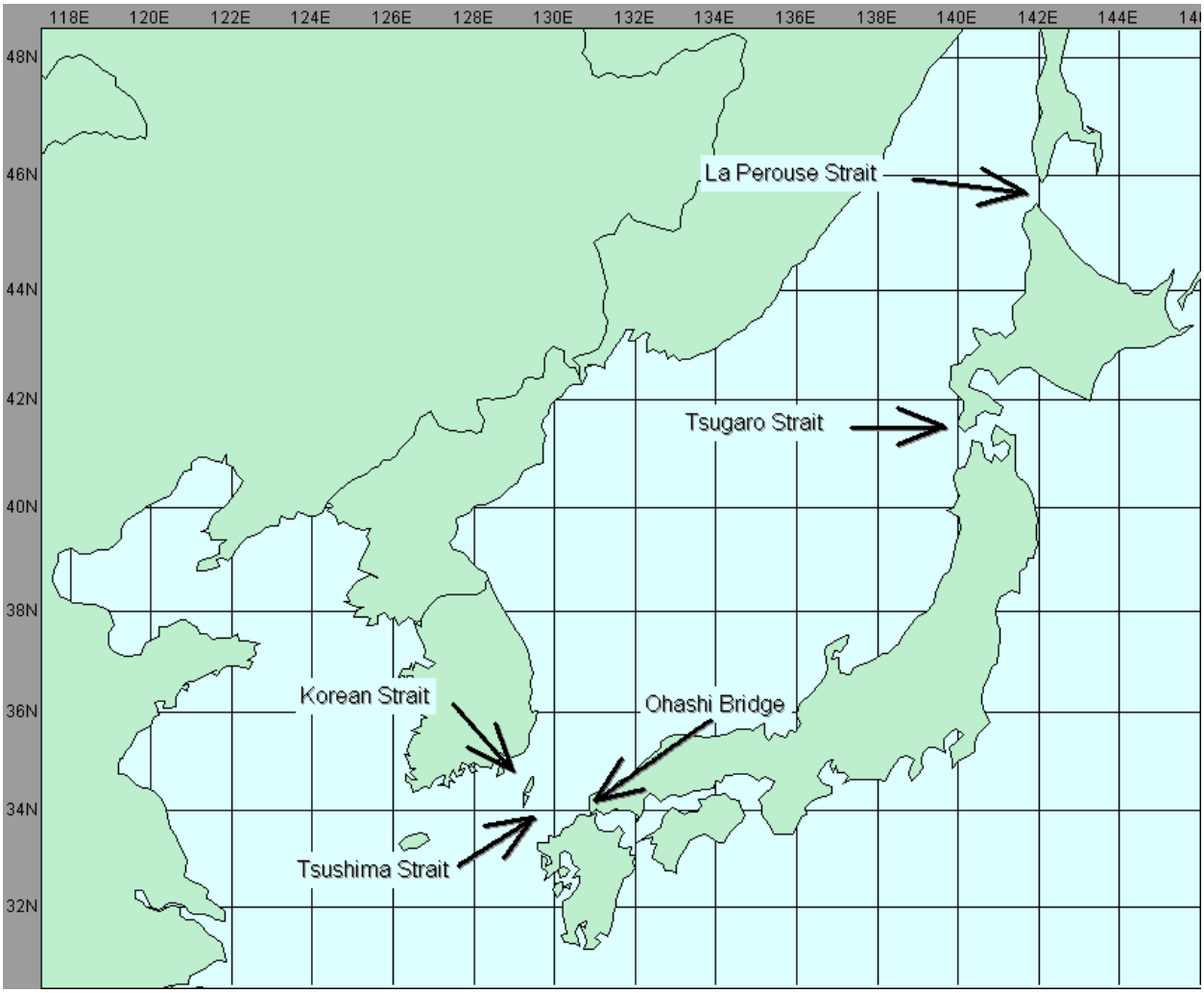
METOC HAZARDS

IN THE NAVPACMETOCCEN WEST GUAM AOR



LA PEROUSE (SOYA) STRAIT

U.S. Naval assets are not routed through the La Perouse Strait due to political reasons. The La Perouse Strait separates the islands of Sakhalin and Hokkaido. With a width of only 23 miles, the strait is usually closed by pack ice from November to June. The Soya (warm) current flows from the Sea of Japan into the Sea of Okhotsk. This current is strongest in summer peaking

at 1.4 knots and disappears in winter. The warm current forms a sharp separation with the colder water on the northern side of the strait resulting in dense fog over the colder water from June to August.

TSUGARU STRAIT

The Tsugaru Strait is located between Hokkaido and Honshu and is the main passage for ships transiting from the northern Sea of Japan into the Pacific Ocean. This strait is also used as a "gate" by units to evade gale/storm force low pressure systems as they track into either the Sea of Japan or the Sea of Okhotsk. While this strait narrows down to a minimum width of 10 miles, it remains ice-free year round. The Tsugaru (warm) current, an extension of the Tsushima current, flows eastward from the Sea of Japan with velocities exceeding 6 knots (+/- 1 with strong westerly or easterly wind). Eastbound shipping utilizes the central channel while westbound shipping will take advantage of counter currents along the northern portion of the strait. Because of the unique shape of the Tsugaru Strait, winds and seas are not funneled through; however, compression against the mountainous terrain on the windward side results in higher winds and seas through the approaches. Heavy fog is common during the summer months, primarily along the northern side of the strait and along the eastern approaches as the Oyashio Current cools warm moist air.

SHIMONOSEKI / WAKATO OHASHI BRIDGE

This suspension bridge spans the Kanmon Kaikyo channel between Honshu and Kyushu. **At the midway point between high and low tides, when currents are their weakest (slack water), the bridge's 125-foot (38-meter) height above the water allows minimal clearance.** Cruisers, destroyers, and frigates can physically clear the bridge; however accepting a route through this channel is a decision subject to the discretion of the

individual Captain/Master. **Tidal currents can exceed 9 knots** in the Kanmon Kaikyo and **passage should not be attempted when currents exceed 4 knots** due to strong eddies, dangerous shear, and heavy traffic.

KOREAN / TSUSHIMA STRAITS

The Korean strait, the Tsushima Islands, and the Tsushima Strait separate the Korean Peninsula from the islands of Japan. The Korean Strait is located between the Korean Peninsula to the north and the Tsushima Islands to the south. The Tsushima Strait is located between the Tsushima Islands to the north and the Japanese Islands of Kyushu and Honshu to the south. The tidal currents associated with these two large islands (Kyushu and Honshu) and several small ones can extend 5 miles offshore. The Tsushima (warm) Current flows northward through the strait branching into the Korean (warm) Current and the Tsushima (warm) Current. The Korean Current travels along Tsushima Island's west coast and the Tsushima Current travels along the island's east coast. Following frontal passage over the Korean/Tsushima Straits (approximately every 3-4 days in the winter), northeasterly winds are funneled through the strait; consequently, increasing winds by 15-20 knots and building seas by 3-4 feet.

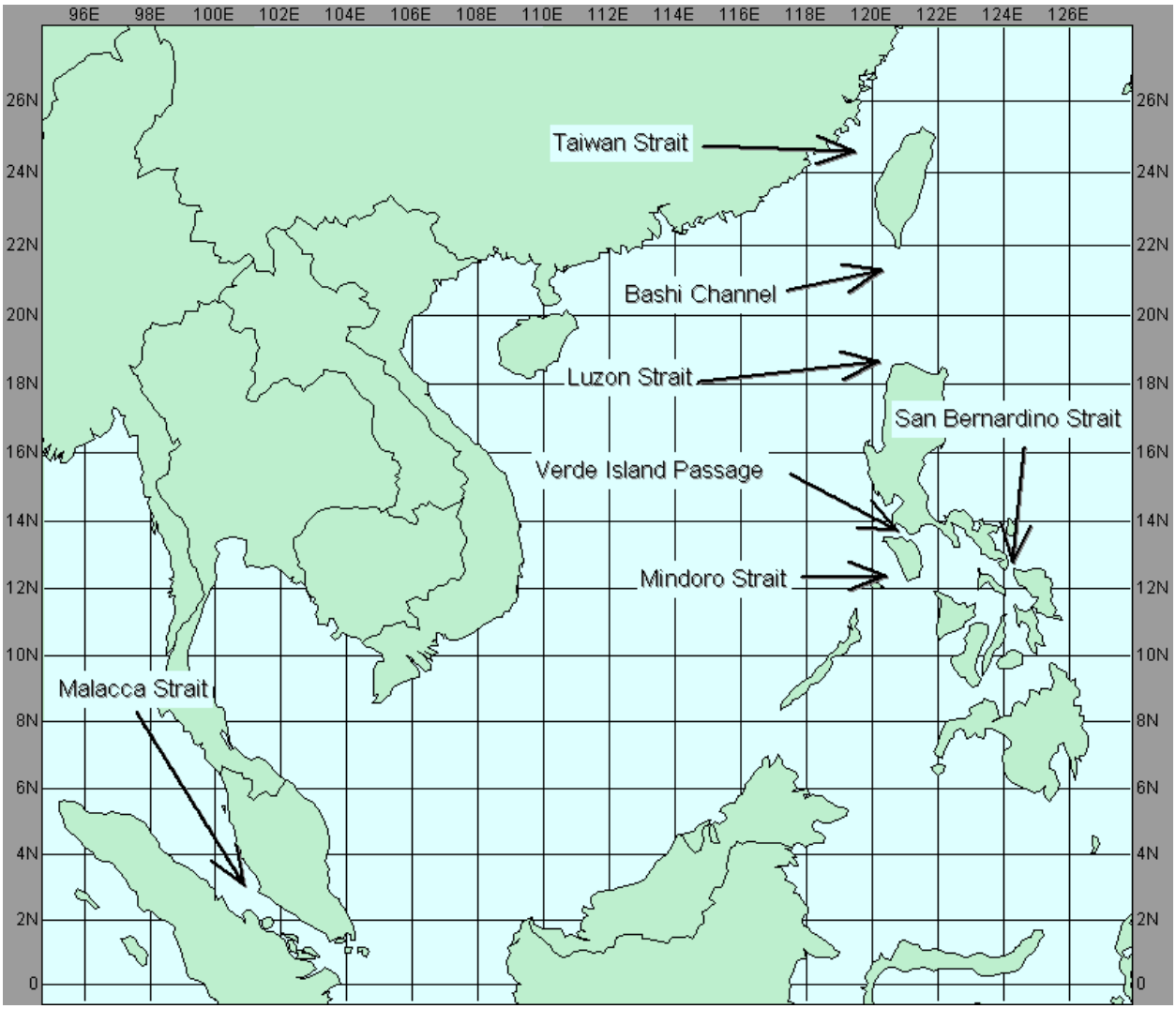
NORTH WALL

The North Wall Effect is caused by a cold air mass moving over the warm Kuroshio Current similar to that seen on the East Coast of United States. As the air/sea temperature contrast increases, instability will increase, creating the possibility of winds stronger than the pressure gradient would indicate. NOGAPS/NORAPS models do not take into account the air/sea temperature contrast and have extreme difficulty in forecasting this effect.

If the wind flow is perpendicular to the Kuroshio Current (northwest component), wind speeds and seas

will be 25%-50% higher than forecasted by NOGAPS/NORAPS/WAM. Maximum seas will be observed 50-150 NM downwind of the North Wall.

If the wind flow opposes the Kuroshio Current (northeast component), the wind speed will still be 25%-50% higher than forecasted, but the seas will build dramatically. The wind-generated seas will oppose the flow of the current, shortening the wavelength and building the sea height 50%-100% higher than forecasted by WAM. Use extreme caution when routing ships in the vicinity of the Kuroshio current, when a North Wall advisory is in effect. For more information, see NAVPACMETOCCEN West Guam AOR Forecaster’s Handbook.



TAIWAN STRAIT

The Taiwan Strait lies between Taiwan and the Chinese mainland with a minimum width of 70 miles. This is a politically sensitive area and ships traversing should be given the predefined route found in the OTSR predefine. INFO USCINCPAC and CINCPACFLT when diverting a unit through this strait. **The principle danger is the Taiwan Banks, an extensive shoal area along Taiwan's southwest to west coastline. The water depth in this area is continuously changing** with depths reported **as shallow as 27 feet.** The China Coastal Current flows southward along China's east coast while

the North Equatorial Current flows northward along Taiwan's west coast. During the northeast monsoon, winds of 15 to 20 knots are the norm; however, following frontal passage, winds increase to 25 knots or greater with an associated increase in seas. Cold surges over the region will produce wind over the Taiwan Strait higher than the pressure gradient would indicate. These supergradient winds are caused by a funneling effect between China and Taiwan (see AOR Forecaster's Handbook for more information). During the summer monsoon, southwesterly winds bring frequent rainshower activity mainly along the Taiwanese coastline.

LUZON STRAIT/BASHI CHANNEL

The Bashi channel encompasses the northern portion of the Luzon Strait and separates the Batan Islands from the islands of Taiwan and Hsiao-lan Yu. This 53 mile wide channel is a major shipping route. Northeast wind of 20-25 knots and 7-9 foot seas associated with the winter monsoon from October to March, dominate the region. **After a cold surge outbreak, the northeast winds are funneled through the strait, resulting in higher wind and seas throughout the channel.** During the Southwest monsoon, winds average 15-20 knots and seas 3-4 feet.

SAN BERNARDINO STRAIT / VERDI ISLAND PASSAGE

The Philippine and South China Seas are connected by the San Bernardino Strait/Verdi Island Passage. The San Bernardino Strait is located in the eastern Philippine Islands between southeast Luzon and northern Samar, and connects with the Verde Island Passage along the western Philippine Islands between southwest Luzon and northern Mindoro. The fresh wind and moderate seas of the northeast monsoon are felt at the entrance to the San Bernardino Strait. **Strong tidal currents are found in this area as well.** In the Cape Verde Passage,

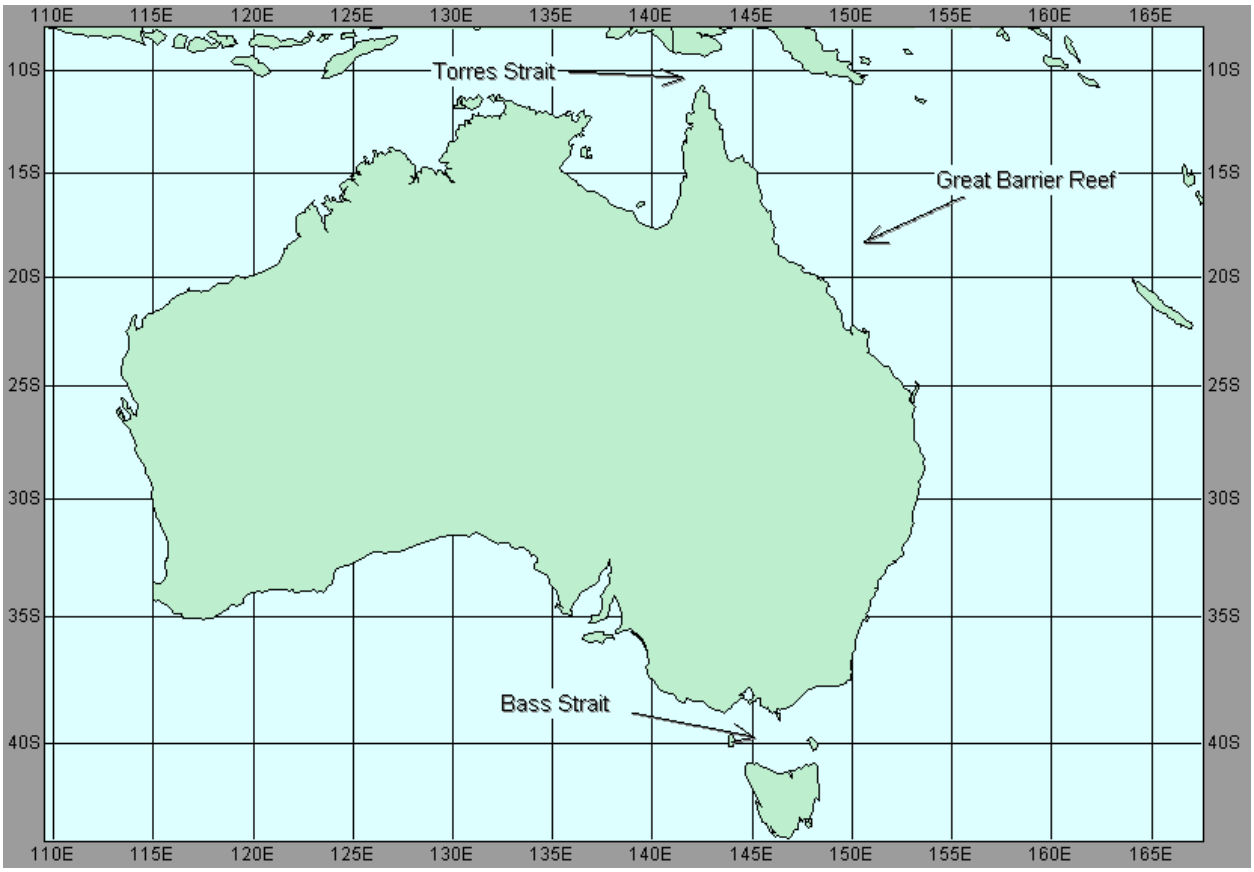
funneling along Mindoro's north coast produces strong wind during both the northeast and southwest monsoons with numerous areas of confused waters produced by eddies and tidal effects. Additionally, converging land breezes frequently produce **strong thunderstorms over this region between 0400 and 1000 local. In certain areas Piracy is also a concern for ships transiting these waters.**

STRAIT OF MALACCA

Thailand and Malaysia bound the Strait of Malacca to the northeast and Sumatra to the southwest. As the main route connecting the Indian Ocean to the South China Sea, **this passage is heavily traveled and subject to piracy by small bands of men boarding ships from small boats mainly at night.** Located between the equator and 5 degrees north latitude, the monsoonal flow is the main weather feature affecting this region. During the northeast monsoon, winds average 5 to 10 knots. **From April to November, the southwest monsoon produces 10 to 20 knot winds and common nocturnal squalls known as "sumatras" which last 1 to 4 hours.**

VIETNAM COAST AND SOUTHERN PORTION OF SOUTH CHINA SEA.

During the Northeast Monsoon (November – March), fresh northeast breezes (17-21 kts) prevail in the northern portion of the South China Sea. The swell waves generated in the northern basin will propagate to the southern basin of the South China Sea. As these swell waves encounter the shallower sea basin, the amplitude (significant wave height) will increase. During severe cold surge outbreaks ships reporting 9-12 feet swells and only 15 knots of wind is not uncommon. For further information refer to Sailing Directions Pub #161.



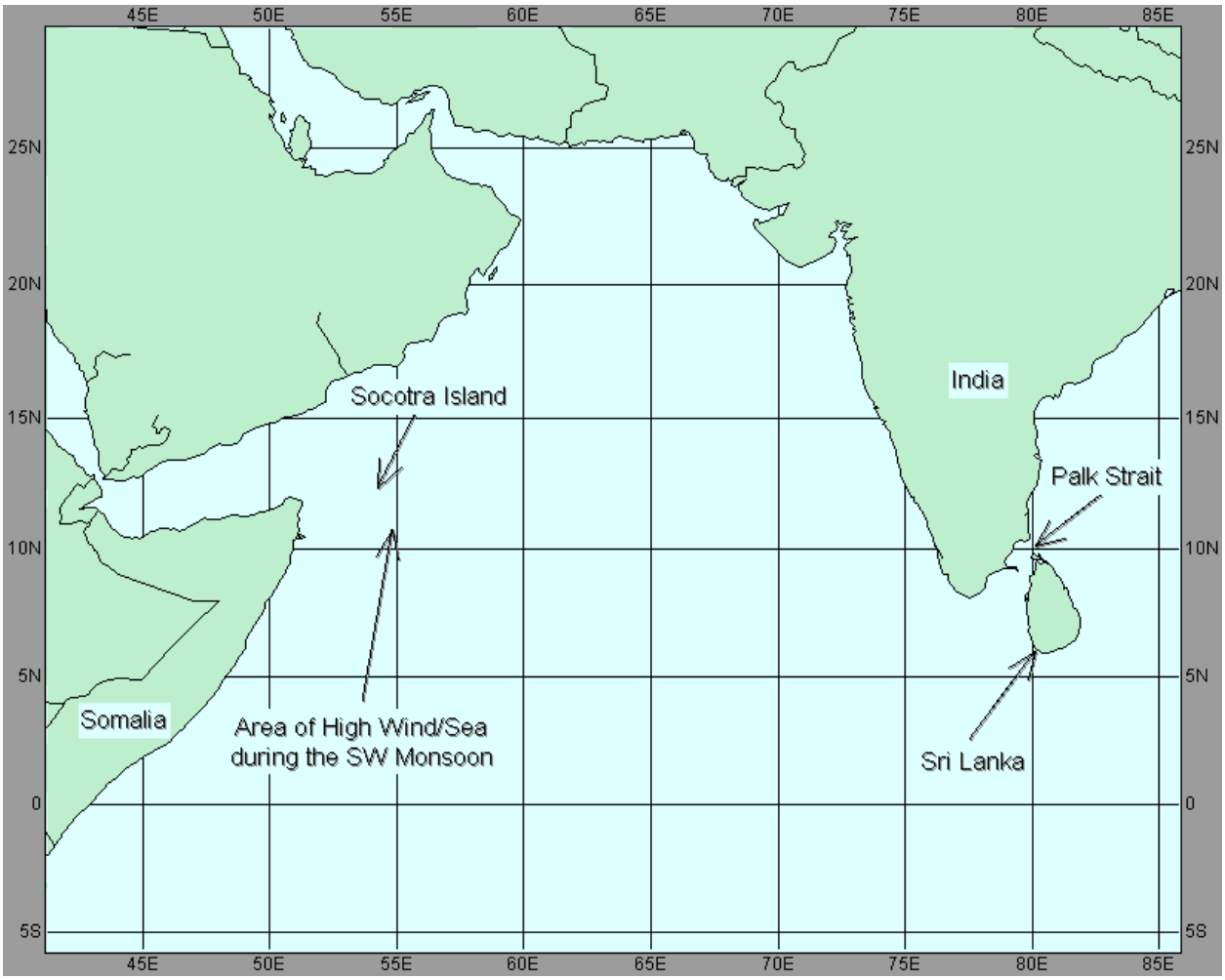
BASS STRAIT

Bass Strait separates Australia from Tasmania. **Gales of force 8 (56-63 knots) and over are frequent in this region, with a peak during the fall and winter months** associated with low-pressure systems transiting the region **every 3-4 days.**

TORRES STRAIT

Torres Strait lies between the north coast of Cape York Peninsula Australia and the south coast of Papua New Guinea, and connects the Coral Sea with the Arafura Sea. **The northern portion of this strait (north of Jervis Island) is shallow and reef strewn and thus unnavigable by larger vessels**. The Great Northeast Channel to the south is relatively free of dangers and

is the passage of choice. **The Inner Route inside of the Great Barrier reef is a well surveyed channel, although pilotage is required for all vessels over 210 feet in length and drafting 27 feet or greater (Refer to Pub 127, Sailing Directions, East Coast of Australia and New Zealand).** The southeast trade winds dominate from April to November with partly cloudy skies and little rain. The northeast monsoon from December to March brings the rainy season, with peak rainfall occurring during the early April.



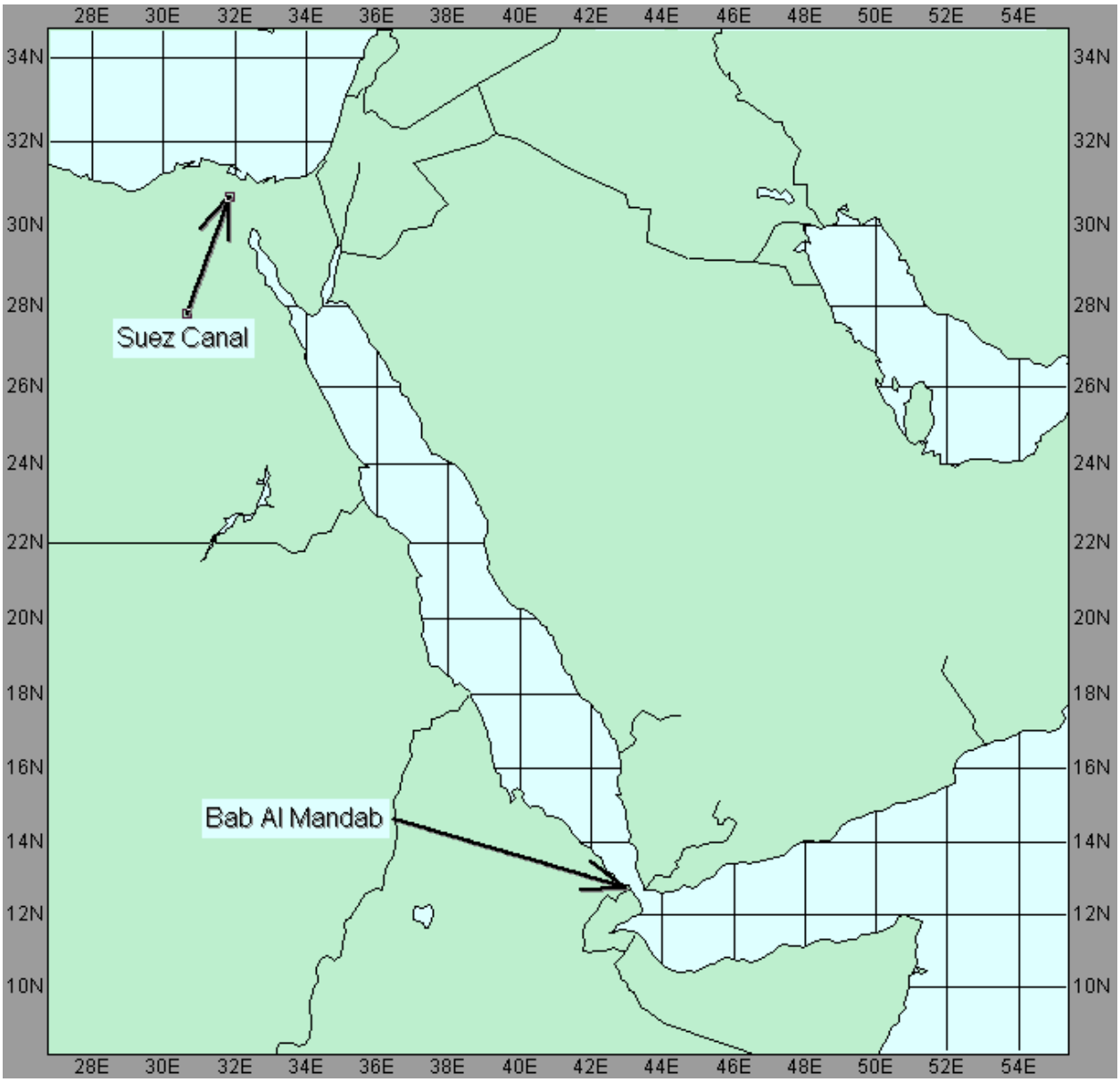
THE SOUTHWEST MONSOON

The Southwest Monsoon dominates the weather in the Arabian Sea from June through September. Ships transiting the coast of Somalia should expect winds reaching gale force during the peak of the Southwest Monsoon. During the Southwest Monsoon, gale force southwesterly winds flow over an extensive fetch area (in excess of 1,000 miles off the Somalia coast), producing very rough seas with wave heights often exceeding 18 feet. Socotra Island, claimed by Yemen, is located 110 miles northeast of Somalia. During the southwest monsoon, converging windflow from the Gulf of Aden and the Somalian coast meet near the island of

Socotra. **At the peak of the Southwest Monsoon, gale force winds over this region can be expected 30 percent of the time and seas in excess of 13 feet over 50 percent of the time.** These strong southwesterly winds enhance the Somali current, which, during the peak of the season, can increase from 4 knots to as high as 7 knots. An additional enhancement in the southwesterly windflow results from the upwelling of cooler water off the coast of Somalia due to transport of the surface water away from the region. **For more information consult NAVPACMETOCCEN WEST AOR Forecaster's Handbook for more information.**

PALK STRAIT

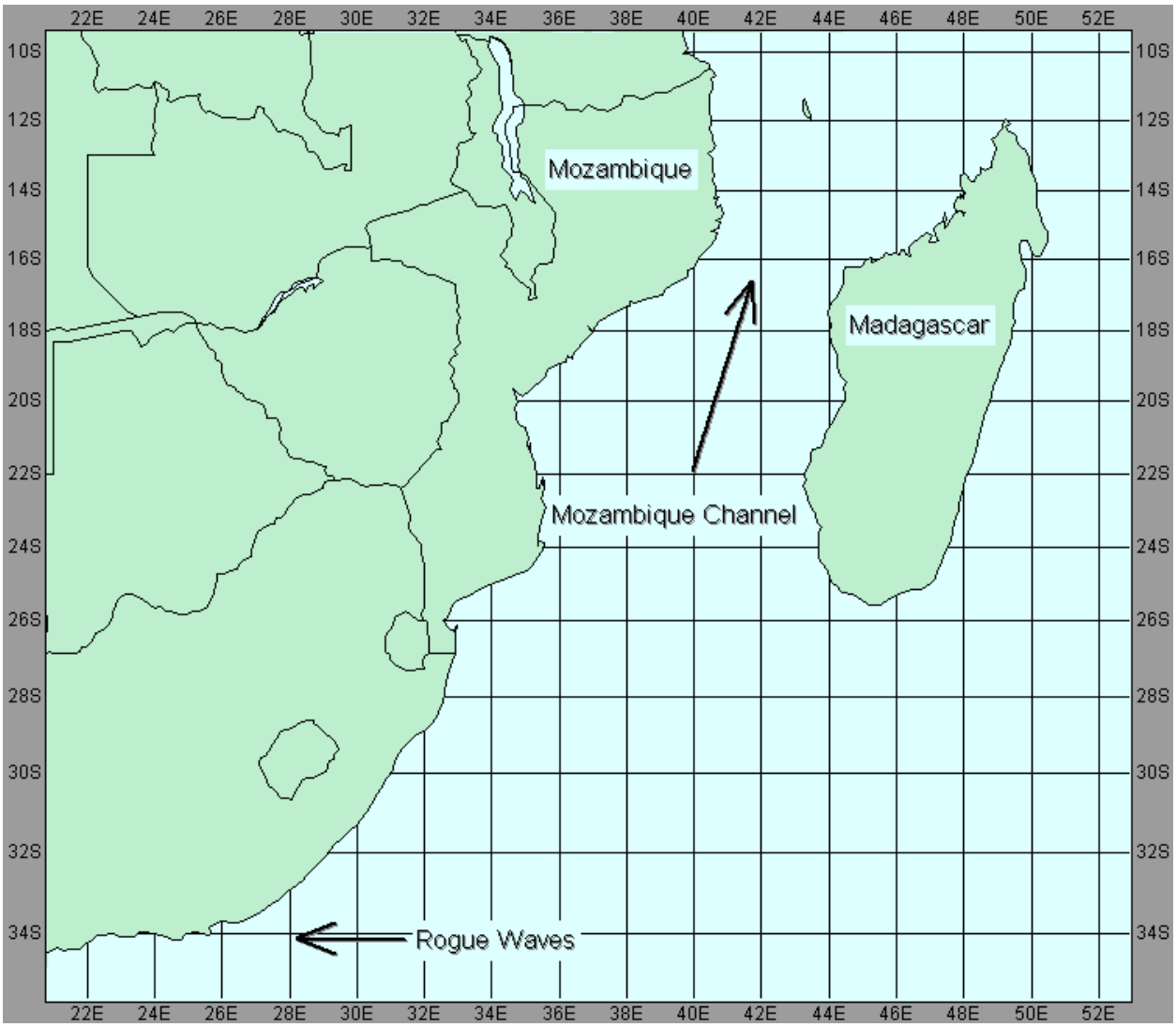
Current political problems preclude regular shipping in this area. Warning # 107 of NIMA NAVSAFETY BETHESDA MD (DTG 011600Z DEC 97) states that entrance by unauthorized vessels into the waters of Palk Strait and the eastern territorial waters of Sri Lanka is prohibited due to increased terrorist attacks against shipping and Sri Lankan naval vessels.



STRAIT OF BAB AL MANDAB / RED SEA

The Strait of Bab al Mandab separates the Red Sea from the Gulf of Aden. The northeast/southwest monsoon is the primary meteorological features of this region. The currents that set up are wind driven and change with the season. During the northeast monsoon, a 0.6 knot counter-clockwise current sets up in the Red Sea with a set to the northwest along the east coast and a

southeast set along the west coast. During the northeast monsoon and its transition months (December to May), **this northwest setting current, or "flood", when combined with a 10 to 15 knot westerly wind, produces a significant navigation hazard for units attempting to transit the Suez canal**. A 1.0 knot current flows from the Gulf of Aden through the Strait of Bab al Mandab into the Red Sea with an outflow into the Mediterranean Sea. During the southwest monsoon, the current changes with a southeastward wind flow throughout the Red Sea and a 0.7 knot outflow through the Strait of Bab al Mandab.



MOZAMBIQUE CHANNEL

The Mozambique Channel separates Mozambique from Madagascar and is 210 miles wide at its narrowest point. The Mozambique Current flows southwest at 1-3 knots on the west side of the channel and gains its maximum strength from October to February during the northeast monsoon. **A counter current of .5 to 1.5 knots exists along the east side of the channel. Tidal currents along the eastern side of the channel resulting from tidal changes of 8.5 to 12.5 feet can add or subtract up to 1.75 knots to these speeds producing hazardous waters off the Madagascar coast.**

Consequently, the main shipping lane lies along the western portion of the channel. Due to the effects of the northeast monsoon, 80 to 95 percent of the annual rainfall for the region falls between October and April. Located near the low latitudes, the Mozambique Current prevents large temperature variations as units transit the channel. During the winter months, frontal systems transiting southern Africa remain well to the south and have little effect on conditions in the channel.

ROGUE WAVES / CAPE ROLLERS

Ships transiting the southern and southwestern coasts of South Africa need to be aware of dangerous, abnormally high waves, which may be created within 20 miles of the continental shelf. Swell waves generated by storms in high latitudes are almost always present off the southeast coast of South Africa, generally moving in a northeast direction. These waves are sometimes augmented by other swell waves generated from a low in the vicinity of Marion Island to the southwest and by seas associated with a transiting frontal system. Occasionally the crests of these different waves will merge, building an abnormally high wave for a short period of time. When a strong northeast wind is present prior to the frontal passage for a significant period of time, the Agulhas current will see an increase in speed of 5 knots. With the wind change with frontal passage, seas will build rapidly against the stronger Agulhas current. When conditions are favorable for rogue wave formation, ships should transit as close to shore as safe navigation permits well outside the 100 fathom contour.