Mariners Weather Log

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Sizing Up the Iceberg

"Indestructible Icebergs"

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Mariners Weather Log

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

National Oceanic and Atmospheric Administration
Conrad C. Lautenbacher, Jr., Administrator

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

Editorial Supervisor
Robert A. Luke

Editor
Bernadette T. Duet

Layout/Design
Patti Geistfeld

Articles, photographs, and letters should be sent to:

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

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

From the Editorial Supervisor

From the Editorial Supervisor

Hello, and Happy Holidays from the entire MWL family. The holiday period is normally a joyous and festive time for all. It is a time to savor the memories past and make new ones with your friends and loved ones. Yes, things have changed this year. No matter where we call home, I believe we all can share a tragic moment or two from this past year. Let us remember our World Trade Center's maritime family of American Bureau of Shipping (ABS), New York Shipping Association, PACRIM, Port Authority of New York & New Jersey, Rohde & Liesenfeld, Serko & Simon LLP, and Zim-American Shipping Company , and lift them up in our hearts this holiday season by remembering all the fond memories we have shared..

This issue has a lot of great stories for your reading pleasure. The *International Ice Patrol* graces our cover with a historical perspective of iceberg removal. Another article, first printed in SMITHSONIAN Magazine, tells of how flotsam can be used to study the ocean currents. The British METOFFICE has offered us a story on the EGOS buoy programme, and the Miami Herald has given permission to reprint their story of how the National Hurricane Center used our VOS Observations to help track Tropical Storm Allison.

Once again, best wishes for a happy and safe holiday season, and I hope that Santa Claus, Criscringle, Father Christmas, Father Frost, Père Noël Joulupukki, Kris Kringle, Sabdiklos, Saint Nicolas, Sancte Claus, Sinter Klaas, or Weinachtsmann brings you all that you hope for and more.
– **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/om/mwl/mwl.htm
Marine Dissemination	http://www.nws.noaa.gov/om/marine/home.htm
U.S. Coast Guard Navigation Center	http://www.navcen.uscg.gov/marcomms/

See these web pages for further links.

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Indestructible Icebergs

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April 15, 2002 will mark the 90th anniversary of the loss of the 'unsinkable' RMS Titanic. The Titanic struck an iceberg late in the night on April 14, 1912 while crossing the Atlantic Ocean south of the Grand Banks of Newfoundland, and vanished under the waves within two and a half hours, taking the lives of over 1500 passengers and crew. This tragic event directly lead to the creation of the International Ice Patrol.

The crew, or "Ice Picks" of the International Ice Patrol, consists of 18 people: a civilian oceanographer and a computer specialist, four officers, one yeoman, and ten marine science technicians located in Groton, Connecticut, with an eleventh marine science technician remotely located at the National Ice Center in Suitland, Maryland. The Ice Picks work closely with expert aviation technicians and air crew from Coast Guard Air Station Elizabeth City, North Carolina. The small crew of the International Ice Patrol is dedicated to serving the North Atlantic mariner and protecting seafarers of all nations from the dangers of icebergs. Since the U.S. Coast Guard began monitoring ice conditions in 1913, they have amassed an enviable safety record. There have been no reported losses of life or property for vessels that have heeded the Ice Patrol's published warnings.

The International Ice Patrol is responsible for providing the Limit of All Known Ice (LAKI) which is specified under the Safety Of Life At Sea (SOLAS) agreement in Chapter V and states specifically "...the south-eastern, southern and south-west limits of the regions of icebergs in the vicinity of the Grand Banks of Newfoundland shall be guarded for the purpose of informing passing ships of the extent of this dangerous region..." From the beginning of the International Ice Patrol until WWII, this service was provided by ships of the Revenue Cutter Service (now the United States Coast Guard). Aircraft provided the primary search method during and after the war, with surface vessels being used during unusually heavy iceberg years.

Since the start of the International Ice Patrol, one question has been asked more then any other. Why not just blow up the iceberg? The short answer is, we tried.

There have been many attempts over the years to reduce the threat posed by icebergs by destroying them and/or speeding up their melting. The theory is that smaller

pieces of ice will melt faster. The problem has been, and continues to be, making the smaller pieces of ice. Most of these experiments were spur-of-the-moment efforts.

Sizing up the Iceberg

The first documented International Ice Patrol attempt to destroy an iceberg occurred on March 26th, 1913 when the U.S. Revenue Cutter Miami used her deck gun on an iceberg she was shadowing (following). The description in the official trip report is "A 6-pound shot was fired against the vertical wall of the berg and had no other effect than to shake down a barrelful of snowlike dust." Undeterred by this initial failure, the Cutter Miami again used her 6-pounder deck gun on an iceberg on May 26, 1914. This time she fired twelve rounds and found the results to be "...just as effective as if we had stormed the Rock of Gibraltar." In June 1915, the U.S. Revenue Cutter Seneca reported "One of its faces presented a good target, and I caused seven common shell, without bursting charge, to be fired into it from our 6-pounder guns. The ice was so rotten that the projectiles entered the ice and stuck there, plainly showing their bases in the holes they made." There are many more reports of a similar nature detailing the use of everything from 20mm cannon to the standard 5-inch gun on the larger cutters. In each case it was found that aside from making a bit of crushed ice, the gunfire had no noticeable effect on icebergs.

Ready, Aim, Fire!

One of the collateral duties assigned to the vessels of the International Ice Patrol was the destruction of derelict vessels, which were usually wooden sailing ships that had been abandoned and might drift for months on the ocean currents, thereby posing a hazard to safe navigation. The ships used guns, mines (an explosive device designed specifically to be attached to the hull of the vessel), and other explosives such as TNT to destroy derelict vessels. Experiments using these items were conducted to see how effective they would be in speeding up the destruction and melting of icebergs. Captains of the vessels would decide to mine the icebergs by letting the explosives drift next to the iceberg, attaching the explosive to them, placing the mine on the iceberg, or trying to jam the explosives into a hole in the surface. In each case, very little damage was done to the iceberg.

In the 1920's, Professor Howard T. Barnes of McGill University located in Montreal conducted experiments on river ice dams using thermite (an incendiary material that produces molten iron at 4000°F) to remove the blockages. In 1926, experiments using thermite were conducted on icebergs with very promising results; however, the findings were not followed up on for many years. In 1959, the research using thermite on icebergs was revisited, and experiments using aerial delivery were conducted using surplus WWII incendiary bombs. The bombs would burst on the surface and spread the material over the iceberg, having little overall effect. However, results were reviewed and scientists still

Drilling

felt thermite had merit for further exploration.

Ice Patrol conducted further experiments using Thermite in 1960 that were more carefully designed and executed, but this time on grounded icebergs near Newfoundland. This required that an iceberg be boarded, holes bored into the iceberg, placement of thermite in the holes, and then detonation. These were very dangerous operations on an unstable iceberg that could roll over at any time with little or no warning. Three different Thermite charges of 196 lbs, 364 lbs, and 560 lbs of Thermite were detonated on two separate icebergs.

The first charge of 196 lbs was detonated and produced steam and molten metal that was scattered over a distance of 100 yards, but did little more than produce several

Thermite Explosion

small growlers (very small icebergs) and a small crater. Another iceberg was boarded, and the second charge of 364 lbs was set and detonated. The results were the same. The final charge of 560 lbs was then set at the base of a large pinnacle on the iceberg. In the International Ice Patrol Bulletin for 1960 it states "... a magnificent display took place as smoke and molten iron was hurled hundreds of feet into the air, but the berg remained virtually unchanged. This concluded the thermite tests."

Carbon Black Painting on Icebergs

Another experiment involved the use of carbon black painted on an iceberg. The theory was that the carbon black would absorb heat from the sun and speed the melting of the iceberg. The carbon had to be spread by hand, which required boarding an iceberg with all the inherent dangers. This experiment met partial success because as the iceberg melted, the water run off would wash away the carbon black, which would stop the melting. Additionally as the center of gravity changed, the iceberg would tend to roll, exposing a fresh clean face to the world, thus requiring another application of carbon black.

Experiments having aircraft drop 1000 lb general purpose and semi-armor-piercing bombs on icebergs were also conducted. Of the twenty bombs dropped, eighteen struck the iceberg. Of those eighteen, three failed to explode, and three detonated underwater. Aside from producing some brash ice, the iceberg was unharmed. Experiments using explosives have been conducted as recently as the 1980's.

Research has also been conducted concerning the use of wires heated by electricity to cut through the iceberg; however, it was found that the electric motors would burn out on the generators before significant progress could be made.

Bombing Experiments Prove Unsuccessful

The International Ice Patrol long ago abandoned its iceberg destruction research. The information presented is to give you an appreciation and a respect for the strength and power of icebergs. Even today, modern, radar equipped ships do strike icebergs. Three ships struck icebergs as recently as 1993. For all of our attempts to melt, destroy, or remove them, the safest and surest method has been found to simply report the positions of the icebergs

and allow nature to work its magic.

If you would like further information on the attempts to destroy icebergs, please contact the International Ice Patrol or visit our web page.

How to Report Icebergs

The Ice Patrol encourages commercial vessels to immediately report ice sightings to COMINTICEPAT GROTON CT through INMARSAT-A or C, using Code 42 to U. S. Coast Guard Communication stations or to Canadian Coast Guard marine radio stations. Regular weather and sea surface temperature reports provide valuable information even when no ice is sighted. Sightings may be reported on guarded frequencies as listed in the annual Announcement of Services.

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

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

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

3. Mail request to:

Commander,
International Ice Patrol
1082 Shennecossett Road
Groton, CT 06340-6095
Attention: Ice Information Officer

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

What to Include in an Ice Report

When reporting icebergs, certain information should be included:

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

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

Table 1 Sizing Guidelines

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

Table 2 Shape Guidelines

Ice data is constantly analyzed at the International Ice Patrol operations center in Groton, Connecticut and added to a computer model. This model incorporates environmental factors such as winds, waves, currents, and sea surface temperatures with iceberg reports to predict drift and deterioration. The processed information from the model is used to estimate the Limit of All Known Ice every twelve hours. The LAKI, sea ice limit, and an area of many bergs are broadcast in two daily text bulletins and a graphic fax chart. The broadcast times and frequencies are available in the annual Announcement of Services. They are also posted daily in the Products section of the IIP web page at:

www.uscg.mil/lantarea/iip/home.html

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

MESSAGE IN A BOTTLE - By studying objects cast up on our shores, researcher Curtis Ebbesmeyer traces the flow of ocean currents

Kevin Krajick
Photographs Rick Rickman
Reprinted with permission

This article originally printed in The Smithsonian, July 2001

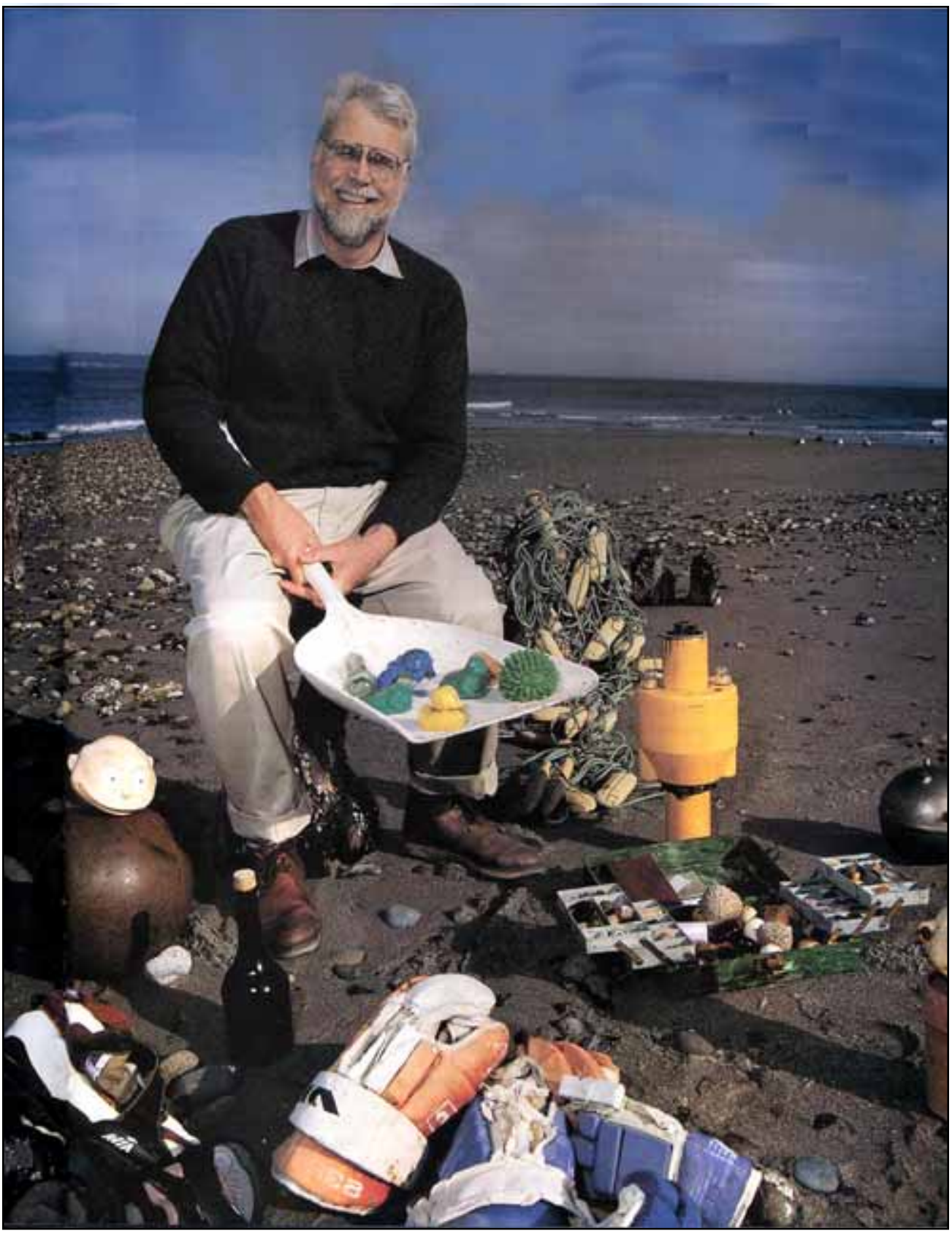
If Curtis Ebbesmeyer had just one word for budding oceanographers, it would probably be: plastics. If he had more than one, he might add: roll-on antiperspirant balls, toxic-waste containers, computer monitors, lightbulbs, armadas of toys and sporting goods, toilet seats, bales of rubber and marijuana, explosive devices, surfboards, coconuts, aircraft, the occasional human body, and a surprising number of genuine messages in bottles. The seas are wonderfully, horribly full of floating things. Sooner or later, many of them wash up on the beach; and on the way, some make epic continent-to-continent journeys, thus forming new data points regarding the complex doings of long-distance ocean current systems-the subject of Ebbesmeyer's work.

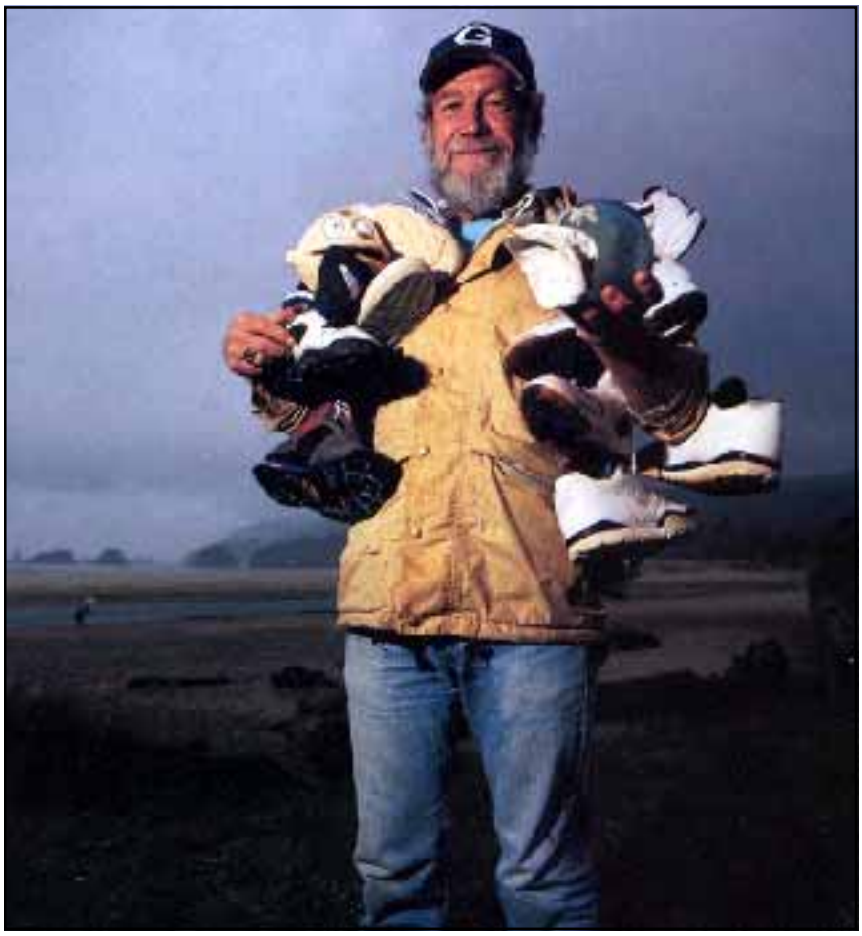
Scientists study currents ever more intensely: they affect not only transportation but weather, biology, evolution and climate change. Most oceanographers use satellites and high-tech buoys for tracking them; Ebbesmeyer, a self-described "filter feeder on floating objects," stubbornly does it the old-fashioned way—by studying movements of random junk. Part reporter and historian, part water physicist, he has sources everywhere, including his own vast, ragtag worldwide army of beachcombers. "The literature of things that float from here to there is so scattered it makes no sense until you compress it," he says. "Then it begins to take on a glow, like radium."

His contributions to the literature range from the seminal to the semi-wacky, but we know one thing: he is probably the only scientist to have posed for *People* magazine mostly naked (grayed in the chest hairs, but looking good) in the pool with a floating bathtub ducky, a souvenir of one of his greatest research triumphs. Colleagues with fancier instruments and stiffer attitudes may sneer, but deep down they must suspect the truth: he has more fun than they do. Along the way, he has learned that ocean surface currents can be chaotically changeable; if two bathtub toys are dumped, say, in the middle of the Pacific at the same moment in the same spot, one may wash up in Hawaii while the other might end up frozen in an Arctic ice floe.

I accidentally entered the world of long-distance floatables on a Canadian Coast Guard icebreaker traversing the Northwest Passage—that frozen labyrinth of islands where Arctic ice floes slowly drain toward the Atlantic. In this treeless region, I was watching off the bow one day for polar bears and instead spied dead ahead a weathered tree fragment in the ice. Eddy Carmack, an onboard oceanographer specializing in water movements such as eddies, assured me this was normal. "Trees fall off banks of north-flowing Siberian and Canadian rivers," he said. "Then they move into the sea ice. They may go around clockwise with the Transarctic Drift"—a great gyre circling the Arctic Ocean—"for 30 years. Eventually, the tree gets spit out near Greenland. If it's not too waterlogged, maybe then it circles the Atlantic for a while. Maybe it lands in England or North Carolina, then somebody puts it on the mantel. There's a lot of odd stuff like that." Carmack jotted down the Seattle phone number of Curt Ebbesmeyer—the man he said knew the most about such odd stuff.

Ebbesmeyer got started in the mid-1960s with Mobil Oil as a roustabout, then, after attending the University of Washington, an oceanographer. A lot of Mobil's oil





Peripatetic beachcomber Steve McLeod, displaying a glass fishing float and other finds, has served as a roving data collector for Ebbesmeyer

was under the frigid Grand Banks off Newfoundland; Ebbesmeyer was told to figure out how to tow approaching icebergs—the largest floating objects in the world- away from drilling platforms. In 1974 he joined Evans—Hamilton, Inc., a small oceanographic consulting firm specializing in measuring and understanding ocean currents. His projects have included placing sewage outfalls to minimize impact on shore ("Did you know 10 percent of sewage floats even after secondary treatment?") and tracking oil slicks (of his work on the Exxon *Valdez* spill: "Did you know oranges are good experimental surrogates? For some reason, if you dump thousands in seawater, they'll distribute themselves exactly like spilled oil").

Each ocean, carrying the long-distance floatables studied by Ebbesmeyer, hosts one or more huge gyres shaped by prevailing winds, Earth's rotation and bordering landmasses. The Gulf Stream, skirting the U.S. East Coast, is part of a clockwise pattern of surface currents that carries Caribbean debris past Nantucket, toward Iceland, to the coasts of Norway and Britain, around the calm center of the Sargasso Sea, and back again. In the Pacific, the Kuroshio, or Japanese, Current arcs clockwise away from Japan and becomes the North Pacific Drift, then turns south 200 to 500 miles off Washington or Oregon, where it is called the California Current. Off Baja California, it turns back out, passing Hawaii, heading for the Philippines and China, and back to Japan. An object may take six years to complete the roughly 14,000-mile circuit.

Unless sidetracked in any of countless ways. Storms drive floaters off track, especially ones with windage—exposed surface area making a sail—into counter-currents or competing gyres, like the North Pacific's counterclockwise Alaska Current, which can snag something from the Pacific Northwest and send it toward Siberia, or filter it through the teeth of the Aleutians to be sucked through the Bering Strait and into the swirling belly of the Arctic. Alternatively, junk may hang out for years if it drifts into the eyes of the great oceanic gyres. Also, strong winds can cause water masses to upwell or downwell powerfully, which is reflected both in surface movements and in huge worldwide submarine currents that flow their own separate ways—a whole other story.

It is also becoming apparent that major surface current systems, once thought stable as rocks, are capable of huge, sudden shifts. In the prehistoric past, these could have been the result—or cause—of drastic climate change; many scientists think that cycle could recur, with dire results. Oceanic distributions of nutrients depend on currents; hitchhiking on currents is

integral to the life cycles of everything from eels to sharks. There's also evidence that even large terrestrial animals may spread and evolve by the unlikely mechanism of "rafting" on ocean debris.

It seems unlikely also that any small human-made object can survive a long voyage, make it to a beach and stay long enough for someone to come along at just the right moment to discover it. But objects do. Boy, do they.

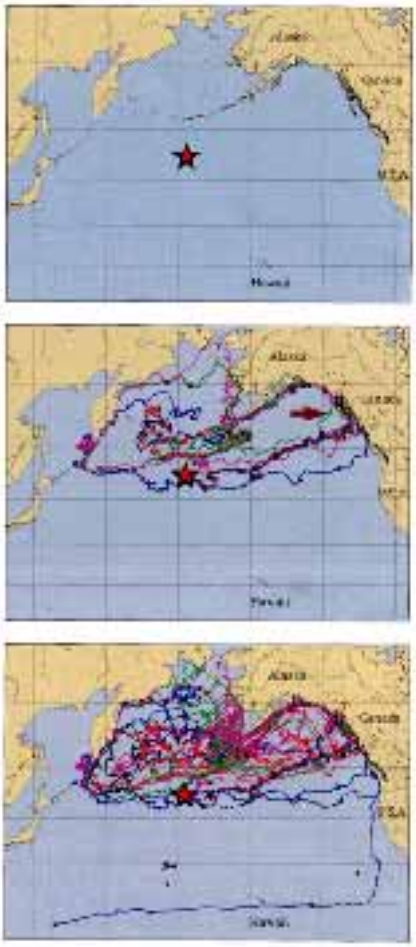
In 1959, the Guinness brewing company of Dublin dumped 150,000 of its bottles into the Atlantic and Caribbean, each containing a scroll bearing greetings from "King Neptune" extolling Guinness and providing instructions for converting the bottle into a lamp. They were so well sealed with cork, wax and lead tape, Guinness predicted they would go 500 years. According to one of Ebbesmeyer's sources, about 80 bottles made it to Coats Island in Canada's Hudson Bay, to be spotted by Inuit hunters. The mystified Inuit used the bottles for target practice, but then saw the scrolls and buried the rest in an unmarked grave.

Ebbesmeyer loves such arcana, but must admit that his first love is garbage. There is so much of it. And most is plastic. The buoyant, indestructible stuff has exploded since the 1950s and '60s; before that most marine garbage was organic, so it eventually rotted or sank. The bulk may come from land, dumped offshore or floated out rivers, but ships contribute much. Lost synthetic fishing gear alone—nets, traps, buoys, lines, packing material—may run 150,000 tons a year. More is washed or thrown off merchant and pleasure vessels, despite a 1987 international convention supposedly curbing marine dumping. As many as 1,000 or more boxcar-size shipping containers—perhaps the most fruitful sources of intriguing objects—fall off ships annually, releasing fleets of floatable goods.

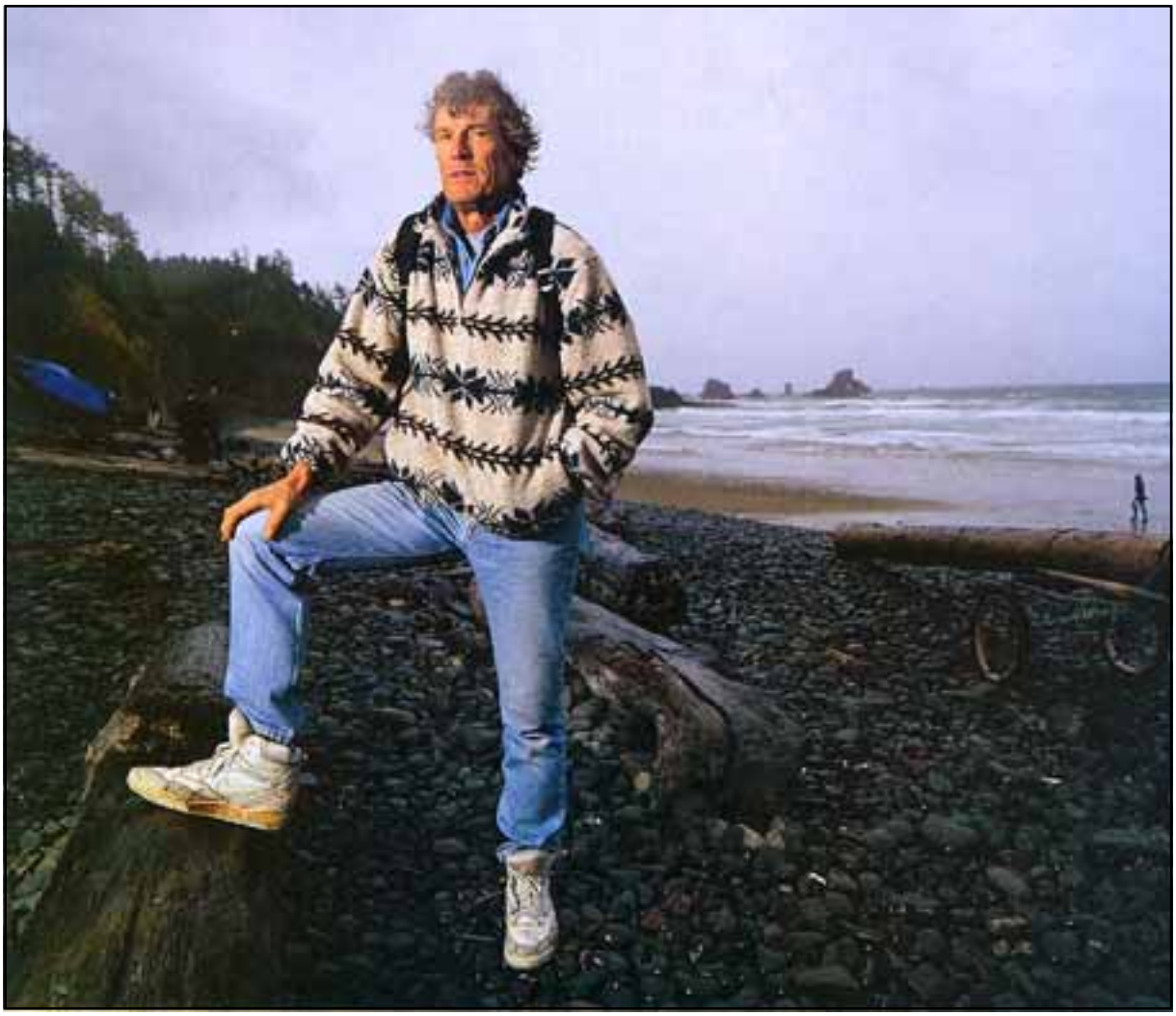
The results are horrifying. In some years tens of thousands of seals and hundreds of thousands of seabirds may die entangled in lost fishing gear. Turtles, whales, fish and at least 100 seabird species mistake plastics for floating food: autopsied animals are often crammed with cigarette lighters, plastic bags, tampon applicators, toy soldiers. Old plastics break up under ultraviolet radiation and waves, but never die; they turn into "nurdles"—colorful, anonymous fingernail—to BB-size bits. The ocean keeps trying to cleanse itself of them like a cold sufferer spitting phlegm. After a recent count, the Southern California Coastal Water Research Project estimated there were more than one million per mile along Orange County beaches. "To my horror and fascination, plastic trash just keeps going," says Ebbesmeyer. "It is both sinister and useful."

Others have long put floatables to work for science. Eighteenth- and nineteenth-century explorers figured out the outlines of major currents simply by watching where objects traveled, including their own vessels. Today, scientific institutions are deploying the latest

Bathtub Toy's Drift



In 1992 a container ship spilled 29,000 bath toys into the Northern Pacific (star, top). After 400 were found (arrow, middle), oceanographer James Ingraham used a computer model to track the objects' route and extrapolate where the remainder would go. Monor currents would push these floatables along myriad paths, indicated here by individual colored lines. The center chart projects the toy's travels through 1995; the bottom, through the end of last year.



On Oregon's Indian Beach, collector Barry Tweed sports Nikes from the 1990 spill that became a subject of scientific inquiry

tracking devices: a planned fleet of 3,000-some PALACE floats, or Profiling Autonomous Lagrangian Circulation Explorers. These drifters automatically sample salinity and temperature—also measures of water movements—and dive on programmed schedules as deep as a mile to catch various current layers, surfacing occasionally like U-boats to transmit data to satellites. But instruments like these cost thousands of dollars apiece and are, by necessity, deployed in limited numbers.

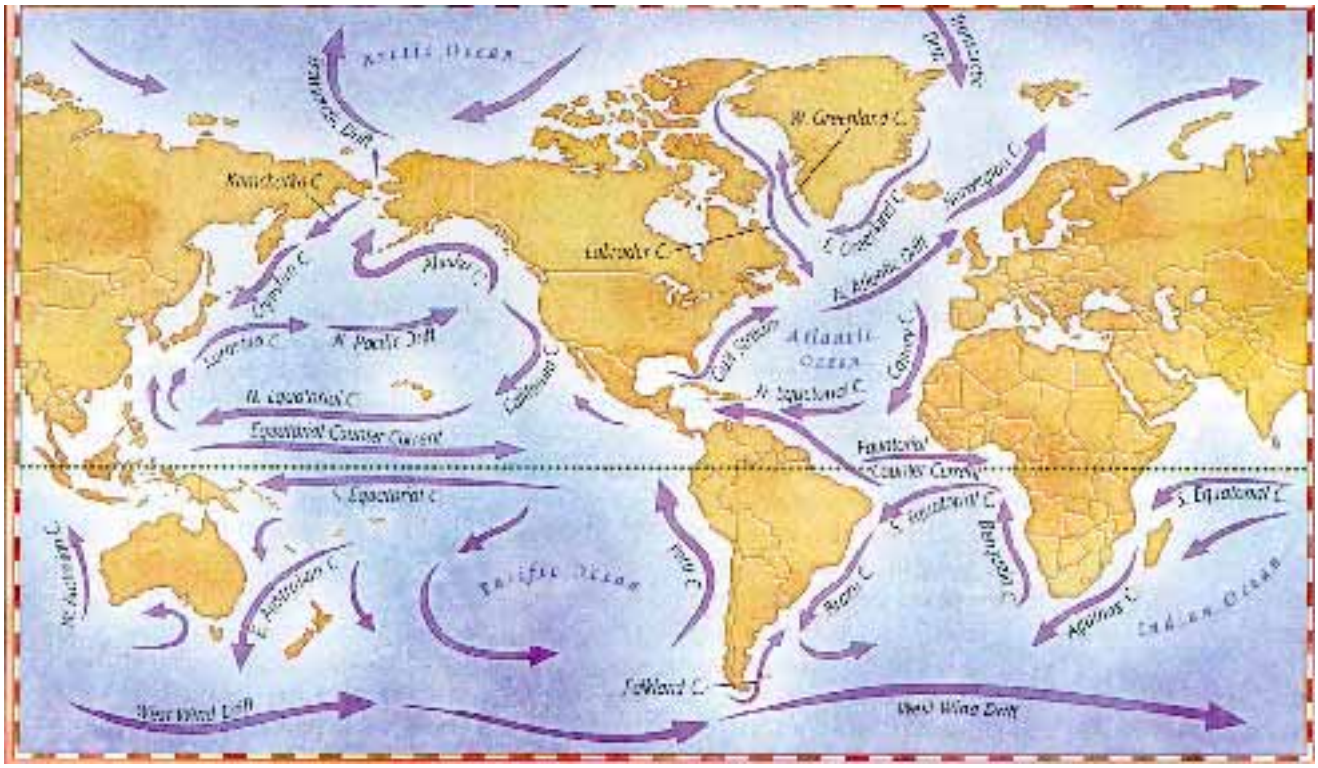
Which brings us back to floating junk—and to Curt Ebbesmeyer. For years he labored at his consulting firm in Seattle but never quite managed to grow up; endlessly curious, Ebbesmeyer did extracurricular thinking on everything from migratory shad to the origin of life. He and a group of colleagues were the first to point out that a single, sudden 1976 Pacific climate/circulation swing had affected dozens of seemingly unconnected phenomenon, including West Coast water-oxygen contents, Arctic sea-ice extents, Andean glacial dynamics; life cycles of corals, crabs, oysters, salmon. He collected this data from existing studies, like so much beachcombed drift; the resulting publication became a key paper on climate change.

Field science was about to take over Ebbesmeyer's life, beginning one day in May' 1991, when his mother, Genevieve, was serving lunch and reading from the paper. Factory-fresh Nike sneakers and hiking boots were washing up on Oregon beaches—so many that

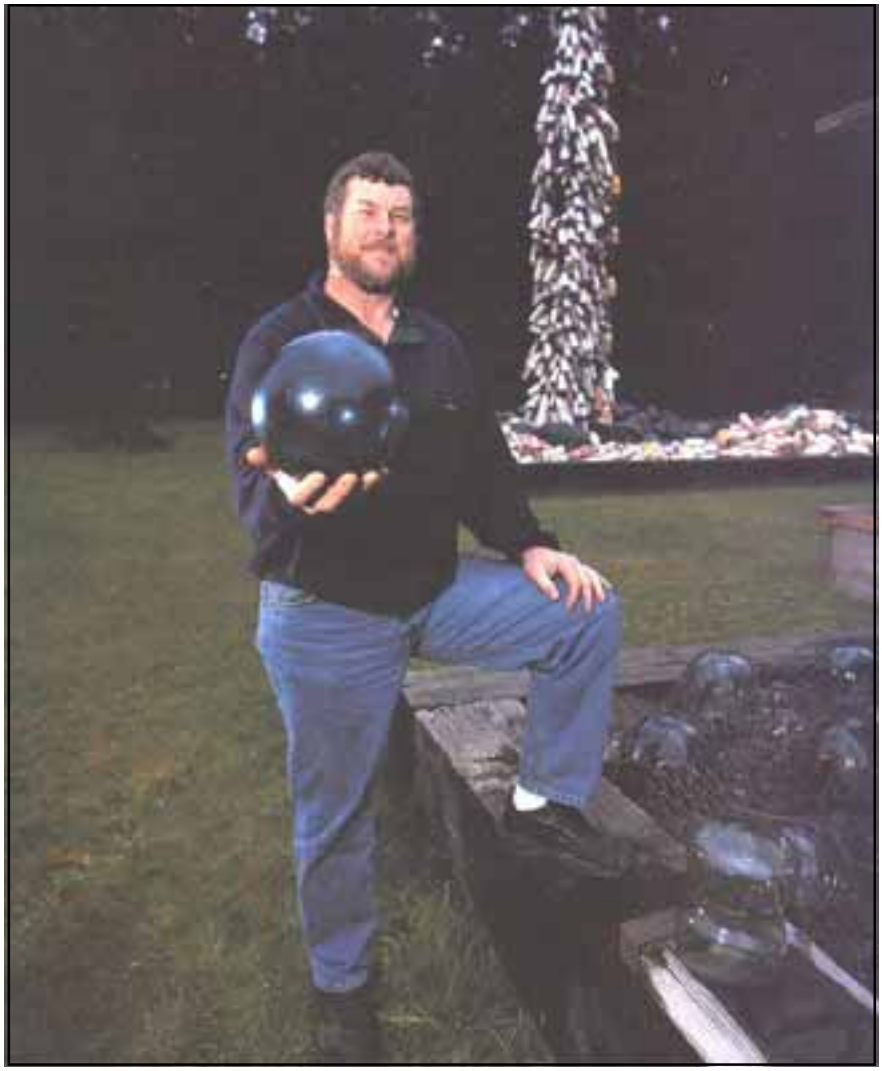
beachcombers were holding swap meets to match lefts with rights of correct sizes for selling or for wearing. No one knew the source. "Curt, isn't that your business to figure out things like that?" inquired Genevieve. Some hours later the phone rang at a home in coastal Rockaway Beach, Oregon, where a swap meet was in progress. It was Curt Ebbesmeyer.

Thus began a brilliant new incarnation for the oceanographer—and for beachcomber/artist Steve McLeod, mightiest Nike hunter of them all. Converging currents and winds make the Pacific Northwest one of the world's most productive beachcombing regions, and thus host to a long-time secret society of serious beachcombers. The big prizes: old glass fishing-net floats, handblown in Japan and ranging from golf-ball-size and smaller to bigger than a medicine ball. The rarest are worth at least $3,000; there are also crab pots, ship parts and many other resalable objects. Pros monitor 24-hour weather radio for two or three days of winds from the south to move debris in from the main oceanic gyre, hobnobbing with fishing captains for intelligence on offshore sightings. Storms, of course, are prime time. Combers wait for high tide—even if it's at 3 A.M.—then climb down crumbly cliffs to dot beaches with lanterns, flashlights, floodlights and headlights; pickup trucks rove surf lines on accessible stretches.

No one knows who found the first Nikes, but McLeod collected his initial batch of about 20 along and near Crescent Beach, a wild stretch of sand flanked by cliffs near his home in Cannon Beach, Oregon. The 56-year-old ex-coast guardsman had long ago dropped out of the "consumerist economy" to pick chanterelles in the woods and sell salvaged fishing floats; he saw an opportunity here. His size nine hiking boots were worn out, and here was an expensive new size nine Nike—albeit only a left, encrusted with barnacles. Combers are generally secretive, but this time they needed each other. One woman mentioned the Nikes to a local television reporter and the news spread. People put the shoes in washers with bleach. Ensuing swap meets featured mounds of Nikes. Soon McLeod had new



Each of the oceans is home to one or more huge gyres, formed by the major surface current systems. These currents, shown above in their average locations and directions, are driven primarily by prevailing winds and Earth's rotation. Image courtesy of Karen Minot



John Anderson has recovered an array of glass fishing floats (he holds his favorite; his rarest is by his foot), along with countless foam buoys that cover a 40-foot post in his yard.

boots on both feet, plus a stock of extras that eventually netted him about $1,300, at around $20 a pair.

Things really got going with the appearance of "Dr. Curt," as they called him. For him, this was not about the money. It took half a dozen phone calls to find McLeod, and a dozen or so more brought him to Nike's transportation manager. The man told him—as Ebbsmeyer suspected—that Nike had lost a load of shoes in a shipping accident; the courts were ironing it out. "They're washing up now. Do you want them back?" asked Ebbesmeyer. He was told, not surprisingly, that he and the beachcombers could keep them. Here, thought Ebbesmeyer, is the best drift experiment anyone could dream of.

Phoning shipping lawyers, he got court papers with baseline data: the ship was the *Hansa Carrier*, en route from Korea, hit by a storm on May 27, 1990, at 48 degrees north, 161 degrees west. Twenty-one containers were swept off deck; five held 80,000 Nikes. Each Nike tongue had a telltale serial number, distinguishing the shipwrecked ones from those of, say, random drowning victims or forgetful beachgoers. (Ultimately, those serial numbers led Ebbesmeyer to deduce that only four of the five containers had likely opened—spilling 61,280 shoes into the sea.)

Ebbesmeyer visited the beachcombers repeatedly, and fit right in. "A kindred spiritwith a PhD!" thought McLeod. He was footloose, so Ebbesmeyer deputized him to document where more Nikes turned up. On the Oregon coast, McLeod met with a diner waitress who directed him to her brother-in-law, who had a garageful. In another town, he looked both ways, then dove head first into a Dumpster for Nikes discarded by a beach cleanup crew. Crossing over into British Columbia, he eventually reached the wild Queen Charlotte Islands, near Alaska. He joined a sea-kayaking trip in the southern islands and, farther north, met beachcombers who had recovered Nikes. Meanwhile, Ebbesmeyer collected more reports from his expanding beachcomber network. After a year or so, they had compiled reliable details on 1,600 wash ups, a 2.6 percent recovery rate—very respectable.

Ebbesmeyer's old buddy, Jim Ingraham of the U.S. National Oceanic and Atmospheric Administration, had worked for years to

extrapolate a computer model of changing Pacific surface currents from Navy weather data, but so far it was only theoretical; here was a real-life test. They plugged in spill coordinates with beaching coordinates and dates; the predictions of Ingraham's Ocean Surface Current Simulator (OSCURS) matched nicely. This allowed Ingraham to refine OSCURS, and draw computer-animated Nike paths, "spreading like ganglia in the ocean and balling up in coastal currents. Then, based on historical weather data, they simulated identical spills for May 27 of every year, 1946 to 1991. The Nikes went a different way each time—a tribute to the ocean's variability. "The surface layer is a strange place," said Ingraham.

Even before it was published in the geophysical journal *EOS,* the study made them minor media stars (what reporter could resist science based on oceangoing sneakers?), and with this, Ebbesmeyer found his true calling. Hundreds of people phoned to see if he could advise on other odd floatables they had found. Failing to find even one other scientist pursuing such things, he decided he was the man for the job. He had already cut his paid workweek 40 percent in order to write more; now he awaited his fondest hope: another big container spill. Besides McLeod, his occasional unpaid "research assistants" included Barry Tweed, a retired Oregon contractor who had built two stunning seaside houses of cedar, hemlock and redwood logs salvaged from surf; John Anderson, a Forks, Washington, plumber

Anderson's haul also includes Japanese soda bottles, orange C- ration containers and other finds.

who had backpacked 30,000 driftnet floats from beaches to a very large pile by his garage; and Vern Krause, a Washington school bus driver with the distinction of having found a mysterious stainless-steel sphere that was confiscated by the military after Ebbesmeyer sought help in identifying it. (Deemed safe, it was returned the next week.)

In December 1991 a friend sent Ebbesmeyer a message in a bottle found on southern Vancouver Island. Gingerly prying open the dampened ship's sheets, Ebbesmeyer saw Chinese characters—a printed appeal for the release of the famous dissident Wei Jingsheng, by then imprisoned 12 years. It took Ebbesmeyer and six colleagues a year of phone calls and help from a friendly American ex-intelligence man to, first, decipher the waterlogged message, and then establish that Taiwanese frogmen had been aiming propaganda bottles toward the mainland for years. Evidence suggested this one had likely been released in summer 1980 near the island of Quemoy, when coastal currents were favorable. Obviously, it had gone off course. Ingraham again applied OSCURS to plot the probable route—through an island chain below Japan, then across the Pacific—and they published a paper in *EOS*, ending with the hope that the "magic of bottle notes" would secure Wei's release from a second term in prison. In 1997 Wei was freed—though no bottle connection is known—and when he came through Seattle, he met with Ebbsmeyer, who gave him a copy of the *EOS* paper.

In 1993 an article from the Sitka (Alaska) *Sentinel* metamorphosed into the team's proudest achievement. It reported that scores of tangerine-size yellow ducks, green frogs, blue turtles and red beavers had beached in Alaska coves. Another big container spill—bathtub toys, no less.

Ebbsmeyer confirmed some 400 sightings along 530 miles of Alaska shoreline. Deciding experiments were in order this time, he obtained samples from the toys' U.S. distributor, Kiddie Products. Each four-toy set was housed in a plastic shell with a cardboard backing, but soaking in seawater dissolved it, meaning the toys had probably been released to go their separate ways within 24 hours.

Ebbsmeyer also noted that some of the salvaged toys appeared to have been gnawed by sea otters,

One theory behind Elian Gonzalez's survival, vivified in a mural installed in Miami, is that dolphins nosed the boy's inner tube, an appealing floatable, to safety.

so he drilled otter-tooth-sized holes in his samples to judge what portion of the originals might have sunk: none. "Very high-quality bathtub toys," said Ebbsmeyer. "Buoyant even when half-waterlogged." He stuck them in his freezer to see if Arctic cold would crack them. Nope.

Then one day he got a call from a minor shipping executive, telling him his ship had come in and directing him to a Tacoma dock. Ebbsmeyer spent four hours with the captain, who opened the ship's log to the spill—29,000 toys dumped on January 10, 1992, at 44.7 degrees north, 178.1 degrees east. With the picture complete, OSCURS got huge amounts of new data. Best of all, Kiddie Products printed the duckies' calculated twisty 15,000-mile route on the back of every new bathtub-toy package. "By far our best publication," says Ebbsmeyer.

He has since founded the nonprofit Beachcombers' and Oceanographers' International Association, complete with the *Beachcombers' Alert!* newsletter (500 paid subscribers from as far as West Africa and New Zealand) and its own Website (www.beachcombers.org). The organization has documented spills of everything from onions to hockey gloves.

Aiming to census marine trash in general, in summer 1999 Steve McLeod signed onto a small sailing vessel owned by the environmentalist Algalita Marine Research Foundation for three weeks. They headed into one eye of the North Pacific Subtropical Gyre—dubbed the Garbage Patch, because it collects so much junk. McLeod spent the three weeks seasick despite his years in the Coast Guard—but still scanning the horizon. About as far from land as one can get, they found piles of rope fishing gear, liquid containers, a volleyball, even a refrigerator. The main haul was nurdles: drags with fine nets indicated 129,000 per square mile—six times the mass of collected zooplankton. A mahi-mahi caught for dinner was full of nurdles.

Ebbsmeyer felt sick when he heard the results. "How do we measure the sea's wildness?" he said. "Like a doctor sizing up a patient, I'd look her in the face. She's breaking out in a nasty rash."

Lately he can be found in his basement warren of six rooms crammed floor to ceiling with newspapers, books and blue looseleaf binders marked by topic, all related somehow to floating things. I visited him there and saw he was continuing to expand: there were rare books on funerary practices of the ancient Vikings, who liked setting dead people adrift. One binder read CUBAN REFUGEE RAFTS. A recent subject of speculation, as reported in *Beachcombers' Alert*!: Did the shipwrecked Cuban boy Elián González survive because porpoises, supposedly attracted to the floatable inner tube, had nudged the boy to safety?

Next day I visited John Anderson, the plumber with the major fishing-float collection. Anderson had

obtained the superstructure of a large crane, planting it vertically in his front yard and covering much of its 40-foot height with foam fishing floats—a kind of totem pole. "My monument to beachcombing," he said. A four-hour tour through the grounds, house and outbuildings showcased his meticulously organized acres of doll heads, fish gaffs, hard hats with peoples names on them, sake bottles, neoprene gloves, ropes, a police LSD-testing kit, fossils, animal bones. "Curt taught me not to overlook anything," said Anderson.

Down in Canyon Beach, McLeod seemed a little depressed. He showed me around town, sporting a pair of fancy Nikes—he has a lifetime supply—but a business plan to sell sculptures of beachcombed kelp stalks had tanked due to lack of demand. The beaches were spectacular and covered with countless nurdles. Had they been gold flakes or garnets, we would have been rich. While we hiked, McLeod fantasized about new ways to make money, including a machine to filter recyclable nurdles from the sand.

On my travels I also did a lot of beachcombing myself. My best site was the Willapa National Wildlife Refuge at Leadbetter Point, Washington. It was a mile-and-a-half walk through dense bush and drizzle to a long, arcing beach where a receding tide, trackless sand and tsunamis of sanderlings flying just above the swash told me I was on a still-wild coast. There are so few left.

Here, in addition to countless plastic bags, bottle tops, and soda and water bottles, I logged 302 items. Partial List: beer cans—Coors, Bud, Miller, Hamm's, Rainier; plastic Kodiak chewing tin; blue plastic 55-gallon drum, empty; blue plastic hospital ID bracelet, no name; peppermint Life Saver, individually wrapped; glass Oso Negro liquor bottle, top on; two foam fishing buoys; plastic deli clamshell; three car tires; Taco Bell bag; synthetic rope; 12 spent shotgun shells; intact fluorescent light tube; plastic containers for Windex, Spic & Span, Pennzoil, Dannon and Yami yogurts, Darigold cottage cheese, L'Oreal Kids shampoo; a sneaker made in Taiwan; red-billed cotton cap; two nice scallop shells; a golf-ball-size chunk of light gray pumice, possibly from Mount Saint Helens; and—beginner's luck—a real live message in a bottle.

It was semitransparent white plastic vitamin bottle with a rusted metal cap, half buried in the fresh, wet sand, displaying a paper square jammed inside. I unscrewed it and pulled out two dry sheets—a photocopied memorandum dated Oct. 20, 1999, regarding lifeboats aboard the *USS Camden*. There was an informal Q&A regarding life, and its alternative, after abandoning ship for the boats.

Q: After you are in the water, what is the most likely cause of injury to be encountered?

A: Underwater explosion.

Q: How do you enter the water and proceed away from the ship in case of burning petroleum in the water?

A: Enter feet first, swim under water, coming to the surface for air by splashing water away and swim under water. Repeating the process until you are clear of the flame.

Q: With water, how long could a man survive without food?

A: Three weeks or longer.

Q: How long could a man survive without water?

A: Eight to twelve days.

And so on.

I checked with the Navy. The *Camden* is a combat-support ship, based near Seattle. Most of its recent missions had been routine coastal exercises. As far as I could tell, all aboard were safe and well; I do not know why someone dropped this bottle, which probably did not drift far. I now keep it in a cabinet by my desk. For some reason, more than anything else I have, it reminds me of the sea.

Kevin Krajick's *Barren Lands: A Journey to the North American Arctic in Search of Diamonds* is currently being published by W.H. Freeman. Photographer Rick Rickman is based in Laguna Niguel, California.

European Group on Ocean Stations

'Where decision-makers for buoy observations in the North Atlantic Ocean Meet'

Torleif Lothe
EGOS Technical Secretary

In 1977, eight European countries agreed to initiate a project with the aim of setting up and maintaining an experimental European buoy network. The project* was set up as an EEC programme and, in 1979, a Management Committee consisting of one representative from each Party was formally established to co-ordinate the project. A Technical Secretariat was appointed to support the work of the Management Committee and, in 1988, the European Group on Ocean Stations — EGOS — was formed to help co-ordinate the acquisition of meteorological and oceanographic buoy data in the North Atlantic. Eleven years later, in 1999, it was decided to also appoint a Technical Co-ordinator to help deal with the increasing number of drifting buoys.

EGOS currently functions as an action group of the joint WMO-IOC † Data Buoy Co-operation Panel (DBCP) and has grown to include nine member countries — Denmark, France, Germany, Iceland, Ireland, The Netherlands, Norway, Sweden, and the United Kingdom.

Since its formation, EGOS has proven to be an efficient forum for technical decision-makers with hands-on experience of the difficult observing regime that the oceans constitute. The buoy network has made marked advances since its early experimental phase, and the focus of EGOS has now moved on to advanced topics such as data quality, buoy metadata, deployment strategy and spatial/temporal data coverage.

**COST 43 or Co-operation in Science and Technology action 43*

† *WMO-IOC. World Meteorological Organization – International Oceanography Commission*

Deployments

The EGOS drifting and moored buoys are deployed and operated in an area of interest bounded by the latitudes of 30° N. and 65° N. and between the longitudes of 50° W. and the European continent, including the adjacent waters of the Baltic Sea and the Mediterranean Sea.

In order to maintain a continuous operational drifting-buoy network, new buoys have to be deployed on a frequent basis. Drifting buoys are usually deployed by observing ships sailing from Iceland to the eastern coast of North America or by observing ships normally operating on routes from Denmark to Greenland, or from the UK to North America. In recent years an

The objectives of the EGOS programme are:

- to maintain an operational network of drifting and moored buoys in the data sparse areas of the North Atlantic;
- to co-ordinate the development of drifting buoys provided by EGOS members;
- to co-ordinate data dissemination and monitor data quality;
- to provide information on the operational status of buoys to members and co-operating parties.

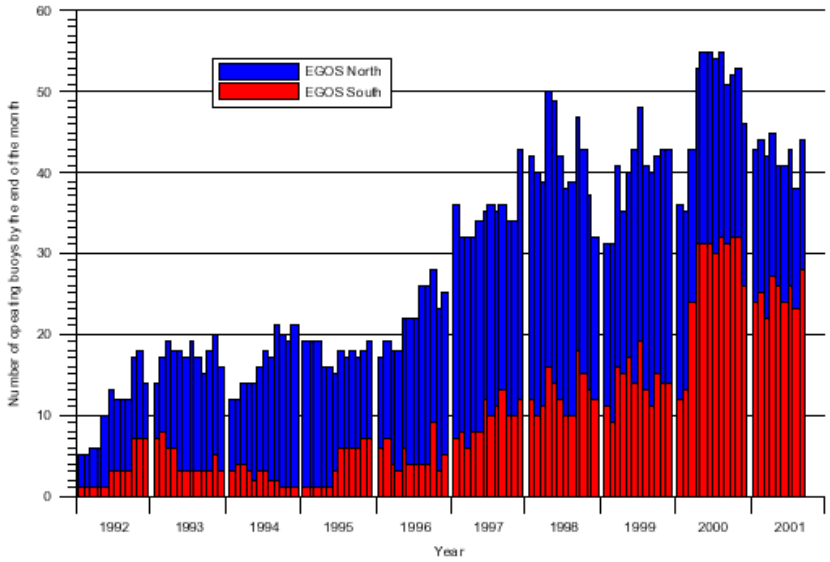


Figure 1. The number of EGOS drifting buoys reporting air pressure data on the Global Telecommunication System from 1992 to October 2001.

Note. For the purposes of the graph on the left, EGOS is subdivided into two sub areas — EGOS North for buoys deployed north of 50° N., and EGOS South for buoys deployed south of 50° N. Because of its importance as a development area for cyclonic weather systems, most of the EGOS programme activity is in the EGOS North area.

increasing number of air deployments sponsored by the Commander, Naval Meteorology and Oceanography Command have helped to improve the spatial resolution.

In the past decade, the annual average number of operational drifting buoys in the EGOS area increased from approximately 11 buoys in 1992 to 49 in 2000 (see Figure 1).

The regular seeding of the North Atlantic with drifter buoys, and the routine deployment and maintenance of the moored buoys, ensures a comprehensive network of in-situ observation data essential for forecasting and climatological purposes.

When possible, servicing visits are made to each moored buoy at six-monthly intervals. The upper moorings are examined every 12 months, and the mooring changed at three-yearly intervals.

Figure 2 overleaf shows the locations of EGOS drifting and moored buoy arrays as at 2

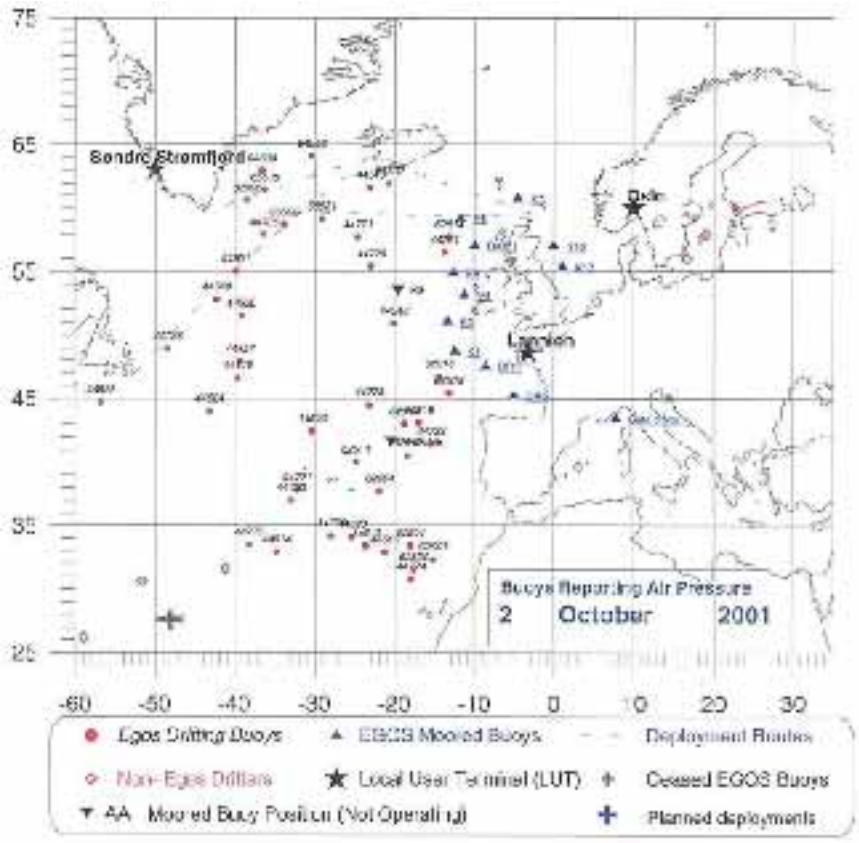


Figure 2. Locations of EGOS drifting and moored buoy arrays as at 2 October 2001.

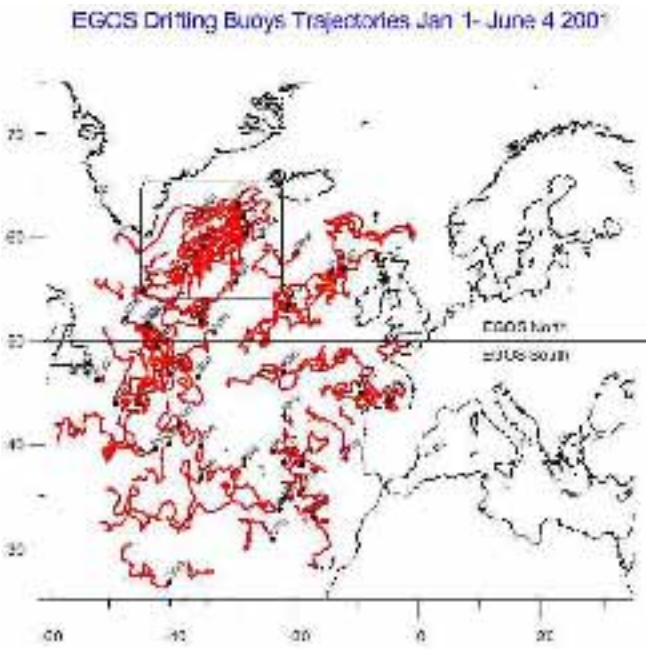


Figure 3. Drift trajectories of EGOS drifting buoys during the first half of 2001. (Note that very few of these buoys appear to be drifting to the south-west of Iceland.)

October 2001, whilst Figure 3 shows the drift trajectories of EGOS drifting buoys during the first half of 2001. Interestingly, and contrary to normal expectations, very few of these buoys appear to be drifting out of the square (indicated on Figure 3) to the south-west of Iceland.

The Met Office currently contributes nine open ocean moored buoys to the EGOS programme and, in addition, jointly operates with Météo-France the 'Brittany' and 'Gacogne' buoys located within the Bay of Biscay*. Météo-France also operates the 'Côte d'Azur' and 'Pomme' moored buoys. In collaboration with the Met Office, the Irish Marine Institute has also recently initiated a moored buoy programme and deployed their moored data buoy, 'M1', sited west of the Aran Islands. A further moored buoy, 'M2', was deployed earlier this year to the east of Dublin, and a further three new deployments are planned.

Buoy types

The **drifting buoys** currently deployed within the EGOS area of operation are primarily SVP-B type drifters which report air pressure, pressure tendency and sea-surface temperature on an hourly basis. (See Figures 4(a) and 4(b)). These buoys are made by a number of different manufacturers, and some are also designed to report wind speed and direction. A smaller number of buoys called FGGE † type buoys are also capable of reporting parameters such as air temperature.

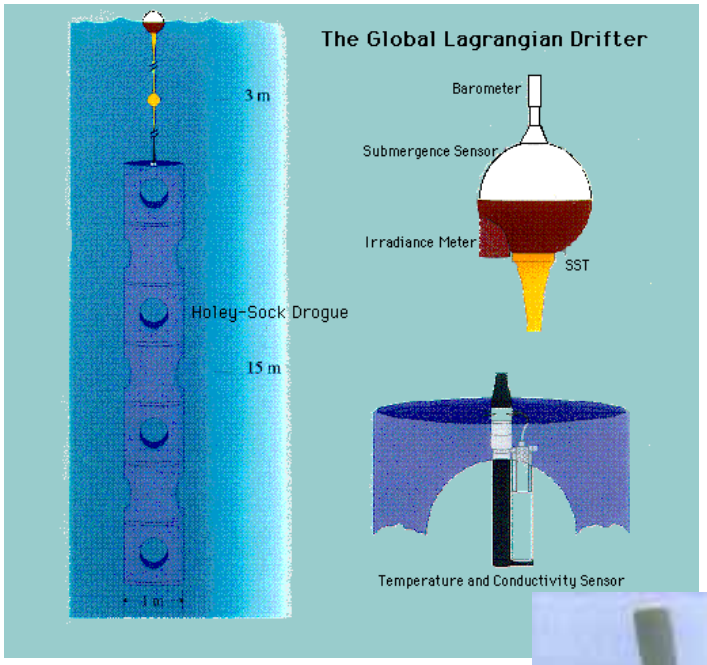


Figure 4(a) (above). Schematic diagram through a SVP-B type drifting buoy and drogue system.

Figure 4(b) (right). A deployed SVP-B type drifting buoy.

* See The Marine Observer, 69, 116

† FGGE. First GARP Global Experiment (GARP. Global Atmospheric Research Programme)

The average lifetime for drifting buoys within EGOS has increased significantly in recent years, as indicated in Figure 5. Although the buoys are expendable and not intended for recovery, they are recovered and re-deployed in suitable cases.

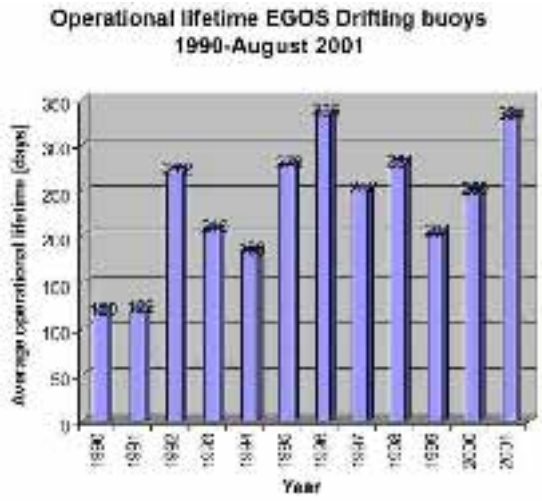


Figure 5. Average operational lifetime of EGOS drifting buoys.

The **moored buoys** form part of a more comprehensive observing programme off the European continental shelf, anchored in water depths of 2,000 to 4,500 metres (see Figure 2 for locations). Parameters measured by the moored buoys include, but are not limited to, the following:

- wind speed;
- wind gust;
- wind direction;
- air pressure;
- air temperature;
- sea-surface temperature;
- humidity;
- significant wave height.

Figure 6 (opposite) shows a typical moored meteorological open ocean buoy in the process of being serviced.

The hull of the moored buoy is normally made from a combination of mild steel and closed cell buoyancy. The buoyancy, a yellow-coloured elastomer material, is protected against abrasion and damage.

The superstructure of the buoy normally comprises a truncated pyramid supporting an instrument sensor ring. The buoy moorings are usually an inverse catenary type with a one-tonne reserve buoyancy sub-surface float and an acoustic release.

The data sensors for moored buoys are normally required to be capable of unattended operation in the marine environment for at least six months. The buoys' systems are powered by sealed lead-acid gel batteries and charged by solar panels attached to the superstructure.

Each moored buoy is fitted with two multi-element radar reflectors and a navigation lamp giving an amber light. The lamp has a visibility of 5 miles and has an illumination cycle of 5 flashes in a period of 10 seconds followed by a pause of 10 seconds with no illumination.

Figure 6. Servicing a moored buoy.

Data transmission

The **drifting buoys** transmit data to the ARGOS system which is a satellite-based system collecting platform data, and delivers it to users world-wide. Telemetry from the platforms is used to calculate the geographic position. The ARGOS operation begins with transmissions from Platform Transmitter Terminals (PTTs) attached to the buoy sensors. The PTTs uplink (transmit) their messages at preset intervals to the ARGOS receivers that are on board the National Oceanic and Atmospheric Administration (NOAA) polar orbiting satellites. The transmitted messages are then relayed to one of the three main system ground stations at Wallops

EGOS is improving the quality of data on the GTS

The EGOS Technical Co-ordinator continuously collects information on the quality of EGOS buoy data and can interact directly with the GTS distribution system when required. If a buoy produces suspect or erroneous data the Technical Co-ordinator can arrange for the sensor data to be corrected or removed from the GTS.

EGOS maintains detailed buoy records and information

Data quality statistics produced by Météo-France comparing the buoy data with the model fields are reviewed and published in EGOS reports on a monthly basis. The monthly reports are prepared by the Technical Secretary and also include full details of buoys currently deployed, or planned for deployment, their locations, their sensor status etc. The reports are also made available on the dedicated EGOS web-site*

EGOS is increasing the amount of data on the GTS

EGOS aims to increase the number and coverage of data on the GTS by minimizing the time between deployment and GTS distribution, by optimizing deployment strategies, and by performing cost benefit analyses of different buoy systems

EGOS secures data for generations to come

The Technical Secretary maintains a metadata database for all EGOS drifting buoys. This information is vital for the use of real time data in climatological studies. EGOS intends to make this database compatible with international standards currently being established

* http://www.cmr.no/conmar/egos
EGOS home pages are located at http://meteo.shom.fr/egos/

Island (Virginia, USA), Fairbanks (USA) and Lannion (France). Received buoy data are also processed through local Land User Terminals (LUTs) located in Norway, Greenland and France (Oslo, Søndre Strømfjord and Lannion, respectively). This reduces the delay of disseminating data to the Global Telecommunication System (GTS).

On the **moored buoys**, all the data from the data acquisition and processing systems are transferred to a Data Collection Platform (DCP) and then transmitted via the Meteosat geo-stationary operated by EUMETSAT. There are usually two DCPs on each moored buoy. The data received by EUMETSAT (at Darmstadt in Germany) are then forwarded to the Met Office where they are converted into WMO FM13-XI SHIP code for retransmission onto the Global Telecommunication System.

Summary

By combining their national buoy programmes within the EGOS framework, it has enabled participating National Meteorological. Services such as the Met Office to focus on their core activities while still being routinely updated on relevant technical and policy issues. Moreover, EGOS provides participating members with the necessary information to ensure that they can manage their buoy deployment strategies efficiently, and also acts as forum for the exchange of technical knowledge and ideas.

Addendum

[A drifter was deployed from the UK Voluntary Observing ship **CanMar Pride** and two drifting buoys were deployed on behalf of the Met Office by the Icelandic Meteorological service at the end of October 2001.]

[A replacement K7 buoy (indicated as non operational in Figure 2), was successfully deployed in mid September 2001 and is operating normally.]

Real-time observations from the EGOS moored buoys are posted on NDBC's web site (http://www.ndbc.noaa.gov).

SATELLITES, OR SIMPLY SHIPS AT SEA, BLEND TO HELP HURRICANE FORECASTERS

By Martin Merzer
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This article originally Published In the Miami Herald, Tuesday, June 19, 2001.
Mmerzer@Herald.com

Something ugly appeared to be brewing in the Gulf of Mexico, but it seemed too early, too unlikely. Hurricane forecasters huddled over satellite photos, analyzed computer printouts. Then, definitive information arrived the old-fashioned way - and the debate ended.

The research vessel **McArthur** reported extraordinarily high winds. Now forecasters knew that Tropical Storm Allison, the first of the hurricane season, was gathering itself into a drenching, deadly force. They rapidly posted warnings in Texas and Louisiana.

In an age of high-tech computers and high-flying satellites, forecasters still rely heavily on low-tech tools reminiscent of a simpler time: basic weather reports from ships at sea and amateur radio reports from remote corners of the hurricane zone.

"Without ship reports, we couldn't do our job, even in this day and age," said Dan Brown, a meteorologist with the Tropical Analysis and Forecast Branch, a government unit that works with the National Hurricane Center. "We have to know what's going on now before we can figure out what will happen later."

Vital Information

Located in a room adjoining the hurricane center's forecasting complex in West Miami-Dade, the unit gathers vital information from hurricane breeding areas in the Atlantic, Caribbean and Gulf of Mexico.

Much of that data arrives four times a day from scores of vessels - freighters, cruise ships and research craft that ply regions too distant to be reached by reconnaissance aircraft. For no compensation other than the generation of goodwill, crew members voluntarily report sea and sky conditions.

'Not Required'

"They're not required to report, but we certainly encourage them to," said meteorologist Robert Molleda. "The more data, the better."

And in it flows, day after day.

On Monday afternoon, for instance, the **Santa Maria** reported from 1,367 miles southeast of Miami that the water and air temperatures were 82°, 19 kt (22-mph) winds blew from the east, the dew point was 72° , and seas were five feet high.

Data From Buoys

Transmitted by radio, comparable information from other ships and from nearly 60 buoys moored close to shore, and floating freely in the ocean is collated on charts used by Brown, Molleda and their colleagues.

Taken while experiencing gusts to 65 kt with sustained 45 kt, just 25 miles seaward of Galveston Bay, from the Training Vessel State of Maine.
Photo courtesy of Bart Clendennon, Cadet Master

NOAA Ship
McArthur

Then, they issue marine forecasts for the tropics and subtropics - and they relay essential information to hurricane forecasters on duty just 20 steps away.

Satellite photos can pinpoint storms, and computerized models can help predict how those storms might behave, but neither can produce the precise, real-time data craved by forecasters. That's where ship and ham radio reports come in.

"This is extremely valuable material because it is the only way we can know for sure what is happening," said Lixion Avila, a lead forecaster at the hurricane center. "It's a report from an instrument - not just a picture."

Seeing The Threat

It was that kind of information that helped forecasters determine earlier this month that the storm soon to be called Allison threatened residents along the Gulf.

On June 5, just five days into the hurricane season, the **McArthur** was conducting research for the National Oceanic and Atmospheric Administration about 100 miles east of the developing storm's center.

As conditions deteriorated, crew members began transmitting hourly weather updates. Finally, just after 1 p.m., the **McArthur** reported sustained wind of 55 mph, well above the 39-mph requirement of a named storm. Allison was born.

47 Deaths

The storm and its remnants ultimately were blamed for 47 direct and indirect deaths, including nine in Florida.

When even stronger storms threaten land, a network of amateur radio operators cranks into action, and station W4EHW (Watching 4 Early Hurricane Warnings) returns to the air.

Another throwback to the early days of hurricane tracking, ham operators still serve as an important link between forecasters and those threatened or assaulted by a storm.

Volunteer Shifts

Based at the hurricane center, the station is staffed during storms by

volunteers working around the clock on three-hour shifts. They relay data in both directions - local conditions are reported to forecasters in South Florida, and forecasts are transmitted to local residents.

"It's the human component that makes it so exciting," said John McHugh, a coordinator of the program.

During 1998, the station was on the air for 500 hours and proved particularly valuable during Hurricane Georges, when reports it relayed from Cuba helped forecasters reposition the storm's eye and recalculate its path through the Florida Keys.

Local Operators

Last year, 40 shifts of local operators kept the station running for 120 hours.

In addition, the station's volunteers coordinate a network of more than 200 people who report local weather observations via e-mail and fax, another valuable source of information - and another example of what organizers call a genuine humanitarian activity.

"It fulfills a lot of the things that you feel from your heart," said Julio Ripoll, a local architect who has been a radio operator and coordinator for W4EHW since it went on the air in 1980. "It's a reminder of the way things used to be."

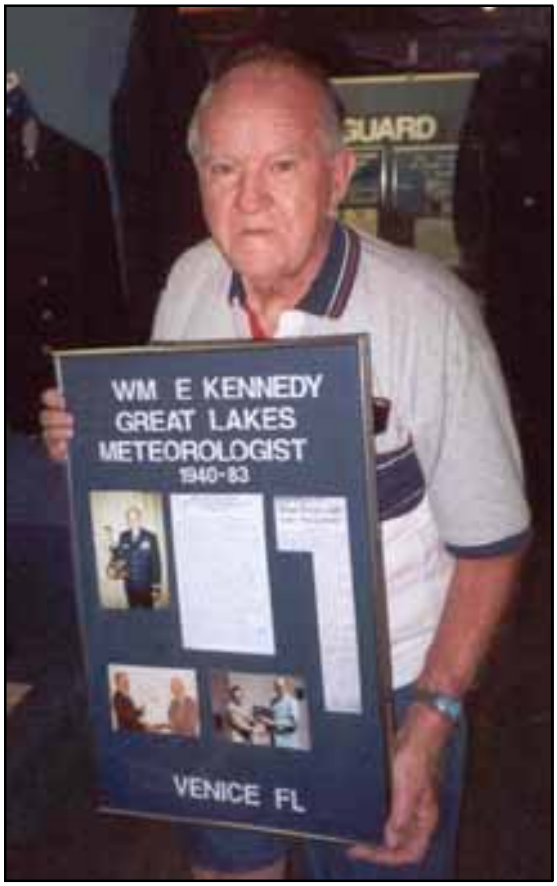
TPC Calling All Ships At Sea

Christopher Burr
Chief, Tropical Analysis and Forecasting Branch
Tropical Prediction Center, Miami Florida

The NWS Tropical Prediction Center (TPC) is now able to contact ships at sea via an e-mail account set up through COMSAT Mobile Communications. By knowing a ship's Inmarsat (a global mobile satellite communications operator) Mobile Number obtained through the Inmarsat ship directory Web site, messages can quickly be exchanged with ships at sea and therefore assist forecasters in preparing tropical cyclone advisories and marine forecast products. This method of communication was used recently to obtain weather information from the ship **Nobel Star**, which was traveling near the center of Tropical Storm Dean.

"We routinely receive ship observations every six hours," said Christopher Burr, Chief of the Tropical Analysis and Forecasting Branch, TPC. But by using e-mail, NWS can now request more frequent observations and monitor storms more closely. "Having these more timely observations can really help increase the accuracy of our marine warnings and save lives" said Burr.

Retired NWS Employee Inducted into Great Lakes Maritime Hall of Fame



A retired NWS employee was honored recently for his contributions to the Great Lakes maritime community by being inducted into the Great Lakes Maritime Hall of Fame. Bill Kennedy is the only person outside of the marine community ever inducted into the Great Lakes Maritime Hall of Fame, which typically honors captains, mates, and engineers on ships.

Kennedy spent 30 years of his 42-year career in Cleveland, OH, as a Port Meteorological Officer. Hired in 1953, he was primarily responsible for setting up a Marine Weather Program on the Great Lakes, in addition to writing for the Mariner's Weather Log and designing special maps for each lake so ships could easily report their locations.

In fact, some of the inductees worked on vessels navigating the Great Lakes during Kennedy's tenure in Cleveland. "After being retired for 18 years, I'm so honored that they still think of me," he said of his recent award. "It is not every day that a NWS employee receives such an honor." According to Bob McLeod, Awareness Branch Chief, Office of Climate, Weather and Water Services, who worked with Kennedy in Cleveland, "Bill's knowledge of the Great Lakes and commitment to the NWS are well known, and this award is well deserved. I have known Bill for many years and he did some good work up there on the Lakes."

Although Kennedy has been recognized many times for his numerous contributions to the field of meteorology - he was bestowed an Honorary Lifetime Membership in the International Ship Masters Association and received a bronze medal for developing a Marine Program on the Great Lakes - he says this Hall of Fame induction is his greatest honor.

These days Kennedy is well known in his Venice, FL, community as the "Venice Gondolier Staff Meteorologist" because of his many weather-related contributions to the local paper. He even has his own weather station and takes observations for the paper. "After being a weatherman for 61 years, I'm still very much involved," he said.

For more information about the Hall of Fame, contact Mr. Ed Brklacich, Director, Great Lakes Lore Museum, Sebewaing, MI (517) 883-3225 or lore@avci.net

Protostatis: Liberty Ship of World War II

Skip Gillham
Vineland, Ontario, Canada

PROTOSTATIS was originally one of the Liberty ships of World War II. These vessels were modeled on a British design and used prefabricated sections. By the end of the war over 2,700 had been built to assist the Allied effort.

President Franklin D. Roosevelt reportedly nicknamed these ships the "Ugly Ducklings" and although they were not beautiful, they were functional. The Liberty ships measured 441.5 feet in length by 57 feet at the beam and they could carry close to 10,000 tons deadweight of cargo in five cargo holds.

The **John Philip Sousa** was built by the St. John's River Shipbuilding Co. of Jacksonville, FL and completed in 1943. The vessel was steam powered and burned oil, rather than coal, when it joined the United States Maritime Administration. The first two voyages had problems with boiler water. When examined, it was discovered that the boilers had been installed before the protective grease had been removed.

John Philip Sousa served the country well as a cargo carrier and when peace was achieved, it, like many of the Liberty ships, was surplus. Some of these ships were retained in the Reserve Fleet, but most were sold to foreign interests to rebuild their mercantile fleets nearly destroyed by war.

This vessel was purchased by a Honduran flag firm in 1946 and sailed as **Erato**. It was sold and renamed **Taxiarchis** in 1954.

In 1960 Greek interests acquired the ship and operated it as the tramp steamer **Prostatis**. She made two trips to the Great Lakes in 1965, but the last one was plagued with problems.

On the final voyage, **Prostatis** loaded scrap metal at Detroit and departed for Genoa, Italy. The vessel ran aground at Traverse Shoal, Lake Ontario, on September 30, 1965, and some cargo had to be removed before tugs could pull the hull free.

The ship reloaded in the shelter of Wolfe Island, off Kingston, ON and departed under tow in mid-November. Rounding the eastern end of Wolfe Island, **Prostatis** again went aground.

By now the crew was low in morale and running out of food. They eventually left for home in a dispute with the owner. Scavengers made night calls and removed various items of value and before long **Prostatis** was frozen in for the winter.

Tugs finally freed the freighter in January and it was towed to Toronto to wait for spring. By then only an overseas trip to Spanish shipbreakers remained. The vessel was pulled into Valencia on July 5, 1966, where ship and cargo were both melted down for recycling. This was an inglorious end to one of the heroic Liberty ships of World War II.

Marine Weather Review
North Atlantic Area—May through August 2001

George P. Bancroft
Meteorologist
Marine Prediction Center

The late spring and summer months are normally the least active of the four-month periods for which marine weather summaries are prepared. With the Bermuda High weaker than usual in May to August 2001, last winter's active pattern of fronts and low-pressure centers moving off the U.S. East Coast persisted in weaker form through the summe. This pattern produced two major storms described in this article, one in late May and the other late in August. Otherwise, the main track of low-pressure centers across the North Atlantic during the summer was north of 50°N., with some of the centers turning more north or northwest toward Greenland. A few of these developed storm-force winds near Greenland or over the northeast Atlantic near the British Isles. There was one named tropical cyclone in MPC's North Atlantic area during the period, Tropical Storm Dean, which occurred late in August.

Tropical Activity

Remnants of Tropical Storm Allison: MPC's waters were not directly affected by Allison, which moved ashore on the upper Texas coast late on June 5. Allison's remnant low-pressure center later emerged off the mid-Atlantic coast on the 16th and merged with a frontal system moving off the U.S. East Coast on June 17. Allison was known more for heavy rains produced over land than for winds, which were below gale force, except in squalls, off the East Coast.

Regeneration of Tropical Storm Dean, 25-27 August: Dean existed as a tropical storm well south of MPC's marine area prior to August 24, before dissipating north of Hispaniola on the 23rd. The remnants moved north into MPC's waters near Bermuda by the 25th, and re-intensified into a tropical storm at 0600 UTC August 27 with maximum sustained winds of 50 kt with gusts to 60 kt. Prior to regeneration, the remnants of Dean appeared as a weak low in both surface charts of Figure 7, near 33°N., 68°W. in the first chart (0600 UTC August 25) and near 36°N., 65°W. in the second analysis chart (0600 UTC August 26). The first part of Figure 10 depicts Tropical Storm Dean at a maximum strength of 60 kt with gusts to 75 kt (just below minimal hurricane strength of 64 kt for sustained winds). The **Lykes Navigator** (WGMJ) reported a southeast wind of 35 kt and 6-m (20-ft) seas near 37°N., 59°W. at 0000 UTC August 27, followed by a south wind of 55 kt and 11.5-m (37- ft) six hours later at 38°N., 61.5°W. The intensifying tropical storm passed just west of this ship during that period. Dean then weakened over cooler water and became an extratropical gale twenty-four hours later (second part of Figure 10), and eventually merged with another gale center near Greenland late on August 30.

Other Significant Events of the Period

Gale off U.S. East Coast, 7-9 May: The center formed south of MPC's waters prior to this period. Blocked by a strong ridge of high pressure east of New England, the center drifted north to near Bermuda at 1200 UTC May 9 with a central pressure of 1002 mb. An area of east to northeast gale winds developed in MPC's far southern waters between 55°W. and 70°W. by the 7th and spread north to 40°N. by May 9. The **Oleander** (PJJU) and another ship (GBCF) reported northeast winds of 35 kt near 34°N., 68°W. and 33°N., 65°W., respectively, at 1200 UTC May 8. Satellite-sensed scatterometer data indicated winds up to 40 kt. The second ship also encountered 7.5-m (24-ft) seas. The blocking high pressure to the north weakened on the 9th and allowed the system to move northeast. By 0000 UTC May 11, the center was near 41°N., 60°W., with winds below gale force.

Storm of 21-23 May: This storm originated from an open frontal wave of low pressure south of Newfoundland on May 20 and moved northeast, absorbing another low-pressure system to the north near 55°N., 42°W. during the period of most rapid development (Figure 1). The drifting buoy 44549 (47°N., 39°W.) reported a pressure of 972 mb at 2200 UTC May 21, indicating the storm was at least that deep at that time. Therefore, the drop in central pressure was at least 29 mb in only a 16-hour period since the analysis time of the first chart in Figure 1. The 500-mb analysis in Figure 2 is valid at a time just prior to the period of rapid deepening and depicts a strong short-wave trough and northwest jet behind it (close spacing of 500-mb contours) supporting this development. See Reference 1 for more information on use of the 500-mb chart and the relationship of the 500-mb flow to surface features. The author determined from the color version of the QuikScat image (Figure 3) that maximum winds in this storm were at least as high as 55 kt. There was possible rain contamination in the higher winds (up to 70 kt), rendering them unreliable. The maximum wind reported by a ship was north 52 kt from the **Faust** (WRYX) near 47°N., 40°W. at 0000 UTC May 22. Twelve hours later, the same ship reported southwest winds of 45 kt and 12.5-m (41-ft) seas near 46°N., 36°W. East of the center, the **Meteor** (DBBH) encountered southeast winds of 51 kt near 47°N., 35°W. at 2100 UTC May 21. Twelve hours later, the same ship was north of the storm center, reporting east winds of 45 kt and 8-m (26-ft) seas. The storm center subsequently weakened and drifted more northwest on May 23 before turning west on the 24th and continuing to weaken.

Eastern North Atlantic Storm of 10-11 July: A low-pressure center moved east off the Labrador coast late on July 7 and developed gale force winds after passing 40°W. on the 8th, then briefly developed storm force winds southwest of the center on July 10. Figure 4 depicts 24-hour movement and development of this system into a storm approaching Great Britain at 1200 UTC July 10, with some 35 to 40 kt ship reports south and west of the center. A high-resolution QuikScat image (Figure 5), valid about 6 hours prior to the time of the second analysis chart of Figure 4, shows an area of 50 to 55 kt northwest winds between 55°N. and 58°N. on the back side of the storm center. One 60 kt wind barb appears near 55.5°N., 19°W. There is more crowding of wind barbs in this version of QuikScat imagery due to the higher data density, but the winds of 50 kt or higher stand out. Among ships, the vessel 9KKF (53N 12W) reported a west wind of 45 kt at 0000 UTC July 11, with a nearby buoy (62090) near the Irish coast reporting 5.5-m (18-ft) seas. At 1800 UTC July 10, the **Western Bridge** (C6JQ9), to the south near 51°N., 10°W., reported west winds of 40 kt and seas of 7.5 m (25 ft). The storm center reached a maximum intensity of 984 mb at 0600 UTC July 10 near 57N 16W. The system then moved into the North Sea and weakened to below gale force on July 12.

Eastern North Atlantic Gale of 15-18 July: This system followed a track similar to that of the 10-11 July storm until July 16, when the system redeveloped southeastward to form a new center south of Ireland by 1800 UTC July 17 (Figure 6). In the July 16-18 period there were numerous reports of gale force winds west

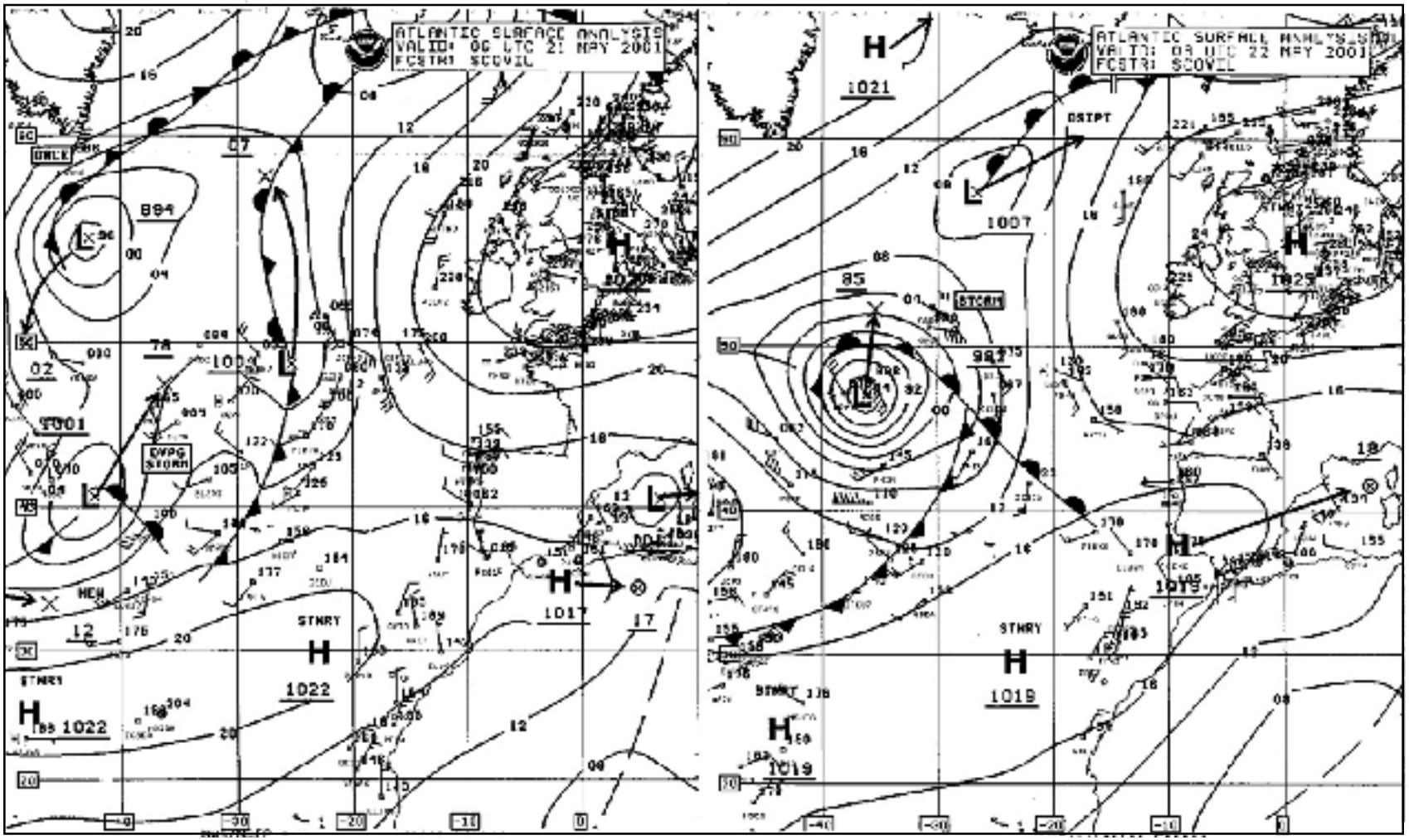


Figure 1. MPC North Atlantic Surface Analysis charts (Part 1) valid 0600 UTC May 21 and 22, 2001

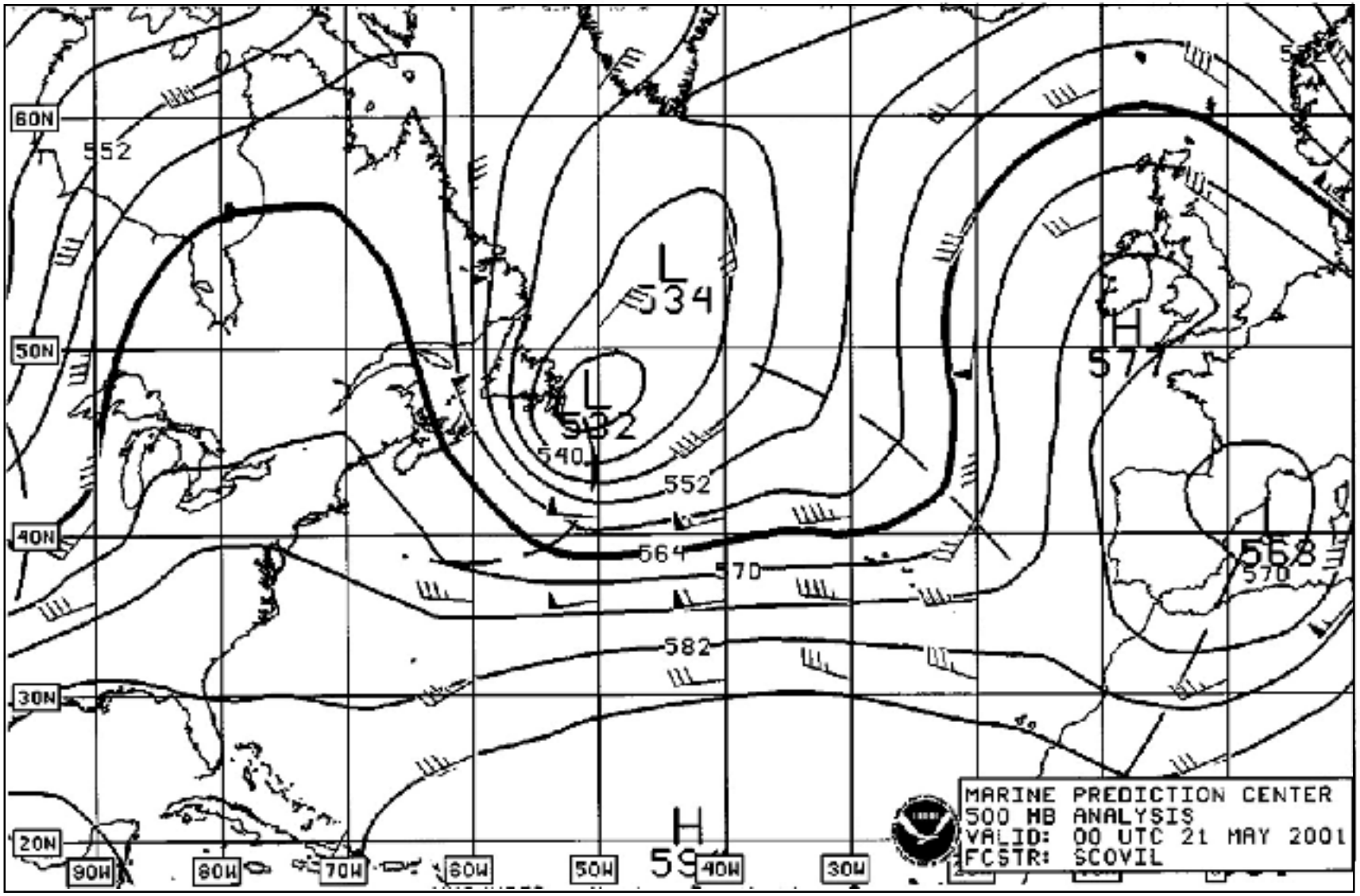


Figure 2. MPC 500-Mb Analysis of North Atlantic valid at 0000 UTC May 21, 2001. The valid time is six hours prior to that of the first surface analysis of Figure 1. The broken or dashed lines are short-wave troughs.

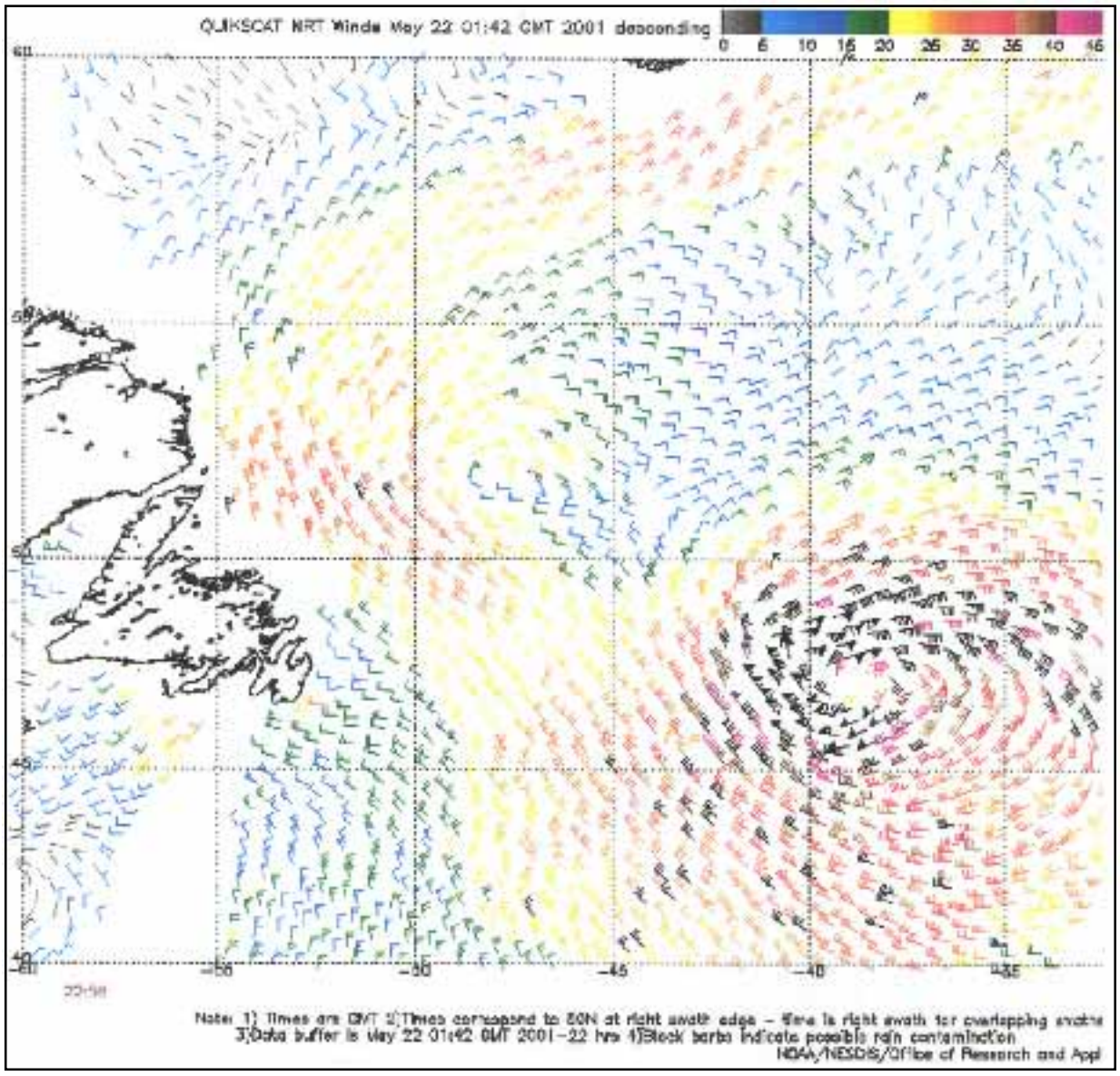


Figure 3. QuikScat scatterometer image of satellite-sensed winds for 2258 UTC and 2117 UTC May 21, 2001 (from NOAA/NESDIS/Office of Research and Applications

and south of the system, extending down into the Bay of Biscay. There was an isolated report of storm force winds from the ship FNVABATO (48°N., 5°W.), reporting a west-southwest wind of 50 kt at 0000 UTC July 18. The **Lykes Navigator** (WGMJ) and the ship ELXX6 experienced west winds of 47 kt near 47°N., 8°W. and 46°N., 8°W., respectively, at that time. Also at 0000 UTC July 18, the **Pharos** (ELTX9) encountered southwest winds of 45 kt and 9.5-m (31-ft) seas, the highest seas reported in this event. The gale center then moved into northern France and weakened inland late on the 18th.

Storm of 25-27 August: This developing storm followed a track similar to that of the late-May storm, except with faster motion northward after initial rapid

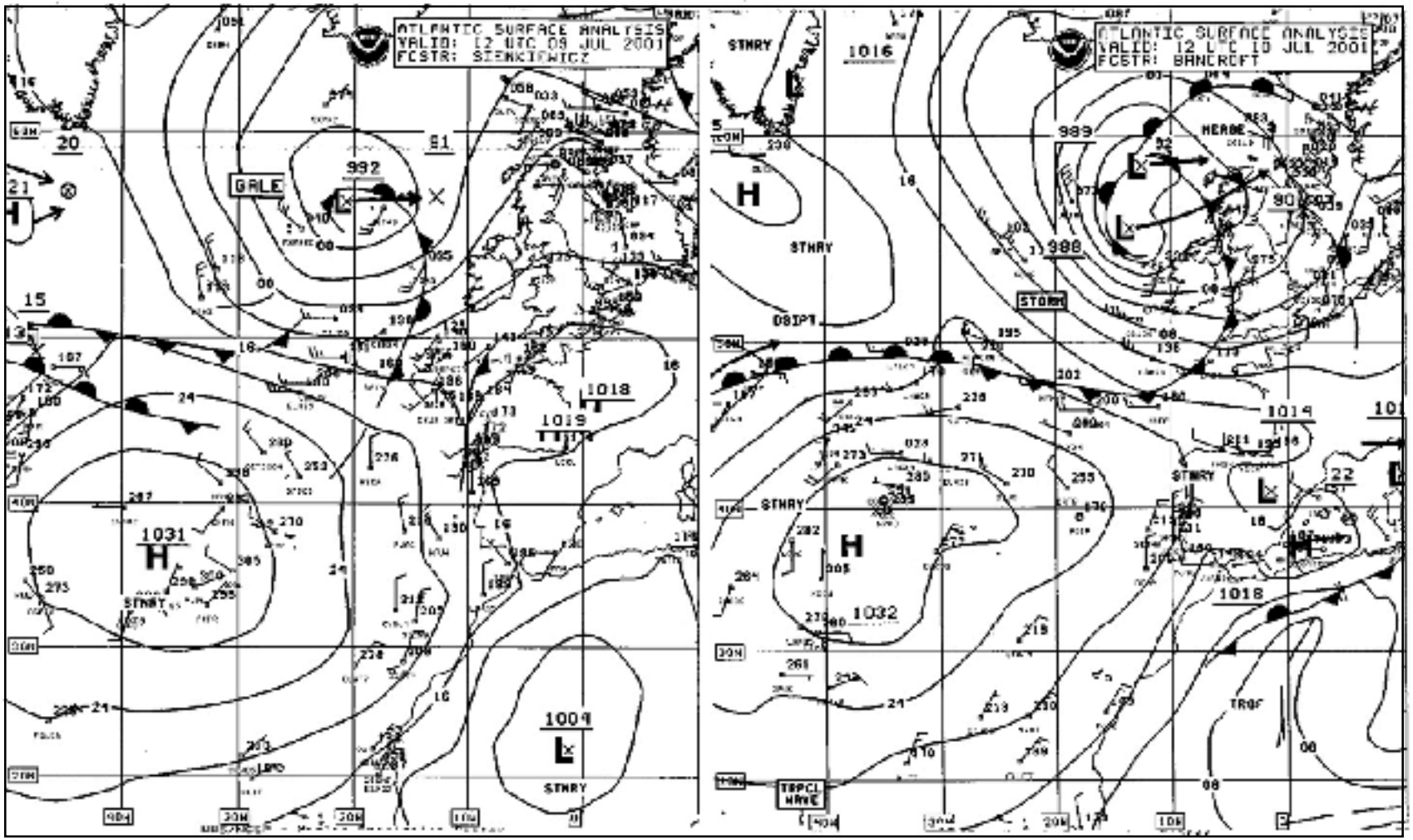


Figure 4. MPC North Atlantic Surface Analysis charts (Part 1) valid 1200 UTC July 9 and 10, 2001.

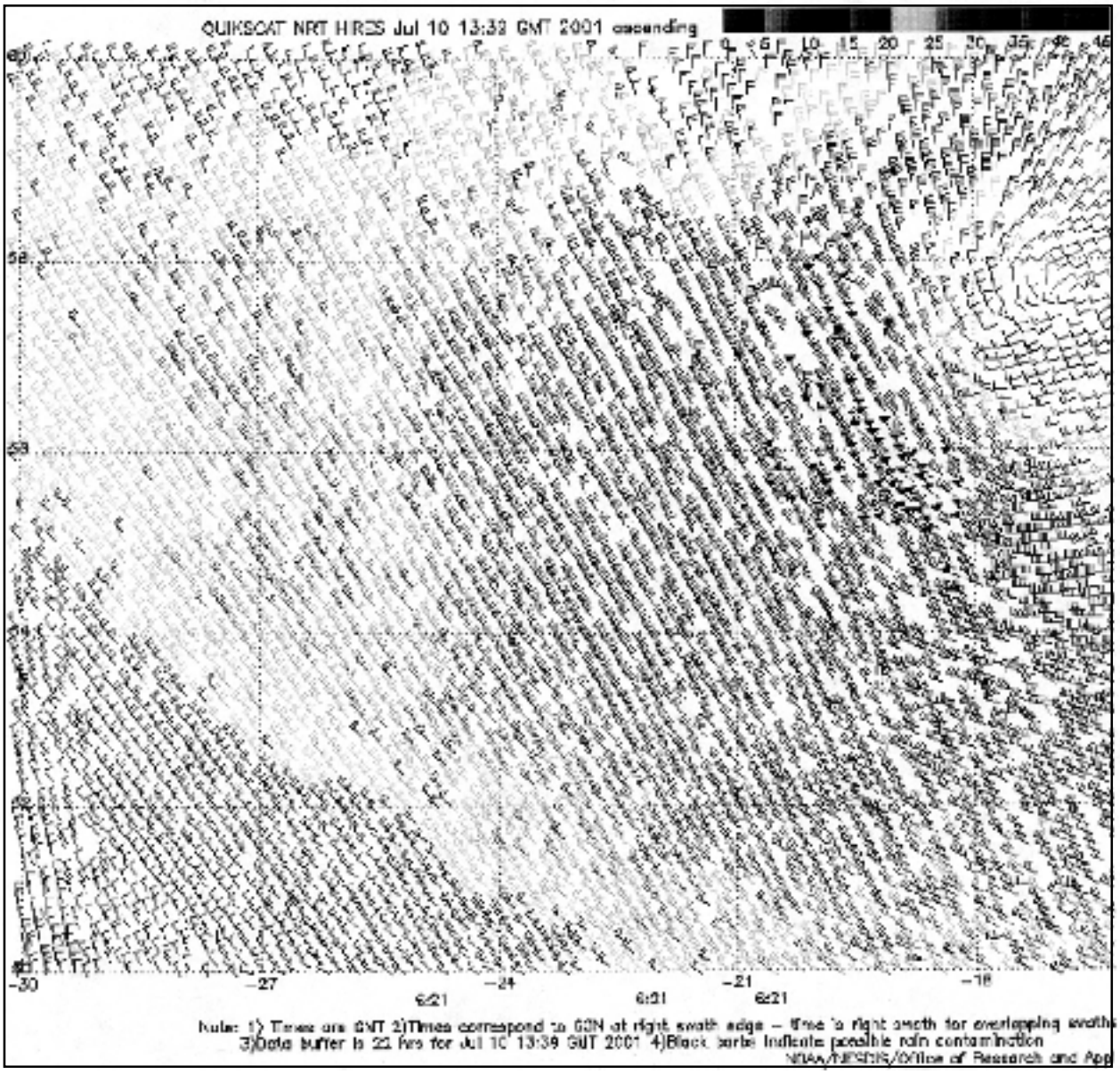


Figure 5. High-resolution QuikScat image of satellite-sensed winds valid for 0621 UTC July 10 (from NOAA/NESDIS/Office of Research and Applications). The resolution is 12.5 km for regular QuikScat inagery.

intensification. Figure 7 depicts the developing storm, initially southeast of Newfoundland, merging with a cold front coming off the east coast of Canada and rapidly intensifying, with the central pressure dropping 32 mb in only 24 hours. A drifting buoy (44621 near 54°N., 42°W.) reported a pressure of 969 mb at 1000 UTC August 26. The storm is shown at maximum intensity, 968 mb, at 0600 UTC August 26. This was the most intense non-tropical low (in terms of central pressure) of the May-to-August period in both the North Atlantic and North Pacific areas. The METEOSAT 7 satellite image of Figure 8 shows the storm near maximum intensity with a frontal cloud band wrapping around the south and east sides of a well-defined center. The storm moved into an area of sparse ship

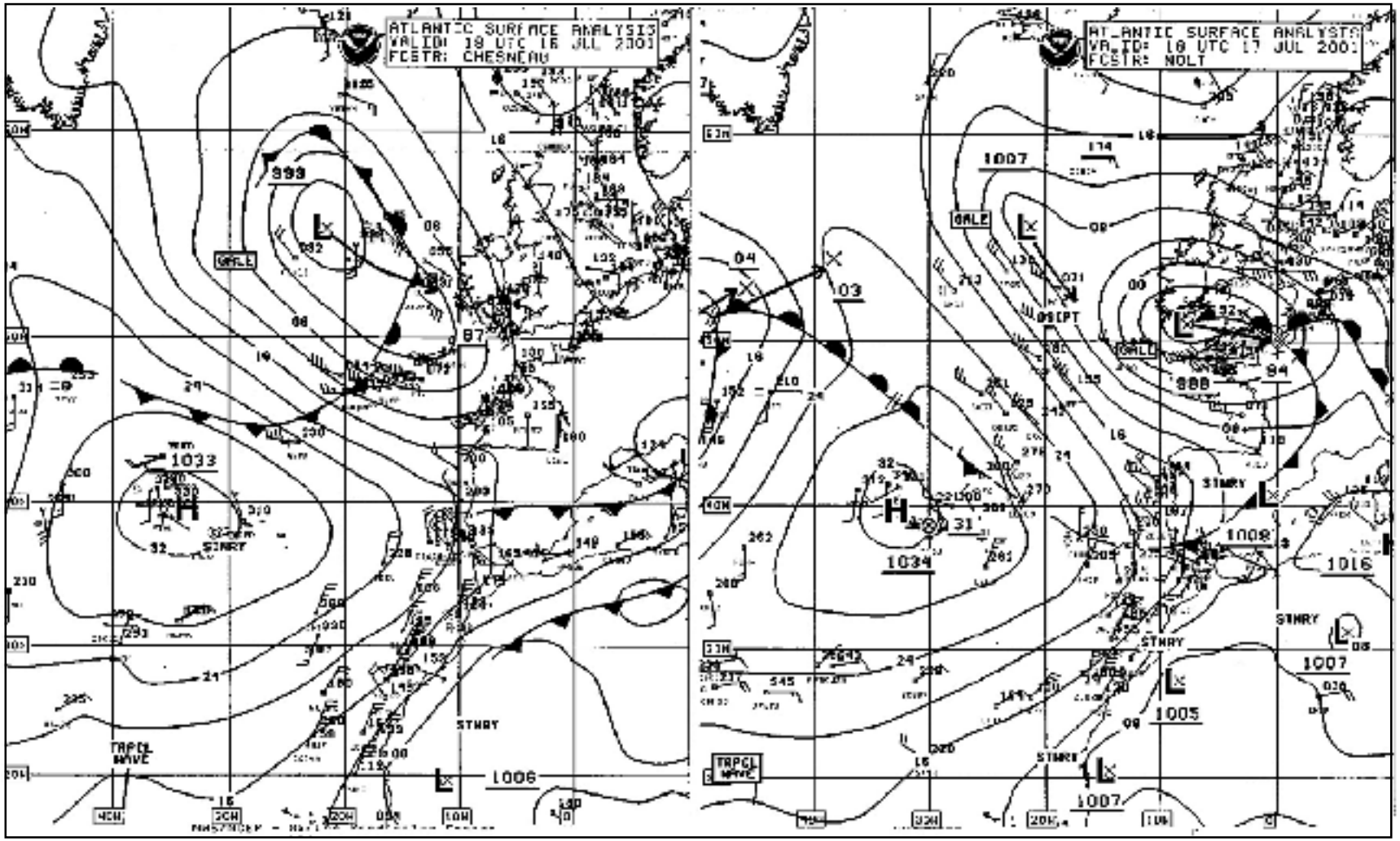


Figure 6. MPC North Atlantic Surface Analysis charts (Part 1) valid 1800 UTC July 16 and 17, 2001.

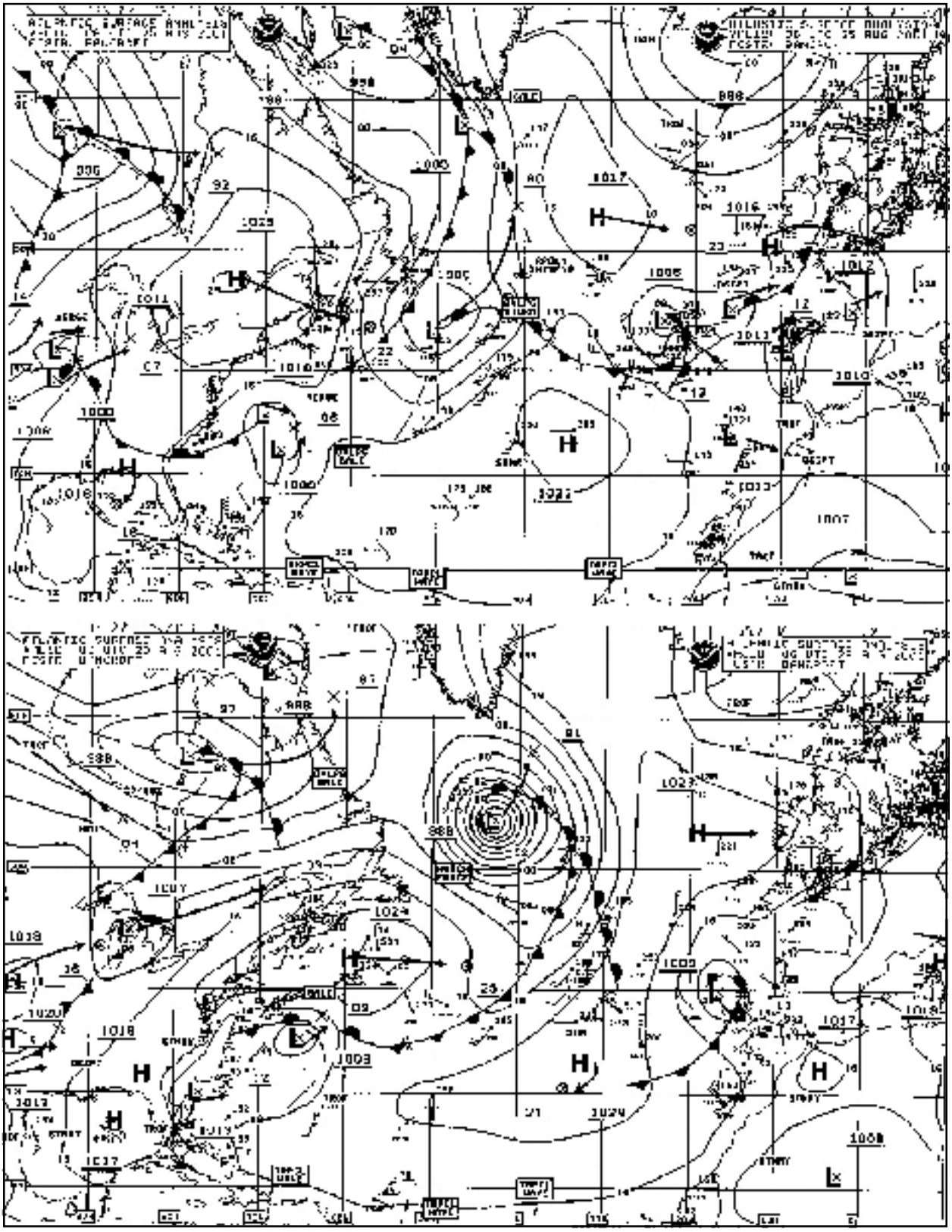


Figure 7. MPC North Atlantic Surface Analysis charts valid 0600 UTC August 25 and 26, 2001.

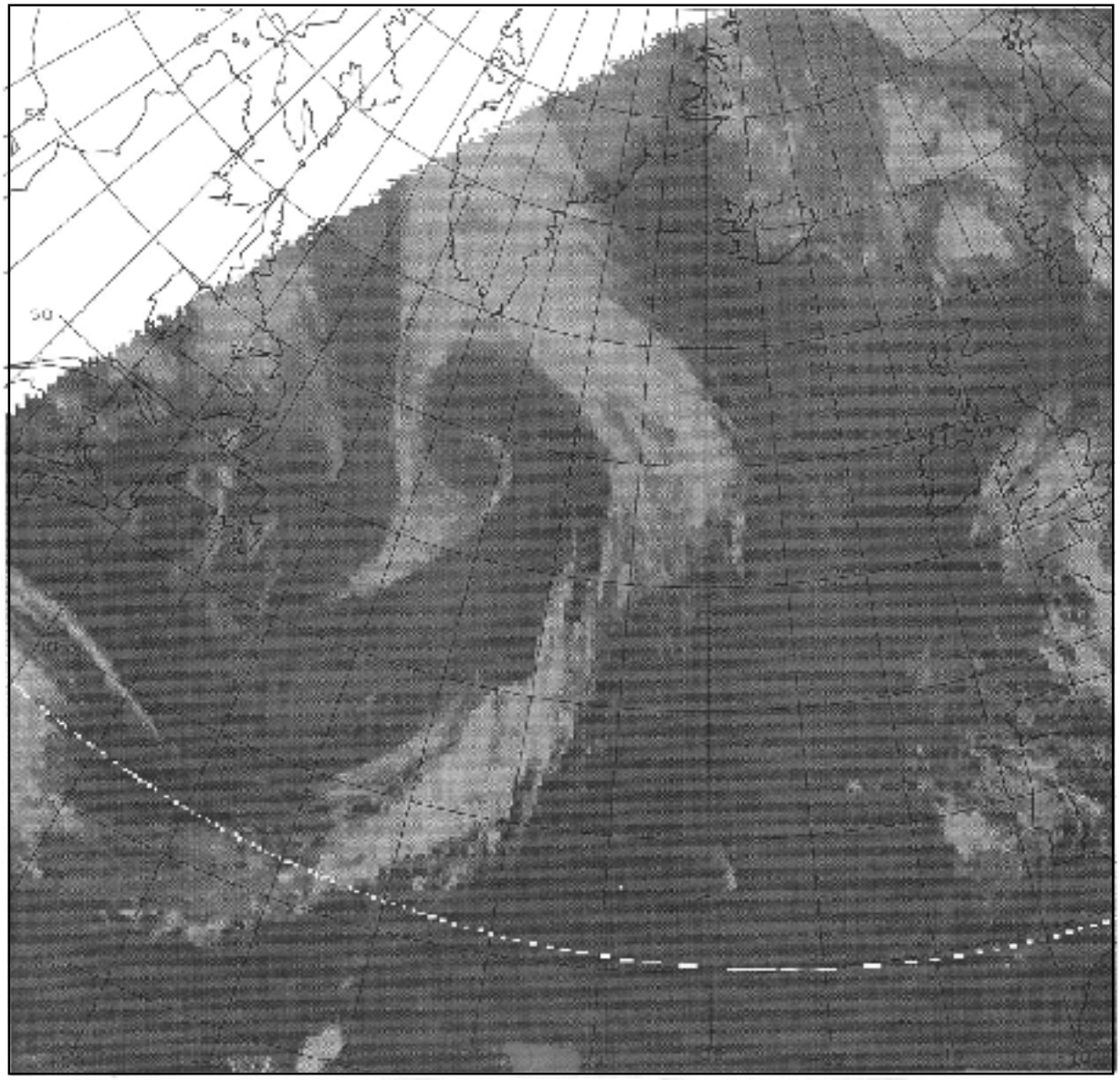


Figure 8. METEOSAT7 infrared satellite image valid 1030 UTC August 26, 2001. Satellite senses temperature on a scale from warm (black) to cold (white) in this type of image. The valid time is four and one-half hours after time of the second surface analysis of Figure 7.

data, but QuikScat imagery (Figure 9) near the time of maximum intensity shows winds of up to 60 kt in the south semicircle of the center. At 0600 UTC on August 26, a ship northeast of the center (Figure 7), the ZCBP6 (55°N., 38°W.) reported a southeast wind of 50 kt and 4.5-m (15-ft) seas.The storm subsequently weakened, with winds diminishing to below gale force as the center approached Iceland on August 28.

Introduction

The weather pattern from May through the first half of June was a continuation of the late winter and early spring pattern. Low-pressure centers moved from near Japan or the southwest part of the North Pacific northeast to the Gulf of Alaska or near the eastern Aleutians, but blocking high pressure

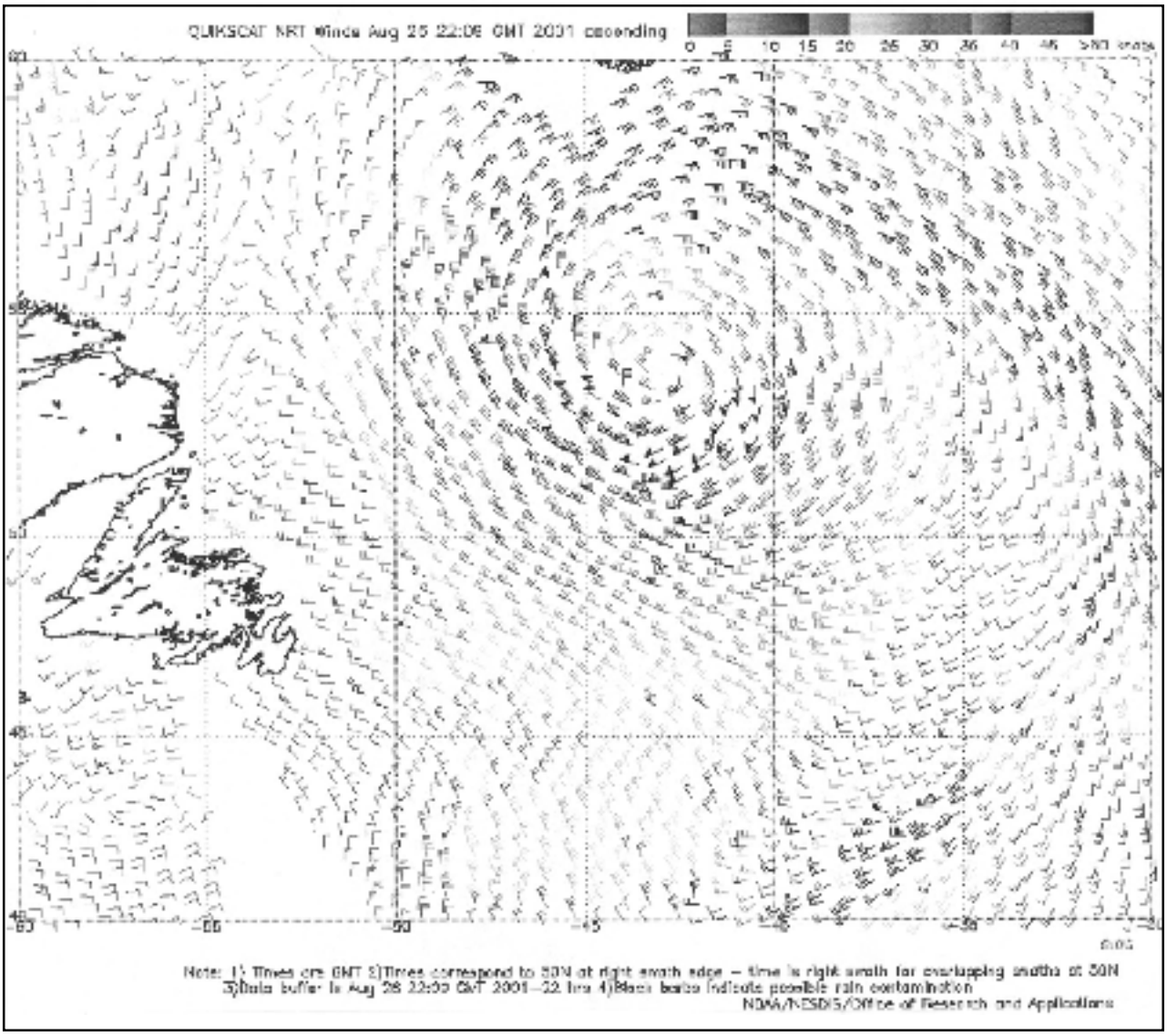


Figure 9. QuikScat scatterometer image of satellite-sensed winds for 0806 UTC August 26, 2001 (from NOAA/NESDIS Office of Research and applications). The time of the pass is only about 2 hours after the valid time of the second surface analysis of Figure 7.

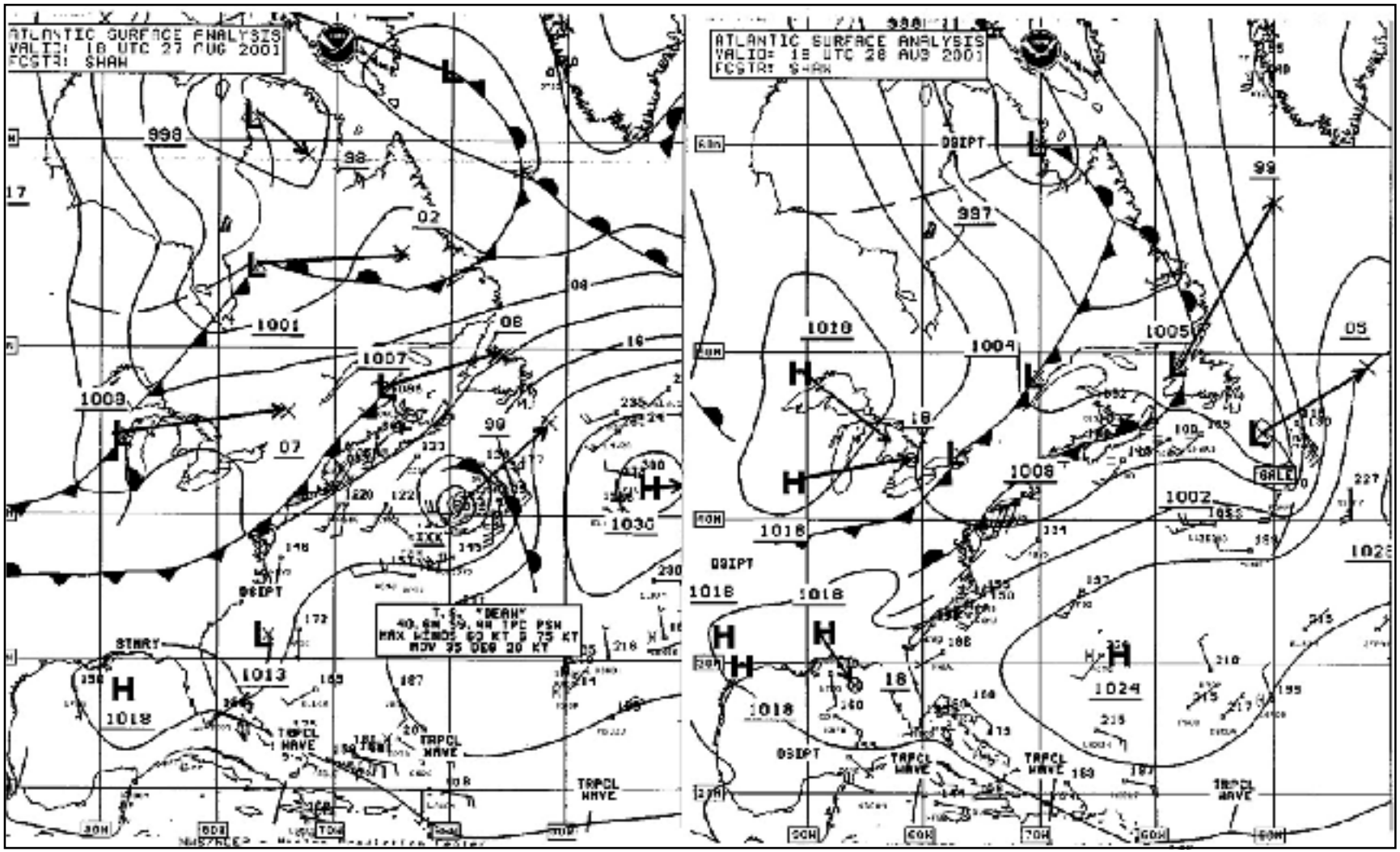


Figure 10. MPC North Atlantic Surface Analysis charts (Part 2) valid 1800 UTC August 27 and 28, 2001.

Marine Weather Review
North Pacific Area—May through August 2001

George P. Bancroft
Meteorologist
Marine Prediction Center

over the Bering Sea forced some of the low-pressure systems in the west to stall or turn northwest. Many of these produced gale force winds, with a few accompanied by storm force conditions, especially in the first half of May. As the season progressed into summer, high pressure strengthened over the eastern Pacific and by August had spread west, forcing the low-pressure tracks to shift more north into the Bering Sea. Some of these, especially late in August, redeveloped in the Gulf of Alaska. The tropics became active in late July, producing several tropical cyclones which moved north of 30°N. and passed near or east of Japan before becoming extratropical (similar to lows with fronts typically found outside the tropics). One of these, Kong-Rey, became an intense extratropical storm in MPC's high seas area and another, Sepat, entered the high seas area as a tropical storm. The southwest corner of MPC's high seas area is 30°N., 160°E. (See reference 2). Tropical cyclones also formed in the eastern North Pacific, but they remained well south of 30°N.

Tropical Activity

Typhoon Kong-Rey: Kong-Rey was named as a tropical storm near 25°N., 150°E. at 0000 UTC July 22 and drifted northwest over the next three days, becoming a typhoon by 1200 UTC on July 23. At 1200 UTC July 23, after crossing 30°N. near 142°E., Kong-Rey turned more northeast and reached maximum strength near 31°N., 144°E., with maximum sustained winds of 85 kt and gusts to 105 kt at 0000 UTC July 27. At 0900 UTC July 27, the ship PCBZ reported a south wind of 40 kt and 7.5-m (24-ft) seas. Nine hours later, with the center of Kong-Rey passing about 60 nmi to the north, the same ship, PCBZ, (31°N., 147°E.) encountered southwest winds of 60 kt. Kong-Rey then weakened to a tropical storm with sustained winds to 50 kt and gusts to 65 kt near 34°N., 150°E. at 0600 UTC July 28. Re-intensification followed as the storm merged with a polar front to the north and became an intense, compact extratropical storm with hurricane force winds, as shown in Figure 1. The GMS satellite image (Figure 2), shows the ex-typhoon with not only a trailing frontal cloud band typically found in extratropical lows, but also a tropical characteristic such as a ring of clouds with thunderstorms near the center.There were no ships reporting near the center, but QuikScat data valid about seven hours after the system became extratropical (Figure 3) reveals 50 to 80 kt wind barbs around the center. The author determined that, due to contamination from heavy rain, the higher wind speeds are unreliable and concluded that maximum winds in the extratropical storm were at least 65 kt. The storm subsequently drifted northeast and weakened to a gale near 48°N., 173°E. at 0000 UTC July 31, and later dissipated in the western Bering Sea early on August 3.

Typhoon Man-Yi: Man-Yi first appeared on MPC's North Pacific surface charts as a minimal typhoon near 16°N., 148°E. at 0600 UTC August 3 and took a more northward track than Kong-Rey. The typhoon developed highest sustained winds of 115 kt with gusts to 140 kt between 1200 UTC August 4 and 0600 UTC August 5 as it drifted north-northwest. It later reached that intensity again at 1200 UTC August 6 when the center was near 27°N., 145°E. The center then turned more north-northeast and crossed 30°N., near 148°E. at 1200 UTC August 7 with maximum sustained winds of 100 kt and gusts to 125 kt. Man-Yi weakened to a tropical storm near

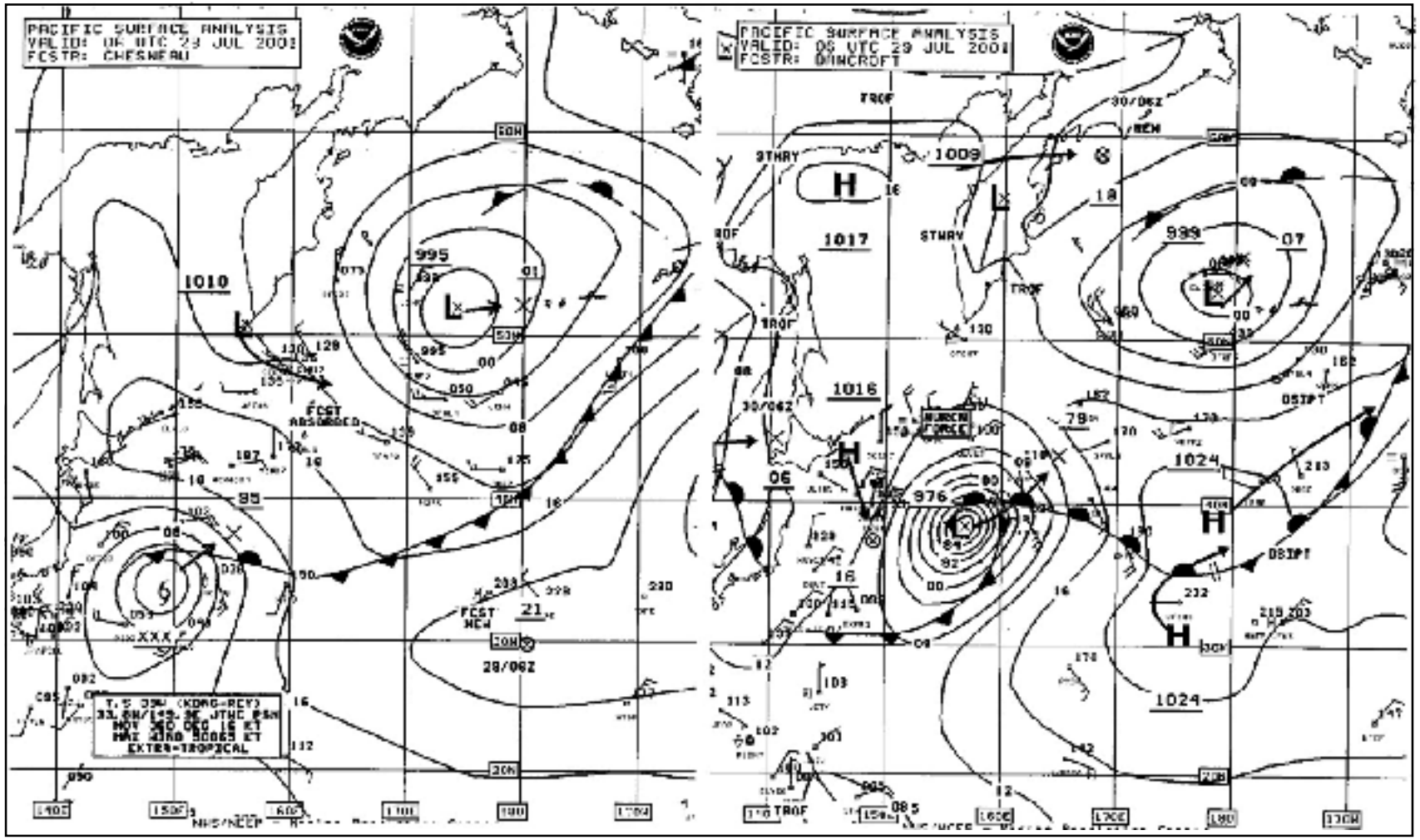


Figure 1. MPC North Pacific Surface Analysis charts (Part 2) valid 0600 UTC July 28 and 29, 2001.

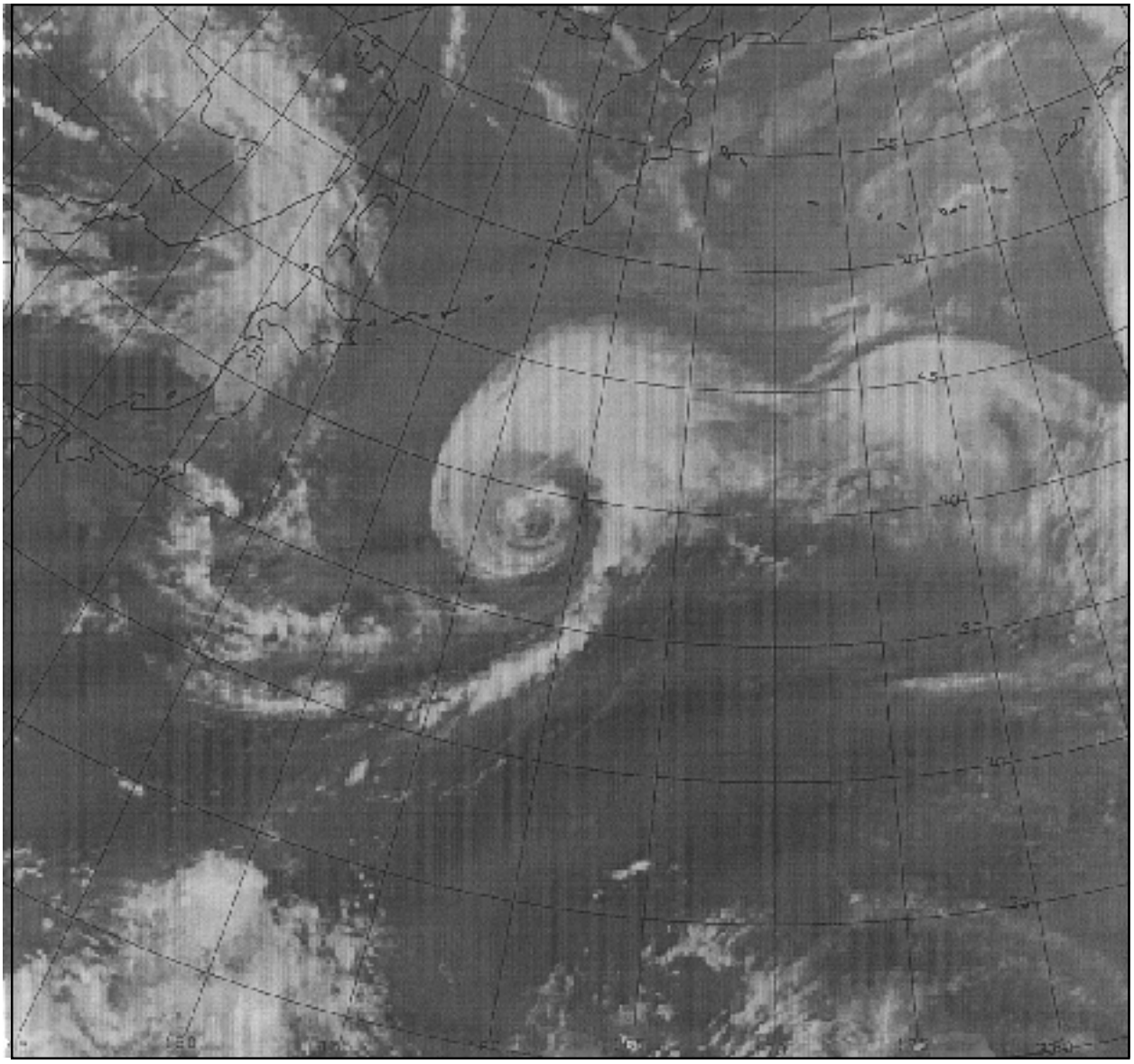
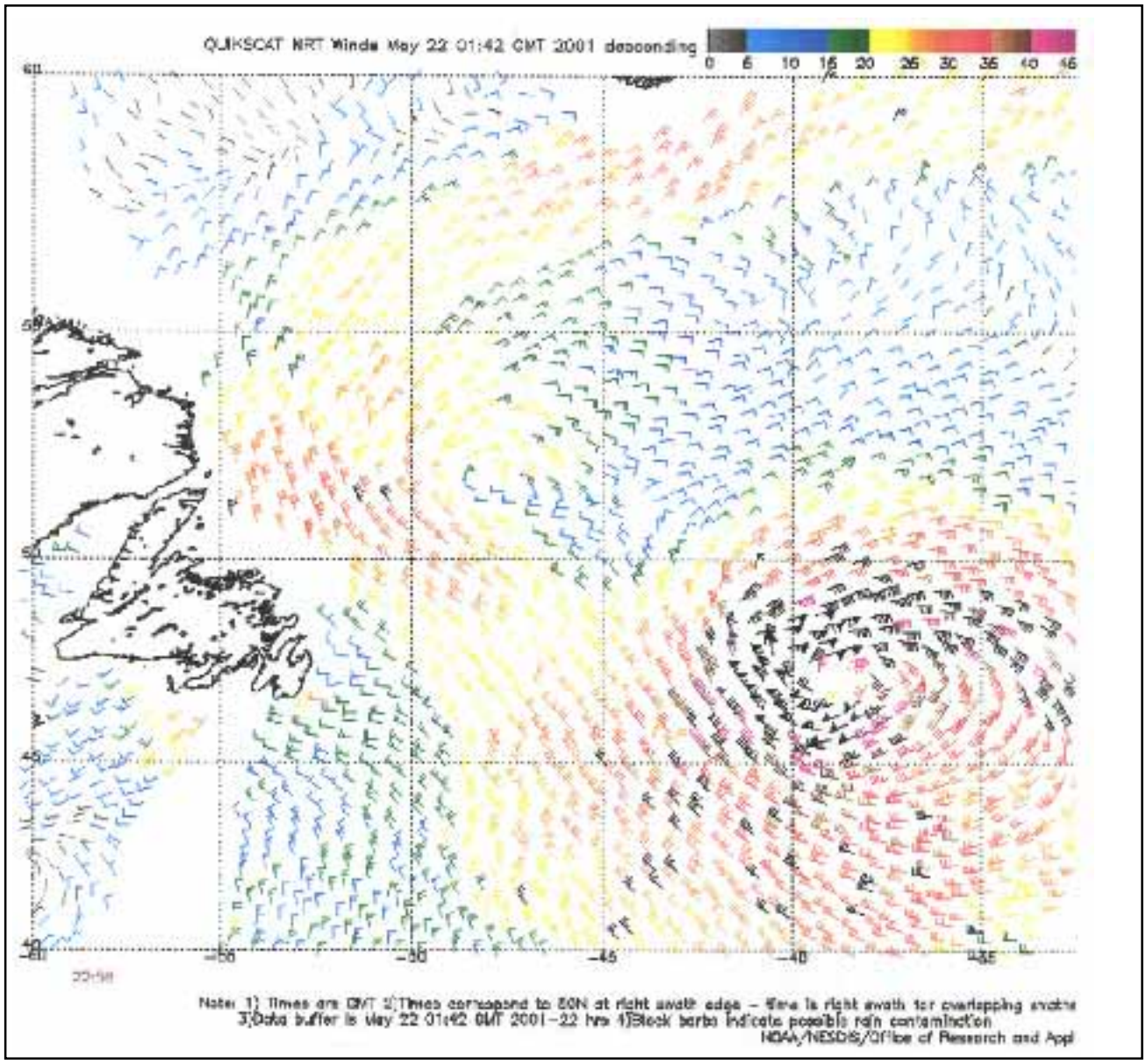


Figure 2. GMS infrared satellite image valid at 0732 UTC July 29, 2001. Satellite senses temperature on a scale from warm (black) to cold (white) in this type of imagery.

38°N., 151°E. at 1800 UTC August 8, with maximum winds of 55 kt and gusts to 70 kt before becoming extratropical six hours later. Man-Yi did not redevelop into an intense extratropical storm, but instead continued to weaken, becoming a low near 47°N., 153°E. at 0000 UTC August 10, with winds below gale force.

Typhoon Pabuk: Tropical Storm Pabuk formed near 19°N., 145°E. at 1200 UTC August 14. It moved northwest, intensifying to a typhoon near 21.5°N., 138°E. at 0000 UTC August 17, with maximum sustained winds of 85 kt and gusts to 105 kt. The ship VNCG encountered southeast winds of 55 kt near 32°N., 136°E. at 1800 UTC August 20. Pabuk then weakened to a tropical storm before turning more northeast across Japan, emerging east of Japan as a tropical depression near 39°N., 143°E. at 1800 UTC August 22. The **Super Rubin** (3FWP5) reported a south wind of 40 kt east of the center near 37°N., 145°E. at 1200 UTC August 22, and again near 37°N.,



Note: 1) Times are GMT 2) Times correspond to 30N at right swath edge - time is right swath for overlapping swath 3) Data buffer is Jul 28 22:27 GMT 2001-22 hrs 4) Black barbs indicate possible rain contamination

Figure 3. QuikScat scatterometer image of satellite-sensed winds around the storm in Figures 1 and 2. The valid time of the pass is 1843 UTC July 28, or about halfway between the times of the surface analyses in Figure 1. Image is courtesy of NOAA/NESDIS/Office of Research and Applications

144°E. six hours later. Pabuk became an extratropical gale near 44°N., 141°E. at 0000 UTC August 23 before weakening to a low in the northeast Sea of Okhotsk at 0600 UTC August 24.

Tropical Depression 15W: See **Northeast Pacific Storm of 30-31 August** in the section **Other Significant Events** for more information.

Tropical Storm Sepat: Tropical Depression 17W formed near 22°N., 162°E. at 0600 UTC August 27 and moved north-northwest. It entered the southwest corner of MPC's high seas waters near 31°N., 161°E. as Tropical Storm Sepat at 0600 UTC August 29. Sepat was a minimal tropical storm with maximum sustained winds of 35 kt and gusts to 45 kt from 0000 UTC through 1800 UTC August 29, before weakening to a tropical depression near 36°N., 159°E. at 0000 UTC August 30. Sepat became a 992-mb extratropical gale near 40°N., 161°E at 1200 UTC August 30 and moved northeast while slowly weakening.

Other Significant Events

Gulf of Alaska Storm of 6-7 May: This storm originated just east of Japan as May began and remained weak while crossing the Pacific until it made a turn toward the Gulf of Alaska early on May 5. Rapid intensification occurred as the system absorbed another low and its trailing arctic front approaching from the northwest (Figure 4), and the central pressure dropped 24 mb to 979 mb in the 24-hour period ending at 0000 UTC May 7. The strongest reported winds were north of the center, where the **Northern Lights** (WFJK) reported from near 57°N., 143°W. with an east wind of 55 kt, along with 5-m (17-ft) seas at 2100 UTC May 6. The **Great Land** (WFDP), northwest of the center, experienced north winds of 45 kt and 6.5-m (21-ft) seas near 58°N., 149°W. at 1200 UTC May 7. At 0000 UTC May 7, in the vicinity of the occluded front, the **CSX Kodiak** (KGTZ) near 55°N., 138°W. encountered southeast winds of 40 kt and 10.5-m (35-ft) seas, the highest seas reported in this storm. Six hours later, the **CSX Anchorage** (KGTX) reported south winds of 35 kt and 8-m (26-ft) seas. Also at this time the **Kenai** (WSNB) was reporting northeast winds of 40 kt and 8-m (26-ft) seas near 58°N., 146°W. The Canadian buoy 46205 (54.2°N., 134.3°W.), reported a maximum wind of southeast 35 kt with gusts to 49 kt at 0000 UTC May 7, and maximum seas of 6.5 m (21 ft) three hours later. The storm center, at maximum intensity in the six-hour period ending 0600 UTC May 7, then began to weaken while drifting northeast. The system weakened to a gale near 57°N 142°W at 0000 UTC May 8 before moving inland late on May 8.

Storm of 11-13 May: A complex area of low pressure moved east of Japan on May 9 and developed a new center near 38°N 163°E at 0000 UTC May 10, and as it moved east-northeast, it slowly intensified. After 0000 UTC May 11, the center turned more north, with much of the intensification occurring in the following 24-hour period when the central pressure dropped 18 mb. At 0600 UTC May 12, near 51°N., 169°W., the system was a 980 mb storm which produced marginal storm force winds around the eastern Aleutians. At 0600 UTC May 12, the **CSX Kodiak** (KGTZ) reported from near 54°N., 161°W. with a southeast wind of 50 kt and 8-m (26-ft) seas, the highest seas reported in this event. Twelve hours later the ship JNKT (54°N., 166°W.), reported east winds of 50 kt and 5.5-m (18-ft) seas. At that time, the storm center developed a lowest central pressure of 975 mb near 53°N., 169°W. before looping back to the southwest and then east and weakening**.** The system then dissipated south of the Alaska Peninsula near 49°N. on May 14.

Western Pacific and Bering Sea Gale of 19-22 June: This system originated as a low which moved off the coast of northern Japan at 0600 UTC June 19 and six hours later developed into a 994-mb gale near 39°N 142°E. Figure 5 depicts the period of most rapid development of this system, when the central pressure dropped 22 mb in the 24-hour period ending 1200 UTC June 21. The second surface analysis of Figure 5 shows the gale at maximum intensity, 970 mb, which is unseasonably strong for late June. The GMS satellite image (Figure 6) reveals a mature system with a well-defined center and frontal cloud band or occlusion which has moved well east of the

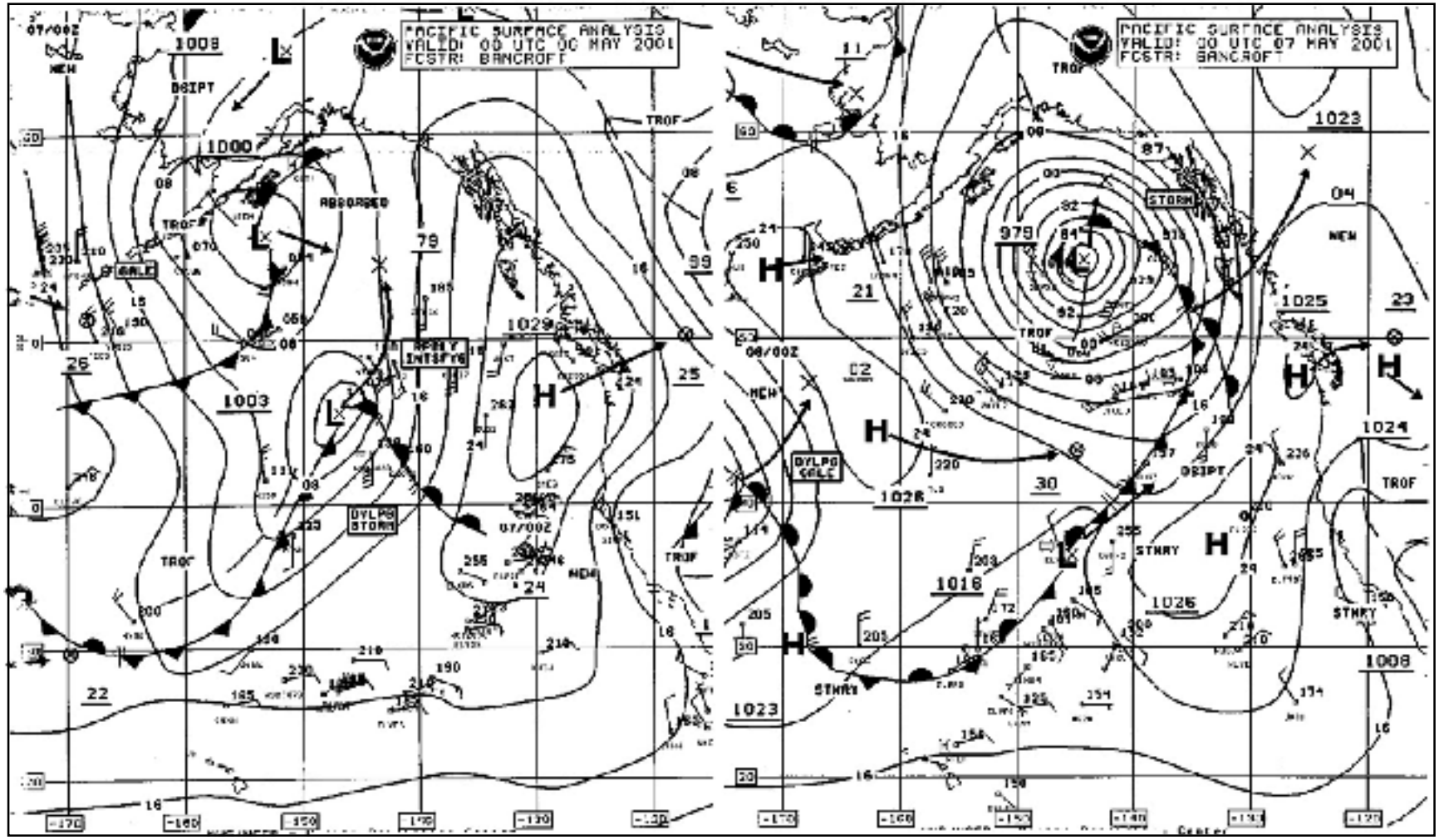


Figure 4. MPC North Pacific Surface Analysis charts (Part 1) valid 0000 UTC May 6 and 7, 2001.

center. The fact that this system had the lowest central pressure, 970 mb, along with the two late-August storms described below, made this the most intense extratropical cyclone (in terms of central pressure) to occur in the North Pacific oceanic surface analysis area during the May-to-August period. At 1200 UTC on June 21, there was an isolated report from the ship **Aquarius Ace** (3FHB8), (45°N., 176°W.), of south winds of 50 kt ahead of the occluded front, but other ships reported 35 kt or less. The maximum seas reported in this event were 8 m (27 ft) from the **Aquarius Ace**. In spite of the intensity of the system, reported winds did not exceed 35 kt over the cold waters of the Bering Sea, where stable conditions near the surface make it difficult for stronger winds aloft to mix down to the surface in summer. The gale center remained nearly stationary during the following twenty-four hours, and then weakened to below gale strength by June 23.

Gulf of Alaska Storm of 19-21 August: This developing storm originated as a weak low which moved east across the southern Sea of Okhotsk on August 15 and 16, and then intensified into a gale in the central Bering Sea late on August 18. The system then rapidly intensified into a storm as it moved into the Gulf of Alaska (Figure 7) and pulled in colder air that was over northwest Alaska (north of the stationary front in the first surface chart of Figure 7). Like the late-June event, this storm developed a lowest central pressure of 970 mb at 1800 UTC August 20. The 500-mb analysis of Figure 8 shows a short-wave trough and jet stream entering the Gulf of Alaska, supporting this development. The ships H3EP (54°N., 156°W.) and the **Caroline Maersk** (OZWA2) at 53°N., 159°W., reported northwest winds of 45 kt at 0000 UTC August 21, the highest reported by ship. There were no reports closer to the center on the south side, where pressure gradients were tighter. At 0000 UTC August 21, The **CSX Kodiak** (KGTZ) reported a northeast wind of 40 kt and 7.5-m (24-ft) seas, and Buoy 46066 (52.5°N., 155°W.) reported seas of 7.6 m (25 ft). Later that day, at 1800 UTC, the **CSX Liberator** (KHRP) at 48°N., 147°W. encountered west winds of 35 kt and 10-m (32 ft) seas, the highest seas reported in this event. By 1200 UTC August 21, the center had reformed to the southeast near 51°N., 140°W., before moving northeast and dissipating near the Queen Charlotte Islands by August 24.

Northeast Pacific Storm of 30-31 August: The origin of this storm can be traced back to Tropical Depression 15W which formed near 24°N., 162°E. at 0600 UTC August 25 and initially moved northwest. After becoming extratropical near 38°N., 145°E. by 1200 UTC August 27 and turning northeast, the developing storm reached the Central Aleutians at 0000 UTC August 30 and turned east. The center intensified into a storm while passing through the southern Gulf of Alaska (Figure 9), attaining a lowest central pressure of 970 mb at 1200 and 1800 UTC August 31. The ship MTFH (48°N., 145°W.) reported seas of 6.5 m (21 ft), with a west wind of 55 kt, as plotted in the second part of Figure 9. At the same time, the **CSX Spirit** (WFLG) encountered south winds of 45 kt and 9-m (30-ft) seas near 52°N., 141°W., followed six hours later by southwest winds of 50 kt and 11-m (36-ft) seas near 51°N., 138°W. At 0300 UTC September 1, Buoy 46004 (51°N., 136°W.) reported a highest wind of 35 kt, with gusts to 47 kt from the southwest, followed three hours later by a maximum significant wave height of 6.5 m (21 ft). The storm center then turned toward the northeast and weakened near the coast of Southeast Alaska on September 1.

References

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

2. Bancroft, G., *High Seas Text Bulletins Issued by MPC* (Mariners Weather Log, Vol. 40, No. 2, Summer 1996)

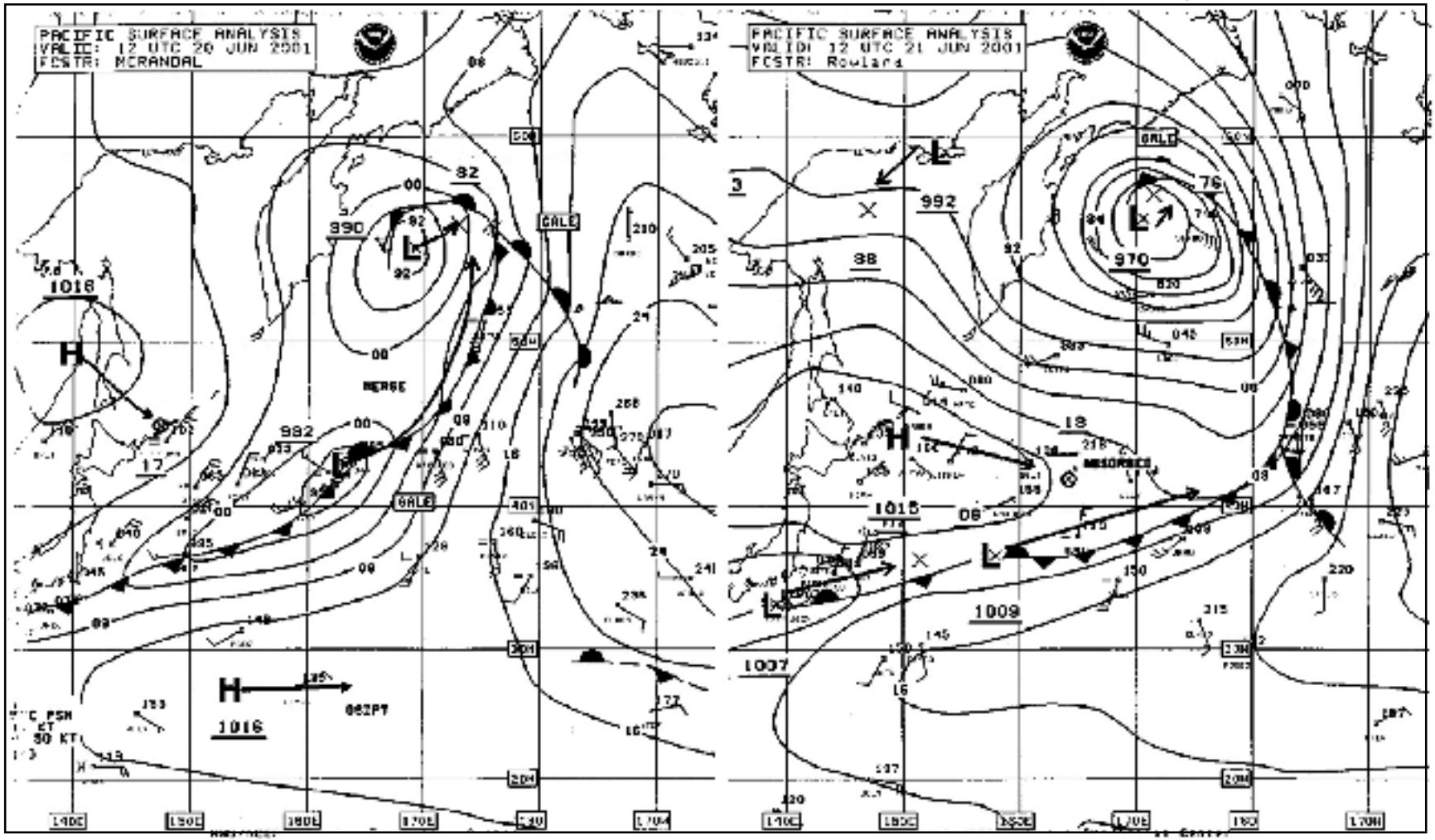


Figure 5. MPC North Pacific Surface Analysis charts (Part 2) valid 1200 UTC June 20 and 21, 2001.

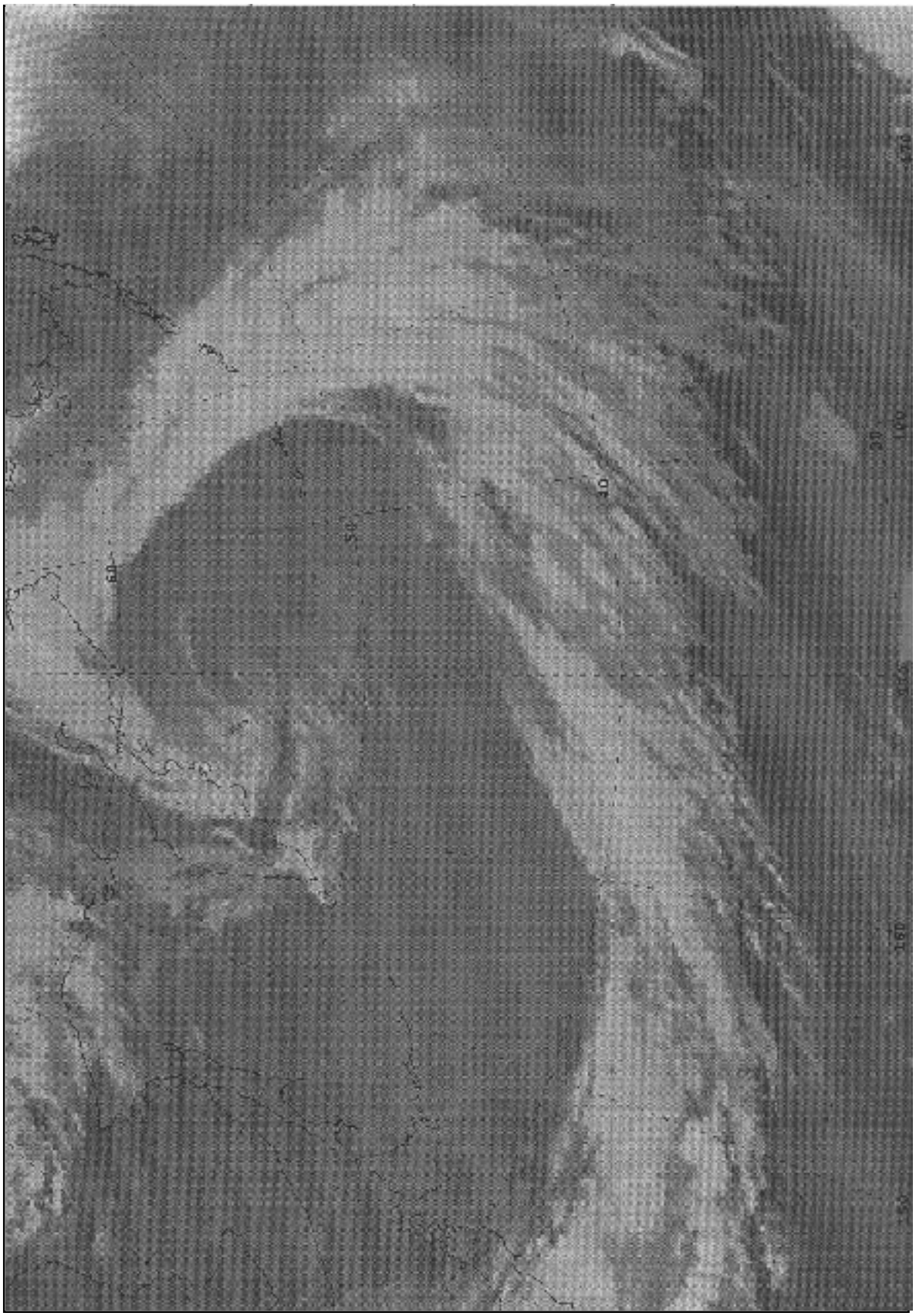


Figure 6. GMS infrared satellite image valid at 1832 UTC June 21, 2001, or about six and one-half hours after valid time of second surface analysis in Figure 5.

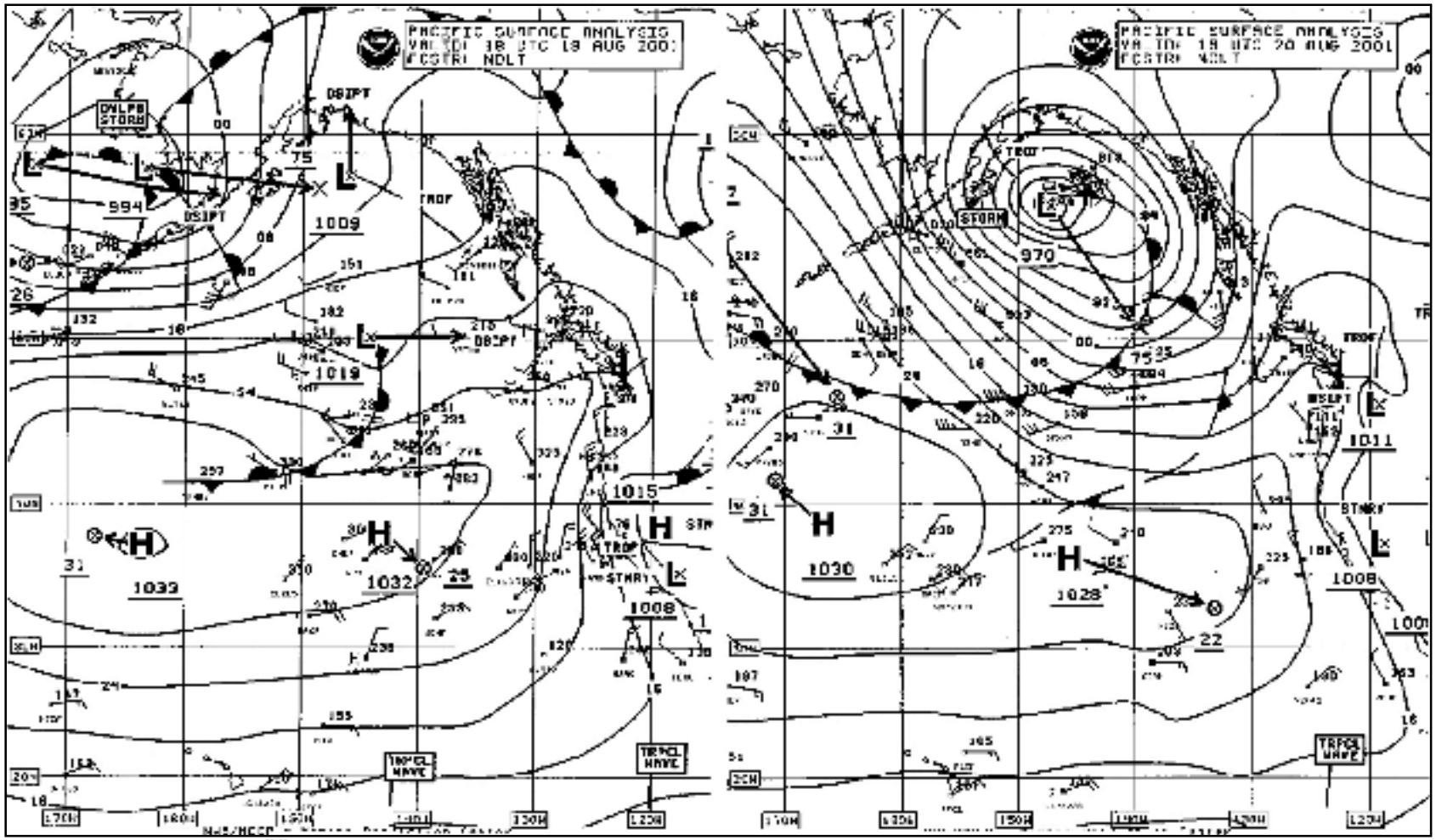


Figure 7. MPC North Pacific Surface Analysis charts (Part 1) valid at 1800 UTC August 19 and 20, 2001

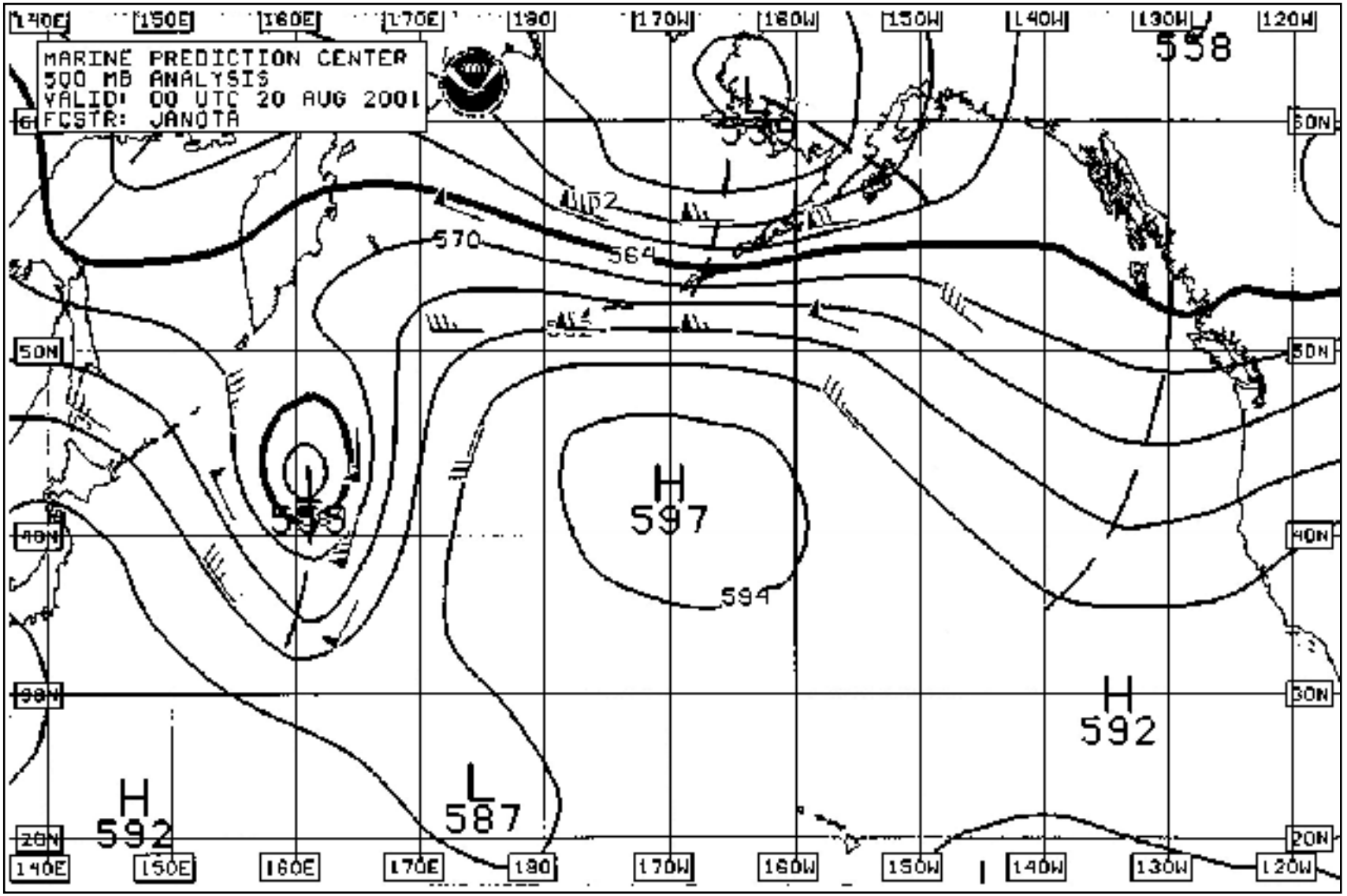


Figure 8. MPC 500-Mb Analysisof North Pacific valid at 0000 UTC August 20, 2001. The broken lines denote short-wave troughs.

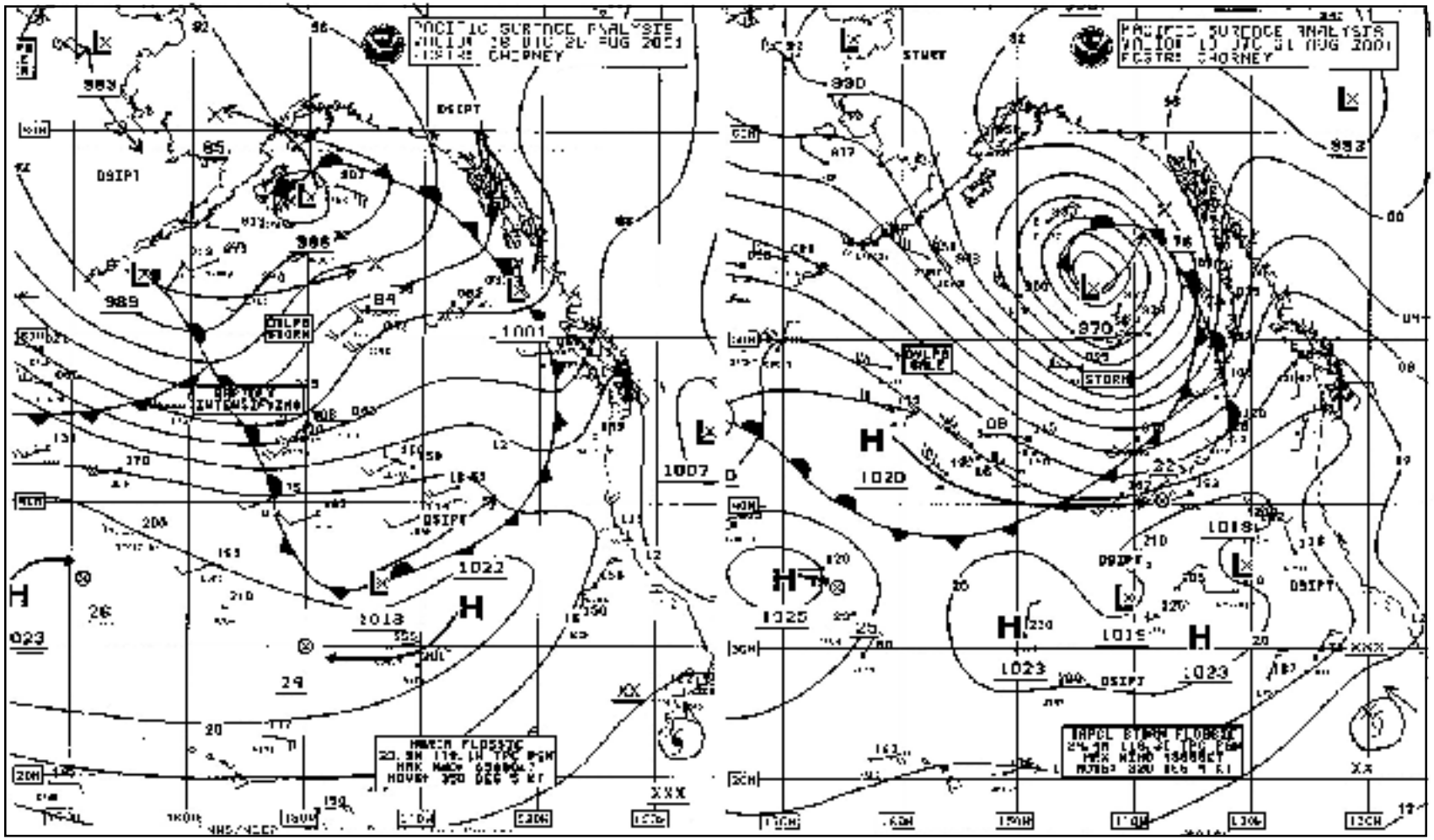


Figure 9. MPC North Pacific Surface Analysis charts (Part 1) valid at 1800 UTC August 30 and 31, 2001.

Tropical Atlantic and Tropical East Pacific Areas—May 2001 - August 2001

Dr. Jack Beven
National Hurricane Center

Daniel P. Brown
Eric J. Holweg
Tropical Analysis and Forecast Branch
Tropical Prediction Center
11691 SW 17th Street

I. Introduction

The normal change from winter to summer weather occurred in the Tropical Prediction Center (TPC) area of responsibility during this period. Two late season gale events occurred in the Atlantic in early May, while twelve tropical cyclones occurred in the Atlantic and Eastern North Pacific basins.

II. The New TPC Tropical Cyclone Danger Area Graphic

Throughout this past hurricane season, the TPC has been producing a "Tropical Cyclone Danger Area" graphic available via the Internet and the U.S. Coast Guard high frequency facsimile (HF Fax). This chart is issued four times per day for both the Atlantic and Eastern/Central Pacific and coincides with the tropical cyclone forecast/advisories issued by the National Hurricane Center (NHC) and Central Pacific Hurricane Center (CPHC) when a tropical cyclone occurs. During periods of no tropical cyclone activity, the product continues to be issued, indicating no active systems in the basin. Developed and implemented at the request of TPC and mMarine Prediction Center high seas customers, this product fills a gap in tropical cyclone warning responsibility to the mariner.

Based on a technique taught in Coast Guard-approved heavy weather avoidance courses, the graphic attempts to account for the inherent track errors in tropical cyclone forecasts. The technique, known as the 1-2-3 Rule, uses values related to the latest NHC 10-year forecast track averages of 100 nautical miles at 24 hours…200 nautical miles at 48 hours…and 300 nautical miles at 72 hours. The 1-2-3 Rule is applied to create an area around the predicted track of a tropical cyclone, marking a region of the high seas that should be avoided by mariners. The graphic also depicts the current and forecast intensity category (tropical depression, tropical storm, or hurricane) of each tropical cyclone along its forecast track. The result is a new product, readily available to the mariner, that provides a visual reference of the latest track/intensity forecast along with minimum recommended distance to maintain from each tropical cyclone. Figure 1 shows an example of this graphic for the Eastern and Central Pacific basin.

Tropical cyclones pose a very serious threat to the mariner, and no single graphic can completely remove the risks involved with operating near these systems. In situations where tropical cyclone forecasts appear uncertain, crew experience is limited, or vessel handling is degraded, it is recom-

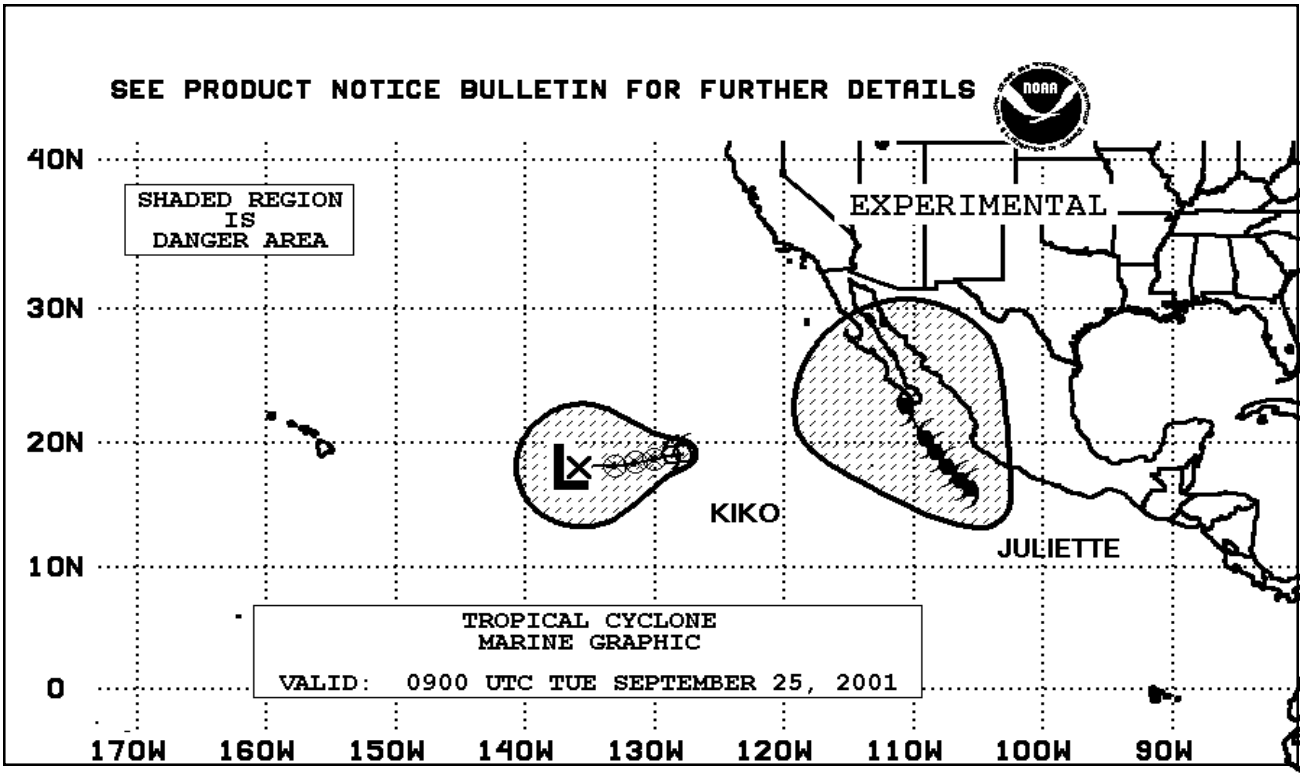


Figure 1: Example of the Tropical Cyclone Danger Area Graphic issued by the Tropical Prediction Center

mended that vessels increase separation beyond that depicted in the graphic. The 1-2-3 Rule does not account for situations such as the outward expansion of the wind field in tropical cyclones transitioning to extratropical gales/storms. Additionally, the rule does not account for problems encountered with smaller ships operating in seas of 12 feet or more. Vessel masters operating in the vicinity of tropical cyclones must also take these factors into consideration. The TPC/NHC recommends that mariners operating in the vicinity of tropical cyclones continually monitor latest advisories from NHC and proceed at their own risk.

III. Significant Weather of the Period

Tropical Cyclones: The Atlantic hurricane season started with five tropical cyclones, of which four became tropical storms; however, none reached hurricane strength. The first half of the Eastern Pacific season saw seven tropical cyclones develop. Six of these became tropical storms, with three reaching hurricane strength and one reaching major hurricane status. ***Note:*** *Tropical cyclone data should be considered preliminary. Only the tracks of the depressions will be included here. Maps showing the tracks of all the named storms of 2001 will be available in the next Mariner's Weather Log.*

Atlantic

Tropical Storm Allison: An area of disturbed weather formed over the Gulf of Mexico on 4 June, due to a combination of a tropical wave and an upper level low. Strong, southerly flow developed east of the system, and when a closed circulation formed about 120 nmi south of Galveston, Texas on the June 5, it immediately became a tropical storm. Allison moved northward with maximum sustained winds reaching 50 kt before landfall near Freeport, Texas later that day. The cyclone continued northward and weakened to a tropical depression over eastern Texas on the 6th and 7th.

Usually, that would have been the end of Allison; however, events did not progress normally. Allison made a slow loop over southeastern Texas, then moved back into the Gulf of Mexico late on 9 June. It turned east-northeastward and moved across southeastern Louisiana and southern Mississippi into southwest Alabama on the 11th. During this motion, an approaching upper level trough caused Allison to re-intensify as a subtropical storm, even though the center was over land (Figure 2). Allison weakened to a subtropical depression while crossing southern Alabama on the 12th, and the east-northeastward motion persisted until the cyclone was over southern North Carolina on the 14th. Allison then meandered over southern and eastern North Carolina until beginning a slow

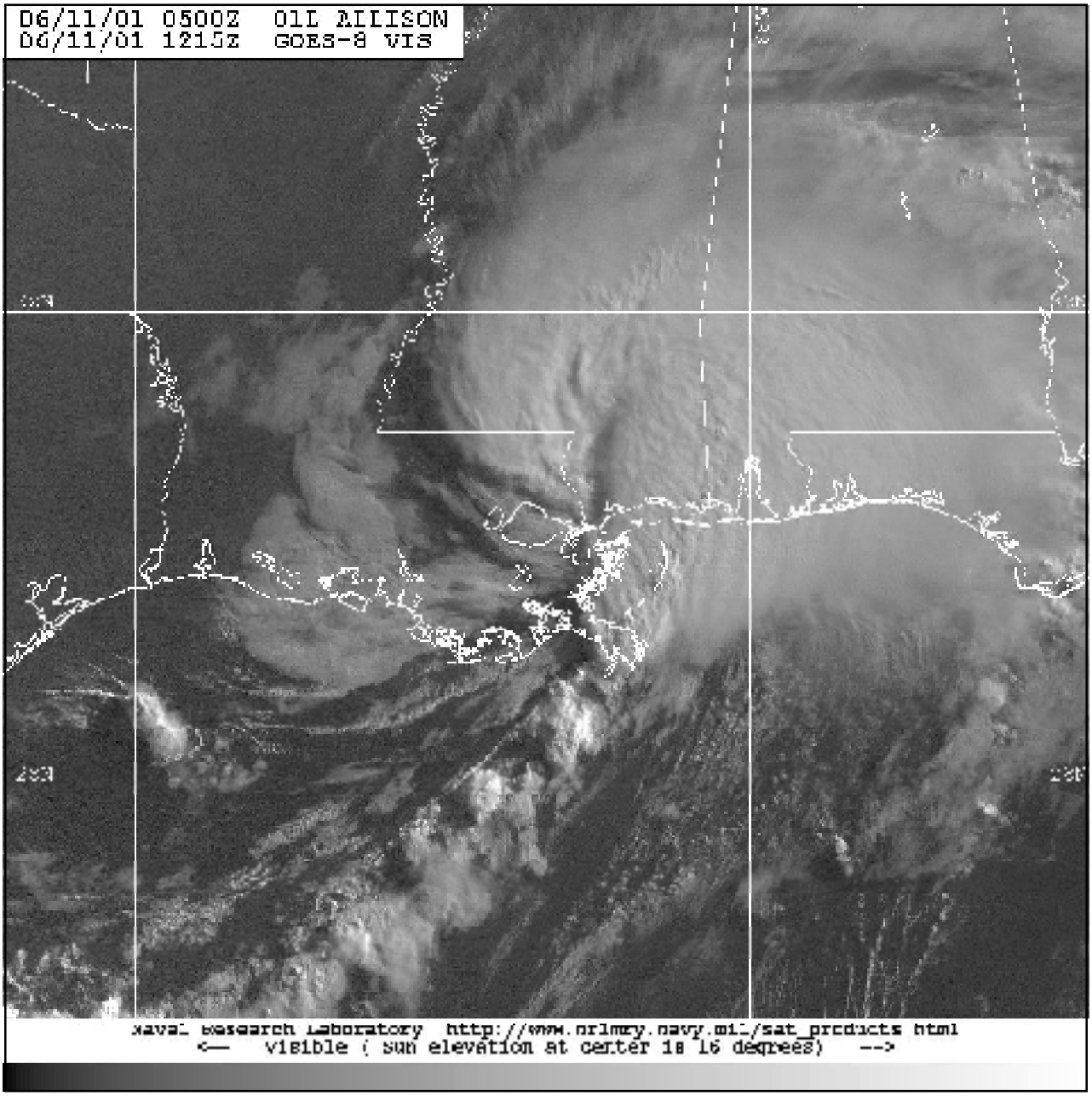


Figure 2: GOES-8 visible image of Allison as a subtropical storm at 1215 UTC 11 June 2001. Image courtesy of the Naval Research Laboratory, Monterey, CA.

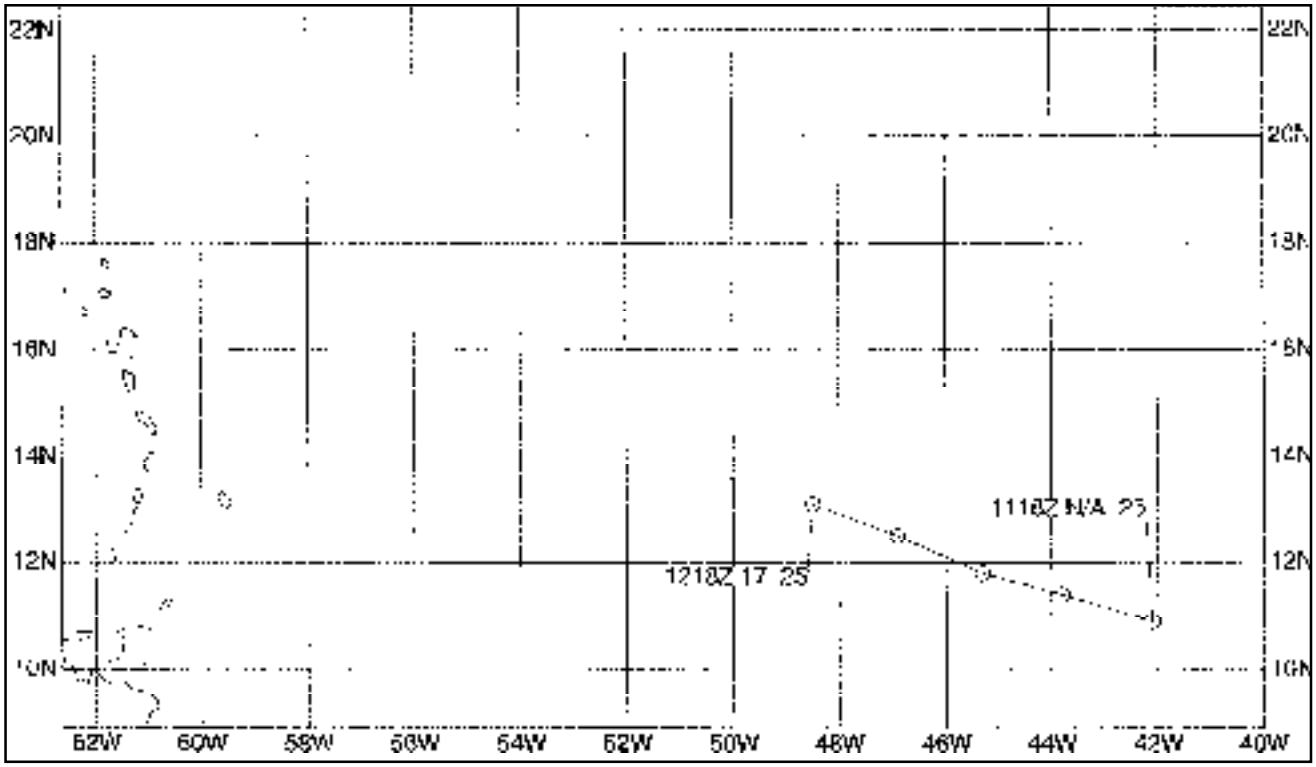


Figure 3: Best track of Tropical Depression Two, 11-12 July 2001.

northward motion on the 15th. A northeastward motion on the 16th brought the center offshore, passing near the Delmarva Peninsula on the 17th and to the south of Cape Cod on the 18th. Allison regained subtropical storm status on the 17th and maintained 35-40 kt winds until it became extratropical on the 18th.

Allison caused some problems for mariners. The NOAA ship **McArthur** (call sign WTEJ) reported 48 kt winds at 1700 UTC 5 June, while the **Paul Buck** (call sign KDGR) reported 34 kt winds at 1200 and 1800 UTC the same day. NOAA buoy 42007 near the Mississippi coast reported 34 kt winds with gusts to 49 kt on 1120 UTC 11 June. On 17 June, sailboats involved in a race also reported sustained winds as high as 48 kt with gusts to 68 kt near the mouth of Delaware Bay and Cape May, New Jersey. However, since these observations are inconsistent with nearby official observations, their accuracy is uncertain.

The worst effects of Allison occurred in southeastern Texas. The slow, looping motion produced widespread excessive rainfalls, with storm totals as high as 36.99 inches at the port of Houston. These rains caused widespread severe flooding and severe damage in the Houston metropolitan area. Heavy rains, flooding, and a few tornadoes were noted elsewhere along the track of Allison. In total, the storm was responsible for 41 deaths and estimated damage of more than $5 billion. This makes Allison the deadliest and most costly tropical or subtropical storm on record in the United States.

Tropical Depression Two: Reports from a U.S. Navy drifting buoy indicate that a tropical wave spawned this depression about 1000 nmi east of the Windward Islands on 11 July (Figure 3). Vertical wind shear prevented further development of the 25 kt system, and the cyclone dissipated late the next day about 600 nmi east of the Windward Islands.

Tropical Storm Barry: A tropical wave that moved westward from the African coast on 24 July showed an increase in convection as it approached the Lesser Antilles on the 28th. The wave moved into the southeastern Gulf

of Mexico on 1 August, where a broad low pressure area first formed. On the 2nd, the low became a tropical depression about 175 nmi west-northwest of Key West, Florida. An Air Force Reserve Hurricane Hunter aircraft determined that the system became Tropical Storm Barry later that day. Barry initially moved west-northwestward, but slowed to a west-southwestward drift on the 3rd and a northeastward drift on the 4th. Vertical shear caused Barry to briefly weaken to a depression on the 4th. This was followed by intensification as Barry turned northward on the 5th. Barry reached a peak intensity of 60 kt before making landfall in the Florida Panhandle between Panama City and Destin early on the 6th. The cyclone weakened to a depression later that day and to a low on the 7th, which dissipated over southeastern Missouri on the 8th.

Shipping generally avoided Barry. One unidentified ship reported 30 kt winds with gusts to 50 kt as the system was first developing on the 2nd. The only other significant marine observation was from NOAA buoy 42039, which reported 39 kt sustained winds with gusts to 54 kt and a 1001 mb pressure at 2000 UTC 5 August. The maximum winds observed at an official land station were 42 kt, with gusts to 69 kt at Eglin Air Force Base; however, unofficial observations, including reports from two sailboats, indicate maximum sustained winds of 60-65 kt with gusts to hurricane force. No deaths were directly attributed to Barry, and the storm caused an estimated $30 million in damage.

Tropical Storm Chantal: A tropical wave that moved westward from the coast of Africa on 11 August developed into a tropical depression about 1300 nmi east of the Windward Islands on the 14th. Moving westward as fast as 30 kt, the depression weakened back to a wave on the 16th. After passing through the Windward Islands, the wave re-organized and developed into Tropical Storm Chantal on the 17th. The storm moved westward until it was south of Jamaica on the 19th, when it turned west-northwestward. Chantal twice reached a peak intensity of 60 kt – the first time on the 19th and the second on the 21st, just before it made landfall on the Yucatan Peninsula near the Mexico-Belize border. Chantal gradually turned west-southwestward after landfall and dissipated over southeastern Mexico the next day.

Two ships reported tropical-storm force winds in Chantal. The **St. Lucia** (call sign C6LF8) reported 37 kt winds at 1200 UTC 18 August, while the **C6RO7** (name unknown) reported 38 kt winds at 1800 UTC the same day. Stations in and around Chetumal, Mexico reported 35 kt sustained winds with gusts to 54 kt.

No deaths were directly attributed to Chantal, and damage in Belize caused by the storm was estimated at $4 million.

Tropical Storm Dean: A tropical wave that moved westward from Africa on 14-15 August began to show signs of organization near the Lesser Antilles on the 21st. The wave passed through the Virgin Islands on the 22nd, and an Air Force Reserve Hurricane Hunter aircraft determined that by afternoon the wave had developed into Tropical Storm Dean with 50 kt winds. This phase of Dean's life was short – by the next day vertical shear had caused it to weaken back to a tropical wave. The wave moved quickly to the north, and on 24 August redeveloped into a broad low pressure area. The low turned slowly northeastward on the 25th and 26th. The low became a tropical depression late on the 26th and regained tropical storm status the next day. Dean gradually accelerated northeastward and reached a peak intensity of 60 kt later on the 27th. It became extratropical southeast of Cape Race, Newfoundland the next day.

Several ships encountered Dean, and selected observations of tropical-storm force winds are given in Table 1. The observation from the **Lykes Navigator** at 0600 UTC 27 August was particularly important, as it helped to determine that Dean had again become a tropical storm. Squalls with winds to tropical-storm force occurred over the Virgin Islands and Puerto Rico, with St. Thomas reporting 35 kt sustained winds with gusts to 42 kt.

Date/Time (UTC)	Ship **name**/ call sign	Latitude (°N)	Longitude (°W)	Wind dir/speed (kt)	Pressure (mb)
22 / 1100	**Nobel Star** (KRPP)	18.8	62.8	110 / 37	1016.0
27 / 0600	**Lykes Navigator** (WGMJ)	37.8	61.6	190 / 55	1004.0
27 / 1800	**Jingu Maru** (JPPT)	41.0	55.9	170 / 47	1012.5
28 / 0000	**Greenwich Maersk** (MZIF7)	40.8	53.3	170 / 36	1017.2

There were no reports of casualties associated with Dean, and damage in Puerto Rico caused by the storm was estimated at $2 million.

Eastern Pacific

Hurricane Adolph: A low pressure area that was likely associated with a tropical wave moved from Central America into the Pacific on 22 May. The system gradually organized, and a tropical depression formed on the 25th about 215 nmi south-southwest of Acapulco, Mexico. Initially moving west-northwestward, the cyclone turned to a slow east-southeastward motion the next day as it became Tropical Storm Adolph. A slow turn to the north occurred on the 27th as Adolph became a hurricane. Adolph turned west-northwestward and intensified on the 28th, reaching an peak intensity of 125 kt the next day (Figure 4). Adolph then turned westward and gradually weakened. It became a tropical storm early on 1 June and was downgraded to a depression later that day. The cyclone dissipated early on 2 June about 400 nmi south-southwest of Cabo San Lucas, Mexico.

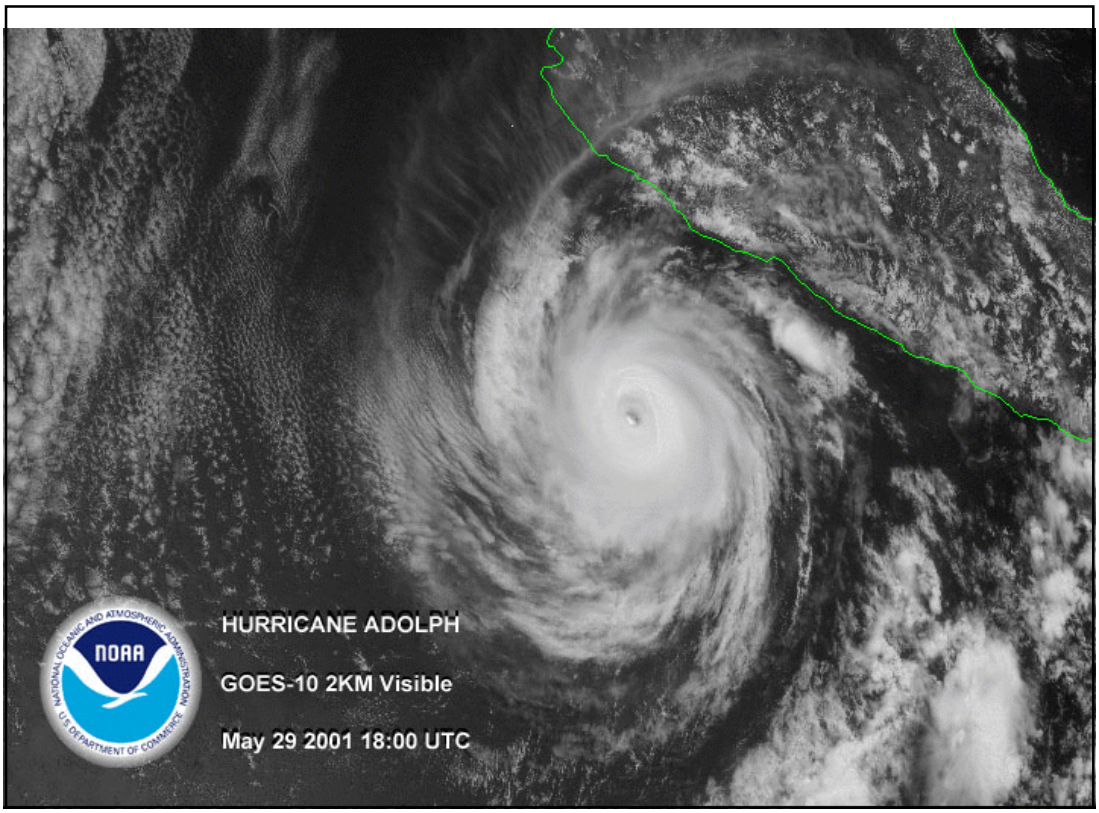


Figure 4: GOES-10 visible image of Hurrican Adolph near peak intensity at 1800 UTC 29 May 2001. Image courtesy of the National Climatic Data Center.

The only report of tropical-storm force winds was from the **CMA CGM Seurat** (call sign DLBX), which reported 39 kt winds and a 1006.0 mb pressure at 0600 UTC 28 May.

Although Adolph was the strongest May hurricane of record in the Eastern North Pacific, there were no reports of casualties or damage.

Tropical Storm Barbara: A tropical wave that emerged from the African coast on 1 June reached the Pacific on 10-11 June. It first showed signs of organization on the 18th, and it developed into a tropical depression on the 20th about 1150 nmi southwest of Cabo San Lucas. Moving west-northwestward through its lifetime, the cyclone became Tropical Storm Barbara later that day and reached a peak intensity of 50 kt the next day. Vertical shear then caused the system to weaken to a tropical depression on the 22nd as it crossed 140°W into the Central Pacific Hurricane Basin. The depression eventually weakened to a tropical wave to the northwest of Kauai on the 26th.

A ship with the call sign **V2FA2** (name unknown) reported 47 kt winds 105 nmi from the center at 0000 UTC 22 June. While this report is close to the estimated intensity at that time, the distance of the ship makes the wind speed appear inconsistent with expectation.

There were no reports of damage or casualties from Barbara.

Tropical Storm Cosme: A tropical wave that crossed Central America on 6 July moved westward and slowly organized. A tropical depression formed on the 13th about 330 nmi southwest of Manzanillo, Mexico, which became Tropical Storm Cosme later that day. Maximum sustained winds reached 40 kt as Cosme moved west-northwestward. Cosme weakened to a depression on the 14th, and then to a low pressure area on the 15th, when it was about 440 nmi west-southwest of Cabo San Lucas. The remnant low moved slowly westward until it dissipated on the 18th.

There were no reports of casualties, damage, or tropical-storm force winds from Cosme.

Hurricane Dalila: A tropical wave that moved westward from Africa on 10 July reached the Eastern Pacific on the 18th. The system organized into a tropical depression on the 21st about 250 nmi south of the Gulf of Tehuantepec. Moving west-northwestward, it became Tropical Storm Dalila later that day. Dalila continued moving west-northwestward through its lifetime, passing about 100 nmi off the southwest Mexican coast on the 22nd and 23rd. Dalila briefly became a 65 kt hurricane on the 24th, weakening back to a tropical storm before the center passed over Socorro Island on the 25th. It weakened to a tropical depression on the 28th and dissipated later that day about 650 nmi west of Cabo San Lucas.

Heavy rains associated with Dalila caused flash floods that damaged homes in Chiapas state in Mexico. There were no reports of casualties or tropical-storm force winds.

Tropical Storm Erick: A tropical wave that moved into the Pacific on 16 July began organizing on the 18th. The system developed into a tropical depression on the 20th about 695 nmi southwest of Cabo San Lucas. Moving west-northwestward, it became a 35 kt tropical storm the next day. Erick maintained minimal tropical storm strength until weakening to a depression on the 23rd. It dissipated the next day about 1050 nmi west of Cabo San Lucas.

There were no reports of casualties, damage, or tropical-storm force winds from Erick.

Tropical Depression Six-E: An area of disturbed weather, possibly associated with a tropical wave, spawned a tropical depression on 22 August about 1300 nmi east of the Hawaiian Islands (Figure 5). The system moved generally north-northwestward before dissipating on the 24th about 1000 nmi east of the Hawaiian Islands. There were no reports of casualties or damage.

Hurricane Flossie: A portion of the tropical wave that spawned Atlantic Tropical Storm Chantal moved into the Pacific on 21 August as Chantal was about to move into the Yucatan Peninsula. The system slowly organized and became a tropical depression on the 26th about 235 nmi south-

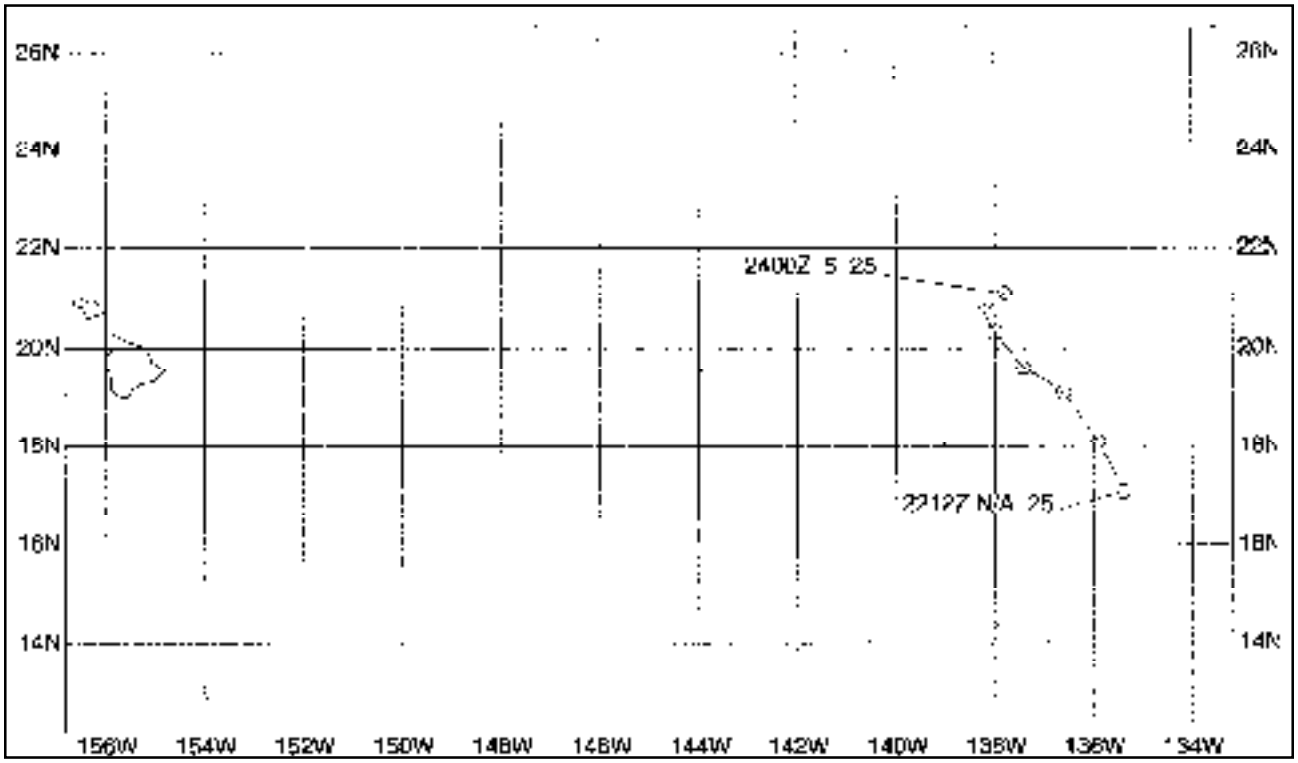


Figure 5: Best track of Tropical Depression Six-E. 22-24 August 2001

southeast of Cabo San Lucas. The cyclone moved westward and became Tropical Storm Flossie later that day. Flossie turned to a slow southwestward motion on the 27th as it reached hurricane strength. This was followed by a slow looping motion on the 28th. Flossie began a northwestward motion on the 29th as it reached a peak intensity of 90 kt. Flossie weakened to a tropical storm on the 31st, then weakened to a depression on 1 September as it recurved slowly to the northeast. The cyclone dissipated the next day about 200 nmi of Punta Eugenia, Mexico.

There were no reports of casualties, damage, or tropical-storm force winds directly associated with Flossie. However, moisture and thunderstorms associated with the remnants of the cyclone spread over portions of southern California on 2-3 September. Lightning strikes from the storms caused two deaths, while associated flash flooding and gusty winds caused minor damage.

Other Significant Events

Two late season gale events occurred over the western Atlantic in early May. These gale centers developed along a stationary front that was draped across the western Atlantic. Strong high pressure north of the front produced strong northeast winds across the western Atlantic for several days prior to the onset of the gale force winds. The first gale center was short-lived, while the second event produced gale conditions south of 31°N. for about 72 hours. No significant non-tropical weather events occurred in the Eastern Pacific basin.

Atlantic, Caribbean and Gulf of Mexico

West Atlantic Gale 3-4 May: This short-lived gale center developed on 2 May as a low along the stationary front draped across the west Atlantic. The low formed northeast of the central Bahamas and at 0000 UTC 3 May was analyzed as a 1013 mb low near 26°N., 66°W. A Quikscat pass from 1000 UTC 3 May detected an area of 25 to 30 kt winds north of the center. At 1200, UTC the ship **Liberty Sea** (call sign KPZH) near 29° N., 62° W.,

observed winds of 40 kt. Based on this observation, the low was upgraded to a gale center at that time. The gale moved northeast at 10 to 15 kt and at 1800 UTC was centered near 27° N., 60° W. The next Quikscat pass at 2220 UTC 3 May detected a solid area of 30 kt winds, while the **Liberty Sea** continued to report 35 to 40 kt winds at both 1800 UTC 3 May and 0000 UTC 4 May. Quikscat data at 0934 UTC 4 May indicated that the winds associated with the gale center had weakened. At 1800 UTC 4 May gale warnings were discontinued, and the weakening gale was analyzed as a 1011 mb low near 27° N., 57° W. The low remained nearly stationary and finally dissipated about 48 hours later.

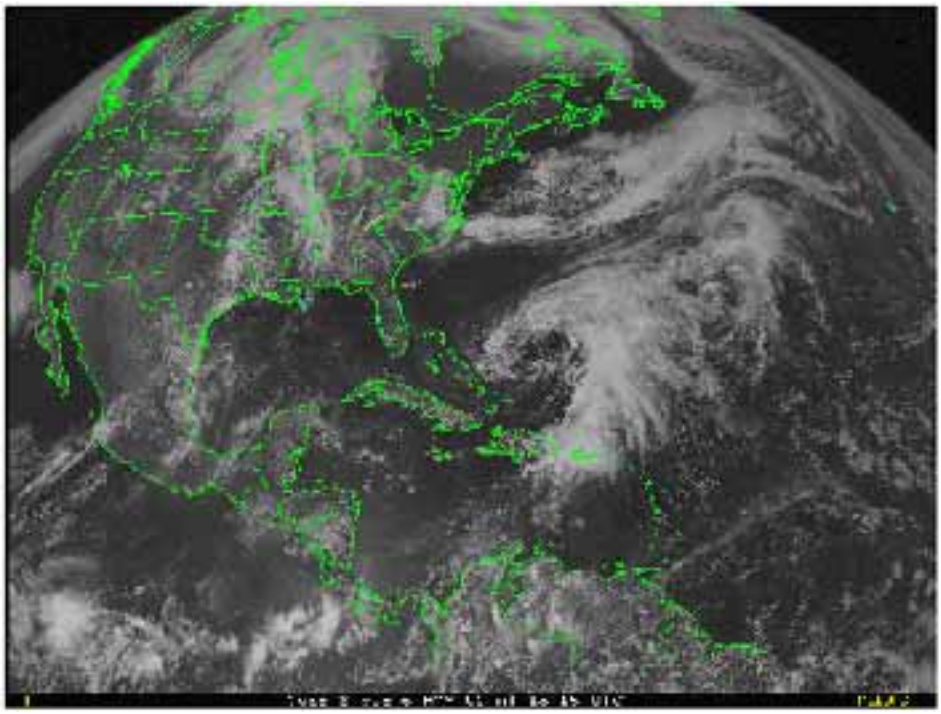


Figure 6: GOES-8 visible image of the west Atlantic gale at 1815 UTC 6 May 2001. Image courtesy of the National Climatic Data Center.

West Atlantic Gale 6-9 May: On 4 May another low began to develop along the old stationary front across the western Atlantic and central Bahamas. The developing gale drifted northeast and became a 1006 mb gale with center near 25° N., 71° W. at 0000 UTC 6 May. Quikscat data at 1023 UTC 6 May detected 30 to 35 kt winds within 240 nmi over the northwest semicircle of the gale center. At 1800 UTC, the ship **Joseph** (call sign ELRZ8) encountered northeast winds of 37 kt near 28°N., 72°W. The ship **Sea-Land Expedition** (call sign WPGJ) observed 34 kt winds near 29°N., 70°W. Visible satellite imagery at 1815 UTC 6 May (Figure 6) depicted a well defined gale centered over the western Atlantic. At this time another strong high pressure center was building over northern New England behind a cold front located off the mid-Atlantic Coast. This increased the pressure gradient across the western Atlantic, and a large area of 25 to 30 kt northeast winds developed well north of the gale center.

As the gale center drifted northeastward on 7 May, the ships **Maersk Shetland** (call sign MSQK3) and the **Lykes Explorer** (call sign WGLA), between 0600 and 1800 UTC, observed northeast winds of 35 to 37 kt near Bermuda. By 1200 UTC 8 May, the gale center had moved northward and was located near 30°N., 64°W. At this time gale conditions continued over the TPC area north of 27° N. and west of the gale center to 70° W. The ship **ZCRR6** (name unknown) encountered northeast winds of 30 kt near 30° N., 74° W. At 1200 UTC, two ships near Bermuda, the **Oleander** (call sign PJJU) and the **Pacific Princess** (call sign GBCF) reported gale force winds of 35 kt and 37 kt, respectively. The gale center continued to move northward, and by 1200 UTC 9 May moved north of the TPC forecast area. Gale conditions ended south of 31°N., however large northerly swells of 2.5 to 3.5 m (8 to 12 ft) continued over the western Atlantic west of 65° W. for the next few days.

Mean Circulation Highlights And Climate Anomalies - July Through October 2001

A. James Wagner
Senior Forecaster, Climate Operations Branch
Climate Prediction Center /NCEP/NWS/NOAA

JULY - AUGUST 2001

The mean 500-mb circulation during the middle and late summer was characterized by a moderately amplified train of troughs and ridges at middle and high latitudes of the Northern Hemisphere. Enhanced ridges with above normal 500-mb heights were located over the western Aleutians, the northern Great Plains, the central Atlantic, and most notably, eastern Europe. At the surface, both the subtropical Pacific High and the Bermuda-Azores High were stronger than normal. Interspersed between the ridges, slightly stronger than normal troughs were located over the eastern Gulf of Alaska, near the east coast of North America, over the extreme eastern Atlantic, and near the Urals in central Asia.

During July, except for an early-month heat wave over the West, above normal temperatures were observed mainly over the middle of the U. S. Along the eastern seaboard, rather cool conditions prevailed most of the time, in response to the stronger than normal upper level trough which prevented the movement of significant amounts of hot and humid air into the region. During August, the heat expanded in different directions for at least part of the month, which affected most of the country. A short, but severe, heat wave developed over the Northeast during the second week, and excessive heat pushed back into the Northwest toward the end of the month. Wildfires became widespread over the Northwest, following a long drought that had its origins during a deficient previous winter rainy season.

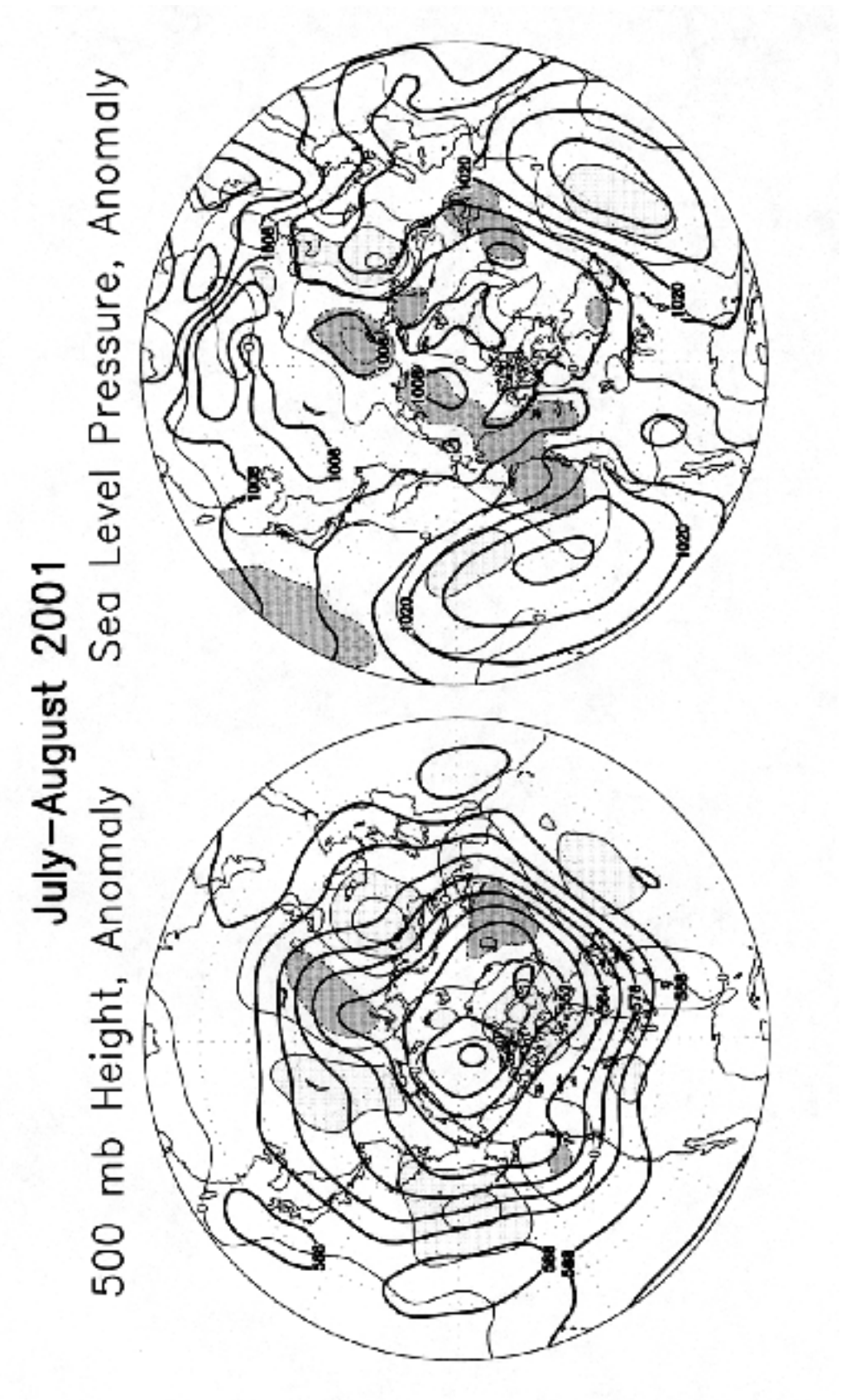
The anomalously strong ridge over eastern Europe and western Russia led to a prolonged period of warm and dry weather over most that region. From time to time, this area of excessive heat expanded into southern Europe, northeastern Africa, and the Middle East.

The recent La Niña had faded to a near-neutral condition, as measured by equatorial sea surface temperatures in the Pacific and most indices of atmospheric circulation. The monsoon was well-developed over India and southeast Asia, with most areas receiving normal or greater rainfall. Under these conditions, the Madden-Julian Oscillation (MJO) was favored to be quite active, and it strongly modulated tropical activity in both the Pacific and the Atlantic sectors.

There were several periods when typhoons were numerous over the western Pacific, but the eastern Pacific had somewhat less activity than usual.

Four named storms had developed over the Atlantic region by the end of August, but only Barry affected the U.S., producing heavy rains along the central Gulf Coast during the second week of the month.

The phase of the MJO was such as to suppress tropical activity in the Atlantic sector during the latter part of August, resulting in only three weak storms when activity is normally rapidly increasing.


July–August 2001
500 mb Height, Anomaly
Sea Level Pressure, Anomaly

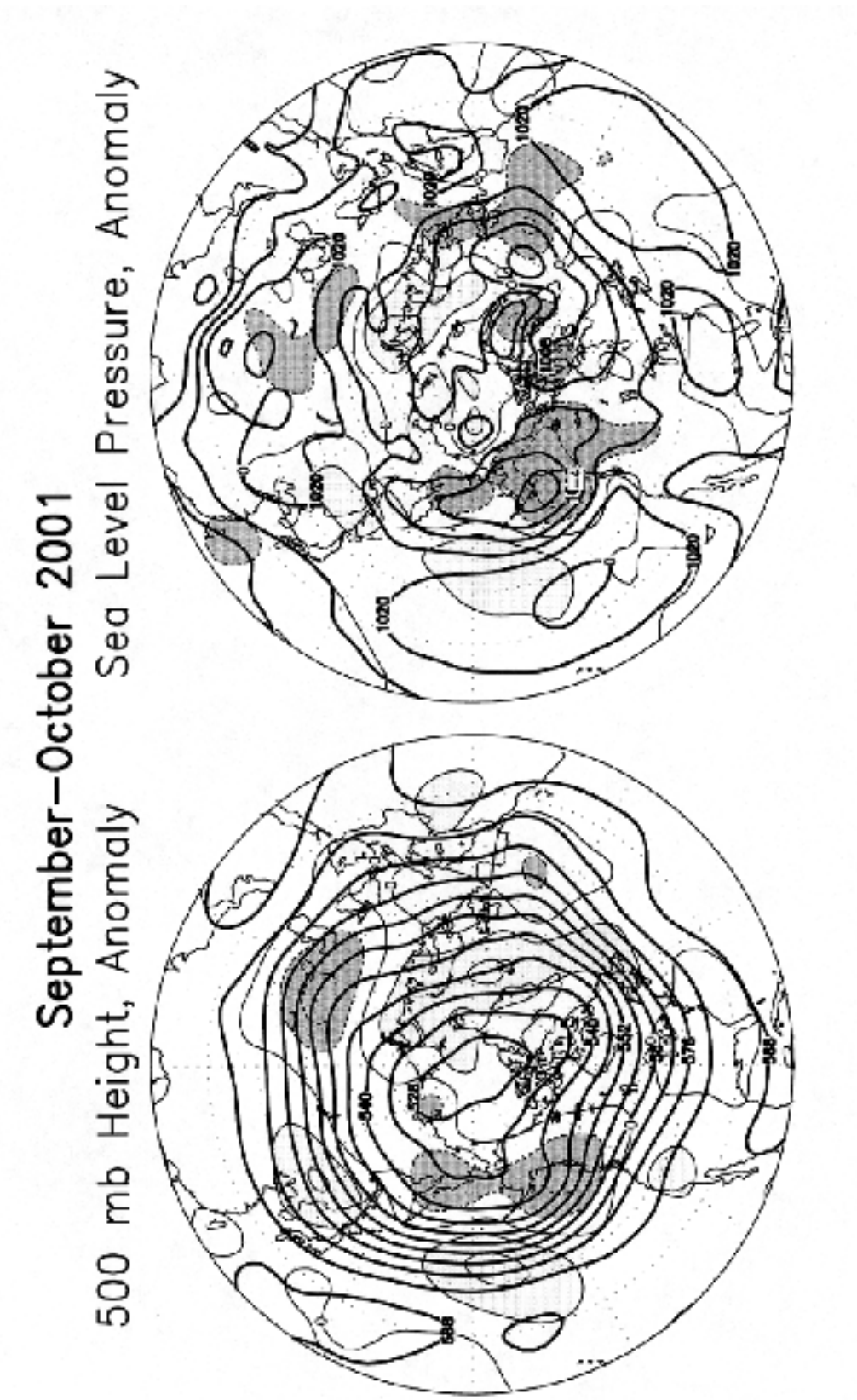

September–October 2001
500 mb Height, Anomaly
Sea Level Pressure, Anomaly

Figure legends and description of units:

The chart on the left in each pair shows the two-month seasonal mean 500-mb height contours at 60 m intervals in heavy solid lines, with alternate contours labeled in decameters (DM). Height anomalies are contoured at 30 m intervals. Areas with mean height anomalies greater than 30 m above normal are shown by light solid lines with light shading, and areas where the mean height anomaly was more than 30 m below normal have light dashed lines with heavy shading.

The charts on the right show the seasonal mean sea level pressure at four mb intervals in heavy solid lines, labeled in mb. Anomalies of SLP are contoured in dashed lines and labeled at two mb intervals, with light shading and light solid lines in areas greater than two mb above normal, and heavy shading and light dashed lines in areas more than two mb below normal.

SEPTEMBER - OCTOBER 2001

The mid-tropospheric circulation during the early fall showed a continuation of the well developed ridge and underlying surface high over the central Pacific. Lower than normal pressure prevailed across the Bering Sea and northern Gulf of Alaska, resulting in strong high latitude westerlies and an early onset of the fall rainy season and gales.

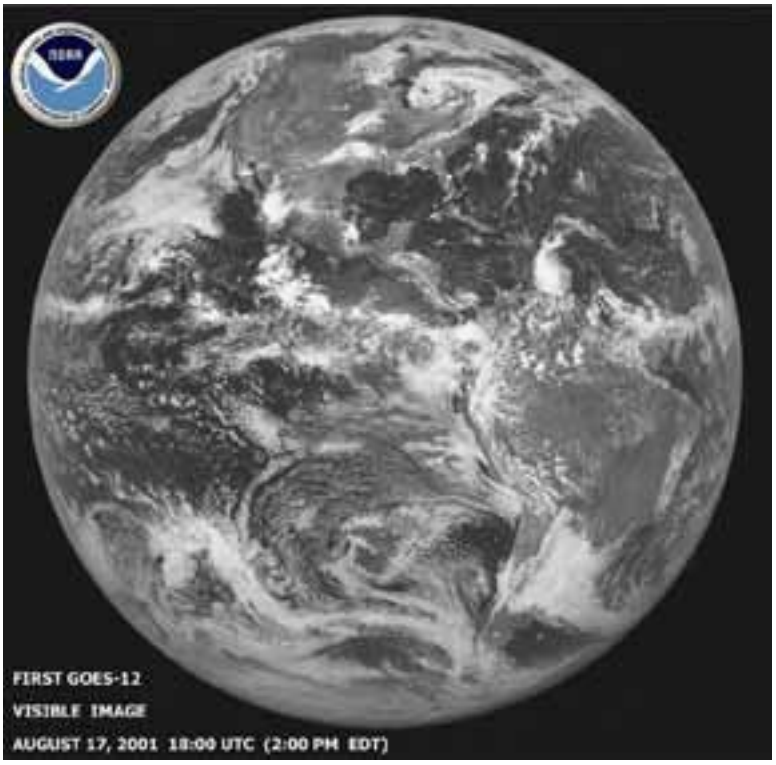
Over the United States, an anomalously strong 500-mb ridge prevailed over the West, accompanied by warmer and drier weather than usual, continuing the drought and wildfire threat past the usual time of onset of fall rains and cooler weather. Under the slightly enhanced but broad trough that covered most of the eastern U.S., temperatures were below normal over the southeastern third of the Nation during September, and the abnormal coolness persisted over the Gulf and south Atlantic states during October, accompanied by heavy rainfall near the Gulf coast. Areas of above normal temperatures was limited to the far West, Southwest, and parts of the Northeast during October. In the West, only parts of the immediate California coastline remained cooler than normal during both months, due to the influence of below normal sea surface temperatures (SSTs) near the shore.

The westerlies over the Atlantic were somewhat south of normal, with above normal heights prevailing across the north from Newfoundland to the Greenland and Barents seas. Below normal heights and enhanced cyclonic activity continued over the eastern Atlantic, but extended inland across central Europe. especially during the latter half of September and the first week of October, when heavy rains occurred over southern and central Europe. This blocking pattern was associated with a negative phase of the North Atlantic Oscillation (NAO). The trough and associated storminess retrograded to the west over the ocean during the latter half of October, and Europe became warmer and drier than normal.

Throughout the entire year, the rainfall distribution over the tropical Pacific has been more typical of that accompanying La Niña, even though since spring many of the indices that monitor the El Niño/Southern Oscillation (ENSO) cycle have averaged close to zero, reflecting a neutral condition. Below normal sea surface temperatures prevailed over the eastern Pacific and much of the adjoining subtropical waters, but above normal SSTs developed eastward as far as the Dateline. As is typical in La Niña years, the Asian monsoon was active, and there were numerous typhoons over the western Pacific, although tropical activity declined sharply in that region during most of October. Again this year, although the number of named tropical storms was somewhat above normal over the western Atlantic region, many of the storms were relatively weak, in spite of above normal SSTs. This was due to greater than normal shear from enhanced westerly components in the high-level winds and periods in which the MJO modulation was unfavorable for strong development. Of the Atlantic tropical storms, only Gabrielle, which produced heavy rains over the Florida Peninsula during the second week of October, had a substantial effect on the U.S.

A Storm By Any Other Name

by Larry Peabody
National Weather Service
Weather Service Forecast Office
San Antonio



They're called *typhoon* in the western Pacific; *baguio* in the Philippines; *cyclone* in the Indian Ocean. In the Atlantic Ocean, Caribbean Sea, Gulf of Mexico and eastern Pacific, they go by the name *hurricane*. And in Baja, California and along the west coast of Mexico, they're known as *chubasco*!

Chubasco? What in the world is a chubasco, you ask? To the uninformed, it may sound like a brand of picante sauce. Or the latest dance craze sweeping Cabo San Lucas. Maybe even that new heavy metal mariachi rock band playing the La Paz circuit. Most likely it's what I came down with the last time I had huevos rancheros for breakfast and then wrestled 12-foot seas off the East Cape of Baja.

Actually, it's none of the above (although one might get a vote or two on that last choice). To the unaware, coming face-to-face with a chubasco can be terrifying. Some have lived to tell about it; others haven't.

According to the *Glossary of Meteorology* (American Meteorological Society, 1959), the 'bible' of weather terminology, chubasco is defined as "a severe thunderstorm with vivid lightning and violent squalls coming from the land on the west coast of Nicaragua and Costa Rica in Central America." In addition to severe thunderstorms and squalls, the term also has been applied locally to tropical storms and hurricanes that strike the west coast of Mexico and the Baja Peninsula.

In late spring and summer, when the inter-tropical convergence zone (ITCZ) is most active, eastern Pacific tropical storms and hurricanes develop in the warm tropical waters southwest of Mexico. Most of these will die at sea as they migrate over colder ocean waters; wander aimlessly westward across the Pacific Ocean south of Hawaii; move inland and perish over the desert; or strike the lower California coast as squalls. But there are destructive exceptions when storms recurve back toward Baja and the west coast of Mexico.

When a tropical storm or hurricane does affect the Baja Peninsula or mainland of Mexico, it is accompanied by damaging wind, pounding surf and torrential rain. The wind damages trees, roofs, houses and buildings. The surf erodes unprotected beaches and coastlines; wreaks havoc on vulnerable fishing and pleasure vessels; undermines exposed or poorly constructed structures; and seriously damages marinas. The rain introduces new threats – viscous mud slides flowing down from nearby hills or mountains, and rampaging flash floods gouging a

Continued from Page 72

normally dry river or creek bed, *arroyo* (gully) or *ramal* (branch).

Even tropical storms or hurricanes that pass hundreds of miles south and west of Baja can have a far-reaching effect. Swells generated by these distant tropical cyclones can reach heights of 20 feet or more on the Pacific side of Baja. On the opposite side, the much smoother Sea of Cortez is spared, thanks to the protection offered by the elongated land mass.

Thunderstorms and squalls formed by the orographic lifting of warm moist air across coastal mountain ranges then drifting across the Sea of Cortez, are known locally as *colla* or *tribunada.* The mountains which reach to the shore along Baja, California and the west coast of Mexico are favorable areas for development. They can develop in other ways, such as along a frontal boundary or some other type of atmospheric disturbance. Whatever they're called, they pose the same threat as thunderstorms in the continental U.S. – intense lightning, sudden wind shifts and buffeting gusts, and torrential rain. In the open ocean, gale-force winds produced by an approaching storm can cause seas to build suddenly, threatening to broach or capsize small fishing and pleasure boats caught unprepared. Angry seas of 15 feet or higher and pounding surf are produced by the increase in wind and waves. Although rare, hail, funnel clouds, tornadoes or waterspouts may accompany these storms.

With the torrential rain comes the threat of a *torrente* (flash flood), especially in mountainous regions. A torrente can be deceptively treacherous, since its source can be miles away from unsuspecting campers, motorists or villages. It also can be particularly devastating when it strikes at night under the cloak of darkness.

A colla or tribunada can be detected early by noting the formation of building cumulus clouds over distant mountain ranges or by the approach from the sea of cumulonimbus clouds - the squall or thunderstorm. Late morning or early afternoon are the most favorable times for development, although they can form at other hours. Usually they tend to dissipate during the late afternoon or evening, or if their passage takes them over cooler water, but they have been known to persist throughout the night and last for several days.

Few locations along the west coast of Mexico or Baja, California are immune. The most favorable regions, however, are those areas where warm water and steeply-rising terrain are closest. There are numerous spots along the west coast of Mexico where this exists. Any place in Baja California Sur would meet this requirement, especially on the Sea of Cortez side, from Loreto southward past La Paz and the East Cape to Cabo San Lucas. Normally, the much cooler water on the Pacific Ocean side inhibits such formation.

The best protection against the effects of a colla or tribunada, as with most other forms of adverse weather, is common sense and advanced planning. Keep a weather eye out for the rapid approach of threatening clouds and have a plan of action to avoid or minimize the threat. If you haven't left port yet and see developing weather, just don't go! Why take a chance? There's always *mañana* (tomorrow). If you can't reach safe harbor and are caught in the open, prepare for rough weather, stay below deck and ride out the storm, if possible. Make sure there are enough personal flotation devices (PFDs) on board, and *all* crew members and passengers are wearing one. Due to their rapid movement, collas or tribunadas seldom affect a spot for more than a few hours, although documented accounts of gale-force winds, blinding lightning, deafening thunder and monster seas may make the experience seem like a lifetime, and liken it to scenes from "*The Perfect Storm.*"

Whatever you call them, chubasco, colla or tribunada, they are the exception to the normally-tranquil weather of Baja, but an exception that can't be ignored, and one which can turn a few hours of fishing and pleasure into an eternity of extreme discomfort and pain, even tragedy, if you're not prepared.

Larry Peabody is Senior Forecaster at the Austin/San Antonio Texas National Weather Service Forecast Office; a Certified Consulting Meteorologist (CCM) and freelance writer; a member of the American Meteorological Society, National Weather Association, Texas Outdoor Writers Association, Outdoor Writers Association of America and, along with wife and fishing companion Barbara, a frequent visitor to Baja, California and advocate of tag-and-release billfishing.

SEPTEMBER 2001 ALASKA MARINE & PUBLIC SERVICES REPORT

New Monthly Record for Alaska BBXX OBS in September!

Alaska set a new, all-time record for Monthly BBXX Observations with 2,268 for September 2001! This beat the old monthly record of 2,059 which was set in August 2001. Congratulations to the following Alaska personnel who visited ships in September: Larry Hubble (7); Rich Courtney (4); Mike Kutz (3); Kimberly Vaughan (1); Jerry Painter (1); James Bunker (1); and Wilford Burson (1).

Kodiak was the "A Division" Station of the Month for September 2001 with a score of 7,416 points. The **Kodiak** staff again led the way with the most BBXX observations transmitted in Alaska, 570, and the most pilot briefings, 146. **Cold Bay** was the "A Division" second place site with a score of 3,016 points. They had their best monthly BBXX total of the year with 182. 2nd place site with a score of 2,805 points. **Juneau** had 1 ship visit, and 240 BBXX observations. **Yakutat** was the "A Division" third ranked station with 1 ship visit, and had an Alaska best 879 marine briefings for a score of 2,616 points. Juneau was the fourth place station with a score of 2,345 points and 1 ship visit.

In the "B Division", **WFO Anchorage** led the way with a score of 1,554 points. **ARH Anchorage** was second with 1,400 points on 7

NWS ALASKA RANKINGS and SCORES

A DIVISION

September 2001

1.	**Kodiak**	**7,416**
2.	Cold Bay	3,016
3.	Yakutat	2,616
4.	Juneau	2,345
5.	Valdez	1,275

JAN – SEP 2001

1.	**Kodiak**	**69,072**
2.	Juneau	31,554
3.	Cold Bay	20,130
4.	Yakutat	11,576
5.	Valdez	10,770

2001 Most Improved

1.	**Juneau**	**+11,438**
2.	Kodiak	+8.991

October 2001

1.	**Kodiak**	**7,197**
2.	Juneau	2,928
3.	Cold Bay	2,675
4.	Yakutat	1,371
5.	Valdez	1,250

JAN – OCT 2001

1.	**Kodiak**	**77,589**
2.	Juneau	34,482
3.	Cold Bay	22,805
4.	Yakutat	12,947
5.	Valdez	12,020

2001 Most Improved

1.	**Juneau**	**+12,038**
2.	Kodiak	+8,669

ship visits. **St. Paul** was third with a score of 1,244 points and 1 ship visit.

In the "C Division," **Barrow** was first again with 300 marine briefings and a score of 1,301 points. Second place McGrath had their first ship visit of the year when they went aboard the tug that hauled their year's supply of helium for weather balloon operations to town. Third place **Bethel** had the second highest total of Pilot Weather Briefings in Alaska for September with 123.

After the first 8 months of the year 2001, the Alaska Marine Division leaders are **Kodiak**, **ARH Anchorage**, and **Barrow**. **ARH Anchorage** has the most ship visits with 82. Kodiak has the most BBXX transmitted with 4,615, the most Marine Briefings with 7,421, and the highest total of Pilot Weather Briefings, with 1,082. Juneau has 4 FAM Floats and Flights in 2001. St. Paul has the highest total of broadcasts with 7,429. Juneau is the 2001 Most Improved Marine and Public Service Program so far with a

NWS ALASKA RANKINGS and SCORES

B DIVISION

SEPTEMBER 2001

1.	**WFO Anchorage**	**1,554**
2.	ARH anchorage	1,400
3.	St. Paul	1,244
4.	King Salmon	966
5.	Annette	716

JAN – SEP 2001

1.	**ARH Anchorage**	**17,000**
2.	St. Paul	11,210
3.	WFO Anchorage	8,755
4.	Annette	8,094
5.	King Salmon	6,307

2001 MOST IMPROVED

1.	**ARH Anchorage**	**+9,200**
2.	WFO Anchorage	+5,964

SEPTEMBER 2001

1.	**ARH Anchorage**	**1,400**
2.	WFO Anchorage	1,396
3.	Annette	1,341
4.	St. Paul	1,043
5.	King Salmon	921

JAN – OCT 2001

1.	**ARH Anchorage**	**18,400**
2.	St. Paul	12,253
3.	WFO Anchorage	10,151
4.	Annette	9,435
5.	King Salmon	7,228

2001 MOST IMPROVED

1.	**ARH Anchorage**	**+10,000**
2.	WFO Anchorage	+7,095

Pictured on the left - While at the Port of Anchorage on September 26, 2001, the Crowley Tug Seneca received the Alaska Marine Program "Award of Excellence." During August 2001, the Seneca had the highest monthly total of observations in recent Alaska history with 142. The Seneca has 396 observations so far this year, and they led all Alaska vessels in the year 2000 with 475 observations. Pictured from left to right are: Buff Pudwill, Charles Tessaro, and Greg Marsh.

NWS ALASKA RANKINGS and SCORES

C DIVISION

September 2001			JAN – SEP 2001			2001 Most Improved		
1.	**Barrow**	**1,301**	**1.**	**Barrow**	**8,430**	**1.**	**Bethel**	**+4,486**
2.	McGrath	1,064	2.	McGrath	7,084	2.	McGrath	+5,964
3.	Bethel	806	3.	Nome	5,468	3.	Barrow	+3,454
4.	Nome	765	4.	Bethel	5,143	4.	Kotzebue	+1,530
5.	Kotzebue	643	5.	Kotzebue	3,972	5.	Nome	+917
6.	Fairbanks	125	6.	Fairbanks	1,969			

September 2001			JAN – OCT 2001			2001 Most Improved		
1.	**McGrath**	**1,179**	**1.**	**Barrow**	**9,135**	**1.**	**McGrath**	**+5,159**
2.	Nome	835	2.	McGrath	8,263	2.	McGrath	+4,840
3.	Kotzebue	755	3.	Nome	6,303	3.	Barrow	+3,584
4.	Barrow	705	4.	Bethel	5,579	4.	Kotzebue	+2,100
5.	Bethel	436	5.	Kotzebue	4,727	5.	Nome	+1,255
6.	Fairbanks	195	6.	Fairbanks	2,164			

BBXX REPORT

Here is the latest information on the **TOP 10 VOS WEATHER REPORTING VESSELS** in Alaskan waters for this year.

SEPTEMBER 2001	OBS	OCTOBER 2001	OBS	JAN – OCT 2001	OBS
1. GUARDIAN	220	1. GUARDIAN	165	1. GUARDIAN	810
2. SENECA	151	2. WARRIOR	116	2. ARCTIC SUN	700
3. ADVENTURER	111	3. SENECA	108	3. SENECA	656
4. MALOLO	92	4. CSX ANCHORAGE	92	4. NORTHERN SPIRIT	565
5. ARCTIC SUN	91	5. ARCTIC SUN	88	4. CSX ANCHORAGE	565
6. PACIFIC PRIDE	85	6. C.F. CAMPBELL	77	6. POLAR EAGLE	514
7. SEA VENTURE	82	7. MALOLO	70	7. WARRIOR	496
8. CSX ANCHORAGE	76	8. SEA VENTURE	66	8. SEABULK MONTANA	490
9. NORTHERN SPIRIT	71	9. SINUK	62	9. CSX KODIAK	417
10. TUSTUMENA	67	10. GRETA	56	10. SAMSON MARINER	407
* ALL ALASKA SHIPS	2,268	* ALL ALASKA SHIPS	1,990	* ALL ALASKA SHIPS	13,514

ALASKA SHIP VISITS SEPTEMBER RANKINGS

Rank	Name	Location	JAN – SEP 2001	SEPTEMBER 2001 Only
1.	**Larry Hubble**	**ARH Anchorage**	**82**	**7**
2.	Rich Courtney	Kodiak	75	4
3.	Greg Matzen	ARH Anchorage	28	
4.	Jerry Painter	Juneau	14	1
5.	Angel Corona	Juneau	7	
5.	Royce Fontenot	Cold Bay	7	
7.	Ralph Johnson	Yakutat	5	
8.	Kimberly Vaughan	Yakutat	4	1
8.	Wilford Burson	St. Paul	4	1
10.	Mike Kutz	MOBEU	3	3
10.	Lynn Chrystal	Valdez	3	
10.	Ed Harris	Cold Bay	3	
10.	Terry Stamey	MOBEU	3	
10.	Laura Furgione	Juneau	3	
15.	Mike Ford	WFO Anchorage	2	
15.	Aimee Devaris	Juneau	2	
15.	Todd Helms	MOBEU	2	
15.	Jim Roberts	King Salmon	2	
15.	Chuck Wilson	Annette	2	
20.	Janet Trimbur	Cold Bay	1	
20.	Art Puustinen	Juneau	1	
20.	Ed Plumb	Juneau	1	
20.	Herschel Knowles	ARH Anchorage	1	
20.	Jerry Steiger	Nome	1	
20.	Donovan Price	Barrow	1	
20.	James Bunker	McGrath	1	1
20	Craig Eckert	Cold Bay	1	1

Pictured on the left - After 8 months of the year 2001, the *CSX Anchorage* is one of the Top 10 weather reporting vessels in Alaskan waters with 397 observations. Pictured here is William Johnson, 2nd Mate on the *CSX Anchorage*, receiving the Award of Excellence while in port in Anchorage, Alaska on September 25th, 2001.

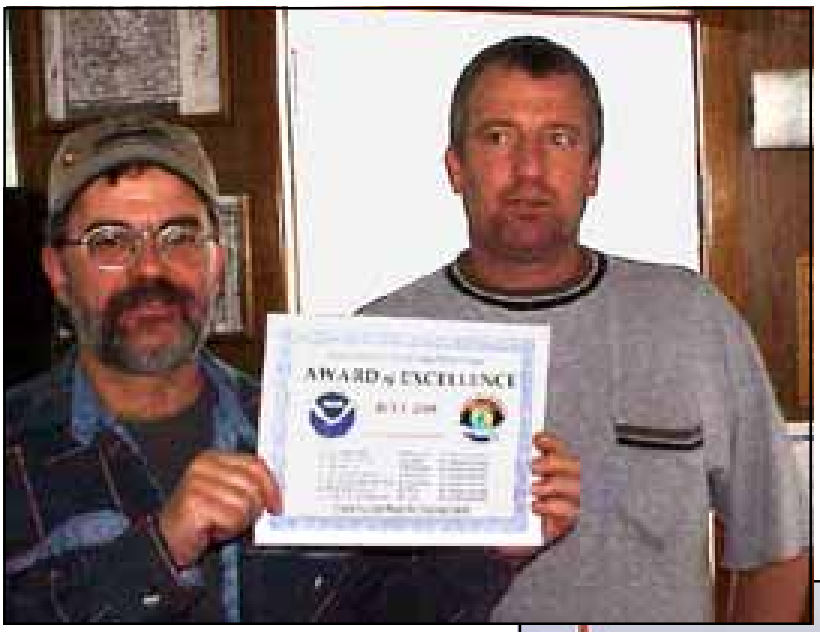
ALASKA SHIP VISITS OCTOBER RANKINGS

Rank	Name	Location	JAN – OCT 2001	OCTOBER 2001 only
1.	**Larry Hubble**	**ARH Anchorage**	**89**	**7**
2.	Rich Courtney	Kodiak	81	6
3.	Greg Matzen	ARH Anchorage	28	
4.	Jerry Painter	Juneau	15	1
5.	Royce Fontenot	Cold Bay	9	2
6.	Angel Corona	Juneau	7	
7.	Ralph Johnson	Yakutat	5	
8.	Kimberly Vaughan	Yakutat	4	
8.	Wilford Burson	St. Paul	4	
10.	Mike Kutz	MOBEU	3	
10.	Lynn Chrystal	Valdez	3	
10.	Ed Harris	Cold Bay	3	
10.	Terry Stamey	MOBEU	3	
10.	Laura Furgione	Juneau	3	
15.	Mike Ford	WFO Anchorage	2	
15.	Aimee Devaris	Juneau	2	
15.	Todd Helms	MOBEU	2	
15.	Jim Roberts	King Salmon	2	
15.	Chuck Wilson	Annette	2	
20.	Janet Trimbur	Cold Bay	1	
20.	Art Puustinen	Juneau	1	
20.	Ed Plumb	Juneau	1	
20.	Herschel Knowles	ARH Anchorage	1	
20.	Jerry Steiger	Nome	1	
20.	Donovan Price	Barrow	1	
20.	James Bunker	McGrath	1	1
20	Craig Eckert	Cold Bay	1	

Captain James Faria and 2nd Mate Dave Swimelar from the *Tug Guardian* received the Alaska Marine Program Award of Excellence while in the port of Anchorage on September 26, 2001. With 121 observations, the *Guardian* took the 2nd highest total observations in Alaskan waters for August 2001. So far, the *Guardian* is ranked 3rd in Alaska for 2001 with 425 observations

Pictured on the left - 3rd Mate Gary Lightner of the *CSX Kodiak* while in the port of Anchorage on October 2nd, 2001. After the first 8 months of 2001, the *CSX Kodiak* was one of the Top 10 of Alaskan reporters.

Pictured above - Captain John Emmel of the *Crowley Tug Warrior* received the Alaska Maine Program Award of Excellence while in the port of Anchorage on October 1st, 2001. Captain Emmel was the pioneer in Alaskan waters in sending e-mail weather observations to the National Weather Service beginning the summer of 1999. During this visit, Captain John loaded the latest SEAS 5.30 software on the *Warrior's* laptop computer. Although the Warrior has spent a good length of time undergoing repairs in the summer of 2001, the *Warrior* is still randed in the Top 10 in Alaskan waters with 329 observations for the period January through August 2001.



Pictured above from left to right is Captain Leonard Hansen and Chief Mate Jeffery Coryell from the *Tug Seneca* while in port in Anchorage on August 30, 2001. Their 80 observations in Alaskan waters from the month of July 2001 qualified them for the Alaska Marine Program "Award of Excellence" as one of the top observing vessels in the VOS program. Pictured directly above is the *Tug Seneca.*

Pictured on the left - The *Chevron Arizona* was chosen by Bob Drummond, PMO Miami, as one of the stellar performers of 2000. Pictured from left to right are: 3rd Mate Dave Corbett, Chief Mate Dan Whyte, and Captain Terry Stark.

Pictured on the right - Amy Seeley presents a 2000 VOS award to the *Oglebay Norton*. Pictured is Captain Patrick J. Nelson. Other mates not pictured who took observations are: Bryce Sunderlin, John Sarns, James Sievewright, Andrew Kania, and Reed Wilson.

Pictured on the left - San Francisco PMO Bob Novak awarded the *President Polk* for outstanding performance during 2000. From left to right: Captain Jerry Blackmon, (outgoing), 2ND Officer Doug Heler, and Captain Jeff Cowan (incoming).

Pictured on the right - The *Westward Belinda* was chosen by Pat Brandow, PMO of Seattle, for a VOS award for the year 2000. Pictured left to right, 3RD Officer F. Punay, Captain Umesh Dixit, 3RD Officer P. Cariquitan, and Chief Officer A. Mehta.

Pictured on the left - The crew of the *Ocean Camellia* performed an exceptional job in taking observations for the VOS program in the year 2000. A VOS Awards Plaque was presented at the Blair Log yard in Tacoma. Pictured left to right: 2ND Officer A. Montano, Captain Mo Kim, Chief Officer T. Batistil Jr., and 3RD Officer N. Salvanera. Standing in the background is PMO Pat Brandow of Seattle.

Pictured on right - Jim Saunders, PMO Baltimore (on right), presents VOS award plaque to Captain Phillip Hansen of the *Tellus*.

Pictured on the left - A 2000 VOS plaque was awarded to the *Vladivostok* for the high quality of surface marine observations. Pictured from left to right: PMO Pat Brandow of Seattle, Captain Yevgeniy Konev, and 3RD Officer Igor Manokhin.

Pictured on the right - Captain Alan Hinshaw (on left), of the *Sealand Integrity*, receiving his 2000 Outstanding award from Jim Nelson PMO Houston (on right). This has been one of the top ships for the last 12 years. Kudos to the Captain and Mates of the Sealand Integrity.

Pictured on the left - The *M/V Tropic Key* was chosen by Bob Drummond, PMO of Miami, for a VOS award for the year 2000. Pictured left to right are: Chief Mate Alan Gumboc, Captain Rodrigo I. Elgincolin Jr., and 2ND Mate Mario Fampo.

Pictured on the right - The *Duncan Island* was one of the ships recognized in 2000 by the VOS program for excellence in weather reporting. From left to right are Captain Brian Stewart and Chief Mate Zdzislaw Tocki.

Pictured on the left - Jim Saunders, PMO Baltimore (not shown), presented VOS award plaque to the *Frances L.* From left to right are: 3RD Officer Abner T. Manglinong, Captain Michel Chapelle, and Chief Officer Rosaliro R. Rafa Jr.

Jim Saunders, PMO Baltimore, (right) presents VOS award plaque to Captain Chase (left) of the *Faust*.

Pictured on the left is Juneau HMT, Jerry Painter, presenting a VOS award for the year 2000 to 1ST Mate Michael Daigler of the *Tug Northern Spirit* (below), while in port in Juneau, Alaska on September 19, 2001. The *Northern Spirit* had the 4th highest total of BBXX observations in Alaskan waters for the 2000 with 253. After 8 months of 2001, the *Northern Spirit* has the 2nd highest total of BBXX observations with 447. The *Northern Spirit* has helped pioneer the use of the SEAS software and 34-mail to encode and transmit BBXX observations in Alaskan waters.

Pictured on the right - VOS award plaque presented by Jim Saunders, PMO Baltimore, to the *Fidelio.* Pictured left to right are: Chief Mate Scott Wegand, Captain Mike Fry, and 2ND Mate Frank Lang.

Pictured on the left - The *Nolizwe* was chosen by Pete Gibino, PMO of Norfolk, as one of the top performers of 2000. A VOS plaque was presented to the crew. Pictured from left to right are: 2ND Officer Rudy Villahermosa, Captain Konstantinos Ntamagkas, and 3RD Mate Jaime Amparo.

NATIONAL WEATHER SERVICE VOLUNTARY OBSERVING SHIP PROGRAM

NEW RECRUITS FROM 01-AUG-2001 TO 31-OCT-2001

NAME OF SHIP	CALL SIGN	AGENT NAME	RECRUITING PMO
COASTAL EXPLORER	WCY3112	COASTAL EXPLORER	KODIAK, AK
HARMONY ACE	H3QA	BARBER SHIP MGMT.	JACKSONVILLE, FL
KNIGHT ISLAND	NMFN	USCG KNIGHT ISLAND	MIAMI, FL
LIBERTY WAVE	KRHZ	LIBERTY MARITIME	HOUSTON, TX
LYKES VOYAGER	ELZU5	STRACHAN SHIPPING CO.	HOUSTON, TX
M/T MONTAUK	WDCJ	SEALIFT INC	NEW ORLEANS, LA
M/V PITTSBURG	ELTQ6	REEDEREI F. LAEISZ GMBH	BALTIMORE, MD
MATANUSKA	WN4201	ALASKA MARINE HIGHWAY	KODIAK, AK
NAVIGATOR	WBO3345	NAVIGATOR	ANCHORAGE, AK
PATRICIA S.	WCY3527	ISLAND TUG AND BARGE CO.	ANCHORAGE, AK
RADIANCE OF THE SEAS	ELIY5	ROYAL CARRIBEAN CRUISE LINE	MIAMI, FL
ROBERT L.	WTW9264	SAUSE BROS OCEAN TOWING CO	KODIAK, AK
SEA TIGER	DGRR	T. PARKER HOST	NORFOLK, VA
SEA VICTORY	WBH9635	CROWLEY MARITIME	ANCHORAGE, AK
TAKARA	LAZN4	WILHELSEN	JACKSONVILLE, FL
TROPIC OPAL	J8WN	TROPIC SHIPPING INC.	MIAMI, FL
USNS POMEROY	NHRD	MAERSK LINES LTD.	NEW YORK CITY, NY
YELLOWFIN	WTE8340	WESTERN PIONEER	KODIAK, AK

VOS Cooperative Ship Report — January through September 2001

The values under the monthly columns represent the number of weather reports received via radio messages. Comments or questions regarding this report should be directed to David McShane, VOS Technical Lead, telephone: (228) 688-1768, or via e-mail to: david.mcshane@noaa.gov.

Ship Name	Call	PMO	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
1ST LT BALDOMERO LOPEZ	WJKV	Jacksonville	0	0	0	0	0	0	0	0	0	0
1ST LT JACK LUMMUS	WJLV	New York City	0	0	0	0	0	0	0	0	0	0
2ND LT. JOHN P. BOBO	WJKH	Norfolk	0	0	0	0	0	0	0	0	9	9
A. V. KASTNER	ZCAM9	Jacksonville	41	55	19	66	76	47	43	83	37	467
A.P. MOLLER	OVYQ2	Seattle	0	0	0	0	0	0	0	0	29	29
AALSMEERGRACHT	PCAM	Long Beach	0	0	0	0	0	0	0	0	30	30
ADVANTAGE	WPPO	Norfolk	0	0	0	0	0	0	0	0	19	19
ADVENTURER	WBN3015	Anchorage	0	0	0	0	0	0	0	0	32	32
AGNES FOSS	WYZ3112	Kodiak	0	0	0	0	0	0	0	0	9	9
AGULHAS	3ELE9	Baltimore	0	0	0	0	0	0	0	0	0	0
ALASKA MARINER	WSM5364	Anchorage	0	0	0	0	0	0	0	0	0	0
ALBEMARLE ISLAND	C6LU3	New York City	0	0	0	0	0	0	0	0	31	31
ALBERNI DAWN	ELAC5	Houston	0	0	0	0	0	0	0	0	5	5
ALBLASGRACHT	PCIG	Houston	0	0	0	0	0	0	8	42	25	75
ALERT	WCZ7335	Anchorage	0	0	0	0	0	0	0	0	0	0
ALEXANDER VON HUMBOLD	Y3CW	Miami	22	627	735	711	734	703	714	736	335	5317
ALKMAN	C6OG4	Houston	0	0	0	0	0	0	0	0	0	0
ALLEGIANCE	WSKD	Norfolk	0	0	0	0	0	0	0	0	0	0
ALLIANCA ROTTERDAM	DHGE	Baltimore	0	0	0	0	0	0	0	0	0	0
ALLIGATOR FORTUNE	ELFK7	Seattle	0	0	0	0	0	0	0	0	0	0
ALLIGATOR GLORY	ELJP2	Seattle	0	0	0	0	0	0	0	0	6	6
ALLIGATOR HOPE	ELFN8	Seattle	0	0	0	0	0	0	0	0	0	0
ALLIGATOR LIBERTY	JFUG	Seattle	0	0	0	0	0	0	0	0	0	0
ALPENA	WAV4647	Cleveland	0	0	0	0	0	0	0	0	0	0
ALPHA HELIX	WSD7078	Kodiak	0	0	0	0	0	0	0	0	12	12
ALTAMONTE	3EIG4	Long Beach	0	0	0	0	0	0	0	0	0	0
AMBASSADOR BRIDGE	3ETH9	Oakland	40	16	60	43	57	51	42	51	30	390
AMERICA	WCY2883	New York City	0	0	0	0	0	0	0	0	0	0
AMERICA SENATOR	9WCR3	Norfolk	0	0	0	0	0	0	0	0	11	11
AMERICA STAR	GZKA	Houston	0	0	0	0	0	0	0	0	30	30
AMERICAN MARINER	WQZ7791	Cleveland	0	0	0	0	0	0	0	0	0	0
AMERICAN MERLIN	WRGY	Norfolk	0	0	0	0	0	0	0	0	0	0
AMERICANA	C6QG4	New Orleans	0	0	0	0	0	0	0	0	0	0
ANASTASIS	9HOZ	Miami	0	0	0	0	0	0	0	0	0	0
ANATOLIY KOLESNICHENKO	UINM	Seattle	0	0	0	0	0	0	0	0	0	0
ANKERGRACHT	PCQL	Baltimore	0	0	0	0	0	0	0	0	0	0
APACHE	WCY5541	Kodiak	0	0	0	0	0	0	0	0	0	0
APL CHINA	S6TA	Seattle	0	0	0	0	0	0	0	0	14	14
APL GARNET	9VVN	Oakland	0	0	0	0	0	0	0	0	0	0
APL JAPAN	S6TS	Seattle	0	0	0	0	0	0	0	0	1	1
APL KOREA	WCX8883	Seattle	31	78	37	27	34	23	24	29	27	310
APL PHILIPPINES	WCX8884	Seattle	0	0	0	0	0	0	56	33	18	107
APL SINGAPORE	WCX8812	Seattle	0	0	0	0	0	0	49	29	20	98
APL THAILAND	WCX8882	Seattle	0	0	0	0	0	0	0	0	12	12
APL TURQUOISE	9VVY	Oakland	0	0	0	0	0	0	0	0	0	0
APOLLOGRACHT	PCSV	Baltimore	0	0	0	0	0	0	0	0	0	0
ARCTIC BEAR	WBP3396	Kodiak	0	0	0	0	0	0	24	21	10	55
ARCTIC OCEAN	C6T2062	New York City	0	0	0	0	0	0	0	0	0	0
ARCTIC SUN	ELQB8	Anchorage	0	0	0	0	0	0	0	0	21	21
ARGENTINA STAR	C6MD8	Houston	0	0	0	0	0	0	0	0	29	29
ARGONAUT	KFDV	New York City	0	0	0	0	0	0	0	0	17	17
ARIES HARMONY	3FEY7	Seattle	0	0	0	0	0	0	0	0	0	0
ARISO	3FHJ6	Seattle	0	0	0	0	0	0	0	0	0	0
ARKTIS FUTURE	OXUF2	Miami	0	0	0	0	0	0	0	0	0	0
ARMCO	WE6279	Cleveland	0	0	0	0	0	0	0	0	1	1
AROSIA	V2SB	New Orleans	0	0	0	0	0	0	0	0	0	0
ARTHUR M. ANDERSON	WE4805	Chicago	0	0	0	0	0	0	0	0	15	15
ASTORIA BRIDGE	ELJJ5	Long Beach	0	0	0	0	0	0	61	80	27	168

Ship Name	Call	PMO	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
ATLANTIC	3FYT	Miami	0	0	0	0	0	0	312	324	118	754
ATLANTIC CARTIER	C6MS4	Norfolk	0	0	0	0	0	0	0	0	10	10
ATLANTIC COMPANION	SKPE	New York City	0	0	0	0	0	0	47	45	10	102
ATLANTIC COMPASS	SKUN	Norfolk	0	0	0	0	0	0	0	0	17	17
ATLANTIC CONCERT	SKOZ	Norfolk	0	0	0	0	0	0	0	0	20	20
ATLANTIC CONVEYOR	C6NI3	Norfolk	0	0	0	0	0	0	0	0	20	20
ATLANTIC ERIE	VCQM	Baltimore	0	0	0	0	0	0	0	0	6	6
ATLANTIC FOREST	ELTN8	New Orleans	0	0	0	0	0	0	0	0	15	15
ATLANTIC NOVA	3FWT4	Seattle	0	0	0	0	0	0	0	0	0	0
ATLANTIC OCEAN	C6T2064	New York City	0	0	0	0	0	0	0	0	2	2
ATLANTIS	KAQP	New Orleans	0	0	0	0	0	0	0	0	3	3
ATTENTIVE	WCZ7337	Anchorage	0	0	0	0	0	0	0	0	0	0
AUCKLAND STAR	C6KV2	Baltimore	0	0	0	0	0	0	0	0	0	0
AWARE	WCZ7336	Anchorage	0	0	0	0	0	0	0	0	0	0
B. T. ALASKA	WFQE	Long Beach	0	0	0	0	0	0	0	0	3	3
BARBARA ANDRIE	WTC9407	Chicago	0	0	0	0	0	0	0	0	5	5
BARRINGTON ISLAND	C6QK	Miami	0	0	0	0	0	0	0	0	0	0
BAY BRIDGE	ELES7	Long Beach	0	0	0	0	0	0	0	0	0	0
BELLONA	3FEA4	Jacksonville	0	0	0	0	0	0	0	0	0	0
BERING SEA	C6YY	Miami	0	0	0	0	0	0	0	0	0	0
BERNARDO QUINTANA A	C6KJ5	New Orleans	0	0	0	0	0	0	66	60	26	152
BLACKHAWK	WBN2081	Anchorage	0	0	0	0	0	0	0	0	0	0
BLARNEY	WBP4766	Kodiak	0	0	0	0	0	0	0	0	0	0
BLUE GEMINI	3FPA6	Seattle	0	0	0	0	0	0	0	0	0	0
BLUE HAWK	D5HZ	Norfolk	0	0	0	0	0	0	0	0	0	0
BLUE NOVA	3FDV6	Seattle	0	0	0	0	0	0	44	10	25	79
BOHEME	SIVY	New York City	0	0	0	0	0	0	0	0	0	0
BONN EXPRESS	DGNB	Houston	734	834	788	867	863	865	1212	984	409	7556
BRASILIA	DGVS	New York City	0	0	0	0	0	0	0	0	11	11
BRIGHT PHOENIX	DXNG	Seattle	0	0	0	0	0	0	0	0	0	0
BRIGHT STATE	DXAC	Seattle	0	0	0	0	0	0	0	0	0	0
BRISBANE STAR	C6LY4	Seattle	0	0	0	0	0	0	0	0	0	0
BRITISH ADVENTURE	ZCAK3	Seattle	0	0	0	0	0	0	66	47	21	134
BROOKLYN BRIDGE	3EZJ9	Oakland	0	0	0	0	0	0	0	0	0	0
BUCKEYE	WAQ3520	Cleveland	0	0	0	0	0	0	0	0	0	0
BUFFALO	WXS6134	Cleveland	0	0	0	0	0	0	0	0	0	0
BUNGA ORKID DUA	9MBQ4	Seattle	0	0	0	0	0	0	0	0	0	0
BUNGA ORKID TIGA	9MBS3	Seattle	0	0	0	0	0	0	0	0	0	0
BUNGA SAGA TIGA	9MBM8	Seattle	0	0	0	0	0	0	0	0	0	0
CABO NEGRO	ELEM2	Houston	0	0	0	0	0	0	0	0	0	0
CALCITE II	WB4520	Chicago	0	0	0	0	0	0	0	0	0	0
CALIFORNIA JUPITER	ELKU8	Long Beach	0	0	0	0	31	15	35	46	32	159
CALIFORNIA MERCURY	JGPN	Seattle	0	0	0	0	0	0	17	17	6	40
CALIFORNIA SENATOR	DEBB	Houston	0	0	0	0	0	0	14	71	37	122
CAPE KNOX	KAOP	New Orleans	0	0	0	0	0	0	0	0	0	0
CAPE WRATH	WRGJ	Baltimore	0	0	0	0	0	0	0	0	0	0
CAPRICORN	PDAY	Baltimore	0	0	0	0	0	0	0	0	3	3
CAPT STEVEN L BENNETT	KAXO	New Orleans	0	0	0	0	0	0	0	0	24	24
CARIBBEAN MERCY	3FFU4	Miami	0	0	0	0	0	0	0	0	0	0
CARIBE CHALLENGER	WDA3588	Kodiak	0	0	0	0	0	0	0	0	3	3
CARNIVAL DESTINY	3FKZ3	Miami	0	0	0	0	0	0	0	0	0	0
CARNIVAL PARADISE	3FOB5	Miami	0	0	0	0	0	0	0	0	9	9
CARNIVAL SPIRIT	3FPR9	Miami	0	0	0	0	0	0	0	0	1	1
CARNIVAL TRIUMPH	3FFM8	Miami	0	0	0	0	0	0	0	0	0	0
CARNIVAL VICTORY	3FFL8	Miami	0	0	0	0	0	0	0	0	0	0
CAROLINA	WYBI	Jacksonville	0	0	0	0	0	0	0	0	0	0
CAROLINE MAERSK	OZWA2	Seattle	0	0	0	0	0	0	0	0	0	0
CARSTEN MAERSK	OZYB2	Seattle	0	0	0	0	0	0	0	0	0	0
CASON J. CALLAWAY	WE4879	Chicago	0	0	0	0	0	0	0	0	13	13
CAVALIER	WBN5983	Anchorage	0	0	0	0	0	0	0	0	0	0
CELEBRATION	H3GQ	New Orleans	0	0	0	0	0	0	0	0	5	5
CENTURY	ELQX6	Miami	0	0	0	0	0	0	0	0	0	0
CENTURY HIGHWAY NO. 2	3EJB9	Long Beach	0	0	0	0	0	0	0	0	0	0
CENTURY HIGHWAY NO. 1	3FFJ4	Houston	0	0	0	0	0	0	0	0	13	13
CENTURY HIGHWAY NO. 3	8JNP	Houston	0	0	0	0	0	0	0	0	0	0
CENTURY LEADER NO. 1	3FBI6	Houston	0	0	0	0	0	0	0	0	22	22
CF CAMPBELL	WCT3784	Kodiak	0	0	0	0	0	0	0	0	14	14
CGM RENOIR	ELVZ8	Norfolk	0	0	0	0	0	0	0	0	20	20
CHANG-LIN TIEN	C6FE6	Oakland	0	0	0	0	0	0	0	0	4	4

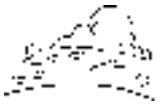
Ship Name	Call	PMO	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
CHARLES ISLAND	C6JT	Miami	0	0	0	0	0	0	23	51	21	95
CHARLES L. BROWN	KNCZ	Jacksonville	0	0	0	0	0	0	0	0	0	0
CHARLES M. BEEGHLEY	WL3108	Cleveland	0	0	0	0	0	0	0	0	0	0
CHASTINE MAERSK	OZZB2	Seattle	0	0	0	0	0	0	0	0	31	31
CHC NO.1	3FSL2	Seattle	0	0	0	0	0	0	0	0	0	0
CHELSEA	KNCX	Miami	0	0	0	0	0	0	0	0	0	0
CHEMICAL PIONEER	KAFO	Houston	0	0	0	0	0	0	0	0	14	14
CHEMICAL TRADER	KRGJ	Jacksonville	0	0	0	0	0	0	0	0	0	0
CHERRY VALLEY	WIBK	Houston	0	0	0	0	0	0	0	0	12	12
CHESAPEAKE BAY	WMLH	Norfolk	0	0	0	0	0	0	19	38	13	70
CHEVRON ARIZONA	KGBE	Miami	0	0	0	0	0	0	0	0	2	2
CHEVRON ATLANTIC	C6KY3	New Orleans	0	0	0	0	0	0	0	0	0	0
CHEVRON COLORADO	KLHZ	Oakland	0	0	0	0	0	0	40	30	17	87
CHEVRON COPENHAGEN	A8GL	Oakland	0	0	0	0	0	0	0	0	0	0
CHEVRON EMPLOYEE PRIDE	C6MC5	Baltimore	0	0	0	0	0	0	0	0	0	0
CHEVRON FELUY	C6FH5	Houston	0	0	0	0	0	0	0	0	0	0
CHEVRON MISSISSIPPI	WXBR	Oakland	0	0	0	0	0	0	0	0	29	29
CHEVRON PERTH	C6KQ8	Oakland	0	0	0	0	0	0	47	26	31	104
CHEVRON SOUTH AMERICA	ZCAA2	New Orleans	0	0	0	0	0	0	0	24	43	67
CHEVRON WASHINGTON	KFDB	Oakland	0	0	0	0	0	0	0	0	0	0
CHIEF GADAO	WEZD	Oakland	0	0	0	0	0	0	0	0	5	5
CHINOOK	WCY2791	Kodiak	0	0	0	0	0	0	0	0	0	0
CHIQUITA BARU	ZCAY7	Jacksonville	0	0	0	0	0	0	0	0	0	0
CHIQUITA BELGIE	C6KD7	Baltimore	0	0	0	0	0	0	0	0	20	20
CHIQUITA BREMEN	ZCBC5	Miami	0	0	0	0	0	0	0	0	14	14
CHIQUITA BRENDA	ZCBE9	Miami	0	0	0	0	0	0	38	31	21	90
CHIQUITA DEUTSCHLAND	C6KD8	Baltimore	0	0	0	0	0	0	0	0	0	0
CHIQUITA ELKESCHLAND	ZCBB9	Miami	0	0	0	0	0	0	0	0	26	26
CHIQUITA FRANCES	ZCBD9	Miami	0	0	0	0	0	0	0	0	26	26
CHIQUITA ITALIA	C6KD5	Baltimore	0	0	0	0	0	0	0	0	0	0
CHIQUITA JEAN	ZCBB7	Jacksonville	0	0	0	0	0	0	0	0	4	4
CHIQUITA JOY	ZCBC2	Miami	0	0	0	0	0	0	46	65	35	146
CHIQUITA NEDERLAND	C6KD6	Baltimore	0	0	0	0	0	0	61	34	30	125
CHIQUITA SCANDINAVIA	C6KD4	Baltimore	0	0	0	0	0	0	0	0	12	12
CHIQUITA SCHWEIZ	C6KD9	Baltimore	0	0	0	0	0	0	0	0	23	23
CITY OF DURBAN	GXIC	Long Beach	66	57	78	56	49	51	38	72	26	493
CLEVELAND	KGXA	Houston	0	0	0	0	0	0	0	0	0	0
CLIFFORD MAERSK	OYRO2	Seattle	0	0	0	0	0	0	0	0	0	0
CMA CGM MONET	ELRR6	New Orleans	0	0	0	0	0	0	0	0	51	51
COASTAL MERCHANT	WCV8696	Seattle	0	0	0	0	0	0	0	0	5	5
COASTAL NAVIGATOR	WCY9686	Seattle	0	0	0	0	0	0	0	0	9	9
COASTAL NOMAD	WSK2703	Kodiak	0	0	0	0	0	0	0	0	0	0
COASTAL PILOT	WBP7281	Kodiak	0	0	0	0	0	0	0	0	0	0
COASTAL SEA	WCA7944	Seattle	0	0	0	0	0	0	0	0	0	0
COASTAL TRADER	WCO6020	Kodiak	0	0	0	0	0	0	0	0	0	0
COASTAL TRADER	WSL8560	Kodiak	0	0	0	0	0	0	0	0	0	0
COLORADO	KWFE	Miami	0	0	0	0	0	0	0	0	0	0
COLUMBIA	WYR2092	Kodiak	0	0	0	0	0	0	0	0	0	0
COLUMBIA BRIDGE	ELXS4	Seattle	0	0	0	0	0	0	0	0	8	8
COLUMBIA STAR	WSB2018	Cleveland	0	0	0	0	0	0	0	0	0	0
COLUMBUS CALIFORNIA	ELUB7	Houston	0	0	0	0	0	0	0	0	0	0
COLUMBUS CANADA	P3RD8	Norfolk	0	0	0	0	0	0	0	0	0	0
COLUMBUS CANADA	ELQN3	Seattle	0	0	0	0	0	0	0	0	0	0
COLUMBUS CANTERBURY	ELUB8	Norfolk	28	52	51	64	76	31	60	46	42	450
COLUMBUS QUEENSLAND	ELUB9	Norfolk	0	0	0	0	0	0	0	0	0	0
COLUMBUS VICTORIA	P3RF8	Norfolk	0	0	0	0	0	0	0	0	18	18
CONDOLEEZZA RICE	C6OK	Baltimore	0	0	0	0	0	0	0	0	0	0
CONTSHIP AMERICA	V7BZ3	Houston	0	0	0	0	0	0	0	0	0	0
CONTSHIP ENDEAVOUR	ZCBE7	Houston	0	0	0	0	0	0	0	0	1	1
CONTSHIP SUCCESS	ZCBE3	Houston	0	0	0	0	0	0	0	0	0	0
CONTSHIP WASHINGTON	ELVZ5	Norfolk	0	0	0	0	0	0	0	0	14	14
COPACABANA	PPXI	Norfolk	0	0	0	0	0	0	0	0	27	27
CORAL SEA	C6YW	Miami	0	0	0	0	0	0	0	0	0	0
CORMORANT ARROW	C6IO9	Seattle	0	0	0	0	0	0	0	0	0	0
CORNELIUS MAERSK	OYTN2	Seattle	0	0	0	0	0	0	0	0	4	4
CORNUCOPIA	KPJC	Oakland	0	0	0	0	0	0	0	0	0	0
COSCO NORFOLK	P3ZY6	Norfolk	0	0	0	0	0	0	0	0	11	11
COSMOWAY	3EVO3	Seattle	0	0	0	0	0	0	0	0	0	0
COUGAR ACE	9VKE	Norfolk	0	0	0	0	0	0	0	0	0	0

Ship Name	Call	PMO	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
COURIER	KCBK	Houston	0	0	0	0	0	0	0	0	30	30
COURTNEY BURTON	WE6970	Cleveland	0	0	0	0	0	0	0	0	4	4
COURTNEY L	ZCAQ8	Baltimore	0	0	0	0	0	0	0	0	10	10
CRIMSON GALAXY	3FIQ6	Norfolk	0	0	0	0	0	0	0	0	24	24
CROSS POINT	WCW8728	Anchorage	0	0	0	0	0	0	0	0	0	0
CROWLEY UNIVERSE	ELRU3	Miami	0	0	0	0	0	0	0	0	2	2
CROWN OF SCANDINAVIA	OXRA6	Miami	0	0	0	0	0	0	0	0	26	26
CSAV BUSAN	ELWZ3	Long Beach	0	0	0	0	0	0	0	0	0	0
CSL CABO	D5XH	Seattle	0	0	0	0	0	0	0	0	11	11
CSS HUDSON	CGDG	Norfolk	0	0	0	0	0	0	0	0	17	17
CSX DEFENDER	KGJB	Oakland	0	0	0	0	0	0	0	0	12	12
CSX PATRIOT	KHRF	Oakland	0	0	0	0	0	0	40	23	22	85
CSX ANCHORAGE	KGTX	Anchorage	0	0	0	0	0	0	62	55	37	154
CSX CONSUMER	WCHF	Houston	0	0	0	0	0	0	0	0	18	18
CSX CRUSADER	WZJF	Jacksonville	0	0	0	0	0	0	0	0	5	5
CSX DISCOVERY	WZJD	Jacksonville	0	0	0	0	0	0	0	0	15	15
CSX ENTERPRISE	KRGB	Oakland	0	0	0	0	0	0	0	0	45	45
CSX HAWAII	KIRF	New York City	0	0	0	0	0	0	0	0	34	34
CSX INNOVATOR	WGKF	Oakland	0	0	0	0	0	0	59	38	27	124
CSX KODIAK	KGTZ	Anchorage	0	0	0	0	0	0	38	38	18	94
CSX LIBERATOR	KHRP	Oakland	0	0	0	0	0	0	0	0	12	12
CSX SPIRIT	WFLG	Oakland	0	0	0	0	0	0	0	0	25	25
CSX TACOMA	KGTY	Anchorage	0	0	0	0	0	0	0	0	13	13
CSX TRADER	KIRH	Oakland	0	0	0	0	0	0	34	46	21	101
CYNTHIA FAGAN	KSDF	Houston	0	0	0	0	0	0	0	0	7	7
DAGMAR MAERSK	ELZD9	New York City	0	0	0	0	0	0	0	0	25	25
DAGNEY	WX8482A	Kodiak	0	0	0	0	0	0	0	0	0	0
DAISHIN MARU	3FPS6	Seattle	0	0	0	0	0	0	0	0	21	21
DANIA PORTLAND	OXEH2	Miami	0	0	0	0	0	0	0	0	0	0
DANIEL FOSS	WTS3171	Kodiak	0	0	0	0	0	0	0	0	0	0
DAVID Z. NORTON	WZF9655	Cleveland	0	0	0	0	0	0	0	0	0	0
DELAWARE BAY	WMLG	Norfolk	0	0	0	0	0	0	0	0	2	2
DENALI	WSVR	Long Beach	0	0	0	0	0	0	0	0	5	5
DIANE H.	WUR7250	Kodiak	0	0	0	0	0	0	0	0	3	3
DILMUN FULMAR	ZCRR6	New Orleans	0	0	0	0	0	0	0	0	0	0
DIRCH MAERSK	OXQP2	Long Beach	0	0	0	0	0	0	0	0	2	2
DIRECT CONDOR	ELWP7	Long Beach	0	0	0	0	0	0	0	0	1	1
DIRECT EAGLE	ELWY5	Long Beach	0	0	0	0	0	0	0	0	0	0
DIRECT FALCON	ELWQ5	Long Beach	0	0	0	0	0	0	0	0	0	0
DIRECT JABIRU	ELYJ9	Oakland	0	0	0	0	0	0	60	39	36	135
DIRECT KOOKABURRA	ELWB8	Long Beach	0	0	0	0	0	0	0	0	12	12
DON PASQUALE	SFQG	Unknown	0	0	0	0	0	0	0	0	0	0
DON QUIJOTE	SFQP	New York City	0	0	0	0	0	0	0	0	0	0
DORTHE MAERSK	DHPD	New York City	0	0	0	0	0	0	0	0	0	0
DORTHE OLDENDORFF	ELXC4	Seattle	0	0	0	0	0	0	0	0	0	0
DRAGOER MAERSK	OXPW2	Long Beach	0	0	0	0	0	0	0	0	0	0
DRESDEN	ELXZ4	Oakland	0	0	0	0	0	0	0	0	0	0
DREW FOSS	WYL7518	Kodiak	0	0	0	0	0	0	0	0	0	0
DUHALLOW	ZCBH9	Baltimore	0	0	4	2	44	110	60	111	30	361
DUNCAN ISLAND	C6JS	Miami	0	0	0	0	0	0	0	0	40	40
E.P. LE QUEBECOIS	CG3130	Norfolk	0	0	2	188	225	229	230	241	111	1226
EARL W. OGLEBAY	WZE7718	Cleveland	0	0	0	0	0	0	0	0	0	0
ECSTASY	H3GR	Miami	0	0	0	0	0	0	0	0	6	6
EDGAR B. SPEER	WQZ9670	Chicago	0	0	0	0	0	0	0	0	27	27
EDWIN H. GOTT	WXQ4511	Chicago	0	0	0	0	0	0	0	0	13	13
EDYTH L	C6YC	Baltimore	0	0	0	0	0	0	0	0	4	4
EL MORRO	KCGH	Miami	0	0	0	0	0	0	0	0	2	2
EL YUNQUE	WGJT	Jacksonville	0	0	0	0	0	0	44	31	21	96
ELATION	3FOC5	Miami	0	0	0	0	0	0	0	0	0	0
EMPIRE STATE	KKFW	New York City	0	0	0	0	0	0	0	0	0	0
ENCHANTMENT OF THE SEAS	LAXA4	Miami	0	0	0	0	0	0	0	0	0	0
ENDEAVOR	WAUW	New York City	0	0	0	0	0	0	0	0	33	33
ENDURANCE	WYA4377	Anchorage	0	0	0	0	0	0	0	0	0	0
ENDURANCE	WAUU	New York City	0	0	0	0	0	0	0	0	0	0
ENERGY ENTERPRISE	WBJF	Baltimore	0	0	0	0	0	0	0	0	0	0
ENGLISH STAR	C6KU7	Long Beach	0	0	0	0	0	0	0	0	13	13
ENIF	9VVI	Houston	0	0	0	0	0	0	0	0	0	0
ENTERPRISE	WAUY	New York City	0	0	0	0	0	0	0	0	26	26
ESSEN EXPRESS	DHEE	Norfolk	0	0	0	0	0	0	0	0	14	14

Ship Name	Call	PMO	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
EVER DECENT	3FUO7	New York City	0	0	0	0	0	0	0	0	0	0
EVER DELIGHT	3FCB8	New York City	0	0	0	0	0	0	0	0	0	0
EVER DELUXE	3FBE8	Norfolk	0	0	0	0	0	0	0	0	0	0
EVER DEVELOP	3FLF8	New York City	0	0	0	0	0	0	0	0	6	6
EVER DEVOTE	3FIF8	New York City	0	0	0	0	0	0	0	0	10	10
EVER DIADEM	3FOF8	New York City	0	0	0	0	0	0	0	0	0	0
EVER DIVINE	3FSA8	Norfolk	0	0	0	0	0	0	0	0	0	0
EVER GAINING	BKJO	Norfolk	0	0	0	0	0	0	0	0	0	0
EVER GENERAL	BKHY	Baltimore	0	0	0	0	0	0	0	0	0	0
EVER GIFTED	BKHF	Long Beach	0	0	0	0	0	0	0	0	0	0
EVER GLOWING	BKJZ	Long Beach	0	0	0	0	0	0	0	0	0	0
EVER GROUP	BKJI	Long Beach	0	0	0	0	0	0	0	0	20	20
EVER LEVEL	BKHJ	Miami	0	0	0	0	0	0	0	0	0	0
EVER LYRIC	BKHI	Long Beach	0	0	0	0	0	0	0	0	0	0
EVER RACER	3FJL4	Norfolk	0	0	0	0	0	0	0	0	2	2
EVER REFINE	3FSB4	New York City	0	0	0	0	0	0	0	0	0	0
EVER RENOWN	3FFR4	Long Beach	0	0	0	0	0	0	0	0	10	10
EVER RESULT	3FSA4	Norfolk	0	0	0	0	0	0	0	0	0	0
EVER RIGHT	3FML3	Long Beach	0	0	0	0	0	0	0	0	0	0
EVER ROUND	3FQN3	Long Beach	0	0	0	0	0	0	0	0	0	0
EVER ROYAL	3FGI3	Long Beach	0	0	0	0	0	0	0	0	0	0
EVER ULTRA	3FEJ6	Seattle	0	0	0	0	0	0	0	0	7	7
EVER UNION	3FFG7	Seattle	0	0	0	0	0	0	0	0	6	6
EVER UNIQUE	3FXQ6	Seattle	0	0	0	0	0	0	0	0	0	0
EVER UNISON	3FTL6	Long Beach	0	0	0	0	0	0	0	0	1	1
EVER UNITED	3FMQ6	Seattle	0	0	0	0	0	0	0	0	0	0
EVERETT EXPRESS	DPGD	Seattle	0	0	0	0	0	0	0	0	3	3
EWA	WEZM	Seattle	0	0	0	0	0	0	56	38	37	131
EXPLORER OF THE SEAS	ELWX5	Miami	0	0	0	0	0	0	318	257	190	765
FAIRBANKS	WGWB	Long Beach	0	0	0	0	0	0	0	0	0	0
FAIRLIFT	PEBM	Norfolk	0	0	0	0	0	0	0	0	0	0
FAIRMAST	PJLC	Norfolk	0	0	0	0	0	0	0	0	0	0
FALSTRIA	C6BD8	Seattle	0	0	0	0	0	0	0	0	0	0
FANTASY	ELKI6	Miami	0	0	0	0	0	0	0	0	0	0
FARALLON ISLAND	FARIS	Oakland	0	0	0	0	0	0	0	0	0	0
FASCINATION	C6FM9	Miami	0	0	0	0	0	0	0	0	0	0
FAUST	WRYX	Jacksonville	0	0	0	0	0	0	0	0	4	4
FIDELIO	WQVY	Jacksonville	0	0	0	0	0	0	50	45	25	120
FIGARO	S6PI	Baltimore	0	0	0	0	0	0	53	32	22	107
FISHHAWK	WRB5085	Kodiak	0	0	0	0	0	0	0	0	12	12
FOREST TRADER	A8GJ	Seattle	0	0	0	0	0	0	0	0	0	0
FRANCES HAMMER	KRGC	Jacksonville	0	0	0	0	0	0	0	0	0	0
FRANCES L	C6YE	Baltimore	0	0	0	0	0	0	0	0	23	23
FRANK A. SHRONTZ	C6PZ3	Oakland	0	0	0	0	0	0	0	0	0	0
FRANKFURT EXPRESS	9VPP	New York City	0	0	0	0	0	0	0	0	3	3
G AND C PARANA	LADC2	Long Beach	0	0	0	0	0	0	0	0	0	0
GALE WIND	WAZ9548	Anchorage	0	0	0	0	0	0	0	0	11	11
GANNET ARROW	C6QF5	Seattle	0	0	0	0	0	0	0	0	0	0
GARDEN BRIDGE	ELVF6	Long Beach	0	0	0	0	0	0	0	0	0	0
GEMINI	KHCF	New York City	0	0	0	0	0	0	0	0	0	0
GENE DUNLAP	WAS2433	Kodiak	0	0	0	0	0	0	0	0	0	0
GEORGE A. STINSON	WCX2417	Cleveland	0	0	0	0	0	0	0	0	17	17
GEORGE SCHULTZ	C6FD4	Baltimore	0	0	0	0	0	0	0	0	0	0
GEORGE WASHINGTON BRIDGE	JKCF	Seattle	24	60	47	68	71	53	45	39	32	439
GEORGIA RAINBOW II	VRVS5	Jacksonville	0	0	0	0	0	0	0	0	5	5
GERMAN SENATOR	ELPL3	Seattle	0	0	0	0	0	0	0	0	0	0
GINGA MARU	JFKC	Long Beach	0	0	0	0	0	0	0	0	0	0
GITTQA OLDENDORF	ELWO7	Norfolk	0	0	0	0	0	0	0	0	0	0
GLADIATOR	WBN5982	Anchorage	0	0	0	0	0	0	0	0	18	18
GLOBAL LINK	WWDY	Baltimore	0	0	0	0	0	0	0	0	0	0
GLOBAL MARINER	WWXA	Baltimore	0	0	0	0	0	0	0	0	26	26
GLOBAL SENTINEL	WRZU	Baltimore	0	0	0	0	0	0	0	0	0	0
GLORIOUS SUCCESS	DUHN	Seattle	0	0	0	0	0	0	0	0	0	0
GOLDEN BEAR	NMRY	Oakland	0	0	0	0	0	0	0	0	0	0
GOLDEN BELL	3EBK9	Seattle	0	0	0	0	0	0	0	0	0	0
GOLDEN GATE	KIOH	Long Beach	0	0	0	0	0	0	0	0	45	45
GOLDEN GATE BRIDGE	3FWM4	Long Beach	0	0	0	0	0	0	0	0	0	0
GOLDEN LAKER	3FNQ6	Norfolk	0	0	0	0	0	0	0	0	0	0
GRAND PACE	3FGJ9	New York City	0	0	0	0	0	0	0	0	0	0

Ship Name	Call	PMO	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
GRANDEUR OF THE SEAS	ELTQ9	Miami	0	0	0	0	0	0	0	0	0	0
GREAT BLESS	VRVL3	Houston	0	0	0	0	0	0	0	0	0	0
GREAT JADE	VRVL7	Seattle	0	0	0	0	0	0	0	0	0	0
GREAT LAND	WFDP	Seattle	0	0	0	0	0	0	0	0	10	10
GREEN BAY	KGTH	Long Beach	0	0	0	0	0	0	0	0	0	0
GREEN COVE	WCZ9380	Oakland	0	0	0	0	0	0	0	0	11	11
GREEN DALE	WCZ5238	Jacksonville	0	0	0	0	0	0	0	0	12	12
GREEN ISLAND	KIBK	New Orleans	0	0	0	0	0	0	0	0	15	15
GREEN LAKE	KGTI	Baltimore	0	0	0	0	0	0	0	0	0	0
GREEN POINT	WCY4148	New York City	0	0	0	0	0	0	0	0	12	12
GREEN RAINIER	3ENI3	Seattle	0	0	0	0	0	0	0	0	0	0
GREEN RIDGE	WRYL	Seattle	0	0	0	0	0	0	0	0	0	0
GREENWICH MAERSK	MZIF7	New York City	0	0	0	0	0	0	0	0	5	5
GRETA	WCY2853	Kodiak	0	0	0	0	0	0	0	0	6	6
GRETE MAERSK	OZNF2	New York City	0	0	0	0	0	0	0	0	11	11
GROTON	KMJL	New York City	0	0	0	0	0	0	0	0	31	31
GUANAJUATO	ELMH8	Jacksonville	0	0	0	0	0	0	0	0	0	0
GUARDIAN	WBO2511	Anchorage	0	0	0	0	39	87	91	118	66	401
GUAYAMA	WZJG	Jacksonville	0	0	0	0	0	0	0	0	8	8
GUDRUN MAERSK	OZFQ2	New York City	0	0	0	0	0	0	0	5	21	26
GUS W. DARNELL	KCDK	Houston	0	0	0	0	0	0	0	0	0	0
GYPSUM BARON	ZCAN3	Norfolk	0	0	0	0	0	0	0	0	0	0
GYPSUM KING	ZCAN2	Baltimore	0	0	0	0	0	0	0	0	0	0
HADERA	ELBX4	Baltimore	0	0	0	0	0	0	59	86	39	184
HANJIN BARCELONA	3EXX9	Long Beach	0	0	0	0	0	0	0	0	0	0
HANJIN HONG KONG	P3UX7	Long Beach	0	0	0	0	0	0	0	0	0	0
HANJIN KAOHSIUNG	P3BN8	Seattle	0	0	0	0	0	0	0	0	1	1
HANJIN NAGOYA	3FJW8	New York City	0	0	0	0	0	0	0	0	0	0
HANSEWALL	V2AO3	Norfolk	0	0	0	0	0	0	0	0	0	0
HEIDELBERG EXPRESS	DEDI	Houston	501	335	752	302	747	785	762	686	369	5239
HENRY HUDSON BRIDGE	JKLS	Seattle	0	0	0	0	0	0	0	0	19	19
HERBERT C. JACKSON	WL3972	Cleveland	0	0	0	0	0	0	0	0	0	0
HOEGH DUKE	ELWP2	Norfolk	0	0	0	0	0	0	0	0	17	17
HOLIDAY	3FPN5	Long Beach	0	0	0	0	0	0	0	0	0	0
HONG KONG SENATOR	DEIP	Seattle	0	0	0	0	0	0	0	0	0	0
HONSHU SILVIA	3EST7	Seattle	0	0	0	0	0	0	0	0	0	0
HOOD ISLAND	C6LU4	Miami	0	0	0	0	0	0	0	0	11	11
HORIZON	ELNG6	Miami	0	0	0	0	0	0	0	0	0	0
HOUSTON EXPRESS	3FQT9	Houston	0	0	0	0	0	0	0	0	0	0
HUAL TRANSPORTER	C6QO3	Jacksonville	0	0	0	0	0	0	0	0	0	0
HUMACAO	WZJB	Norfolk	0	0	0	0	0	0	38	37	14	89
HUMBERGRACHT	PEUQ	Houston	0	0	0	0	0	0	0	0	0	0
HUME HIGHWAY	3EJO6	Jacksonville	0	0	0	0	0	0	0	0	0	0
HYUNDAI DISCOVERY	3FFR6	Seattle	0	0	0	0	0	0	0	0	0	0
HYUNDAI FORTUNE	3FLG6	Seattle	0	0	0	0	0	0	0	0	0	0
HYUNDAI FREEDOM	3FFS6	Seattle	0	0	0	0	0	0	0	0	0	0
HYUNDAI INDEPENDENCE	3FDY6	Seattle	0	0	0	0	0	0	0	0	0	0
HYUNDAI LIBERTY	3FFT6	Seattle	0	0	0	0	0	0	0	0	0	0
IMAGINATION	C6FN2	Miami	0	0	0	0	0	0	0	0	4	4
INDAMEX MISSISSIPPI	ZDDT5	Norfolk	0	0	0	0	0	0	0	0	0	0
INDAMEX WASHINGTON	ELRJ6	Baltimore	0	0	0	0	0	0	0	0	0	0
INDIAN OCEAN	C6T2063	New York City	0	0	0	0	0	0	0	0	27	27
INDIANA HARBOR	WXN3191	Cleveland	0	0	0	0	0	0	0	0	22	22
INFINITY	ELXX7	Miami	0	0	0	0	0	0	0	0	0	0
INLAND SEAS	WCJ6214	Chicago	0	0	0	0	0	0	0	0	0	0
INTEGRITY	WNHL	Baltimore	0	0	0	0	0	0	0	0	0	0
ISLA DE CEDROS	3FOA6	Seattle	0	0	0	0	0	0	41	26	33	100
ISLAND CHAMPION	WCZ7046	Anchorage	0	0	0	0	0	0	0	0	0	0
ITB BALTIMORE	WXKM	Baltimore	0	0	0	0	0	0	0	0	6	6
ITB MOBILE	KXDB	New York City	0	0	0	0	0	0	0	0	0	0
ITB NEW YORK	WVDG	Baltimore	0	0	0	0	0	0	0	0	14	14
IVARAN EAGLE	DNEN	Houston	0	0	0	0	0	0	0	0	0	0
IVER FOSS	WCY6442	Kodiak	0	0	0	0	0	0	0	0	0	0
IWANUMA MARU	3ESU8	Seattle	82	31	102	112	76	54	80	74	52	663
J. BENNETT JOHNSTON	C6QE3	Oakland	0	0	0	0	0	0	0	0	12	12
J. DENNIS BONNEY	C6FH6	Baltimore	0	0	0	0	0	0	0	0	0	0
J.A.W. IGLEHART	WTP4966	Cleveland	0	0	0	0	0	0	0	0	0	0
JACKLYN M.	WCV7620	Chicago	0	0	0	0	0	0	26	53	12	91
JACKSONVILLE	WNDG	Baltimore	0	0	0	0	0	0	0	0	6	6

Ship Name	Call	PMO	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
JADE ORIENT	ELRY6	Seattle	0	0	0	0	0	0	0	0	0	0
JADE PACIFIC	ELRY5	Seattle	0	0	0	0	0	0	0	0	0	0
JAMES A. HANNAH	WU8842	Chicago	0	0	0	0	0	0	0	0	0	0
JAMES N. SULLIVAN	C6FD3	Baltimore	0	0	0	0	0	0	27	23	16	66
JAMES R. BARKER	WYP8657	Cleveland	0	0	0	75	63	37	82	85	32	374
JEB STUART	WRGQ	Oakland	0	0	0	0	0	0	0	0	0	0
JO CLIPPER	PFEZ	Baltimore	0	0	0	0	0	0	0	0	22	22
JO LONN	PFEW	Houston	0	0	0	0	0	0	0	1	33	34
JOHN G. MUNSON	WE3806	Chicago	0	0	0	0	0	0	0	0	17	17
JOHN J. BOLAND	WZE4539	Cleveland	0	0	0	0	0	0	0	0	3	3
JOHN PAGE	WPKS	Norfolk	0	0	0	0	0	0	0	0	0	0
JOIDES RESOLUTION	D5BC	Norfolk	0	0	0	0	0	0	0	0	5	5
JOSEPH L. BLOCK	WDA2768	Chicago	0	0	0	0	0	0	0	0	6	6
JUBILEE	3FPM5	Long Beach	0	0	0	0	0	0	0	0	0	0
JUDY LITRICO	KCKB	Houston	0	0	0	0	0	0	0	0	0	0
JUNEAU	KSBG	Seattle	0	0	0	0	0	0	0	0	0	0
KANIN	ELEO2	New Orleans	0	0	0	0	0	0	0	0	20	20
KAPITAN AFANASYEV	UFIL	Seattle	0	0	0	0	0	0	0	0	6	6
KAPITAN BYANKIN	UAGK	Seattle	0	0	0	0	0	0	0	0	0	0
KAPITAN KONEV	UAHV	Seattle	0	0	0	0	0	0	0	0	13	13
KAPITAN MASLOV	UBRO	Seattle	0	0	0	0	0	0	0	0	0	0
KAPITAN SERYKH	UGOZ	Seattle	0	0	0	0	0	0	0	0	0	0
KAREN ANDRIE	WBS5272	Chicago	0	0	0	0	0	0	0	0	4	4
KAREN MAERSK	OZKN2	Seattle	0	0	0	0	0	0	0	0	0	0
KATRINE MAERSK	OZLL2	New York City	0	0	0	0	0	0	0	0	0	0
KAUAI	WSRH	Long Beach	0	0	0	0	0	0	0	0	21	21
KAYE E. BARKER	WCF3012	Cleveland	0	0	0	0	0	0	0	0	4	4
KAZIMAH	9KKL	Houston	0	0	0	0	0	0	0	0	0	0
KEE LUNG	BHFN	Seattle	0	0	0	0	0	0	0	0	0	0
KEN KOKU	3FMN6	Seattle	0	0	0	0	0	0	0	0	0	0
KEN SHIN	YJQS2	Seattle	0	0	0	0	0	0	0	0	11	11
KEN YO	3FIC5	Seattle	0	0	0	0	0	0	0	0	0	0
KENAI	WSNB	Houston	0	0	0	0	0	0	0	0	0	0
KENNETH E. HILL	C6FA6	New York City	0	0	0	0	0	0	0	0	0	0
KENNETH T. DERR	C6FA3	New York City	0	0	0	0	0	0	0	0	0	0
KENNICOTT	WCY2920	Kodiak	0	0	0	0	0	0	0	0	0	0
KINSMAN INDEPENDENT	WUZ7811	Cleveland	0	0	0	0	0	0	0	0	0	0
KIRSTEN MAERSK	OYDM2	Seattle	0	0	0	0	0	0	0	0	0	0
KIWI ARROW	C6HU6	Houston	0	0	0	0	0	0	0	0	0	0
KNOCK ALLAN	ELOI6	Houston	0	0	0	0	0	0	72	63	52	187
KNORR	KCEJ	New York City	0	0	0	0	0	0	0	0	0	0
KNUD MAERSK	OYBJ2	New York City	0	0	0	0	0	0	0	0	0	0
KOELN EXPRESS	9VBL	New York City	669	775	852	823	846	855	880	901	386	6987
KUPARUK RIVER	WBN4379	Anchorage	0	0	0	0	0	0	0	0	0	0
KURE	3FGN3	Seattle	0	0	0	0	0	0	0	0	13	13
LAKE GUARDIAN	WAO9082	Chicago	0	0	0	0	0	0	0	0	0	0
LECONTE	WZE4270	Kodiak	0	0	0	0	0	0	0	0	0	0
LEO FOREST	3FPH8	Seattle	0	0	0	0	0	0	0	0	13	13
LEONARD J. COWLEY	CG2959	Norfolk	0	0	0	0	0	0	0	0		0
LIBERTY GLORY	NBDP	New Orleans	0	0	0	0	0	0	0	0	0	0
LIBERTY SEA	KPZH	New Orleans	0	0	0	0	0	0	29	42	38	109
LIBERTY SPIRIT	WCPU	New Orleans	0	0	0	0	0	0	0	0	0	0
LIBERTY STAR	WCBP	New Orleans	0	0	0	0	0	0	0	0	14	14
LIBERTY SUN	WCOB	Houston	0	0	0	0	0	0	0	0	20	20
LICORNE PACIFIQUE	J8CV5	Houston	0	0	0	0	0	0	0	0	28	28
LIHUE	WTST	Oakland	0	0	0	0	0	0	0	0	34	34
LILAC ACE	3FDL4	Long Beach	0	0	0	0	0	0	0	9	26	35
LNG LEO	WDZB	New York City	0	0	0	0	0	0	0	0	0	0
LNG LIBRA	WDZG	New York City	0	0	0	0	0	0	0	0	0	0
LNG TAURUS	WDZW	New York City	0	0	0	0	0	0	0	0	0	0
LNG VIRGO	WDZX	New York City	0	0	0	0	0	0	0	0	0	0
LOIS H.	WTD4576	Kodiak	0	0	0	0	0	0	0	0	4	4
LOK PRAGATI	ATZS	Seattle	0	0	0	0	0	0	0	0	0	0
LONG LINES	WATF	Baltimore	0	0	0	0	0	0	0	0	0	0
LOOTSGRACHT	PFPT	Houston	0	0	0	0	0	0	0	0	0	0
LT CAMPBELL	WBD5759	Kodiak	0	0	0	0	0	0	0	0	0	0
LUISE OLDENDORFF	3FOW4	Seattle	0	0	0	0	0	0	0	0	0	0
LURLINE	WLVD	Oakland	0	0	0	0	0	0	0	0	6	6
LYKES CHALLANGER	FNHV	Houston	0	0	0	0	0	0	0	0	0	0



Ship Name	Call	PMO	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
LYKES CHALLENGER	ELXM4	Houston	0	0	0	0	0	0	0	0	0	0
LYKES COMMANDER	3ELF9	Baltimore	0	0	0	0	0	0	0	0	0	0
LYKES COMMANDER	3FRY9	Houston	0	0	0	0	0	0	0	0	23	23
LYKES CONDOR	DGGD	Houston	0	0	0	0	0	0	0	0	0	0
LYKES DISCOVERER	WGXO	Houston	0	0	0	0	0	0	0	0	46	46
LYKES EAGLE	ELZE3	Houston	0	0	0	0	0	0	0	0	20	20
LYKES EXPLORER	WGLA	Houston	47	81	47	46	60	46	49	54	20	450
LYKES HAWK	ELVB6	Houston	0	0	0	0	0	0	0	0	0	0
LYKES HUNTER	DNKL	Norfolk	0	0	0	0	0	0	0	0	0	0
LYKES LIBERATOR	WGXN	Houston	0	0	0	0	0	0	0	0	31	31
LYKES MOTIVATOR	WABU	Houston	0	0	0	0	0	0	0	40	18	58
LYKES NAVIGATOR	WGMJ	Houston	0	0	0	0	0	0	0	0	14	14
LYKES RAVEN	DIGF	Houston	0	0	0	0	0	0	0	0	0	0
LYKES VOYAGER	DJPL	Houston	0	0	0	0	0	0	0	0	0	0
M/V PITTSBURG	ELTQ6	Baltimore	0	0	0	0	0	0	0	0	33	33
M/V SAFMARINE INFANTA	V7CN8	Baltimore	0	0	0	0	0	0	0	0	14	14
MAASDAM	PFRO	Miami	0	0	0	0	0	0	0	38	5	43
MACKINAC BRIDGE	JKES	Seattle	66	78	53	79	91	57	58	86	45	613
MADISON MAERSK	OVJB2	Oakland	0	0	0	0	0	0	0	0	13	13
MAERSK ALASKA	KAKF	Baltimore	0	0	0	0	0	0	0	0	0	0
MAERSK ARIZONA	KAKG	Baltimore	0	0	0	0	0	0	0	0	27	27
MAERSK CALIFORNIA	WCX5083	Miami	0	0	0	0	0	0	101	80	45	226
MAERSK CHARLESTON	ELRO2	New York City	0	0	0	0	0	0	0	0	17	17
MAERSK ENDEAVOUR	XP4210	Miami	0	0	0	0	0	0	0	0	0	0
MAERSK GIANT	OU2465	Miami	0	0	0	0	0	0	0	0	0	0
MAERSK SEA	S6CW	Seattle	0	0	0	0	0	0	0	0	0	0
MAERSK SHETLAND	MSQK3	Miami	0	0	0	0	0	0	0	0	0	0
MAERSK SOMERSET	MQVF8	New Orleans	0	0	0	0	0	0	0	0	0	0
MAERSK STAFFORD	MRSS9	New Orleans	0	0	0	0	0	0	0	0	0	0
MAERSK SUFFOLK	MRSS8	Houston	0	0	0	0	0	0	0	0	0	0
MAERSK SURREY	MRSG8	Houston	0	0	0	0	0	0	0	0	0	0
MAERSK TAIKI	9VIG	Baltimore	0	0	0	0	0	0	0	0	0	0
MAERSK TAIYO	9VJO	Jacksonville	0	0	0	0	0	0	0	0	3	3
MAERSK TENNESSEE	WCX3486	Miami	0	0	50	44	47	4	30	81	28	284
MAERSK TEXAS	WCX3249	Miami	0	0	0	0	0	0	0	0	2	2
MAERSK VALENCIA	ELXK7	Norfolk	0	0	0	0	0	0	0	0	0	0
MAERSK WAVE	S6TV	Baltimore	0	0	0	0	0	0	0	0	11	11
MAERSK WIND	S6TY	Baltimore	0	0	0	0	0	0	0	0	24	24
MAERSK_VALENCIA	OUJH2	Newark	0	0	0	0	0	0	0	0	5	5
MAGLEBY MAERSK	OUSH2	New York City	0	0	0	0	0	0	0	0	13	13
MAHARASHTRA	VTSQ	Seattle	0	0	0	0	0	0	0	0	1	1
MAHEGA	IR4009	Norfolk	0	0	0	0	0	0	0	0	0	0
MAHIMAHI	WHRN	Oakland	0	0	0	0	0	0	0	0	18	18
MAIRANGI BAY	GXEW	Long Beach	0	0	0	0	0	0	0	0	15	15
MAJ. BERNARD F. FISHER	KBGK	Jacksonville	0	0	0	0	0	0	0	0	0	0
MALOLO	WYH6327	Kodiak	0	0	0	0	0	0	0	0	25	25
MANFRED NYSTROM	WCN3590	Kodiak	0	0	0	0	0	0	0	0	0	0
MANHATTAN BRIDGE	3FWL4	Seattle	0	0	0	0	0	0	0	0	34	34
MANOA	KDBG	Oakland	0	0	0	0	0	0	0	0	0	0
MANUKAI	KNLO	Oakland	0	0	0	0	0	0	0	0	0	0
MANULANI	KNIJ	Oakland	0	0	0	0	0	0	8	42	18	68
MARCHEN MAERSK	OWDQ2	Long Beach	0	32	22	23	21	24	23	34	25	204
MAREN MAERSK	OWZU2	Long Beach	0	0	0	0	0	0	0	0	22	22
MARGRETHE MAERSK	OYSN2	Long Beach	0	0	0	0	0	0	34	37	42	113
MARIA ANGELICOUSSIS	C6FP2	Houston	0	0	0	0	0	0	0	8	7	15
MARIE MAERSK	OULL2	New York City	0	0	0	0	0	0	0	0	0	0
MARINE CHEMIST	KMCB	Houston	0	0	0	0	0	0	63	37	22	122
MARINE COLUMBIA	KLKZ	Oakland	0	0	0	0	0	0	0	0	3	3
MARION GREEN	PIAN	Norfolk	0	0	0	0	0	0	0	0	0	0
MARIT MAERSK	OZFC2	Miami	0	0	0	0	0	0	0	0	0	0
MARK HANNAH	WYZ5243	Chicago	0	0	0	0	0	0	0	0	0	0
MARSTA MAERSK	OUNO5	Norfolk	0	0	0	0	0	0	0	0	13	13
MARY CATHERINE	WTW9216	Kodiak	0	0	0	0	0	0	0	0	0	0
MATHILDE MAERSK	OUUU2	Long Beach	0	0	0	0	0	0	0	0	5	5
MATSONIA	KHRC	Oakland	0	0	0	0	0	0	0	0	0	0
MAUI	WSLH	Long Beach	0	0	0	0	0	0	0	0	16	16
MAURICE EWING	WLDZ	New York City	0	0	0	0	0	0	0	0	3	3
MAYAGUEZ	WZJE	Jacksonville	0	0	0	0	0	0	0	0	9	9
MAYVIEW MAERSK	OWEB2	Oakland	0	0	0	0	0	0	0	32	25	57

Ship Name	Call	PMO	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
MEKHANIK KALYUZHNIY	UFLO	Seattle	0	0	0	0	0	0	0	0	0	0
MEKHANIK MOLDOVANOV	UIKI	Seattle	0	0	0	0	0	0	0	0	0	0
MEKONG PIONEER	V2JN	Miami	0	0	0	0	0	0	0	113	56	169
MELVILLE	WECB	Long Beach	0	0	0	0	0	0	26	67	39	132
MERCURY	3FFC7	Miami	0	0	0	0	0	0	0	0	0	0
MERLIN	WBHU	Houston	0	0	0	0	0	0	0	0	28	28
MESABI MINER	WYQ4356	Cleveland	0	0	0	0	0	0	0	0	20	20
METEOR	DBBH	Houston	0	0	0	0	0	0	0	0	115	115
METTE MAERSK	OXKT2	Long Beach	0	0	0	0	0	0	0	0	0	0
MICHAEL O'LEARY	WCP9556	Kodiak	0	0	0	0	0	0	0	0	0	0
MICHIGAN	WRB4141	Chicago	0	0	0	0	0	0	0	0	0	0
MIDDLETOWN	WR3225	Cleveland	0	0	0	0	0	0	0	0	0	0
MIKI HANA	WTW9252	Kodiak	0	0	0	0	0	0	0	0	0	0
MING ASIA	BDEA	New York City	0	0	0	0	0	0	0	0	6	6
MING PEACE	ELVR9	Long Beach	0	0	0	0	0	0	0	0	0	0
MOKIHANA	WNRD	Oakland	0	0	0	0	0	0	0	0	0	0
MOKU PAHU	WBWK	Oakland	0	0	0	0	0	0	0	0	9	9
MOL BRAVERY	3FXX4	Oakland	0	0	0	0	0	0	0	0	30	30
MOL COLUMBUS	3ETV8	Seattle	0	0	0	0	0	0	0	0	8	8
MONCHEGORSK	P3NL5	Houston	0	0	0	0	0	0	0	0	6	6
MONTEREY BAY	3FDO6	Seattle	0	0	0	0	0	0	0	0	26	26
MORMACSKY	WMBQ	Houston	0	0	0	0	0	0	0	0	0	0
MORMACSTAR	KGDF	Houston	0	0	0	0	0	0	0	0	6	6
MORMACSUN	WMBK	Houston	0	0	0	0	0	0	0	0	23	23
MOSEL ORE	ELRE5	Norfolk	0	0	0	0	0	0	0	0	29	29
MSC BOSTON	9HGP4	New York City	0	0	0	0	0	0	0	0	0	0
MSC CALIFORNIA	LAKS5	Seattle	0	0	0	0	0	0	0	0	0	0
MSC FEDERICA	C4LV	New York City	0	0	0	0	0	0	0	0	0	0
MSC XINGANG	3EHR6	Norfolk	0	0	0	0	0	0	0	0	0	0
MUNKEBO MAERSK	OUNI5	New York City	0	0	0	0	0	0	0	17	15	32
MV CONTSHIP ROME	ELVZ6	Norfolk	0	0	0	0	0	0	0	0	6	6
MYRON C. TAYLOR	WA8463	Chicago	0	0	0	0	0	0	0	0	0	0
MYSTIC	PCCQ	Long Beach	0	0	0	0	0	0	0	0	0	0
NAGOYA EXPRESS	P3LE4	Seattle	0	0	0	0	0	0	0	0	0	0
NANUQ	WCY8498	Anchorage	0	0	0	0	0	0	0	0	0	0
NATHANIEL B. PALMER	WBP3210	Seattle	0	0	0	0	0	0	0	0	0	0
NATOMA	WBB5799	Kodiak	0	0	0	0	0	0	0	0	0	0
NAVAJO	WCT5737	Kodiak	0	0	0	0	0	0	0	0	0	0
NEW HORIZON	WKWB	Long Beach	0	12	3	13	16	40	17	32	35	168
NEW NIKKI	3FHG5	Seattle	0	0	0	0	0	0	0	0	0	0
NIEUW AMSTERDAM	PGGQ	Long Beach	0	0	0	0	0	0	0	0	0	0
NOAA DAVID STARR JORDAN	WTDK	Seattle	0	0	0	68	56	51	23	47	34	279
NOAA SHIP ALBATROSS IV	WMVF	Norfolk	0	0	0	0	0	0	94	112	34	240
NOAA SHIP DELAWARE II	KNBD	New York City	0	0	0	0	0	0	90	173	54	317
NOAA SHIP FERREL	WTEZ	Norfolk	0	0	0	0	0	0	0	0	6	6
NOAA SHIP KA'IMIMOANA	WTEU	Seattle	0	0	0	0	0	0	99	67	53	219
NOAA SHIP MCARTHUR	WTEJ	Seattle	0	0	0	0	0	0	0	0	0	0
NOAA SHIP MILLER FREEMAN	WTDM	Seattle	0	0	0	0	0	0	168	152	94	414
NOAA SHIP OREGON II	WTDO	New Orleans	0	0	0	0	6	40	89	181	55	371
NOAA SHIP RAINIER	WTEF	Seattle	0	0	0	0	0	0	0	0	0	0
NOAA SHIP RONALD H BROWN	WTEC	New Orleans	0	0	0	0	0	0	120	16	42	178
NOAA SHIP T. CROMWELL	WTDF	Seattle	0	0	0	0	0	0	0	0	9	9
NOAA SHIP WHITING	WTEW	Baltimore	0	0	0	0	0	0	0	0	0	0
NOAAS GORDON GUNTER	WTEO	New Orleans	0	0	0	0	0	0	108	88	17	213
NOBEL STAR	KRPP	Houston	0	0	0	0	0	0	0	0	0	0
NOBLE STAR	3FRU7	Seattle	0	0	0	0	0	0	0	0	0	0
NOL STENO	ZCBD4	New York City	0	0	0	0	0	0	26	49	14	89
NOLIZWE	MQLN7	Norfolk	0	0	0	0	0	0	0	0	0	0
NOMZI	MTQU3	Baltimore	0	0	0	0	0	0	0	0	0	0
NOORDAM	PGHT	Miami	0	0	0	0	0	0	0	0	4	4
NORASIA SHANGHAI	DNHS	New York City	0	0	0	0	0	0	0	0	9	9
NORDCLIFF	P3GB4	Seattle	0	0	0	0	0	0	0	0	0	0
NORDMAX	P3YS5	Seattle	0	0	0	0	0	0	62	63	26	151
NORDMORITZ	P3YR5	Seattle	0	0	0	0	0	0	0	0	0	0
NORMA H.	WYL6686	Kodiak	0	0	0	0	0	0	0	0	16	16
NORMAN S.	WCW7514	Anchorage	0	0	0	0	0	0	0	0	9	9
NORTHERN LIGHTS	WFJK	New Orleans	0	0	0	0	0	0	0	0	8	8
NORTHERN SPIRIT	WAQ2746	Kodiak	0	0	0	0	0	0	29	37	21	87
NORWAY	C6CM7	Miami	0	0	0	0	0	0	0	0	30	30
NORWEGIAN WIND	C6LG6	Miami	0	0	0	0	0	0	0	0	0	0

Ship Name	Call	PMO	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
NTABENI	3EGR6	Houston	0	0	0	0	0	0	0	0	0	0
NUERNBERG EXPRESS	9VBK	Houston	0	0	0	0	0	0	0	0	5	5
NYK SPRINGTIDE	S6CZ	Seattle	0	0	0	0	0	0	0	0	0	0
NYK STARLIGHT	3FUX6	Long Beach	0	0	0	0	0	0	0	0	0	0
OCEAN CAMELLIA	3FTR6	Seattle	0	0	0	0	0	0	0	38	41	79
OCEAN CITY	WCYR	Houston	0	0	0	0	0	0	0	0	0	0
OCEAN CLIPPER	3EXI7	New Orleans	0	0	0	0	0	0	0	0	3	3
OCEAN MARINER	WCF3990	Anchorage	0	0	0	0	0	0	0	0	0	0
OCEAN ORCHID	3ECQ9	Seattle	0	0	0	0	0	0	0	0	0	0
OCEAN PALM	3FDO7	Seattle	0	0	0	0	0	0	80	66	40	186
OCEAN RANGER	WAM7635	Anchorage	0	0	0	0	0	0	0	0	0	0
OCEAN SERVICE	WTW9263	Kodiak	0	0	0	0	0	0	0	0	0	
OGLEBAY NORTON	WAQ3521	Cleveland	0	0	0	0	0	0	0	0	0	0
OLEANDER	PJJU	Newark	0	0	0	0	0	0	0	0	13	13
OOCL AMERICA	ELSM7	Oakland	0	0	0	0	0	0	0	0	0	0
OOCL CALIFORNIA	VRWC8	Seattle	0	0	0	0	0	0	0	0	32	32
OOCL FAIR	VRWB8	Long Beach	0	0	0	0	0	0	15	22	13	50
OOCL FIDELITY	VRWG5	Long Beach	0	0	0	0	0	0	0	0	0	0
OOCL FORTUNE	VRWF2	Norfolk	0	0	0	0	0	0	0	0	0	0
OOCL FREEDOM	VRCV	Norfolk	0	0	0	0	0	0	0	0	0	0
OOCL FRIENDSHIP	VRWD3	Long Beach	0	0	0	0	0	0	0	0	0	0
OOCL HONG KONG	VRVA5	Oakland	0	0	0	0	0	0	60	57	35	152
OOCL NETHERLANDS	VRVN6	Long Beach	0	0	0	0	0	0	0	0	9	9
ORIANA	GVSN	Miami	0	0	0	0	0	0	0	0	0	0
ORIENTAL ROAD	3FXT6	Houston	0	0	0	0	0	0	0	0	0	0
ORIENTE GRACE	3FHT4	Seattle	0	0	0	0	0	0	0	0	0	0
ORIENTE HOPE	3ETH4	Seattle	0	0	0	0	0	0	0	0	0	0
ORIENTE NOBLE	3FVF5	Seattle	0	0	0	0	0	0	0	0	0	0
ORIENTE PRIME	3FOU4	Seattle	0	0	0	0	0	0	0	0	0	0
ORIENTE VICTORIA	3FVG8	Seattle	22	36	41	22	44	20	31	42	33	291
OURO DO BRASIL	ELPP9	Baltimore	0	0	0	0	0	0	0	0	8	8
OVERSEAS CHICAGO	KBCF	Oakland	0	0	0	0	0	0	0	0	0	0
OVERSEAS HARRIETT	WRFJ	Houston	0	0	0	0	0	0	0	0	14	14
OVERSEAS JOYCE	WUQL	Jacksonville	0	0	0	0	0	0	0	0	19	19
OVERSEAS MARILYN	WFQB	Houston	0	0	0	0	0	0	0	0	0	0
OVERSEAS NEW ORLEANS	WFKW	Houston	0	0	0	0	0	0	0	0	13	13
OVERSEAS NEW YORK	WMCK	Houston	0	0	0	0	0	0	0	0	0	0
OVERSEAS PHILADELPHIA	WGDB	Houston	0	0	0	0	0	0	0	0	0	0
OVERSEAS VIVIAN	KAAZ	Norfolk	0	0	0	0	0	0	0	0	0	0
OVERSEAS WASHINGTON	WFGV	Houston	0	0	0	0	0	0	0	0	0	0
P & O NEDLLOYD BUENOS AI	PGEC	Houston	0	0	0	0	0	0	0	0	3	3
P & O NEDLLOYD VERA CRUZ	PGFE	Houston	0	0	0	0	0	0	0	0	17	17
P&O NEDLLOYD GENOA	MYMX5	Houston	0	0	0	0	0	0	0	0	19	19
P&O NEDLLOYD HOUSTON	PGEB	Houston	0	0	0	0	0	0	47	53	40	140
P&O NEDLLOYD LOS ANGELES	PGDW	Long Beach	0	0	0	0	0	0	0	0	0	0
P&O NEDLLOYD MARSEILLE	MYSU5	Seattle	0	0	0	0	0	0	0	0	0	0
P&O NEDLLOYD SYDNEY	PDHY	Seattle	0	0	0	0	0	0	0	0	15	15
P&O NEDLLOYD TEXAS	ZCBF6	Houston	0	0	0	0	0	0	0	0	0	0
PACDREAM	ELQO6	Seattle	0	0	0	0	0	0	0	0	0	0
PACDUKE	A8SL	Seattle	0	0	0	0	0	0	0	0	0	0
PACIFIC HIRO	3FOY5	Seattle	0	0	0	0	0	0	0	0	0	0
PACIFIC MERCHANT	ELXR8	Houston	0	0	0	0	0	0	0	0	0	0
PACIFIC PRIDE	WCN4995	Kodiak	0	0	0	0	0	0	0	0	30	30
PACIFIC SENATOR	ELTY6	Long Beach	0	0	0	0	0	0	0	0	0	0
PACKING	ELBX3	Seattle	0	0	0	0	0	0	0	0	0	0
PACOCEAN	ELJE3	Seattle	0	0	0	0	0	0	0	0	0	0
PACPRINCESS	ELED8	Houston	0	0	0	0	0	0	0	0	12	12
PAN ATLANTIC	ELYJ7	Norfolk	0	0	0	0	0	0	0	0	0	0
PARAGON	WDA2311	Kodiak	0	0	0	0	0	0	0	0	0	0
PATRIOT	KGBQ	Houston	0	0	0	0	0	0	0	0	0	0
PATRIOT	WDA2500	Seattle	0	0	0	0	0	0	0	0	0	0
PAUL BUCK	KDGR	Houston	0	0	0	0	0	0	0	0	4	4
PAUL R. TREGURTHA	WYR4481	Cleveland	0	0	0	0	0	0	0	0	4	4
PEARL ACE	VRUN4	Seattle	0	0	0	0	0	0	51	9	10	70
PEGASUS HIGHWAY	3FMA4	New York City	0	0	0	0	0	0	0	0	0	0
PEGGY DOW	PJOY	Long Beach	0	0	0	0	0	0	0	0	0	0
PELAGIA	PGRQ	Houston	86	66	90	100	95	67	106	161	47	818
PENANG SENATOR	DQVH	Seattle	0	0	0	0	0	0	0	0	0	0
PFC EUGENE A. OBREGON	WHAQ	Norfolk	0	0	0	0	0	0	0	0	0	0
PFC WILLIAM B. BAUGH	KRPW	Norfolk	0	0	0	0	0	0	0	0	0	0
PHILADELPHIA	KSYP	Baltimore	0	0	0	0	0	0	0	0	0	0

Ship Name	Call	PMO	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
PHILIP R. CLARKE	WE3592	Chicago	0	0	0	0	0	0	0	0	0	0
PIERRE FORTIN	CG2678	Norfolk	0	0	0	0	0	0	0	0	0	0
PINO GLORIA	3EZW7	Seattle	0	0	0	0	0	0	0	0	0	0
PISCES EXPLORER	MWQD5	Long Beach	0	0	0	0	0	0	0	0	0	
POLAR ALASKA	KSBK	Long Beach	0	0	0	0	0	0	0	0	4	4
POLAR CALIFORNIA	WMCV	Long Beach	0	0	0	0	0	0	0	0	6	6
POLAR EAGLE	ELPT3	Anchorage	0	0	0	0	0	0	66	94	23	183
POLAR ENDEAVOUR	WCAJ	New Orleans	0	0	0	0	0	0	0	0	5	5
POLAR INDEPENDENCE	KLHV	Long Beach	0	0	0	0	0	0	0	0	0	0
POLAR TEXAS	KNFD	Long Beach	0	0	0	0	0	0	0	0	4	4
POLAR TRADER	WCZ3758	Long Beach	0	0	0	0	0	0	0	0	0	0
POLYNESIA	V2CA2	Oakland	0	0	0	0	0	0	0	0	0	0
POTOMAC TRADER	WXBZ	Houston	0	0	0	0	0	0	0	0	0	0
POWHATAN TATF 166	WCY9968	Norfolk	0	0	0	0	0	0	0	0	0	0
POWHATTAN	WTX7883	Kodiak	0	0	0	0	0	0	0	0	0	0
PRESIDENT ADAMS	WRYW	Oakland	0	0	0	0	0	0	63	66	25	154
PRESIDENT GRANT	WCY2098	Long Beach	0	0	0	0	0	0	0	0	13	13
PRESIDENT JACKSON	WRYC	Oakland	0	0	0	0	0	0	0	0	11	11
PRESIDENT KENNEDY	WRYE	Oakland	0	0	0	0	0	0	0	0	33	33
PRESIDENT POLK	WRYD	Oakland	0	0	0	0	0	0	0	0	32	32
PRESIDENT TRUMAN	WNDP	Oakland	0	0	0	0	0	0	57	75	37	169
PRESIDENT WILSON	WCY3438	Long Beach	0	0	0	0	0	0	0	0	31	31
PRIDE OF BALTIMORE II	WUW2120	Baltimore	0	0	0	0	0	0	39	21	32	92
PRINCE OF OCEAN	3ECO9	Seattle	0	0	0	0	0	0	0	0	0	0
PRINCE WILLIAM SOUND	WSDX	Long Beach	0	0	0	0	0	0	0	0	0	0
PRINCES HIGHWAY	3ERU8	Jacksonville	0	0	0	0	0	0	0	0	0	0
PRIWALL	DQVF	Norfolk	0	0	0	0	0	0	0	0	4	4
PROJECT ARABIA	PJKP	Miami	0	0	0	0	0	0	0	18	27	45
PRUDHOE BAY	KPFD	Long Beach	0	0	0	0	0	0	0	0	0	0
PUDONG SENATOR	DQVI	Seattle	0	82	106	13	64	21	73	93	50	502
PUSAN SENATOR	DQVG	Seattle	0	0	0	0	0	0	0	0	16	16
PVT FRANKLIN J. PHILLIPS	WMFW	Norfolk	0	0	0	0	0	0	0	0	0	0
QUEEN ELIZABETH 2	GBTT	New York City	0	0	0	0	0	0	0	0	48	48
QUEENSLAND STAR	MZBM7	Houston	0	0	0	0	0	0	0	0	35	35
R. HAL DEAN	C6JN	Long Beach	0	0	0	0	0	0	0	0	0	0
R.J. PFEIFFER	WRJP	Long Beach	0	0	0	0	0	0	13	33	36	82
R.V. DAY	WS6709	Kodiak	0	0	0	0	0	0	0	0	0	0
R/V TIGLAX	WZ3423	Anchorage	0	0	0	0	0	0	0	0	16	16
RADIANCE OF THE SEAS	ELIY5	Miami	0	0	0	0	0	0	0	0	0	0
RAINBOW BRIDGE	3EYX9	Seattle	0	0	0	0	0	0	0	0	24	24
RANGER	WBN5979	Seattle	0	0	0	0	0	0	0	0	3	3
RANI PADMINI	ATSR	Norfolk	0	0	0	0	0	0	0	0	0	0
RAYMOND E. GALVIN	C6FD6	Oakland	0	0	0	0	0	0	0	0	0	0
REBECCA LYNN	WCW7977	Chicago	0	0	0	0	0	0	0	0	10	10
REDFIN	WTP2735	Kodiak	0	0	0	0	0	0	0	0	3	3
REDOUBT	WCG3013	Anchorage	0	0	0	0	0	0	0	0	0	0
REPULSE BAY	MQYA3	Houston	0	0	0	0	0	0	0	0	18	18
RESERVE	WE7207	Cleveland	0	0	0	0	0	0	0	0	0	0
RESOLUTE	KFDZ	Norfolk	0	0	0	0	0	0	0	0	0	0
RICHARD G MATTHIESEN	WLBV	Jacksonville	0	0	0	0	0	0	0	0	16	16
RICHARD H HATZKE	C6FE5	Oakland	0	0	0	0	0	0	0	0	0	0
RICHARD REISS	WBF2376	Cleveland	0	0	0	0	0	0	0	0	14	14
RIO APURE	ELUG7	Miami	0	0	0	0	0	0	0	0	0	0
ROBERT E. LEE	KCRD	New Orleans	0	0	0	0	0	0	0	0	0	0
ROGER BLOUGH	WZP8164	Chicago	0	0	0	0	0	0	0	0	0	0
ROGER REVELLE	KAOU	New Orleans	1	32	78	57	74	39	70	65	30	446
ROTTERDAM EXPRESS	S6IG	Long Beach	788	899	930	904	977	868	942	938	447	7693
ROUGHNECK	WTW9262	Kodiak	0	0	0	0	0	0	0	0	0	0
ROYAL PRINCESS	GBRP	Long Beach	0	0	0	0	0	0	27	10	15	52
RUBIN ARTEMIS	3FAH7	Seattle	0	0	0	0	0	0	0	0	0	0
RUBIN BONANZA	3FNV5	Seattle	0	0	0	0	0	0	0	0	0	0
RUBIN KOBE	DYZM	Seattle	0	0	0	0	0	0	0	0	0	0
RUBIN PEARL	YJQA8	Seattle	0	0	0	0	0	0	0	0	0	0
RUBIN STELLA	3FAP5	Seattle	0	0	0	0	0	0	0	0	0	0
SABINE PHILADELPHIA	WNFJ	New Orleans	0	0	0	0	0	0	0	0	0	0
SAGA CREST	H3FB	Miami	0	0	0	0	0	0	0	0	0	0
SAGA SPRAY	VRRW5	Jacksonville	0	0	0	0	0	0	0	0	0	0
SALLY J.	WQZ9646	Kodiak	0	0	0	0	0	0	0	0	0	0
SALLY MAERSK	OZHS2	Seattle	0	0	0	0	0	0	0	0	0	0
SALOME	S6CL	New York City	0	0	0	0	0	0	0	0	0	0
SAM HOUSTON	KDGA	Houston	0	0	0	0	0	0	0	0	0	0

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SAMSON MARINER	WCN3586	Kodiak	0	0	0	0	0	0	49	61	14	124
SAMUEL L. COBB	KCDJ	Oakland	0	0	0	0	0	0	0	0	0	0
SAMUEL RISLEY	CG2960	Norfolk	0	0	0	0	0	0	0	0	0	0
SAN MARCOS	ELND4	Jacksonville	0	0	0	0	0	0	0	0	0	0
SANDRA FOSS	WYL4908	Kodiak	0	0	0	0	0	0	0	0	0	0
SANKO LAUREL	3EXQ3	Seattle	0	0	0	0	0	0	0	0	0	0
SANTA CHRISTINA	3FAE6	Seattle	0	0	0	0	0	0	0	0	0	0
SANTA MONICA	ELNJ3	Seattle	0	0	0	0	0	0	0	0	0	0
SAUDI DIRIYAH	HZZB	Norfolk	0	0	0	0	0	0	0	0	0	0
SAUDI HOFUF	HZZC	Houston	0	0	0	0	0	0	0	14	16	30
SC BREEZE	ELOC6	New York City	0	0	0	0	0	0	0	0	0	0
SC HORIZON	ELOC8	Houston	0	0	0	0	0	0	0	0	0	0
SCL INFANTA	GBSA	Houston	0	0	0	0	0	0	0	0	0	0
SEA BREEZE	WBN3019	Anchorage	0	0	0	0	0	0	0	0	5	5
SEA CHEETAH	V2PM9	Norfolk	0	0	0	0	0	0	0	0	0	0
SEA FLYER	WBL8673	Anchorage	0	0	0	0	0	0	0	0	0	0
SEA MARINER	J8FF9	Miami	0	0	0	0	0	0	0	0	0	0
SEA MERCHANT	ELQN2	Norfolk	0	0	0	0	0	0	114	96	51	261
SEA PRINCESS	KRCP	New Orleans	0	0	0	0	0	0	0	0	0	0
SEA RACER	ELQI8	Jacksonville	0	0	0	0	0	0	0	0	0	0
SEA RANGER	WBM8733	Anchorage	0	0	0	0	0	0	0	0	9	9
SEA RIVER HICHINBROOK	WJBG	Oakland	0	0	0	0	0	0	0	0	0	0
SEA TIGER	DGRR	Norfolk	0	0	0	0	0	0	0	0	0	0
SEA VALIANT	WBN9213	Anchorage	0	0	0	0	0	0	0	0	0	0
SEA VALOR	WBN9212	Anchorage	0	0	0	0	0	0	0	0	0	0
SEA VENTURE	WCC7684	Anchorage	0	0	0	0	0	0	0	0	16	16
SEA VICTORY	WBH9635	Anchorage	0	0	0	0	0	0	0	0	0	0
SEA VIKING	WCE8951	Anchorage	0	0	0	0	0	0	0	0	0	0
SEA WISDOM	3FUO6	Seattle	0	0	0	0	0	0	0	0	0	0
SEA/LAND VICTORY	DIDY	New York City	0	0	0	0	0	0	0	0	15	15
SEABULK MONTANA	WCW9126	Anchorage	0	0	0	0	0	0	0	0	7	7
SEALAND ACHIEVER	WPKD	Houston	0	0	0	0	0	0	0	0	19	19
SEALAND ARGENTINA	DGVN	Jacksonville	0	0	0	0	0	0	0	0	0	0
SEALAND ATLANTIC	KRLZ	Houston	0	0	0	0	0	0	0	0	6	6
SEALAND COMET	V7AP3	Oakland	0	0	0	0	0	0	0	0	21	21
SEALAND COMMITMENT	KRPB	Houston	0	0	0	0	0	0	66	45	43	154
SEALAND DEVELOPER	KHRH	Houston	0	0	0	0	0	0	0	0	28	28
SEA-LAND EAGLE	V7AZ8	Long Beach	0	0	0	0	0	0	0	0	0	0
SEALAND EXPEDITION	WPGJ	Jacksonville	85	90	48	79	66	48	72	68	37	593
SEALAND FLORIDA	KRHX	Houston	66	104	83	76	39	42	56	55	30	551
SEALAND FREEDOM	V7AM3	Houston	0	0	0	0	0	0	0	0	0	0
SEALAND HONDURAS	OUQP2	New Orleans	0	0	0	0	0	0	0	0	6	6
SEALAND INDEPENDENCE	WGJC	Long Beach	0	0	0	0	0	0	0	0	0	0
SEALAND INTEGRITY	WPVD	Houston	219	95	175	145	85	127	141	85	84	1156
SEALAND INTREPID	9VWZ	Norfolk	0	0	0	0	0	0	0	0	0	0
SEALAND MARINER	V7AM5	Houston	0	0	0	0	0	0	0	0	0	0
SEALAND MERCURY	V7AP6	Oakland	29	46	56	52	39	40	63	54	20	399
SEALAND METEOR	V7AP7	Long Beach	0	0	0	0	0	0	35	60	35	130
SEALAND MOTIVATOR	WAAH	Houston	0	0	0	0	0	0	0	76	34	110
SEALAND NAVIGATOR	WPGK	Long Beach	0	0	0	0	0	0	72	53	29	154
SEALAND PERFORMANCE	KRPD	Houston	0	0	0	0	0	0	0	0	14	14
SEALAND PRIDE	WDA3673	Houston	0	0	0	0	0	0	0	0	25	25
SEALAND QUALITY	KRNJ	Jacksonville	0	0	0	0	0	0	0	0	18	18
SEALAND RACER	V7AP8	Long Beach	0	0	0	0	0	0	0	0	0	0
SEA-LAND URUGUAY	DGVZ	Norfolk	0	0	0	0	0	0	0	0	0	0
SEARIVER AMERICAN PROGRESS	KAWN	Valdez	0	0	0	0	0	0	0	0	0	0
SEARIVER GALENA BAY	WGZK	Anchorage	0	0	0	0	0	0	0	0	1	1
SEARIVER NORTH SLOPE	KHLQ	Oakland	0	0	0	0	0	0	0	0	0	0
SELMA KALKAVAN	TCSX	Norfolk	0	0	0	0	0	0	0	0	0	0
SENECA	WBN8469	Anchorage	0	0	0	0	85	88	75	142	53	443
SENSATION	C6FM8	Miami	0	0	0	0	0	0	0	0	1	1
SETO BRIDGE	JMQY	Oakland	0	0	0	0	0	0	0	0	42	42
SEVEN OCEAN	3EZB8	Seattle	0	0	0	0	0	0	0	0	0	0
SEVEN SEAS	3FBS9	Seattle	0	0	0	0	0	0	0	0	0	0
SEWARD JOHNSON	WST9756	Miami	0	0	0	0	0	0	0	0	0	0
SHIRAOI MARU	3ECM7	Seattle	0	0	0	0	0	0	0	0	38	38
SIDNEY FOSS	WYL5445	Kodiak	0	0	0	0	0	0	0	0	0	0
SIDNEY STAR	C6JY7	Houston	0	0	0	0	0	0	0	0	0	0
SIKU	WCQ6174	Anchorage	0	0	0	0	0	0	0	0	0	0
SINE MAERSK	OZOK2	Seattle	0	0	0	0	0	0	0	0	16	16
SINGA STAR	9VNF	Seattle	0	0	0	0	0	0	0	0	0	0

Ship Name	Call	PMO	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
SINUK	WCQ8110	Anchorage	0	0	0	0	38	55	56	53	19	221
SKAGEN MAERSK	OYOS2	Seattle	0	0	0	0	0	0	0	0	0	0
SKAUBRYN	LAJV4	Seattle	0	0	0	0	0	0	0	0	9	9
SKAUGRAN	LADB2	Seattle	0	0	0	0	0	0	0	30	25	55
SKODSBORG	OYRJ4	Baltimore	0	0	0	0	0	0	0	0	0	0
SNOHOMISH	WSQ8098	Kodiak	29	19	33	12	12	17	49	23	10	204
SOFIE MAERSK	OZUN2	Seattle	0	0	0	0	0	0	0	0	0	0
SOL DO BRASIL	ELQQ4	Baltimore	0	0	0	0	0	0	0	0	0	0
SOLAR WING	ELJS7	Jacksonville	0	0	0	0	0	0	0	0	38	38
SOROE MAERSK	OYKJ2	Seattle	0	0	0	0	0	0	0	0	0	0
SOUTH FORTUNE	3FJC6	Seattle	0	0	0	0	0	0	0	0	0	0
SOUTHDOWN CHALLENGER	WA4659	Cleveland	0	0	0	0	0	0	0	0	31	31
SOVEREIGN MAERSK	OYGA2	Seattle	0	0	0	0	0	0	0	11	14	25
SPLENDOUR OF THE SEAS	LAUS4	Miami	0	0	0	0	0	0	0	0	0	0
SS BADGER	WBD4889	Chicago	0	0	0	0	0	0	0	0	31	31
SS OCEANIC	C6IF7	Miami	0	0	0	0	0	0	0	0	0	0
SSGT EDWARD A. CARTER JR	WPWH	Norfolk	0	0	0	0	0	0	0	0	0	0
ST BLAIZE	J8FO	Norfolk	0	0	0	0	0	0	0	0	0	0
ST. CLAIR	WZA4027	Cleveland	0	0	0	0	0	0	0	0	0	0
ST. LUCY	ELPO3	Norfolk	0	0	0	0	0	0	0	0	0	0
STACEY FOSS	WYL4909	Kodiak	0	0	0	0	0	0	0	0	0	0
STALWART	WBN6512	Anchorage	0	0	0	0	0	0	0	0	0	0
STALWART	WYP8962	Anchorage	0	0	0	0	0	0	0	0	0	0
STAR ALABAMA	LAVU4	Baltimore	0	0	0	0	0	0	0	0	0	0
STAR AMERICA	LAVV4	Jacksonville	0	0	0	0	0	0	0	0	0	0
STAR EAGLE	LAWO2	Baltimore	0	0	0	0	0	0	34	43	30	107
STAR EVVIVA	LAHE2	Jacksonville	0	0	0	0	0	0	50	39	37	126
STAR FLORIDA	LAVW4	Houston	0	0	0	0	0	0	0	0	4	4
STAR FRASER	LAVY4	Houston	0	0	0	0	0	0	0	0	10	10
STAR GEIRANGER	LAKQ5	Norfolk	0	0	0	0	0	0	0	0	16	16
STAR GRAN	LADR4	Long Beach	0	0	0	0	0	0	0	0	6	6
STAR GRINDANGER	LAKR5	Norfolk	0	0	0	0	0	0	0	0	0	0
STAR HANSA	LAXP4	Jacksonville	0	0	0	0	0	0	0	0	14	14
STAR HARDANGER	LAXD4	Baltimore	0	0	0	0	0	0	0	0	0	0
STAR HARMONIA	LAGB5	Baltimore	0	0	0	0	0	0	0	0	10	10
STAR HERDLA	LAVD4	Baltimore	0	0	0	0	0	0	0	0	0	0
STAR HIDRA	LAVN4	Baltimore	0	0	0	0	0	0	38	13	43	94
STAR HIDRA	LAVX4	Seattle	0	0	0	0	0	0	0	0	0	0
STAR HOSANGER	LAXF4	Jacksonville	0	0	0	0	0	0	0	0	0	0
STAR HOYANGER	LAXG4	Baltimore	0	0	0	0	0	0	0	0	0	0
STAR IKEBANA	S6BK	Norfolk	0	0	0	0	0	0	0	0	1	1
STAR ISMENE	LANT5	Baltimore	0	0	0	0	0	0	0	0	0	0
STAR SKARVEN	LAJY2	Miami	0	0	0	0	0	0	0	0	0	0
STAR TRONDANGER	LAQQ2	Baltimore	0	0	0	0	0	0	0	13	12	25
STATENDAM	PHSG	Miami	0	0	0	0	0	0	0	0	0	0
STELLAR KOHINOOR	3FFG8	Seattle	0	0	0	0	0	0	0	0	0	0
STENA CLIPPER	C6MX4	Miami	0	0	0	0	0	0	18	74	32	124
STEWART J. CORT	WYZ3931	Chicago	0	0	0	0	0	0	0	0	30	30
STONEWALL JACKSON	KDDW	New Orleans	0	0	0	0	0	0	0	0	0	0
STRONG CAJUN	KALK	Norfolk	0	0	0	0	0	0	0	0	0	0
STRONG PATRIOT	WCZ8589	Norfolk	0	0	0	0	0	0	0	0	0	0
SUCO DO BRASIL	ELAQ5	Baltimore	0	0	0	0	0	0	23	37	14	74
SUN ACE	3EMJ6	Seattle	0	0	0	0	0	0	0	0	0	0
SUN DANCE	3ETQ8	Seattle	0	0	0	0	0	0	0	0	23	23
SUNBELT DIXIE	D5BU	Baltimore	0	0	0	0	0	0	0	0	12	12
SUNDA	ELPB8	Houston	0	0	0	0	0	0	0	0	0	0
SUPER RUBIN	3FWP5	Seattle	0	0	0	0	1	69	38	79	46	233
SUSAN MAERSK	OYIK2	Seattle	0	0	0	0	0	0	0	0	0	0
SUSAN W. HANNAH	WAH9146	Chicago	0	0	0	0	0	0	0	0	5	5
SVEND MAERSK	OYJS2	Seattle	0	0	0	0	0	0	0	0	0	0
SVENDBORG MAERSK	OZSK2	Seattle	0	0	0	0	0	0	0	0	25	25
T/V STATE OF MAINE	NTNR	Norfolk	0	0	0	0	0	0	0	0	0	0
TAGUS	LAZA2	Long Beach	0	0	0	0	0	0	0	0	0	0
TAI HE	BOAB	Long Beach	0	0	0	0	0	0	0	0	23	23
TAIHO MARU	3FMP6	Seattle	0	0	0	0	0	0	0	0	0	0
TAIKO	LAQT4	New York City	0	0	0	0	0	0	0	0	0	0
TAKAMINE	LACT5	Jacksonville	0	0	0	0	0	0	0	0	0	0
TAKASAGO	LACR5	Jacksonville	0	0	0	0	0	0	0	0	0	0
TALISMAN	LAOW5	Jacksonville	0	0	0	0	0	0	0	0	0	0

Ship Name	Call	PMO	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
TAMPA	LMWO3	Long Beach	0	0	0	0	0	0	0	0	0	0
TANABATA	WCZ5535	Baltimore	0	0	0	0	0	0	36	45	19	100
TAN'ERLIQ	WCY8497	Anchorage	0	0	0	0	0	0	0	0	0	0
TAPIOLA	LAOQ2	Norfolk	0	0	0	0	0	0	0	0	0	0
TARAGO	LAPN5	New York City	0	0	0	0	0	0	0	0	0	0
TATNUCK	WBY2415	Kodiak	0	0	0	0	0	0	0	0	5	5
TAURUS	WYH6499	Kodiak	0	0	0	0	0	0	0	0	15	15
TAUSALA SAMOA	V2FA2	Long Beach	0	0	0	0	0	0	0	0	22	22
TELLUS	WRYG	Baltimore	0	0	0	0	0	0	0	0	33	33
TEQUI	3FDZ5	Seattle	0	0	0	0	0	0	0	0	0	0
TEXAS	LMWR3	Baltimore	0	0	0	0	0	0	0	0	0	0
TEXAS CLIPPER	KVWA	Houston	0	0	0	0	0	0	0	0	0	0
THOMAS G. THOMPSON	KTDQ	Seattle	0	0	0	0	0	0	0	0	0	0
THORKIL MAERSK	MSJX8	Miami	0	0	0	0	0	0	43	24	23	90
TITAN	WAW9232	Kodiak	0	0	0	0	0	0	0	0	0	0
TJALDRID	XPRT	Unknown	0	0	0	0	0	0	0	0	0	0
TMM PUEBLA	ELRZ8	Houston	0	0	0	0	0	0	0	0	17	17
TMM VERACRUZ	V2PC4	Houston	0	0	0	0	0	0	0	0	0	0
TOBIAS MAERSK	MSJY8	Long Beach	0	0	0	0	0	0	0	0	26	26
TOKYO HIGHWAY	3EDF9	Long Beach	0	0	0	0	0	0	0	0	0	0
TOWER BRIDGE	ELJL3	Long Beach	0	0	0	0	0	0	0	0	14	14
TRADE COSMOS	VRUQ2	Miami	0	0	0	0	0	0	0	0	0	0
TRANSWORLD	3FFY3	New Orleans	0	0	0	0	0	0	0	0	0	0
TREIN MAERSK	MSQQ8	Baltimore	0	0	0	0	0	0	0	0	19	19
TRIANON	LAIZ4	Jacksonville	0	0	0	0	0	0	0	0	0	0
TRINITY	WRGL	Houston	0	0	0	0	0	0	0	0	13	13
TRITON	WTU2310	Chicago	0	0	0	0	0	0	0	0	0	0
TRIUMPH ACE	H3CB	Seattle	0	0	0	0	0	0	22	12	36	70
TROJAN STAR	C6OD7	Baltimore	0	0	0	0	0	0	0	0	13	13
TROPIC FLYER	J8NV	Miami	0	0	0	0	0	0	0	0	0	0
TROPIC JADE	J8NY	Miami	0	0	0	0	0	0	0	0	0	0
TROPIC KEY	J8PE	Miami	0	0	0	0	0	0	0	0	0	0
TROPIC LURE	J8PD	Miami	0	0	0	0	0	0	0	0	1	1
TROPIC OPAL	J8WN	Miami	0	0	0	0	0	0	0	0	0	0
TROPIC OPAL	J8NW	Unknown	0	0	0	0	0	0	0	27	75	102
TROPIC SUN	3EZK9	New Orleans	0	0	0	0	0	0	0	0	0	0
TROPIC TIDE	3FGQ3	Miami	0	0	0	0	0	0	0	0	0	0
TROPICALE	ELBM9	New Orleans	0	0	0	0	0	0	0	0	0	0
TUDOR STAR	C6OD8	Unknown	0	0	0	0	0	0	0	0	28	28
TUSTUMENA	WNGW	Kodiak	0	0	0	0	0	0	32	34	25	91
UNITED SPIRIT	ELYB2	Seattle	0	0	0	0	0	0	0	0	30	30
UNIVERSE EXPLORER	3FMF2	New Orleans	0	0	0	0	0	0	0	0	0	0
USCGC ACACIA	NODY	Chicago	0	0	0	0	0	0	0	0	0	0
USCGC ACTIVE	NRTF	Seattle	0	0	0	0	0	0	0	0	0	0
USCGC ACUSHNET	NNHA	Kodiak	0	0	0	0	0	0	0	0	0	0
USCGC ALEX HALEY	NZPO	Kodiak	0	0	0	0	0	0	0	0	5	5
USCGC ANTHONY PETIT	NERW	Chicago	0	0	0	0	0	0	0	0	0	0
USCGC BRAMBLE	NODK	Cleveland	0	0	0	0	0	0	0	0	0	0
USCGC COURAGEOUS	NCRG	Norfolk	0	0	0	0	0	0	0	0	0	0
USCGC DURABLE	NRUN	Houston	0	0	0	0	0	0	0	0	0	0
USCGC FIREBUSH	NODL	Kodiak	0	0	0	0	0	0	0	0	0	0
USCGC GENTIAN	NBHF	Norfolk	0	0	0	0	0	0	0	0	0	0
USCGC HAMILTON	NMAG	Long Beach	0	0	0	0	0	0	0	0	0	0
USCGC HARRIET LANE	NHNC	Norfolk	0	0	0	0	0	0	0	0	0	0
USCGC HEALY	NEPP	Seattle	0	0	0	0	0	0	0	0	0	0
USCGC KATMAI BAY	NRLX	Chicago	0	0	0	0	0	0	0	0	0	0
USCGC KUKUI	NKJU	Seattle	0	0	0	0	0	0	0	0	0	0
USCGC MACKINAW	NRKP	Chicago	0	0	0	0	0	0	0	0	0	0
USCGC MELLON	NMEL	Seattle	0	0	0	0	0	0	0	0	6	6
USCGC MIDGETT	NHWR	Seattle	0	0	0	0	0	0	0	0	0	0
USCGC MORGENTHAU	NDWA	Oakland	0	0	0	0	0	0	0	0	12	12
USCGC NORTHLAND	NLGF	Norfolk	0	0	0	0	0	0	0	0	0	0
USCGC OSPREY	NBRF	Seattle	0	0	0	0	0	0	0	0	0	0
USCGC POLAR SEA	NRUO	Seattle	0	0	0	0	0	0	0	0	0	0
USCGC POLAR STAR	NBTM	Seattle	0	0	0	0	0	0	0	0	0	0
USCGC SASSAFRAS	NODT	Oakland	0	0	0	0	0	0	0	0	2	2
USCGC SEDGE	NODU	Anchorage	0	0	0	0	0	0	0	0	0	0
USCGC SHERMAN	NMMJ	Oakland	0	0	0	0	0	0	0	0	0	0
USCGC STEADFAST	NSTF	Seattle	0	0	0	0	0	0	0	0	0	0

Ship Name	Call	PMO	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
USCGC SUNDEW	NODW	Chicago	0	0	0	0	0	0	0	0	0	0
USCGC VIGOROUS	NQSP	Baltimore	0	0	0	0	0	0	0	0	0	0
USCGC WOODRUSH	NODZ	Seattle	0	0	0	0	0	0	0	0	0	0
USNS 1ST LT. HARRY L. MARTIN	NDFH	Jacksonville	0	0	0	0	0	0	0	0	0	0
USNS ALTAIR	NRZA	Norfolk	0	0	0	0	0	0	0	0	0	0
USNS APACHE	NIGP	Norfolk	0	0	0	0	0	0	0	0	0	0
USNS BRUCE C. HEEZEN	NBID	New Orleans	0	0	0	0	0	0	0	0	31	31
USNS CAPELLA	NBXO	Jacksonville	0	0	0	0	0	0	0	0	0	0
USNS GILLILAND	NAMJ	Norfolk	0	0	0	0	0	0	0	0	0	0
USNS IMPECCABLE	NINT	Norfolk	0	0	0	0	0	0	0	0	0	0
USNS JOHN MCDONNELL	NJMD	New Orleans	0	0	0	0	0	0	0	0	2	2
USNS MENDONCA	NBMK	New Orleans	0	0	0	0	0	0	0	0	0	0
USNS NAVAJO_	NOYK	Long Beach	0	0	0	0	0	0	0	0	0	0
USNS REGULUS	NLWA	New Orleans	0	0	0	0	0	0	0	0	0	0
USNS SEAY	NZIN	New Orleans	0	0	0	0	0	0	0	0	0	0
USNS SHASTA	NRNC	Seattle	0	0	0	0	0	0	19	47	32	98
USNS SODERMAN	NANL	Norfolk	0	0	0	0	0	0	0	0	0	0
USNS SPICA	NMJG	Norfolk	0	0	0	0	0	0	0	0	0	0
USNS SUMNER	NZAU	New Orleans	0	0	0	0	0	0	0	0	0	0
USNS VINDICATOR	NTOR	Norfolk	0	0	0	0	0	0	0	0	0	0
USNS WATKINS	NIJB	Seattle	0	0	0	0	0	0	0	0	0	0
VEGA	9VJS	Houston	0	0	0	0	0	0	0	0	0	0
VICE PRESIDENT - GULF PORTS	MMP1	Houston	0	0	0	0	0	0	0	0	0	0
VIRGINIA	3EBW4	Seattle	0	0	0	0	0	0	0	0	0	0
VLADIVOSTOK	UBXP	Seattle	0	0	0	0	0	0	0	0	18	18
VOYAGER OF THE SEAS	ELWU7	Miami	0	0	0	0	0	0	0	0	7	7
WARRIOR	WBN4383	Anchorage	0	0	0	0	0	0	0	0	0	0
WASHINGTON HIGHWAY	JKHH	Seattle	0	0	0	0	0	0	0	0	24	24
WASHINGTON SENATOR	DEAZ	Long Beach	0	0	0	0	0	0	0	0	0	0
WAYNE FARTHING	MMP2	Houston	0	0	0	0	0	0	0	0	0	0
WEATHERBIRD II	WCT6653	Seattle	0	0	0	0	0	0	0	0	0	0
WECOMA	WSD7079	Seattle	0	0	0	0	0	0	0	0	22	22
WEST DIANA	3FCZ4	Baltimore	0	0	0	0	0	0	0	0	0	0
WESTERN BRIDGE	C6JQ9	Baltimore	0	0	0	0	0	0	0	0	29	29
WESTERN MARINER	WRB9690	Anchorage	0	0	0	0	0	0	0	0	0	0
WESTERN NAVIGATOR	WAX7602	Anchorage	0	0	0	0	0	0	0	0	0	0
WESTERN RANGER	WBN3008	Anchorage	0	0	0	0	0	0	0	0	0	0
WESTERN TITAN	WCX4599	Anchorage	0	0	0	0	0	0	0	0	0	0
WESTWARD VENTURE	KHJB	Seattle	0	0	0	0	0	0	24	22	16	62
WESTWOOD ANETTE	C6QO9	Seattle	0	0	0	0	0	0	0	0	2	2
WESTWOOD BELINDA	H9IM	Seattle	0	0	0	0	0	0	0	57	33	90
WESTWOOD BORG	LAON4	Seattle	0	0	0	0	0	0	0	54	37	91
WESTWOOD BREEZE	LAOT4	Seattle	0	0	0	0	0	0	63	49	42	154
WESTWOOD CLEO	H9GW	Seattle	0	0	0	0	0	0	0	0	6	6
WESTWOOD JAGO	C6CW9	Seattle	0	0	0	0	0	0	0	0	0	0
WESTWOOD MARIANNE	C6QD3	Seattle	0	0	0	0	0	0	0	0	14	14
WILFRED SYKES	WDA2769	Chicago	0	0	0	0	0	0	0	0	14	14
WILLIAM E. CRAIN	ELOR2	Oakland	0	0	0	0	0	0	0	0	0	0
WILLIAM E. MUSSMAN	D5OE	Seattle	0	0	0	0	0	0	0	0	0	0
WILSON	WNPD	New Orleans	0	0	0	0	0	0	0	0	0	0
WORLD SPIRIT	ELWG7	Seattle	0	0	0	0	0	0	54	51	20	125
YEOMAN BRIDGE	C6JY9	Baltimore	0	0	0	0	0	0	0	0	2	2
YURIY OSTROVSKIY	UAGJ	Seattle	0	0	0	0	0	0	0	0	0	0
ZENITH	ELOU5	Miami	0	0	0	0	0	0	0	0	7	7
ZIM AMERICA	4XGR	New York City	0	0	0	0	0	0	16	59	34	109
ZIM ASIA	4XFB	New Orleans	0	0	0	0	0	0	43	25	35	103
ZIM ATLANTIC	4XFD	New York City	0	0	0	0	0	0	0	0	18	18
ZIM CHINA	4XFQ	New York City	0	0	0	0	0	0	0	0	13	13
ZIM EUROPA	4XFN	New York City	0	0	0	0	0	0	0	0	16	16
ZIM HONG KONG	4XGW	Houston	0	0	0	0	0	0	32	58	40	130
ZIM IBERIA	4XFP	New York City	0	0	0	0	0	0	0	0	36	36

Ship Name	Call	PMO	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
ZIM ISRAEL	4XGX	New Orleans	0	0	0	0	0	0	15	34	32	81
ZIM ITALIA	4XGT	New Orleans	0	0	0	0	0	0	0	0	0	0
ZIM JAMAICA	4XFE	New York City	0	0	0	0	0	0	0	0	0	0
ZIM KOREA	4XGU	Miami	0	0	0	0	0	0	0	0	7	7
ZIM PACIFIC	4XFC	New York City	0	0	0	0	0	0	34	19	43	96
ZIM U.S.A.	4XFO	New York City	0	0	0	0	0	0	0	0	21	21

Observation Totals	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
	3676	4592	5342	5137	5947	5759	11081	11852	11258	64644

On the right - CHRISTIAN RADICH at Statue of Liberty October 4, 2001

Above - STRATSRAAD LEHMKUHL and EUROPA arrive at Statue of Liberty as part of SEA TREK 2001, October 4, 2001

On the right - STAD AMSTERDAM June 23, 2001 Photos by Thad Koza Tall Ships International

Meteorological Services—Observations

U.S. Port Meteorological Officers

Headquarters

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

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

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

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

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

Canada

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

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

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

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

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

China

YU Zhaoguo
Shanghai Meteorological Bureau
166 Puxi Road
Shanghai, China

Denmark

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

United Kingdom

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

Bristol Channel
Captain A Maytham MM, FRMetS, PGCE
Met Office
Port Met Officer - Bristol Channel
Titan House Rm 107
Cardiff Bay Business Centre
Lewis Road
Cardiff. CF24 5BS
Tel: +44 (0) 29 2045 1323
Fax:+44 (0) 29 2045 1326
E-mail: austin.maytham@metoffice.com

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

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

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

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

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

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

France

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

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

Germany

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

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

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

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

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

Greece

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

Hong Kong

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

Israel

Hani Arbel, PMO
Haifa Port
Tel: 972 4 8664427

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

Japan

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

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

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

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

Kenya

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

Malaysia

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

Mauritius

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

Netherlands

Jan Schaap, PMO
KNMI, Afd. WM/OW
Port Meteorological Office
Postbus 201
3730 AE De Bilt, Netherlands
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
Tel: 516-924-0499 (0227)

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