Mariners Weather Log

Vol. 45, No. 2 **August 2001**

U.S. Coast Guard Women's Rescue or SPARS Recruiting Poster (circa 1942).
For more information read *Women and the Sea* on page 60.
Image courtesy of the Mariners Museum, Newport News, VA.

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

Articles, photographs, and letters should be sent to:

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

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

From the Editorial Supervisor

Well, I guess I have it. This is my first real issue of the *Mariners Weather Log*. When I came aboard in late January, the April issue was already pretty well packaged up. I just scrambled to figure out where all the pieces went. I hope my shoulders are wide enough to carry on this great endeavor. Also, I do really appreciate all who have helped me on my indoctrination into the wonderful world of NOAA administration. As they say, what doesn't kill you only makes you stronger.

We have several great articles in this issue. The cover image depicts the spectrum of sea service by women over the years. *Women and the Sea* tells that while the ships were at sail, the women were not just counting the days to their men's return. They were running businesses, working in factories, and even looting and plundering with the best (worst) of them.

Another article outlines the SEAS software, past and present. The Windows®-based SEAS 2000 software has now been officially released. SEAS 2000 offers a smoother, more capable input of weather information for transmitting into the NWS gateway. Quality control, handy references, and graphics have been built in to aid the observer in sending quality observations.

I hope you enjoy this issue of the *Mariners Weather Log*. Comments, complaints, and articles are always appreciated.

Robert Luke

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/pm/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.

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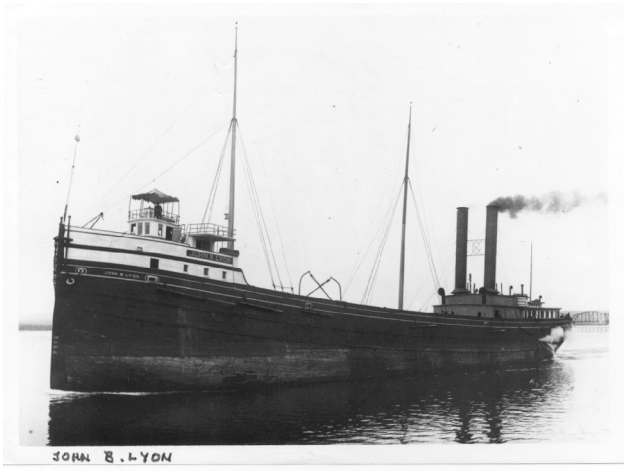
John B. Lyon: Shipwreck

Skip Gillham
Vineland, Ontario, Canada

The *John B. Lyon* had an amazing streak of misfortune in 20 years of service.

This wooden bulk carrier was built by Quayle and Sons and launched at Cleveland in the spring of 1881. The oak hull was designed to carry coal or grain, and the ship was equipped with sails to assist the two compound steam engines.

In May 1881, the 274-ft-long freighter spent 3 days aground at Chicago while inbound with coal and twelve tugs were needed to pull her free. She got stuck again in the Chicago River on July 16 and was in a collision in the Buffalo River on October 2. The ship grounded again at Chicago on October 12 and was mauled by a Lake Michigan storm on November 26 that toppled the twin stacks, broke the steam pipes, and caused a loss of power. *John B. Lyon* reached port thanks to the sails. After this disastrous first year, things only improved marginally. The wheel was disabled when it caught a towline in the spring of 1882, and the vessel ran aground in Lake St. Clair on two occasions in 1883. On August 28, 1884, *John B. Lyon* was struck by the barge it was towing, and, on September 19, 1884, the boilerhouse caught fire resulting in $500.00 worth of damage.



A grounding leaving Chicago on November 12, 1887 sheared three blades off the wheel and, following repairs, lost all four blades hitting a rock at the Lime Kiln Crossing.

In 1888, there were three more groundings, two in 1889 and two more in April 1891 before a collision on May 28, 1891, with a pair of barges. Two more minor groundings in July and November closed out that season. The ship stranded at Forest Bay on May 10, 1892, while loaded with oats and corn and, after being released, sank in 9 ft of water. The ship was rebuilt in 1892 but ran aground later in the year at Traverse Bay.

Another collision and a grounding marred 1895, and the cabins caught fire in Lake Huron on September 9, 1896. The last voyage began at Marquette, MI, early in September 1900 and after delivering ore to Ashtabula, OH, the *John B. Lyon* set out for Erie, PA, to load coal. It never arrived and began taking water in a storm on September 12. The poor old hull could not handle the conditions, cracked, and sank. Nine sailors perished while six more were spared.

After 20 years of groundings, collisions and fires, the career of the *John B. Lyon* had come to an end. ⚓

Helsinki to Miami Aboard Azipod/V Carnival *Spirit*

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

In April of 2001, Carnival Cruise Lines took delivery of their newest and most modern ship, the 960 ft, 80,000 gt *Spirit*. *Spirit* was built at the Kaverna/Masa Yard in Helsinki, Finland, and brought across the Atlantic to commence passenger service in the Caribbean and then Alaskan waters.

I was fortunate to be aboard during this transit and spent time both on the ship's bridge and engineering spaces. *Spirit's* bridge is equipped with modern, state-of-the-art navigation and communications equipment, which permits a high level of routing accuracy.

Weather information is obtained using Navtex, Wefax, and INMARSAT. Wefax reception, unfortunately, was poor for the entire 5,000-mile voyage, and so was not relied upon. However, downloading Marine Prediction Center (MPC) charts from the MPC Internet server was the easiest and fastest method of obtaining charts and so this method quickly became the preferred method.

In addition to MPC charts *Spirit's* watch officers made use of the Ocean Routes ORION system, which permits downloading of weather data out to 10 days and includes surface, 500-hPa, sea-state, ice, ocean currents, and tropical information. These data downloads are accomplished via a satellite communications link to the Ocean Routes FTP Web site. A complete file for 10 days of data is downloaded in approximately 8 minutes. These weather files are then displayed in color and can be animated, placing the weather in motion, and allowing patterns and trends to be easily detected.

MPC charts were also downloaded using an FTP batch download process, which is most easily used as a module within the OCENS SeaStation program. The true advantage of FTP chart and weather data downloads via satellite communications is

the speed, clarity and simplicity of the process. Charts are in the hands of watchstanders within minutes of being placed on the Internet. Broadcast schedules are not a concern and charts are sharp and clear.

In addition to charts, *Spirit* was equipped with a NOAA APT satellite capture system that allowed real-time capture and display of NOAA 12, 14, and 16 visible and infrared imagery. NOAA 16 was experiencing operational problems during the voyage period and so imagery from that satellite was not always usable.

Spirit's route upon departing Helsinki, Finland (60° N./25° E.), took her west across the Gulf of Finland, then south through the Baltic Sea to the Denmark Straits, where a northerly course was taken to reach the North Sea. Once in the North Sea, *Spirit* turned south and followed the English Channel to the Atlantic. Upon exiting the English Channel a modified "bucket route" was taken to Miami, FL (26° N./80° W.). The modified bucket route involved a 100- to 200-mile course deviation south of a rhumbline between Lands End, UK, and Miami, to provide sea room from several gale and storm force low-pressure systems crossing the North Atlantic between 40° N. and 50° N. This route was tweaked and updated as necessary when charts and Ocean Route files became available at 0000 UTC and 1200 UTC daily.

Spirit, driven by twin azipod propulsion units was able to make a consistent 22 kt for the entire voyage, facilitating the avoidance of low-pressure systems. We did experience large swells while transiting the waters south of Bermuda. These 10-ft swells were produced by a gale off New England, and precisely predicted by the MPC 24-, 48-, and 96-hr forecasts.

I found that analysis and forecasts coming from both commercial sources such as Ocean Routes as well as the MPC very accurately portrayed the weather experienced by *Spirit*. I compared analysis and forecasts each day and was impressed by the high correlation of analysis and forecast products, both surface features, 500-hPa and sea state. This high degree of accuracy may be due in part to the new IBM super computers that the NWS made operational this past year. These computers seem to be running computer models faster, make use of more data than was used previously, resulting in more accurate results.

Spirit arrived at Miami's sea buoy at 0600, on April 24, as originally planned at departure from Helsinki at 0630, on April 12. On time arrival accompanied by a host of tugs spraying water from fire monitors, was a credit to both the ship's officers and engineers and to the availability of accurate and timely weather information provided by forecasters at the MPC and Ocean Routes.

How to Invert a Buoy

David Gilhousen
National Data Buoy Center

A Coast Guard law enforcement aircraft reported an unusual siting in the Bering Sea this March, a capsized 12-m discus buoy. The photograph, shown in Figure 1, confirmed what the National Data Buoy Center (NDBC) had feared. The buoy reporting as station 46035 stopped transmitting during a fierce storm on February 8, 2001, when the last reported significant wave height was 14.45 m. Observations from 46035 were a vital source of information for Alaskan weather forecasts in general and marine forecasts to support commercial fishing in particular. This article will examine the extreme conditions that caused the capsizing.

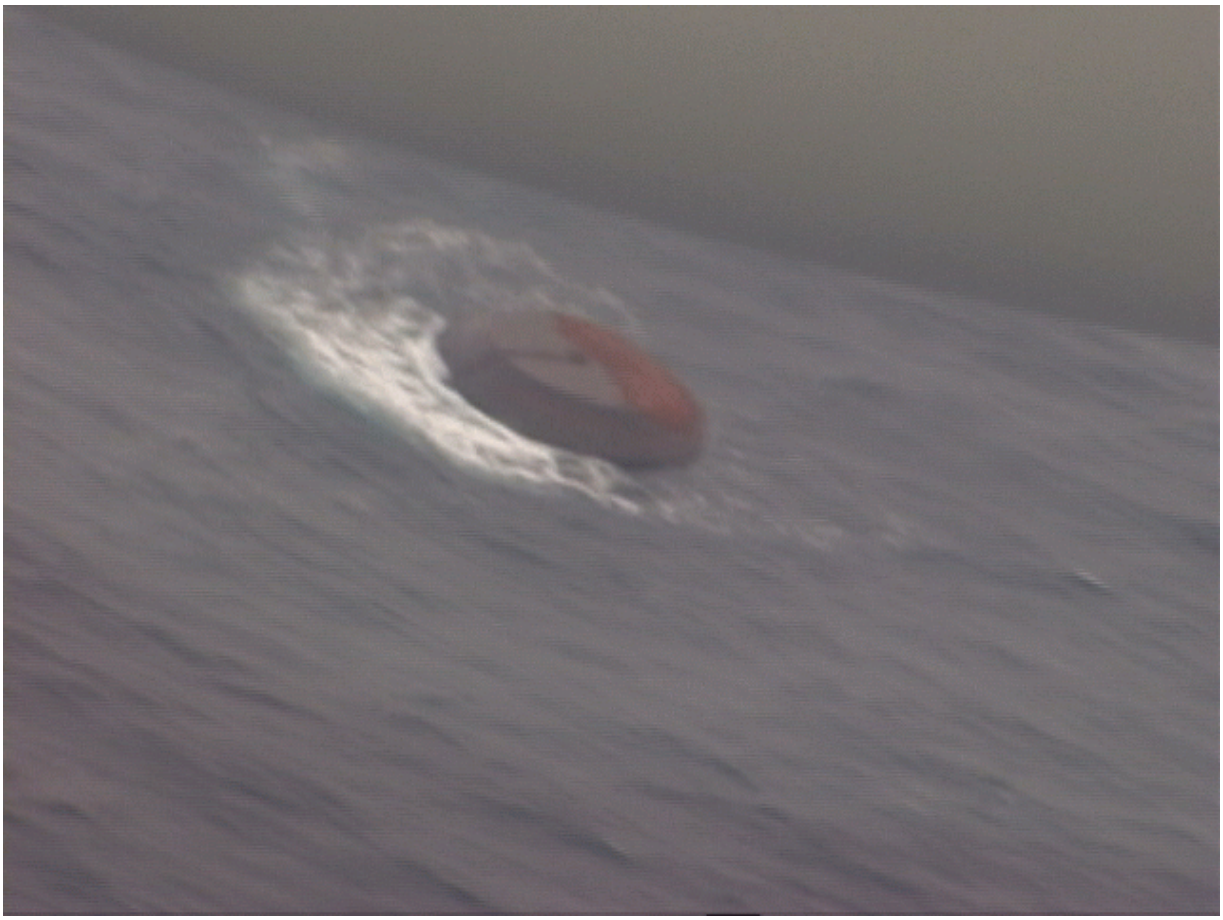


Figure 1. Aerial photograph of the capsized 12-m buoy, which was still attached to its mooring at 46035 in the Bering Sea.

Historical Significance

This was the first time an NDBC large discus buoy had capsized since the 1970's when two 10-m discus buoys in the Pacific capsized and one 12-m buoy that was adrift capsized north of Bermuda. As a result of several postcapsizing studies and conferences in the late 1970's, NDBC decided to use the 6-m Naval Oceanographic and Meteorological Automated Device (NOMAD) hull in place of the 10-m discus for deployments in the north Pacific and north Atlantic. However, NDBC chose a 12-m discus hull for use at 46035 in the mid-1980's in order to support two redundant reporting systems. Redundant reporting systems are desirable since 46035 is approximately 450 miles away from the Coast Guard base in Kodiak, AK, and servicing is possible only during the summer months. Ironically, a specially designed 6-m NOMAD with redundant reporting systems was scheduled to replace the 12-m discus buoy this summer.

Interestingly, the 14.45-m significant wave height was not the highest ever reported at this station. A November 3, 1996, storm produced a significant wave height of 15.37 m with the same 16.7-m dominant wave period. However, no one knows that actual maximum wave height — which could be close to twice the significant wave height — that toppled the 12-m buoy. It could well have been larger than the 1996 storm.

The all-time highest significant wave height ever reported by an NDBC station was 16.91 m by a 6-m NOMAD hull on November 19, 1991, at station 46003 south of the Aleutians. Nevertheless, 46035's observation of 14.45 m ranks this storm as one of the top ten ever encountered by an NDBC buoy on the basis of significant wave height. All significant wave heights over 14 m were reported at north Pacific buoy stations 46001 through 46006, and 46035 most of them by NOMAD buoys. Stations 46001 through 46006 were established in the mid-1970's.

A fascinating study of discus buoy capsizing was conducted in the Oregon State University wave flume in the 1970's. Model discus buoys were built and placed in the flume with waves of known height and steepness. The discus buoys began to capsize when the height-to-buoy-diameter ratio exceeded 1.0 and a wave steepness parameter exceeded 0.19. Calculations based on 46035's last observation produced a ratio of 1.1 and a steepness parameter of 0.20. Capsizing was, therefore, possible. In contrast, calculations based on the last observations reported by the three previous capsizings did not meet this criteria. It is estimated that considerably less than 0.01 percent of all NDBC observations taken from discus buoys meet this criteria.

Meteorological Conditions at Time of Capsizing

Surface meteorological analyses and satellite photos were obtained to answer two questions. First, is there a meteorological reason to expect that the conditions would rapidly deteriorate during the hour following the last report? Second, how well do the meteorological features correlate with previous capsizings?

Figure 2 shows the Marine Product Center's (MPC) surface analysis at 1800 UTC. A strong, occluded 966-hPa low pressure area was located approximately 400 km due north of the buoy. The low

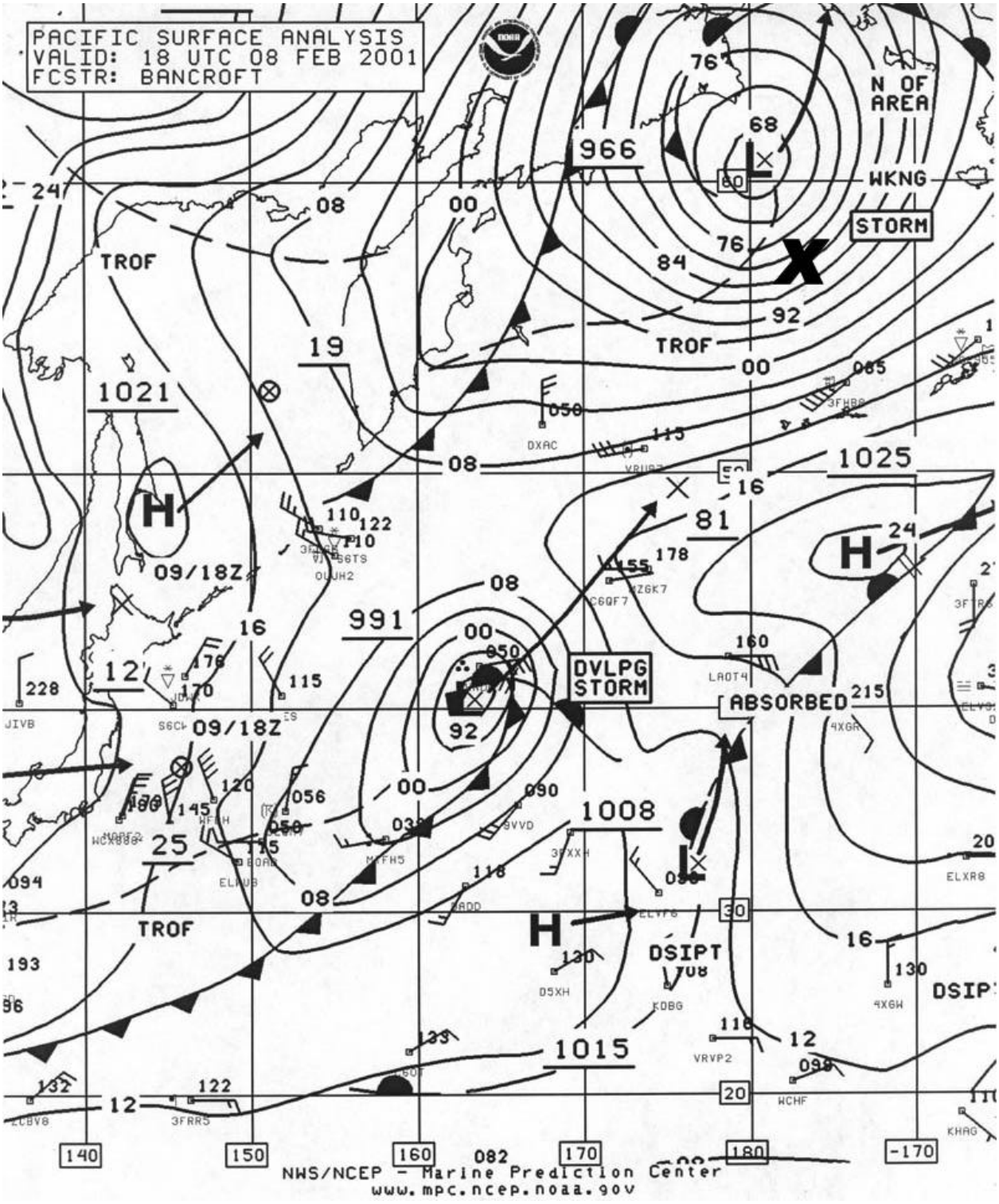


Figure 2. The MPC surface analysis for the north Pacific at 1800 UTC, February 8, 2001. X marks the location of 46035.

was stationary and beginning to fill. It had reached 963 hPa on the 1200 UTC analysis and was tracked within 100-km west of the buoy at approximately 0500 UTC earlier that day on its journey northward. A trough extended from the low to a position just west of the buoy.

Figure 3 is a NOAA-12 AVHRR multispectral image taken at 1740 UTC marked with features identified in the following discussion. Three strong convective cells oriented in a southeast to northwest line just to the north of the buoy mark the entrance of the polar surge of Siberian air just to the west of the surface trough. An independent assessment by six MPC meteorologists place an abrupt kink in the trough where a secondary low had formed approximately 100 km to the northeast of the buoy. Then, they locate the trough with the thin line of convection extending west-southwest from the secondary low just north of the buoy. The occlusion appears to be rotating southward around the secondary low. The secondary low is not depicted in the MPC surface analyses. Multiple peaks in the wind speed and wave height reports from 46035 also provide evidence for the

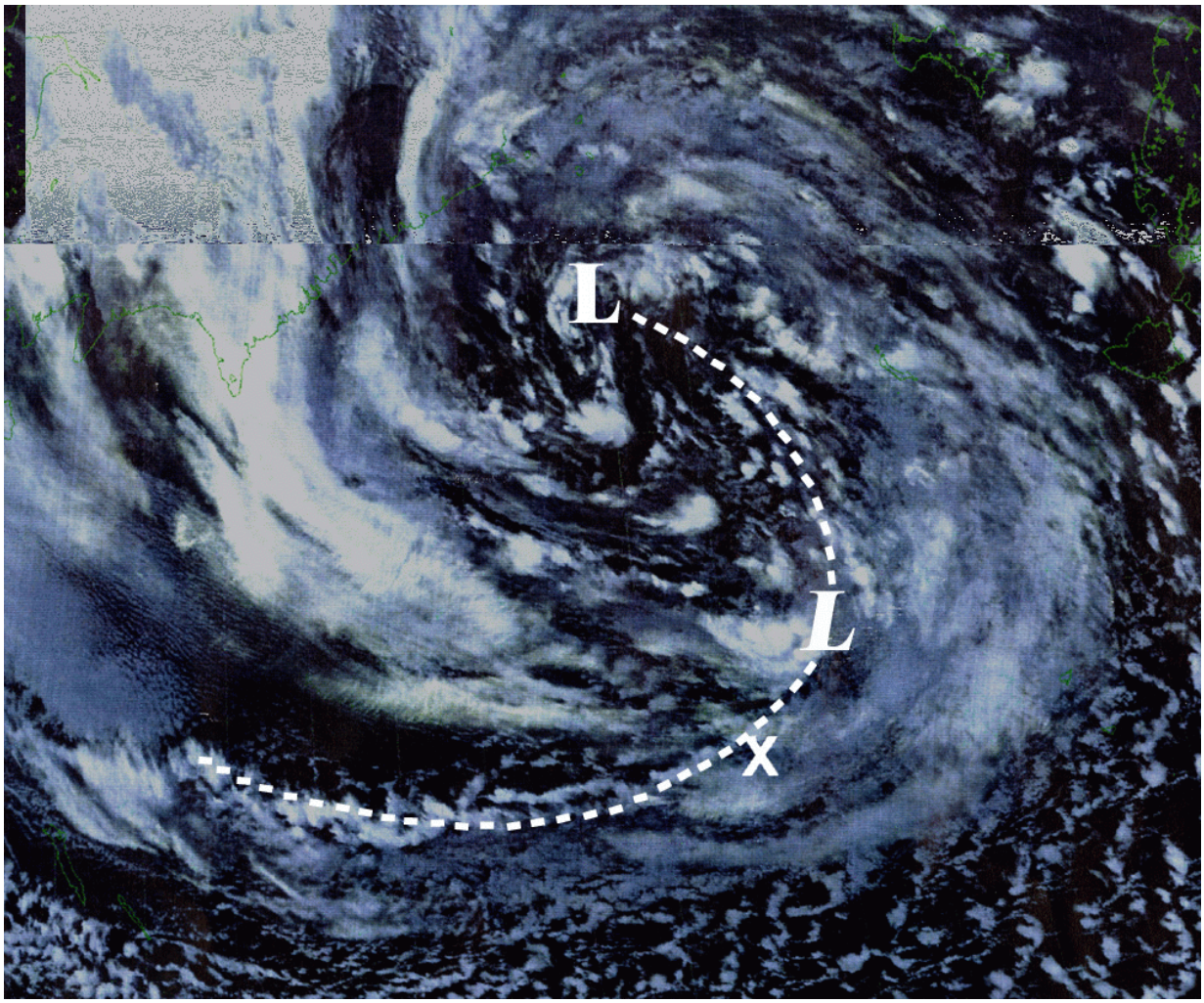


Figure 3. The NOAA-12 AVHRR multispectral image for 1740 UTC, February 8, 2001. X marks the location of 46035. The "L" is the occluded low and the "*L*" is the secondary low.

secondary low. The sustained 10-minute average winds, shown in Figure 4, reached 26.4 m/s at 0440 UTC and the lowest pressure (969.9 hPa) was reported at 0500 UTC with the passage of the original occlusion. The winds then dipped to 22.8 m/s at 0640 UTC before rising even higher to 28.6 m/s at 1130 UTC. The wind speed remained above 25 m/s until 1600 UTC. 46035's significant wave height, which reached 13.56 m at 0800 UTC with the original occlusion, peaked at 14.78 m at 1400 UTC with the secondary low.

Possible Capsizing Scenarios

Based on this analysis, it's quite possible that the trough passed 46035 between 1800 and 1900 UTC bringing a wind shift to the west-northwest and rapidly cooling the air temperature. The destabilization would bring stronger and very gusty winds that could have contributed to the capsizing. Near hurricane force winds getting under an exposed part of the 12-m hull as it came crashing through a wave can exert substantial torque.

More likely, the wind shift brought wind seas from the west and caused a period of nonlinear wave interaction with the southwesterly swells. The building seas from a slightly different direction could have created breaking waves on top of the large swells, providing enough energy for capsizing. After analyzing this situation, Dr. Steve Lyons, tropical weather expert on *The Weather Channel*, likens these chaotic conditions to those depicted in the famous opening scene from the old *Victory at Sea* films. These

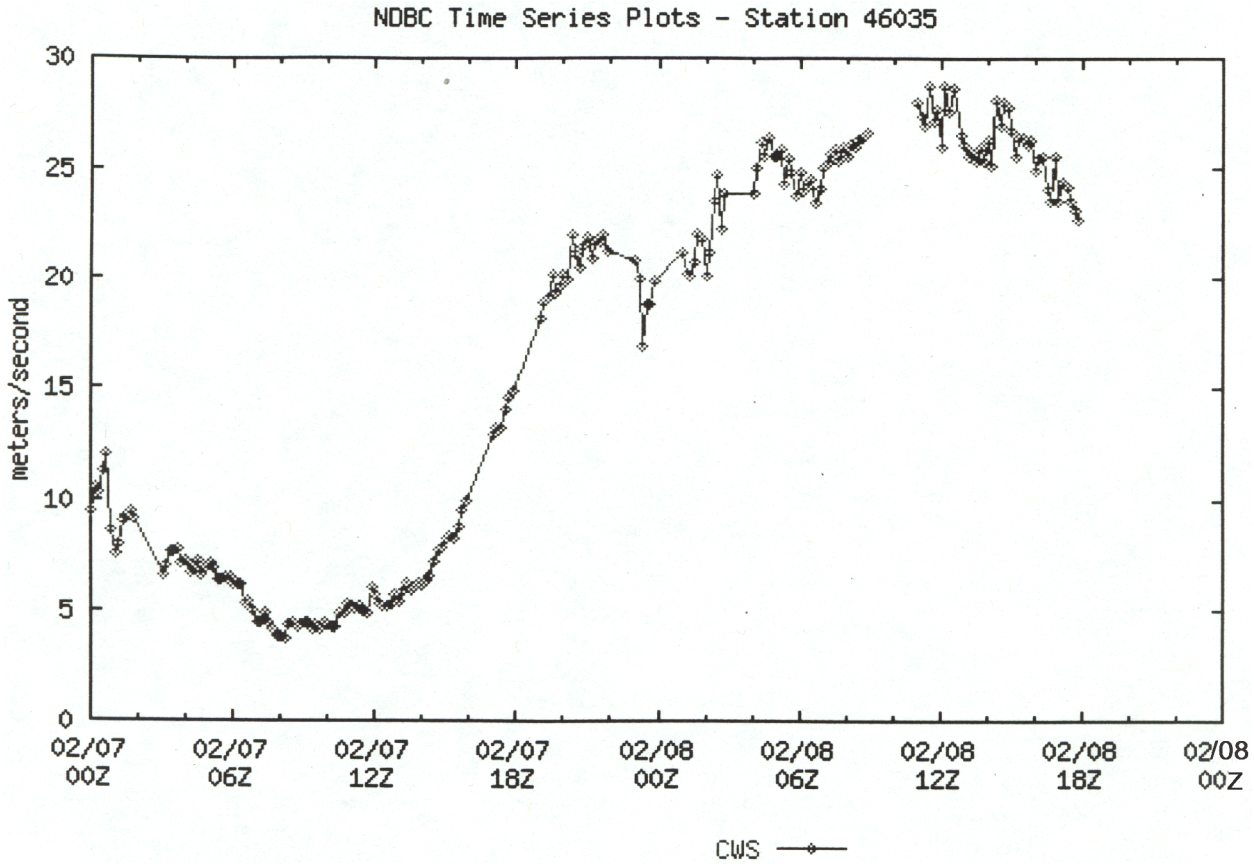


Figure 4. A time-series plot of consecutive 10-minute average wind speeds reported by the Data Acquisition, Control, and Telemetry (DACT) at 46035.

westerly seas are probably the reason why the wave heights at 46035 rose in the last few hours before 1800 UTC.

Surface meteorological charts were compared with those reported from previous capsizings. All three capsizings of 10- or 12-m discus buoys featured occluded low pressure areas approximately 200- to 350-km north of the buoy at the time of capsizing. Passage of deep, postfrontal, cold troughs with intense convection cells occurred in each instance. The capsizing of 12D02 at 46035 clearly fits the pattern.

Conclusion and Recovery of 46035

Given the wave conditions reported by 12D02 at the last transmission, capsizing is well within the realm of possibility. The observed wave height-to-diameter ratio and a steepness parameter agree well with wave conditions that capsized model discus buoys in the Oregon State wave flume. Satellite imagery suggests that the wind speed could increase immediately after the last transmission and that crossing seas could be encountered. The location of an intense low pressure area just to the north of the buoy location agrees well with the pattern of previous buoy capsizings.

Magone Marine, under contract to NOAA, recovered and towed the buoy into Dutch Harbor, AK. Figure 5 shows them righting the buoy that may one day be reused after refurbishment. In the meantime, a 6-m NOMAD buoy will be placed at 46035 this fall.

Acknowledgments

James Partain of NCEP's MPC coordinated analysis of the satellite image among the marine forecasters. Dr. Steve Lyons of *The Weather Channel* also provided insightful comments.

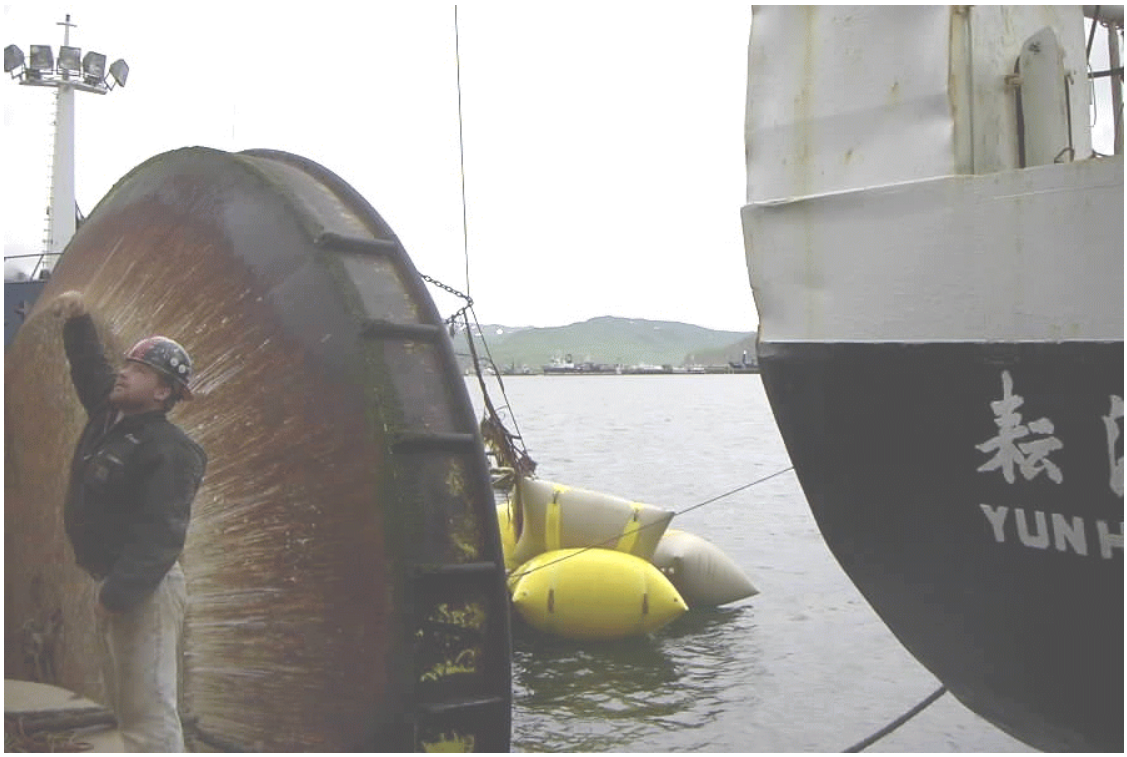


Figure 5. The 12-m discus buoy being righted in the shipyards at Dutch Harbor, AK.

Tropical Atlantic and Tropical East Pacific Areas – January through April 2001

Daniel P. Brown and Christopher Burr (Chief)
Tropical Analysis and Forecast Branch
Topical Prediction Center
11691 SW 17th Street
Miami, FL 33149-2165

I. New TPC Graphical Marine Products

The Tropical Prediction Center's Tropical Analysis and Forecast Branch (TAFB) will begin issuing several new graphical charts for the Atlantic and the Pacific on July 30, 2001 (1200 UTC). The products, covering the tropics and subtropics, will be broadcast over the New Orleans (Atlantic) and Pt. Reyes (Pacific) radiofax schedules. The new products include:

- Atlantic Sea State Analysis charts (issued four times daily). These charts will replace the 00-hr wind/seas charts.
- Peak wave period/ prevailing swell direction charts for both basins (issued twice daily for the 48-hr forecast and once daily for the 72-hr forecast)
- Additional wind/seas forecast charts for the Pacific (two 00-/24-hr charts, one 48-hr chart, and one 48-/72-hr chart)
- Tropical Surface Analysis charts for the Pacific (issued four times daily)

In addition, a Tropical Cyclone Danger Area graphic will be issued four times daily for each basin. The charts (capable of displaying multiple storms) will display a shaded danger area that is determined by adding 100, 200, and 300 nmi to the maximum 34-kt wind radii at the 24-, 48-, and 72-hr forecast positions. Also, the Atlantic wind/seas forecasts will extend eastward from the current 55° W. to 35° W. (Sea state analysis and peak wave period/prevailing swell direction charts will cover the same area).

Comments should be directed to Christopher Burr, Chief TAFB, at burr@nhc.noaa.gov or 305-229-4430.

II. Strong Winds Across Southern Caribbean Sea

Strong trade winds and large seas are quite common across the southern portion of the Caribbean Sea, especially along the coast of Colombia. From mid-December to March and again from mid-June through July these easterly trade winds become very strong, occasionally reach gale force. The strength of the wind depends upon the strength and position of the high pressure ridge across the western Atlantic and how low surface pressures are over northern South America. During the winter, the Atlantic ridge is farther south, resulting in a tighter pressure gradient over the Caribbean Sea. From mid-June to mid-July the Atlantic ridge usually strengthens while surface

pressures are quite low over northern South America, again resulting in a tight pressure gradient across the southern Caribbean.

White (1976) described an event in which a boat approximately 100 nmi south of Jamaica in early July experienced 30- to 40-kt winds and seas of 5 to 8 m (15 to 25 ft) for approximately 36 hr. The captain of the boat questioned whether they had unknowingly wandered into the fringe of a tropical cyclone. Such was not the case. In the past it was very difficult for forecasters to know just how strong these winds were blowing, but with regular SSM/I and Quikscat data forecasters now realize that winds of 25 to 30 kt are fairly common off the coast of northwest Colombia, at certain times of the year.

In February, a prolonged wind event occurred and produced a period of gale force winds over the southern Caribbean. The event began on February 1 and culminated between February 8–17, when gale conditions and high seas were observed by several ships. On February 1, the western Atlantic high pressure ridge was quite strong and covered the western Atlantic. Strong northeast to east winds of 25 to 30 kt occurred across the southern Caribbean between 70° W. and 80° W. On February 3–6, the Atlantic high pressure ridge and the Caribbean winds weakened as a weak cold front moved off the southeast United States coast.

However, beginning on February 8, stronger high pressure built across the western Atlantic while pressures lowered over South America. The winds over the southern Caribbean increased and periods of gale force winds occurred from February 8–17. The gale area was generally confined to the area south of 15° N. between 73° W. and 80° W., as indicated by Quikscat data. A pass from February 15 at 1044 UTC (Figure 1) was representative of the conditions during the period. The pass detected an area of 30- to 35-kt winds across much of the southern Caribbean, which is the area that normally has the strongest winds in the Caribbean Sea. Several ships observed gale force winds during the event. At 0600 UTC, February 9, the ship *P&O Nedlloyd Houston* (call sign PGEB) encountered 37-kt winds and seas of 5 m (16 ft) near 12° N., 77.5° W. On February 13, the ship *Alberni Dawn* (call sign ELAC5) observed 38-kt winds near 12° N., 74° W. at 0000 UTC and the ship *Eastern Express* (call sign 3FDN7) observed 37-kt winds near 12° N., 78° W. at 1200 UTC. On February 14, several ships including the *Arcadia* (call sign GRFP), *Vision of the Seas* (call sign ELUY7), and *J. Bennett Johnston* (call sign C6QE3) observed winds of 35 to 40 kt across the area. On February 17, the high pressure ridge across the western Atlantic weakened and retreated east as a strong cold front moved across the Gulf of Mexico. Winds across the southern Caribbean finally decreased below gale force, but remained at 20 to 25 kt for several more days.

It appears that most mariners who spend significant time in the Caribbean Sea are aware of the strong winds along the coast of South America. Nonetheless, this is a challenging area for marine forecasters at the Tropical Prediction Center (TPC). With better observational tools, such as SSM/I and Quikscat, forecasters are now more cognizant of the severity and duration of these strong wind events. Hopefully with better forecasts, most mariners will be able to avoid these areas during dangerous wind events.

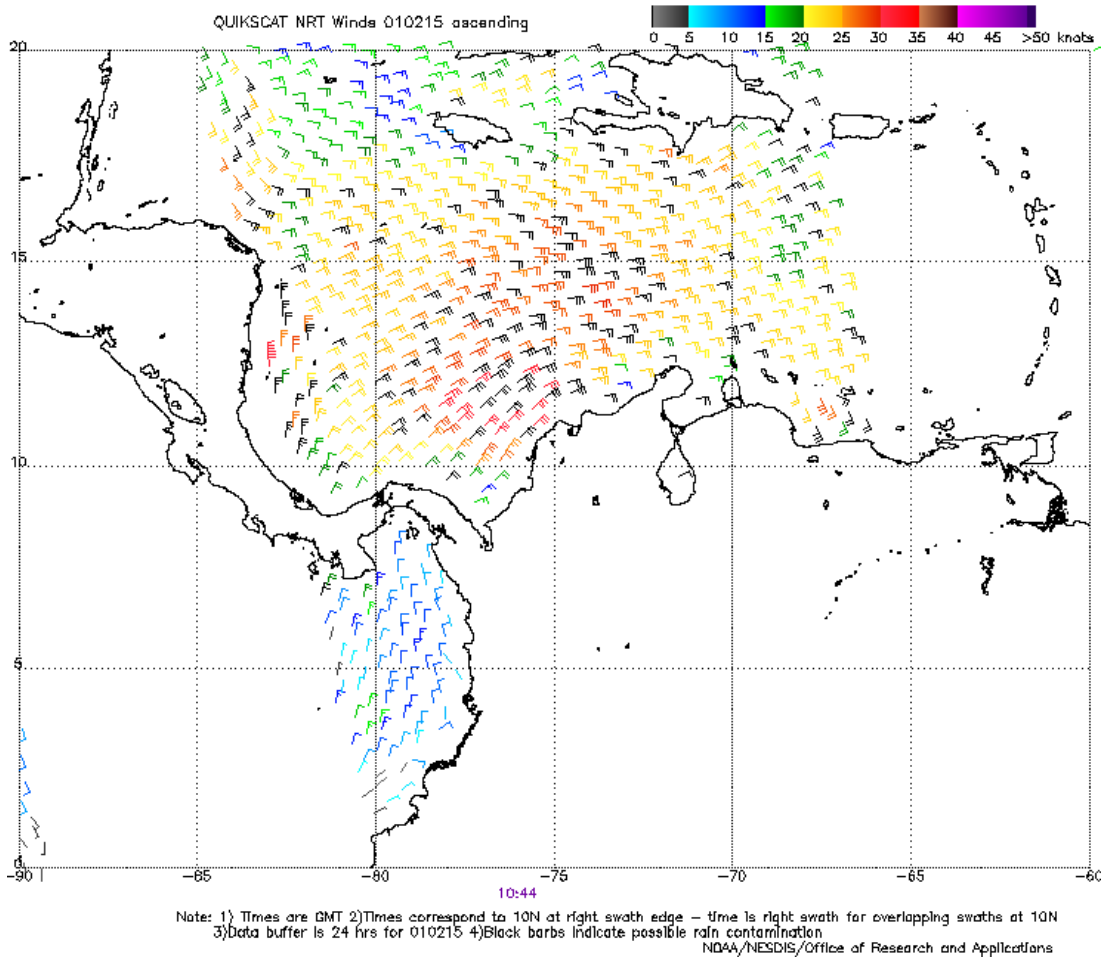


Figure 1. Quikscat data at 1044 UTC, February15, 2001. Image courtesy of National Environment Satellite, Data, and Information Service.

III. Significant Weather of the Period

A. Tropical Cyclones:

None

B. Other Significant Events:

1. Atlantic, Caribbean, and the Gulf of Mexico

The first few months of 2001 were quite active in terms of nontropical gale warnings over the subtropical Atlantic, Caribbean, and the Gulf of Mexico. Several gale centers developed over the west Atlantic between January and March with one becoming a storm center a few hundred miles east of Jacksonville, FL. In late February and early March, a storm developed over the subtropical central Atlantic. Even portions of the Caribbean Sea experienced gale force winds in February, as noted in Section II of this article.

Atlantic Cold Front

January 10–11: A strong cold front moved off the southeast U.S. coast around 0000 UTC, January 9. The front moved rapidly east and was located from 31° N., 66° W. to central Cuba by 0000 UTC, January 10. At this time, gale

winds were felt north of 27° N. west of the cold front to 75° W. By 1800 UTC, the cold front extended from 31° N., 60° W. to the north coast of Haiti. With gale winds north of 27° N. within 300 nmi either side of the front. A Quikscat pass at 2140 UTC detected a large area of 30- to 35-kt winds near the front. Two ships confirmed the Quikscat gales. The *Sea Princess* (call sign KRCP) encountered south winds of 35 kt east of the front and the *Albemarle Island* (call sign C6LU3) observed northwest winds of 37 kt and seas of 4.5 m (15 ft). At 0600 UTC, January 11, the cold front reached from 31° N., 52° W. to the north coast of the Dominican Republic. At 1200 UTC the ship *Liberty Spirit* (call sign WCPU) reported westerly winds of 37 kt west of the front. At 1800 UTC, January 11, the cold front extended from 31° N., 46° W. to the Mona Passage. By this time winds decreased quickly as gale force winds moved north of 31° N.

Gulf of Mexico Cold Front January 19–20: On January 17, a weak low pressure center developed along the coast of south Texas. The low pressure remained nearly stationary for approximately 24 hr while the trailing cold front had moved offshore and extended into northern Mexico. At this time, winds northwest of the front were only approximately 20 kt with seas remaining less than 8 ft. Later on the 18th, the low pressure system moved northeast and by 0000 UTC, January 19, was located just south of Lake Charles, LA. The trailing cold front extended southwest to just north of Veracruz, Mexico. At that time, stronger high pressure began building over the western Gulf of Mexico west of the cold front. By 1200 UTC northerly gale force winds were occurring south of 25° N. west of the cold front. Gale warnings were verified by a 1208 UTC Quikscat pass that detected a large area of 30- to 35-kt winds over the southwest Gulf. During the afternoon of January 19, Veracruz, which normally experiences very strong north winds behind fronts due to the winds being funneled east of the Sierra Madre Oriental mountain range, observed north winds of 40 to 45 kt with gusts as high as 65 kt. At 0000 UTC, January 20, the low pressure was located well inland across the western Carolinas. The cold front extended south from the low across the Gulf from Apalachicola, FL, to the Yucatan Peninsula. (This was the same low pressure system that produced the rain and snow in the Washington, D.C., area for the Presidential Inauguration.) By that time, winds over the southwest Gulf decreased below gale force, but the northerly winds over the area west of the front continued strong at 25 to 30 kt. The winds and seas decreased over the Gulf later on the 20th as high pressure settled over east Texas and the western Gulf of Mexico.

West Atlantic Storm January 23–24: The event began as a strong short-wave trough moved over the western Atlantic and initiated the development of a significant low pressure system along a stationary front over the central Bahamas on January 22. At 0000 UTC, January 23, the developing storm was analyzed as northward moving 1012-hPa low centered near 27° N., 78° W. At 0600 UTC, gale force winds were observed by the *Federal Kivalina* (call sign VRWK5) near 27° N., 79° W. By 1200 UTC, the system was a storm near 29° N., 76° W. with a trailing cold front extending southwest across the eastern tip of Cuba through the northwest Caribbean Sea to the northern coast of Nicaragua. Drifting buoy 41501

reported northwest winds of 39 kn at 1200 UTC near 30° N., 79° W. The majority of the storm force winds remained along and just north of 31° N., and by 1800 UTC, storm warnings were discontinued south of 31° N. However, strong gale force winds continued north of 28° N. over the western Atlantic for the next 24 hr. At 0000 UTC, January 24, the 996-hPa storm center was located near 32° N., 74° W.

A Quikscat pass from just before 0000 UTC (Figure 2) confirmed the location of the center and detected gale force winds over the southwest semicircle of the storm. The ship *Edyth L.* (call sign C6YC) just southwest of the storm center, encountered northwest winds of 40 kt at 0600 UTC and 37 kt at 1200 UTC near 31° N., 74° W. At 1200 UTC, January 24, several ships from 27° N. to 31° N. between 60° W. and 75° W., including the *Sea-Land Expedition* (call sign WPGJ), the *Charles Island* (call sign C6JT), and the *Jo Alder* (call sign ELGG3), observed 30- to 35-kt winds and combined seas of 4 to 6 m (13 to 19 ft). At 1800 UTC, January 24, the storm center moved well north of 31° N. with the trailing front through 31° N., 60° W. to the north coast of the Dominican Republic. At this time, gale

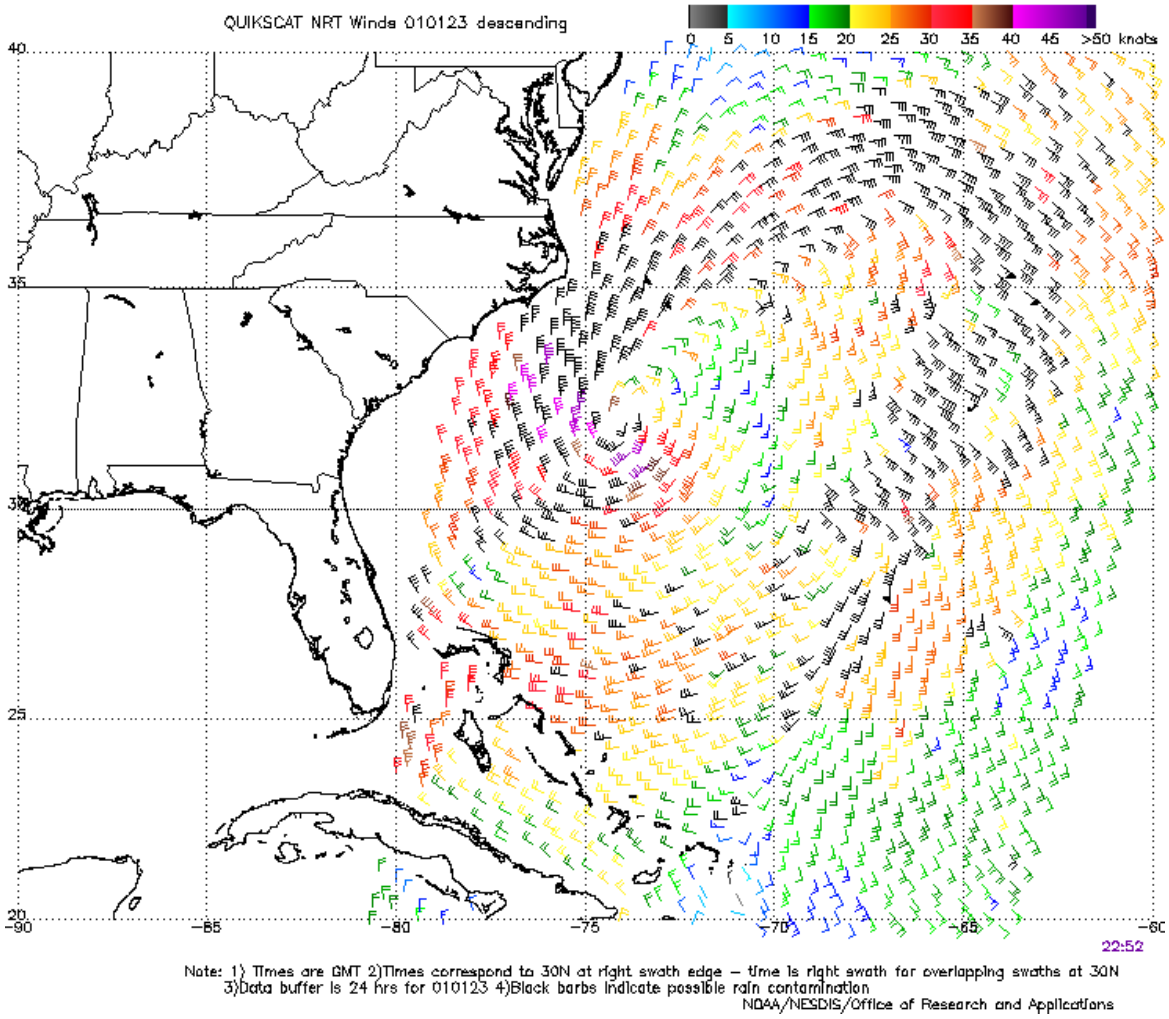


Figure 2. Quikscat data at 2252 UTC, January 23, 2001. Image courtesy of National Environment Satellite, Data, and Information Service.

force winds retreated north of 31° N.; however, northerly swells helped to produce combined seas of 3 to 4.5 m (10 to 15 ft) over the western Atlantic for another 12 to 24 hr.

Atlantic Gale

January 26–27: The next western Atlantic storm developed approximately 36 hr after the previous event ended. This storm developed much farther north than the previous storm, but produced strong gale force winds and very large seas well south of 31° N. The event began as a strong upper level trough moved off the east coast of the United States and into the western Atlantic. At 1200 UTC, January 25, the developing storm center was analyzed as a 1011-hPa low pressure centered near 34° N., 72° W. A developing cold front trailed southwest from the low to just east of Miami, FL. The low pressure strengthened rapidly and by 0000 UTC, January 26, was analyzed as a 990-hPa storm center located well north of 31° N. However, the by-now strong cold front extended through 31° N., 66° W. to the eastern tip of Cuba. At this time, gale force winds were occurring over the TPC forecast area north of 27° N. and west of the front. At 0600 UTC, the ship *Endeavor* (call sign WAUW) encountered 40-kt winds near 32° N., 71° W. The ship *Maersk Surrey* (call sign MRSG8) observed west winds of 38 kt at both 0600 UTC and 1200 UTC near 27° N., 71° W. Quikscat data at 1056 UTC, January 26, indicated a large area of 35- to 45-kt winds north of 27° N. west of the front to 75° W. An 1815 UTC, GOES-8 visible satellite image (Figure 3) showed that the center of the storm was located well north of 31° N., while the front extended through 31° N., 56° W. to the northeast tip of the Dominican Republic. At this time, the *Endeavor* near 30° N., 67° W. encountered northwest winds of 35 kt and northwest swells of 6.5 m (21 ft). By 0600 UTC, January 27, the front passed through 31° N., 52° W. to Puerto Rico. At this time, gale force winds moved north of 31° N., but very large swells produced combined seas of 5 to 7 m (18 to 24 ft) across much of the western and central Atlantic. At 1200 UTC, the ship *Torm Freya* (call sign ELVY8) observed 7 m (24 ft) combined seas near 30° N., 64° W. Large northerly swells continued to affect much of the central and western Atlantic for the next 2 to 3 days. These swells were seen as far south as the northern coast of Puerto Rico and the Leeward Islands.

Central Atlantic Storm February 25–March 1 and Gale March 4–5: During the last few days of February and the first week of March a significant upper level trough became established over the central Atlantic. This trough aided in the development of a rather complex storm center north of 31° N. The main low pressure system drifted south while several weaker lows rotated counterclockwise around the system. The result was a long period of gales and very large swells across the central Atlantic.

The event began at 1200UTC, February 25, as a strong cold front associated with the complex storm center moved east across the central and eastern portion of the TPC forecast area. At 1200 UTC, the cold front extended along 31° N., 43° W.; 25° N., 50° W.; 23° N., 60° W. Gale force winds of 35 to 45 kt were felt north of 27° N. west of the front to 58° W. The ship *Green Island* (call sign KIBK) observed northwest winds of 40 kt near 31° N., 49° W. A Quikscat pass from 2217 UTC confirmed the large area of gale force winds. At 0600 UTC, February 26, the storm center was still north

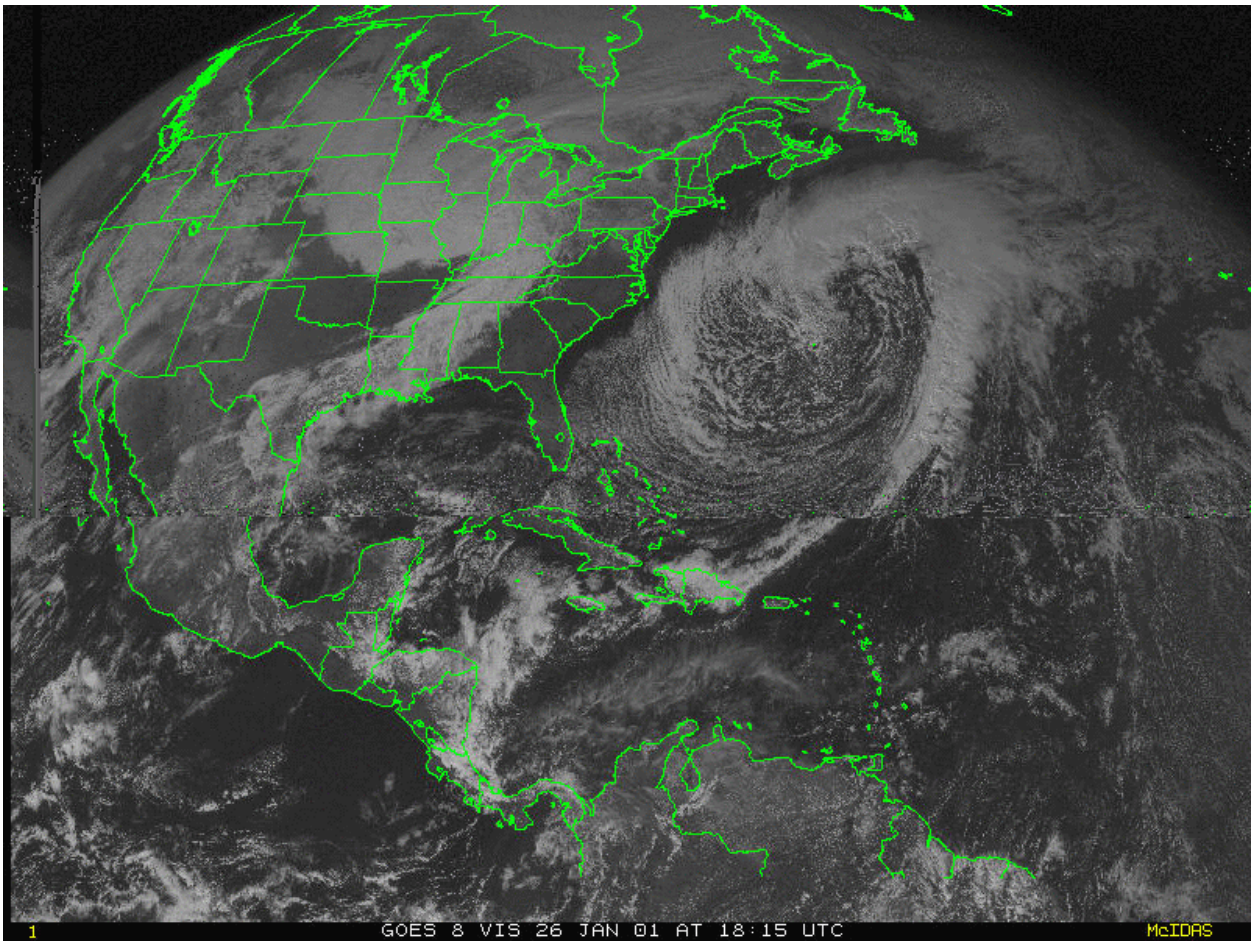


Figure 3. GOES-8 visible image of Atlantic storm at 1815 UTC, January 26, 2001. Image courtesy of the National Climatic Data Center.

of the area while the cold front extended through 31° N., 38° W. to 22° N., 50° W. At this time, the gale conditions moved south, and the ship *James M. Sullivan* (call sign C6FD3) encountered west winds of 36 kt and combined seas of 23 ft near 26° N., 49° W. By 1800 UTC, the 985-hPa storm center moved farther south and was located near 33° N., 48° W. As the storm moved east along 31° N. (Figure 4), winds to storm force and combined seas as high as 10 m (33 ft) swept across the northern portion of the TPC forecast area north of 27° N. between 35° W. and 55° W. from 1800 UTC, February 26, until 1800 UTC, February 27. Although no ships reported storm force winds, several encountered gale force winds and very high seas. By February 28, the storm center moved northeast away from the area, but another fast-moving gale center and cold front dropped southward into the central Atlantic producing gale conditions over the same area for another 24 to 36 hr. Two Quikscat passes on February 28, detected a large area of 30- to 35-kt winds north of 27° N. and west of the new cold front. By 1200 UTC, March 1, the gale center moved well north of the area, and the front began to weaken across the eastern portion of the area. Gale conditions finally ended, however, west to northwest

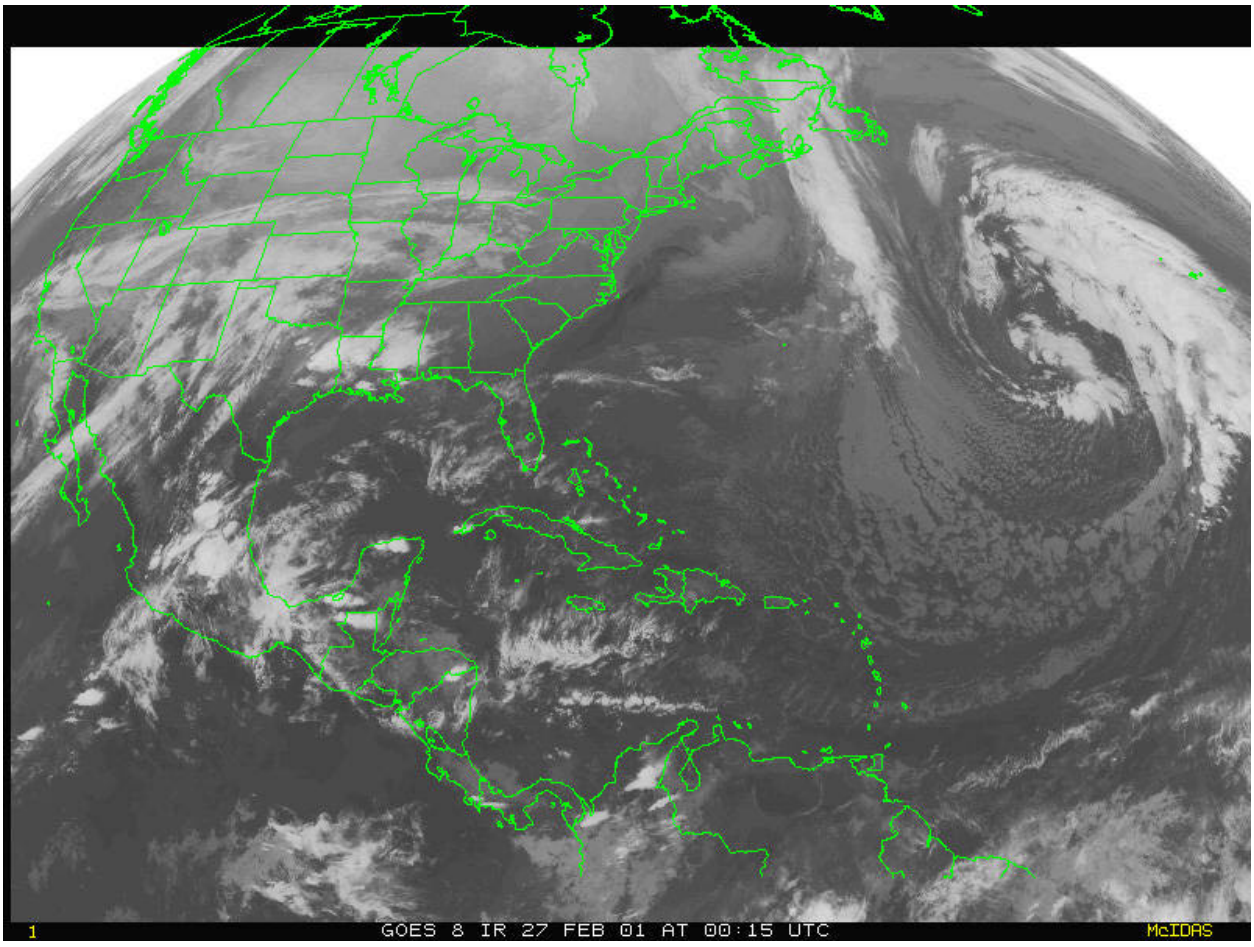


Figure 4. GOES-8 infrared image of Atlantic storm at 0015 UTC, February 27, 2001. Image courtesy of the National Climatic Data Center.

winds of 20 to 30 kt and combined seas of 14 to 20 ft continued across much of the central Atlantic through March 3.

The second gale event over the central Atlantic in 1 week began on March 4 when another strong cold front swept southeast across the eastern portion of the TPC forecast area. At 1200 UTC, March 4, the front extended from 30° N., 35° W. to 26° N., 50° W. Westerly gale force winds of 30 to 40 kt occurred north of 27° N. and between 35° W. and 50° W. At 0600 UTC, March 5, the ship *Looiersgracht* (call sign PFPQ) encountered northwest winds of 39 kt and combined seas of 7.5 m (24 ft). A Quikscat pass from 0812 UTC, March 5, verified the large area of gales, by indicating a large area of west to northwest winds of 30- to 40-kt north of 27° N. between 35° W. and 50° W. By 1200 UTC, March 5, the cold front moved east of 35° W. However, gale force winds continued over the area until 0000 UTC, March 6. Winds decreased rapidly late on March 6; however, large northerly swells of 10 to 15 kt continued over the eastern portion of the TPC forecast area for another 24 to 36 hr.

West Atlantic Storm March 5–8: This was the same storm system that brought more than 2 ft of

snow to portions of northern New England. Early on March 3, a low pressure center developed along the coast of Texas and Louisiana. The low strengthened and moved across the southeast United States on March 4. By 0000 UTC, March 5, the low was centered over West Virginia with a cold front trailing south along the southeast U.S. coast across central Florida into the extreme southeast Gulf of Mexico. The original low pressure center began to weaken as a new low formed off the North Carolina coast. By 1200 UTC, March 5, the developing storm was located just off the Virginia coast with the cold front trailing through 31° N., 75° W. to 23° N., 80° W. At this time, gale conditions were occurring north of 29° N. west of the front to 80° W. The ship *Gus W. Darnell* (call sign KCDK) experienced northwest winds of 35 kt and 36 kt, respectively, at 1800 UTC, March 5, and 0000 UTC, March 6.

By 1200 UTC, March 6, the storm center was located off the northern New England coast with the cold front extending through 31° N., 59° W., 24° N., 63° W., across Hispaniola to the northern coast of Nicaragua. At 1200 UTC, the ship *Leader* (call sign KMLD) and the *Gus W. Darnell* reported northwest gale force winds of 35 to 38 kt. The buoy 41002 near 32° N., 75° W. observed wind of 35 kt and seas of 5.5 m (19 ft). By 0000 UTC, March 7, the cold front extended through 31° N., 52° W., 23° N., 60° W., across Puerto Rico and into the central Caribbean. A postfrontal trough had moved into the western Atlantic and tightened the pressure gradient. This resulted in an area of storm force winds north of 27° N. between 58° W. and 74° W. At the same time, gale conditions extended south to 24° N. A Quikscat pass from just before 0000 UTC, March 7 (Figure 5), detected a large area of 50-kt winds. At 0000 UTC, the ship *Star Florida* (call sign LAVW4) experienced storm force winds of 54 kt near 32° N., 73° W. and the ship *Kolskiy Zaliv* (call sign P3FY6) observed winds of 39 kt near 25° N., 65° W. Several ships reported 5- to 7-m (16- to 24-ft) seas with the buoy 41002 observing seas of 7.5 m (24 ft) and buoy 41010 near 29° N., 78° W. reported seas of 5.5 m (18 ft). The next Quikscat pass from just before 1200 UTC, March 7, indicated that the storm force winds had moved north of 30° N. At 1800 UTC, the front extended from 31° N., 52° W. to Puerto Rico. While winds had decreased somewhat, gales continued north of 25° N. west of the front to 60° W. Elsewhere west of the front, northwest winds remained 20 to 30 kt. By 1200 UTC, March 8, gale conditions moved north of 31° N., but very large swells of 3 to 5 m (10 to 15 ft) continued across much of the western Atlantic for the next several days. These swells produced some minor coastal flooding along the north coast of Puerto Rico.

Gulf of Mexico Brief Gale March 18 and West Atlantic Gale March 20–21: On March 17, a front became stationary across the southeast Gulf of Mexico. Late that day, a weak wave of low pressure developed on the front over the south-central Gulf. Between 0000 UTC and 1200 UTC, March 18, gale force winds occurred north of 26° N. between 89° W. and 92° W. Northeast winds at buoy 42001 (near 26° N., 90° W.) in the middle Gulf of Mexico increased from 25 to 35 kt shortly after 0000 UTC. By 0400 UTC, buoy 42001 observed sustained east-northeast winds of 37 kt

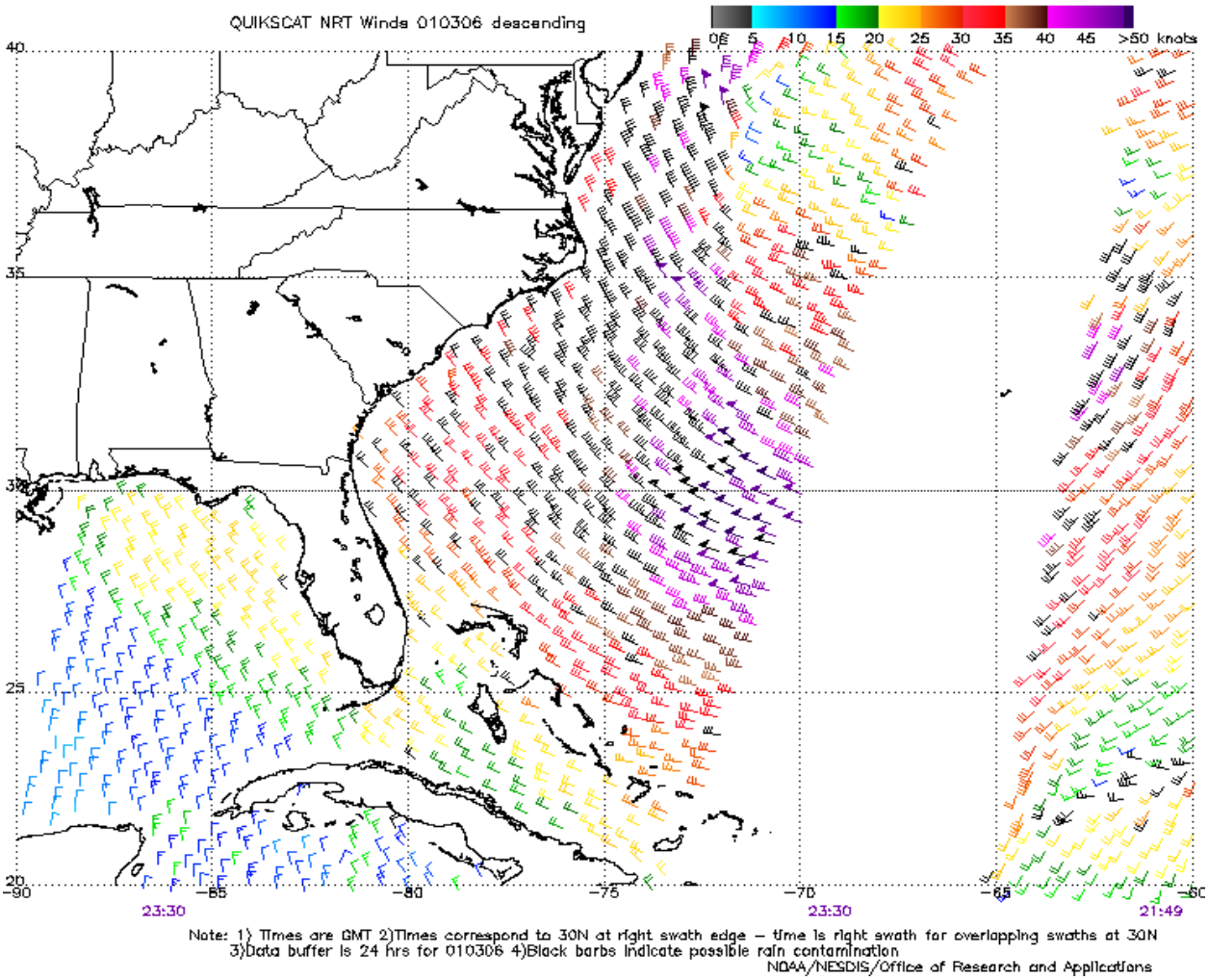


Figure 5. Quikscat data at 2330 UTC, March 6, 2001, Image courtesy of National Environment Satellite, Data, and Information Service.

with gusts to 45 kt, and seas rose from 2.5 m (8 ft) to 4 m (13 ft) in only 4 hr. At 0600 UTC, the ship *Santa Maria* (call sign DCUW) near 28° N., 91° W. observed northeast winds of 37 kt and seas of 3 m (10 ft). By 1200 UTC, March 18, the wave of low pressure moved east over Florida. Winds over the Gulf decreased slightly and gale warnings were discontinued. However, northeast winds of 20 to 30 kt continued over the northeast Gulf as another low pressure system developed later on March 18. This low pressure center eventually produced gale force winds over the western Atlantic.

Late on March 18, a low pressure center developed along the stationary front over the south-central Gulf of Mexico. The low began moving slowly northeast and by 1200 UTC, March 19, was located near 25° N., 88° W. At 0000 UTC, March 20, the 1008-hPa low was centered over the northeast Gulf of Mexico near 27° N., 85° W. A warm front extended through central Florida and across the western Atlantic from 27° N., 80° W. to

25° N., 65° W. The tight pressure gradient between strong high pressure north of the warm front and the developing storm center produced an area of easterly gale force winds over the western Atlantic north of the warm front. At 0000 UTC and 0600 UTC, the ship *Choyang Honour* (call sign DADD) near 28° N., 77° W. observed east winds of 39 kt and 41 kt, respectively. At 1200 UTC, March 20, the developing storm was located inland over southern Georgia with the warm front extending east along 27° N., 75° W. to 25° N., 60° W. At this time, the cold front extended across the Florida Peninsula and western Cuba. Several ships near 30° N., 79° W., including the *Palmero Senator* (call sign ELTY9), XXHH (name unknown), and the *Choyang Honour,* observed gale to storm force winds of 40 to 50 kt. At 1815 UTC, GOES-8 visible image (Figure 6) shows the storm over the southeast United States. At 0000 UTC, March 21, the storm was centered along the coast of South Carolina with the cold front trailing across the northern Bahamas to central Cuba. At 0600 and 1200 UTC, March 21, the ships *Frances L* (call sign C6YE), the *Yuriy Arshenevskiy* (call sign UCJR), and the XXLL (name unknown) observed gale force winds near 30° N., 76° W. At 0000 UTC, March 22, the storm was located along the coast of Virginia with the cold front extending through 31° N., 69° W. to eastern Cuba. At this time, gale force winds moved north of 31° N.; however, strong winds of 25 to 30 kt with seas of 3 to 5 m (10 to 15 ft) continued both east and west of the cold front. The winds finally decreased on March 23, but northerly swells of 2.5 to 3.5 m (8 to 12 ft) continued across the western Atlantic until March 25. The same storm produced over a foot of late season snowfall over portions of the southern Appalachians on March 20–21.

2. Eastern Pacific

The eastern north Pacific was affected by eight Gulf of Tehuantepec gale events and two other gale events associated with strong cold fronts that moved east along 30° N.

Gulf of Tehuantepec: The Gulf of Tehuantepec gale events resulted from strong north to northeast winds funneling through the Isthmus of Tehuantepec. These events were verified by Quikscat data and occasionally by reliable ship observations. The majority of the gale events lasted from 24 to 48 hr, but two events lasted approximately 72 hr. Table 1 lists the beginning times and dates for each Gulf of Tehuantepec gale event between January and April 2001. The first Gulf of Tehuantepec event began at 0000 UTC, January 3. No ship observations of gale force winds were received, but several Quikscat passes confirmed the gale and possible brief storm event. A Quikscat pass from 0044 UTC, January 4 (Figure 7), indicated 35- to 45-kt winds over the area with a very small area of storm force winds in the Gulf. The event ended at 1800 UTC, January 5.

The subsequent two Gulf of Tehuantepec gale events occurred very close together over a 3-day period in January. The first one began at 0600 UTC, January 20, and ended at 1200 UTC, January 21. This event was produced by the same strong high pressure and cold front that produced gales in the southwest Gulf of Mexico on January 19–20. Quikscat data from 1143 UTC, January 20, indicated 35- to 40-kt winds in the Gulf of Tehuantepec. During this event the ship *Dominica* (call sign C6LF9) encountered northeast winds of 30 kt just south of the

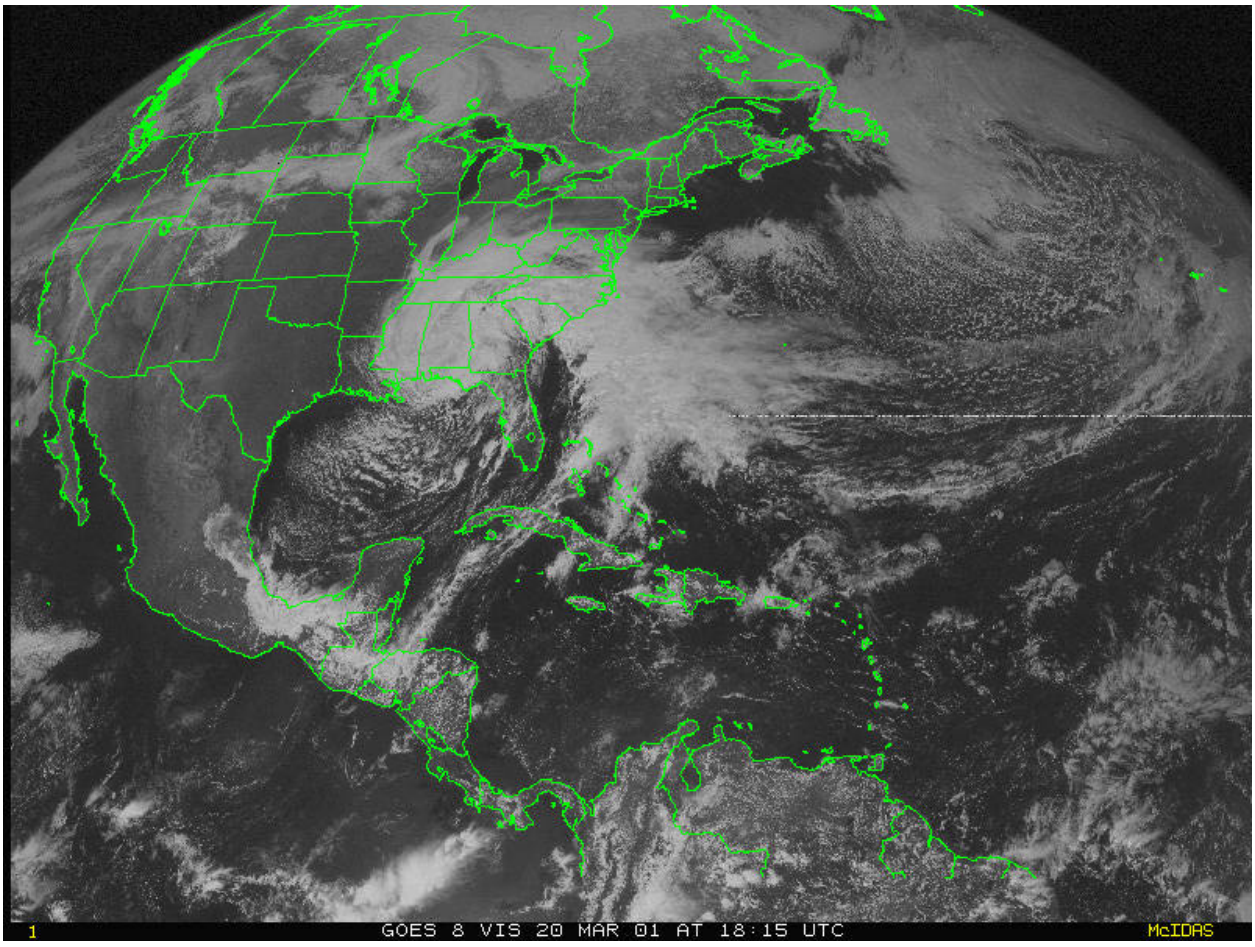


Figure 6. GOES-8 visible image of developing storm over the southeast United States at 1815 UTC, March 20, 2001. Image courtesy of the National Climatic Data Center.

Table 1. List of Gulf of Tehuantepec gale events between January and April 2001.

Event	Beginning	End
1	0000 UTC, January 3	1800 UTC, January 5
2	0600 UTC, January 20	1200 UTC, January 21
3	0600 UTC, January 22	1630 UTC, January 23
4	0600 UTC, February 3	1800 UTC, February 6
5	1030 UTC, February 11	0000 UTC, February 12
6	0000 UTC, February 18	1200 UTC, February 19
7	1200 UTC, March 5	1800 UTC, March 6
8	1030 UTC, March 20	0000 UTC, March 22

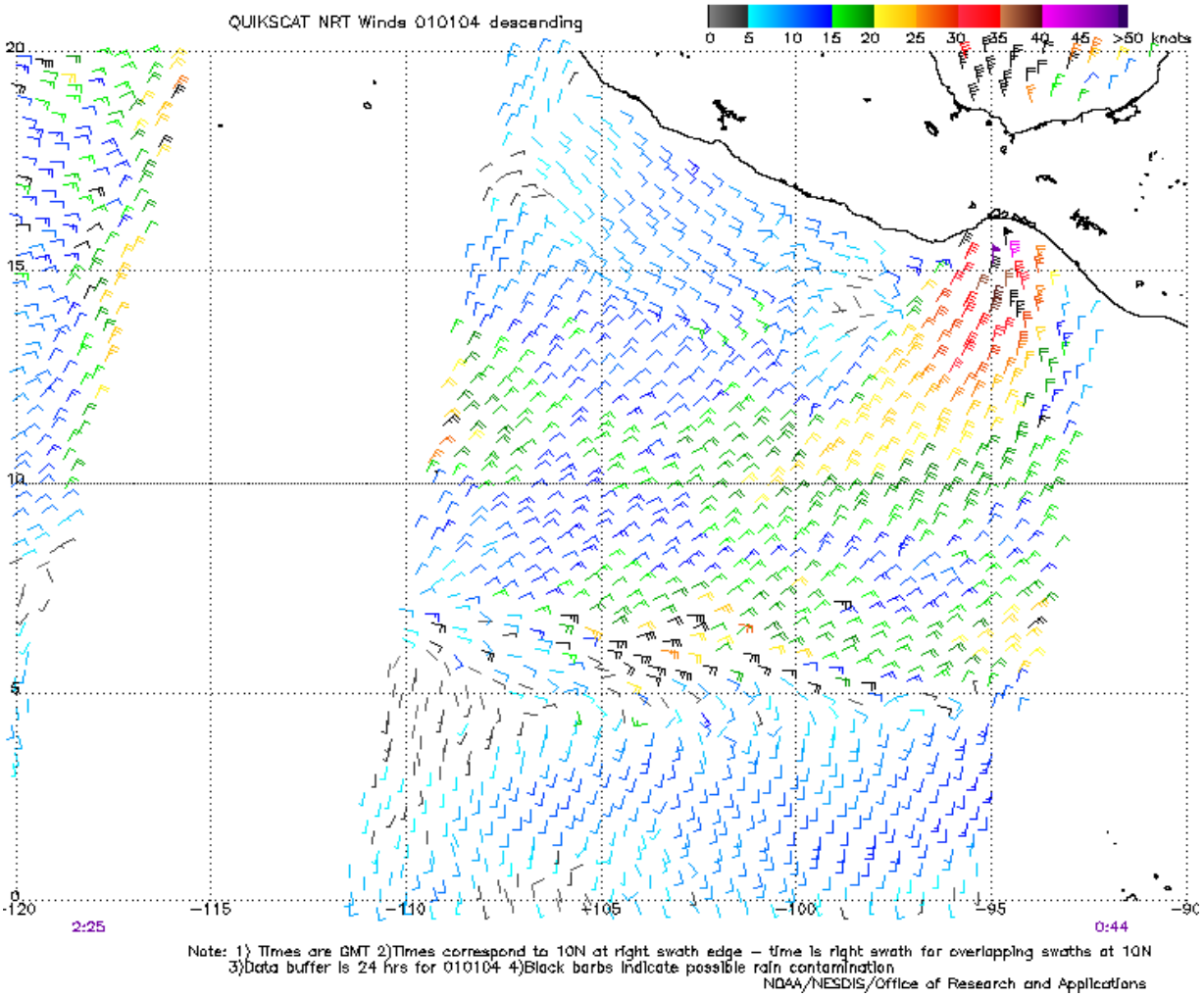


Figure 7. Quikscat data at 0044 UTC, January 4, 2001. Image courtesy of National Environment Satellite, Data, and Information Service.

Gulf near 13° N., 95.5° W. at 1800 UTC, January 20. The next gale event began only 18 hr after the previous event ended and was the result of another strong high pressure system, centered north of the area building south. The event began at 0600 UTC, January 22, and ended at 1800 UTC, January 23. A Quikscat pass from 1232 UTC, January 22, indicated that winds of 35 to 40 kt were present in the Gulf of Tehuantepec.

The fourth Gulf of Tehuantepec gale event of the period began at 0600 UTC, February 3. Several ships in and near the Gulf of Tehuantepec reported strong winds between February 4 and 6. The ship *Washington Highway* (call sign JKHH) observed northeast winds of 32 and 31 kt, respectively, at 1200 and 1800 UTC, February 5. The ship *Century Highway No. 3* (call sign 8JNP) observed 32 kt at 1800 UTC, February 5, and 44 kt at 0000 UTC, February 6.

The event lasted for 3½ days and finally ended at 1800 UTC, February 6. The next event was quite brief, lasting a little more than 12 hr. The gale began shortly before 1200 UTC, February 11, and ended at 0000 UTC, February 12. During this event a Quikscat

pass from approximately 1200 UTC indicated 25- to 30-kt winds in the Gulf of Tehuantepec; however, the ship *Zim Iberia* (call sign 4XFP) confirmed the gale by encountering north winds of 40 kt at 1200 UTC, February 11.

The sixth Gulf of Tehuantepec gale event began at 0000 UTC, February 18. Six hours later the ship *Alberni Dawn* (call sign ELAC5) reported north winds of 37 kt. Quikscat data from 2341 UTC, February 18, indicated winds of 35 to 40 kt in the Gulf. At 0600 UTC, February 19, the ship ELX27 (name unknown) observed 29 kt winds just south of the area. The gale ended at 1200 UTC, February 19. The seventh gale event occurred from 1200 UTC, March 5, until 0600 UTC, March 6. This event was produced by the same weather system that produced the west and central Atlantic Storm on March 5–8. Quikscat data from 2336 UTC, March 5, detected 30- to 40-kt winds over the Gulf of Tehuantepec.

The last event of the period began shortly before 1200 UTC, March 20. A Quikscat pass from 1150 UTC, March 20, detected northerly winds of 30 to 35 kt in the Gulf of Tehuantepec. At 0000 UTC, March 21, the ship *Albatros* (call sign C6LV3) encountered north winds of 33 kt and seas of 3.5 m (12 ft). The gale event lasted another 24 hr and ended at 0000 UTC, March 22.

Gale Center and Strong Cold Front February 13: On February 12, a low pressure center formed north of the TPC forecast area. The low quickly became a gale center and moved southward around the circulation of a large upper level low located over north-central California. By 0000 UTC, February 13, the 1008-hPa gale center was located just north of the TPC forecast area near 31° N., 123° W. A cold front extended southwest from the gale center to 26° N., 131° W. Shortly after 0000 UTC, gale conditions began impacting the northern portion of the TPC forecast area. At 0209 UTC, Quikscat pass detected an area of northwesterly gale force winds north of 27° N. northwest of the cold front to 128° W. The gale center began moving northeast and at 0600 UTC, February 13, was centered just off the coast of southern California with the cold front trailing along 28° N., 121° W. to 23° N., 128° W. As the gale center moved into southern California at 1200 UTC, several ships well southwest of the center encountered 25- to 30-kt winds. The NOAA ship *Ka' Imimoana* (call sign WTEU) observed southwest winds of 30 kn near 27° N., 119° W. Quikscat data from 1322 UTC confirmed the ship observations, and indicated a large area of 25- to 35-kt winds north of 25° N. along and west of the cold front to 131° W. At 1800 UTC, February 13, the gale center moved inland over southern California and the winds south of 30° N. began to decrease; therefore, gale warnings were discontinued. However, north to northwest winds of 20 to 25 kt and combined seas of 3 to 5 m (10 to 16 ft) continued north of 25° N. east of 130° W. for the next 24 hr.

Storm Center and Associated Cold Front March 3–4: On March 3–4, a storm center moved east-northeast at 25 kt, along the northern boundary (30° N.) of the TPC High Seas Forecast area. The storm and associated cold front produced an area of gale force winds over the northern portion of the TPC forecast area. At 0000 UTC, March 3, the front approached the northwest corner of the TPC forecast area near 30° N., 140° W. By 1200 UTC, the front extended through 30° N., 134° W. to 26° N., 140° W. At this time, gale force winds were occurring along 30° N. and two ships reported gale force winds near 30° N., 140° W. The ship *P&O Nedlloyd Sao Paulo* (call sign DGSR) encountered west winds of

45 kt near 32° N., 139° W. and the *Sea-Land Enterprise* (call sign KRGB) observed northwest winds of 39 kt near 31° N., 142° W. Quikscat data from 1407 UTC (Figure 8) confirmed the presence of storm force winds well north of 30° N., with gale force winds along and just south of 30° N. At 0000 UTC, March 4, the *P&O Nedlloyd Sao Paulo* reported northwest winds of 39 kt near 30° N., 136° W. By 0600 UTC, the front extended through 30° N., 127° W. to 20° N., 140° W. Shortly thereafter, the storm center moved northeast, and the gale conditions ended south of 30° N. However, on March 5, another low pressure moved southeastward around the large circulation of the main storm center and continued producing an area of 25 to 30 kt winds across the northern portion of the TPC forecast area. Combined seas of 3.5 to 5 m (12 to 16 ft) continued across the area north of 25° N., until March 7, when the seas finally began to subside.

IV. References

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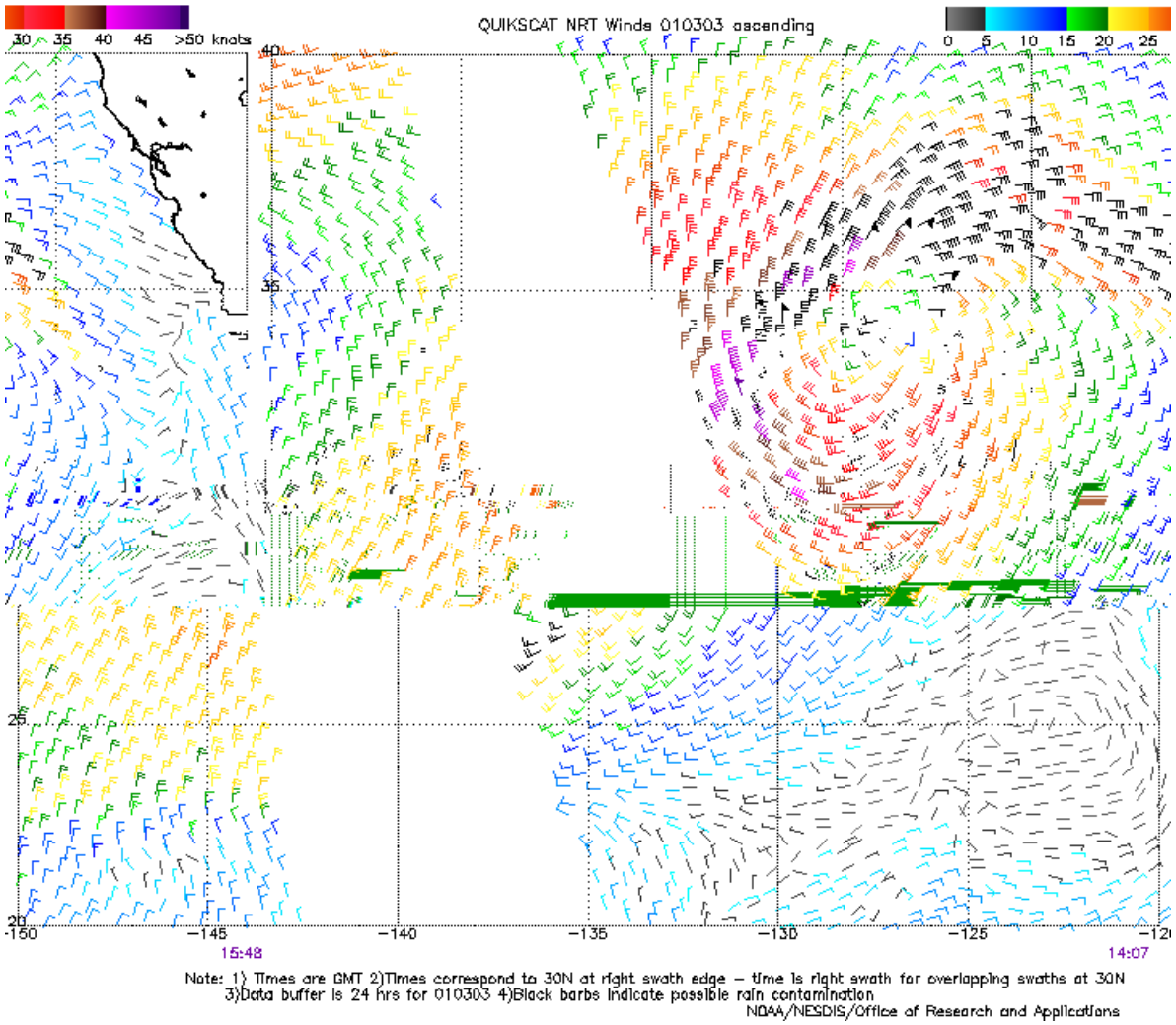


Figure 8. Quikscat data at 1407 UTC, March 3, 2001. Image courtesy of National Environment Satellite, Data, and Information Service.

Myrtle Beach, SC, Waterspout July 6, 2001, (c)2001 Paul R. Donovan

The summer scare moved ashore injuring several people, destroying mobile homes, overturning buses, and causing more than $8M in damages.

Mean Circulation Highlights and Climate Anomalies January Through April 2001

A. James Wagner
Climate Operations Branch
Climate Prediction Center/WCCP/NWS/NOAA

I am the Senior Forecaster in the Climate Operations Branch of the Climate Prediction Center /NCEP/NWS/NOAA. I participate in the preparation of all the types of forecasts done in the Branch: 6- to 10-day extended forecasts, week two forecasts, threats assessments, ½-month lead monthly outlooks, and the series of long-lead seasonal outlooks going out to a year ahead. Other duties include applied research in developing and improving tools for the forecasts and giving special briefings on the forecasts and their methodology to the media and visiting scientists.

January-February 2001

The middle tropospheric circulation over the Northern Hemisphere had a very strong cyclonic circulation and below normal 500-hPa heights over the northwestern Pacific and Bering Sea area, with frequent strong storms affecting that area and much of Alaska, which had a persistently mild and wet winter in most areas. Abnormally cold weather afflicted much of northern China and eastern Siberia. A stronger than normal subtropical ridge and associated surface anticyclone stretched across most of the Pacific at middle and lower latitudes, with a strong jet stream between them over the western half of the ocean. The enhanced jet over the western Pacific is typical of past years with La Niña, which was still continuing, although with somewhat reduced intensity compared with the past 2 winters. Downstream over the eastern Pacific, the flow was highly difluent, with a weak trough near the California coast and a ridge extending northward from Washington state through western Canada to eastern Alaska. This part of the pattern was not typical of La Niña, with deficient winter rains and snows in the Pacific northwest and above normal precipitation in much of California and Arizona being the opposite of the usual La Niña-associated pattern. Dry conditions accompanied by relatively mild temperatures prevailed much of the time over the eastern U.S., while colder than normal conditions continued over the west and developed over the northern and central Great Plains during February. Both months were wet over the southern and central Great Plains, and the wet area extended northeastward to the Great Lakes in February.

Downstream over eastern North America, an area of weak positive 500-hPa height anomaly covered the eastern U.S., which represented more of a weakening of the climatological trough than an actual ridge, although in February there was a strong ridge in place, which is a typical La Niña winter

pattern in that region. Over the Atlantic, a pronounced negative phase of the North Atlantic Oscillation (NAO) was in place, especially during January, continuing the mean pattern that had prevailed during the previous 2 months. Moderate blocking as shown by above normal heights prevailed at high latitudes while below normal heights were observed at lower latitudes. The storm track was displaced south of its normal position, and western and southern Europe continued to have abnormally wet weather, while northern and eastern Europe were dry most of the time.

March-April 2001

The circulation pattern over the Pacific during March and April was anomalously anticyclonic at both the surface and in the middle troposphere, with a large area of above normal 500-hPa heights and sea level pressures covering most of the Pacific Basin, except for the far western part and the northeastern Gulf of Alaska. The anomalies for this 2-month period were very weak over most of North America, reflecting the cancellation of sharply contrasting patterns in which a strong ridge centered near the West Coast and trough near the Atlantic coast during March was replaced by a ridge in the middle of the U.S. and weak troughs near the two coasts during most of April. The temperature pattern underwent a correspondingly large dramatic change, with a warm west and cold south and east in March being replaced by mild temperatures over most of the country except for the far west. The precipitation pattern in March was almost El Niño — like, with heavy rainfall across the south, but this was due primarily to an extremely strong negative phase of the NAO associated with extensive blocking centered in the Davis Strait that pushed the storm track and cold air far south of normal.

The middle tropospheric anomalies and sea level patterns were even more anomalous during the early spring period than during the winter, with the storm track quite well-defined across the central Atlantic, entering Europe somewhat further north than during the previous 2 months, but still south of its climatological position. The weather across southern Europe and North Africa was persistently mild and dry, while periods of unusually cold weather affected the British Isles and Scandinavia.

Note on the Tropics and Southern Hemisphere

The La Niña conditions that have prevailed since the summer of 1998 continued through the first 4 months of 2000, but became rather weak during late March and April. Unusually warm water and conducive atmospheric circulation patterns over the western Pacific and much of the Indian Ocean were again this year associated with an active tropical storm season in Australia and the southern Indian Ocean throughout most of the 4-month period.

May-June 2001

The map of mean 500-hPa height and height anomalies (left) shows generally above normal heights over much of the Pacific Basin, except for somewhat stronger than normal troughs east of Japan and over the northeastern Gulf of Alaska. Stronger than normal ridges persisted for much of the period over the Bering Sea and near the west coast of the U.S., with a positive anomaly centered near California. This pattern dried and warmed the southwest, while occasional moderate rains that fell mainly in June when the trough moved closer to British Columbia, prolonged the, thus far, quite deficient

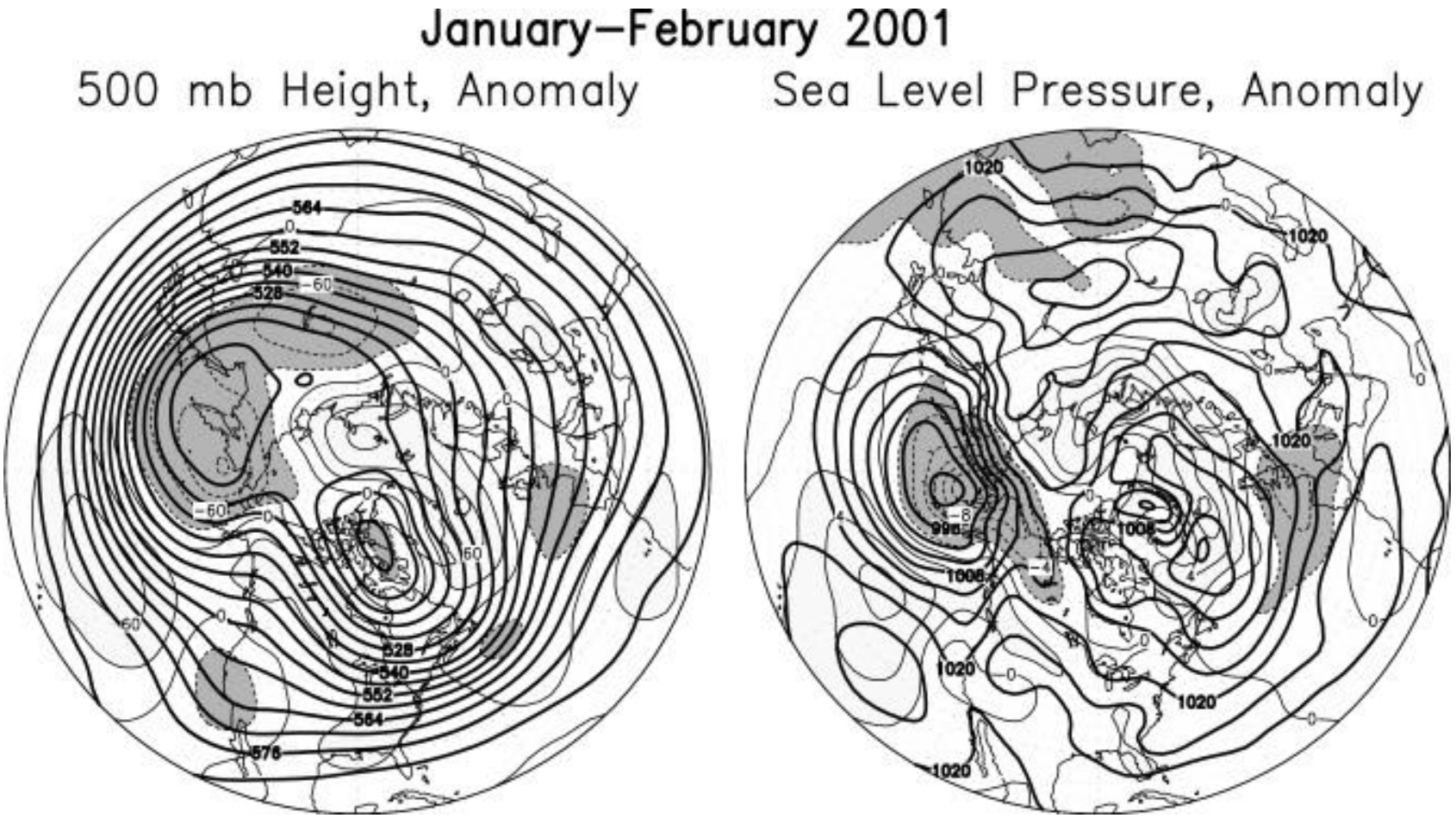
rainy season over the Pacific northwest.

A strong ridge was also located over eastern Canada, where episodes of blocking continued the recurrent pattern seen for most of the winter and early spring, Dry conditions prevailed over both the southeastern and southwestern U.S. through May, but a sudden change to wet conditions occurred over the southeast, in early June when Tropical Storm Allison brought heavy rains and floods to parts of the Gulf coast states, and primarily beneficial rains to much of the interior southeast and Atlantic coast as the remnants moved slowly northeastward. Somewhat similar to the previous year, late spring warmth during May over much of the United States was replaced by noticeably cooler weather over the middle of the country during June as a trough deepened over the Mississippi Valley. Active storm systems brought heavy rains, often accompanied by severe weather, to parts of the Great Plains, upper Mississippi Valley, and the Great Lakes region.

The strong ridge over southwestern Europe was associated with abnormally dry conditions in the area and over much of the Mediterranean Basin, although unlike in the previous year, no extensive heat waves developed due to a changeable circulation pattern.

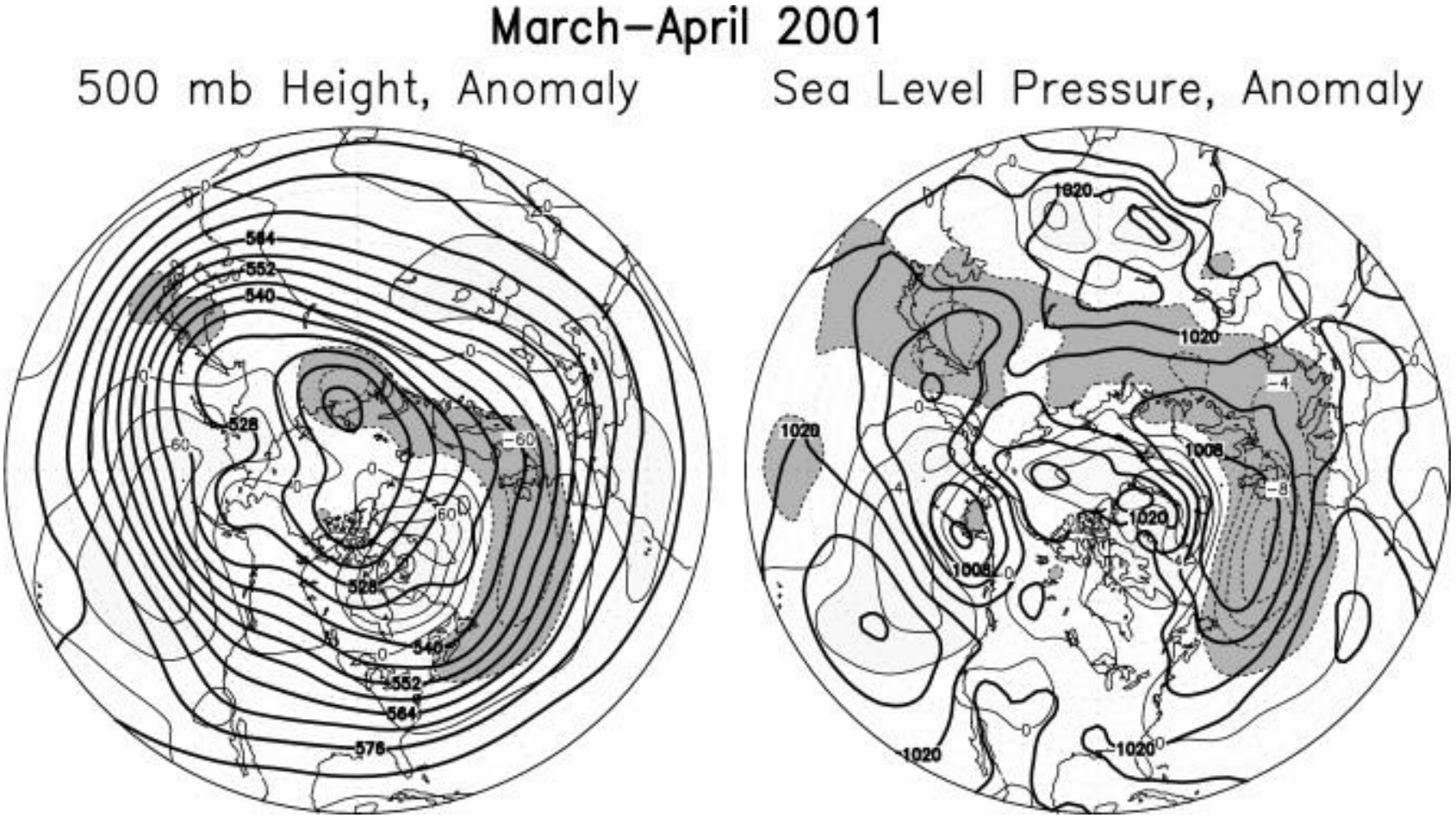
Mean troughs also persisted over the central Atlantic southeast of the Canadian maritime provinces and from Scandinavia and the White Sea southwardthrough western Russia, while a broad ridge continued over central Siberia.

La Niña conditions, characterized by below normal SSTs along the equator, had just about disappeared over the equatorial Pacific, and most oceanic and atmospheric indices indicated a close to neutral state of the ENSO phenomenon. The generally strong ridges at middle latitudes mentioned above, and a more active than usual early part of the summer monsoon in parts of southeast Asia, fueled by extra moisture from the higher than normal SSTs that continued over a wide area of the western Pacific, were typical of those observed during the past 3 years when the unusually persistent La Niña has been in place. Early season typhoons and tropical storms were not exceptionally numerous over the western or eastern Pacific, however, and Allison was the only named storm to develop in the Atlantic sector.



The chart on the left show the seasonal mean 500-hPa height contours at 60-m intervals in solid lines, with alternate contours labeled in decameters (dm). Height anomalies are contoured in dashed lines at 30-m intervals. Areas of mean height anomalies greater than 30 m below normal have heavy shading, and areas of mean height anomalies of more than 30 m below normal have heavy shading.

The chart on the right show the seasonal mean sea level pressure (SLP) at 4-hPa intervals in solid lines, labeled in hPa. Anomalies of SLP are contoured in dashed lines and labeled at 2 hPa intervals, with light shading in areas more than 2 hPa above normal, and dark shading in areas greater than 2 hPa below normal.



The chart on the left show the seasonal mean 500-hPa height contours at 60-m intervals in solid lines, with alternate contours labeled in decameters (dm). Height anomalies are contoured in dashed lines at 30-m intervals. Areas of mean height anomalies greater than 30 m below normal have heavy shading, and areas of mean height anomalies of more than 30 m below normal have heavy shading.

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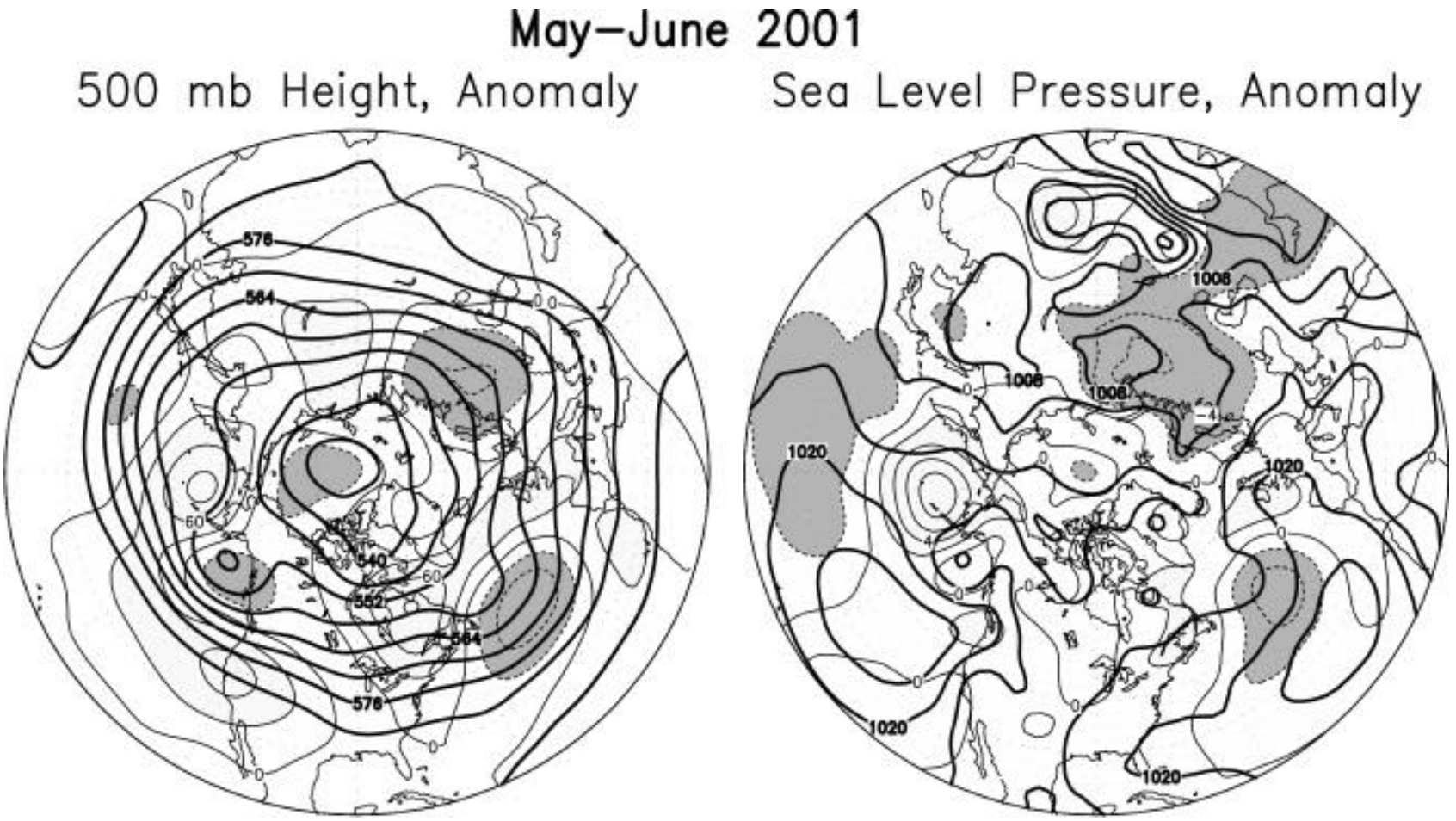

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Familiarization Float Aboard the *Ocean Mariner* Tugboat May 16-18, 2001

Edward Plumb
Meteorologist Intern
National Weather Service
Juneau, Alaska

In an effort to improve marine forecasts and to strengthen the relationship with the marine community, the National Weather Service (NWS) has encouraged forecasters to participate in familiarization (FAM) floats aboard marine vessels. Western Towboat Company, based in Seattle, WA, generously offered to accommodate meteorologists interested in sailing on one of their tugboats. When I was offered the opportunity to take a FAM float on the *Ocean Mariner* tugboat traveling through southeast Alaska, I immediately jumped at the chance to gain first-hand experience of the weather from the mariner's perspective.

As a meteorologist for the Weather Forecast Office in Juneau, I routinely write and update marine forecasts for southeast Alaska and the eastern Gulf of Alaska coast. Since southeast Alaska relies heavily on barge and tugboat operations for supplies, marine weather can have a large impact on the successful and timely delivery of goods and equipment. To gain insight into the variety of marine weather within the Juneau forecast area, I requested a FAM float from Juneau to Yakutat (Figure 1). This trip would expose me to the protected waters of the inner channels as well as the exposed outer coastal waters in the northeastern Gulf of Alaska.

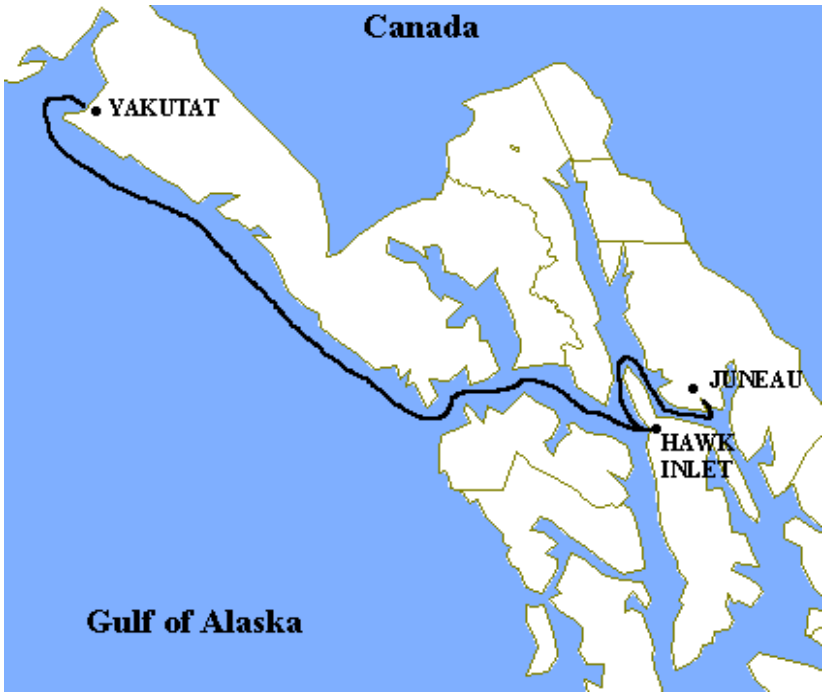


Figure 1. The FAM float route

Purpose

This familiarization float taught how weather impacts tugboat operations, interaction with regular users of our marine forecast products, and how to obtain feedback about our marine forecast program. I was also interested in learning about any frequently encountered local variations in wind speed and direction that cause our forecasts to be unrepresentative of the actually observed conditions.

Itinerary

I boarded the Ocean Mariner (Figure 2) in Juneau while it was enroute from Seattle to Yakutat. The total distance of my journey from Juneau to Yakutat was approximately 260 nmi with an average cruising speed of 8 to 9 kt. This distance included a scheduled stop in Hawk Inlet on the western coast of Admiralty Island to drop off supplies at the Greens Creek Mine.

The Crew

The *Ocean Mariner* was piloted by Captain Phil Rausch, along with three crew members. The Captain and crew work a demanding schedule that requires them to be alert around the clock. They alternate navigating the tugboat in shifts that typically last 4 to 6 hours. Arrival in a port can occur at any time of the day, and it can take 4 to 8 hours to unload/load containers and equipment. Therefore, during their downtime these guys are trying to catch up on much needed sleep.

Weather

The synoptic weather pattern over the region consisted of a broad area of low pressure in the Gulf of Alaska that was weakening in place, as a ridge of high pressure developed along the northeast Gulf coast. We

Figure 2. The *Ocean Mariner* (provided by Western Towboat Company)

encountered southerly winds gusting to 20 kt in the inner channels, while variable winds less than 10 kt prevailed in the northeastern Gulf. There was a southeast swell from 2 to 2.5 m (6 to 8 ft) when we entered the open ocean, which had subsided to 0.3 to 1 m (1 to 3 ft) as we approached the entrance to Yakutat bay. The crew aboard the *Ocean Mariner* commented, ". . . this is about as good as it gets out here!"

The Trip

The crew of the *Ocean Mariner* informed me of the type of weather conditions that hamper operations. They are generally not concerned with strong winds while they are traveling through the inner channels. Strong head winds will slow their progress, but due to the smaller fetch of water for the wind to blow over, large sea conditions are seldom encountered within the inner channels. If the wind or sea conditions become too hair-raising, they will seek relief in a sheltered cove or bay (Figure 3). On the other hand, strong winds are dangerous and do bring operations to a halt when they are loading/unloading containers and equipment at a port (Figure 4). When winds of 35 kt or higher are forecast along the outer coast, they will delay crossing unprotected waters due to potentially dangerous sea conditions and the possibility of losing containers overboard. They may also cancel a crossing because of the delays involved with getting weathered in at a port for a long time.

Figure 3. The *Nana Provider* barge in Gastineau Channel, Juneau, Alaska

Figure 4. Unloading containers from the *Nana Provider* at the dock in Juneau

One mate remarked that if some uncertainty is with the track or intensity of a weather system, he prefers that we forecast the wind and seas too high rather than too low. He feels that it's better to know what sort of weather and sea conditions they may get into while enroute and have time to prepare for a potentially hazardous situation. This beats getting surprised and caught in weather conditions that are unsafe for operations. I emphasized several times during the journey the importance of ship observations to the forecast process. I also pointed out the limited number of surface observation sites and buoys available within the Alaska coastal waters. I explained to the crew that an increase in the observation network will improve the accuracy of our marine forecasts, alert meteorologists to unforecasted conditions, and result in updates to forecasts as necessary. Observations will also allow us to gain some insight into local variations in wind speed and direction.

Conclusion

I would like to thank Western Towboat for giving me the opportunity to sail aboard the *Ocean Mariner*. I would also like to thank the crew for providing me with an enormous amount of valuable information about tugboat operations and marine weather. Fortunately, for my land-based body, the wind and seas were tranquil during my 2-day journey. Although I didn't get to experience a raging storm and high seas, I do have a much better understanding of the impacts of weather on marine operations and a new respect for the vulnerability of vessels at sea to the powers of Mother Nature.

These cloud pictures were taken at 41°13′ N. 68°00′ W. southeast of Frenchmans Bay. The wind briefly shifted to the northwest, but the real front came through the next day. Courtesy of Jack McAdam, Master, NOAA Ship *Delaware II*.

Waterspout from *Keystone Cherry Valley* (WIBK) taken July 5, 2001, off the coast of Lake Charles, LA.

May 2001 Alaska Marine and Public Services Report

Kodiak was the "A Division" Station of the Month for May 2001 with a score of 9,592 points. Rich Courtney had 12 ship visits, and the Kodiak staff again led the way with the most BBXX observations transmitted in Alaska with 658. Kodiak had the most Marine Briefings with 880. Juneau was the "A Division" 2nd place site with an excellent score of 7,167 points. Juneau had 4 ship visits, 2 FAM Floats, 1 FAM Flight, along with 517 BBXX observations. Cold Bay was the "A Division" 3rd ranked station with 1 ship visit, 138 BBXX observations, and 500 Marine Briefings, for a score of 2,418 points. Fourth place Yakutat had 2 ship visits and 241 marine briefings for a score of 1,197 points.

In the "B Division," Alaska Region Headquarters led the way with 12 ship visits for a score of 2,400 points. Bethel was the "C Division" leader with 1,085 points on the strength of an Alaska best 151 Pilot Weather Briefings. Second Place Barrow had the most MAREPS in the C Division with 78. (Note: A conservative estimate was made for the counts from Annette and Valdez due to the non-reciept of their May Monthly Activity Report.)

After the first 5 months of 2001, the Alaska Marine Division leaders are Kodiak, ARH Anchorage, and McGrath. The Alaska Region HQ has the most ship visits with 36. Kodiak has transmitted the most BBXX with 2,153 and has the most Marine Briefings with 3,903. Kodiak also has the highest total of Pilot Weather Briefings with 578 with McGrath close behind with 524.

NWS Alaska Rankings and Scores

A Division

MAY 2001

1. Kodiak 9,592
2. Juneau 7,167
3. Cold Bay 2,418
4. Yakutat 1,197
5. Valdez 920

JAN - MAY 2001

1. Kodiak 32,681
2. Juneau 17,472
3. Cold Bay 9,902
4. Yakutat 5,436
5. Valdez 5,200

B Division

MAY 2001

1. ARH Anchorage . 2,400
2. WFO Anchorage . 1,511
3. St. Paul 930
4. King Salmon 598
5. Annette 560

JAN - MAY 2001

1. ARH Anchorage . 7,200
2. St. Paul 5,573
3. Annette 4,233
4. WFO Anchorage . 2,955
5. King Salmon 2,766

C Division

MAY 2001

1. Bethel 1,085
2. Barrow 848
3. McGrath 714
4. Nome 604
5. Kotzebue 555
6. Fairbanks 127

JAN - MAY 2001

1. McGrath 3,319
2. Barrow 2,630
3. Nome 2,446
4. Kotzebue 1,611
5. Bethel 1,366
6. Fairbanks 1,242

Alaska Ship Visits January through May 2001

Rank	Name	Location	Amount
1.	Larry Hubble	ARH Anchorage	36
2.	Rich Courtney	Kodiak	30
3.	Greg Matzen	ARH Anchorage	22
4.	Angel Corona	Juneau	6
4.	Jerry Painter	Juneau	6
6.	Ralph Johnson	Yakutat	5
7.	Ed Harris	Cold Bay	3
7.	Terry Stamey	MOBEU	3
7.	Royce Fontenot	Cold Bay	3
10.	Wilford Burson	St. Paul	2
10.	Mike Ford	WFO Anchorage	2
10.	Aimee Devaris	Juneau	2
10.	Laura Furgione	Juneau	2
10.	Jim Roberts	King Salmon	2
15.	Janet Trimbur	Cold Bay	1
15.	Chuck Wilson	Annette	1
15.	Art Puustinen	Juneau	1
15.	Ed Plumb	Juneau	1
15.	Craig Eckert	Cold Bay	1

BBXX REPORT

Due to problems with the NCDC Web page that counts ship observations, this months BBXX Report is incomplete. It appears that no vessel had more observations than the *Seneca* in May with 86. The *Seabulk Montana* continues their lead in the 2001 Alaska rankings with 313 so far.

MAY 2001	BBXX	JAN - MAY 2001	BBXX
1. SENECA	86	1. SEABULK MONTANA	313

Captain John Strong from the SeaCoast Tug *Pacific Pride* received the Alaska Marine Program Award of Excellence for being one of the top weather reporting vessels in Alaskan waters for May 2001. The *Pacific Pride* was visiting the Port of Anchorage on July 27, 2001.

(L to R) Captain G. D'Agostino and 2nd Mate C. Lorenzano from the LNG tanker *Artic Sun* (ELQB8) were in port in Nikisi, AK, on June 14, 2001. The *Artic Sun* received the Alaska Marine Program Award of Excellence for transmitting the most BBXX observations (60) in Alaskan waters for April 2001.

SEAS 2000 – A Better Way to Encode Observations

Ever forget how to encode sea ice and have a hard time reading your tattered *Ship's Code Card*? Can't erase all those dots on your wind plotting boards? Or, do you simply want to remove the Beaufort chart from your wall since those force 11 and 12 photos look too scary? Ever wonder if there's got to be a better way to code weather observations?

There is! If you have INMARSAT communications and a separate (non-GMDSS) PC, a new Windows-based software package called SEAS 2000 could be the answer. SEAS 2000 users no longer need to remember the ship code because the software automatically places it in a compressed binary format. Cloud charts and Beaufort sea state photos are contained in the software. Throw away those wind calculators and plotting boards because true wind directions are calculated given the apparent wind and the ship's heading. SEAS 2000 does all of your unit conversions and calculations for you. You can also use SEAS 2000 to meet your AMVER (position reporting) requirements with the U.S. Coast Guard.

Take a stroll through the AMVER/SEAS 2000 Tour on page 52 for a peak at what SEAS 2000 is all about. *SEAS - Then and Now* on page 50 provides a historical look at how this software was developed.

For more information on SEAS 2000, contact your nearest Port Meteorological Officer (see the list at the back of this issue) or Steve Cook from Global Ocean Observing System Center (GOOS) at steven.cook@nooa.gov, (858) 546-7103 or you can visit the SEAS Web site at http://seas.nos.noaa.gov/seas/seas2000.html.

Data From Private Yachts and Cruise Ships Now Being Included in VOS Program

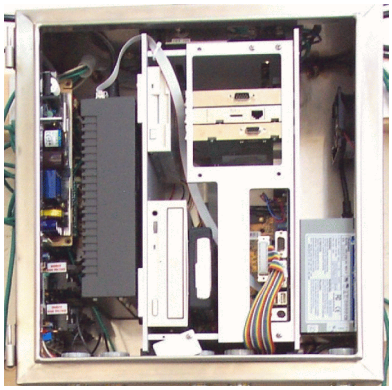
Tom Houston
President and CEO
International SeaKeepers Society

National Oceanic and Atmospheric Administration (NOAA)'s Voluntary Observing Ship (VOS) Program has begun receiving weather data from yachts and cruise ships that are participating in an exciting new ocean- and weather-monitoring program launched by the nonprofit International SeaKeepers Society. Over the last 3 years, SeaKeepers has developed, field tested, and begun deploying on super yachts, cruise ships, and other vessels around the world. The ocean- and weather-monitoring module autonomously gathers, records, and transmits data on marine weather and ocean conditions that may be useful in studies of the health of the oceans, global climate change, and the status of the oceans food chain. SeaKeepers modules are already operating on more than 40 private yachts and cruise ships and will soon be installed on fiberoptic cable-laying ships owned by Global Crossing, Inc. Generally, SeaKeepers-equipped vessels operate outside established shipping lanes and, therefore, gather and transmit ocean and weather data from areas of the oceans not covered by ships participating in the VOS program. SeaKeepers hopes to have some 500 vessels participating in its ocean- and weather-monitoring fleet worldwide by 2004.

SeaKeepers operates pursuant to a Memorandum of Understanding and Data Sharing Agreement with NOAA. The National Data Buoy Center (NDBC), a part of the National Weather Service (NWS), provides the NOAA point of contact for this agreement. On May 15, 2001, SeaKeepers began sending weather data from its vessels to the NWS as part of NOAA's VOS program. All data from SeaKeepers vessels are being carefully reviewed, and feedback is being provided by NWS to SeaKeepers. So far, data from the first six SeaKeepers modules compares very favorably with data coming in for the forecast models. By October, it is expected that all 46 SeaKeepers vessels will be transmitting data to NWS. SeaKeepers vessels have been included in the Global Ocean Observing System (GOOS) and international VOS scheme by action of the World Meteorological Organization (WMO) and the Intergovernmental Oceanographic Commission (IOC).

Although originally developed for use on super yachts and cruise ships, SeaKeepers believes its module can also be effectively used on cargo vessels. In recent meetings with officials from the VOS program at NDBC, SeaKeepers expressed an

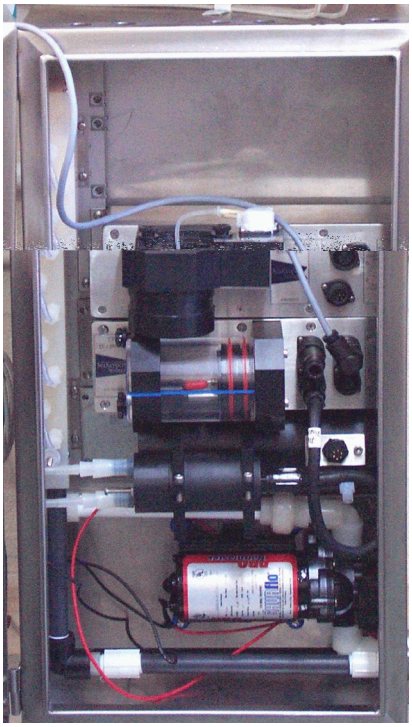
interest in pilot tests conducted on its modules (or at least the weather data-gathering portion of its module) aboard container and other cargo vessels. SeaKeepers officials believe that installation of its automatic weather module might serve to improve the number and accuracy of weather reports from VOS ships. The staff of the VOS program plans further discussions with SeaKeepers officials on this proposal.



There are two main portions to the SeaKeepers module – one gathers weather data and the other gathers ocean data. The weather portion automatically gathers and records air temperature, relative humidity, barometric pressure, sea surface temperature, and wind speed and direction. Every 3 hours a 10-minute wind speed and direction average is taken, and the measurements are transmitted via a dedicated INMARSAT C transceiver.

In times of high wind, the module is programmed to transmit every hour. SeaKeepers combines standardized R.M. Young meteorological sensors with its own proprietary software to automatically batch and transmit the data.

The ocean portion of the SeaKeepers module gathers data on salinity, pH, oxygen, and Eh (pollution index) levels. Additional sensors will soon be deployed for solar radiation, ocean color (CDOM), phytoplankton levels, turbidity, heavy metals, PCO2, and TCO2. More detailed information on the module, the types of data it gathers and transmits, and its technical and installation



specifications can be found at www.seakeepers.com. Working together, SeaKeepers and NDBC recently produced a version of the SeaKeepers monitoring module for use on ocean piers. The first such joint NDBC/SeaKeepers module is now operating on a pier in Miami, FL. Encouraged by this collaboration, NDBC and SeaKeepers are now undertaking a joint feasibility study of converting the SeaKeepers ocean module for use on 3-m buoys.

Antarctica

Sean M. McPhilamy
Chief Marine Science Technician
MSTC, USCG

On any other day, I probably wouldn't be defending my recommendation to divert the U.S. Coast Guard Cutter (USCGC) *Polar Sea* into the center track of a 962-hPa barotropic low, but this certainly wasn't any other day. And this wasn't really my happiest of recommendations to the Captain; it was just one of many during another 6-month deployment to Antarctica.


Josh Landis

My name is Sean McPhilamy, and I am the Chief Marine Science Technician aboard *Polar Sea*, one of two ocean-going icebreakers supporting the U.S. science station at McMurdo, in the Ross Sea. Along with our sister ship, the USCGC *Polar Star*, the U.S. Coast Guard (USCG) provides logistics and science support to the National Science Foundation's Antarctic Program.

In my role as Marine Science liaison, I coordinate and manage the atmosphere and ocean science interests conducted during our deployments in both north and south high latitude operations. Specifically for the *Polar Sea*, I have been trained at the U.S. Joint Command Weather School at Keesler Air Force Base in Biloxi, MS, to observe and forecast weather.

Meteorology can be challenging enough to work in the same location for extended periods of time, but even more so, as we support worldwide ice operations. As an example, it confused more than a few people recently as I was studying tropical storm avoidance, until the realization dawned about our routine crossings of the intertropical convergence during our support of Antarctic operations.

In data-sparse open-water regions, satellite data can be your best friend and worst enemy. "Experience, judgement, prudence, vigilance" are just words until the safety of a ship and her crew are considered. The Commanding Officer of *Polar Sea* has his Deck

Watch Officers and Quartermasters work closely with the Marine Science Technicians to observe, understand, and log the weather.

With her gracefully sloped bow and wide beam, the Polar Sea is built to break ice. But her lively sea-action is why she is known more delightedly as a "polar roller." In the crossing of the southern hemisphere's Roaring Forties and Furious Fifties, the taking of westerly beam swells causes the *Polar Sea* to sway "to and fro," routinely in excess of 30° port and starboard. With larger storms, the rolling and pitching becomes more intense. Seasoned sailors often can be found spending some time on the passageway bulkheads, as an alternate deck, while making rounds of the ship.

In addition to satellite sensors (such as infrared and visible spectrums) from the polar-orbiting birds, the cutters obtain weather facsimile charts from the worldwide network services. The U.S. Navy also provides daily input to the chosen course, from its Meteorological and Oceanographic Commands.

Often however, basing ship movement decisions, upon the comments of someone "driving a desk" in Yokusoka, Japan, isn't something the Captain does lightly however. So, this is where I found myself this February outbound from our successful resupply of McMurdo Station.

In the Ross Sea, as we were rounding Cape Adare, the Navy advised us of a 5-day forecasted "explosively" deepening low, forecast to 935 hPa, on our outbound track for southern Australia. Ahead of it, was the mature low, I had mentioned at the beginning of this article. As we reviewed the situation, the decision was made to make best possible (a grand 16-kt SOA!) in the sea way of the southern Pacific.

We made for the mature 962-hPa low, while watching the upper level trough upstream that was beginning to influence a triple point low to the west. In turn, the forecast storm's movement and forecast development was a cause for some concern, as it accelerated on our reciprocal course. Had we chosen instead to slow and take the lee of the earlier mature low, we more surely would have been in the confluence of the deeper low's occluded front. As we continued north, we watched (by the satellite's eye) with fascination the continued deepening of the system we had avoided.

I definitely appreciate the support of the U.S. Navy and the Australian Bureau of Meteorology in our choices "down under." In combining our onboard ship's observations, our satellite data and their forecasting models, we avoided the brunt of the most fascinating weather system I have been fortunate enough to observe.

For questions about weather observations and forecasting onboard the USCGC *Polar Sea*, please feel free to contact me anytime. And feel free to visit our ship's Web site at http://www.oz.net/~polarsea.

Changes to Australian Weather Radiofax Services

The Bureau of Meteorology has for many years been supplying the maritime community with weather information in the form of charts broadcast via its AXM and AXI radiofacsimile services. The HF transmitters for this service are currently provided and operated by the Royal Australian Navy (RAN) at their stations near Darwin (for AXI) and Canberra (AXM).

As a result of the RAN's changeover to its new HF radio communications facility in the next few years, the Bureau will be assuming broadcasting responsibility of AXI/AXM within the next 12 months. Arrangements have been made to continue the broadcasts from new transmitting sites located at Charleville (Queensland) and Wiluna (Western Australia) upon the closure of the RAN transmitters on July 1, 2002. The first phase of this transition process will occur at 0000 UTC, on August 20, 2001, when radiofax transmissions will be temporarily consolidated out of one broadcasting station. To provide services with the best coverage possible:

- AXM frequencies will continue to be routinely used for the broadcasts.
- AXI frequency 7535 kHz will be used from 1100 UTC to 2100 UTC, and 15615 kHz will be used from 2100 UTC to 1100 UTC.

The Bureau strongly advises users of AXI to monitor the Information Notice transmitted daily at 0045 UTC for further information confirming the AXI frequencies that will be used from August 20, 2001. Information updates will also be posted on the Bureau's Marine Page on the Web, http://www.bom.gov.au/marine.

Further advice will be given about the commencement of AXI from Wiluna and AXM from Charleville early in 2002.

For further advice and in case of difficulties arising from this transition please contact the Bureau on:

- phone: +61 3 9662 2182
- fax: +61 3 9662 1223
- e-mail:opsgen@bom.gov.au

To recap, the frequencies of the AXI/AXM broadcasts as of August 20, 2001, will be:

AXM Frequencies kHz	AXI Frequencies kHz
2628 (Continuous)	7535 (1100 UTC to 2100 UTC)
5100 (Continuous)	15615 (2100 UTC to 1100 UTC)
11030 (Continuous)	
13920 (Continuous)	
20469 (Continuous)	

SEAS – Then and Now

Janet P. Brockett
Paul I. Chinn
Steven K. Cook
Office of Oceanic and Atmospheric Research
Global Ocean Observing System Center

The original Shipboard Environmental Acquisition System (SEAS) software has been the workhorse for the successful real-time data collection and transmission of sea surface meteorological and oceanographic observations from the United States Voluntary Observing Ship (VOS) Program since the early 1980's. Over the years, the SEAS software played an integral role in delivering hundreds of thousands of meteorological and tens of thousands of oceanographic observations to the National Weather Service (NWS) and National Centers for Environmental Prediction (NCEP), and more recently saving tens of thousands of communication dollars by using more efficient compressed binary file transmission techniques and satellite transmission systems.

In 1982, the original SEAS software was developed to support the National Oceanic and Atmospheric Administration (NOAA) VOS Program consisting of more than1,500 commercial container/tanker vessels. Additionally, the SEAS software was installed on dozens of foreign flag commercial vessels as well as the NOAA research fleet. The SEAS software provides the bridge officers with the capability of entering World Meteorological Organization (WMO) coded messages (meteorological and oceanographic) that are internally quality controlled and transmitted in real time via satellite to Land Earth Stations where they are forwarded to the Global Telecommunications System (GTS) and routed around the world for immediate use in offshore marine forecasts and model validation. These vessels are globally distributed and transmit sea surface meteorological and subsurface oceanographic observations between two and four times every day they are at sea. The observations they collect are essential to improving offshore marine forecasts, providing “sea truth” for synoptic satellite data, supporting the El Niño Southern Oscillation (ENSO) modeling and research work, and adding to the climatic database used in global climate change studies.

As the years passed, more and more users (National and International VOS participants) of the operational SEAS software and the resulting data have come online asking for more types of observations to be transmitted (e.g., thermosalinograph, chemical parameters like pCO_2, drifting buoy, ice and mammal sighting reports). The required-coding change for VOS messages and the many advances in technology argued for the development of a new SEAS software package. In particular, much of the VOS fleet had incorporated Windows software into their computer systems and were requesting upgrades to the SEAS systems presently deployed to facilitate data collection and transmission.

Objective

The main objective of Automated Mutual-Assistance Vessel Rescue (AMVER)/SEAS 2000 is to be a Windows-based software package for the collection and transmission of the AMVER System, sea surface meteorological, and subsurface oceanographic data. Existing operational shipboard SEAS software will be upgraded from DOS-based systems, and will accommodate a WMO-mandatory code change implemented in May 2000.

Development of AMVER/SEAS 2000 included design input from the NWS, National Marine Fisheries Service (NMFS), Oceanic and Atmospheric Research (OAR), United States Coast Guard (USCG), and the maritime training community. Deployment of the SEAS 2000 software upgrade not only benefits the United States VOS Program that supports many NOAA elements as well as university research, but the international VOS networks as well.

Proposed Work

AMVER/SEAS 2000 was developed in a Windows-based, modular-format, with password protection, shipboard software package that will use, when appropriate, Shipboard Computer Systems (SCS), Automated Weather Systems (AWS) packages, and/or manual entry to create a message in a compressed binary file format that can be transmitted via INMARSAT Standard C and decoded in a shore-based "black box" and distributed to the appropriate data users. The software includes the capability to collect, automatically quality control, format, store, archive (aboard ship) and transmit the following reports:

WMO-Coded Reports
- Met Reports - BBXX
- XBT Reports - JJYY - BATHY
- CTD/XCTD Reports - KKXX - TESAC
- TSG Reports - NNXX - TRACKOB

- USCG AMVER Reports
  - AMVER
- Unique Reports
  - Chemical Parameters - pCO_2 and Fluorometry
  - Drifting Buoy Deployment Reports
  - USCG Ice Patrol Reports
  - Marine Mammal Reports

The AMVER/SEAS 2000 development is being divided into three phases:

- The first phase was be to develop the Met/AMVER user interface for prototype testing by the SEAS 2000 working group that includes NWS, USCG, and Global Ocean Observing System (GOOS) Center personnel. Beta testing Phase I has been concluded. Phase I release 5.30 is being installed as of this writing.
- The second phase will be to integrate developing technology (i.e., new Sippican recording device) to collect expendable bathythermograph (XBT) observations. We are presently moving ahead with the Mk-21 integration using Windows 98.
- The third phase will be to incorporate automated sensor packages into the software to improve the accuracy, timeliness, and transmission of environmental information. We have already begun integrating marine mammal, International Ice Patrol, and drifting deployment report capability.

For more information on SEAS 2000, contact your nearest Port Meteorological Officer (see the list at the rear of this issue) or Steve Cook from GOOS Center at steven.cook@nooa.gov, (858) 546-7103 or you can visit the SEAS Web site at http://seas.nos.noaa.gov/seas/seas2000.html.

You can also take a tour of SEAS 2000 on page 52 of this issue.

AMVER/SEAS 2000 Tour

Janet P. Brockett
Paul I. Chinn
Steven K. Cook
Office of Oceanic and Atmospheric Research
Global Ocean Observing System Center

Automated Mutual-Assistance Vessel Rescue System (AMVER)/Shipboard Environmental Acquisition System (SEAS) 2000 consists of several software modules that support AMVER reporting requirements and the taking and transmission of weather and other environmental observations to the National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS). The software supports filing AMVER sail plans, deviation, position, and arrival reports. As an added benefit, when weather observations are taken and transmitted to the SEAS address every 6 hours, a vessel position report is automatically generated and sent to the U.S. Coast Guard (USCG) AMVER center; thus, eliminating the need to file separate position reports.

The main module, operates as a control panel (shown in Figure 1), allowing the user to select a reporting function by clicking a button or from the pull-down menu. The computer's Universal Time Coordinated (UTC) is always displayed in the title bar. This information, vital to weather observations, gives the operator an instant check to verify the accuracy of the computer's time.

However, before the main module can be activated for the first time, required information must be entered into the Administration screen (See Figure 2). This information is used in all of the different modules that comprise the AMVER/SEAS software. The five mandatory fields that must be filled in are displayed in red text. Required information include the ship name, call sign, maximum ship speed, the INMARSAT C mobile identification (ID) number, and the medical personnel onboard. Anytime an update occurs on this screen, a binary message is written to diskette for transmission with the Standard C transmitter.

Figure 1. AMVER/SEAS 2000 control panel

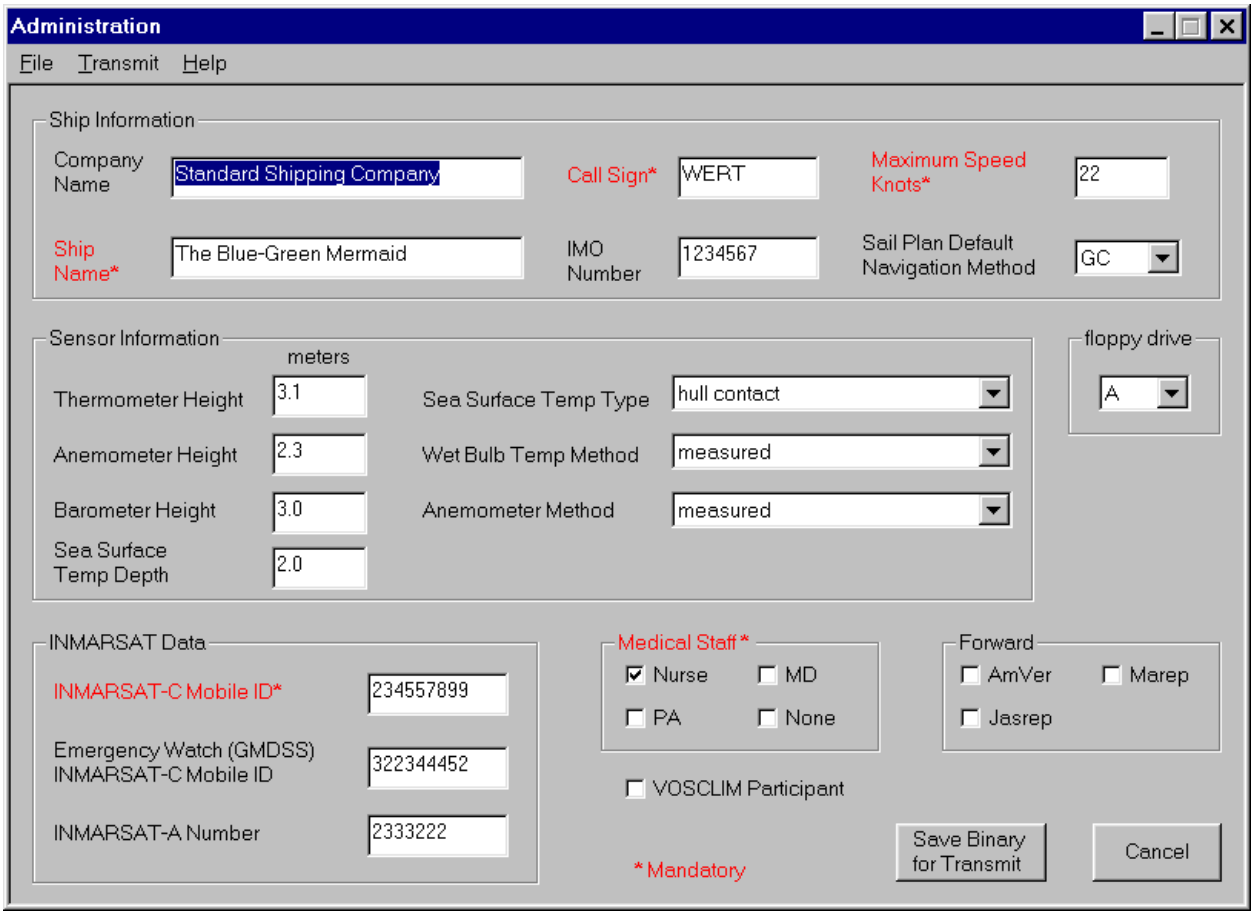


Figure 2. Administration screen

Once the main module is activated, the operator can file a sail plan (Figure 3). Although not required for taking weather observations, when the sail plan is available, it is used to help verify the position reported in the weather observation. Likewise, the position reported in the weather observation is used to alert the mariner to file a deviation report if the position does not fit the sail plan.

When the operator clicks the [met] button in Figure 1, the met initialization screen (Figure 4) is displayed where the observer enters the ship's current position. The ship's call sign, the wind measurement type, and whether or not to include the weather group is taken from information entered on the administration screen. The observation time is taken from the computer's clock and rounded to the nearest hour. The observer can change the computed observation date and time by using the override buttons on this screen.

When all required fields are entered on the meteorological initialization screen, the observer has the choice of entering the observation using the World Meteorological Organization (WMO) 5-character code groupings by clicking the [Quick Form] button or by clicking [Next] and proceeding through a screen sequence that allows entry of observed values rather than the WMO codes. Selecting Quick Form displays the screen in Figure 5. When displaying the Quick Form, the WMO coded BBXX message is automatically displayed and updated in a

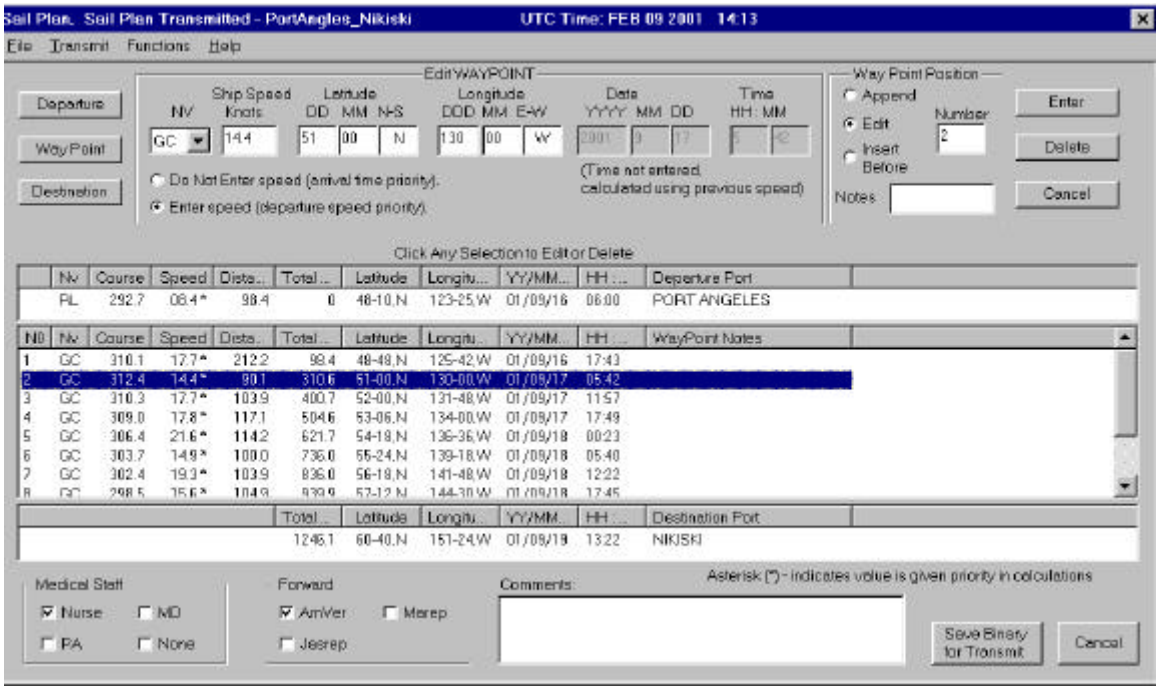


Figure 3. Sail plan

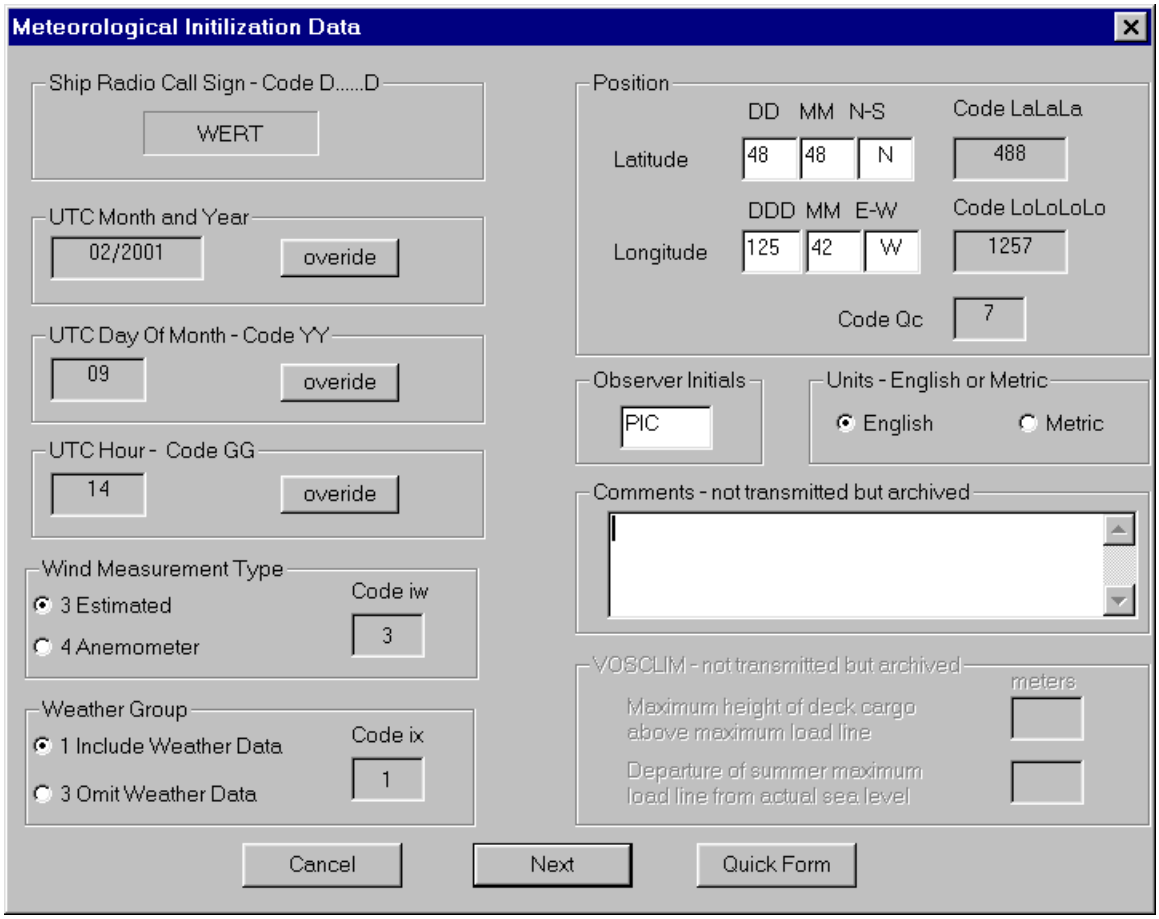


Figure 4. Meteorological initialization

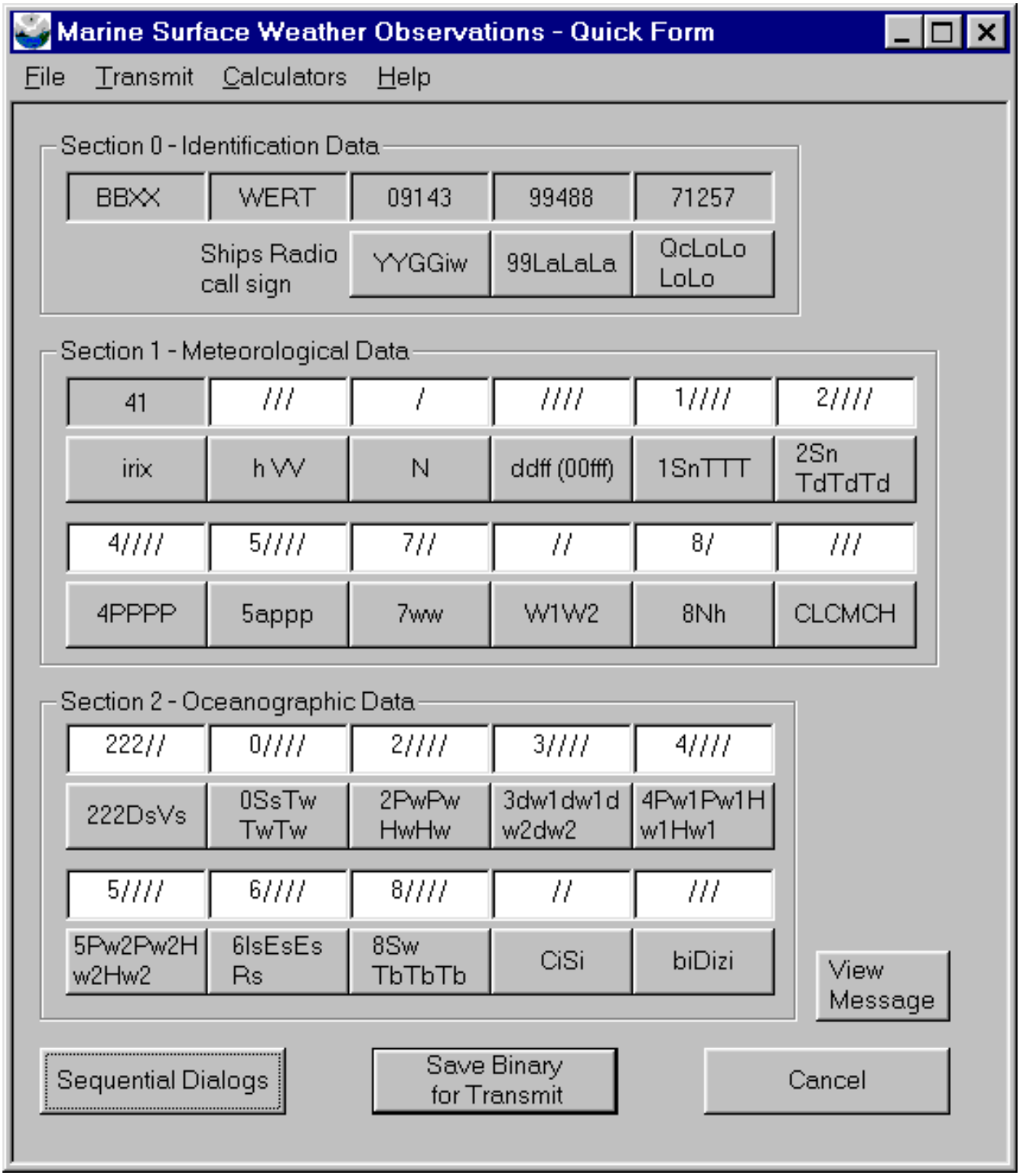


Figure 5. Quick Form for WMO code entries

separate window as entries are made. Figure 6 is such an example.

Buttons labeled with the WMO codes tie the Quick Form to the sequential screen entries. For example, should an observer using the Quick Form wish to view Beaufort Scale sea state diagrams to estimate wind speed, a click on the [ddff(00fff)] button invokes the wind speed, direction, and air temperature screen Figure 7. The observer can now click the estimated wind speed in the list box and view the corresponding Beaufort Scale diagram in the lower left corner of the

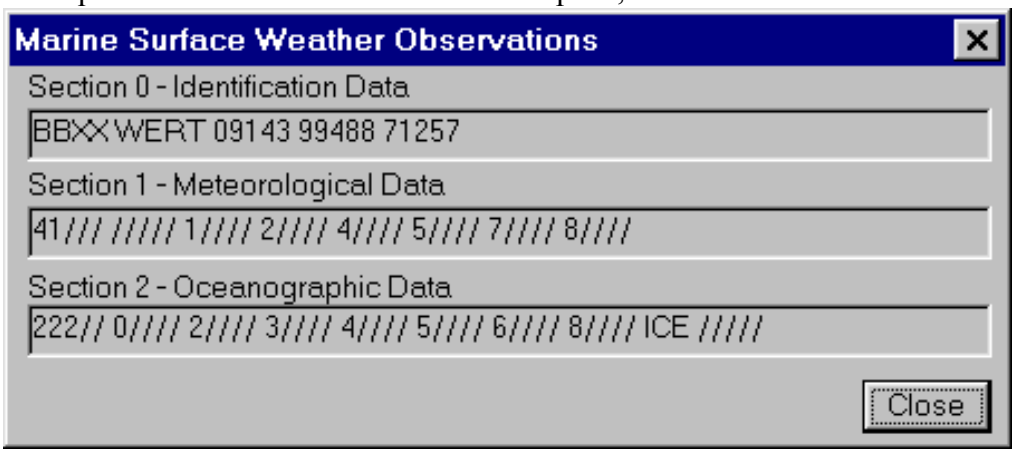


Figure 6. WMO-coded BBXX message

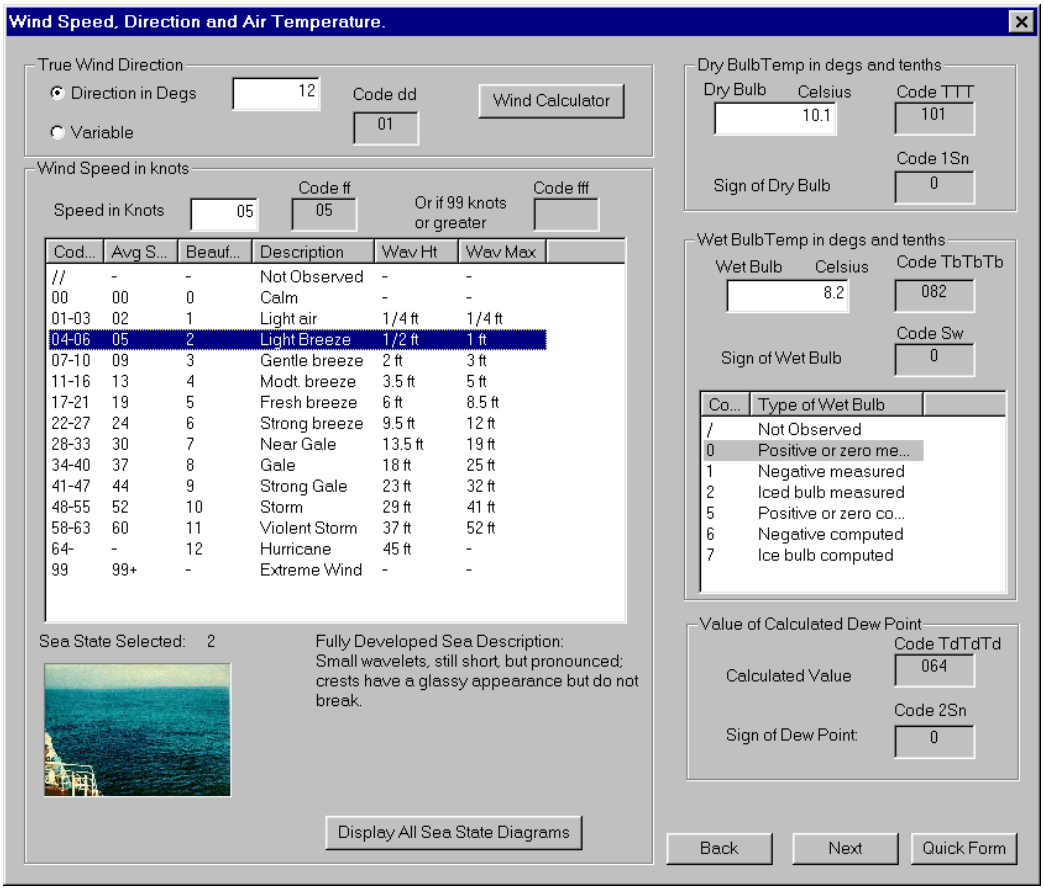


Figure 7. Wind speed, direction and air temperature screen

screen. Clicking [Display All Sea State Diagrams] shows the entire Beaufort Scale as in Figure 8. Selecting one of these diagrams updates the WMO entry on the quick form with the appropriate code.

To assist in wind speed and direction calculations, a wind calculator is accessible by clicking the [Wind Calculator] button on the wind speed, direction, and air temperature screen. By entering the ship's course and speed in knots along with the apparent wind speed and direction, true wind speed and direction are calculated. Apparent wind direction entries may be entered as degrees true or as degrees measured clockwise from the ship's bow. The wind calculator (Figure 9) can also be invoked from the menu bar of the Quick Form.

AMVER/SEAS 2000 contains various other features to assist in taking observations, including pictures of clouds at the high, medium, and low levels to help identify cloud types. Conversion calculators convert meters to feet and Celsius to Fahrenheit. The observation may be saved as compressed binary for transmission to the National Weather Service (NWS) or it may be saved in ASCII for other purposes.

System Requirements:

Minimum system requirements are:

- Operating system – Windows 2000, Windows NT, Windows 98, Windows 95.
- Works best with 200-MHz Pentium or better
- Video card that supports 800 x 600 pixels with 65K colors or better.
- 10 MB free hard disk space
- 3.5-inch floppy drive
- INMARSAT Standard C transceiver with floppy drive and capability to transmit a binary file

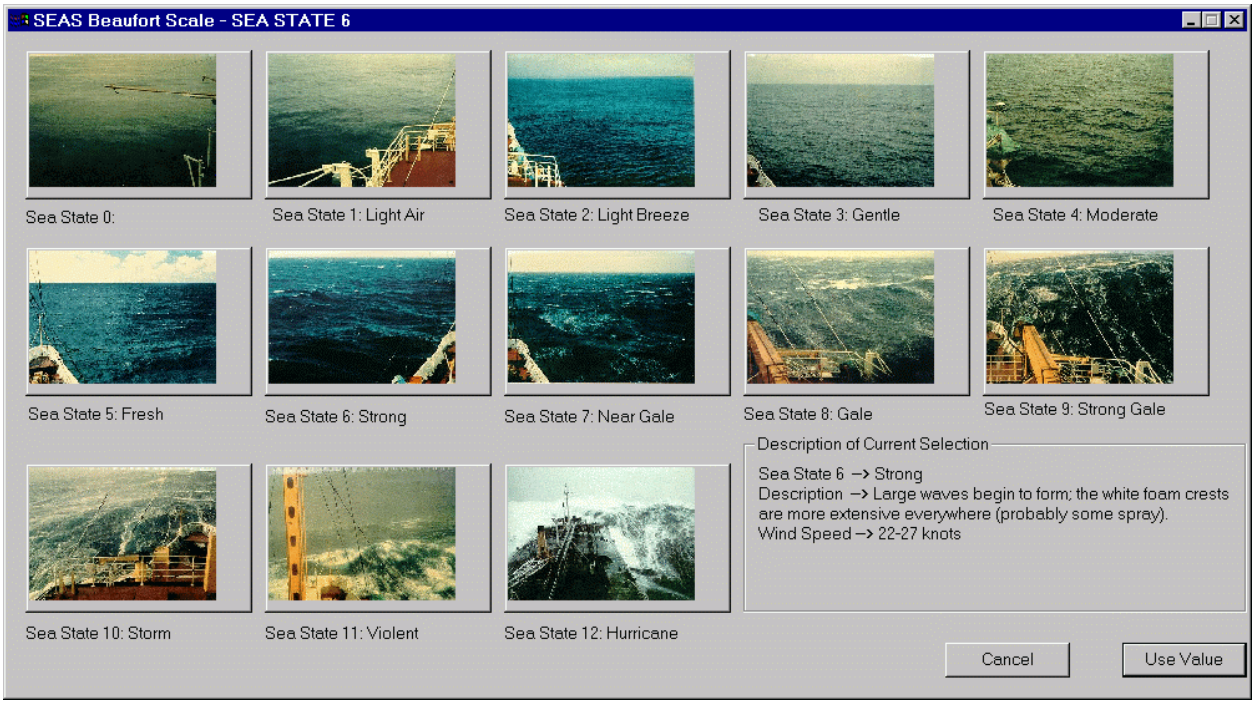


Figure 8. Beaufort scale diagrams

For more information on SEAS 2000, contact your nearest Port Meteorological Officer (see the list at the rear of this issue) or Steve Cook from Global Ocean Observing System (GOOS) Center at steven.cook@nooa.gov, (858) 546-7103 or you can visit the SEAS Web site at http://seas.nos.noaa.gov/seas/seas2000.html. If you would like a brief history of SEAS, go to page 50 in this issue.

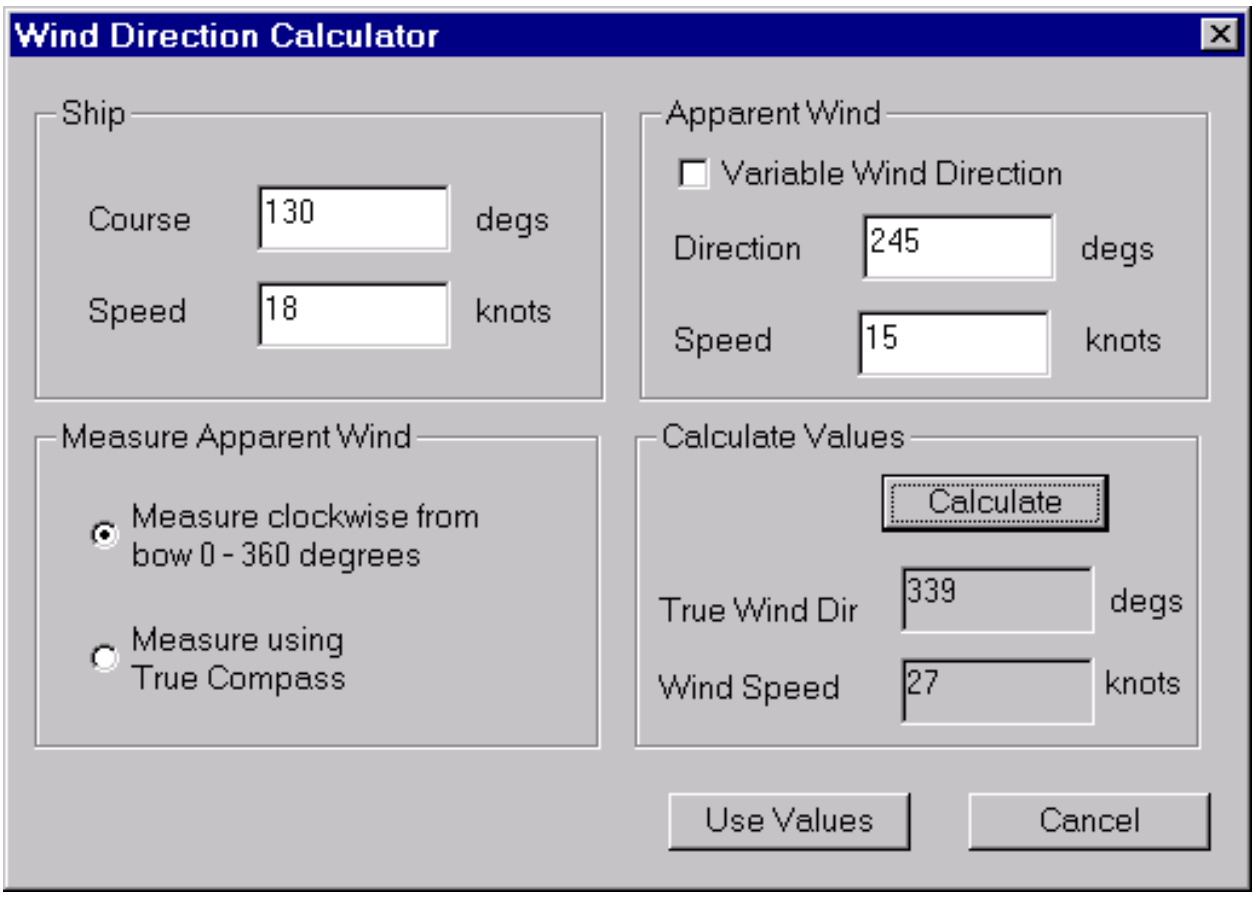


Figure 9. Wind calculator

Women and the Sea

Justin Lyons
Mariners Museum
Newport News, VA

Robert Luke
VOS Program Leader

For centuries, the battle to survive the elements and sail the world's waters was depicted as a struggle between *men* and the sea. The Mariners' Museum located in Newport News, VA, reveals a different story in its new temporary exhibition *Women and the Sea*. From the myths and legends of mermaids and Greek goddesses to the remarkable heroics of female lighthousekeepers and "firsts" for women in the Navy, this interactive exhibit takes a look at the role of women in maritime history. Artifacts, paintings, lithographs, photographs, and recreations of a harbor town, tavern, and ship carver's workshop, will show the dramatic impact of women on the maritime world and economy.

"Women and their interaction with the sea has mostly been a silent topic. But, women have always been part of the sea, from myth and legend to today's maritime careers. Women were usually left behind when sailors went to sea, which forced women to survive by working in a variety of professions, from seamstress to washerwoman. The first women to break this mold went to sea disguised as men. Their experiences paved the way for women to join their husbands and participate in a life on the oceans in the 1800's," said The Mariners' Associate Curator Tracey Neikirk. "These exposures to the sea encouraged new generations of women to become river pilots, yachtswomen, or members of the U.S. Navy or Coast Guard. Today, women

Ida Lewis, Lighthousekeeper, Lime Rock, RI

are still trying to dispel these myths. With every new generation, more women are turning to the sea as professionals, not as observers." "Legend and history would suggest that women have had no place in the rigorous trade of plying the seas in merchant ships, much less a Navy man-of-war," said The Mariners' CEO and President John Hightower. "As so often happens, history, when one examines her muse more carefully, is often misleading. Women have always been part of legend, and they have certainly been a presence in maritime history as well as in today's Navies."

As early mariners set sail to explore untamed seas, they often sought supernatural protection against natural forces that could easily destroy them. Greek mariners were the earliest to associate female mythological creatures with the sea. Over hundreds of years those myths have evolved into the mariners' belief in mermaids and sirens. Reports of mermaid sightings by explorers and sailors were surprisingly common. Described as creatures having the torso and head of a woman, but the tail of a fish, mermaids were depicted alternately as kind servants of the sea and as malicious animals with powers to entrap seafarers.

As men journeyed out to sea, women were often left at home with children, with no income until the man's return. A mock Sea Port town explores how women overcame the months and sometimes years they were left vying for themselves or even thriving as lucrative owners of shops and inns.

During the early eighteenth century, women began disguising themselves as men to get aboard vessels in hopes of being near a loved one, financially supporting themselves, or finding adventure. To accomplish this feat, women would take advantage of the forward-most section of the ship, called the fo'c'sle, where they hid all gender-related items from the rest of the crew. Here women would also change clothes or bathe in secrecy. Courageous women sailors like Hannah Snell, Mary Anne Talbot, and Mary Lacy, who fought and worked aboard ships as men for years. The famous story of eighteenth-century female pirates Anne Bonny and

Ann Bonney and Mary Read

1829 Lithograph

Mary Read, who pillaged local fishing ships, is also conveyed during the exhibit.

Life onboard a British man-of-war was hard for the wife of a sailor: she shared her husband's hammock and his daily ration of salted beef, dried peas, hardtack, and cheese while staying out of the way of daily activities. One of the most difficult inevitable consequences of wives following their husbands to sea was childbirth. The term "son of a gun" resulted from the firing of a ship's guns to hasten a difficult birth.

Sea travel was a rough and desolate life for the men of a ship's crew; for the wife of a sea captain, it was even more confining and socially isolated. Much of the time women were expected to remain below decks in the cabin and would often help with navigation, making sails, or keeping the logbook and accounts. Unfortunately, not many of the journals or letters of these women have survived. Mary Ann Hathaway Tripp (1810-1906) was one of the first American women to travel around the world. She circumnavigated the globe three times with her husband Captain Lemuel Carver Tripp, a merchant mariner in the China trade, between 1833 and 1845.

Though not always recognized, lighthousekeeping was often performed by women. Heroines such as Grace Darling and Ida Lewis have been forever etched into history for enduring the lonely life of a lighthousekeeper to save hundreds of lives from ferocious storms and deadly accidents.

By the mid-nineteenth century, new roles for women began to open up along the

waterfront. During this period, more women began working the water in partnership with their husbands. Some even found success carrying on the family business after their husbands died. Yachting, fishing, trading, and even serving in the Navy, women have stepped into a wide variety of roles.

Several women became known as competent pilots along the Mississippi and Ohio Rivers during the late nineteenth century. Callie French and her husband, Captain A.B. French, operated several floating theaters. Callie piloted the vessel *New Sensations* and took charge of every aspect of entertainment—from food preparation to acting, writing jokes, and playing the calliope. After her husband died in 1902, Callie continued to pilot boats for 5 more years until she retired. She boasted that she had never lost a boat.

As early at 1811, women served as nurses in the "man's Navy." By World War I, women were called on to "free a man to fight" by taking the place of men in administrative positions on the home front. By World War II, the Navy Women Accepted for Volunteer Emergency Service (WAVES) and Coast Guard SPARS (from the Coast Guard motto "Semper Paratus," Always Ready) became a vital part of the war machine.

No longer are the rivers, lakes, and oceans of the world dominated by males. Today, women run successful fishing businesses and compete against men in international yacht racing. Women such as Dame Naomi Christine James, the first woman to sail solo around the world and Cape Horn; Gertude Vanderbilt and Phyliss Sopwith, the first two women to compete against each other in an America's Cup race; and Dawn Riley, captain of the first all-woman America's Cup team are just a few of many who have helped pave the way for more women to play an active role in the recreational, military, and economical aspects of the sea.

The Women and the Sea Exhibit will be shown at the Mariners Museum until January 6, 2002. For more information call (757) 596-2222 or (800) 581-7245, or write to the Mariners Museum, 100 Museum Drive, Newport News, VA 23606. You can also reach the museum at www.mariner.org.

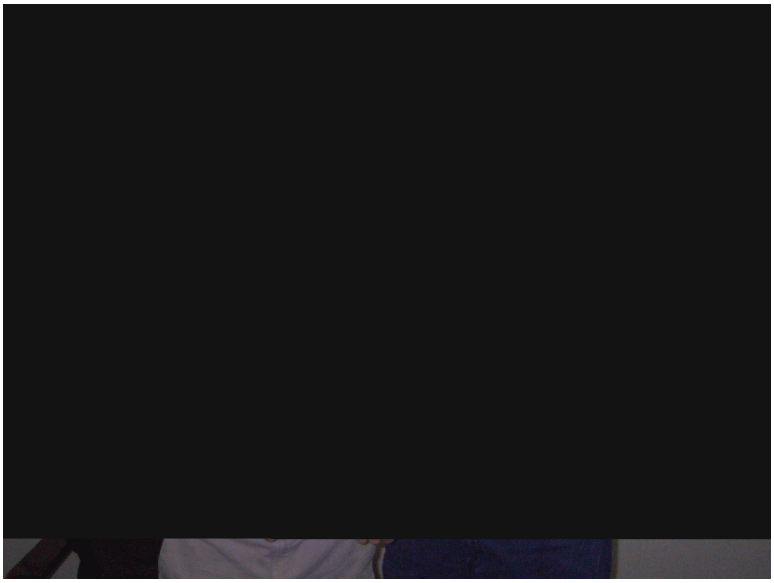
Woman Worker at an Aircraft Factory

National Weather Service Voluntary Observing Ship Program
New Recruits from April 1, 2001, through July 31, 2001

NAME OF SHIP	CALL	AGENT NAME	RECRUITING PMO
ADVENTURER	WBN3015	CROWLEY MARINE SERVICES INC.	ANCHORAGE, AK
ALERT	WCZ7335	CROWLEY MARINE SERVICES	ANCHORAGE, AK
AMERICA SENATOR	9WCR3	ANDERS WILLIAMS SHIP AGENCY	NORFOLK, VA
APACHE	WCY5541	SAUSE BROS TOWING	KODIAK, AK
ATTENTIVE	WCZ7337	CROWLEY MARINE INC.	ANCHORAGE, AK
AWARE	WCZ7336	CROWLEY MARINE SERVICES	ANCHORAGE, AK
CARIBE CHALLENGER	WDA3588	SEA COAST TOWING	KODIAK, AK
CARNIVAL SPIRIT	3FPR9	CARNIVAL SPIRIT	MIAMI, FL
CHINOOK	WCY2791	SAUSE BROS TOWING	KODIAK, AK
COASTAL PILOT	WBP7281	COASTAL TRANSPORTATION INC.	KODIAK, AK
COASTAL TRADER	WSL8560	COASTAL TRANSPORTATION INC.	KODIAK, AK
COASTAL TRADER	WCO6020	COASTAL TRANSPORTATION INC.	KODIAK, AK
CROSS POINT	WCW8728	YUTANA BARGE LINES	ANCHORAGE, AK
DREW FOSS	WYL7518	FOSS MARITME CO.	KODIAK, AK
ENDURANCE	WYA4377	CROWLEY MARINE SERVICES	ANCHORAGE, AK
ESSEN EXPRESS	DHEE	HAPAG-LLOYD, INC.	NORFOLK, VA
GALE WIND	WAZ9548	ANDERSON TUG AND BARGE	ANCHORAGE, AK
GLADIATOR	WBN5982	CROWLEY MARITIME SERVICES	ANCHORAGE, AK
GRETA	WCY2853	SEA COAST TOWING	KODIAK, AK
INFINITY	ELXX7	CELEBRRITY CRUISES INC.	MIAMI, FL
IVER FOSS	WCY6442	FOSS MARITIME CO.	KODIAK, AK
KUPARUK RIVER	WBN4379	CROWLEY MARINE SERVICES	ANCHORAGE, AK
LEO FOREST	3FPH8	NIPPON YUSEN KAISHA, N.Y.K. BLDG	SEATTLE, WA
LIBERTY GLORY	NBDP	LIBERTY MARITIME CORP	NEW ORLEANS, LA
MAERSK TAIYO	9VJO	A. P. MOLLER SINGAPORE	JACKSONVILLE, FL
MAERSK WAVE	S6TV	WALLENIUS WILHELMSEN LINES (USA)	BALTIMORE, MD
MANFRED NYSTROM	WCN3590	DUNLAP TOWING CO	KODIAK, AK
MARY CATHERINE	WTW9216	SAUSE BROS TOWING	KODIAK, AK
MERLIN	WBHU	% SEALIFT INC.	HOUSTON, TX
MIKI HANA	WTW9252	SAUSE BROS TOWING	KODIAK, AK
NANUQ	WCY8498	CROWLEY MARINE SERVICES	ANCHORAGE, AK
NATOMA	WBB5799	SAUSE BROS OCEAN TOWING INC.	KODIAK, AK
NAVAJO	WCT5737	SAUSE BROS TOWING	KODIAK, AK
NORMA H.	WYL6686	BOYER BARGE LINES	KODIAK, AK
OCEAN SERVICE	WTW9263	SAUSE BROS TOWING	KODIAK, AK
OOCL NETHERLANDS	VRVN6	OOCL (USA) INC.	LOS ANGELES, CA
PARAGON	WDA2311	SEA COAST TOWING	KODIAK, AK
POLAR ENDEAVOUR	WCAJ	POLAR TANKERS	NEW ORLEANS, LA
POWHATTAN	WTX7883	SAMPSON TUG AND BARGE	KODIAK, AK
R.V. DAY	WS6709	SOUTHCOAST INC.	KODIAK, AK
REDOUBT	WCG3013	COOK INLET TUG AND BARGE CO. INC.	ANCHORAGE, AK
ROUGHNECK	WTW9262	SAUSE BROS TOWING	KODIAK, AK
SALLY J.	WQZ9646	WESTERN PIONEER SHIPPING	KODIAK, AK
SEA BREEZE	WBN3019	CROWLEY MARINE SERVICES	ANCHORAGE, AK
SEA VENTURE	WCC7684	CROWLEY MARINE SERVICES	ANCHORAGE, AK
SEARIVER AMERICAN PROGRESS	KAWN	SEARIVER MARITIME INC.	VALDEZ, AK
SS BADGER	WBD4889	LAKE MICHIGAN CAR FERRY	CHICAGO, IL
STALWART	WYP8962	CROWLEY MARINE SERVICES	ANCHORAGE, AK
STAR ISMENE	LANT5	A/S BILLABONG	BALTIMORE, MD
TAN'ERLIQ	WCY8497	CROWLEY MARINE SERVICES	ANCHORAGE, AK
TITAN	WAW9232	SAUSE BROS TOWING	KODIAK, AK
TRIANON	LAIZ4	WILHELMSEN, WILH, USA	JACKSONVILLE, FL
USNS IMPECCABLE	NINT	MAERSK , INC.	NORFOLK, VA
USNS WATKINS T-AKR 315	NIJB	USNS WATKINS T-AKR 315	SEATTLE, WA

Cason J. Calloway **received a 1999 VOS Award. Pictured is Captain Paul Dubbs. Not pictured are Mates Ken Senff, Don Parker, and Todd Smith.**

The *Rebecca Lynn* received a 1999 VOS Award. Pictured is 2nd Mate Nick Burse. Not pictured are Captain Jerry Karlevic and 1st Mate Steve Meyer.



Jim Nelson, PMO Houston/Galveston, is giving an award to Captain William L. Miles of the *Lykes Discoverer* (WGXO). *Lykes Discoverer* provided our forecasters with 756 weather observations in 2000. This is Captain Miles' second year in a row on two different ships receiving our annual award. When Captain Miles is off, Captain David S. Putty is Master. The NWS and NOAA extend their thanks to both Masters for their great support.

Captain Lawrence R. Swick, Master of the *Sealand Performance* (KRPD), accepted the ship's third award for excellence in weather observing. Great job performance!!

This photo is from Larry Cain, PMO Jacksonville, showing the S/S *El Yunque* receiving her 2000 VOS Award. Pictured (L to R) are Paul Champion 2nd Mate and Merle Schultz, Master.

The *Daishin Maru* has been a very consistent weather reporter for the past 5 years. They have reported the weather elements every 6 hours when crossing the Pacific between Japan and the West Coast of the United States. A plaque was presented to the vessel for the year 2000 for superior performance in the U.S. VOS Program. (L to R) Captain Emmanuel Salvador, Pat Brandow, (PMO Seattle), 2nd Mate Vicente Genovea, 3rd Mate Alden Rodenas.

The NOAA Ship *Ronald H. Brown* was presented a VOS Award for superior performance and dedicated support for the year 2000. (L to R) ENS J. Pralgo, ENS C. Martin, LT R. Kamphaus, and Captain D. Dreves.

The *APL China* was chosen by Pat Brandow, PMO of Seattle, as one of the top performers of 2000. A VOS plaque was presented to the crew. (L to R) 2nd Officer Myint Wai, Chief Officer Chan Nam Keong, and Cadet Dinesh.

The *CSL Cabo* was one of the ships recognized in 2000 by the VOS Program for excellent weather reporting. (L to R) Pat Brandow (PMO Seattle),Captain L. Kovalchuk, 3rd Officer M. Zaritsky, and Chief Officer O. Dubenko.

Captain Kenneth Fisher of the *CSX Enterprise* holds the 13th consecutive Award

Left side "Wall of Honor" VOS Awards

Right side "Wall of Honor" VOS Awards

VOS Cooperative Ship Report -- January through July 2001

The National Climatic Data Center (NCDC) 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. NDBC supplies the ship names to NCDC. Comments or questions regarding this report should be directed to NCDC, Climate Data Division, 151 Patton Avenue, Asheville, NC 28801, Attention: Stuart Hinson (828-271-4437 or stuart.hinson@noaa.gov).

SHIP NAME	CALL	PORT	JAN	FEB	MAR	APR	MAY	JUN	JUL	TOTAL
1ST LT BALDOMERO LOPEZ	WJKV	Unknown	0	0	0	0	0	0	12	12
1ST LT JACK LUMMUS	WJLV	Unknown	0	0	0	0	0	0	0	0
2ND LT. JOHN P. BOBO	WJKH	Unknown	0	0	0	0	0	0	5	5
A. V. KASTNER	ZCAM9	Anchorage	41	55	19	66	76	47	43	347
A.P. MOLLER	OVYQ2	Anchorage	0	0	0	0	0	0	0	0
AALSMEERGRACHT	PCAM	Anchorage	0	0	0	0	0	0	36	36
ADVANTAGE	WPPO	Anchorage	0	0	0	0	0	0	38	38
ADVENTURER	WBN3015	Anchorage	0	0	0	0	0	0	0	0
AGNES FOSS	WYZ3112	Anchorage	0	0	0	0	0	0	7	7
AGULHAS	3ELE9	Anchorage	0	0	0	0	0	0	0	0
ALASKA MARINER	WSM5364	Anchorage	0	0	0	0	0	0	0	0
ALBEMARLE ISLAND	C6LU3	Anchorage	0	0	0	0	0	0	68	68
ALBERNI DAWN	ELAC5	Anchorage	0	0	0	0	0	0	9	9
ALBLASGRACHT	PCIG	Anchorage	0	0	0	0	0	0	8	8
ALERT	WCZ7335	Anchorage	0	0	0	0	0	0	0	0
ALEXANDER VON HUMBOLD	Y3CW	Anchorage	22	627	735	711	734	703	714	4246
ALKMAN	C6OG4	Anchorage	0	0	0	0	0	0	0	0
ALLEGIANCE	WSKD	Anchorage	0	0	0	0	0	0	0	0
ALLIANCA ROTTERDAM	DHGE	Anchorage	0	0	0	0	0	0	11	11
ALLIGATOR FORTUNE	ELFK7	Anchorage	0	0	0	0	0	0	0	0
ALLIGATOR GLORY	ELJP2	Anchorage	0	0	0	0	0	0	0	0
ALLIGATOR HOPE	ELFN8	Anchorage	0	0	0	0	0	0	0	0
ALLIGATOR LIBERTY	JFUG	Anchorage	0	0	0	0	0	0	0	0
ALPENA	WAV4647	Anchorage	0	0	0	0	0	0	0	0
ALPHA HELIX	WSD7078	Anchorage	0	0	8	22	32	12	24	98
ALTAMONTE	3EIG4	Anchorage	0	0	0	0	0	0	0	0
AMBASSADOR BRIDGE	3ETH9	Anchorage	40	16	60	43	57	51	42	309
AMERICA	WCY2883	Anchorage	0	0	0	0	0	0	0	0
AMERICA SENATOR	9WCR3	Anchorage	0	0	0	0	0	0	0	0
AMERICA STAR	GZKA	Anchorage	79	135	92	80	72	78	91	627
AMERICAN MARINER	WQZ7791	Anchorage	0	0	0	0	0	0	0	0
AMERICAN MERLIN	WRGY	Anchorage	0	0	0	0	0	0	0	0
AMERICANA	C6QG4	Anchorage	0	0	0	0	0	0	0	0
ANASTASIS	9HOZ	Anchorage	0	0	0	0	0	0	0	0
ANATOLIY KOLESNICHENKO	UINM	Anchorage	0	0	0	0	0	0	0	0
ANKERGRACHT	PCQL	Anchorage	0	0	0	0	0	0	0	0
APACHE	WCY5541	Anchorage	0	0	0	0	0	0	4	4
APL CHINA	S6TA	Anchorage	51	61	44	51	57	26	34	324
APL GARNET	9VVN	Anchorage	0	0	0	0	0	0	0	0
APL JAPAN	S6TS	Anchorage	0	0	0	0	0	0	47	47
APL KOREA	WCX8883	Anchorage	31	78	37	27	34	23	24	254
APL PHILIPPINES	WCX8884	Anchorage	0	0	0	0	0	0	56	56
APL SINGAPORE	WCX8812	Anchorage	0	0	0	0	0	0	49	49
APL THAILAND	WCX8882	Anchorage	0	0	0	0	0	0	24	24
APL TURQUOISE	9VVY	Anchorage	0	0	0	0	0	0	0	0
APOLLOGRACHT	PCSV	Anchorage	0	0	0	0	0	0	82	82
ARCTIC BEAR	WBP3396	Anchorage	0	0	0	0	0	0	24	24
ARCTIC OCEAN	C6T2062	Anchorage	0	0	0	0	0	0	0	0
ARCTIC SUN	ELQB8	Anchorage	0	0	0	0	0	0	77	77
ARGENTINA STAR	C6MD8	Anchorage	0	0	0	0	0	0	52	52
ARGONAUT	KFDV	Anchorage	0	0	0	0	0	0	0	0

SHIP NAME	CALL	PORT	JAN	FEB	MAR	APR	MAY	JUN	JUL	TOTAL
ARIES HARMONY	3FEY7	Anchorage	0	0	0	0	0	0	5	5
ARISO	3FHJ6	Anchorage	0	0	0	0	0	0	0	0
ARKTIS FUTURE	OXUF2	Anchorage	0	0	0	0	0	0	0	0
ARMCO	WE6279	Anchorage	0	0	0	0	0	0	0	0
AROSIA	V2SB	Anchorage	0	0	0	0	0	0	0	0
ARTHUR M. ANDERSON	WE4805	Anchorage	0	0	0	0	0	0	54	54
ASTORIA BRIDGE	ELJJ5	Anchorage	0	0	0	0	0	0	61	61
ATLANTIC	3FYT	Anchorage	0	0	0	0	0	0	312	312
ATLANTIC CARTIER	C6MS4	Anchorage	0	0	0	0	0	0	51	51
ATLANTIC COMPANION	SKPE	Anchorage	0	0	0	0	0	0	47	47
ATLANTIC COMPASS	SKUN	Anchorage	0	0	0	0	0	0	54	54
ATLANTIC CONCERT	SKOZ	Anchorage	11	36	33	46	35	23	25	209
ATLANTIC CONVEYOR	C6NI3	Anchorage	0	0	0	0	0	0	35	35
ATLANTIC ERIE	VCQM	Anchorage	0	0	0	0	0	0	25	25
ATLANTIC FOREST	ELTN8	Anchorage	37	24	13	15	17	1	12	119
ATLANTIC NOVA	3FWT4	Anchorage	0	0	0	0	0	0	0	0
ATLANTIC OCEAN	C6T2064	Anchorage	0	0	0	0	0	0	29	29
ATLANTIS	KAQP	Anchorage	0	0	0	0	0	0	0	0
ATTENTIVE	WCZ7337	Anchorage	0	0	0	0	0	0	0	0
AUCKLAND STAR	C6KV2	Anchorage	0	0	0	0	0	0	27	27
AWARE	WCZ7336	Anchorage	0	0	0	0	0	0	0	0
B. T. ALASKA	WFQE	Baltimore	0	0	0	0	0	0	0	0
BARBARA ANDRIE	WTC9407	Baltimore	0	0	0	0	0	0	0	0
BARRINGTON ISLAND	C6QK	Baltimore	0	0	0	0	0	0	40	40
BAY BRIDGE	ELES7	Baltimore	0	0	0	0	0	0	0	0
BELLONA	3FEA4	Baltimore	0	0	0	0	0	0	0	0
BERING SEA	C6YY	Baltimore	0	0	0	0	0	0	0	0
BERNARDO QUINTANA A	C6KJ5	Baltimore	0	0	0	0	0	0	66	66
BLACKHAWK	WBN2081	Baltimore	0	0	0	0	0	0	0	0
BLARNEY	WBP4766	Baltimore	0	0	0	0	0	0	6	6
BLUE GEMINI	3FPA6	Baltimore	0	0	0	0	0	0	0	0
BLUE HAWK	D5HZ	Baltimore	0	0	0	0	0	0	0	0
BLUE NOVA	3FDV6	Baltimore	0	0	0	0	0	0	44	44
BOHEME	SIVY	Baltimore	0	0	0	0	0	0	0	0
BONN EXPRESS	DGNB	Baltimore	734	834	788	867	863	865	1212	6163
BRASILIA	DGVS	Baltimore	0	0	0	0	0	0	0	0
BRIGHT PHOENIX	DXNG	Baltimore	0	0	0	0	0	0	0	0
BRIGHT STATE	DXAC	Baltimore	0	0	0	0	0	0	0	0
BRISBANE STAR	C6LY4	Baltimore	0	0	0	0	0	0	0	0
BRITISH ADVENTURE	ZCAK3	Baltimore	0	0	0	0	0	0	66	66
BROOKLYN BRIDGE	3EZJ9	Baltimore	0	0	0	0	0	0	0	0
BUCKEYE	WAQ3520	Baltimore	0	0	0	0	0	0	0	0
BUFFALO	WXS6134	Baltimore	0	0	0	0	0	0	0	0
BUNGA ORKID DUA	9MBQ4	Baltimore	0	0	0	0	0	0	0	0
BUNGA ORKID TIGA	9MBS3	Baltimore	0	0	0	0	0	0	0	0
BUNGA SAGA TIGA	9MBM8	Baltimore	0	0	0	0	0	0	0	0
CABO NEGRO	ELEM2	Cleveland	0	0	0	0	0	0	0	0
CALCITE II	WB4520	Cleveland	0	0	0	0	0	0	0	0
CALIFORNIA JUPITER	ELKU8	Cleveland	0	0	0	0	31	15	35	81
CALIFORNIA MERCURY	JGPN	Cleveland	0	0	0	0	0	0	17	17
CALIFORNIA SENATOR	DEBB	Cleveland	0	0	0	0	0	0	14	14
CAPE KNOX	KAOP	Cleveland	0	0	0	0	0	0	0	0
CAPE WRATH	WRGJ	Cleveland	0	0	0	0	0	0	0	0
CAPRICORN	PDAY	Cleveland	0	0	0	0	0	0	0	0
CAPT STEVEN L BENNETT	KAXO	Cleveland	0	0	0	0	0	0	15	15
CARIBBEAN MERCY	3FFU4	Cleveland	0	0	0	0	0	0	0	0
CARIBE CHALLENGER	WDA3588	Cleveland	0	0	0	0	0	0	0	0
CARNIVAL DESTINY	3FKZ3	Cleveland	0	0	0	0	0	0	0	0

SHIP NAME	CALL	PORT	JAN	FEB	MAR	APR	MAY	JUN	JUL	TOTAL
CARNIVAL PARADISE	3FOB5	Cleveland	0	0	0	0	0	0	4	4
CARNIVAL SPIRIT	3FPR9	Cleveland	0	0	0	0	0	0	0	0
CARNIVAL TRIUMPH	3FFM8	Cleveland	0	0	0	0	0	0	0	0
CARNIVAL VICTORY	3FFL8	Cleveland	0	0	0	0	0	0	8	8
CAROLINA	WYBI	Cleveland	0	0	0	0	0	0	0	0
CAROLINE MAERSK	OZWA2	Cleveland	0	0	0	0	0	0	0	0
CARSTEN MAERSK	OZYB2	Cleveland	0	0	0	0	0	0	0	0
CASON J. CALLAWAY	WE4879	Cleveland	0	0	0	0	0	0	8	8
CAVALIER	WBN5983	Cleveland	0	0	0	0	0	0	0	0
CELEBRATION	H3GQ	Cleveland	0	0	0	0	0	0	34	34
CENTURY	ELQX6	Cleveland	0	0	0	0	0	0	0	0
CENTURY HIGHWAY #2	3EJB9	Cleveland	0	0	0	0	0	0	0	0
CENTURY HIGHWAY NO. 1	3FFJ4	Cleveland	0	0	0	0	0	0	0	0
CENTURY HIGHWAY_NO. 3	8JNP	Cleveland	0	0	0	0	0	0	0	0
CENTURY LEADER NO. 1	3FBI6	Cleveland	0	0	0	0	0	0	42	42
CF CAMPBELL	WCT3784	Cleveland	0	0	0	0	0	0	7	7
CGM RENOIR	ELVZ8	Cleveland	0	0	0	0	0	0	0	0
CHANG-LIN TIEN	C6FE6	Cleveland	0	0	0	0	0	0	4	4
CHARLES ISLAND	C6JT	Cleveland	0	0	0	0	0	0	23	23
CHARLES L. BROWN	KNCZ	Cleveland	0	0	0	0	0	0	0	0
CHARLES M. BEEGHLEY	WL3108	Cleveland	0	0	0	0	0	0	0	0
CHASTINE MAERSK	OZZB2	Cleveland	0	0	0	0	0	0	0	0
CHC NO.1	3FSL2	Cleveland	0	0	0	0	0	0	0	0
CHELSEA	KNCX	Cleveland	0	0	0	0	0	0	0	0
CHEMICAL PIONEER	KAFO	Cleveland	0	0	0	0	0	0	33	33
CHEMICAL TRADER	KRGJ	Cleveland	0	0	0	0	0	0	0	0
CHERRY VALLEY	WIBK	Cleveland	0	0	0	0	0	0	15	15
CHESAPEAKE BAY	WMLH	Cleveland	0	0	0	0	0	0	19	19
CHEVRON ARIZONA	KGBE	Cleveland	0	0	0	0	0	0	20	20
CHEVRON ATLANTIC	C6KY3	Cleveland	0	0	0	0	0	0	19	19
CHEVRON COLORADO	KLHZ	Cleveland	0	0	0	0	0	0	40	40
CHEVRON COPENHAGEN	A8GL	Cleveland	0	0	0	0	0	0	0	0
CHEVRON EMPLOYEE PRIDE	C6MC5	Cleveland	0	0	0	0	0	0	1	1
CHEVRON FELUY	C6FH5	Cleveland	0	0	0	0	0	0	0	0
CHEVRON MISSISSIPPI	WXBR	Cleveland	0	0	0	0	0	0	63	63
CHEVRON PERTH	C6KQ8	Cleveland	0	0	0	0	0	0	47	47
CHEVRON SOUTH AMERICA	ZCAA2	Cleveland	0	0	0	0	0	0	0	0
CHEVRON WASHINGTON	KFDB	Cleveland	11	1	33	3	8	2	4	62
CHIEF GADAO	WEZD	Cleveland	0	0	0	0	0	0	22	22
CHINOOK	WCY2791	Cleveland	0	0	0	0	0	0	0	0
CHIQUITA BARU	ZCAY7	Cleveland	0	0	0	0	0	0	0	0
CHIQUITA BELGIE	C6KD7	Cleveland	0	0	0	0	0	0	63	63
CHIQUITA BREMEN	ZCBC5	Cleveland	0	0	0	0	0	0	42	42
CHIQUITA BRENDA	ZCBE9	Cleveland	0	0	0	0	0	0	38	38
CHIQUITA DEUTSCHLAND	C6KD8	Cleveland	0	0	0	0	0	0	61	61
CHIQUITA ELKESCHLAND	ZCBB9	Cleveland	0	0	0	0	0	0	48	48
CHIQUITA FRANCES	ZCBD9	Cleveland	0	0	0	0	0	0	31	31
CHIQUITA ITALIA	C6KD5	Cleveland	0	0	0	0	0	0	0	0
CHIQUITA JEAN	ZCBB7	Cleveland	0	0	0	0	0	0	44	44
CHIQUITA JOY	ZCBC2	Cleveland	0	0	0	0	0	0	46	46
CHIQUITA NEDERLAND	C6KD6	Cleveland	0	0	0	0	0	0	61	61
CHIQUITA SCANDINAVIA	C6KD4	Cleveland	0	0	0	0	0	0	57	57
CHIQUITA SCHWEIZ	C6KD9	Cleveland	0	0	0	0	0	0	0	0
CHO YANG ATLAS	DQVH	Cleveland	0	0	0	0	0	0	73	73
CITY OF DURBAN	GXIC	Cleveland	66	57	78	56	49	51	38	395
CLEVELAND	KGXA	Cleveland	0	0	0	0	43	4	9	56
CLIFFORD MAERSK	OYRO2	Cleveland	0	0	0	0	0	0	34	34
CMA CGM MONET	ELRR6	Cleveland	55	73	77	76	85	73	80	519

SHIP NAME	CALL	PORT	JAN	FEB	MAR	APR	MAY	JUN	JUL	TOTAL
COASTAL MERCHANT	WCV8696	Cleveland	0	0	0	0	0	0	5	5
COASTAL NAVIGATOR	WCY9686	Cleveland	0	0	0	0	0	0	0	0
COASTAL NOMAD	WSK2703	Cleveland	0	0	0	0	0	0	0	0
COASTAL PILOT	WBP7281	Cleveland	0	0	0	0	0	0	0	0
COASTAL SEA	WCA7944	Cleveland	0	0	0	0	0	0	0	0
COASTAL TRADER	WCO6020	Cleveland	0	0	0	0	0	0	0	0
COASTAL TRADER	WSL8560	Cleveland	0	0	0	0	0	0	0	0
COLORADO	KWFE	Cleveland	0	0	0	0	0	0	0	0
COLUMBIA	WYR2092	Cleveland	0	0	0	0	0	0	0	0
COLUMBIA BRIDGE	ELXS4	Cleveland	14	12	60	59	10	20	34	209
COLUMBIA STAR	WSB2018	Cleveland	0	0	0	0	0	0	0	0
COLUMBUS CALIFORNIA	ELUB7	Cleveland	0	0	0	0	0	0	0	0
COLUMBUS CANADA	ELQN3	Cleveland	0	0	0	0	0	0	0	0
COLUMBUS CANADA	P3RD8	Cleveland	0	0	0	0	0	0	0	0
COLUMBUS CANTERBURY	ELUB8	Cleveland	28	52	51	64	76	31	60	362
COLUMBUS QUEENSLAND	ELUB9	Cleveland	0	0	0	0	0	0	0	0
COLUMBUS VICTORIA	P3RF8	Cleveland	0	0	0	0	0	0	11	11
CONDOLEEZZA RICE	C6OK	Cleveland	0	0	0	0	0	0	0	0
CONTSHIP AMERICA	V7BZ3	Cleveland	0	0	0	0	0	0	0	0
CONTSHIP ENDEAVOUR	ZCBE7	Cleveland	0	0	0	0	0	0	8	8
CONTSHIP SUCCESS	ZCBE3	Cleveland	0	0	0	0	0	0	0	0
CONTSHIP WASHINGTON	ELVZ5	Cleveland	0	0	0	0	0	0	0	0
COPACABANA	PPXI	Cleveland	0	0	0	0	0	0	0	0
CORAL SEA	C6YW	Cleveland	0	0	0	0	0	0	0	0
CORMORANT ARROW	C6IO9	Cleveland	0	0	0	0	0	0	0	0
CORNELIUS MAERSK	OYTN2	Cleveland	0	0	0	0	0	0	0	0
CORNUCOPIA	KPJC	Cleveland	0	0	0	0	0	0	0	0
COSCO NORFOLK	P3ZY6	Cleveland	0	0	0	0	0	0	0	0
COSMOWAY	3EVO3	Cleveland	0	0	0	0	0	0	0	0
COUGAR ACE	9VKE	Cleveland	0	0	0	0	0	0	0	0
COURIER	KCBK	Cleveland	0	0	0	0	0	0	38	38
COURTNEY BURTON	WE6970	Cleveland	0	0	0	0	0	0	0	0
COURTNEY L	ZCAQ8	Cleveland	0	0	0	0	0	0	0	0
CRIMSON GALAXY	3FIQ6	Cleveland	0	0	0	0	0	0	0	0
CROSS POINT	WCW8728	Cleveland	0	0	0	0	0	0	0	0
CROWLEY UNIVERSE	ELRU3	Cleveland	0	0	0	0	0	0	16	16
CROWN OF SCANDINAVIA	OXRA6	Cleveland	16	25	27	34	56	36	44	238
CSAV BUSAN	ELWZ3	Cleveland	0	0	0	0	0	0	0	0
CSL CABO	D5XH	Cleveland	0	0	0	0	0	0	22	22
CSS HUDSON	CGDG	Cleveland	0	0	0	0	0	0	24	24
CSX DEFENDER	KGJB	Cleveland	0	0	0	0	0	0	37	37
CSX PATRIOT	KHRF	Cleveland	0	0	0	0	0	0	40	40
CSX ANCHORAGE	KGTX	Cleveland	0	0	0	0	0	0	62	62
CSX CONSUMER	WCHF	Cleveland	0	0	0	0	0	0	31	31
CSX CRUSADER	WZJF	Cleveland	0	0	0	0	0	0	52	52
CSX DISCOVERY	WZJD	Cleveland	50	114	60	45	33	37	54	393
CSX ENTERPRISE	KRGB	Cleveland	0	0	0	0	0	0	64	64
CSX HAWAII	KIRF	Cleveland	81	120	55	62	52	50	79	499
CSX INNOVATOR	WGKF	Cleveland	0	0	0	0	0	0	59	59
CSX KODIAK	KGTZ	Cleveland	0	0	0	0	0	0	38	38
CSX LIBERATOR	KHRP	Cleveland	0	0	0	0	0	0	36	36
CSX SPIRIT	WFLG	Cleveland	0	0	0	0	0	0	62	62
CSX TACOMA	KGTY	Cleveland	0	0	0	0	0	0	31	31
CSX TRADER	KIRH	Cleveland	0	0	0	0	0	0	34	34
CYNTHIA FAGAN	KSDF	Cleveland	0	0	0	0	0	0	0	0
DAGMAR MAERSK	ELZD9	Kodiak	0	0	0	0	0	0	38	38
DAGNEY	WX8482A	Kodiak	0	0	0	0	0	0	34	34
DAISHIN MARU	3FPS6	Kodiak	0	0	0	0	0	0	96	96

SHIP NAME	CALL	PORT	JAN	FEB	MAR	APR	MAY	JUN	JUL	TOTAL
DANIA PORTLAND	OXEH2	Kodiak	0	0	0	0	0	0	0	0
DANIEL FOSS	WTS3171	Kodiak	0	0	0	0	0	0	0	0
DAVID Z. NORTON	WZF9655	Kodiak	0	0	0	0	0	0	0	0
DELAWARE BAY	WMLG	Kodiak	0	0	0	0	0	0	0	0
DENALI	WSVR	Kodiak	0	0	0	0	0	0	59	59
DIANE H.	WUR7250	Kodiak	0	0	0	0	0	0	0	0
DILMUN FULMAR	ZCRR6	Kodiak	0	0	0	0	0	0	0	0
DIRCH MAERSK	OXQP2	Kodiak	0	0	0	0	0	0	16	16
DIRECT CONDOR	ELWP7	Kodiak	0	0	0	0	0	0	0	0
DIRECT EAGLE	ELWY5	Kodiak	0	0	0	0	0	0	0	0
DIRECT FALCON	ELWQ5	Kodiak	0	0	0	0	0	0	0	0
DIRECT JABIRU	ELYJ9	Kodiak	0	0	0	0	0	0	60	60
DIRECT KOOKABURRA	ELWB8	Kodiak	0	0	0	0	0	0	41	41
DON PASQUALE	SFQG	Kodiak	0	0	0	0	0	0	0	0
DON QUIJOTE	SFQP	Kodiak	0	0	0	0	0	0	0	0
DORTHE MAERSK	DHPD	Kodiak	0	0	0	0	0	0	0	0
DORTHE OLDENDORFF	ELXC4	Kodiak	0	0	0	0	0	0	0	0
DRAGOER MAERSK	OXPW2	Kodiak	0	0	1	23	14	18	12	68
DRESDEN	ELXZ4	Kodiak	0	0	0	0	0	0	0	0
DREW FOSS	WYL7518	Kodiak	0	0	0	0	0	0	0	0
DUHALLOW	ZCBH9	Kodiak	0	0	4	2	44	110	60	220
DUNCAN ISLAND	C6JS	Kodiak	0	0	0	0	0	0	82	82
E.P. LE QUEBECOIS	CG3130	Unknown	0	0	2	188	225	229	230	874
EARL W. OGLEBAY	WZE7718	Unknown	0	0	0	0	0	0	0	0
ECSTASY	H3GR	Unknown	0	0	0	0	0	0	0	0
EDGAR B. SPEER	WQZ9670	Unknown	0	0	13	64	155	128	136	496
EDWIN H. GOTT	WXQ4511	Unknown	0	0	0	0	0	0	0	0
EDYTH L	C6YC	Unknown	0	0	0	0	0	0	35	35
EL MORRO	KCGH	Unknown	0	0	0	0	0	0	0	0
EL YUNQUE	WGJT	Unknown	0	0	0	0	0	0	44	44
ELATION	3FOC5	Unknown	0	0	0	0	0	0	0	0
EMPIRE STATE	KKFW	Unknown	0	0	0	0	0	0	0	0
ENCHANTMENT OF THE SEAS	LAXA4	Unknown	0	0	0	0	0	0	11	11
ENDEAVOR	WAUW	Unknown	0	0	0	0	0	0	0	0
ENDURANCE	WAUU	Unknown	0	0	0	0	0	0	17	17
ENDURANCE	WYA4377	Unknown	0	0	0	0	0	0	0	0
ENERGY ENTERPRISE	WBJF	Unknown	0	0	0	0	0	0	0	0
ENGLISH STAR	C6KU7	Unknown	0	0	0	0	0	0	0	0
ENIF	9VVI	Unknown	0	0	0	0	0	0	19	19
ENTERPRISE	WAUY	Unknown	0	0	0	0	0	0	26	26
ESSEN EXPRESS	DHEE	Unknown	0	0	0	0	0	0	0	0
EVER DECENT	3FUO7	Unknown	0	0	0	0	0	0	0	0
EVER DELIGHT	3FCB8	Unknown	0	0	0	0	0	0	0	0
EVER DELUXE	3FBE8	Unknown	0	0	0	0	0	0	0	0
EVER DEVELOP	3FLF8	Unknown	0	0	0	0	0	0	9	9
EVER DEVOTE	3FIF8	Unknown	0	0	0	0	0	0	0	0
EVER DIADEM	3FOF8	Unknown	0	0	0	0	0	0	0	0
EVER DIVINE	3FSA8	Unknown	0	0	0	0	0	0	0	0
EVER GAINING	BKJO	Unknown	0	0	0	0	0	0	0	0
EVER GENERAL	BKHY	Unknown	0	0	0	0	0	0	0	0
EVER GIFTED	BKHF	Unknown	0	0	0	0	0	0	0	0
EVER GLOWING	BKJZ	Unknown	0	0	0	0	0	0	0	0
EVER GROUP	BKJI	Unknown	0	0	0	0	0	0	15	15
EVER LEVEL	BKHJ	Unknown	0	0	0	0	0	0	0	0
EVER LYRIC	BKHI	Unknown	0	0	0	0	0	0	0	0
EVER RACER	3FJL4	Unknown	0	0	0	0	0	0	0	0
EVER REFINE	3FSB4	Unknown	0	0	0	0	0	0	0	0
EVER RENOWN	3FFR4	Unknown	0	0	0	0	0	0	0	0

SHIP NAME	CALL	PORT	JAN	FEB	MAR	APR	MAY	JUN	JUL	TOTAL
EVER RESULT	3FSA4	Unknown	0	0	0	0	0	0	0	0
EVER RIGHT	3FML3	Unknown	0	0	0	0	0	0	0	0
EVER ROUND	3FQN3	Unknown	0	0	0	0	0	0	0	0
EVER ROYAL	3FGI3	Unknown	0	0	0	0	0	0	0	0
EVER ULTRA	3FEJ6	Unknown	0	0	0	0	0	0	12	12
EVER UNION	3FFG7	Unknown	0	0	0	0	0	0	9	9
EVER UNIQUE	3FXQ6	Unknown	0	0	0	0	0	0	0	0
EVER UNISON	3FTL6	Unknown	0	0	0	0	0	0	7	7
EVER UNITED	3FMQ6	Unknown	0	0	0	0	0	0	0	0
EVERETT EXPRESS	DPGD	Unknown	0	0	0	0	0	0	21	21
EWA	WEZM	Unknown	0	0	0	0	0	0	56	56
EXPLORER OF THE SEAS	ELWX5	Unknown	0	0	0	0	0	0	318	318
FAIRBANKS	WGWB	Oakland	0	0	0	0	0	0	0	0
FAIRLIFT	PEBM	Oakland	0	0	0	0	0	0	0	0
FAIRMAST	PJLC	Oakland	0	0	0	0	0	0	0	0
FALSTRIA	C6BD8	Oakland	0	0	0	0	0	0	0	0
FANTASY	ELKI6	Oakland	0	0	0	0	0	0	0	0
FARALLON ISLAND	FARIS	Oakland	0	0	0	0	0	0	0	0
FASCINATION	C6FM9	Oakland	0	0	0	0	0	0	0	0
FAUST	WRYX	Oakland	0	0	0	0	0	0	44	44
FIDELIO	WQVY	Oakland	0	0	0	0	0	0	50	50
FIGARO	S6PI	Oakland	0	0	0	0	0	0	53	53
FISHHAWK	WRB5085	Oakland	0	0	0	0	0	0	5	5
FOREST TRADER	A8GJ	Oakland	0	0	0	0	0	0	0	0
FRANCES HAMMER	KRGC	Oakland	0	0	0	0	0	0	0	0
FRANCES L	C6YE	Oakland	0	0	0	0	0	0	40	40
FRANK A. SHRONTZ	C6PZ3	Oakland	0	0	0	0	0	0	18	18
FRANKFURT EXPRESS	9VPP	Oakland	0	0	0	0	0	0	47	47
G AND C PARANA	LADC2	Chicago	0	0	0	0	0	0	0	0
GALE WIND	WAZ9548	Chicago	0	0	0	0	0	0	35	35
GANNET ARROW	C6QF5	Chicago	0	0	0	0	0	0	0	0
GARDEN BRIDGE	ELVF6	Chicago	0	0	0	0	0	0	0	0
GEMINI	KHCF	Chicago	0	0	0	0	0	0	0	0
GENE DUNLAP	WAS2433	Chicago	0	0	0	0	0	0	0	0
GEORGE A. STINSON	WCX2417	Chicago	0	0	0	0	0	0	0	0
GEORGE SCHULTZ	C6FD4	Chicago	0	0	0	0	0	0	20	20
GEORGE WASHINGTON BRIDGE	JKCF	Chicago	24	60	47	68	71	53	45	368
GEORGIA RAINBOW II	VRVS5	Chicago	0	0	0	0	0	0	42	42
GERMAN SENATOR	ELPL3	Chicago	0	0	0	0	0	0	0	0
GINGA MARU	JFKC	Chicago	0	0	0	0	0	0	73	73
GITTQA OLDENDORF	ELWO7	Chicago	0	0	0	0	0	0	0	0
GLADIATOR	WBN5982	Chicago	0	0	0	0	0	0	0	0
GLOBAL LINK	WWDY	Chicago	0	0	0	0	0	0	0	0
GLOBAL MARINER	WWXA	Chicago	0	0	0	0	0	0	0	0
GLOBAL SENTINEL	WRZU	Chicago	0	0	0	0	0	0	0	0
GLORIOUS SUCCESS	DUHN	Chicago	0	0	0	0	0	0	0	0
GOLDEN BEAR	NMRY	Chicago	0	0	0	9	76	81	71	237
GOLDEN BELL	3EBK9	Chicago	0	0	0	0	0	0	0	0
GOLDEN GATE	KIOH	Chicago	17	80	55	45	25	19	51	292
GOLDEN GATE BRIDGE	3FWM4	Chicago	0	0	0	0	0	0	0	0
GOLDEN LAKER	3FNQ6	Chicago	0	0	0	0	0	0	0	0
GRAND PACE	3FGJ9	Chicago	0	0	0	0	0	0	0	0
GRANDEUR OF THE SEAS	ELTQ9	Chicago	0	0	0	0	0	0	0	0
GREAT BLESS	VRVL3	Chicago	0	0	0	0	0	0	0	0
GREAT JADE	VRVL7	Chicago	0	0	0	0	0	0	0	0
GREAT LAND	WFDP	Chicago	0	0	0	0	0	0	37	37
GREEN BAY	KGTH	Chicago	0	0	0	0	0	0	0	0
GREEN COVE	WCZ9380	Chicago	0	0	0	0	0	0	14	14

SHIP NAME	CALL	PORT	JAN	FEB	MAR	APR	MAY	JUN	JUL	TOTAL
GREEN DALE	WCZ5238	Chicago	0	0	0	0	0	0	9	9
GREEN ISLAND	KIBK	Chicago	0	0	0	0	0	0	0	0
GREEN LAKE	KGTI	Chicago	0	0	0	0	0	0	23	23
GREEN POINT	WCY4148	Chicago	0	0	0	0	0	0	47	47
GREEN RAINIER	3ENI3	Chicago	0	0	0	0	0	0	0	0
GREEN RIDGE	WRYL	Chicago	0	0	0	0	0	0	0	0
GREENWICH MAERSK	MZIF7	Chicago	0	38	47	39	44	60	64	292
GRETA	WCY2853	Chicago	0	0	0	0	0	0	0	0
GRETE MAERSK	OZNF2	Chicago	0	0	0	0	0	0	27	27
GROTON	KMJL	Chicago	0	0	0	0	0	0	0	0
GUANAJUATO	ELMH8	Chicago	0	0	0	0	0	0	0	0
GUARDIAN	WBO2511	Chicago	0	0	0	0	39	87	91	217
GUAYAMA	WZJG	Chicago	0	0	0	0	0	0	11	11
GUDRUN MAERSK	OZFQ2	Chicago	0	0	0	0	0	0	0	0
GUS W. DARNELL	KCDK	Chicago	0	0	0	0	0	0	0	0
GYPSUM BARON	ZCAN3	Chicago	0	0	0	0	0	0	0	0
GYPSUM KING	ZCAN2	Chicago	0	0	0	0	0	0	0	0
HADERA	ELBX4	Unknown	0	0	0	0	0	0	59	59
HANJIN BARCELONA	3EXX9	Unknown	0	0	0	0	0	0	0	0
HANJIN HONG KONG	P3UX7	Unknown	0	0	0	0	0	0	0	0
HANJIN KAOHSIUNG	P3BN8	Unknown	0	0	0	0	0	0	12	12
HANJIN NAGOYA	3FJW8	Unknown	0	0	0	0	0	0	0	0
HANSEWALL	V2AO3	Unknown	0	0	0	0	0	0	0	0
HEIDELBERG EXPRESS	DEDI	Unknown	501	335	752	302	747	785	762	4184
HENRY HUDSON BRIDGE	JKLS	Unknown	0	0	0	0	0	0	84	84
HERBERT C. JACKSON	WL3972	Unknown	0	0	0	0	0	0	0	0
HOEGH DUKE	ELWP2	Unknown	0	0	0	0	0	0	0	0
HOLIDAY	3FPN5	Unknown	0	0	0	0	0	0	0	0
HONG KONG SENATOR	DEIP	Unknown	0	0	0	0	0	0	0	0
HONSHU SILVIA	3EST7	Unknown	0	0	0	0	0	0	0	0
HOOD ISLAND	C6LU4	Unknown	12	37	34	36	37	29	16	201
HORIZON	ELNG6	Unknown	0	0	0	0	0	0	0	0
HOUSTON EXPRESS	3FQT9	Unknown	0	0	0	0	0	0	0	0
HUAL TRANSPORTER	C6QO3	Unknown	0	0	0	0	0	0	0	0
HUMACAO	WZJB	Unknown	0	0	0	0	0	0	38	38
HUMBERGRACHT	PEUQ	Unknown	0	0	0	0	0	0	0	0
HUME HIGHWAY	3EJO6	Unknown	0	0	0	0	0	0	22	22
HYUNDAI DISCOVERY	3FFR6	Unknown	0	0	0	0	0	0	0	0
HYUNDAI FORTUNE	3FLG6	Unknown	0	0	0	0	0	0	0	0
HYUNDAI FREEDOM	3FFS6	Unknown	0	0	0	0	0	0	0	0
HYUNDAI INDEPENDENCE	3FDY6	Unknown	0	0	0	0	0	0	0	0
HYUNDAI LIBERTY	3FFT6	Unknown	0	0	0	0	0	0	0	0
IMAGINATION	C6FN2	Unknown	0	0	0	0	0	0	0	0
INDAMEX MISSISSIPPI	ZDDT5	Unknown	0	0	0	0	0	0	0	0
INDAMEX WASHINGTON	ELRJ6	Unknown	0	0	0	0	0	0	0	0
INDIAN OCEAN	C6T2063	Unknown	0	0	0	0	0	0	0	0
INDIANA HARBOR	WXN3191	Unknown	0	0	0	0	0	0	30	30
INFINITY	ELXX7	Unknown	0	0	0	0	0	0	0	0
INLAND SEAS	WCJ6214	Unknown	0	0	0	0	0	0	14	14
INTEGRITY	WNHL	Unknown	0	0	0	0	0	0	0	0
ISLA DE CEDROS	3FOA6	Unknown	0	0	0	0	0	0	41	41
ISLAND CHAMPION	WCZ7046	Unknown	0	0	0	0	0	0	0	0
ITB BALTIMORE	WXKM	Unknown	0	0	0	0	0	0	0	0
ITB MOBILE	KXDB	Unknown	0	0	0	0	0	0	0	0
ITB NEW YORK	WVDG	Unknown	0	0	0	0	0	0	0	0
IVARAN EAGLE	DNEN	Unknown	0	0	0	0	0	0	0	0
IVER FOSS	WCY6442	Unknown	0	0	0	0	0	0	0	0
IWANUMA MARU	3ESU8	Unknown	82	31	102	112	76	54	80	537

SHIP NAME	CALL	PORT	JAN	FEB	MAR	APR	MAY	JUN	JUL	TOTAL
J. BENNETT JOHNSTON	C6QE3	Newark	0	0	0	0	0	0	0	0
J. DENNIS BONNEY	C6FH6	Newark	0	0	0	0	0	0	0	0
J.A.W. IGLEHART	WTP4966	Newark	0	0	0	0	0	0	0	0
JACKLYN M.	WCV7620	Newark	0	0	0	0	0	0	26	26
JACKSONVILLE	WNDG	Newark	0	0	0	0	0	0	0	0
JADE ORIENT	ELRY6	Newark	0	0	0	0	0	0	0	0
JADE PACIFIC	ELRY5	Newark	0	0	0	0	0	0	0	0
JAMES A. HANNAH	WU8842	Newark	0	0	0	0	0	0	0	0
JAMES N. SULLIVAN	C6FD3	Newark	0	0	0	0	0	0	27	27
JAMES R. BARKER	WYP8657	Newark	0	0	0	75	63	37	82	257
JEB STUART	WRGQ	Newark	0	0	0	0	0	0	0	0
JO CLIPPER	PFEZ	Newark	0	0	0	0	0	0	33	33
JO LONN	PFEW	Newark	0	0	0	0	0	0	0	0
JOHN G. MUNSON	WE3806	Newark	0	0	0	0	0	0	24	24
JOHN J. BOLAND	WZE4539	Newark	0	0	0	0	0	0	4	4
JOHN PAGE	WPKS	Newark	0	0	0	0	0	0	0	0
JOIDES RESOLUTION	D5BC	Newark	0	0	0	0	0	0	0	0
JOSEPH L. BLOCK	WDA2768	Newark	0	0	0	0	0	0	0	0
JUBILEE	3FPM5	Newark	0	0	0	0	0	0	0	0
JUDY LITRICO	KCKB	Newark	0	0	0	0	0	0	9	9
JUNEAU	KSBG	Newark	0	0	0	0	0	0	0	0
KANIN	ELEO2	Jacksonville	0	0	0	0	0	0	51	51
KAPITAN AFANASYEV	UFIL	Jacksonville	0	0	0	0	0	0	0	0
KAPITAN BYANKIN	UAGK	Jacksonville	0	0	0	0	0	0	0	0
KAPITAN KONEV	UAHV	Jacksonville	0	0	0	0	0	0	38	38
KAPITAN MASLOV	UBRO	Jacksonville	0	0	0	0	0	0	0	0
KAPITAN SERYKH	UGOZ	Jacksonville	0	0	0	0	0	0	0	0
KAREN ANDRIE	WBS5272	Jacksonville	0	0	0	0	0	0	10	10
KAREN MAERSK	OZKN2	Jacksonville	0	0	0	0	0	0	0	0
KATRINE MAERSK	OZLL2	Jacksonville	0	0	0	0	0	0	0	0
KAUAI	WSRH	Jacksonville	0	0	0	0	0	0	34	34
KAYE E. BARKER	WCF3012	Jacksonville	0	0	0	0	0	0	0	0
KAZIMAH	9KKL	Jacksonville	0	0	0	0	0	0	0	0
KEE LUNG	BHFN	Jacksonville	0	0	0	0	0	0	0	0
KEN KOKU	3FMN6	Jacksonville	0	0	0	0	0	0	0	0
KEN SHIN	YJQS2	Jacksonville	0	0	0	0	0	0	23	23
KEN YO	3FIC5	Jacksonville	0	0	0	0	0	0	0	0
KENAI	WSNB	Jacksonville	0	0	0	0	0	0	0	0
KENNETH E. HILL	C6FA6	Jacksonville	0	0	0	0	0	0	0	0
KENNETH T. DERR	C6FA3	Jacksonville	0	0	0	0	0	0	0	0
KENNICOTT	WCY2920	Jacksonville	0	0	0	0	0	0	3	3
KINSMAN INDEPENDENT	WUZ7811	Jacksonville	0	0	0	0	0	0	0	0
KIRSTEN MAERSK	OYDM2	Jacksonville	0	0	0	0	0	0	0	0
KIWI ARROW	C6HU6	Jacksonville	0	0	0	0	0	0	0	0
KNOCK ALLAN	ELOI6	Jacksonville	0	0	0	0	0	0	72	72
KNORR	KCEJ	Jacksonville	0	0	0	0	0	0	0	0
KNUD MAERSK	OYBJ2	Jacksonville	0	0	0	0	0	0	0	0
KOELN EXPRESS	9VBL	Jacksonville	669	775	852	823	846	855	880	5700
KUPARUK RIVER	WBN4379	Jacksonville	0	0	0	0	0	0	0	0
KURE	3FGN3	Jacksonville	0	0	0	0	0	0	15	15
LAKE GUARDIAN	WAO9082	Unknown	0	0	0	0	0	0	0	0
LECONTE	WZE4270	Unknown	0	0	0	0	0	0	0	0
LEO FOREST	3FPH8	Unknown	0	0	0	0	0	0	32	32
LEONARD J. COWLEY	CG2959	Unknown	16	66	63	43	32	24	19	263
LIBERTY GLORY	NBDP	Unknown	0	0	0	0	0	0	0	0
LIBERTY SEA	KPZH	Unknown	0	0	0	0	0	0	29	29
LIBERTY SPIRIT	WCPU	Unknown	0	0	0	0	0	0	0	0
LIBERTY STAR	WCBP	Unknown	0	0	0	0	0	0	39	39

SHIP NAME	CALL	PORT	JAN	FEB	MAR	APR	MAY	JUN	JUL	TOTAL
LIBERTY SUN	WCOB	Unknown	0	0	0	0	0	0	0	0
LICORNE PACIFIQUE	J8CV5	Unknown	0	0	0	0	0	0	7	7
LIHUE	WTST	Unknown	0	0	0	0	0	0	67	67
LILAC ACE	3FDL4	Unknown	0	0	0	0	0	0	0	0
LNG LEO	WDZB	Unknown	0	0	0	0	0	0	0	0
LNG LIBRA	WDZG	Unknown	0	0	0	0	0	0	0	0
LNG TAURUS	WDZW	Unknown	0	0	0	0	0	0	0	0
LNG VIRGO	WDZX	Unknown	0	0	0	0	0	0	0	0
LOIS H.	WTD4576	Unknown	0	0	0	0	0	0	2	2
LOK PRAGATI	ATZS	Unknown	0	0	0	0	0	0	5	5
LONG LINES	WATF	Unknown	0	0	0	0	0	0	0	0
LOOTSGRACHT	PFPT	Unknown	0	0	0	0	0	0	22	22
LT CAMPBELL	WBD5759	Unknown	0	0	0	0	0	0	0	0
LUISE OLDENDORFF	3FOW4	Unknown	0	0	0	0	0	0	0	0
LURLINE	WLVD	Unknown	0	0	0	0	0	0	0	0
LYKES CHALLANGER	FNHV	Unknown	0	0	0	0	0	0	0	0
LYKES CHALLENGER	ELXM4	Unknown	0	0	0	0	0	0	0	0
LYKES COMMANDER	3ELF9	Unknown	0	0	0	0	0	0	0	0
LYKES COMMANDER	3FRY9	Unknown	0	0	0	0	0	0	0	0
LYKES CONDOR	DGGD	Unknown	0	0	0	0	0	0	0	0
LYKES DISCOVERER	WGXO	Unknown	0	0	0	0	0	0	81	81
LYKES EAGLE	ELZE3	Unknown	0	0	0	0	0	0	0	0
LYKES EXPLORER	WGLA	Unknown	47	81	47	46	60	46	49	376
LYKES HAWK	ELVB6	Unknown	0	0	0	0	0	0	0	0
LYKES HUNTER	DNKL	Unknown	0	0	0	0	0	0	0	0
LYKES LIBERATOR	WGXN	Unknown	0	0	0	0	0	0	54	54
LYKES MOTIVATOR	WABU	Unknown	0	0	0	0	0	0	0	0
LYKES NAVIGATOR	WGMJ	Unknown	0	0	0	0	0	0	59	59
LYKES RAVEN	DIGF	Unknown	0	0	0	0	0	0	0	0
LYKES VOYAGER	DJPL	Unknown	0	0	0	0	0	0	0	0
M/V PITTSBURG	ELTQ6	Miami	0	0	0	0	0	0	0	0
M/V SAFMARINE INFANTA	V7CN8	Miami	14	33	21	18	19	23	20	148
MAASDAM	PFRO	Miami	0	0	0	0	0	0	0	0
MACKINAC BRIDGE	JKES	Miami	66	78	53	79	91	57	58	482
MADISON MAERSK	OVJB2	Miami	0	0	0	0	0	0	31	31
MAERSK ALASKA	KAKF	Miami	0	0	0	0	0	0	0	0
MAERSK ARIZONA	KAKG	Miami	0	0	0	0	0	0	0	0
MAERSK CALIFORNIA	WCX5083	Miami	0	0	0	0	0	0	101	101
MAERSK CHARLESTON	ELRO2	Miami	0	0	0	0	22	112	122	256
MAERSK ENDEAVOUR	XP4210	Miami	0	0	0	0	0	0	0	0
MAERSK GIANT	OU2465	Miami	0	0	0	0	0	0	0	0
MAERSK SEA	S6CW	Miami	0	0	0	0	0	0	0	0
MAERSK SHETLAND	MSQK3	Miami	0	0	0	0	0	0	0	0
MAERSK SOMERSET	MQVF8	Miami	0	0	0	0	0	0	10	10
MAERSK STAFFORD	MRSS9	Miami	0	0	0	0	0	0	0	0
MAERSK SUFFOLK	MRSS8	Miami	0	0	0	0	0	0	0	0
MAERSK SURREY	MRSG8	Miami	0	0	0	0	0	0	0	0
MAERSK TAIKI	9VIG	Miami	0	0	0	0	0	0	0	0
MAERSK TAIYO	9VJO	Miami	0	0	0	0	0	0	0	0
MAERSK TENNESSEE	WCX3486	Miami	0	0	50	44	47	4	30	175
MAERSK TEXAS	WCX3249	Miami	0	0	0	0	0	0	0	0
MAERSK VALENCIA	ELXK7	Miami	0	0	0	0	0	0	0	0
MAERSK WAVE	S6TV	Miami	0	0	0	0	0	0	27	27
MAERSK WIND	S6TY	Miami	0	0	0	0	0	0	56	56
MAERSK_VALENCIA	OUJH2	Miami	0	0	0	0	0	0	16	16
MAGLEBY MAERSK	OUSH2	Miami	0	0	0	0	0	0	19	19
MAHARASHTRA	VTSQ	Miami	0	0	0	0	0	0	0	0
MAHEGA	IR4009	Miami	0	0	0	0	0	0	0	0

SHIP NAME	CALL	PORT	JAN	FEB	MAR	APR	MAY	JUN	JUL	TOTAL
MAHIMAHI	WHRN	Miami	0	0	0	0	0	0	0	0
MAIRANGI BAY	GXEW	Miami	73	65	31	88	96	58	80	491
MAJ. BERNARD F. FISHER	KBGK	Miami	0	0	0	0	0	0	0	0
MALOLO	WYH6327	Miami	0	0	0	0	0	0	42	42
MANFRED NYSTROM	WCN3590	Miami	0	0	0	0	0	0	0	0
MANHATTAN BRIDGE	3FWL4	Miami	0	0	0	0	0	0	46	46
MANOA	KDBG	Miami	39	117	62	57	63	40	55	433
MANUKAI	KNLO	Miami	0	0	0	0	0	0	0	0
MANULANI	KNIJ	Miami	0	0	0	0	0	0	8	8
MARCHEN MAERSK	OWDQ2	Miami	0	32	22	23	21	24	23	145
MAREN MAERSK	OWZU2	Miami	0	0	0	0	0	0	36	36
MARGRETHE MAERSK	OYSN2	Miami	0	0	0	0	0	0	34	34
MARIA ANGELICOUSSIS	C6FP2	Miami	0	0	0	0	0	0	0	0
MARIE MAERSK	OULL2	Miami	0	0	0	0	0	0	0	0
MARINE CHEMIST	KMCB	Miami	0	0	0	0	0	0	63	63
MARINE COLUMBIA	KLKZ	Miami	0	0	0	0	0	0	0	0
MARION GREEN	PIAN	Miami	0	0	0	0	0	0	0	0
MARIT MAERSK	OZFC2	Miami	0	0	0	0	0	0	39	39
MARK HANNAH	WYZ5243	Miami	0	0	0	0	0	0	0	0
MARSTA MAERSK	OUNO5	Miami	0	0	0	0	0	0	0	0
MARY CATHERINE	WTW9216	Miami	0	0	0	0	0	0	0	0
MATHILDE MAERSK	OUUU2	Miami	0	0	0	0	0	0	25	25
MATSONIA	KHRC	Miami	0	0	0	0	0	0	30	30
MAUI	WSLH	Miami	0	0	0	0	0	0	17	17
MAURICE EWING	WLDZ	Miami	0	0	0	0	0	0	37	37
MAYAGUEZ	WZJE	Miami	0	0	0	0	0	0	27	27
MAYVIEW MAERSK	OWEB2	Miami	0	0	0	0	0	0	0	0
MEKHANIK KALYUZHNIY	UFLO	Miami	0	0	0	0	0	0	0	0
MEKHANIK MOLDOVANOV	UIKI	Miami	0	0	0	0	0	0	0	0
MEKONG PIONEER	V2JN	Miami	0	0	0	0	0	0	0	0
MELVILLE	WECB	Miami	0	0	0	0	0	0	26	26
MERCURY	3FFC7	Miami	0	0	0	0	0	0	0	0
MERLIN	WBHU	Miami	0	0	0	0	0	0	0	0
MESABI MINER	WYQ4356	Miami	0	0	0	0	0	0	18	18
METEOR	DBBH	Miami	144	447	547	690	558	401	443	3230
METTE MAERSK	OXKT2	Miami	0	0	0	0	0	0	0	0
MICHAEL O'LEARY	WCP9556	Miami	0	0	0	0	0	0	0	0
MICHIGAN	WRB4141	Miami	0	0	0	0	0	0	2	2
MIDDLETOWN	WR3225	Miami	0	0	0	0	0	0	0	0
MIKI HANA	WTW9252	Miami	0	0	0	0	0	0	0	0
MING ASIA	BDEA	Miami	0	0	0	0	0	0	0	0
MING PEACE	ELVR9	Miami	0	0	0	0	0	0	0	0
MOKIHANA	WNRD	Miami	0	0	0	0	0	0	0	0
MOKU PAHU	WBWK	Miami	0	0	0	0	0	0	23	23
MOL BRAVERY	3FXX4	Miami	0	0	0	0	0	0	46	46
MOL COLUMBUS	3ETV8	Miami	0	0	0	0	0	0	67	67
MONCHEGORSK	P3NL5	Miami	0	0	0	0	0	0	16	16
MONTEREY BAY	3FDO6	Miami	0	0	0	0	0	0	56	56
MORMACSKY	WMBQ	Miami	0	0	0	0	0	0	0	0
MORMACSTAR	KGDF	Miami	57	148	29	20	5	19	48	326
MORMACSUN	WMBK	Miami	0	0	0	0	0	0	13	13
MOSEL ORE	ELRE5	Miami	0	0	0	0	0	0	25	25
MSC BOSTON	9HGP4	Miami	0	0	0	0	0	0	0	0
MSC CALIFORNIA	LAKS5	Miami	0	0	0	0	0	0	0	0
MSC FEDERICA	C4LV	Miami	0	0	0	0	0	0	0	0
MSC XINGANG	3EHR6	Miami	0	0	0	0	0	0	0	0
MUNKEBO MAERSK	OUNI5	Miami	0	0	0	0	0	0	0	0
MV CONTSHIP ROME	ELVZ6	Miami	0	0	0	0	0	0	0	0

SHIP NAME	CALL	PORT	JAN	FEB	MAR	APR	MAY	JUN	JUL	TOTAL
MYRON C. TAYLOR	WA8463	Miami	0	0	0	0	0	0	0	0
MYSTIC	PCCQ	Miami	0	0	0	0	0	0	0	0
NAGOYA EXPRESS	P3LE4	Norfolk	0	0	0	0	0	0	0	0
NANUQ	WCY8498	Norfolk	0	0	0	0	0	0	0	0
NATHANIEL B. PALMER	WBP3210	Norfolk	0	0	0	0	0	0	0	0
NATOMA	WBB5799	Norfolk	0	0	0	0	0	0	0	0
NAVAJO	WCT5737	Norfolk	0	0	0	0	0	0	0	0
NEW HORIZON	WKWB	Norfolk	0	12	3	13	16	40	17	101
NEW NIKKI	3FHG5	Norfolk	0	0	0	0	0	0	0	0
NIEUW AMSTERDAM	PGGQ	Norfolk	0	0	0	0	0	0	0	0
NOAA DAVID STARR JORDAN	WTDK	Norfolk	0	0	0	68	56	51	23	198
NOAA SHIP ALBATROSS IV	WMVF	Norfolk	0	0	0	0	0	0	94	94
NOAA SHIP DELAWARE II	KNBD	Norfolk	0	0	0	0	0	0	90	90
NOAA SHIP FERREL	WTEZ	Norfolk	0	31	37	66	64	59	80	337
NOAA SHIP KA'IMIMOANA	WTEU	Norfolk	0	0	0	0	0	0	99	99
NOAA SHIP MCARTHUR	WTEJ	Norfolk	0	0	0	0	0	0	0	0
NOAA SHIP MILLER FREEMAN	WTDM	Norfolk	0	0	0	0	0	0	168	168
NOAA SHIP OREGON II	WTDO	Norfolk	0	0	0	0	6	40	89	135
NOAA SHIP RAINIER	WTEF	Norfolk	0	0	0	69	79	81	75	304
NOAA SHIP RONALD H BROWN	WTEC	Norfolk	0	0	0	0	0	0	120	120
NOAA SHIP T. CROMWELL	WTDF	Norfolk	0	0	0	0	0	0	75	75
NOAA SHIP WHITING	WTEW	Norfolk	0	0	0	0	0	0	65	65
NOAAS GORDON GUNTER	WTEO	Norfolk	0	0	0	0	0	0	108	108
NOBEL STAR	KRPP	Norfolk	0	0	0	0	0	0	14	14
NOBLE STAR	3FRU7	Norfolk	0	0	0	0	0	0	0	0
NOL STENO	ZCBD4	Norfolk	0	0	0	0	0	0	26	26
NOLIZWE	MQLN7	Norfolk	0	0	0	0	0	0	0	0
NOMZI	MTQU3	Norfolk	0	0	43	55	25	2	11	136
NOORDAM	PGHT	Norfolk	0	0	0	0	0	0	10	10
NORASIA SHANGHAI	DNHS	Norfolk	0	0	0	0	0	0	27	27
NORDCLIFF	P3GB4	Norfolk	0	0	0	0	0	0	0	0
NORDMAX	P3YS5	Norfolk	0	0	0	0	0	0	62	62
NORDMORITZ	P3YR5	Norfolk	0	0	0	0	0	0	0	0
NORMA H.	WYL6686	Norfolk	0	0	0	0	0	0	0	0
NORMAN S.	WCW7514	Norfolk	0	0	0	0	0	0	16	16
NORTHERN LIGHTS	WFJK	Norfolk	0	0	0	0	0	0	1	1
NORTHERN SPIRIT	WAQ2746	Norfolk	0	0	0	0	0	0	29	29
NORWAY	C6CM7	Norfolk	0	0	0	0	0	0	22	22
NORWEGIAN WIND	C6LG6	Norfolk	0	0	0	0	0	0	0	0
NTABENI	3EGR6	Norfolk	0	0	0	0	0	0	0	0
NUERNBERG EXPRESS	9VBK	Norfolk	0	0	0	0	0	0	0	0
NYK SPRINGTIDE	S6CZ	Norfolk	0	0	0	0	0	0	0	0
NYK STARLIGHT	3FUX6	Norfolk	0	0	0	0	0	0	25	25
OCEAN CAMELLIA	3FTR6	New Orleans	0	0	0	0	0	0	0	0
OCEAN CITY	WCYR	New Orleans	0	0	0	0	0	0	0	0
OCEAN CLIPPER	3EXI7	New Orleans	0	0	0	0	0	0	0	0
OCEAN MARINER	WCF3990	New Orleans	0	0	0	0	0	0	0	0
OCEAN ORCHID	3ECQ9	New Orleans	0	0	0	0	0	0	0	0
OCEAN PALM	3FDO7	New Orleans	0	0	0	0	0	0	80	80
OCEAN RANGER	WAM7635	New Orleans	0	0	0	0	0	0	0	0
OCEAN SERVICE	WTW9263	New Orleans	0	0	0	0	0	0	0	0
OGLEBAY NORTON	WAQ3521	New Orleans	0	0	0	0	0	0	0	0
OLEANDER	PJJU	New Orleans	0	0	0	0	0	0	13	13
OOCL AMERICA	ELSM7	New Orleans	0	0	0	0	0	0	0	0
OOCL CALIFORNIA	VRWC8	New Orleans	0	0	0	0	0	0	55	55
OOCL FAIR	VRWB8	New Orleans	0	0	0	0	0	0	15	15
OOCL FIDELITY	VRWG5	New Orleans	0	0	0	0	0	0	0	0
OOCL FORTUNE	VRWF2	New Orleans	0	0	0	0	0	0	0	0

SHIP NAME	CALL	PORT	JAN	FEB	MAR	APR	MAY	JUN	JUL	TOTAL
OOCL FREEDOM	VRCV	New Orleans	0	0	0	0	0	0	0	0
OOCL FRIENDSHIP	VRWD3	New Orleans	0	0	0	0	0	0	0	0
OOCL HONG KONG	VRVA5	New Orleans	0	0	0	0	0	0	60	60
OOCL NETHERLANDS	VRVN6	New Orleans	0	0	0	0	0	0	46	46
ORIANA	GVSN	New Orleans	0	0	0	0	0	0	22	22
ORIENTAL ROAD	3FXT6	New Orleans	0	0	0	0	0	0	0	0
ORIENTE GRACE	3FHT4	New Orleans	0	0	0	0	0	0	0	0
ORIENTE HOPE	3ETH4	New Orleans	0	0	0	0	0	0	0	0
ORIENTE NOBLE	3FVF5	New Orleans	0	0	0	0	0	0	0	0
ORIENTE PRIME	3FOU4	New Orleans	0	0	0	0	0	0	0	0
ORIENTE VICTORIA	3FVG8	New Orleans	2	36	41	22	44	20	31	196
OURO DO BRASIL	ELPP9	New Orleans	0	0	0	0	0	0	20	20
OVERSEAS CHICAGO	KBCF	New Orleans	0	0	0	0	0	0	0	0
OVERSEAS HARRIETT	WRFJ	New Orleans	0	0	0	0	0	0	13	13
OVERSEAS JOYCE	WUQL	New Orleans	0	0	0	0	0	0	40	40
OVERSEAS MARILYN	WFQB	New Orleans	0	0	0	0	0	0	13	13
OVERSEAS NEW ORLEANS	WFKW	New Orleans	0	0	0	0	0	0	15	15
OVERSEAS NEW YORK	WMCK	New Orleans	0	0	0	0	0	0	0	0
OVERSEAS PHILADELPHIA	WGDB	New Orleans	0	0	0	0	0	0	0	0
OVERSEAS VIVIAN	KAAZ	New Orleans	0	0	0	0	0	0	0	0
OVERSEAS WASHINGTON	WFGV	New Orleans	0	0	0	0	0	0	0	0
P&O NEDLLOYD BUENOS AIRES	PGEC	Unknown	0	0	0	0	0	0	47	47
P&O NEDLLOYD VERA CRUZ	PGFE	Unknown	0	0	0	0	0	0	19	19
P&O NEDLLOYD GENOA	MYMX5	Unknown	0	0	0	0	0	0	36	36
P&O NEDLLOYD HOUSTON	PGEB	Unknown	0	0	0	0	0	0	47	47
P&O NEDLLOYD LOS ANGELES	PGDW	Unknown	0	0	0	0	0	0	61	61
P&O NEDLLOYD MARSEILLE	MYSU5	Unknown	0	0	0	0	0	0	0	0
P&O NEDLLOYD SYDNEY	PDHY	Unknown	0	0	0	0	0	0	29	29
P&O NEDLLOYD TEXAS	ZCBF6	Unknown	0	0	0	0	0	0	0	0
PACDREAM	ELQO6	Unknown	0	0	0	0	0	0	0	0
PACDUKE	A8SL	Unknown	0	0	0	0	0	0	0	0
PACIFIC HIRO	3FOY5	Unknown	0	0	0	0	0	0	0	0
PACIFIC MERCHANT	ELXR8	Unknown	0	0	0	0	0	0	0	0
PACIFIC PRIDE	WCN4995	Unknown	0	0	0	11	47	23	27	108
PACIFIC SENATOR	ELTY6	Unknown	0	0	0	0	0	0	0	0
PACKING	ELBX3	Unknown	0	0	0	0	0	0	1	1
PACOCEAN	ELJE3	Unknown	0	0	0	0	0	0	0	0
PACPRINCESS	ELED8	Unknown	0	0	0	0	0	0	0	0
PAN ATLANTIC	ELYJ7	Unknown	0	0	0	0	0	0	0	0
PARAGON	WDA2311	Unknown	0	0	0	0	0	0	0	0
PATRIOT	KGBQ	Unknown	0	0	0	0	0	0	0	0
PATRIOT	WDA2500	Unknown	0	0	0	0	0	0	0	0
PAUL BUCK	KDGR	Unknown	0	0	0	2	21	12	38	73
PAUL R. TREGURTHA	WYR4481	Unknown	0	0	0	0	0	0	7	7
PEARL ACE	VRUN4	Unknown	0	0	0	0	0	0	51	51
PEGASUS HIGHWAY	3FMA4	Unknown	0	0	0	0	0	0	0	0
PEGGY DOW	PJOY	Unknown	0	0	0	0	0	0	0	0
PELAGIA	PGRQ	Unknown	86	66	90	100	95	67	106	610
PFC EUGENE A. OBREGON	WHAQ	Unknown	0	0	0	0	0	0	0	0
PFC WILLIAM B. BAUGH	KRPW	Unknown	0	0	0	0	0	0	0	0
PHILADELPHIA	KSYP	Unknown	0	0	0	0	0	0	0	0
PHILIP R. CLARKE	WE3592	Unknown	0	0	0	0	0	0	0	0
PIERRE FORTIN	CG2678	Unknown	0	0	0	0	0	0	0	0
PINO GLORIA	3EZW7	Unknown	0	0	0	0	0	0	0	0
PISCES EXPLORER	MWQD5	Unknown	0	0	0	0	0	0	0	0
POLAR ALASKA	KSBK	Unknown	0	0	0	0	0	0	14	14
POLAR CALIFORNIA	WMCV	Unknown	0	0	0	0	0	0	16	16
POLAR EAGLE	ELPT3	Unknown	0	0	0	0	0	0	66	66

SHIP NAME	CALL	PORT	JAN	FEB	MAR	APR	MAY	JUN	JUL	TOTAL
POLAR ENDEAVOUR	WCAJ	Unknown	0	0	0	0	0	0	0	0
POLAR INDEPENDENCE	KLHV	Unknown	0	0	0	0	0	0	0	0
POLAR TEXAS	KNFD	Unknown	0	0	0	0	0	0	11	11
POLAR TRADER	WCZ3758	Unknown	0	0	0	0	0	0	0	0
POLYNESIA	V2CA2	Unknown	0	0	0	0	0	0	0	0
POTOMAC TRADER	WXBZ	Unknown	0	0	0	0	0	0	0	0
POWHATAN TATF 166	WCY9968	Unknown	0	0	0	0	0	0	0	0
POWHATTAN	WTX7883	Unknown	0	0	0	0	0	0	0	0
PRESIDENT ADAMS	WRYW	Unknown	0	0	0	0	0	0	63	63
PRESIDENT GRANT	WCY2098	Unknown	0	0	0	0	0	0	56	56
PRESIDENT JACKSON	WRYC	Unknown	0	0	0	0	0	0	68	68
PRESIDENT KENNEDY	WRYE	Unknown	76	10	79	66	65	63	59	418
PRESIDENT POLK	WRYD	Unknown	0	0	0	0	0	0	55	55
PRESIDENT TRUMAN	WNDP	Unknown	0	0	0	0	0	0	57	57
PRESIDENT WILSON	WCY3438	Unknown	0	0	0	0	0	0	41	41
PRIDE OF BALTIMORE II	WUW2120	Unknown	0	0	0	0	0	0	39	39
PRINCE OF OCEAN	3ECO9	Unknown	0	0	0	0	0	0	0	0
PRINCE WILLIAM SOUND	WSDX	Unknown	0	0	0	0	0	0	0	0
PRINCES HIGHWAY	3ERU8	Unknown	0	0	0	0	0	0	0	0
PRIWALL	DQVF	Unknown	0	0	0	0	0	0	0	0
PROJECT ARABIA	PJKP	Unknown	0	0	0	0	0	0	0	0
PRUDHOE BAY	KPFD	Unknown	0	0	0	0	0	0	11	11
PUDONG SENATOR	DQVI	Unknown	0	82	106	13	64	21	73	359
PUSAN SENATOR	DQVG	Unknown	0	0	0	0	0	0	38	38
PVT FRANKLIN J. PHILLIPS	WMFW	Unknown	0	0	0	0	0	0	7	7
QUEEN ELIZABETH 2	GBTT	Unknown	0	0	0	0	0	0	69	69
QUEENSLAND STAR	MZBM7	Unknown	0	101	64	75	66	53	41	400
R. HAL DEAN	C6JN	Unknown	0	0	0	0	0	0	0	0
R.J. PFEIFFER	WRJP	Unknown	0	0	0	0	0	0	13	13
R.V. DAY	WS6709	Unknown	0	0	0	0	0	0	0	0
R/V TIGLAX	WZ3423	Unknown	0	0	0	0	0	0	15	15
RADIANCE OF THE SEAS	ELIY5	Unknown	0	0	0	0	0	0	0	0
RAINBOW BRIDGE	3EYX9	Unknown	0	0	0	0	0	0	72	72
RANGER	WBN5979	Unknown	0	0	0	0	0	0	0	0
RANI PADMINI	ATSR	Unknown	0	0	0	0	0	0	0	0
RAYMOND E. GALVIN	C6FD6	Unknown	0	0	0	0	0	0	4	4
REBECCA LYNN	WCW7977	Unknown	0	0	0	0	0	0	14	14
REDFIN	WTP2735	Unknown	0	0	0	0	0	0	0	0
REDOUBT	WCG3013	Unknown	0	0	0	0	0	0	0	0
REPULSE BAY	MQYA3	Unknown	0	0	0	0	0	0	67	67
RESERVE	WE7207	Unknown	0	0	0	0	0	0	0	0
RESOLUTE	KFDZ	Unknown	0	0	0	0	0	0	0	0
RICHARD G MATTHIESEN	WLBV	Unknown	0	0	0	0	29	54	74	157
RICHARD H HATZKE	C6FE5	Unknown	0	0	0	0	0	0	21	21
RICHARD REISS	WBF2376	Unknown	0	0	0	0	0	0	15	15
RIO APURE	ELUG7	Unknown	0	0	0	0	0	0	7	7
ROBERT E. LEE	KCRD	Unknown	0	0	0	0	0	0	0	0
ROGER BLOUGH	WZP8164	Unknown	0	0	1	66	47	74	100	288
ROGER REVELLE	KAOU	Unknown	1	32	78	57	74	39	70	351
ROTTERDAM EXPRESS	S6IG	Unknown	788	899	930	904	977	868	942	6308
ROUGHNECK	WTW9262	Unknown	0	0	0	0	0	0	0	0
ROYAL PRINCESS	GBRP	Unknown	0	0	0	0	0	0	27	27
RUBIN ARTEMIS	3FAH7	Unknown	0	0	0	0	0	0	0	0
RUBIN BONANZA	3FNV5	Unknown	0	0	0	0	0	0	0	0
RUBIN KOBE	DYZM	Unknown	0	0	0	0	0	0	19	19
RUBIN PEARL	YJQA8	Unknown	0	0	0	0	0	0	53	53
RUBIN STELLA	3FAP5	Unknown	0	0	0	0	0	0	0	0
SABINE PHILADELPHIA	WNFJ	Seattle	0	0	0	0	0	0	0	0

SHIP NAME	CALL	PORT	JAN	FEB	MAR	APR	MAY	JUN	JUL	TOTAL
SAGA CREST	H3FB	Seattle	0	0	0	0	0	0	0	0
SAGA SPRAY	VRRW5	Seattle	0	0	0	0	0	0	0	0
SALLY J.	WQZ9646	Seattle	0	0	0	0	0	0	0	0
SALLY MAERSK	OZHS2	Seattle	0	0	0	0	0	0	0	0
SALOME	S6CL	Seattle	0	0	0	0	0	0	0	0
SAM HOUSTON	KDGA	Seattle	0	0	0	0	0	0	0	0
SAMSON MARINER	WCN3586	Seattle	0	0	0	0	0	0	49	49
SAMUEL L. COBB	KCDJ	Seattle	0	0	0	0	0	0	0	0
SAMUEL RISLEY	CG2960	Seattle	0	0	0	0	0	0	127	127
SAN MARCOS	ELND4	Seattle	0	0	0	0	0	0	0	0
SANDRA FOSS	WYL4908	Seattle	0	0	0	0	0	0	0	0
SANKO LAUREL	3EXQ3	Seattle	0	0	0	0	0	0	0	0
SANTA CHRISTINA	3FAE6	Seattle	0	0	0	0	0	0	0	0
SANTA MONICA	ELNJ3	Seattle	0	0	0	0	0	0	0	0
SAUDI DIRIYAH	HZZB	Seattle	0	0	0	0	0	0	0	0
SAUDI HOFUF	HZZC	Seattle	0	0	0	0	0	0	0	0
SC BREEZE	ELOC6	Seattle	0	0	0	0	0	0	0	0
SC HORIZON	ELOC8	Seattle	0	0	0	0	0	0	0	0
SCL INFANTA	GBSA	Seattle	0	0	0	0	0	0	0	0
SEA BREEZE	WBN3019	Seattle	0	0	0	0	0	0	0	0
SEA CHEETAH	V2PM9	Seattle	0	0	0	0	0	0	0	0
SEA FLYER	WBL8673	Seattle	0	0	0	0	0	0	0	0
SEA MARINER	J8FF9	Seattle	0	0	0	0	0	0	0	0
SEA MERCHANT	ELQN2	Seattle	0	0	0	0	0	0	114	114
SEA PRINCESS	KRCP	Seattle	0	0	0	0	0	0	0	0
SEA RACER	ELQI8	Seattle	0	0	0	0	0	0	0	0
SEA RANGER	WBM8733	Seattle	0	0	0	0	0	0	0	0
SEA RIVER HICHINBROOK	WJBG	Seattle	0	0	0	0	0	0	0	0
SEA TIGER	DGRR	Seattle	0	0	0	0	0	0	0	0
SEA VALIANT	WBN9213	Seattle	0	0	0	0	0	0	0	0
SEA VALOR	WBN9212	Seattle	0	0	0	0	0	0	0	0
SEA VENTURE	WCC7684	Seattle	0	0	0	0	0	0	5	5
SEA VICTORY	WBH9635	Seattle	0	0	0	0	0	0	0	0
SEA VIKING	WCE8951	Seattle	0	0	0	0	0	0	0	0
SEA WISDOM	3FUO6	Seattle	0	0	0	0	0	0	0	0
SEA/LAND VICTORY	DIDY	Seattle	0	0	0	0	0	0	0	0
SEABULK MONTANA	WCW9126	Seattle	0	0	0	0	0	0	40	40
SEALAND ACHIEVER	WPKD	Seattle	0	0	0	0	0	0	65	65
SEALAND ARGENTINA	DGVN	Seattle	0	0	0	0	0	0	0	0
SEALAND ATLANTIC	KRLZ	Seattle	0	0	0	0	0	0	23	23
SEALAND COMET	V7AP3	Seattle	0	0	0	0	0	0	0	0
SEALAND COMMITMENT	KRPB	Seattle	0	0	0	0	0	0	66	66
SEALAND DEVELOPER	KHRH	Seattle	0	0	0	0	0	0	69	69
SEA-LAND EAGLE	V7AZ8	Seattle	0	0	0	0	0	0	0	0
SEALAND EXPEDITION	WPGJ	Seattle	85	90	48	79	66	48	72	488
SEALAND FLORIDA	KRHX	Seattle	66	104	83	76	39	42	56	466
SEALAND FREEDOM	V7AM3	Seattle	0	0	0	0	0	0	0	0
SEALAND HONDURAS	OUQP2	Seattle	0	0	0	0	0	0	37	37
SEALAND INDEPENDENCE	WGJC	Seattle	0	0	0	0	0	0	0	0
SEALAND INTEGRITY	WPVD	Seattle	219	95	175	145	85	127	141	987
SEALAND INTREPID	9VWZ	Seattle	0	0	0	0	0	0	13	13
SEALAND MARINER	V7AM5	Seattle	0	0	0	0	0	0	0	0
SEALAND MERCURY	V7AP6	Seattle	29	46	56	52	39	40	63	325
SEALAND METEOR	V7AP7	Seattle	0	0	0	0	0	0	35	35
SEALAND MOTIVATOR	WAAH	Seattle	0	0	0	0	0	0	0	0
SEALAND NAVIGATOR	WPGK	Seattle	0	0	0	0	0	0	72	72
SEALAND PERFORMANCE	KRPD	Seattle	0	0	0	0	0	0	26	26
SEALAND PRIDE	WDA3673	Seattle	0	0	0	0	0	0	68	68

SHIP NAME	CALL	PORT	JAN	FEB	MAR	APR	MAY	JUN	JUL	TOTAL
SEALAND QUALITY	KRNJ	Seattle	0	0	0	0	0	0	47	47
SEALAND RACER	V7AP8	Seattle	0	0	0	0	0	0	33	33
SEA-LAND URUGUAY	DGVZ	Seattle	0	0	0	0	0	0	0	0
SEARIVER AMERICAN PROGRESS	S KAWN	Seattle	0	0	0	0	0	0	0	0
SEARIVER GALENA BAY	WGZK	Seattle	0	0	0	0	0	0	0	0
SEARIVER NORTH SLOPE	KHLQ	Seattle	0	0	0	0	0	0	0	0
SELMA KALKAVAN	TCSX	Seattle	0	0	0	0	0	0	28	28
SENECA	WBN8469	Seattle	0	0	0	0	85	88	75	248
SENSATION	C6FM8	Seattle	0	0	0	0	0	0	0	0
SETO BRIDGE	JMQY	Seattle	0	0	0	0	0	0	32	32
SEVEN OCEAN	3EZB8	Seattle	0	0	0	0	0	0	0	0
SEVEN SEAS	3FBS9	Seattle	0	0	0	0	0	0	0	0
SEWARD JOHNSON	WST9756	Seattle	0	0	0	0	0	0	0	0
SHIRAOI MARU	3ECM7	Seattle	82	88	130	103	133	76	94	706
SIDNEY FOSS	WYL5445	Seattle	0	0	0	0	0	0	0	0
SIDNEY STAR	C6JY7	Seattle	0	0	0	0	0	0	0	0
SIKU	WCQ6174	Seattle	0	0	0	0	0	0	33	33
SINE MAERSK	OZOK2	Seattle	0	0	0	0	0	0	0	0
SINGA STAR	9VNF	Seattle	0	0	0	0	0	0	0	0
SINUK	WCQ8110	Seattle	0	0	0	0	38	55	56	149
SKAGEN MAERSK	OYOS2	Seattle	0	0	0	0	0	0	53	53
SKAUBRYN	LAJV4	Seattle	0	0	0	0	0	0	48	48
SKAUGRAN	LADB2	Seattle	0	0	0	0	0	0	0	0
SKODSBORG	OYRJ4	Seattle	0	0	0	0	0	0	28	28
SNOHOMISH	WSQ8098	Seattle	29	19	33	12	12	17	49	171
SOFIE MAERSK	OZUN2	Seattle	0	0	0	0	0	0	0	0
SOL DO BRASIL	ELQQ4	Seattle	0	0	0	0	0	0	14	14
SOLAR WING	ELJS7	Seattle	62	86	89	29	62	81	105	514
SOROE MAERSK	OYKJ2	Seattle	0	0	0	0	0	0	0	0
SOUTH FORTUNE	3FJC6	Seattle	0	0	0	0	0	0	0	0
SOUTHDOWN CHALLENGER	WA4659	Seattle	0	0	0	0	0	0	53	53
SOVEREIGN MAERSK	OYGA2	Seattle	0	0	0	0	0	0	0	0
SPLENDOUR OF THE SEAS	LAUS4	Seattle	0	0	0	0	0	0	0	0
SS BADGER	WBD4889	Seattle	0	0	0	0	0	0	118	118
SS OCEANIC	C6IF7	Seattle	0	0	0	0	0	0	0	0
SSGT EDWARD A. CARTER JR.	WPWH	Seattle		0	0	0	0	0	0	0
ST BLAIZE	J8FO	Seattle	0	0	0	0	0	0	0	0
ST. CLAIR	WZA4027	Seattle	0	0	0	0	0	0	0	0
ST. LUCY	ELPO3	Seattle	0	0	0	0	0	0	0	0
STACEY FOSS	WYL4909	Seattle	0	0	0	0	0	0	0	0
STALWART	WBN6512	Seattle	0	0	0	0	0	0	0	0
STALWART	WYP8962	Seattle	0	0	0	0	0	0	0	0
STAR ALABAMA	LAVU4	Seattle	0	0	0	0	0	0	0	0
STAR AMERICA	LAVV4	Seattle	0	0	0	0	0	0	0	0
STAR EAGLE	LAWO2	Seattle	0	0	0	0	0	0	34	34
STAR EVVIVA	LAHE2	Seattle	0	0	0	0	0	0	50	50
STAR FLORIDA	LAVW4	Seattle	0	41	64	49	48	33	29	264
STAR FRASER	LAVY4	Seattle	0	46	48	17	21	14	13	159
STAR GEIRANGER	LAKQ5	Seattle	0	0	0	0	0	0	0	0
STAR GRAN	LADR4	Seattle	0	0	0	0	0	0	0	0
STAR GRINDANGER	LAKR5	Seattle	0	0	0	0	0	0	0	0
STAR HANSA	LAXP4	Seattle	0	0	0	0	0	0	0	0
STAR HARDANGER	LAXD4	Seattle	0	0	0	0	0	0	0	0
STAR HARMONIA	LAGB5	Seattle	0	0	0	0	0	0	0	0
STAR HERDLA	LAVD4	Seattle	0	0	0	0	33	36	7	76
STAR HIDRA	LAVN4	Seattle	0	0	0	0	0	0	38	38
STAR HIDRA	LAVX4	Seattle	0	0	0	0	0	0	0	0
STAR HOSANGER	LAXF4	Seattle	0	0	0	0	0	0	0	0

SHIP NAME	CALL	PORT	JAN	FEB	MAR	APR	MAY	JUN	JUL	TOTAL
STAR HOYANGER	LAXG4	Seattle	0	0	0	0	0	0	0	0
STAR IKEBANA	S6BK	Seattle	0	0	0	0	0	0	0	0
STAR ISMENE	LANT5	Seattle	0	0	0	0	0	0	0	0
STAR SKARVEN	LAJY2	Seattle	0	0	0	0	0	0	0	0
STAR TRONDANGER	LAQQ2	Seattle	0	0	0	0	0	0	0	0
STATENDAM	PHSG	Seattle	0	0	0	0	0	0	0	0
STELLAR KOHINOOR	3FFG8	Seattle	0	0	0	0	0	0	0	0
STENA CLIPPER	C6MX4	Seattle	0	0	0	0	0	0	18	18
STEWART J. CORT	WYZ3931	Seattle	0	0	0	0	0	0	61	61
STONEWALL JACKSON	KDDW	Seattle	0	0	0	0	0	0	26	26
STRONG CAJUN	KALK	Seattle	0	0	0	0	0	0	0	0
STRONG PATRIOT	WCZ8589	Seattle	0	0	0	0	0	0	0	0
SUCO DO BRASIL	ELAQ5	Seattle	0	0	0	0	0	0	23	23
SUN ACE	3EMJ6	Seattle	0	0	0	0	0	0	0	0
SUN DANCE	3ETQ8	Seattle	0	0	0	0	0	0	0	0
SUNBELT DIXIE	D5BU	Seattle	0	0	0	0	0	0	14	14
SUNDA	ELPB8	Seattle	0	0	0	0	0	0	0	0
SUPER RUBIN	3FWP5	Seattle	0	0	0	0	1	69	38	108
SUSAN MAERSK	OYIK2	Seattle	0	0	0	0	0	0	0	0
SVEND MAERSK	OYJS2	Seattle	0	0	0	0	0	0	0	0
SVENDBORG MAERSK	OZSK2	Seattle	0	0	0	0	0	0	0	0
T/V STATE OF MAINE	NTNR	Long Beach	0	0	0	0	0	0	0	0
TAGUS	LAZA2	Long Beach	0	0	0	0	0	0	11	11
TAI HE	BOAB	Long Beach	0	0	0	0	0	0	66	66
TAIHO MARU	3FMP6	Long Beach	0	0	0	0	0	0	0	0
TAIKO	LAQT4	Long Beach	0	0	0	0	0	0	0	0
TAKAMINE	LACT5	Long Beach	0	0	0	0	0	0	0	0
TAKASAGO	LACR5	Long Beach	0	0	0	0	0	0	0	0
TALISMAN	LAOW5	Long Beach	0	0	0	0	0	0	0	0
TAMPA	LMWO3	Long Beach	0	0	0	0	0	0	0	0
TANABATA	WCZ5535	Long Beach	0	0	0	0	0	0	36	36
TAN'ERLIQ	WCY8497	Long Beach	0	0	0	0	0	0	0	0
TAPIOLA	LAOQ2	Long Beach	0	0	0	0	0	0	0	0
TARAGO	LAPN5	Long Beach	0	0	0	0	0	0	0	0
TATNUCK	WBY2415	Long Beach	0	0	0	0	0	0	0	0
TAURUS	WYH6499	Long Beach	0	0	0	0	0	32	48	80
TAUSALA SAMOA	V2FA2	Long Beach	0	0	0	0	0	0	0	0
TELLUS	WRYG	Long Beach	0	0	0	0	0	0	54	54
TEQUI	3FDZ5	Long Beach	0	0	0	0	0	0	0	0
TEXAS	LMWR3	Long Beach	0	0	0	0	0	0	0	0
TEXAS CLIPPER	KVWA	Long Beach	0	0	0	0	0	0	56	56
THOMAS G. THOMPSON	KTDQ	Long Beach	0	0	0	0	0	0	9	9
THORKIL MAERSK	MSJX8	Long Beach	0	0	0	0	0	0	43	43
TITAN	WAW9232	Long Beach	0	0	0	0	0	0	0	0
TJALDRID	XPRT	Long Beach	0	0	0	0	0	0	0	0
TMM PUEBLA	ELRZ8	Long Beach	0	0	0	0	0	0	37	37
TMM VERACRUZ	V2PC4	Long Beach	0	0	0	0	0	0	0	0
TOBIAS MAERSK	MSJY8	Long Beach	0	0	0	0	0	0	55	55
TOKYO HIGHWAY	3EDF9	Long Beach	0	0	0	0	0	0	0	0
TOWER BRIDGE	ELJL3	Long Beach	0	0	0	0	0	0	20	20
TRADE COSMOS	VRUQ2	Long Beach	0	0	0	0	0	0	0	0
TRANSWORLD	3FFY3	Long Beach	0	0	0	0	0	0	0	0
TREIN MAERSK	MSQQ8	Long Beach	0	0	0	0	0	0	38	38
TRIANON	LAIZ4	Long Beach	0	0	0	0	0	0	15	15
TRINITY	WRGL	Long Beach	0	0	0	0	0	0	2	2
TRITON	WTU2310	Long Beach	0	0	0	0	0	0	0	0
TRIUMPH ACE	H3CB	Long Beach	0	0	0	0	0	0	22	22
TROJAN STAR	C6OD7	Long Beach	0	0	0	0	0	0	44	44

SHIP NAME	CALL	PORT	JAN	FEB	MAR	APR	MAY	JUN	JUL	TOTAL
TROPIC FLYER	J8NV	Long Beach	0	0	0	0	0	0	0	0
TROPIC JADE	J8NY	Long Beach	0	0	0	0	0	0	0	0
TROPIC KEY	J8PE	Long Beach	0	0	0	0	0	0	0	0
TROPIC LURE	J8PD	Long Beach	0	0	0	0	0	0	4	4
TROPIC OPAL	J8NW	Long Beach	0	0	0	0	0	0	0	0
TROPIC OPAL	J8WN	Long Beach	0	0	0	0	0	0	0	0
TROPIC SUN	3EZK9	Long Beach	0	0	0	0	0	0	0	0
TROPIC TIDE	3FGQ3	Long Beach	0	0	0	0	0	0	0	0
TROPICALE	ELBM9	Long Beach	0	0	0	0	0	0	0	0
TUDOR STAR	C6OD8	Long Beach	0	0	0	0	0	0	24	24
TUSTUMENA	WNGW	Long Beach	0	0	0	0	0	0	32	32
UNITED SPIRIT	ELYB2	Houston	0	0	0	0	0	0	52	52
UNIVERSE EXPLORER	3FMF2	Houston	0	0	0	0	0	0	0	0
USCGC ACACIA	NODY	Houston	0	0	0	0	0	0	0	0
USCGC ACTIVE	NRTF	Houston	0	0	0	0	0	0	0	0
USCGC ACUSHNET	NNHA	Houston	0	0	0	0	0	0	0	0
USCGC ALEX HALEY	NZPO	Houston	0	0	0	0	0	0	6	6
USCGC ANTHONY PETIT	NERW	Houston	0	0	0	0	0	0	0	0
USCGC BRAMBLE	NODK	Houston	0	0	0	0	0	0	0	0
USCGC COURAGEOUS	NCRG	Houston	0	0	0	0	0	0	0	0
USCGC DURABLE	NRUN	Houston	0	0	0	0	0	0	0	0
USCGC FIREBUSH	NODL	Houston	0	0	0	0	0	0	0	0
USCGC GENTIAN	NBHF	Houston	0	0	0	0	0	0	0	0
USCGC HAMILTON	NMAG	Houston	0	0	0	0	0	0	0	0
USCGC HARRIET LANE	NHNC	Houston	0	0	0	0	0	0	0	0
USCGC HEALY	NEPP	Houston	0	0	0	0	0	0	160	160
USCGC KATMAI BAY	NRLX	Houston	0	0	0	0	0	0	0	0
USCGC KUKUI	NKJU	Houston	0	0	0	0	0	0	0	0
USCGC MACKINAW	NRKP	Houston	0	0	0	0	0	0	0	0
USCGC MELLON	NMEL	Houston	0	0	0	0	0	0	0	0
USCGC MIDGETT	NHWR	Houston	0	0	0	0	0	0	0	0
USCGC MORGENTHAU	NDWA	Houston	0	0	0	0	0	0	0	0
USCGC NORTHLAND	NLGF	Houston	0	0	0	0	0	0	32	32
USCGC OSPREY	NBRF	Houston	0	0	0	0	0	0	0	0
USCGC POLAR SEA	NRUO	Houston	0	0	0	0	0	0	27	27
USCGC POLAR STAR	NBTM	Houston	0	0	0	0	0	0	0	0
USCGC SASSAFRAS	NODT	Houston	0	0	0	0	0	0	0	0
USCGC SEDGE	NODU	Houston	0	0	0	0	0	0	0	0
USCGC SHERMAN	NMMJ	Houston	0	0	0	0	0	0	0	0
USCGC STEADFAST	NSTF	Houston	0	0	0	0	0	0	0	0
USCGC SUNDEW	NODW	Houston	0	0	0	0	0	0	0	0
USCGC VIGOROUS	NQSP	Houston	0	0	0	0	0	0	0	0
USCGC WOODRUSH	NODZ	Houston	0	0	0	0	0	0	0	0
USNS 1ST LT. HARRY L. MARTIN	TIN NDFH	Houston	0	0	0	0	0	0	18	18
USNS ALTAIR	NRZA	Houston	0	0	0	0	0	0	0	0
USNS APACHE	NIGP	Houston	0	0	0	0	0	0	0	0
USNS BRUCE C. HEEZEN	NBID	Houston	0	0	0	0	0	0	28	28
USNS CAPELLA	NBXO	Houston	0	0	0	0	0	0	0	0
USNS GILLILAND	NAMJ	Houston	0	0	0	0	0	0	0	0
USNS IMPECCABLE	NINT	Houston	0	0	0	0	0	0	0	0
USNS JOHN MCDONNELL	NJMD	Houston	0	0	0	0	0	0	50	50
USNS MENDONCA	NBMK	Houston	0	0	0	0	0	0	0	0
USNS NAVAJO_	NOYK	Houston	0	0	0	0	0	0	0	0
USNS REGULUS	NLWA	Houston	0	0	0	0	0	0	0	0
USNS SEAY	NZIN	Houston	0	0	0	0	0	0	0	0
USNS SHASTA	NRNC	Houston	0	0	0	0	0	0	19	19
USNS SODERMAN	NANL	Houston	0	0	0	0	0	0	0	0

SHIP NAME	CALL	PORT	JAN	FEB	MAR	APR	MAY	JUN	JUL	TOTAL
USNS SPICA	NMJG	Houston	0	0	0	0	0	0	0	0
USNS SUMNER	NZAU	Houston	0	0	0	0	0	0	0	0
USNS VINDICATOR	NTOR	Houston	0	0	0	0	0	0	0	0
USNS WATKINS	NIJB	Houston	0	0	0	0	0	0	0	0
VEGA	9VJS	Valdez	0	0	0	0	0	0	0	0
VICE PRESIDENT - GULF PORTS	TS MMP1	Valdez	0	0	0	0	0	0	0	0
VIRGINIA	3EBW4	Valdez	0	0	0	0	0	0	0	0
VLADIVOSTOK	UBXP	Valdez	0	0	0	0	0	0	55	55
VOYAGER OF THE SEAS	ELWU7	Valdez	0	0	0	0	0	0	0	0
WARRIOR	WBN4383	Unknown	0	0	0	0	0	0	0	0
WASHINGTON HIGHWAY	JKHH	Unknown	0	0	0	0	0	0	107	107
WASHINGTON SENATOR	DEAZ	Unknown	0	0	0	0	0	0	0	0
WAYNE FARTHING	MMP2	Unknown	0	0	0	0	0	0	0	0
WEATHERBIRD II	WCT6653	Unknown	0	0	0	0	0	0	0	0
WECOMA	WSD7079	Unknown	0	0	0	0	0	0	62	62
WEST DIANA	3FCZ4	Unknown	0	0	0	0	0	0	0	0
WESTERN BRIDGE	C6JQ9	Unknown	0	0	0	0	0	0	102	102
WESTERN MARINER	WRB9690	Unknown	0	0	0	0	0	0	0	0
WESTERN NAVIGATOR	WAX7602	Unknown	0	0	0	0	0	0	0	0
WESTERN RANGER	WBN3008	Unknown	0	0	0	0	0	0	0	0
WESTERN TITAN	WCX4599	Unknown	0	0	0	0	0	0	0	0
WESTWARD VENTURE	KHJB	Unknown	0	0	0	0	0	0	24	24
WESTWOOD ANETTE	C6QO9	Unknown	0	0	0	0	0	0	27	27
WESTWOOD BELINDA	H9IM	Unknown	0	0	0	0	0	0	0	0
WESTWOOD BORG	LAON4	Unknown	0	0	0	0	0	0	0	0
WESTWOOD BREEZE	LAOT4	Unknown	0	0	0	0	0	0	63	63
WESTWOOD CLEO	H9GW	Unknown	0	0	0	0	0	0	0	0
WESTWOOD JAGO	C6CW9	Unknown	0	0	0	0	0	0	0	0
WESTWOOD MARIANNE	C6QD3	Unknown	0	0	0	0	0	0	55	55
WILFRED SYKES	WDA2769	Unknown	0	0	0	0	0	0	9	9
WILLIAM E. CRAIN	ELOR2	Unknown	0	0	0	0	0	0	0	0
WILLIAM E. MUSSMAN	D5OE	Unknown	0	0	0	0	0	0	0	0
WILSON	WNPD	Unknown	0	0	0	0	0	0	0	0
WORLD SPIRIT	ELWG7	Unknown	0	0	0	0	0	0	54	54
YEOMAN BRIDGE	C6JY9	New York City	0	0	0	0	0	0	1	1
YURIY OSTROVSKIY	UAGJ	New York City	0	0	0	0	0	0	0	0
ZENITH	ELOU5	Unknown	0	0	0	0	0	0	12	12
ZIM AMERICA	4XGR	Unknown	0	0	0	0	0	0	16	16
ZIM ASIA	4XFB	Unknown	0	0	0	0	0	0	43	43
ZIM ATLANTIC	4XFD	Unknown	0	0	0	0	0	0	50	50
ZIM CHINA	4XFQ	Unknown	0	0	0	0	0	0	33	33
ZIM EUROPA	4XFN	Unknown	0	0	0	0	0	0	0	0
ZIM HONG KONG	4XGW	Unknown	0	0	0	0	0	0	32	32
ZIM IBERIA	4XFP	Unknown	59	61	44	88	84	41	53	430
ZIM ISRAEL	4XGX	Unknown	0	0	0	0	0	0	15	15
ZIM ITALIA	4XGT	Unknown	0	0	0	0	0	0	23	23
ZIM JAMAICA	4XFE	Unknown	46	25	40	61	82	29	41	324
ZIM KOREA	4XGU	Unknown	0	0	0	0	0	0	34	34
ZIM PACIFIC	4XFC	Unknown	0	0	0	0	0	0	34	34
ZIM U.S.A.	4XFO	Unknown	0	0	0	0	0	0	50	50
OBSERVATION TOTALS			**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**TOTAL**
			4758	6713	7386	7519	8499	7896	21977	64748

Meteorological Services—Observations

U.S. Port Meteorological Officers

David McShane
Voluntary Observing Ship Technical Leader
National Data Buoy Center
Building 1100, Room 353A
Stennis Space Center, MS 39529-6000
Tel: 228-688-1768
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

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
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

Marine Observations Unit
Bureau of Meteorology, 7th Floor
150 Lonsdale Street
Melbourne
Victoria 3000 Australia
Tel: +61 3 9669 4651
Fax: +61 3 9669 4168
E-mail: marine_obs@bom.gov.au

Michael J. Hills, PMA
Victoria Regional Office
Bureau of Meteorology, 26th Floor
150 Lonsdale Street
Melbourne
Victoria 3000 Australia
Tel: +61 3 9669 4982
Fax: +61 3 9663 4934
E-mail: m.hills@bom.gov.au

Malcolm Young, PMA
MalMet Services Pty Ltd.
Unit 3, 76 Gardiner Street
Como
Western Australia 6152
Australia
Tel: +61 8 9474 1974
Fax: +61 8 6210 1801
E-mail: malyoung@iinet.net.au

Captain E.E. (Taffy) Rowlands, PMA
NSW Regional Office
Bureau of Meteorology, Level 15
300 Elizabeth Street
Sydney
NSW 2010
Australia
Tel:+61 2 9296 1547
Fax: +61 2 9296 1648
E-mail: e.rowlands@bom.gov.au

Canada

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

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

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

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

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

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

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

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

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

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

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

Gérard Doligez
Météo-France
Quai des Abeilles
76600 LE HAVRE
Tel: +33 232740360
Fax: +33 232740361
E-mail: gerard.doligez@meteo.fr

P. Grandmaison
Centre départemental de Météo-France
2, bd du Château-Double
13098 Aix-en-Provence cedex 02
Tel: +33 442959020
Fax: +33 442959029
E-mail: pascal.grandmaison@meteo.fr

M. Le Stum
Centre départemental de Météo-France
Aerodrome
29490 Guipavas
Tel: +33 298325555
Fax: +33 298848550
E-mail: marcel.lestum@metro.fr

J-P Goubet
Centre départemental de Météo-France
17, bd Sainte-Beuve
62200 Boulogne-sur-Mer
Tel: +33 321332425
Fax: +33 321333312
E-mail: jean-pierre.goubet@meteo.fr

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.gov.hk

Israel

Hani Arbel, PMO
Haifa Port
Tel: 972 4 8664427
Aharon Ofir, PMO
Marine Department
Ashdod Port
Tel: 972 8 8524956

Japan

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
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 ⚓

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Data Buoy Center
Building 1100, Room 353D
Stennis Space Center, MS 39520-6000
Attn: *Mariners Weather Log*

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