MAY 1980
No. 5

FISHING INFORMATION

Southwest Fisheries Center-La Jolla, California

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U.S. DEPARTMENT OF COMMERCE
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NATIONAL MARINE FISHERIES SERVICE
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MAY 1980, No. 5

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PREFACE

This publication, Fishing Information, appears monthly and contains 1) fishery advisory information, 2) a narrative description of pertinent surface temperature conditions, 3) charts of winds and pressures for the eastern North Pacific, 4) charts of sea surface temperature for the North Pacific and eastern tropical Pacific, and 5) charts of subsurface temperature structure in the eastern North Pacific.

A supplement to Fishing Information appears at 15-day intervals throughout the year. It contains a chart of sea surface temperature (contoured at $2^{o}F$ ($1^{o}C$) intervals) from Baja California to Vancouver Island out to about $135^{o}W$. Special bulletins are published in conjunction with the 15-day sea surface temperature charts which include short-term projections of albacore distribution and locations of productive fishing areas, information on oceanographic and atmospheric conditions, and other information as is appropriate during the albacore fishing season.

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CONTENTS

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J. Renner (Figures 1, 2, 3, 4, 5, 6, 7, and 15-day Supplement)

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Fisheries and Oceans Canada, West Vancouver Laboratory, British Columbia by L. F. Giovando from observations by:
  J. Redhead at Langara Island Light;
  H. Ewen at Cape St. James Light;
  R. W. Moe at Kains Island Light;
  M. V. Stewart at Amphitrite Point Light

Scripps Institution of Oceanography, La Jolla, California

Sea Surface Temperature and Environmental Conditions

Forrest R. Miller

Eastern North Pacific

In May the Aleutian low pressure center is normally located near 55°N, 165°W and the eastern Pacific high pressure system is centered near 35°N, 140°W (Figure 1). Along the east and southeast periphery of the high pressure system surface winds are usually greater than 15 knots. In this region, there is normally a moderately strong southward transport of colder water in the California Current along the U. S. west coast to the southern tip of Baja California. Extensive low cloud cover combined with strong northerly winds aid in maintaining cold coastal waters while inland areas are heated to summertime temperatures.

During May 1980 the Aleutian low center was near its normal position, but central pressures were 5 to 8 millibars below normal. The subtropical high pressure center was 10° of longitude west of its normal position with near normal central pressures. From 45°N to 50°N surface wind speeds were 3 to 5 knots higher than normal. Elsewhere, surface winds were near the normal for May (Figure 2).

The sea surface temperature (SST) pattern continued to reflect a strengthening of the north Pacific Ocean front near 40°N (Figure 3) as it did in March 1980. Strong wind mixing of surface layers during frequent storm passages from 35°N to 45°N kept SST's from 1 to 2°C below normal west of 140°W (Figure 5). The greatest concentration of isotherms and development of the ocean temperature front appeared west of 155°W between 40°N and 43°N where SST departures were more than 2°C below normal. A secondary ocean frontal feature appeared between 30°N and 35°N west of 140°W where SST's were also more than 1°C below normal. East of 140°W and in the Gulf of Alaska, SST's were closer to normal than they had been for the past 8 months. During the fall of 1979 and winter of 1980, SST's off the coast of North America were markedly above normal. By mid-April 1980, SST's began a rapid return to near-normal as the Pacific high pressure system was reestablished. This trend is expected to continue, and SST's along the U. S. west coast will probably decrease to values more than 1°C below normal south of 43°N during the next 3 months. Offshore, west of 125°W and south of 35°N, SST's may remain slightly above normal. Below normal SST's will probably prevail north of 40°N for several months. During May 1980, SST's were more than 1°C colder than in May 1979 over a large part of the eastern Pacific west of 135°W and north of 30°N (Figure 7).

Western North Pacific

During May 1980 the atmospheric circulation was similar to that in April 1980. The Aleutian low pressure system dominated the low level wind circulation over the north Pacific north of 40°N, and the western Pacific high pressure system had a great influence over the surface circulation south of 35°N. The widespread high pressure system was centered between 30°N and 35°N across the western Pacific with stronger wind mixing at the ocean surface around 40°N and along 25°N. Along these latitude bands SST's were more than 1°C below normal (Figure 6). To the east of northern Japan the area covered by positive SST departures was probably associated with a strong Kuroshio Current transporting relatively warm water to the northeast. East of 155°E SST's were more than 1°C below

normal over a large area from 35°N to 45°N where weather fronts and associated strong surface winds maintained deep ocean mixing. Off the east coast of northern Japan the north Pacific Ocean front appeared to be split into two major bands west of 155°E and converged into a single weaker frontal zone between 40°N and 43°N (Figure 4). Another marked ocean frontal boundary has been evident between Formosa and southern Japan for the past 3 months, probably due to the relatively warm water south of 30°N which was transported northward in the Sushima Current (east of China and Korea), and the influence of cold weather outbreaks across the yellow sea.

Eastern Tropical Pacific

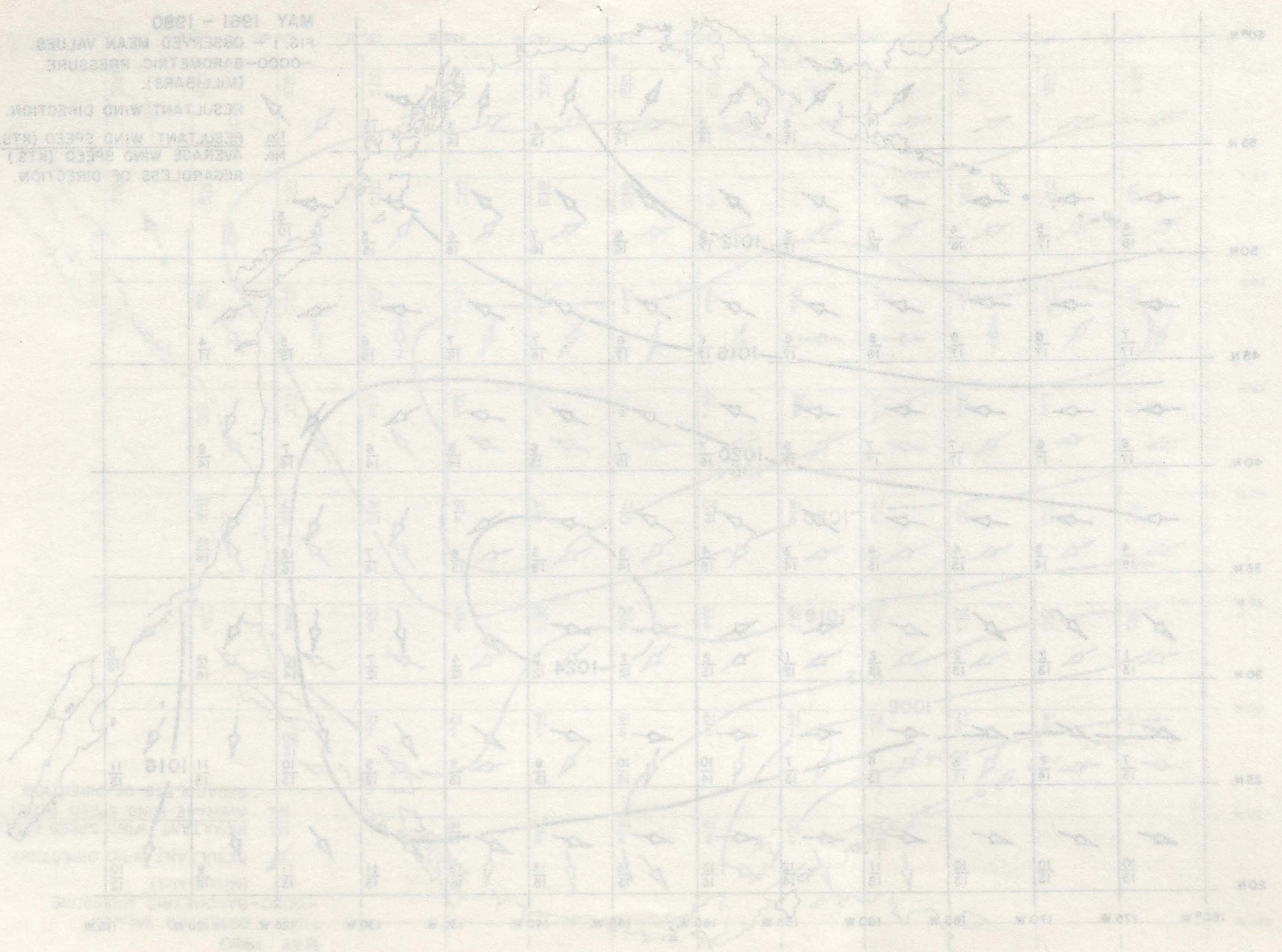
During May, SST's normally increase in the northern hemispheres with the largest monthly increase of 1 to 2°C occurring in the Gulfs of California and Panama and along the coast of Mexico from 15°N to 25°N. In the southern hemisphere, seasonal cooling takes place with SST's decreasing as much as 2 to 3°C in the surface layers of the Peru Current. Along the equator, cooling also takes place from the coast of Ecuador out to 110°W.

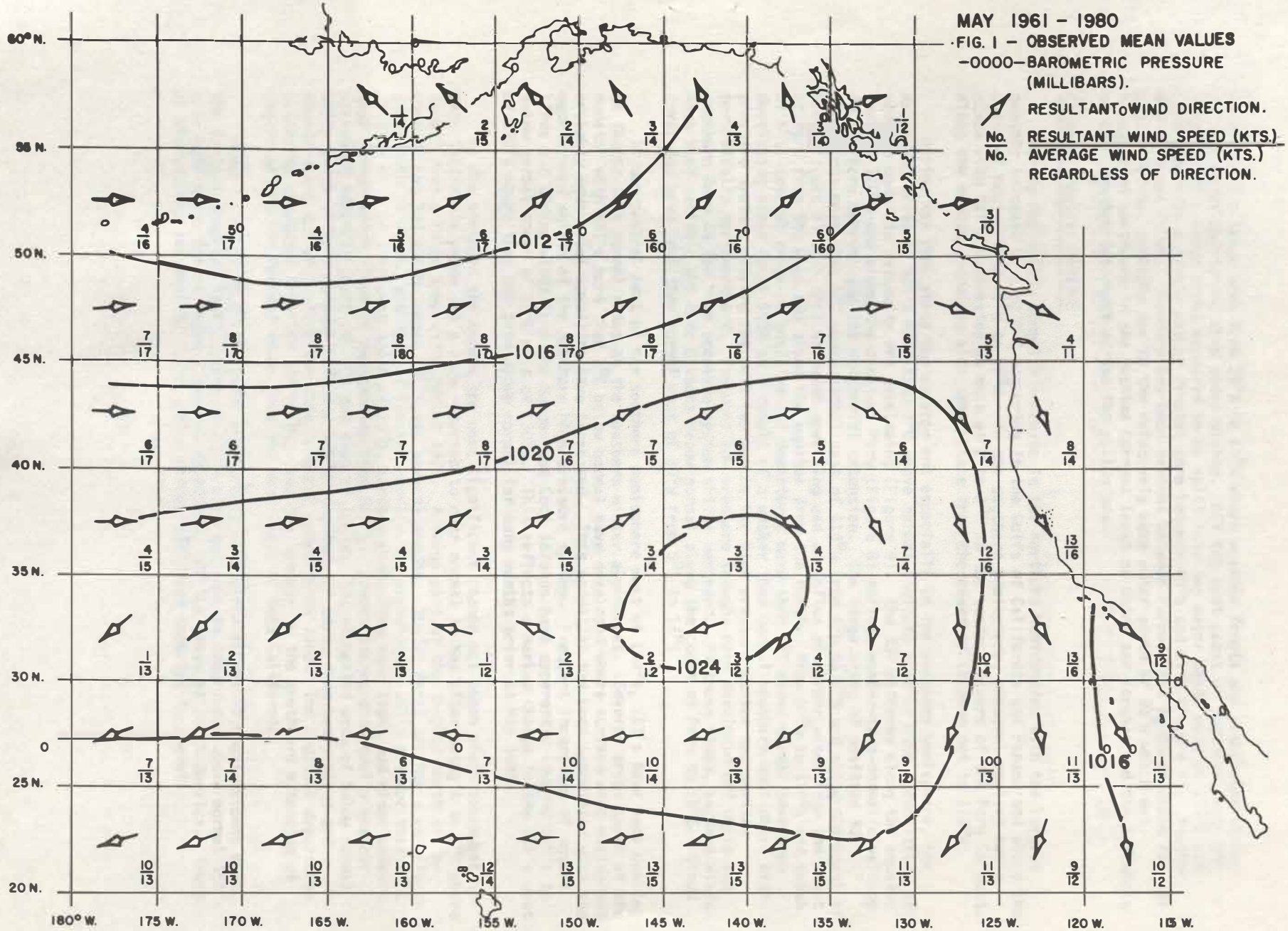
During May 1980 along the equator and especially in the southern hemisphere, the expanding areas of SST's more than 1°C above normal indicate that El Niño conditions of weak to moderate intensity are developing (Figure 9). The SST patterns along the equator east of 120°W and along the coast of Peru (Figure 8) reflect weaker-than-normal upwelling in the Peru Current and its equatorial extension. The large areas of positive SST departures more than 1°C above normal east of 110°W from 5°N to 2°S and along the coast of Peru (Figure 9) also indicate weak upwelling and an influx of warmer water into the coast of Peru from the west and along the equator from the north. From 80°W to 110°W and south of 5°S, several areas of positive SST departures more than 1°C above normal have been developing since April 1980 as a result of a weaker than normal southern hemisphere high pressure system. During the past two months the high pressure center has shifted periodically northwestward. Frequent low pressure troughs have developed off Chile and southern Peru as the high pressure system shifts westward. At these times, surface winds have been variable and 2 to 6 knots below normal along the coast of Peru to 10°S. Cloud cover has been less than normal east of 80°W from 5°S to 15°S.

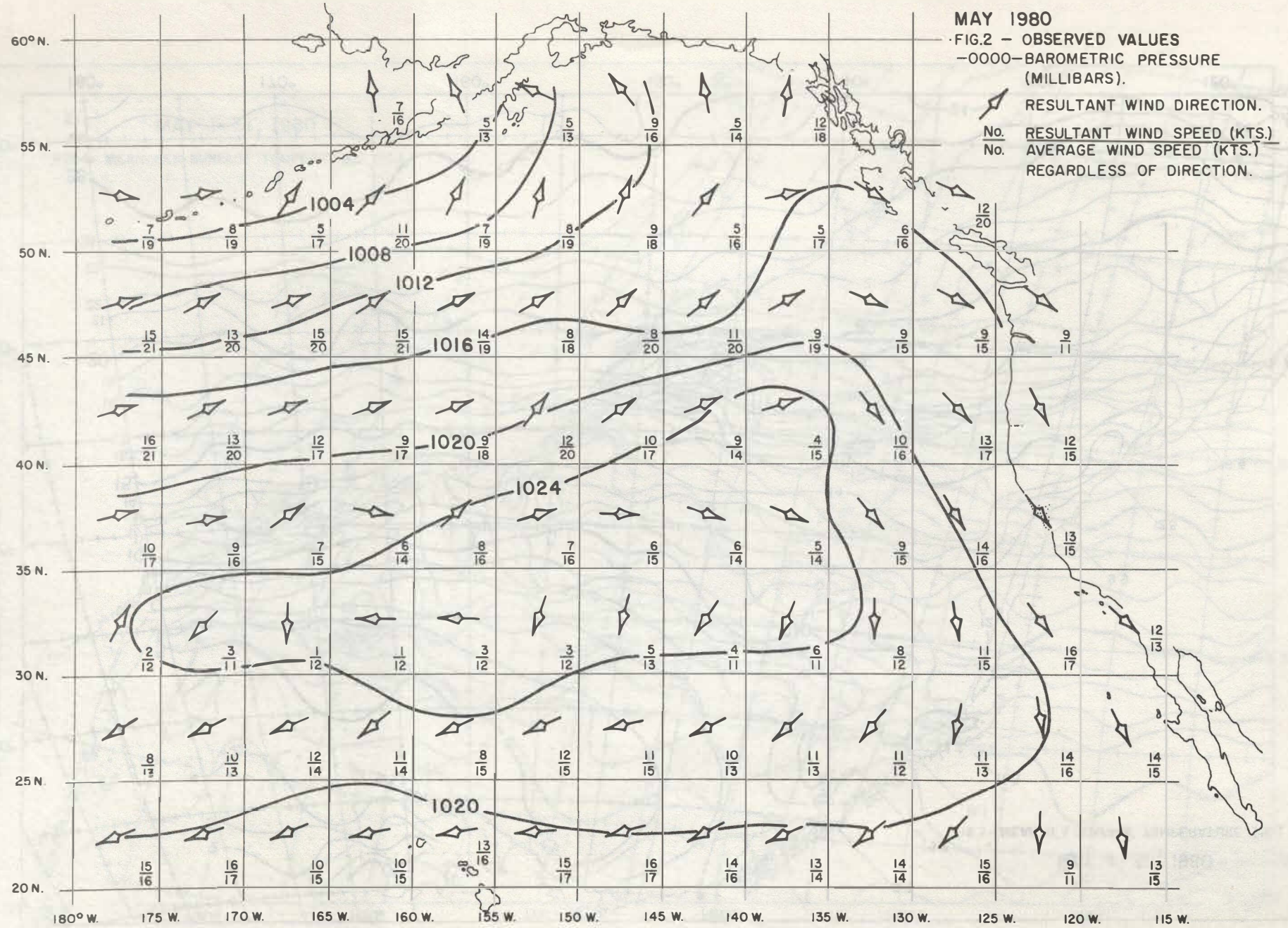
In the central part of the southern hemisphere west of 130°W, SST's have been cooling at faster than normal rates as the southern winter approaches. Several areas south of the equator with SST's more than 1°C below normal have developed where surface wind mixing and probably equatorial upwelling have increased. This condition has been associated with the equatorward shifts of the southern high pressure system. Frequent incursions of squall lines and strong winds into the Samoan and Cook Islands have apparently lowered SST's to below normal south of 15°S west of 130°W. This reflects a marked change in the SST's west of 130°W where they had been above normal for many months prior to May 1980.

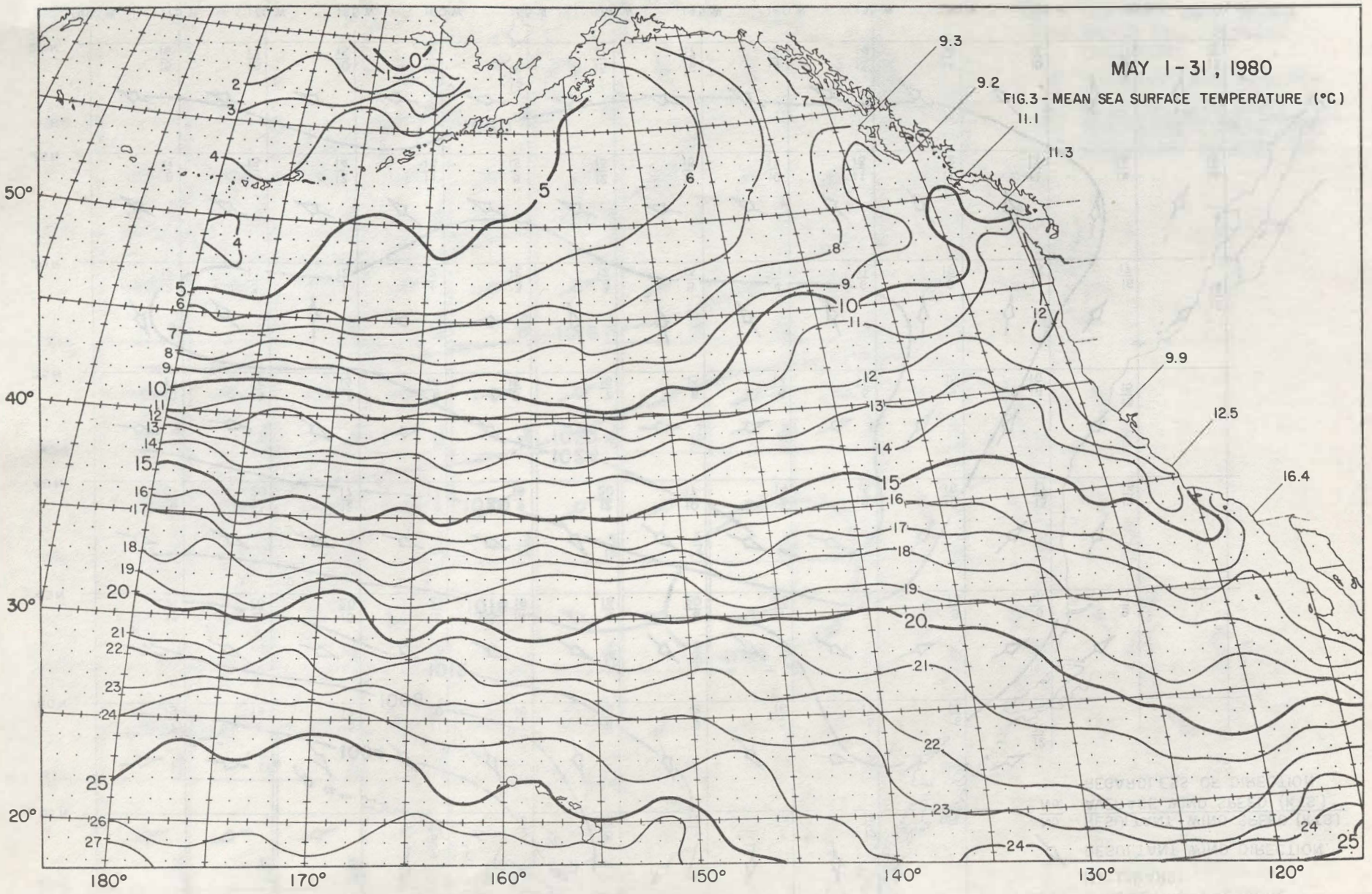
In the northern hemisphere the most significant change has taken place southwest of Baja California where SST's have returned to near normal in May after being 1 to 2°C above normal over a large area since August 1979. A large part of the tropics north of the equator has had above normal SST's for several months. During April and May a very large area south of Mexico and west of Central America has experienced SST's greater than 29°C (Figure 8). In this area north of 10°N, surface winds have been light and cloud cover near normal which aided in maintaining high SST's. Thunderstorms and squally weather increased markedly south of 10°N and east of 100°W. The elongated area of below normal SST's south of 10°N between 80°W and 100°W resulted, in part, from heavy cloud and thunderstorm activity along the intertropical convergence zone. The negative departures extending southeast from the tip of Baja was due largely to the southward extension of cooler California Current water from the west coast of Baja California.

Based on existing SST patterns and surface wind circulations it seems evident that the eastern tropical Pacific east of 120°W will continue to experience above normal SST's over most areas for at least 3 months, especially off the coast of South America. South of the equator and west of 120°W, below normal SST's are expected to prevail.



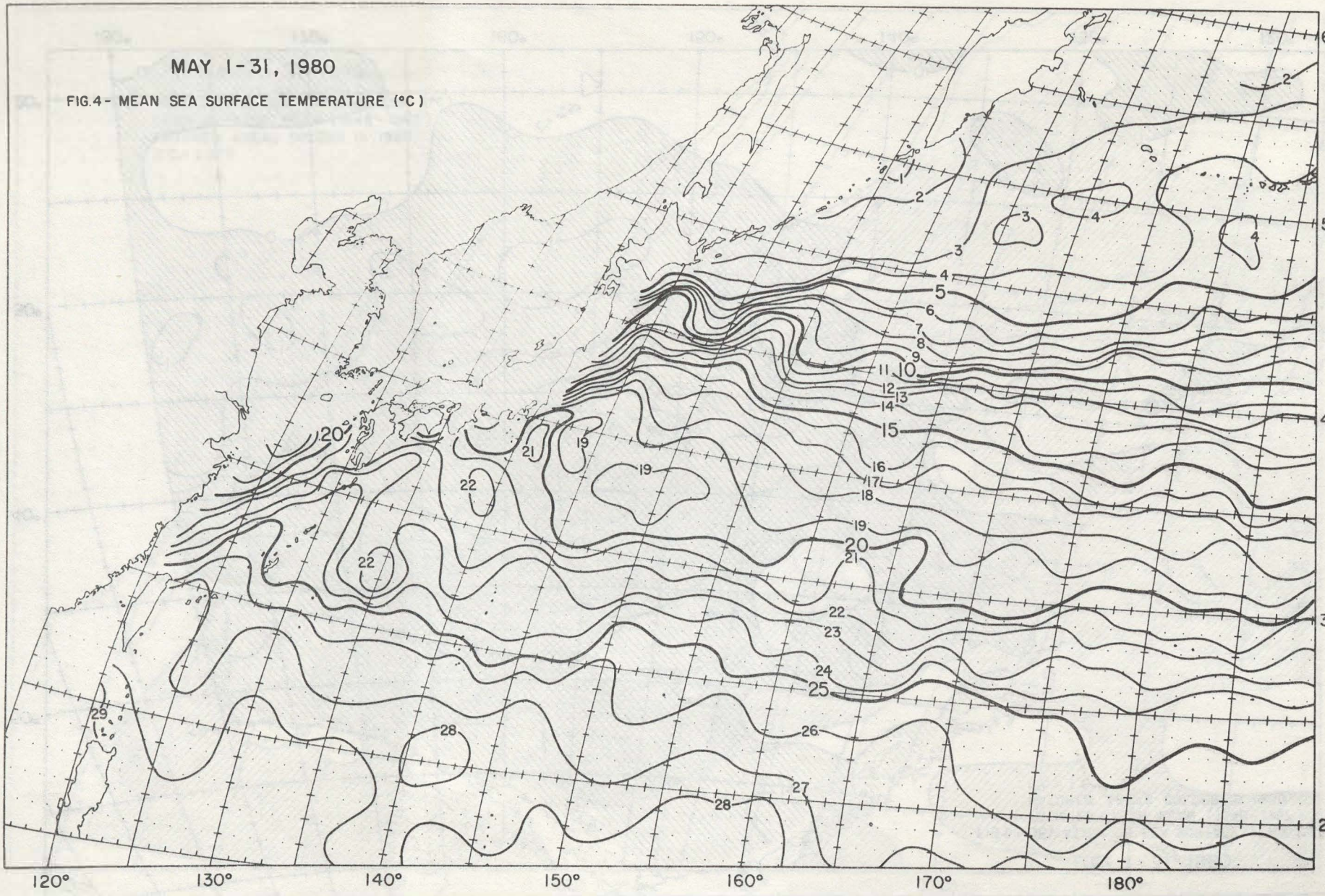

MAY 1961 - 1980
FIG. 1 - OBSERVED MEAN VALUES
-0000- BAROMETRIC PRESSURE (MILLIBARS).
RESULTANT WIND DIRECTION.
No. / No. RESULTANT WIND SPEED (KTS.) / AVERAGE WIND SPEED (KTS.) REGARDLESS OF DIRECTION.
1012
1016
1020
1024
1016
60° N.
55 N.
50 N.
45 N.
40 N.
35 N.
30 N.
25 N.
20 N.
180° W.
175 W.
170 W.
165 W.
160 W.
155 W.
150 W.
145 W.
140 W.
135 W.
130 W.
125 W.
120 W.
115 W.

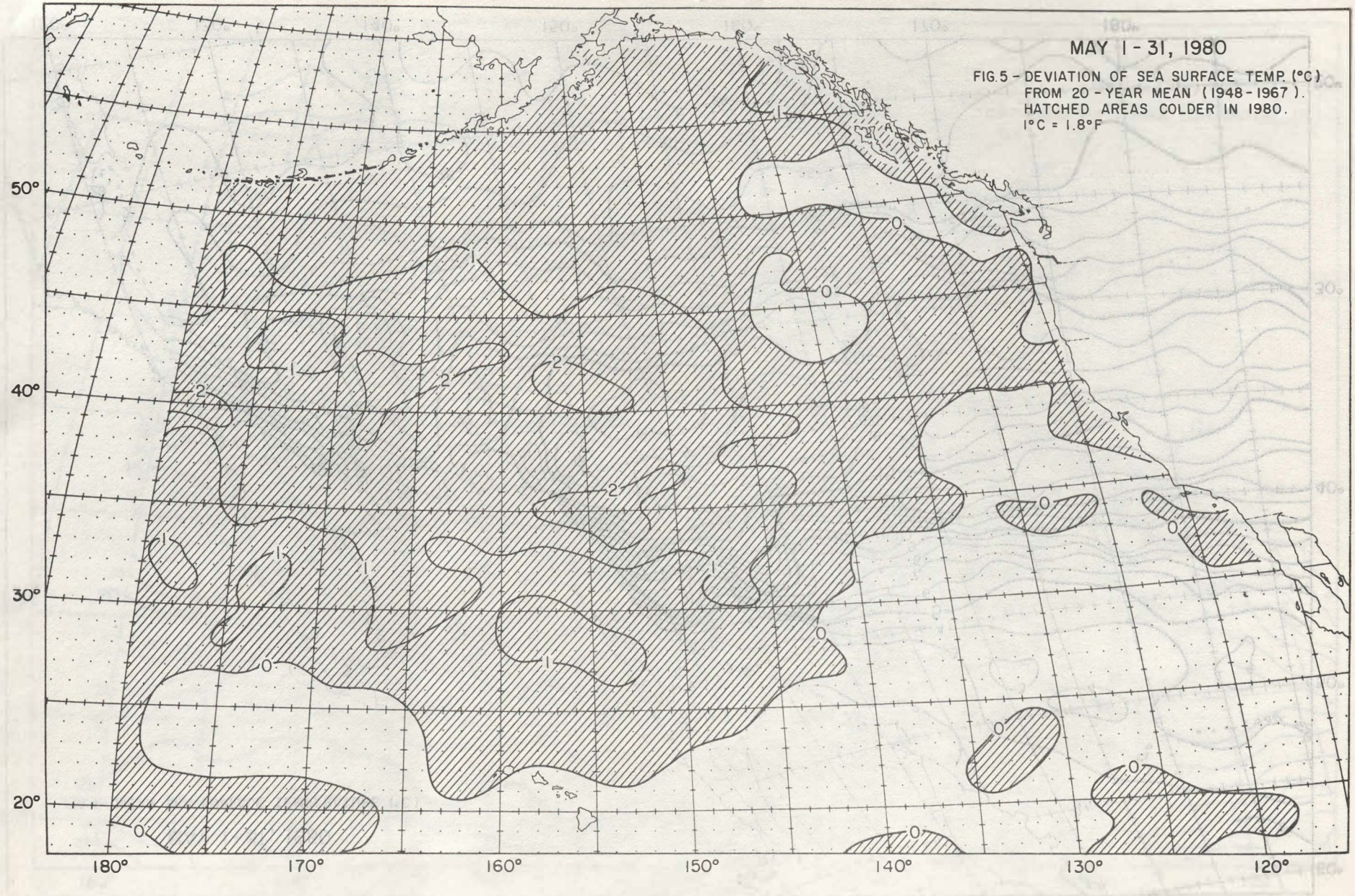

MAY 1980
FIG.2 – OBSERVED VALUES
–0000– BAROMETRIC PRESSURE (MILLIBARS).
RESULTANT WIND DIRECTION.
No. RESULTANT WIND SPEED (KTS.)
No. AVERAGE WIND SPEED (KTS.) REGARDLESS OF DIRECTION.
1004
1008
1012
1016
1020
1024
1020
60° N.
55 N.
50 N.
45 N.
40 N.
35 N.
30 N.
25 N.
20 N.
180° W.
175 W.
170 W.
165 W.
160 W.
155 W.
150 W.
145 W.
140 W.
135 W.
130 W.
125 W.
120 W.
115 W.

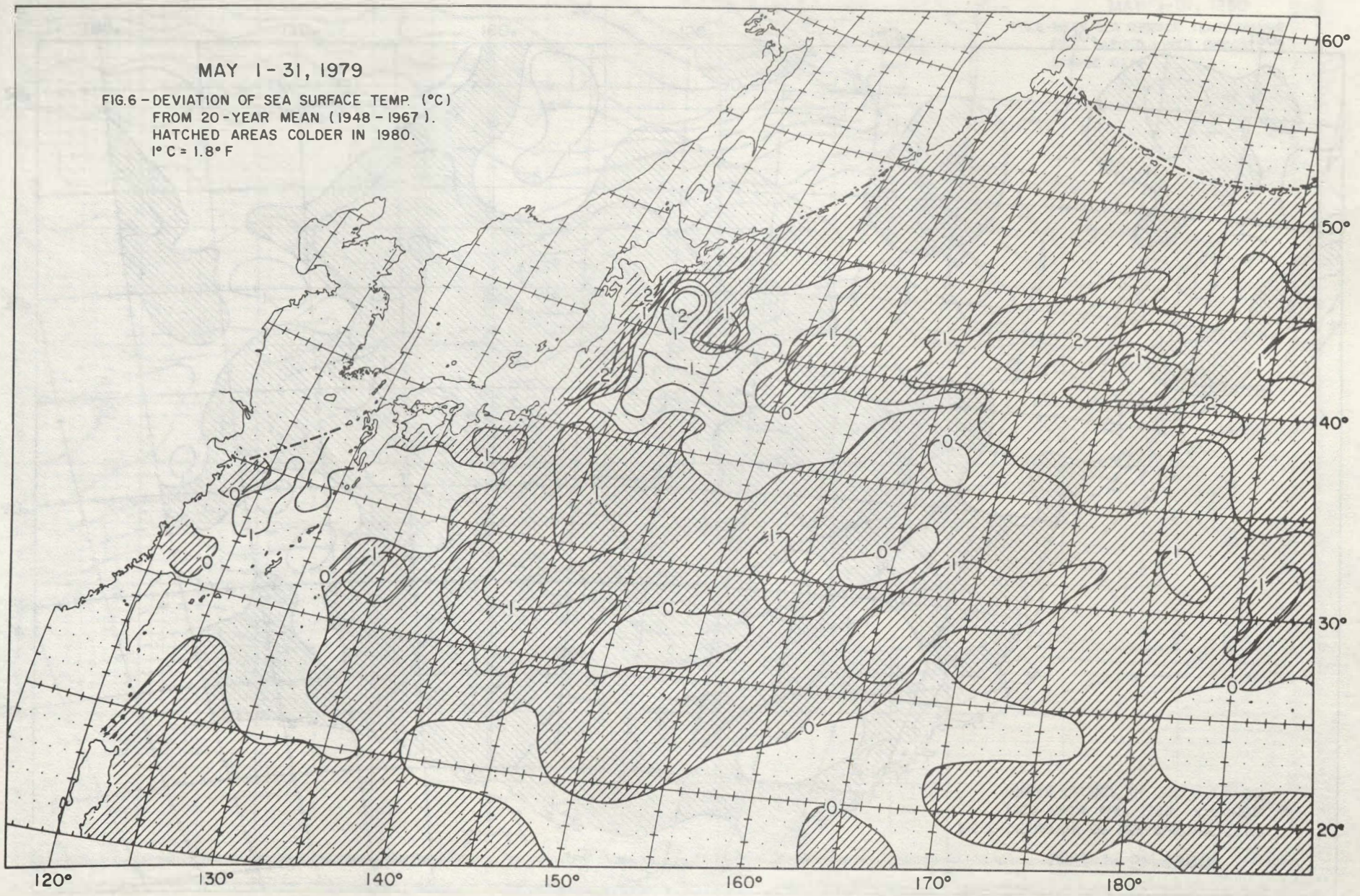

MAY 1-31, 1980
FIG.3 - MEAN SEA SURFACE TEMPERATURE (°C)
9.3
9.2
11.1
11.3
9.9
12.5
16.4
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°

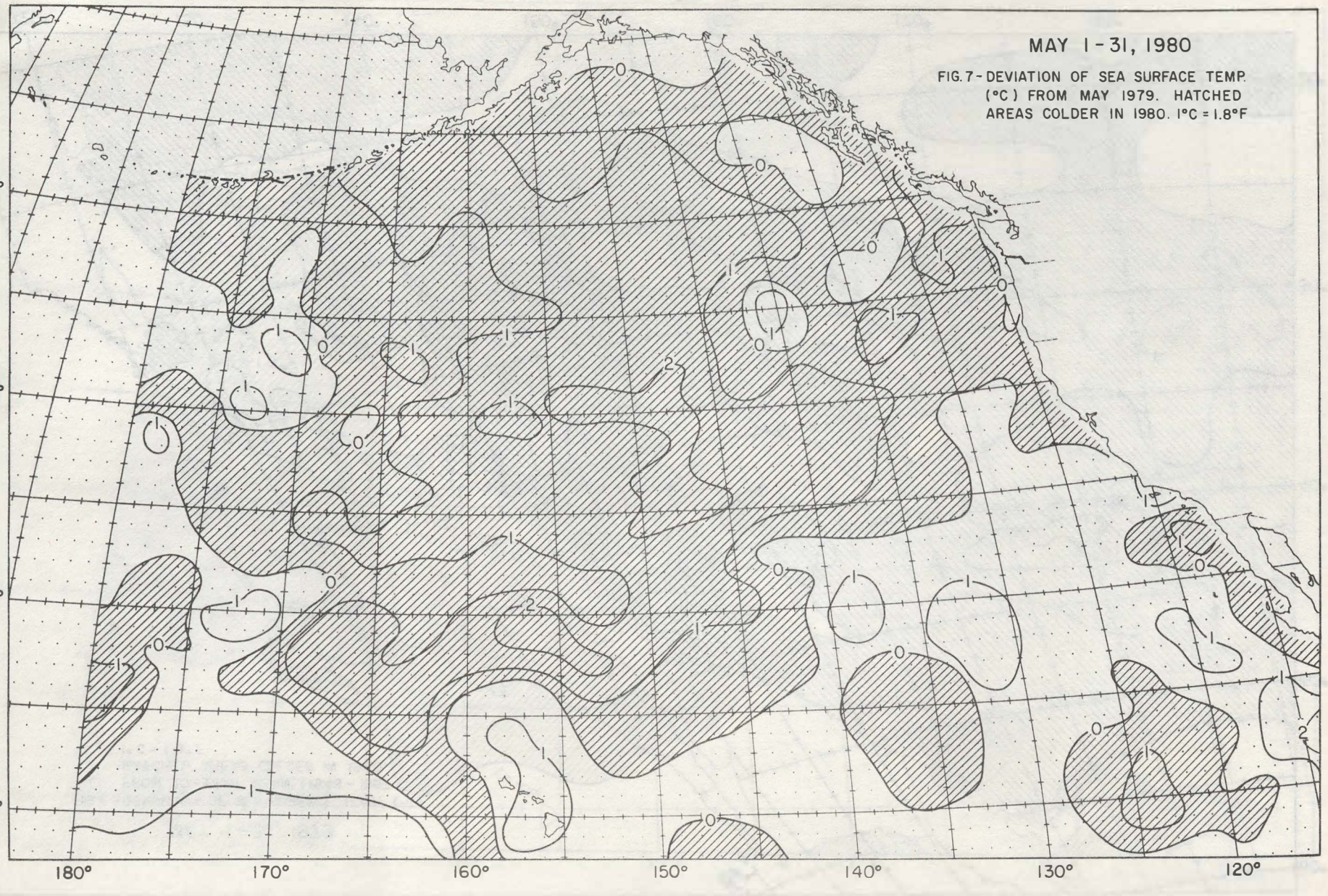
MAY 1-31, 1980

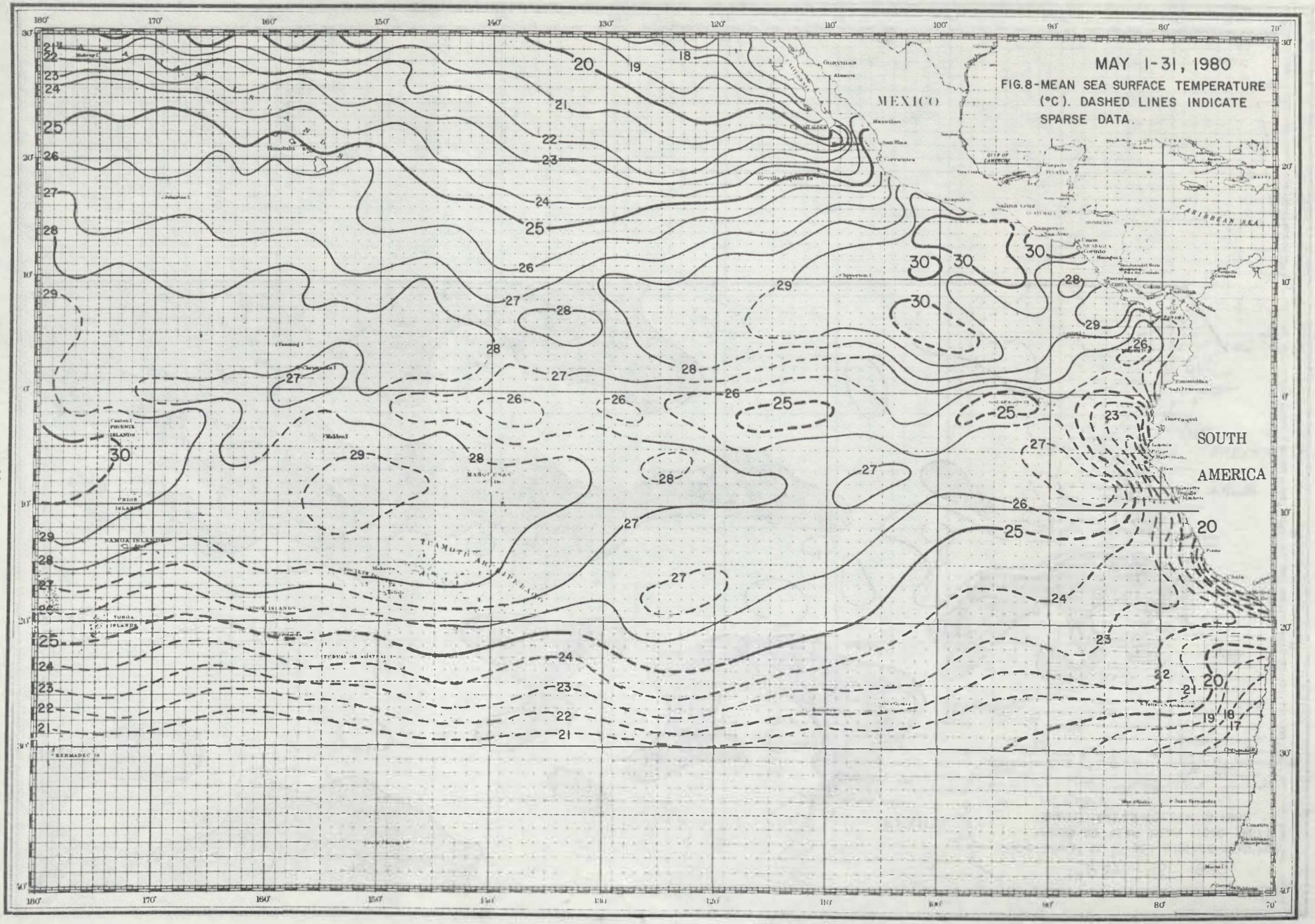
FIG.4- MEAN SEA SURFACE TEMPERATURE (°C)

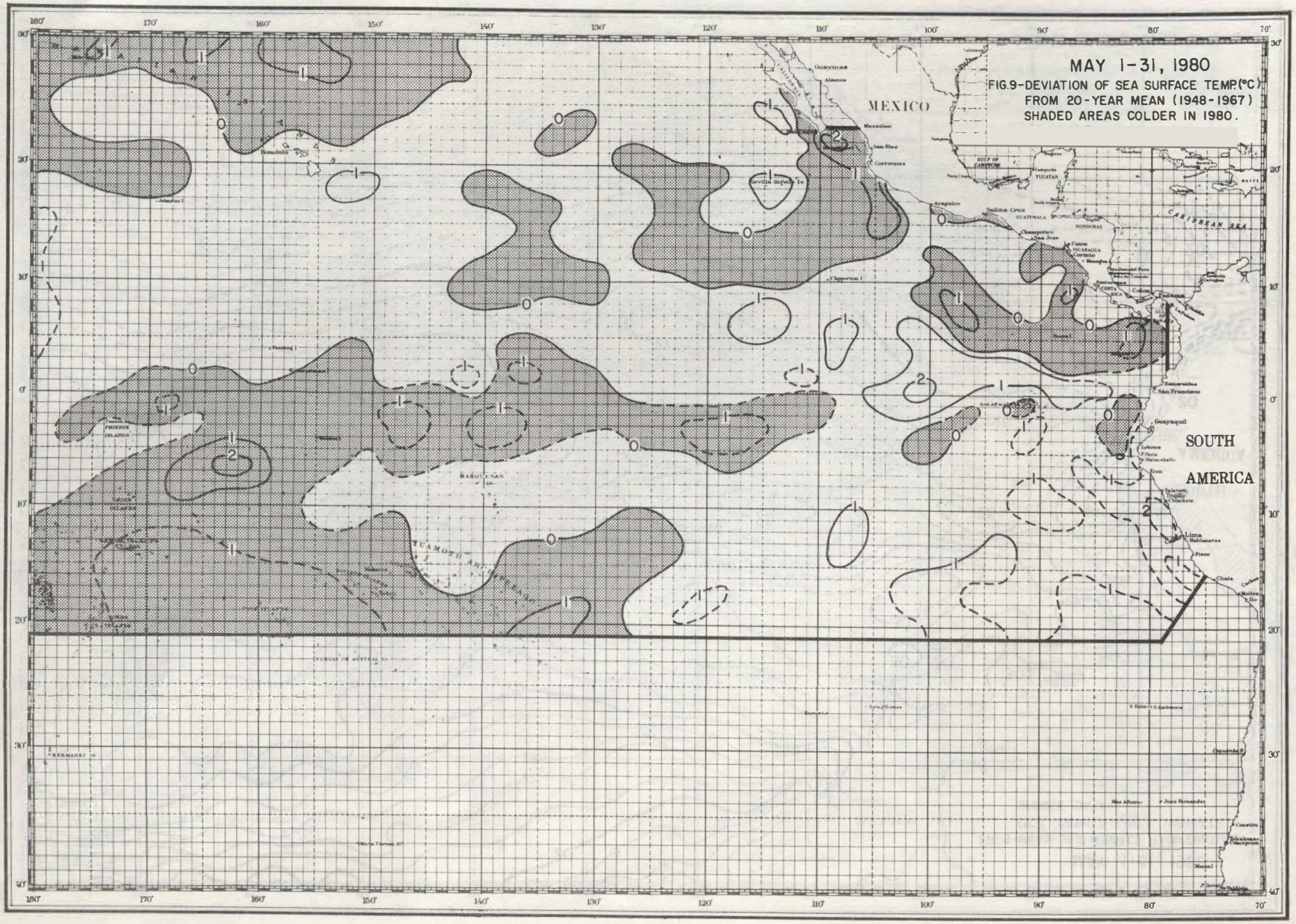



MAY 1 - 31, 1980
FIG. 5 - DEVIATION OF SEA SURFACE TEMP. (°C) FROM 20 - YEAR MEAN (1948 - 1967). HATCHED AREAS COLDER IN 1980.
1°C = 1.8°F
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°


MAY 1 - 31, 1979
FIG.6 - DEVIATION OF SEA SURFACE TEMP. (°C) FROM 20-YEAR MEAN (1948 - 1967). HATCHED AREAS COLDER IN 1980.
1° C = 1.8° F
60°
50°
40°
30°
20°
120°
130°
140°
150°
160°
170°
180°


MAY 1 - 31, 1980
FIG. 7 - DEVIATION OF SEA SURFACE TEMP. (°C) FROM MAY 1979. HATCHED AREAS COLDER IN 1980. 1°C = 1.8°F
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°


MAY 1-31, 1980
FIG.8-MEAN SEA SURFACE TEMPERATURE (°C). DASHED LINES INDICATE SPARSE DATA.
MEXICO
SOUTH AMERICA
CARIBBEAN SEA
GULF OF CALIFORNIA
PHOENIX ISLANDS
SAMOA ISLANDS
TUAMOTU ARCHIPELAGO
TUBUAI IS (AUSTRAL IS)
KERMADEC IS
GALAPAGOS IS
MARQUESAS IS
180° 170° 160° 150° 140° 130° 120° 110° 100° 90° 80° 70°
30° 20° 10° 0° 10° 20° 30° 40°


MAY 1-31, 1980
FIG.9-DEVIATION OF SEA SURFACE TEMP.(°C)
FROM 20-YEAR MEAN (1948-1967)
SHADED AREAS COLDER IN 1980.
MEXICO
SOUTH
AMERICA
CARIBBEAN SEA
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
70°
30°
20°
10°
0°
10°
20°
30°
40°