

Atlas of PILOT CHARTS

South Atlantic Ocean

NVPUB105

SECOND EDITION 1995

Prepared from data furnished by the DEFENSE MAPPING AGENCY of the Department of Defense
and by the Department of Commerce, and published at the
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DMA STOCK NO. NVPUB105 ED. NO. 002

NAVIGATIONAL WARNINGS AND SAFETY AT SEA

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BROADCAST WARNINGS - THE BEGINNING

On August 19, 1907, the U.S. Navy Hydrographic Center broadcast its first navigation warning to ships at sea. At the time there was neither a schedule for broadcasting navigational warnings nor a worldwide navigation safety system for shipping.

Information concerning navigation safety was difficult to obtain in a timely manner due to the limitations of maritime communications equipment available at that time and the lack of international coordination. Vessels were communicating with each other via wireless telegraph. The typical wireless telegraph had a range of only about 250 miles, depending on the age and power of the transmitter. Radios were new, unreliable and very fragile; they were not on board most vessels at the time. When a ship's officer received a wireless request for assistance from another vessel, he would go to its aid, but the lack of international coordination concerning maritime safety was still a problem. One incident would cause the entire world to begin to focus on the problems of safety at sea.

On April 14, 1912, the "unsinkable" passenger liner *S.S. Titanic* was crossing the North Atlantic Ocean at record-breaking speed on her maiden voyage from England to the United States. The *Titanic* received a wireless message from the *S.S. Amerika*, advising the *Titanic* of the existence of two icebergs ahead. The *Titanic* relayed the telegraph message to Defense Mapping Agency's (DMA) predecessor, the U.S. Hydrographic Office in Washington D.C., via the telegraph station at Cape Race, Newfoundland. At 11:45 PM that night, the *Titanic* struck one of the icebergs. About two hours later the *Titanic* sank. Because her owners considered her unsinkable, there were only enough lifeboats for about one third of the people on board. The *S.S. California* was lying only ten miles away, waiting for daylight before entering the ice fields. It could be seen by passengers and crew on the *Titanic*. Because the Wireless Officer on the *California* was off duty, no one on board heard the wireless distress call from the *Titanic*. The crew of the *S.S. Carpathia* heard the distress call and responded to it immediately. The *Carpathia's* Wireless Officer was also off duty but he was still in the wireless room. Because she was far away, the *Carpathia* did not arrive on the scene until about 5:00 AM. The *Carpathia* recovered all of the survivors from the *Titanic* lifeboats. The *Titanic* went down with more than 1500 people still on board. The telegram reporting the icebergs arrived at the Hydrographic Office later that day. The whole world had suddenly become interested in safety at sea.

SAFETY OF LIFE AT SEA (SOLAS)

The following year, an international group met and formed SOLAS, the Safety Of Life At Sea Convention. It was determined that there should be lifeboat space for everyone on board a vessel, and that vessels at sea should maintain a 24 hour radio watch. This group still meets and discusses international safety issues.

SOLAS established the International Ice Patrol to monitor ice conditions in the vicinity of the Grand Banks and report the location of any icebergs to mariners. After the first year, the U.S. Coast Guard assumed control of the operation - it still patrols the area and promulgates ice messages during the ice season, though it now uses aircraft instead of ships to conduct the patrols. Computers run programs that calculate probable tracklines of known icebergs.

As technology advanced, the quality of shipboard communications equipment improved and radios replaced the wireless telegraph as standard equipment on board vessels throughout the world.

BROADCAST WARNING SERVICE BEGINS

The Navigation Safety Broadcast Service (commonly referred to as the "Watch Desk") provided by DMA today was established by the Hydrographic Office in 1921. It was staffed twenty four hours a day during World War II. After the war the Service was staffed sixteen hours a day. On February 1, 1990, the Watch Desk went back to continuous service and has since been operational around the clock.

When the Hydrographic Office Navigation Safety Broadcast Service started, all messages were broadcast as either HYDROLANTs or HYDROPACs. This service offered worldwide coverage of navigational warnings for all commercial and military shipping.

HYDROLANTs covered the North Atlantic Ocean, South Atlantic Ocean, North Sea, Baltic Sea, English Channel, Mediterranean Sea and adjoining areas.

HYDROPACs covered the North Pacific Ocean, South Pacific Ocean, South China Sea, Indian Ocean, Red Sea, Persian Gulf and adjoining areas.

In 1946, the Hydrographic Office relocated from Washington, D.C. to Suitland, Maryland. In 1962, the U.S. Hydrographic Office changed its name and became the U.S. Naval Oceanographic Office. On July 1, 1972, the mapping and charting functions of the Army, Navy and Air Force consolidated and became DMA. The responsibilities and functions of the Navigation Safety Broadcast Service came under the administration of DMA's Hydrographic Center (DMAHC) and remained in the same location at the Suitland, Maryland Federal Center. On September 18, 1978, the Hydrographic Center (HC), with its Navigation Safety Broadcast Service and charting functions, merged with the Topographic Center (TC) and became the Defense Mapping Agency Hydrographic/Topographic Center (DMAHTC). This merger included relocating the entire Hydrographic Center to the site of the Topographic Center in Bethesda, Maryland.

On June 30, 1995, a reorganization of the Defense Mapping Agency took place and the Hydrographic/ Topographic Center was dissolved. The Navigation Safety Broadcast Service is still operational at the same location, but is now solely under the administrative control of DMA.

WORLDWIDE NAVIGATIONAL WARNING SERVICE

On January 1, 1977, the Worldwide Navigational Warning Service (WWNWS) was established through the joint efforts of the International Hydrographic Organization (IHO) and the Inter-governmental Maritime Consultative Organization (IMCO - now known as the International Maritime Organization, IMO). This service is an internationally coordinated broadcast service for the promulgation of information on worldwide hazards to navigation for international shipping.

WWNWS divides the world into sixteen NAVAREAS **(see Figure 1)**. The United States participates as Area Coordinator for both NAVAREA IV, which covers the Western North Atlantic, and NAVAREA XII, which covers the Eastern North Pacific. DMA is the international coordinator for NAVAREAS IV and XII - the United States Coast Guard is the U.S. National Coordinator. The Coast Guard has the responsibility to broadcast coastal and local warnings for the East, Gulf and West coasts of the United States.

In addition to broadcasting navigational warnings for international shipping in NAVAREA IV and NAVAREA XII, the Watch Desk at DMA still promulgates HYDROLANT and HYDROPAC warnings (outside NAVAREA IV and XII coverage) for United States shipping. This gives U.S. military and U.S. flag commercial shipping the option of having worldwide coverage for broadcast navigational warnings from U.S. sources **(see Figure 2)**.

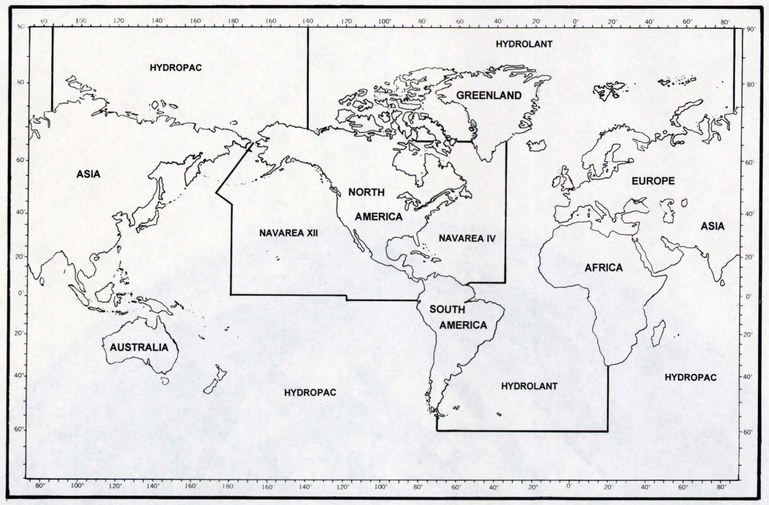


FIG. 2. UNITED STATES NAVIGATIONAL WARNING SYSTEMS.

NAVIGATIONAL WARNING MESSAGE CONTENT

Broadcast warnings promulgated by the Watch Desk at DMA will normally contain information concerning one or more of the following situations:

- Casualties to major and outermost aids to navigation such as primary lights, lightships, large navigational buoys (LNBs), approach or sea buoys. Mariners should monitor local broadcasts for information concerning inshore, harbor and inland waterways, and aids that otherwise may not affect offshore navigation.
- Establishment of new aids that could affect the safety of offshore navigation; alterations of an established aid where the change might be confusing are also promulgated.
- Floating dangers, such as those drifting in or near sealanes, and large derelicts adrift on the high seas. Following the end of the ice season, all reports of ice below 52° North that endanger the North Atlantic shipping lanes are also broadcast. Trees, timbers, and drifting buoys do not normally constitute a danger for oceangoing vessels and are not broadcast on the long-range systems. They may be promulgated in local broadcasts.
-New or amended shoal depths, or other changes in hydrography.
-Dangerous wrecks and obstructions.
-Marine, air or submarine distress, and searches for survivors. Reports of overdue vessels and aircraft are also normally broadcast.
-Selected exercises and hazardous operations conducted by units of the armed forces are normally broadcast. Specifically, these include the use of flares, searchlights or pyrotechnics that may be mistaken for distress signals, night firing exercises, darken-ship exercises, missile launches, and space mission launches.
-Information regarding drifting mines and unexploded ordnance at depths of less than 100 fathoms is broadcast when there is a clear danger to shipping.
-Vessels engaged in seismic operations, which often detonate explosives and tow extremely long cables.
-Malfunctions, scheduled off-air time for maintenance, and other information concerning electronic aids to navigation including marine radiobeacons, LORAN-C, OMEGA, and satellite navigation systems.
-The presence of large unwieldy tows in congested waters.
-Notification of special changes or events such as the alteration or suspension of mandatory traffic separation schemes or activation of a new buoyage system.

Navigation safety messages are canceled when no longer applicable. Messages are always canceled by specific notification in a message. A message pertaining to an exercise or event of known duration includes its own cancellation, usually one hour after conclusion of the event. Warnings that are sufficiently permanent in nature to warrant promulgation as a Notice to Mariners correction are canceled six weeks after publication of that printed notice.

NAVIGATIONAL WARNINGS VIA SATELLITE

The Global Maritime Distress and Safety System (GMDSS) is an automated ship-to-ship, shore-to-ship and ship-to-shore system covering distress alerting and relay, promulgation of maritime safety information (MSI), and basic communication links.

GMDSS represents a significant improvement in marine safety over the previous system of short range and high seas radio transmissions. Operational service of the GMDSS began on February 1, 1992, with full implementation targeted for February 1, 1999.

The International Maritime Satellite Organization (INMARSAT) is a key player within GMDSS. It is a consortium composed of over 75 international partners who provide maritime safety communications for ships at sea.

GMDSS INMARSAT SATELLITES

AOR-E	Atlantic Ocean Region-East
AOR-W	Atlantic Ocean Region-West
POR	Pacific Ocean Region
IOR	Indian Ocean Region

SafetyNET is a service of the INMARSAT Enhanced Group Call (EGC) System. The EGC system is a method used to specifically address messages to particular regions or ships. Its unique addressing capabilities allow messages to be sent to all vessels in fixed geographical areas or to predetermined groups of ships. SafetyNET is the IMO-designated service through which ships receive MSI messages via INMARSAT C terminals

The Watch Desk at DMA now supplements the High Frequency (HF) broadcast with the INMARSAT SafetyNET Service to promulgate navigational warnings for NAVAREA IV and NAVAREA XII via satellite. Distress messages are sent out immediately upon receipt. Nondistress messages are sent out on the regular scheduled WWNWS SafetyNET Service. NAVAREA IV satellite messages are sent out at 1000Z and 2200Z daily via the AOR-W Satellite. NAVAREA XII satellite messages are sent out at 1030Z and 2230Z daily via the POR Satellite.

The Watch Desk will continue to send out long range warnings via HF broadcast until GMDSS becomes fully operational in 1999. The procedure for sending out DMA navigational warnings via HF broadcast has not changed with the implementation of GMDSS. To obtain more information on GMDSS and INMARSAT SafetyNET Service, refer to the latest edition of DMA Pub 117 RADIO NAVIGATIONAL AIDS.

NAVTEX

NAVTEX, also a part of the GMDSS, is a maritime radio warning system consisting of a series of coast stations transmitting radioteletype safety messages on the international standard Medium Frequency (MF) 518 kHz. The United States Coast Guard maintains operational control of NAVTEX stations in U.S. coastal waters.

NAVTEX coast stations transmit during preset time slots so as to minimize interference with each other. Routine messages are normally broadcast four to six times daily. Urgent messages are broadcast upon receipt, provided that an adjacent station is not transmitting. Since the broadcast uses the MF band, a typical station service radius ranges from 100 to 500 nautical miles day and night. Interference or reception from stations farther away occasionally occurs at night.

Each NAVTEX message broadcast contains a four character header describing identification of station (first character), message content (second character), and message serial number (third and fourth characters). This header allows the microprocessor in the shipboard receiver to screen messages, selecting only those stations relevant to the user, and not printing out messages previously received. Selected messages are printed on a roll of paper as received, to be read by the mariner at his or her convenience. Unwanted messages are suppressed. Suppression of unwanted messages is becoming more important to the mariner as the number of messages, including rebroadcasts, increases annually.

Vessels regulated by the SOLAS Convention, as amended in 1988 (cargo vessels over 300 tons and passenger vessels, on international voyages), and operating in areas where NAVTEX service is available, have been required to carry NAVTEX receivers since August 1, 1993. The U.S. Coast Guard discontinued broadcasts of safety information over MF Morse Code on that date.

The U.S. Coast Guard voice broadcasts (channel 22A), often containing inshore and harbor information, remain unaffected by NAVTEX. With NAVTEX, mariners who did not have the knowledge of Morse Code necessary to receive safety messages, or who had difficulty receiving them on a timely basis, should have found a significant advantage in having a NAVTEX receiver. Mariners who were unable to staff a radio watch on a 24-hour-a-day basis should have also seen an advantage in having a NAVTEX receiver.

NAVTEX coverage is reasonably continuous to 200 nautical miles off the U.S. East, Gulf and West Coasts; Puerto Rico; Southwest Alaska; Hawaii; **(see Figure 3)** and 300 to 400 nautical miles off Guam.

For a complete list of U.S. Coast Guard NAVTEX stations in operation, their broadcast schedules, and more information on the worldwide implementation of NAVTEX, refer to the latest edition of DMA Pub 117 RADIO NAVIGATIONAL AIDS.

DMA does not promulgate navigation safety warnings falling within U.S. waters if the information is completely contained in NAVTEX coverage areas. The U.S. Coast Guard covers those situations with NAVTEX Broadcasts.

Safety warnings which overlap coverage areas will be promulgated as both a NAVTEX message and a NAVAREA message, with the NAVAREA message promulgated by both HF broadcast and satellite. Otherwise, message duplication is minimized whenever possible.

SPECIAL WARNINGS

When the United States Government becomes aware of any international political situation with the potential for a possible hazardous condition for U.S. shipping, DMA is called upon to release a Special Warning.

Consultation between the Department of State, Maritime Administration, Chief of Naval Operations, Defense Mapping Agency, and any of several other government organizations determines the content and wording of the Special Warning.

With a final approval for release from the Department of State, DMA promulgates the Special Warning through its broadcast warning system for U.S. shipping, Government agencies and military commands worldwide. The Special Warning is sent to all WWNWS NAVAREA Coordinators and U.S. Coast Guard Districts for dissemination and is rebroadcast by DMA every Friday for five weeks. .

U.S. flag merchant vessels in the vicinity of the affected area are required to acknowledge receipt of the Special Warning to the U.S. Coast Guard through an Automated Mutual-Assisted Vessel Rescue System (AMVER) report.

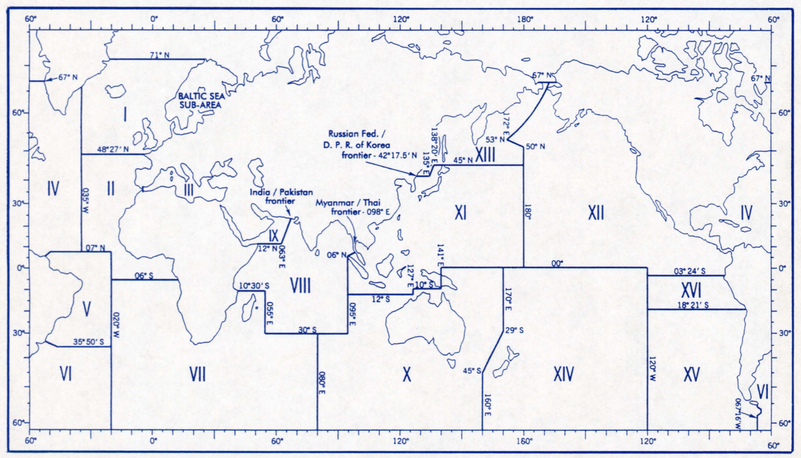
CONCLUSION

With local navigation warning coverage of NAVTEX by MF broadcast, HYDROLANTs and HYDROPACs by HF broadcast and NAVAREA IVs/XIIs by both the HF broadcast and via satellite (SafetyNET), the U.S. Coast Guard and the Defense Mapping Agency use the latest technology available to release messages concerning safety of life at sea.

To maintain a sucessful worldwide navigational warning system, DMA must receive up-to-date information concerning hazards to navigation from as many sources as possible, then promulgate timely warnings for worldwide shipping.

In some underdeveloped parts of the world, the coastal countries lack the facilities to broadcast navigation warnings for adjacent waters. Hazardous situations may exist and go unreported unless a passing vessel's crew takes notice and makes a report to one of the WWNWS NAVAREA Coordinators. DMA continuously needs to receive this type of information from these areas.

To ensure the continued success of the Worldwide Navigational Warning Service, mariners should continue to make reports on observations made concerning the safety of life at sea. For more detailed information concerning any of the systems in this article, or for details on how to contact any of the NAVAREA Coordinators, refer to the latest edition of DMA Pub 117 RADIO NAVIGATIONAL AIDS.



THE DELIMINATION OF SUCH AREAS IS NOT RELATED AND SHALL NOT PREJUDICE THE DELIMITATIONS OF ANY BOUNDARIES BETWEEN STATES

FIG. 1. WORLDWIDE NAVIGATIONAL WARNING SERVICE (WWNWS) NAVAREAS.

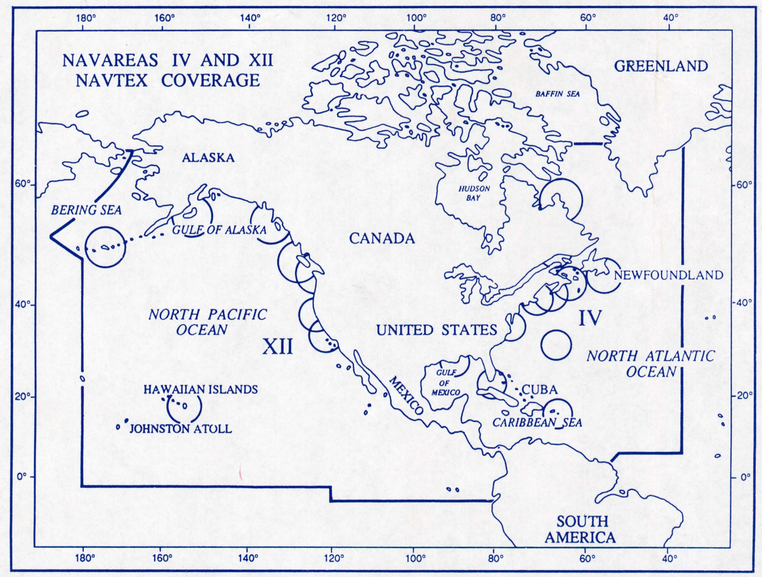
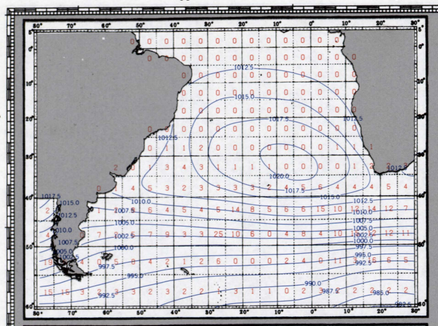
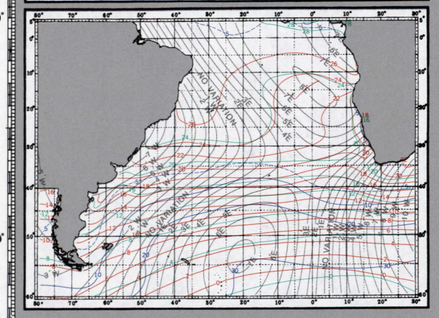


FIG. 3. NAVTEX COVERAGE FOR NAVAREA IV AND NAVAREA XII.

PILOT CHART OF THE SOUTH ATLANTIC OCEAN

JANUARY





GALES

The red numerals in the center of each 5-degree square on this inset chart show the average percentage of ship reports in which winds of at least force 8 have been recorded for the month. In cases where the observation count is low the gale frequency may be nonrepresentative and therefore different from the values used in the text. Where "0" is given, gales may have been recorded, but too infrequently to give a percentage value.

SURFACE PRESSURE

This chart shows the average barometric pressure reduced to sea level. Isobars are solid blue lines for every 2.5 millibars difference in pressure.

AIR TEMPERATURE

The mean air temperature (°C) in red lines is shown for every 2 degrees. All weather narratives refer to air temperature.

VISIBILITY

Blue lines show percentage of observations reporting visibility less than 2 miles.

SEA SURFACE TEMPERATURE

The mean sea surface temperature (°C), in green lines, is shown for every 4 degrees.

OCEAN CURRENTS

Solid arrows indicate the prevailing direction and numerals the average speed of the currents expressed in knots as determined from ships' logs. Dashed arrows are approximations of the prevailing current directions which were determined from other sources when ship log information was unavailable or inadequate.

Values given may be regarded as the probable drift a ship might experience in a particular area. They do not represent the maximum current speed which may occur.

The subtropical convergence is a zone of converging currents and sinking water. Horizontal water movements are either nonexistent or of low speed and variable direction in this zone.

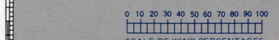
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EXPLANATION OF WIND ROSES

PREVAILING WINDS AND CALMS.—The wind rose in blue color is located in the center of each 5° square where there was sufficient data. The rose shows the distribution of the winds that have prevailed in the area over a considerable period. The wind percentages are summarized for the eight points and calm. The arrows fly with the wind indicating the direction from which the wind blew. The length of the shaft, measured from the outside of the circle using the scale below, gives the percent of the total number of observations in which the wind has blown from that direction. The number of feathers shows the average force of the wind on the Beaufort scale. The figure in the center of the circle gives the percentage of calms. When the arrow is too long to fit conveniently in the 5° square, anything over 29 percent, the shaft is broken and the percentage is indicated by numerals.

FOR EXAMPLE.—The sample wind rose should be read thus: In the reported observations the wind has averaged as follows: From N. 3 percent, force 3; N.E. 1 percent, force 3; E. 4 percent, force 4; S.E. 24 percent, force 5; S. 37 percent, force 4; S.W. 13 percent, force 3; W. 7 percent, force 3; N.W. 6 percent, force 3; calms 5 percent.



USE OF CHART - This chart is not intended to be used alone but in conjunction with other navigational aids. The chart presents, in graphic form, averages obtained from data gathered over many years in meteorology and oceanography to aid the navigator in selecting the quickest and safest routes. Included are explanations of how to use each type of information depicted on this chart.

FREQUENCY OF WAVE HEIGHTS

The red lines on the main body of the chart indicate the percentage of frequency of wave height equal to or greater than 12 feet. In analysis, when both sea and swell are reported, the higher value is used in the summarization.

ICE LIMITS

- ● ● ● ● ● Extreme limit of glacier ice since 1772.
- ——— Extreme limit of pack ice of 1/10 concentration or greater for period 1966-1980.
- ^^^^^^ Mean limit of pack ice of 1/10 concentration or greater during eight recent years.

Definition: Concentration is the ratio of the sea surface actually covered by ice to the total area of sea surface, both ice covered and ice free, at a specific location or over a defined area.

MAGNETIC VARIATION

The lines of equal magnetic variation for the epoch 1995 are shown by gray lines on the main body of the chart. The annual rate of change is shown by gray lines on the lower inset chart.

JANUARY

PRESSURE—During January, the intertropical convergence zone centered in the equatorial trough lies just north of the equator. The trough's mean position streches from Liberia to French Guiana, with a mean central pressure just over 1010 millibars. The South Atlantic subtropical high extends from southern Africa to South America and from 5°S to 40°S. The central pressure of the subtropical high is centered near 32°S, 5°W and averages just over 1020 millibars. South of 40°S the mean pressure gradient is relatively zonal; mean pressure decreases to less than 985 millibars at 60°S.

TEMPERATURE—Mean air temperatures range from less than 0°C at 60°S to nearly 28°C in the Bight of Biafra. At 30°S, mean air temperatures range from just below 24°C off the South American coast to just below 18°C off the African coast. Nearly 98 percent of the observations along the equator fall between 23°C and 31°C; at 60°S, between −2°C and 4°C; and at 30°S, between 20°C and 28°C off the coast of South America and between 16°C and 24°C off the coast of Africa.

WINDS—Southeasterly winds prevail from the Cape of Good Hope to the Horn of Brazil, whereas north of this region southwesterly winds prevail along the coast of Africa from Angolia to Guinea. Northerly winds prevail north of the equator between South America and 20°W and between 15°S and 40°S from South America to mid-ocean. Winds average force 3 to 4 across most regions north of 40°S. Exceptions occur in the vicinity of the Benguela current and the northeast trades where they average force 4 to 5. South of 40°S, the scalar mean wind speeds average force 5 and the wind is predominately form the west.

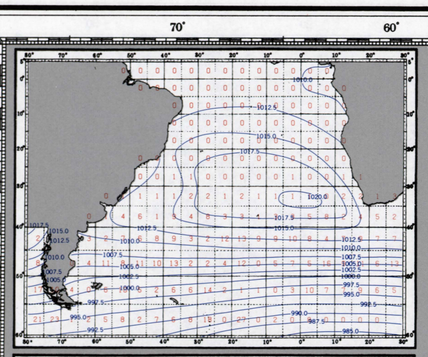
GALES—Winds of force 8 or higher are mainly confined south of 40°S. Ten percent or more of the observations east of 50°W between 40°S and 55°S report gale force winds. Frequencies reach 20 percent just north of 50°S at mid-ocean and east of 18°E.

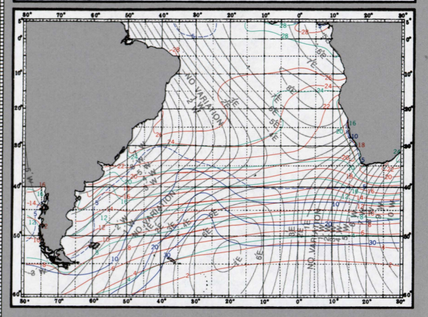
VISIBILITY—The frequency pattern for visibilities less than 2 miles varies little annually like many other meteorological parameters across the South Atlantic. Most areas south of 40°S report visibilities less than 2 miles 10 percent or more of the time except in the region west and north of the Falkland Islands. Frequencies increase to more than 30 percent south of 53°S and east of 25°W. Ten percent frequencies are also observed over the northern portion of the Gulf of Guinea.

WAVE HEIGHTS—Along the Benguela current, wave heights of 12 feet or greater are observed 10 to 20 percent of the time as far north as 22°S. Wave heights of this magnitude are not encountered as frequently in any other area this far north in the South Atlantic. Frequencies of 10 percent or more are observed south of 35°S at 20°W and south of 45°S at 60°W. Wave heights of at least 12 feet are most often encountered east of 35°W between 42°S and 50°S where frequencies reach 40 percent.

FEBRUARY

PILOT CHART OF THE SOUTH ATLANTIC OCEAN





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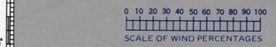
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FEBRUARY

PRESSURE—In general, the mean pressure pattern has changed little since January. Within the equatorial trough the pressure has decreased to below 1010 millibars along the equator from Africa to the Greenwich meridian. Within the equatorial trough the intertropical convergence zone lies along the equatorial trough the intertropical convergence zone lies along the equator east of the Greenwich meridian and just north of the equator west of the Greenwich meridian. The South Atlantic subtropical high still extends from continent to continent and from 5°S to 40°S. Its mean central pressure remains at just over 1020 millibars, centered near 32°S, 0° longitude. South of 40°S, the strong zonal pressure gradient is maintained.

TEMPERATURE—Mean air temperature range from a high of 28°C in the region between the Brazilian port cities of Natal and Fortaleza and over the Gulf of Guinea to a low of 1°C near 60°S. At 30°S, mean air temperatures range from over 24°C off Brazil to under 18°C off South Africa. During February, the highest extreme temperatures occur just south of the equator when 98 percent of the observations fall just south of the equator where 98 percent of the observations fall between 24°C and 32°C. At 30°S, 98 percent fall between 20°C to 28°C off South America and between 16°C to 24°C off Africa; at 60°S, 98 percent fall between —1°C and 4°C.

WINDS—Prevailing westerly winds continue south of 40°S, with mean scalar speeds of force 4 to 6. Southerly and to southeasterly winds prevail from southern Africa to northern Brazil and to the Gulf of Guinea. Predominately northerly winds are observed between 20°W and South America north of the equator and between South America and the mid-ocean from 20°S to 40°S. North of 40°S, winds average force 2 to 4, with the exception of the northeast trades and along the axis of the Benguela current where winds average force 3 to 5.

GALES—Gale force winds (force 8 or higher) are mainly confined south of 40°S and east of 50°W where frequencies of 10 percent or more are reported. Occurences reach a maximum of 20 percent in an area roughly described as east of 30°W and between 45°S and 55°S.

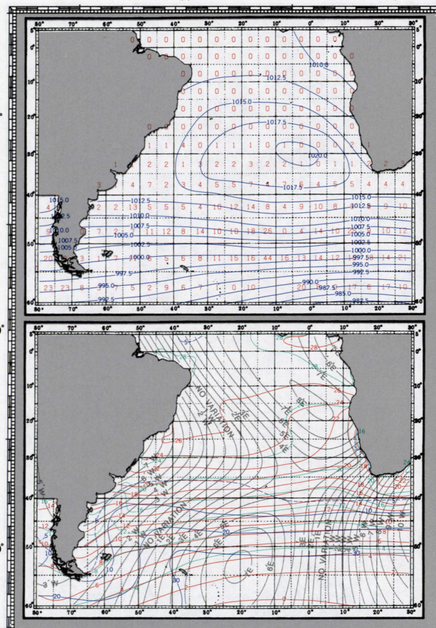
VISIBILITY—Poor visibility (less than 2 miles) are encountered more than 10 percent of the time in most areas east of a line that runs from 57°S, 60°W to 40°S, 36°W. Frequencies increase southeast to over 30 percent east of a line that runs from 60°S, 48°W to 50°S, 33°W. Observed frequencies of 10 percent also appear along the coast Namibia.

WAVE HEIGHTS—North of 30°S, only the axis of the Benguela current do wave heights 12 feet or higher occur with a frequency of 10 percent or more. Most regions south of 35°S have frequencies over 10 percent. The highest frequencies (50 percent) are observed east of 5°E between 49°S and 55°S.

CONVERGENCE
SUBTROPICAL
EXTREME LIMIT OF GLACIER ICE
EXTREME LIMIT OF PACK ICE
NO VARIATION
SOUTH GEORGIA
SOUTH SANDWICH ISLANDS
Tristan da Cunha Group
Gough I
St Helena
Ascension
Bouvetoya
CAPE OF GOOD HOPE
RIO DE JANEIRO
MONTEVIDEO
DURBAN
PORT ELIZABETH
WALVIS BAY
LUANDA
DAKAR
FREETOWN
ACCRA
LAGOS
DOUALA
LIBREVILLE
PORT GENTIL
MATADI
BANANA
POINTE NOIRE
FREE TOWN
MONROVIA
ABIDJAN
TAKORADI
TEMA
LOME
COTONOU
PORT HARCOURT
CALABAR
FERNANDO POO
DOUALA
KRIBI
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BUENOS AIRES
MAR DEL PLATA
BAHIA BLANCA
COMODORO RIVADAVIA
PUERTO MADRYN
PUNTA ARENAS
PUERTO DESEADO
PUERTO SAN JULIAN
PUERTO SANTA CRUZ
RIO GALLEGOS
USHUAIA
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PILOT CHART OF THE SOUTH ATLANTIC OCEAN

MARCH



GALES

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AIR TEMPERATURE

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VISIBILITY

Blue lines show percentage of observations reporting visibility less than 2 miles.

SEA SURFACE TEMPERATURE

The mean sea surface temperature (°C), in green lines, is shown for every 4 degrees.

OCEAN CURRENTS

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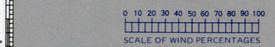
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MAGNETIC VARIATION

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MARCH

PRESSURE—In March the South Atlantic subtropical high continues to predominate from southern Africa to South America and from 10°S to 40°S. The mean central pressure has shifted slightly northwest since February. Now centered near 30°S, 5°W, it continues to support a mean central pressure over 1020 millibars. Little change is noted in the mean pressure pattern south of 40°S where the strong zonal pressure gradient continues. The mean pressure over the Gulf of Guinea decreases to its lowest for any month. This contributes to making March the most influential month for the equatorial trough and congruently the intertropical convergence zone. The influence of the equatorial trough extends from 5°N to 10°S; the intertropical convergence zone is centered along the equator from the coast of Africa to 10°W and just north of the equator from 10°W to the coast of South America.

TEMPERATURE—From the Gulf of Guinea to Horn of Brazil the vast majority (98 percent) of temperature observations fall between 24°C and 32°C. The highest means occur over the Gulf of Guinea where they average just above 28°C. At 60°S, means run as low as 0°C, with only 1 percent of the temperatures falling below −1°C or above 4°C. Along the 30°S parallel, means range from 24°C off South America to less than 18°C off Africa; 98 percent of the temperatures fall between 20°C and 28°C off Brazil and between 16°C and 24°C off South Africa.

WINDS—The circulation around the quasi-permanent subtropical high produces prevailing winds out of the south (southeast through southwest) along the west coast of Africa. Along the upper left quadrant of the high the winds become easterly before turning northerly along the east coast of South America between 20°S and 40°S. Winds of force 3 to 5 are average along the axis of the Benguela current, the Agulhas current, and the northeast trades. Most other regions north of 40°S produce average winds of force 2 to 4. South of 40°S, winds average force 4 to 6 and are predominately out of the west.

GALES—Winds of force 8 or higher generally occur south of 35°S. Frequencies of 10 percent or more are observed mainly east of the Falkland Islands and south of 40°S, whereas frequencies of 20 percent are observed between 30°W and 30°E between the latitudes of 45°S and 60°S.

VISIBILITY—Visibilities less than 2 miles are observed more than 5 percent of the time only in a few areas north of 40°S. Frequencies of 10 percent or higher are observed predominately east of the Falkland Islands and south of 42°S. Occurrences of poor visibilities (less than 2 miles) increase to 30 percent across the South Atlantic east of 40°W and south of 50°S.

WAVE HEIGHTS—Nearly all regions south of 35°S report wave heights of at least 12 feet 10 percent or more of the time. The only area north of 35°S to report frequencies of 10 percent or more lies along the axis of the Benguela current. Frequencies reach as high as 20 percent between 27°S and 32°S. Wave heights of this magnitude are most often encountered south of 50°S and east of 5°W where frequencies reach 50 percent.

CONVERGENCE

SUBTROPICAL HIGH

EXTREME LIMIT OF GLACIER ICE

EXTREME LIMIT OF PACK ICE

NO VARIATION

Ascension

St Helena

Tristan da Cunha Group

Gough I

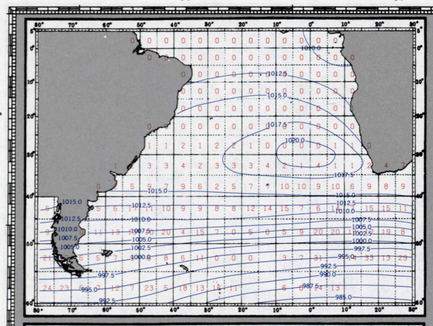
SOUTH GEORGIA

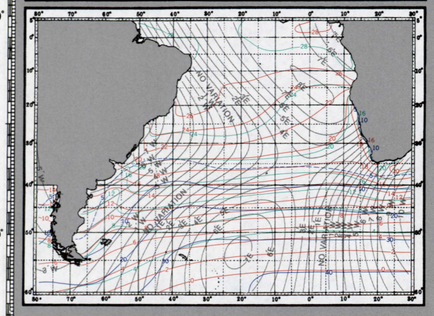
SOUTH SANDWICH ISLANDS

Bouvetoya

APRIL

PILOT CHART OF THE SOUTH ATLANTIC OCEAN





GALES

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VISIBILITY

Blue lines show percentage of observations reporting visibility less than 2 miles.

SEA SURFACE TEMPERATURE

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OCEAN CURRENTS

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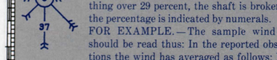
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APRIL

PRESSURE—In April the equatorial trough has weakened slightly from the previous month as some small increases in the mean pressure are noted over the Gulf of Guinea. The dominance of the subtropical high remains unchanged, continuing to extend from continent to continent and from 10°S to 40°S. Its mean central pressure, now centered near 30°S, 5°W, still holds at over 1020 millibars. South of 40°S, the strong zonal pressure pattern continues nearly unchanged.

TEMPERATURE—The most noticeable difference in the April mean air temperature pattern when compared to March's is the 2°C cooler temperatures south of 20°S. Mean temperatures range from a high of 28°C over the Gulf of Guinea to a low of –1°C at 60°S. Of the temperatures at 60°S, 98 percent fall between –3°C and 4°C; within a band that extends 5 degrees latitude either side the equator, 98 percent fall between 24°C and 32°C. Mean temperatures at 30°S range from just over 22°C off Brazil to 16°C off South Africa. At this latitude, 98 percent of the observations fall between 16°C and 28°C off Brazil and between 13°C to 22°C off South Africa.

WINDS—Between 35°S and 10°N scalar mean winds average force 2 to 4 except in the vicinity of the northeast trades where they average force 3 to 5. From the Cape of Good Hope to the Horn of Brazil north, southeasterly winds are predominant except for the northeast trades and the southwesterly winds along the coast of Africa from Tigres Bay to 10°N. South of 35°S, the prevailing winds are westerly, with mean scalar winds of force 4 to 6.

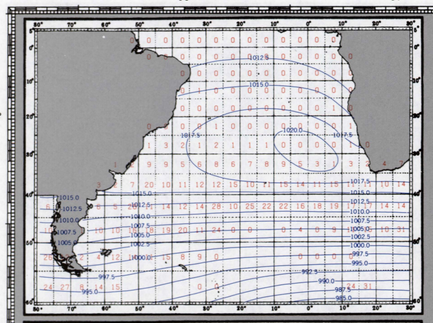
GALES—Cooler temperatures and increased cyclonic activity have lead to increased gales (force 8 or higher winds) across the southern regions of the South Atlantic. Most gales are observed south of 40°S in the vicinity of the Agulhas current and the Falkland current. East of 45°W between 45°S and 55°S, 20 percent frequencies are observed.

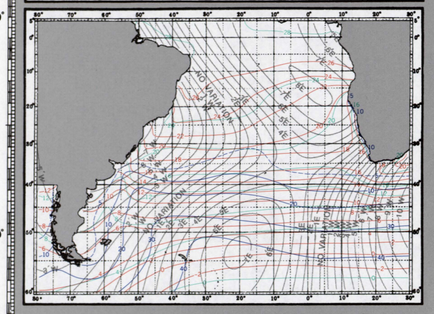
VISIBILITY—Poor visibilities (less than 2 miles) are rarely observed outside the cyclonic belt (south of 40°S) across the South Atlantic. Frequencies of 10 percent or higher are generally observed south of 40°S and east of the Falkland Islands. Frequencies increase to over 40 percent south of 57°S and east of 18°W. The only region north of the cyclonic belt with frequencies of 10 percent is a narrow band off the west coast of South Africa and Namibia.

WAVE HEIGHTS—The highest frequencies of wave heights 12 feet or greater at latitudes north of 30°S occur in the vicinity of the Benguela current. Frequencies in this region have decreased from the previous month and now average just over 10 percent. Most areas south of 30°S, except along the coast of South America north of 50°S, report wave heights of at least 12 feet 10 percent or more of the time. The highest frequencies, 50 percent, are reported in the region south of 45°S and east of 5°W.

PILOT CHART OF THE SOUTH ATLANTIC OCEAN

MAY





GALES

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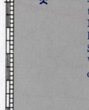
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0 10 20 30 40 50 60 70 80 90 100

SCALE OF WIND PERCENTAGES

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MAY

PRESSURE—With the approach of the austral winter and the influx of cooler temperatures the equatorial trough becomes increasingly weaker. During May, its central pressure averages just below 1012 millibars, with the intertropical convergence zone centered along the 5°N parallel. Centered near 30°S, 0° longitude, the mean central pressure of the South Atlantic subtropical high is near 1022 millibars. The high still extends from continent to continent and from 40°S to near the equator. South of the subtropical high the relatively tight zonal pressure gradient remains in place with little significant change in its mean pattern.

TEMPERATURE—Mean air temperature values have decreased since April. May means along the equator run just over 27°C. At 30°S, they run from 20°C off Brazil to 15°C off South Africa, and at 60°S they run as low as −3°C. Between the equator and northern Brazil and at mid-ocean between the equator and 5°S, 98 percent of the observed temperatures fall between 24°C and 32°C. Along the 30°S parallel, 98 percent fall between 12°C and 24°C off Brazil and between 12°C and 22°C off South Africa, at 60°S, 98 percent fall between −4°C and 0°C.

WINDS-North of the equator, the northeast trades prevail along the northeast coast of South America, averaging force 3 to 5. Between the northeast trades and 30°S the scalar mean winds average force 2 to 4, whereas south of 30°S they average force 4 to 6. Prevailing winds south of the northeast trades are southeasterly from southern Africa to northeastern Brazil; southerly off the African coast from Angola to Guinea; northwesterly from 25°S to 40°S between 5°W and 40°W; easterly along the east coast of Brazil; and westerly south of 35°S.

GALES—Winds of force 8 or greater are mostly observed south of 30°S. Frequencies of 10 percent or more are mainly confined between 35°S and 55°S, with the highest frequencies (20 percent) appearing chiefly within the roaring forties.

VISIBILITY—Most major shipping routes across the South Atlantic have exceptionally good visibilities: more than 90 percent of the obervations north of 40°S report 5 miles or better. Most regions east of the Falkland Islands and south of 40°S show poor visibilities (less than 2 miles) 10 percent or more of the time. Frequencies increase to 40 percent east of South Georgia Island and south of 52°S. Occurrences of 10 percent are also observed along a narrow strip off the west coast of Namibia and South Africa.

WAVE HEIGHTS—The frequency of wave heights 12 feet or greater along the axis of the Benguela current are observed less during May than any other month. Wave heights of this magnitude do occur 10 percent of the time in the vicinity of the Benguela current and as far north as 22°S at mid-ocean. Frequencies increase towards the southeast to a maximum of 50 percent in the area east of 15°W and south of 50°S.

CONVERGENCE

SUBTROPICAL

EXTREME LIMIT OF GLACIER ICE

EXTREME LIMIT OF PACK ICE

NO VARIATION

Ascension

St Helena

Tristan da Cunha Group

Gough I

SOUTH GEORGIA

SOUTH SANDWICH ISLANDS

Bouvetoya

CAPE OF GOOD HOPE TO RIO DE JANEIRO 3382

CAPE OF GOOD HOPE TO MONTEVIDEO 3617

MONTEVIDEO TO CAPE OF GOOD HOPE 3526

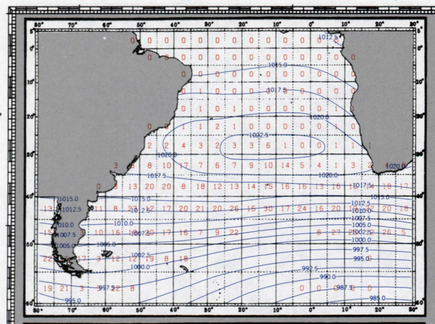
FROM COLON TO PONTA DEL COLGA 3309

RIO DE JANEIRO TO CAPE OF GOOD HOPE 4200

SKELETON BAY TO WALVIS BAY 1100

JUNE

PILOT CHART OF THE SOUTH ATLANTIC OCEAN

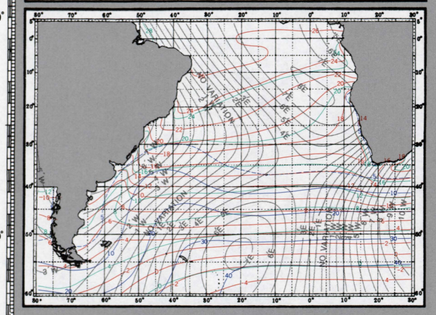


GALES

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VISIBILITY

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SEA SURFACE TEMPERATURE

The mean sea surface temperature (°C), in green lines, is shown for every 4 degrees.

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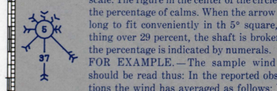
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MAGNETIC VARIATION

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JUNE

PRESSURE—Along the equator the mean pressure continues to increase, influencing the intertropical convergence zone to push north between 5°N and 10°N. The subtropical high now centered near 30°S, 10°W continues to dominate as its mean central pressure rises to just over 1023 millibars. The high still extends from continent to continent and from 40°S to near the equator. As throughout the year, the strong zonal pressure gradient is maintained south of 40°S.

TEMPERATURE—Mean air temperatures continue to drop with the approach of mid-winter. The mean 26°C isotherm runs from near Recife, Brazil, across the equator at mid-ocean to the lower edge of the Bight of Biafra. The mean −4°C isotherm which doesn't appear north of 60°S during May, now appears east of 30°W, reaching as far north as 58°S. At 30°S, means range from 15°C off Africa to 19°C off South America. Examination of the temperature extremes along the equator show that less than 2 percent of the observed temperatures fall outside the 24°C to 32°C envelope. At 30°S, less than 2 percent fall outside the 12°C to 24°C envelope off Brazil and the 12°C to 20°C envelope off South Africa. Approximately 98 percent of the temperatures at 60°S are observed between −5°C and 6°C.

WINDS—The northeast trades so consistently apparent for the first five months have disappeared by June. North of 30°S, most of the winds are from the southern quadrant; the majority are southeasterly. The only exception is along the southeast coast of Brazil and Uruguay where winds are northeasterly. Winds north of 30°S average force 3 to 5, whereas south of 30°S they average force 4 to 6. The predominately westerly winds associated with the roaring forties have increased their influence and now range as far north as 30°S.

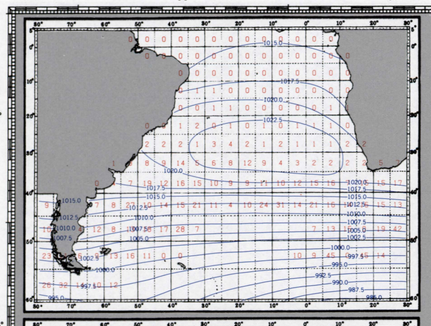
GALES—The frequency of force 8 or higher winds has increased since May. With the exception of the South American coastal areas from the Gulf of San Jorge north, most regions south of 30°S report gale frequencies of 5 percent or more. The highest frequencies (20–29 percent) are observed mainly in the roaring forties between 55°W and 20°E. Twenty percent frequencies are also observed as far north as 35°S just south of the African continent and just east of the mainstream of the Falkland current.

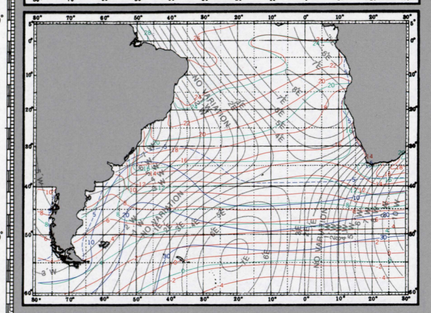
VISIBILITY—Only a few small areas north of 35°S observe poor visibilities (less than 2 miles) 5 percent of the time. In general, poor visibilities occur east of the Falkland current and south of 40°S where frequencies are reported at 10 percent or higher. Poor visibilities reach a maximum of 40 percent in the region south of 55°S and east of 25°W.

WAVE HEIGHTS—The Benguela current wave regime becomes very distinguishable during June, the first month in which frequencies of wave heights of at least 12 feet exceed 10 percent north of 20°S. For other regions of the South Atlantic, frequencies reach 10 percent at 30°S and increase southerly to a maximum of 50 percent in the area east of 25°W and south of 52°S.

PILOT CHART OF THE SOUTH ATLANTIC OCEAN

JULY





GALES

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VISIBILITY

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0 10 20 30 40 50 60 70 80 90 100

SCALE OF WIND PERCENTAGES

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JULY

PRESSURE—The South Atlantic subtropical high is at its peak during July, extending from just north of the equator to 40°S and from South America to Africa. Since mid-summer the pressure along both continents has increased by nearly 10 millibars while the central pressure of the subtropical high has increased by only 4 to 5 millibars. Centered near 30°S, 10°W, the mean central pressure of the high runs near 1024 millibars. The weak equatorial trough has moved farther north - the intertropical convergence zone now lies just south of 10°N. South of 40°S, the mean zonal pressure gradient remains virtually unchanged.

TEMPERATURE—During July, the only region south of the equator producing mean air temperature above 26°C lies along the northeast coast of South America. At 30°S, the means range from 14°C off Africa to 19°C off the coast of South America. Means along the 60°S parallel range from −5°C at 30°E to 2°C at 70°W. Approximately 98 percent of the observed temperatures fall within the following limits: 20°C to 28°C over the Bight of Biafra; 24°C to 32°C off northeast South America; 10°C to 22°C at 30°S; and −5°C to 6°C at 60°S.

WINDS-Scalar mean winds average force 3 to 5 north of 30°S and force 4 to 6 south of 30°S. Southeasterly winds prevail north of a line from the Cape of Good Hope to the coast of Brazil at 25°S. These prevailing winds become more southerly off the coast of Africa north of 15°S. Between 25°S and 35°S from the coast of Brazil to mid-ocean northerly winds prevail, and south of 35°S the stronger westerlies dominate.

GALES—Winds of force 8 or greater are mainly reported south of 35°S where most areas observe frequencies of at 10 percent. Maximum gale frequencies increase to just over 20 percent in an area that extends from the Drake Passage northeast between the Falkland Islands and South Georgia and then eastward between 40°S and 53°S to 30°E.

VISIBILITY—Across the South Atlantic, poor visibilities (less than 2 miles) are rarely observed north of 35°S. Frequencies reach 5 percent along the west African coast from Congo to the Cape of Good Hope. Frequencies of 10 percent or higher are observed south of 35°S between 65°W and 35°W and south of 40°S east of 35°W. In general, frequencies increase to 20 percent south of 50°S and east of 45°W.

WAVE HEIGHTS—Wave heights of at least 12 feet are observed 10 percent of the time as far north as 10°S at 30°W and as far north as 22°S in the vicinity of the Benguela current. The higher frequency of higher waves is still evident along the axis of the Benguela current. Wave heights of this magnitude reach a maximum of 50 percent frequency east of South Georgia Island and south of 48°W.

CONVERGENCE

SUBTROPICAL

EXTREME LIMIT OF GLACIER ICE

EXTREME LIMIT OF PACK ICE

MEAN LIMIT OF PACK ICE

NO VARIATION

Ascension

St Helena

Tristan da Cunha Group

Gough I

Bouvetoya

SOUTH GEORGIA

SOUTH SANDWICH ISLANDS

CAPE OF GOOD HOPE TO RIO DE JANEIRO 3309

CAPE OF GOOD HOPE TO MONTEVIDEO 3617

MONTEVIDEO TO CAPE OF GOOD HOPE 3528

RIO DE JANEIRO TO CAPE OF GOOD HOPE 3352

FROM COLON AND PANAMA TO HORN

FROM NEW YORK TO PLATA

TO PLATA

TO HORN

CAPE TO RIO

RIO TO CAPE

CAPE TO PLATA

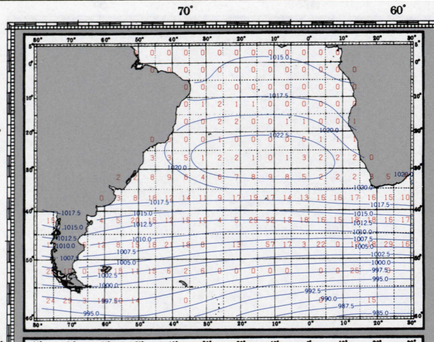
PLATA TO CAPE

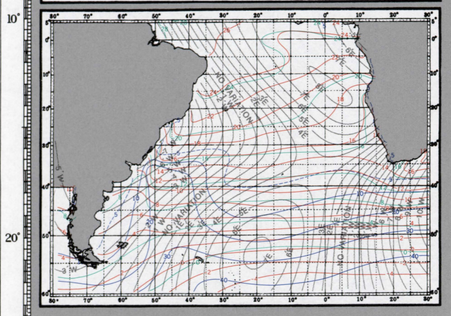
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AUGUST

PILOT CHART OF THE SOUTH ATLANTIC OCEAN





GALES

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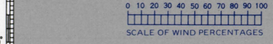
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MAGNETIC VARIATION

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AUGUST

PRESSURE—In August, the South Atlantic subtropical high remains near its July stature. The mean central pressure stays around 1024 millibars, centered near 30°S, 10°W. Boundaries of the subtropical high still extend from north of the equator to 40°S and across the width of the South Atlantic. A fairly intense cloud band associated with the intertropical convergence zone lies just south of 10°N where the equatorial trough crosses the region. The strong zonal pressure gradient south of 40°S continues without significant change.

TEMPERATURE—August brings the coldest mean air temperatures to the South Atlantic. From the northeast coast of South America north, means still run 26°C or slightly higher, whereas over small portions of the Gulf of Guinea the means have dropped to below 24°C. At 30°S, means range from 14°C off Africa to 18°C off Brazil; at 60°S they run from 2°C south of Cape Horn to −5°C east of 10°W. The 1 percent and 99 percent isotherms are 20°C and 29°C over the Gulf of Guinea, 24°C and 32°C off northeast South America, 10°C and 24°C off South Africa, 8°C and 20°C off Porto Alegre, −4°C and 5°C at 60°S, 70°W, and −5°C and 0°C at 60°S, 30°E.

WINDS—The prevailing wind pattern for August is similar to that of the previous two months: south to southwest winds off the coast of Africa from Angola to Guinea; southeast winds from the Cape of Good Hope to the Horn of Brazil; northerly winds from southeastern Brazil and Uruguay east to mid-ocean; and westerly winds south of 30°S. Average winds of force 3 to 5 reign north of 30°S and force 4 to 6 south of 30°S. The lightest winds are found along the African coast from Cape Santa Maria to Cape Lopez where they average force 2.

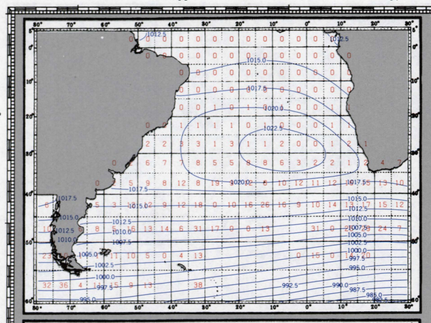
GALES—Most areas south of 30°S report gale frequencies of 5 percent or more except for the coastal areas of South America north of the Valdes Peninsula. Frequencies increase to over 20 percent in the region between 55°W and 30°E and between 35°S and 52°S.

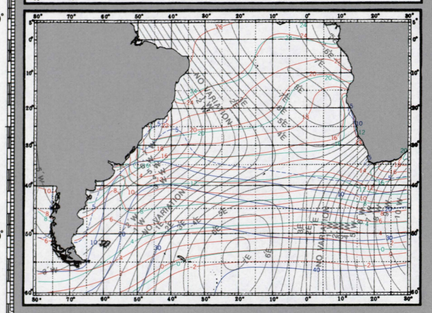
VISIBILITY—Remarkably good visibilities are still found north of 35°S where more than 90 percent of the observations report visibilities of 5 miles or better. Poor visibilities (less than 2 miles) at 50°W longitude range from 10 percent at 35°S to 30 percent at 60°S. At 20°W, they range from 10 percent at 46°S to over 40 percent at 60°S, and at 30°E they range from 10 percent at 42°S to over 40 percent at 60°S.

WAVE HEIGHTS—North of 35°S the highest frequencies of wave heights of at least 12 feet appear along the axis of the Benguela current where frequencies of 10 percent appear as far north as 15°S and frequencies of 20 percent as far north as 22°S. The lowest occurrences of at least 12 foot waves are observed along the east coast of South America: frequencies range from 10 percent at Cabo San Antonio to over 30 percent at Tierra Del Fuego. The highest observed frequencies, 50 percent, are found south of 47°S and east of South Georgia.

PILOT CHART OF THE SOUTH ATLANTIC OCEAN

SEPTEMBER





GALES

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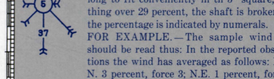
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PREVAILING WINDS AND CALMS.—The wind rose in blue color is located in the center of each 5° square where there was sufficient data. The rose shows the distribution of the winds that have prevailed in the area over a considerable period. The wind percentages are summarized for the eight points and calm. The arrows fly with the wind indicating the direction from which the wind blew. The length of the shaft, measured from the outside of the circle using the scale below, gives the percent of the total number of observations in which the wind has blown from that direction. The number of feathers shows the average force of the wind on the Beaufort scale. The figure in the center of the circle gives the percentage of calms. When the arrow is too long to fit conveniently in th 5° square, anything over 29 percent, the shaft is broken and the percentage is indicated by numerals.

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SEPTEMBER

PRESSURE—With the advent of slightly warmer temperatures in September the equatorial trough begins to reappear north of the equator. The subtropical high is still centered near 30°S, 10°W, with a mean central pressure of 1024 millibars. Since August, the influence of the high has dwindled as its mean northern extent decreased by 10 degrees latitude. The mean zonal pressure gradient continues south of 40°S, as in all previous months.

TEMPERATURE—The September mean air temperature increases slightly over August, ranging from −4°C at 60°S to 26°C off the northeast coast of South America. At 30°S, mean range from 14°C off South Africa to 19°C off Brazil. Extreme temperatures are close to those of August; 98 percent of the observations north of Natal, Brazil, fall between 24°C and 32°C, whereas over the Gulf of Guinea 98 percent fall between 21°C and 29°C. Along the 30°S parallel, 98 percent are found between 12°C and 24°C off Brazil and between 12°C and 20°C off South Africa. At 60°S, 98 percent fall between −5°C and 4°C.

WINDS—The circulation around the subtropical high produces prevailing southeasterly winds from the Cape of Good Hope to the southern edge of the North Atlantic. The influence of the high is relatively weak along the coast of Africa between 15°S and 10°N and in this region the prevailing winds flow onshore from the southwest. Between 20°S adn 30°S and from the coast of South America to the center of the subtropical high the winds have a predominantly northerly component. Scalar winds average force 3 to 5 north of 30°S and 4 to 6 south of 30°S.

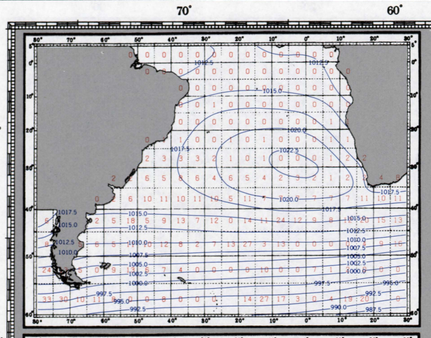
GALES—Winds equal to or greater than force 8 are observed 10 percent or more of the time south of a line that runs form southeastern Argentina to the southern portion of the Agulhas current. Frequencies reach 20 percent between 40°S and 48°S and between 35°W and 5°W.

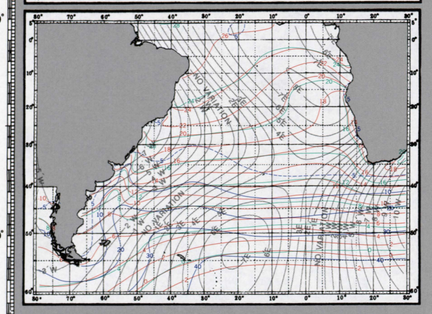
VISIBILITY—The visibility pattern has changed little since August. Poor visibilities (less than 2 miles) are observed 10 percent or more of the time south of 38°S at 50°W and south of 42°S at 20°E. Frequencies increase towards the southeast to a high of 40 percent south of 55°S and east of 26°W. Ten percent frequencies are also observed along the coast of Namibia. Exceptionally good visibilities continue along the South American coast where poor visibilities are reported less than 10 percent of the time.

WAVE HEIGHTS—Wave heights of at least 12 feet are observed 10 percent or more of the time across most areas south of 25°S, with the exception of the near coastal zone of South America north of the Gulf of San Matia. North of 25°S, 10 percent frequencies are observed along the axis of the Benguela current as far as 17°S. South of 25°S, frequencies increase southeasterly to a maximum of 50 percent in the region to the east of South Geroglia and south of 50°S.

OCTOBER

PILOT CHART OF THE SOUTH ATLANTIC OCEAN





GALES

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SURFACE PRESSURE

This chart shows the average barometric pressure reduced to sea level. Isobars are solid blue lines for every 2.5 millibars difference in pressure.

AIR TEMPERATURE

The mean air temperature (°C) in red lines is shown for every 2 degrees. All weather narratives refer to air temperature.

VISIBILITY

Blue lines show percentage of observations reporting visibility less than 2 miles.

SEA SURFACE TEMPERATURE

The mean sea surface temperature (°C), in green lines, is shown for every 4 degrees.

OCEAN CURRENTS

Solid arrows indicate the prevailing direction and numerals the average speed of the currents expressed in knots as determined from ships' logs. Dashed arrows are approximations of the prevailing current directions which were determined from other sources when ship log information was unavailable or inadequate.

Values given may be regarded as the probable drift a ship might experience in a particular area. They do not represent the maximum current speed which may occur.

The subtropical convergence is a zone of converging currents and sinking water. Horizontal water movements are either nonexistent or of low speed and variable direction in this zone.

LOCAL WEATHER

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ICE LIMITS

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0 10 20 30 40 50 60 70 80 90 100
SCALE OF WIND PERCENTAGES

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OCTOBER

PRESSURE—As temperatures continue to increase in October, the equatorial trough deepens and becomes more influential. The mean position of the intertropical convergence zone rests between 5°N and 10°N. The subtropical high is losing some its prestige as its central pressure decreases slightly to 1023 millibars. Now centered near 30°S, 5°W, the subtropical high still extends from Africa to South America and from 10°S to 40°S. South of 40°S, the mean pressure gradient remains zonal, with little change from the previous month.

TEMPERATURE—With the rise in the mean air temperature, the 26°C isotherm continues to move farther south, crossing the equator. Little increase is noted at 30°S where the means range from just above 14°C off South Africa to nearly 20°C off Brazil. At 60°S, means east of 30°W still range below −3°C. Off northeast South America the majority (98%) of the observations fall between 24°C and 32°C; over the Gulf of Guinea they range from 23°C to 30°C. Along the 30°S parallel, only 1 percent of the observations fall below 12°C. At this latitude 1 percent fall above 25°C off the Brazilian coast and above 22°C off the African coast. More than 98 percent of the temperatures observed along 60°S fall between −5°C and 6°C.

WINDS—Onshore southwesterly winds predominate from Angola to Guinea; southeasterly winds prevail from South Africa to northeastern South America. Northerly winds persist on the west side of the subtropical high, with westerly winds prevailing from the southern edge of the high to south of 60°S. Most regions north of 30°S produce average force winds of 3 to 5. A concentration of slightly higher, more constant winds appears over the Benguela current. Scalar mean winds of force 4 to 6 are observed across most regions south of 30°S.

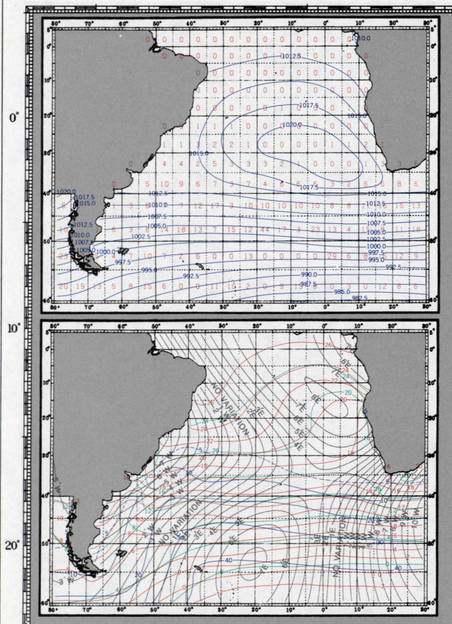
GALES—Winds of force 8 or greater are observed 10 percent or more of the time along the Agulhas current off southeast Africa. Frequencies of at least 10 percent are also observed in most regions south of 35°S and north of a line that runs through 60°S, 40°W and 50°S, 30°E, except for the South American coastal areas north of Puerto Diseado, Argentina. Twenty percent frequencies are observed along the roaring forties between 30°W and 10°E and in a few areas south of Cape Horn.

VISIBILITY—Poor visibility (less than 2 miles) are mainly confined to the cyclonic belt south of 40°S. East of 60°W, frequencies reach 10 percent near 40°S and increase to 40 percent east of 35°W and south of 54°S.

WAVE HEIGHTS—The delineation of higher frequencies of wave heights 12 feet or greater is still evident along the axis of the Benguela current where frequencies reach 10 percent as far north as 22°S and 20 percent as far north as 31°S. Most regions south of 30°S report frequencies of at least 10 percent. Frequencies increase to a maximum of 50 percent in the area south of 52°S and east of South Georgia Island.

PILOT CHART OF THE SOUTH ATLANTIC OCEAN

NOVEMBER



GALES

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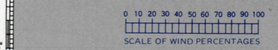
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NOVEMBER

PRESSURE—The South Atlantic subtropical high continues to weaken. Its mean central pressure, centered near 30°S, 5°W, is just over 1020 millibars. With warmer seasonal temperatures the equatorial trough continues to deepen; a monthly mean pressure just below 1010 millibars appears over the Bight of Biafra. Associated with the trough, the intertropical convergence zone extends from the Gulf of Guinea to southeastern Venezuela. From the roaring forties to 60°S the predominant zonal pressure pattern persists as in all previous months.

TEMPERATURE—Mean air temperatures continue to increase across the South Atlantic, with the means at the equator running from 25°C to 27°C. At 30°S they range from 16°C off Africa up to 21°C off Brazil; at 60°S they range from −3°C to 4°C. Ninety-eight percent of the observations fall between 24°C and 32°C off northeast South America, between 12°C and 22°C off South Africa at 30°S, between 14°C and 26°C off Brazil at 30°S, between −5°C and 3°C at 60°S, 30°E, and between 0°C and 8°C at 60°S, 70°W.

WINDS—Mean winds of force 4 to 5 are observed along the Benguela current while other areas north of 35°S generate mean winds of only force 3 to 4. South of 30°S the average force is 4 to 6. Westerly winds still prevail south of 35°S. Northerly winds are predominant over the western quadrant of the subtropical high. Southeasterly winds prevail from the Cape of Good Hope to the southern portion of the North Atlantic with the exception of the southwesterly winds along the African coast from Angola to Guinea.

GALES—The frequency of gales north of 40°S has decreased since October. The only area north of 40°S to report 10 percent frequencies lies just off the southern edge of the South African continent shelf. Most areas south of 40°S experience frequencies greater than 10 percent except for the region north and west of the Falkland Islands. Frequencies of 20 percent are observed south of Cape Horn and along the 50°S parallel between 30°W and 20°E.

VISIBILITY—Visibilities less than 2 miles are observed 10 percent or more of the time east of a line that runs from the tip of South America north along the west side of the Falkland Islands to 32°S, 45°W and south of a line that runs from 32°S, 45°W to 40°S, 30°E. Frequencies increase to 40 percent east of South Georgia Island and south of 54°S.

WAVE HEIGHTS—North of 35°S the frequency of wave heights greater than or equal to 12 feet are still highest in the vicinity of the Benguela current. Ten percent frequencies are observed as far north as 20°S in this region and 20 percent frequencies as far north as 25°S. Most regions south of 30°S to 35°S report frequencies of 10 percent or more. Occurrences increase to a maximum of 50 percent south of 52°S and east of 30°W.

DECEMBER

PILOT CHART OF THE SOUTH ATLANTIC OCEAN

