Mariners Weather Log

Vol. 45, No. 1 April 2001

A Fresh Breeze in the West Wind Belt

In: "The South Pole", by Roald Amundsen, 1872-1928

From Treasures of the NOAA Library Collection

Archival Photograph by Mr. Steve Nicklas, NOS, NGS

Mariners Weather Log

U.S. DEPARTMENT OF COMMERCE
Donald L. Evans, Secretary

National Oceanic and Atmospheric Administration
Scott B. Gudes, Administrator (Acting)

National Weather Service
John J. Kelly, Jr.,
Assistant Administrator for Weather Services

Editorial Supervisor
Robert A. Luke

Editor
Mary Ann Burke

Articles, photographs, and letters should be sent to:

Mr. Robert A. Luke, Editorial Supervisor
Mariners Weather Log
NDBC (W/Ops 52)
Bldg 1100, Room 353D
Stennis Space Center, MS 39529-6000

Phone: (228) 688-1457
Fax: (228) 668-3153
E-mail: robert.luke@noaa.gov

From the National Data Buoy Center

As Marty Baron announced last issue, the *Mariners Weather Log* is now under our purview. I want all readers to know that we take this responsibility seriously and know that we have a tough act to follow. Marty produced a valuable, high quality document and we aim to keep it that way.

NDBC picked up production of the MWL when we began managing the NWS Voluntary Observing Ship (VOS) Program. For more than 25 years, we have operated NOAA's Marine Observation Network of buoys and coastal stations and are excited about now integrating the VOS Program into our operations. We are convinced that this will increase our opportunity to provide the nation with more observations of high quality than ever before, and thus, allow the NWS to issue more accurate and timely warnings and forecasts.

My staff and I are always at your service. Please let us know if we can do anything to help you. And by all means, keep those manuscripts, photographs, and other materials coming. Without you there is no MWL!

Paul F. Moersdorf, Ph.D.
Director⚓

Some Important Web Page Addresses

NOAA	http://www.noaa.gov
National Weather Service	http://www.nws.noaa.gov
National Data Buoy Center	http://www.ndbc.noaa.gov
AMVER Program	http://www.amver.com
VOS Program	http://www.vos.noaa.gov
SEAS Program	http://seas.nos.noaa.gov/seas/
Mariners Weather Log	http://www.nws.noaa.gov/om/mwl/mwl.htm
Marine Dissemination	http://www.nws.noaa.gov/om/marine/home.htm
U.S. Coast Guard Navigation Center	http://www.navcen.uscg.gov/marcomms/

See these web pages for further links.

Table of Contents

Departments:

International Ice Patrol

MST3 Rachel Kenward
Lt. Chris Strong

R.M.S. Titanic left on her maiden voyage from the port of Southampton, England, en route for New York City with the fame of being the unsinkable ship. On the night of April 14, 1912, the **Titanic** struck an iceberg just south of the Grand Banks of Newfoundland and within two and a half-hours she sank, taking the lives of over 1,500 passengers and crew. This devastating accident generated a public outcry demanding safe passage across the North Atlantic Ocean. However, this was not the only tragedy that had occurred in this region. Between 1880 and 1890, 40 vessels were seriously damaged and 14 were lost due to ice. The need for safe passage through these ice-infested waters was immediately addressed by many maritime nations and as a result, the precursor of the International Ice Patrol was established. For the remainder of 1912, the U.S. Navy sent cruisers to serve as sentry on the Grand Banks of Newfoundland, but the Navy couldn't spare the ships to perform this mission for long. Therefore, in 1913 the Revenue Cutter Service (now the U.S. Coast Guard) assumed the patrol.

The **Titanic** disaster spurred many maritime nations to examine the safety of their vessels on the open ocean. The first international conference on the safety of vessel at sea was convened in London, England, on November 12, 1913, during which the subject of patrolling the ice regions was thoroughly discussed. On January 30, 1914, the delegates signed an international convention called the Safety of Life at Sea (SOLAS), but it would not go into effect until July 1, 1915. Among the many maritime issues addressed in SOLAS is patrolling the vicinity of the Grand Banks and informing passing vessels of the extent of iceberg danger. To deal with this specific issue, SOLAS mandated the creation of the International Ice Patrol. The decree dictates that the U.S. Government perform the operational duties of the International Ice Patrol with funding from the international signatories. With the **Titanic** incident still very fresh in everyone's minds, there was some concern that waiting until July 1915 would not be sufficient. Therefore, on January 31, 1914, the government of Great Britain, on behalf of the several nations

Continued on Page 5

International Ice Patrol

Continued from Page 4

interested, made inquiry as to whether the United States would undertake the patrol at once under the provisions stipulated in the convention. The proposition was favorably considered by President Wilson and on February 7, 1914, he directed that the (then) Revenue Cutter Service begin the International Ice Observation and Ice Patrol Service as soon as possible. Since then, the U.S. Coast Guard (Revenue Cutter Service) has conducted the patrol each year, with the exception of a brief period during World War II.

The region known as the Grand Banks of Newfoundland is of particular interest for several reasons. First, the great circle route, the shortest distance between two ports, connecting the U.S and Canada with Europe crosses right through this area (Figure 1). This means that there is a high volume of merchant vessels that need to cross this treacherous region. Second, the Grand Banks are home to very productive fishing grounds, which makes it especially attractive to commercial fisherman, which only serves to compound the high traffic density. Finally, the adverse environmental conditions (high winds, rough seas, and dense fog) makes this locale even more dangerous.

Probably the most important environmental factor to consider is the dense fog that often occurs on and near the Grand Banks. This occurs when the southern flow of the Labrador Current joins the warm Gulf Stream waters at the tail of the Banks. As warm winds flow over the Gulf Stream and then over the cold Labrador Current, an advective fog forms which can last for many days. This dense blanket of fog severely limits visibility and restricts a vessel's ability to maneuver. Furthermore, the upper level jet stream frequently flows right over this region. As a result, (mid-latitude) low-pressure systems often move through, bringing severe weather with high winds and seas.

The oceanographic structures in this region also contribute to the danger around the Grand Banks of Newfoundland. The principal contributors to this are the Labrador Current and the bathymetry. The Labrador Current is the main ocean current responsible for transporting icebergs into this region. It is a relatively fast-moving current that stays cold enough to carry icebergs all the way from the Labrador Sea and Baffin Bay to southern temperate waters. In fact, the **Titanic** sank at the latitude of Providence, Rhode Island. The bathymetry is also responsible for the transport of icebergs, but it has more impact on where the icebergs flow rather than how fast. Due to the fact that the majority of an iceberg's mass lies below the water, its track is greatly governed by the sub-surface currents. The depths of these currents, like the Labrador, often dictate that they follow the 1,000 meter curve. The result of this is that icebergs commonly track through the gap between the Grand Banks and the Flemish Cap, affectionately termed "iceberg alley."

Due to the constant dangers in this area, the International Ice Patrol (IIP), operating out of Groton, Connecticut, maintains an ever vigilant watch over the North Atlantic and reports the Limit of

Large non-tabular iceberg as seen from a vessel.

Continued on Page 6

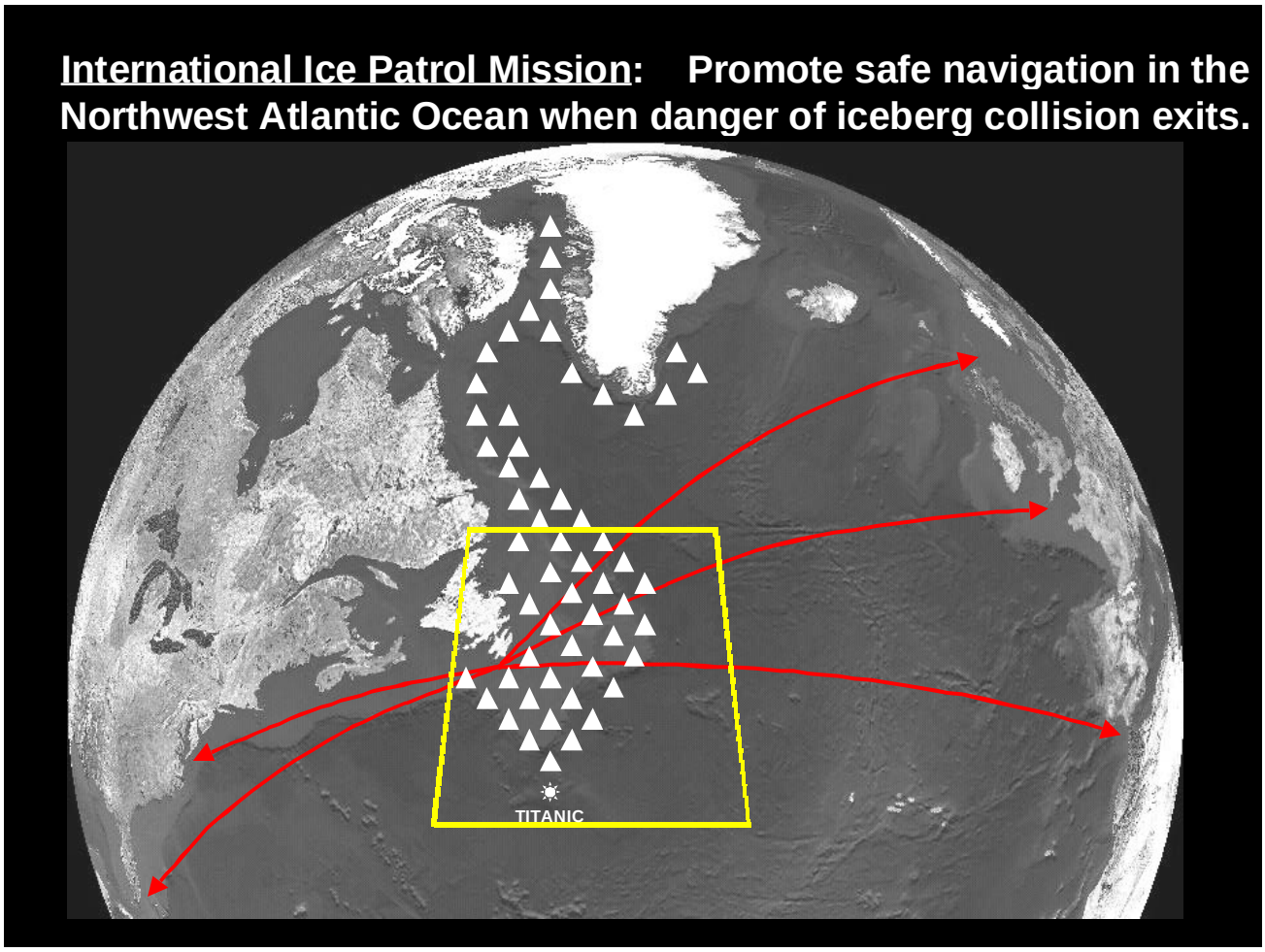


Figure 1. Great circle routes from Europe to North America.

International Ice Patrol

Continued from Page 5

All Known Ice (LAKI) for the Grand Banks of Newfoundland and the surrounding area. Seasonal patrol dates have remained largely unchanged from year to year. Reconnaissance usually begins in late February and continues through July, but the exact dates vary from year to year as dictated by the distribution of icebergs. The longest season on record was in 1992, which lasted from February 7th to September 26th, for a total of 203 days. Conversely, in 1999 the season never opened due to the fact that most icebergs were pushed west rather than south. Except during extreme years, the Grand Banks are generally clear of ice from August to February, with the exception of a few stray icebergs.

Today the International Ice Patrol uses HC-130H Hercules aircraft, which can cover over 2,000 nautical miles and fly for more than 12 hours. However, the International Ice Patrol typically flies five- to seven-hour patrols. They use planes out of Elizabeth City, North Carolina, that are equipped with forward and side looking airborne radar for iceberg detection. Each flight covers an average of 30,000 square miles of ocean. Visual observations are conducted when conditions allow, but due to low cloud ceilings and the dense fog described earlier, good visibility conditions only exist about 30% of the time. During the ice season, IIP's reconnaissance detachments deploy to St. John's, Newfoundland, every other week and complete about five patrols over a nine-day period. As explained

Continued on Page 7

International Ice Patrol

Continued from Page 6

earlier, the patrol was initially conducted using Coast Guard cutters, but this method of operation proved very expensive and time-consuming. After World War II the Coast Guard began using aircraft to fly reconnaissance.

How to Report Icebergs

Due to the high number of vessels that transit through this region, the Ice Patrol encourages commercial vessels to immediately report ice sightings to COMINTICEPAT GROTON CT through INMARSAT-A or C, using Code 42; to U. S. Coast Guard Communication stations; or to Canadian Coast Guard marine radio stations. Even when no ice is sighted, regular weather and sea surface temperature reports provide valuable information. Commercial vessels are an important source of iceberg information. During the 2000 ice season, 257 ships sent the IIP 1,415 reports, 79.1% of all reports received. Of all the reports, 444 contained information concerning icebergs, accounting for 60.7% of all iceberg reports. Additionally, this population also provided the Ice Patrol with information on 28.9% of the icebergs that were used to set the Limit of All Known Ice.

Sightings may be reported on guarded frequencies as listed in the annual Announcement of Services.

Copies of the annual Announcement of Services are available through several methods:

1. World Wide Web:
   www.uscg.mil/lantarea/iip/data/ann_ser.html

2. E-mail request to:
   iipcomms@rdc.uscg.mil

3. Mail request to:
   Commander, International Ice Patrol
   1082 Shennecossett Road
   Groton, CT 06340-6095
   Attention: Ice Information Officer

4. Phone request to:
   (860) 441-2626

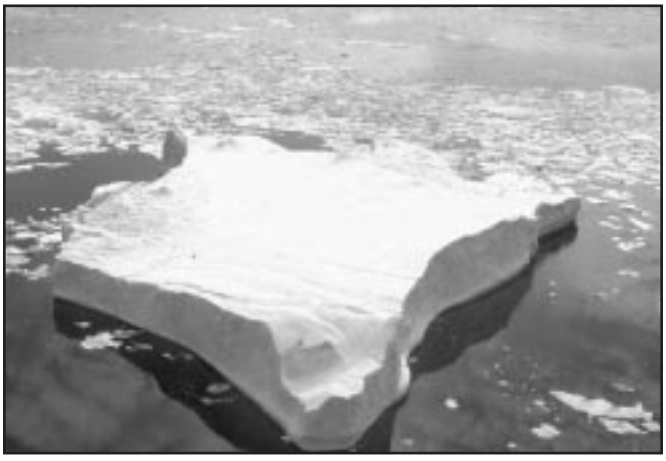
What to Include in an Ice Report

When reporting icebergs, certain information should be included:

Ship's name and call sign
Date/Time (UTC) ice was sighted
Iceberg position (latitude, longitude)
Method of observation (radar, visual, both)
Number of icebergs
Size and shape (Tables 1 and 2)

Ice data is constantly analyzed at the International Ice Patrol operations center in Groton, Connecticut, and added to a computer model. This model incorporates environmental factors such as winds, waves, currents, and sea surface temperatures with iceberg

Continued on Page 8



Large tabular iceberg as seen from aircraft.

SIZE	HEIGHT		LENGTH	
	(ft)	(m)	(ft)	(m)
Growler	<17	<5	<50	<15
Small Berg	17-50	5-15	50-200	15-60
Medium Berg	51-150	16-45	201-400	61-122
Large Berg	151-240	46-75	401-670	123-213
Very Large Berg	>240	>75	>670	>213

Table 1. Sizing Guidelines

SHAPE	DESCRIPTION
Non-Tabular	This category covers all icebergs that are not tabular-shaped as described below. This includes icebergs that are dome-shaped, sloping, blocky, and pinnacle.
Tabular	Flat-topped iceberg with length-height ratio greater than 5:1.

Table 2. Shape Guidelines

International Ice Patrol

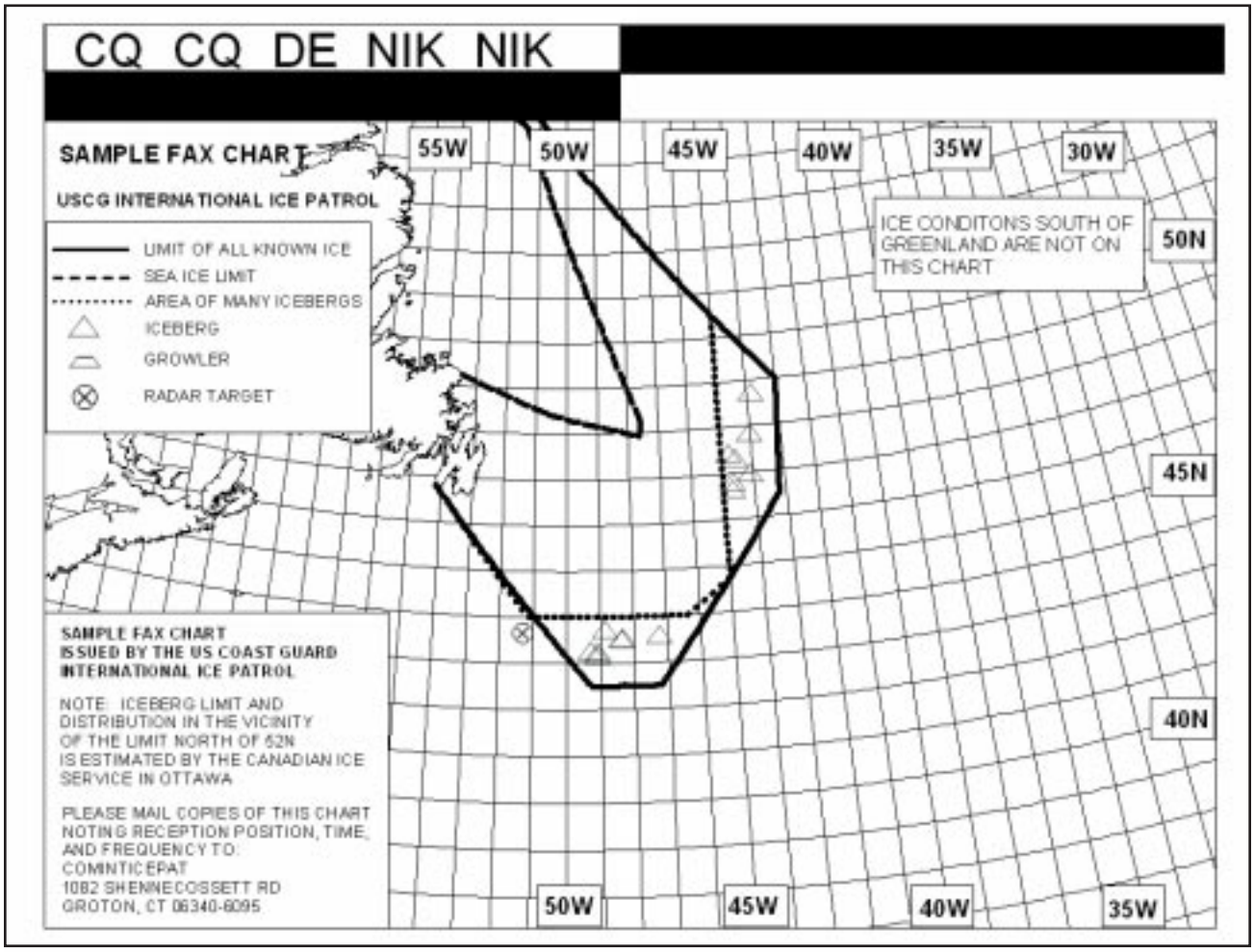
Continued from Page 7

reports to predict drift and deterioration. The processed information from the model is used to estimate the Limit of All Known Ice every 12 hours. The LAKI, sea ice limit, and an area of many bergs are broadcast in two daily text bulletins and a graphic fax chart. The broadcast times and frequencies are available in the annual Announcement of Services. They are also posted daily in the Products section of the IIP webpage at: www.uscg.mil/lantarea/iip/home.html.

The Ice Patrol

The crew of 16 ice observers or "Ice Picks" from Groton, Connecticut, includes a civilian oceanographer and computer specialist, four officers, one yeoman, and nine marine science technicians. The Ice Picks work closely with expert aviation technicians and aircrew from Coast Guard Air Station Elizabeth City, North Carolina. The small crew of the International Ice Patrol is dedicated to serving the North Atlantic mariner and protecting seafarers of all nations from the dangers of icebergs. Since the U.S. Coast Guard began monitoring ice conditions in 1913, they have amassed an enviable safety record: There have been no reported losses of life or property for vessels that have heeded published warnings.

The International Ice Patrol is grateful to all mariners who have contributed to this record and hopes to have your support in the future. Should you have any questions or comments, please contact the International Ice Patrol by e-mail through the World Wide Web or call: (860) 441-2626.⚓



Sample fax chart of ice limits.

San Patrick: Lost Among the Aleutians

Skip Gillham
Vineland, Ontario, Canada

The *Good Hope* in August 1962 at the Iroquois Lock of the St. Lawrence Seaway. Photograph by George Ayoub.

During World War II the United States Maritime Commission (USMC) ordered the construction of close to 500 T-2 tankers to help carry the vital fuel supplies to the war fronts and to maintain the ships at sea. When peace was achieved, many of the vessels were surplus and sold to private interests both at home and abroad.

The tanker **White Bird Canyon** was built at Mobile in 1944 by the Alabama Shipbuilding and Drydock Company. The 10,172 gross ton tanker was managed by the American Petroleum Transport Co. during the war, but reverted to the USMC in September 1946.

The European allies had lost many ships from their merchant fleets and did not have the capacity to replace them quickly. The U.S. government, now with excess tonnage, made freighters and tankers available to their partners and **White Bird Canyon** was sold to the Government of France in 1948. Renamed **Gonfreville**, the ship joined Cia Navale des Petroles a year later and served them until 1962.

In the 1960s, with large new tankers being delivered, many T-2s were sold for scrap. This ship won a reprieve and passed to the Victor Shipping Co. for registry in Liberia as **Good Hope**. The vessel now operated in the tramp trade and is shown in a photo by George Ayoub at the Iroquois Lock of the St. Lawrence Seaway during one of three trips to the Great Lakes in 1962.

In 1964 the 20-year-old hull was sent to Kobe, Japan, and rebuilt by Mitsubishi as a dry bulk carrier. It returned to work as the Liberian flag **San Patrick**.

After loading wheat and cattle feed at Vancouver, the vessel encountered severe weather en route to Yokohama, Japan, late in 1964. On December 17, during a blinding blizzard, **San Patrick** stranded on Ulak Island in the Aleutian chain off Alaska.

Hurricane force winds smashed the ship and three SOS messages were dispatched. A Japanese vessel in the vicinity heard the distress calls, but could not locate the ship.

When the atrocious conditions subsided, U.S. Navy planes searched the region, but the remains of **San Patrick** were not located for three days. By then the hull was severely damaged and all of the crew of 30 had perished. Apparently, only one body was ever recovered.

Skip Gillham is the author of 22 books, most related to Great Lakes ships and shipping.⚓

Downloading National Weather Service Charts Using Globalstar™ Satellite Communications and *SeaStation 2000*

Captain Michael W. Carr
Faculty, Maritime Institute of Technology & Graduate Studies
mcarr@mitags.org

Although specifically listed above, DOC/NOAA/NWS does not officially condone or endorce the use of these products. This article was written as informational in nature and should be used as such.

Obtaining weather charts at sea, until recently, has been accomplished via single side band weatherfax broadcast. Now, with reliable satellite communications systems seeing widespread use, there are economical methods to capture charts at sea using this technology as well as weatherfax.

One of the best combinations of hardware and software systems in terms of both cost and ease of use is the combination of the Globalstar™ (www.globalstarusa.com) Communications System, which uses 48 low-Earth-orbit satellites to provide voice as well as data transfers at 9600 baud, and *SeaStation 2000* software (www.ocens.com).

Using a Globalstar handheld phone not much larger than a cell phone, a connection can be made to the Internet where all National Weather Service (NWS) charts are now posted as soon as each chart is completed. Unlike weatherfax broadcasts where charts are only available at a specific broadcast time, charts on the Internet reside in their designated file location until the next updated chart is prepared. Charts are always available, and the most recent products, whether chart or text, are so noted.

SeaStation 2000 contains a database of all NWS charts, listed by geographical area, forecast area, and World Meteorological Organization file code. When a desired chart or multiple charts are selected in the *SeaStation 2000* directory, those products are downloaded either one by one using standard Internet "http" selection, or as a group using "ftp" batch download. Batch download sends all selected charts to your computer, one right after another, without having to manually select each product.

Using "ftp" batch download is the most efficient and economical method of obtaining updated charts since you build a menu of desired charts within the *SeaStation* system prior to logging on to Globalstar. Once logged on and with *SeaStation 2000* software up and running, you simply click on "download" and SeaStation goes out to the Internet via Globalstar and grabs each selected

Continued on Page 11

Downloading Charts

Continued from Page 10

chart, downloading them directly into the *SeaStation 2000* directory where they are labeled by chart name and date-time group.

Download time per chart averages 45 seconds, so a batch download including, for example, Surface Analysis, 500-mb analysis, Sea State, wave period, as well as 48- and 96-hour forecasts, takes approximately five minutes. Globalstar rates are $1.50 per minute, so five minutes of air time totals around $7.50, a very economical method of obtaining crucial weather charts exactly when you need them and as often as you need them.

Does this system truly work at sea? Yes, it does. I recently had the opportunity to test Globalstar and *SeaStation 2000* on a ten-day voyage through the western Caribbean. Not only did I effortlessly download charts, but I also sent and received e-mail via www.hotmail.com, as well as made voice calls back to the USA.

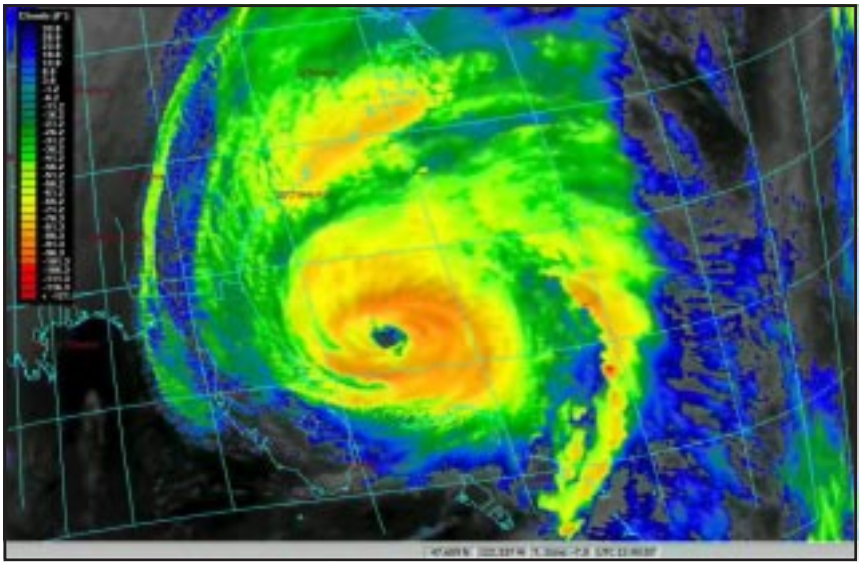
An added benefit to downloading charts via GlobalStar and *SeaStation* is that, once received, charts can be geo-referenced and a ship's position automatically displayed on the charts using GPS input. This capability allows a weather chart to be converted into a navigational tool, where distances to weather systems as well as heavy weather avoidance determinations are easily computed. Charts can be displayed tiled alongside one another or with satellite images, increasing their use tremendously.

On my recent voyage, I used a Panasonic Toughbook laptop computer, Globalstar GSP-1600 portable phone, *SeaStation 2000* software, and Garmin handheld GPS to capture and geo-reference charts. Since I was not tied to weatherfax broadcast schedules, I downloaded charts from both the Tropical Prediction Center (TPC) and Marine Prediction Center (MPC) when I needed to.

Each day I modified the "ftp batch download" menu to suit my needs, obtaining additional sea state charts when the weather was rough, and more 500-mb charts when I became aware of approaching cold fronts. This tailoring of chart downloads allowed me to obtain exactly the charts I needed for a particular situation. Using GPS input, I geo-referenced charts within minutes of receiving the data and gained a solid understanding of the analyzed and forecasted weather in our operational area.

Globalstar and *SeaStation 2000* now provide mariners with a new and efficient means of obtaining critical MPC and TPC charts. During hurricane season, this capability is invaluable since it permits instant access to tropical advisories, necessary for determining areas to avoid based upon the 1-2-3 rule and a 34 knot wind radius.

And though weatherfax is a tried and true method or receiving charts at sea, the flexibility, convenience, and speed of downloading charts via Globalstar and *SeaStation 2000* should be embraced. It is a powerful tool for mariners to use in obtaining up-to-the-minute weather data, which is critical to making proper routing decisions.⚓



Sample satellite imagery from *SeaStation 2000* software.

NIMA Announces Stand-up of Maritime Safety Information Center

FOR IMMEDIATE RELEASE
Release Number PA-001-04
January 31, 2001
Media Contact:
Jennifer Lafley/301-227-3089
Joan Mears/301-227-2057

Bethesda, MD—The National Imagery and Mapping Agency (NIMA) proudly announces the stand-up of the Maritime Safety Information Center. The Center is responsible for all of NIMA's maritime safety and hydrographic activities. Establishment of the Center drives to the core value of end-to-end accountability, thus guaranteeing NIMA customers the "navigation information edge." Electronic access to data files is provided at http://pollux.nss.nima.mil.

The Maritime Safety Information Center's mission is to collect, evaluate, and compile worldwide marine navigation products and databases. The mission includes support to the U.S. worldwide portfolio of NIMA and NOAA nautical charts, Digital Nautical Chart (DNC) production and maintenance hardcopy, and digital publications such as Notice to Mariners, Sailing Directions, NIMA List of Lights, U.S. Coast Guard Light Lists, American Practical Navigator (Bowditch), and other navigation science publications. The Center is the coordinator for the Worldwide Navigational Warning Service's NAVAREA IV and NAVAREA XII safety messages, an essential part of the Global Maritime Distress and Safety System.

Steven C. Hall, chief, and Roy Soluri, deputy chief, will manage the new organization.

NIMA is a Department of Defense combat support agency and a member of the Intelligence Community providing imagery, imagery intelligence, and geospatial information in support of national objectives. Headquartered in Bethesda, Maryland, NIMA operates major facilities in northern Virginia, Washington, D.C., and St. Louis, Missouri.⚓

NIMA headquarters, Bethesda, Maryland.

Some Technical Terms Used in This Month's Marine Weather Reviews

Blocking High Pressure: Usually a well developed, stationary or slow moving area of high pressure which can act to deflect or obstruct other weather systems. The motion of other weather systems can be impeded, stopped completely, or forced to split around the blocking High Pressure Area.

Closed Low: A low which has developed a closed circulation with one or more isobars encircling the low. This is a sign that the low is strengthening.

Closed off Surface Circulation: Similar to a closed low. Refers to a surface low with one or more closed isobars. When there are falling pressures, the low is considered to be strengthening.

Cutoff Low: A closed low or trough which has become detached from the prevailing flow it had previously been connected to (becoming cutoff from it).

Digging Short Wave: Upper air short waves and waves of longer wavelength (long waves) interact with one another and have a major impact on weather systems. Short waves tend to move more rapidly than longer waves. A digging short wave is one that is moving into a slower moving long wave. This often results in a developing or strengthening low pressure or storm system.

Frontal Low Pressure Wave: Refers to an area of low pressure which has formed along a front.

Isobars: Lines drawn on a surface weather map connecting points of equal atmospheric pressure.

Short Wave Trough: Specifies a moving low or front as seen in upper air (constant pressure) weather charts. They are recognized by characteristic short wavelength (hence short wave) and wavelike bends or kinks in the constant pressure lines of the upper air chart.

Tropical Wave or Depression: An area of low pressure that originates over the tropical ocean and may be the early stage of a hurricane. Often marked by thunderstorm or convective cloud activity. Winds up to 33 knots.

Trough: An area of low pressure in which the isobars are elongated instead of circular. Inclement weather often occurs in a trough.

Wind Shear: Refers to sharp changes in wind speed and/or direction over short distances, either vertically or horizontally. It is a major hazard to aviation. Wind shear above tropical depressions or storms will impede their development into hurricanes.⚓

Marine Weather Review
North Atlantic Area—September through December 2000

George P. Bancroft
Meteorologist
Marine Prediction Center

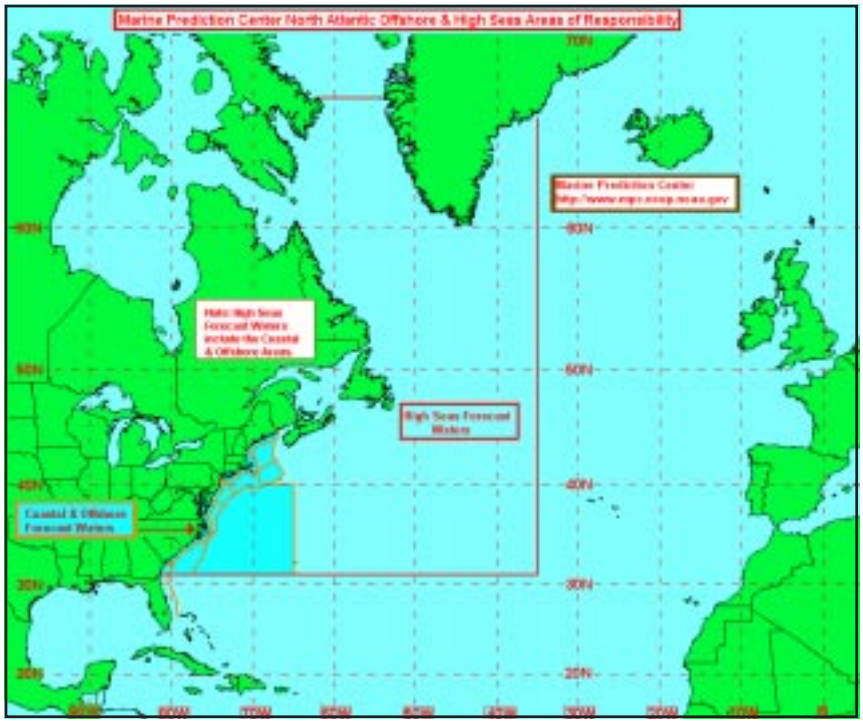
Tropical Activity

The months of September and October were quite active, with seven tropical cyclones or former tropical cyclones affecting MCP's marine area north of 31N.

September began with high pressure covering the area south of 45N. Tropical Storm Florence formed on the southern boundary of MPC's area near 31N 72W at 1200 UTC September 11 and drifted southwest. Trapped by the high-pressure ridge to the north, Florence became nearly stationary for four days near 30N 73W. After becoming a hurricane for the 24-hour period ending at 1800 UTC September 13 with maximum sustained winds of 65 kt with gusts to 80 kt, Florence weakened just south of the area before accelerating to the northeast ahead of an approaching cold front on the 15th. Florence then re-intensified to a hurricane, attaining maximum strength at 1800 UTC September 16 near 36N 61.7W (Figure 1) with maximum sustained winds of 70 kt with gusts to 85 kt. Six hours later, the **Global Mariner (call sign WWXA)** encountered southeast winds of 50 kt near 40N 58W. Florence then passed near Cape Race as a tropical storm at 1800 UTC September 17 before weakening to an extratropical gale northeast of Newfoundland six hours later.

Tropical Storms Gordon and Helene moved onshore over northern Florida about four days apart. Gordon weakened into an extratropical low on the Georgia coast at 1800 UTC September 18 before moving up the coast and becoming absorbed into a strong inland low-pressure system on the 22nd. Unlike, Gordon, the extratropical remains of Helene re-intensified into a storm after

Continued on Page 16



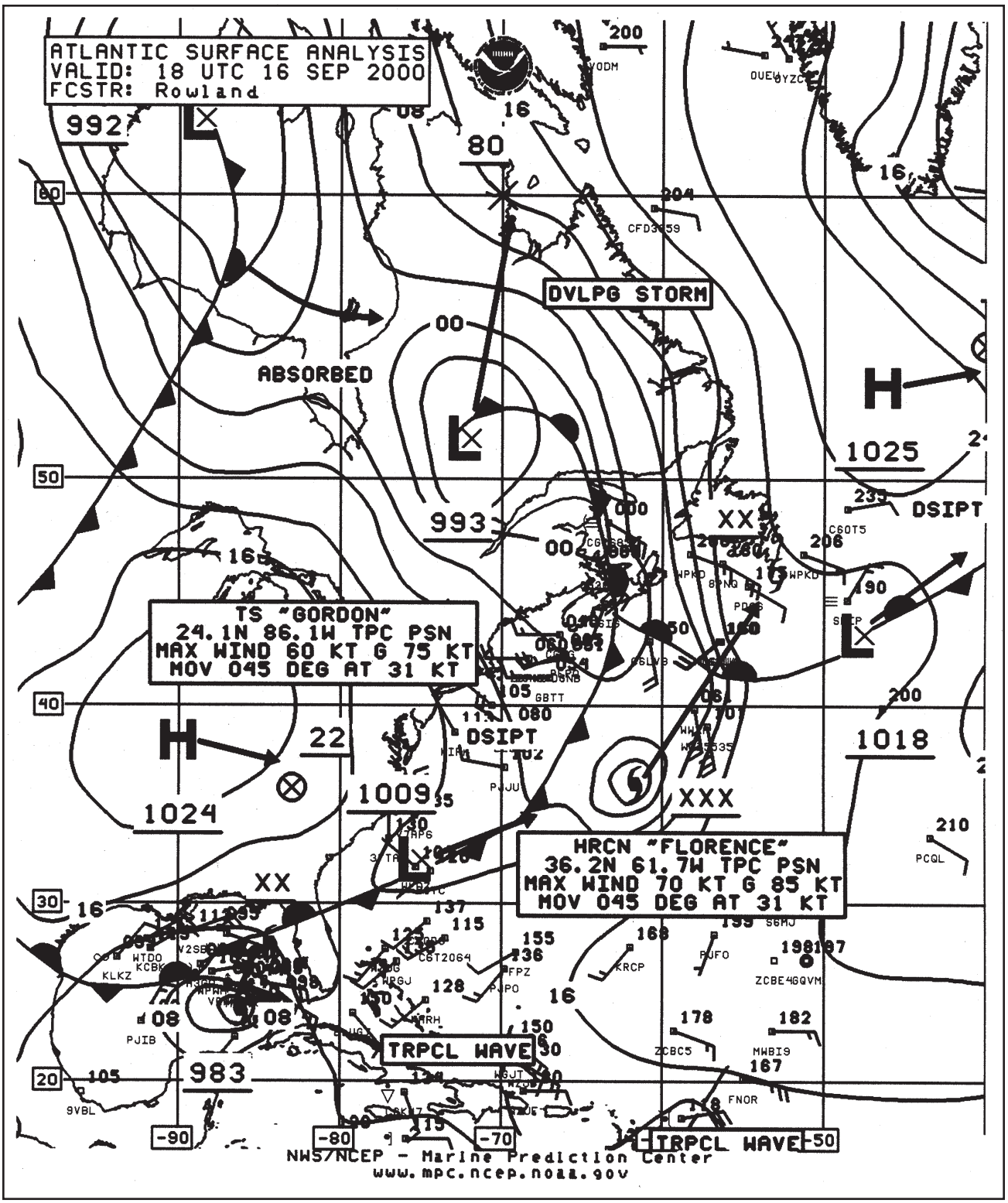


Figure 1. MPC North Atlantic Surface Analysis chart (Part 2) valid 1800 UTC September 16, 2000.

North Atlantic Area

Continued from Page 14

moving off the North Carolina coast on the 23rd. In the 12-hour period ending at 0600 UTC September 25, ex-Helene deepened from 1003 mb to 992 mb to become the storm shown in Figure 2 near 41N 62W. There was a report from a racing sailboat of southwest winds as high at 77 kt and 35 ft (10.7 m) seas in this storm on September 25 shortly after 1200 UTC (see reference). This report was much higher than the 50-kt south-southwest winds reported by the two ships southeast of the center, the **Koeln Express (9VBL)** and the **Global Mariner (WWXA)** (Figure 2). See page 52 for information on the the **Koeln Express'** first encounter with Helene in the Gulf of Mexico on September 20. Figure 3 is a GOES8 infrared satellite image of the storm taken about five hours later, showing a system with both tropical (circular dense overcast south of Newfoundland) and frontal characteristics. This system later became a 970-mb storm southeast of Greenland two days later before turning east toward Great Britain and weakening.

Hurricane Isaac moved northeast and entered MPC's waters near 31N 56W with maximum sustained winds of 100 kt with gusts to 130 kt at 1200 UTC September 29. Figure 2 shows Isaac about four days earlier, near the edge of the chart. Isaac then weakened to a minimal hurricane (65 kt sustained winds) at 38N 50W before merging with a nearby frontal zone and becoming the compact extratropical storm shown in Figure 4 near 45N 34W. The system then moved northeast past Great Britain as a gale by October 4.

Tropical Storm Leslie developed just south of the MPC waters near 30.4N 76.7W at 1200 UTC October 5 and drifted east-northeast, but weakened to a tropical depression upon entering MPC's offshore waters 30 hours later. Leslie was then swept northeast by an approaching cold front and then merged with the front off the East Coast on the 7th. The remains of Leslie later re-intensified as a storm just south of Great Britain with 967 mb central pressure by 0000 UTC October 11, with 40 to 50 kt winds reported south of the center over the Bay of Biscay.

Tropical Storm Michael developed near 30N 71W, just south of the area, by 0600 UTC October 17 and drifted east, intensifying rapidly into a hurricane 12 hours later. Figure 5 shows Michael approaching MPC's waters six hours prior to becoming a hurricane. Michael then accelerated northeast with the approach of a frontal system from the northwest. Figure 6 shows Hurricane Michael at maximum intensity with maximum sustained winds of 85 kt with gusts to 105 kt. Figure 7 is a GOES8 infrared satellite image of Michael near maximum intensity, but six hours prior to becoming extratropical. (Note the frontal cloud band south of the center.) The **TMM Mexico (3FRY9)** encountered south winds of 55 kt near 38N 61W at 1200 UTC October 19 as Michael passed to the west. Another vessel, the **Faust (WRYX)**, reported southwest winds of 30 kt and 33 ft (10 m) seas near 38N 60W at 1800 UTC October 19. The system then moved northeast across the island of Newfoundland as an extratropical storm 12 hours later and then passed near the British Isles as a gale on the 22nd. The ship **VCRT** encountered west winds of 60 kt and 24 ft (7.3 m) seas near Cape Race at 1800 UTC October 20 after the storm passed to the north.

Also on Figure 6, Tropical Depression #18 at 27.5N 59.5W moved northeast and became Tropical Storm Nadine when crossing 31N around 1200 UTC October 20. Nadine merged with the cold front to the north and became extratropical at 0600 UTC October 22 and then followed the remains of Michael to the north of Great Britain on the 24th. Nadine was the last named tropical cyclone of the season.

Other Significant Weather

The North Atlantic typically becomes more active with non-tropical (or extratropical) cyclones as the fall season progresses, sometimes even with tropical activity still going on. That was the case this year, as indicated in the events described below.

A developing storm moved northeast from Newfoundland at 1200 UTC September 5 with 998 mb central pressure, reaching 62N 17W 48 hours later with the pressure bottoming out at 960 mb,

Continued on Page 22

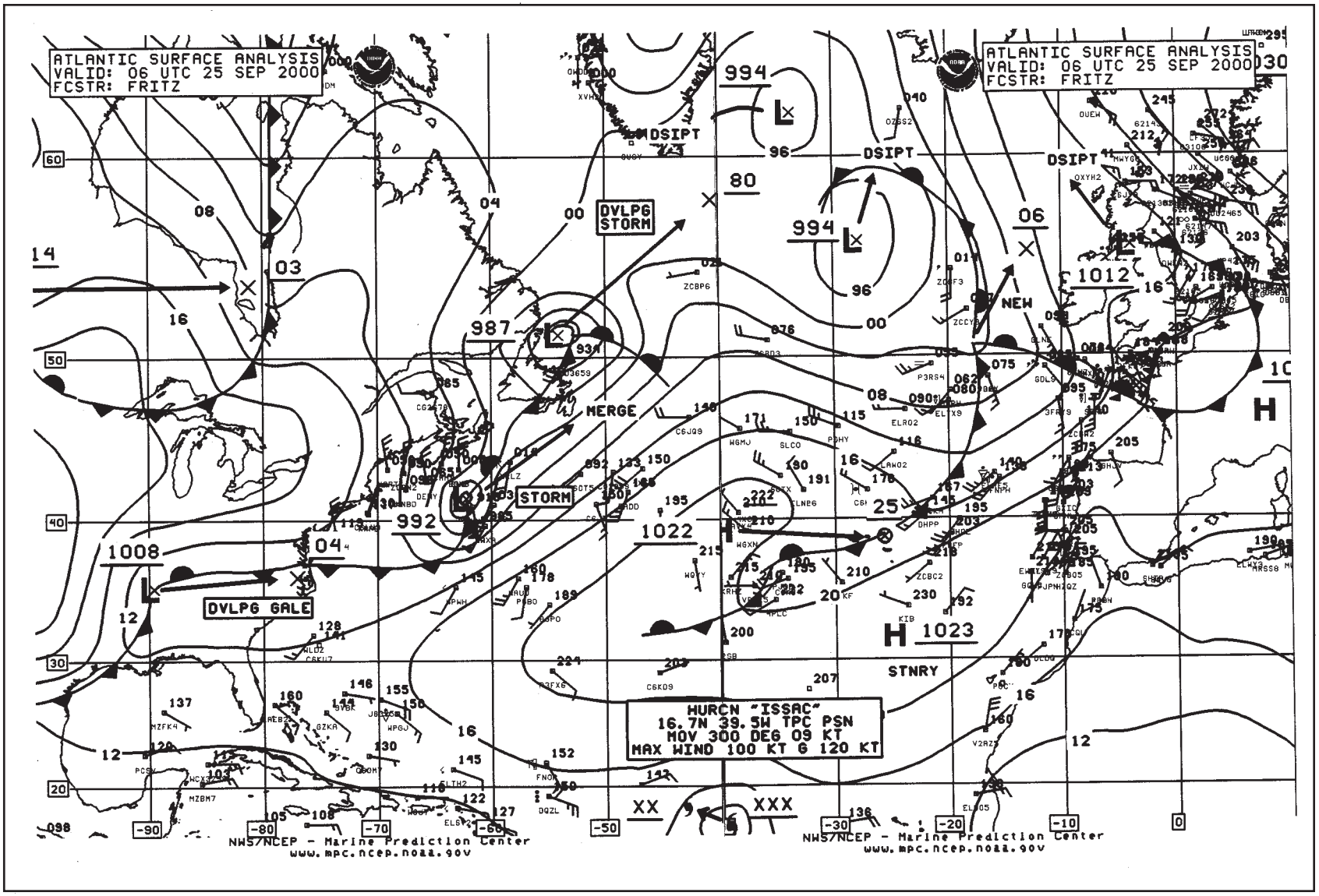


Figure 2. MPC North Atlantic Surface Analysis chart valid 0600 UTC September 25, 2000.

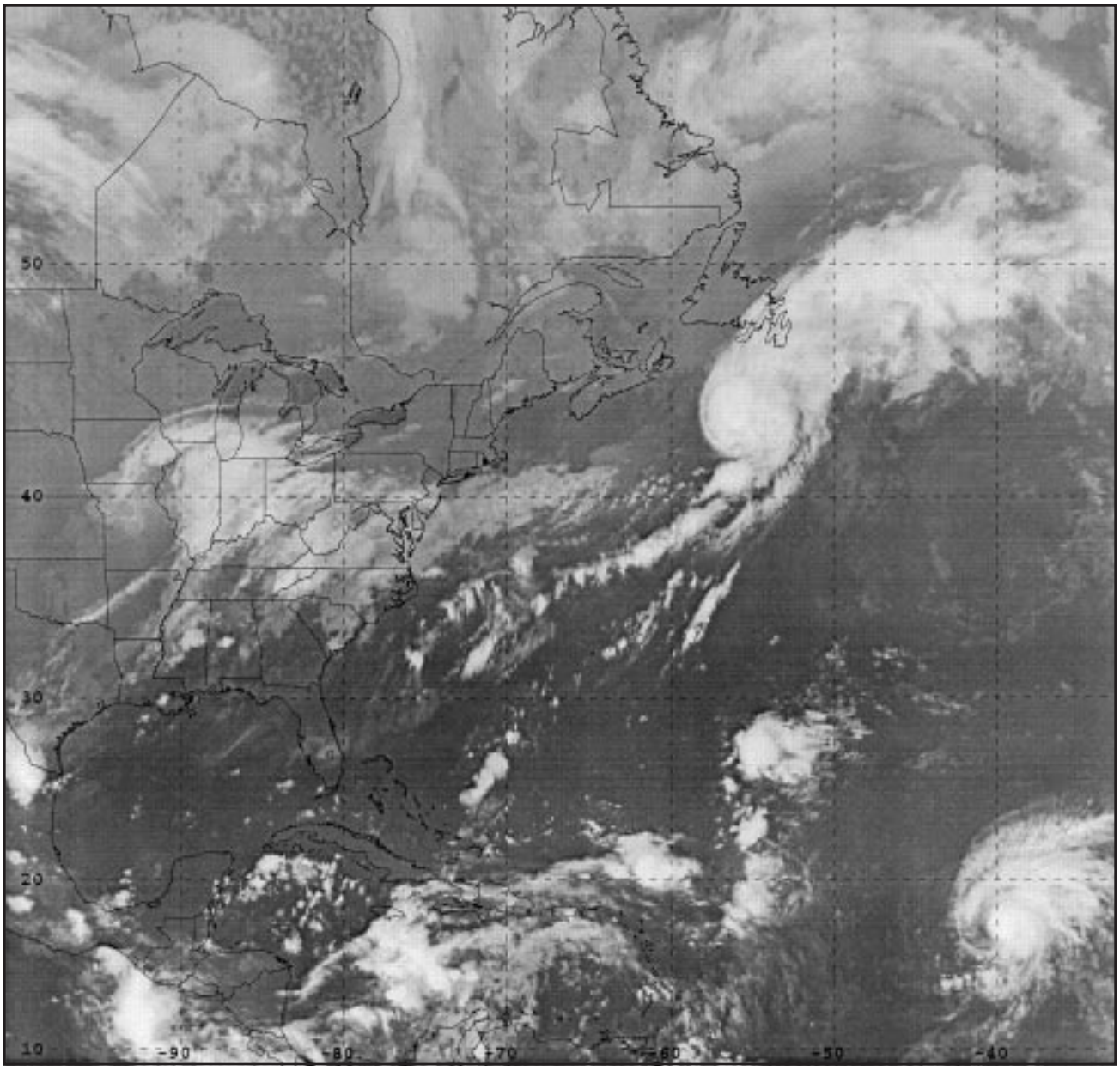


Figure 3. GOES8 infrared satellite image valid at 1115 UTC September 25, 2000. Valid time is 5 hours and 15 minutes later than that of Figure 2. Satellite senses temperature on a scale from warm (black) to cold (white) in this type of image.

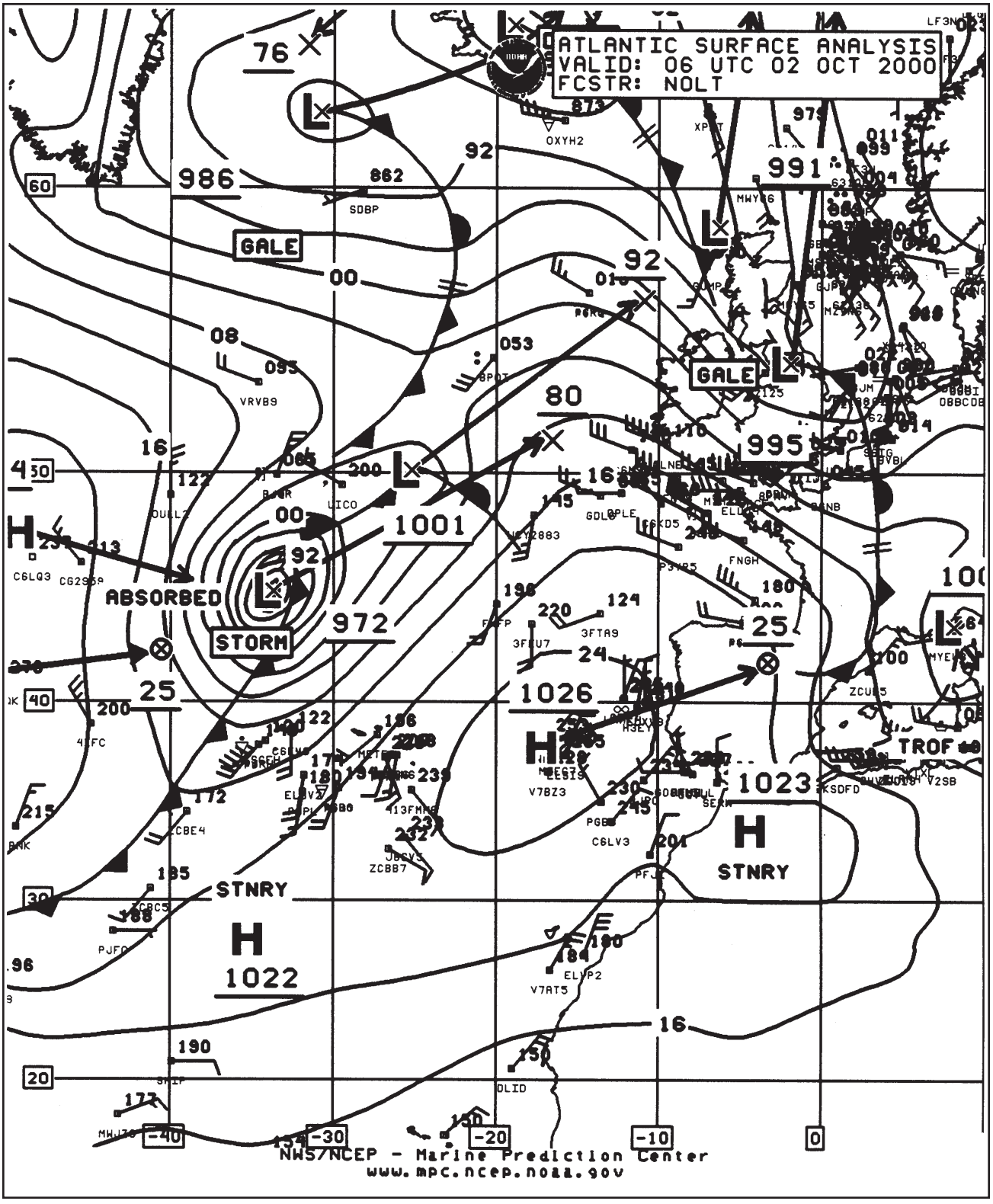


Figure 4. MPC Part 1 North Atlantic Surface Analysis chart valid 0600 UTC October 2, 2000.

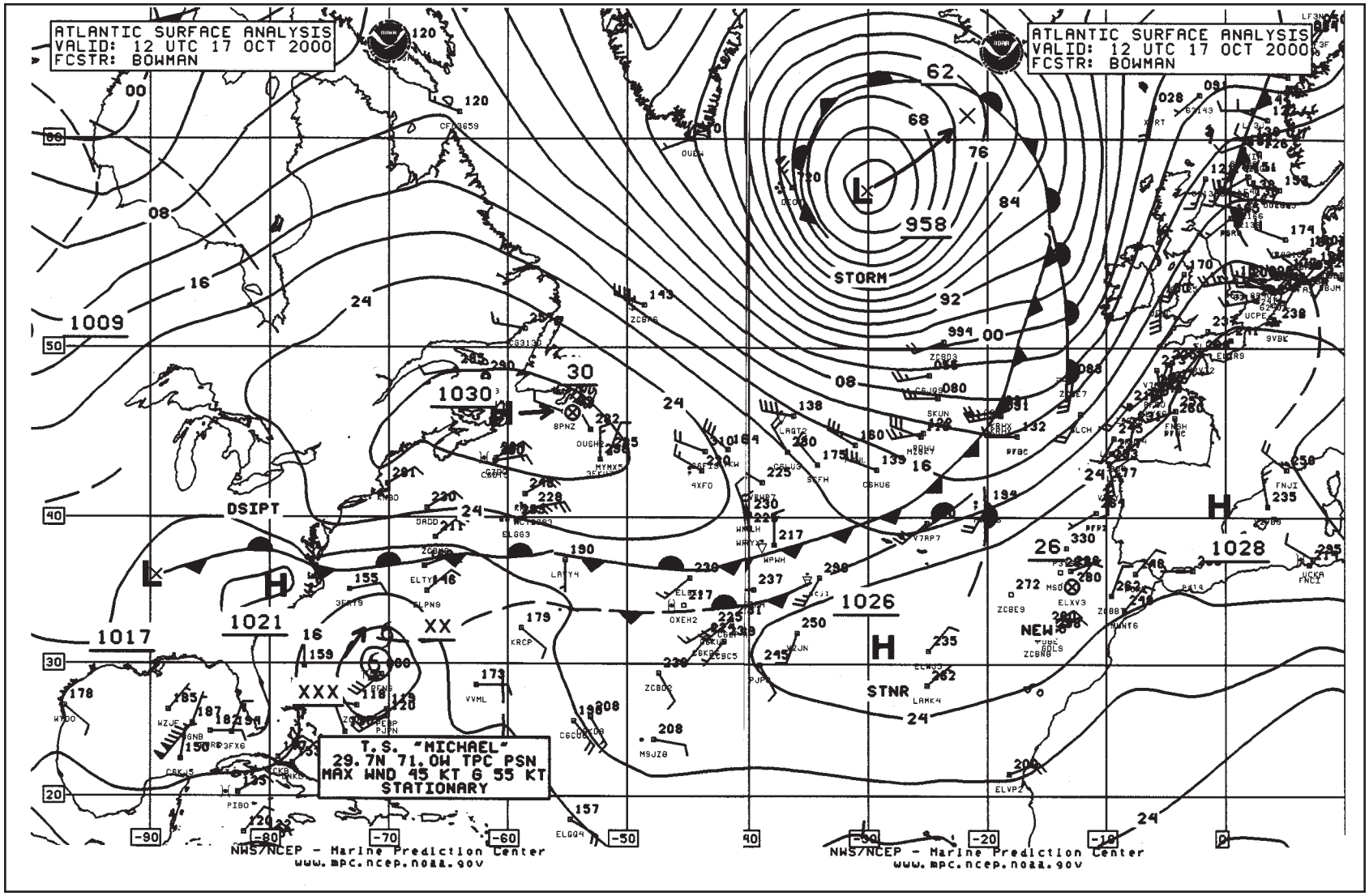


Figure 5. MPC North Atlantic Surface Analysis chart valid 1200 UTC October 17, 2000.

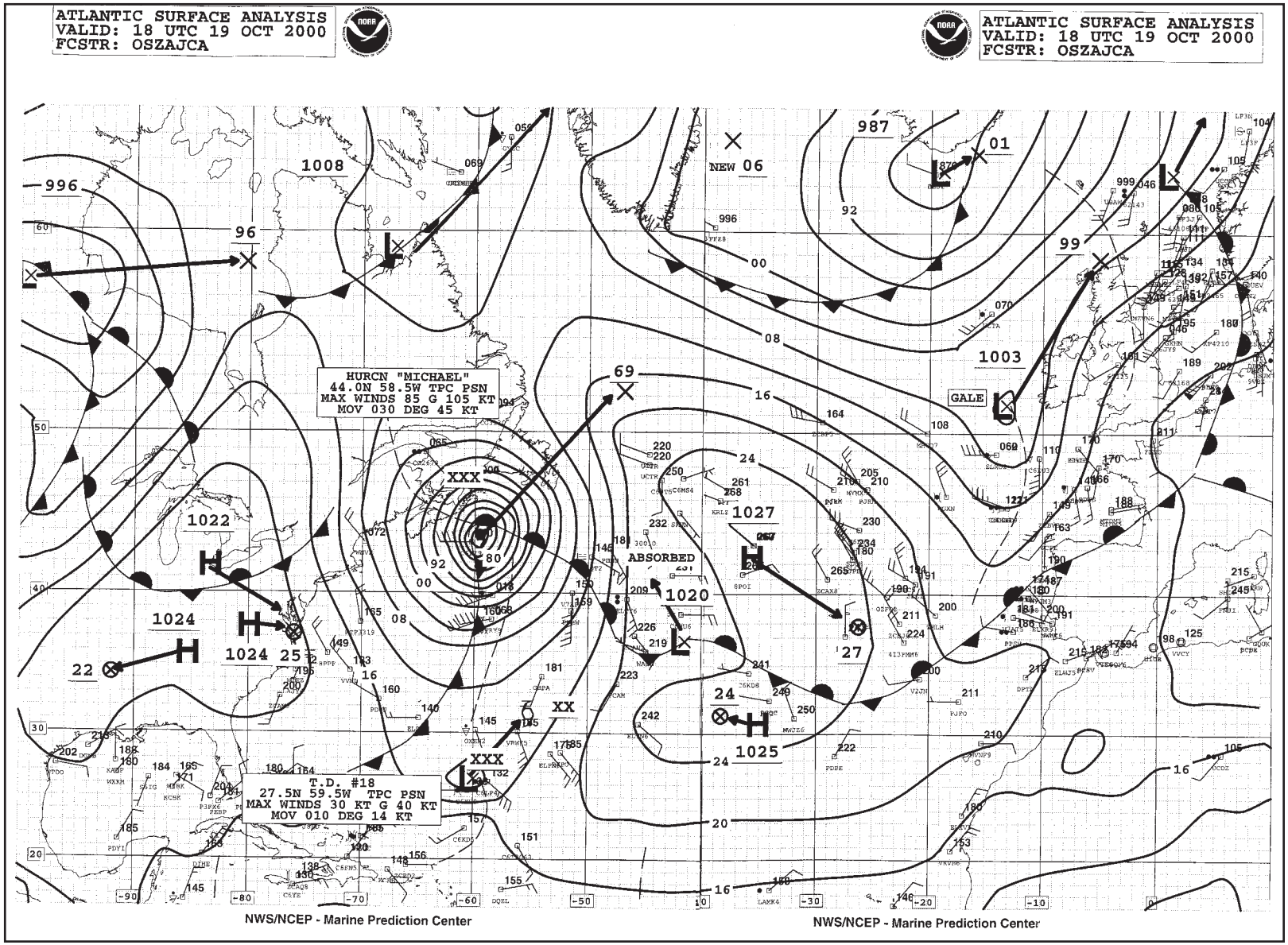


Figure 6. MPC North Atlantic Surface Analysis chart valid 1800 UTC October 19, 2000.

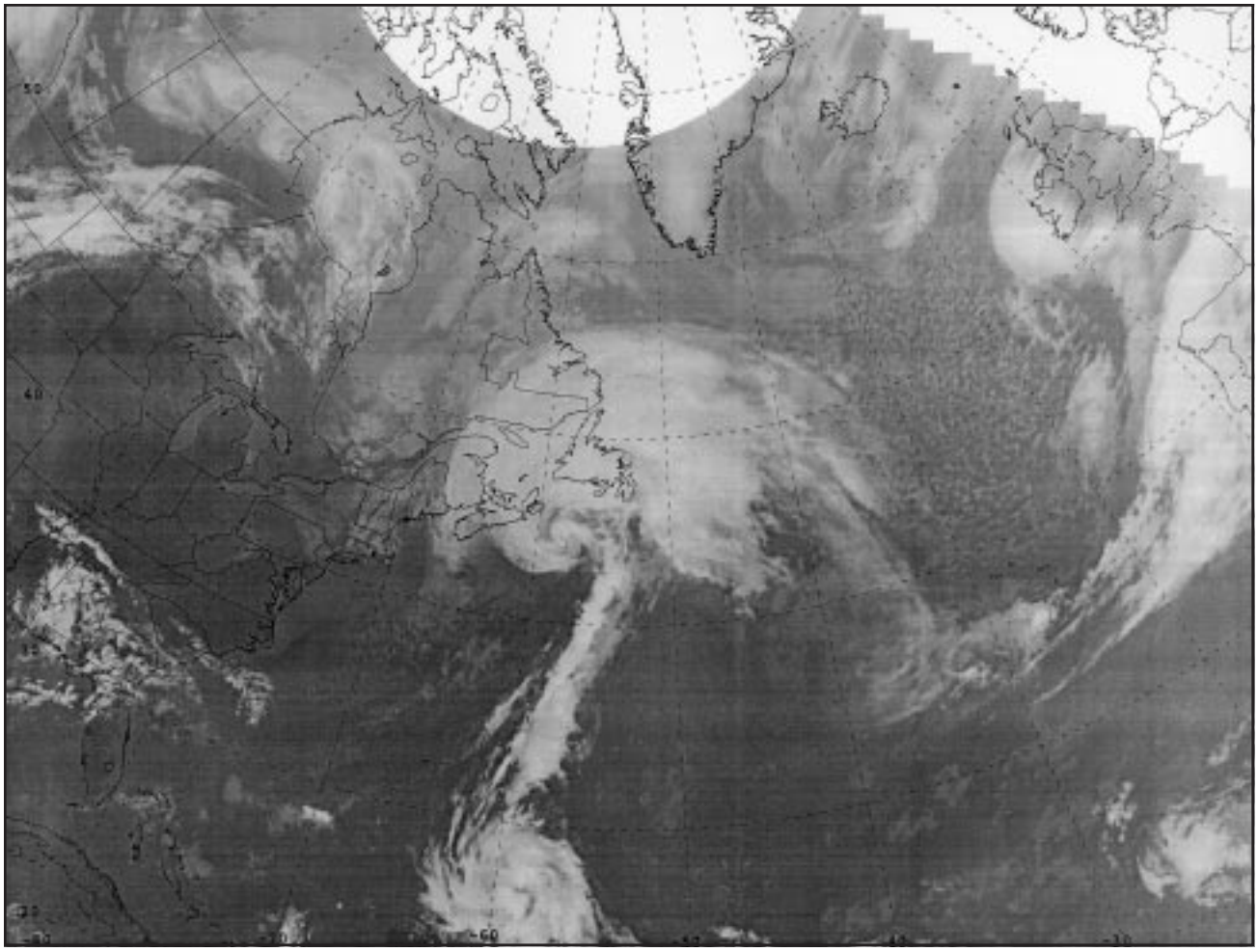


Figure 7. GOES8 infrared satellite image valid 1815 UTC October 19, 2000. Valid time is only 15 minutes later than that of Figure 6.

North Atlantic Area

Continued from Page 17

unseasonably strong for early September. At 1200 UTC September 7, ship **SLCH** reported a west wind of 50 kt and 23 ft (7 m) seas near 56N 18W. The highest reported seas were from the buoy **62143** (62N 2W), with 41 ft (12.5 m) reported at 1200 UTC September 8.

In the middle of October, as Hurricane Michael was developing, a somewhat deeper low developed over the north-central North Atlantic with hurricane force winds reported. The 958 mb storm, shown in Figure 5 at maximum intensity, underwent much of its deepening in the 24-hour period after moving northeast from Newfoundland, with the central pressure dropping 32 mb to 962 mb by 1800 UTC October 16. This would therefore qualify as a meteorological "bomb." The ship **DEOT** west of the center encountered northwest winds of 65 kt (Figure 5). Another ship, **ZCBP6**, westbound south of the storm center, reported northwest winds of 65 kt and 47 ft (15.4 m) seas near 53N 43W at 1800 UTC October 16, then northwest winds of 55 kt and 53 ft (16.2 m) seas six hours later near 53N 44W. The storm subsequently moved northeast and weakened near Iceland by the 19th.

In late October, low pressure formed on a front down near 31N 56W with a central pressure of 1013 mb at 0000 UTC October 24 and moved northeast, deepening slowly over the next 48 hours to

Continued on Page 23

North Atlantic Area

Continued from Page 22

998 mb, then rapidly after 0000 UTC October 26 as the system drew in an arctic airmass from the west. The center deepened to 952 mb by 0000 UTC near 61N 27W, a fall of 46 mb in 24 hours. The storm turned to the northwest and slowed, bottoming out at 946 mb (27.94 in) at 1200 UTC October 27 (Figure 8), the second deepest low in the North Atlantic in the four-month period. The label "dangerous storm" was used at the time to denote a storm with hurricane force winds and/or seas of 40 ft (12.2 m) or more. Now, the label "hurricane force" or "hurcn force" is used instead. There was one report of south winds of 65 kt from the ship **TXVH2** (59N 22W) at 2100 UTC October 26. Well to the south, the **Liberty Spirit (WCPU)** encountered southwest winds of 55 kt and 43 ft (13.1 m) seas near 52N 22W at 1200 UTC October 27. This large system left a large pool of cold air over the North Atlantic, which strengthened a front and jet stream to the south and set the stage for the rapid development of the most intense storm of the period in both oceans.

Figure 9 shows this rapid development and movement, from a 997 mb open frontal wave of low pressure to a 944 mb storm in the North Sea in only 18 hours—a drop of 53 mb (1.57 in). The strongest winds occurred south of the center in the North Sea near the time of the second part of Figure 9. The strongest winds reported from buoys were southwest 95 kt from **62165** (54N 1E) and southwest 70 kt from **62414** (53N 3E). The author is uncertain of the reliability of the 95-kt report. The strongest winds reported from ships were south 66 kt from the **Vera Mukhina (UCMP)** near 55N 4E and south 65 kt from the **Maersk Endeavor (XP4210)** near 55N 5E at 1200 UTC October 30. The highest seas reported were to the west in the open ocean, 33 ft (10.1 m) from the ship **MHCQ7** near 48N 18W at 0000 UTC October 30. Figure 10 is a METEOSAT7 infrared satellite image of the storm at maximum intensity, 942 mb (27.82 in) at 1800 UTC October 30. The image reveals cold-topped (white) frontal cloud bands wrapping around the center near 57N 7E, indicating the system is very intense and of great vertical extent.

The weather pattern during much of the period from October to December was marked by frequent development of lows that moved off the East Coast. Most of these moved toward the British Isles, but some turned north across the Canadian Maritimes and into the Labrador Sea. Perhaps the most significant of these in terms of winds and seas was the East Coast "bomb" of November 30 to December 1. Figure 11 shows this system deepening from 1004 mb (just south of Cape Cod) to 970 mb near 42N 60W in an 18-hour period. It is interesting to note that 20 mb of this deepening occurred in the first six hours and that this storm produced an 80 kt ship report (**ZCAH2**) on the back side of the storm near 41N 63W at 0600 UTC December 1. This report is supported by QuikScat scatterometer date for 0936 UTC December 1 (Figure 12), taking into account the small difference in valid time. At 1500 UTC December 1, the **Fidelio (WQVY)** near 43N 60W encountered north winds of 65 kt. The ship **ZCB06** at 1800 UTC December 1 reported seas of 45 ft (13.7 m), along with southwest winds of 50 kt near 41N 49W. This storm subsequently tracked east-northeast and weakened to a gale near Great Britain on December 6.

In December, a blocking high developed by mid-month at high latitudes, keeping most lows south of 50N. Another developing storm that produced winds and seas similar to those in the November 30 to December 1 event, but farther east, formed near 40N 63W with 1002 mb central pressure at 1800 UTC December 7 and moved northeast. In 24 hours it deepened 42 mb to become a 960 mb storm east of Newfoundland (Figure 13). The ship **ZCBF3** reported a west wind of 70 kt and 38 ft (11.6 m) near 51N 49W at 0600 UTC December 9, which is verified by the QuikScat image in Figure 14. As a high-latitude blocking high-pressure area developed to the north during the second week of December, the storm then stalled and looped to the southeast by the 10th.

Reference

E-mail communication (through L. Chesneau, MPC, *Story of a Rapidly Intensifying Low*).⚓

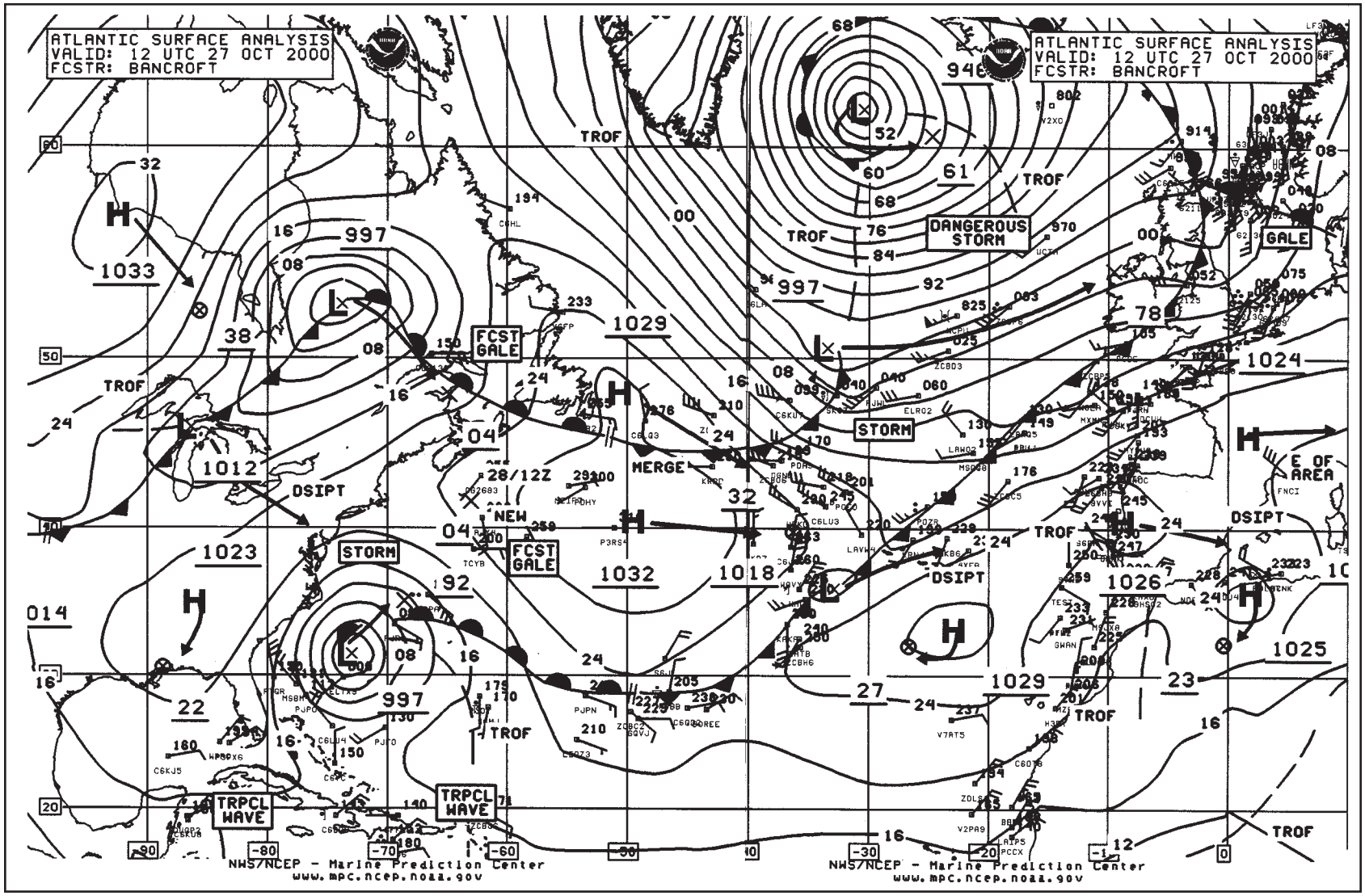


Figure 8. MPC North Atlantic Surface Analysis chart valid 1200 UTC October 27, 2000.

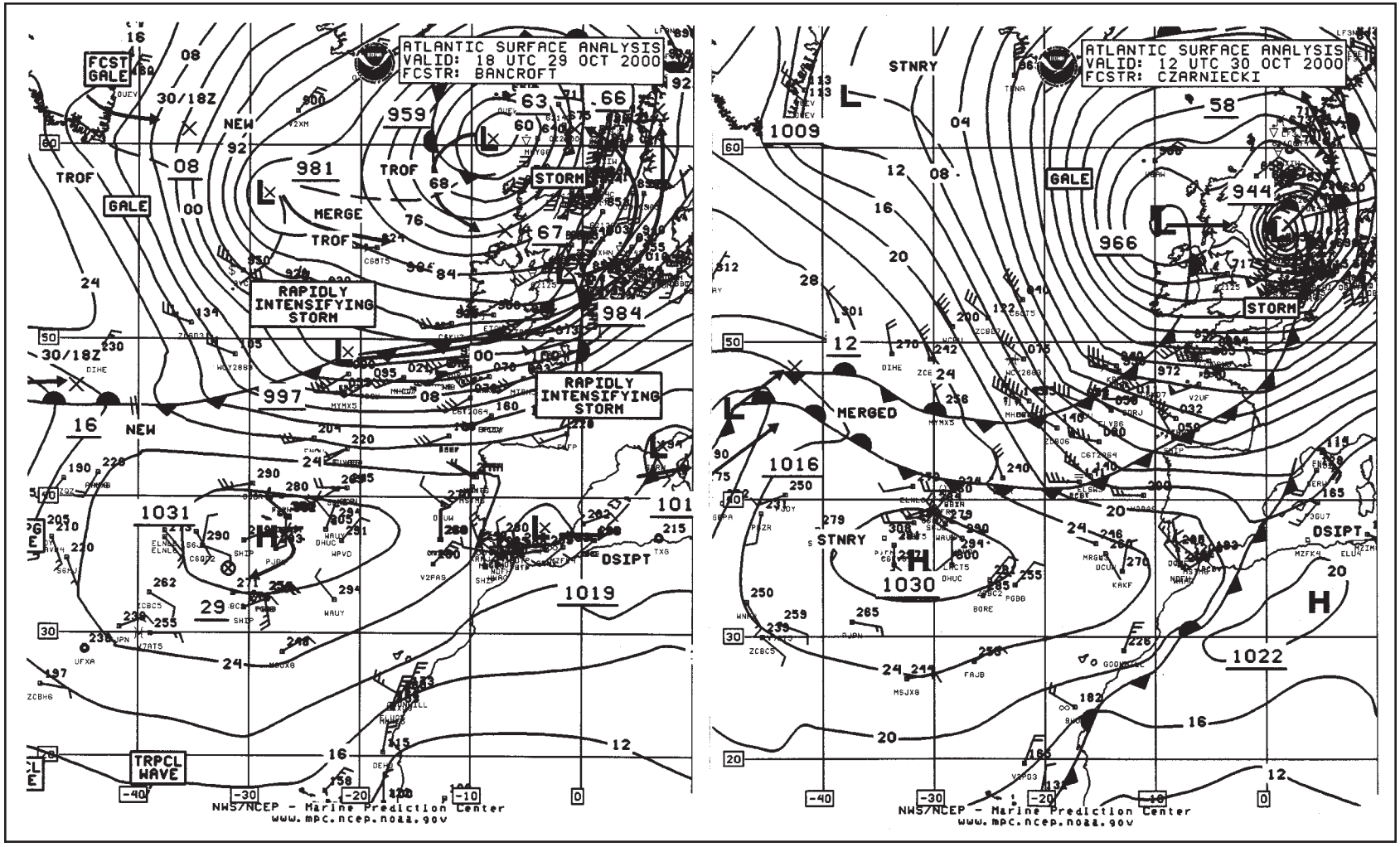


Figure 9. MPC Part 1 North Atlantic Surface Analysis charts valid at 1800 UTC October 29 and 1200 UTC October 30, 2000.

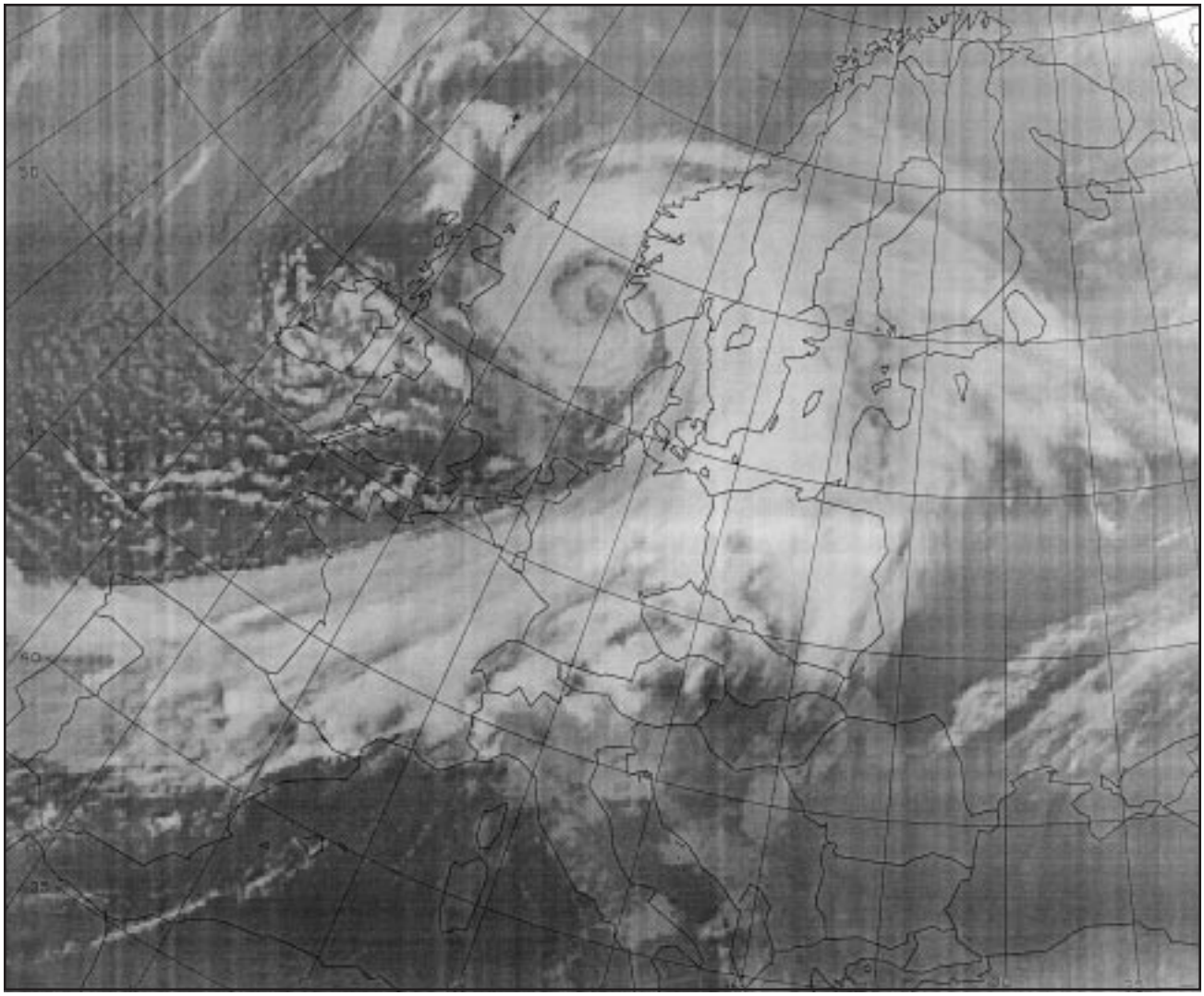


Figure 10. METEOSAT7 infrared satellite image valid 1800 UTC October 30, 2000. The valid time is six hours later than that of the second part of Figure 9 and shows the North Sea storm at maximum intensity.

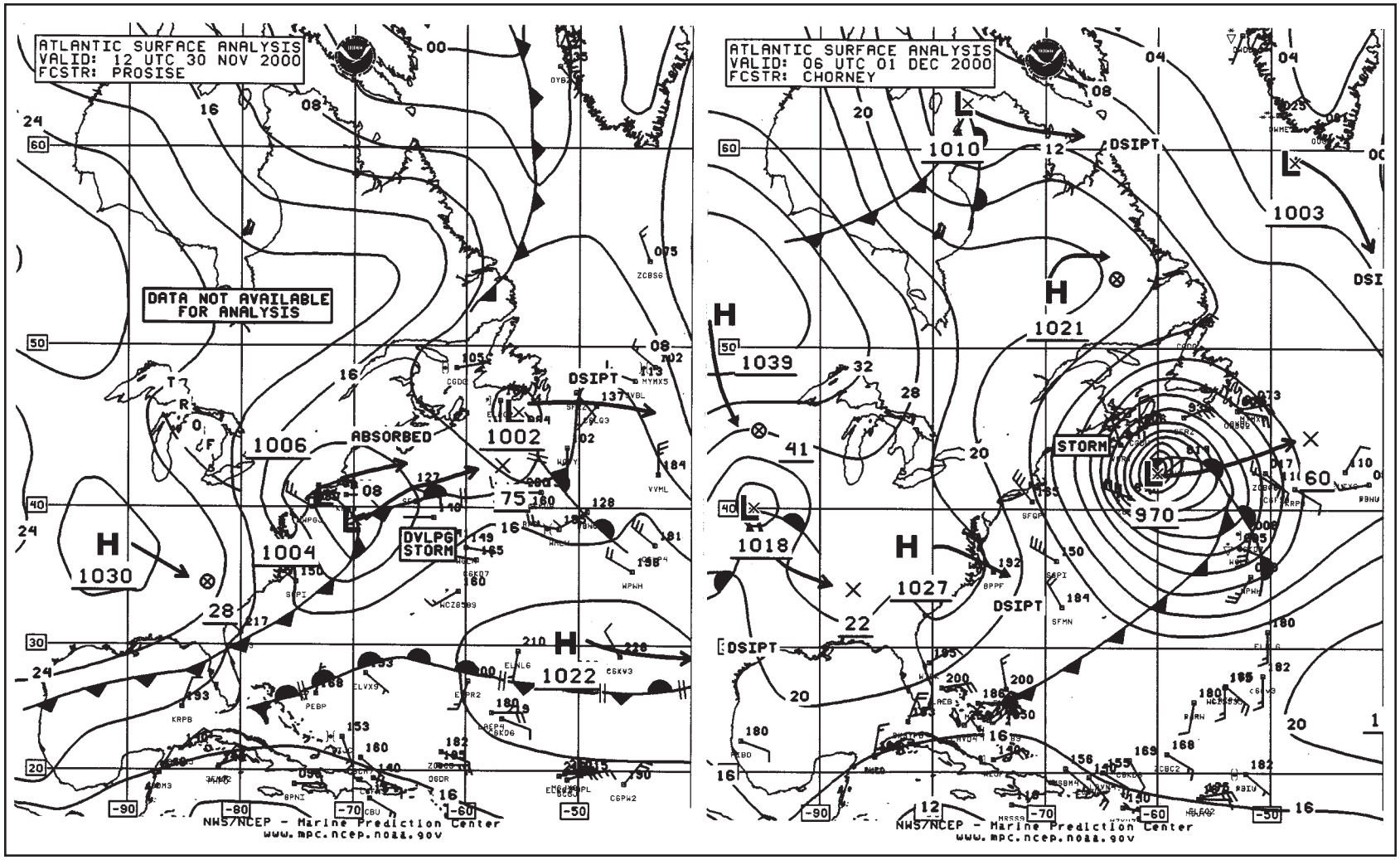


Figure 11. MPC Part 2 North Atlantic Surface Analysis charts valid 1200 UTC November 30 and 0600 UTC December 1, 2000.

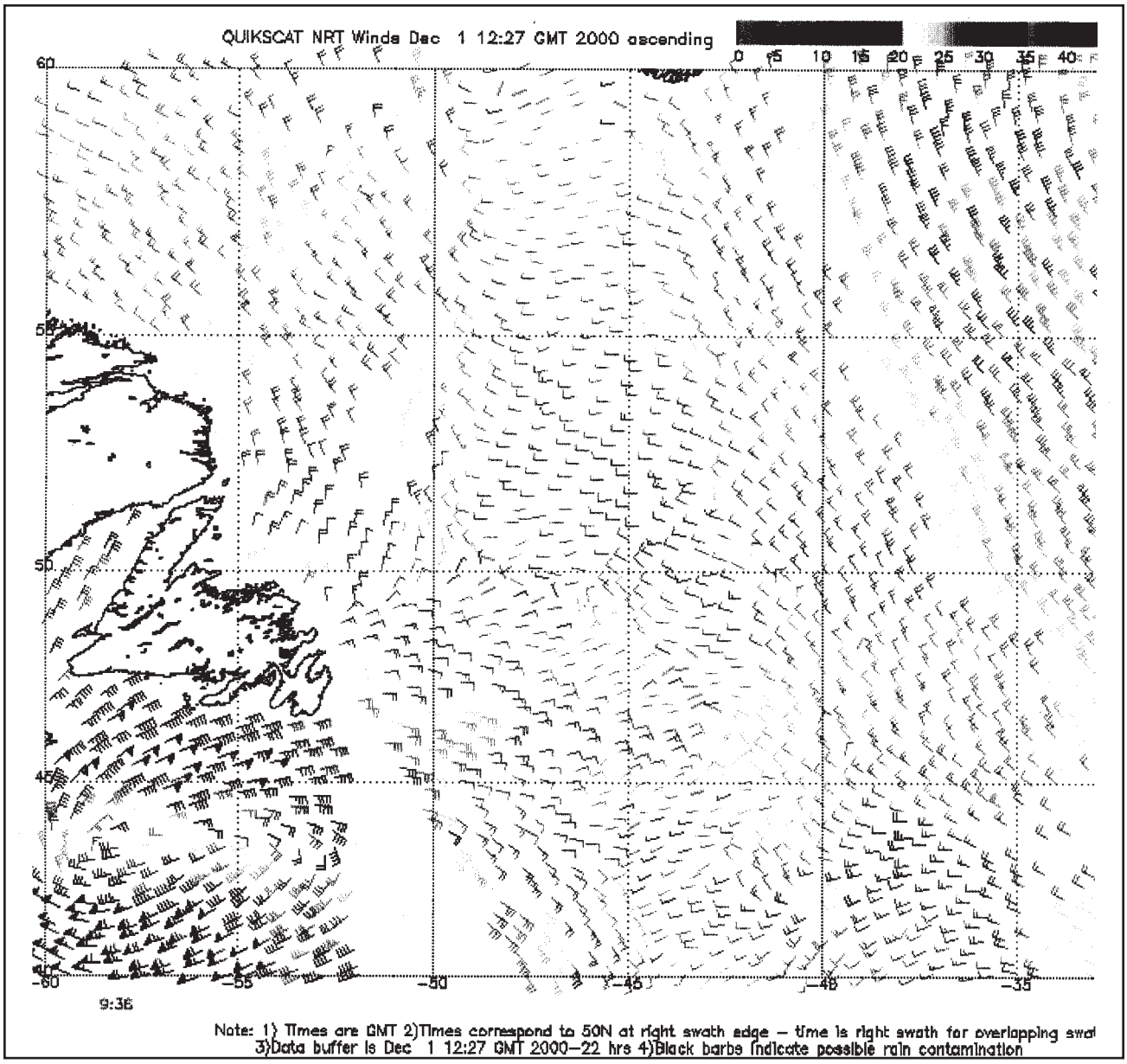


Figure 12. QuikScat scatterometer image of satellite-sensed winds around the storm shown in Figure 11. The valid time of the pass is 0936 UTC December 1, 2000, or only 3 hours and 36 minutes later than the valid time of the second analysis in Figure 11. Image is from NOAA/NESDIS/Office of Research and Applications.

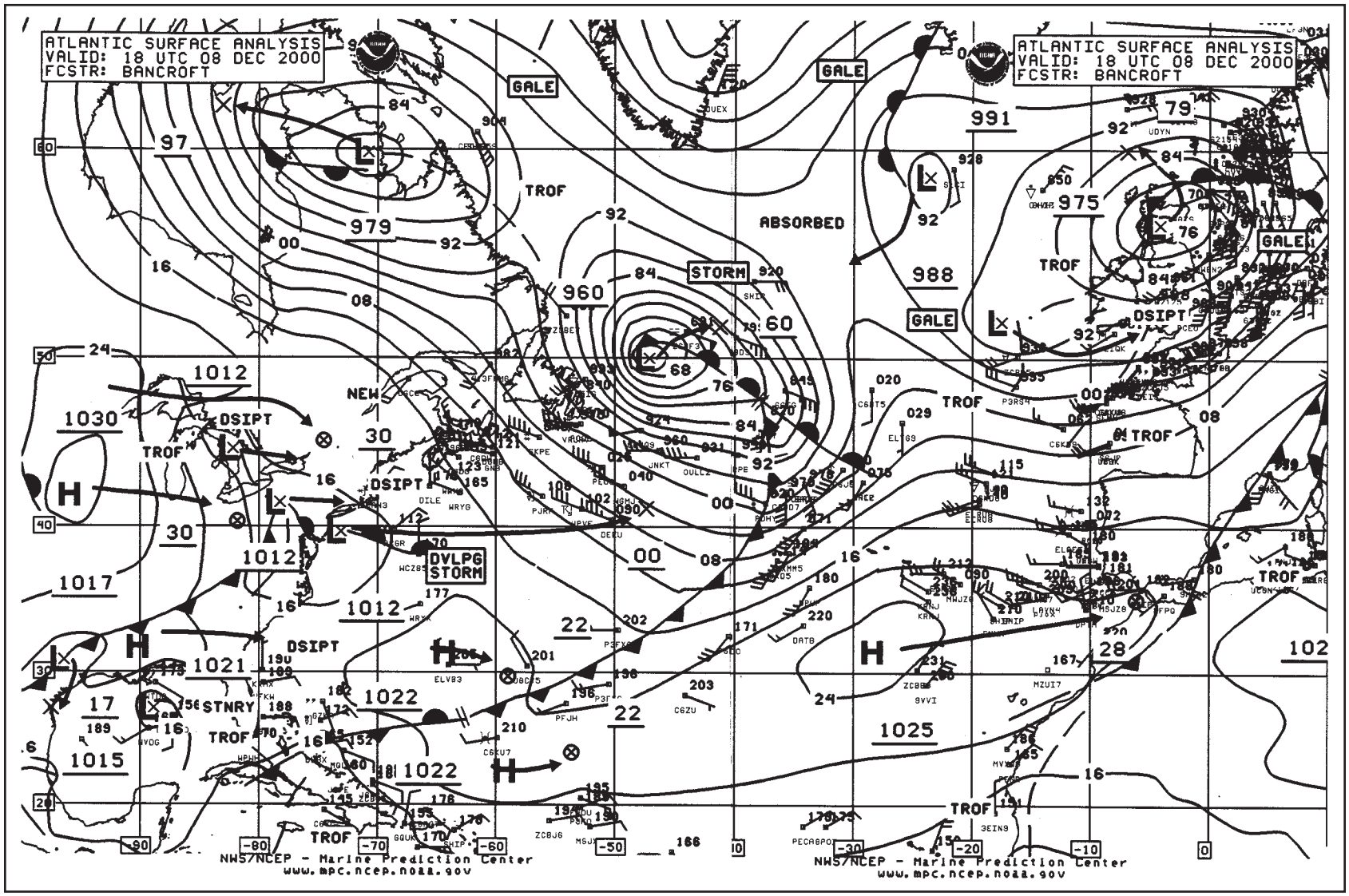


Figure 13. MPC North Atlantic Surface Analysis chart valid at 1800 UTC December 8, 2000.

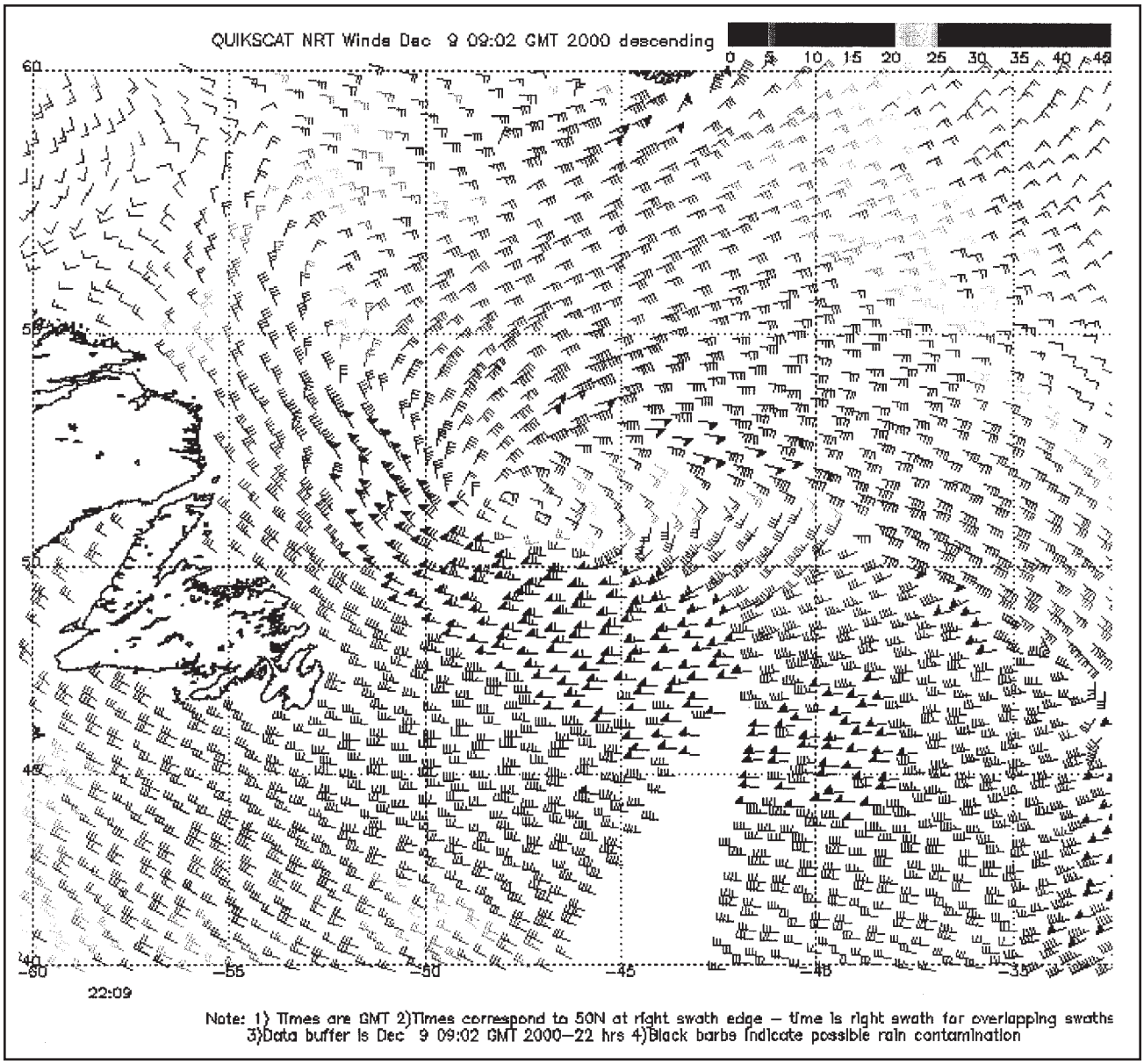


Figure 14. QuikScat scatterometer image of satellite-sensed winds around the storm in Figure 13. The valid time of the pass is 2209 UTC December 8, 2000, or about four hours later than the valid time of Figure 13. Note the 80 kt wind barb near 50N 50W. Image is from NOAA/NESDIS/Office of Research and Applications.

Marine Weather Review
North Pacific Area—September through December 2000

George P. Bancroft
Meteorologist
Marine Prediction Center

Tropical Activity

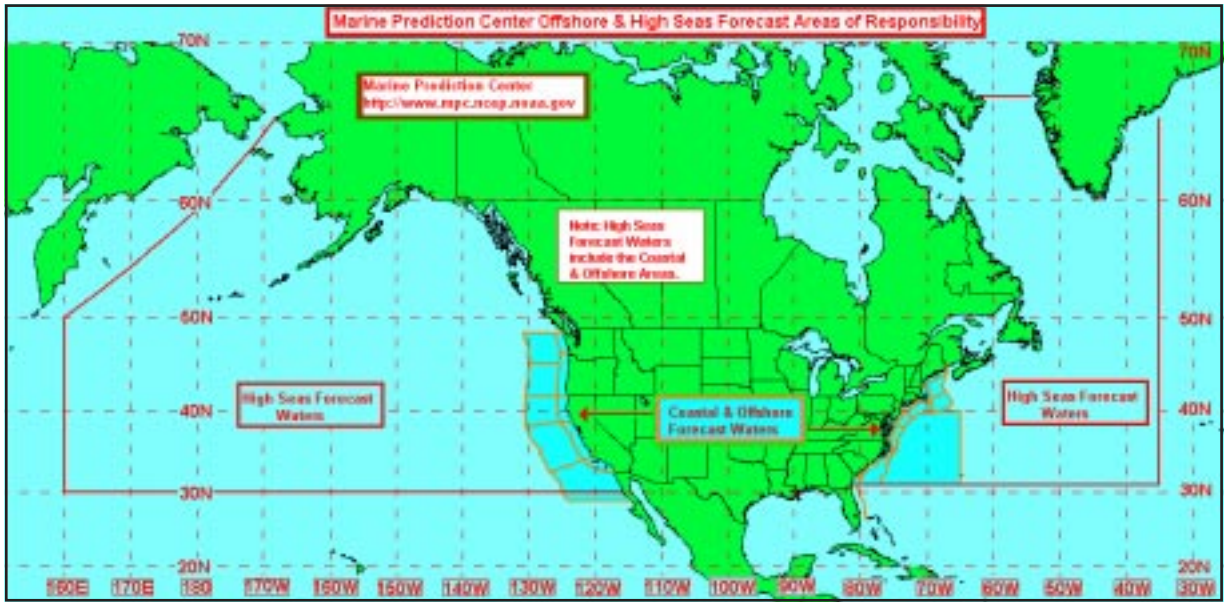
The tropics in the western North Pacific were active, with many of the storms staying south and west of the MPC's surface-analysis chart area. Two typhoons did recurve northeast to appear on MPC's North Pacific surface analysis.

The first, Typhoon Sonamu, moved north into the MPC chart area south of Japan on September 16 with maximum sustained winds of 75 kt with gusts to 90 kt. Sonamu became an extratropical storm over the southern Kurile Islands early on September 18, before moving into the western Bering Sea as a complex gale center by the 19th. The remains of Sonamu then moved into northwestern Alaska on September 22.

Typhoon Shanshan

The second typhoon, Shanshan, tracked farther east and actually moved into the MPC high seas area north of 30N and east of 160E, crossing 30N near 168E at 1200 UTC September 23 with maximum sustained winds of 90 kt with gusts to 110 kt. Shanshan weakened to a tropical storm near

Continued on Page 32



North Pacific Area

Continued from Page 31

35N 174E by 0600 UTC September 24. Unlike Sonamu, Shanshan interacted with a low-pressure system and polar front to the northwest and explosively deepened into an intense extratropical storm. The central pressure of the low-pressure center to the north of Shanshan fell from 993 mb to 950 mb in only 18 hours as it merged with Shanshan, a drop of 43 mb (1.27 in). Figure 1 depicts this dramatic development over only an 18-hour period ending at 0000 UTC September 25. The second part of Figure 1 shows the intense extratropical storm at maximum intensity, 950 mb, analyzed with the help of abundant ship data. This development was not only unusual for this early in the season, but also produced one of the most intense storms to develop over the North Pacific during this four-month period. Figure 2 is a 500 mb analysis chart valid at 1200 UTC September 24 indicating a vigorous short-wave trough supporting development. Details on relationships between surface and upper-air features and use of the 500 mb chart may be found in an earlier article by Sienkiewicz and Chesneau (see references). Figure 3 is a GMS infrared satellite image of the storm near maximum intensity and is valid at about the same time as the second analysis of Figure 1. There is the hint of a small "eye" at the center.

At 1800 UTC September 24, the ship **PFEU** near 42N 179E encountered southwest winds of 60 kt and 51 ft (15.5 m) seas, the highest winds and seas reported by ship. The second highest reported seas were 37 ft (11.3 m) from the ship **ELXU6** near 41N 179E at 0600 UTC September 25. Reported winds were southwest 30 kt at this time, but six hours prior to this, the same ship reported southwest winds of 56 kt. West of the center, the **Everett Express (call sign DPGD)** reported a north wind of 60 kt and 35 ft (10.7 m) seas near 46N 172E at 0600 UTC September 25. The **World Spirit (ELWG7)** reported a northeast wind of 37 kt and pressure of 951 mb near 44N 175E at 0000 UTC September 25.

The storm subsequently drifted northeast and then east and began to weaken. By 0000 UTC September 26 the central pressure was up to 965 mb. By the 30th, the extratropical remains of Shanshan weakened to a low with winds below gale force off the coast of Washington state.

Other Significant Weather

As cyclonic activity picked up during October and November, there were many systems that developed storm-force winds. The emphasis here is on storms that develop hurricane force winds and/or large waves, or extraordinary intensity.

Figure 4 depicts the rapid development of what became the most intense storm of the four-month period in the northeast Pacific. This is another example of a "bomb," with the central pressure dropping more than 24 mb in a 24-hour period. The second part of Figure 4 shows the storm at maximum intensity. Figure 5 is a GOES10 infrared satellite image of the storm close to the time of maximum intensity. The dense and cold-topped (white in the image) frontal clouds north and east of the center actually spiral twice around a well-defined center, indicative of a very intense, mature storm. The highest wind reported from a ship was an east wind of 55 kt from the **Sea-Land Anchorage (KGTX)** near 54N 136W at 1800 UTC October 27, with reported seas of 33 ft (10.1 m). The highest seas reported were 38 ft (11.6 m) from the **Great Land (WFDP)** near 54N 135W at 1500 UTC October 27, and the reported wind was southeast 50 kt. The strongest wind from a buoy was southeast wind of 43 kt with gusts to 52 kt from **46004** (51N 137W) at 0900 UTC October 27. The buoy **46184** (54N 139W) reported winds as strong, from the northeast, at 2100 UTC October 27. Seas reached 37 ft (11.3 m) at the buoy **46036** (48N 134W) at 0600 UTC October 28. Swell driven southeast around the back side of the storm reached the northern California coast on the evening of the 28th, up to 30 ft (9.1 m). The storm subsequently weakened and drifted east to the Oregon coast on the 29th.

November was perhaps the most active period, especially during

Continued on Page 39

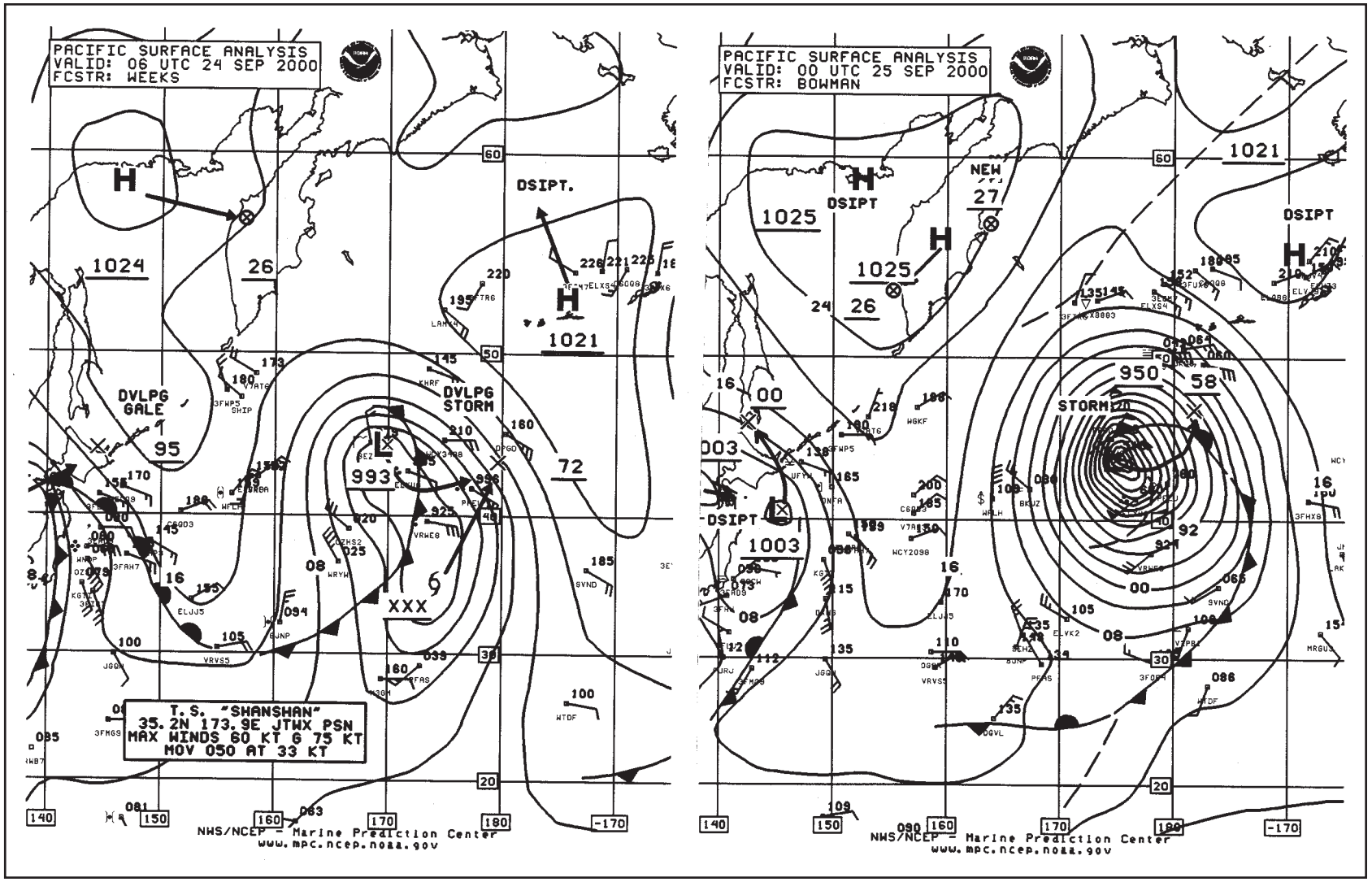


Figure 1. MPC North Pacific Surface Analysis charts valid at 0600 UTC September 24 and 0000 UTC September 25, 2000.

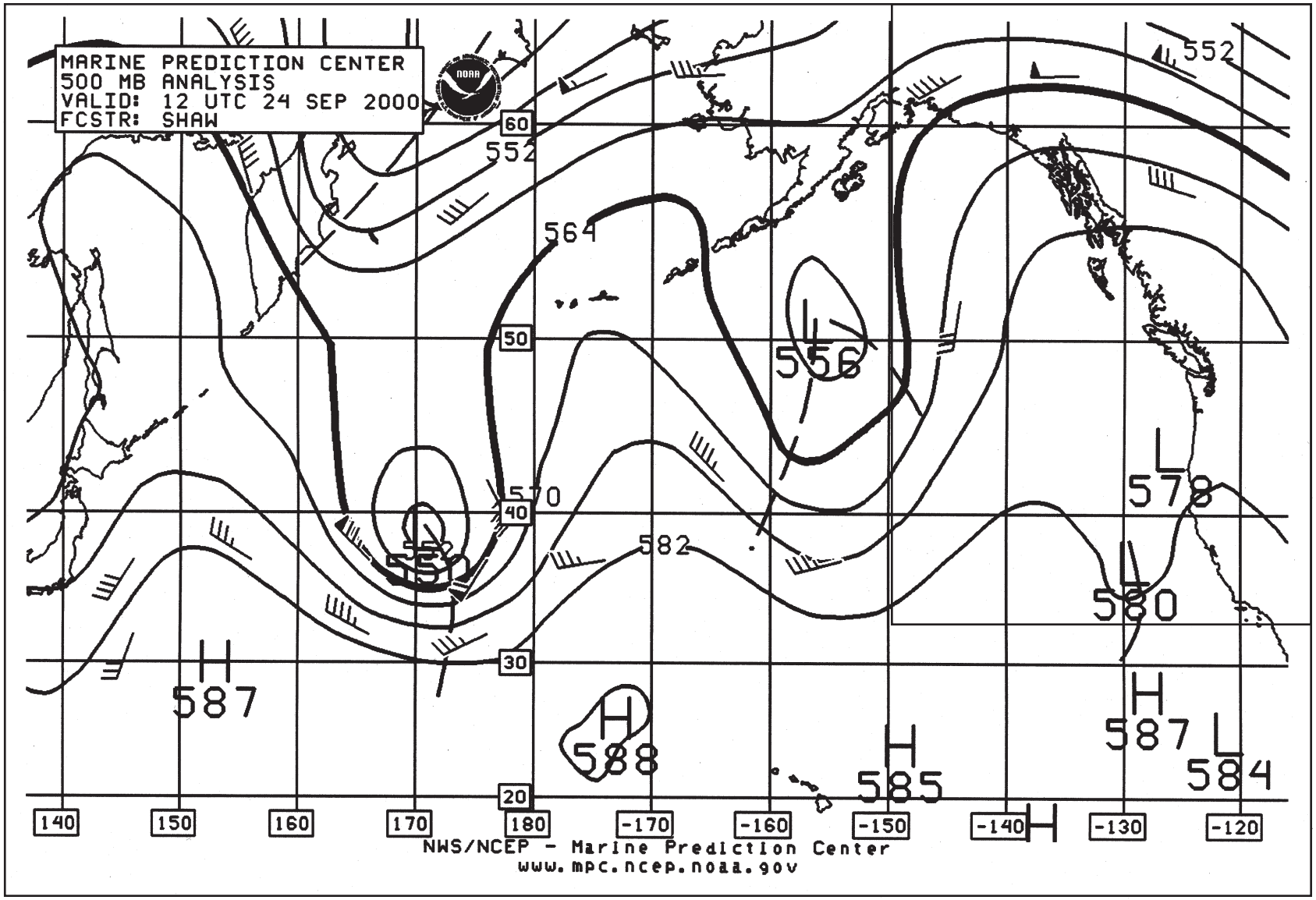


Figure 2. MPC 500-Mb Analysis of North Pacific valid at 1200 UTC September 24, 2000.

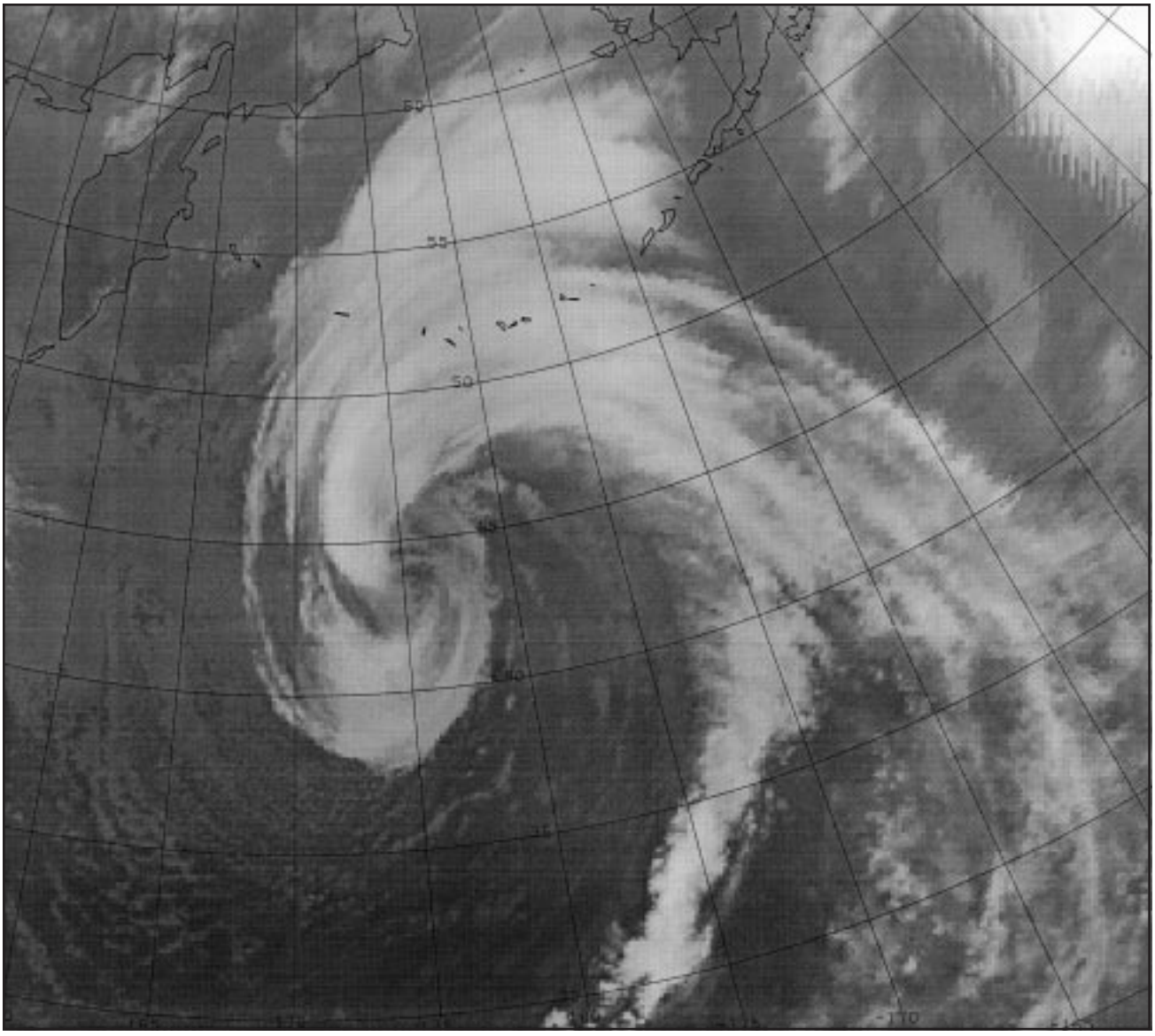


Figure 3. GMS infrared satellite image valid at 2332 UTC September 24, 2000.

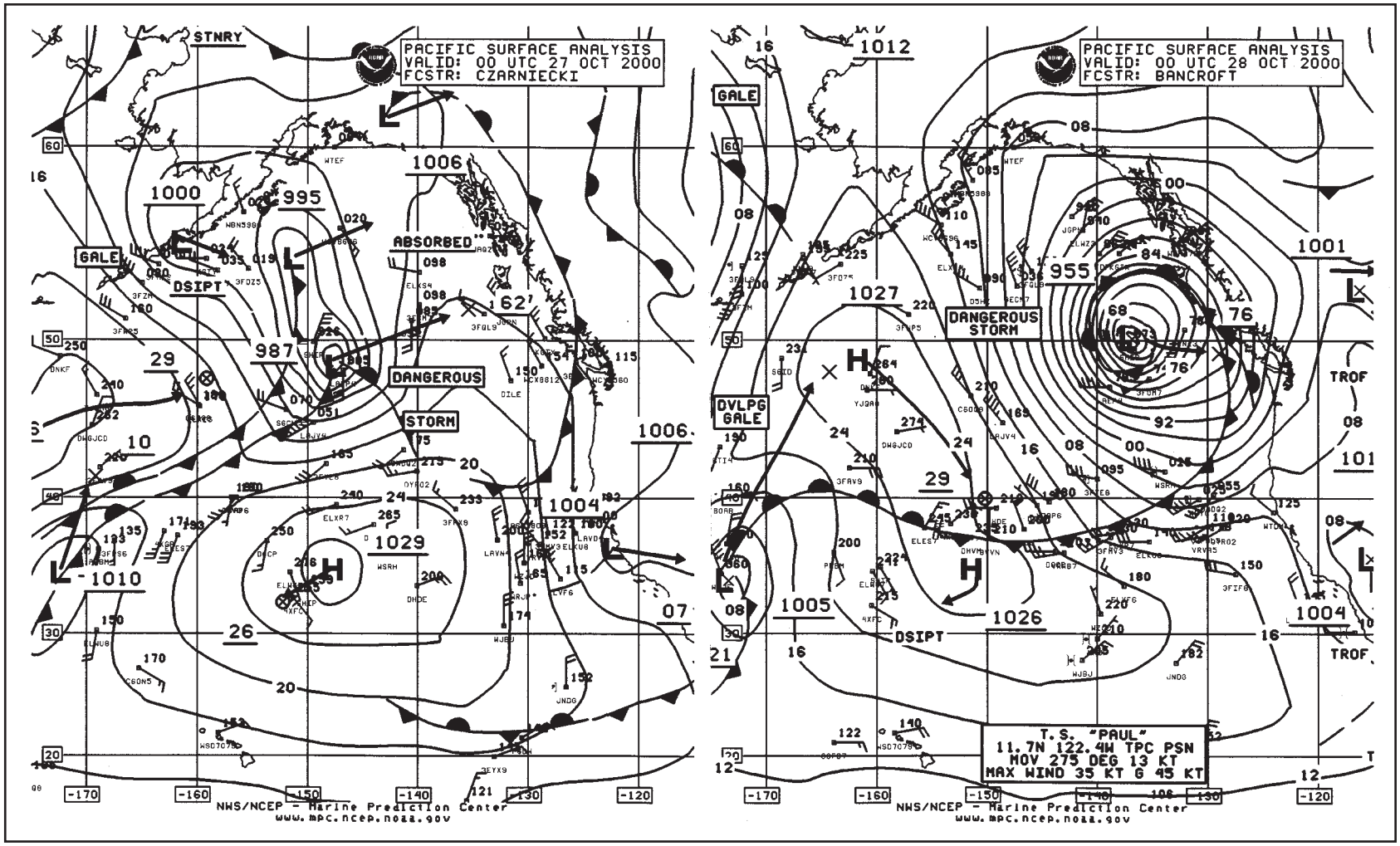


Figure 4. MPC North Pacific Surface Analysis charts (Part 1) valid at 0000 UTC October 27 and 28, 2000.

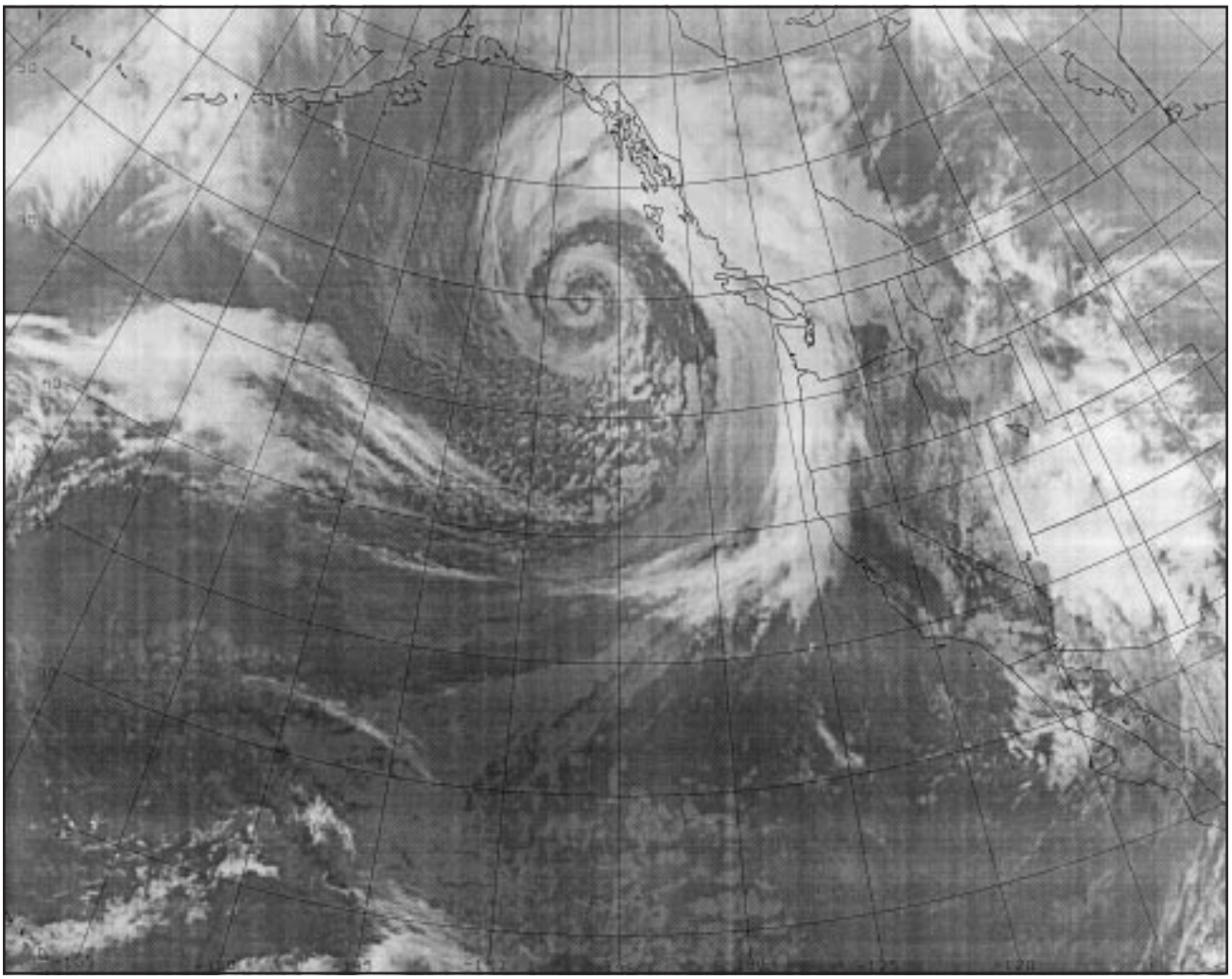


Figure 5. GOES10 infrared satellite image of the storm in Figure 4 near maximum intensity, valid at 2300 UTC October 27, 2000.

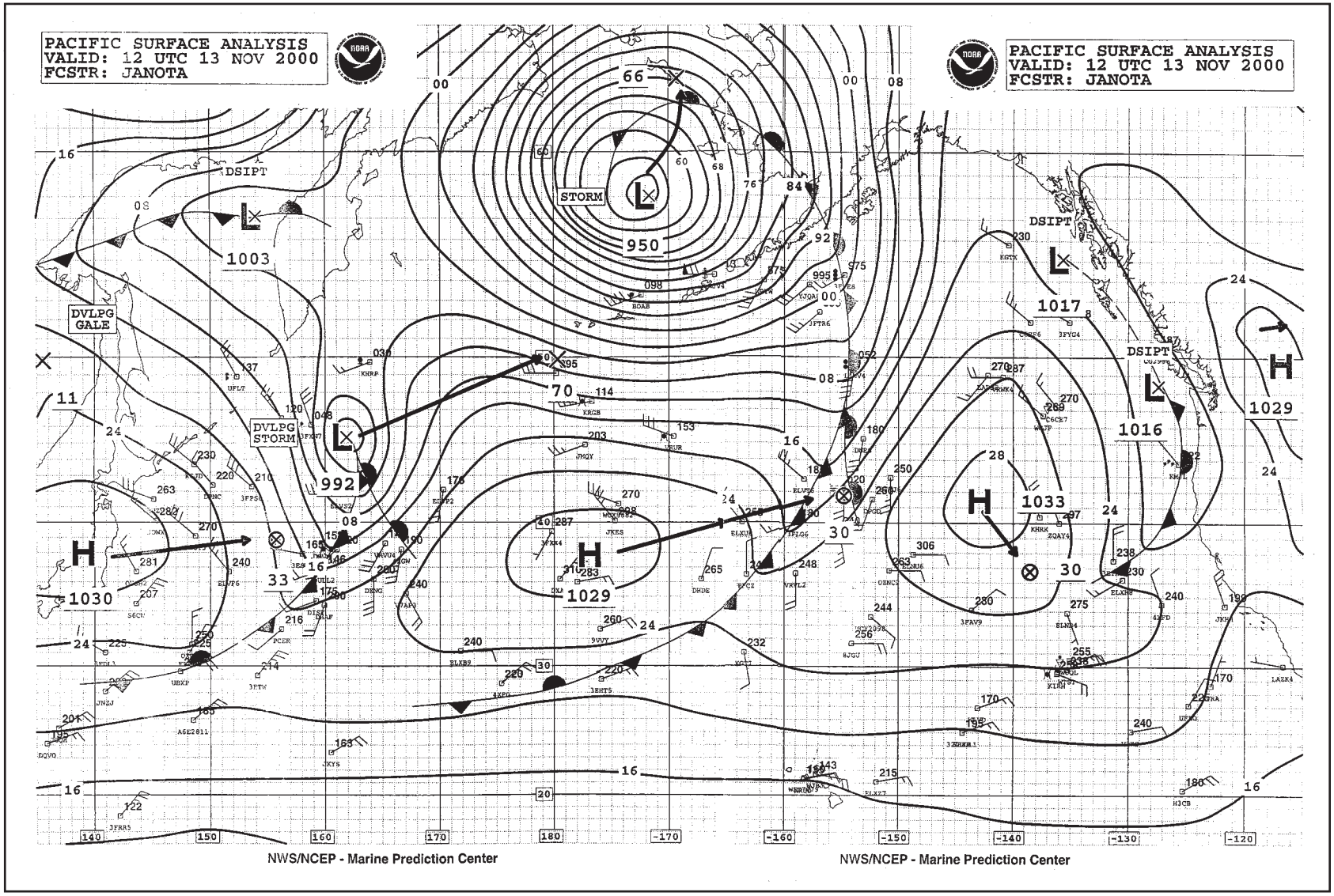


Figure 6. MPC North Pacific Surface Analysis chart valid at 1200 UTC November 13, 2000.

North Pacific Area

Continued from Page 32

the middle of the month, when a series of large storms developed east of Japan or the Kurile Islands and moved toward the Aleutians and Bering Sea with hurricane-force winds. The most intense of these is shown in Figure 6 at maximum intensity with a central pressure of 950 mb. It had its origins near Japan early on November 10, taking three days to reach the eastern Bering Sea. During the 24-hour period prior to 0000 UTC November 12, the central pressure dropped 30 mb. The storm then lifted north and weakened near the Bering Strait late on the 14th. The maximum reported wind was 68 kt from the **Skaubryn (LAJV4)** near Dutch Harbor (Figure 6), and the maximum seas of 53 ft (16.2 m) were also observed by this ship. Earlier, at 0100 UTC November 13, the **Skaubryn** encountered south winds of 65 kt near the same location. To the south, the **CSX Enterprise (KRGB)** near 45N 170E reported northwest winds of 34 kt and 43 ft (13.1 m) seas at 0600 UTC November 12. The buoy **46035** (57N 177W) reported maximum winds of 47 kt with gusts to 60 kt from the northwest at 1700 UTC November 13.

A storm of similar intensity to the one above developed northeast of Japan late on November 14 and rapidly deepened late on the 16th to 952 mb near 51N 179W at 0000 UTC November 17. The system then became complex (or developed multiple centers) as it reached the eastern Aleutians (Figure 7), with the main center at 951 mb. The center had passed through an area of sparse ship data southwest of the center. Figure 8 is a QuikScat image of winds remotely sensed by satellite with the valid time of the pass 1921 UTC November 16. The image has 70 to 80 kt wind barbs on the back side of the storm near 50N 172E, with the center located near 51N 177E at that time. Later, at 1200 UTC November 17, the **Sea-Land Explorer (WGJF)** encountered southwest winds of 65 kt at 52N 179W. Six hours later, the same vessel reported from near Adak Island with a west wind of 45 kt and 45 ft (13.7 m) seas. The **Skaubryn (LAJV4)** reported a northwest wind of 45 kt and 42 ft (12.8 m) seas near 56N 175E at 0600 UTC November 17. The storm then began to weaken and drift north in the Bering Sea on the 18th.

A secondary developing storm center formed on the front associated with the storm above by 1800 UTC November 23, as shown in Figure 9. The parent center was dissipating in the Bering Sea at this time. The center deepened 24 mb in 24 hours before moving into Southeast Alaska (second part of Figure 9). The most notable observation taken in this storm was a 65 kt south wind and 41 ft (12.5 m) seas from the **Sea-Land Tacoma (KGTY)** at 0500 UTC November 23, or one hour before map time in the second analysis of Figure 9.

Late in November, low-pressure systems were active along a more southern track south of 40N, a pattern not seen much during this four-month period. Some of these produced storm force winds. One of these, after tracking east toward California, turned north northeast on a track similar to that of the storm in Figure 9. Figure 10 shows the motion and development of this storm during a 24-hour period, with the maximum intensity of 968 mb reached at 1800 UTC November 30. In the second part of Figure 10, the **Sea-Land Kodiac (KGTZ)** appears near the Queen Charlotte Islands with a southeast wind of 65 kt.

In early December, with high pressure developing over the eastern Pacific, the stronger systems were directed more north toward the Bering Sea. A large vertically stacked storm system developed in the Bering Sea by the 7th, which became as deep as 948 mb on December 13th near the Western Aleutians (not shown). This system lingered over the Bering Sea for a week before becoming absorbed by a gale center passing south of the Aleutians.

Reference

Sienkiewicz, J. and Chesneau, L., *Mariner's Guide to the 500-Millibar Chart* (Mariners Weather Log, Winter 1995).⚓

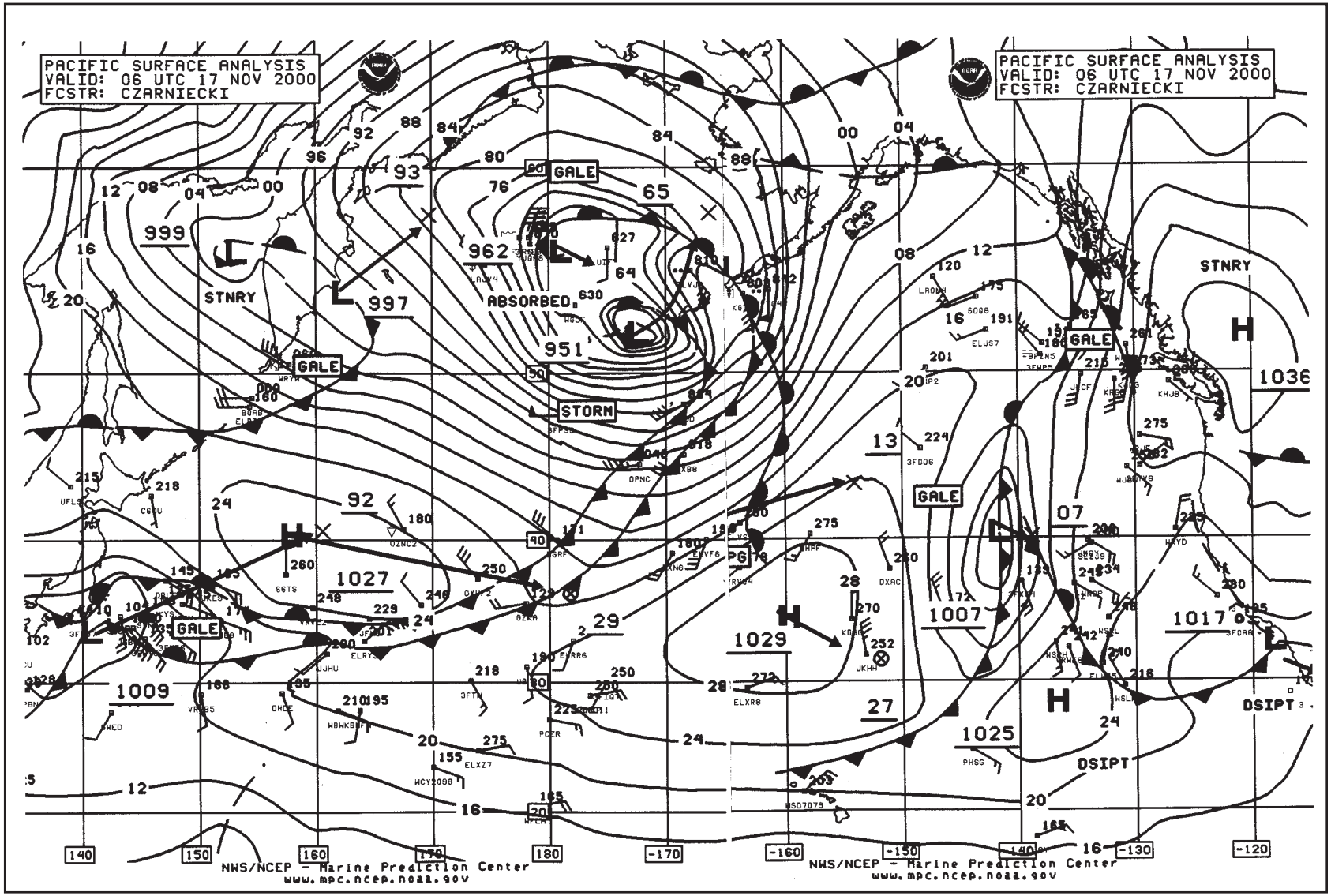


Figure 7. MPC North Pacific Surface Analysis chart valid at 0600 UTC November 17, 2000.

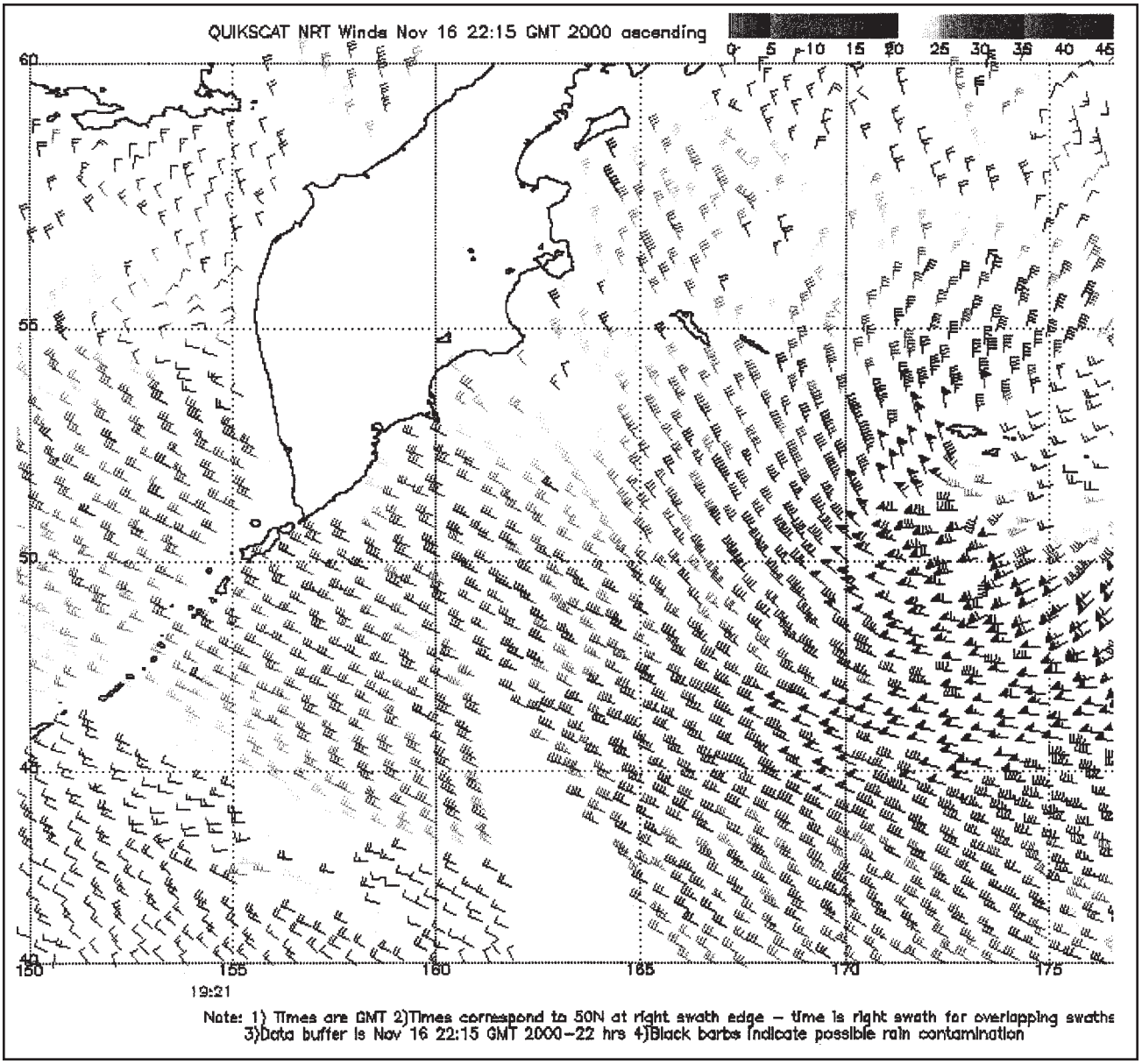


Figure 8. QuikScat scatterometer image of winds remotely sensed by satellite. Valid time of the pass is 1921 UTC November 16, 2000. Image courtesy of NOAA/NESDIS/Office of Research and Applications.

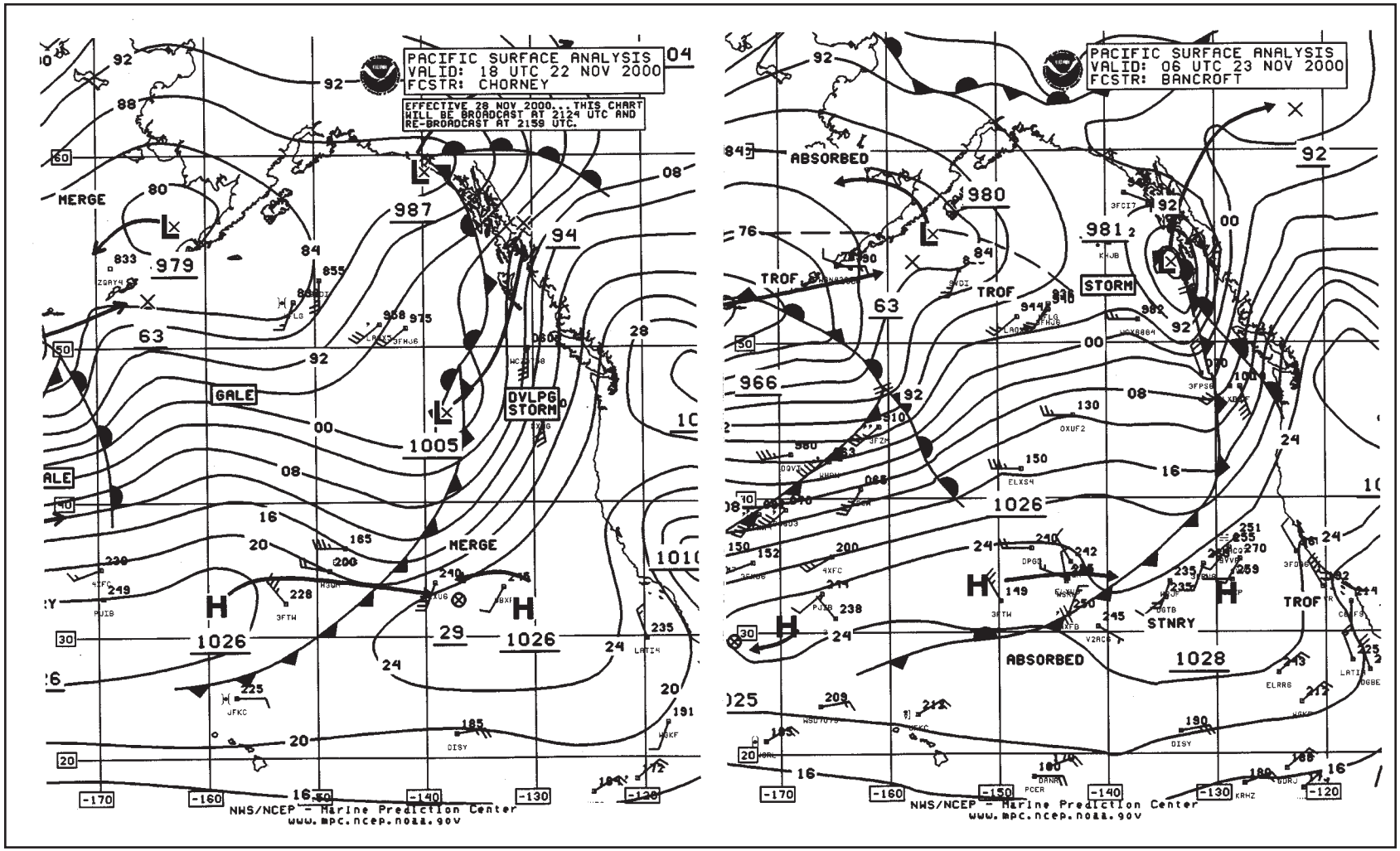


Figure 9. MPC North Pacific Surface Analysis charts (Part 1) valid at 1800 UTC November 22 and 0600 UTC November 23, 2000.

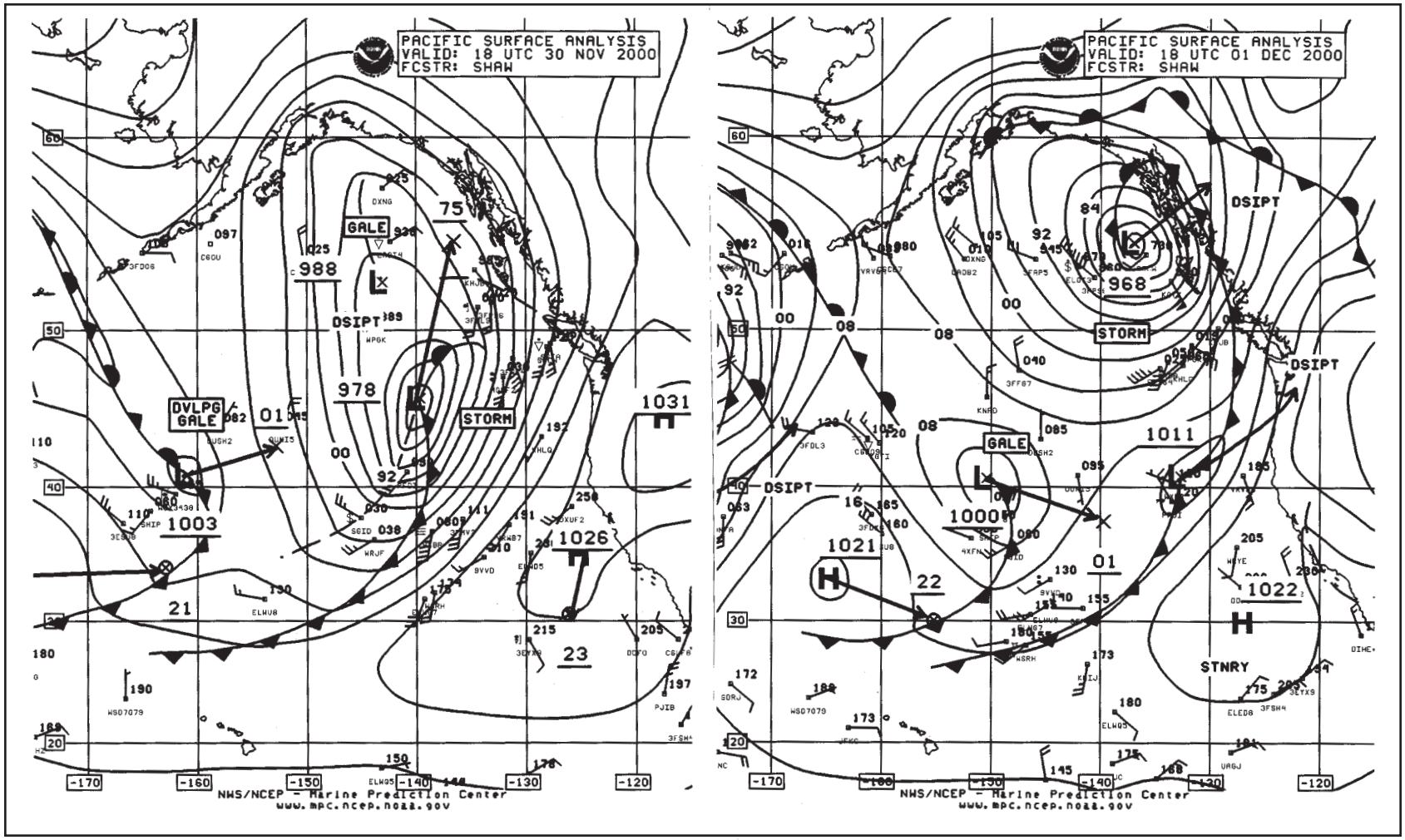


Figure 10. MPC North Pacific Surface Analysis charts (Part 1) valid at 1800 UTC November 30 and 1800 UTC December 1, 2000.

Tropical Atlantic and Tropical East Pacific Areas—September through December 2000

Dr. Jack Beven
National Hurricane Center

Daniel Brown
Tropical Analysis and Forecast Branch
Tropical Prediction Center
11691 SW 17th Street
Miami, FL 33149-2165

I. Introduction

The busy 2000 hurricane season continued at the Tropical Prediction Center (TPC) with a total of eighteen tropical and subtropical cyclones forming during the period.

II. The Koeln Express and Tropical Storm Helene

Many ships have encountered tropical cyclones, but it is uncommon for a ship to encounter the same cyclone twice in two different parts of the ocean. Such was the fortune of the **Koeln Express (call sign 9VBL)**, which encountered Tropical Storm Helene in both the Gulf of Mexico and the North Atlantic Ocean (see page 24).

During the first encounter on September 20, Helene was a poorly-defined tropical depression in the southeastern Gulf of Mexico (Figure 1). The **Koeln Express** reported maximum winds of 27 kt at 2200 UTC that day and a minimum pressure of 1008.7 mb two hours earlier. These measurements agreed well with earlier data from a reconnaissance aircraft.

The second encounter was more serious. Helene moved eastnortheastward off the North Carolina coast on September 24 and accelerated into the Atlantic. It caught up with the **Koeln Express** early on the 25th (Figure 2). Table 1 shows the hourly data reported by the ship as the storm passed, with a maximum wind of 56 kt at 0600 UTC on the 25th and a minimum pressure of 988.2 mb

Continued on Page 46

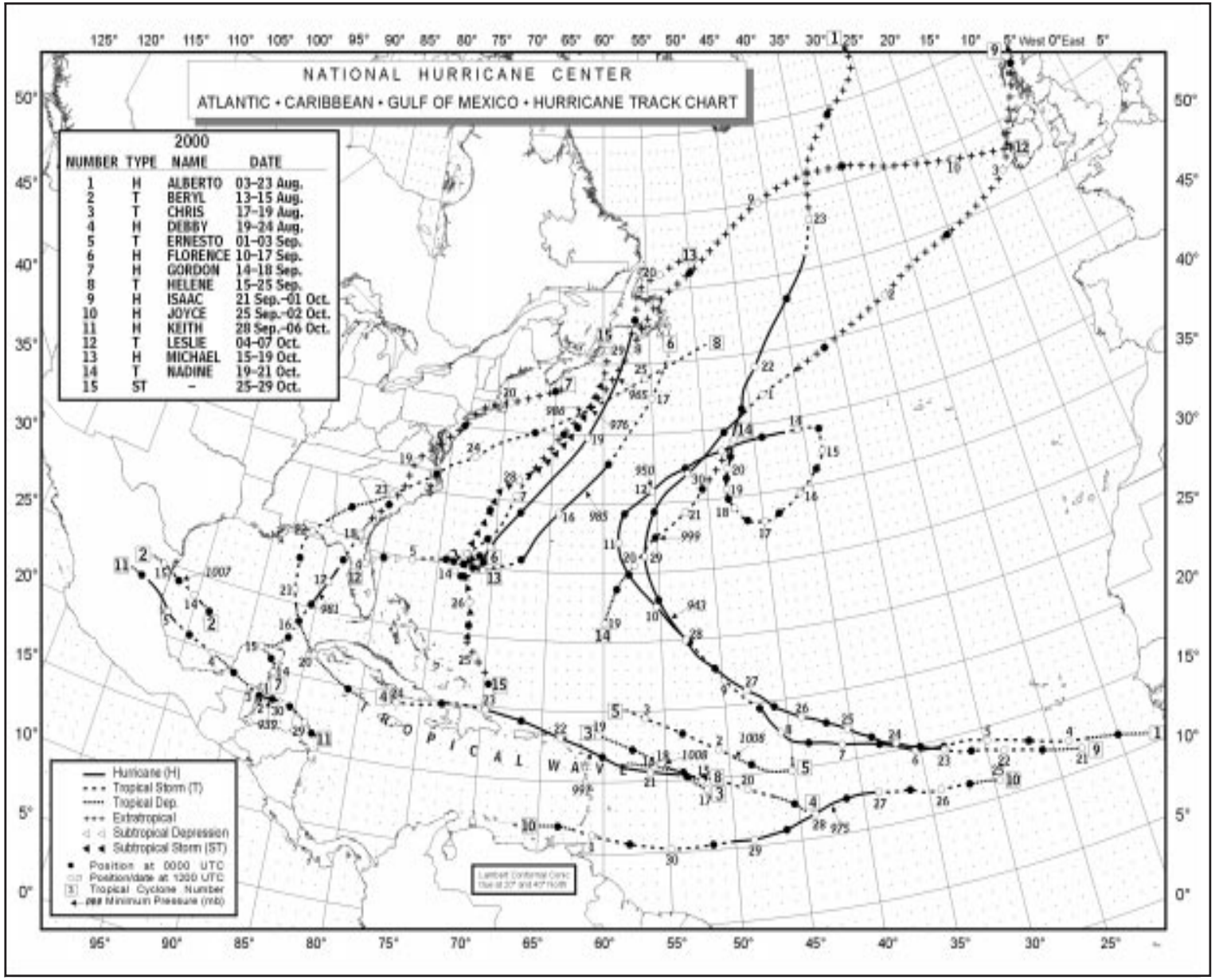


Figure 1. Tracks of Atlantic hurricanes, tropical storms, and subtropical storms of 2000.

Tropical Prediction Center

Continued from Page 44

one hour later. Notice that the winds sharply increase to their maximum just as the center passes, and the pressure changes rapidly (8-10 mb) during the three hours before and after the center passes. These details indicate Helene still had the characteristics of a tropical cyclone, despite having passed over land and accelerated into the westerlies. Based on post-analysis of these data, the final best track of Helene was extended into the Atlantic as a tropical storm rather than an extratropical cyclone.

This encounter again highlights the importance of frequent weather reports when a ship is near a tropical cyclone. The intense part of the storm only lasted a few hours on the **Koeln Express**, with tropical storm winds lasting only seven hours. Normal six-hourly ship reports would have been insufficient to resolve the tight inner core if the peak conditions had not coincided with the 0600 UTC reporting time. Ships near the core of a tropical cyclone (or even near the core of intense extratropical cyclones) are asked to send observations at least every three hours.

III. Significant Weather of the Period

A. Tropical Cyclones: Eleven tropical cyclones and one sub-tropical cyclone were observed in the Atlantic basin during the

Continued on Page 47

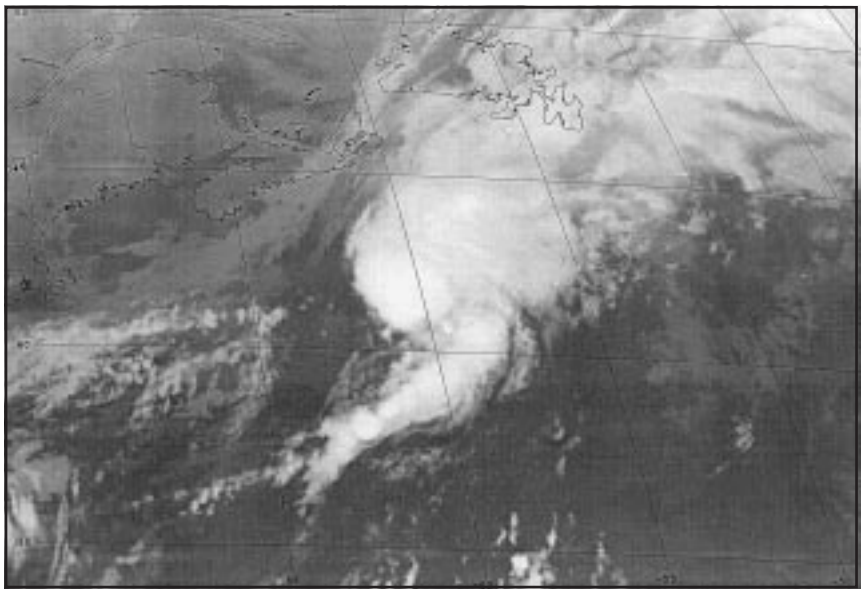


Figure 2. GOES8 infrared image of Tropical Storm Helene at 0645 UTC September 25, 2000.

Date/Time (UTC)	Lat. (°N)	Lon. (°W)	Wind dir/speed (deg/kt)	Pressure (mb)
24/2100	39.7	65.1	180/21	1006.8
24/2200	39.9	64.7	190/27	1006.6
24/2300	40.0	64.3	190/27	1006.0
25/0000	40.1	64.4	190/29	1005.5
25/0100	40.3	63.6	180/29	1005.2
25/0200	40.4	63.3	180/29	1003.6
25/0300	40.5	62.9	170/35	1001.7
25/0400	40.6	62.5	180/41	999.5
25/0500	40.8	62.1	180/41	997.3
25/0600	40.9	61.7	170/56	991.6
25/0700	41.0	61.3	260/47	988.2
25/0800	41.2	60.9	290/41	995.6
25/0900	41.3	60.6	280/35	1000.1
25/1000	41.4	60.2	290/35	1001.7
25/1100	41.6	59.8	280/27	1003.3
25/1200	41.6	59.4	280/27	1004.8
25/1300	41.7	59.0	290/23	1006.8

Table 1. Observations from the *Koeln Express* during its second encounter with Tropical Storm Helene, September 24-25, 2000.

Tropical Prediction Center

Continued from Page 46

period. This activity included one tropical depression, four tropical storms, and six hurricanes, two of which became Category 4 hurricanes on the Saffir-Simpson Hurricane Scale. The eastern North Pacific basin saw one hurricane and five tropical storms form during the period, as well as Tropical Storm Kristy, which formed on August 31.

1. Atlantic

Tropical Storm Ernesto: A tropical wave that moved westward from the African coast on August 28 spawned a tropical depression about midway between the Lesser Antilles and Africa on September 1 (Figure 1). Moving west-northwestward, the cyclone became Tropical Storm Ernesto the next day. Ernesto peaked at 35 kt, then quickly weakened and dissipated on September 3 about 250 n mi northeast of the northern Leeward Islands. There are no reports of damage, casualties, or tropical storm winds.

Tropical Depression Nine: This depression formed about 160 n mi south of Lake Charles, Louisiana, on September 8 (Figure 3). Moving north-northwestward, the poorly-defined center moved ashore near Sabine Pass, Texas, the next day and quickly dissipated.

The maximum sustained winds were 30 kt. Gusts to 39 kt were reported at buoy **42001** at 2100 UTC September 8, with gusts to 36 kt at buoy **42041** one hour later. Rainfall associated with this depression affected portions of Louisiana and Mississippi. There are no reports of damage or casualties.

Continued on Page 48

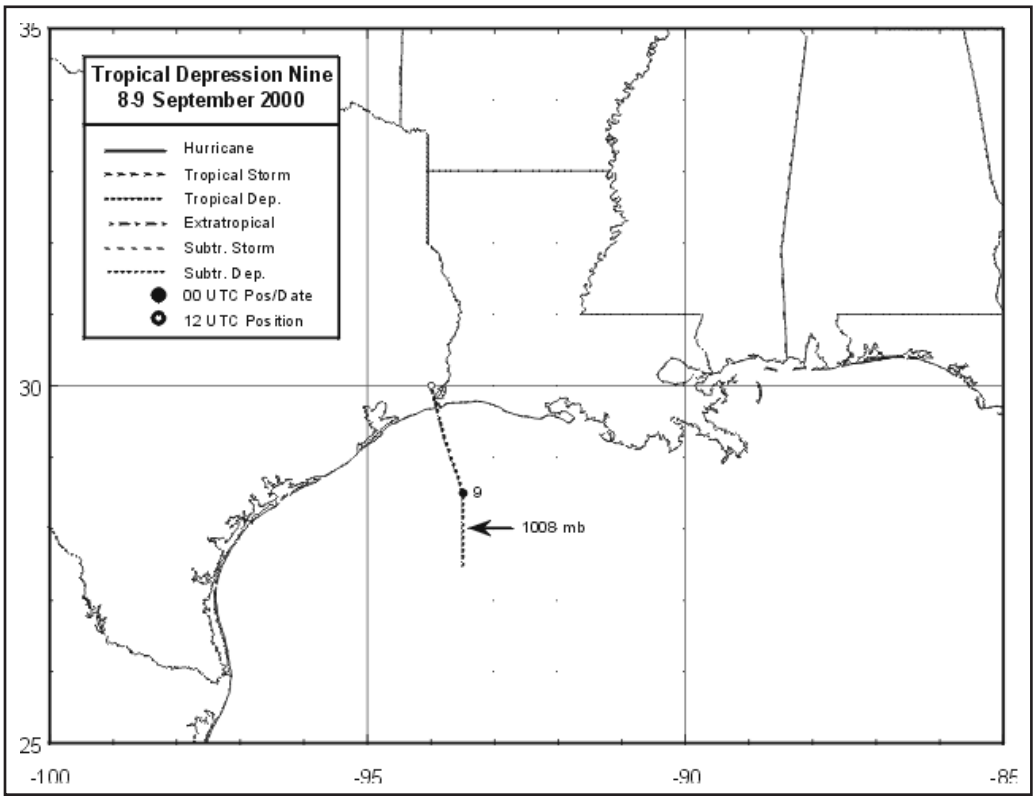


Figure 3. Track of Tropical Depression Nine, September 8-9, 2000.

Tropical Prediction Center

Continued from Page 47

Hurricane Florence: A cold front moved off the U.S. east coast during the first week of September. A frontal wave developed on the 8th and acquired subtropical depression characteristics by the 10th, when it was about 325 n mi west-southwest of Bermuda (Figure 1). Further organization was rapid, and on the 11th the cyclone became a tropical depression, a tropical storm, and then a hurricane. Florence meandered generally westward for the next two days, weakening back to a tropical storm on the 13th. A southward drift on September 14 was followed by a faster eastward to east-northeastward motion the next day. Florence accelerated northeastward on the 16th, at which time it regained hurricane status. A peak intensity of 70 kt occurred later that day. Florence again weakened to a tropical storm on 17 September, and the circulation merged with a cold front later that day.

Florence passed about 65 n mi northwest of Bermuda near 0800 UTC September 16. The island reported sustained winds of 36 kt with gusts to 50 kt at 0400 UTC that day. Three ships reported tropical storm winds during Florence: (1) The **Global Mariner (WWXA)** reported 49 kt and a 1005.2 mb pressure at 0000 UTC September 17, (2) the **Cap Verde (ELVO3)** reported 39 kt and a 1009.0 mb pressure at 0000 UTC September 11, and (3) the **Duncan Island (C6JS)** reported 34 kt and a 1007.0 mb pressure at 1200 UTC September 17.

Rips currents associated with swells from Florence were blamed for three deaths on the North Carolina coast. There are no reports of damage.

Hurricane Gordon: A tropical wave that emerged from the African coast on September 4 entered the eastern Caribbean Sea on September 9-10. It continued westward and became better organized on September 12, and a tropical depression formed from it on September 14 near the east coast of the Yucatan Peninsula. The cyclone moved northwestward while over land, then turned northeastward upon moving into the Gulf of Mexico on the 15th. The depression became Tropical Storm Gordon on the 16th and Hurricane Gordon by 0000 UTC on the 17th. Gordon's winds reached 70 kt later that day, at which time an Air Force Reserve Hurricane Hunter aircraft measured a minimum central pressure of 981 mb. This was followed by weakening to a tropical storm. The storm made landfall near Cedar Key, Florida, about 0300 UTC September 18. It merged with a cold front and became extratropical later that day.

Tropical storm winds affected portions of the Florida west coast, with Cedar Key reporting 45 kt sustained winds and gusts to 59 kt at 0110 UTC September 18. The lowest reported pressure was 997.6 mb at Cross City, Florida, at 0300 UTC on the 18th. Table 2 shows selected ship and buoy observations from Gordon. The most significant observation was from the **P&O Nedlloyd Genoa (MYMX5)**, which reported 64 kt winds and a 999.9 mb pressure at 2100 UTC September 16. This helped in determining that Gordon had reached hurricane strength.

Gordon is blamed for 23 deaths from flooding in Guatemala, many of which probably occurred during the pre-depression stage. One death from high surf was reported from the Florida Panhandle. Damage in the United States is estimated at $10.8 million.

Tropical Storm Helene: A tropical wave that moved off the African coast on September 10 briefly developed into a tropical depression over the tropical Atlantic on the 15th (Figure 1). Although the cyclone weakened to a wave the next day, it brought locally heavy rains and gusty winds to the Leeward Islands on the 17th. The wave continued westward and re-developed into a depression northwest of Grand Cayman Island on the 19th. The depression moved northwest into the Gulf of Mexico on the 20th and became Tropical Storm Helene on the 21st. The northward-moving storm strengthened to 60 kt later that day before vertical shear caused weakening. Helene made landfall near Fort Walton Beach, Florida, around 1100 UTC on the 22nd as a minimal tropical storm and quickly weakened to a depression.

Continued on Page 49

Tropical Prediction Center

Continued from Page 48

The depression moved northeastward across the southeastern United States and began to re-intensify while over North Carolina. Helene regained tropical storm status just before moving into the Atlantic on the 23rd, and once again reached 60 kt as the storm accelerated northeastward on the 24th-25th. Helene was absorbed by a frontal system later on the 25th.

In addition to the reports from the **Koeln Express** (section II), in the Gulf of Mexico, the **Cherry Valley (WIBK)** reported 54 kt winds at 2100 UTC September 21, with 47 kt and a 1004.1 mb pressure an hour later. In the Atlantic, the **Global Mariner** reported 52 kt winds and a 999.5 mb pressure at 0600 UTC on the 25th. Sustained tropical storm winds were reported at automated stations on the North Carolina coast, with the Diamond Shoals Coastal Marine Automated Network (C-MAN) station reporting 51 kt with gusts to 61 kt (at an elevation of 46.6 m or 153 ft) at 2243 UTC on the 23rd. Gusts to tropical storm force were reported along the coast of the Florida Panhandle.

One person was killed by a Helene-spawned tornado in South Carolina. The U.S. damage estimate is $16 million.

Hurricane Isaac: A strong tropical wave that emerged from the African coast on September 20 spawned a tropical depression a couple of hundred miles south of the Cape Verde Islands the next day (Figure 1). The cyclone became Tropical Storm Isaac on the 22nd and Hurricane Isaac on the 23rd as it moved west-northwestward. The hurricane strengthened to 105 kt on the 24th, followed by weakening to 75 kt by the 26th that was partly due to vertical shear. Isaac re-intensified on the 27th, with an estimated peak intensity of 120 kt occurring later that day as the hurricane turned northwestward (Figure 4). A gradual turn to the northeast occurred from September 29 to October 1, with Isaac passing about 440 n mi east of Bermuda on the 29th. Weakening occurred during the turn, and Isaac fell to tropical storm status on the 1st. It became extratropical later that day. Extratropical Isaac continued northeastward across the Atlantic, brushing the British Isles on October 3 before merging with a larger low the next day.

Continued on Page 50

Ship or Buoy (Name or ID)	Date/Time (UTC)	Lat. (°N)	Lon. (°W)	Wind dir/speed (deg/kt)	Pressure (mb)
OOCL Innovation	16/1500	25.8	86.9	120/35	1010.5
Federal Kivalina	16/1800	25.6	87.0	110/42	1009.0
P&O Nedlloyd Genoa	16/2100	25.1	85.0	090/64	999.9
Chevron Arizona	17/0000	24.9	83.8	150/52	1004.2
42003	17/0020	25.9	85.9	345/43[a]	999.6
Liberty Sun	17/0600	24.9	84.1	210/45	1006.8
42036	17/2100	28.5	84.5	340/37[b]	1003.8
Celebration	18/1200	27.3	83.4	190/45	1008.3

[a] 10-min average
[b] 8 min average

Table 2. Selected ship and buoy observations of 34 kt or greater winds for Hurricane Gordon, September 14-18, 2000.

Tropical Prediction Center

Continued from Page 49

Ships avoided Isaac's large circulation for the most part. The **Seabulk Debbie (DEBB)** reported 52 kt winds at 1800 UTC September 30, and the **Saudi Makkah (HZQZ)** reported 40 kt at that time. While no damage is attributed to Isaac, surf from swells generated by the hurricane caused one death on Long Island, New York.

Hurricane Joyce: A tropical wave that moved off the African coast on September 22 developed into a tropical depression on the 25th about 350 n mi southwest of the Cape Verde Islands (Figure 1). The cyclone became Tropical Storm Joyce on the 26th and a hurricane the following day as it moved generally westward. Joyce reached a peak intensity of 80 kt on the 28th. This was followed by weakening to a tropical storm on the 29th. A continued westward motion took Joyce through the Windward Islands on October 1 as a weak tropical storm. The cyclone weakened to a depression over the southeastern Caribbean Sea later that day and dissipated on the 2nd.

There are no marine reports of tropical storm force winds from Joyce. Barbados reported 30 kt sustained winds with gusts to 40 kt as the center passed about 120 n mi to the south on October 1. There are no reports of damage or casualties.

Hurricane Keith: A tropical wave that moved off the African

Continued on Page 51

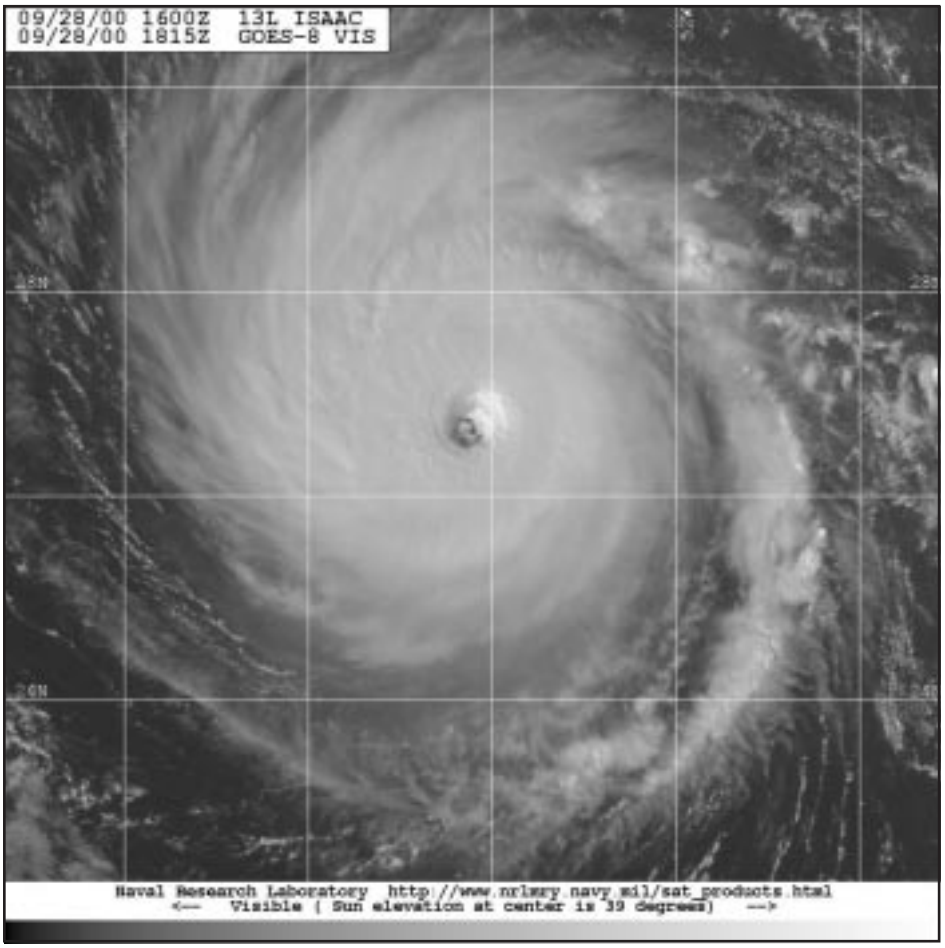


Figure 4. GOES8 visible image of Hurricane Isaac near peak intensity at 1815 UTC September 28, 2000. Image courtesy of Naval Research Laboratory, Monterey, California.

Tropical Prediction Center

Continued from Page 50

coast on September 16 moved into the western Caribbean Sea by September 27, where it became better organized. A tropical depression formed from it on the 28th about 60 n mi north-northeast of Cape Gracias a Dios, Nicaragua (Figure 1). Moving northwestward, the cyclone became Tropical Storm Keith the next day. Keith strengthened very rapidly, and by early on October 1 winds had increased to the peak intensity of 120 kt with an aircraft-measured minimum pressure of 939 mb. The hurricane slowed and turned westward during this time, and by late on the 1st the eye was just southeast of Ambergris Cay and Caye Caulker, Belize (Figure 5). Keith moved little for the next 36 hours while steadily weakening. Maximum sustained winds had decreased to 60 kt when the center finally made landfall on the Belize mainland around 0300 UTC on the 3rd. A general west-northwestward motion then began which continued for the rest of Keith's life. Keith weakened to a tropical depression over the Yucatan Peninsula on the 3rd, then it regained tropical storm status over the Bay of Campeche the next day. The cyclone continued to strengthen until it made landfall as an 80 kt hurricane just north of Tampico, Mexico, around 1800 UTC on the 5th. It dissipated over northeastern Mexico the next day.

The only ship known to have encountered Keith was the **Edyth L (C6YC)** which reported 60 kt winds and a 1009 mb

Continued on Page 52

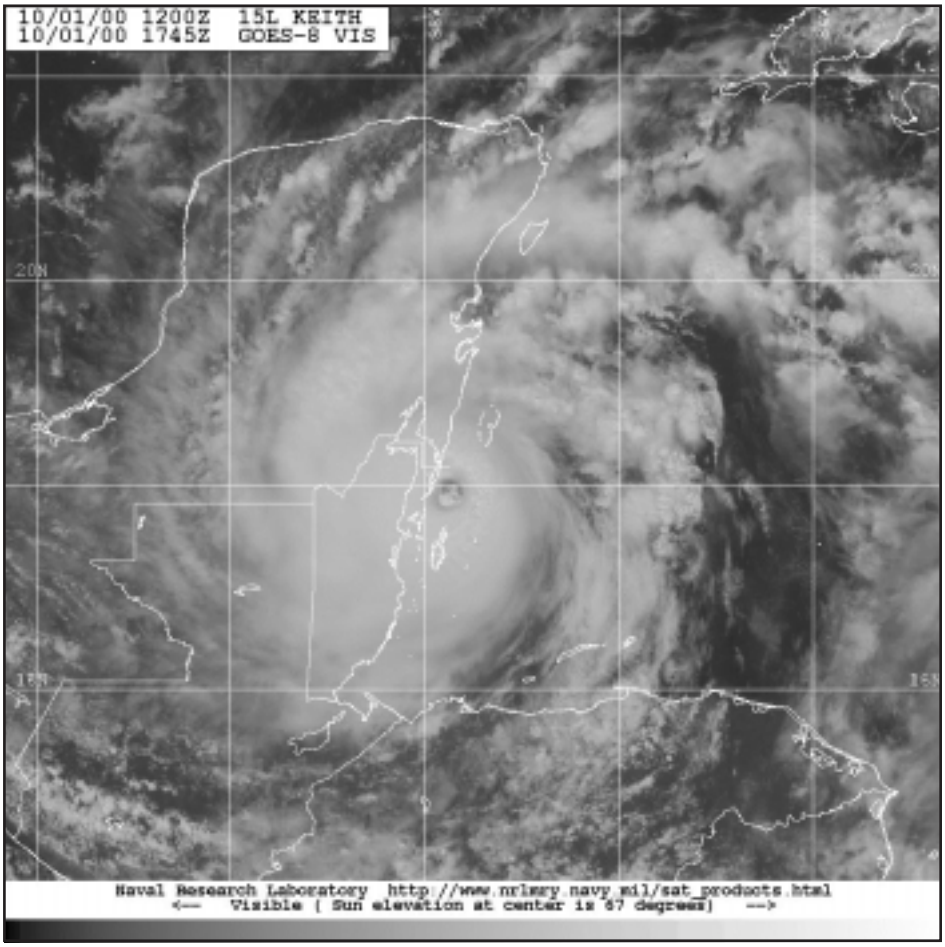


Figure 5. GOES8 visible image of Hurricane Keith at 1745 UTC October 1, 2000. Image courtesy of the Naval Research Laboratory, Monterey, California.

Tropical Prediction Center

Continued from Page 51

pressure at 1800 UTC September 30. The highest winds at a land station were 40 kt with gusts to 55 kt at Tampico at 1445 UTC on October 5. There are unofficial reports from amateur radio operators of 90-110 kt winds on Ambergris Cay and Caye Caulker on the 1st.

Twenty-four deaths are associated with Keith, with many from flooding caused by prolonged rainfall from the slow moving storm. However, five of the deaths occurred when two catamarans moored in Belize broke loose during the storm. Damage estimates in Belize are near $225 million.

Tropical Storm Leslie: A tropical wave, which could have spawned Hurricane Isaac, moved into the central Caribbean Sea on September 29. The wave moved north-northwestward into the southeastern Gulf of Mexico by October 2 as it became better organized. The interaction of the wave, an old frontal system, and a jet stream, led to the formation of a subtropical depression over central Florida on the 4th (Figure 1). The depression moved northeastward and then eastward into the Atlantic and became Tropical Storm Leslie on the 5th. Leslie turned gradually northeastward on October 6-7 as it reached a peak intensity of 40 kt. It became extratropical about 325 n mi north-northwest of Bermuda later that day. The extratropical remains of Leslie moved rapidly northeastward and eastward across the Atlantic and was last seen approaching the British Isles on October 10.

The only observation of tropical storm winds was from the **Kent Voyageur (8PNK)**, which reported 36 kt winds at 0000 UTC October 6. There are no reports of damage and casualties from Leslie. However, the pre-Leslie disturbance was responsible for widespread heavy rains and flooding in southeastern Florida. The flooding caused $950 million in damage and was indirectly responsible for three deaths.

Hurricane Michael: A cold front moved off the U.S. southeast coast on October 7, followed by formation of a frontal low just east of the central Bahamas on October 12. The low moved erratically to a position about 650 n mi east of Jacksonville, Florida, by the 15th, when it acquired enough organized convection and separation from the front to become a subtropical depression (Figure 1). Further development led to the system becoming a subtropical storm on the 16th, a tropical storm early on the 17th, and a hurricane later on that day. Michael moved little from the 15th through the 17th. A northeastward motion began on the 18th with acceleration on the 19th. Michael reached a peak intensity of 85 kt late on the 19th (Figure 6), then became extratropical early on the 20th just before landfall in Newfoundland. The extratropical low could be tracked for one more day before it was absorbed by another low over the Labrador Sea.

Although Michael was extratropical as it hit Newfoundland, the storm produced hurricane-force winds. **Sagona Island** reported sustained winds of 69 kt with gusts to 93 kt. There are numerous reports of ship encounters with Michael, and selected observations are given in Table 3. The most significant observation was from the **MSC Xingang (3EHR6)**, which reported 80 kt winds and a 965.5 mb pressure at 1700 UTC October 19. This report was the basis for Michael's peak intensity.

There are no reports of casualties, and only minor damage was reported from Newfoundland.

Tropical Storm Nadine: A combination of a tropical wave and an upper-level trough produced a tropical depression about 600 n mi southeast of Bermuda on October 19 (Figure 1). The system moved notheastward and became Tropical Storm Nadine on the 20th with a peak intensity of 50 kt early on the 21st. Nadine became extratropical on the 22nd and was absorbed by a larger low later that day.

Winds of 40 kt were reported by the **Aalsmeergracht (PCAM)** and the **Figaro (S6PI)** at 0000 UTC and 1200 UTC October 21 respectively. A 33 kt wind reported by the **Prince of Waves (C6LP4)** at 1800 UTC on the 19th helped determine that a tropical depression had formed. There are no reports of damage or casualties.

Continued on Page 54

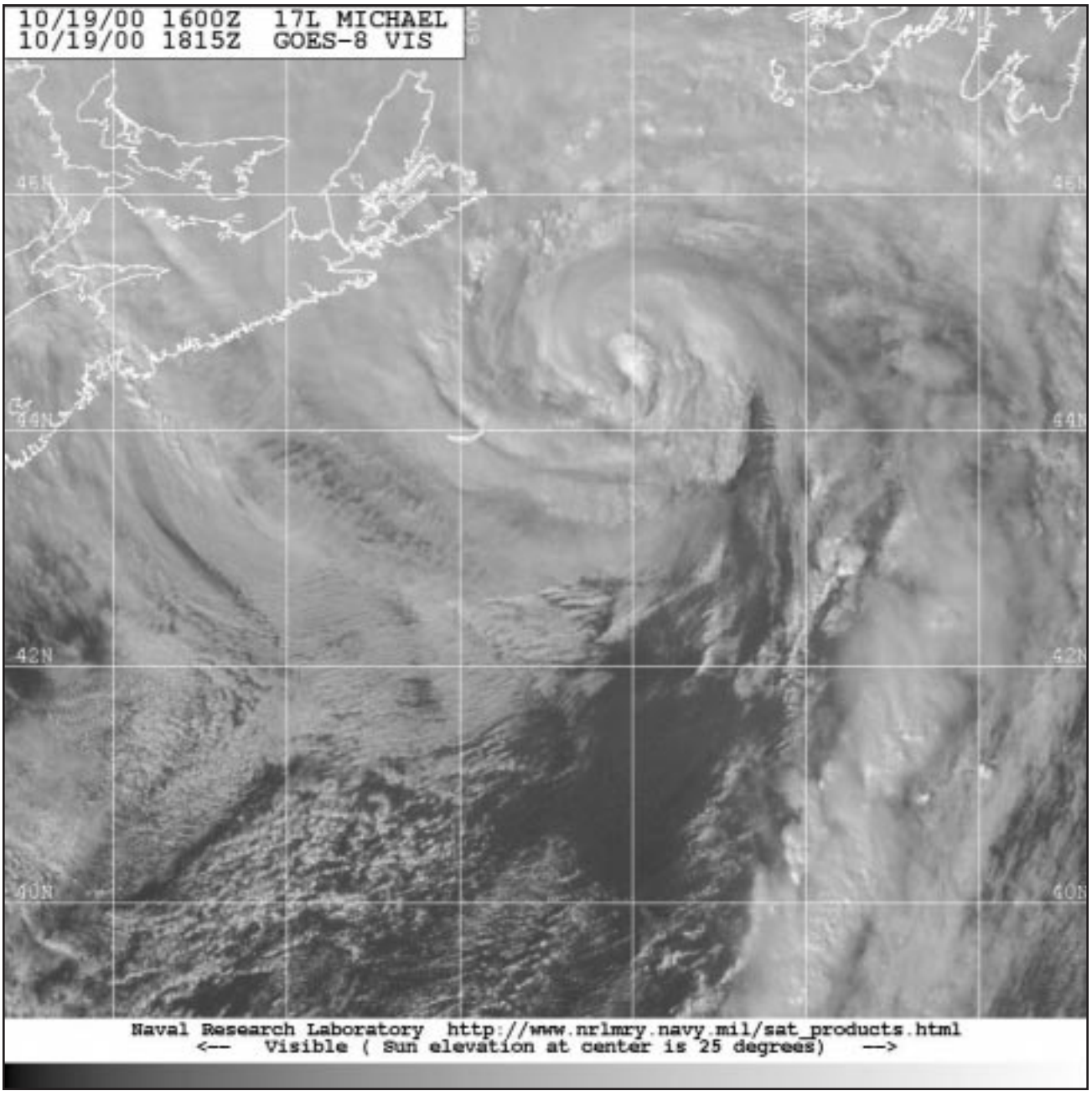


Figure 6. GOES8 visible image of Hurricane Michael near peak intensity at 1815 UTC October 19, 2000. Image courtesy of the Naval Research Laboratory, Monterey, California.

Tropical Prediction Center

Continued from Page 52

Unnamed Subtropical Storm: In a fashion similar to Michael two weeks earlier, a non-tropical low formed along an old frontal system just east of the Turks and Caicos Islands on October 25 (Figure 1). The low moved northwestward and quickly became a gale center, and by late that day it had developed enough organized convection that a post-storm analysis indicates it became a subtropical storm. The storm moved northward and north-northwestward on the 26th, followed by a north-northeastward turn and acceleration on the 27th. It then turned northeastward with further acceleration on the 28th while reaching a peak intensity of 55 kt. The cyclone became extratropical near Sable Island, Nova Scotia, early on the 29th and lost its identity near eastern Nova Scotia later that day.

Sable Island reported 35 kt winds at 0700 UTC on October 29 with a minimum pressure of 980.6 mb an hour earlier. The storm affected many ships and buoys, with selected observations listed in Table 4. The **Nomzi (MTQU3)** reported 46 kt winds at 0000 UTC on the 29th, while Canadian buoy **44137** reported 39 kt winds and a 979.1 mb pressure two hours later. There are no reports of damage or casualties.

2. Eastern Pacific

Tropical Storm Kristy: An area of disturbed weather, possibly associated with a tropical wave, developed into a tropical depression on August 31 about 1350 n mi west southwest of Cabo San Lucas (Figure 7). The cyclone moved little during its lifetime. It briefly became a minimal tropical storm on September 2, followed by weakening and dissipation the next day. There are no reports of damage, casualties, or tropical storm winds.

Hurricane Lane: A tropical wave that moved off the African coast

Continued on Page 55

Ship or Buoy (Name or ID)	Date/Time (UTC)	Lat. (°N)	Lon. (°W)	Wind dir/speed (deg/kt)	Pressure (mb)
El Yunque	17/1800	26.1	75.3	310/37	1012.7
WPJG	18/1500	30.9	70.7	270/36	1004.5
Lok Pratap	18/2100	31.8	68.4	220/50	1004.8
Star Fraser	19/0000	34.9	67.4	120/37	999.0
Ever Right	19/1200	41.4	55.0	180/39	1010.6
TMM Mexico	19/1200	38.1	60.4	180/57	1001.0
Faust	19/1200	38.0	58.0	170/42	1007.0
MSC Xingang	19/1700	43.0	59.4	180/80	965.5
Gotland Spirit	19/1800	43.3	60.3	270/40	974.0
OOCL Innovation	19/1800	39.8	58.4	250/38	1001.8
44139	19/1800	44.3	57.4	140/43[a]	983.5
44255	19/2100	47.3	57.4	040/37[a]	976.1

[a] 10-min average

Table 3. Selected ship and buoy observations of 34 kt or greater winds associated with Hurricane Michael, October 15-19, 2000.

Tropical Prediction Center

Continued from Page 54

on August 20 moved into the Pacific on the 29th. After slow and erratic development, a tropical depression formed about 140 n mi southwest of Manzanillo, Mexico, on September 5 (Figure 7). The depression became a tropical storm later that day. From September 6-8, Lane made a counterclockwise loop while the maximum winds varied from 35-50 kt. The storm turned northwestward late on the 8th, and Lane became a hurricane before passing over Socorro Island on the 9th. It reached a peak intensity of 85 kt with a 50-60 n mi-wide eye on the 10th (Figure 8), which coincided with a west-northwestward turn that lasted into the next day. Lane weakened to a tropical storm on the 11th, then gradually turned northward on October 12-13 while weakening to a depression. The cyclone dissipated about 250 n mi west of San Diego, California, on the 14th.

During the loop, Lane developed a large circulation which later affected Socorro, portions of the Mexican coast, and several ships (Table 5). San Jose del Cabo, Mexico, reported a 40 kt gust at 1850 UTC September 9, and Socorro Island reported a 973.7 mb pressure at 1500 UTC that day. There are no reports of damage or casualties.

Tropical Storm Miriam: A tropical wave that moved off the African coast on August 29 moved into the Pacific on September 9. After several days of slow motion and development, a tropical

Continued on Page 58

Ship or Buoy (Name or ID)	Date/Time (UTC)	Lat. (°N)	Lon. (°W)	Wind dir/speed (deg/kt)	Pressure (mb)
Advantage	25/0600	26.8	70.1	050/37	1011.0
Dock Express 20	25/1200	27.0	68.9	050/45	1009.0
Splendour of the Seas	25/1800	28.6	65.2	070/40	1015.0
Guayama	26/1200	27.1	74.6	010/40	1007.0
Pacific Crane	27/0600	35.4	67.5	110/38	1015.6
Iver Express	28/0000	29.3	71.1	230/38	1007.5
Wilson	28/0000	29.1	69.7	250/35	1011.5
Mignon	28/0000	35.0	73.8	020/44	N/A
Charles Island	28/1800	40.5	67.9	360/35	1000.0
Buoy 44008	28/1900	40.5	69.4	350/35[b]	1005.7
Nomzi	29/0000	37.3	65.8	320/46	1004.7
Buoy 44137	29/0200	41.8	60.9	160/39[a]	979.1
WCY5331	29/0300	43.8	60.6	130/45	985.7
Buoy 44141	29/0500	42.1	56.2	170/37[a]	998.1
Northern Venture	29/0600	40.1	58.3	180/42	1001.3

[a] 10-min average
[b] 8 min average

Table 4. Selected ship and buoy observations of 34 kt or greater winds associated with the unnamed subtropical storm, October 25-29, 2000.

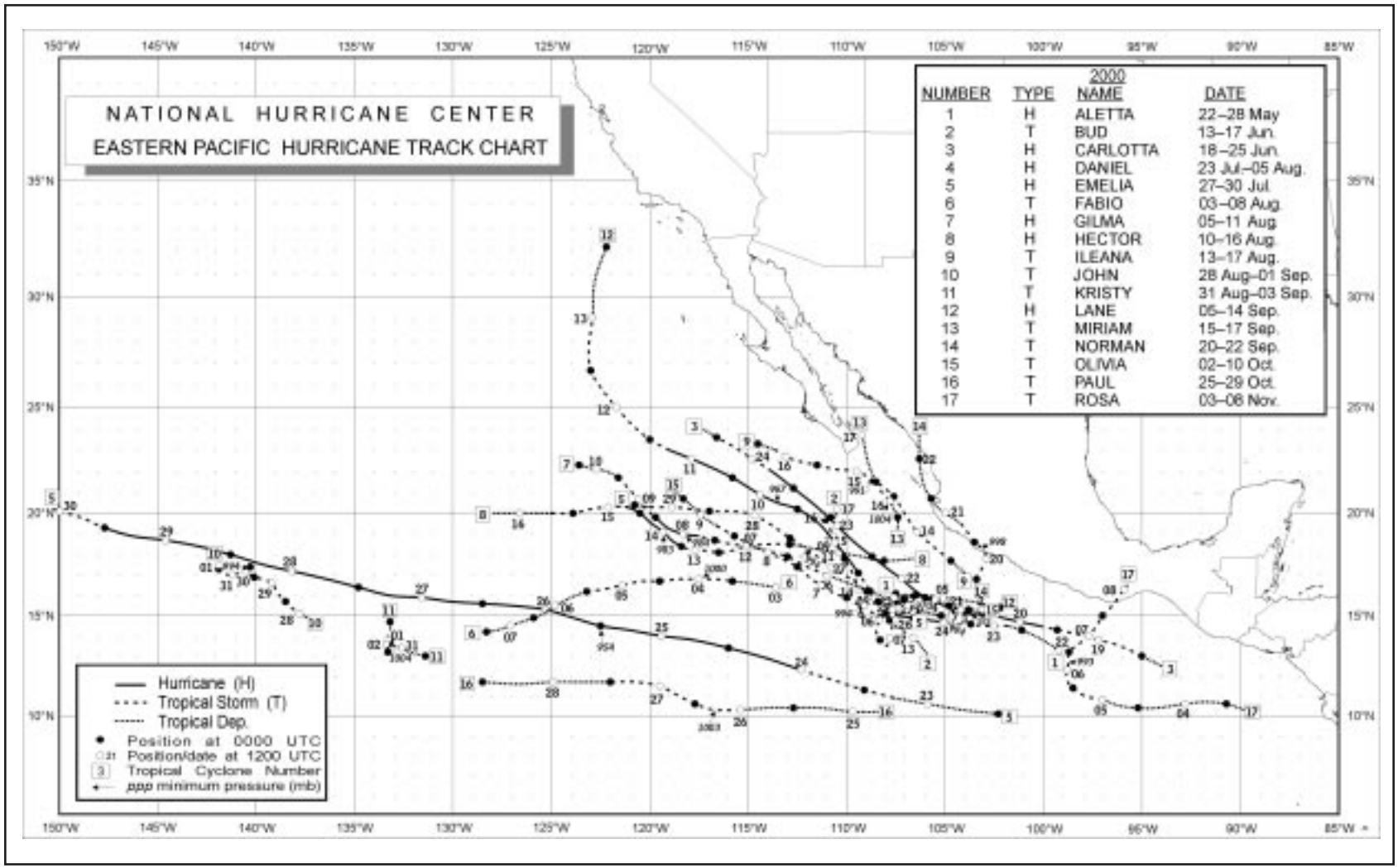


Figure 7. Tracks of eastern Pacific hurricanes and tropical storms of 2000.

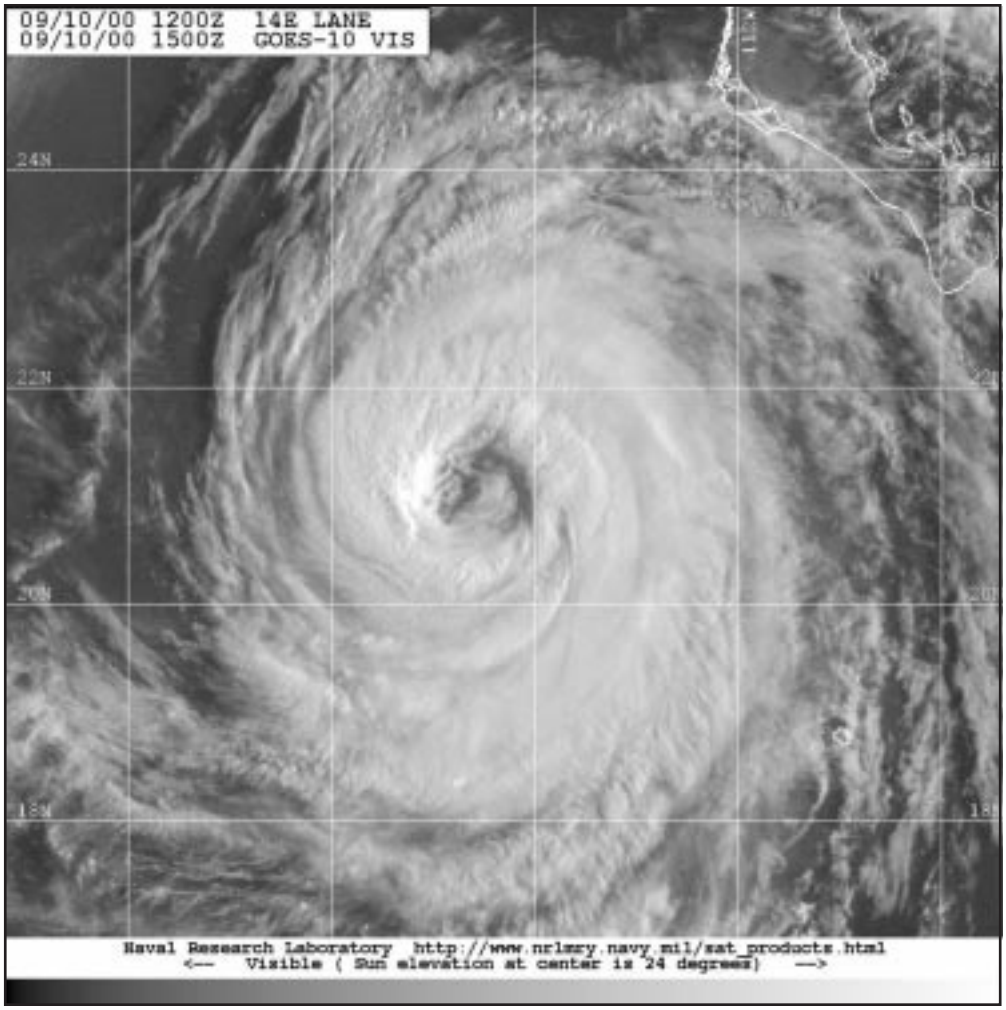


Figure 8. GOES10 visible image of Hurricane Lane near peak intensity at 1500 UTC September 10, 2000. Image courtesy of the Naval Research Laboratory, Monterey, California.

Ship (Name or ID)	Date/Time (UTC)	Lat. (°N)	Lon. (°W)	Wind dir/speed (deg/kt)	Pressure (mb)
ELXZ7	06/1500	13.8	109.4	310/34	1005.5
1st Lt Baldomero Lopez	08/1800	20.1	107.1	130/38	1006.0
St. Lucia	09/0600	20.0	107.2	130/42	1006.0
Sealand Voyager	09/1500	21.0	108.1	130/38	1003.9
Choyang Zenith	09/1500	22.6	110.5	080/43	1005.5
Ursula Rickmers	10/0900	23.2	112.0	100/37	1003.5

Table 5. Selected ship observations of 34 kt or greater winds associated with Hurricane Lane, September 5-14, 2000.

Tropical Prediction Center

Continued from Page 55

depression formed about 250 n mi south-southeast of Cabo San Lucas, Mexico, on the 15th. Initially moving northward, the cyclone turned north-northwestward and briefly became a 35 kt tropical storm on the 16th. Miriam weakened to a depression on the 17th due to vertical shear, and it dissipated later that day about 60 n mi northeast of Cabo San Lucas. There are no reports of damage, casualties, or tropical storm winds.

Tropical Storm Norman: A portion of the tropical wave that triggered Hurricane Gordon moved across Central America and Mexico from September 14-16. The system spawned a tropical depression on the 20th about 180 n mi south-southeast of Manzanillo, Mexico. The system drifted northward and became a 45 kt tropical storm just before landfall on the Mexican coast between Lazaro Cardenas and Colima late that day. Norman weakened to a depression over land on the 21st as it turned northwestward, then it moved over water near Puerto Vallarta late that day. No strengthening occurred before Norman made a final landfall near Mazatlan on the 22nd, and the cyclone dissipated later that day.

Norman was upgraded to a tropical storm based on two ships reports. The **Iwanuma Maru (3ESU8)** reported 38 kt winds and a 1001.5 mb pressure at 1200 UTC on September 20, while the **Star Grip (LADQ4)** reported 39 kt winds and a 1003.0 mb pressure an hour later. Although Norman produced heavy rains over portions of southern Mexico, there are no reports of damage or casualties.

Tropical Storm Olivia: A tropical wave that moved off the African coast on September 16 crossed into the Pacific the 28th. Development was slowed by vertical wind shear caused by Hurricane Keith over the Caribbean. However, a tropical depression formed on October 2 about 245 n mi south-southeast of Manzanillo (Figure 7). Moving generally westward, the cyclone became a tropical storm on the 3rd and reached a peak intensity of 55 kt later that day. Olivia maintained 55 kt winds into the 5th, followed by shear-induced weakening to a minimal tropical storm the next day. The storm turned west-northwestward later on the 6th and re-intensified, with a second peak intensity of 55 kt on the 8th. Olivia continued west-northwestward, weakening to a depression on the 9th and to a low pressure area on the 10th. The remnant low turned northeastward and moved into northwestern Mexico a few days later.

There are no reports of damage, casualties, or tropical storm winds. However, the remnant low did produce locally heavy rains across portions of northwestern Mexico and the southwestern United States.

Tropical Storm Paul: A disturbance in the Intertropical Convergence Zone developed into a tropical depression on October 25 about 775 n mi south of Cabo San Lucas (Figure 7). The cyclone moved westward through its lifetime except for a brief west-northwestward motion on the 26th-27th. The depression became Tropical Storm Paul on the 26th, with a peak intensity of 40 kt later that day. Paul weakened to a depression on the 28th and dissipated the next day about 1200 n mi southwest of Cabo San Lucas. There are no reports of damage, casualties, or tropical storm winds.

Tropical Storm Rosa: A tropical wave spawned a depression on November 3 about 215 n mi south-southwest of San Salvador, El Salvador (Figure 7). The system moved westward and became Tropical Storm Rosa on the 5th. Rosa turned northward and reached a peak intensity of 55 kt on the 6th, followed by weakening and a northeastward turn on the 7th. Rosa made landfall on November 8 near Huatulco, Mexico, as a minimal tropical storm and dissipated over land later that day. There are no reports of damage, casualties, or tropical storm winds.

B. Other Significant Events: The first non-tropical gale of the fall/winter season occurred in early October when a strong cold front produced gale force winds in the Western Gulf of Mexico. After a rather quiet November, several significant gale events occurred over the Atlantic south of 31N in December. By mid-December, as

Continued on Page 59

Tropical Prediction Center

Continued from Page 58

winter officially began, several strong cold fronts produced gale force winds over the Gulf of Mexico and western Atlantic. These cold fronts also produced an extended period of record cold temperatures across the eastern United States. Several of these cold fronts produced gale events in the Gulf of Tehuantepec.

1. Atlantic, Caribbean and Gulf of Mexico

Gulf of Mexico Cold Front October 7-10: The day after Hurricane Keith's final landfall, a strong early season cold front moved slowly southeastward off the Texas coast, producing gales over the western Gulf. By 0000 UTC October 7, the cold front was located from near New Orleans, Louisiana, west-southwest to Corpus Christi, Texas. At 1800 UTC that day the front was located from Cedar Key west-southwest through 27N 93W to near Tampico. A strong high pressure center over the north-central United States was building south across Texas and the Gulf northwest of the cold front. By 1200 UTC October 8 the front extend from Fort Myers, Florida, west through 25N 92W to the Mexican coast near 19N 96W. A 1044 mb high was over Nebraska with a strong pressure gradient over the southwest Gulf of Mexico.

The cold front and high pressure center continued to move slowly southeast during the next 24 to 36 hours. Several buoys over the northwest Gulf observed 30 kt sustained winds on October 8-9. However, no ship reports were received in the southwest Gulf where the strongest winds likely occurred. Veracruz, Mexico reported sustained winds of 35 kt gusting to 45 kt on the afternoon of October 8, and gusts to 55 kt the next day. (Strong winds often occur at Veracruz behind cold fronts since northerly winds are funneled along the eastern slopes of a mountain range located west of the city.) QuikScat scatterometer data on October 8-9 indicated 30-35 kt winds over the western Gulf of Mexico, with the 0047 UTC October 9 pass showing 35-45 kt winds south of 25N west of 95W. By 0000 UTC October 10, the front moved southeast of the Gulf, while the high pressure center weakened and moved to northern Arkansas. Winds decreased below gale force by 0600 UTC October 10, although 20-25 kt winds and 3-3.5 m (9-12 ft) seas continued for an additional 30 hours.

East Atlantic Gale December 5-6: This short-lived event began on December 5, as a gale center located north of 31N moved rapidly east-northeast across the central and eastern Atlantic. A strong ridge of high pressure across the tropical east Atlantic combined with the gale center to create a tight pressure gradient over the northeastern portion of the TPC forecast area. The **Kaapgracht (PFJH)** observed southwest winds 39 kt at 0600 UTC December 6. Farther east, the **Fort Fleur D'epee (FNOU)** reported 37 kt winds near 31N 36W at the same time. Gale conditions ended south of 31N by 1800 UTC December 6 as the gale center moved away from the area.

East Atlantic Cold Front and Gale Center December 12-15: At 0600 UTC December 12, a cold front extended through 31N 35W-30N 40W to 25N 55W, with a 1031 mb high well northwest of the front. Strong northeast winds occurred within 300 n mi northwest of the front. At 1200 UTC December 12 the **Polar Colombia (ELSI9)** just north of 31N reported 33 kt northeast winds. QuikScat data confirmed this report and suggested gales were present in the area north of the front east of 45W. By 0600 UTC December 13 the cold front extended from 27N 35W to 25N 50W. While winds were below gale force, northeast winds of 25-30 kt continued north of the front to 31N.

On December 14, an upper-level disturbance moving across the area helped develop a low along the front near 26N 40W. By 0600 UTC December 14, the low was a gale center near 24N 42W. At that time the **Douce France (FNRS)** observed 40 kt northeast winds near 27N 42W. The ship **Chiquita Nederland (C6KD6)** reported 35 kt northeast winds six hours later. The low continued drifting southwest, and winds decreased below gale force by 0600 UTC December 15. However, the low and a strong high pressure ridge to

Continued on Page 60

Tropical Prediction Center

Continued from Page 59

the northwest produced 25-30 kt northeast winds from 20N-31N between 40W-60W for the next several days.

Gulf of Mexico/Western Atlantic Cold Front December 17: A cold front over the central Gulf of Mexico was overtaken by a stronger front around 0600 UTC December 17. The combined front then moved quickly east across the eastern Gulf, Florida, and into the western Atlantic by 1800 UTC that day. Gales occurred over the northern Gulf of Mexico between 0000 and 1800 UTC December 17 north of 27N west of the front to 92W. At 0600 UTC the **NBID** (name unknown) encountered 37 kt winds, while the **USCG Courageous (NCRG)** reported 33 kt winds. Gales were also observed ahead of the front over the Atlantic north of 30N west of 70W between 1200 UTC December 17 and 0000 UTC December 18. Several ships just north of 31N observed 35-40 kt southwest winds at 1200 and 1800 UTC on the 17th. After 0000 UTC December 18 high pressure built across the Gulf of Mexico and western Atlantic and winds decreased rapidly across the area.

Strong Gulf of Mexico/Atlantic Cold Front December 19-20: The next in a series of strong cold fronts entered the Gulf of Mexico on the afternoon of December 18, with a weak low forming on the front over the northwestern Gulf. By 0000 UTC December 19, the 1016 mb low was located near New Orleans with the cold front trailing southwestward to near Tampico. The **NBID** encountered its second gale in three days, reporting 35 kt winds near 30N 87W at both 0600 UTC and 1200 UTC on the 19th. Several ships and buoys reported winds of 33-38 kt between 1200 and 1800 UTC on the 19th, with the **Chevron Arizona (KGBE)** observing 36 kt and the **Sealand Atlantic (KRLZ)** encountering 38 kt winds near 27N 91W. Sea heights over the Gulf of Mexico built rapidly behind the cold front with buoy **42002** reporting seas as high as 5 m (16 ft). By 1800 UTC December 19, the front extended from the extreme western Atlantic across Florida to the Yucatan Peninsula. Over the western Atlantic, the **Bonn Express (DGNB)** and the **ZCBU8** (name unknown) observed 35-38 kt winds at 0000 UTC and 0600 UTC December 20. By 1200 UTC December 20, the cold front extended from 31N 69W across eastern Cuba to near 15N 83W. By this time, gale force winds over the Atlantic retreated north of 31N, although strong winds continued near the cold front until December 21. Strong winds also occurred behind the front over the northwest Caribbean Sea, with ships reporting northerly winds of 20-30 kt and seas of 3-4 m (10-13 ft).

Atlantic Gale Center and Cold Front December 25-26: On December 24 a low pressure system developed along a stationary front across the central Bahamas. The low moved northeast and at 1200 UTC December 25 became a 1014 mb gale center near 26N 71W with a trailing cold front extending to central Cuba. By 0000 UTC December 26, the gale center moved north of 31N with the trailing cold front extended through 31N 57W-25N 67W to the eastern tip of Cuba. Strong high pressure built over the western Atlantic west of the front. The **Irbenskiy Proliv (UBDJ)** encountered 35 kt winds at both 0000 UTC and 0600 UTC December 26 just west of the front. Other ships across the western Atlantic reported north to northeast winds of 25-30 kt on the 26th, with the **Wilson (WNPD)** observing 30 kt winds and seas of 4 m (13 ft) at 0600 UTC. By 1800 UTC on the 26th, the cold front extended along 31N 50W-25N 60W to the Windward Passage. Winds had decreased below gale force, although 20-30 kt winds continued across the western Atlantic for another day.

Atlantic Gale Center and Cold Front December 29-30: On December 27 a low pressure system developed over the northwestern Gulf of Mexico. The low and associated cold front moved east and by 1200 UTC December 28 the low, then of 1007 mb, was just south of the Florida Panhandle with a trailing cold front extending southwestward to near Veracruz. The low continued to strengthen and by 0000 UTC December 29, a 1002 mb gale center was just east of Jacksonville with a cold front extending across central Florida to the Yucatan Peninsula. At 0600 UTC,

Continued on Page 61

Tropical Prediction Center

Continued from Page 60

buoy **41010** reported 35 kt winds while the **Hamane Spirit (C6OT5)** encountered 40 kt winds and 4 m (14 ft) seas near 29N 75W. At 1200 UTC December 29, the gale center was near 31N 67W and the cold front trailed to central Cuba. An 1104 UTC QuikScat overpass indicated a large area of 30-40 kt winds north of 28N west of the cold front to 78N. At 1200 UTC the **Federal Saguenay (8PNQ)** reported 35 knot winds near 32N 70W. By 0000 UTC December 30, the gale center was north of 31N with the cold front extending through 31N 60W to the Windward Passage. The area of gales was located north of 28N east of the front to 55W. At 0600 UTC December 30, the area of gales moved north of 31N. However, northerly swells of 3-3.5 m (9-12 ft) continued for another 12 to 24 hours across the western Atlantic.

2. Eastern Pacific

Gulf of Tehuantepec: Seven Gulf of Tehuantepec gale events occurred during the period. The first event occurred in early October with four events occurring in December, including one very prolonged event. The gale events were verified by Special Sensor Microwave/Imager (SSM/I) and QuikScat data and occasionally by ship reports.

The first Gulf of Tehuantepec gale event began at 0600 UTC October 9 and was due to the strong early season cold front over the Gulf of Mexico (see above). The **Mercury (3FFC7)** observed 34 kt winds at 1200 UTC October 10. The gale event lasted over two days and ended at 1800 UTC October 11.

The next two events occurred in November with the first one beginning at 0600 UTC November 20. This event may have been a short-lived storm event, as at 0000 UTC November 22 the **Hannover Express (DEHZ)** reported 50 kt winds near 14N 96W. QuikScat data from near that time also indicated winds to near storm force in the Gulf of Tehuantepec. The **Zim Japan (4XGV)** encountered 35 kt winds at 1200 UTC November 22. The gale event ended at 0000 UTC November 23. The last event in November began at 1200 UTC November 30 and ended at 1800 UTC December 1. No ship reports of gale force winds were received. However, a QuikScat overpass shortly before 0000 UTC December 1 detected winds of 30-35 kt.

A five-and-a-half-day Gulf of Tehuantepec gale event occurred in early December. The prolonged event began at 0000 UTC December 3 and ended at 1200 UTC December 8. The **LAGX4** (name unknown) observed 40 kt winds at 1800 UTC December 2, and the **Century Highway No. 1 (3FFJ4)** encountered 38 kt winds near 14N 95W at 0000 UTC December 8. Three additional Gulf of Tehuantepec gale events occurred later in December with the first beginning at 1800 UTC December 17 and ending at 1200 UTC December 18. The next event started at 1800 UTC December 19 and ended at 0000 UTC December 21. During this event, the **V2PC1** (name unknown) reported 31 kt winds at both 1200 and 1800 UTC December 20. The last event began at 0600 UTC December 30 and ended at 1800 UTC December 31. During this event, the **Zim Asia (4XFB)** encountered 35 kt winds at 1200 UTC December 31.

IV. The 2001 Hurricane Season

The 2001 hurricane season begins in the eastern Pacific on May 15 and in the Atlantic on June 1. Both seasons run through November 30. The names for this season's storms will include:

Atlantic	Eastern Pacific
Allison	Adolph
Barry	Barbara
Chantal	Cosme
Dean	Dalila
Erin	Erick
Felix	Flossie
Gabrielle	Gil
Humberto	Henriette
Iris	Israel
Jerry	Juliette
Karen	Kiko
Lorenzo	Lorena
Michelle	Manuel
Noel	Narda
Olga	Octave
Pablo	Priscilla
Rebekah	Raymond
Sebastien	Sonia
Tanya	Tico
Van	Velma
Wendy	Wallis
	Xina
	York
	Zelda⚓

Coastal Waters Warm, but La Niña Still Lingers

Carmeyia Gillis
Office of Public Affairs
NOAA Climate Prediction Center

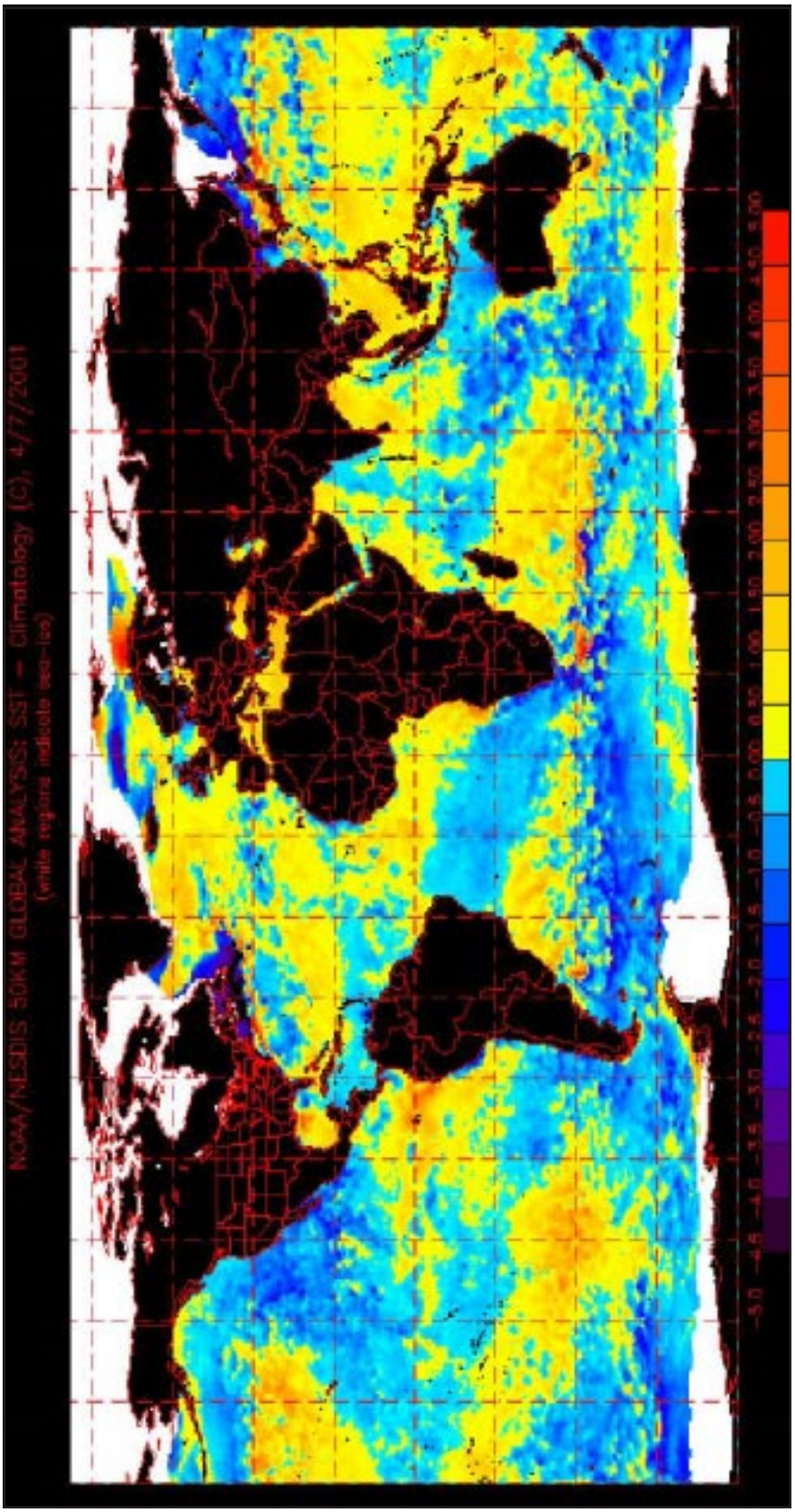
NOAA climate specialists are watching ocean temperatures warm off the coast of South America. Such warm water temperatures sometimes signal the onset of the global climate pattern called El Niño. Despite the warmer water, La Niña conditions are still dominating the global climate. La Niña is expected to weaken, however, and is not expected to significantly affect the weather this spring over North America. "Brief periods of warmer coastal waters do not necessarily indicate an El Niño," said NOAA's Climate Prediction Center research meteorologist Vernon Kousky.

According to Kousky, water temperatures along the coasts of Ecuador and northern Peru are typically at their warmest during the months of March and April. While water temperatures of this region have recently risen above normal, subsurface ocean temperatures remain near or below normal. Ocean surface winds will increase over the next several weeks, cooling the surface water temperatures again.

"El Niño, as the term is used today, reflects a warming of waters in the equatorial Pacific from the South American coast westward to near Indonesia," said Kousky. "It is this warming that causes changes in the jet streams, resulting in significant shifts in weather patterns worldwide."

El Niño can cause increased rainfall and destructive flooding in the southern tier of the U.S., throughout most of Indonesia, and in coastal sections of northern Peru and Ecuador. Other areas, such as northeast Brazil, southern Africa, northeastern Australia and Hawaii, experience reduced rainfall and even drought during El Niño. Global weather patterns associated with El Niño impact every phase of human existence, including agriculture, transportation, construction, heating and cooling, and water supply.

For more information visit the NOAA El Niño web site at: www.elnino. noaa.gov.⚓



La Niña conditions on April 7, 2001.

It Only Takes One

Robert A. Luke
VOS Program Leader

Allen Kam
National Weather Service Office
Seattle, Washington

It is two a.m. You are assigned the midnight to four watch with the wind, weather, and seas intensifying. Oh, and the coffee is cold too. One of your duties is to take a weather observation. Yeah, right, you have all the time in the world and the ship's master wants you to go out in the horizontal, freezing rain to boot. Life is so grand at times, isn't it? Well, your effort does not go unnoticed or unappreciated. This story is about how one single, solitary observation was instrumental in the development of a high sea warning that helped the Washington State coastline get prepared.

On February 1, 2001, the **Century Highway No. 2 (3EJB9)** was located at 43.2N 141.6W, just south of a strong surface low-pressure center. Their 1800 UTC observation reported surface winds from 260 degrees at 55 knots. This was a key report, as it was just south of the strong low (976 hectopascals [hPa]) centered at 46N 141W. The area to the immediate south and southwest of the low was of prime interest, because the Aviation Forecast Model had predicted the strongest pressure gradient in this area and indicated low level winds around 50 knots. Furthermore, NOAA's wave forecast model, the WaveWatch III, initialized by the Aviation Model, had used the 50 knot wind forecast to build a heavy west swell that was forecast to reach the Washington coast within 30 hours, before 0000 UTC February 3.

Without the accurate truth from ships and buoys reporting in, the forecast model predictions can be off. *Your observations are a critical tool forecasters use to give them complete confidence in the model's solution.*

That 1800 UTC observation taken and transmitted by the crew of the **Century Highway No. 2** was crucial. It supported the forecast model's solution, enabling the Seattle National Weather Service Office Forecasters to put up a Heavy Surf Advisory for the Washington Coast and add high seas to the Coastal Marine Forecast for Friday, February 2. This forecast was issued at 2230 UTC on February 1, just four and one half-hours past the observation time. The highest seas measured on the Washington Coast were 23.3 feet at the **Columbia River Buoy (46029)** and 23.2 feet at the **Grays Harbor Wave Rider Buoy**. Both of these readings were at 00Z on February 3, or 4 p.m. PST Friday, February 2.

Thanks go out to the master and crew of the **Century Highway No. 2**.

Press on with Style!

The Century Highway No. 2.

March 2001 Alaska Marine Services Report

Kodiak was the "A Division" Station of the month for March 2001 with a score of 6,030 points. Kodiak had the most BBXX observations transmitted in Alaska with 420, the most marine briefings with 843. Kodiak made six ship visits. Juneau was the "A Division" second place site with a score of 2,330 points. Juneau had three ship visits and 192 BBXX observations. The Juneau staff has recently created software that converts a plain language e-mail ship observation into a coded BBXX message. The e-mail message from the ship does have to be in a specific format. Early tests of this new method have shown excellent results. Cold Bay was the "A Division" third ranked station with two ship visits and 485 marine briefings, for a score of 1,910 points.

In the "B Division," Alaska Region Headquarters led the way with seven ship visits for a score of 1,400 points. St. Paul was close behind in second place with two ship visits and a score of 1,335 points. Barrow was the fist place site in the "C Division" with a score of 476 points. Barrow has the most BBXX observations transmitted in the C Division with 32. These came from their 06Z scan of e-mail ship observations. Kotzebue checks the e-mail OBS at 18Z, and Kodiak still transmits the observations from 00Z and 12Z. WFO Anchorage was the second ranked C Division site with a score of 433 points. They had their highest score of the year on the strength of Mike Ford's ship visits to the **Tustumena** and **Bartlett** to check and repair their F420 wind systems.

After the first three months of 2001, the Alaska Marine Division leaders are Kodiak, St. Paul, and Barrow. The Alaska Region HQ and Kodiak are tied with the most ship visits with 14. Kodiak has transmitted the most BBXX with 1,181 followed by Juneau with 528. Kodiak has the highest number of marine briefings with 2,402, followed by Cold Bay with 1,445.

The Crowley tug **Warrior** transmitted the most observations for March with 83. For this year so far, the **SeaBulk Montana** has the most BBXX observations with 206. With this report, I have also added Alaska ships that transmit their observations via Code 41 satellite. Here are the Top 5 Alaskan vessels so far this year:

January - March 2001	BBXX
Seabulk Montana	206
Arctic Sun	187
Warrior	182
CSX Anchorage	151
CSX Tacoma	138⚓

Captain Jim Faria of the Crowley Tug *Warrior* receiving the Alaska Marine "Award of Excellence" while in port in Anchorage Alaska on December 22, 2000. The Warrior had the highest total of Alaska BBXX observations for the month of November 2000 with 54. Most all of these were sent to Alaska WSO's via e-mail.

The Crowley Tug *Guardian* (pictured below) was presented with a Special Achievement Award for 2000 while in port in Anchorage on January 31, 2001. They had the third highest total of observations taken in Alaskan waters with 261. Pictured from left to right are 1st Mate Nate Collar and Captain Richard Swain.

VOS Program Selects New Leaders

Robert Luke
New VOS Program Lead

Robert Luke has assumed the duties as the new Voluntary Observing Ship (VOS) Program Leader, which has been relocated to the National Data Buoy Center (NDBC) at Stennis Space Center, Mississippi. "Luke" has extensive knowledge and experience from over 20 years as a Chief Meteorologist in the U.S. Navy. Luke's various tours included Misawa, Japan; Brunswick, Maine; Port Hueneme, California; Operation Deep Freeze Winter Over Party at McMurdo Station, Antarctica; Christchurch, New Zealand; **USS Coral Sea**; Barbers Point, Hawaii; **USS Kitty Hawk**; Pre-Commissioning Unit **George Washington**; **USS George Washington**; and the Naval Oceanographic Office (NAVOCEANO). At NAVOCEANO, Luke was responsible for the entire Navy and Marine Corps meteorology and oceanography training material guidelines and requirements. Luke has extensive experience in computer-based training (CBT) development, computer operations and network configuration, curriculum development, and technical writing gained from his duties while in the Navy and after leaving the uniform behind. As a civilian, he worked for Lockheed Martin and Science and Engineering Associates, as a Senior Training Development Specialist, and also JD Edwards as a Technical Trainer before returning to his real calling of "Marine Meteorology."

As VOS Program Leader, Luke will be responsible for programmatic and logistical management of the VOS program. Luke's duties include supporting the Port Meteorological Officers (PMOs) in supplies and equipment, liaison with shipping firms, government agencies, and the World Meteorological Organization's VOS Program member countries. An additional full-time duty is as the Editorial Supervisor of the Mariners Weather Log magazine.

Besides spending over half his life at sea or supporting those who were, Luke still finds time to indulge in another favorite pastime–Scouting. Over the decades, Luke has been an assistant Scoutmaster with Boy Scout troops in Japan, New Zealand, Maine, and Hawaii. For the past several years, Luke has become the Cubmaster of the local Cub Scout Pack in his town of Poplarville, Mississippi (pop. 2,000). He even assists his wife as an assistant Brownie Leader. Luke believes if you are not having fun at what you are doing, you are not doing it right.

Dave McShane
New VOS Technical Leader

Dave McShane was selected as the VOS Program Technical Leader at the National Weather Services's NDBC in January 2001. Dave came to the VOS program with 29 years of experience in all facets of meteorology and oceanography.

Dave retired from the Navy in 1993 after serving for 22 years. He began his military career as an electronics technician with the early Polaris Fleet Ballistic Missile Submarine program. He was commissioned after completing his B.S. degree and returned to the submarine community as a Trident I Backfit Weapons Officer. He served as staff oceanographer, Deputy Operations and Plans and Special Projects officer for

Continued on Page 69

VOS Program

Continued from Page 68

Submarine Development Group 1 prior to his assignment as Chief Engineer and Navigation and Operations Officer on one of the last remaining diesel submarines. Dave surfaced and upon completion of Naval Postgraduate School was Commander of Oceanographic Unit 2 (embarked in **USNS Dutton**) and Oceanographic Unit 4 (embarked in **USNS Chauvenet**) during Desert Shield and Desert Storm, prior to being assigned as Deputy Director of the Naval Oceanographic and Atmospheric Research Laboratory (Atmospheric Directorate) in Monterey, California. He subsequently was assigned as the Director of the Basic Oceanography Accession Training Program within the Naval Oceanographic Office (NAVOCEANO). Immediately following his departure from active military service, Dave held the position of operational oceanographer with the NAVOCEANO.

In the private sector, Dave served as Senior Automated Surface Observing Systems (ASOS) Observer and regional human resources director for a government contractor and data analyst; and forecaster for two government contractors working on the technical services contract with the NDBC.

As VOS Technical Program Leader, Dave will be responsible for management of the VOS database, will serve as National Weather Service (NWS) focal point for the Shipboard Environmental Acquisition System (SEAS), will manage the VOS communications, and will participate in various national and international efforts to automate ship observations. Dave's phone number and email address are (228) 688-1768 and David.McShane@noaa.gov respectively.

Dave holds a B.S. from Auburn University, an MBA from National University, and an M.S. in Meteorology and Physical Oceanography from the Naval Postgraduate School.⚓

Port Meteorological Officers Annual Workshop

The annual Port Meteorological Officer (PMO) Workshop was hosted by the National Data Buoy Center (NDBC) at Stennis Space Center, Mississippi, on March 12-15, 2001. This was a time where the PMOs could gather, meet the new VOS national program office leads, exchange ideas and generally tell the "new guys" how it really works.⚓

Front Row: Steve Cook - Global Ocean Observing Systems, Capt. E.J. O'Sullivan - Met Office UK, Bob Webster - Los Angeles, Jim Nelson - Houston, Amy Seeley - Chicago, Bob Drummond - Miami, Melinda Bailey - Southern Region, George Smith - Cleveland
Middle Row: Jack Warrelmann - New Orleans, Pat Brandow - Seattle, Robert Luke - NDBC, Pete Gibino - Norfolk, Tim Rulon - NWS Headquarters, Jim Saunders - Baltimore
Back Row: Dave McShane - NDBC, Tim Kenefick - New York, Bob Novak - Oakland, Larry Cain - Jacksonville, Glenn Rasch - Western Region, Ron Fordyce - Met Canada, Sergio Marsh - Eastern Region
(Not pictured: Tom Townsend - Central Region)

National Weather Service Voluntary Observing Ship Program

New Recruits from September 1, 2000 through March 31, 2001

NAME OF SHIP	CALL	AGENT NAME	RECRUITING PMO
AGULHAS	3ELE9	NEW YORK GULF & ATLANTIC MARITIME SERVICE, INC.	BALTIMORE, MD
ALASKA MARINER	WSM5364	WESTERN TOWBOAT CO.	ANCHORAGE, AK
APL TURQUOISE	9VVY	AMERICIAN SHIP MANAGEMENT	SAN FRANCISCO, CA
ARCTIC BEAR	WBP3396	BERING MARING CORPORATION	KODIAK, AK
ATLANTIC FOREST	ELTN8	FOREST LINES	NEW ORLEANS, LA
AUCKLAND STAR	C6KV2	ASSOCIATED STEAMSHIP AGENTS	BALTIMORE, MD
BLARNEY	WBP4766	SOUTHCOAST INC.	KODIAK, AK
CARNIVAL VICTORY	3FFL8	CARNIVAL CRUISE LINE	MIAMI, FL
CAROLINE MAERSK	OZWA2	MAERSK PACIFIC LTD	SEATTLE, WA
CARSTEN MAERSK	OZYB2	MAERSK PACIFIC LTD	SEATTLE, WA
CAVALIER	WBN5983	CROWLEY MARINE SERVICES	ANCHORAGE, AK
CF CAMPBELL	WCT3784	CAMPBELL TOWING	KODIAK, AK
CHASTINE MAERSK	OZZB2	MAERSK PACIFIC LTD.	SEATTLE, WA
CHIQUITA BELGIE	C6KD7	GREAT WHITE FLEET - CHIQUITA CENTER	BALTIMORE, MD
CHIQUITA DEUTSCHLAND	C6KD8	GREAT WHITE FLEET - CHIQUITA CENTER	BALTIMORE, MD
CHIQUITA NEDERLAND	C6KD6	GREAT WHITE FLEET - CHIQUITA CENTER	BALTIMORE, MD
CHIQUITA SCANDINAVIA	C6KD4	GREAT WHITE FLEET - CHIQUITA CENTER	BALTIMORE, MD
CHIQUITA SCHWEIZ	C6KD9	GREAT WHITE FLEET - CHIQUITA CENTER	BALTIMORE, MD
CHOYANG PARK	3FQR8	INCHCAPE SHIPPING SERVICES	NORFOLK, VA
CLIFFORD MAERSK	OYRO2	MAERSK PACIFIC LTD	SEATTLE, WA
COASTAL NAVIGATOR	WCY9686	COASTAL TRANSPORTATION INC.	SEATTLE, WA
COASTAL NOMAD	WSK2703	COASTAL TRANSPORTATION INC.	KODIAK, AK
CONTSHIP WASHINGTON	ELVZ5	INCHCAPE SHIPPING SERVICES	NORFOLK, VA
CORNELIUS MAERSK	OYTN2	MAERSK PACIFIC LTD	SEATTLE, WA
COUGAR ACE	9VKE	INCHCAPE SHIPPING SERVICES	NORFOLK, VA
CRIMSON GALAXY	3FIQ6	LAVINO SHIPPING AGENCIES	NORFOLK, VA
DAGNEY	WX8482A	WARDS COVE PACKING CO.	KODIAK, AK
DIANE H.	WUR7250	BOYER ALASKA BARGE LINES	KODIAK, AK
DIRECT JABIRU	ELYJ9	INCHAPE SHIPPING SERVICES	SAN FRANCISCO, CA
EVERETT EXPRESS	DPGD	INTERNATIONAL SHIPPING CO.	SEATTLE, WA
EXPLORER OF THE SEAS	ELWX5	RCCL	MIAMI, FL
FAIRBANKS	WGWB	PORT METEOROLOGICAL OFFICE	LOS ANGELES, CA
FISHHAWK	WRB5085	COOK INLET TUG AND BARGE	KODIAK, AK
GENE DUNLAP	WAS2433	DUNLAP TOWING CO.	ANCHORAGE, AK
GEORGIA RAINBOW II	VRVS5	STEVENS SHIPPING CO.	JACKSONVILLE, FL
GERMAN SENATOR	ELPL3	DSR SENATOR LINE	SEATTLE, WA
GITTQA OLDENDORF	ELWO7	KERR NORTON MARINE	NORFOLK, VA
GOLDEN LAKER	3FNQ6	SHINWA (USA) INC.,	NORFOLK, VA
GREAT BLESS	VRVL3	BIEHL & CO.	HOUSTON, TX
GUARDIAN	WBO2511	CROWLEY MARINE SERVICES	ANCHORAGE, AK
HANSEWALL	V2AO3	INCHAPE SHIPPING SERVICES	NORFOLK, VA
HUAL TRANSPORTER	C6QO3	HOEGH FLEET SERVICE AS	JACKSONVILLE, FL
INDAMEX MISSISSIPPI	ZDDT5	INCHCAPE SHIPPING SERVICES	NORFOLK, VA
INTEGRITY	WNHL	MARITRANS INC	BALTIMORE, MD
ISLAND CHAMPION	WCZ7046	ISLAND TUG AND BARGE CO.	ANCHORAGE, AK
JOHN BRIX	WCY7560	SEA COAST TOWING INC.	KODIAK, AK
KAPITAN AFANASYEV	UFIL	FESCO AGENCIES N.A., INC	SEATTLE, WA
LEON	P3TG6	T. PARKER HOST INC., WORLD TRADE CTR., SUITE 820	NORFOLK, VA
LOIS H.	WTD4576	BOYER ALASKA BARGE LINES	KODIAK, AK
LT CAMPBELL	WBD5759	CAMPBELL TOWING	KODIAK, AK
LYKES EAGLE	ELOY6	STRACHAN SHIPPING CO.	HOUSTON, TX

Continued on Page 71

NAME OF SHIP	CALL	AGENT NAME	RECRUITING PMO
LYKES MOTIVATOR	KUS1105	STRACHAN SHIPPING CO.	HOUSTON, TX
M/V SAFMARINE INFANTA	V7CN8	JOHN S. CONNOR, INC	BALTIMORE, MD
MAERSK TEXAS	WCX3249	M/V MAERSK TEXAS	MIAMI, FL
MAERSK WIND	S6TY	WILHELMSEN WILHELMSEN LINES (USA) INC	BALTIMORE, MD
MAHEGA	IR4009	DR. RICCARDO VANNUCCI	NORFOLK, VA
MALOLO	WYH6327	DUNLAP TOWING COMPANY	KODIAK, AK
MARIA ANGELICOUSSIS	C6FP2	CHEVRON SHIPPING CO.	HOUSTON, TX
MARION GREEN	PIAN	CAPEES SHIPPING AGENCIES, INC.	NORFOLK, VA
MICHAEL O'LEARY	WCP9556	DUNLAP TOWING CO	KODIAK, AK
MSC REGINA	3FGF9	MEDITERRANEAN SHIPPING CO.	NORFOLK, VA
NORMAN S.	WCW7514	ISLAND TUG AND BARGE CO.	ANCHORAGE, AK
NORTHERN SPIRIT	WAQ2746	PETRO MARINE SERVICES	KODIAK, AK
OCEAN MARINER	WCF3990	WESTERN TOWBOAT CO.	ANCHORAGE, AK
OCEAN NAVIGATOR	WSC2552	WESTERN TOWBOAT CO,	ANCHORAGE, AK
OCEAN RANGER	WAM7635	WESTERN TOWBOAT CO.	ANCHORAGE, AK
OCEANBREEZE	ELLY4	PREMIER CRUISE LINE	MIAMI, FL
PACIFIC MERCHANT	ELXR8	PORT METEOROLOGICAL OFFICER	HOUSTON, TX
PACIFIC PRIDE	WCN4995	PACIFIC PRIDE	KODIAK, AK
PAN ATLANTIC	ELYJ7	T. PARKER HOST, INC. _PH: 757-627-6286	NORFOLK, VA
PATRIOT	WDA2500	UNITED STATES LINES	SEATTLE, WA
REDFIN	WTP2735	WESTERN PIONEER SHIPPING	KODIAK, AK
SAG RIVER	WLDF	SABINE TRANSPORT	HOUSTON, TX
SAGA SPRAY	VRRW5	CAROLINA SHIPPING CO.	JACKSONVILLE, FL
SAMSON MARINER	WCN3586	SAMSON TUG AND BARGE	KODIAK, AK
SAUDI HOFUF	HZZC	BIEHL & CO.	HOUSTON, TX
SEA CHEETAH	V2PM9	INCHAPE SHIPPING SERVICES	NORFOLK, VA
SEA FLYER	WBL8673	CROWLEY MARINE SERVICES	KODIAK, AK
SEA PANTHER	DQVF	INCHCAPE SHIPPING SERVICES	NORFOLK, VA
SEA RANGER	WBM8733	CROWLEY MARINE SERVICES	ANCHORAGE, AK
SEA VALIANT	WBN9213	CROWLEY MARINE SERVICES	ANCHORAGE, AK
SEA VIKING	WCE8951	CROWLEY MARINE SERVICES	ANCHORAGE, AK
SEABULK MONTANA	WCW9126	CISPRI	ANCHORAGE, AK
SEALAND PRIDE	WDA3673	MAERSK SEALAND MARINE DEPT.	HOUSTON, TX
SENECA	WBN8469	CROWLEY MARINE SERVICES	ANCHORAGE, AK
SIKU	WCQ6174	CROWLEY MARINE SERVICES	KODIAK, AK
SINE MAERSK	OZOK2	MAERSK PACIFIC LTD	SEATTLE, WA
SINUK	WCQ8110	CROWLEY MARINE SERVICES	KODIAK, AK
SNOHOMISH	WSQ8098	DUNLAP TOWING COMPANY	ANCHORAGE, AK
ST. LUCY	ELPO3	CAPES SHIPPING AGENCIES, INC.	NORFOLK, VA
STAR EAGLE	LAWO2	A/S BILLABONG	BALTIMORE, MD
STAR FLORIDA	LAVW4	STAR SHIPPING (NY) INC	HOUSTON, TX
SWAN ARROW	C6CN8	UNITED SHIP MANAGEMENT, LTD	BALTIMORE, MD
TARAGO	LAPN5	WILHELMSEN WALLENIUS LINES	NEW YORK CITY, NY
TATNUCK	WBY2415	SEACOAST TOWING	KODIAK, AK
TAURUS	WYH6499	DUNLAP TOWING COMPANY	KODIAK, AK
TELLUS	WRYG	C/O PACIFIC GULF MARINE	BALTIMORE, MD
TMM VERACRUZ	V2PC4	PORT METEOROLOGICAL OFFICER	HOUSTON, TX
TRIUMPH ACE	H3CB	INTERNATIONAL MARINE TRANSPORT CO., LTD	SEATTLE, WA
USCGC OSPREY WPB-87307	NBRF	P.O. BOX 582	SEATTLE, WA
USNS MENDONCA	NBMK	USNS MENDONCA	NEW ORLEANS, LA
USNS SHASTA TAE-33	NRNC	FPO AP 96678-4042	SEATTLE, WA
USNS TIPPECANOE (TAO-199)	NTIP	COMMANDING OFFICER	SEATTLE, WA
VICE PRESIDENT - GULF PORTS	MMP1	CAPT. ROBERT H. GROH	HOUSTON, TX
WAYNE FARTHING	MMP2	WAYNE FARTHING	HOUSTON, TX
WESTERN MARINER	WRB9690	WESTERN TOWBOAT CO.	ANCHORAGE, AK
WESTERN NAVIGATOR	WAX7602	WESTERN TOWBOAT COMPANY INC.	ANCHORAGE, AK
WESTERN RANGER	WBN3008	WESTERN TOWBOAT COMPANY INC.	ANCHORAGE, AK
WESTERN TITAN	WCX4599	WESTERN TOWBOAT CO.	ANCHORAGE, AK

These photos were taken last year in a North Atlantic storm at approximately 48N 50W by the *Sealand Performance* (KRPD). The seas were running 20 to 24 feet with a sustained wind of 40+ knots.

VOS Program Awards and Presentations Gallery

The *Rubin Kobe* was one of the ships recognized in 1999 by the VOS program for superior performance. Standing left to right is the Second Officer Gorgohio Gemal, Chief Officer Henry Cuevas, and Captain Rogelio Jalit. Standing in the background is Pat Brandow, PMO Seattle.

Award presentation for *Sol Do Brasil*. Pictured are Captain Bernd Karsten Springer, PMO Jim Saunders (Baltimore), and 3/O Julio Pesantes La Hoz.

Here is a picture of the Dunlap Tug *Snohomish* while in port in Anchorage on January 8, 2001. The Snohomish took 169 weather observations during the year 2000 and was registered for the National Weather Service VOS program in October 2000. Captain John Larson is shown receiving the VOS program plaque.

NOAA Ship *Oregon II (call sign WTDO)* receives a VOS award. Pictured left to right are New Orleans PMO Jack Warrelmann, Master Jim Rowe, OPS Officer Jesse Stark, 3rd Mate Dave Nelson, and Nav Officer Nick Toth.

Baltimore PMO Jim Saunders made a VOS award presentation to the *Frances L*. Pictured left to right are C/O A.C. Gatoula, Captain Wilson, and 3/O Guilleruo.

A VOS award was prsented to *M/V Liberty Star* (call sign WCBP). Pictured from left to right are New Orleans PMO Jack Warrelmann, Chief Mate Bruce L. Oberg, and Captain Kevin J. McKenna.

VOS Coop Ship Reports — September through December 2000

The National Climatic Data Center compiles the tables for the VOS Cooperative Ship Report from radio messages. The values under the monthly columns represent the number of weather reports received. Port Meteorological Officers supply ship names to the NCDC. Comments or questions regarding this report should be directed to NCDC, Climate DataDivision, 151 Patton Avenue, Asheville, NC 28801, Attention: Stuart Hinson (828-271-4437 or stuart.hinson@noaa.gov).

SHIP NAME	CALL	PORT	SEP	OCT	NOV	DEC	TOTAL
1ST LT BALDOMERO LOPEZ	WJKV	Jacksonville	41	0	14	32	87
1ST LT JACK LUMMUS	WJLV	New York City	0	7	51	0	58
1ST LT. HARRY L. MARTIN	NDFH	Jacksonville	0	16	1	0	17
2ND LT. JOHN P. BOBO	WJKH	Norfolk	0	0	0	8	8
A. V. KASTNER	ZCAM9	Jacksonville	72	74	71	52	269
AALSMEERGRACHT	PCAM	Long Beach	30	19	0	43	92
ADVANTAGE	WPPO	Norfolk	35	37	40	0	112
AGDLEK	OUGV	Miami	1	22	9	6	38
AGNES FOSS	WYZ3112	Seattle	0	9	9	10	28
AL FUNTAS	9KKX	Miami	0	0	0	11	11
AL SAMIDOON	9KKF	Houston	41	0	0	0	41
ALBEMARLE ISLAND	C6LU3	Newark	30	42	52	58	182
ALBERNI DAWN	ELAC5	Houston	34	10	17	31	92
ALBLASGRACHT	PCIG	Houston	22	26	0	44	92
ALEXANDER VON HUMBOLD	Y3CW	Miami	628	731	688	457	2504
ALFAMAR	TCYB	Norfolk	1	1	0	0	2
ALKMAN	C6OG4	Houston	0	10	4	0	14
ALLEGIANCE	WSKD	Norfolk	8	0	3	14	25
ALLIANCA AMERICA	DHGE	Baltimore	1	2	7	10	20
ALLIGATOR BRAVERY	3FXX4	Oakland	57	60	56	45	218
ALLIGATOR COLUMBUS	3ETV8	Seattle	47	52	47	23	169
ALLIGATOR FORTUNE	ELFK7	Seattle	6	7	4	2	19
ALLIGATOR GLORY	ELJP2	Seattle	32	36	38	4	110
ALLIGATOR LIBERTY	JFUG	Seattle	66	61	46	55	228
ALMA	ELPN5	New York City	1	0	0	0	1
ALPENA	WAV4647	Cleveland	10	11	10	1	32
ALTAIR	DBBI	Miami	595	647	578	497	2317
AMBASSADOR BRIDGE	3ETH9	Oakland	48	66	69	66	249
AMERICA	WCY2883	New York City	41	45	21	1	108
AMERICA FEEDER	ELUZ8	Miami	3	1	0	12	16
AMERICA STAR	GZKA	Houston	67	91	77	40	275
AMERICAN MARINER	WQZ7791	Cleveland	20	25	32	11	88
AMERICAN MERLIN	WRGY	Norfolk	0	52	37	38	127
ANASTASIS	9HOZ	Miami	7	16	17	0	40
ANATOLIY KOLESNICHENKO	UINM	Seattle	0	14	17	31	62
ANKERGRACHT	PCQL	Baltimore	50	32	30	46	158
APL CHINA	S6TA	Seattle	58	43	43	31	175
APL GARNET	9VVN	Oakland	31	26	43	22	122
APL JAPAN	S6TS	Seattle	44	51	44	36	175
APL KOREA	WCX8883	Seattle	10	24	60	41	135
APL PHILIPPINES	WCX8884	Seattle	43	60	23	12	138
APL SINGAPORE	WCX8812	Seattle	61	51	32	53	197
APL THAILAND	WCX8882	Seattle	21	24	29	9	83
APL TOURMALINE	9VVP	Oakland	63	54	64	42	223
APL TURQUOISE	9VVY	Oakland	0	0	33	37	70
APOLLOGRACHT	PCSV	Baltimore	20	63	30	37	150
AQUARIUS ACE	3FHB8	New York City	89	98	110	95	392
ARCO ALASKA	KSBK	Long Beach	10	14	7	10	41
ARCO CALIFORNIA	WMCV	Long Beach	5	2	8	13	28
ARCO FAIRBANKS	WGWB	Long Beach	0	4	5	0	9
ARCO INDEPENDENCE	KLHV	Long Beach	12	2	2	0	16
ARCO JUNEAU	KSBG	Seattle	0	13	6	34	53
ARCO SAG RIVER	WLDF	Long Beach	1	0	0	0	1
ARCO TEXAS	KNFD	Long Beach	8	12	7	9	36
ARIES HARMONY	3FEY7	Seattle	6	7	12	6	31
ARINA ARCTICA	OVYA2	Miami	52	45	59	43	199

Continued on Page 76

Continued from Page 75

SHIP NAME	CALL	PORT	SEP	OCT	NOV	DEC	TOTAL
ARISO	3FHJ6	Seattle	59	71	66	39	235
ARKTIS FUTURE	OXUF2	Miami	22	58	64	11	155
ARMCO	WE6279	Cleveland	0	3	11	1	15
AROSIA	V2SB	New Orleans	65	21	0	0	86
ARTHUR M. ANDERSON	WE4805	Chicago	56	38	66	39	199
ASTORIA BRIDGE	ELJJ5	Long Beach	25	14	0	12	51
ATLANTIC	3FYT	Miami	191	221	213	194	819
ATLANTIC CARTIER	C6MS4	Norfolk	8	20	18	19	65
ATLANTIC COMPANION	SKPE	Newark	26	21	26	42	115
ATLANTIC COMPASS	SKUN	Norfolk	29	21	40	36	126
ATLANTIC CONVEYOR	C6NI3	Norfolk	27	28	23	19	97
ATLANTIC FOREST	ELTN8	New Orleans	0	0	0	9	9
ATLANTIC OCEAN	C6T2064	Newark	32	37	17	4	90
ATLANTIS	KAQP	New Orleans	6	20	9	9	44
AUCKLAND STAR	C6KV2	Baltimore	63	28	32	23	146
BARBARA ANDRIE	WTC9407	Chicago	30	21	24	14	89
BARRINGTON ISLAND	C6QK	Miami	55	41	43	41	180
BAY BRIDGE	ELES7	Long Beach	16	29	20	21	86
BELLONA	3FEA4	Jacksonville	0	21	1	0	22
BERNARDO QUINTANA A	C6KJ5	New Orleans	34	63	59	44	200
BESIRE KALKAVAN	TCAO	New York City	0	1	0	16	17
BLACKHAWK	WBN2081	Seattle	4	0	0	5	9
BLUE GEMINI	3FPA6	Seattle	0	14	5	0	19
BLUE HAWK	D5HZ	Norfolk	0	18	16	24	58
BLUE NOVA	3FDV6	Seattle	25	30	0	0	55
BOHEME	SIVY	New York City	0	0	42	59	101
BONN EXPRESS	DGNB	Houston	675	732	689	719	2815
BOSPORUS BRIDGE	3FMV3	Oakland	0	58	53	47	158
BP ADMIRAL	ZCAK2	Houston	1	70	46	23	140
BRIGHT PHOENIX	DXNG	Seattle	30	58	38	55	181
BRIGHT STATE	DXAC	Seattle	0	0	29	12	41
BRITISH ADVENTURE	ZCAK3	Seattle	0	53	46	31	130
BRITISH HAWK	ZCBK6	New Orleans	0	0	0	1	1
BROOKLYN BRIDGE	3EZJ9	Oakland	55	41	83	32	211
BUCKEYE	WAQ3520	Cleveland	13	4	0	0	17
BURNS HARBOR	WQZ7049	Chicago	68	84	73	68	293
CALCITE II	WB4520	Chicago	3	0	0	0	3
CALIFORNIA HIGHWAY	3FHQ4	Seattle	3	13	3	0	19
CALIFORNIA JUPITER	ELKU8	Long Beach	42	60	55	33	190
CALIFORNIA MERCURY	JGPN	Seattle	17	29	30	14	90
CAPE MAY	JBCN	Norfolk	2	0	0	0	2
CAPE ROGER	VCBT	Norfolk	0	1	0	1	2
CAPRICORN	PDAY	Baltimore	25	10	22	11	68
CAPT STEVEN L BENNETT	KAXO	New Orleans	19	27	36	6	88
CARIBBEAN MERCY	3FFU4	Miami	3	41	0	0	44
CARNIVAL PARADISE	3FOB5	Miami	35	29	34	22	120
CARNIVAL VICTORY	3FFL8	Miami	0	16	10	0	26
CAROLINA	WYBI	Jacksonville	26	25	15	0	66
CASON J. CALLAWAY	WE4879	Chicago	17	10	10	11	48
CELEBRATION	H3GQ	New Orleans	13	8	9	14	44
CENTURY HIGHWAY #2	3EJB9	Long Beach	18	17	20	28	83
CENTURY HIGHWAY NO. 1	3FFJ4	Houston	34	21	36	23	114
CENTURY HIGHWAY_NO. 3	8JNP	Houston	17	17	25	38	97
CENTURY LEADER NO. 1	3FBI6	Houston	40	50	45	44	179
CGM RENOIR	ELVZ8	Norfolk	2	0	0	0	2
CHANG-LIN TIEN	C6FE6	Oakland	22	13	29	8	72
CHARLES E. WILSON	WZE4539	Cleveland	19	7	6	5	37
CHARLES ISLAND	C6JT	Miami	62	38	20	38	158
CHARLES L. BROWN	KNCZ	Jacksonville	1	2	22	0	25
CHARLES M. BEEGHLEY	WL3108	Cleveland	9	1	7	7	24
CHELSEA	KNCX	Miami	14	0	0	0	14
CHEMICAL PIONEER	KAFO	Houston	35	28	20	25	108
CHERRY VALLEY	WIBK	Houston	46	31	16	18	111
CHESAPEAKE BAY	WMLH	Houston	10	42	38	10	100
CHESAPEAKE TRADER	WGZK	Houston	28	0	3	23	54
CHEVRON ARIZONA	KGBE	Miami	14	6	0	18	38
CHEVRON ATLANTIC	C6KY3	New Orleans	0	0	9	35	44
CHEVRON COLORADO	KLHZ	Oakland	4	4	0	1	9
CHEVRON EMPLOYEE PRIDE	C6MC5	Baltimore	28	64	16	0	108
CHEVRON MISSISSIPPI	WXBR	Oakland	44	26	64	7	141
CHEVRON PERTH	C6KQ8	Oakland	63	74	33	50	220
CHEVRON SOUTH AMERICA	ZCAA2	New Orleans	9	8	32	23	72

Continued on Page 77

Continued from Page 76

SHIP NAME	CALL	PORT	SEP	OCT	NOV	DEC	TOTAL
CHEVRON WASHINGTON	KFDB	Oakland	0	15	31	4	50
CHIEF GADAO	WEZD	Oakland	20	14	27	31	92
CHIQUITA BELGIE	C6KD7	Baltimore	45	43	30	37	155
CHIQUITA BREMEN	ZCBC5	Miami	50	56	51	0	157
CHIQUITA BRENDA	ZCBE9	Miami	58	58	61	64	241
CHIQUITA DEUTSCHLAND	C6KD8	Baltimore	40	46	55	50	191
CHIQUITA ELKESCHLAND	ZCBB9	Miami	38	36	28	39	141
CHIQUITA FRANCES	ZCBD9	Miami	27	23	54	35	139
CHIQUITA ITALIA	C6KD5	Baltimore	46	25	44	45	160
CHIQUITA JEAN	ZCBB7	Jacksonville	66	73	73	49	261
CHIQUITA JOY	ZCBC2	Miami	40	44	24	36	144
CHIQUITA NEDERLAND	C6KD6	Baltimore	47	70	63	55	235
CHIQUITA ROSTOCK	ZCBD2	Miami	56	63	43	58	220
CHIQUITA SCANDINAVIA	C6KD4	Baltimore	58	41	47	26	172
CHIQUITA SCHWEIZ	C6KD9	Baltimore	46	48	52	60	206
CHO YANG ATLAS	DQVH	Seattle	27	36	15	16	94
CHOYANG PHOENIX	P3ZY6	Norfolk	51	15	7	0	73
CITY OF DURBAN	GXIC	Long Beach	83	88	49	52	272
CLEVELAND	KGXA	Houston	21	31	16	7	75
CLIFFORD MAERSK	OYRO2	Seattle	0	0	25	0	25
CMA CGM MONET	ELRR6	New Orleans	25	60	67	53	205
COASTAL MERCHANT	WCV8696	Seattle	31	39	15	0	85
COASTAL NAVIGATOR	WCY9686	Seattle	0	0	0	1	1
COASTAL SEA	WCA7944	Seattle	2	2	1	4	9
COLUMBIA BRIDGE	ELXS4	Seattle	57	49	39	44	189
COLUMBINE	3ELQ9	Baltimore	0	0	0	15	15
COLUMBUS CANADA	P3RD8	Norfolk	90	95	83	19	287
COLUMBUS CANTERBURY	ELUB8	Norfolk	31	46	53	56	186
COLUMBUS VICTORIA	P3RF8	Norfolk	0	0	0	26	26
CONTSHIP AMERICA	V7BZ3	Houston	59	10	0	0	69
CONTSHIP ENDEAVOUR	ZCBE7	Houston	21	20	16	16	73
CONTSHIP SUCCESS	ZCBE3	Houston	82	99	61	91	333
CONTSHIP WASHINGTON	ELVZ5	Norfolk	44	32	42	45	163
CORAL HIGHWAY	3FEB5	Jacksonville	0	0	0	2	2
CORAL SEA	C6YW	Miami	0	0	0	26	26
CORMORANT ARROW	C6IO9	Seattle	12	6	8	5	31
CORNELIUS MAERSK	OYTN2	Seattle	0	0	15	6	21
CORWITH CRAMER	WTF3319	Norfolk	2	6	7	12	27
COSMIC MASTER	DZJN	Seattle	0	0	1	0	1
COSMOWAY	3EVO3	Seattle	5	13	11	0	29
COURIER	KCBK	Houston	28	45	14	25	112
COURTNEY BURTON	WE6970	Cleveland	11	21	7	5	44
COURTNEY L	ZCAQ8	Baltimore	33	29	21	17	100
CROWLEY UNIVERSE	ELRU3	Miami	2	23	33	16	74
CROWN OF SCANDINAVIA	OXRA6	Miami	51	44	43	39	177
CSAV BRASILIA	DGVS	New York City	25	24	0	28	77
CSL CABO	D5XH	Seattle	6	0	27	36	69
CSS HUDSON	CGDG	Norfolk	61	7	82	11	161
DAGMAR MAERSK	DHAF	New York City	19	30	68	14	131
DAISHIN MARU	3FPS6	Seattle	59	97	70	61	287
DANIA PORTLAND	OXEH2	Miami	143	89	56	98	386
DELAWARE BAY	WMLG	Houston	27	14	27	24	92
DENALI	WSVR	Long Beach	25	15	19	18	77
DIRECT FALCON	ELWQ5	Long Beach	55	79	55	14	203
DIRECT KOOKABURRA	ELWB8	Long Beach	0	0	11	27	38
DOCK EXPRESS 20	PJRF	Baltimore	2	19	0	82	103
DON QUIJOTE	SFQP	New York City	30	0	26	35	91
DORTHE MAERSK	DHPD	New York City	0	2	22	20	44
DORTHE OLDENDORFF	ELXC4	Seattle	26	25	22	31	104
DRAGOER MAERSK	OXPW2	Long Beach	15	54	0	19	88
DUHALLOW	ZCBH9	Baltimore	35	104	57	52	248
DUNCAN ISLAND	C6JS	Miami	12	1	23	20	56
E.P. LE QUEBECOIS	CG3130	Norfolk	208	228	73	0	509
EASTERN BRIDGE	C6JY9	Baltimore	47	46	4	16	113
ECSTASY	H3GR	Miami	2	3	4	0	9
EDELWEISS	VRUM3	Seattle	8	6	17	4	35
EDGAR B. SPEER	WQZ9670	Chicago	54	54	84	80	272
EDWIN H. GOTT	WXQ4511	Chicago	5	15	21	12	53
EDYTH L	C6YC	Baltimore	37	52	44	71	204
EL MORRO	KCGH	Miami	9	15	17	10	51
EL YUNQUE	WGJT	Jacksonville	83	63	33	35	214
ELTON HOYT II	WE3993	Cleveland	0	5	0	0	5

Continued on Page 78

Continued from Page 77

SHIP NAME	CALL	PORT	SEP	OCT	NOV	DEC	TOTAL
ENCHANTED ISLE	3FMG2	New Orleans	0	0	9	11	20
ENCHANTMENT OF THE SEAS	LAXA4	Miami	0	0	4	1	5
ENDEAVOR	WAUW	New York City	19	37	21	44	121
ENDURANCE	WAUU	New York City	18	24	39	3	84
ENERGY ENTERPRISE	WBJF	Baltimore	0	0	0	1	1
ENGLISH STAR	C6KU7	Long Beach	76	79	79	68	302
ENIF	9VVI	Houston	18	27	6	12	63
ENTERPRISE	WAUY	New York City	37	22	30	27	116
EVER DECENT	3FUO7	New York City	12	8	8	3	31
EVER DELIGHT	3FCB8	New York City	0	8	0	3	11
EVER DELUXE	3FBE8	Norfolk	1	0	0	0	1
EVER DEVOTE	3FIF8	New York City	0	5	0	1	6
EVER DIADEM	3FOF8	New York City	0	9	15	10	34
EVER GALLANT	BKJN	Norfolk	0	0	11	7	18
EVER GENERAL	BKHY	Baltimore	4	1	0	0	5
EVER GLOWING	BKJZ	Long Beach	8	10	17	4	39
EVER GOVERN	BKHN	Seattle	0	2	0	0	2
EVER GRADE	3FOW2	Seattle	0	3	7	0	10
EVER LEVEL	BKHJ	Miami	0	0	0	16	16
EVER LYRIC	BKHI	Long Beach	0	0	3	6	9
EVER REFINE	3FSB4	New York City	0	15	0	10	25
EVER RENOWN	3FFR4	Long Beach	9	4	3	7	23
EVER RESULT	3FSA4	Norfolk	6	2	0	0	8
EVER RIGHT	3FML3	Long Beach	10	2	0	0	12
EVER ROUND	3FQN3	Long Beach	9	2	4	0	15
EVER ULTRA	3FEJ6	Seattle	3	17	0	6	26
EVER UNION	3FFG7	Seattle	9	6	12	11	38
EVER UNISON	3FTL6	Long Beach	10	4	6	2	22
EVERETT EXPRESS	DPGD	Seattle	29	79	75	16	199
EXPLORER OF THE SEAS	ELWX5	Miami	0	0	3	41	44
FAIRLIFT	PEBM	Norfolk	0	35	30	2	67
FANTAL MERCHANT	ELXB6	Seattle	65	1	0	0	66
FAUST	WRYX	Jacksonville	20	25	26	52	123
FIDELIO	WQVY	Jacksonville	47	56	53	41	197
FIGARO	S6PI	Newark	45	36	24	50	155
FRANCES L	C6YE	Baltimore	27	38	43	66	174
FRANK A. SHRONTZ	C6PZ3	Oakland	46	28	12	0	86
FRANKFURT EXPRESS	9VPP	New York City	4	21	13	14	52
GALVESTON BAY	WPKD	Houston	57	49	30	39	175
GEETA	VRUL7	New Orleans	3	0	0	0	3
GEORGE A. SLOAN	WA5307	Chicago	9	15	2	0	26
GEORGE A. STINSON	WCX2417	Cleveland	10	20	43	28	101
GEORGE SCHULTZ	C6FD4	Baltimore	1	0	12	4	17
GEORGE WASHINGTON BRIDGE	JKCF	Seattle	44	51	59	41	195
GEORGIA RAINBOW II	VRVS5	Jacksonville	30	56	14	54	154
GERD MAERSK	OZNC2	New York City	0	0	29	4	33
GINGA MARU	JFKC	Long Beach	0	0	65	80	145
GLOBAL MARINER	WWXA	Baltimore	83	13	9	74	179
GLOBAL SENTINEL	WRZU	Baltimore	83	68	57	20	228
GLORIOUS SUCCESS	DUHN	Seattle	0	0	0	25	25
GOLDEN GATE	KIOH	Long Beach	8	5	14	11	38
GOLDEN GATE BRIDGE	3FWM4	Long Beach	79	77	84	96	336
GOLDEN LAKER	3FNQ6	Norfolk	0	0	0	63	63
GRANDEUR OF THE SEAS	ELTQ9	Miami	0	8	5	4	17
GREAT LAND	WFDP	Seattle	37	40	35	5	117
GREEN COVE	WCZ9380	Oakland	30	23	18	20	91
GREEN DALE	WCZ5238	Jacksonville	1	0	0	0	1
GREEN ISLAND	KIBK	New Orleans	28	0	11	21	60
GREEN LAKE	KGTI	Baltimore	69	59	60	72	260
GREEN POINT	WCY4148	New York City	0	14	26	35	75
GREEN RAINIER	3ENI3	Seattle	28	30	5	0	63
GREEN RIDGE	WRYL	Seattle	0	0	0	1	1
GREENWICH MAERSK	MZIF7	New York City	0	17	30	62	109
GRETE MAERSK	OZNF2	New York City	23	0	24	2	49
GROTON	KMJL	Newark	0	4	38	37	79
GUAYAMA	WZJG	Jacksonville	40	52	44	44	180
GUDRUN MAERSK	OZFQ2	New York City	6	34	23	4	67
GYPSUM BARON	ZCAN3	Norfolk	37	0	0	0	37
HADERA	ELBX4	Baltimore	2	30	52	22	106
HANJIN KAOHSIUNG	P3BN8	Seattle	0	0	3	20	23
HANJIN KEELUNG	P3VH7	Houston	6	4	0	0	10
HANJIN NAGOYA	3FJW8	New York City	0	2	0	0	2

Continued on Page 79

Continued from Page 78

SHIP NAME	CALL	PORT	SEP	OCT	NOV	DEC	TOTAL
HANJIN OSAKA	3EQD9	New York City	4	0	0	0	4
HANJIN SHANGHAI	3FGI5	Newark	0	0	1	0	1
HANSA LUBECK	ELUC5	Long Beach	5	0	0	0	5
HEAVEN RIVER	ELVF6	Long Beach	0	21	92	58	171
HEIDELBERG EXPRESS	DEDI	Houston	226	458	457	495	1636
HENRY HUDSON BRIDGE	JKLS	Seattle	63	29	67	78	237
HERBERT C. JACKSON	WL3972	Cleveland	4	1	0	1	6
HOEGH DUKE	ELWP2	Norfolk	0	0	0	11	11
HOEGH MINERVA	LAGI5	Seattle	0	0	32	0	32
HONG KONG SENATOR	DEIP	Seattle	14	14	4	0	32
HONSHU SILVIA	3EST7	Seattle	16	23	14	21	74
HOOD ISLAND	C6LU4	Miami	37	56	41	30	164
HUAL ASIA	C6QX7	New York City	1	0	0	0	1
HUMACAO	WZJB	Norfolk	39	38	35	33	145
HUMBERGRACHT	PEUQ	Houston	0	0	0	29	29
HUME HIGHWAY	3EJO6	Jacksonville	0	0	10	37	47
HYUNDAI DISCOVERY	3FFR6	Seattle	31	51	55	23	160
HYUNDAI FORTUNE	3FLG6	Seattle	37	51	41	39	168
HYUNDAI FREEDOM	3FFS6	Seattle	10	8	10	5	33
HYUNDAI FRONTIER	C6RF6	Seattle	35	38	37	0	110
HYUNDAI INDEPENDENCE	3FDY6	Seattle	1	0	0	0	1
INDAMEX MISSISSIPPI	ZDDT5	Norfolk	17	10	7	0	34
INDIAN OCEAN	C6T2063	New York City	17	34	26	37	114
INDIANA HARBOR	WXN3191	Cleveland	69	98	69	41	277
INLAND SEAS	WCJ6214	Chicago	1	1	0	0	2
IRENA ARCTICA	OXTS2	Miami	41	52	60	92	245
ISLA DE CEDROS	3FOA6	Seattle	41	46	43	25	155
ITB BALTIMORE	WXKM	Baltimore	33	51	18	0	102
ITB MOBILE	KXDB	New York City	0	13	12	11	36
ITB NEW YORK	WVDG	Newark	0	5	21	30	56
IVARAN HUNTER	DNKL	Norfolk	34	31	1	0	66
IWANUMA MARU	3ESU8	Seattle	82	89	90	86	347
J. BENNETT JOHNSTON	C6QE3	Oakland	0	21	30	0	51
J.A.W. IGLEHART	WTP4966	Cleveland	3	8	1	0	12
JACKLYN M.	WCV7620	Chicago	12	12	13	10	47
JACKSONVILLE	WNDG	Baltimore	35	0	2	12	49
JADE PACIFIC	ELRY5	Seattle	0	9	24	42	75
JAMES N. SULLIVAN	C6FD3	Baltimore	0	10	1	29	40
JAMES R. BARKER	WYP8657	Cleveland	45	35	27	76	183
JEB STUART	WRGQ	Oakland	1	0	0	0	1
JO CLIPPER	PFEZ	Baltimore	2	56	26	29	113
JO LONN	PFEW	Houston	0	12	46	13	71
JOHN G. MUNSON	WE3806	Chicago	9	10	11	24	54
JOHN J. BOLAND	WF2560	Cleveland	0	1	0	1	2
JOIDES RESOLUTION	D5BC	Norfolk	36	70	31	30	167
JOSEPH	ELRZ8	Houston	19	2	48	56	125
JUDY LITRICO	KCKB	Houston	0	37	13	32	82
KANIN	ELEO2	New Orleans	0	0	28	61	89
KAPITAN AFANASYEV	UFIL	Seattle	0	50	32	23	105
KAPITAN BYANKIN	UAGK	Seattle	4	0	35	47	86
KAPITAN KONEV	UAHV	Seattle	54	55	65	35	209
KAPITAN MASLOV	UBRO	Seattle	16	18	19	22	75
KAPITAN SERYKH	UGOZ	Seattle	0	0	0	1	1
KAREN ANDRIE	WBS5272	Chicago	1	11	1	3	16
KAREN MAERSK	OZKN2	Seattle	0	0	46	0	46
KAUAI	WSRH	Long Beach	46	44	47	38	175
KAYE E. BARKER	WCF3012	Cleveland	0	4	1	0	5
KEE LUNG	BHFN	Seattle	0	25	32	46	103
KEN SHIN	YJQS2	Seattle	4	11	19	13	47
KEN YO	3FIC5	Seattle	0	0	9	40	49
KENAI	WSNB	Houston	0	3	1	0	4
KENNETH E. HILL	C6FA6	Newark	17	7	4	0	28
KINSMAN INDEPENDENT	WUZ7811	Cleveland	21	27	19	7	74
KIWI ARROW	C6HU6	Houston	33	23	0	0	56
KNOCK ALLAN	ELOI6	Houston	67	44	75	53	239
KOELN EXPRESS	9VBL	New York City	692	700	705	727	2824
KURE	3FGN3	Seattle	19	0	0	0	19
LEE A. TREGURTHA	WUR8857	Cleveland	9	12	6	2	29
LEONARD J. COWLEY	CG2959	Norfolk	15	9	0	0	24
LIBERTY SEA	KPZH	New Orleans	3	0	0	0	3
LIBERTY SPIRIT	WCPU	New Orleans	1	43	23	0	67
LIBERTY STAR	WCBP	New Orleans	37	39	1	50	127

Continued on Page 80

Continued from Page 79

SHIP NAME	CALL	PORT	SEP	OCT	NOV	DEC	TOTAL
LIBERTY SUN	WCOB	Houston	41	30	23	0	94
LICORNE PACIFIQUE	J8CV5	Houston	82	67	61	57	267
LIHUE	WTST	Oakland	43	62	56	36	197
LILAC ACE	3FDL4	Long Beach	3	8	0	0	11
LNG CAPRICORN	KHLN	New York City	7	0	0	0	7
LNG LIBRA	WDZG	New York City	31	0	0	0	31
LOK PRAGATI	ATZS	Seattle	9	5	4	8	26
LOOTSGRACHT	PFPT	Houston	55	6	52	34	147
LUISE OLDENDORFF	3FOW4	Seattle	16	0	0	0	16
LURLINE	WLVD	Oakland	33	42	41	39	155
LYKES CHALLANGER	FNHV	Houston	19	40	50	23	132
LYKES COMMANDER	3ELF9	Baltimore	39	5	67	18	129
LYKES CONDOR	DGGD	Houston	31	27	20	0	78
LYKES DISCOVERER	WGXO	Houston	82	52	46	62	242
LYKES EXPLORER	WGLA	Houston	49	40	36	43	168
LYKES HAWK	ELVB6	Houston	0	31	20	37	88
LYKES LIBERATOR	WGXN	Houston	41	31	22	49	143
LYKES NAVIGATOR	WGMJ	Houston	44	30	49	31	154
LYKES RAVEN	DIGF	Houston	20	2	12	4	38
LYKES VOYAGER	DJPL	Houston	29	42	39	34	144
M/V SP5. ERIC G. GIBSON	KAKF	Baltimore	19	26	25	29	99
MAASDAM	PFRO	Miami	4	2	1	0	7
MACKINAC BRIDGE	JKES	Seattle	57	66	60	87	270
MADISON MAERSK	OVJB2	Oakland	14	4	3	13	34
MAERSK ARIZONA	KAKG	Baltimore	13	42	17	31	103
MAERSK CALIFORNIA	WCX5083	Miami	0	0	28	15	43
MAERSK CHARLESTON	ELRO2	New York City	51	69	41	20	181
MAERSK GANNET	GJLK	Miami	4	0	0	0	4
MAERSK GIANT	OU2465	Miami	223	247	237	246	953
MAERSK RIO GRANDE	ELRJ5	Miami	0	0	0	1	1
MAERSK SCOTLAND	MXAR9	Houston	36	71	30	36	173
MAERSK SEA	S6CW	Seattle	52	87	77	56	272
MAERSK SHETLAND	MSQK3	Miami	57	13	41	0	111
MAERSK SOMERSET	MQVF8	New Orleans	44	30	84	54	212
MAERSK STAFFORD	MRSS9	New Orleans	18	43	3	51	115
MAERSK SUFFOLK	MRSS8	Houston	40	17	21	10	88
MAERSK TAIKI	9VIG	Baltimore	22	0	0	14	36
MAERSK TENNESSEE	WCX3486	Miami	31	36	51	42	160
MAERSK TEXAS	WCX3249	Miami	33	38	14	14	99
MAERSK VALENCIA	ELXK7	Norfolk	15	16	14	3	48
MAERSK WIND	S6TY	Norfolk	0	0	18	61	79
MAGLEBY MAERSK	OUSH2	Newark	14	24	48	21	107
MAHIMAHI	WHRN	Oakland	25	36	37	22	120
MAIRANGI BAY	GXEW	Long Beach	83	69	78	50	280
MAJESTIC MAERSK	OUJH2	Newark	5	12	7	27	51
MANHATTAN BRIDGE	3FWL4	Seattle	37	54	14	19	124
MANOA	KDBG	Oakland	12	33	18	8	71
MANULANI	KNIJ	Oakland	0	0	14	46	60
MARCHEN MAERSK	OWDQ2	Long Beach	6	47	13	4	70
MAREN MAERSK	OWZU2	Long Beach	14	14	4	34	66
MARGRETHE MAERSK	OYSN2	Long Beach	25	32	22	32	111
MARIE MAERSK	OULL2	Newark	5	19	16	12	52
MARINE CHEMIST	KMCB	Houston	51	15	0	0	66
MARINE COLUMBIA	KLKZ	Oakland	25	0	15	43	83
MARIT MAERSK	OZFC2	Miami	18	18	23	18	77
MARK HANNAH	WYZ5243	Chicago	2	3	2	0	7
MARSTA MAERSK	OUNO5	Norfolk	0	1	9	0	10
MATHILDE MAERSK	OUUU2	Long Beach	23	19	41	11	94
MATSONIA	KHRC	Oakland	27	8	20	44	99
MAUI	WSLH	Long Beach	21	27	23	20	91
MAURICE EWING	WLDZ	Newark	58	40	0	6	104
MAYAGUEZ	WZJE	Jacksonville	0	0	5	15	20
MAYVIEW MAERSK	OWEB2	Oakland	41	31	27	21	120
MC-KINNEY MAERSK	OUZW2	Newark	23	28	18	19	88
MEKHANIK KALYUZHNIY	UFLO	Seattle	55	77	62	47	241
MEKHANIK MOLDOVANOV	UIKI	Seattle	37	46	6	39	128
MELBOURNE STAR	GOVL	Newark	72	53	48	72	245
MELVILLE	WECB	Long Beach	58	75	71	66	270
MERCURY	3FFC7	Miami	15	6	0	0	21
MESABI MINER	WYQ4356	Cleveland	73	75	90	81	319
METEOR	DBBH	Houston	193	120	1	0	314
METTE MAERSK	OXKT2	Long Beach	17	21	17	6	61

Continued on Page 81

Continued from Page 80

SHIP NAME	CALL	PORT	SEP	OCT	NOV	DEC	TOTAL
MICHIGAN	WRB4141	Chicago	1	10	0	3	14
MIDDLETOWN	WR3225	Cleveland	3	0	2	0	5
MING ASIA	BDEA	New York City	23	0	0	0	23
MOKIHANA	WNRD	Oakland	54	70	71	33	228
MOKU PAHU	WBWK	Oakland	44	23	30	12	109
MORELOS	PGBB	Houston	30	71	1	0	102
MORMACSKY	WMBQ	New York City	11	12	0	0	23
MORMACSTAR	KGDF	Houston	45	10	0	17	72
MORMACSUN	WMBK	Norfolk	44	12	29	12	97
MOSEL ORE	ELRE5	Norfolk	63	68	49	59	239
MSC CALIFORNIA	LAKS5	Seattle	30	29	14	31	104
MSC XINGANG	3EHR6	Norfolk	17	12	14	12	55
MUNKEBO MAERSK	OUNI5	New York City	0	0	18	33	51
MV CONTSHIP ROME	ELVZ6	Norfolk	23	77	43	40	183
MYRON C. TAYLOR	WA8463	Chicago	15	28	12	0	55
NAGOYA EXPRESS	P3LE4	Seattle	21	21	11	6	59
NAJA ARCTICA	OXVH2	Miami	108	108	114	40	370
NATHANIEL B. PALMER	WBP3210	Seattle	13	39	44	46	142
NATIONAL HONOR	DZDI	Long Beach	0	0	1	0	1
NEDLLOYD HOLLAND	KRHX	Houston	24	44	43	46	157
NEDLLOYD RALEIGH BAY	PHKG	Houston	24	26	33	44	127
NEW HORIZON	WKWB	Long Beach	33	7	0	4	44
NEWARK BAY	WPKS	Houston	57	31	0	0	88
NIEUW AMSTERDAM	PGGQ	Long Beach	26	23	0	0	49
NOAA DAVID STARR JORDAN	WTDK	Seattle	78	59	78	27	242
NOAA SHIP ALBATROSS IV	WMVF	Norfolk	43	62	72	0	177
NOAA SHIP DELAWARE II	KNBD	New York City	126	75	49	50	300
NOAA SHIP FERREL	WTEZ	Norfolk	0	51	13	0	64
NOAA SHIP KA'IMIMOANA	WTEU	Seattle	105	55	87	38	285
NOAA SHIP MCARTHUR	WTEJ	Seattle	213	160	183	93	649
NOAA SHIP MILLER FREEMAN	WTDM	Seattle	146	139	72	0	357
NOAA SHIP OREGON II	WTDO	New Orleans	129	117	37	40	323
NOAA SHIP RAINIER	WTEF	Seattle	76	86	0	0	162
NOAA SHIP RONALD H BROWN	WTEC	New Orleans	150	91	69	0	310
NOAA SHIP T. CROMWELL	WTDF	Seattle	70	56	20	0	146
NOAA SHIP WHITING	WTEW	Baltimore	23	0	2	0	25
NOAAS GORDON GUNTER	WTEO	New Orleans	97	16	13	0	126
NOBEL STAR	KRPP	Houston	22	63	8	21	114
NOL AMAZONITE	9VBX	Long Beach	0	0	4	16	20
NOL DIAMOND	9VYT	Long Beach	0	11	1	0	12
NOL STENO	ZCBD4	New York City	8	11	10	11	40
NOLIZWE	MQLN7	New York City	19	87	60	45	211
NOMZI	MTQU3	Baltimore	65	28	36	45	174
NOORDAM	PGHT	Miami	12	18	2	21	53
NORASIA SHANGHAI	DNHS	New York City	42	10	4	52	108
NORDMAX	P3YS5	Seattle	14	53	36	59	162
NORDMORITZ	P3YR5	Seattle	41	28	37	49	155
NORTHERN LIGHTS	WFJK	New Orleans	35	37	0	5	77
NORWAY	C6CM7	Miami	15	0	27	60	102
NORWEGIAN WIND	C6LG6	Miami	5	13	10	0	28
NTABENI	3EGR6	Houston	62	0	0	0	62
NUERNBERG EXPRESS	9VBK	Houston	674	495	7	12	1188
NYK SPRINGTIDE	S6CZ	Seattle	9	8	4	15	36
NYK STARLIGHT	3FUX6	Long Beach	57	21	24	37	139
OCEAN CAMELLIA	3FTR6	Seattle	79	42	52	0	173
OCEAN CITY	WCYR	Houston	10	0	23	0	33
OCEAN CLIPPER	3EXI7	New Orleans	54	59	36	8	157
OCEAN PALM	3FDO7	Seattle	60	69	69	51	249
OGLEBAY NORTON	WAQ3521	Cleveland	0	0	0	2	2
OLEANDER	PJJU	Newark	27	28	22	9	86
OLYMPIAN HIGHWAY	3FSH4	Seattle	5	13	10	14	42
OOCL CALIFORNIA	VRWC8	Seattle	59	46	47	47	199
OOCL FIDELITY	VRWG5	Long Beach	23	22	33	47	125
OOCL HONG KONG	VRVA5	Oakland	28	28	24	30	110
OOCL INNOVATION	WPWH	Houston	72	45	51	37	205
OOCL INSPIRATION	KRPB	Houston	48	37	63	30	178
ORIANA	GVSN	Miami	42	20	30	38	130
ORIENTE HOPE	3ETH4	Seattle	57	0	0	23	80
ORIENTE PRIME	3FOU4	Seattle	15	24	10	9	58
ORIENTE VICTORIA	3FVG8	Seattle	20	17	21	30	88
OURO DO BRASIL	ELPP9	Baltimore	34	30	18	13	95
OVERSEAS BOSTON	KRDB	Long Beach	0	0	4	57	61

Continued on Page 82

Continued from Page 81

SHIP NAME	CALL	PORT	SEP	OCT	NOV	DEC	TOTAL
OVERSEAS HARRIETT	WRFJ	Houston	26	11	34	30	101
OVERSEAS JOYCE	WUQL	Jacksonville	49	22	24	30	125
OVERSEAS MARILYN	WFQB	Houston	26	8	15	0	49
OVERSEAS NEW ORLEANS	WFKW	Houston	32	35	35	18	120
OVERSEAS WASHINGTON	WFGV	Houston	0	0	1	0	1
P & O NEDLLOYD BUENOS AI	PGEC	Houston	12	13	19	19	63
P & O NEDLLOYD VERA CRUZ	PGFE	Houston	14	10	12	7	43
P&O NEDLLOYD HOUSTON	PGEB	Houston	76	59	46	48	229
P&O NEDLLOYD LOS ANGELES	PGDW	Long Beach	58	69	62	57	246
P&O NEDLLOYD MARSEILLE	MYSU5	Seattle	54	44	9	0	107
P&O NEDLLOYD SYDNEY	PDHY	Seattle	40	23	26	35	124
PACDREAM	ELQO6	Seattle	26	18	14	20	78
PACIFIC MERCHANT	ELXR8	Houston	0	61	83	42	186
PACIFIC SENATOR	ELTY6	Long Beach	0	61	0	0	61
PACKING	ELBX3	Seattle	18	7	16	17	58
PACOCEAN	ELJE3	Seattle	3	8	14	3	28
PACPRINCE	ELED7	Seattle	5	0	18	55	78
PACPRINCESS	ELED8	Houston	0	16	33	19	68
PAUL BUCK	KDGR	Houston	5	8	17	9	39
PAUL R. TREGURTHA	WYR4481	Cleveland	18	36	23	23	100
PEARL ACE	VRUN4	Seattle	27	72	32	70	201
PEGASUS HIGHWAY	3FMA4	New York City	9	3	0	0	12
PEGGY DOW	PJOY	Long Beach	75	103	50	59	287
PELAGIA	PGRQ	Houston	51	78	5	4	138
PFC EUGENE A. OBREGON	WHAQ	Norfolk	5	43	37	8	93
PHILADELPHIA	KSYP	Baltimore	0	1	0	0	1
PHILIP R. CLARKE	WE3592	Chicago	6	12	26	14	58
PIERRE FORTIN	CG2678	Norfolk	203	170	0	0	373
PISCES EXPLORER	MWQD5	Long Beach	9	43	30	11	93
POLAR TRADER	WCZ3758	Long Beach	9	16	15	16	56
POLYNESIA	DNMR	Oakland	56	30	24	0	110
POTOMAC TRADER	WXBZ	Houston	64	28	0	0	92
PRESIDENT ADAMS	WRYW	Oakland	59	52	60	55	226
PRESIDENT GRANT	WCY2098	Long Beach	49	46	45	50	190
PRESIDENT JACKSON	WRYC	Oakland	48	43	39	39	169
PRESIDENT KENNEDY	WRYE	Oakland	71	68	59	46	244
PRESIDENT POLK	WRYD	Oakland	62	71	68	34	235
PRESIDENT TRUMAN	WNDP	Oakland	49	74	56	29	208
PRESIDENT WILSON	WCY3438	Long Beach	51	57	51	37	196
PRESQUE ISLE	WZE4928	Chicago	22	18	16	8	64
PRIDE OF BALTIMORE II	WUW2120	Baltimore	0	0	2	0	2
PRINCE OF OCEAN	3ECO9	Seattle	0	0	31	21	52
PRINCES HIGHWAY	3ERU8	Jacksonville	24	80	68	19	191
PROJECT ARABIA	PJKP	Miami	47	22	5	34	108
PROJECT ORIENT	PJAG	Baltimore	40	21	3	63	127
PUDONG SENATOR	DQVI	Seattle	84	58	43	65	250
PUSAN SENATOR	DQVG	Seattle	63	50	36	60	209
QUEEN ELIZABETH 2	GBTT	New York City	63	45	70	76	254
QUEEN OF SCANDINAVIA	OUSE6	Miami	27	20	13	10	70
QUEENSLAND STAR	MZBM7	Houston	76	70	70	49	265
R.J. PFEIFFER	WRJP	Long Beach	47	43	25	13	128
RAINBOW BRIDGE	3EYX9	Seattle	75	58	56	55	244
RAYMOND E. GALVIN	C6FD6	Oakland	1	8	4	14	27
REBECCA LYNN	WCW7977	Chicago	7	5	11	5	28
REPULSE BAY	MQYA3	Houston	0	11	12	4	27
RHAPSODY OF THE SEAS	LAZK4	Miami	0	2	0	1	3
RICHARD G MATTHIESEN	WLBV	Jacksonville	0	1	0	0	1
RICHARD H MATZKE	C6FE5	Oakland	19	11	12	4	46
RICHARD REISS	WBF2376	Cleveland	20	13	1	3	37
RIO APURE	ELUG7	Miami	49	47	24	35	155
RO RO SENTOSA	9VRL	Jacksonville	0	1	0	0	1
ROGER BLOUGH	WZP8164	Chicago	14	34	50	30	128
ROGER REVELLE	KAOU	New Orleans	68	31	18	23	140
ROTTERDAM EXPRESS	S6IG	Long Beach	609	554	407	478	2048
ROYAL PRINCESS	GBRP	Long Beach	26	4	39	26	95
RUBIN BONANZA	3FNV5	Seattle	21	35	0	48	104
RUBIN PEARL	YJQA8	Seattle	68	60	58	50	236
RUBIN STELLA	3FAP5	Seattle	0	0	7	45	52
SABINE PHILADELPHIA	WNFJ	New Orleans	17	17	14	35	83
SAGA CREST	H3FB	Miami	8	0	0	0	8
SALLY MAERSK	OZHS2	Seattle	22	14	0	0	36
SALOME	S6CL	Newark	7	0	0	0	7

Continued on Page 83

Continued from Page 82

SHIP NAME	CALL	PORT	SEP	OCT	NOV	DEC	TOTAL
SAM HOUSTON	KDGA	Houston	8	28	19	0	55
SAMUEL RISLEY	CG2960	Norfolk	0	12	86	145	243
SAN ISIDRO	ELVG8	Norfolk	9	20	7	3	39
SAN MARCOS	ELND4	Jacksonville	35	68	44	48	195
SANDRA FOSS	WYL4908	Seattle	0	14	0	0	14
SANDY BAY	KAAC	Oakland	0	0	0	3	3
SANKO LAUREL	3EXQ3	Seattle	7	7	12	4	30
SANTA BARBARA	ELOT3	Seattle	2	1	0	0	3
SANTA MONICA	ELNJ3	Seattle	31	38	53	34	156
SAUDI MAKKAH	HZQZ	Houston	67	41	35	41	184
SEA INITIATIVE	DEBB	Houston	17	39	0	19	75
SEA MARINER	J8FF9	Miami	29	40	23	49	141
SEA PRINCESS	KRCP	New Orleans	38	12	6	38	94
SEA TRADE	ELGH4	Norfolk	36	3	18	7	64
SEA VALOR	WBN9212	Seattle	0	5	9	2	16
SEA-LAND CHARGER	V7AY2	Long Beach	3	57	16	20	96
SEA-LAND DISCOVERY	WZJD	Jacksonville	0	8	33	38	79
SEA-LAND URUGUAY	DGVZ	Norfolk	38	32	0	0	70
SEA/LAND VICTORY	DIDY	New York City	0	0	0	18	18
SEALAND ANCHORAGE	KGTX	Seattle	61	66	65	54	246
SEALAND ARGENTINA	DGVN	Jacksonville	0	0	0	1	1
SEALAND ATLANTIC	KRLZ	Houston	46	42	51	45	184
SEALAND CHALLENGER	WZJC	Houston	41	43	49	31	164
SEALAND COMET	V7AP3	Oakland	39	40	60	32	171
SEALAND CONSUMER	WCHF	Houston	21	8	9	14	52
SEALAND CRUSADER	WZJF	Jacksonville	30	26	43	22	121
SEALAND DEFENDER	KGJB	Oakland	56	51	45	18	170
SEALAND DEVELOPER	KHRH	Long Beach	32	34	23	38	127
SEALAND ENDURANCE	KGJX	Long Beach	18	16	9	0	43
SEALAND ENTERPRISE	KRGB	Oakland	73	72	64	19	228
SEALAND EXPEDITION	WPGJ	Jacksonville	70	75	64	26	235
SEALAND EXPLORER	WGJF	Long Beach	36	66	66	39	207
SEALAND EXPRESS	KGJD	Long Beach	25	17	89	116	247
SEALAND HAWAII	KIRF	Seattle	55	59	58	35	207
SEALAND HONDURAS	OUQP2	Miami	13	24	25	10	72
SEALAND INDEPENDENCE	WGJC	Long Beach	0	1	39	28	68
SEALAND INNOVATOR	WGKF	Oakland	31	41	53	35	160
SEALAND INTEGRITY	WPVD	Houston	64	158	62	35	319
SEALAND INTREPID	9VWZ	Norfolk	30	37	1	2	70
SEALAND KODIAK	KGTZ	Seattle	27	26	45	13	111
SEALAND LIBERATOR	KHRP	Oakland	11	32	38	51	132
SEALAND MERCURY	V7AP6	Oakland	38	32	31	45	146
SEALAND METEOR	V7AP7	Long Beach	43	30	11	34	118
SEALAND NAVIGATOR	WPGK	Long Beach	62	67	72	37	238
SEALAND PACIFIC	WSRL	Long Beach	54	64	62	24	204
SEALAND PATRIOT	KHRF	Oakland	42	29	20	38	129
SEALAND PERFORMANCE	KRPD	Houston	30	60	48	49	187
SEALAND PRODUCER	WJBJ	Long Beach	37	53	49	26	165
SEALAND QUALITY	KRNJ	Jacksonville	17	50	27	31	125
SEALAND RACER	V7AP8	Long Beach	35	22	44	27	128
SEALAND RELIANCE	WFLH	Long Beach	86	69	69	48	272
SEALAND SPIRIT	WFLG	Oakland	0	0	30	16	46
SEALAND TACOMA	KGTY	Seattle	43	54	29	28	154
SEALAND TRADER	KIRH	Oakland	69	71	43	26	209
SEALAND VOYAGER	KHRK	Long Beach	75	71	64	62	272
SEARIVER BATON ROUGE	WAFA	Oakland	0	0	0	26	26
SEARIVER BAYTOWN	KFPM	Oakland	9	5	11	12	37
SEARIVER NORTH SLOPE	KHLQ	Oakland	0	11	10	8	29
SETO BRIDGE	JMQY	Oakland	35	58	56	36	185
SEVEN SEAS	3FBS9	Seattle	13	21	33	14	81
SHIRAOI MARU	3ECM7	Seattle	124	91	111	120	446
SIDNEY FOSS	WYL5445	Seattle	0	21	6	0	27
SINE MAERSK	OZOK2	Seattle	24	19	0	0	43
SKAGEN MAERSK	OYOS2	Seattle	0	27	9	0	36
SKAUBRYN	LAJV4	Seattle	66	53	44	29	192
SKAUGRAN	LADB2	Seattle	39	22	31	22	114
SKODSBORG	OYRJ4	Houston	0	22	0	0	22
SKY PRINCESS	GYYP	Miami	0	0	152	223	375
SNOW CRYSTAL	C6ID8	New York City	61	82	0	0	143
SOFIE MAERSK	OZUN2	Seattle	0	14	12	0	26
SOL DO BRASIL	ELQQ4	Baltimore	53	43	67	55	218
SOLAR WING	ELJS7	Jacksonville	86	55	88	85	314

Continued on Page 84

Continued from Page 83

SHIP NAME	CALL	PORT	SEP	OCT	NOV	DEC	TOTAL
SOROE MAERSK	OYKJ2	Seattle	0	44	0	0	44
SOUTHDOWN CHALLENGER	WA4659	Cleveland	17	32	58	30	137
SOVEREIGN MAERSK	OYGA2	Seattle	24	0	1	20	45
SOVEREIGN OF THE SEAS	LAEB2	Miami	1	0	0	0	1
SPLENDOUR OF THE SEAS	LAUS4	Miami	8	8	0	0	16
ST BLAIZE	J8FO	Norfolk	8	0	0	0	8
ST. LUCY	ELPO3	Norfolk	0	0	74	53	127
STALWART	WBN6512	Seattle	1	10	4	0	15
STAR ALABAMA	LAVU4	Baltimore	40	24	13	27	104
STAR AMERICA	LAVV4	Jacksonville	3	27	0	0	30
STAR DOVER	LAEP4	Seattle	11	21	13	22	67
STAR EVVIVA	LAHE2	Jacksonville	14	17	22	19	72
STAR FRASER	LAVY4	Houston	30	27	29	0	86
STAR GEIRANGER	LAKQ5	Norfolk	0	30	0	74	104
STAR GRINDANGER	LAKR5	Norfolk	0	0	31	0	31
STAR HANSA	LAXP4	Jacksonville	14	16	6	1	37
STAR HARDANGER	LAXD4	Baltimore	0	0	11	12	23
STAR HARMONIA	LAGB5	Baltimore	0	2	22	0	24
STAR HERDLA	LAVD4	Baltimore	21	41	51	41	154
STAR HIDRA	LAVN4	Baltimore	42	35	32	31	140
STAR HIDRA	LAVX4	Seattle	0	0	1	1	2
STAR HOYANGER	LAXG4	Baltimore	15	23	5	2	45
STAR TRONDANGER	LAQQ2	Baltimore	5	14	6	5	30
STATENDAM	PHSG	Miami	14	66	58	50	188
STELLAR IMAGE	3FDO6	Seattle	0	0	67	33	100
STELLAR KOHINOOR	3FFG8	Seattle	0	5	55	16	76
STENA CLIPPER	C6MX4	Miami	13	11	26	11	61
STEPHAN J	V2JN	Miami	134	138	64	50	386
STEWART J. CORT	WYZ3931	Chicago	9	27	18	14	68
STONEWALL JACKSON	KDDW	New Orleans	0	10	22	0	32
STRONG PATRIOT	WCZ8589	Norfolk	38	12	15	9	74
SUN DANCE	3ETQ8	Seattle	0	14	17	17	48
SUNBELT DIXIE	D5BU	Baltimore	16	18	23	18	75
SUPER RUBIN	3FWP5	Seattle	43	31	42	0	116
SUSAN MAERSK	OYIK2	Seattle	26	0	0	11	37
SUSAN W. HANNAH	WAH9146	Chicago	10	8	3	11	32
SVEND MAERSK	OYJS2	Seattle	2	30	0	0	32
SVENDBORG MAERSK	OZSK2	Seattle	26	0	8	43	77
SWAN ARROW	C6CN8	Baltimore	0	0	0	5	5
TAGUS	LAZA2	Long Beach	13	9	7	7	36
TAI HE	BOAB	Long Beach	44	42	35	33	154
TAIKO	LAQT4	New York City	0	0	13	12	25
TAKAMINE	LACT5	Jacksonville	0	3	23	0	26
TAKASAGO	LACR5	Jacksonville	0	15	0	0	15
TALISMAN	LAOW5	Jacksonville	18	24	1	21	64
TANABATA	WCZ5535	Baltimore	27	0	20	30	77
TARAGO	LAPN5	New York City	0	0	17	0	17
TAUSALA SAMOA	V2KS	Seattle	70	85	81	62	298
TEAL ARROW	C6KB8	Newark	0	0	1	0	1
TECO TRADER	KSDF	Houston	0	11	65	12	88
TEQUI	3FDZ5	Seattle	16	27	11	17	71
TEXAS	LMWR3	Baltimore	38	0	0	0	38
THORKIL MAERSK	MSJX8	Miami	65	53	34	55	207
TMM MEXICO	3FRY9	Houston	42	35	44	8	129
TMM VERACRUZ	V2PC4	Houston	0	8	8	18	34
TOBIAS MAERSK	MSJY8	Long Beach	29	47	51	36	163
TORM FREYA	ELVY8	Norfolk	24	6	36	30	96
TOWER BRIDGE	ELJL3	Long Beach	17	3	11	13	44
TRADE COSMOS	VRUQ2	Miami	55	15	0	0	70
TRANSWORLD	3FFY3	New Orleans	0	0	20	56	76
TREIN MAERSK	MSQQ8	Baltimore	38	48	43	17	146
TRINITY	WRGL	Houston	0	0	4	0	4
TRIUMPH ACE	H3CB	Seattle	0	29	36	28	93
TROJAN STAR	C6OD7	Baltimore	0	0	45	75	120
TROPIC FLYER	J8NV	Miami	0	17	3	0	20
TROPIC JADE	J8NY	Miami	0	7	11	18	36
TROPIC KEY	J8PE	Miami	0	27	29	30	86
TROPIC LURE	J8PD	Miami	8	24	26	23	81
TROPIC SUN	3EZK9	New Orleans	13	35	27	0	75
TROPIC TIDE	3FGQ3	Miami	7	9	7	0	23
TUSTUMENA	WNGW	Seattle	19	20	12	9	60
UNITED SPIRIT	ELYB2	Seattle	65	60	86	66	277

Continued on Page 85

Continued from Page 84

SHIP NAME	CALL	PORT	SEP	OCT	NOV	DEC	TOTAL
USCGC ACUSHNET WMEC 167	NNHA	Oakland	0	60	3	0	63
USCGC BRAMBLE (WLB 392)	NODK	Cleveland	0	0	14	0	14
USCGC COURAGEOUS	NCRG	Norfolk	17	4	0	2	23
USCGC DURABLE (WMEC 628)	NRUN	Houston	2	0	0	0	2
USCGC GENTIAN	NBHF	Norfolk	12	11	1	3	27
USCGC KUKUI (WLB-203)	NKJU	Seattle	0	6	0	0	6
USCGC MACKINAW	NRKP	Chicago	2	0	4	7	13
USCGC MELLON (WHEC 717)	NMEL	Seattle	4	14	0	0	18
USCGC NORTHLAND WMEC 904	NLGF	Norfolk	21	0	37	35	93
USCGC POLAR SEA__(WAGB 1	NRUO	Seattle	0	1	157	61	219
USCGC POLAR STAR (WAGB 1	NBTM	Seattle	49	0	0	0	49
USCGC SUNDEW (WLB 404)	NODW	Chicago	1	4	8	0	13
USCGC VIGOROUS WMEC 627	NQSP	Baltimore	0	0	0	2	2
USNS BRUCE C. HEEZEN	NBID	New Orleans	0	1	0	27	28
USNS GILLILAND	NAMJ	Norfolk	0	3	25	0	28
USNS GUS W. DARNELL	KCDK	Houston	0	3	7	13	23
USNS JOHN MCDONNELL (T-A	NJMD	New Orleans	0	0	42	18	60
USNS LITTLEHALES (T-AGS	NLIT	New Orleans	0	0	14	4	18
USNS NAVAJO_(TATF-169)	NOYK	Long Beach	16	19	0	37	72
USNS PERSISTENT	XXXX	Norfolk	0	0	0	1	1
USNS POLLUX	NMVG	New Orleans	0	0	8	0	8
USNS SHASTA TAE-33	NRNC	Seattle	0	31	53	36	120
USNS SUMNER	NZAU	New Orleans	46	40	34	50	170
VALIANT	WXCA	New Orleans	0	0	5	0	5
VEGA	9VJS	Houston	0	0	17	4	21
VICTORIA	GBBA	Miami	0	1	13	33	47
VIRGINIA	3EBW4	Seattle	0	0	0	27	27
VLADIVOSTOK	UBXP	Seattle	60	92	55	80	287
VOYAGER OF THE SEAS	ELWU7	Miami	0	23	1	0	24
WAARDRECHT	S6BR	Seattle	56	62	53	0	171
WASHINGTON HIGHWAY	JKHH	Seattle	101	113	101	120	435
WEATHERBIRD II	WCT6653	Seattle	9	7	0	0	16
WECOMA	WSD7079	Seattle	31	94	80	64	269
WESTERN BRIDGE	C6JQ9	Baltimore	53	81	42	75	251
WESTWARD	WZL8190	Miami	0	4	5	8	17
WESTWARD VENTURE	KHJB	Seattle	19	29	29	44	121
WESTWOOD ANETTE	C6QO9	Seattle	63	41	43	40	187
WESTWOOD BELINDA	C6CE7	Seattle	38	41	52	40	171
WESTWOOD BORG	LAON4	Seattle	38	36	44	34	152
WESTWOOD BREEZE	LAOT4	Seattle	9	19	14	22	64
WESTWOOD CLEO	C6OQ8	Seattle	36	30	31	19	116
WESTWOOD JAGO	C6CW9	Seattle	42	37	25	30	134
WESTWOOD MARIANNE	C6QD3	Seattle	43	63	46	36	188
WILFRED SYKES	WC5932	Chicago	1	5	8	3	17
WILLIAM E. CRAIN	ELOR2	Oakland	18	1	0	9	28
WILSON	WNPD	New Orleans	39	44	15	29	127
WORLD SPIRIT	ELWG7	Seattle	32	28	35	36	131
YUCATAN	3FTA9	Houston	22	13	0	0	35
YURIY OSTROVSKIY	UAGJ	Seattle	38	51	43	44	176
ZENITH	ELOU5	Miami	0	1	3	9	13
ZIM AMERICA	4XGR	Newark	43	53	27	16	139
ZIM ASIA	4XFB	New Orleans	33	33	84	90	240
ZIM ATLANTIC	4XFD	New York City	17	62	38	31	148
ZIM CANADA	4XGS	Norfolk	52	16	21	47	136
ZIM CHINA	4XFQ	New York City	28	19	44	40	131
ZIM EUROPA	4XFN	New York City	3	24	59	32	118
ZIM HONG KONG	4XGW	Houston	18	42	25	18	103
ZIM IBERIA	4XFP	New York City	9	16	3	2	30
ZIM ISRAEL	4XGX	New Orleans	31	57	31	26	145
ZIM ITALIA	4XGT	New Orleans	19	0	50	69	138
ZIM JAMAICA	4XFE	New York City	36	48	28	35	147
ZIM JAPAN	4XGV	Baltimore	22	14	41	74	151
ZIM KOREA	4XGU	Miami	23	36	36	34	129
ZIM PACIFIC	4XFC	New York City	28	59	57	29	173
ZIM SANTOS	ELRJ6	Baltimore	0	0	14	3	17
ZIM SEATTLE	ELWZ3	Seattle	56	42	34	50	182
ZIM U.S.A.	4XFO	New York City	12	17	47	36	112
Totals	Sep	24360					
	Oct	25745					
	Nov	23672					
	Dec	21580					
Period Total		95357					

Meteorological Services—Observations

U.S. Port Meteorological Officers

Headquarters

David McShane
Voluntary Observing Ship Technical Leader
National Data Buoy Center
Building 1100, Room 353A
Stennis Space Center, MS 39529-6000
Tel: 228-688-1678
Fax: 228-688-3153
E-mail: david.mcshane@noaa.gov

Robert A. Luke
Voluntary Observing Ship Program Leader
National Data Buoy Center
Building 1100, Room 353D
Stennis Space Center, MS 39529-6000
Tel: 228-688-1457
Fax: 228-688-3153
E-mail: robert.luke@noaa.gov

Mary Ann Burke, Editor
Mariners Weather Log
230 E. 5th Street
Frederick, MD 21701
Tel and Fax: 301-663-7835
E-mail: wvrs@earthlink.net

Atlantic Ports

Robert Drummond, PMO
National Weather Service, NOAA
2550 Eisenhower Blvd, Suite 312
P.O. Box 165504
Port Everglades, FL 33316
Tel: 954-463-4271
Fax: 954-462-8963
E-mail: robert.drummond@noaa.gov

Lawrence Cain, PMO
National Weather Service, NOAA
13701 Fang Road
Jacksonville, FL 32218-7933
Tel: 904-741-5186
Fax: 904-741-0078
E-mail: larry.cain@noaa.gov

Peter Gibino, PMO, Norfolk
National Weather Service, NOAA
4034-B G. Washington Highway
Yorktown, VA 23692-2724
Tel: 757-877-1692
Fax: 757-877-9561
E-mail: peter.gibino@noaa.gov

James Saunders, PMO
National Weather Service, NOAA
Maritime Center I, Suite 287
2200 Broening Highway
Baltimore, MD 21224-6623
Tel: 410-633-4709
Fax: 410-633-4713
E-mail: james.saunders@noaa.gov

Tim Kenefick, PMO, New York/New Jersey
National Weather Service, NOAA
110 Lower Main Street, Suite 201
South Amboy, NJ 08879-1367
Tel: 732-316-5409
Fax: 732-316-7643
E-mail: timothy.kenefick@noaa.gov

Great Lakes Ports

Amy Seeley, PMO
National Weather Service, NOAA
333 West University Dr.
Romeoville, IL 60446-1804
Tel: 815-834-0600 Ext. 269
Fax: 815-834-0645
E-mail: amy.seeley@noaa.gov

George Smith, PMO
National Weather Service, NOAA
Hopkins International Airport
Cleveland, OH 44135
Tel: 216-265-2374
Fax: 216-265-2371
E-mail: george.e.smith@noaa.gov

Gulf of Mexico Ports

John Warrelmann, PMO
National Weather Service, NOAA
New Orleans International Airport
Box 20026
New Orleans, LA 70141
Tel: 504-589-4839
E-mail: john.warrelmann@noaa.gov

James Nelson, PMO
National Weather Service, NOAA
Houston Area Weather Office
1620 Gill Road
Dickinson, TX 77539-3409
Tel: 281-534-2640 x.277
Fax: 281-337-3798
E-mail: jim.nelson@noaa.gov

Pacific Ports

Derek LeeLoy
Ocean Services Program Coordinator
National Weather Service Pacific Region HQ
Grosvenor Center, Mauka Tower
737 Bishop Street, Suite 2200
Honolulu, HI 96813-3201
Tel: 808-532-6439
Fax: 808-532-5569
E-mail: derek.leeloy@noaa.gov

Robert Webster, PMO
National Weather Service, NOAA
501 West Ocean Blvd., Room 4480
Long Beach, CA 90802-4213
Tel: 562-980-4090
Fax: 562-980-4089
E-mail: bob.webster@noaa.gov

Robert Novak, PMO
National Weather Service, NOAA
1301 Clay Street, Suite 1190N
Oakland, CA 94612-5217
Tel: 510-637-2960
Fax: 510-637-2961
E-mail: bob.novak@noaa.gov

Patrick Brandow, PMO
National Weather Service, NOAA
7600 Sand Point Way, N.E.
BIN C15700
Seattle, WA 98115-6349
Tel: 206-526-6100
Fax: 206-526-4571 or 6094
E-mail: pat.brandow@noaa.gov

Richard Courtney
National Weather Service, NOAA
600 Sandy Hook Street, Suite 1
Kodiak, AK 99615-6814
Tel: 907-487-2102
Fax: 907-487-9730
E-mail: richard.courtney@noaa.gov

Lynn Chrystal, OIC
National Weather Service, NOAA
Box 427
Valdez, AK 99686-0427
Tel: 907-835-4505
Fax: 907-835-4598
E-mail: lynn.chrystal@noaa.gov

Larry Hubble
National Weather Service Alaska Region
222 West 7th Avenue #23
Anchorage, AK 99513-7575
Tel: 907-271-3507
Fax: 907-271-3711
E-mail: greg.matzen@noaa.gov

SEAS Field Representatives

GOOS Center Manager
Steve Cook
8604 La Jolla Shores Drive
La Jolla, CA 92037-1508
Tel: 858-546-7103
Fax: 619-546-7185
E-mail: steven.cook@noaa.gov

GOOS Staff
John Steger, LCDR
AOML/GOOS Center
4301 Rickenbacker Causeway

Continued on Page 87

Meteorological Services
Continued from Page 86

Miami, FL 33149-1026
Tel: 305-361-4356
Fax: 305-361-4366
E-mail: john.steger@noaa.gov

Northeast Atlantic SEAS Rep.
Jim Farrington
SEAS Logistics/AMC
439 West York Street
Norfolk, VA 23510
Tel: 757-441-3062
Fax: 757-441-6495
E-mail: james.w.farrington@noaa.gov

Pacific Northwest SEAS Rep.
Bob Decker
SEAS Logistics/PMC
7600 Sand Point Way, NE, Bin C15700
Seattle, WA 98115-0700
Tel: 206-526-4280
Fax: 206-526-4281
E-mail: bob.decker@noaa.gov

Southwest Pacific SEAS Rep.
Carrie Wolfe
Southern California Marine Institute
820 S. Seaside Avenue
San Pedro, Ca 90731-7330
Tel: 310-519-3181
Fax: 310-519-1054
E-mail: hbbio048@csun.edu

Southeast Atlantic SEAS Rep.
Ann-Marie Wilburn
AOML/GOSO Center
4301 Rickenbacker Causeway
Miami, FL 33149-1026
Tel: 305-361-4336
Fax: 305-361-4366
E-mail: wilburn@aoml.noaa.gov

Gobal Drifter Program
Craig Engler
AOML/PHOD
4301 Rickenbacker Causeway
Miami, FL 33149-1026
Tel: 305-361-4439
Fax: 305-361-4366
E-mail: craig.engler@noaa.gov

NIMA Fleet Liaisons

Joe Schruender, East Coast Fleet Liaison
Christopher G. Janus, West Coast Fleet Liaison
ATTN: GIMM (MS D-44)
4600 Sangamore Road
Bethesda, MD 20816-5003
Tel: 301-227-3120
Fax: 301-227-4211
E-mail: schruendj@nima.mil
janusc@nima.mil

U.S. Coast Guard AMVER Center

Richard T. Kenney
AMVER Maritime Relations Officer
United States Coast Guard
Battery Park Building
New York, NY 10004
Tel: 212-668-7764
Fax: 212-668-7684
E-mail: rkenney@batteryny.uscg.mil

Other Port Meteorological Officers

Australia

Head Office
Marine Observations Unit
Bureau of Meteorology
150 Lonsdale Street, 7th Floor
Melbourne, VIC 3000
Tel: +613 9669 4651
Fax: +613 9669 4168
E-mail: marine_obs@bom.gov.au

Melbourne
Michael J. Hills, Port Meteorological Agent
Victoria Regional Office
Bureau of Meteorology
150 Lonsdale Street, 26th Floor
Melbourne, VIC 3000
Tel: +613 9669 4982
Fax: +613 9663 4957
E-mail: m.hills@bom.gov.au

Fremantle
Malcolm Young, Port Meteorological Agent
MalMet Services Pty Ltd
Unit 3/76 Gardner Street
COMO WA 6152
Tel: +618 9474 1974
Fax: +618 9260 8475
E-mail: malyoung@iinet.net.au

Sydney
Captain Einion E. (Taffy) Rowlands, PMA
NSW Regional Office
Bureau of Meteorology, Level 15
300 Elizabeth Street
Sydney NSW 2000
Tel:+612 9296 1547
Fax: +612 9296 1648
E-mail: e.rowlands@bom.gov.au

Canada

Randy Sheppard, PMO
Meteorological Service of Canada
16th Floor, 45 Aldernay Drive
Dartmouth, Nova Scotia B2Y 2N6
Tel: 902-426-6703
E-mail: randy.sheppard@ec.gc.ca

Jack Cossar, PMO
Meteorological Service of Canada
6 Bruce Street
St. John's, Newfoundland A1N 4T3
Tel: 709-722-4798
Fax: 709-722-5097
E-mail: jack.cossar@ec.gc.ca

Michael Riley, PMO
Meteorological Service of Canada
700-1200 West 73rd Avenue
Vancouver, British Columbia V6P 6H9
Tel: 604-664-9136
Fax: 604-664-9195
E-mail: mike.riley@ec.gc.ca

Ron Fordyce, Supt. Marine Data Unit
Rick Shukster, PMO
Roland Kleer, PMO
Meteorological Service of Canada
Port Meteorological Office
100 East Port Blvd.
Hamilton, Ontario L8H 7S4
Tel: 905-312-0900
Fax: 905-312-0730
E-mail: ron.fordyce@ec.gc.ca
rick.shukster@ec.gc.ca
roland.kleer@ec.gc.ca

Richard Dupuis, PMO
Meteorological Service of Canada
100 Alexis Nihon Blvd., 3rd Floor
Ville St. Laurent, Quebec H4M 2N8

China

YU Zhaoguo
Shanghai Meteorological Bureau
166 Puxi Road
Shanghai, China

Denmark

Commander Lutz O. R. Niegsch
PMO, Danish Meteorological Inst.
Lyngbyvej 100, DK-2100
Copenhagen, Denmark
Tel: +45 39157500
Fax: +45 39157300

United Kingdom

Headquarters
Capt. E. J. O'Sullivan
Marine Observations Manager, Met. Office
Observations Supply - Marine Networks
Beaufort Park
Easthampstead, Wokingham
Berkshire RG40 3DN
Tel: +44-1344 85-5723
Fax: +44-1344 85-5873
Email: edward.osullivan@metoffice.com

Bristol Channel
Captain Austin P. Maytham, PMO

Continued on Page 88

Meteorological Services
Continued from Page 87

P.O. Box 278, Companies House
CrownWay, Cardiff CF14 3UZ
Tel: + 44 029 2202 142223
Fax: +44 029 2022 5295

East England
Captain John Steel, PMO
Customs Building, Albert Dock
Hull HU1 2DP
Tel: +44 01482 320158
Fax: +44 01482 328957

Northeast England
Captain Gordon Young, PMO
Able House, Billingham Reach Ind. Estate
Billingham, Cleveland TS23 lPX
Tel: +44 0642 560993
Fax:+44 0642 562170

Northwest England
Colin B. Attfield, PMO
Room 331, Royal Liver Building
Liverpool L3 1JH
Tel:+44 0151 236 6565
Fax: +44 0151 227 4762

Scotland and Northern Ireland
Captain Peter J. Barratt, PMO
Navy Buildings, Eldon Street
Greenock, Strathclyde PA16 7SL
Tel: +44 01475 724700
Fax: +44 01475 892879

Southeast England
Captain Harry H. Gale, PMO
Trident House, 21 Berth, Tilbury Dock
Tilbury, Essex RM18 7HL
Tel: +44 01385 859970
Fax: +44 01375 859972

Southwest England
Captain James M. Roe, PMO
8 Viceroy House, Mountbatten Business Centre
Millbrook Road East
Southampton SO15 lHY
Tel: +44 023 8022 0632
Fax: +44 023 8033 7341

France

Yann Prigent, PMO
Station Mét., Noveau Semaphore
Quai des Abeilles, Le Havre
Tel: +33 35422106
Fax: +33 35413119

P. Coulon
Station Météorologique
de Marseille-Port
12 rue Sainte Cassien
13002 Marseille
Tel: +33 91914651 Ext. 336

Germany

Volker Weidner, PMO
Deutscher Wetterdienst
Met. Hafendienst
Postfach 70 04 21
22004 Hamburg
Tel: 040 3190 8826

Volker Weidner, PMO
Peter Gollnow, PMO
Horst von Bargen, PMO
Deutscher Wetterdienst
Jenfelder Allee 70a
22043 Hamburg
Tel: +49 40 66901411
Fax: +49 40 66901496
E-mail: pmo@dwd.de

Henning Hesse, PMO
Deutscher Wetterdienst
An de Neuen Schleuse
27570 Bremerhaven
Tel: +49 471 7004018
Fax: +49 471 7004017
E-mail: pmo@dwd.de

Ulrich Ranke, PMO
Deutscher Wetterdienst
Flughafendamm 45
28199 Bremen
Tel: +49 421 5372163
Fax: +49 421 5372166
E-mail: pmo@dwd.de

Christel Heidner, OMP
Christine Bergs, PMO
Deutscher Wetterdienst
Seestr. 15a
18119 Rostock
Tel: +49 381 5438830
Fax: +49 381 5438863
E-mail: pmo@dwd.de

Greece

George E. Kassimidis, PMO
Port Office, Piraeus
Tel: +301 921116
Fax: +3019628952

Hong Kong

C. F. Wong, PMO
Hong Kong Observatory
134A Nathan Road
Kowloon, Hong Kong
Tel: +852 2926 3113
Fax: +852 2311 9448
E-mail: hkopmo@hko.gcn.gov.hk

Israel

Hani Arbel, PMO
Haifa Port
Tel: 972 4 8664427

Aharon Ofir, PMO
Marine Department
Ashdod Port
Tel: 972 8 8524956

Japan

Headquarters
Kanno Yoshiaki
Marine Div., Climate and Marine Dept.
Japan Meteorological Agency
1-3-4 Otemachi, Chiyoda-ku
Tokyo, 100-8122 Japan
Fax: +03-3211-6908
Email: ykanno@met.kishou.go.jp

Utsunomiya Tadayoshi, PMO
Kobe Marine Observatory
1-4-3, Wakinohamakaigan-Dori, Chuo-ku
Kobe, 651-0073 Japan
Fax: +078-222-8946

Yazawa Yasushi, PMO
Nagoya Local Meteorological Observatory
2-18, Hiyoricho, Chigusa-ku
Nagoya, 464-0039 Japan
Fax: +052-762-1242

Uwabe Willy, PMO
Yokohama Local Met. Observatory
99 Yamate-cho, Naka-ku
Yokohama, 231-0862 Japan
Fax: +045-622-3520

Kenya

Ali J. Mafimbo, PMO
PO Box 98512
Mombasa, Kenya
Tel: +254 1125685
Fax: +254 11433440

Malaysia

NG Kim Lai
Assistant Meteorological Officer
Malaysian Meteorological Service
Jalan Sultan, 46667 Petaling
Selangor, Malaysia

Mauritius

Mr. S Ragoonaden
Meteorological Services
St. Paul Road, Vacoas, Mauritius
Tel: +230 6861031
Fax: +230 6861033

Netherlands

Jan Schaap, PMO
KNMI, Afd. WM/OW
Port Meteorological Office
Postbus 201
3730 AE De Bilt, Netherlands

Continued on Page 89

Meteorological Services
Continued from Page 88

Tel: +3130-2206391
Fax: +3130-2210849
E-mail: jan.schaap@knmi.nl

New Zealand

Julie Fletcher, MMO
MetService New Zealand Ltd.
P.O. Box 722
Wellington, New Zealand
Tel: +644 4700789
Fax: +644 4700772

Norway

Tor Inge Mathiesen, PMO
Norwegian Meteorological Institute
Allegaten 70, N-5007
Bergen, Norway
Tel: +475 55236600
Fax: +475 55236703

Poland

Jozef Kowalewski,PMO
Institute of Meteorology and Water Mgt.
Maritime Branch
ul.Waszyngtona 42, 81-342 Gdynia Poland
Tel: +4858 6205221
Fax: +4858 6207101
E-mail: kowalews@stratus/imgw.gdynia.pl

Saudi Arabia

Mahmud Rajkhan, PMO
National Met. Environment Centre
Eddah
Tel:+ 9662 6834444 Ext. 325

Singapore

Edmund Lee Mun San, PMO
Meteorological Service, PO Box 8
Singapore Changi Airport
Singapore 9181
Tel: +65 5457198
Fax: +65 5457192

South Africa

C. Sydney Marais, PMO
c/o Weather Office
Capt Town International Airport 7525
Tel: + 2721-934-0450 Ext. 213
Fax: +2721-934-3296

Gus McKay, PMO
Meteorological Office
Durban International Airpot 4029
Tel: +2731-422960
Fax: +2731-426830

Mnikeli Ndabambi
Assistant Director, Meteorological Training
South African Weather Bureau
Tel: +2712-309-3090
Fax: +2712-323-4518
E-mail: mnikeli@weathersa.co.za

Sweden

Morgan Zinderland
SMHI
S-601 76 Norrköping, Sweden

Meteorological Services - Forecasts

Headquarters

Marine Weather Services Program Manager
National Weather Service
1325 East-West Highway, Room 14126
Silver Spring, MD 20910
Tel: 301-713-1677 x. 126
Fax: 301-713-1598
E-mail: laura.cook@noaa.gov

Richard May
Assistant Marine Weather Services
Program Manager
National Weather Service
1325 East-West Highway, Room 14124
Silver Spring, MD 20910
Tel: 301-713-1677 x. 127
Fax: 301-713-1598
E-mail: richard.may@noaa.gov

U.S. NWS Offices

Atlantic & Eastern Pacific Offshore & High Seas

David Feit
National Centers for Environmental
Prediction
Marine Prediction Center
Washington, DC 20233
Tel: 301-763-8442
Fax: 301-763-8085

Tropics

Chris Burr
National Centers for Environmental
Prediction
Tropical Prediction Center
11691 Southwest 17th Street
Miami, FL 33165
Tel: 305-229-4433
Fax: 305-553-1264
E-mail: burr@nhc.noaa.gov

Central Pacific High Seas

Tim Craig
National Weather Service Forecast Office
2525 Correa Road, Suite 250
Honolulu, HI 96822-2219
Tel: 808-973-5280
Fax: 808-973-5281
E-mail: timothy.craig@noaa.gov

Alaska High Seas

Dave Percy
National Weather Service
6930 Sand Lake Road
Anchorage, AK 99502-1845
Tel: 907-266-5106
Fax: 907-266-5188

Coastal Atlantic

John W. Cannon
National Weather Service Forecast Office
P.O. Box 1208
Gray, ME 04039
Tel: 207-688-3216
E-mail: john.w.cannon@noaa.gov

Mike Fitzsimmons
National Weather Service Office
810 Maine Street
Caribou, ME 04736
Tel: 207-498-2869
Fax: 207-498-6378
E-mail: mikefitzsimmons@noaa.gov

Tom Fair/Frank Nocera
National Weather Service Forecast Office
445 Myles Standish Blvd.
Taunton, MA 02780
Tel: 508-823-1900
E-mail: thomas.fair@noaa.gov;
frank.nocera@noaa.gov

Ingrid Amberger
National Weather Service Forecast Office
175 Brookhaven Avenue
Building NWS #1
Upton, NY 11973

Continued on Page 90

Meteorological Services
Continued from Page 89

Tel: 516-924-0499 (0227)
E-mail: ingrid.amberger@noaa.gov

James A. Eberwine
National Weather Service Forecast Office
Philadelphia
732 Woodlane Road
Mount Holly, NJ 08060
Tel: 609-261-6600 ext. 238
E-mail: james.eberwine@noaa.gov

Dewey Walston
National Weather Service Forecast Office
44087 Weather Service Road
Sterling, VA 20166
Tel: 703-260-0107
E-mail: dewey.walston@noaa.gov

Brian Cullen
National Weather Service Office
10009 General Mahone Hwy.
Wakefield, VA 23888-2742
Tel: 804-899-4200 ext. 231
E-mail: brian.cullen@noaa.gov

Mike Colby
National Weather Service Office
53 Roberts Road
Newport, NC 28570
Tel: 919-223-5737
E-mail: michael.colby@noaa.gov

Doug Hoehler
National Weather Service Forecast Office
2015 Gardner Road
Wilmington, NC 28405
Tel: 910-762-4289
E-mail: douglas.hoehler@noaa.gov

Stephanie Fauver
National Weather Service Office
5777 South Aviation Avenue
Charleston, SC 29406-6162
Tel: 843-744-0303 ext. 6
E-mail: stephanie.fauver@noaa.gov

Andrew Shashy
National Weather Service Forecast Office
13701 Fang Road
Jacksonville, FL 32218
Tel: 904-741-5186

Randy Lascody
National Weather Service Office
421 Croton Road
Melbourne, FL 32935
Tel: 407-254-6083

Roberto Hiraldo-Garcia
National Weather Service Forecast Office
11691 Southwest 17 Street
Miami, FL 33165-2149
Tel: 305-229-4525

Great Lakes

Daron Boyce, Senior Marine Forecaster
National Weather Service Forecast Office
Hopkins International Airport
Cleveland, OH 44135
Tel: 216-265-2370
Fax: 216-265-2371

Tom Paone
National Weather Service Forecast Office
587 Aero Drive
Buffalo, NY 14225
Tel: 716-565-0204 (M-F 7am-5pm)

Tracy Packingham
National Weather Service Office
5027 Miller Trunk Hwy.
Duluth, MN 55811-1442
Tel: 218-729-0651
E-mail: tracy.packingham@noaa.gov

Dave Guenther
National Weather Service Office
112 Airport Drive S.
Negaunee, MI 49866
Tel: 906-475-5782 ext. 676
E-mail: dave.gunther@noaa.gov

Terry Egger
National Weather Service Office
2485 S. Pointe Road
Green Bay, WI 54313-5522
Tel: 920-494-5845
E-mail: teriegger@noaa.gov

Robert McMahon
National Weather Service Forecast Office
Milwaukee
N3533 Hardscrabble Road
Dousman, WI 53118-9409
Tel: 414-297-3243
Fax: 414-965-4296
E-mail: robert.mcmahon@noaa.gov

Tim Seeley
National Weather Service Forecast Office
333 West University Drive
Romeoville, IL 60446
Tel: 815-834-0673 ext. 269
E-mail: tim.seeley@noaa.gov

Bob Dukesherer
National Weather Service Office
4899 S. Complex Drive, S.E.
Grand Rapids, MI 49512-4034
Tel: 616-956-7180 or 949-0643
E-mail: bob.dukesherer@noaa.gov

Steve Rowley
National Weather Service Office
8800 Passenheim Hill Road
Gaylord, MI 49735-9454
Tel: 517-731-3384
E-mail: steven.rowley@noaa.gov

Jeff Zoltowski
National Weather Service Office
9200 White Lake Road
White Lake, MI 48386-1126
Tel: 248-625-3309
Fax: 248-625-4834
E-mail: jeffrey.zoltowski@noaa.gov

Coastal Gulf of Mexico

Constantine Pashos
National Weather Service Forecast Office
2090 Airport Road
New Braunfels, TX 78130
Tel: 210-606-3600

Len Bucklin
National Weather Service Forecast Office
62300 Airport Road
Slidell, LA 70460-5243
Tel: 504-522-7330

Steve Pfaff, Marine Focal Point
National Weather Service Forecast Office
300 Pinson Drive
Corpus Christi, TX 78406
Tel: 512-289-0959
Fax: 512-289-7823

Larry Maifeld, HMT
Steve Smart, HMT
National Weather Service, NOAA
300 Pinson Drive
Corpus Christi, TX 78406-1803
Tel: 361-299-1357
E-mail: larry.maifeld@noaa.gov
steve.smart@noaa.gov

Rick Gravitt
National Weather Service Office
500 Airport Blvd., #115
Lake Charles, LA 70607
Tel: 318-477-3422
Fax: 318-474-8705
E-mail: richard.gravitt@noaa.gov

Eric Esbensen
National Weather Service Office
8400 Airport Blvd., Building 11
Mobile, AL 36608
Tel: 334-633-6443
Fax: 334-607-9773

Paul Yura
National Weather Service Office
20 South Vermillion
Brownsville, TX 78521

Brian Kyle
National Weather Service Office
Houston
1620 Gill Road

Continued on Page 91

Meteorological Services
Continued from Page 90

Dickenson, TX 77539
Tel: 281-337-5074
Fax: 281-337-3798

Greg Mollere, Marine Focal Point
National Weather Service Forecast Office
3300 Capital Circle SW, Suite 227
Tallahassee, FL 32310
Tel: 904-942-8999
Fax: 904-942-9396

Dan Sobien
National Weather Service Office
Tampa Bay
2525 14th Avenue SE
Ruskin, FL 33570
Tel: 813-645-2323
Fax: 813-641-2619

Scott Stripling, Marine Focal Point
National Weather Service Office
Carr. 190 #4000
Carolina, Puerto Rico 00979
Tel: 787-253-4586
Fax: 787-253-7802
E-mail: scott.stripling@noaa.gov

Coastal Pacific

William D. Burton
National Weather Service Forecast Office
Bin C15700
7600 Sand Point Way NE
Seattle, WA 98115
Tel: 206-526-6095 ext. 231
Fax: 206-526-6094

Stephen R. Starmer
National Weather Service Forecast Office
5241 NE 122nd Avenue
Portland, OR 97230-1089
Tel: 503-326 2340 ext. 231
Fax: 503-326-2598

Rick Holtz
National Weather Service Office
4003 Cirrus Drive
Medford, OR 97504
Tel: 503-776-4303
Fax: 503-776-4344
E-mail: rick.holtz@noaa.gov

John Lovegrove
National Weather Service Office
300 Startare Drive
Eureka, CA 95501
Tel: 707-443-5610
Fax: 707-443-6195

Jeff Kopps
National Weather Service Forecast Office
21 Grace Hopper Avenue, Stop 5
Monterey, CA 93943-5505
Tel: 408-656-1717
Fax: 408-656-1747

Chris Jacobsen
National Weather Service Forecast Office
520 North Elevar Street
Oxnard, CA 93030
Tel: 805-988-6615
Fax: 805-988-6613

Don Whitlow
National Weather Service Office
11440 West Bernardo Ct., Suite 230
San Diego, CA 92127-1643
Tel: 619-675-8700
Fax: 619-675-8712

Andrew Brewington
National Weather Service Forecast Office
6930 Sand Lake Road
Anchorage, AK 95502-1845
Tel: 907-266-5105

Dave Hefner
National Weather Service Forecast Office
Intl. Arctic Research Ctr. Bldg./UAF
P.O. Box 757345
Fairbanks, AK 99701-6266
Tel: 907-458-3700
Fax: 907-450-3737

Laura Furgione
National Weather Service Forecast Office
8500 Mendenhall Loop Road
Juneau, AK 99801
Tel and Fax: 907-790-6827

Ernie Jillson
National Weather Service Office
Hueneme Road, Building 3232
Barrigada, Guam 96913
Tel: 671-472-0950
E-mail: ernie.jillson@noaa.gov⚓

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Building 1100, Room 353D
Stennis Space Center, MS 39529-6000
Attn: Mariners Weather Log

Address Correction Requested
OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE $300

Special
Standard Rate

In this Issue: