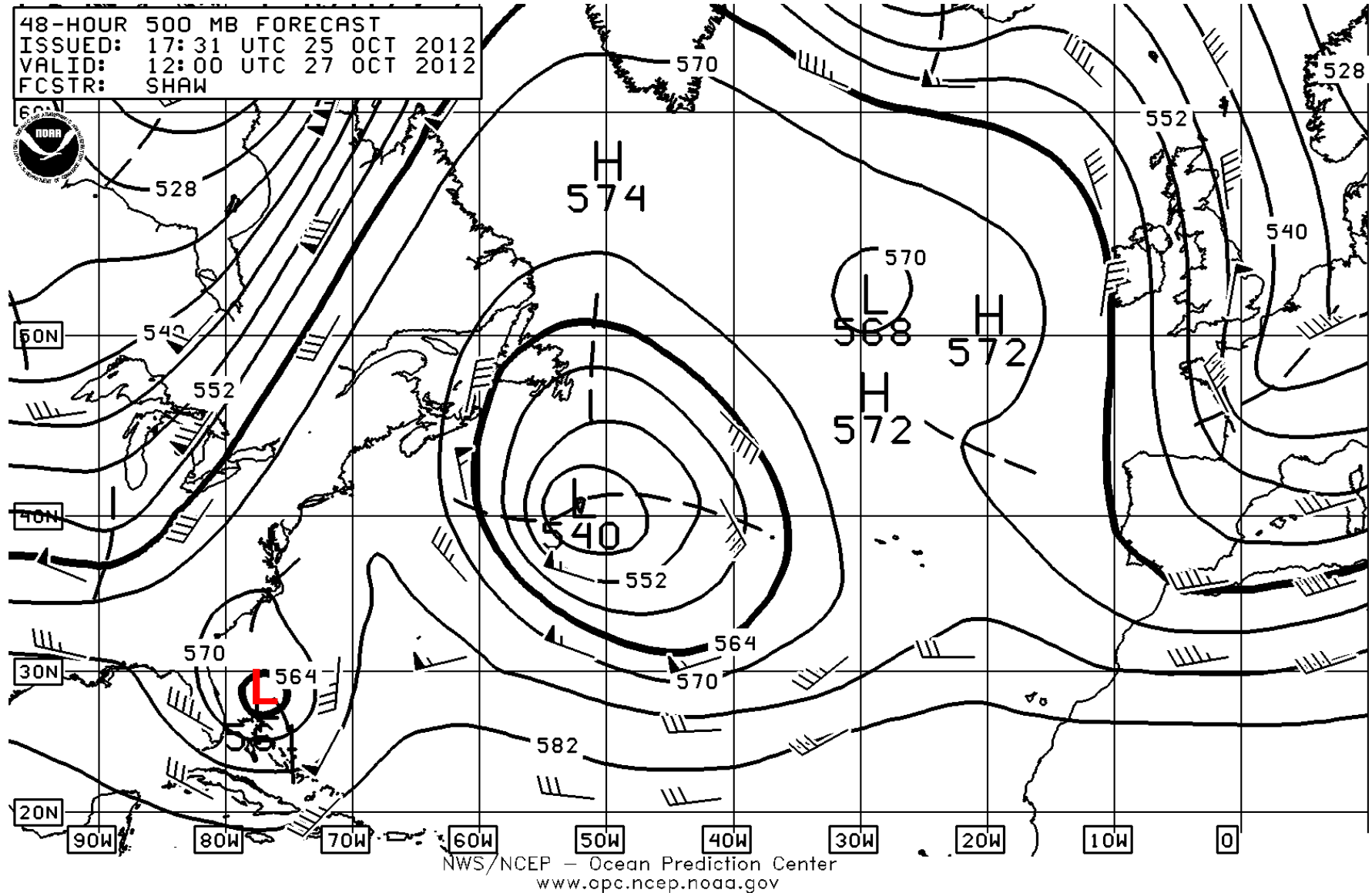
By the morning of 27 October, the trough was predicted to continue moving eastward with the cut-off low moving southwestward (retrograding).

15

Obtain the data: Upper-air forecasts


```
96-HOUR 500 MB FORECAST
ISSUED:  17:07 UTC 25 OCT 2012
VALID:   12:00 UTC 29 OCT 2012
FCSTR:   MCRANDAL
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NWS/NCEP — Ocean Prediction Center
www.opc.ncep.noaa.gov

By the morning of 29 October, Sandy was predicted to merge with the trough.

Obtain the data: Wind / Wave analysis

WIND / WAVE ANALYSIS
ISSUED: 13:44 UTC 25 OCT 2012
VALID: 12:00 UTC 25 OCT 2012
FCSTR: MCRANDAL

SIGNIFICANT WAVE HEIGHT IS SHOWN
(THE AVERAGE HEIGHT OF THE
HIGHEST ONE-THIRD OF THE WAVES)

SOURCE S OF 31N: NHC

HURCN SANDY
22.4N 75.5W 1500 NHC PSN
MOVG 360 DEG 14 KT
MAX WIND 90 KT G 110 KT

SIG WAVE HGT (FT) & WIND
S/NCEP — OCEAN PREDICTION CENTER
www.opc.ncep.noaa.gov

On the morning of 25 October, the highest winds and seas in the vicinity of Sandy were 90G110 KT and at least 15 ft (Sandy was off this chart).

17

Obtain the data: Wind / Wave forecasts
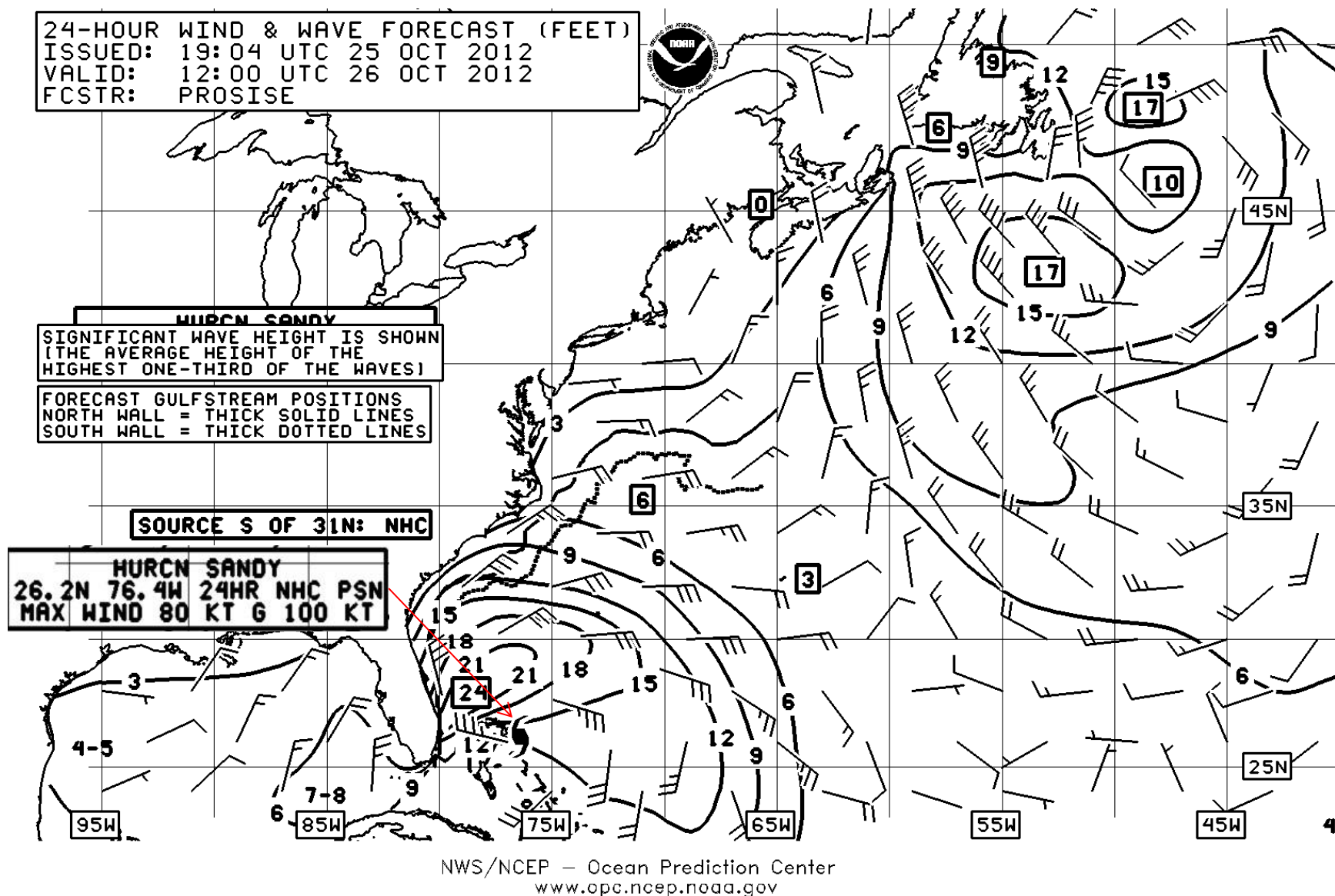
On the morning of 26 October, the highest winds and seas expected near Sandy were 80G100 KT and 24 ft.
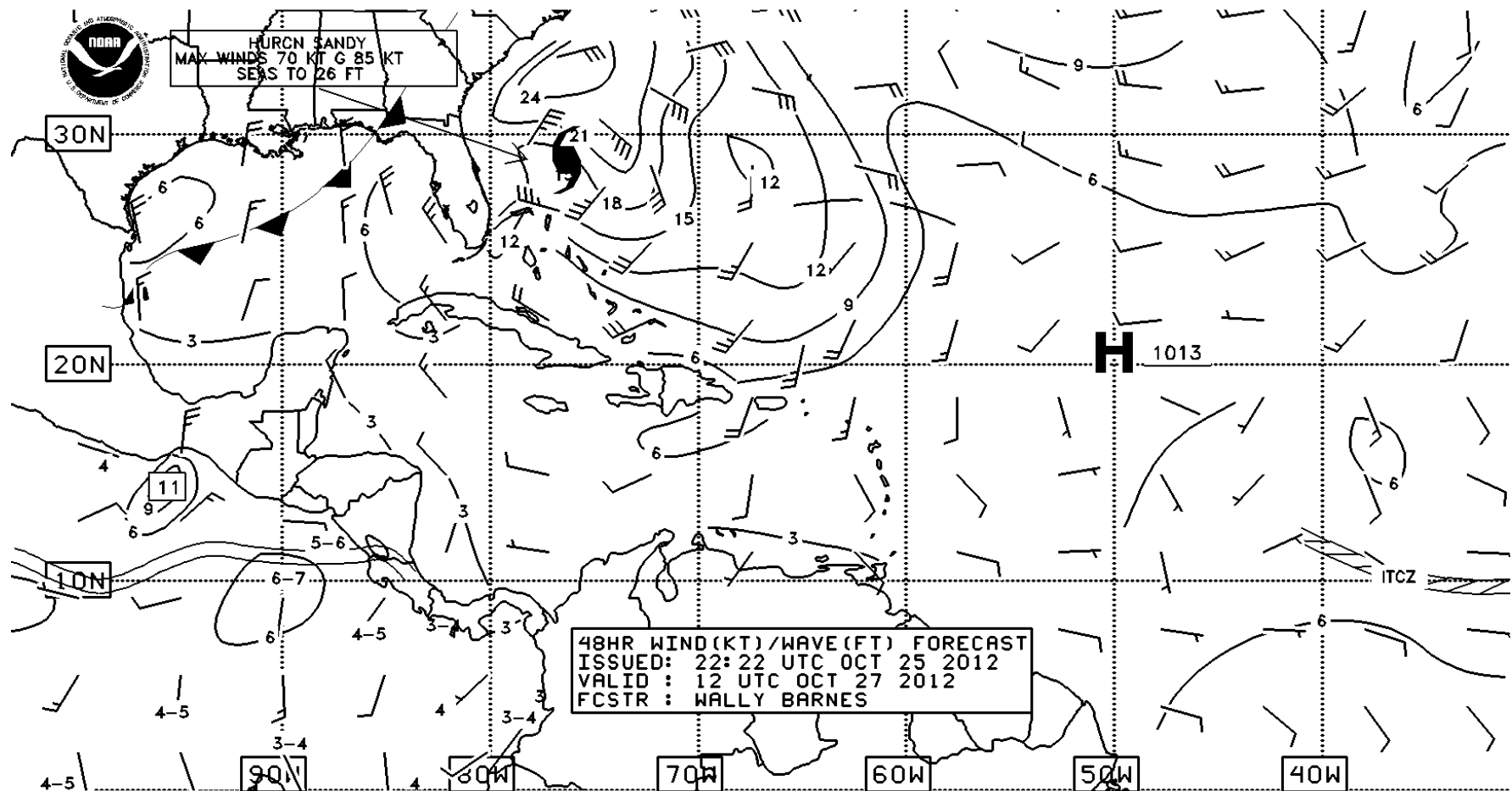
18

Obtain the data: Wind / Wave forecasts

By the morning of 27 October, the highest winds and seas expected in Sandy were 70G85 KT and 26 ft (BTW, at 12UTC on 27 October, the highest winds and seas were reported at 65G80 KT and 32 ft.).
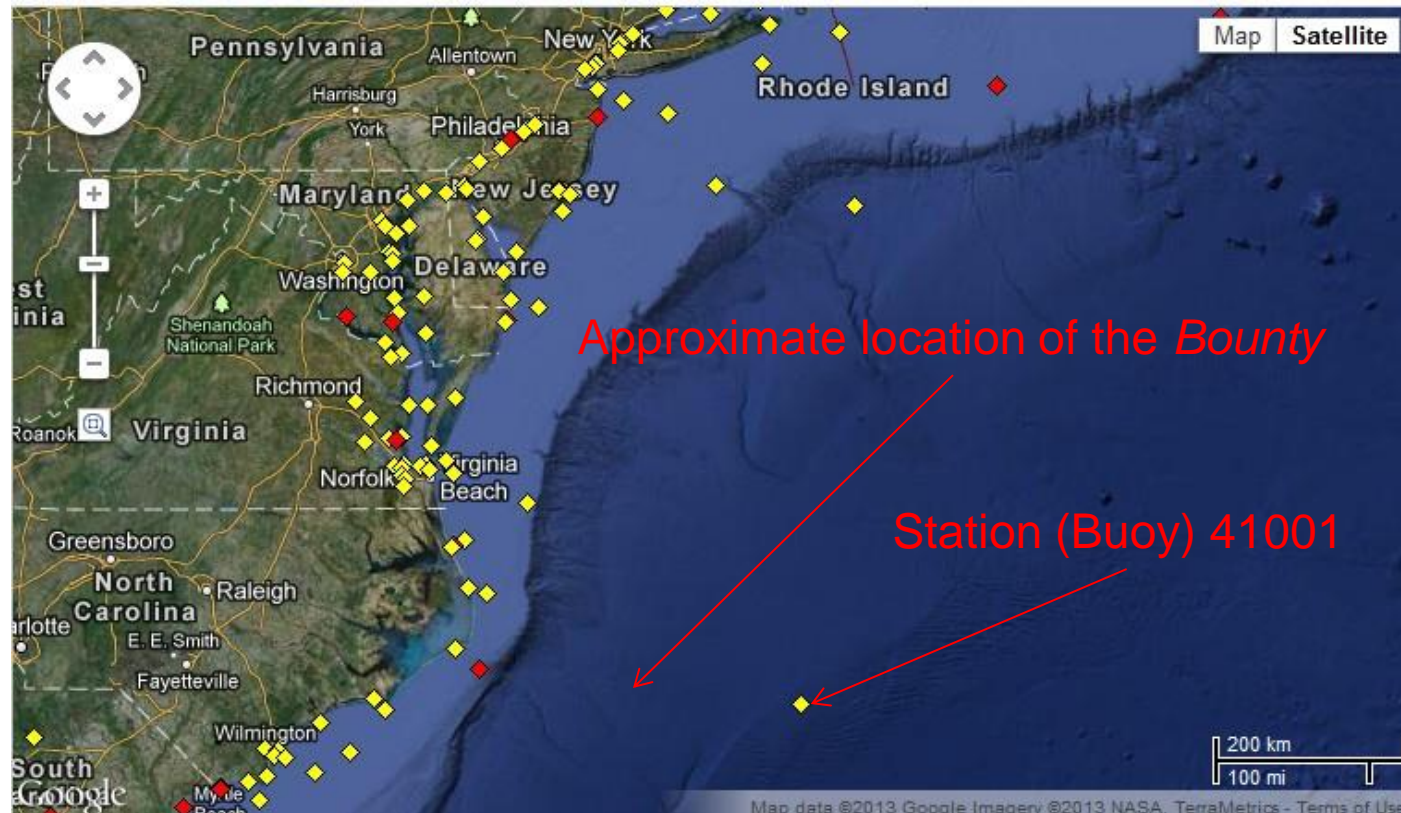
Obtain the data: Wind / Wave forecasts

On 25 October 2012, the skipper could have downloaded a 96-hour Wind / Wave forecast chart for the western Atlantic, valid for the morning of 29 October 2012. But the chart was not in the on-line archive. So, I obtained the nearest Wind and Wave forecast (72-hour):
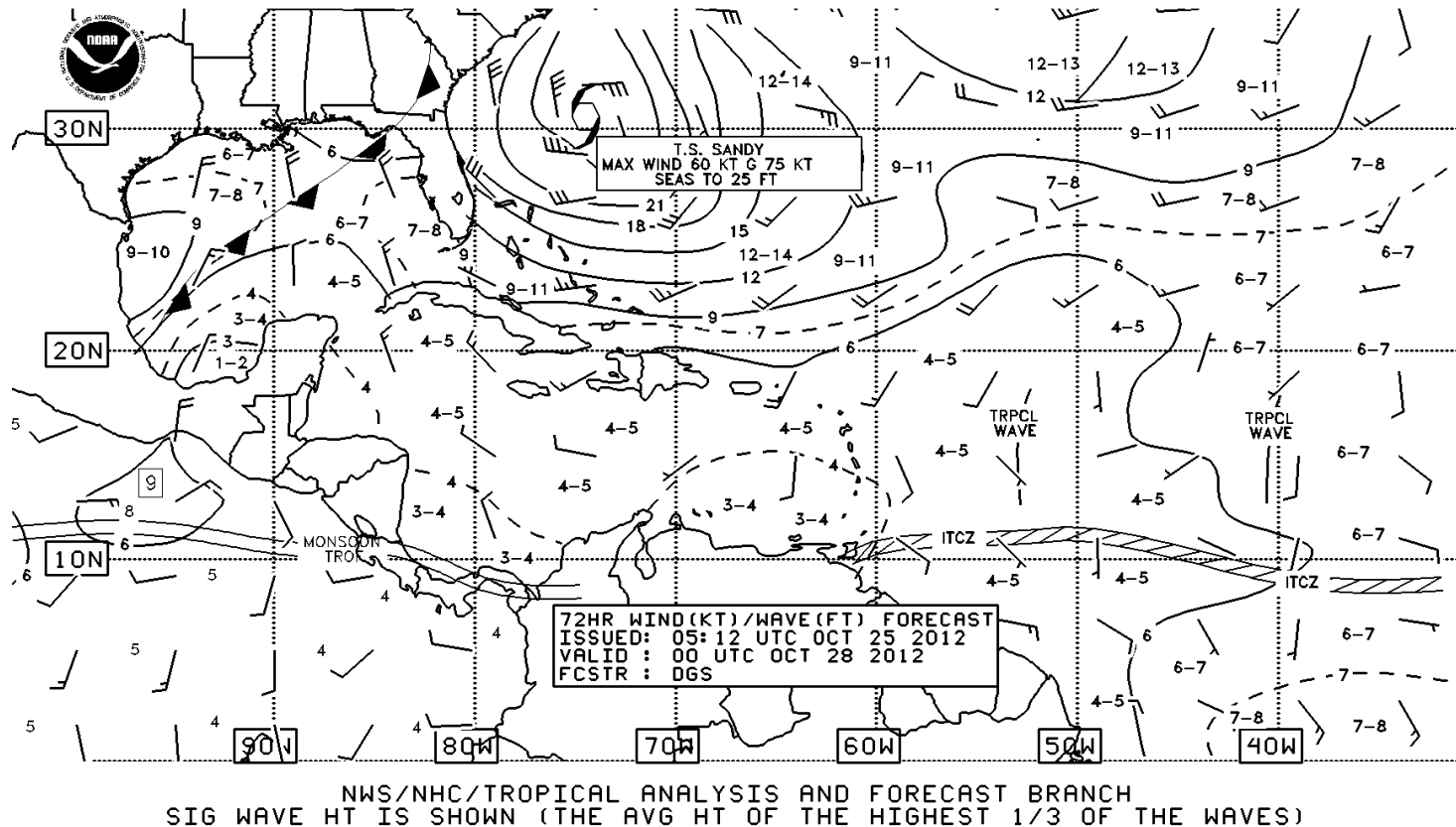
By the evening of 27 October, the highest wind and seas expected in the vicinity of Sandy were 60G75 KT and 25 ft.

Obtain the data: Wind / Wave forecasts

Also, I obtained the wind and wave measurements from the www.ndbc.noaa.gov archive for the buoy nearest the *Bounty's* position on the morning of 29 October. I assumed these values are what was forecasted on 25 October:

Obtain the data: Wind / Wave forecasts

Station (Buoy) 41001

YY	MM	DD	hh	mm	WDIR	WSPD	GST	WVHT	DPD	APD	MWD	PRES
					degT	m/s	m/s	m	sec	sec	degT	hPa
2012	10	29	05	50	285	28.5	35.4	6.04	12.12	8.33	66	970.6
2012	10	29	06	50	292	26.7	33.5	99.00	99.00	99.00	999	971.8
2012	10	29	07	50	293	23.8	33.0	9.14	12.12	9.64	258	973.7
2012	10	29	08	50	999	99.0	99.0	99.00	99.00	99.00	999	973.3

At 0500UTC (0100EDT), 29 October, the largest wind speed was 57 KT with gusts to 71 KT and the highest wave height (WVHT) was **20 ft.** But, this was the last wave report from the buoy!

Analyze the data: Skipper's fundamental calculation to make the 'go-no go' decision

'*Bounty* to depart evening of 25 October and make 4 KT'

From 'The Sinking of the Bounty' by Matthew Shaer, 'departed 21UTC, 25 October' *Outside,* Feb 2013
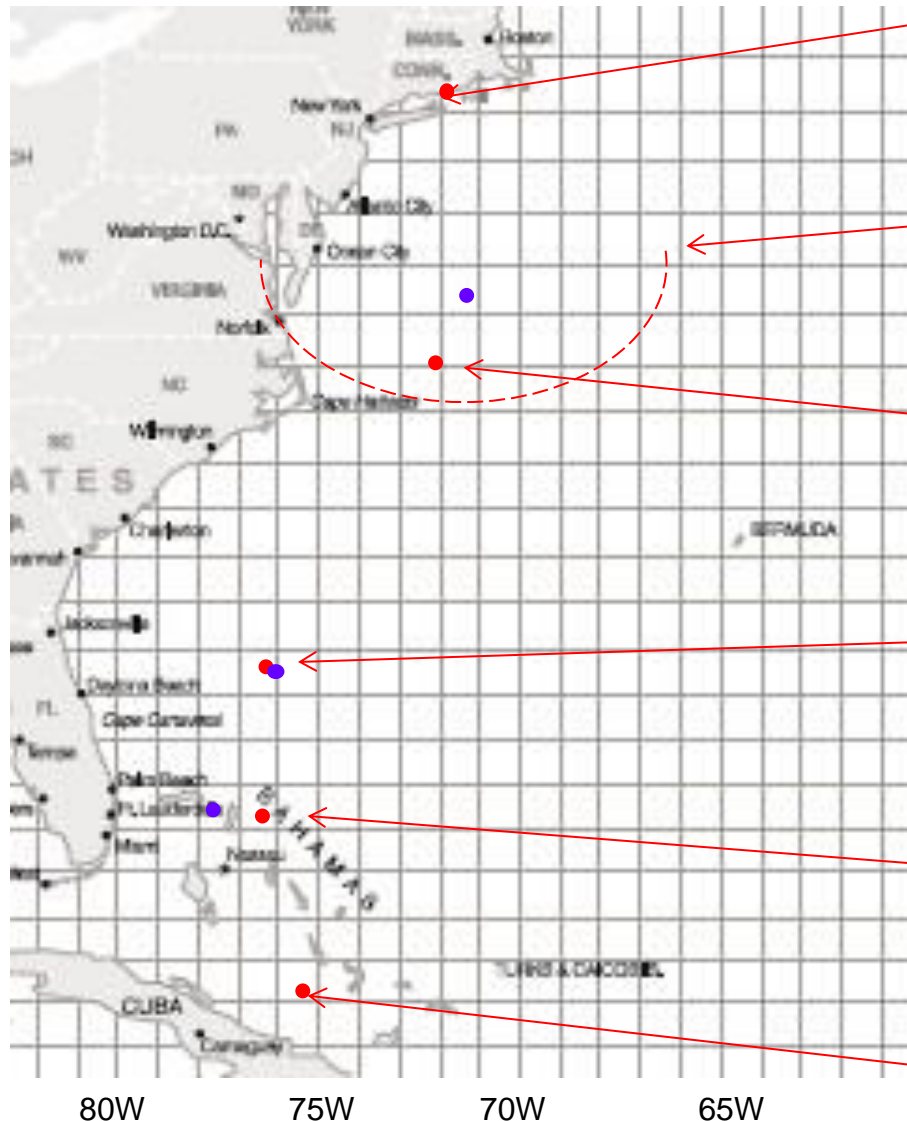
Bounty expected position at 21UTC, 29 October

(96h x 4nm/h = 384nm/60nm/deg lat = 6.4 deg lat)

Sandy 96h forecast valid 12UTC, 29 October, 65G80KT (actual 80G100, •)

Sandy 48h forecast valid 12UTC, 27 October, 70G85KT (actual 65G80KT, •)

Sandy 24h forecast valid 12UTC, 26 October, 80G100KT (actual 70G85KT, •)

Sandy position at 12UTC, 25 October, 90G110KT

23

Review and revise decisions

From the fundamental calculation, the skipper made the 'go' decision on 25 October knowing the *Bounty* would have to avoid Sandy.

From Morgenstein (CNN, 30 October 2012): The ship was scheduled to arrive in St. Petersburg FL as early as November 7 for a public display on November 10 and 11.

From Shaer: The skipper believed Sandy would barrel up the coast and eventually track inland somewhere near NC…thus, at first *Bounty* tacked east in an effort to avoid the worst of Sandy. By sailing southeast before turning south, *Bounty* could stay windward of the storm.

The skipper apparently did not believe the NOAA-OPC forecast track. Further, the Wind / Wave forecasts of 20 to 28 foot seas must not have concerned him "He reminded the crew that he'd been in hurricanes before and that the *Bounty* had always made it", (from Miles, 'Outside').

From Miles ('Outside'): The skipper's plan was to sail due east, wait for Sandy to turn toward land, and then push the vessel into the storm's southeast quadrant, where hurricane winds are usually weakest (EH, normally weakest in SW quadrant).

But, the *Bounty* sailed SSE, not SE or E. There was nothing written about this decision.
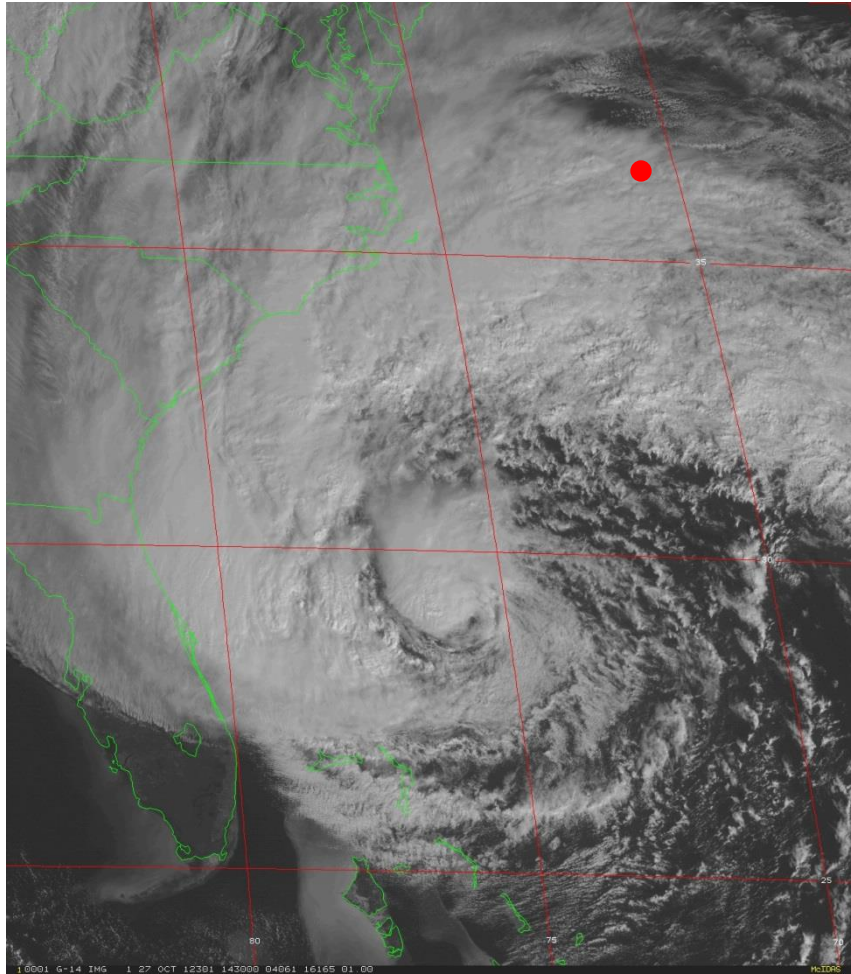
Incredibly, the *Bounty* turned SW on 27 October. Why?

Let's study the data available to the skipper on 27 October that helped that decision.

Obtain the data: Surface analysis
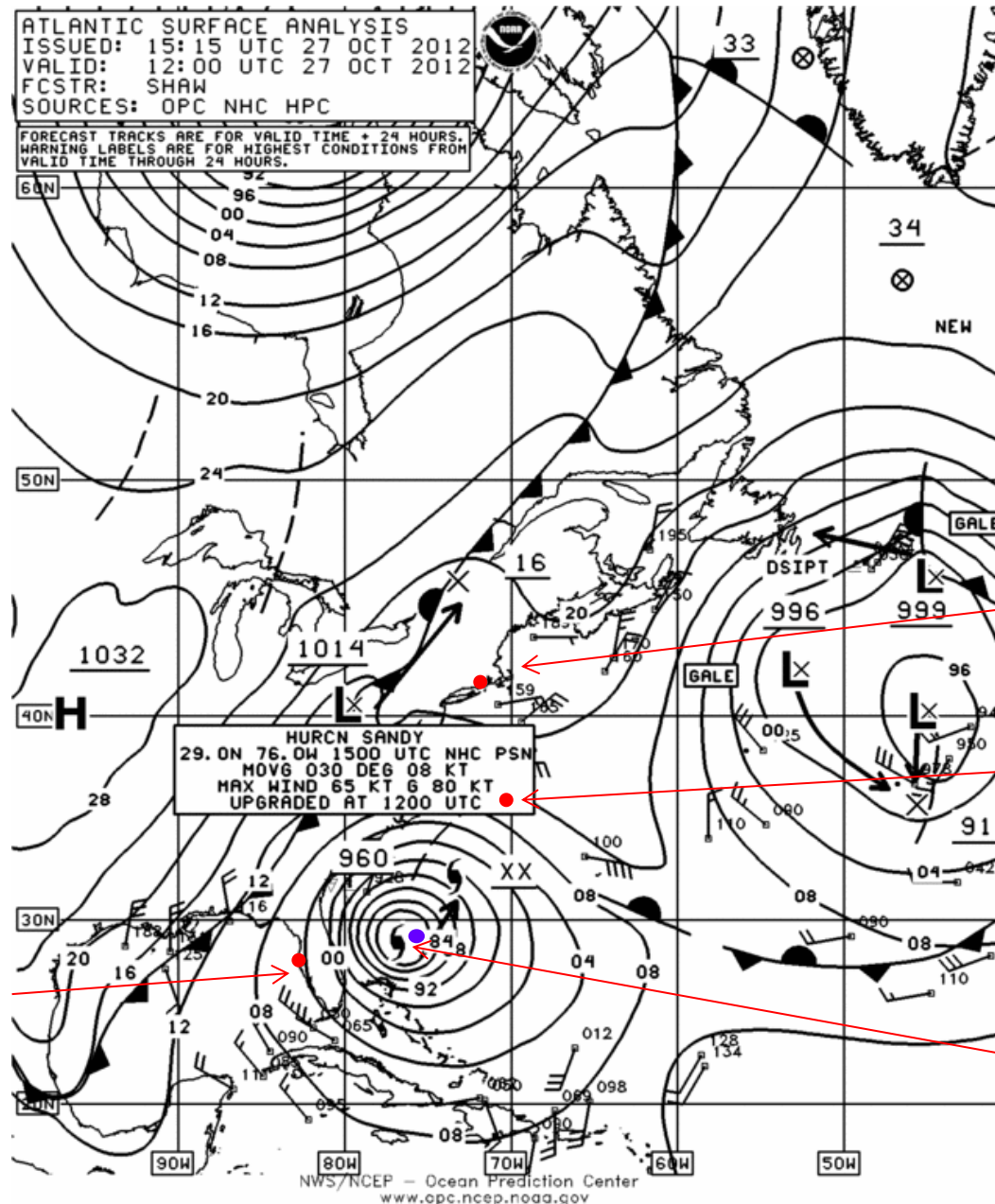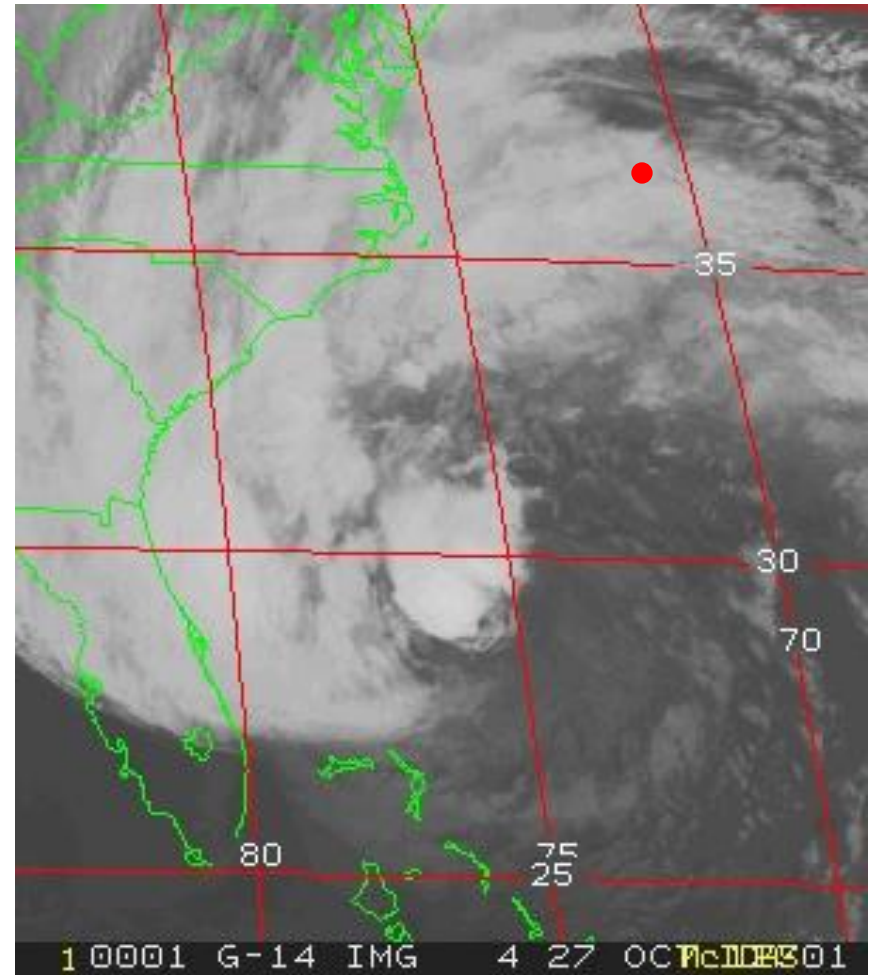
New London CT

Approximate
position
of the *Bounty*

Hurricane Sandy
had maximum
winds of 65 KT with
gusts to 80 KT
(BTW, close to 48h prediction
made at 12UTC, 25 Oct. for
70G80 KT, ●)

St. Petersburg FL
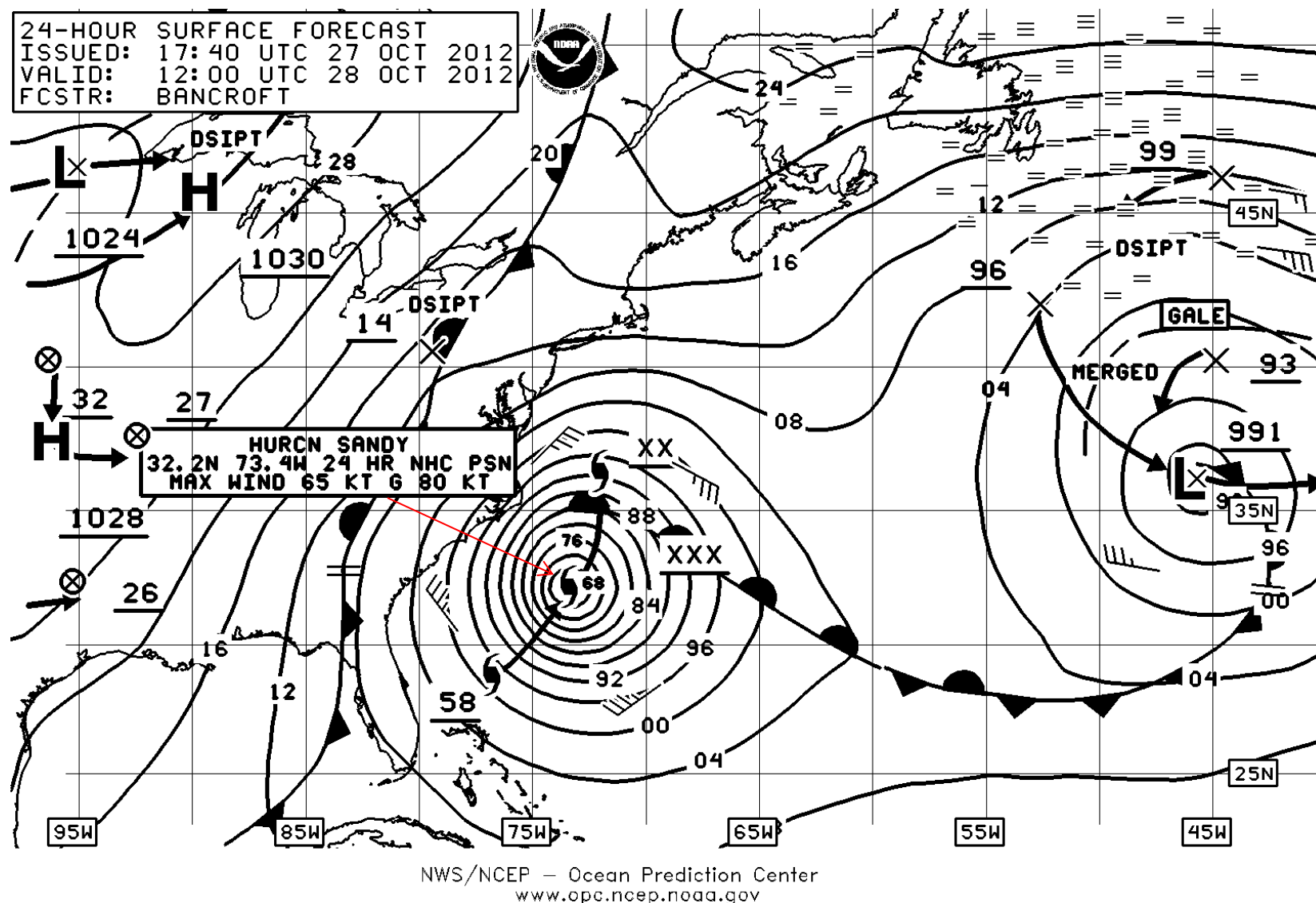
25

Obtain the data: Satellite images

1430UTC, 27 October 2012, visible   1430UTC, 27 October 2012, infrared

Sandy had neither a clear eye nor a significant outflow cloud shield.
Approximate position of the *Bounty*   ●

Obtain the data: Surface forecasts

Sandy was predicted to move NE and, by the morning of 28 October, maximum winds were predicted to remain the same at 65 KT, gusts to 85 KT. The last position shown for Sandy is for 12UTC, 29 October.

27

Obtain the data: Surface forecasts
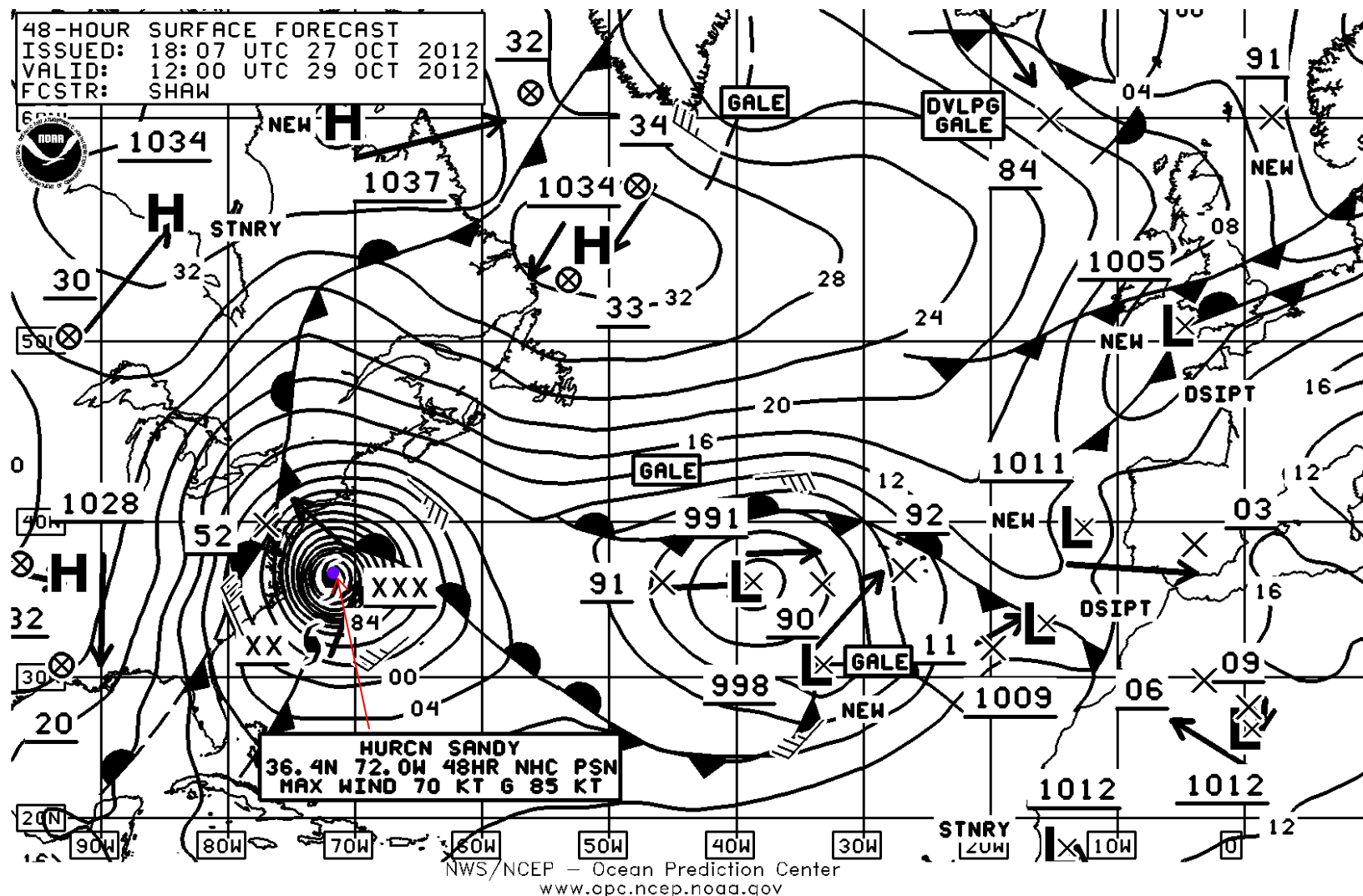
Sandy was predicted to move NNE and, by the morning of 29 October, maximum winds were predicted to increase to 70 KT, gusts to 85 KT. The last position shown for Sandy is for 12UTC, 30 October. (BTW, close to 96h prediction made at 12UTC, 25 Oct. for 65G80 KT,●)

Obtain the data: Upper-air analysis
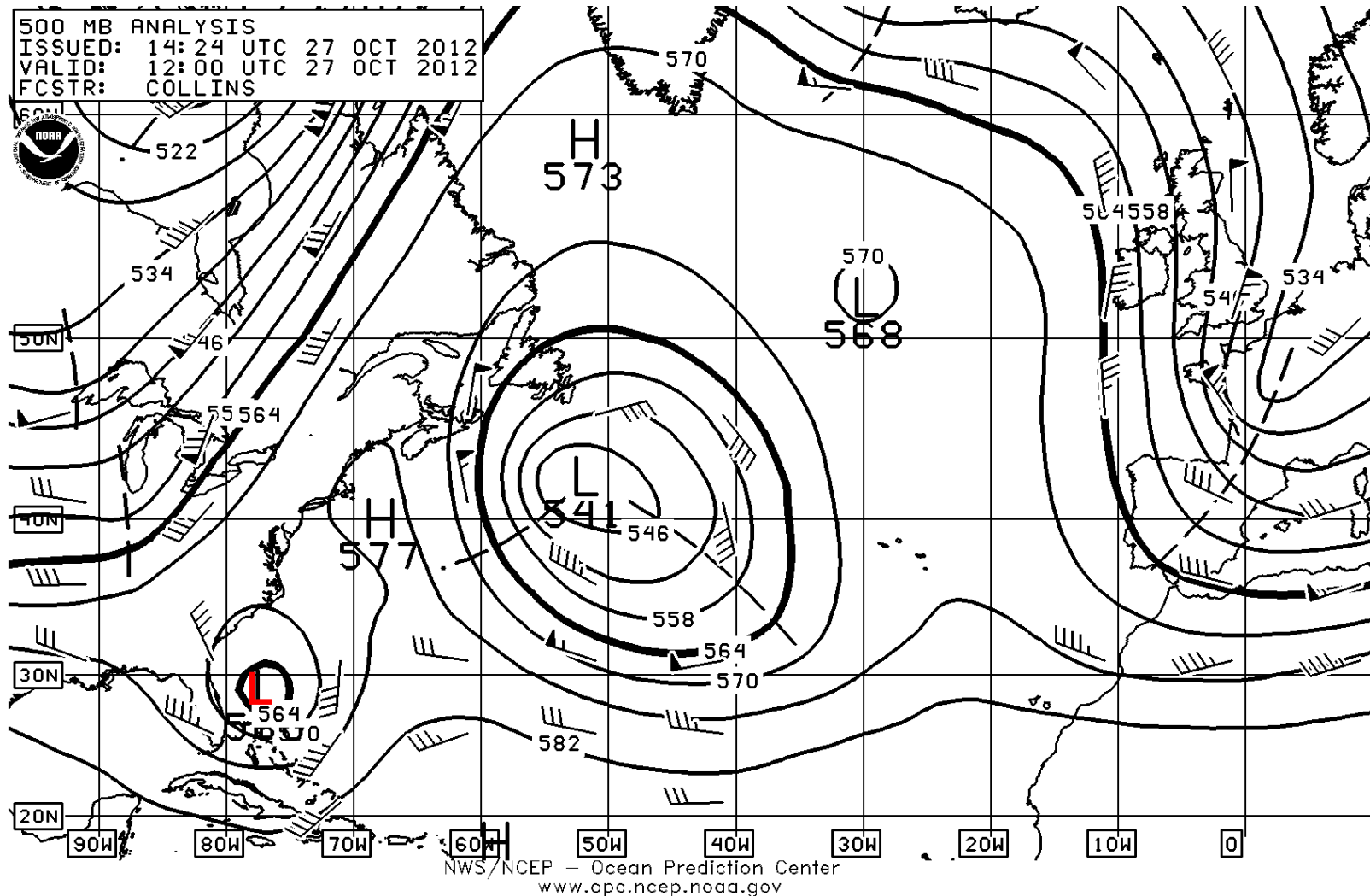
On the morning of 27 October, the trough was west with the cut-off low to the east (as predicted at 12UTC on 25 October).

Obtain the data: Upper-air forecasts
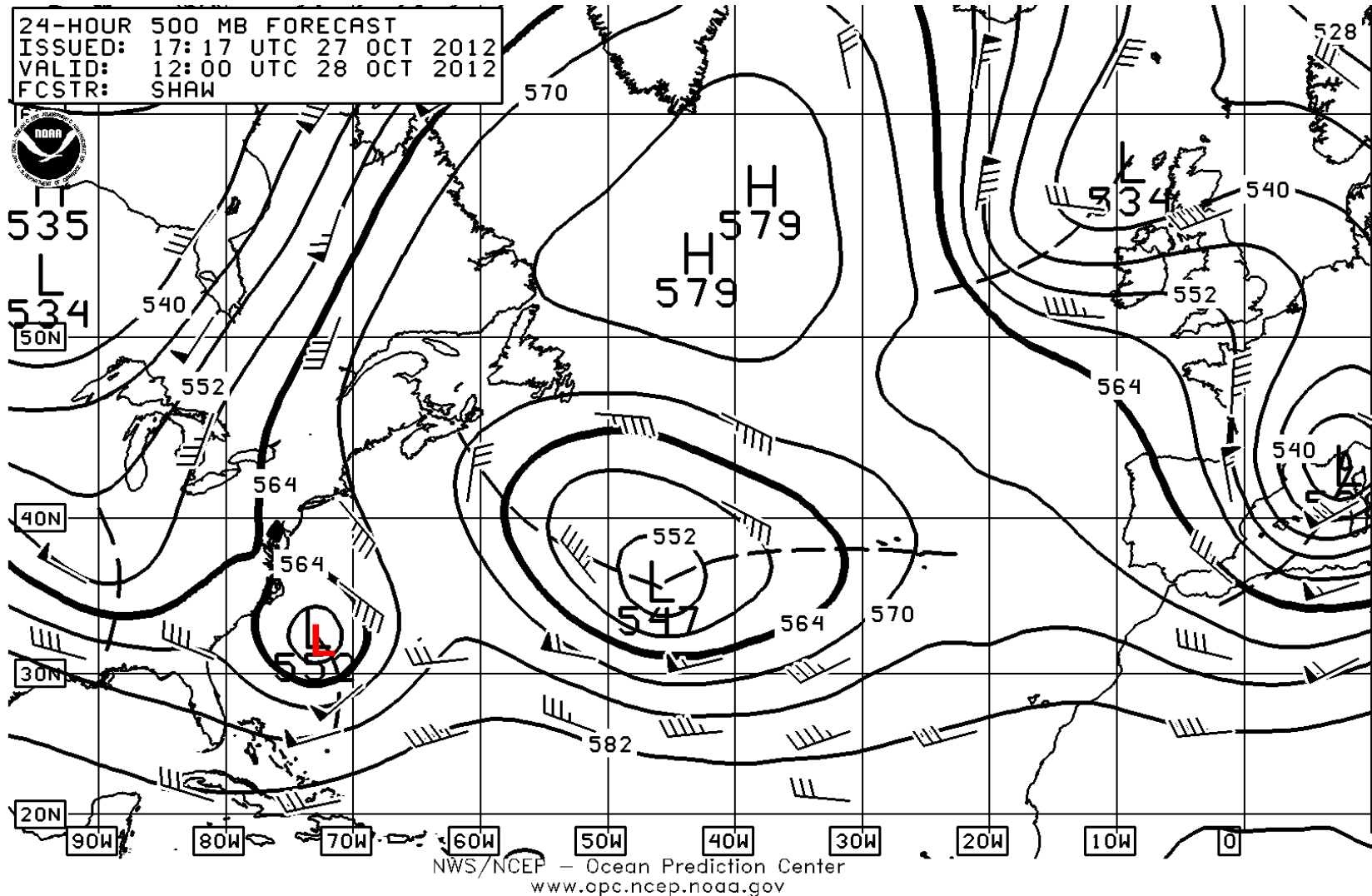
By the morning of 28 October, the trough was predicted to continue moving eastward with the retrograding cut-off low moving southeastward.

Obtain the data: Upper-air forecasts
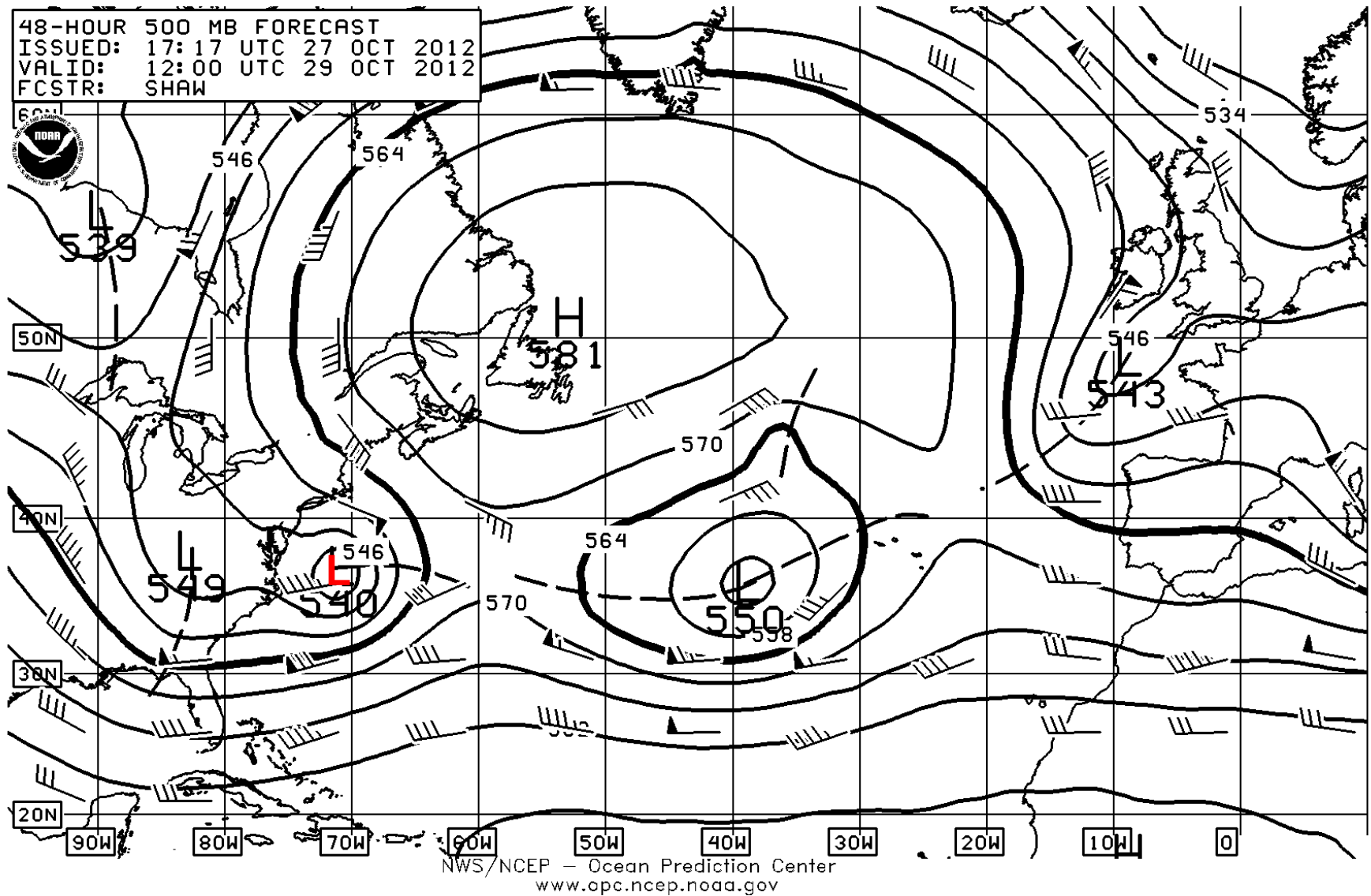
By the morning of 29 October, Sandy was predicted to merge with the trough
(BTW, as predicted at 12UTC on 25 October).

31

Obtain the data: Wind / Wave analysis

On the morning of 27 October, the highest winds and seas in the vicinity of Sandy were 65G80 KT and 32 ft.

Obtain the data: Wind / Wave forecasts

On the morning of 28 October, the highest winds and seas expected near Sandy were 65G80 KT and 36 ft.

Obtain the data: Wind / Wave forecasts


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                              HURCN SANDY
L ←    36.4N 72.0W 48HR NHC PSN
                  MAX WIND 70 KT G 85 KT
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48HR WIND(KT)/WAVE(FT) FORECAST
ISSUED: 18:14 UTC OCT 27 2012
VALID : 12 UTC OCT 29 2012
FCSTR : SS
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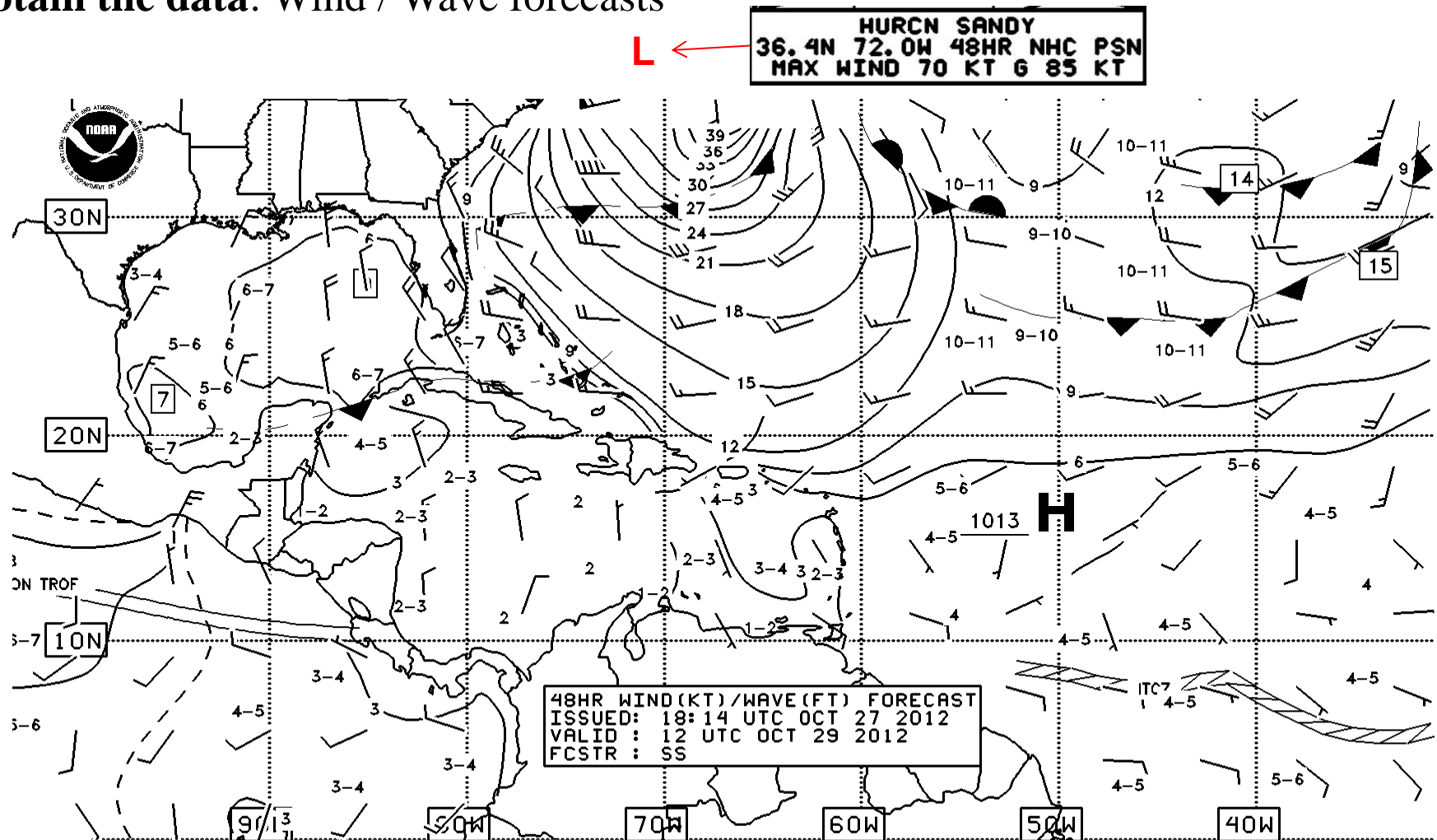
NWS/NHC/TROPICAL ANALYSIS AND FORECAST BRANCH
SIG WAVE HT IS SHOWN (THE AVG HT OF THE HIGHEST 1/3 OF THE WAVES)

By the morning of 29 October, the highest winds and seas expected in Sandy were 70G85 KT and at least 39 ft [the skipper would have had a chart with the projection shown on Slide 33]

(BTW, at 12UTC on 29 October the highest seas were reported at 42 ft.).

Analyze the data: Skipper's decision to track SW
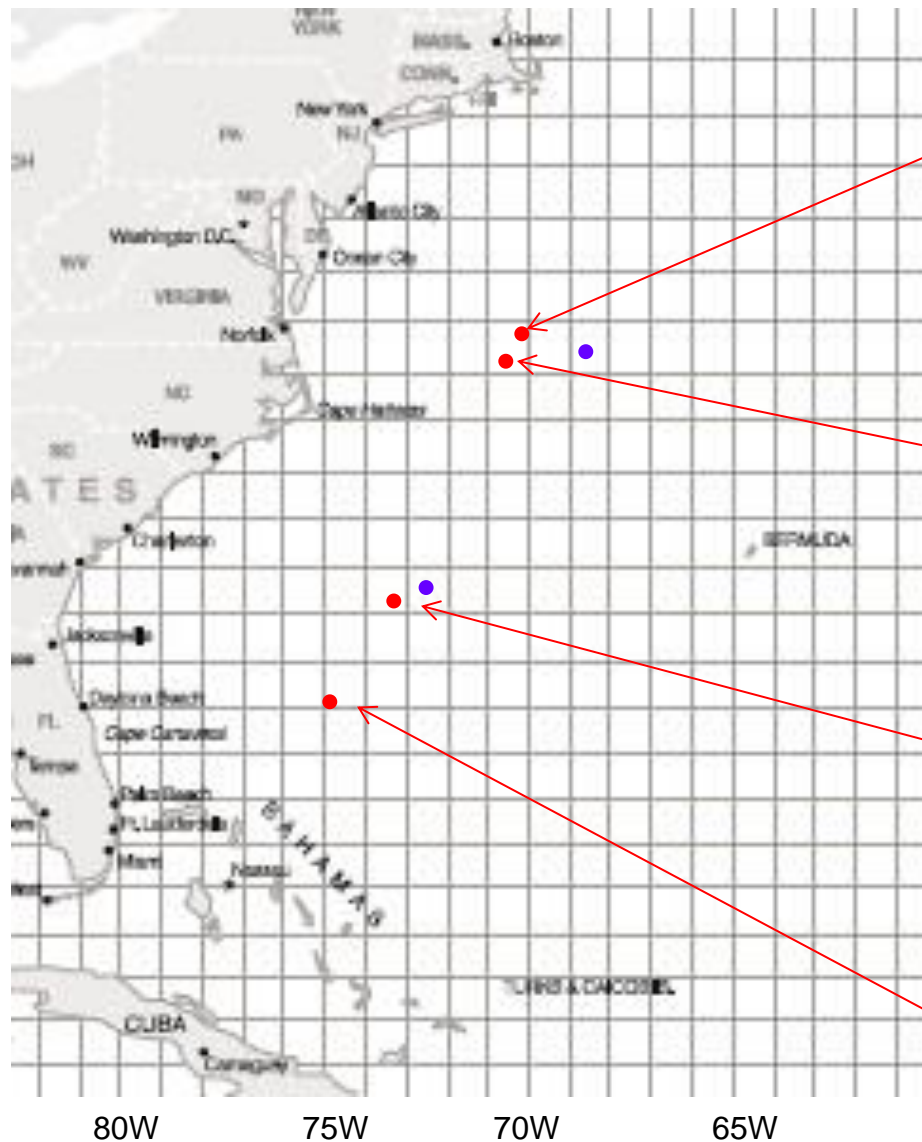
Bounty approximate position 27 October

40N

Sandy 48h forecast valid 12UTC, 29 October, max winds and seas 70G85 KT & 39 ft. SE quadrant (actual 80G100 KT & 42 ft. SE quadrant, •)

35N

Sandy 24h forecast valid 12UTC, 28 October, max winds and seas 65G80 KT & 36 ft. SE quadrant (actual 65G80 KT & 30-38 ft. SE quadrant, •)

30N

25N

Sandy position at 12UTC, 27 October, max winds and seas 65G80 KT & 32 ft.

80W   75W   70W   65W

Review and revise decisions

From Shaer: "beginning on Friday 26 October, the crew printed out maps from the ship's WeatherFax and posted them in the hallway below decks so all hands could track the storm's progress and the location of *Bounty* relative to it."

From Shaer: "Saturday, 27 October:

The skipper decided to steer the ship SW, toward the coast : 'You try to get up as close to the eye as you can and you stay down in the SE quadrant and when it stops, you don't want to get in front of it…you'll get a good ride out of the hurricane' (from a TV interview).

The third mate recalled the skipper reasoned that by 27 October, *Bounty* had made it out far enough beyond Sandy's eye that if he steered toward land the counterclockwise winds along the margins of the storm would help propel the ship to St. Petersburg.

Neither the third-mate nor the other senior officers who might have had a say in navigational matters ever objected to the new SW tack".

I conclude from my analysis of these charts that the skipper had two choices: 1) track E to miss the high winds and seas coming at them and head for Bermuda, thus, delaying the arrival date in St Petersburg, 2) gamble that the *Bounty* could pass, with dispatch, in front of Sandy and get the expected southward 'ride' near shore. He chose #2.
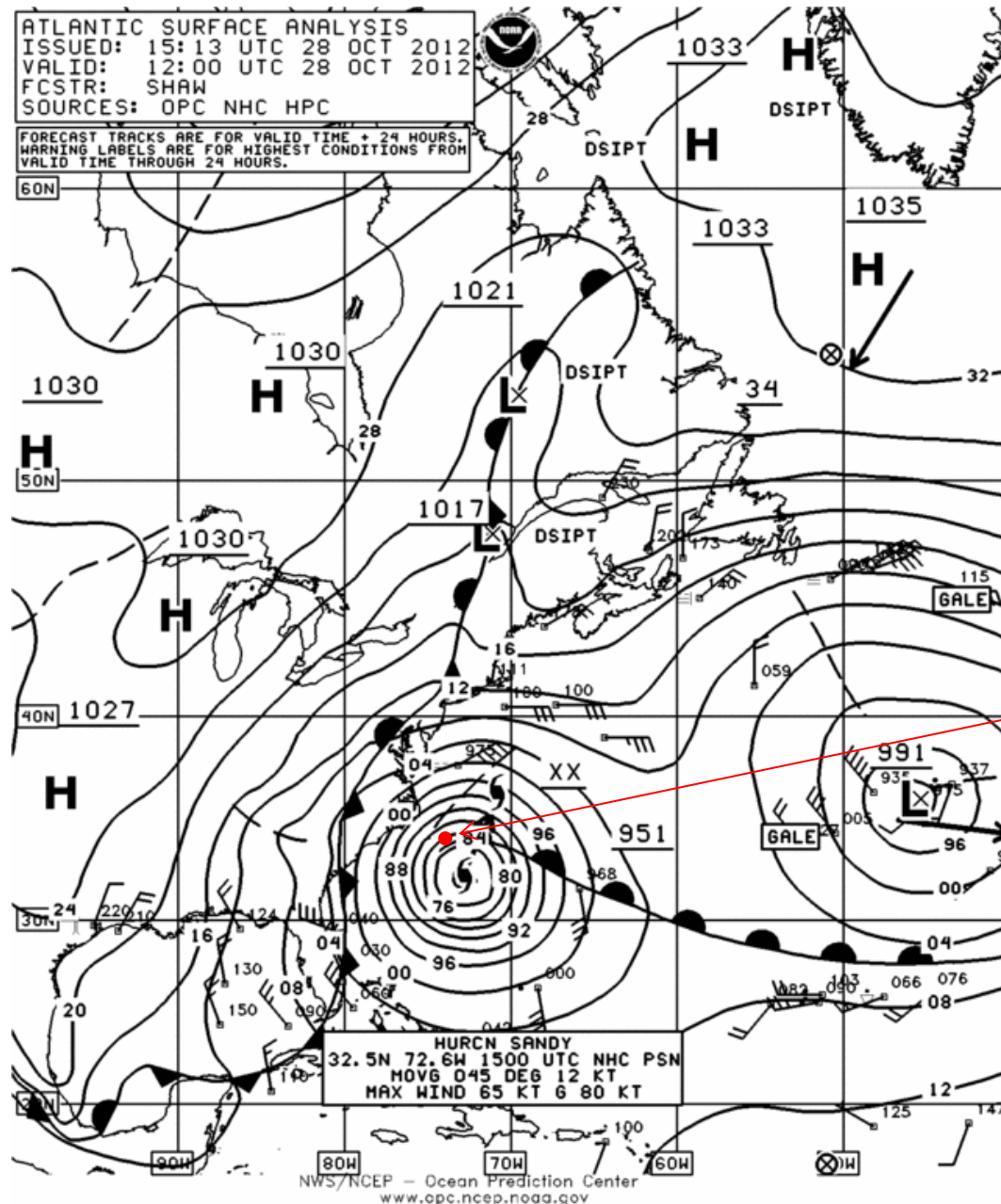
But, why the late order to abandon ship?

Obtain the data: Surface analysis
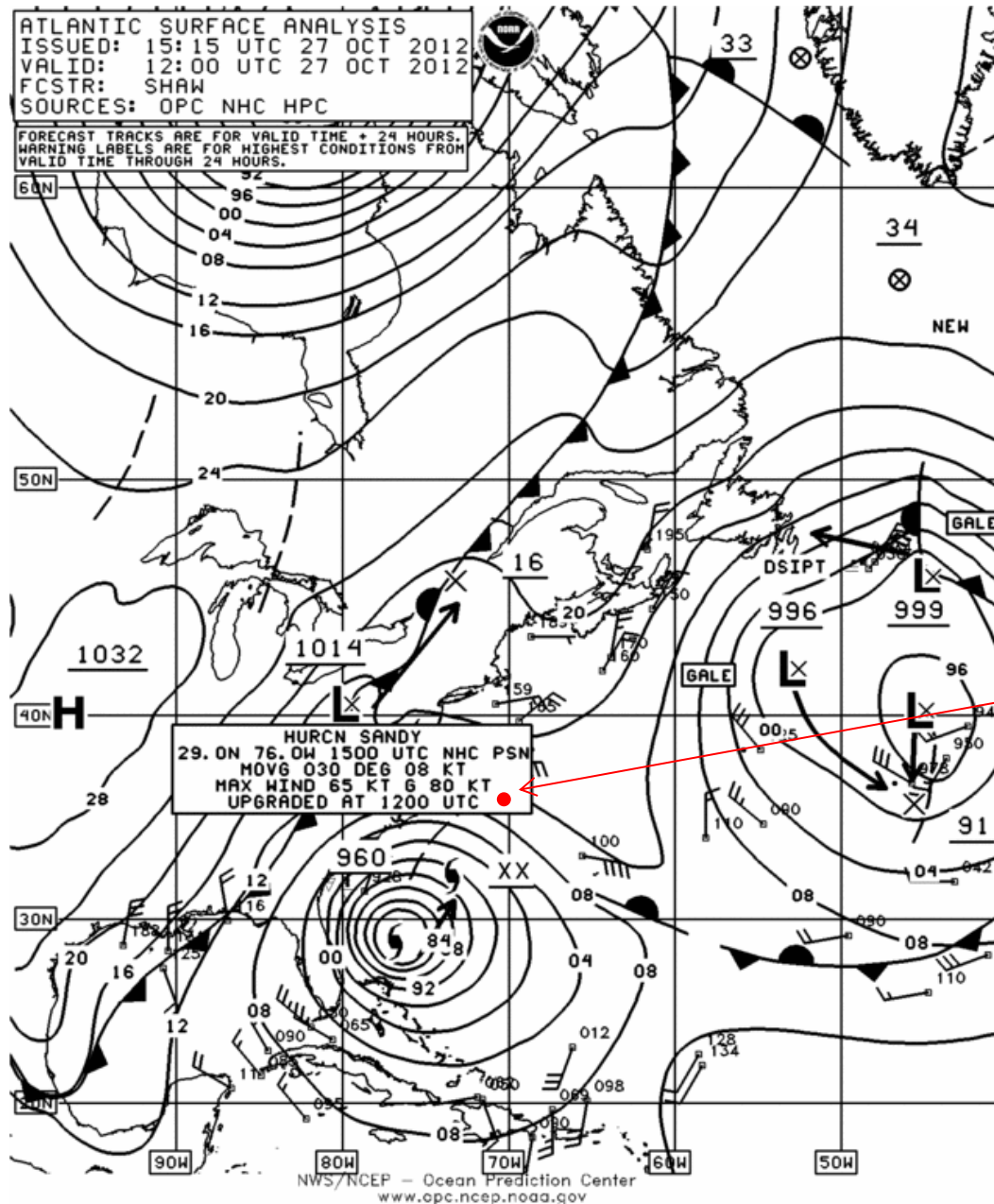
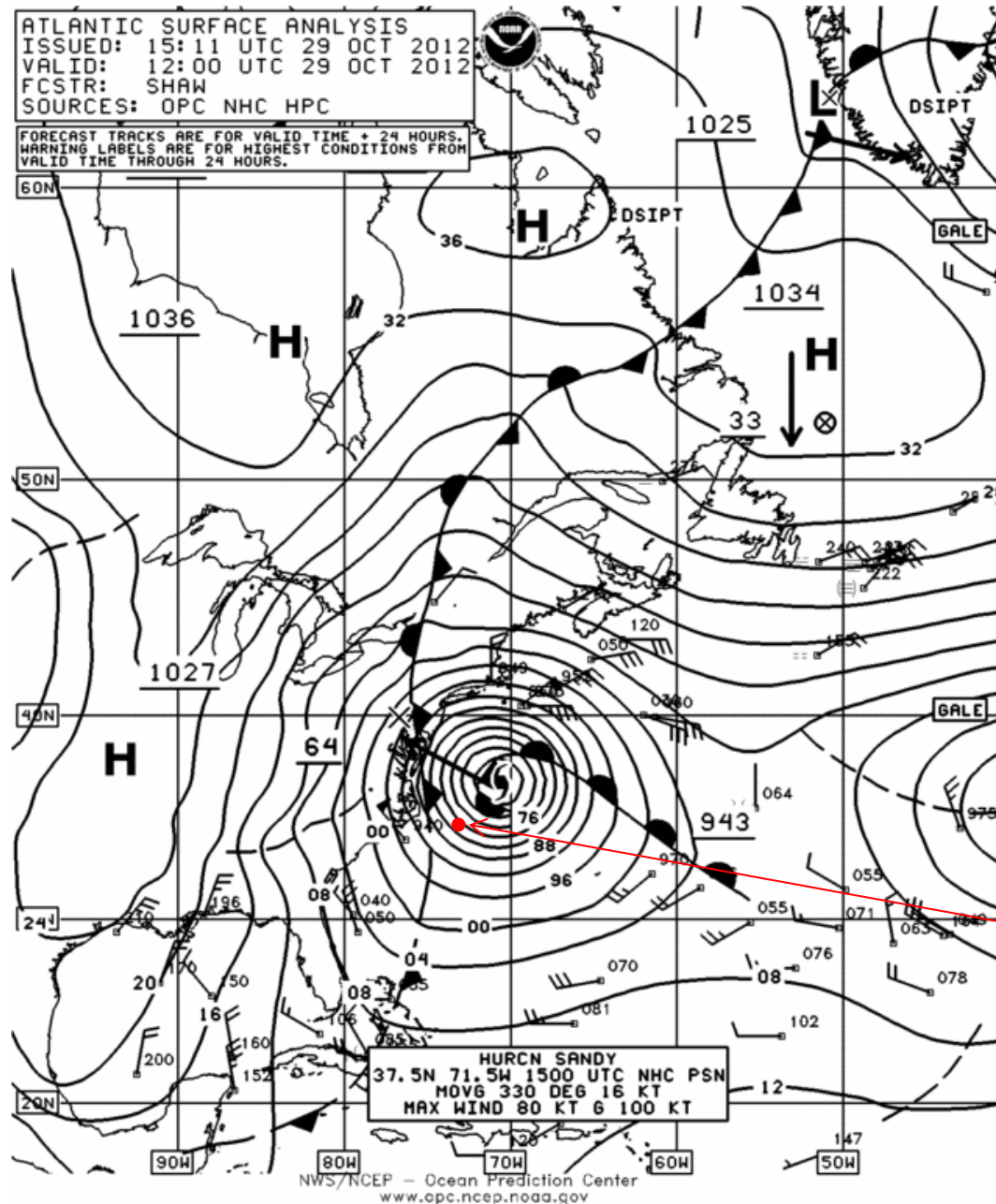Approximate position of the *Bounty*

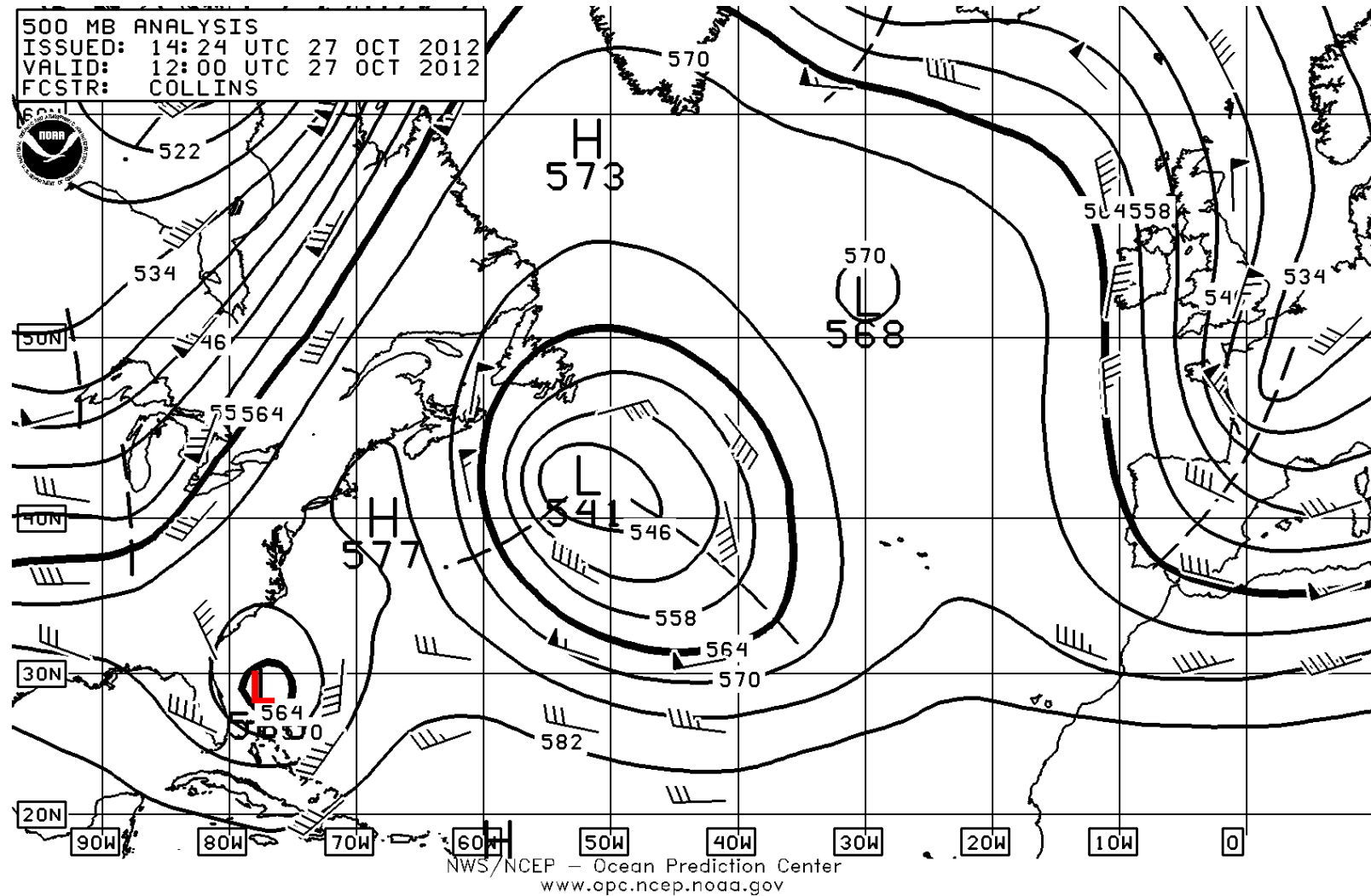**Obtain the data**: Surface analysis

Approximate position of the *Bounty*

Obtain the data: Surface analysis

Approximate position of the sinking *Bounty*
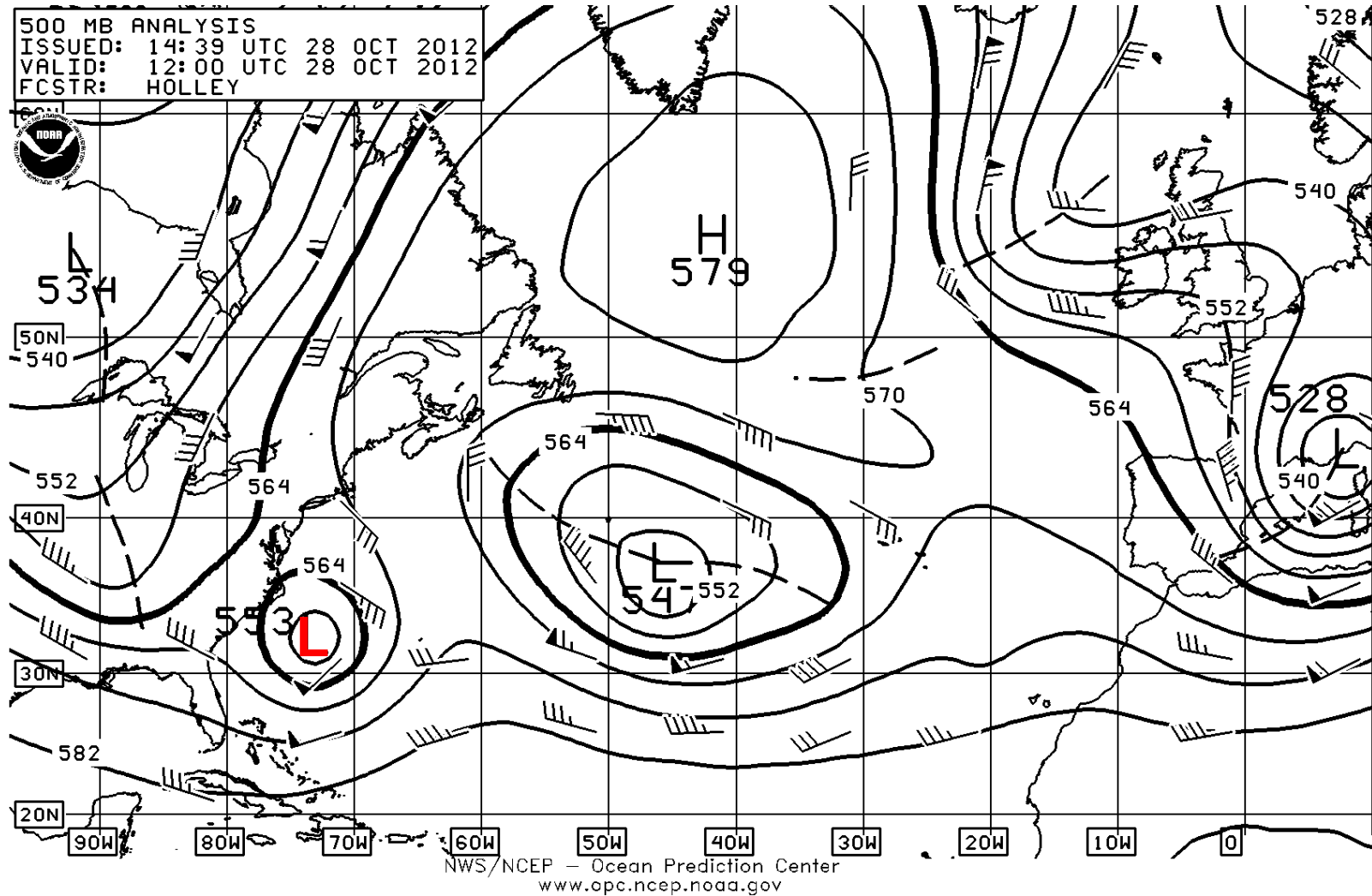
39

Obtain the data: Upper-air analysis

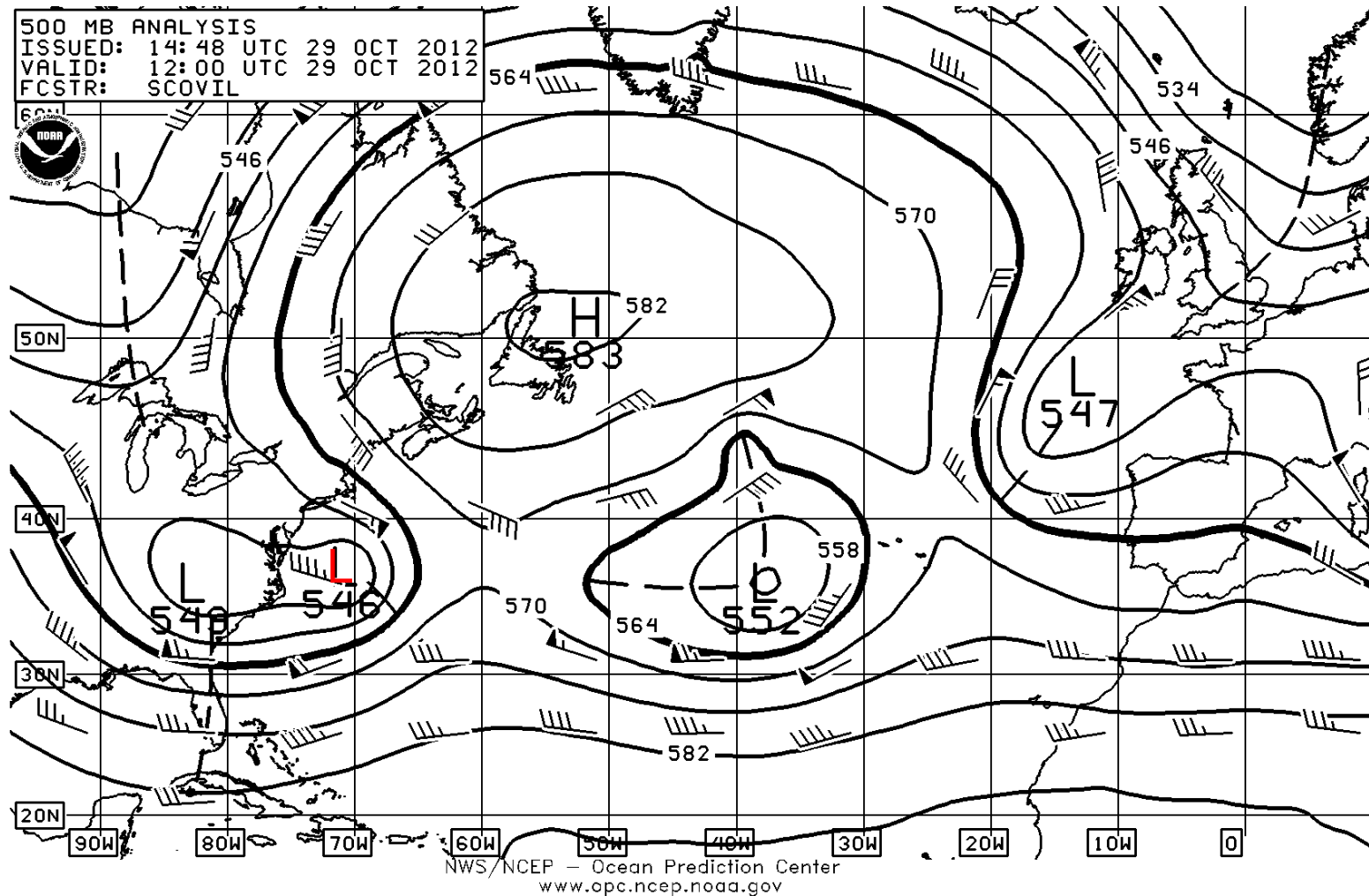On the morning of 27 October, the trough was west with the cut-off low to the east

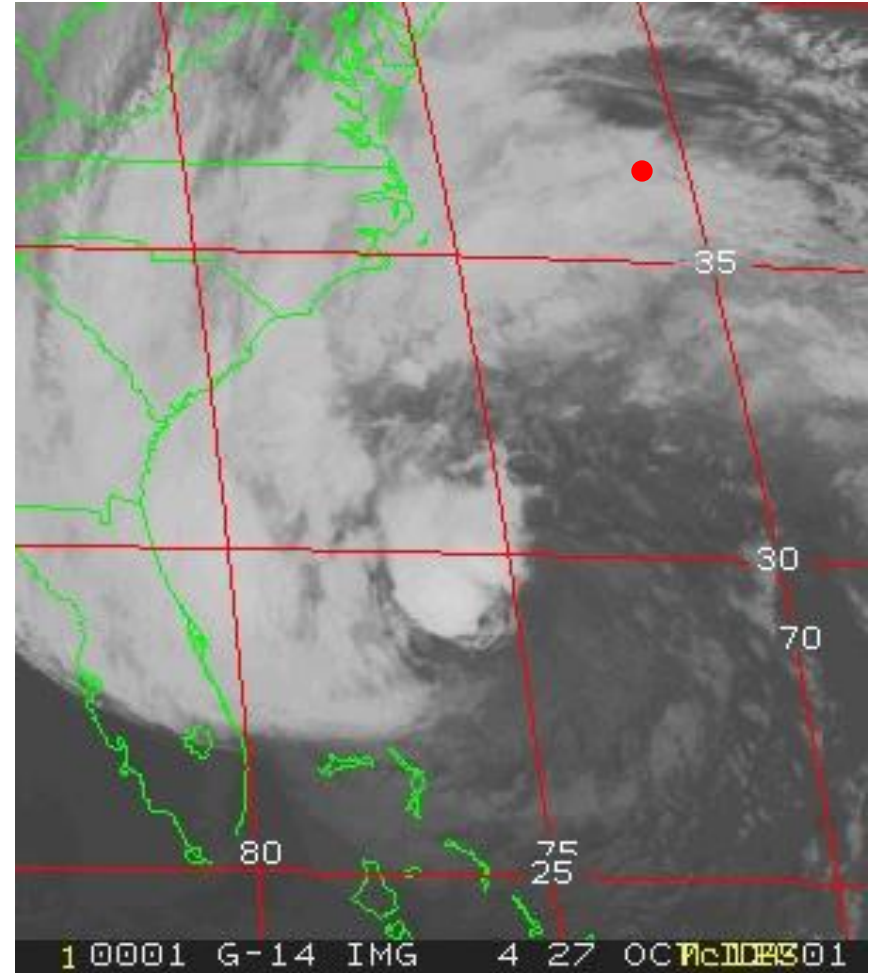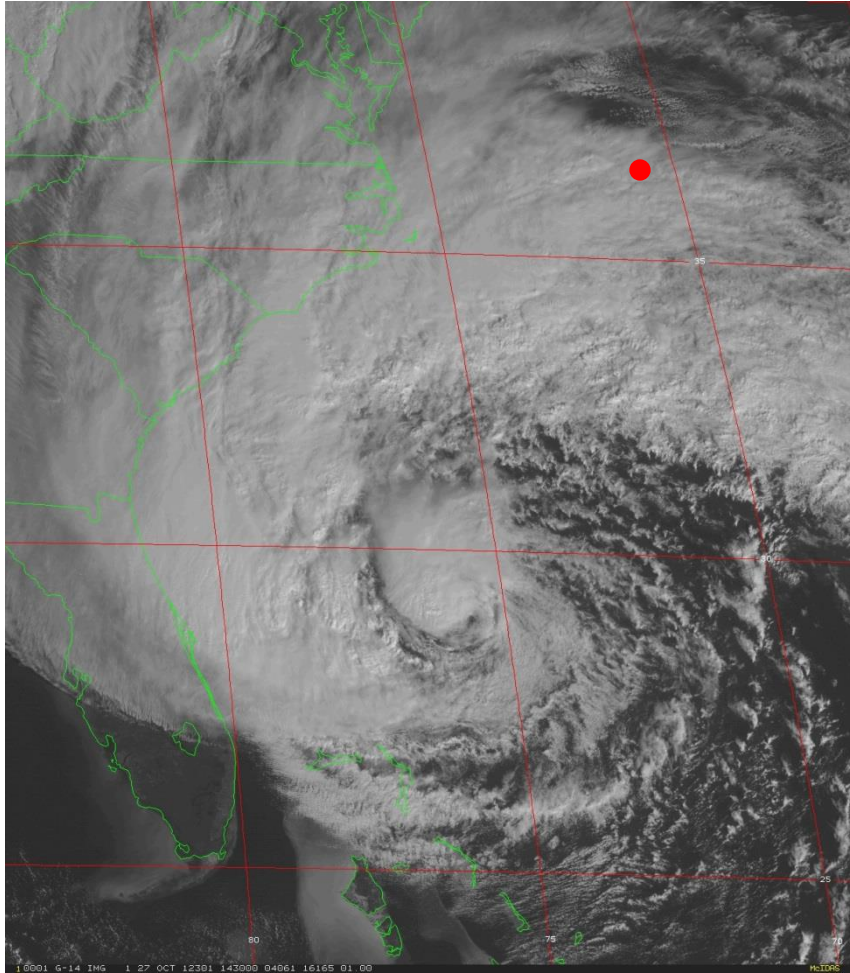**Obtain the data**: Upper-air analysis

On the morning of 28 October, the trough and Sandy came closer and the cut-off low moved to the east

Obtain the data: Upper-air analysis

On the morning of 29 October, the trough and Sandy were merging and the cut-off low moved further east and a classic Ω - block formed

Obtain the data: Satellite images

1430UTC, 27 October 2012, visible   1430UTC, 27 October 2012, infrared
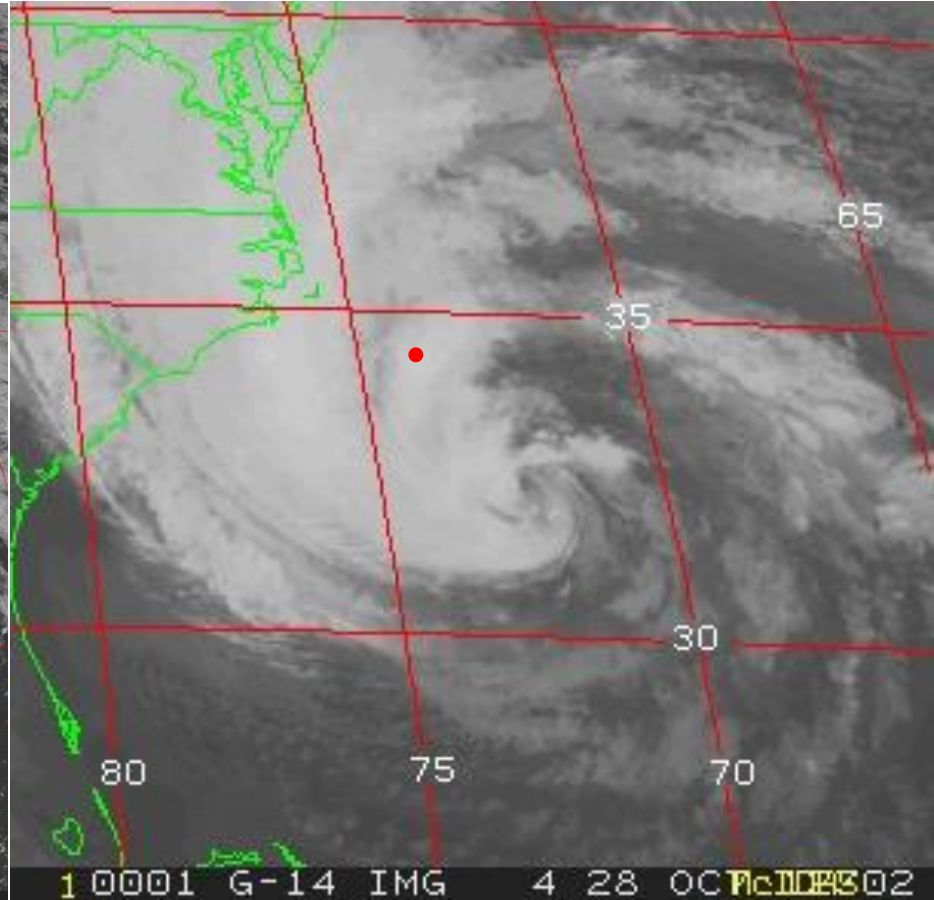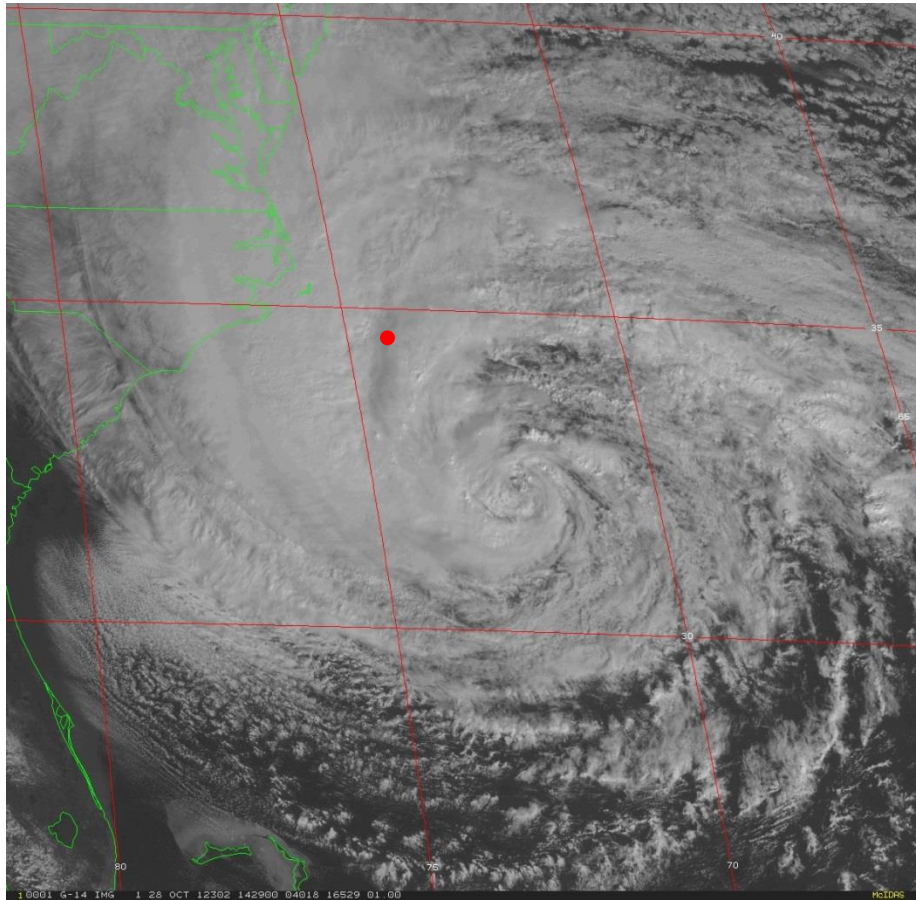
Sandy had neither a clear eye nor a significant outflow cloud shield.
Approximate position of the *Bounty* ●

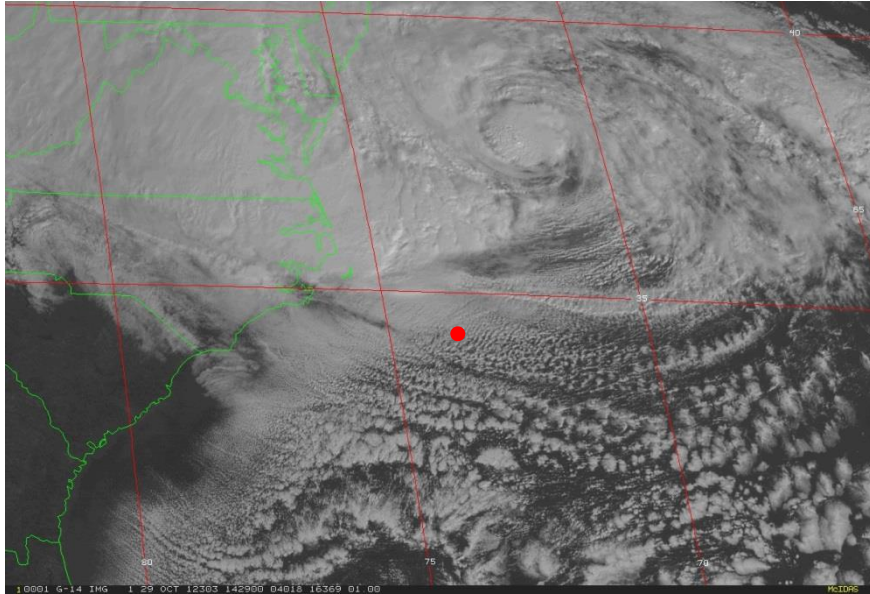**Obtain the data**: Satellite images

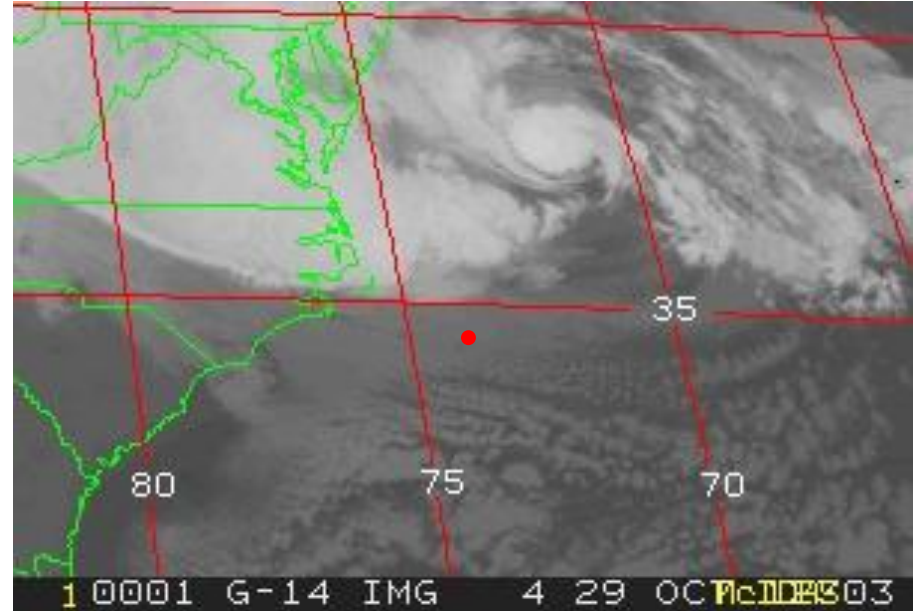1430UTC, 28 October 2012, visible   1430UTC, 28 October 2012, infrared

Sandy had neither a clear eye nor a uniform outflow cloud shield.

Approximate position of the *Bounty* •

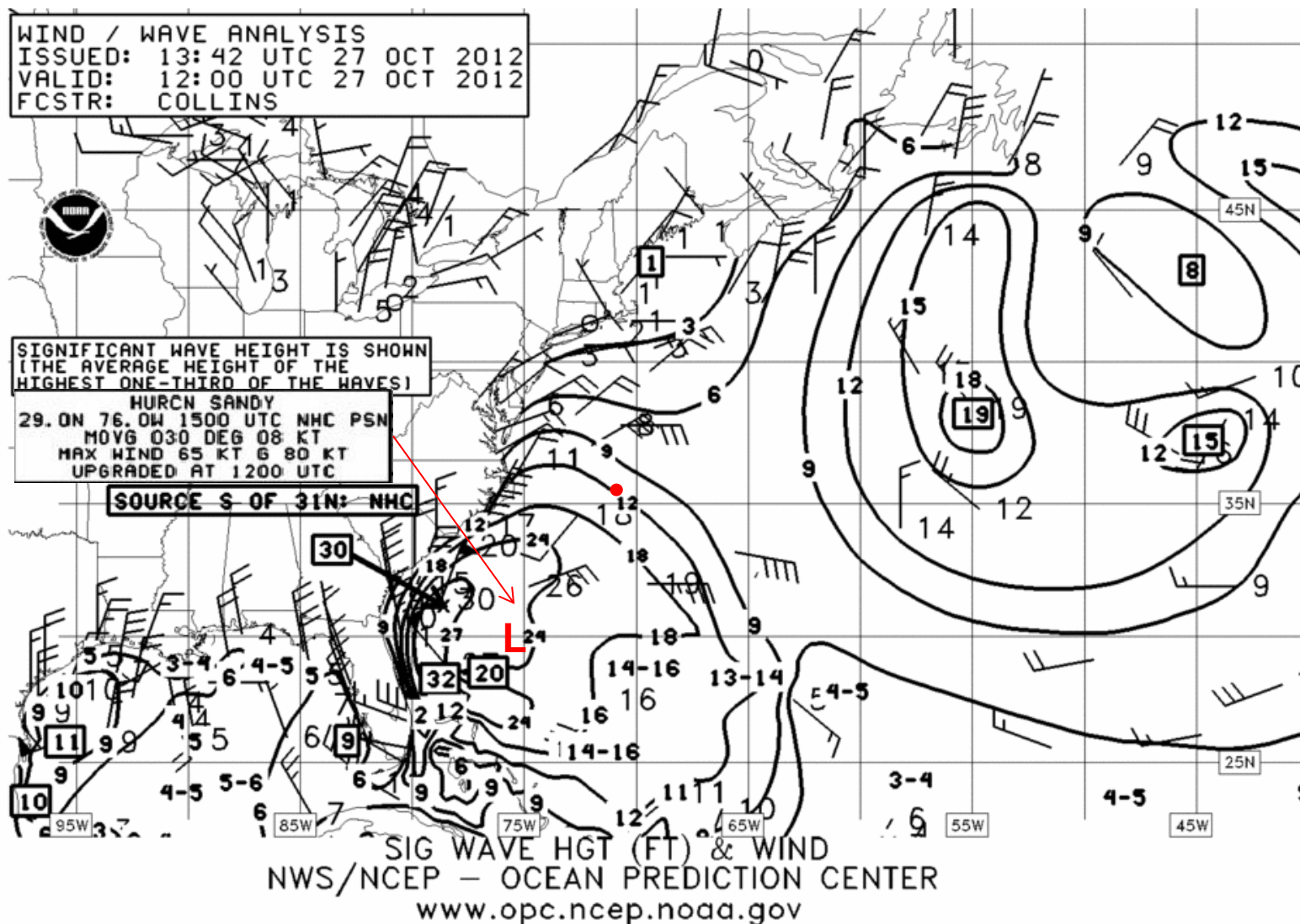**Obtain the data**: Satellite images

1430UTC, 29 October 2012, visible   1430UTC, 29 October 2012, infrared

Sandy had no clear eye and its outflow cloud shield had merged with the clouds fromthe mid-latitude storm to the west. Approximate position of the *Bounty* •
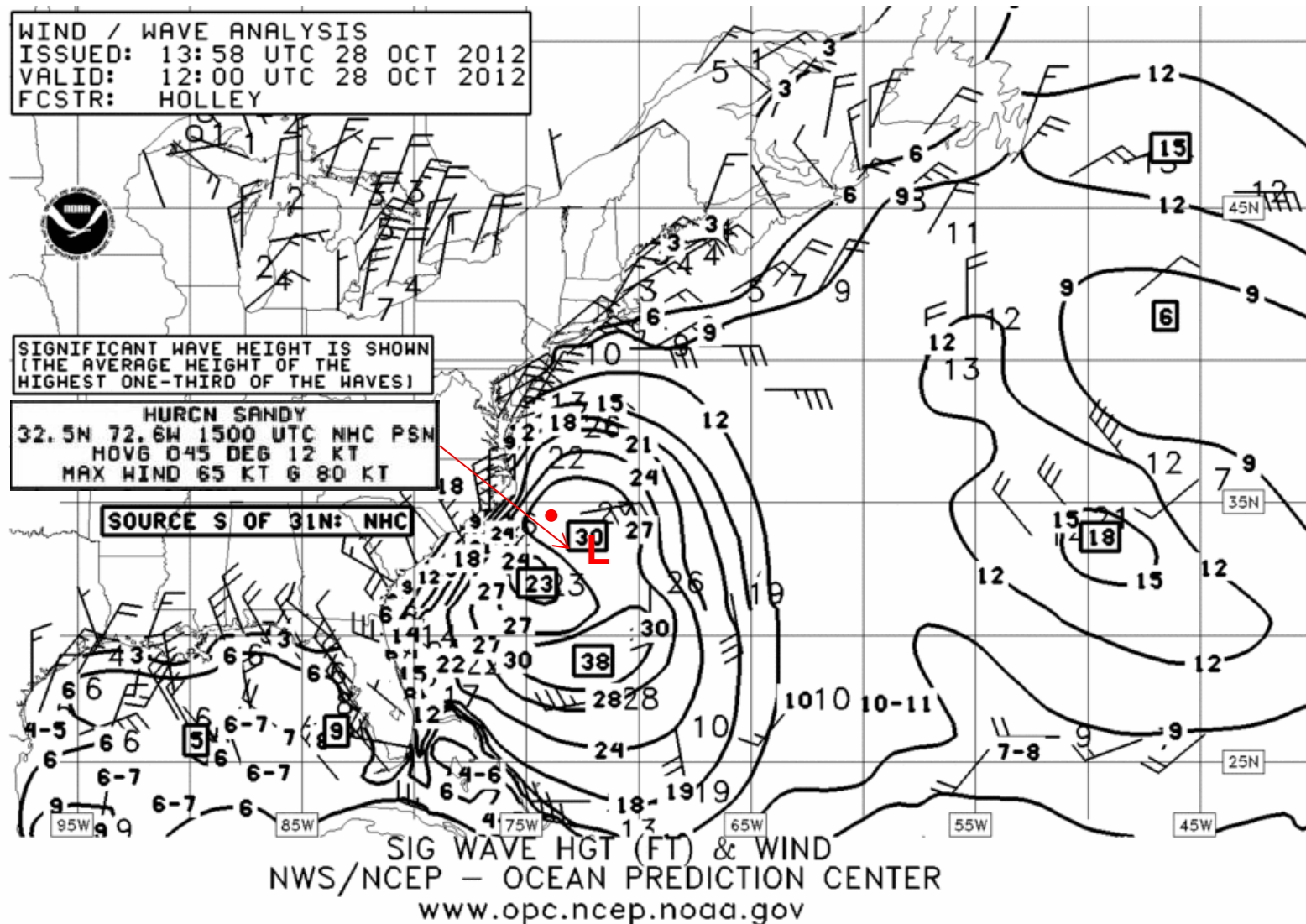
Obtain the data: Wind / Wave analysis

WIND / WAVE ANALYSIS
ISSUED: 13:42 UTC 27 OCT 2012
VALID: 12:00 UTC 27 OCT 2012
FCSTR: COLLINS

SIGNIFICANT WAVE HEIGHT IS SHOWN
(THE AVERAGE HEIGHT OF THE
HIGHEST ONE-THIRD OF THE WAVES)

HURCN SANDY
29.0N 76.0W 1500 UTC NHC PSN
MOVG 030 DEG 08 KT
MAX WIND 65 KT G 80 KT
UPGRADED AT 1200 UTC

SOURCE S- OF 31N: NHC

SIG WAVE HGT (FT) & WIND
NWS/NCEP — OCEAN PREDICTION CENTER
www.opc.ncep.noaa.gov

On the morning of 27 October, the highest winds and seas in the vicinity of Sandy were 65G80 KT and 32 ft.   Approximate position of the *Bounty* •

46

Obtain the data: Wind / Wave analysis

On the morning of 28 October, the highest winds and seas in the vicinity of Sandy were 65G80 KT and 30 ft. Approximate position of the *Bounty* •
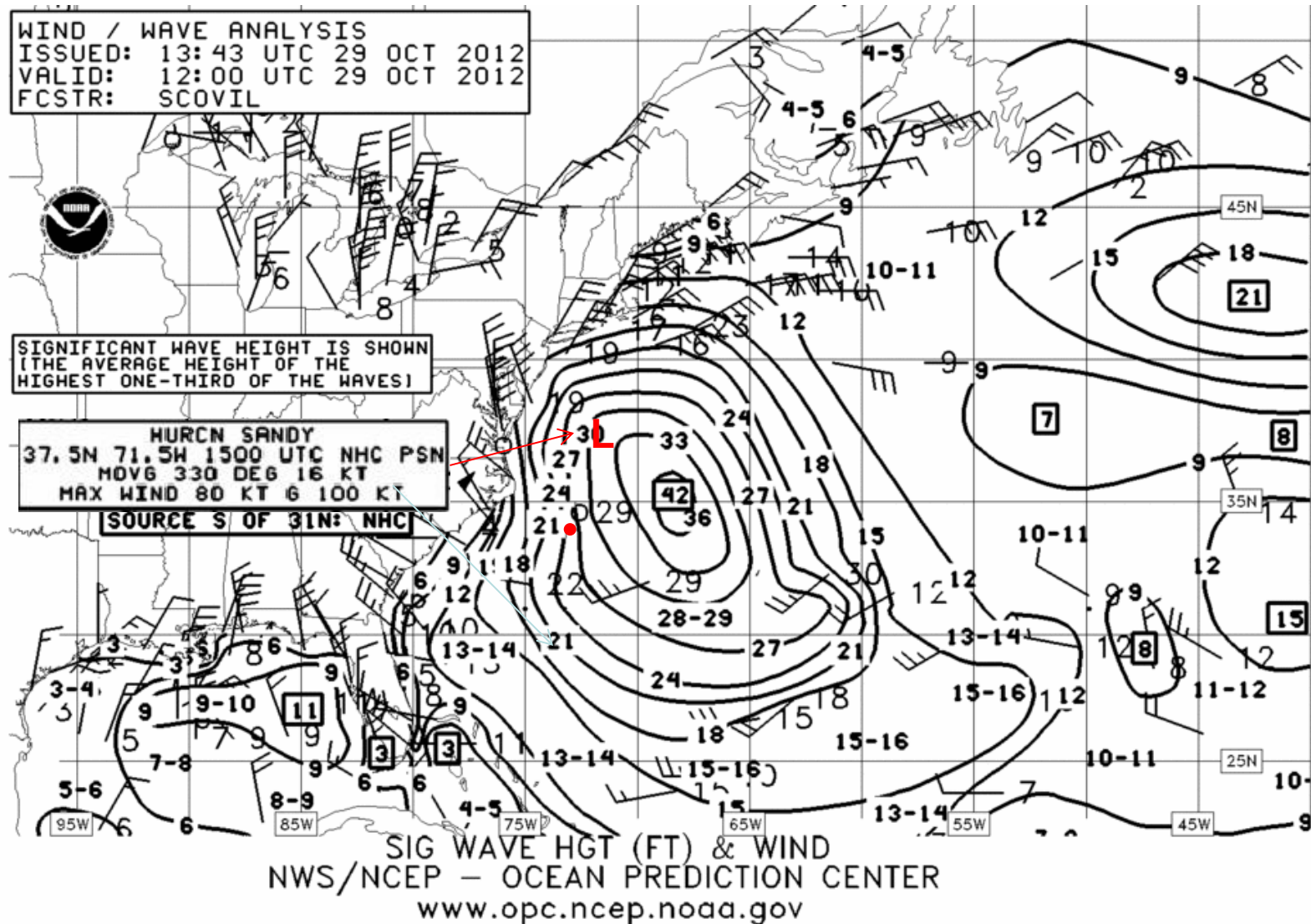
Obtain the data: Wind / Wave analysis

WIND / WAVE ANALYSIS
ISSUED: 13:43 UTC 29 OCT 2012
VALID: 12:00 UTC 29 OCT 2012
FCSTR: SCOVIL

SIGNIFICANT WAVE HEIGHT IS SHOWN
[THE AVERAGE HEIGHT OF THE
HIGHEST ONE-THIRD OF THE WAVES]

HURCN SANDY
37.5N 71.5W 1500 UTC NHC PSN
MDVG 330 DEG 16 KT
MAX WIND 80 KT G 100 KT
SOURCE S OF 31N: NHC

SIG WAVE HGT (FT) & WIND
NWS/NCEP – OCEAN PREDICTION CENTER
www.opc.ncep.noaa.gov

On the morning of 29 October, the highest winds and seas in the vicinity of Sandy were 80G100 KT and 42 ft. Approximate position of the *Bounty* •

48

Analyze the data: The skipper's too-late order to abandon ship

The superposition of the *Bounty's* 27-29 October track on the surface weather analysis, demonstrates the ship passed 'in front' of Sandy.

The 27-29 October satellite images demonstrate that Sandy became larger and better organized.

The 27-29 October wind and wave analyses confirmed the above observation from the satellite images and demonstrated the winds and seas increased in the vicinity of Sandy.

It's not known why the *Bounty's* captain changed his plans to sail around the east side of the hurricane. Instead, the ship crossed in front of the storm, eventually sinking on October 29.
Alberto Mier (www.cnn.com/interactive/2013/03/us/bounty/)

Analyze the data (continued): The skipper's too-late order to abandon ship

From CNN (www.cnn.com/interactive/2013/03/us/bounty/): "Early evening, Thursday, October 25, water in the bilge area appeared to be at routine levels. *Bounty's* pumps didn't seem to be performing at their usual speed, but the crew was not alarmed.

The engine room itself worried the *Bounty's* newly hired engineer. He thought it needed a good cleaning. Sawdust and wood chips littered the floor. Everything just looked old.

Around 0930EDT on Saturday October 27, water crept out of the bilge area -- and up into the engine room.

Sunday, October 28, wood chips and sawdust from the dirty floor were floating in the rising water and clogging the pumps. They had to be shut off constantly to clear the strainers. At 16EDT, 4 feet of seawater covered the engine room. Electrical equipment was short-circuiting in the water. The skipper admitted they were losing the battle. Around 19EDT, one of the ship's two generators failed. About 20EDT, the second generator died, plunging the boat into darkness.

Sometime after midnight, Monday 29 October, water in the engine room measured more than 6 feet deep. With the engines dead, *Bounty* was adrift. Around 04EDT, seawater began flooding the "tween" deck above the engine room.

Before dawn, the 400-ton *Bounty* rolled nearly all the way over on its starboard side.

Review and revise decisions: The skipper's too-late order to abandon ship

27 October: The skipper decided to steer the ship SW, toward the coast : (from the TV interview on YouTube) "You try to get up as close to the eye as you can and you stay down in the SE quadrant and when it stops, you don't want to get in front of it…you'll get a good ride out of the hurricane". He got in front of Sandy and sank in the SW quadrant!

From CNN (www.cnn.com/interactive/2013/03/us/bounty/): "Sometime after midnight (29 October), they focused on how they were going to safely abandon ship. (From just-completed radio communication) The skipper said the Coast Guard planned to launch rescue helicopters around 06EDT, weather permitting. If they could hold off abandoning ship, he told the crew, perhaps they wouldn't be in the water too long.

….around 4 a.m., the captain decided it was time to go…..

Before dawn, the Bounty rolled nearly all the way over on its starboard side. Some jumped into the water, others simply fell."

From Shaer: "Early in the morning of 29 October, with the ship adrift, the first mate twice requested the skipper to order the ship to be abandoned when the ship was upright and stable. But, the skipper refused".

If you were the skipper, what would you have done?

From FAA Aviation Decision Making (AMD)

PIC (skipper) **Hazardous Attitudes**	**Antidotes**
Macho (I can make it to FL)	Taking chances is foolish
Anti-authority (Let's wait until the 2014 CG hull inspection)	Follow the rules, they are usually right
Invulnerability (I've been through hurricanes before)	It could happen to me
Impulsivity (It's now OK to head SW; do not abandon ship)	Not so fast, think first
Resignation (helpless crew member in water finding raft)	I'm not helpless, I can make a difference

An old aviation saying (skipper's mistake)

The first mistake may scare you (the *Bounty* put to sea when all other tall-ships stayed in port)

The second mistake may hurt you (the initial course was changed from SE to SW)

The third mistake may kill you (the initial requests from the senior crew to abandon ship were ignored)

Plan a future voyage using current on-line NOAA weather information and forecasts
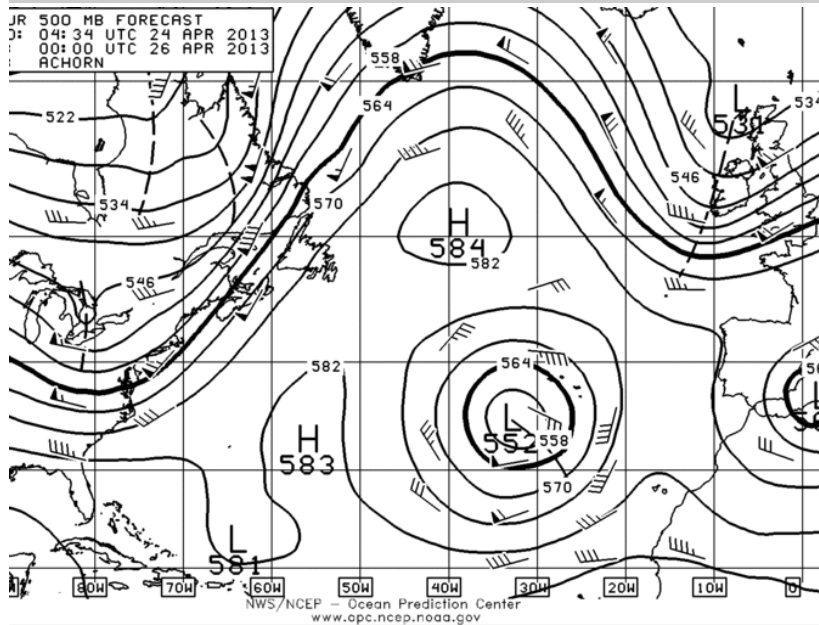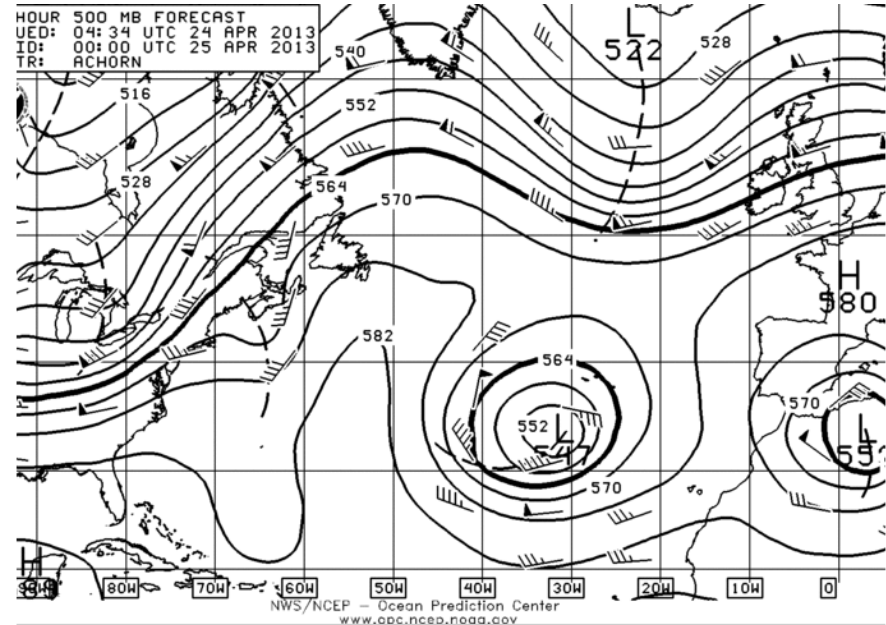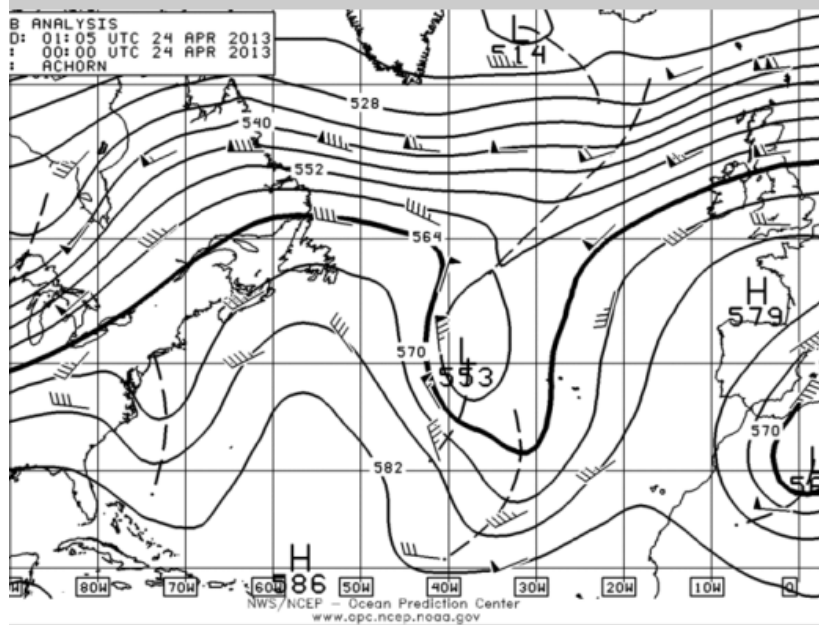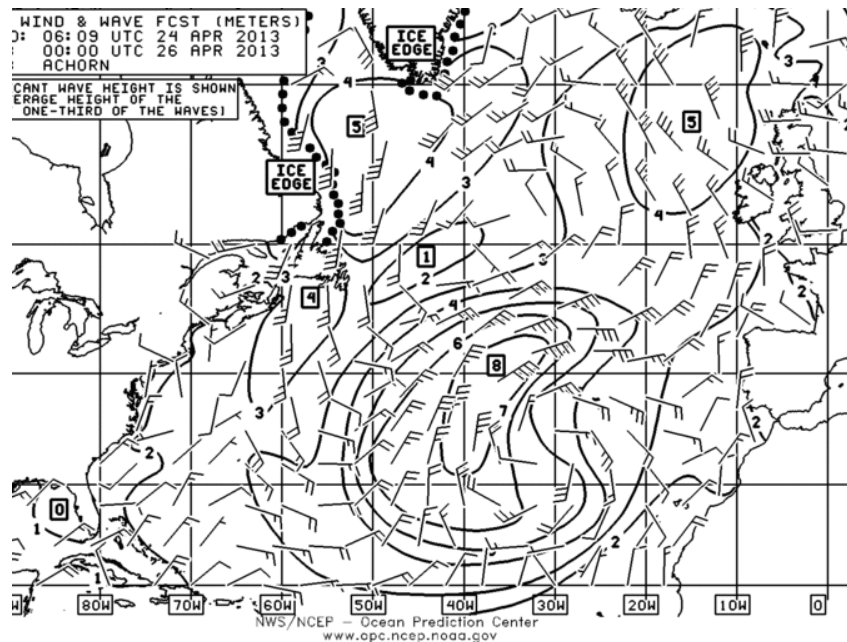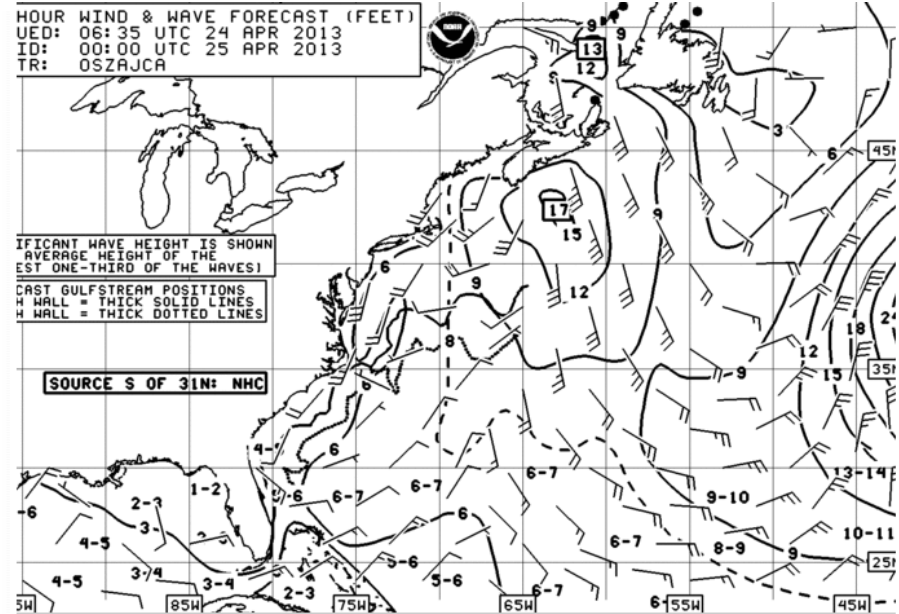
08EDT, 24April13 information from NOAA-OPC site (Atlantic marine):

Only 96h forecast available

Plan a future voyage using current on-line NOAA weather information and forecasts
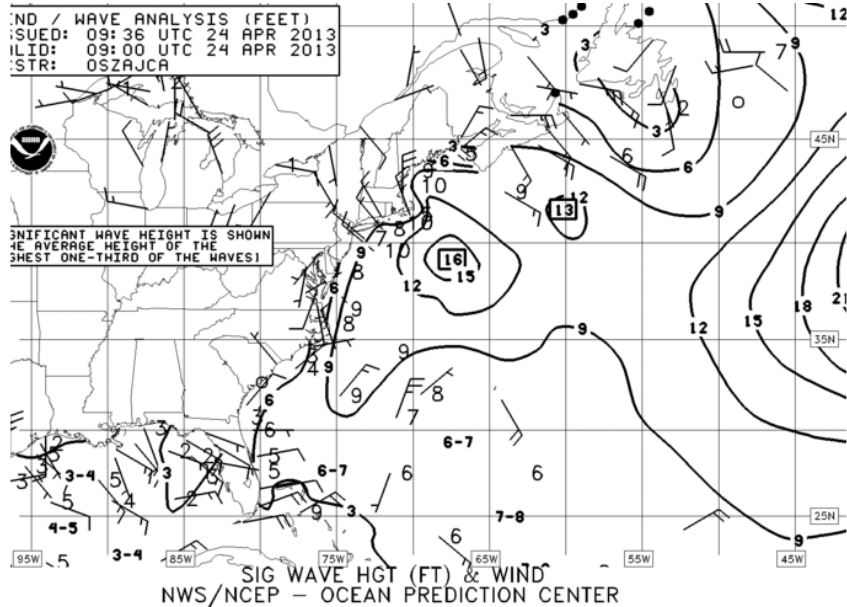
08EDT, 24April13 information from NOAA-OPC site (Atlantic marine):

Only 96h forecast available

08EDT, 24April13 information from NOAA-OPC site (Atlantic marine):

Only 96h forecast available

Plan a future voyage using current on-line NOAA weather information and forecasts

08EDT, 24April13 information from NOAA-OPC site (marine forecasts text, coastal waters):

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COASTAL WATERS FORECAST
NATIONAL WEATHER SERVICE NEW YORK NY
730 AM EDT WED APR 24 2013

MONTAUK POINT NEW YORK TO SANDY HOOK NEW JERSEY OUT 20 NM OFFSHORE
INCLUDING LONG ISLAND SOUND...LONG ISLAND BAYS AND NEW YORK HARBOR

ANZ300-242315-
730 AM EDT WED APR 24 2013

.SYNOPSIS FOR LONG ISLAND WATERS AND NEW YORK HARBOR...
LOW PRESSURE DEPARTS TO THE EAST AS A COLD FRONT APPROACHES LATE
TODAY AND MOVES ACROSS THE AREA TONIGHT. HIGH PRESSURE WILL BUILD IN
THROUGH THE END OF THE WEEK...AND REMAIN INTO EARLY NEXT WEEK.


LONG ISLAND SOUND WEST OF NEW HAVEN CT/PORT JEFFERSON NY-
730 AM EDT WED APR 24 2013

.TODAY...NW WINDS 5 TO 10 KT...BECOMING SW LATE THIS MORNING AND
EARLY AFTERNOON...THEN BECOMING S 10 TO 15 KT WITH GUSTS UP TO 20 KT
LATE. SEAS 1 FT OR LESS...THEN AROUND 2 FT THIS AFTERNOON.
.TONIGHT...S WINDS AROUND 15 KT...BECOMING W AFTER MIDNIGHT. SEAS
AROUND 2 FT. A CHANCE OF SHOWERS.
.THU...NW WINDS 10 TO 15 KT WITH GUSTS UP TO 20 KT...BECOMING W 5
TO 10 KT IN THE AFTERNOON. SEAS AROUND 2 FT IN THE MORNING...THEN
1 FT OR LESS.
.THU NIGHT...SW WINDS 5 TO 10 KT...BECOMING W AFTER MIDNIGHT. SEAS
1 FT OR LESS.
.FRI...NW WINDS 5 TO 10 KT. SEAS 1 FT OR LESS.
.FRI NIGHT...NW WINDS AROUND 5 KT. SEAS 1 FT OR LESS.
.SAT...N WINDS AROUND 5 KT...BECOMING E IN THE AFTERNOON...THEN
BECOMING S. SEAS 1 FT OR LESS.
.SUN...S WINDS 5 TO 10 KT. SEAS 1 FT OR LESS.
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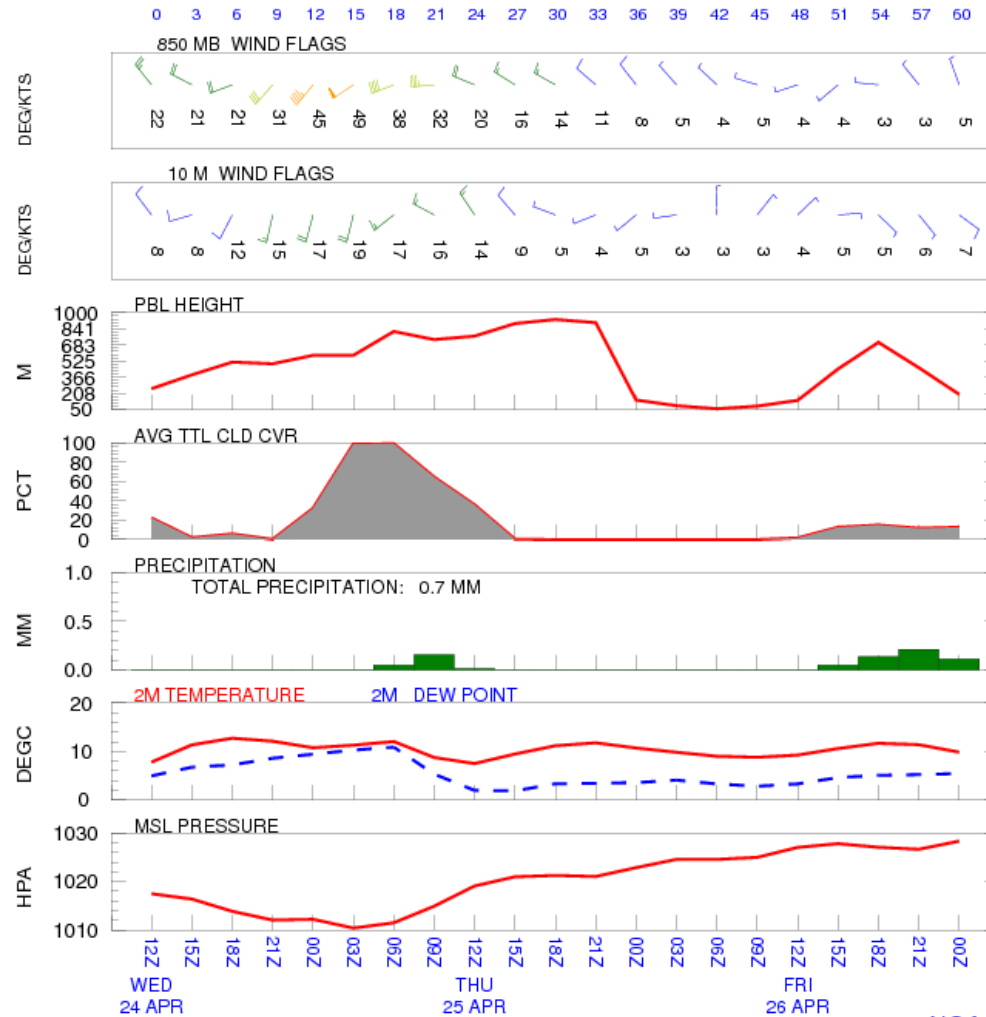
Plan a future voyage using current on-line NOAA weather information and forecasts
09EDT, 24April13 information from www.ready.noaa.gov/READYcmet.php

GFS METEOROGRAM
Latitude: 41.14 Longitude: -72.66
Buoy 44039, Central Long Island Sound

DATA INITIAL TIME: 24 APR 2013 06Z
CALCULATION STARTED AT: 24 APR 2013 12Z
CALCULATION ENDED AT: 27 APR 2013 00Z
NOAA AIR RESOURCES LABORATORY
READY Web Server

Plan a future voyage using current on-line NOAA weather information and forecasts
09EDT, 24April13 information from www.ready.noaa.gov/READYcmet.php (Sounding,GFS)
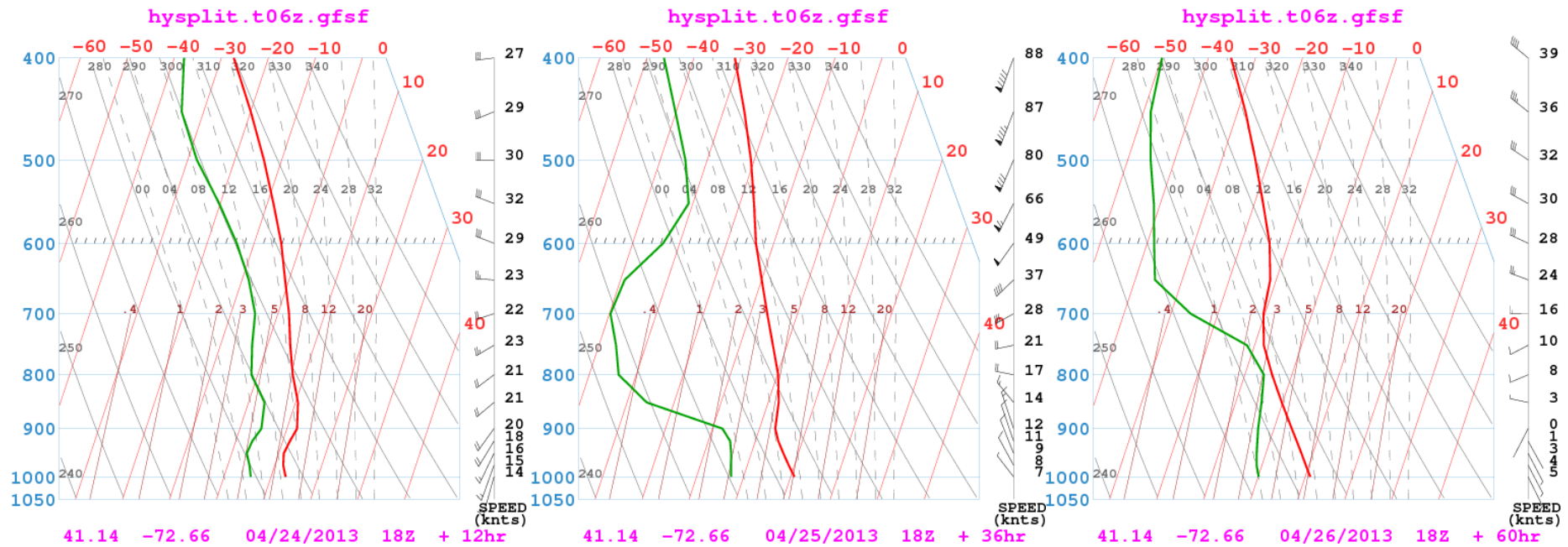
Plan a future voyage using current on-line NOAA weather information and forecasts

Which day would you sail 24, 25 or 26 April 2013 and why?

Archived data sources:

Surface and upper-air weather maps:

> www.weather.unisys.com/archive/sfc_map/
> www.weather.unisys.com/archive/eta_init/
> nomads.ncdc.noaa.gov/ncep/NCEP

Surface weather data (hourly):

> cdo.ncdc.noaa.gov/qclcd/QCLCD

choose "Quality Controlled Local Climatological Data (QCLCD)". Copy data and save as a comma-delimited text file for import to Excel.

Upper-air soundings (plots and listings from the NAM (12km, 3 hourly, U.S.)):

> ready.arl.noaa.gov/READYamet.php

Radar:
> gis.ncdc.noaa.gov/map/viewer/#app=cdo&cfg=cdo&theme=hourly&layers=0001
> &extent=-139.2:12.7:-50.4:57.8&srid=4326&node=gis&display=nexrad

blow up and center on either W99 or 0B7. Screen-save the image as a jpg file.

Archived data sources (continued):

Satellite images:

www.nsof.class.noaa.gov/saa/products/search?datatype_family=GVAR_IMG

Steps:
- Login: username: hindman2, pswd: N22DJ17m
- W99 scene sides: -82 (82W, left)), 41 (41N, top), -76 (76W, right), 35 (35N, bottom)
- Enter period: yyyy-mm-dd, hh:mm:ss GMT to yyyy-mm-dd, hh:mm:ss GMT
- Enter GOES number: 12 (USA East, 1 Apr 2003 - 10 May 2010), 13 (USA East, 14 Apr 2010 – present (GOES 14 used in Oct 2012 when GOES 13 temporarily down))
- Hit 'Search'
- Check the images desired in Shopping Cart and hit Update
- Go to cart and select Output Format (jpg), Bits (8), Spatial Res. VIS (1 km), IR (1 km), Bands (1 for vis; 4 for IR), select Map Overlay.
- Hit 'Place Order'
- Fill out survey and hit 'Submit' button.
- You'll receive a confirmation e-mail. The order should appear within 24 hours; quicker for few images and slower for more images.
- Download and save the images using the http method.

Buoy data:

www.ndbc.noaa.gov