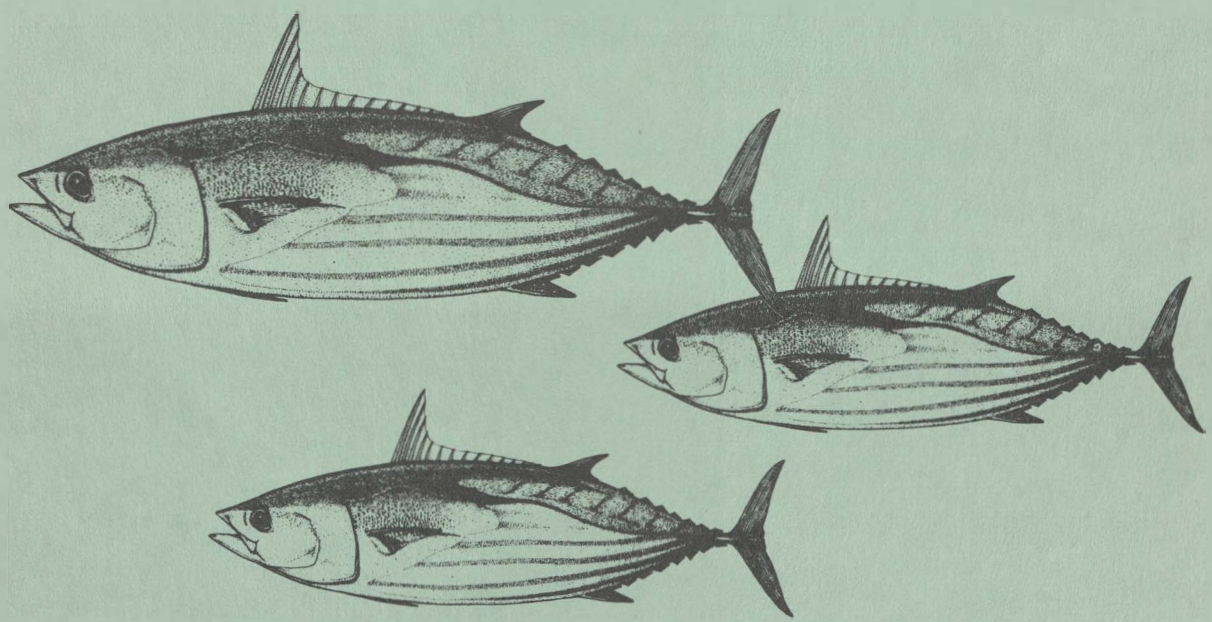
SEPTEMBER 1976
No. 9

FISHING INFORMATION

Southwest Fisheries Center-La Jolla, California



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U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
SOUTHWEST FISHERIES CENTER
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FISHING INFORMATION

SEPTEMBER 1976 , No. 9

EDITOR: JAMES A. RENNER

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. This is a chart of sea surface temperature (contoured at 2°F (1°C) intervals) from Baja California to Vancouver Island out to about 135°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.

The secretary of Commerce has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Department.

Submitted for publication - November 1, 1976

CONTENTS

ENVIRONMENTAL CHARTS ANALYZED BY:

F. Miller (Figures 8 and 9)
J. Renner (Figures 1, 2, 3, 4, 5, 6, 7, 10, 11, 12 and 15 day Supplement)

TECHNICAL EDITOR:
R. Allen
CARTOGRAPHY:
R. Allen, H. Orr

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National Environmental Satellite Service, Washington, D.C.
National Marine Fisheries Service, La Jolla, California; Honolulu, Hawaii
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National Weather Service, San Diego, California and Washington, D.C.
Fisheries Research Board of Canada, Pacific Environmental Institute, West Vancouver, British Columbia by L.F. Giovando from observations by
L. Sabourin at Langara Island Light; G. Anderson at Cape St. James Light;
L. Collins at Kains Island Lightstation; I.G. McNeil at Amphitrite Point Light
Scripps Institution of Oceanography, La Jolla, California
Fishing Vessels, *Aquarius, Caribe, Carol Virginia, Diana C., Frances Ann, Gina Karen, Maria C.J., Maria Elena, Marietta, Mary Barbara, Mermaid, Polaris, Raffaello, Rosa Olivia, Saratoga, Santa Elena, Santa Rosa, Seaquest, Venturous*

Expendable bathythermograph and salinity observations are made by the mates and engineers of the *California, Hawaiian Enterprise,* and *Hawaiian Queen* of the Matson Navigation Co. The data are processed under supervision of D.R. McLain at the NMFS Pacific Environmental Group, using computer facilities of the Fleet Numerical Weather Central, Monterey. The project is partially supported by tne National Science Foundation and the Office of Naval Research.

Sea Surface Temperature and Environmental Conditions

N. CLARK AND F. MILLER

Eastern North Pacific

Sea surface temperature changes between August and September are usually small in the eastern North Pacific as seasonal cooling begins. During September 1976 temperatures decreased by 1 to 3° F (0.6 to 1.7°C) over most of the Gulf of Alaska and along the west coast of North America from eastern Alaska south to the Channel Islands off southern California. Small temperature increases occurred over a large area between Baja California and Hawaii.

The greatest change in the sea surface temperature anomaly pattern occurred in an area southwest of Baja California between 20° N and 30° N where temperatures that were 1 to 3° F (0.6 to 1.7° C) below normal in August increased to 1 to 3° F (0.6 to 1.7° C) above normal values. The large area of 3 to 5° F (1.7 to 2.8° C) below-normal temperatures in the central and northern regions of the eastern North Pacific increased in size and intensity during September and now covers most of the ocean north of 33° N.

Temperatures along the U.S. west coast are 1 to 2° F (0.6 to 1.1° C) below normal except for small areas of slightly above-normal temperatures off northern Oregon, northern California, and around the Channel Islands.

Sea level pressures averaged up to 8 millibars below normal over much of the eastern North Pacific during September, resulting in a fairly strong Aleutian low pressure system and a weakened North Pacific high pressure cell. Strong northwesterly winds on the western side of the Aleutian low caused sea surface temperatures to decrease at above-normal rates over the western Gulf of Alaska.

Western North Pacific

The greatest change in the sea surface temperature anomaly pattern during September 1976 occurred east of Honshu and Hokkaido where temperatures that were 2 to 4° F (1.1 to 2.2° C) below normal, increased to 1 to 2° F (0.6 to 1.1° C) above-normal values. Above-normal warming also occurred between 20° N and 30° N and 125° E and 140° E where slightly above-normal temperatures increased to 1 to 3° F (0.6 to 1.7° C) above-normal values.

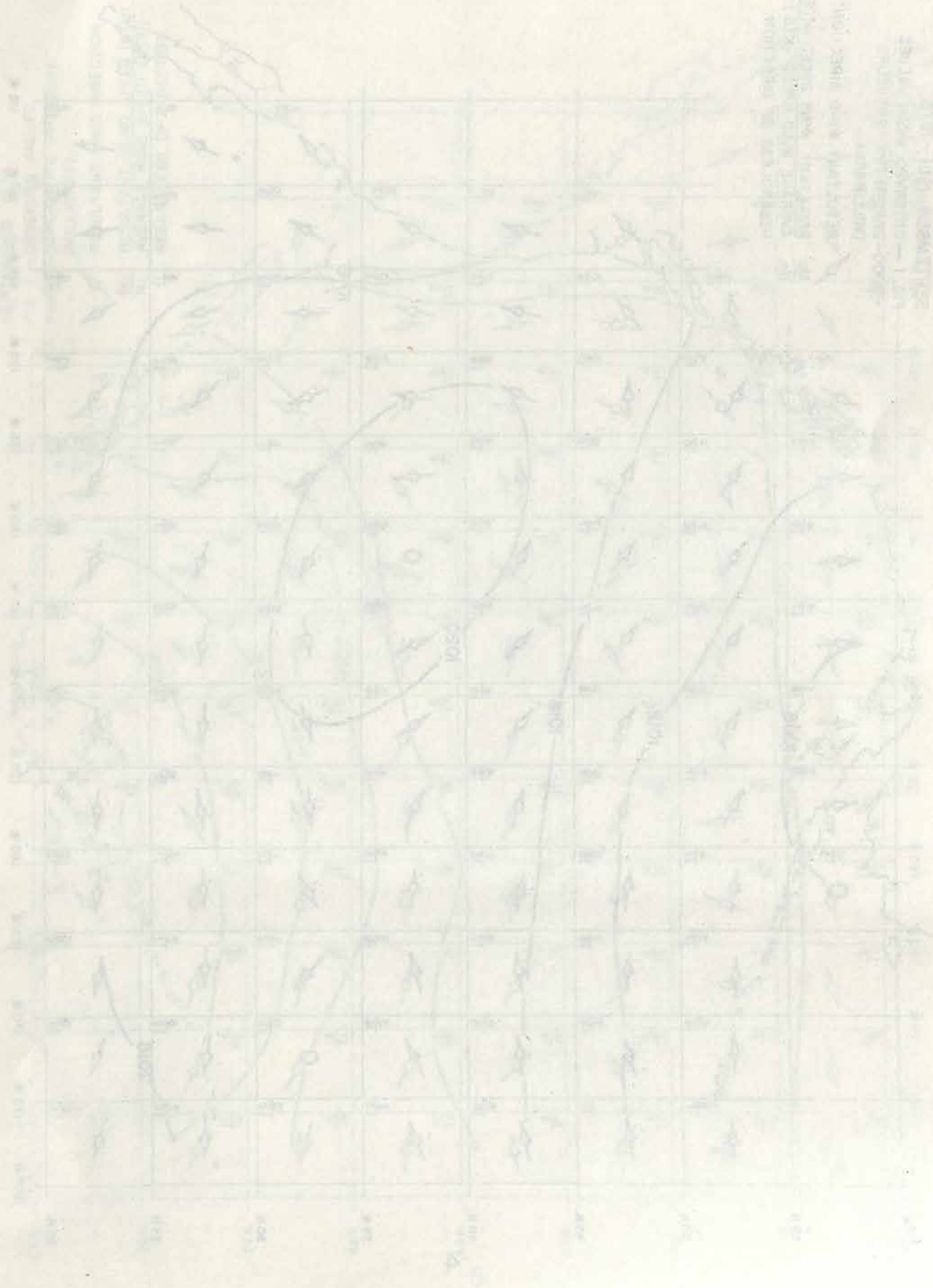
The large area of 3 to 5° F (1.7 to 2.8° C) below-normal temperatures in the central western North Pacific decreased in size and intensity during the month.

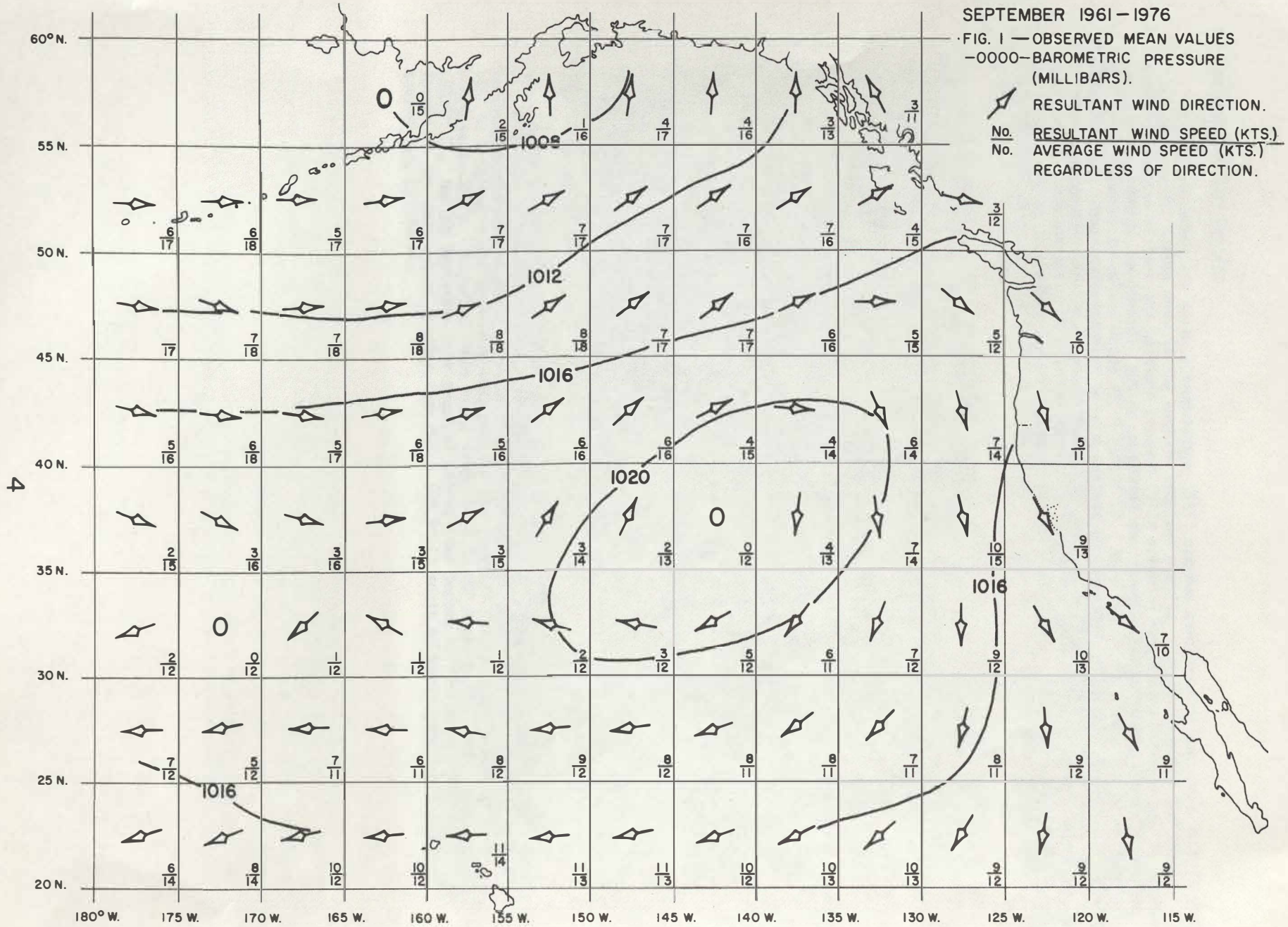
Eastern Tropical Pacific

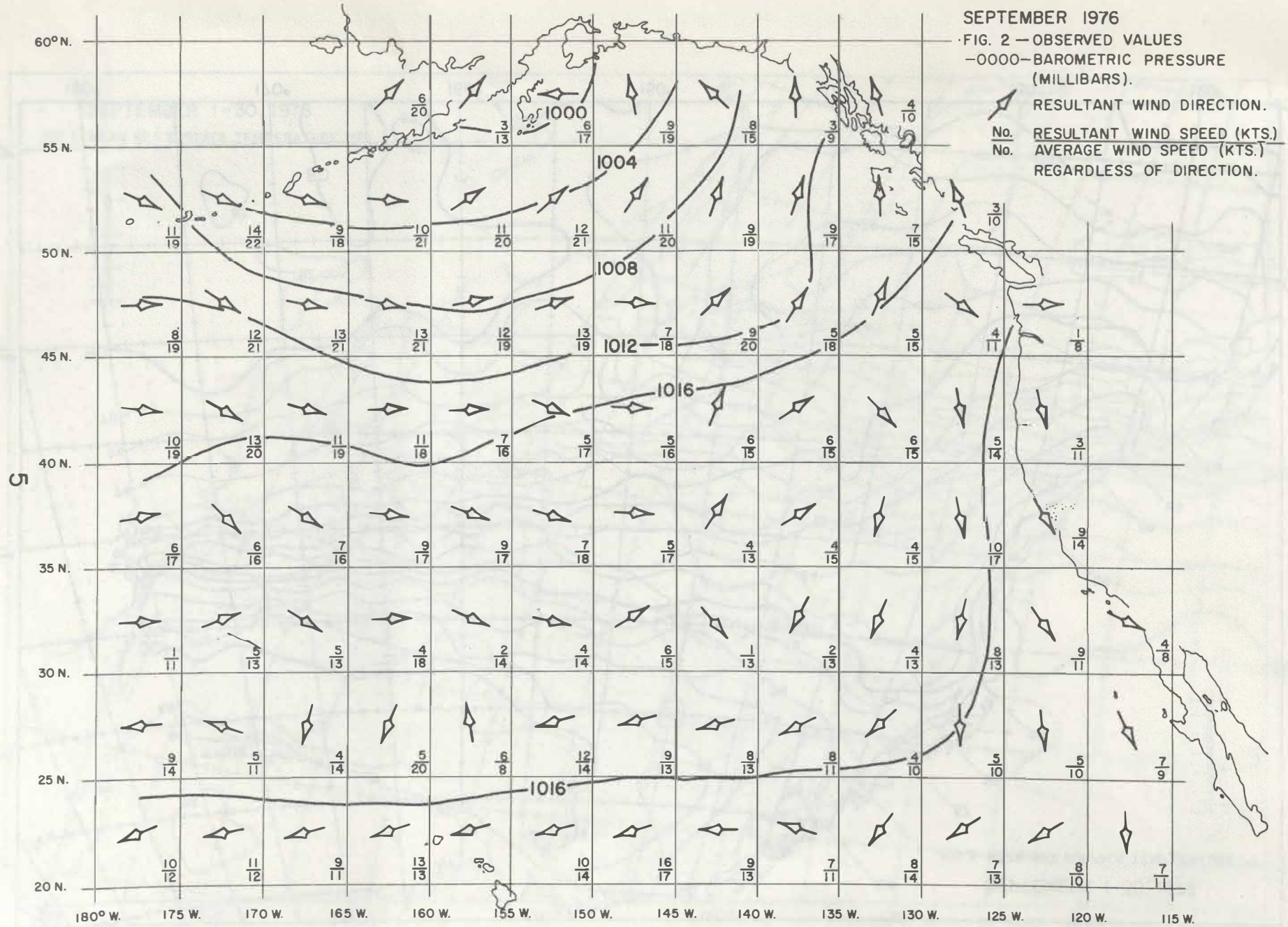
During September sea surface temperature (SST) changes are normally less than 1° F (0.6° C) from 30° N to 30° S over most of the eastern tropical Pacific. In the southern hemisphere along the coasts of Peru and southern Ecuador SST's normally reach seasonal minimums in September and October. Along the equator, active upwelling over several summer months normally reduces SST's in September to values below 70° F (21.1° C). As a result the equatorial ocean frontal (north-south) temperature gradient is at a maximum in September, especially between the Galapagos Islands and Ecuador. In the northern hemisphere seasonal warming normally continues, but in some areas along the paths of tropical storms SST's are decreased to below normal values due to heavy wind mixing in surface layers and above normal cloud cover. Adjacent to the storm's paths, light surface winds and fairly clear skies prevail resulting in above normal monthly mean SST's of 2° F (1.1° C) or more.

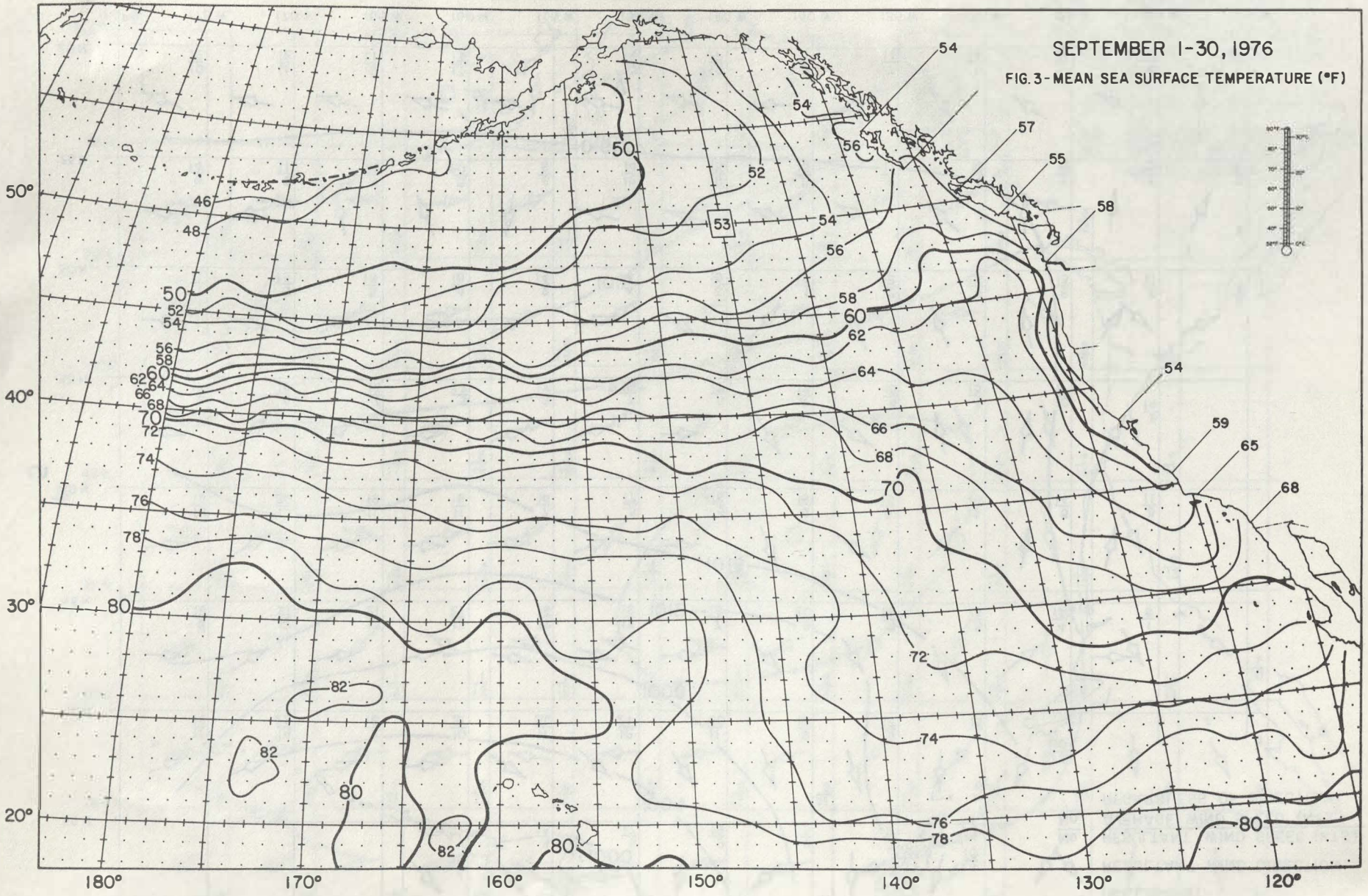
In September 1976 most of the usual seasonal SST changes took place with slight cooling south of 5° N and some warming along the west coasts of Mexico north of 20° N and Baja California. However, because of the wide-spread above normal SST's in the equatorial region east of 120° W and along the coast of South America during the past 4 months the SST patterns (Figure 8) in September resembled the patterns in the warm (El Niño) years of 1972 and 1965. The areas covered by positive SST anomalies greater than 2° F (1.1° C) were greater in September 1976 than in August 1976 (Figure 9). In the southern hemisphere to 30° S SST's were above normal in all areas except along the south coast of Peru and in the central Pacific between 150° W and 170° W. In the southeast Pacific the low level atmospheric circulation returned to normal from mid-August to mid-September and reestablished the high pressure area and the southeast trade winds along the coast of Peru and Ecuador. However, during the last half of September a succession of low pressure centers and weather fronts moved across the southeast Pacific at lower latitudes than normal, and once again disrupted the normal ocean atmosphere circulations along the coast of South American from the equator to about 15° S. These events were associated with the positive SST anomalies greater than 4° F (2.2° C) in September near the coast of Peru from 6° S to 12° S. Along the equator between 90° W and 120° W the positive SST anomalies (Figure 9) decreased 2 to 3° F (1.1 to 1.6° C) in some areas from August to September 1976. Because such an extensive area, especially south of the equator, has had above normal SST's throughout the southern winter season, it is not expected that SST's will return to or become colder than normal along the equator and the coast of South America until early in 1977. The normal seasonal warming and the continuing weak southern hemisphere circulation east of 120° W may result in even greater warming by November or December 1976 and may result in El Niño conditions to 15° S.

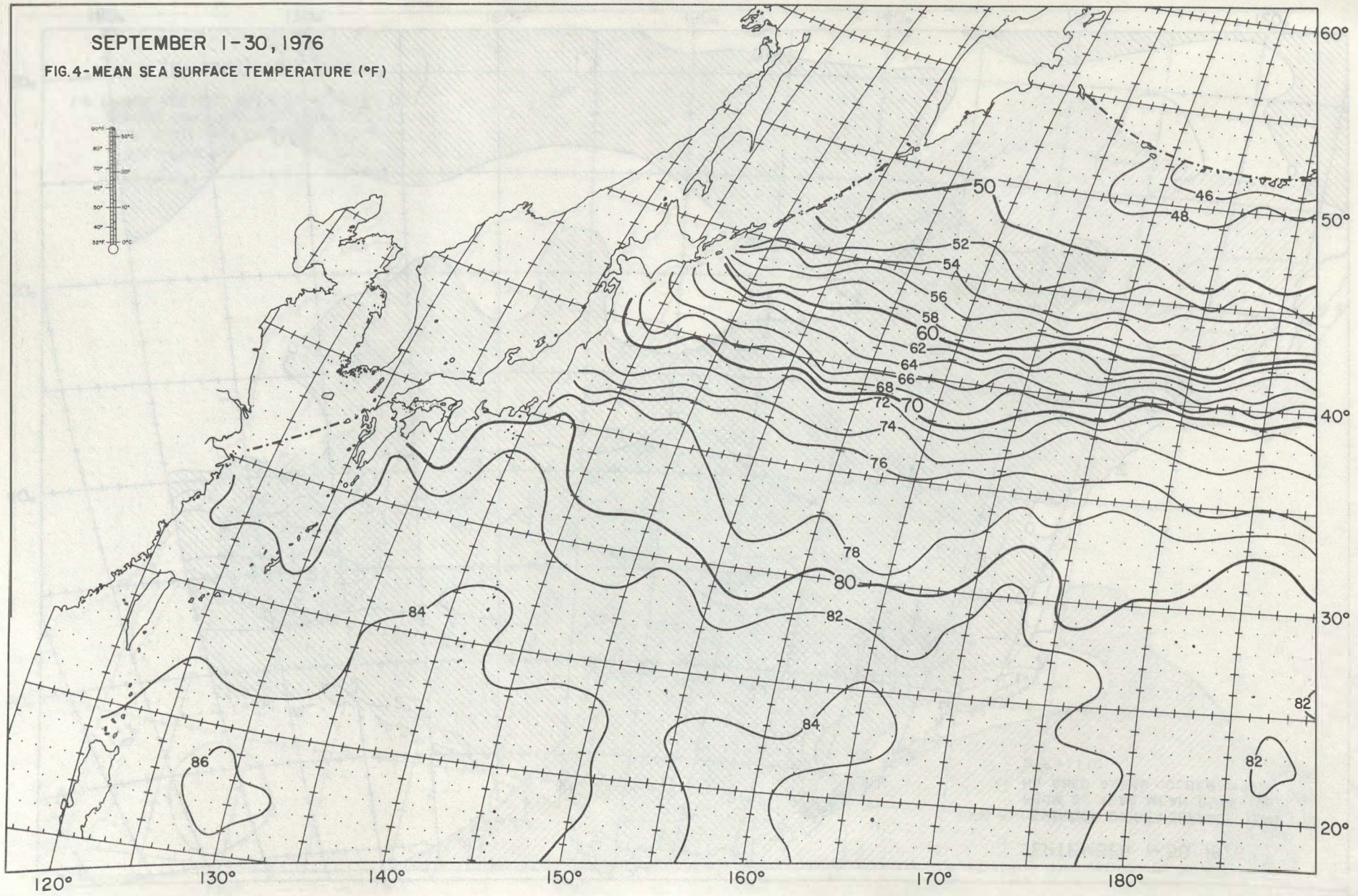
In the northern hemisphere (Figure 9) the alternating patterns of positive and negative SST anomalies from 5° N to 25° N resulted from tropical storm development and their movement northwestward with the associated strong winds around the storm systems. The areas east of 140° W, which were not under the influence of the tropical storms, experienced an above normal increase in SST's. Figure 8 shows areas from 10° N to 20° N where SST's were greater than 84° F (28.9° C). During September four tropical storms (two became hurricanes Kathleen and Liza) formed in the warm waters greater than 84° F (28.9° C) south of Mexico and moved northwest toward Baja California.

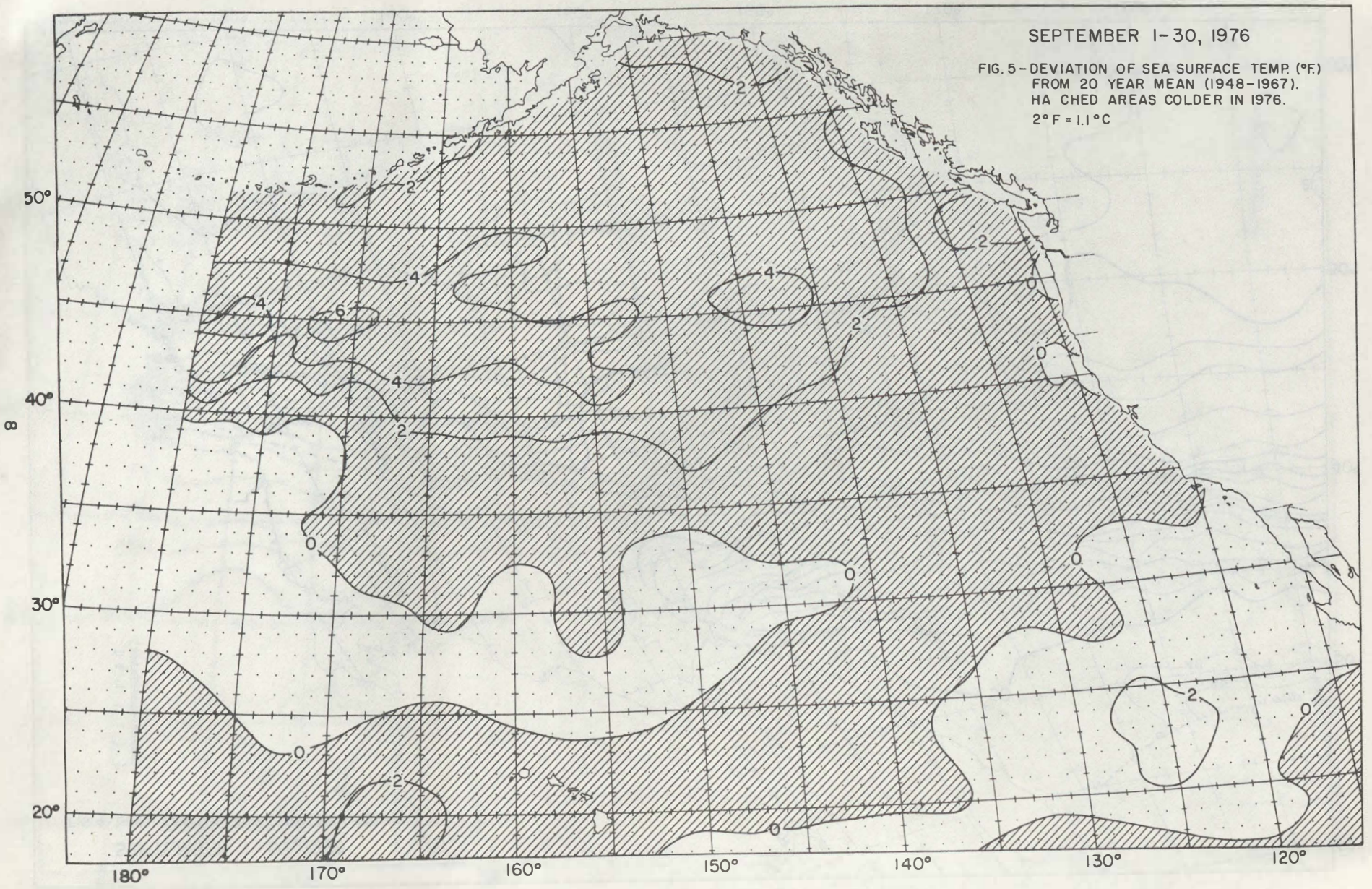


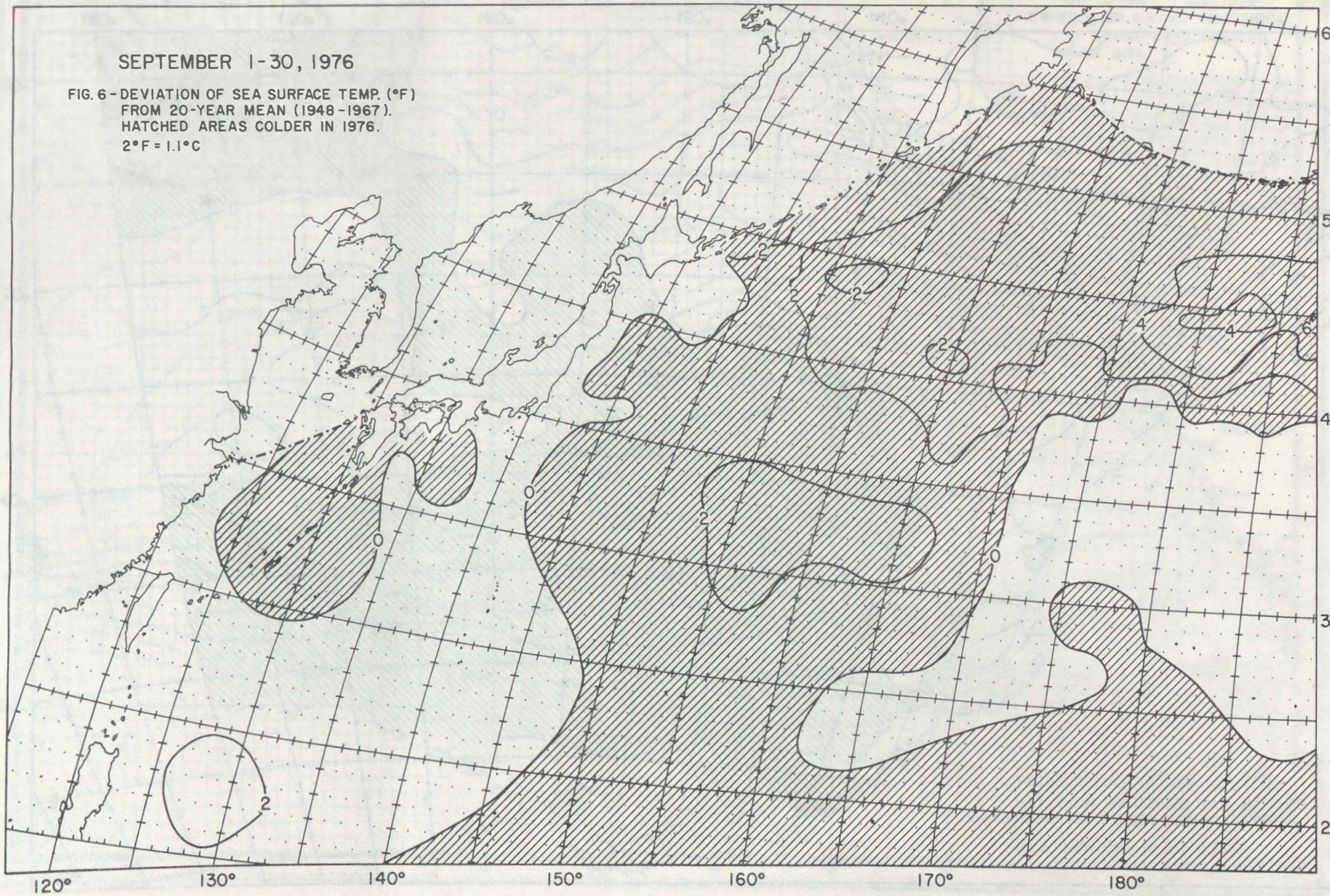

SEPTEMBER 1961 – 1976
FIG. 1 — OBSERVED MEAN VALUES
–0000– BAROMETRIC PRESSURE (MILLIBARS).
RESULTANT WIND DIRECTION.
No. RESULTANT WIND SPEED (KTS.)
No. AVERAGE WIND SPEED (KTS.) REGARDLESS OF DIRECTION.
1008
1012
1016
1020
1016
1016
60° N.
55 N.
50 N.
45 N.
40 N.
35 N.
30 N.
25 N.
20 N.
180° W.
175 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.

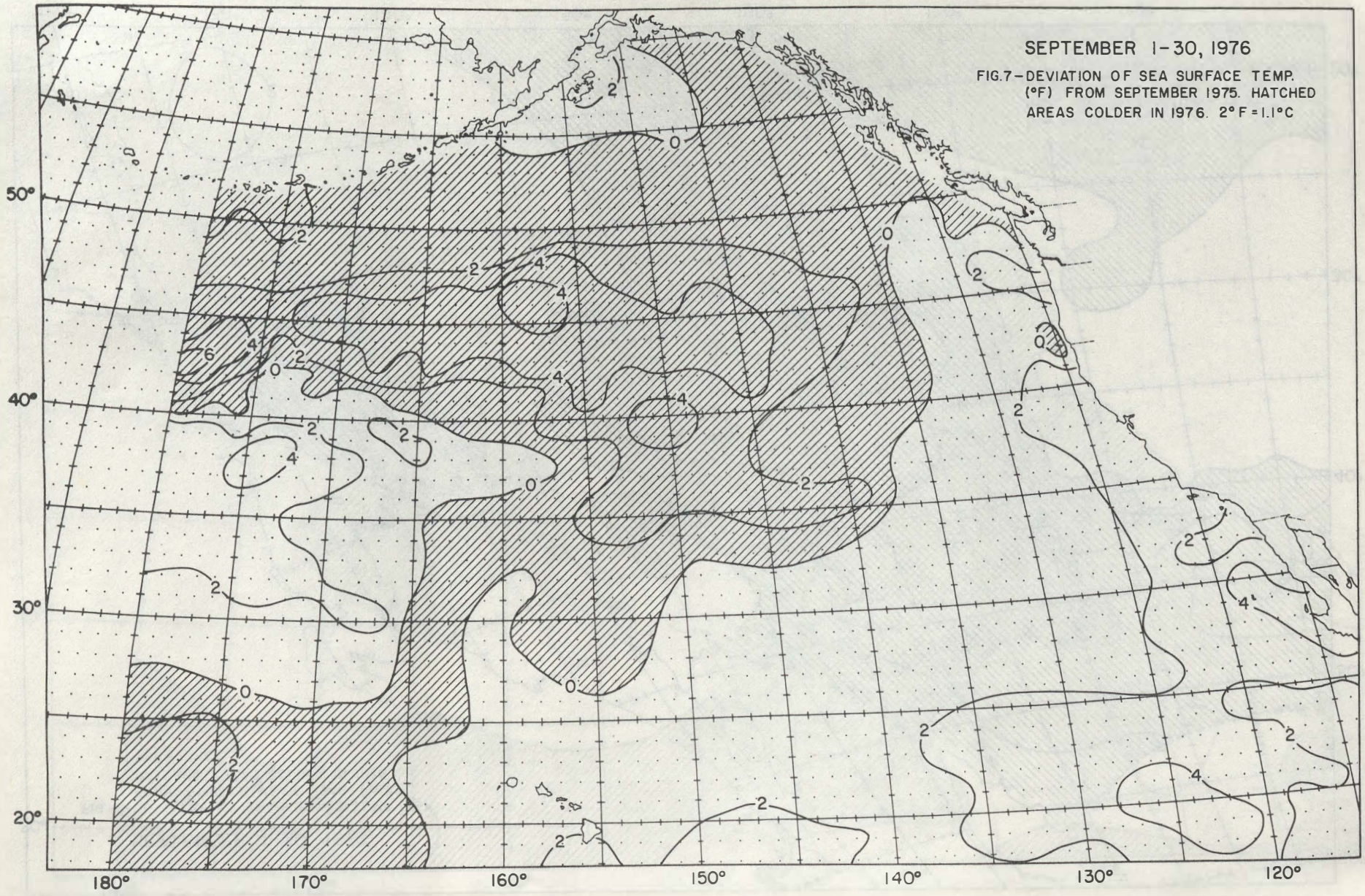

SEPTEMBER 1976
FIG. 2 — OBSERVED VALUES
—0000— BAROMETRIC PRESSURE (MILLIBARS).
RESULTANT WIND DIRECTION.
No. RESULTANT WIND SPEED (KTS.)
No. AVERAGE WIND SPEED (KTS.) REGARDLESS OF DIRECTION.
1000
1004
1008
1012
1016
1016
60° N.
55 N.
50 N.
45 N.
40 N.
35 N.
30 N.
25 N.
20 N.
180° W.
175 W.
170 W.
165 W.
160 W.
155 W.
150 W.
145 W.
140 W.
135 W.
130 W.
125 W.
120 W.
115 W.

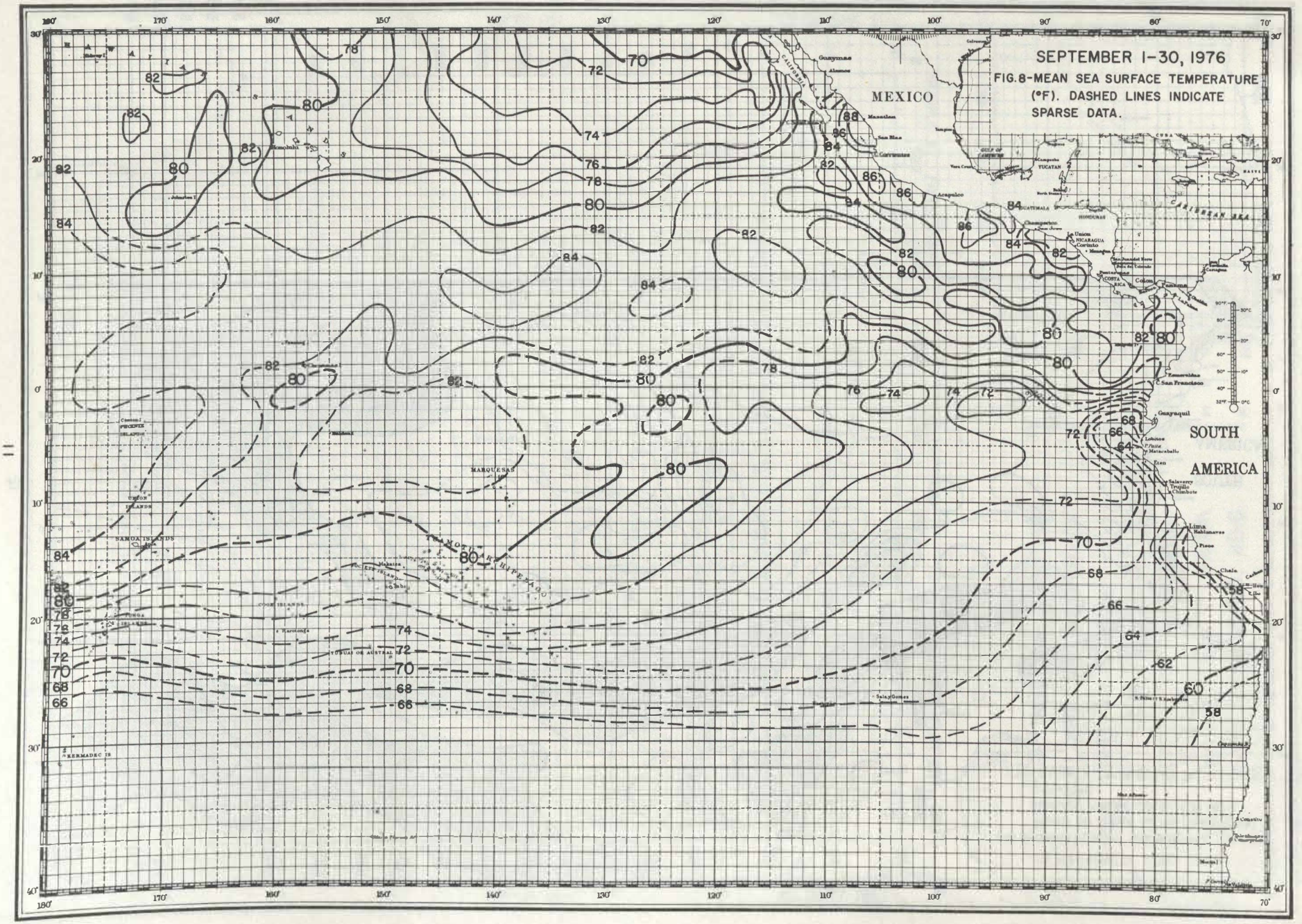

SEPTEMBER 1-30, 1976
FIG. 3 - MEAN SEA SURFACE TEMPERATURE (°F)
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°


SEPTEMBER 1-30, 1976
FIG. 4 - MEAN SEA SURFACE TEMPERATURE (°F)
46
48
50
52
54
56
58
60
62
64
66
68
70
72
74
76
78
80
82
84
86
82
82
60°
50°
40°
30°
20°
120°
130°
140°
150°
160°
170°
180°


SEPTEMBER 1-30, 1976
FIG. 5 - DEVIATION OF SEA SURFACE TEMP. (°F.) FROM 20 YEAR MEAN (1948-1967). HA CHED AREAS COLDER IN 1976.
2° F = 1.1 °C
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°


SEPTEMBER 1-30, 1976
FIG. 6 - DEVIATION OF SEA SURFACE TEMP. (°F) FROM 20-YEAR MEAN (1948-1967). HATCHED AREAS COLDER IN 1976.
2°F = 1.1°C
60°
50°
40°
30°
20°
120°
130°
140°
150°
160°
170°
180°
0
2
4
6


SEPTEMBER 1-30, 1976
FIG.7-DEVIATION OF SEA SURFACE TEMP. (°F) FROM SEPTEMBER 1975. HATCHED AREAS COLDER IN 1976. 2° F = 1.1°C
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°


SEPTEMBER 1-30, 1976
FIG. 8-MEAN SEA SURFACE TEMPERATURE (°F). DASHED LINES INDICATE SPARSE DATA.
MEXICO
SOUTH AMERICA
CALIFORNIA
GULF OF CALIFORNIA
CARIBBEAN SEA
GUATEMALA
HONDURAS
NICARAGUA
COSTA RICA
CUBA
HAITI
YUCATAN
Guaymas
Mazatlan
San Blas
Acapulco
Guayaquil
Lima
Callao
Salaverry
Trujillo
Chimbote
Pisco
Chala
MARQUESAS
SAMOA ISLANDS
COOK ISLANDS
TUAMOTU ARCHIPELAGO
KERMADEC IS
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
70°
40°
30°
20°
10°
0°

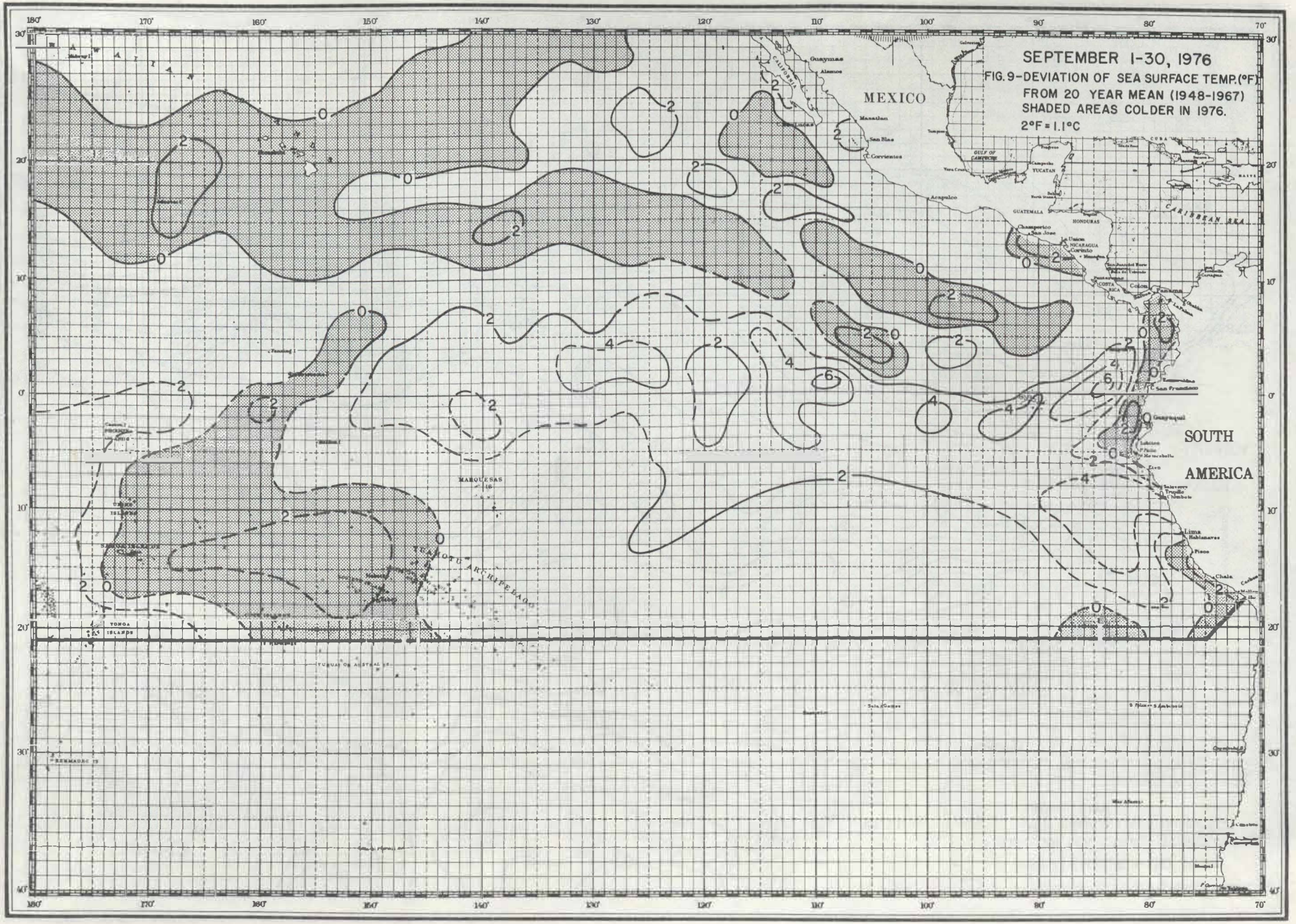
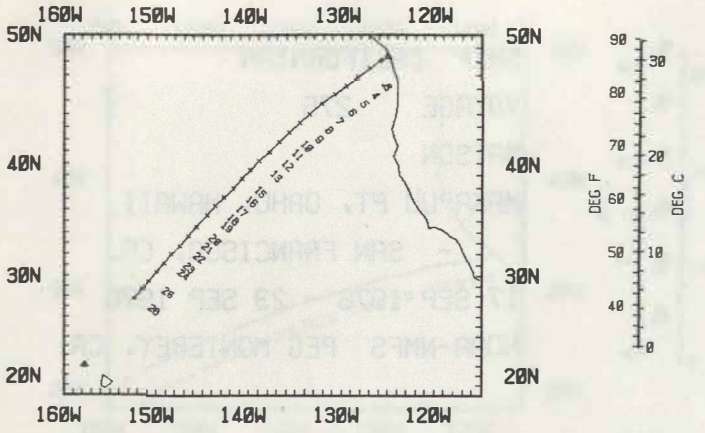

SEPTEMBER 1-30, 1976
FIG. 9-DEVIATION OF SEA SURFACE TEMP.(°F) FROM 20 YEAR MEAN (1948-1967)
SHADED AREAS COLDER IN 1976.
2°F = 1.1°C
MEXICO
SOUTH AMERICA
CARIBBEAN SEA
MARQUESAS
TUAMOTU ARCHIPELAGO
TONGA ISLANDS
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
70°
30°
20°
10°
0°
40°

FIGURE 10



SHIP CALIFORNIAN
VOYAGE 275
MATSON
CAPE FLATTERY, WASH.
- MAKAPUU PT, OAHU, HAWAII
05 SEP 1976 - 11 SEP 1976
NOAA-NMFS PEG MONTEREY, CA.

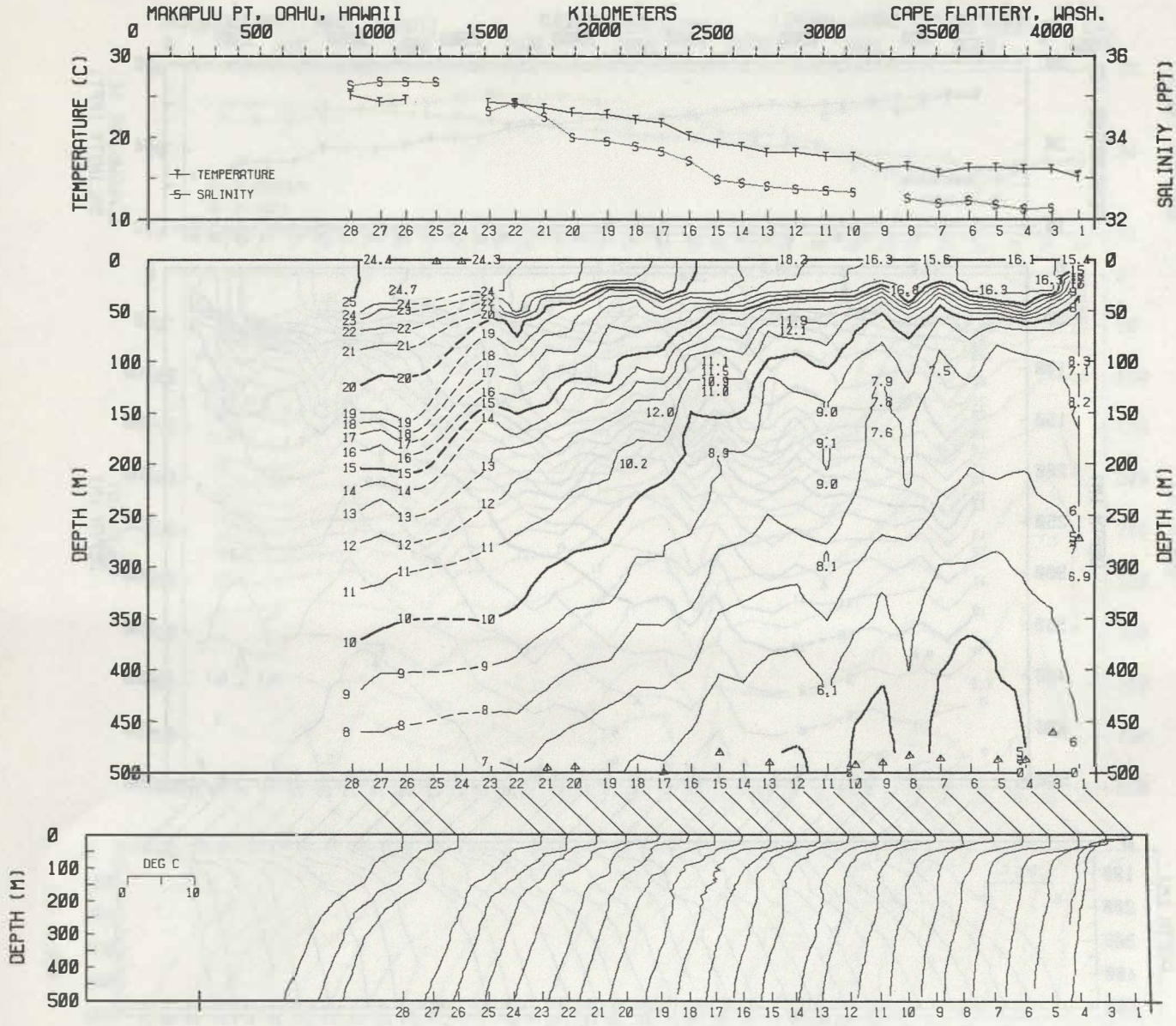
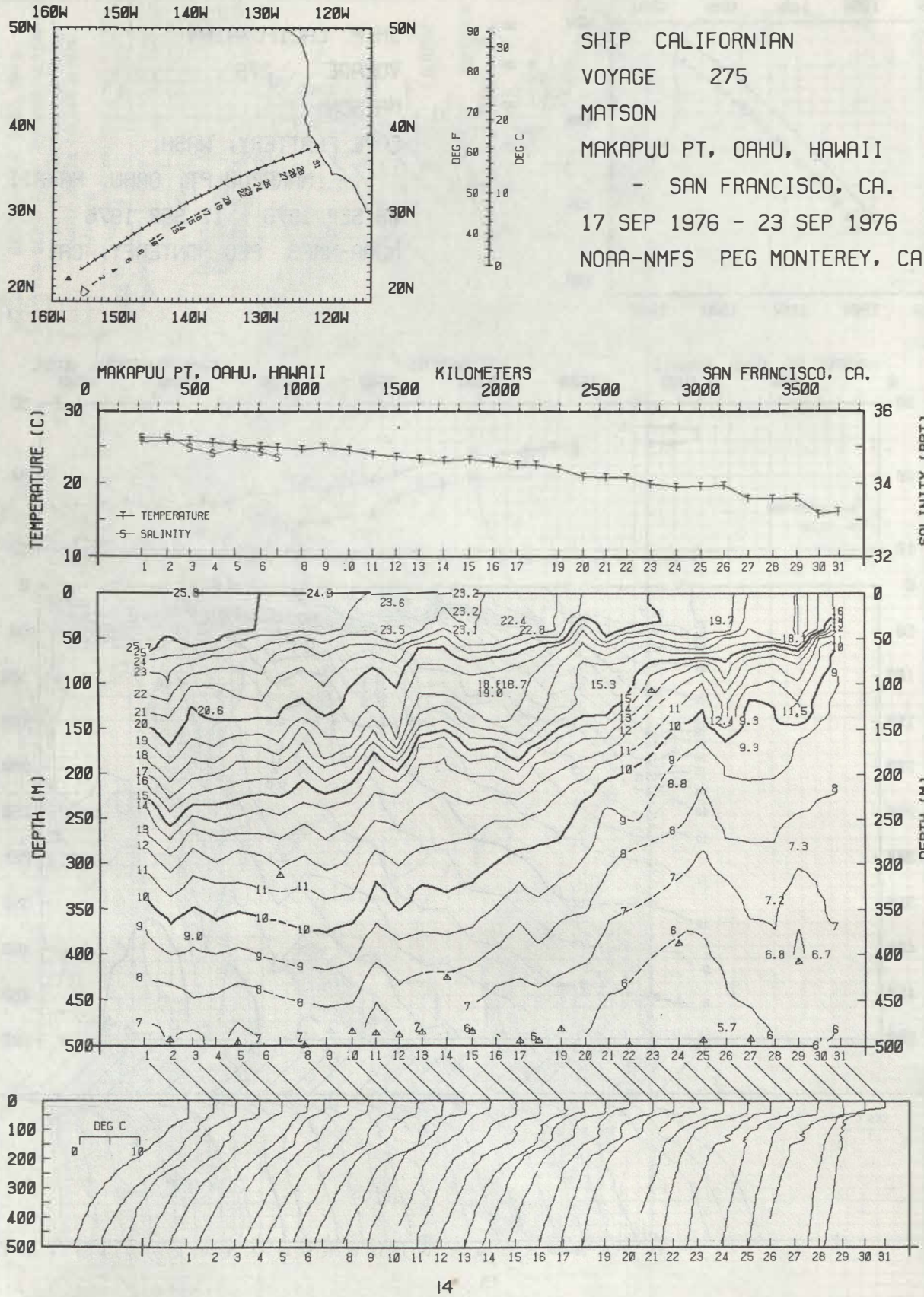


FIGURE 11



SHIP CALIFORNIAN

VOYAGE 275

MATSON

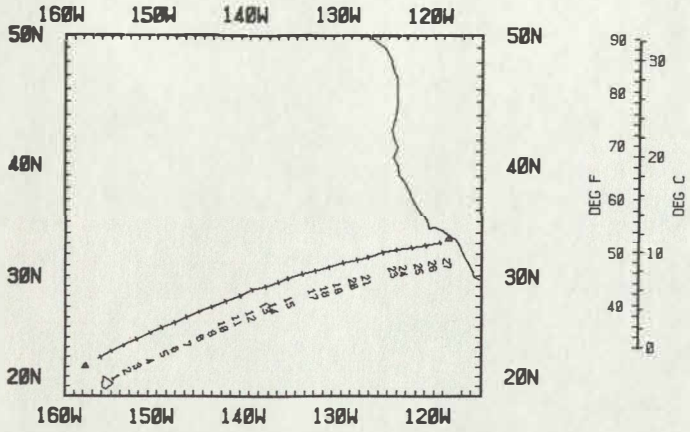
MAKAPUU PT, OAHU, HAWAII

- SAN FRANCISCO, CA.

17 SEP 1976 - 23 SEP 1976

NOAA-NMFS PEG MONTEREY, CA.

FIGURE 12



SHIP HAWAIIAN ENTERPRISE
VOYAGE 149
MATSON
MAKAPUU PT. OAHU. HAWAII
- LOS ANGELES. CA.
08 SEP 1976 - 13 SEP 1976
NOAA-NMFS PEG MONTEREY. CA.