

MARINE WEATHER REVIEW - NORTH ATLANTIC AREA

January through April 2002

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Introduction

The most active period was through mid-February, when a series of low-pressure systems developed off the U.S. East Coast and tracked northeast. Most of these, with few exceptions, passed between Greenland and Great Britain. The month of January was especially stormy, with many of the lows developing hurricane-force winds. MPC issued 55 high seas warnings for hurricane force winds during January, the most in any month in MPC's North Atlantic high seas area (north of 31N and west of 35W) since 1995, when MPC began keeping a count of its high seas warnings. Only the North Pacific high seas area in January 1998 had more such warnings (60).

The weather pattern became more variable from the second week of February through April, with blocking high pressure becoming frequent over the central North Atlantic. This forced low-pressure systems to move north from the Canadian Maritimes toward Greenland and then turn east; with slow-moving cutoff lows sometimes forming over the southern high seas waters or off Portugal. The last of the events with hurricane-force winds was in late March.

Significant Events of the Period

Central Atlantic Storm of 2-4

January: Figure 1 depicts three low-

pressure centers south of Newfoundland which quickly merged into one center and deepened during the following 24-hour period to form the 959-mb central Atlantic storm in the second part of the figure. Even when taking the initial central pressure from the deepest of the three centers (997 mb), the system dropped an impressive 38 mb in the 24-hour period covered by Figure 1, which was the period of most rapid deepening. By 1200 UTC January 3, MPC classified this system as a hurricane-force storm. The QuikScat image of Figure 2 confirms this, showing wind barbs as high as 70 kt south of the center. The valid time of the image is about one hour after the time of the second analysis in Figure 1. The highest wind reported by ships was 60 kt, with the **P&O Nedlloyd Sydney** (PDHY) encountering a southwest wind of 60 kt and 12.2-meter seas (40 feet) near 51N 30W at 1800 UTC January 3. The **Canmar Honour** (ZCBP5) reported a southwest wind of 45 kt and seas of 14.0 meters (46 feet), the highest seas reported in this storm. This system subsequently weakened near the eastern coast of Greenland late on January 4.

North Atlantic Storm of 4-6

January: This storm originated as a frontal wave of low pressure in the Gulf of Mexico on the first and moved off the U.S. East Coast on the third, developing multiple centers. Figure 3 depicts the primary center as

the 993-mb storm near 34N 71W at 1200 UTC January 4, plus two secondary low-pressure centers to the northeast. The easternmost center deepened rapidly in the following 24 hours and became the main center, shown as the hurricane-force storm (943 mb) near Greenland at 1200 UTC January 5. The drop in central pressure was an impressive 47 mb (1.39 inches) during this period, almost 2 mb per hour. The central pressure bottomed out at 942 mb (27.82 inches) as the center reached 62N 39W six hours later. This made the storm the second deepest of the January-to-April period, not only in the North Atlantic, but also in both oceans. The highest winds and seas reported by ship were on the backside of the primary storm center off the U.S. East Coast. The **Sea-Land Performance** (KRPD) reported a north wind of 60 kt and 8.8-meter seas (29 feet) near 37N 62W at 0000 UTC January 5. The **Lykes Liberator** (WGXM) encountered a northwest wind of 55 kt and 13.7-meter seas (45 feet) near 34N 71W at 1800 UTC January 4. The redeveloped stronger system near Greenland was in an area of sparse ship data, but QuikScat data (Figure 4) revealed winds as high as 65 kt southeast of the center. The infrared satellite image (Figure 5) shows the storm near maximum intensity with a well-defined center near 60N 40W and associated frontal bands. The broadening of the frontal band well south of the center is the

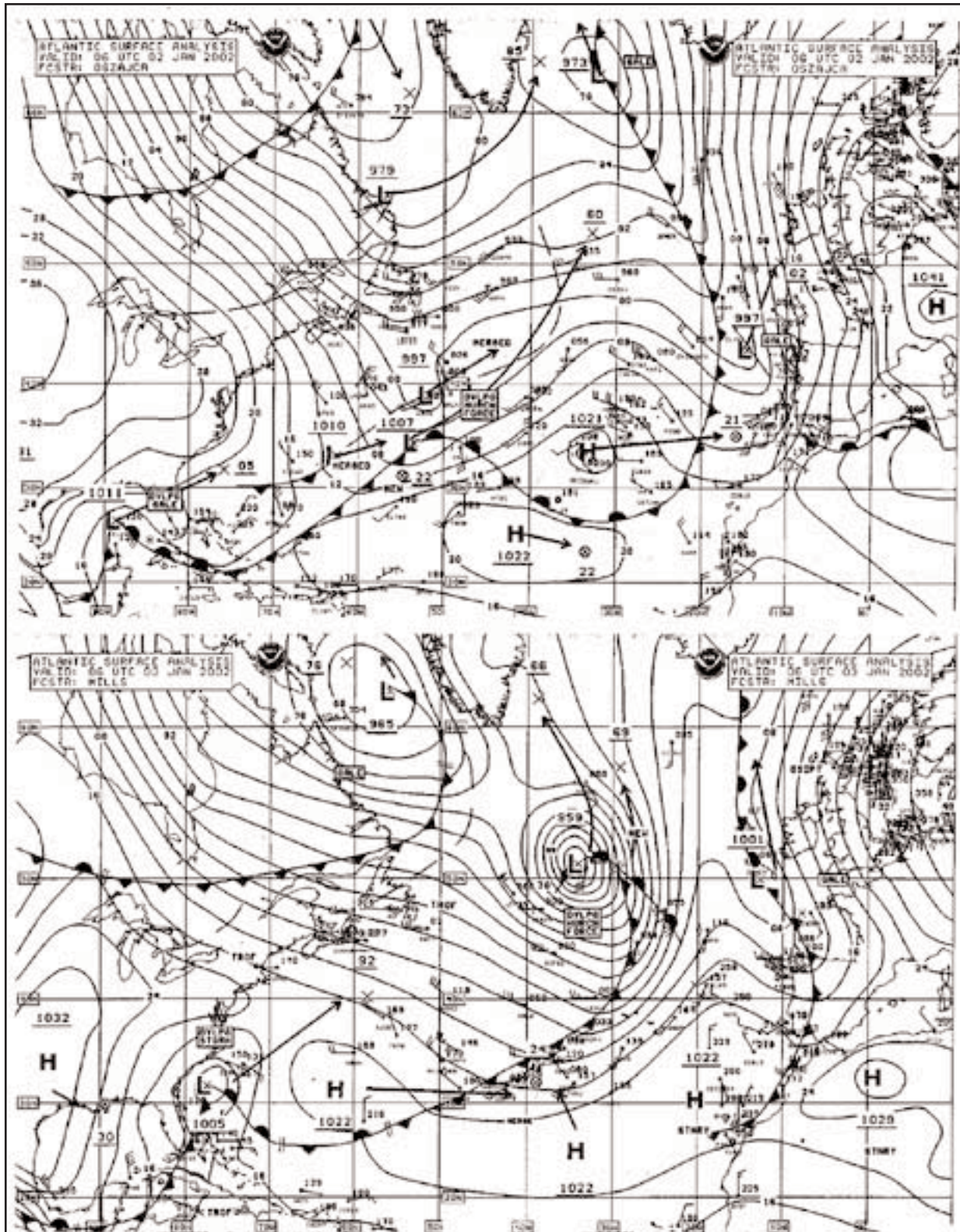


Figure 1. MPC North Atlantic Surface Analysis charts valid 0600 UTC January 2 and 3, 2002.

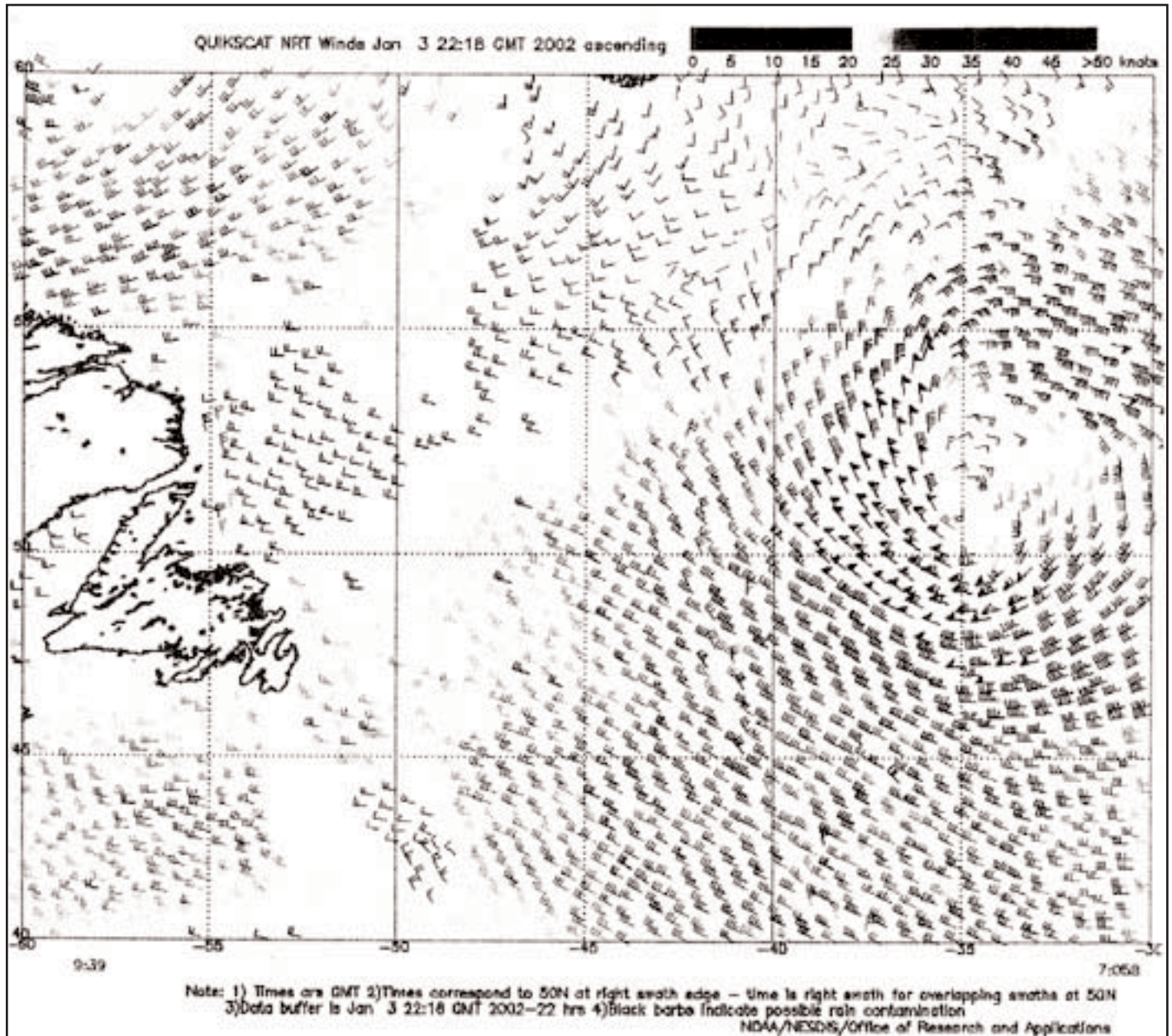


Figure 2. QuikScat scatterometer image of satellite-sensed winds valid approximately 0700 UTC January 3, 2002.
(Image courtesy of NOAA/NESDIS Office of Research and Applications)

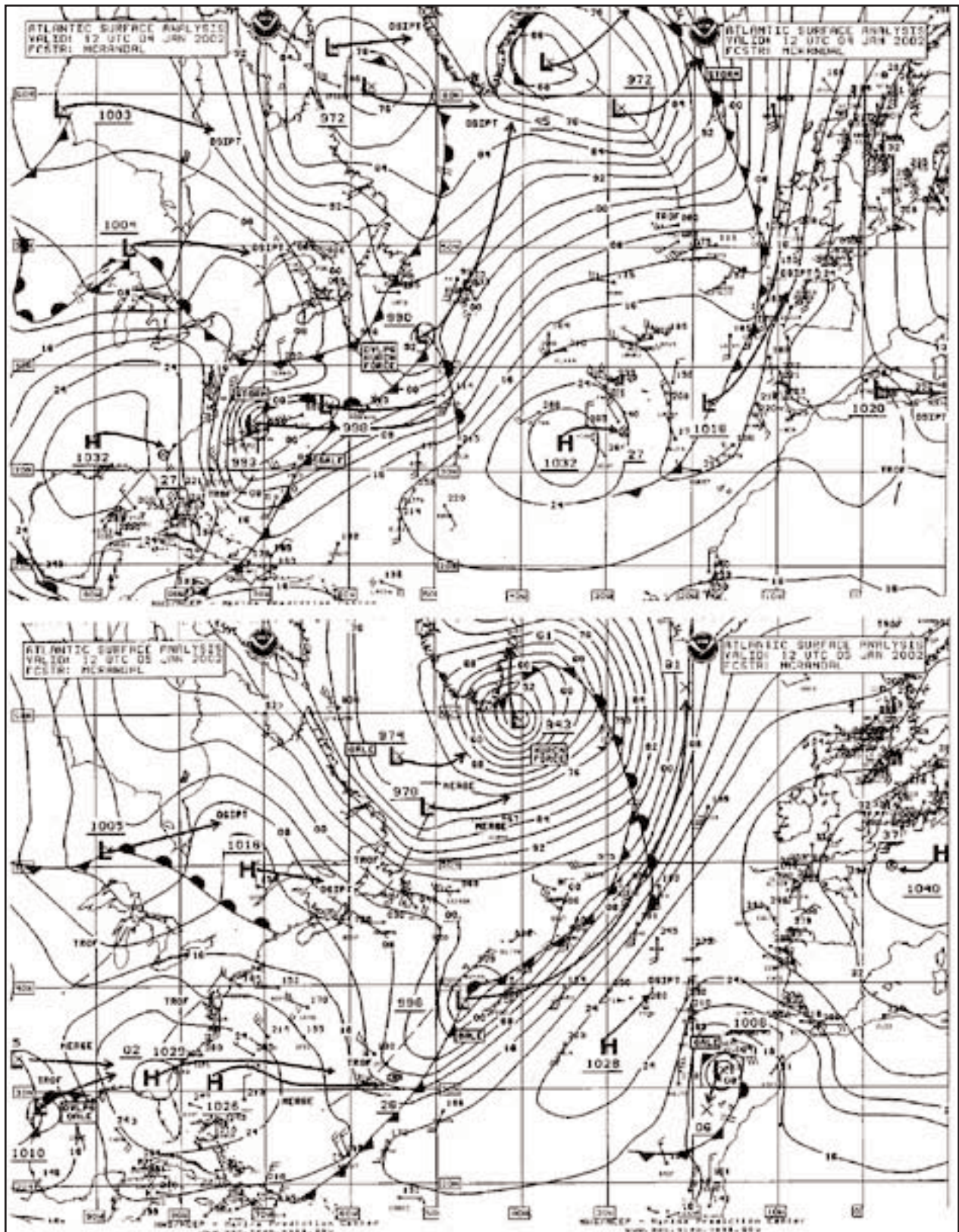


Figure 3. MPC North Atlantic Surface Analysis charts valid 1200 UTC January 4 and 5, 2002.

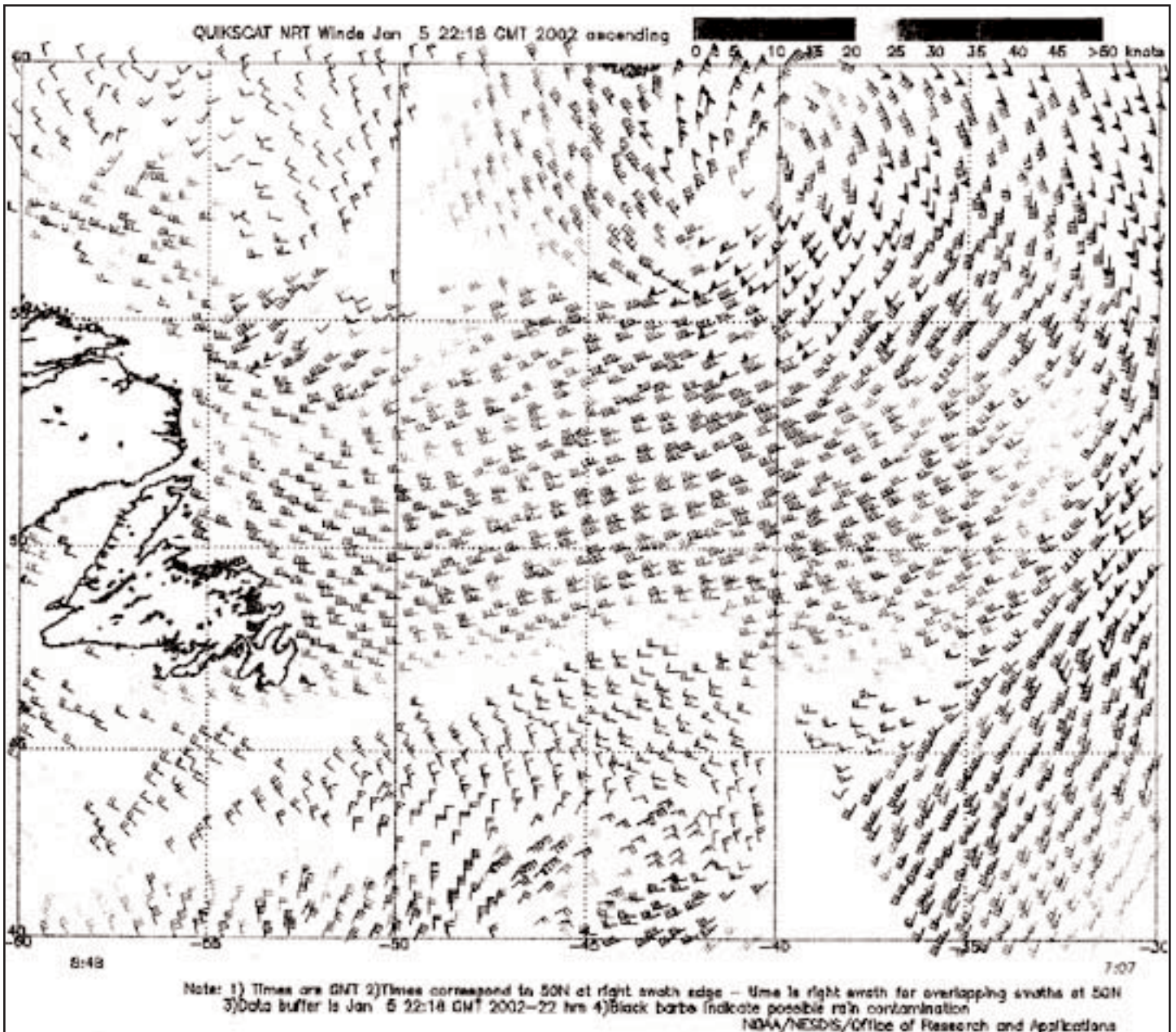


Figure 4. QuikScat scatterometer image of satellite-sensed winds valid approximately 0700 UTC January 3, 2002.
(Image courtesy of NOAA/NESDIS/Office of Research and Applications)

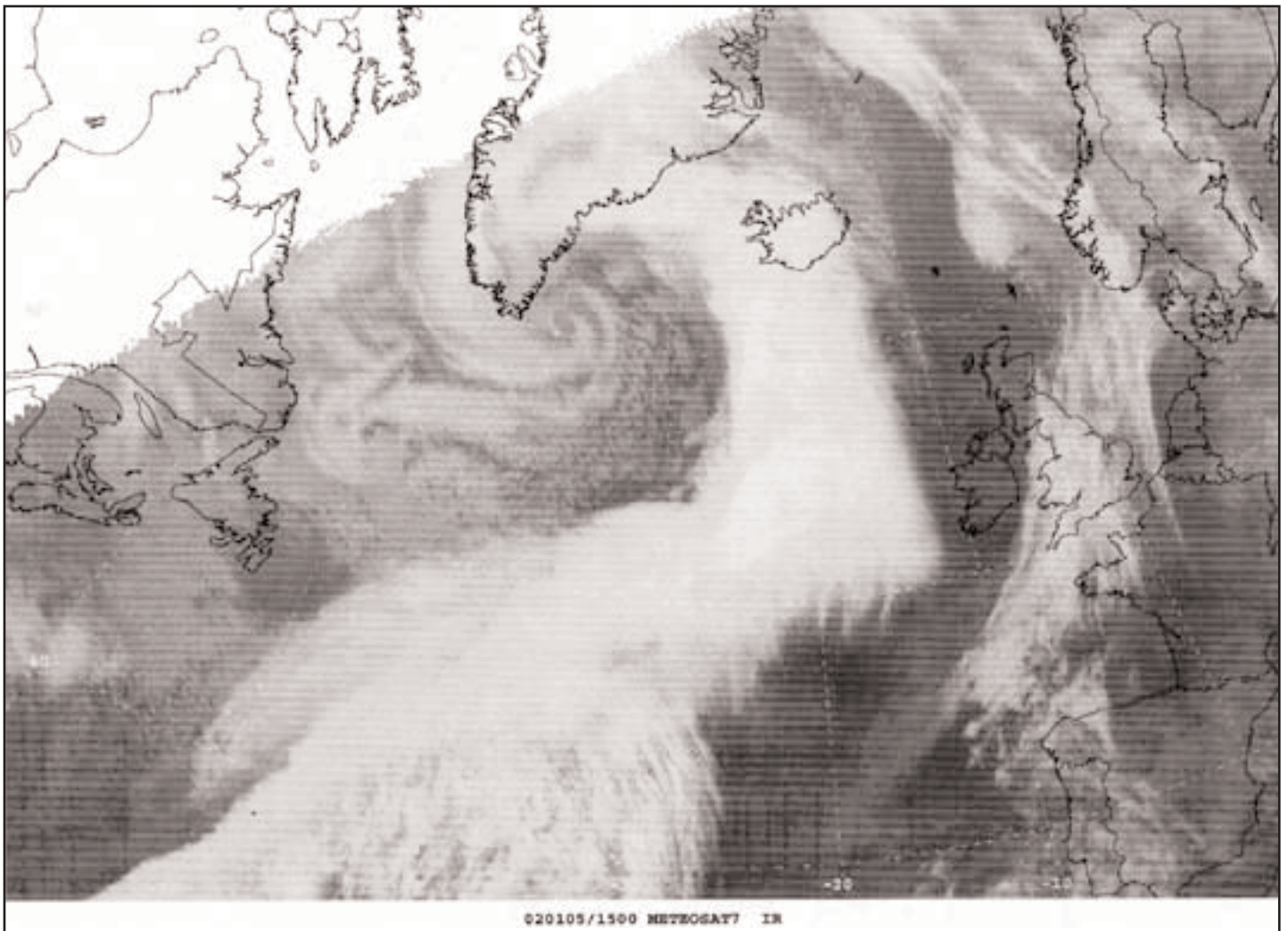


Figure 5. METEOSAT 7 infrared satellite image valid 1500 UTC January 5, 2002. Satellite senses temperature on a scale from warm (black) to cold (white) in this type of image. The valid time is only 3 hours later than that of the second surface analysis in Figure 3.

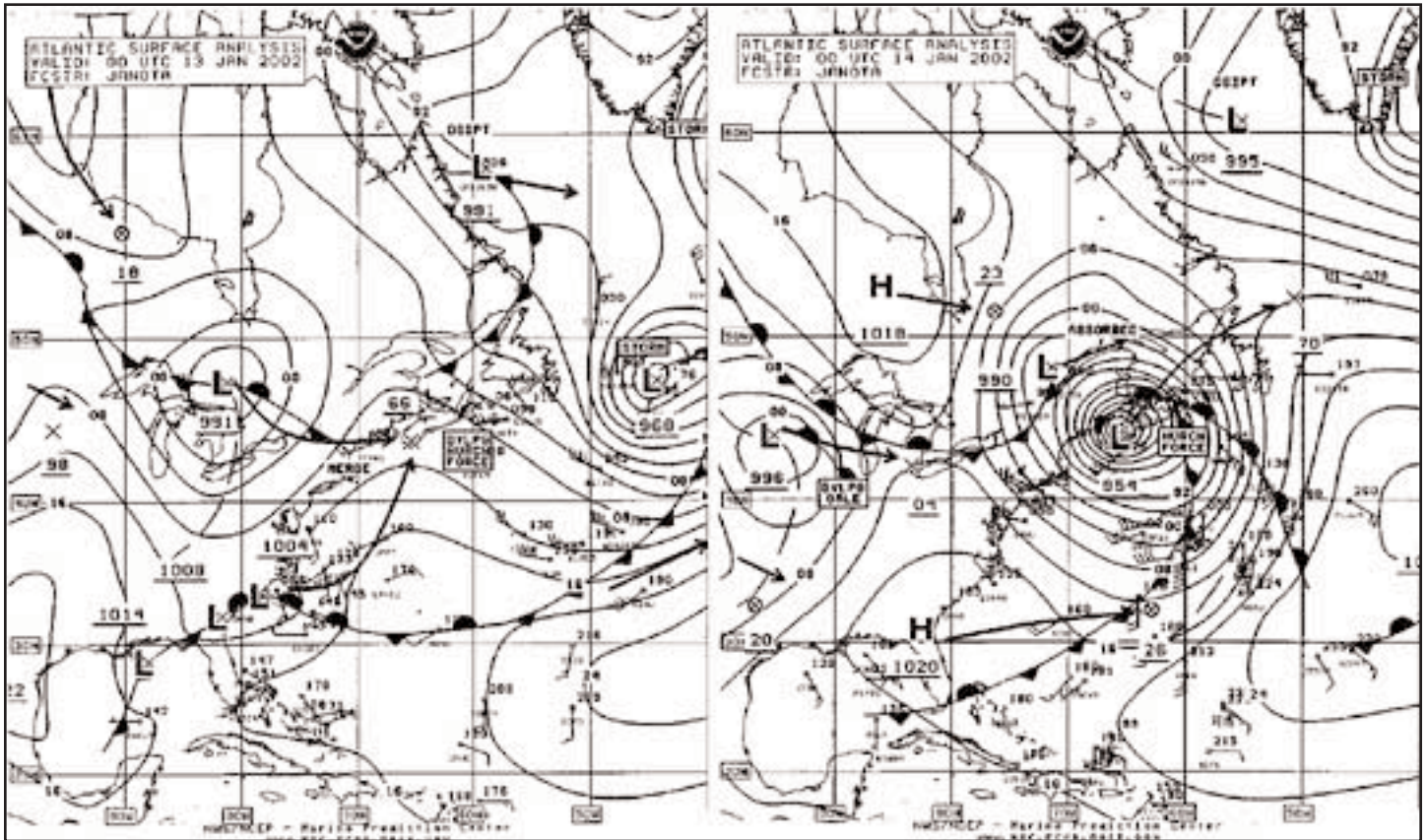


Figure 6. MPC North Atlantic Surface Analysischarts (Part 2 - west) valid 0000 UTC January 13 and 14, 2002.

low on the trailing front, depicted near 39N 47W in the second part of Figure 3, which subsequently moved rapidly northeast past Iceland by 1800 UTC January 6, while the main center weakened near the Greenland coast.

Gulf of Maine “Bomb” - 13-16

January: Originating near the Carolina coast at 0000 UTC January 13, this system developed explosively as it passed east of New England on the afternoon of January 13. Figure 6 depicts the storm during its most rapid development over a 24-hour period. The central pressure dropped 50 mb (1.48 inches) during this period, with 34 mb of that drop occurring in the last 12 hours. The storm reached

maximum intensity at 0000 UTC January 14 (954 mb or 28.17 inches), before beginning a slow weakening trend while continuing on a northeastward track across the Canadian Maritimes. The hurricane-force winds in this storm were mainly south and southwest of the center and lasted only 12 to 18 hours, but were quite intense. The **British Harrier** (MZFK4) encountered southwest winds of 80 to 90 kt near 43N 66W in the six hour period ending at 0600 UTC January 14, and seas of 14.9 meters (49 feet) near 43N 65W at 1200 UTC January 14. By comparison, a QuikScat pass taken about 2230 UTC January 13 shows winds of 75 kt in the Gulf of Maine

(Figure 7). The **Pharos** (ELTX9) reported west winds of 55 kt and 16.2-meter seas (53 feet) near 41N 56W at 1800 UTC January 14, the maximum seas reported in this storm. **Hibernia Platform** 44145 (46.7N 48.7W) clocked southwest winds of up to 77 kt at 2100 UTC January 14. Canadian buoy 44142 (42.5N 64.0W) reported southwest winds of 49 kt, with gusts to 62 kt, at 0300 UTC January 14, and seas 12.5 meters (41 feet) at 0700 UTC that same day, the highest winds and seas reported from buoys. Among coastal C-MAN stations, **Matinicus Rock** (MDRM1, 43.8N 68.7W) reported the highest winds, with a northwest wind of 55 kt and gusts to 65 kt at 2300 UTC

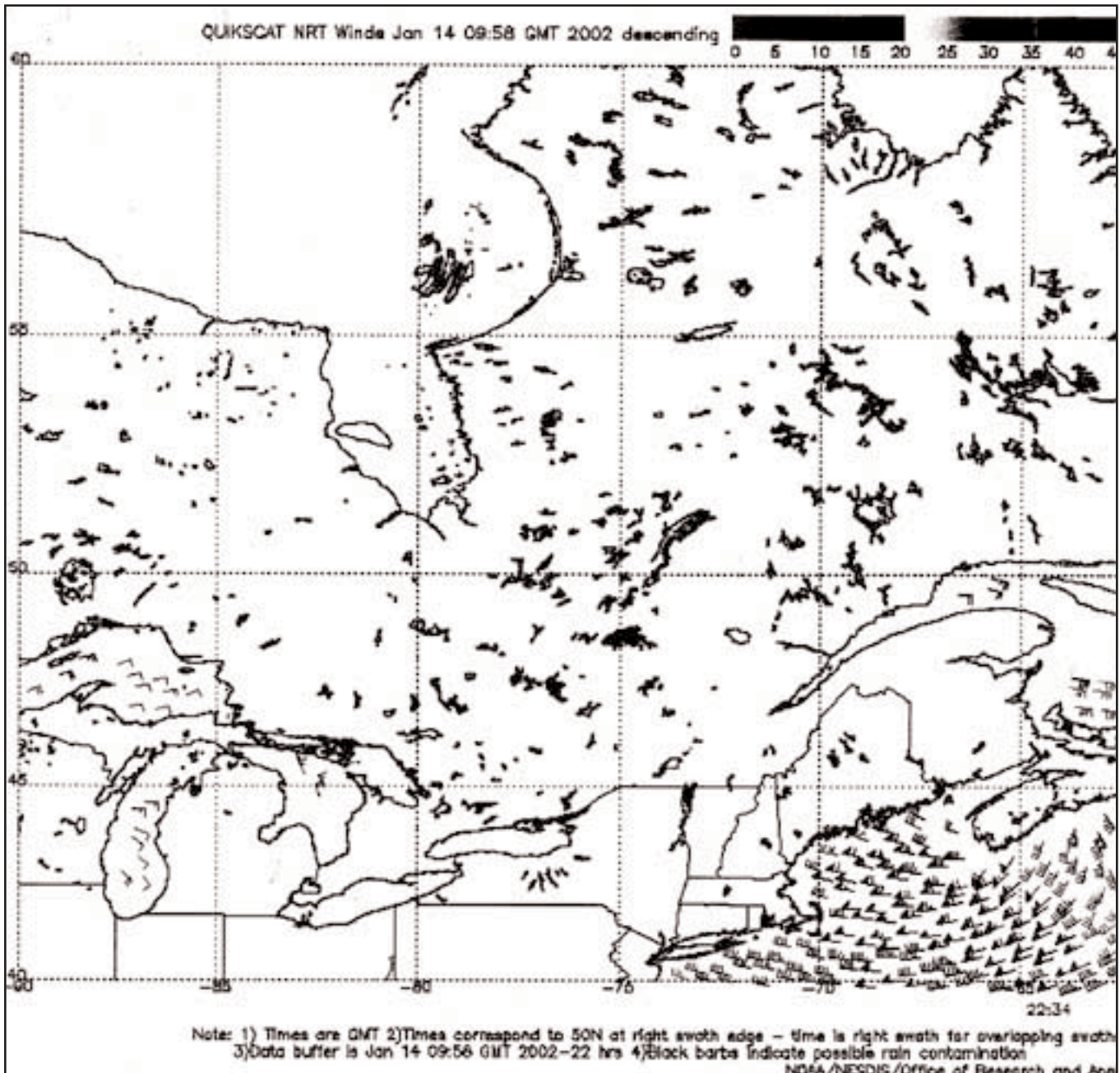


Figure 7. QuikScat scatterometer image of satellite-sensed winds valid approximately 2230 UTC January 13, 2002.

(Image courtesy of NOAA/NESDIS/Office of Research and Applications)

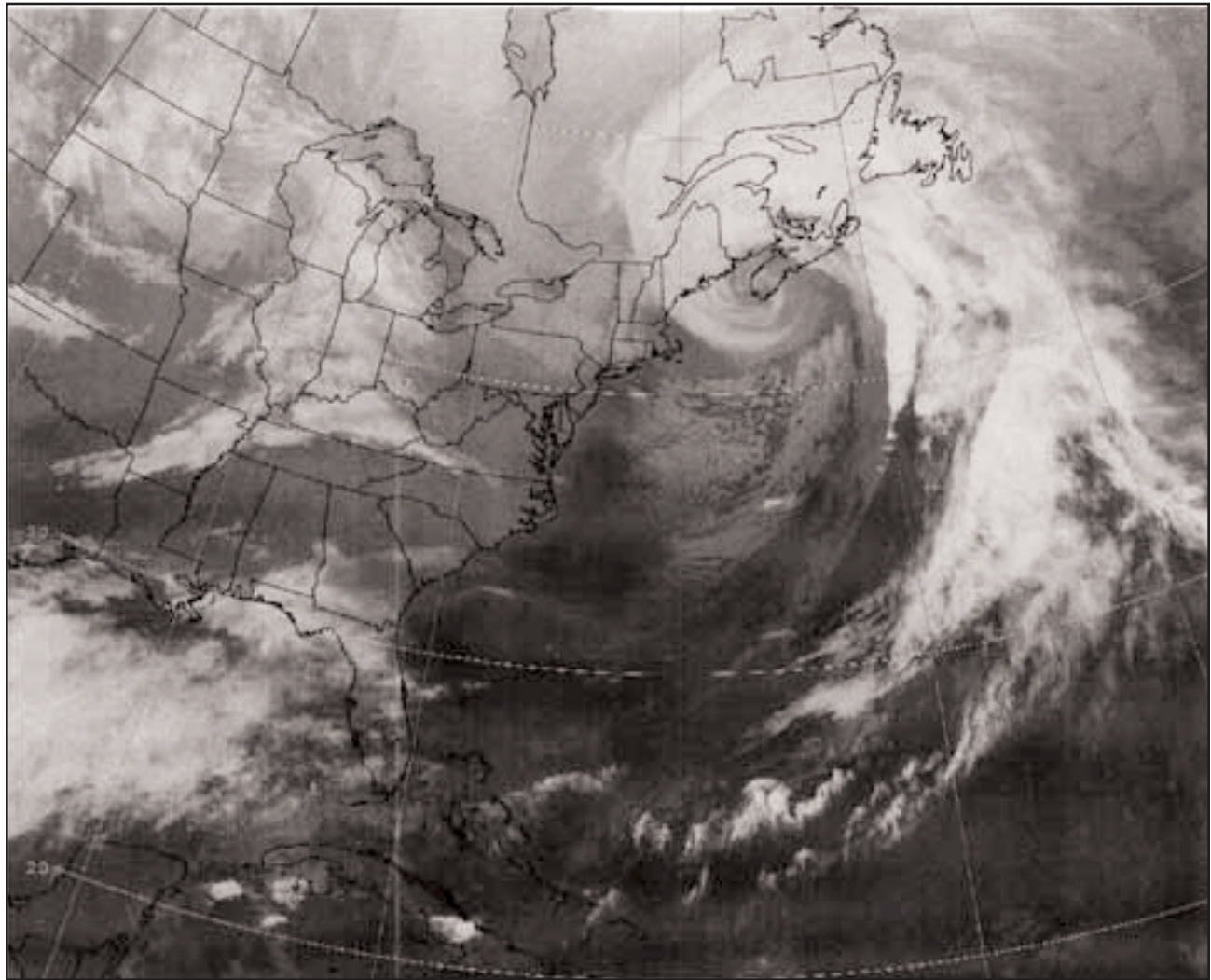
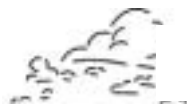


Figure 8. GOES-8 infrared satellite image valid 0015 UTC January 14, 2002. The valid time is approximately that of the second surface analysis of Figure 6.

January 13. The infrared satellite image of Figure 8 shows the storm near maximum intensity with a well-defined center near Cape Sable and strong convection along a portion of the cold front near 59W. The storm subsequently stalled east of Greenland on January 16, where it weakened to a gale by the next day.

North Atlantic Storm of 16-20

January: After passing northeast through MPC's offshore waters on January 15, this system absorbed two other lows to the north, pulled arctic

air into its circulation and accomplished much of its intensification in the 24-hour period ending at 0600 UTC January 17. At 0600 UTC January 17, the storm center was at 50N 46W with a central pressure of 972 mb. The **Talisman** (LAOW5) south of the center near 43N 46W reported a southwest wind of 70 kt. The storm's central pressure bottomed out at 960 mb near 57N 29W twenty-four hours later, similar in intensity to the January 2-4 storm. The **Alligator Reliance** (ZCBN5) encountered southwest winds of 70 kt

near 48N 31W at 0000 UTC January 18. The **Irving Primrose** (8POI) encountered west winds of 65 kt near 54N 27W at 1200 UTC January 18. Buoy 62108 (53.4N 19.4W) reported 12.2-meter seas (40 feet) six hours later. At 0000 UTC January 19, the ship **ZCBP6** reported west winds of 50 kt and seas of 11.0 meters (36 feet), the highest seas reported by ship in this event.

Eastern Atlantic Storm of 19-22

January: While the aforementioned storm was elongating and weakening

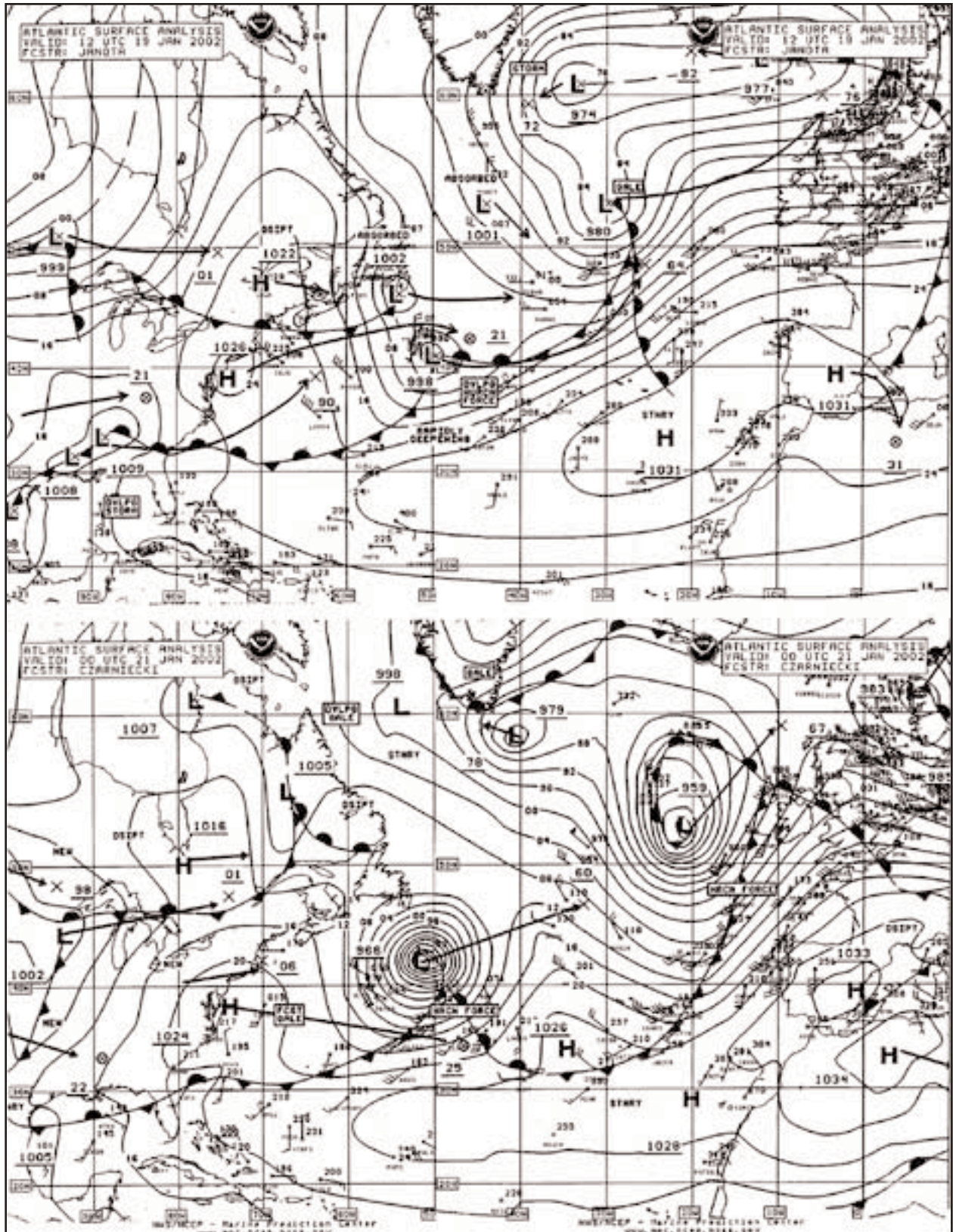


Figure 9. MPC North Atlantic Surface Analysis charts valid 1200 UTC January 19 and 0000 YTC January 21, 2002.



east of Greenland (Figure 9), a storm developed in the eastern North Atlantic with an intensity similar to that of the 2-4 and 16-20 January storms, but tracked farther east. The first part of Figure 9 shows the system passing south of Newfoundland. Rapid intensification followed as the system absorbed the low to the northwest near Cape Race with its trailing arctic front, and the central pressure dropped 35 mb in the 24-hour period ending 0600 UTC January 20. The second part of Figure 9 shows the storm at maximum intensity (959 mb) west of Ireland. At 1200 UTC January 20, the **Leverkusen Express** (DEHY) near 47N 31W, and the **Marchen Maersk** (OWDQ2) near 47N 25W, encountered winds from the northwest and southwest at 60 kt, respectively. The **Lykes Liberator** (WGXM) to the west near 45N 41W reported northwest winds of 45 kt and 11.3-meter seas (37 feet) at this time. QuikScat data (not shown) available around this storm near maximum intensity revealed hurricane-force winds of 65 kt south of the center in an area of no ship data. The storm subsequently weakened to a gale while passing just north of the British Isles on January 22.

North Atlantic Storm of 20-23

January: Again referring to Figure 9, this storm followed immediately in the wake of the preceding event and was unlike most preceding storms in that it developed earlier and farther south after moving off the U.S. East Coast. The period covered by Figure 9 includes the period of most-rapid intensification, the 24-hour period ending at 0000 UTC January 21 when the central pressure dropped 39 mb. The center developed a maximum

intensity of 961 mb in the central North Atlantic eighteen hours later. The ship **SLCO** (40N 58W) reported a west wind of 60 kt at 1800 UTC January 20. Six hours later, the ship **ZQYJ6** encountered northwest winds of 60 kt near 39N 56W. At 0600 UTC January 21, the **Nordmax** (P3YS5) near 38N 51W experienced northwest winds of 50 kt and 12.8-meter seas (42 feet). The Canadian buoy 44140 (43.7N 51.7W) reported north winds reaching 49 kt, with gusts to 66 kt, at 0200 UTC January 21 and maximum seas of 7.5 meters (25 feet) two hours later. At 1800 UTC January 22, with the storm center slowly weakening and approaching Great Britain, the **Lykes Liberator** (WGXM) near 47N 19W reported south winds of 50 kt and 13.7-meter seas (45 feet), the highest seas reported in this event. The weakening system subsequently passed east across Great Britain and the North Sea on January 23 and 24.

Northwest Atlantic Storm of 22-30

January: This storm began as multiple low-pressure centers near the northeast coast of the U.S. at 1800 UTC January 2, which moved northeast and merged into one while rapidly intensifying (by 36 mb) in the first 24 hours. At 0600 UTC January 23, with the center east of Newfoundland near 47N 49W (972 mb), MPC classified it as a hurricane-force storm. At 0000 UTC January 23, the **Zim Korea** (4XGU) near 39N 56W reported west winds of 60 kt and 8.5-meter seas (28 feet). Twelve hours later, the vessel **ELVF6** (43N 47W) encountered west winds of 55 kt and 13.4-meter seas (43N 47W). The storm center then moved north while slowly deepening and stalled on January 24, south of Greenland near 55N, blocked by a strong high-

pressure ridge over Greenland. Figure 10 depicts the stalled center south of Greenland at 0000 UTC January 26 near maximum intensity. The QuikScat image in Figure 11, valid more than 15 hours prior to the valid time of the first part of Figure 10, shows hurricane-force winds up to 80 kt north of the center, off the southern tip of Greenland. The system subsequently looped back to the northwest and weakened to a gale west of Greenland by January 31. Meanwhile, other significant developments were occurring to the south and east of this persistent system, as indicated below.

Eastern Atlantic Storm of 26-28

January: Low pressure moved off the New England coast at 0000 UTC January 25 and elongated eastward while slowly intensifying. The system formed a new center to the east, which appears in the first part of Figure 10 as the 989-mb center at 42N 42W. This took over as the main center while moving northeast and intensifying, leading to the hurricane-force storm (954 mb) in the second part of Figure 10. With the long fetch of gale to storm-force southwest winds apparent in the eastern Atlantic, seas became quite high. The **Atlantic Concert** (SKOZ) reported a southwest wind of 70 kt and 17.1-meter seas (56 feet) near 48N 21W at 1200 UTC January 27, while the **Sea-Land Motivator** (WAAH) to the southwest encountered southwest winds of 45 kt and 13.7-meter seas (45 feet) near 45N 29W. Later, at 0600 UTC January 28 with the system near maximum intensity, the **Atlantic Companion** (SKPE) reported southwest winds of 65 kt near 55N 12W, while the **Arina Arctica** (OVYA2) north of the center

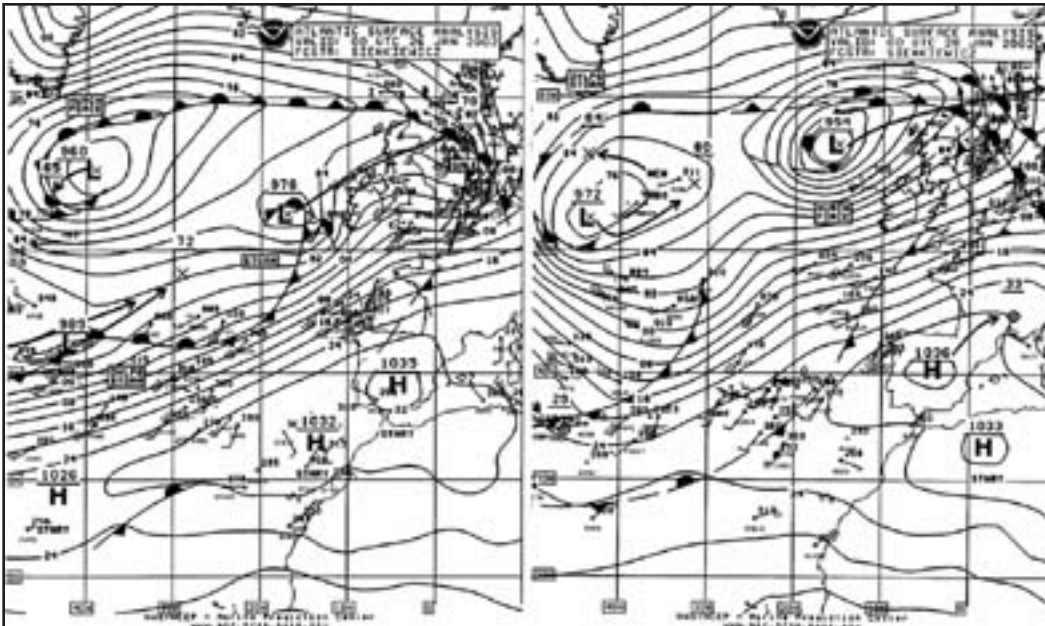


Figure 10. MPC North Atlantic Surface analysis charts (Part 1 - east) valid 0000 UTC January 26 and 28, 2002.

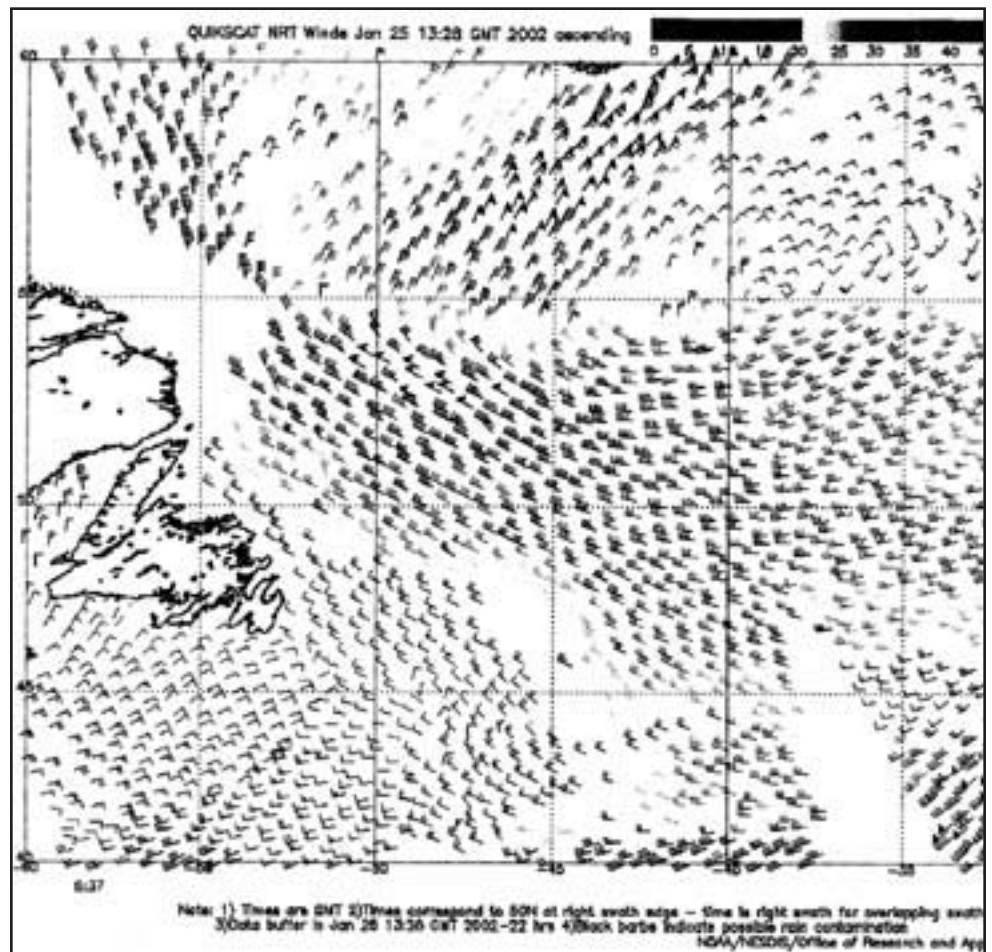


Figure 11. QuikScat scatterometer image of satellite-sensed winds valid approximately 0830 UTC January 25, 2002. (Image courtesy of NOAA/NESDIS/Office of research and Applications)

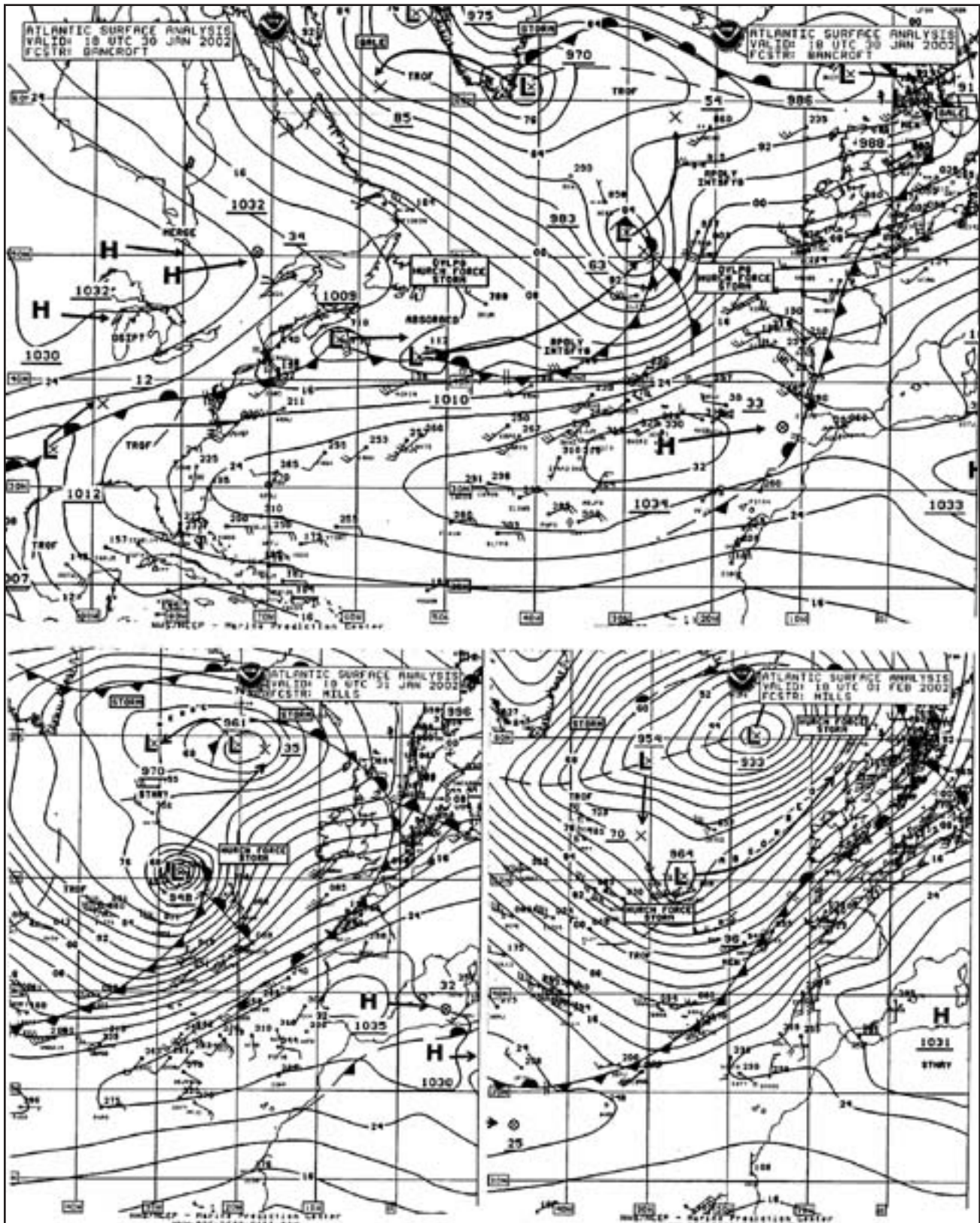


Figure 12. MPC North Atlantic Surface Analysis charts: A full-ocean chart valid 1800 UTC January 30 plus two Part 1 analysis charts valid 1800 UTC January 31 and February 1, 2002.

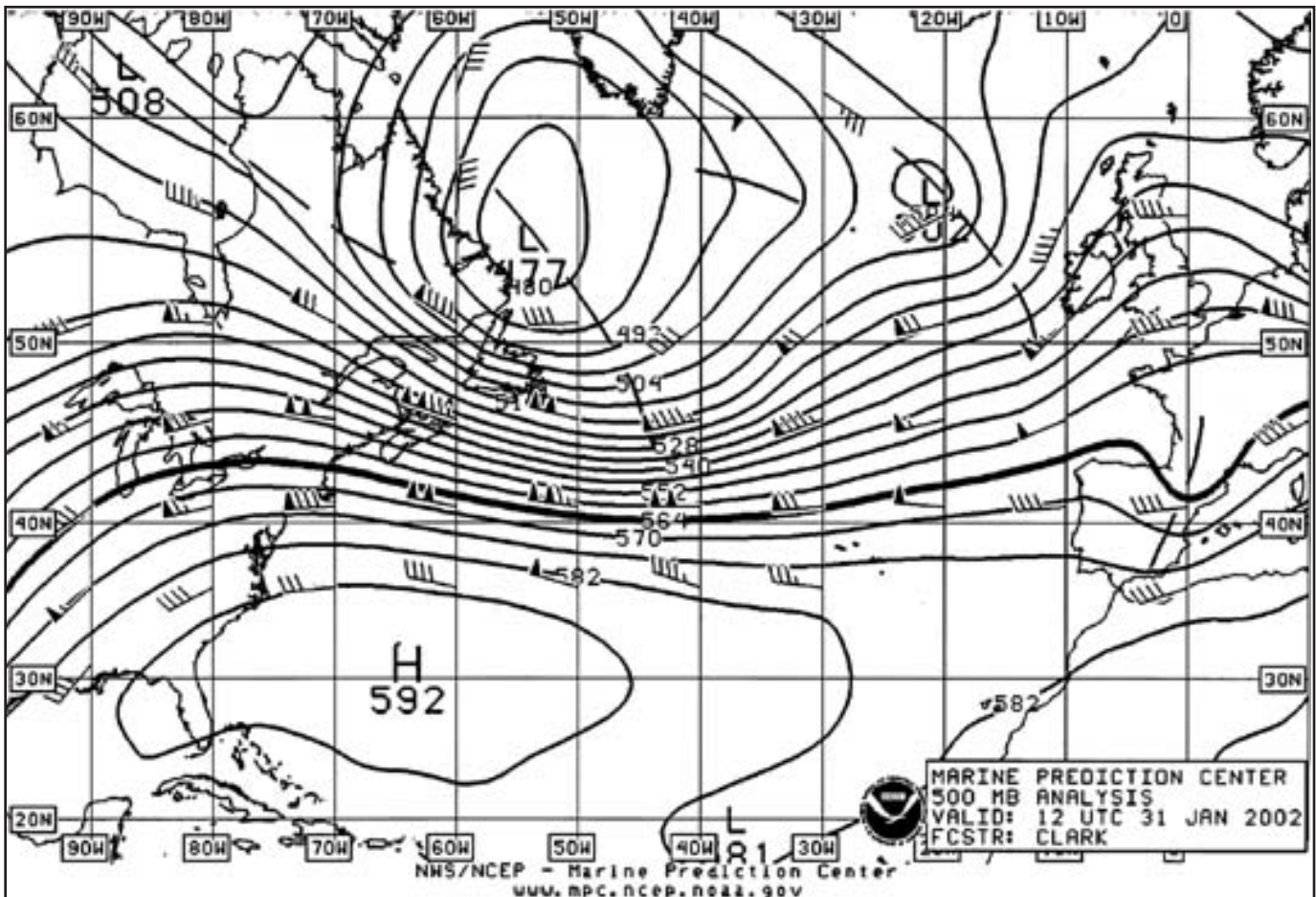


Figure 13. MPC 500-Mb analysis of North Atlantic valid at 1200 UTC January 31, 2002. The chart is computer-generated with short-wave troughs (dashed lines) added by the analyst.

experienced northeast winds of 65 kt near 62N 13W. The storm then weakened while passing north of Great Britain on the 28th before moving inland over Norway by January 29.

Eastern Atlantic Storm of January 30 to February 1: The next developing storm system moved east of the island of Newfoundland at 1800 UTC January 29 and then moved northeast while rapidly intensifying. The system is shown in the first part of Figure 12 twenty-four hours later as the developing hurricane-force storm near 52N 30W. Twelve hours later, the center was near 55N 23W with a central pressure down to 964 mb, a drop of 31 mb in

24 hours. The **Contship Endeavour** (ZCBE7) encountered west winds of 60 kt and 6.1-meter seas (20 feet) near 50N 24W at 0600 UTC January 31, after the center passed to the north. At the same time, the ship **PFAQ** nearby at 51N 24W reported west winds of 55 kt and seas of 9.1 meters (30 feet). Another ship, **ELZT6** near 47N 31W, experienced west winds of 40 kt and 10.7-meter seas (35 feet), the highest seas reported in this storm. The storm center appears in the second part of Figure 12 just south of Iceland, about to loop back to the southwest and becoming absorbed by a much larger storm system described next.

Eastern Atlantic "Bomb," January 30 to February 2: Following close

behind the preceding system, the next major storm developed from the 1010-mb low south of Newfoundland shown in the first part of Figure 12. This low underwent explosive intensification with much of the deepening occurring in the first 24 hours, in which the central pressure fell 62 mb (1.83 inches) in 24 hours. Thirty-two millibars (0.94 inch) or more than half of that drop in pressure occurred in the final six hours, leading to the 948-mb hurricane-force storm shown in the second surface analysis of Figure 12. Figure 13 is a 500-mb analysis valid at a time when the surface low was deepening most rapidly. It shows strong support aloft in the form of an intense short-wave

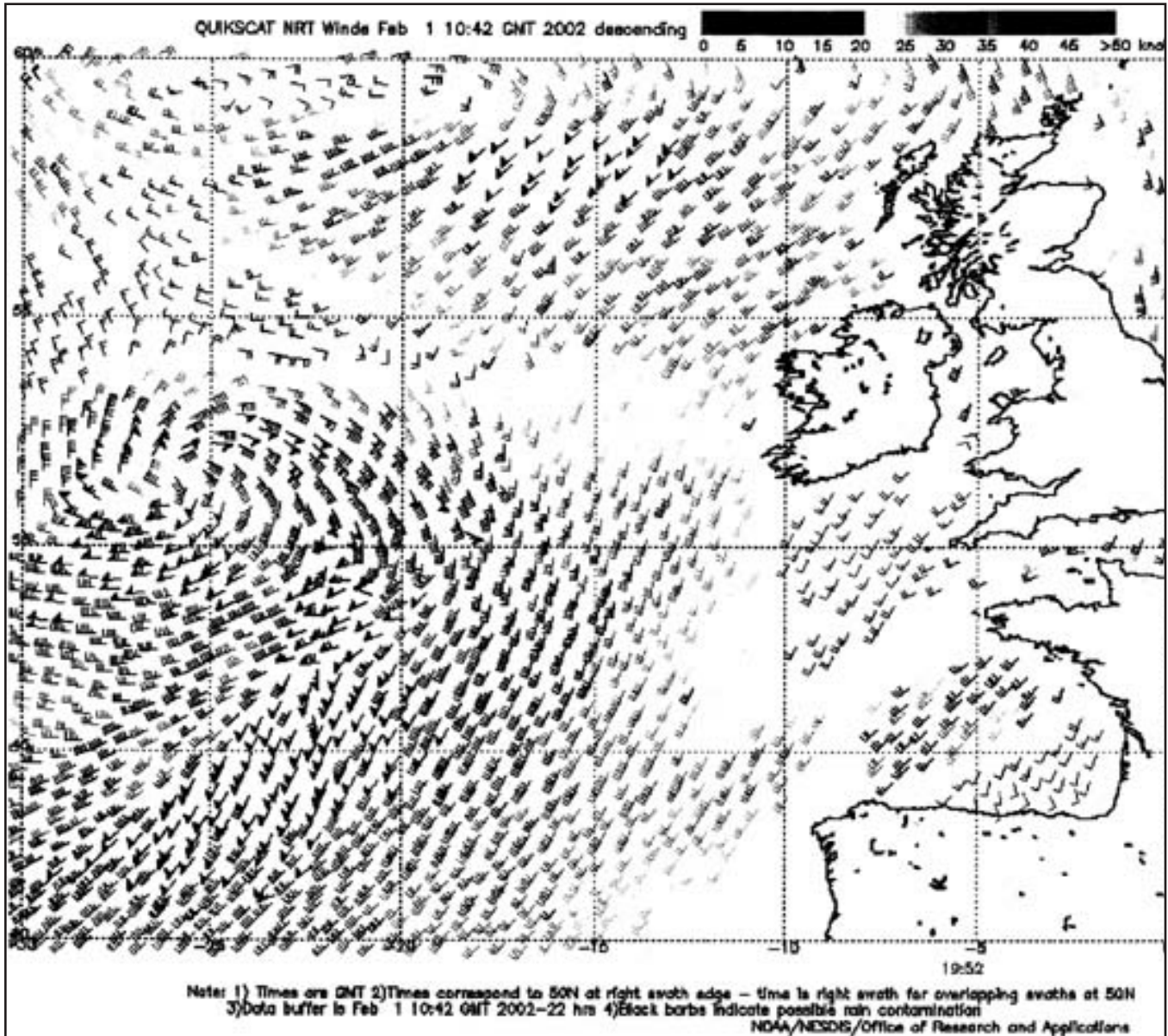


Figure 14. QuikScat scatterometer image of satellite-sensed winds valid approximately 2000 UTC January 31, 2002.

(Image courtesy of NOAA/NESDIS/Office of Research and Application)

trough and jet stream of up to 135 kt coming off the Canadian coast. In the second analysis of Figure 12 the ship **Contship Endeavour (ZCBE7)**, reported a 90-kt west wind just south of the 948-mb center. This report looks reasonable when compared to the QuikScat image of Figure 14 valid about two hours later, showing two 80-kt wind barbs just south of the center. The storm center underwent

further intensification in the following 24 hours, leading to the 933-mb center approaching Iceland (third part of Figure 12). The center passed over a buoy (62520 at 59.61N 16.02W) which reported pressures as low as 925 mb at 1600 UTC February 1. The infrared satellite image of Figure 15 is valid near the time of maximum intensity, revealing a well-defined main center northwest of Great

Britain with cold cloud tops indicating considerable vertical development. The clouds appear more convective in the cold air behind the front, where there is a secondary circulation near 50N 29W corresponding to the new hurricane-force storm center near 50N 26W in Figure 12. The highest winds and seas occurred with this new center after the primary center pulled to the north. This is not surprising, since

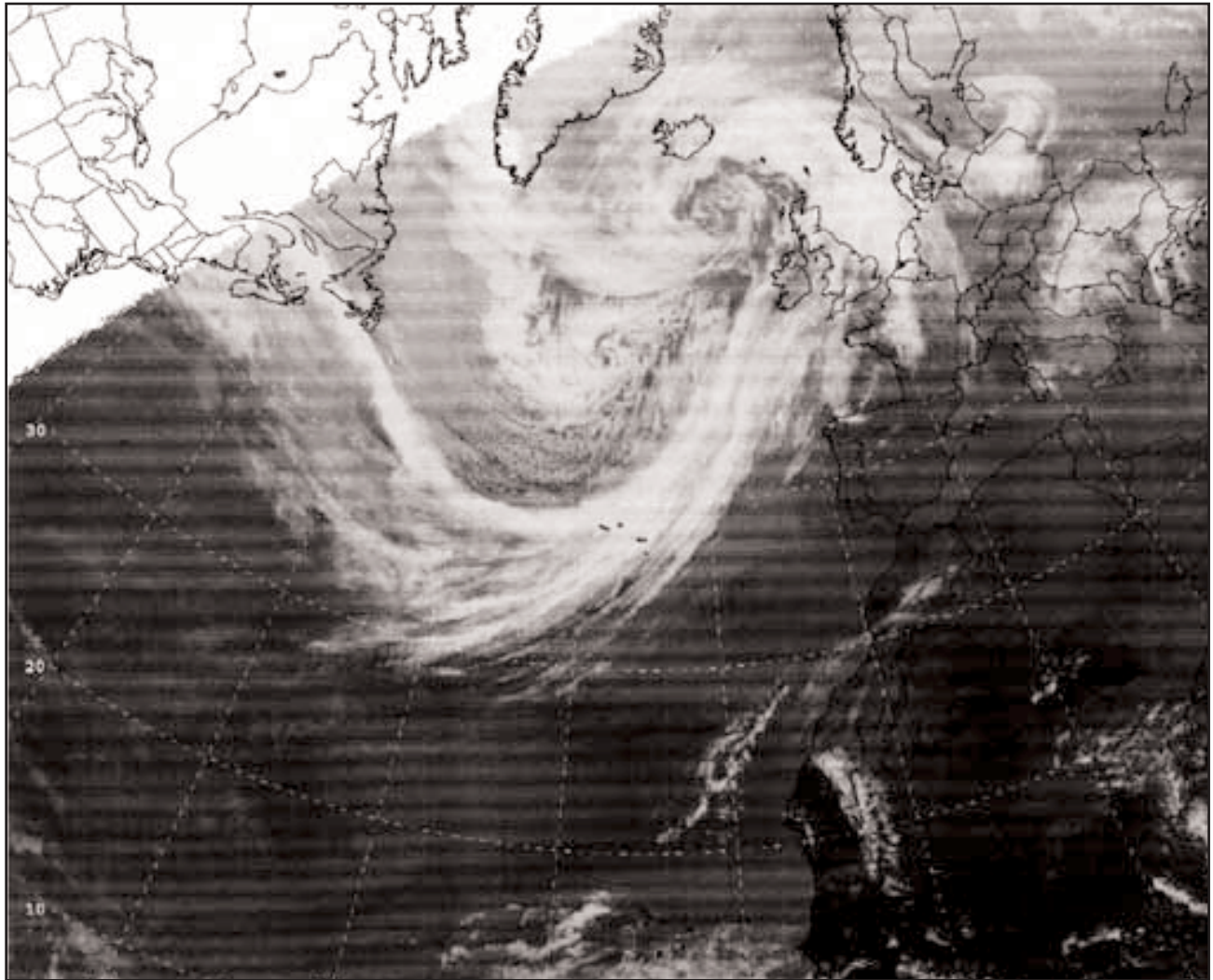


Figure 15. METEOSAT-7 infrared satellite image valid 1500 UTC February 1, 2002. The valid time is only 3 hours prior to that of the third surface analysis in Figure 12.

cold air over the ocean surface produces instability, mixing stronger winds from aloft down to the surface. The cold air also has more “bite” on the sea surface, enhancing waves. The ship **ELZU3** near 46N 47W reported a northwest wind of 70 kt at 0600 UTC February 1, while another vessel (**ELZT6**) encountered west winds of 65 kt and 19.8-meter seas (65 feet) near 47N 39W. At the same time, a buoy to the northeast (62108 near 53.3N 19.3W) reported southwest winds of 55 kt and 13.4-meter seas. Another ship, the **Atlantic Compass**

(**SKUN**) near 49N 29W, experienced southwest winds of 50 kt and 18.0-meter seas (59 feet) six hours later. The storm subsequently passed east of Iceland late on February 2 and began to weaken.

In summary, this was the most significant event of the period, producing maximum reported winds equal to those reported in the January 13-16 storm, plus the highest seas, lowest central pressure and greatest rate of intensification.

North Atlantic Storm of 4-8

February: This system formed off the southeast U.S. coast at 0000 UTC February 4 and tracked northeast to near Sable Island 24 hours later, absorbing another low and arctic front that were over the northeastern U.S. After initially deepening 31 mb in the first 24 hours, the center underwent further intensification after passing northeast of the island of Newfoundland and developed hurricane-force winds (Figure 16). The central pressure bottomed out at 947 mb at 0000 UTC February 7



when the center was near 54N 40W. The **Fidelio** (WQVY) near 50N 43W reported a southwest wind of 65 kt at 1800 UTC February 6 (Figure 16). Also at this time, the ship LAIP5 near 46N 47W encountered a west wind of 60 kt and 11.3-meter seas (37 feet), while the **Canmar Honour** (ZCBP5) near 46N 38W experienced southwest winds of 40 kt and 14.0-meter seas (46 feet). The ship **PFAQ** near 43N 44W reported a southwest wind of 55 kt and 15.2-meter seas (50 feet) at 1200 UTC February 6. The storm system then weakened slowly while tracking east, before dissipating near the British Isles on February 9.

Northwest Atlantic Storm of 14-20 March: Unlike other storms preceding it, this hurricane-force storm developed from a primary low-pressure center which moved through southeastern Canada before exiting the southern Labrador coast and absorbing weaker lows that were south of the Canadian Maritimes (Figure 17). The central pressure dropped 33 mb in the 24-hour period ending at 1200 UTC March 15. The second part of Figure 17 shows the system at maximum intensity (956 mb). The **Newfoundland Otter**

(CFD3659) reported a northwest wind of 80 kt near 53N 53W at 1800 UTC March 15. The ship **PDHW** near 46N 44W reported 11.0-meter seas (36 feet) along with west winds of 35 kt at 1200 UTC March 16. Blocked by high pressure over Greenland, the storm then moved southeast and stalled for several days near 52N 35W, weakening to a gale on March 20.

North Atlantic Storm of 17-20

April: This developing storm tracked east-northeast from Nova Scotia at 0000 UTC April 16 and intensified rapidly after passing east of Newfoundland late on April 16. The central pressure fell 26 mb in the 24-hour period ending at 0600 UTC April 18, when the center was near 52N 39W at 963 mb. The center stalled in the vicinity and became as deep as 958 mb thirty-six hours later before beginning a weakening trend. This storm was almost as intense as the March storm in terms of central pressure. The strongest winds and highest seas were southwest and south of the center. The ship **SDBQ** reported the highest wind, a southwest wind of 60 kt near 45N 43W at 0000 UTC April 19. The same ship

reported a west wind of 50 kt along with 13.4-meter seas (44 feet) near 45N 44W twelve hours later. At 0000 UTC April 20, the vessel **LART5** near 42N 40W encountered west winds of 55 kt and seas of 15.5 meters (51 feet), the highest seas reported in this storm. The system accelerated toward the northeast late on the April 20, passing northeast of Iceland on April 22. ↓

References

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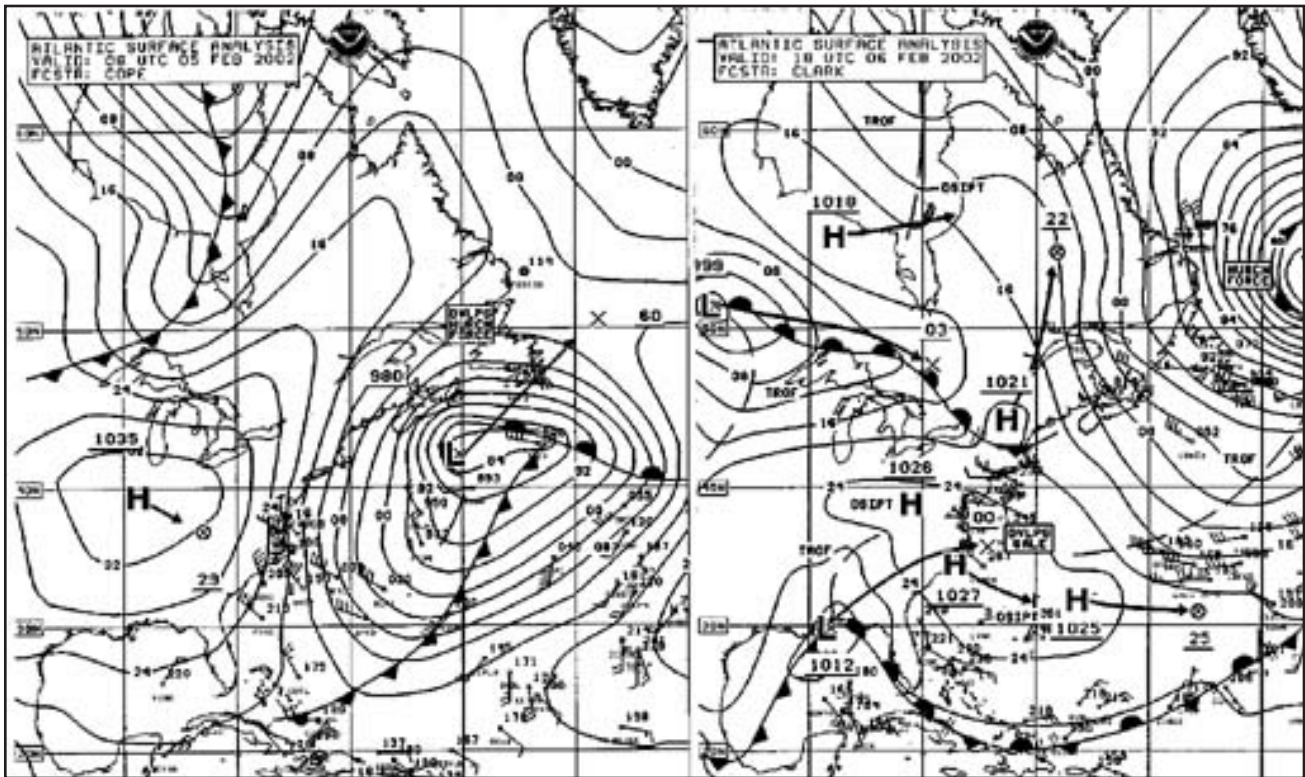


Figure 16. MPC North Atlantic Surface Analysis charts (Part 2) valid 0600 UTC February 5 and 1800 UTC February 6, 2002.

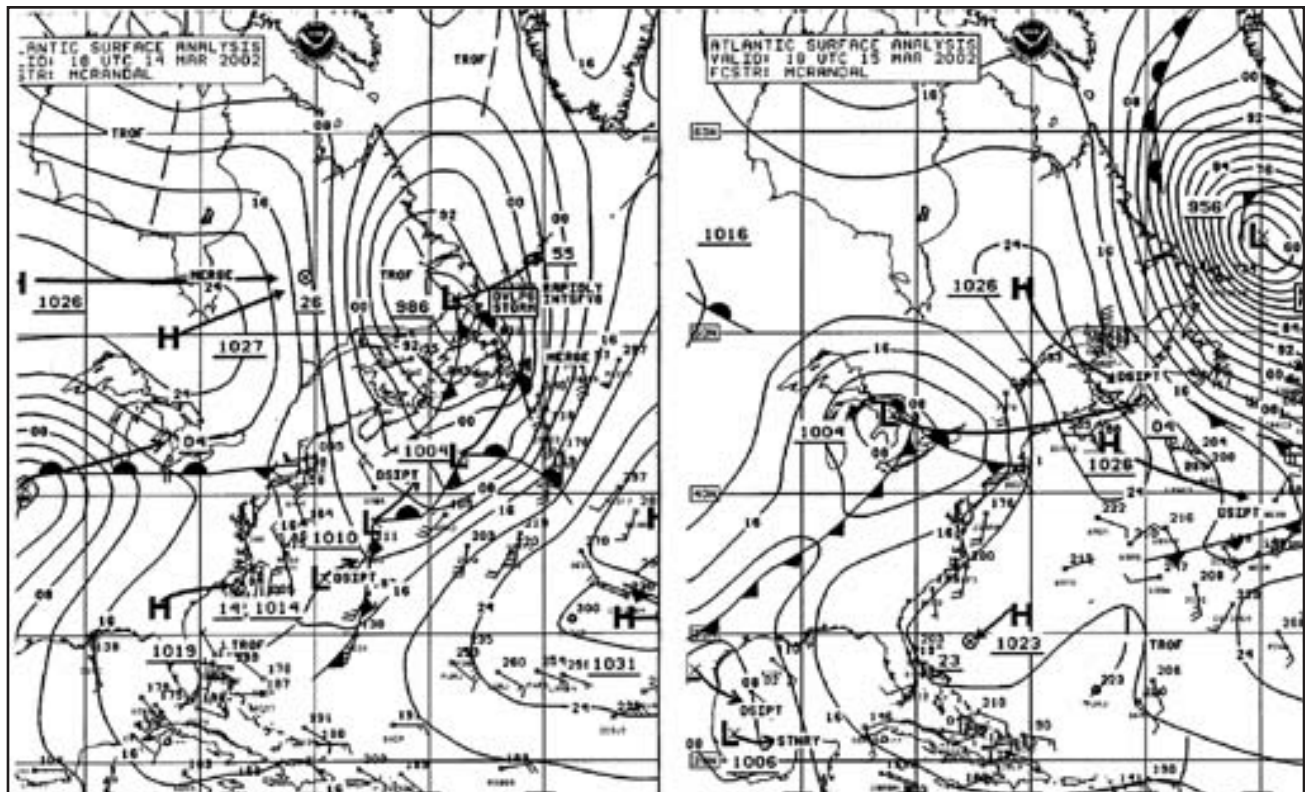


Figure 17. MPC North Atlantic Surface Analysis charts (Part 2) valid 1800 UTC March 14 and 15, 2002.