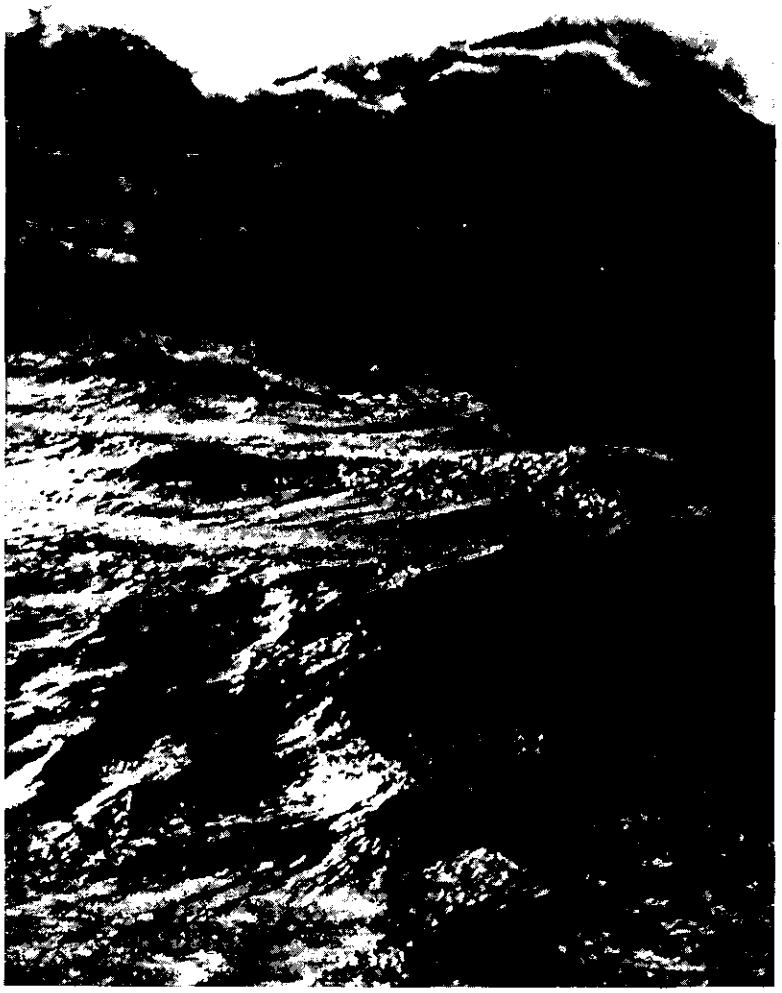
OCEANOGRAPHIC Monthly Summary

Volume III Number 1 January 1983



Contents

3 OceaNotes
4 Pacific SST - monthly mean
6 Pacific SST - anomaly
8 Pacific SST - yearly change
10 Atlantic SST - monthly mean
11 Atlantic SST - anomaly
12 Atlantic SST - yearly change
14 Bering Sea/North Slope ICE, with text
15 West Coast OCEAN FEATURES, with text
16 West Coast SST - monthly mean
17 West Coast SST - anomaly
18 East Coast OCEAN FEATURES, with text
20 East Coast SST - monthly mean
22 East Coast SST - anomaly
24 Subscription information

U.S. DEPARTMENT OF COMMERCE • National Oceanic and Atmospheric Administration
National Weather Service/National Earth Satellite Service

Oceanographic Monthly Summary is published monthly by the National Weather Service and the National Earth Satellite Service. *Oceanographic Monthly Summary* contains sea surface temperature (SST) analyses on both regional and ocean basin scales for the Atlantic and Pacific Oceans. All of the SST analyses use the Robinson-Bauer climatology.* *Oceanographic Monthly Summary* also contains Alaskan sea ice information and ocean feature information for contiguous U.S. ocean regions.

Oceanographic Monthly Summary welcomes articles containing information of interest to *Oceanographic Monthly Summary* readers, such as, news on operational oceanography, unusual ocean feature phenomena, etc. Contributions should be sent to the editor (address below); please submit a double-spaced, typed original along with two copies. The length should be no more than two typed pages. Accepted material will appear in the OceaNotes section of *Oceanographic Monthly Summary*. Contributions can be published as quickly as the next monthly issue.

If you are interested in receiving *Oceanographic Monthly Summary* regularly, please refer to the back cover for subscription information.

*Robinson, M.K., 1976. Atlas of North Pacific Ocean Monthly Mean Temperatures and Mean Salinities of the Surface Layer; *NavOceano Ref. Pub. 2.*

Robinson, M.K., R.A. Bauer and E.H. Schroeder, 1979. Atlas of North Atlantic-Indian Ocean Monthly Mean Temperatures and Mean Salinities of the Surface Layer; *NavOceano Ref. Pub. 18.*

Oceanographic Monthly Summary
Editor: Steve Auer
National Meteorological Center, W/NMC21
National Weather Service, NOAA
Washington, DC 20233
(telephone: 301/763-8133)
Assistant Editor: Jenifer Wartha Clark
Synoptic Analysis Branch, S/DS23
National Earth Satellite Service, NOAA
Washington, DC 20233
(telephone: 301/763-8446)

Computer Analyses are prepared by:
Regional: William H. Gemmill
Hemispheric: John Kundrat

National Meteorological Center, W/NMC21
National Weather Service, NOAA
Washington, DC 20233
(telephone: 301/763-8133)

A REVERSAL OF THE NORMAL LOOP CURRENT BOUNDARY PATTERN by Steve Auer

Oceanographic analysts working with infrared satellite imagery use the warmest water (which appears as a darker shade of grey on the satellite image) as a tracer for defining the Loop Current's location. Thus, the Loop is visualized as containing warmer water than the adjacent Gulf of Mexico waters. However, during the first half of August 1982, this relationship was apparently reversed as satellite imagery showed the Loop to be slightly cooler (1°C or less) at the surface. In addition, the Robinson-Bauer climatology suggests that this condition may be an annual event.

As part of the Gulf Stream System, the Loop Current advects water from the Caribbean Sea through the Yucatan Strait penetrating a varying distance into the Gulf of Mexico before looping around and exiting through the Florida Straits. For much of the year, the Loop is identified on satellite imagery by a thermal gradient, which is sharpest during the winter. However, intense summertime insolation weakens this gradient as SSTs become nearly isothermal across the Gulf. This condition prevents surface thermal identification of the Loop. The Loop can be analyzed at subsurface depths using expendable bathythermographs (XBT). However, these observations are scattered and infrequent. Thus the Loop's position is largely unknown from about July to October.

On August 3, 1982, an infrared image showed a slight thermal gradient running north into the Gulf past the Yucatan Strait. The Loop side of the gradient was cooler, a perplexing reversal of the normal pattern. Nevertheless, other images on August 3, 7, and 15 also showed this pattern. The August 7 image was best, showing most of the Loop's boundary. The SST charts produced by the National Meteorological Center during the period also indicated this reversed gradient pattern as the Loop area was seen to be slightly cooler. Also, XBT data from July 31 and August 1, 19, and 27 determined a rough Loop position which agreed with the satellite imagery.

The Robinson-Bauer SST Climatology suggests that this may be an annual event. The August climatology is seen in Figure 1. SST's in the approximate Loop area are seen to be slightly lower. This condition is not seen in any other climatological month. Apparently, the Gulf's surface water response to the summer insolation is greater than the Caribbean and the advection of the Caribbean water by the Loop into the Gulf accounts for this unusual pattern. If this is an annual episode, its onset can be used to provide a much needed Loop observation during the long summertime data void.

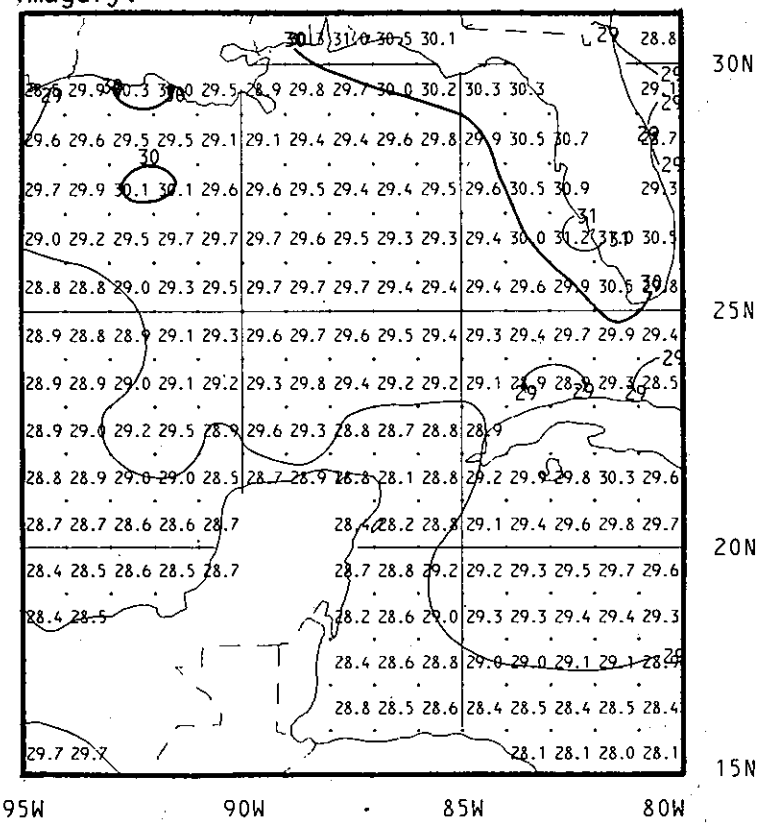
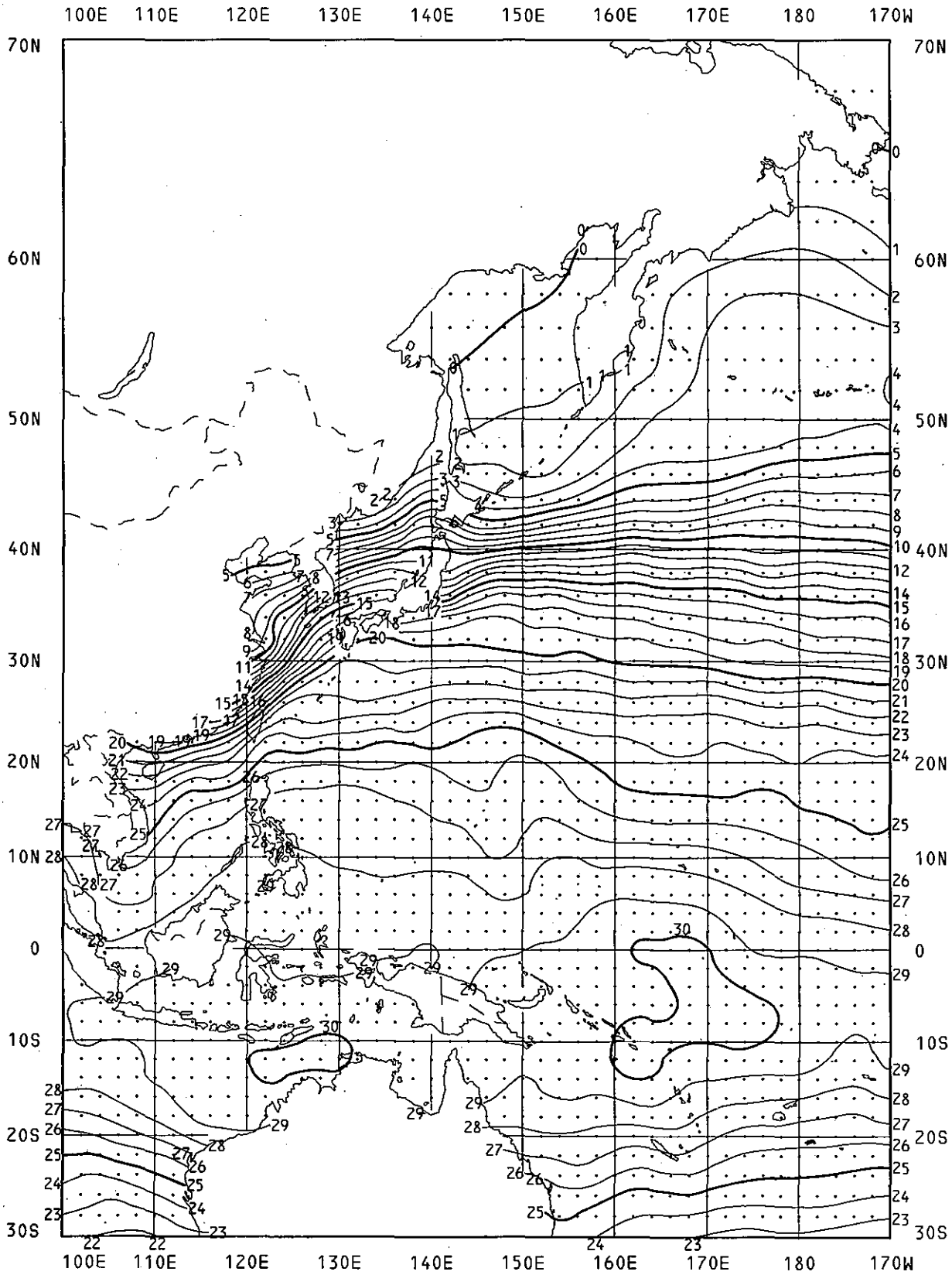
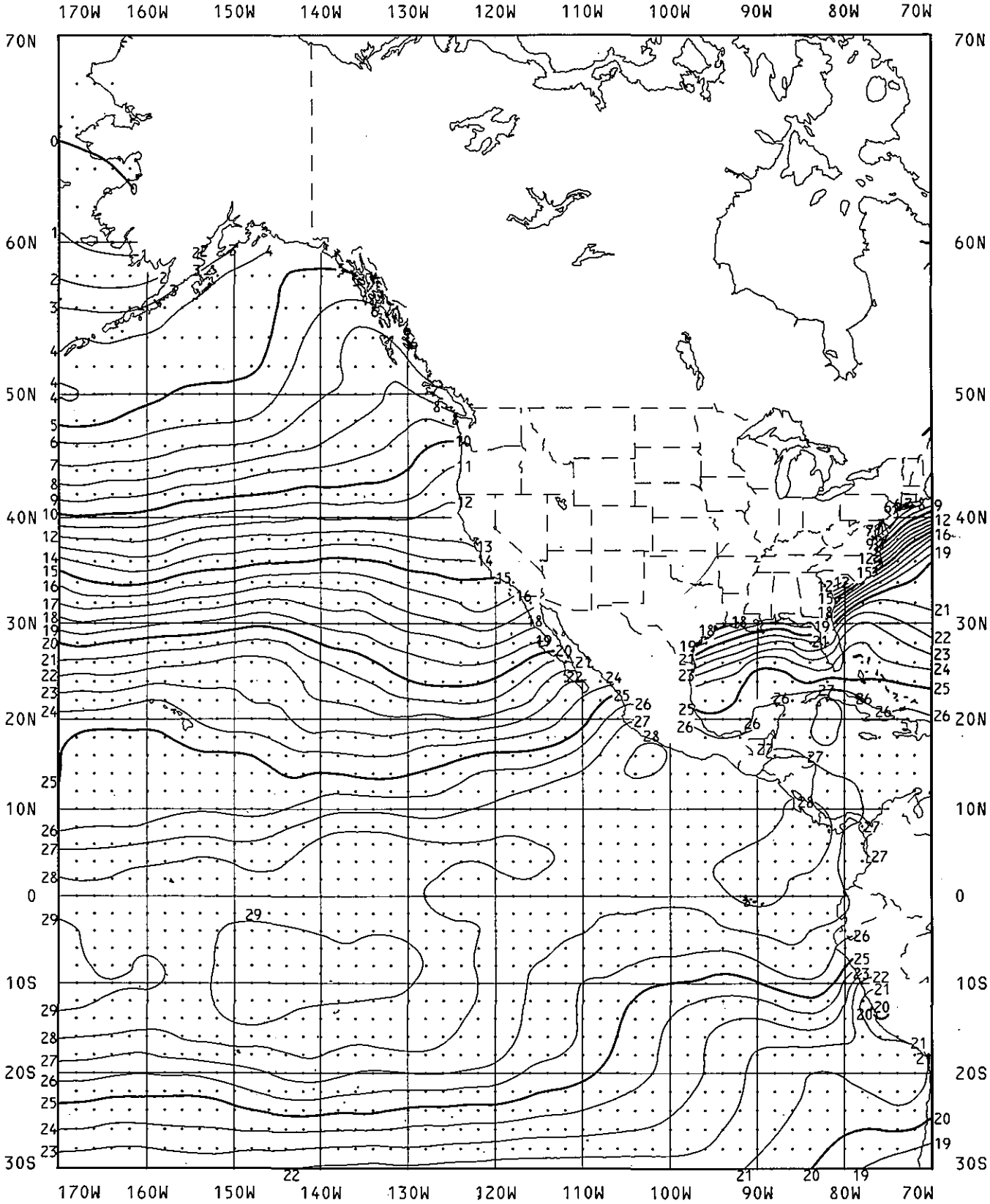


Figure 1. Robinson-Bauer SST Climatology for August.



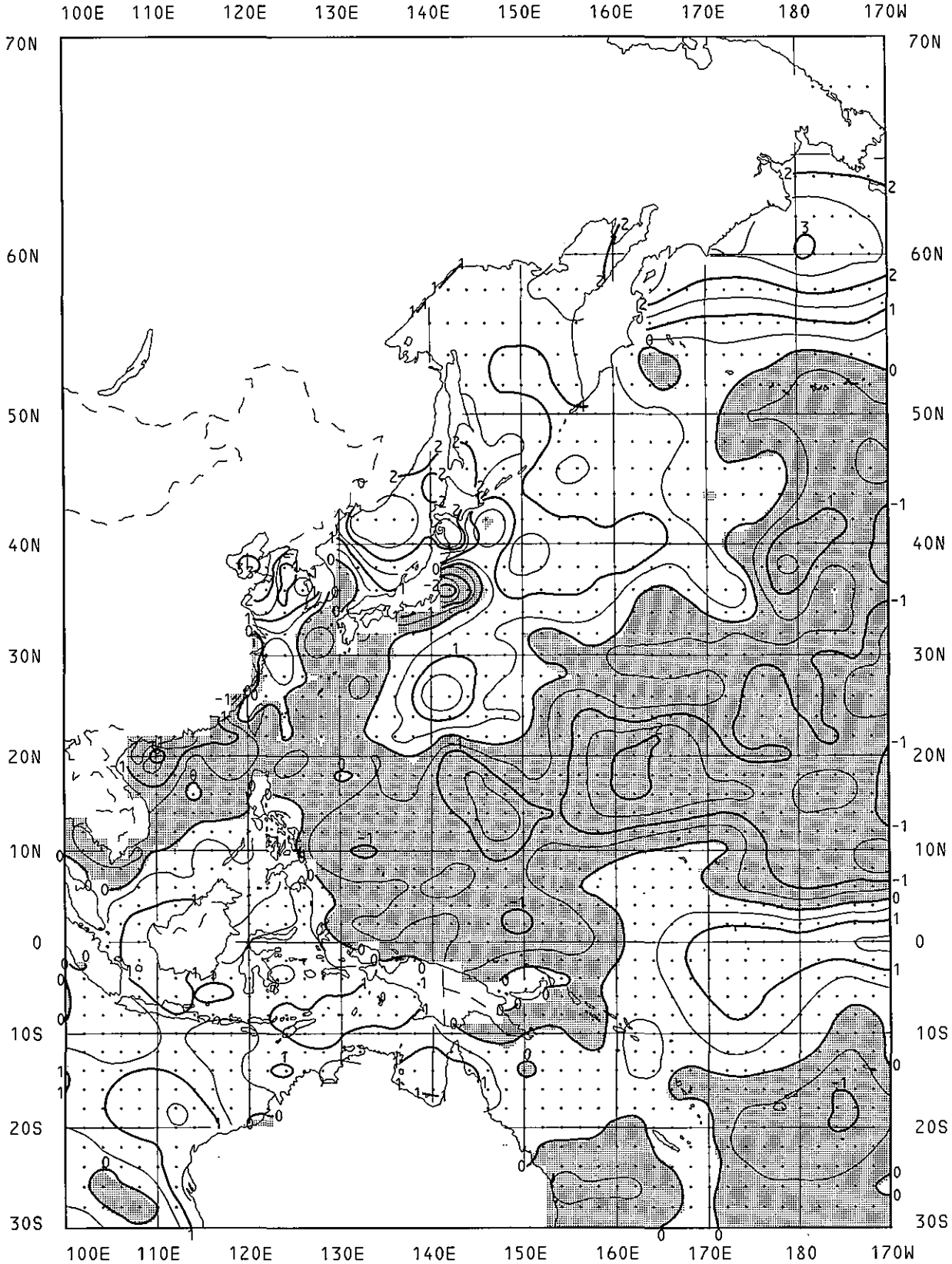
Western Pacific Ocean
SST--MONTHLY MEAN (°C)
January 1983

Monthly mean sea surface temperature is the mean of two-day analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.



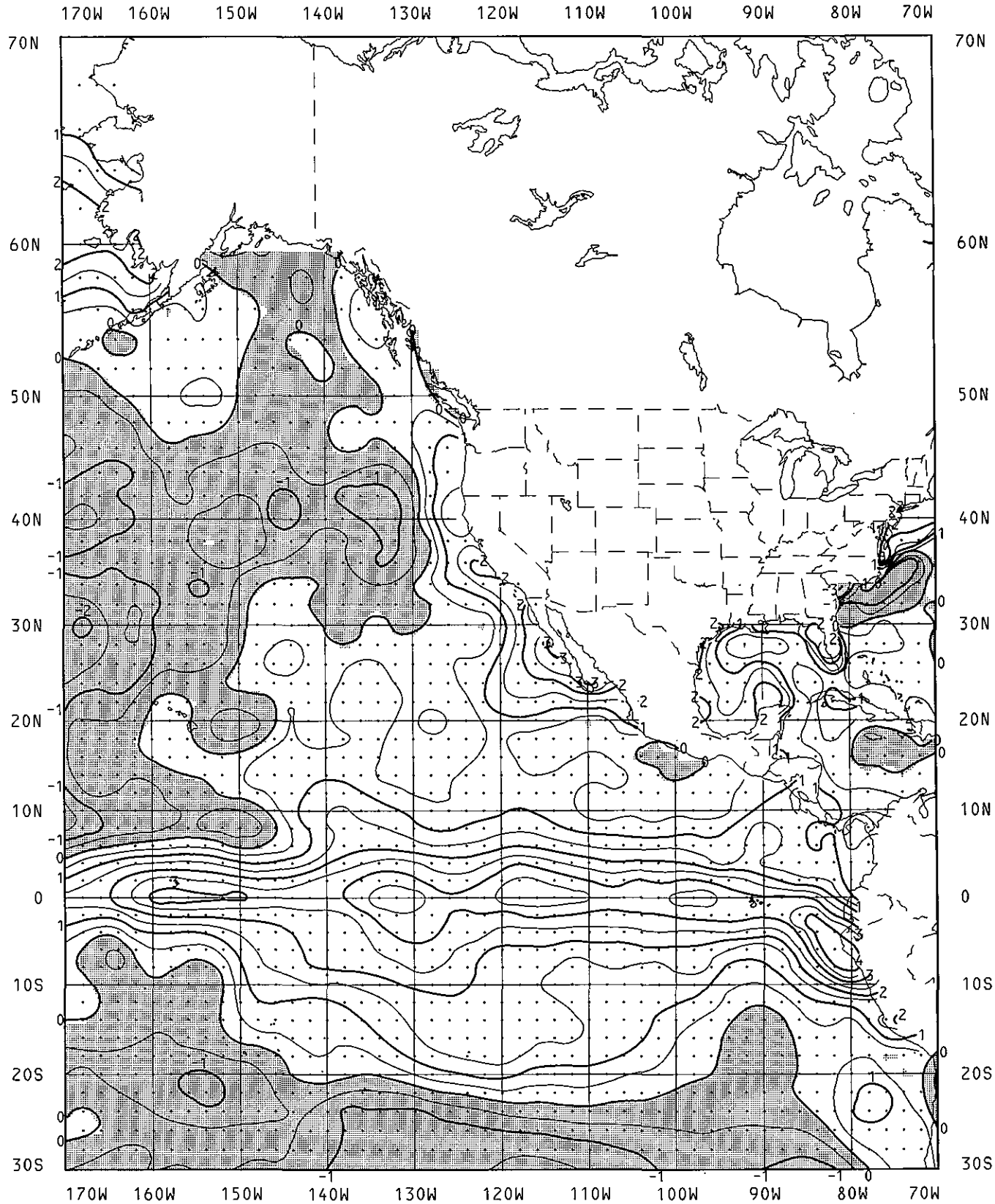
Eastern Pacific Ocean
SST--MONTHLY MEAN (°C)
January 1983

Monthly mean sea surface temperature is the mean of two-day analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.



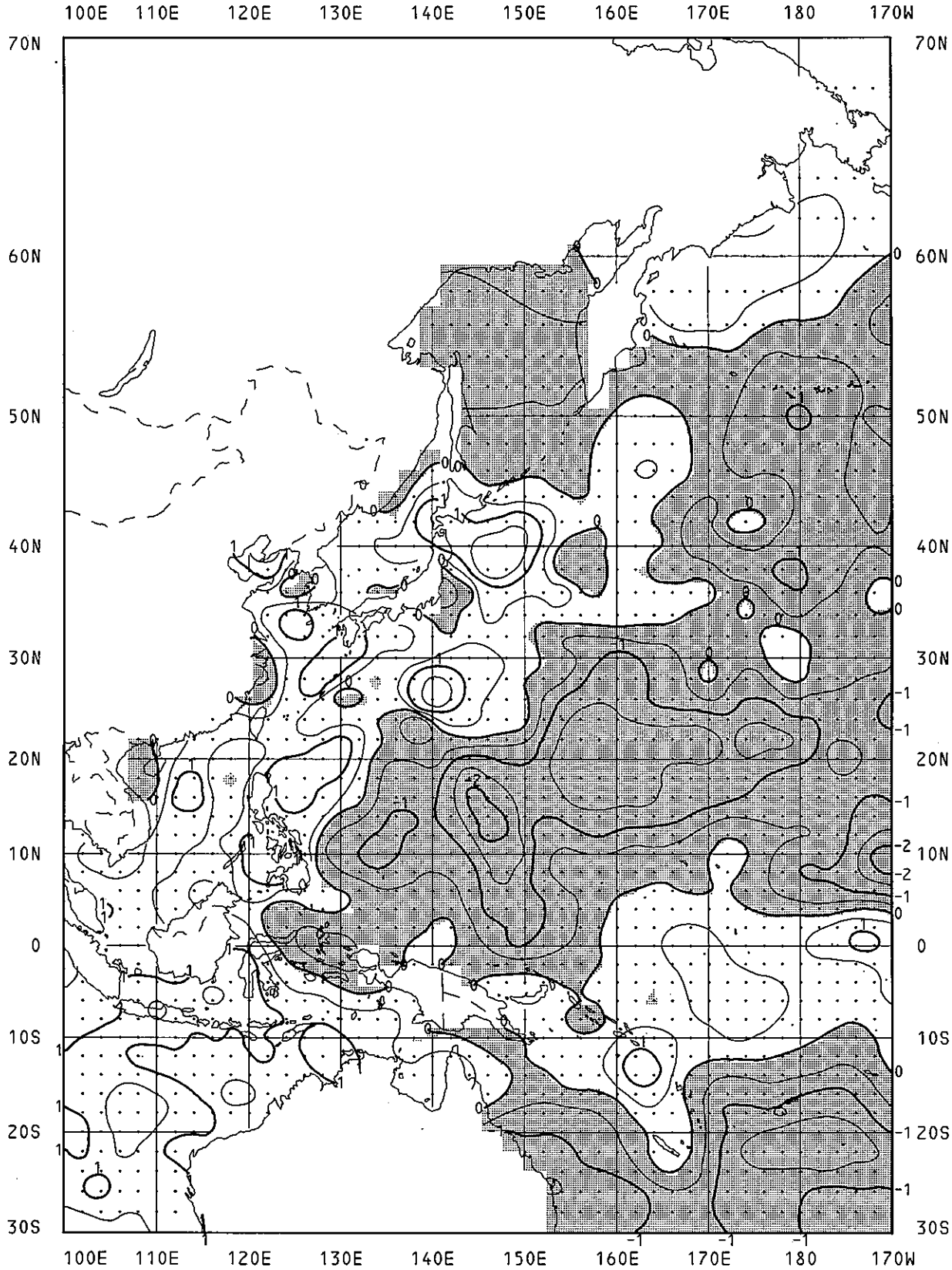
Western Pacific Ocean
SST--MONTHLY ANOMALY (°C)
January 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.



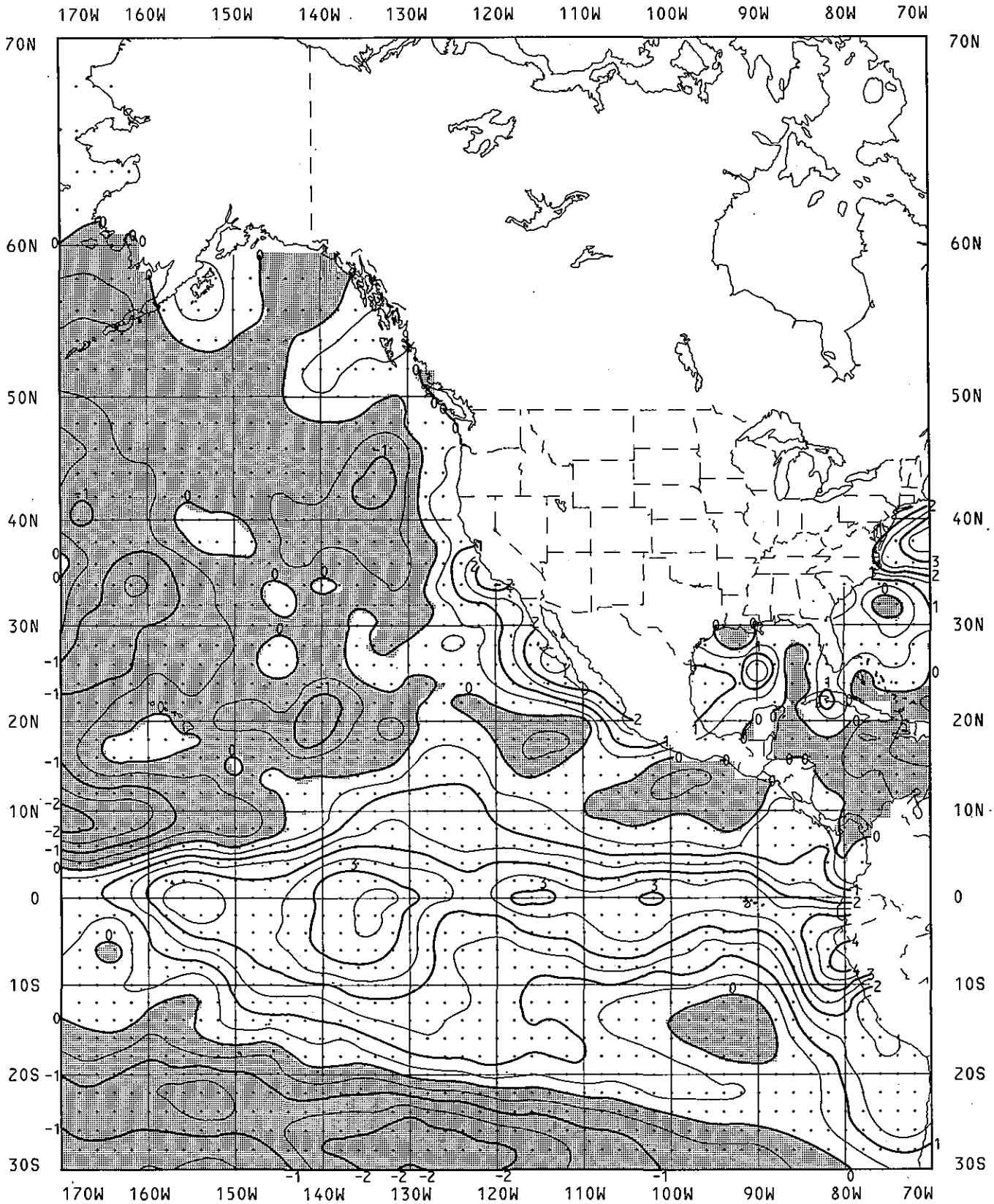
Eastern Pacific Ocean
SST--MONTHLY ANOMALY (°C)
January 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.



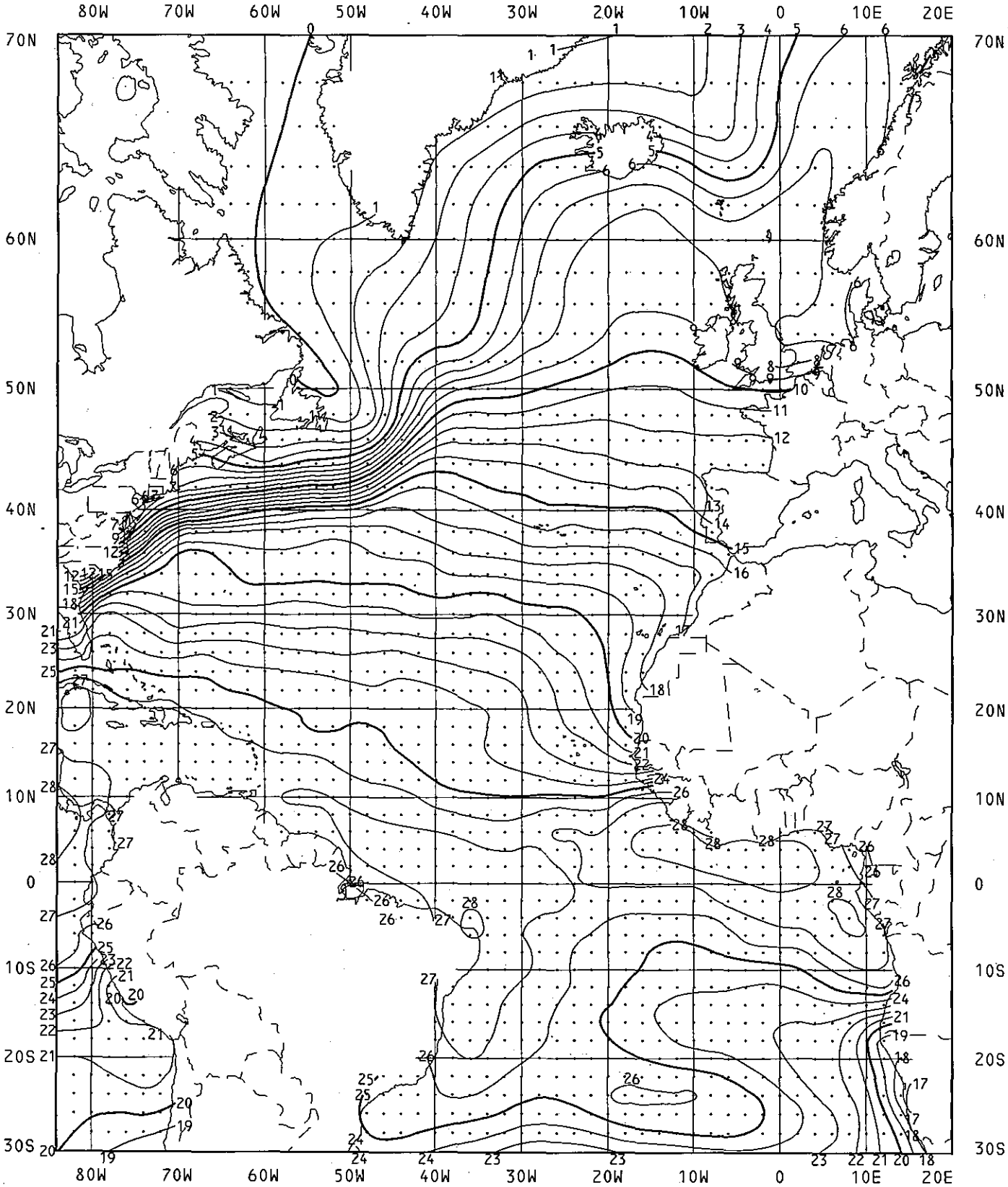
Western Pacific Ocean
SST--YEARLY CHANGE (°C)
January 1983

Yearly change is the difference between the monthly mean SST for this month and for the corresponding month last year -- shading shows where this year's monthly mean is colder than the corresponding monthly mean last year. Contour line interval is 0.5°C.



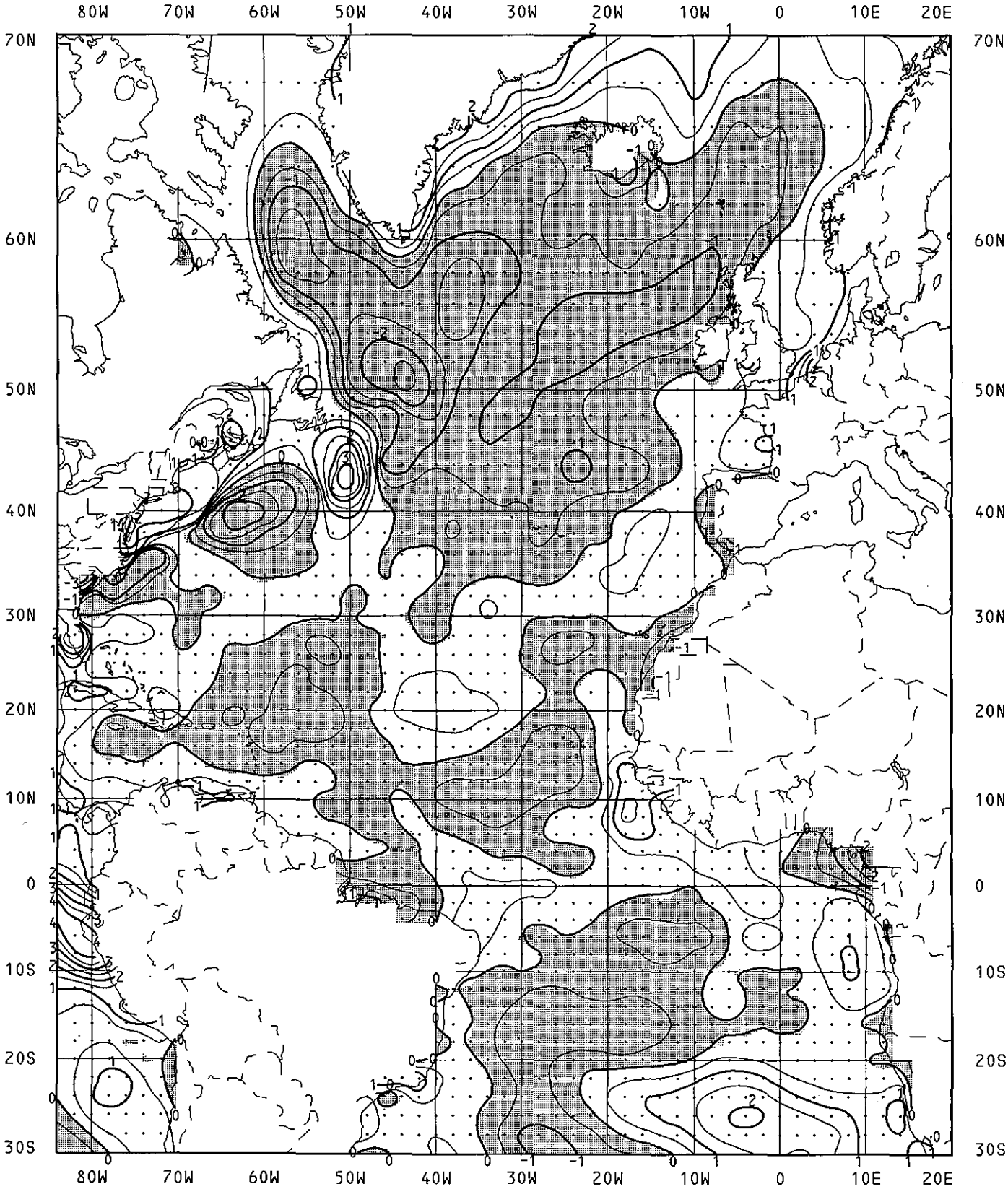
Eastern Pacific Ocean
SST--YEARLY CHANGE (°C)
January 1983

Yearly change is the difference between the monthly mean SST for this month and for the corresponding month last year -- shading shows where this year's monthly mean is colder than the corresponding monthly mean last year. Contour line interval is 0.5°C.



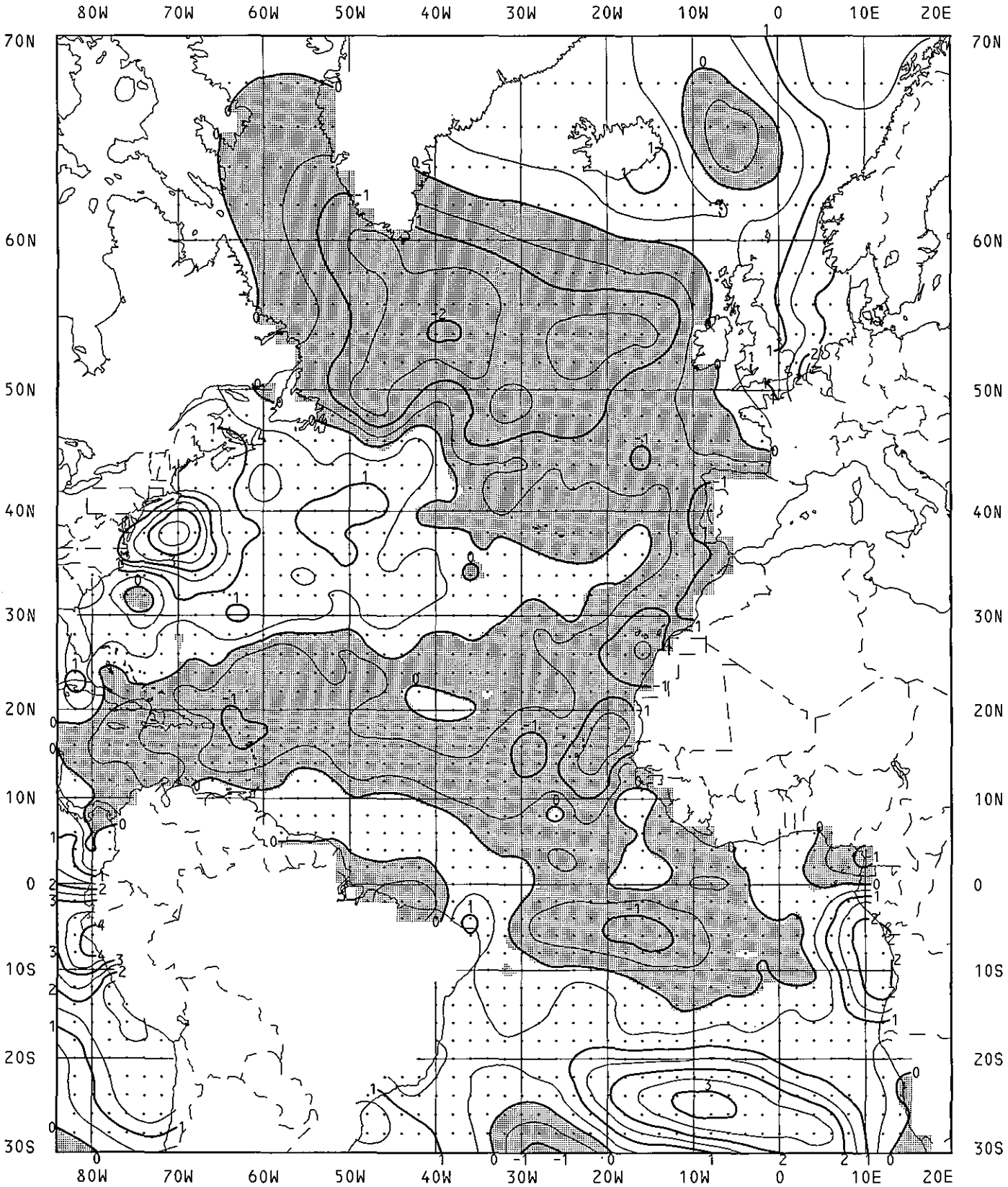
Atlantic Ocean
SST--MONTHLY MEAN (°C)
January 1983

Monthly mean sea surface temperature is the mean of two-day analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.



Atlantic Ocean
SST--MONTHLY ANOMALY (°C)
January 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.



Atlantic Ocean
SST--YEARLY CHANGE (°C)
January 1983

Yearly change is the difference between the monthly mean SST for this month and for the corresponding month last year -- shading shows where this year's monthly mean is colder than the corresponding monthly mean last year. Contour line interval is 0.5°C.

REGIONAL ANALYSES

Bering Sea / North Slope Ice

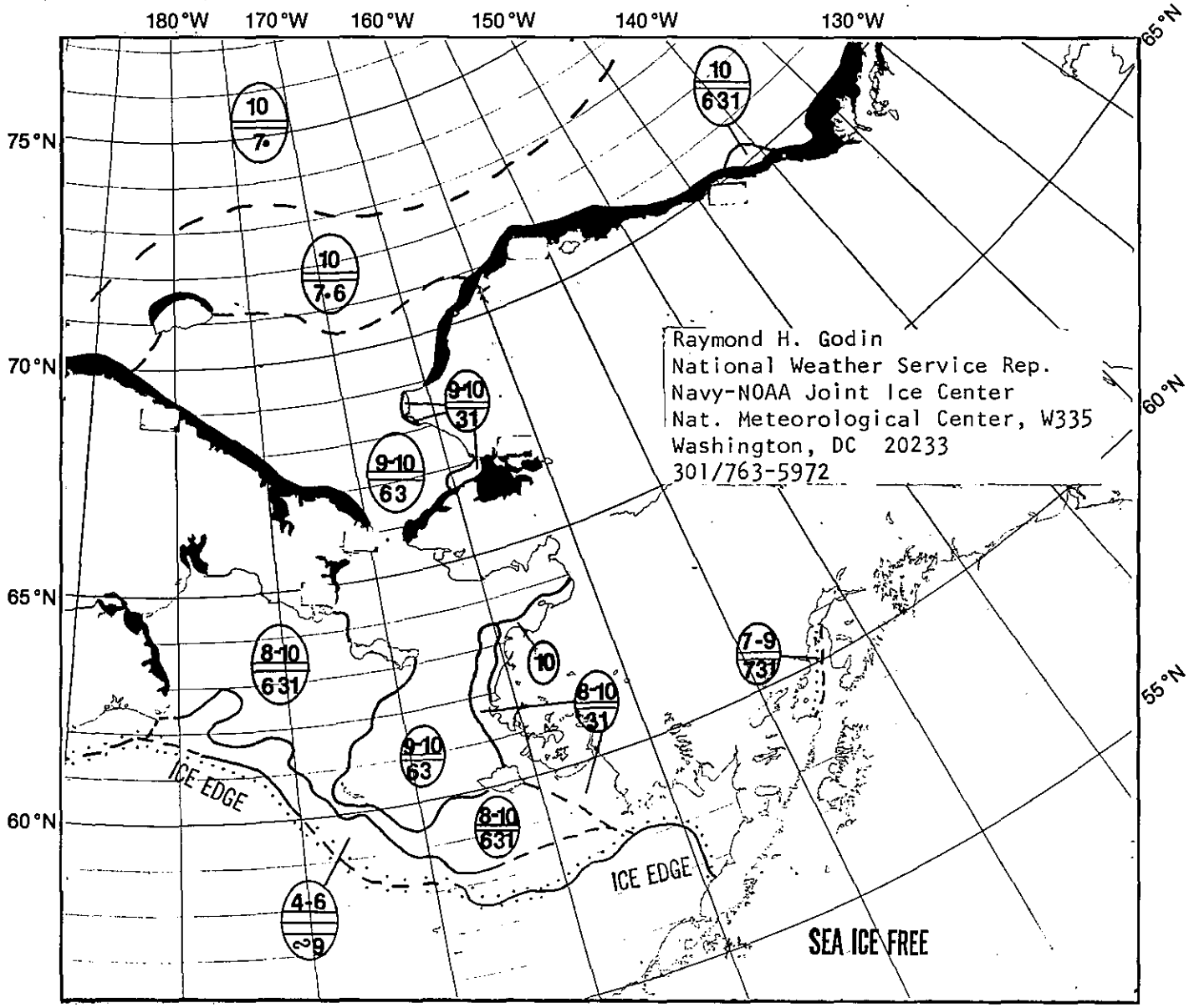
West Coast

- Ocean features
- Sea surface temperature
- SST anomaly

East Coast

- Ocean features
- Sea surface temperature
- SST anomaly

BERING SEA / NORTH SLOPE ICE ANALYSIS



C = Total ice concentration in the area in tenths.

C_a, C_b, C_c = Concentration of thickest (C_a), 2nd thickest (C_b), and 3rd thickest (C_c) ice

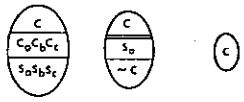
S_a, S_b, S_c = Stage of development of thickest (S_a), 2nd thickest (S_b), and 3rd thickest (S_c) ice.

~C = Concentration of ice within area(s) of strips and patches.

STAGE(S) OF DEVELOPMENT (THICKNESS)

1 = New ice (0-10 cm)
3 = Young ice (10-30 cm)
6 = First year (30-200 cm)
7 = First year thin (30-70 cm)
1. = First year medium (70-120 cm)
4. = First year thick (120-200 cm)
7. = Old ice (survived at least one summer's melt)

EXAMPLES



125 Theoretical thickness of this season's growth (cm).

Fast ice. Sea ice which forms and remains fast along the coast.

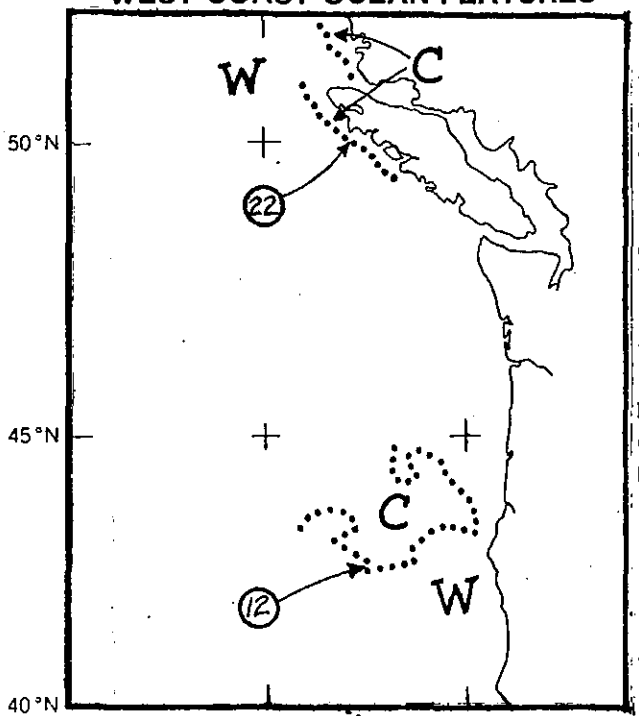
Ice boundary visually or satellite observed.

Ice boundary estimated.

JANUARY 1983

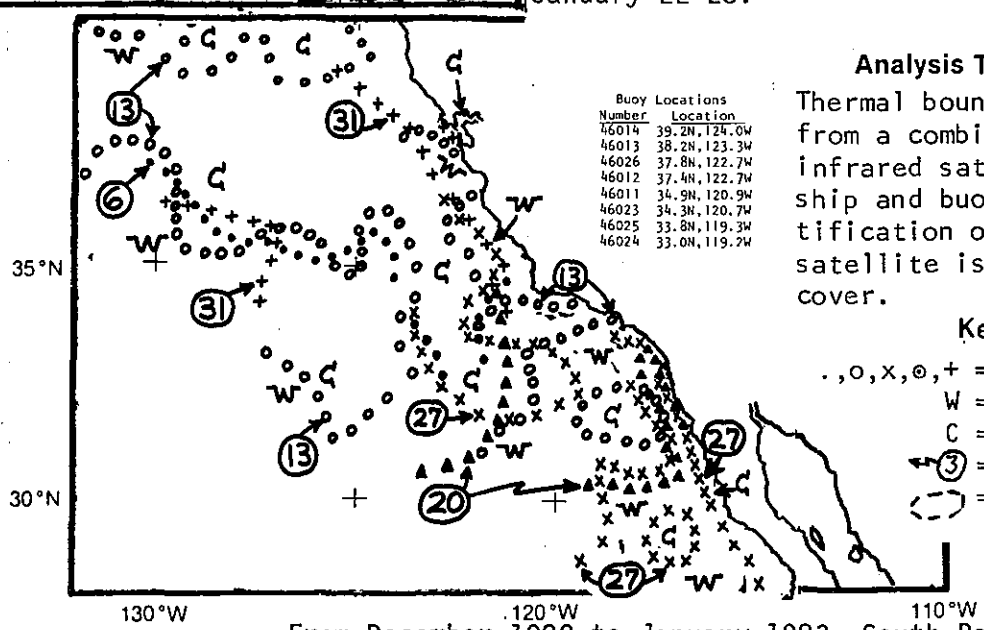
The mean monthly surface pressure circulation shows a 986 mb low centered in the central Gulf of Alaska near 52°N 150°W. The low pressure center is displaced eastward of its normal position near 51°N 175°E. Northeasterly geostrophic winds affect the marginal ice zone of the Bering Sea. At Bering Sea coastal stations located at Nome (64°N 165°W), King Salmon (59°N 157°W), and Cold Bay (55°N 163°W) monthly mean temperatures were normal. Not reflected in the monthly means are the southeasterly winds and above normal temperatures which affected the Bering Sea area during the latter third of the month. The ice edge expanded rapidly early in the month under the influence of northerly winds and below normal temperatures. Late in the month, when temperatures warmed as the winds became southeasterly, the ice in the Bering Sea drifted westward. The westward drift expanded the ice edge west of 170°W where the ice edge is at a more northerly latitude. The current ice edge position is near its historical mean.

WEST COAST OCEAN FEATURES



JANUARY 1983

The rate of wintertime cooling in the North Panel area substantially decreased during January. SST decreases of 0.5-1.0°C were observed at the offshore buoys during the month. The only departure from this trend was a minor 0.5°C warming episode during January 13-19 at the buoy at 42°30N 130°W. The most significant occurrence in the North Panel area was an anomalous warming in nearshore waters east of 127°W during the second half of the month. Coastal stations showed a slight overall monthly mean SST decrease (0.3°C), although most of this cooling took place during the first half of the month, with the anomalous warming thereafter. In all cases, SSTs at coastal stations were higher at the end of the month than at the beginning. Factors contributing to this nearshore warming were unseasonably mild air temperatures and strong southerly winds associated with several intense weather systems which moved through the area during January 22-28.



Buoy Locations

Number	Location
46014	39.2N,124.0W
46013	38.2N,123.3W
46026	37.8N,122.7W
46012	37.4N,122.7W
46011	34.9N,120.9W
46023	34.3N,120.7W
46025	33.8N,119.3W
46024	33.0N,119.2W

Analysis Techniques

Thermal boundaries are determined from a combination of enhanced infrared satellite imagery and ship and buoy observations. Identification of these features by satellite is limited by cloud cover.

Key

.,o,x,⊙,+ = thermal boundaries
W = warm
C = cold
(3) = date of feature
(dashed) = outline of water mass feature

From December 1982 to January 1983, South Panel Area SSTs decreased seasonally 0.5-1.0°C except within 250 miles of the Baja and southern California coasts and 500 miles of the central California coast. Maximum warming of 1.0°C occurred along central California. Satellite imagery consistently suggested warmer southerly currents along the entire coast with slightly cooler water along the immediate coast. SSTs 0.5-1.0°C below normal north of 32°N and west of 128°W continued the pattern set in April 1982. Elsewhere above normal SSTs showed a maximum of 3.0°C above normal along the central California coast. Upwelling-favorable winds occurred January 8-11 but caused little upwelling. Periods of strong southerly to westerly winds with passing storms mixed and cooled the ocean 1-2°C beyond 100 miles offshore January 18-31.

BUOY STATISTICS

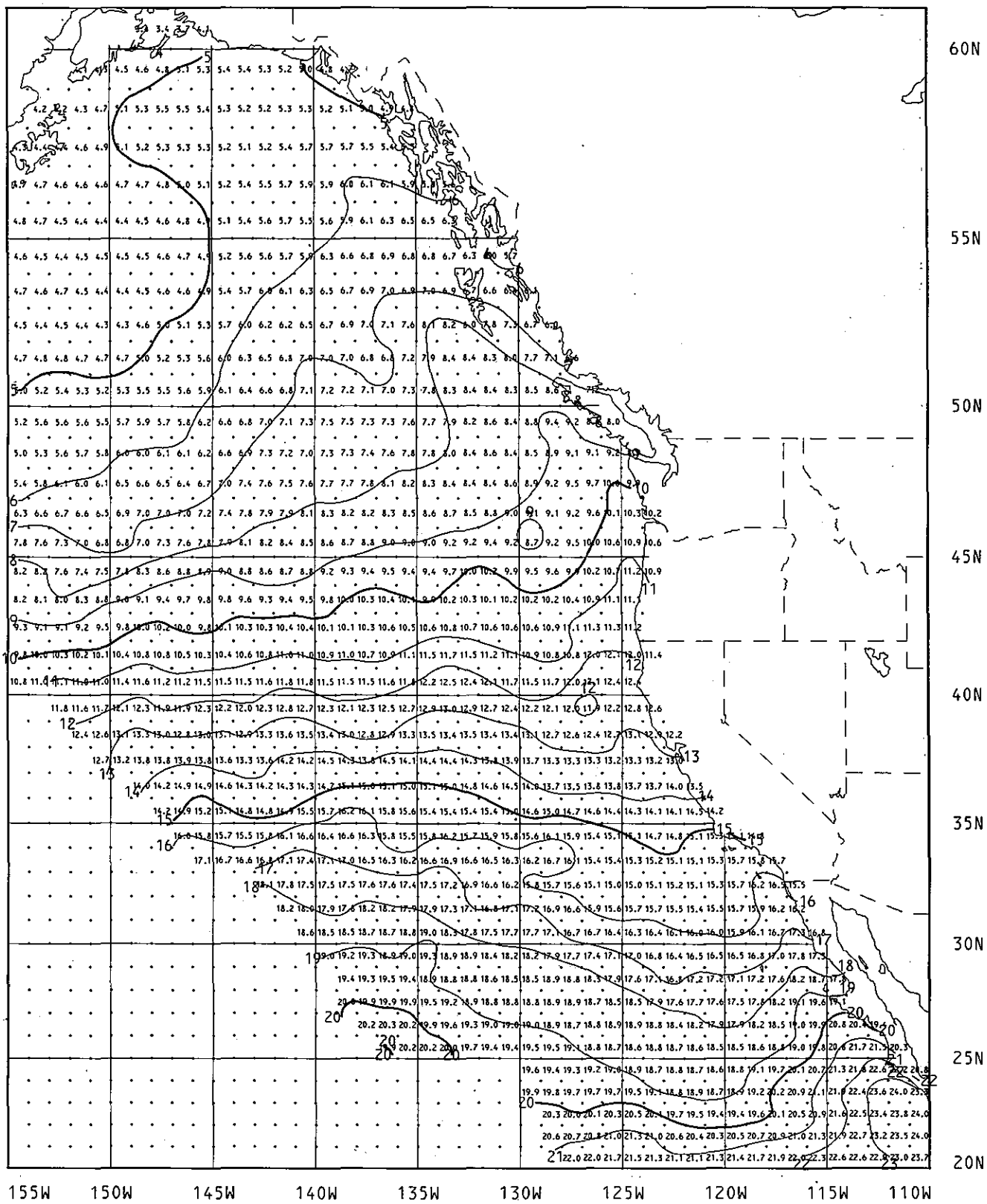
Buoy No.	Mean SST	Std. Dev.
46014	13.2	0.9
46013	13.2	0.6
46026	12.0	0.8
46012	13.8	0.4
46011	15.5	0.4
46023	15.6	0.4
46025	15.8	0.8
46024	16.0	0.2

North Panel

Kent Short
Seattle Ocean Services Unit
National Weather Service/NOAA
7600 Sand Point Way NE
Bin C15700
Seattle, WA 98115
206/527-6105

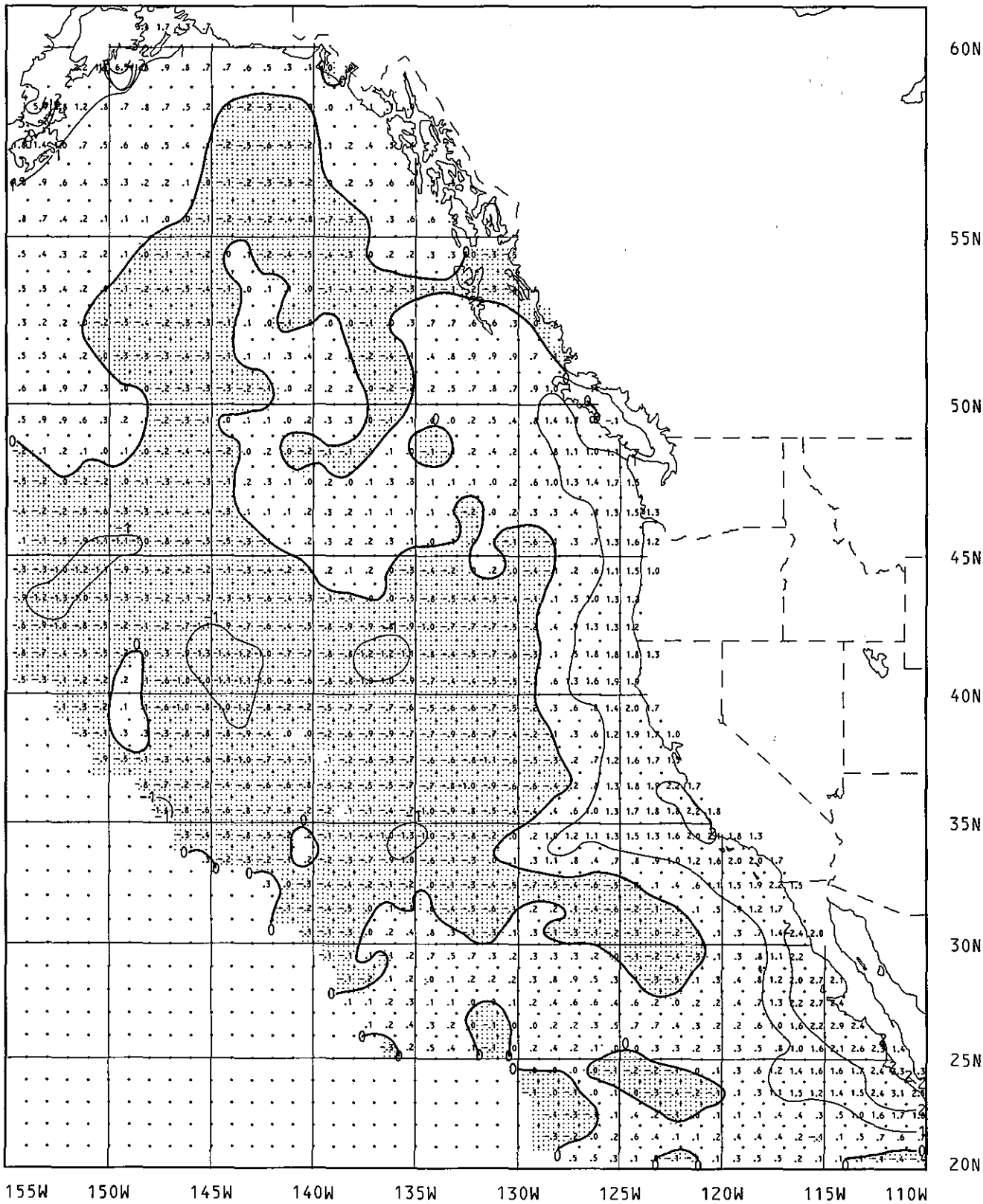
South Panel

Larry Breaker
Satellite Field Service Station
National Earth Satellite Service
NOAA
660 Price Avenue
Redwood City, CA 94063
415/364-2422



West Coast
SST--MONTHLY MEAN (°C)
January 1983

Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.



West Coast
SST--MONTHLY ANOMALY (°C)
January 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.

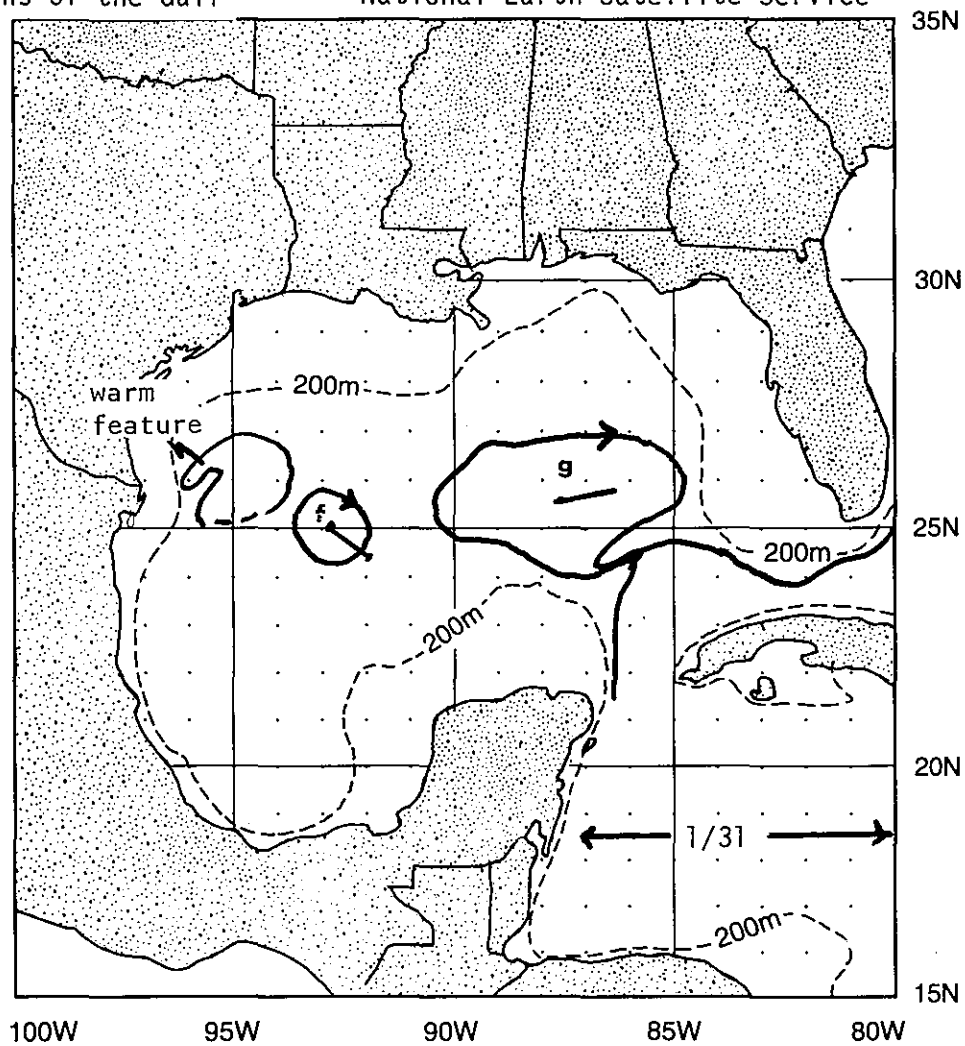
EAST COAST OCEAN FEATURES

The end of this month's positions of the Gulf Stream System and its associated eddies are shown for the NW Atlantic and the Gulf of Mexico. The Gulf Stream and Loop Current boundaries are located by infrared satellite imagery or XBT (expendable bathythermograph) data. Anticyclonic eddies are labeled a-z in the Gulf of Mexico and 1-99 in the NW Atlantic. Cyclonic eddies are labeled A-Z. Arrows on eddies indicate direction of circulation. Warm-core or anticyclonic eddies rotate clockwise; cold-core or cyclonic eddies rotate counterclockwise. The line to the eddy center shows the net translation since last month or since last observed. Eddies or sections of the Gulf Stream System which were not observed during the month are not shown on the analysis chart. The long arrows at the bottom of the chart indicate the date of data used.

Data used in this analysis include:
- NOAA satellite infrared imagery, National Earth Satellite Service
- Bathythermograph data, National Meteorological Center of National Weather Service,
- Oceanographic Analysis, A daily detailed analysis issued by National Weather Service/ National Earth Satellite Service

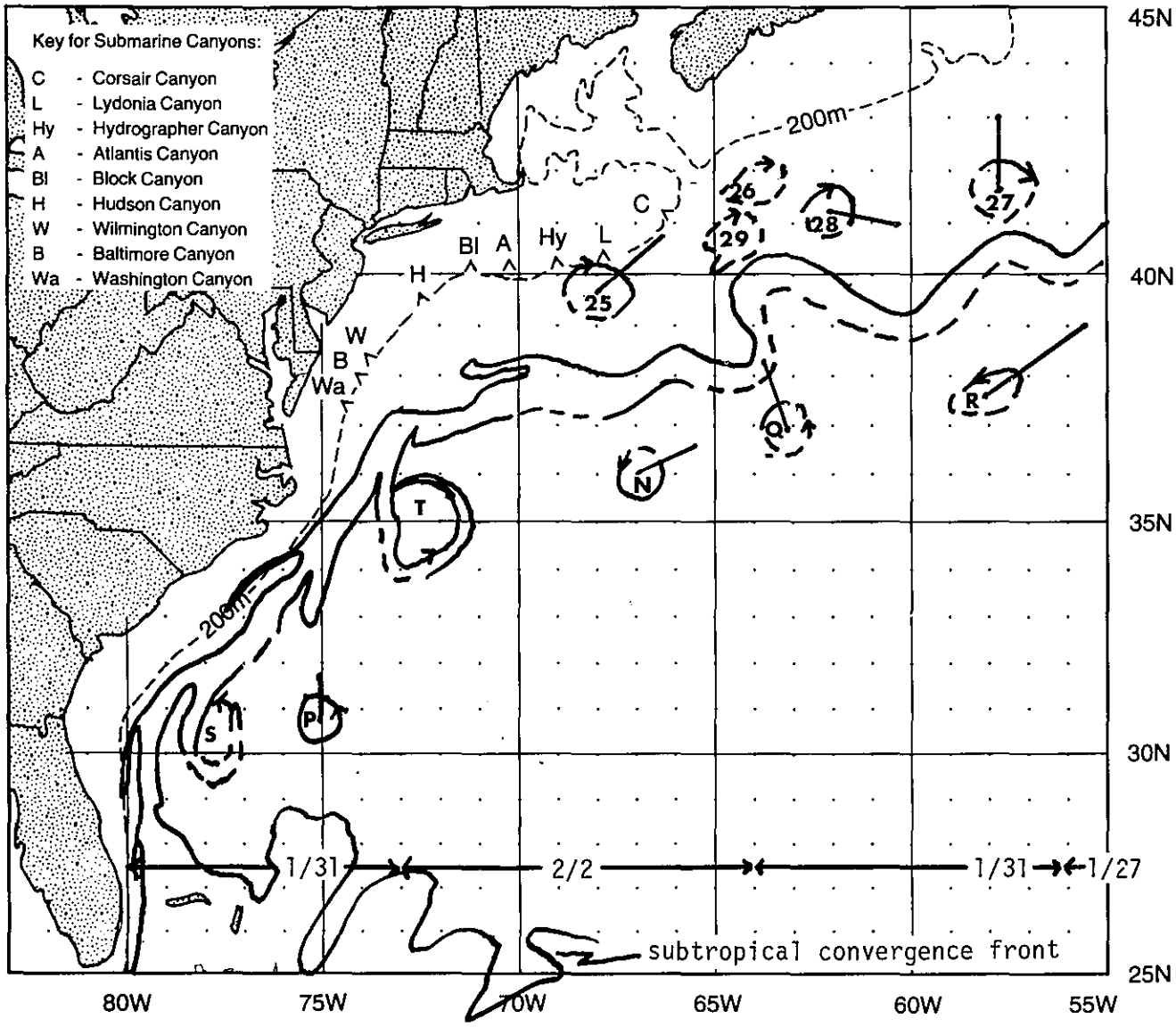
Jenifer Wartha Clark
Synoptic Anal. Br., S/DS23
NESS/NOAA
Washington, DC 20233
301/763-8446

Steve Auer
Nat. Met. Center, W/NMC21
Nat. Weather Service, NOAA
Washington, DC 20233
301/763-8133



JANUARY 1983

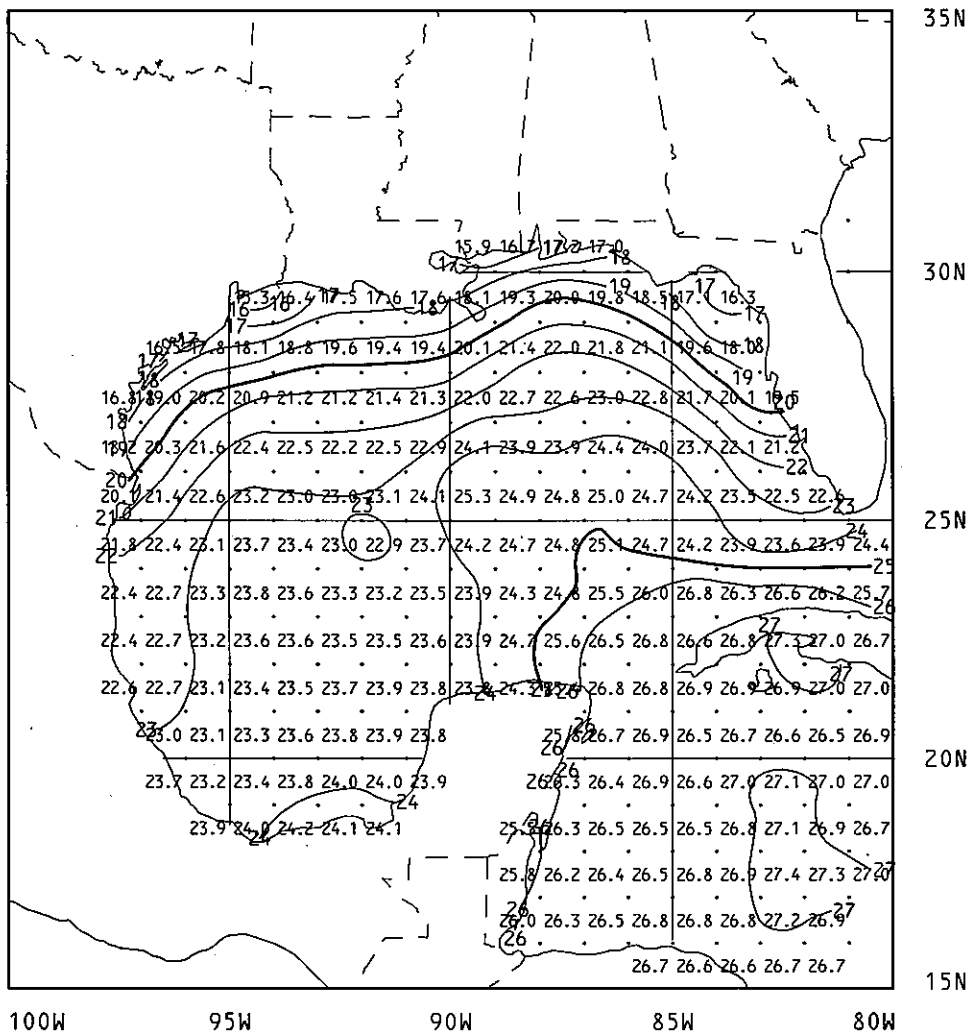
The northern amplitude of the Loop Current has increased from 24°N to 24°30N. Eddy g translated 120 km WSW during January. Eddy f, previously identified by AXBT (airborne expendable bathythermograph) data on December 2, translated about 110 km NW by January 31. A warm eddy-like feature was discerned in the northwestern Gulf near 26°N 94°30W.



One new anticyclonic eddy was observed during January. Anticyclonic eddy 22 was not observed all month and its status is uncertain (i.e., it may no longer exist). A Gulf Stream meander near 41°N 64°W pinched-off around mid-January forming new eddy 29. Eddy 25 translated 175 km SW. The locations of eddies 26, 27, and 28 are uncertain due to much cloudiness and some conflicting data. Eddy 26 was last observed on January 8. Eddies 28 and 27 apparently translated 140 km WNW and 150 km S, respectively.

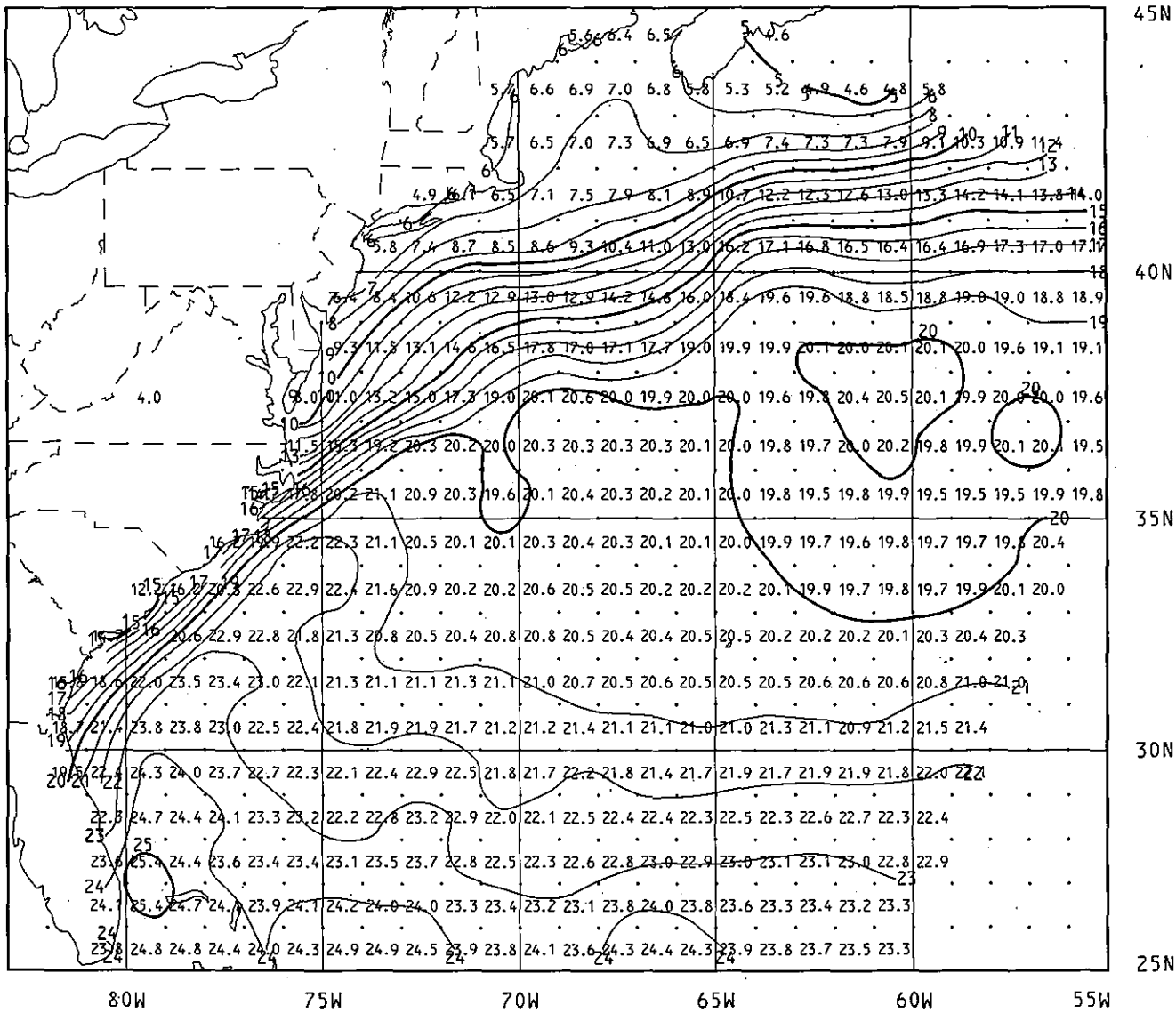
Cyclonic eddies S and T are newly observed eddies whose origins are unknown. Eddy N moved erratically during the month with a net translation of 140 km SW. Eddy P travelled 110 km S. Eddy Q, identified by the Naval Eastern Oceanography Center, apparently moved 155 km SE. Eddy R translated 330 km SW. The subtropical covergence front was observed for the first time this winter season on January 30-31.

EAST COAST SST-
MONTHLY MEAN



Gulf of Mexico
SST--MONTHLY MEAN (°C)
January 1983

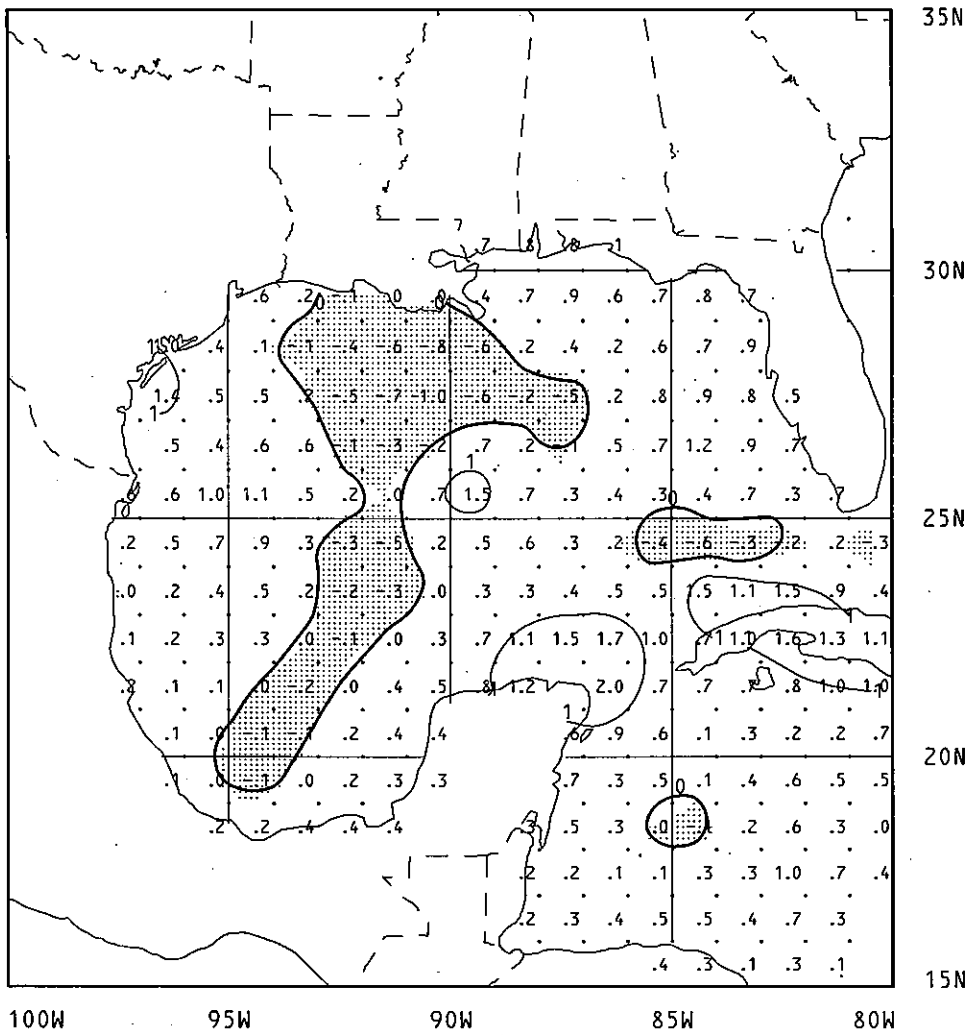
Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.



NW Atlantic Ocean
SST--MONTHLY MEAN (°C)
January 1983

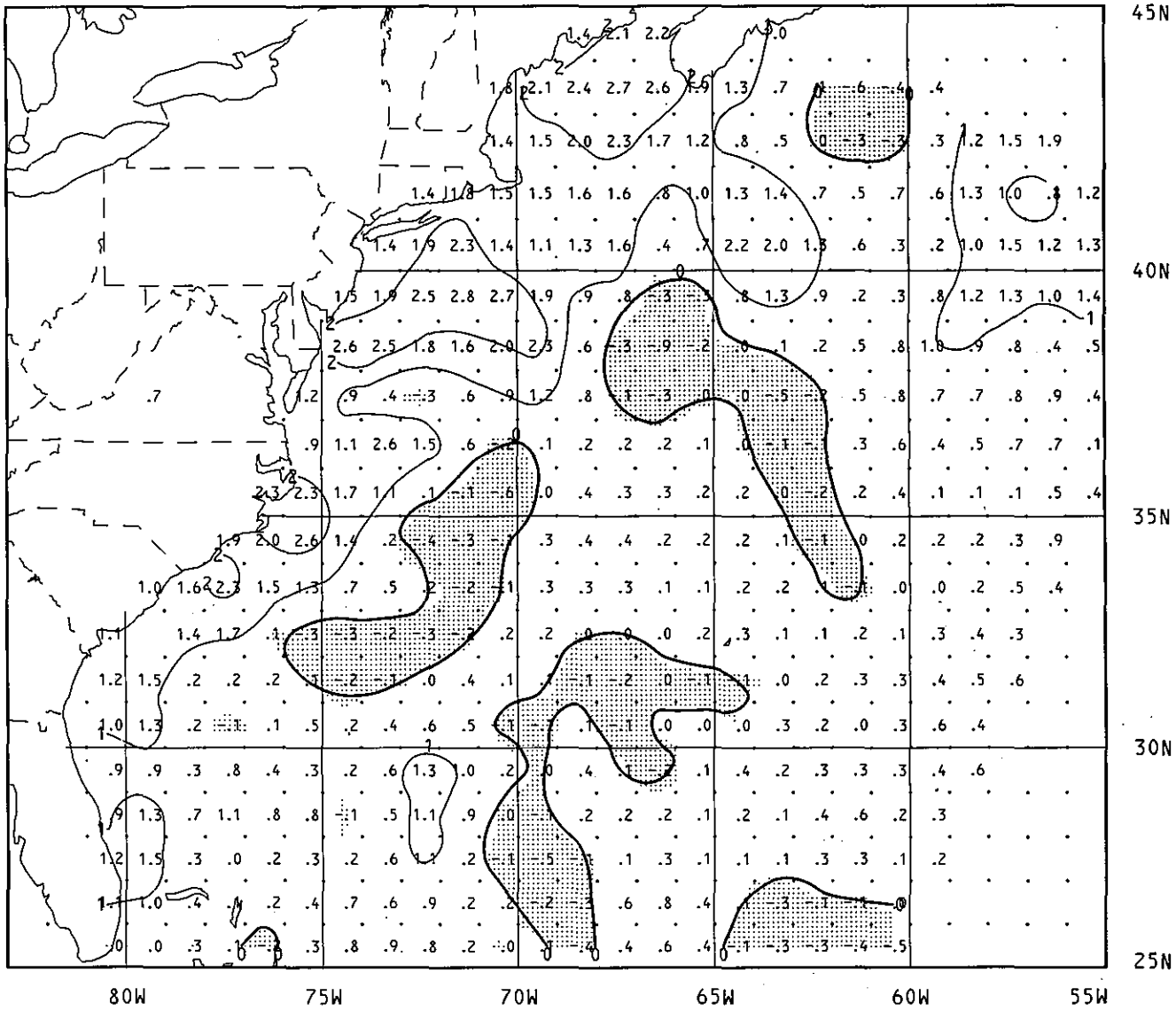
Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.

EAST COAST SST-ANOMALY



Gulf of Mexico
SST--MONTHLY ANOMALY (°C)
January 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.



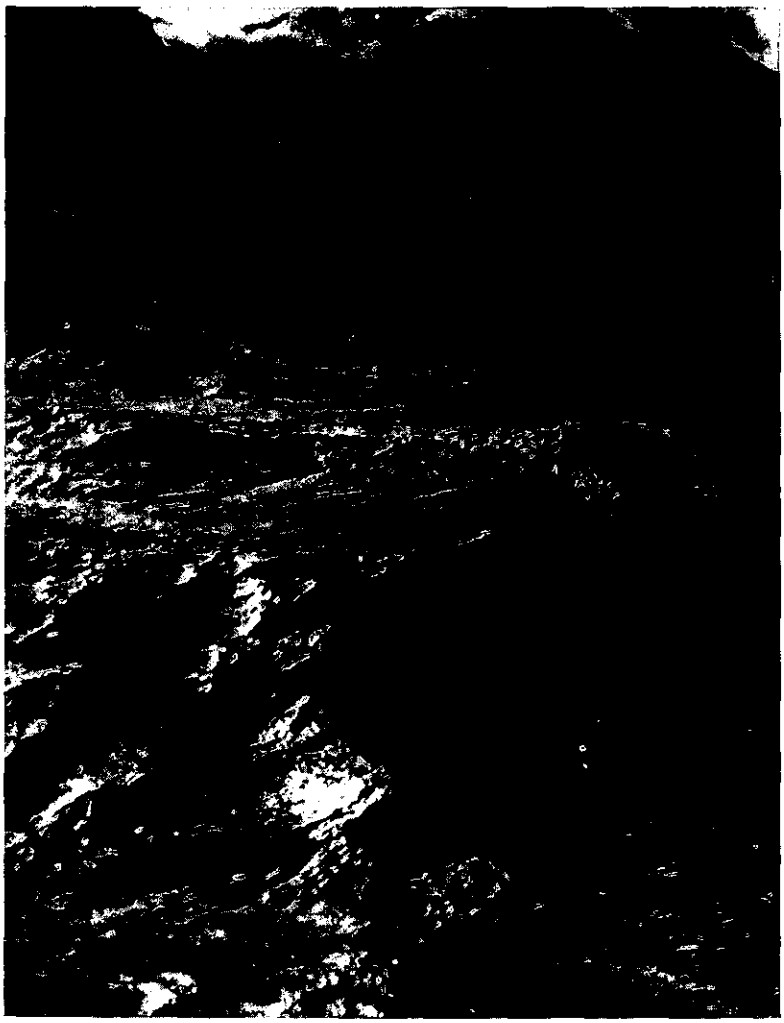
NW Atlantic Ocean
SST--MONTHLY ANOMALY (°C)
January 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.

* U.S.GOVERNMENT PRINTING OFFICE: 1983 381-013/310

OCEANOGRAPHIC Monthly Summary

Volume III Number 2 February 1983



Contents

3 OceaNotes

4 Pacific SST - monthly mean, ship and buoy data

6 Pacific SST - anomaly

10 Atlantic SST - monthly mean, ship and buoy data

11 Atlantic SST - anomaly

14 Bering Sea/North Slope ICE, with text

15 West Coast OCEAN FEATURES, with text

16 West Coast SST - monthly mean

17 West Coast SST - anomaly

18 East Coast OCEAN FEATURES, with text

20 East Coast SST - monthly mean

22 East Coast SST - anomaly

24 Subscription information

U.S. DEPARTMENT OF COMMERCE • National Oceanic and Atmospheric Administration
National Weather Service
National Environmental Satellite, Data, and Information Service

Oceanographic Monthly Summary is published by the National Weather Service and the National Environmental Satellite, Data, and Information Service (NESDIS). *Oceanographic Monthly Summary* contains sea surface temperature (SST) analyses on both regional and ocean basin scales for the Atlantic and Pacific Oceans. The hemispheric SST analyses use the National Climatic Center (NCC) Climatology*. The regional SST analyses use the Robinson-Bauer Climatology.* Eventually the regional analyses will also use the NCC based climatology. *Oceanographic Monthly Summary* also contains Alaskan sea ice information and ocean feature information for contiguous U.S. ocean regions.

Oceanographic Monthly Summary welcomes articles containing information of interest to *Oceanographic Monthly Summary* readers, such as, news on operational oceanography, unusual ocean feature phenomena, etc. Contributions should be sent to the editor (address below). Accepted material will appear in the OceaNotes section of *Oceanographic Monthly Summary*. Contributions can be published as quickly as the next monthly issue.

If you are interested in receiving *Oceanographic Monthly Summary* regularly, please refer to the back cover for subscription information.

*Reynolds, R.W., 1982. A Monthly Averaged Climatology of Sea Surface Temperatures; *NOAA Technical Report NWS 31*.

*Robinson, M.K., 1976. Atlas of North Pacific Ocean Monthly Mean Temperatures and Mean Salinities of the Surface Layer; *NavOceano Ref. Pub. 2*.

Robinson, M.K., R. A. Bauer and E.H. Schroeder, 1979. Atlas of North Atlantic-Indian Ocean Monthly Mean Temperatures and Mean Salinities of the Surface Layer; *NavOceano Ref. Pub. 18*.

Oceanographic Monthly Summary
Editor: Steve Auer
National Meteorological Center, W/NMC21
National Weather Service, NOAA
Washington, DC 20233
(telephone: 301/763-8133)
Assistant Editor: Jenifer Wartha Clark
Synoptic Analysis Branch, S/DS23
NESDIS, NOAA
Washington, DC 20233
(telephone: 301/763-8446)

SST Computer Analyses are prepared by:
William H. Gemmill
Marine Products Branch, W/NMC21
National Meteorological Center
National Weather Service, NOAA
Washington, DC 20233
(telephone: 301/763-8133)

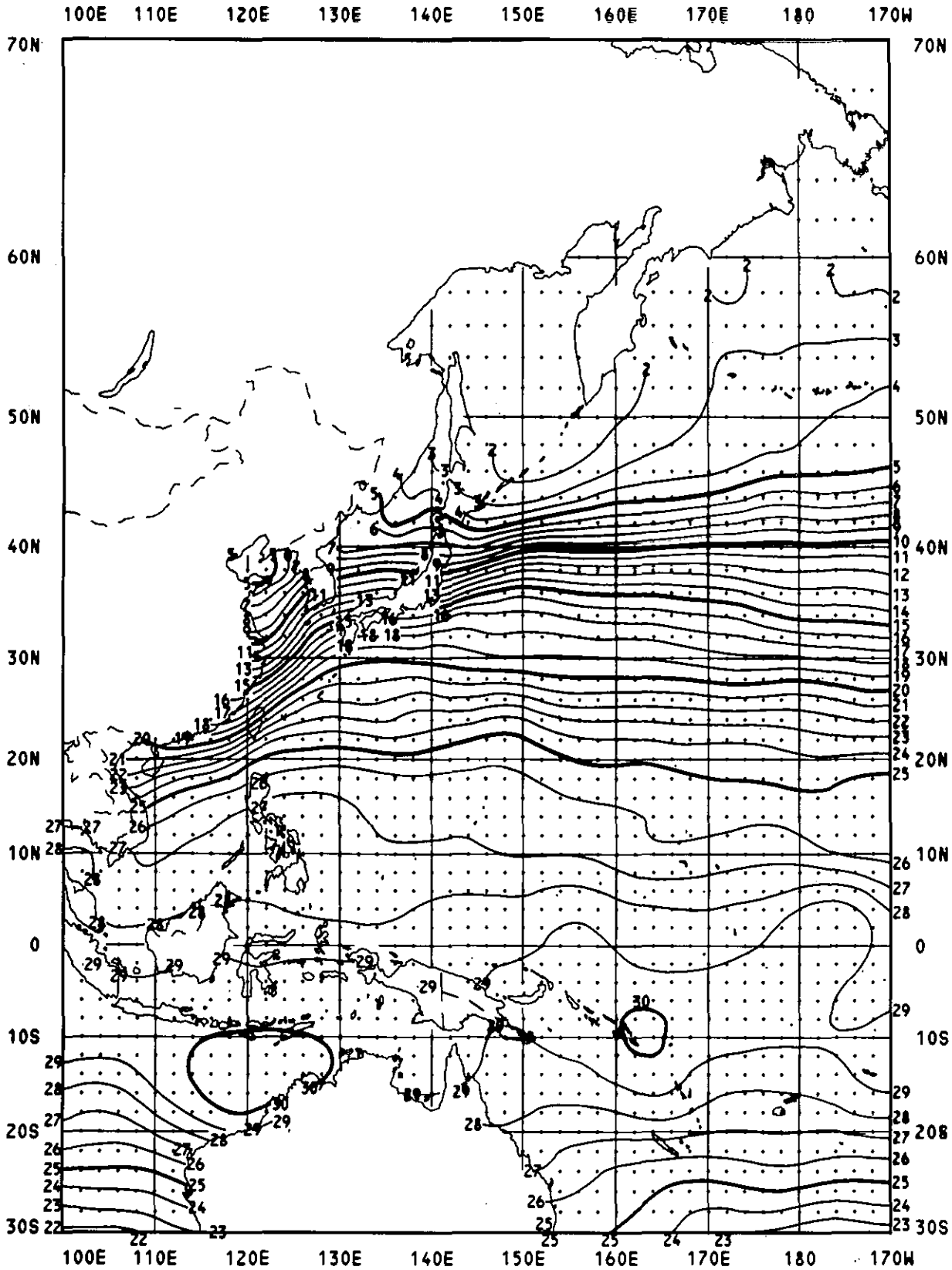
NEW GLOBAL SST ANALYSIS

The recent extreme warming in the tropical eastern Pacific has been underestimated by the global operational objective SST analysis (see discussion in the November 1982 issue of this publication for more details). In an effort to improve our SST fields, a global analysis has been provided by a new analysis produced by the Climate Analysis Center (CAC). This analysis is obtained from two-degree latitude and longitude monthly summaries of climatologically screened in situ (ship and buoy) SST observations. These two-degree summaries are processed by a non-linear filter based on the computation of medians (see Rabiner, 1975). Since medians were used rather than weighted means, extreme points could be systematically eliminated from the final product.

The global SST climatology used by CAC is the one-degree resolution SST climatology processed by Reynolds (1982) from an NCC data summary of in situ SST observations. A comparison of the differences between this climatology and five other global climatologies, including the Robinson and Bauer climatology can be found in Reynolds (1983).

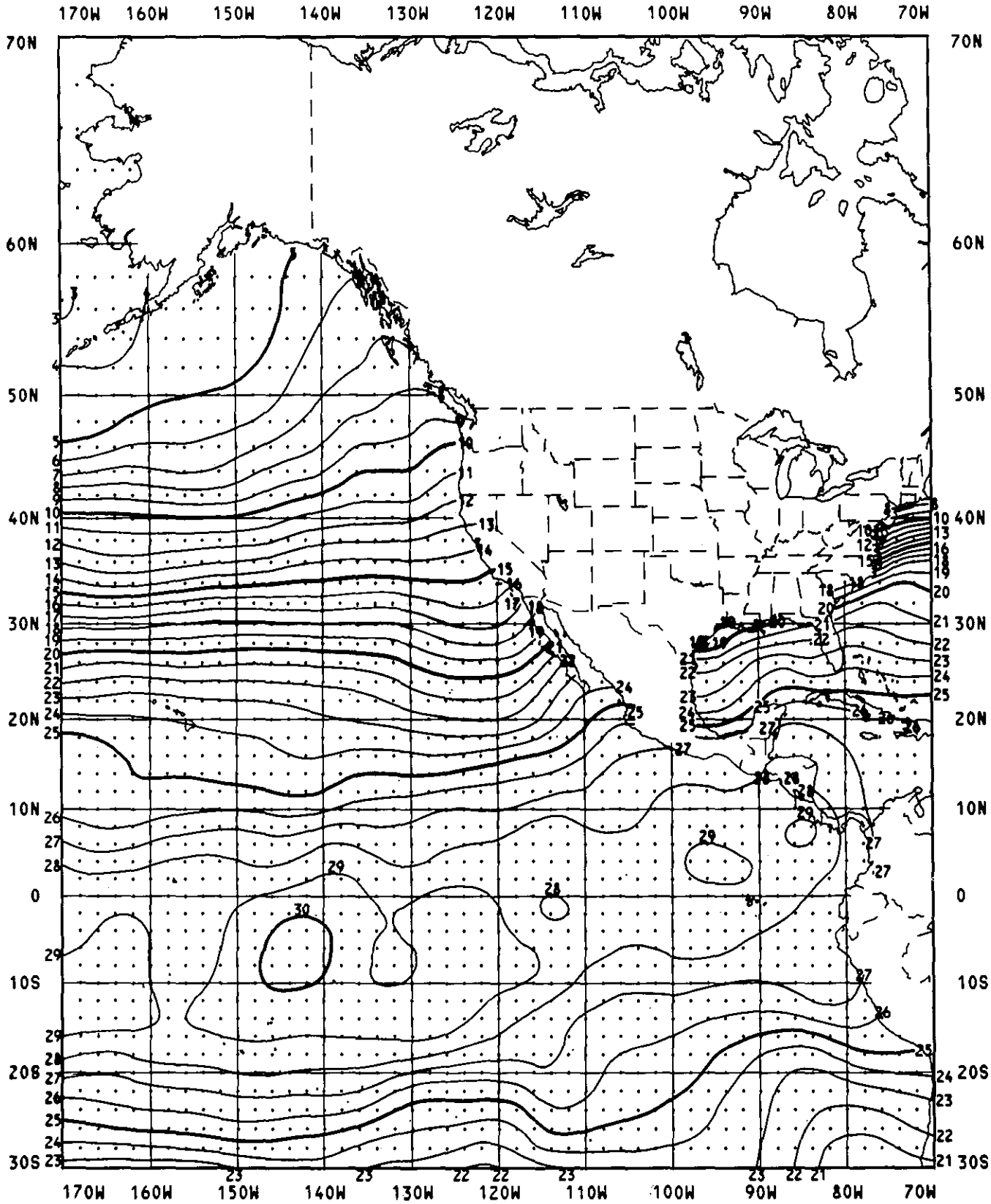
In coming issues of *Oceanographic Monthly Summary* a set of charts derived from satellite data will be also included on pages 8, 9, and 12.

Reynolds, R.W., 1982. A Monthly Averaged Climatology of Sea Surface Temperatures. *NOAA Technical Report NWS 31*, 35 pp.
Reynolds, R.W., 1983. A Comparison of Sea Surface Temperature Climatologies. *J. of Climate and Applied Meteor.*, 22, in press.
Rabiner, L.R., M.R. Sambur, and C.E. Schmidt, 1975. Applications of Linear Smoothing Algorithm to Speech Processing. *IEE Trans. on Acoustics, Speech and Signal Processing*, ASSP-23, 552-557.



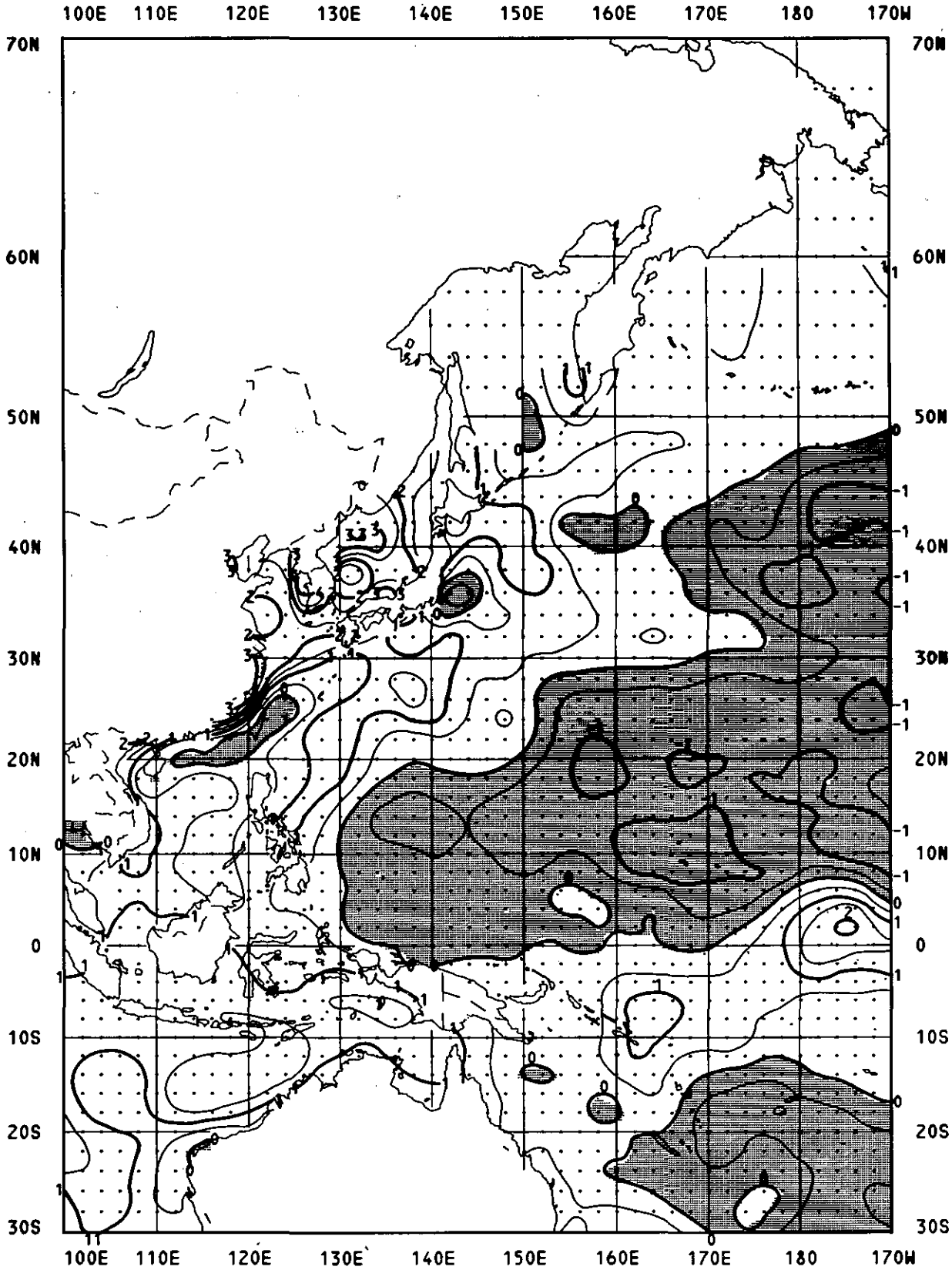
Western Pacific Ocean
SST--MONTHLY MEAN (°C)
SHIP and BUOY DATA
February 1983

This is the new chart format (see p. 3). Monthly mean of in situ data (ship and buoy observations). Contour line interval is 1.0°C.



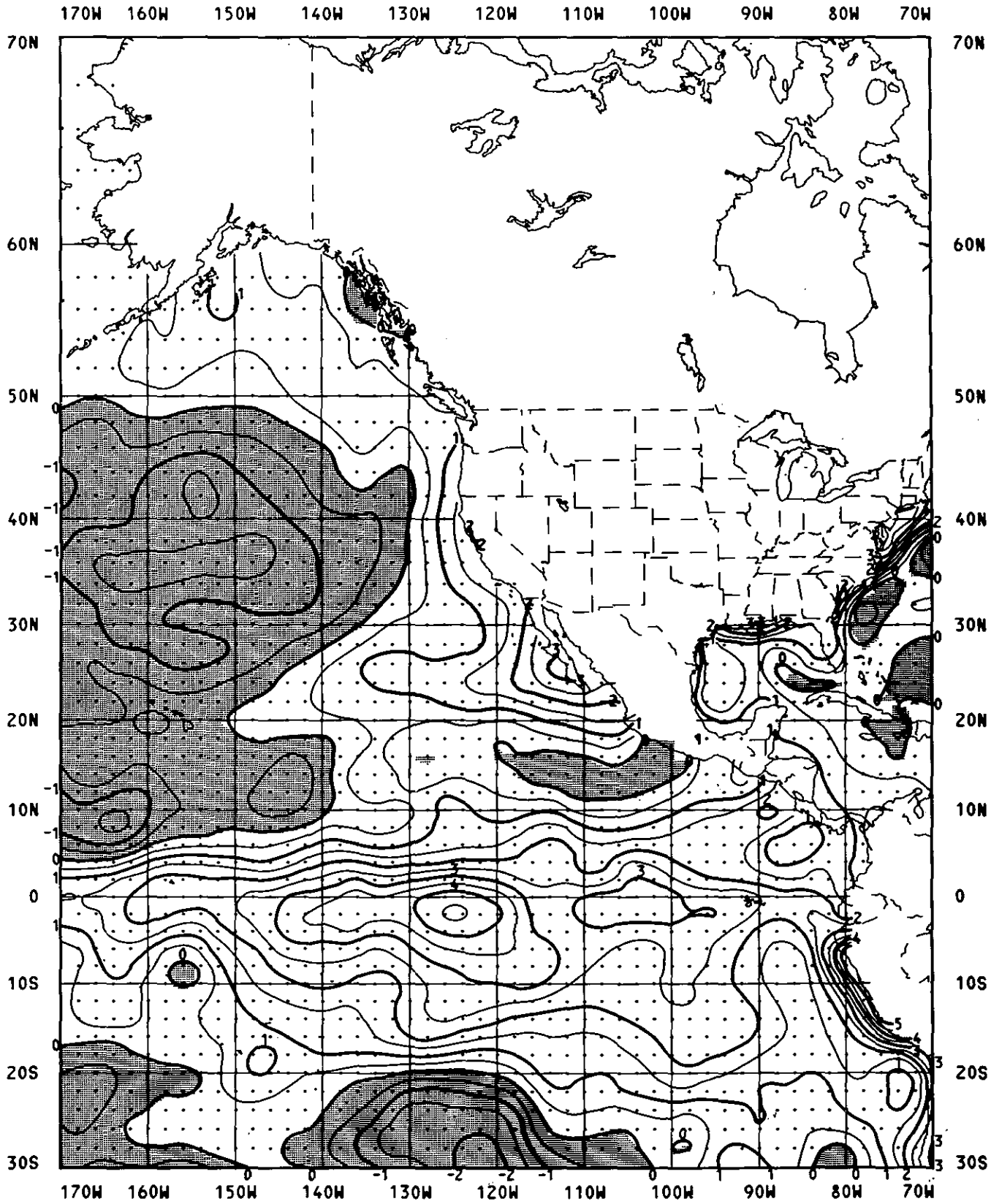
Eastern Pacific Ocean
SST--MONTHLY MEAN (°C)
SHIP and BUOY DATA
February 1983

This is the new chart format (see p. 3). Monthly mean of in situ data (ship and buoy observations). Contour line interval is 1.0°C.



Western Pacific Ocean
SST--MONTHLY ANOMALY(°C)
SHIP and BUOY DATA
February 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the NCC climatological monthly mean value (see p. 2) -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.

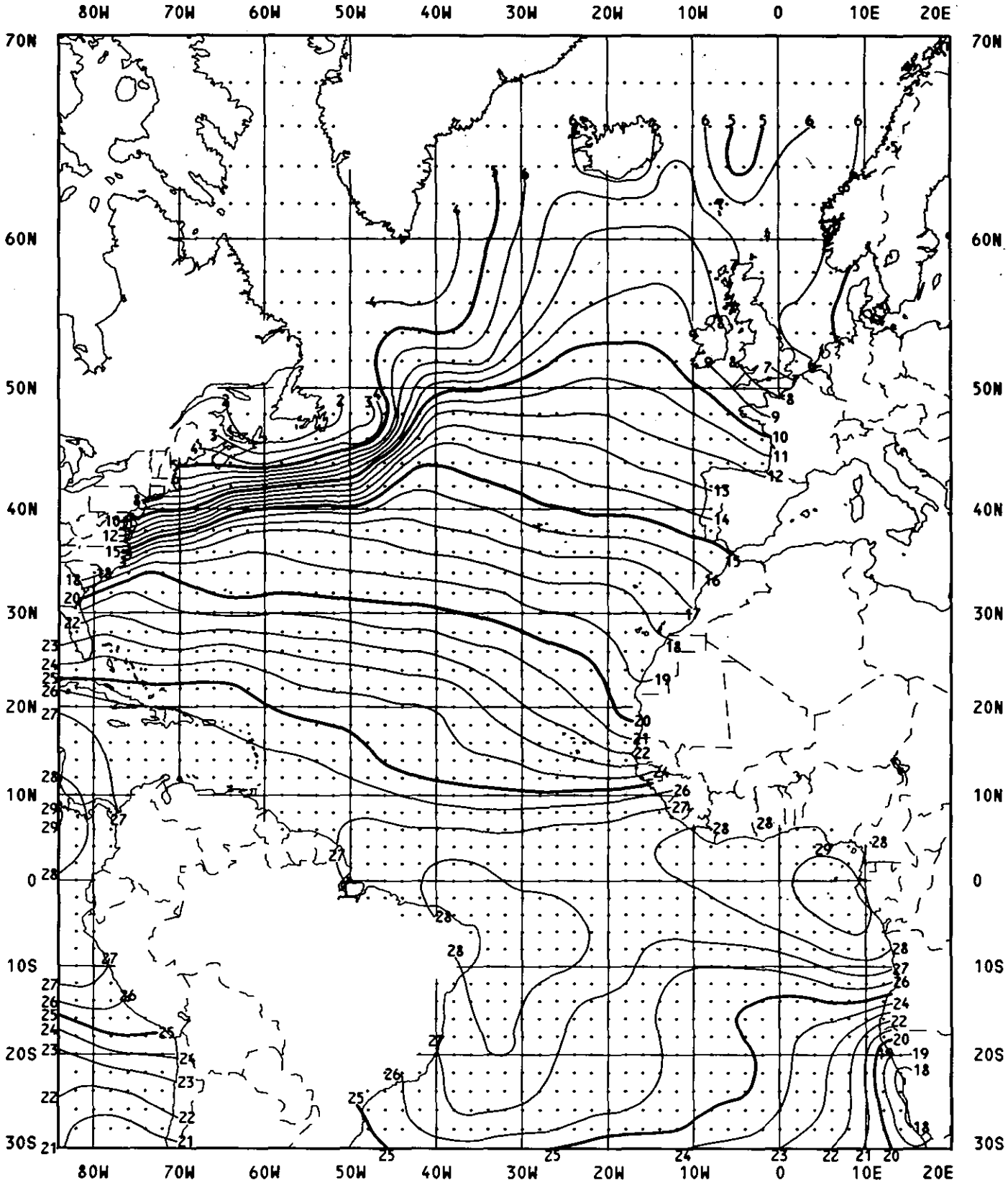


Eastern Pacific Ocean
SST--MONTHLY ANOMALY (°C)
SHIP and BUOY DATA
February 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the NCC climatological monthly mean value (see p. 2)-- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.

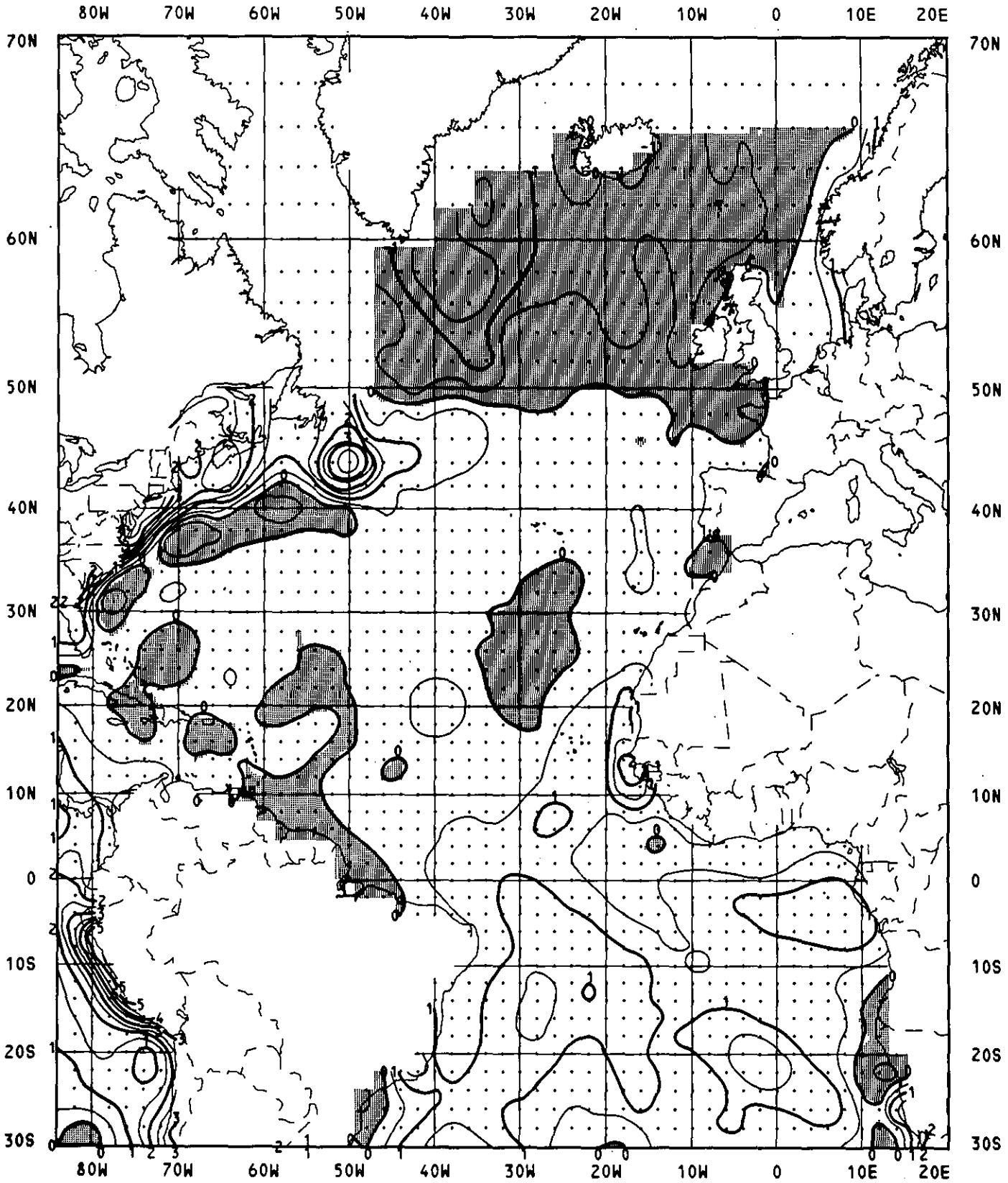
This page is intentionally left blank. Monthly charts using satellite data will appear on this page in coming issues.

This page is intentionally left blank. Monthly charts using satellite data will appear on this page in coming issues.



Atlantic Ocean
SST--MONTHLY MEAN (°C)
SHIP and BUOY DATA
February 1983

This is the new chart format (see p. 3). Monthly mean sea surface temperature is the mean of in situ data (ship and buoy observations). Contour line interval is 1.0°C.

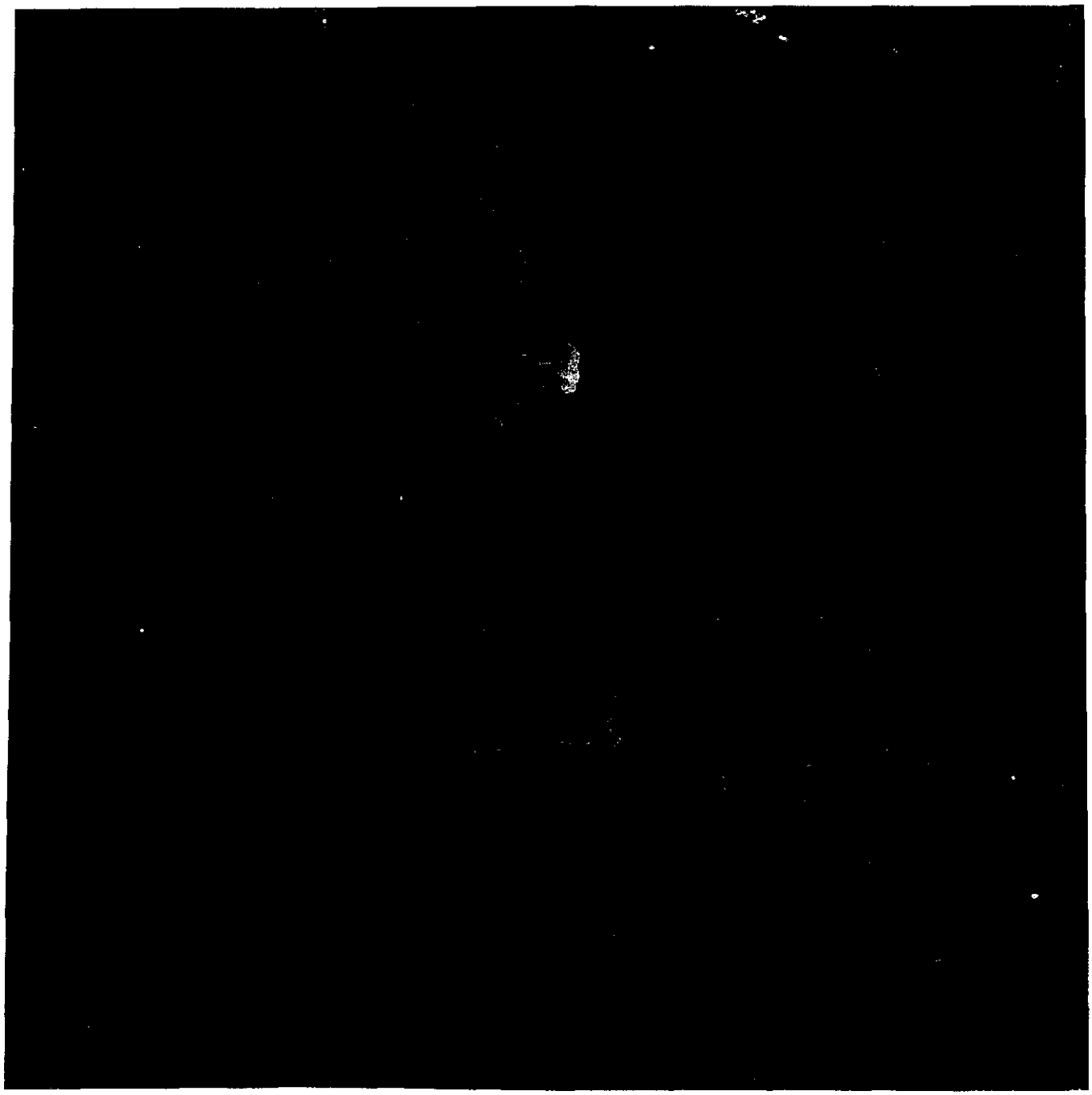


Atlantic Ocean
SST--MONTHLY ANOMALY (°C)
SHIP and BUOY DATA
February 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the NCC climatological monthly mean value (see p. 2) -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.

NOAA-7 SATELLITE IMAGE #8723

This infrared satellite image is from 0840 GMT on March 3, 1983. The area of coverage includes the eastern basin of the Gulf of Mexico. Surface temperature gradients are seen on the image as shades of grey--darker shades indicating higher temperatures. The landmasses of Florida, Cuba, and the Yucatan Peninsula are seen as cooler than the sea surface in the upper right, lower right, and lower left corners, respectively. Cooler shelf waters are discerned along Florida, the Bahama Islands (east of Florida), and Cuba. The warm waters of the Gulf Stream System are seen to penetrate into the Gulf of Mexico and flow thru the Florida Straits and along the east coast of Florida. Anticyclonic eddy g is seen northwest of the Loop Current penetration. For details on the monthly events of this region see page 18.



REGIONAL ANALYSES

Bering Sea / North Slope Ice

West Coast

Ocean features

Sea surface temperature

SST anomaly

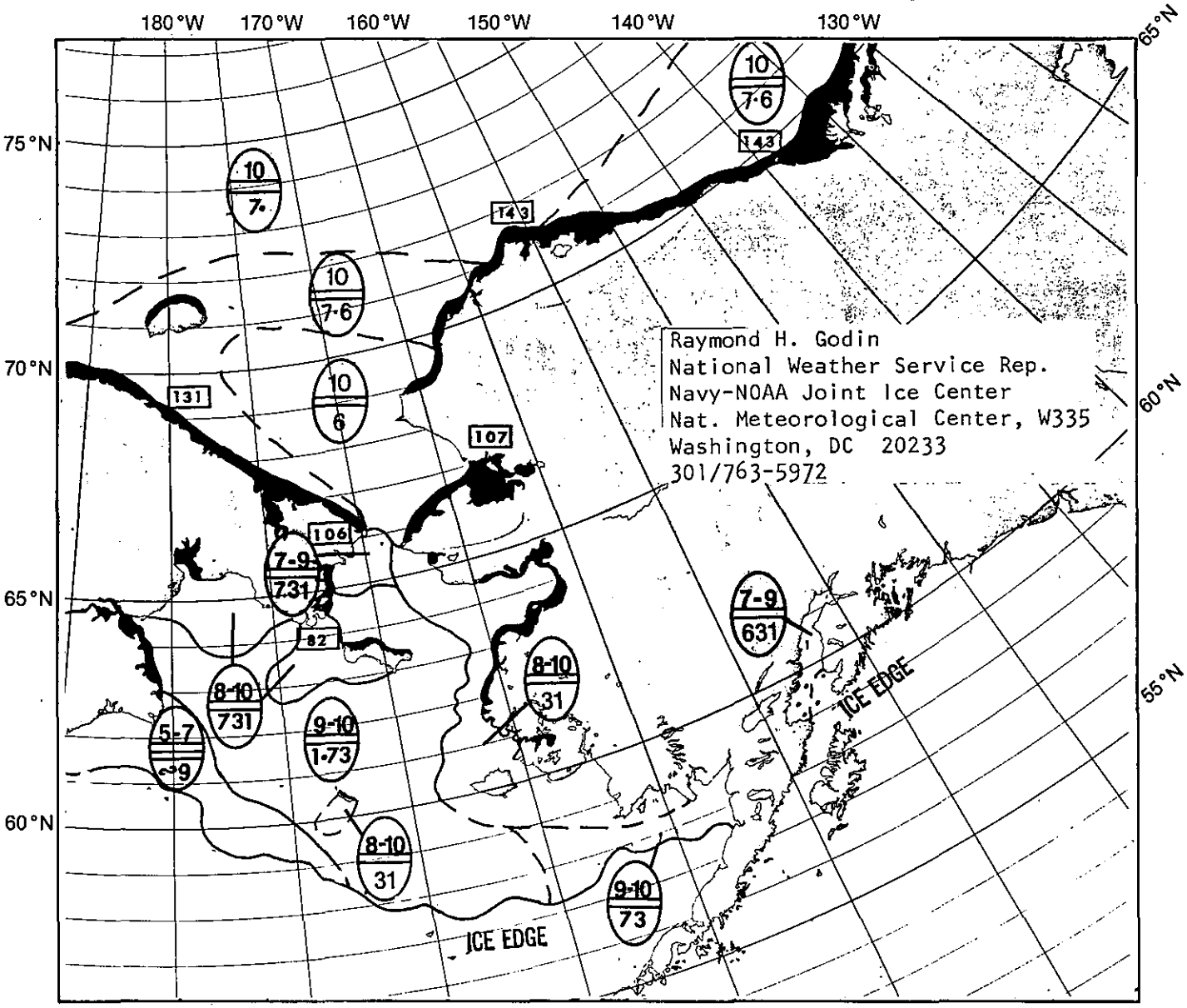
East Coast

Ocean features

Sea surface temperature

SST anomaly

BERING SEA / NORTH SLOPE ICE ANALYSIS



C = Total ice concentration in the area in tenths.

C_a, C_b, C_c = Concentration of thickest (C_a), 2nd thickest (C_b), and 3rd thickest (C_c) ice

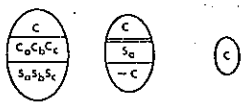
S_a, S_b, S_c = Stage of development of thickest (S_a), 2nd thickest (S_b), and 3rd thickest (S_c) ice.

-C = Concentration of ice within area(s) of strips and patches.

STAGE(S) OF DEVELOPMENT (THICKNESS)

1 = New ice (0-10 cm)
3 = Young ice (10-30 cm)
6 = First year (30-200 cm)
7 = First year thin (30-70 cm)
1. = First year medium (70-120 cm)
4. = First year thick (120-200 cm)
7. = Old ice (survived at least one summer's melt)

EXAMPLES



125 — Theoretical thickness of this season's growth (cm).

Fast ice. Sea ice which forms and remains fast along the coast.

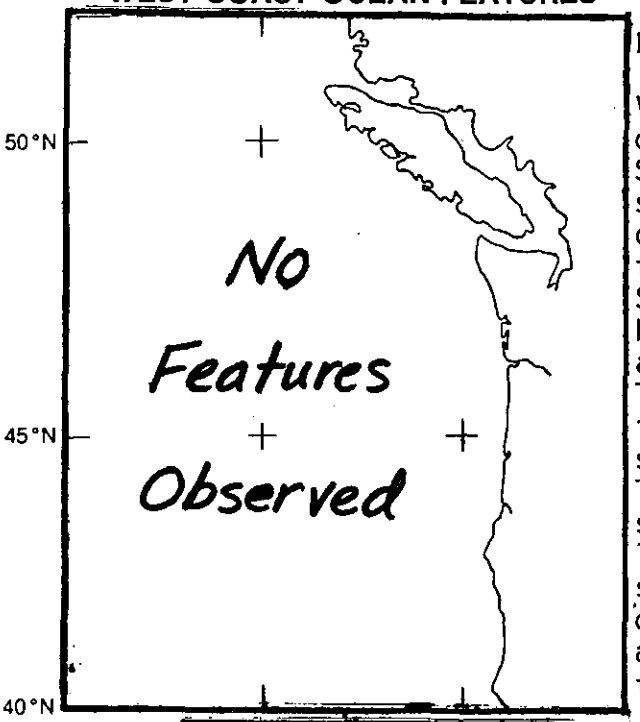
Ice boundary visually or satellite observed.

Ice boundary estimated.

FEBRUARY 1983

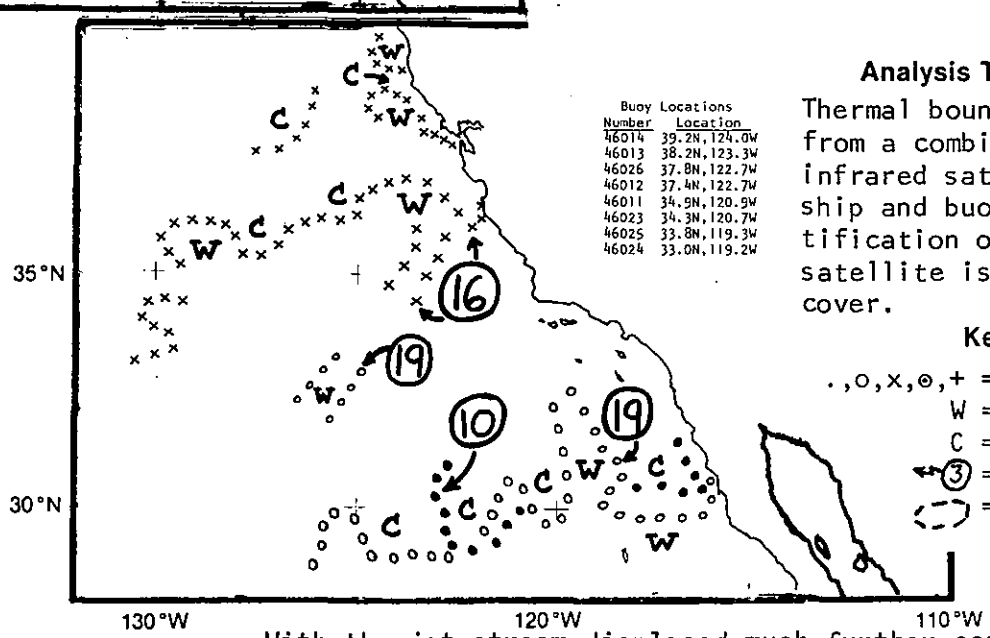
The mean monthly surface pressure circulation shows a double center 985 mb low pressure system in the northern Pacific near 51°N 170°W and 48°N 150°W. In the Bering Sea geostrophic surface winds are easterly south of 60°N and northeasterly to the north. An extensive shore and flaw lead containing new and young ice extends from the Bering Strait to Bristol Bay (59°N 160°W). The thickest non-fast ice in the Bering Sea consists of first year medium ice located southwest of the ice generation area within the shore/flaw lead feature. Large shore leads are also observed west of St. Lawrence (63°N 170°W) and St. Matthew (61°N 173°W) Islands. The ice edge generally expanded 30-35 km east of 175°W and 100-150 km west of 175°W. The current ice edge position is near the historical mean.

WEST COAST OCEAN FEATURES



FEBRUARY 1983

Very small SST changes and weak SST gradients characterized the north panel area during February. Slight cooling occurred in offshore areas, and slight warming in coastal waters. However, the changes were virtually insignificant, amounting to less than 0.5°C over the month in both cases. Small fluctuations in SST were observed at all buoys and coastal stations, but were not part of any trend, and were generally unrelated spatially. The only exception to this was a consistent warming episode observed at all Washington coastal stations during the last ten days of the month. The significant warm anomaly in nearshore waters seen in preceding months is persisting, and is likely related to strong positive anomalies observed further south along California. Cloud cover severely hampered the use of satellite imagery during February. No significant thermal features were seen in the limited usable imagery.



Analysis Techniques

Thermal boundaries are determined from a combination of enhanced infrared satellite imagery and ship and buoy observations. Identification of these features by satellite is limited by cloud cover.

Key

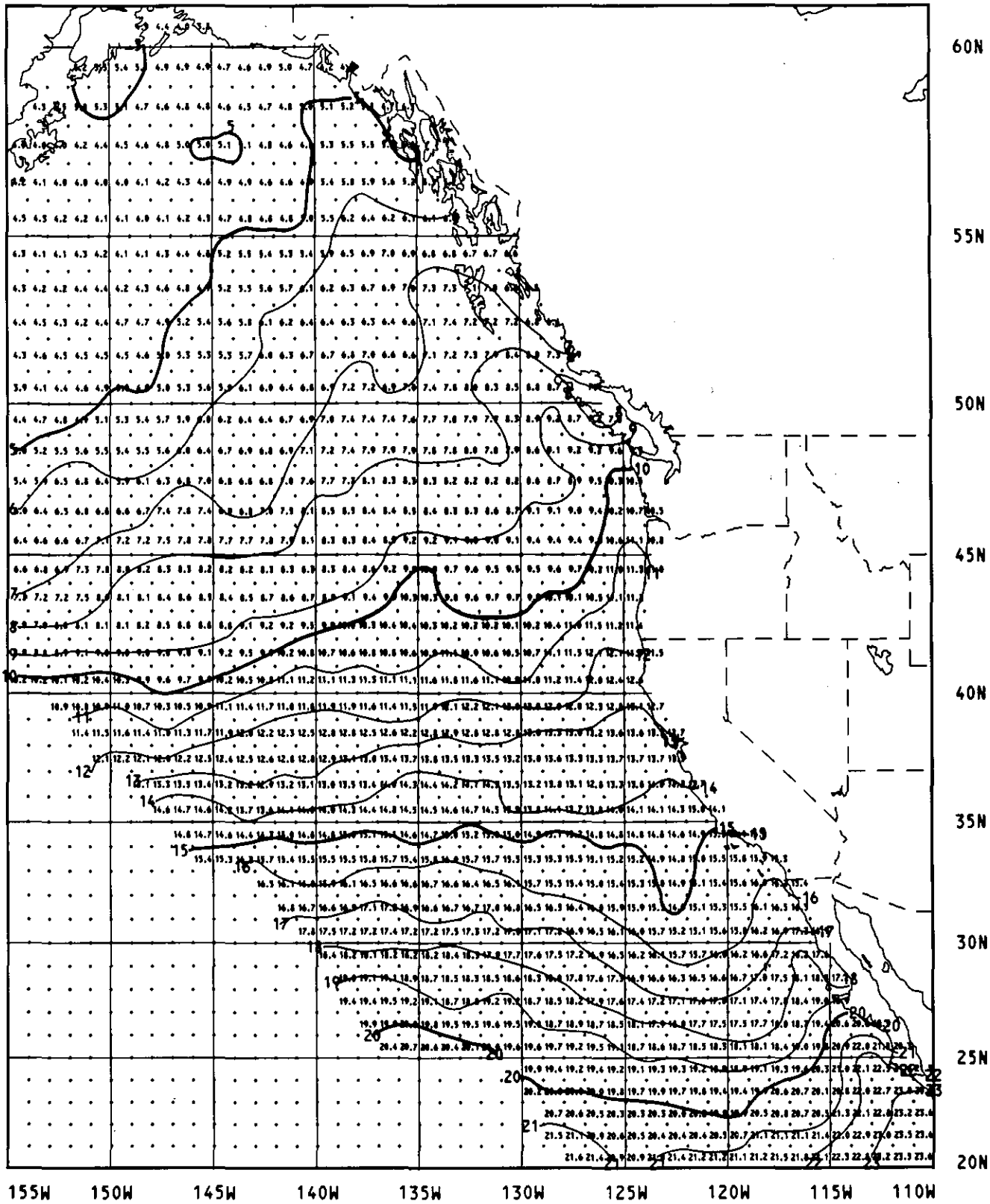
.,o,x,⊙,+ = thermal boundaries
W = warm
C = cold
(3) = date of feature
(- -) = outline of water mass feature

With the jet stream displaced much further south than average, several storm systems moved through the south panel area (SPA) in Feb. causing stronger and more persistent southerly surface winds than normal from the coast to 130°W. This, in turn, prevented any significant upwelling from occurring and led to a 0.5°C warming of the average SSTs from Jan.to Feb. east of 127°W. This warming near the coast enhanced the pool of anomalously warm water in this area so that average SSTs in Feb. were 1.0-3.5°C above normal along the entire SPA coast and extending offshore 550 km. The center of the warm pool was near 36°N 122°W. West of 127°W, SSTs decreased 0.5-1.0°C in Feb. SSTs between 32° and 39°N west of 132°W continued 1.0-1.5°C cooler than normal, although the cool area is smaller than several months ago.

Buoy No.	Avg. SST	Std. Dev.
46014	13.5	0.3
46013	13.7	1.2
46026	13.2	0.5
46012	14.0	0.2
46011	15.3	0.3
46023	15.5	0.2
46025	16.1	0.2
46024	15.5	0.2

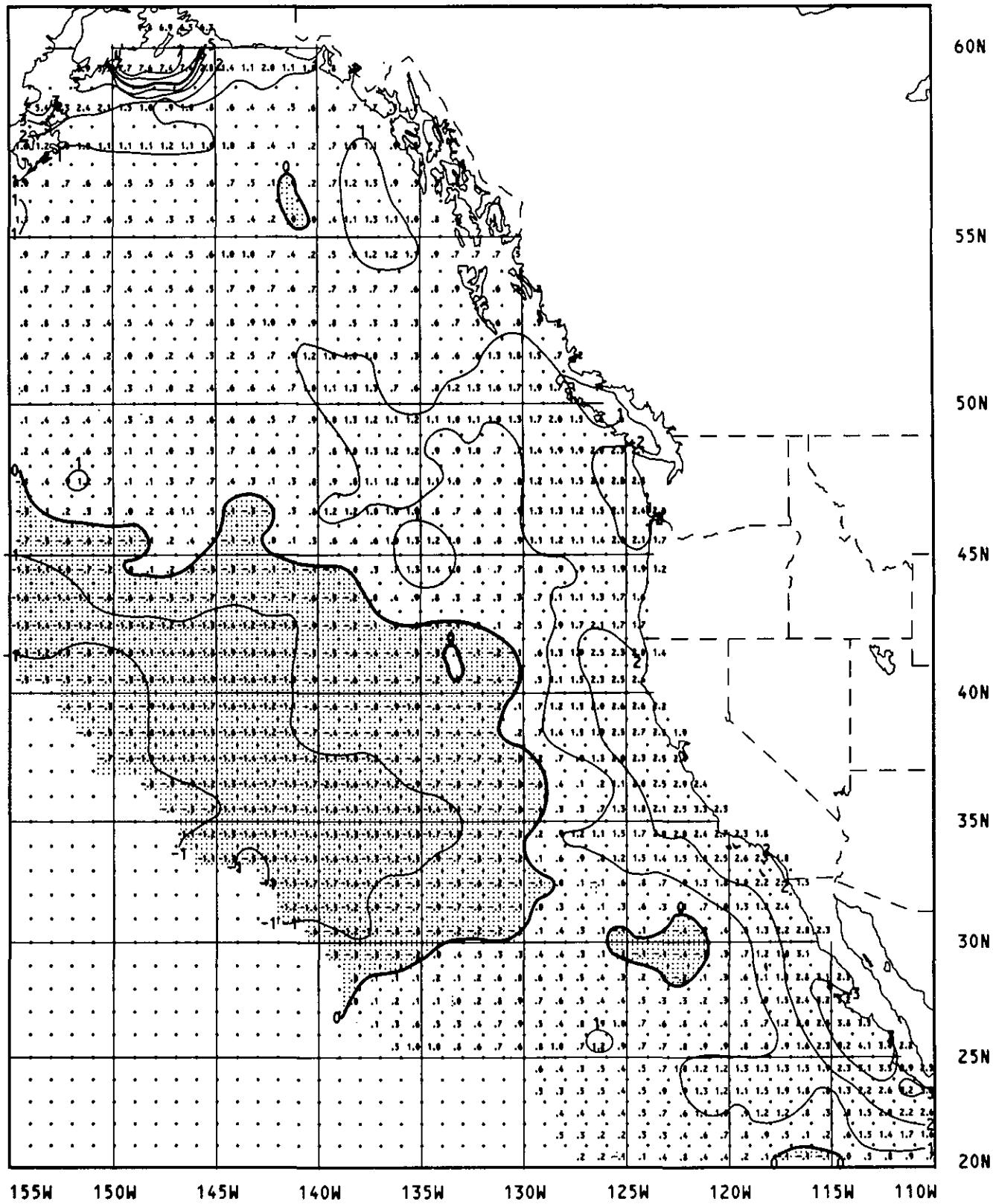
North Panel
Kent Short
Seattle Ocean Services Unit
National Weather Service/NOAA
7600 Sand Point Way NE
Bin C15700
Seattle, WA 98115
206/527-6105

South Panel
Larry Breaker
Satellite Field Service Station
NESDIS/NOAA
660 Price Avenue
Redwood City, CA 94063
415/364-2422



West Coast
SST--MONTHLY MEAN (°C)
February 1983

Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.



West Coast
SST--MONTHLY ANOMALY (°C)
February 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.

The end of this month's positions of the Gulf Stream System and its associated eddies are shown for the NW Atlantic and the Gulf of Mexico. The Gulf Stream and Loop Current boundaries are located by infrared satellite imagery or XBT (expendable bathythermograph) data. Anticyclonic eddies are labeled a-z in the Gulf of Mexico and 1-99 in the NW Atlantic. Cyclonic eddies are labeled A-Z. Arrows on eddies indicate direction of circulation. Warm-core or anticyclonic eddies rotate clockwise; cold-core or cyclonic eddies rotate counterclockwise. The line to the eddy center shows the net translation since last month or since last observed. Eddies or sections of the Gulf

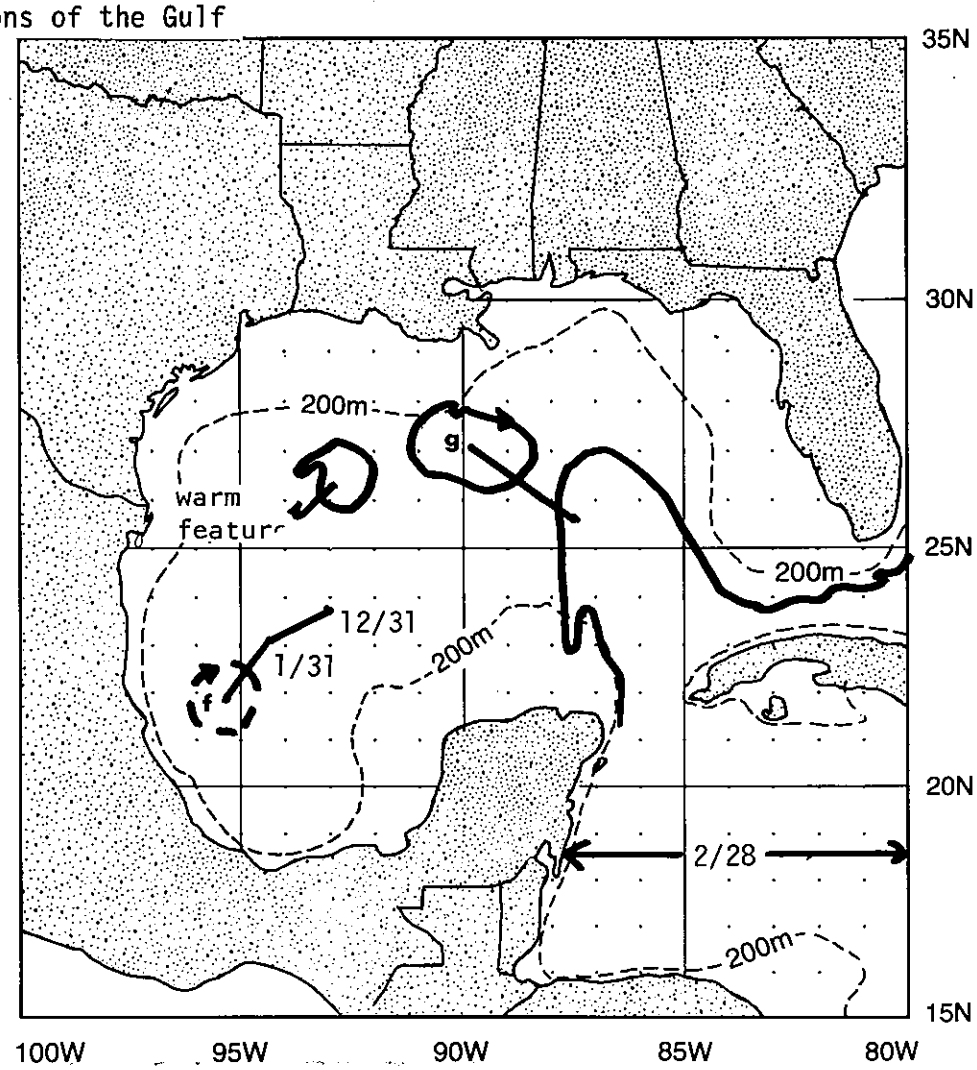
EAST COAST OCEAN FEATURES

Stream System which were not observed during the month are not shown on the analysis chart. The long arrows at the bottom of the chart indicate the date of data used.

Data used in this analysis include:
- NOAA satellite infrared imagery, NESDIS
- Bathythermograph data, National Meteorological Center of National Weather Service
- Oceanographic Analysis, A daily detailed analysis issued by National Weather Service/NESDIS

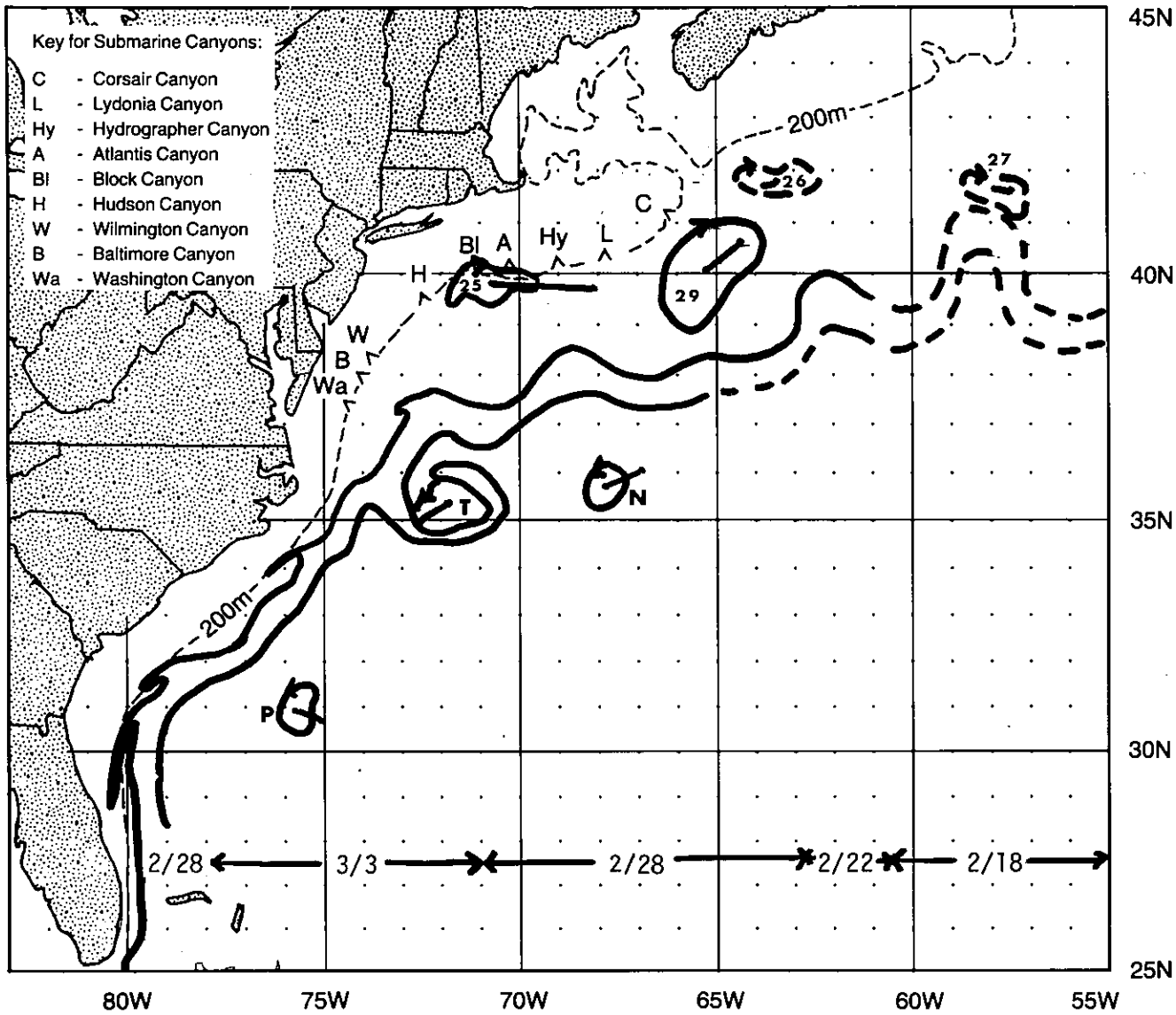
Jenifer Wartha Clark
Synoptic Anal. Br., S/DS23
NESDIS/NOAA
Washington, DC 20233
301/763-8446

Steve Auer
Nat. Met. Center, W/NMC21
Nat. Weather Service, NOAA
Washington, DC 20233
301/763-8133



February 1983

The amplitude of the Loop Current has increased about two degrees of latitude this month. This increase is not largely due to a Loop Current buildup and intrusion, but to the Loop's partial absorption of eddy g. These two features were clearly separated on February 7, but they began interacting before February 11. By February 20 the Loop and eddy g appeared to be merged, forming a large amplitude Loop Current. Around February 27 a reduced eddy g pinched off from the Loop. The current position of eddy g shows a net translation of 275 km NW. Eddy f is estimated from drifting buoy position information provided by the NOAA Data Buoy Center. This buoy has

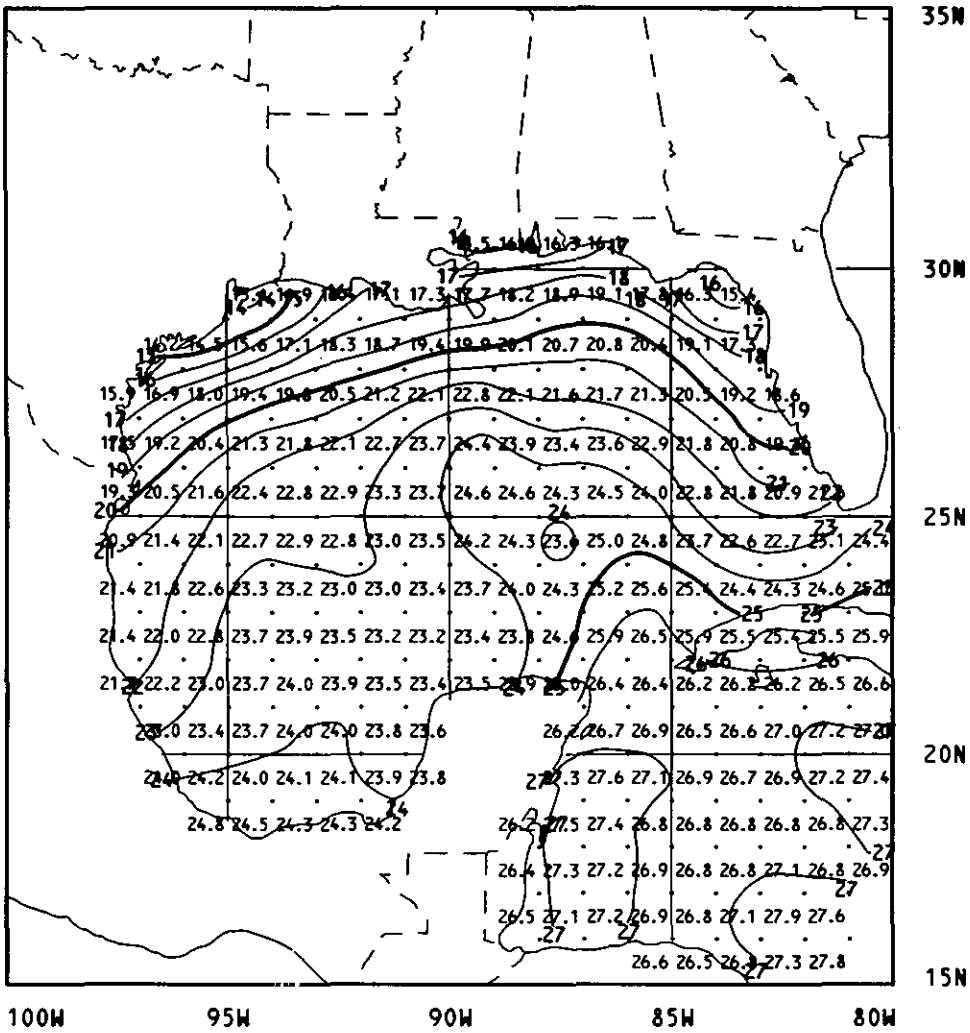


been in eddy f since October reporting its position and sea water temperatures from 0-200 meters depth. Eddy f end-of-month positions since December have been amended and are indicated in the analysis with translation lines. The warm feature near 26°30N 92°30W, originally thought to have been eddy f, has been observed in satellite imagery since late January.

The status of eddy 22 has been tentative since December in that it was uncertain whether it had been absorbed into the Stream about December 15 near 38°30N 70°W or if it still existed west of that position. Since satellite imagery of the region has shown no trace of an eddy, it apparently was absorbed in mid-December. No new anticyclonic eddies were formed or absorbed in February. Eddy 25 translated 220 km W. Eddy 29 translated 100 km SW. The size of eddy 29 significantly increased in mid- to late-February. This may possibly be due to the absorption of eddy 28, which was not observed this month, or to an interaction with a Gulf Stream meander. Eddy 26 apparently moved 40 km NE. Eddy 27 had translated 30 km W when last observed on February 18.

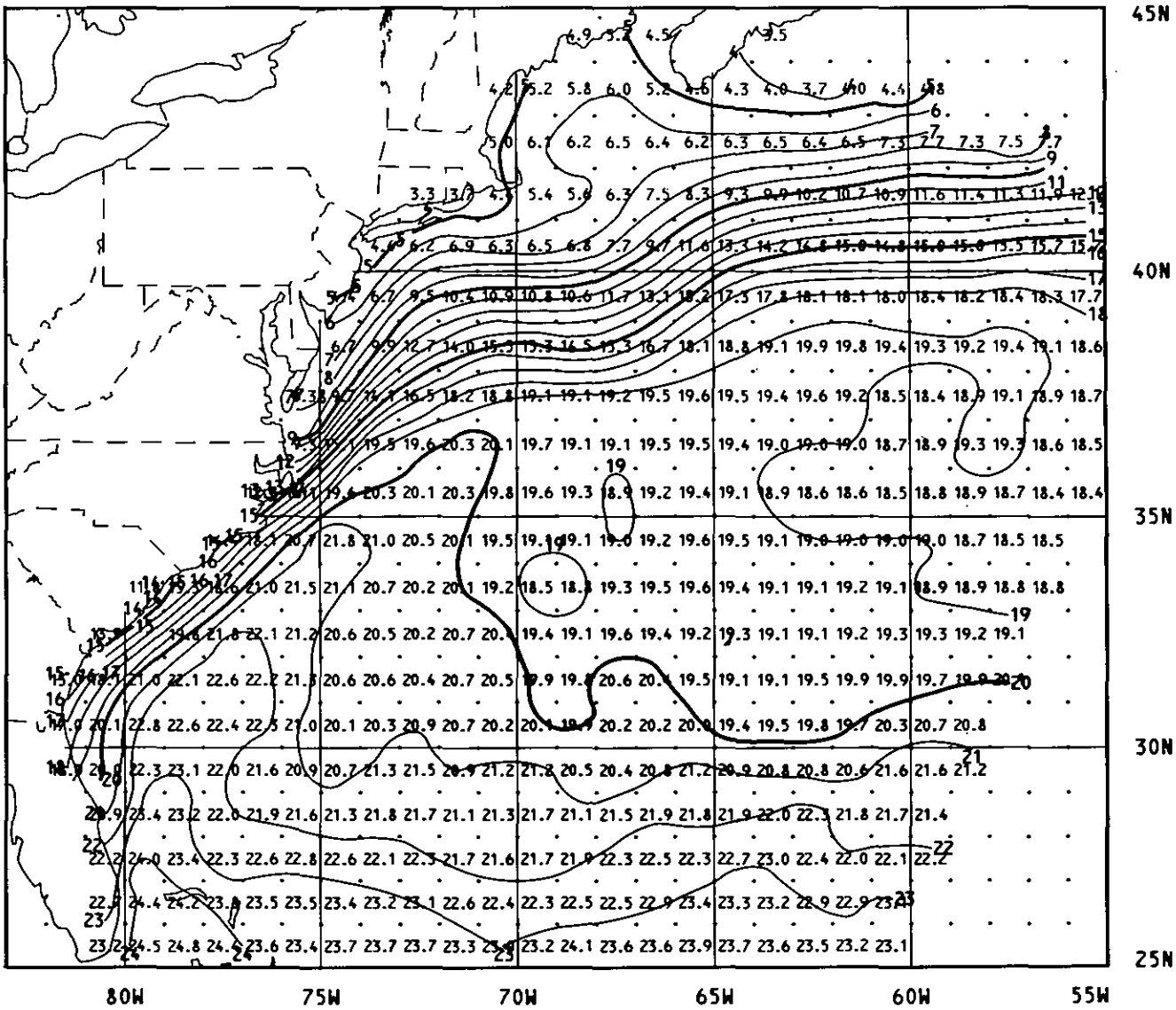
No new cyclonic eddies were observed. Eddy N translated 90 km WSW. Eddy P moved 75 km WNW. Eddy T travelled 85 km NE. Eddies Q, R, and S were not observed.

EAST COAST SST-
MONTHLY MEAN



Gulf of Mexico
SST--MONTHLY MEAN (°C)
February 1983

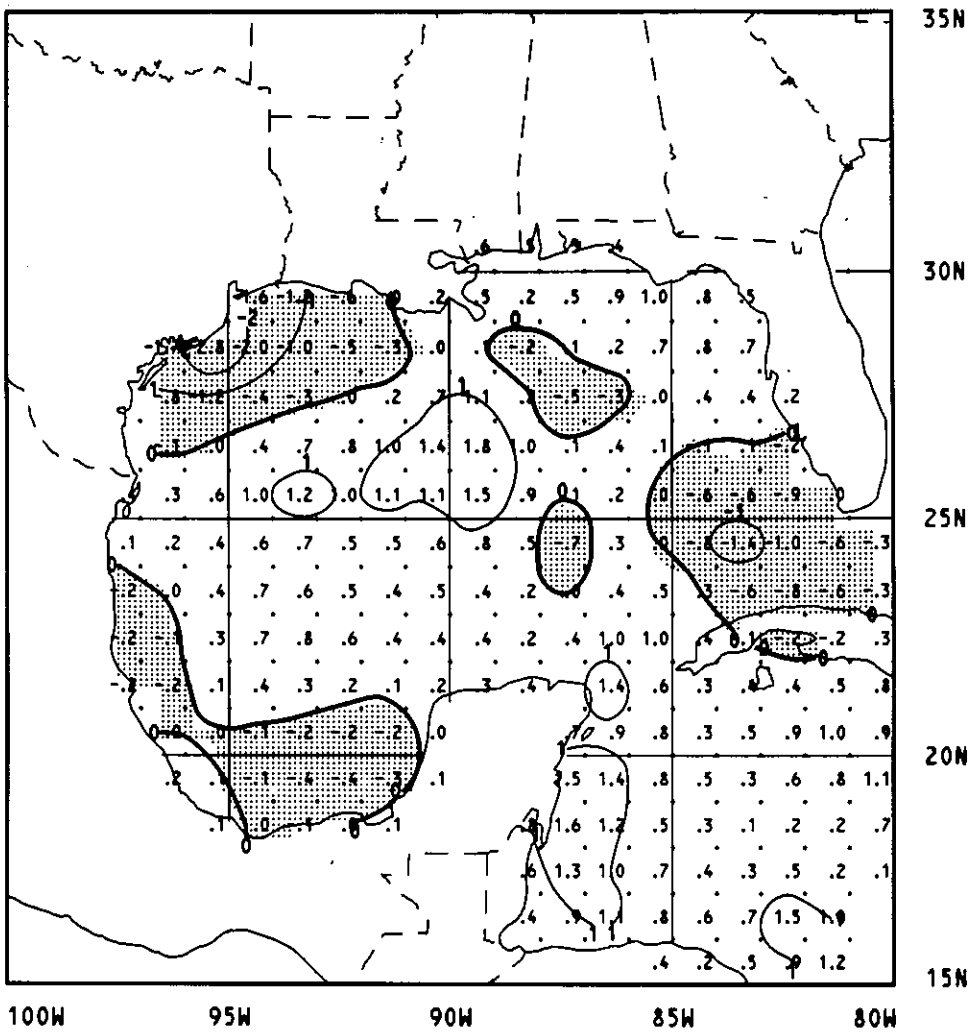
Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.



NW Atlantic Ocean
SST--MONTHLY MEAN (°C)
February 1983

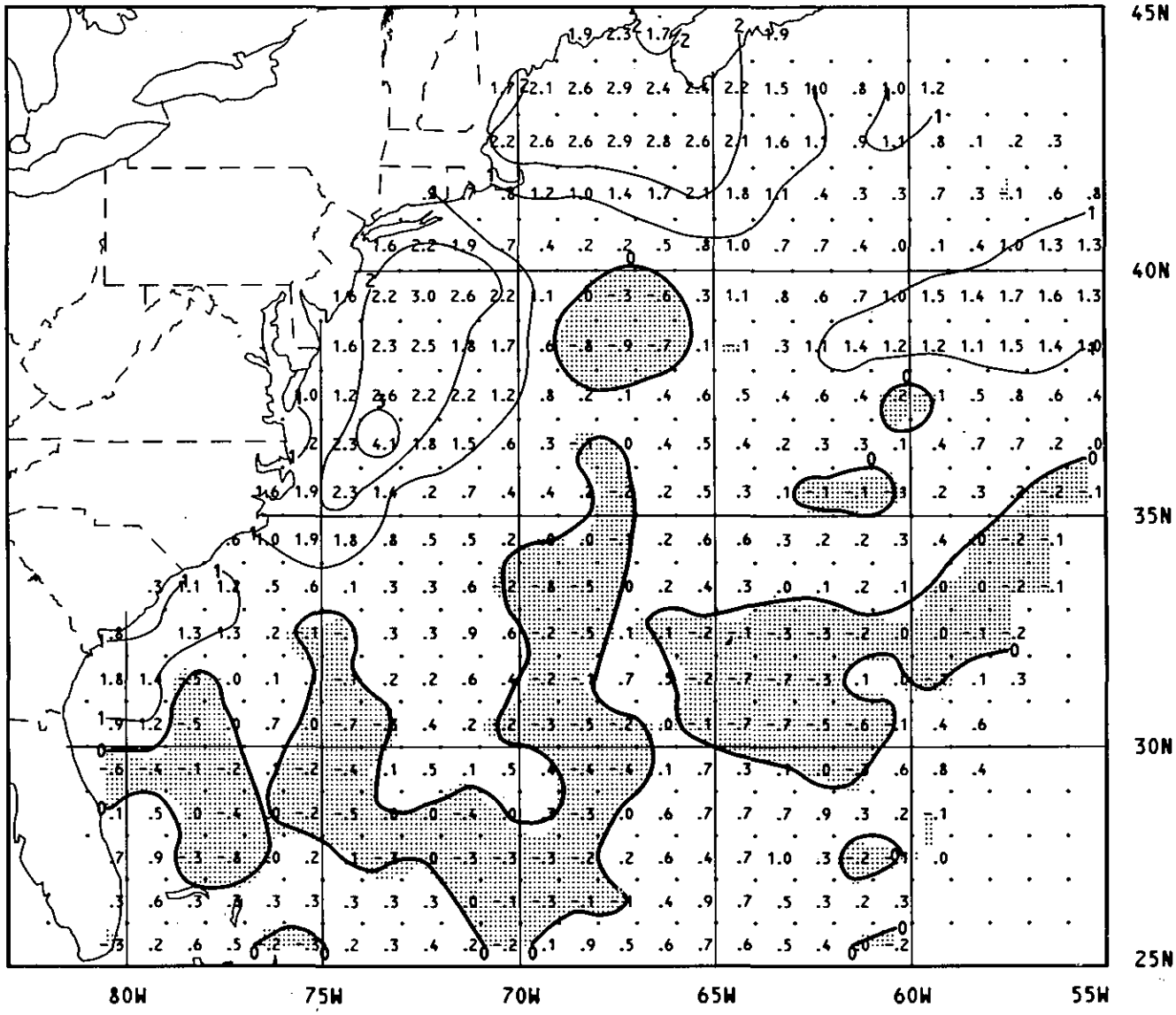
Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.

EAST COAST SST-ANOMALY



Gulf of Mexico
SST--MONTHLY ANOMALY (°C)
February 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.

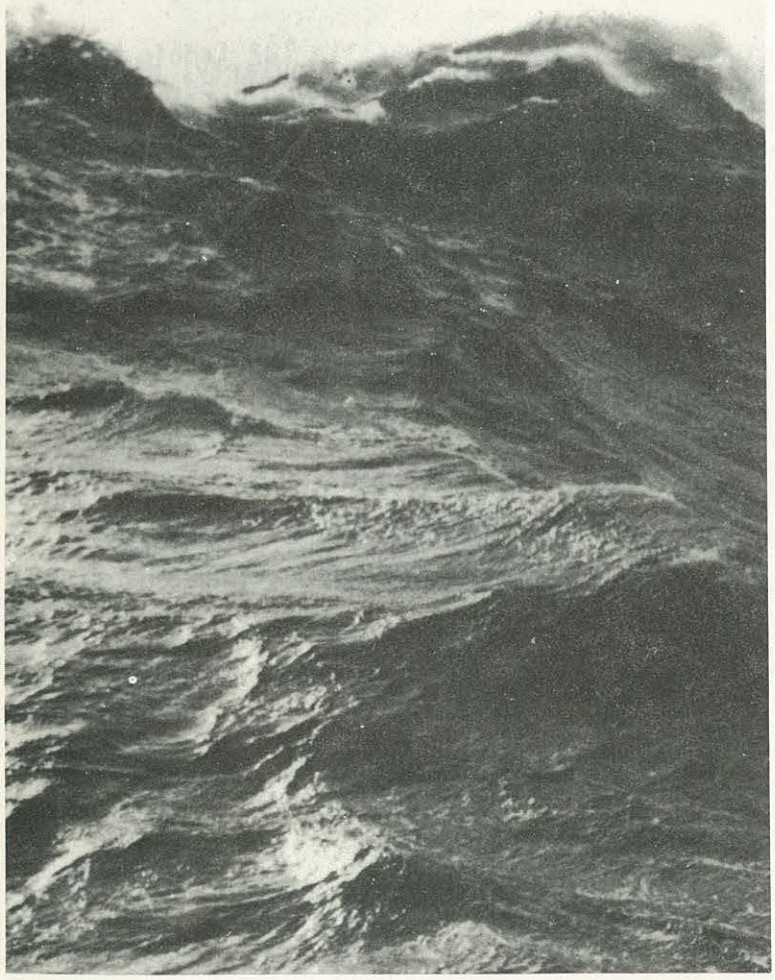


NW Atlantic Ocean
SST--MONTHLY ANOMALY (°C)
February 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.

OCEANOGRAPHIC Monthly Summary

Volume III Number 3 March 1983



Contents

3 OceaNotes

4 Pacific SST - monthly mean, ship and buoy data

6 Pacific SST - anomaly

10 Atlantic SST - monthly mean, ship and buoy data

11 Atlantic SST - anomaly

12 Satellite IMAGE of the Month

14 Bering Sea/North Slope ICE, with text

15 West Coast OCEAN FEATURES, with text

16 West Coast SST - monthly mean

17 West Coast SST - anomaly

18 East Coast OCEAN FEATURES, with text

20 East Coast SST - monthly mean

22 East Coast SST - anomaly

24 Subscription information

U.S. DEPARTMENT OF COMMERCE • National Oceanic and Atmospheric Administration
National Weather Service
National Environmental Satellite, Data, and Information Service

Oceanographic Monthly Summary is published by the National Weather Service and the National Environmental Satellite, Data, and Information Service (NESDIS). *Oceanographic Monthly Summary* contains sea surface temperature (SST) analyses on both regional and ocean basin scales for the Atlantic and Pacific Oceans. The hemispheric SST analyses use the National Climatic Center (NCC) Climatology*. The regional SST analyses use the Robinson-Bauer Climatology.* *Oceanographic Monthly Summary* also contains Alaskan sea ice information and ocean feature information for contiguous U.S. ocean regions.

Oceanographic Monthly Summary welcomes articles containing information of interest to *Oceanographic Monthly Summary* readers, such as, news on operational oceanography, unusual ocean feature phenomena, etc. Contributions should be sent to the editor (address below). Accepted material will appear in the OceaNotes section of *Oceanographic Monthly Summary*. Contributions can be published as quickly as the next monthly issue.

If you are interested in receiving *Oceanographic Monthly Summary* regularly, please refer to the back cover for subscription information.

*Reynolds, R.W., 1982. A Monthly Averaged Climatology of Sea Surface Temperatures; *NOAA Technical Report NWS 31.*

*Robinson, M.K., 1976. Atlas of North Pacific Ocean Monthly Mean Temperatures and Mean Salinities of the Surface Layer; *NavOceano Ref. Pub. 2.*

Robinson, M.K., R. A. Bauer and E.H. Schroeder, 1979. Atlas of North Atlantic-Indian Ocean Monthly Mean Temperatures and Mean Salinities of the Surface Layer; *NavOceano Ref. Pub. 18.*

Oceanographic Monthly Summary
Editor: Steve Auer
National Meteorological Center, W/NMC21
National Weather Service, NOAA
Washington, DC 20233
(telephone: 301/763-8133)
Assistant Editor: Jenifer Wartha Clark
Synoptic Analysis Branch, S/DS23
NESDIS, NOAA
Washington, DC 20233
(telephone: 301/763-8446)

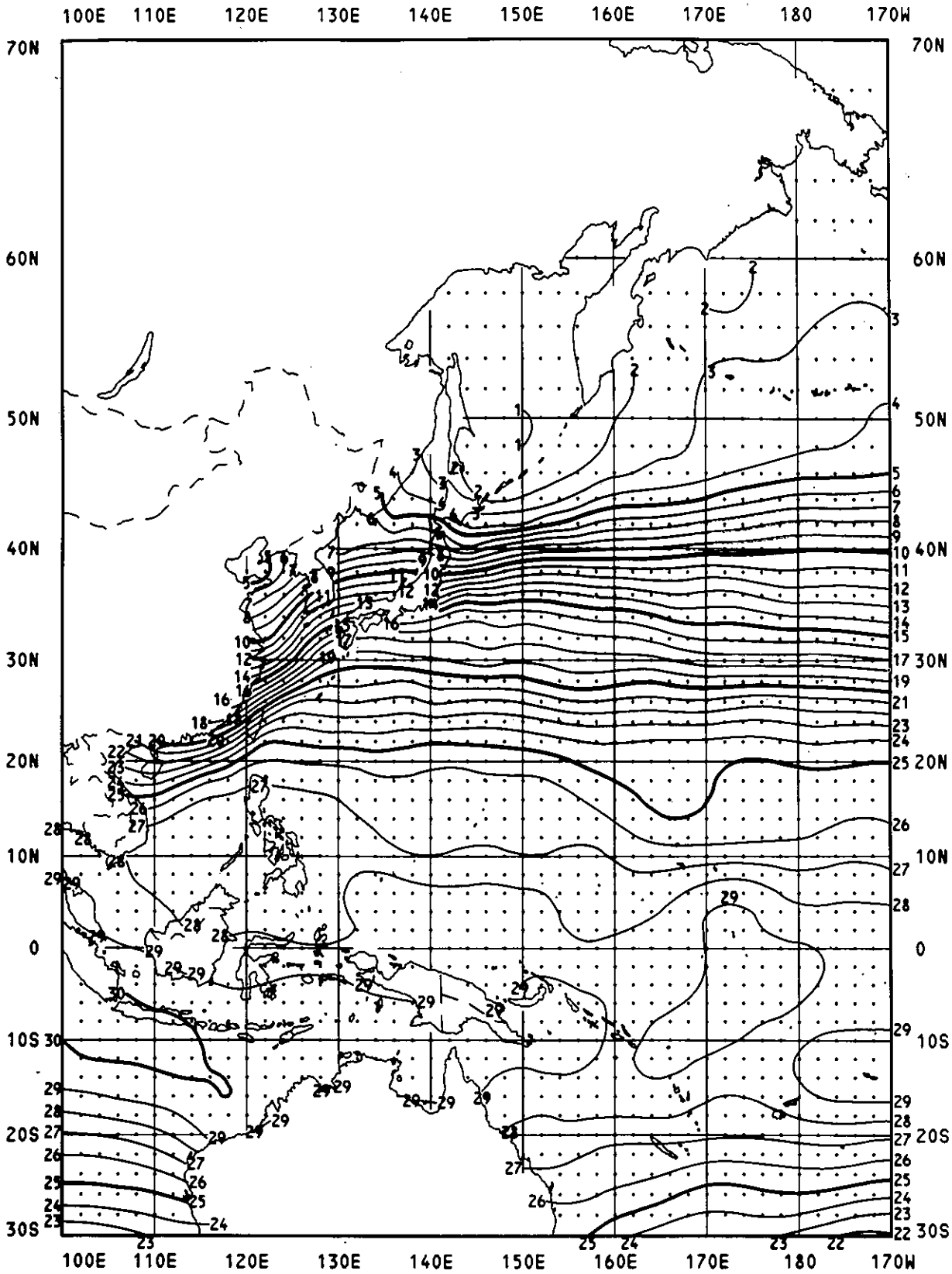
SST Computer Analyses are prepared by:
William H. Gemmill
Marine Products Branch, W/NMC21
National Meteorological Center
National Weather Service, NOAA
Washington, DC 20233
(telephone: 301/763-8133)

NEW GLOBAL SST ANALYSIS

The recent extreme warming in the tropical eastern Pacific has been underestimated by the global operational objective SST analysis (see discussion in the November 1982 issue of this publication for more details). In an effort to improve our SST fields, a global analysis has been provided by a new analysis produced by the Climate Analysis Center (CAC). This analysis is obtained from two-degree latitude and longitude monthly summaries of climatologically screened in situ (ship and buoy) SST observations. These two-degree summaries are processed by a non-linear filter based on the computation of medians (see Rabiner, 1975). Since medians were used rather than weighted means, extreme points could be systematically eliminated from the final product.

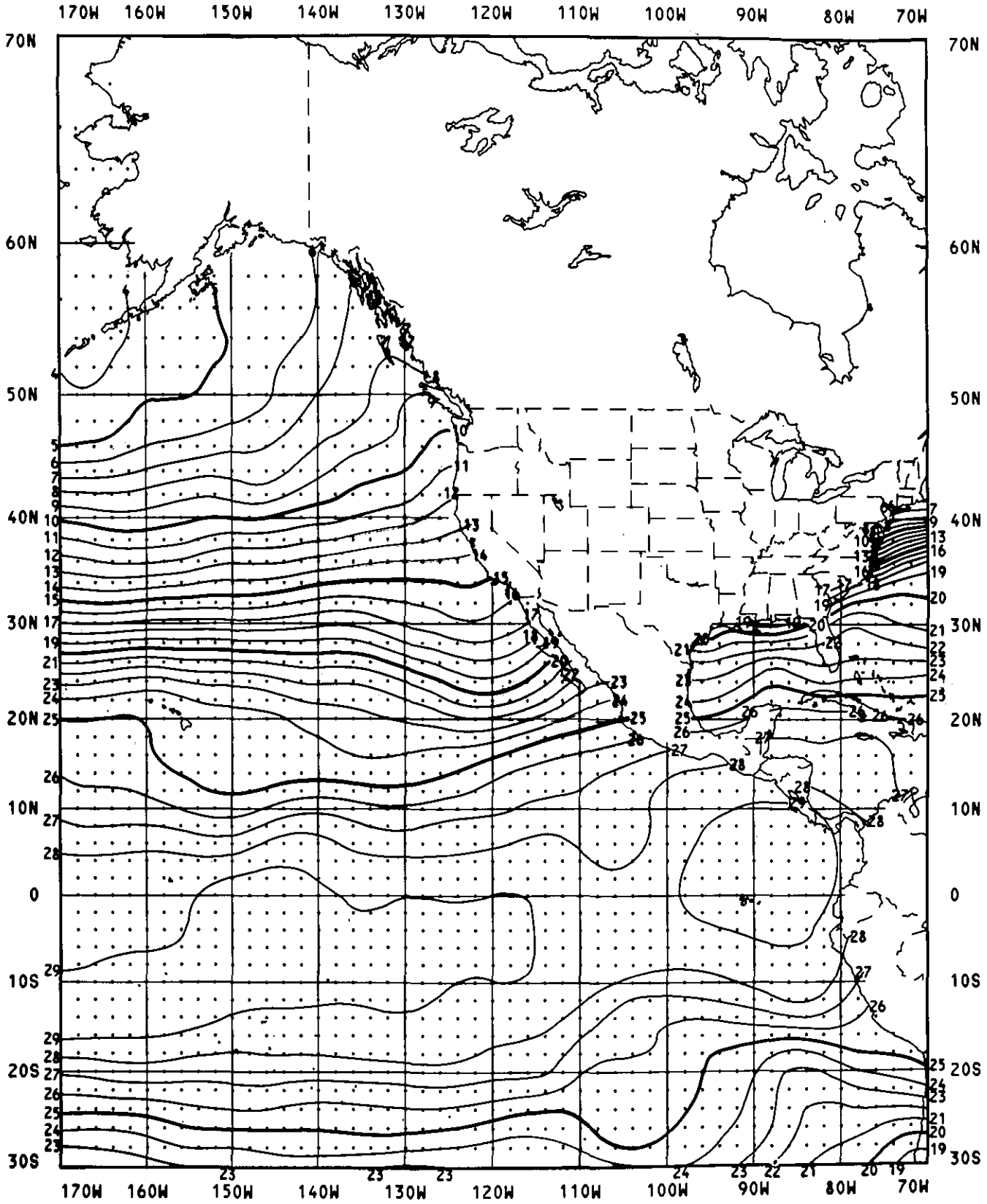
The global SST climatology used by CAC is the one-degree resolution SST climatology processed by Reynolds (1982) from an NCC data summary of in situ SST observations. A comparison of the differences between this climatology and five other global climatologies, including the Robinson and Bauer climatology can be found in Reynolds (1983).

Reynolds, R.W., 1982. A Monthly Averaged Climatology of Sea Surface Temperatures. *NOAA Technical Report NWS 31*, 35 pp.
Reynolds, R.W., 1983. A Comparison of Sea Surface Temperature Climatologies. *J. of Climate and Applied Meteor.*, 22, in press.
Rabiner, L.R., M.R. Sambur, and C.E. Schmidt, 1975. Applications of Linear Smoothing Algorithm to Speech Processing. *IEE Trans. on Acoustics, Speech and Signal Processing*, ASSP-23, 552-557.



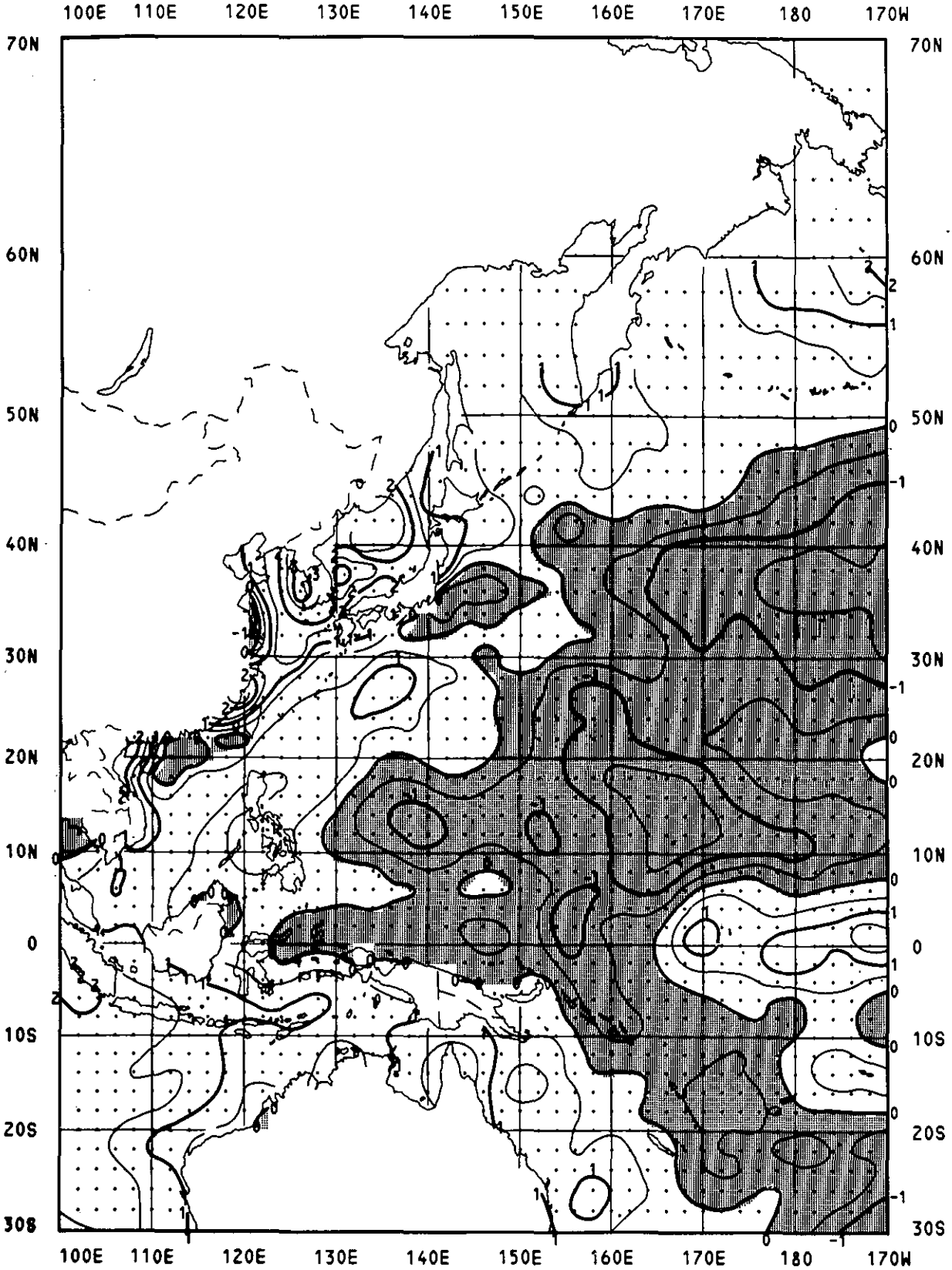
Western Pacific Ocean
SST--MONTHLY MEAN (°C)
March 1983

Monthly mean sea surface temperature is the mean of in-situ data [ships and buoys] within two-degree quadrangles Contour line interval is 1.0°C.



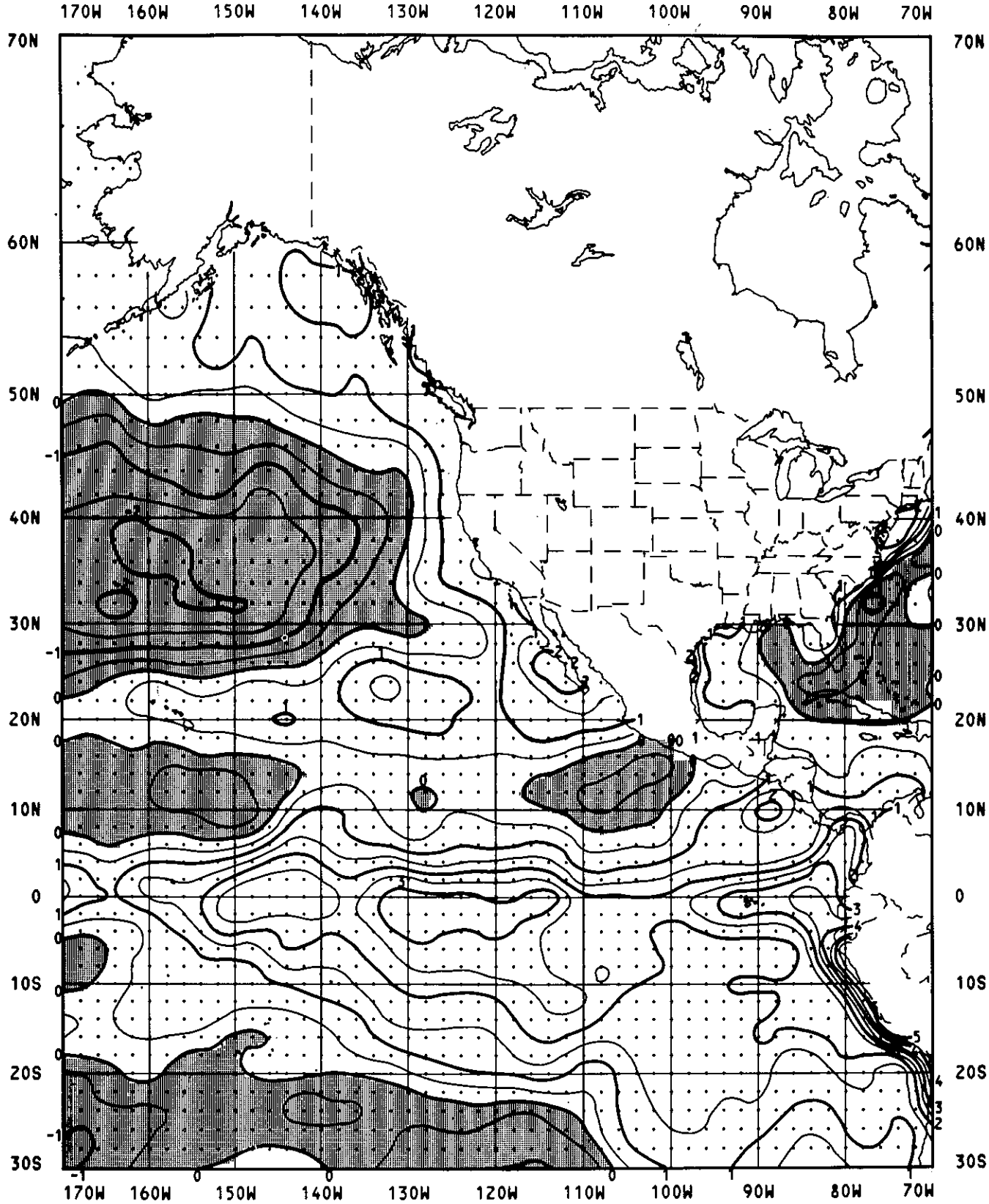
Eastern Pacific Ocean
SST--MONTHLY MEAN (°C)
March 1983

Monthly mean sea surface temperature is the mean of in-situ data [ships and buoys] within two-degree quadrangles. Contour line interval is 1.0°C.



Western Pacific Ocean
SST--MONTHLY ANOMALY (°C)
March 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.

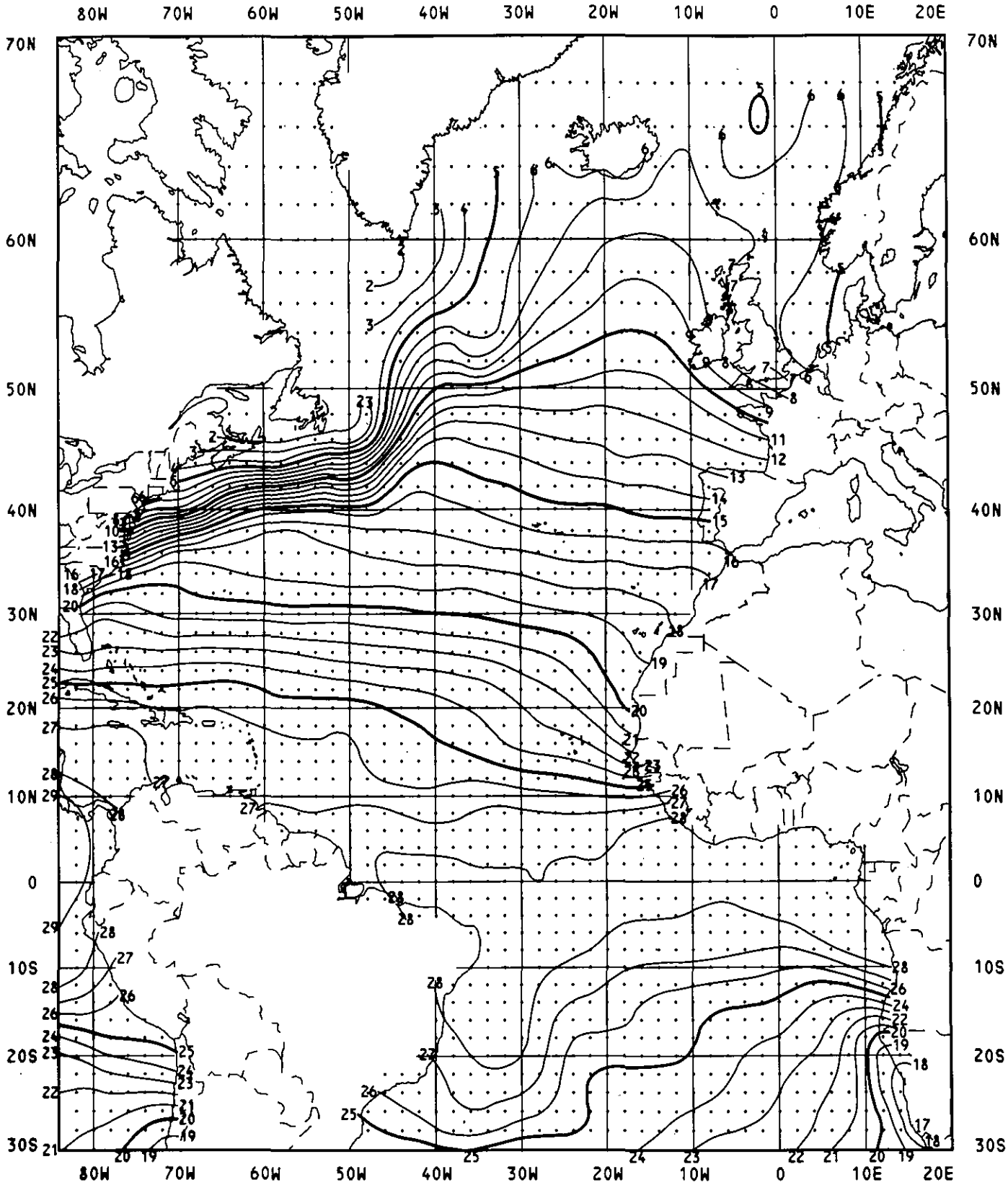


Eastern Pacific Ocean
SST--MONTHLY ANOMALY (°C)
March 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.

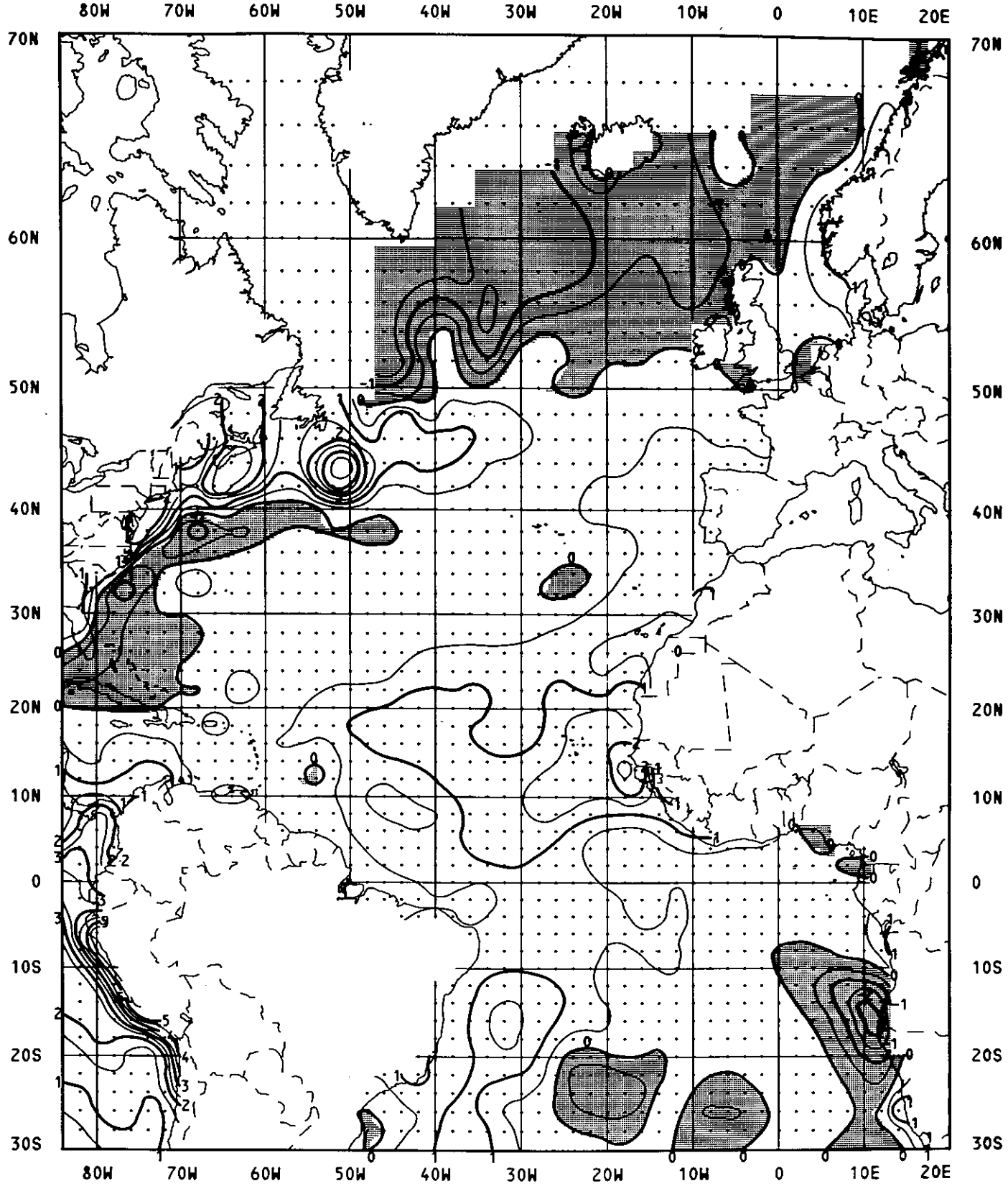
This page is intentionally left blank. Monthly charts using satellite data will appear on this page in coming issues.

This page is intentionally left blank. Monthly charts using satellite data will appear on this page in coming issues.



Atlantic Ocean
SST--MONTHLY MEAN (°C)
March 1983

Monthly mean sea surface temperature is the mean of in-situ data [ships and buoys] within two-degree quadrangles. Contour line interval is 1.0°C.



Atlantic Ocean
SST--MONTHLY ANOMALY (°C)
March 1983

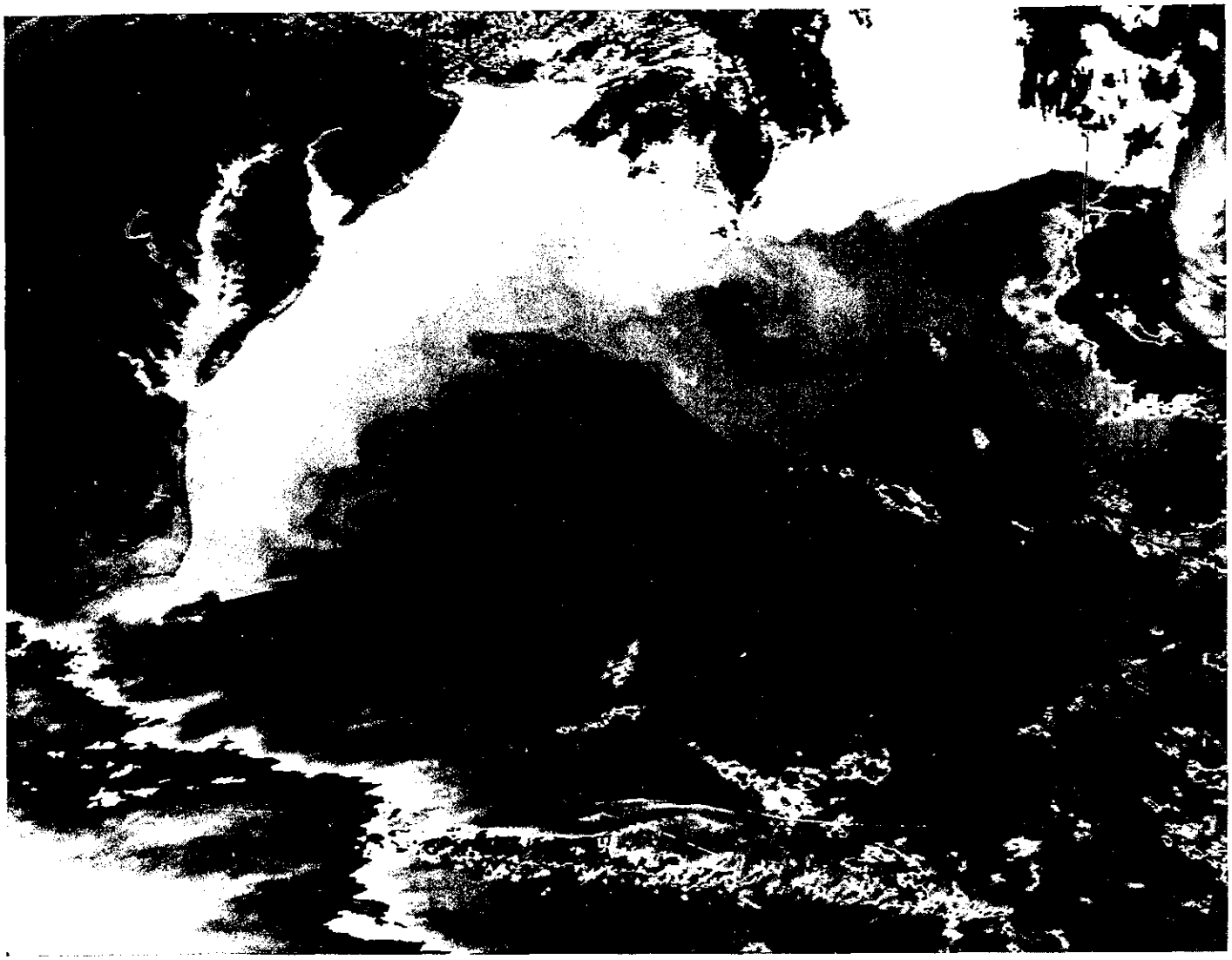
Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.

SATELLITE IMAGE OF THE MONTH

Marcia L. Weaks
Environmental Products Branch, E/SP22
NESDIS, NOAA
Washington, DC 20233
301/763-8142

Separation of the Gulf Stream ?

The above satellite image (NOAA-7 #8899) illustrates surface thermal patterns that outline the path of the Gulf Stream as it passes northeast of Cape Hatteras, North Carolina, on March 15, 1983. Dark gray shades represent the warmest water masses; lighter grey shades represent cooler waters. According to the satellite picture, two pathways for the Gulf Stream are possible; one looping cyclonically around a cold eddy, and another meandering anticyclonically to the northwest of the cold eddy. One kilometer digital satellite data also revealed a discontinuity in the surface temperature pattern on the order of 1-2°C. However, sea truth data was necessary to verify the surface temperature patterns. Subsurface (expendable bathythermograph) data were available for nine stations across the Stream. A subsurface analysis verified the positions of thermal features as analyzed in the March 16 NWS/NESDIS daily Oceanographic Analysis: near 36.5°N 72°W the Stream was very narrow, but it was not cut off into two branches. The XBT data were widely spaced, therefore, interpolation was necessary to fill in the data gaps. I feel the results of these analyses are not conclusive but that drifting buoy data and/or a more detailed XBT survey would be.



REGIONAL ANALYSES

Bering Sea / North Slope Ice

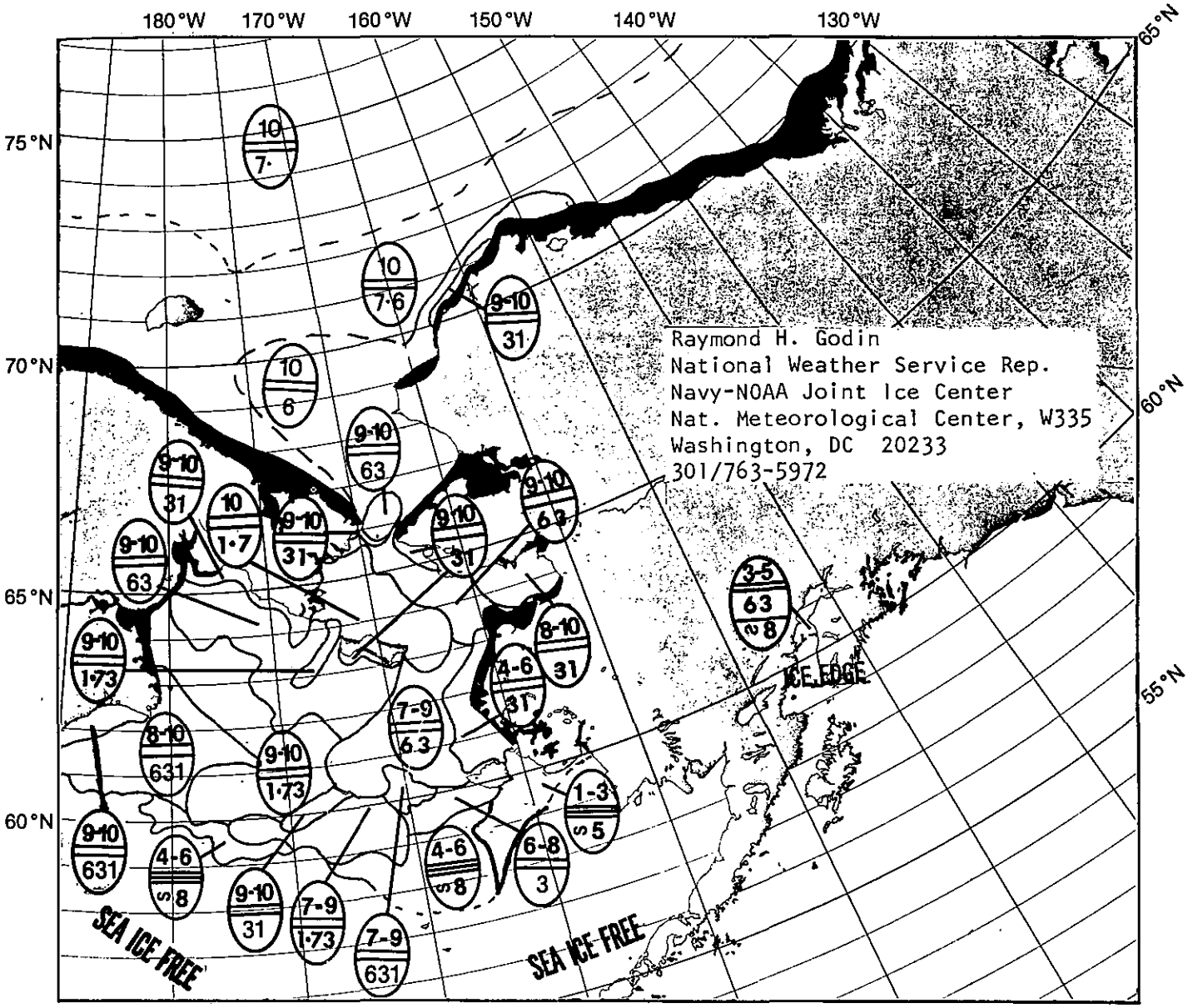
West Coast

- Ocean features
- Sea surface temperature
- SST anomaly

East Coast

- Ocean features
- Sea surface temperature
- SST anomaly

BERING SEA / NORTH SLOPE ICE ANALYSIS



C = Total ice concentration in the area in tenths.
C_a, C_b, C_c = Concentration of thickest (C_a), 2nd thickest (C_b), and 3rd thickest (C_c) ice
S_a, S_b, S_c = Stage of development of thickest (S_a), 2nd thickest (S_b), and 3rd thickest (S_c) ice.
~C = Concentration of ice within area(s) of strips and patches.

STAGE(S) OF DEVELOPMENT (THICKNESS)

1 = New ice (0-10 cm)
3 = Young ice (10-30 cm)
6 = First year (30-200 cm)
7 = First year thin (30-70 cm)
1. = First year medium (70-120 cm)
4. = First year thick (120-200 cm)
7. = Old ice (survived at least one summer's melt)

EXAMPLES

125 Theoretical thickness of this season's growth (cm).

Fast ice. Sea ice which forms and remains fast along the coast.

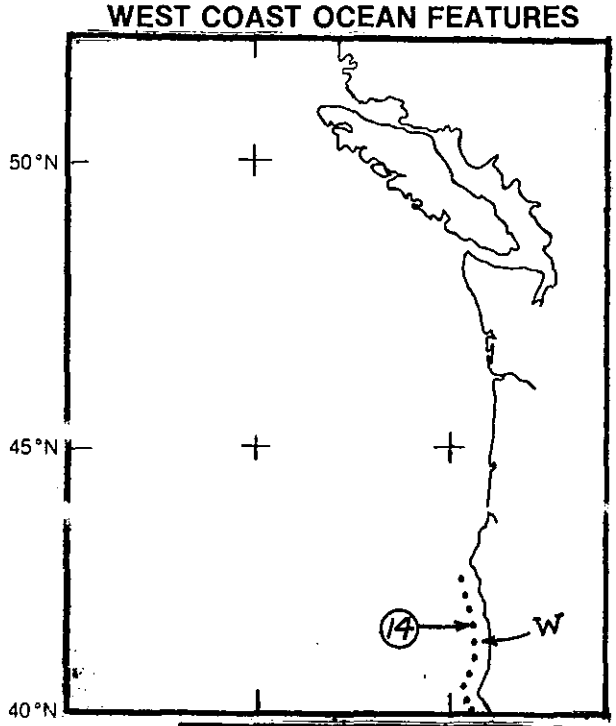
Ice boundary visually or satellite observed.

Ice boundary estimated.

MARCH 1983

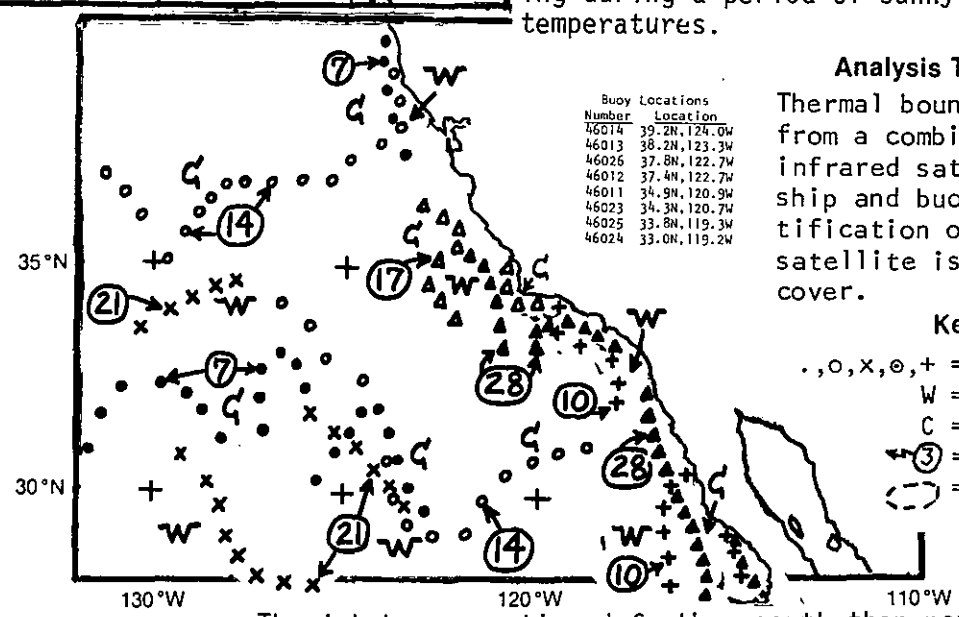
The mean monthly surface pressure circulation shows a deep 991 mb low centered near 49°N 160°W. From the low's center to the southern Bering Sea the surface pressure deviates from 20 to 10 mb below the monthly normal. Easterly geostrophic winds affect all Alaskan ice covered waters. At Bering Sea coastal stations the monthly mean surface temperatures were much above normal at King Salmon (59°N 157°W) and above normal at Nome (64°N 165°W) and Cold Bay (55°N 163°W). Under the influence of strong easterly winds and above normal temperatures the ice edge receded 100-160 km in Bristol Bay (east of 166°W) in the southeastern Bering Sea. West of 166°W the ice edge changed little. The current ice edge is 100-200 km north of its historical mean position in Bristol Bay and 20-80 km south of the mean in the central and western Bering Sea.

WEST COAST OCEAN FEATURES



MARCH 1983

Conditions in the north panel area reflect the highly anomalous oceanographic and atmospheric phenomena which have occurred during the past few months along the West Coast from equatorial regions to Southeast Alaska. Offshore buoys showed a warm anomaly of about 1°C, while coastal stations averaged 1.7°C above normal for March. Prevailing winds were from the south and southeast instead of the normally dominant westerly direction, resulting in a greater than normal northward and shoreward wind-driven transport of surface waters. No net change was observed in offshore SSTs during the month although a warming of 0.6-0.9°C did occur on March 17-19, followed by cooling to previous values. Coastal stations showed an average net increase of 0.6°C during March, most of which occurred during two warming episodes, March 7-13 and 17-19. The former was due to northward and shoreward transport of warmer water by strong southerly winds, and the latter due to local warming during a period of sunny weather and warm air temperatures.



Buoy Locations

Number	Location
46014	39.2N,124.0W
46013	38.2N,123.3W
46026	37.8N,122.7W
46012	37.4N,122.7W
46011	34.9N,120.9W
46023	34.3N,120.7W
46025	33.8N,119.3W
46024	33.0N,119.2W

Analysis Techniques

Thermal boundaries are determined from a combination of enhanced infrared satellite imagery and ship and buoy observations. Identification of these features by satellite is limited by cloud cover.

Key

.,o,x,⊙,+ = thermal boundaries
W = warm
C = cold
(3) = date of feature
(- -) = outline of water mass feature

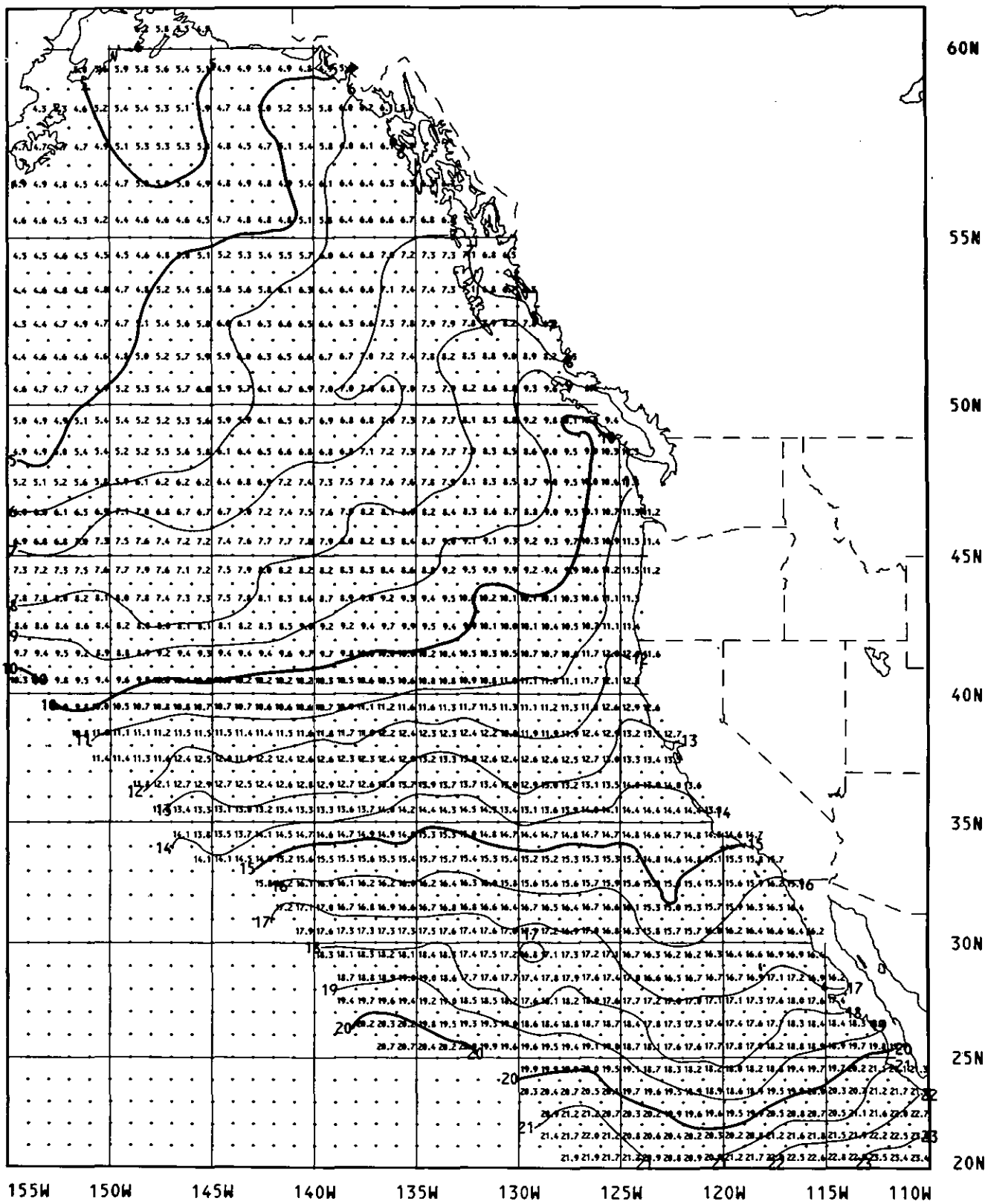
The jetstream continued farther south than normal but shifted north to 40° N over the south panel area in late March. Frequent storms continued stronger and more persistent than normal southerly surface winds, mainly north of 35°N. The lack of significant upwelling caused SSTs to be above normal east of 131°W most of March with a maximum of 3.0°C above normal along central Cal. coast. Below normal SSTs continued west of 131°W but weakened to 0.5-1.0°C below normal. Seasonal 0.5-1.0°C cooling occurred north of 37°N and west of 125°W during March; while unseasonal 0.5°C warming occurred northward to 35°N between 125-130°W. As the storm track shifted north, occasional northwesterly winds after March 17 caused upwelling south of 37°N, cooling mean SSTs 0.5°C within 150 miles of the coasts of central Cal. and the Baja.

BUOY STATISTICS

Buoy No.	Mean SST	Std. Dev.
46014	13.5	0.5
46026	13.6	0.5
46012	13.8	0.4
46011	15.0	0.6
46023	15.7	1.0
46025	16.1	0.4
46024	15.4	0.2

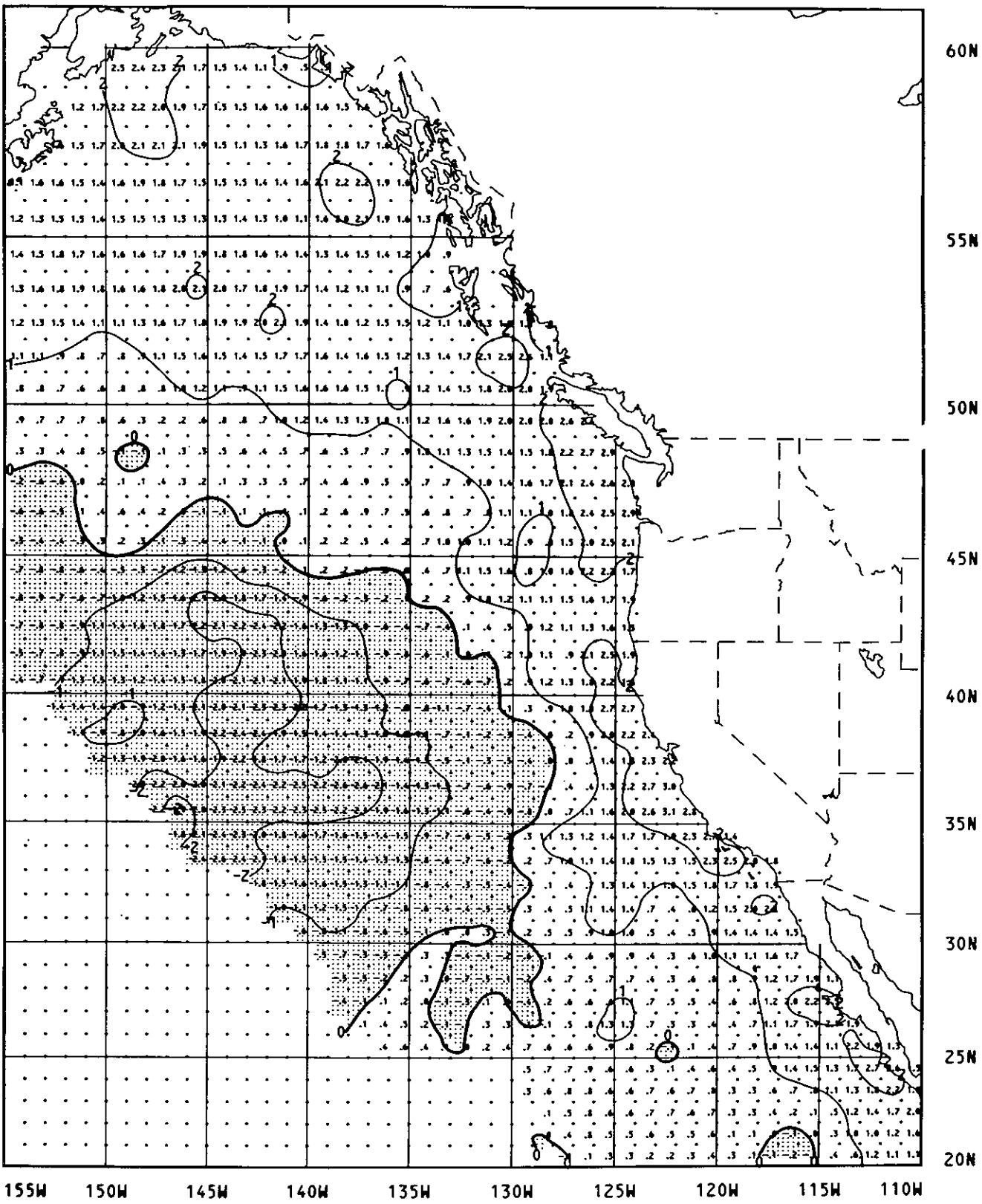
North Panel
Kent Short
Seattle Ocean Services Unit
National Weather Service/NOAA
7600 Sand Point Way NE
Bin C15700
Seattle, WA 98115
206/527-6105

South Panel
Larry Breaker
Satellite Field Service Station
NESDIS/NOAA
660 Price Avenue
Redwood City, CA 94063
415/364-2422



West Coast
SST--MONTHLY MEAN (°C)
March 1983

Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.



West Coast
SST--MONTHLY ANOMALY (°C)
March 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.

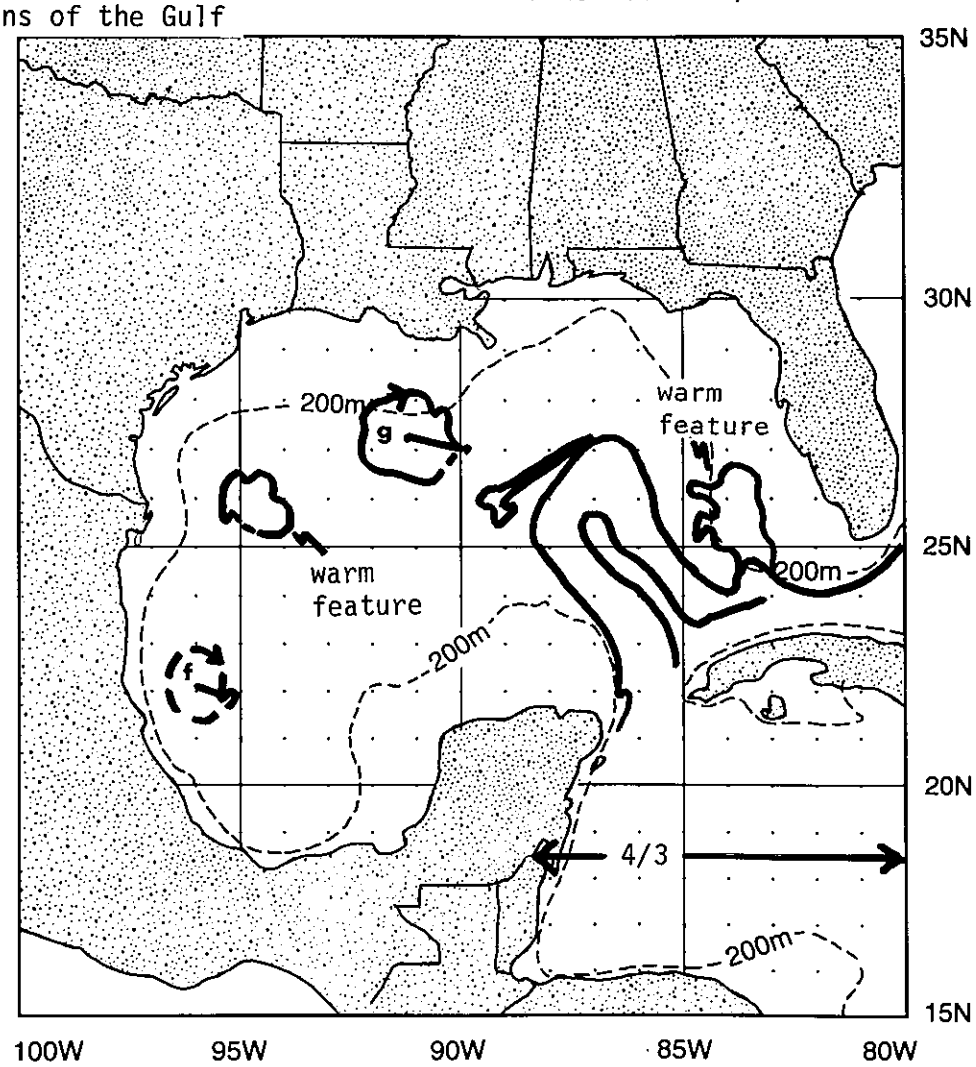
EAST COAST OCEAN FEATURES

The end of this month's positions of the Gulf Stream System and its associated eddies are shown for the NW Atlantic and the Gulf of Mexico. The Gulf Stream and Loop Current boundaries are located by infrared satellite imagery or XBT (expendable bathythermograph) data. Anticyclonic eddies are labeled a-z in the Gulf of Mexico and 1-99 in the NW Atlantic. Cyclonic eddies are labeled A-Z. Arrows on eddies indicate direction of circulation. Warm-core or anticyclonic eddies rotate clockwise; cold-core or cyclonic eddies rotate counterclockwise. The line to the eddy center shows the net translation since last month or since last observed. Eddies or sections of the Gulf Stream System which were not observed during the month are not shown on the analysis chart. The long arrows at the bottom of the chart indicate the date of data used.

Data used in this analysis include:
- NOAA satellite infrared imagery, NESDIS
- Bathythermograph data, National Meteorological Center of National Weather Service
- Oceanographic Analysis, A daily detailed analysis issued by National Weather Service/NESDIS

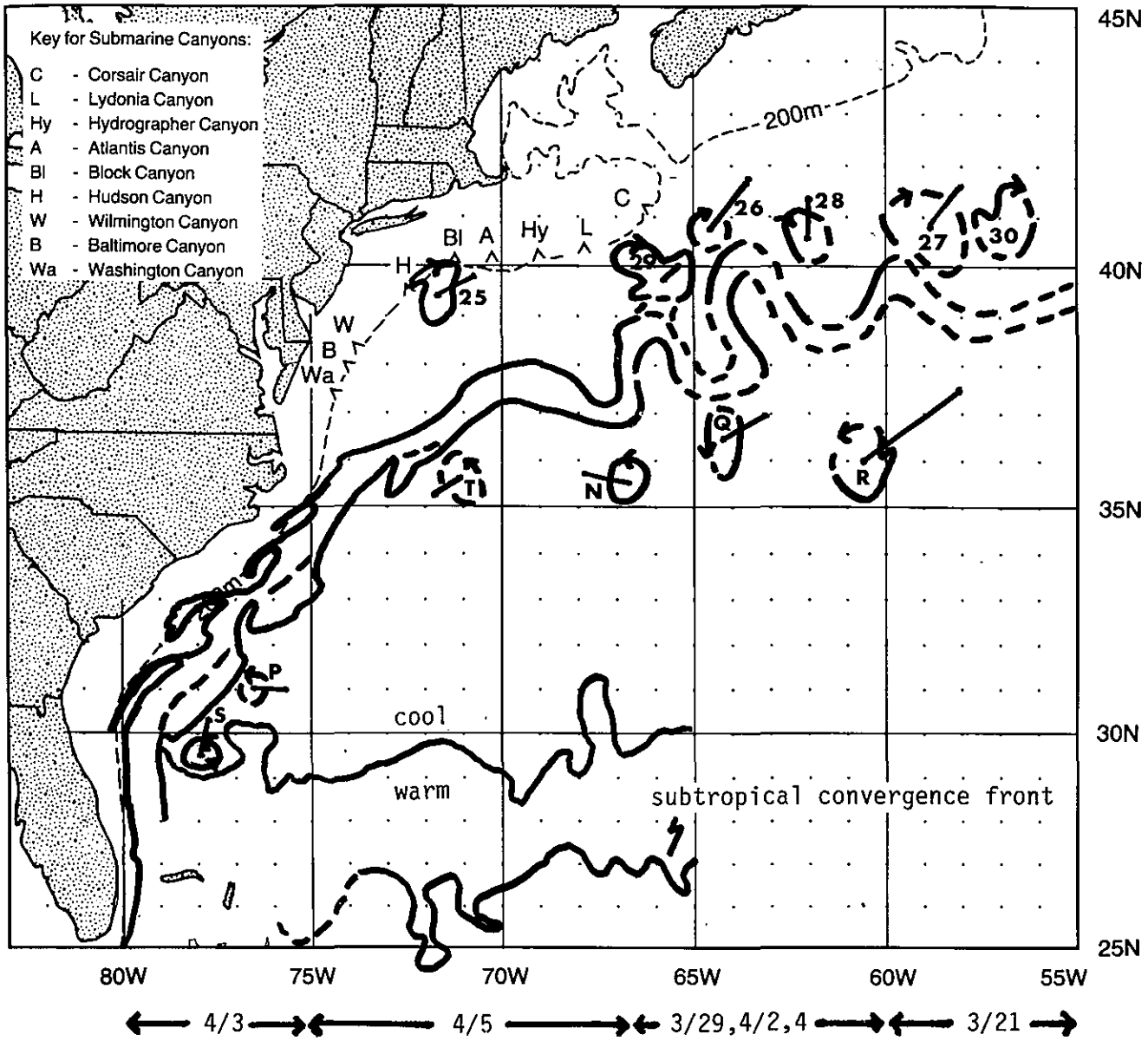
Jenifer Wartha Clark
Synoptic Anal. Br., S/DS23
NESDIS/NOAA
Washington, DC 20233
301/763-8446

Steve Auer
Nat. Met. Center, W/NMC21
Nat. Weather Service, NOAA
Washington, DC 20233
301/763-8133



MARCH 1983

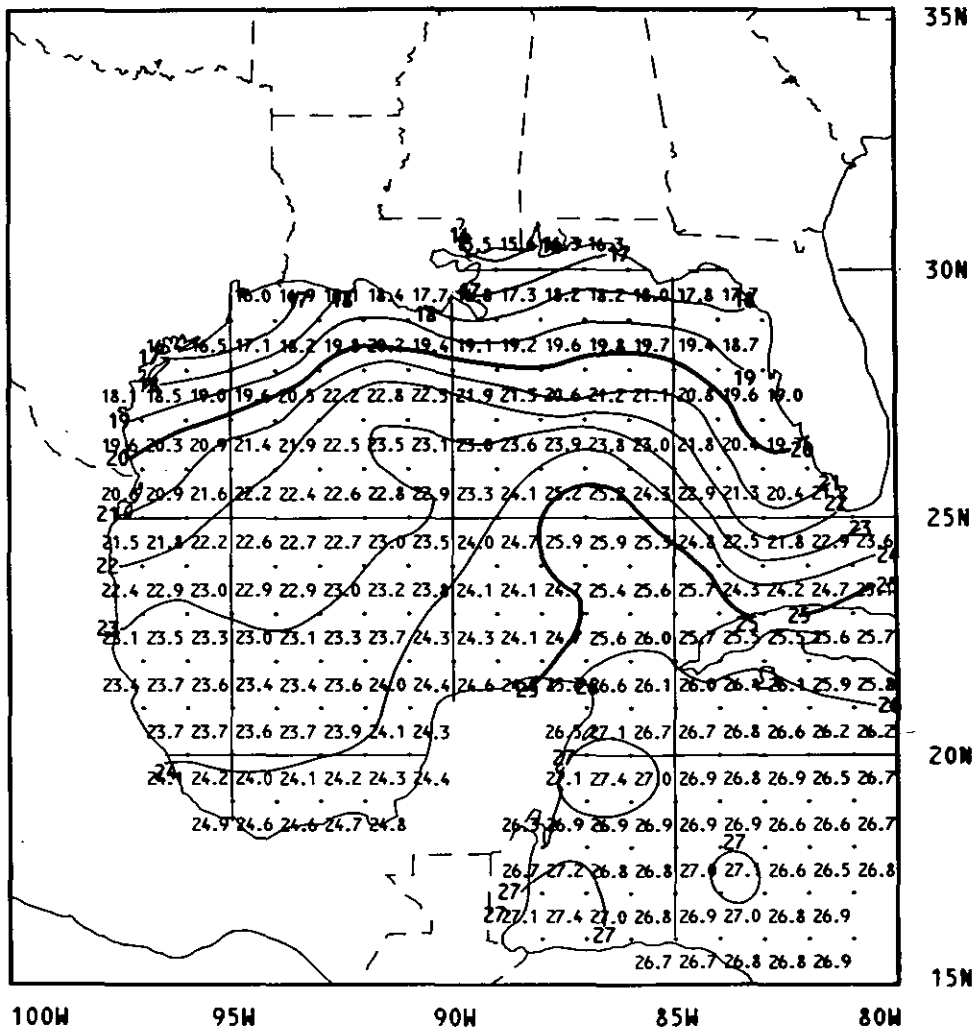
No change in Loop Current amplitude occurred during the month. Eddy g translated 130 km WNW. Eddy f, which is being tracked by a drifting buoy, was partially observed on March 18 satellite imagery. Eddy f translated about 85 km NW in March. An infrequent sighting of the inner edge of the Loop Current occurred around the end of March. The protrusion in the Loop near 25°N 83°W has a large patch of warm mixed Loop/shelf water associated with it to the north.



One new anticyclonic eddy was observed during March. A Gulf Stream meander apparently formed new eddy 30 near 40°N 56°W about March 21. Eddy 28, last observed on January 31, apparently traveled 75 km S. Eddy 25 faintly seen on March 28 translated 100 km SW. Eddy 29 has been interacting with the Stream meander south of it since March 20. Eddy 29 translated 55 km SW in March. Eddy 26, last seen February 21, translated 140 km SW. Eddy 27, last seen February 18, moved 110 km SW.

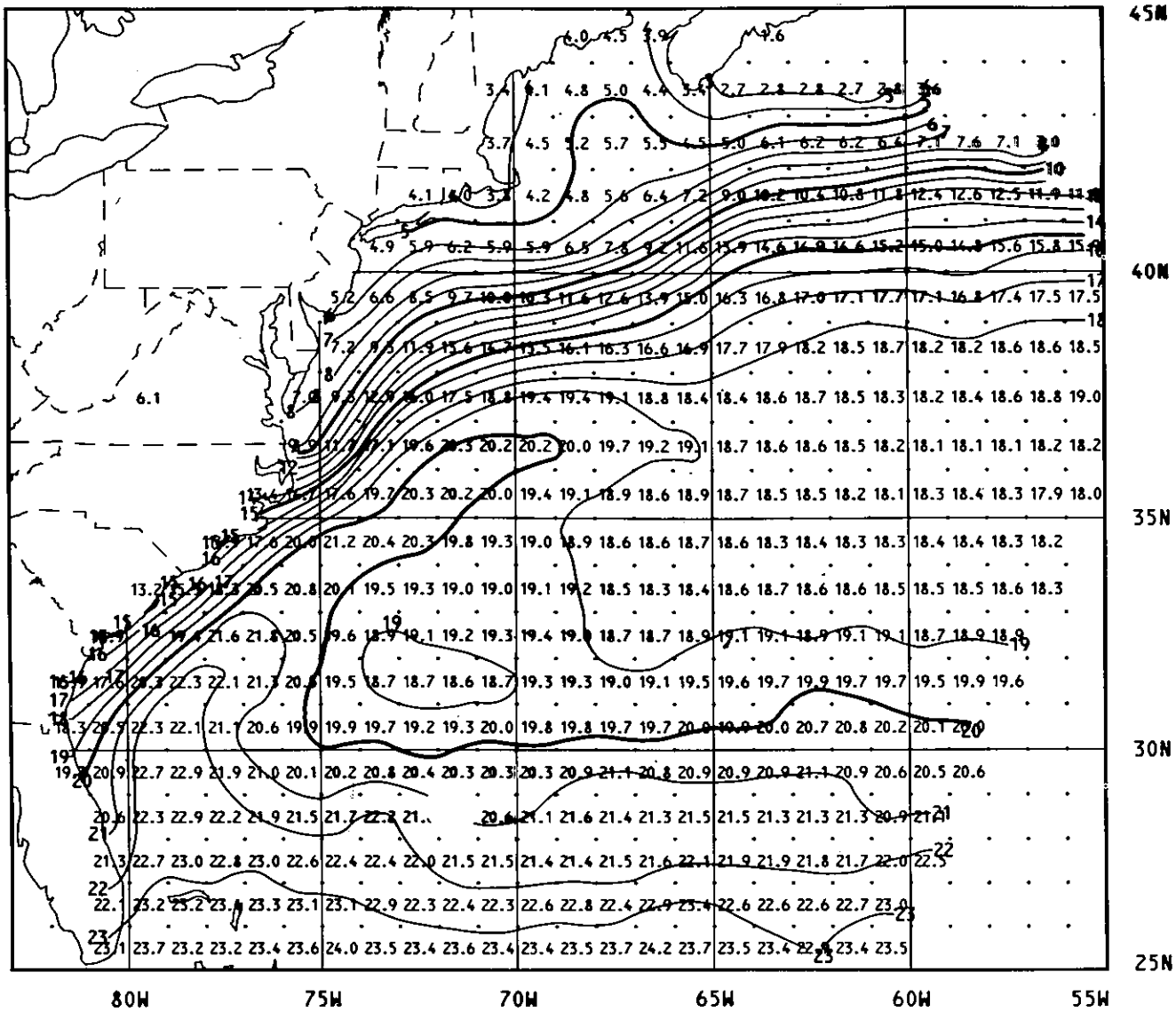
Cyclonic eddy S apparently translated 110 km SSW since last observed on January 31. Eddy P faintly detected on March 20 moved 85 km W. Eddy T traveled 75 km NE and eddy N traveled 100 km SE. Eddies Q and R, last seen on January 31, apparently translated 110 km SW and 275 km SW, respectively. The subtropical convergence front along 27°N and a secondary temperature front to the north along 29°N were detected by end-of-March satellite imagery.

EAST COAST SST-
MONTHLY MEAN



Gulf of Mexico
SST--MONTHLY MEAN (°C)
March 1983

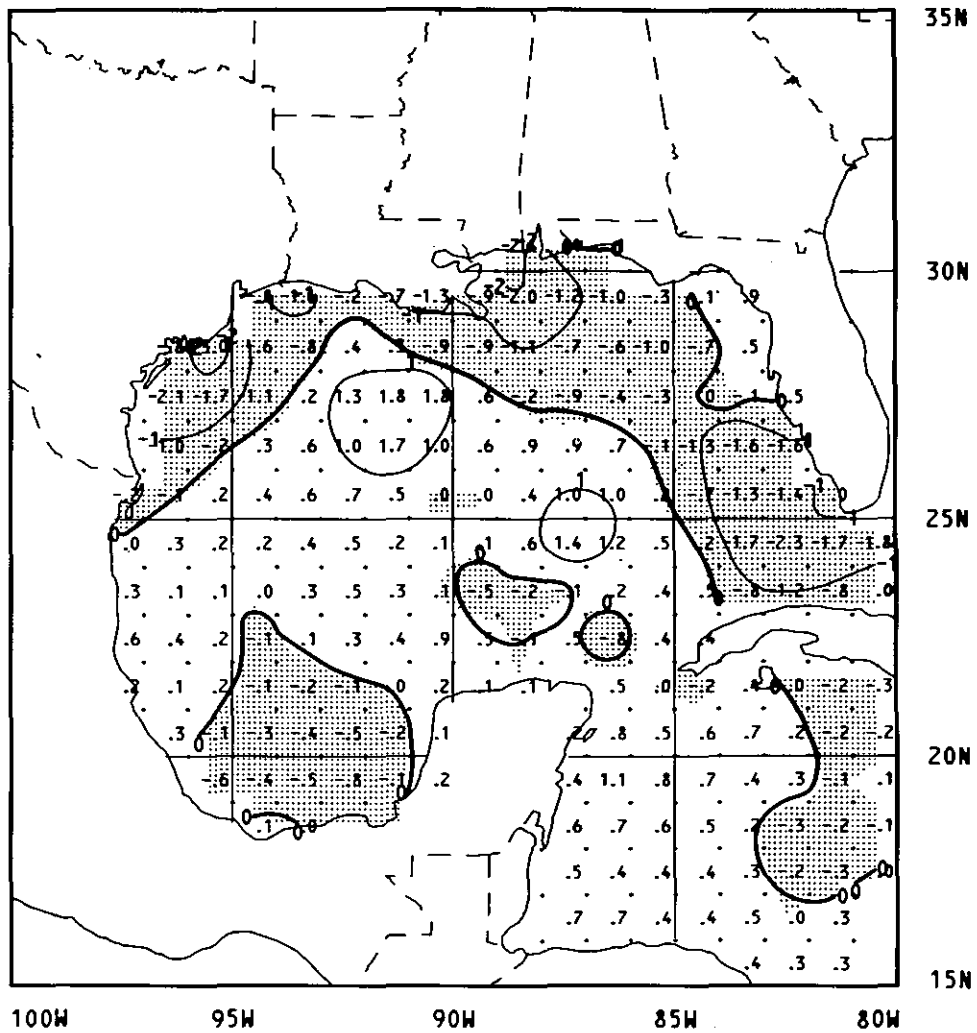
Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.



NW Atlantic Ocean
SST--MONTHLY MEAN (°C)
March 1983

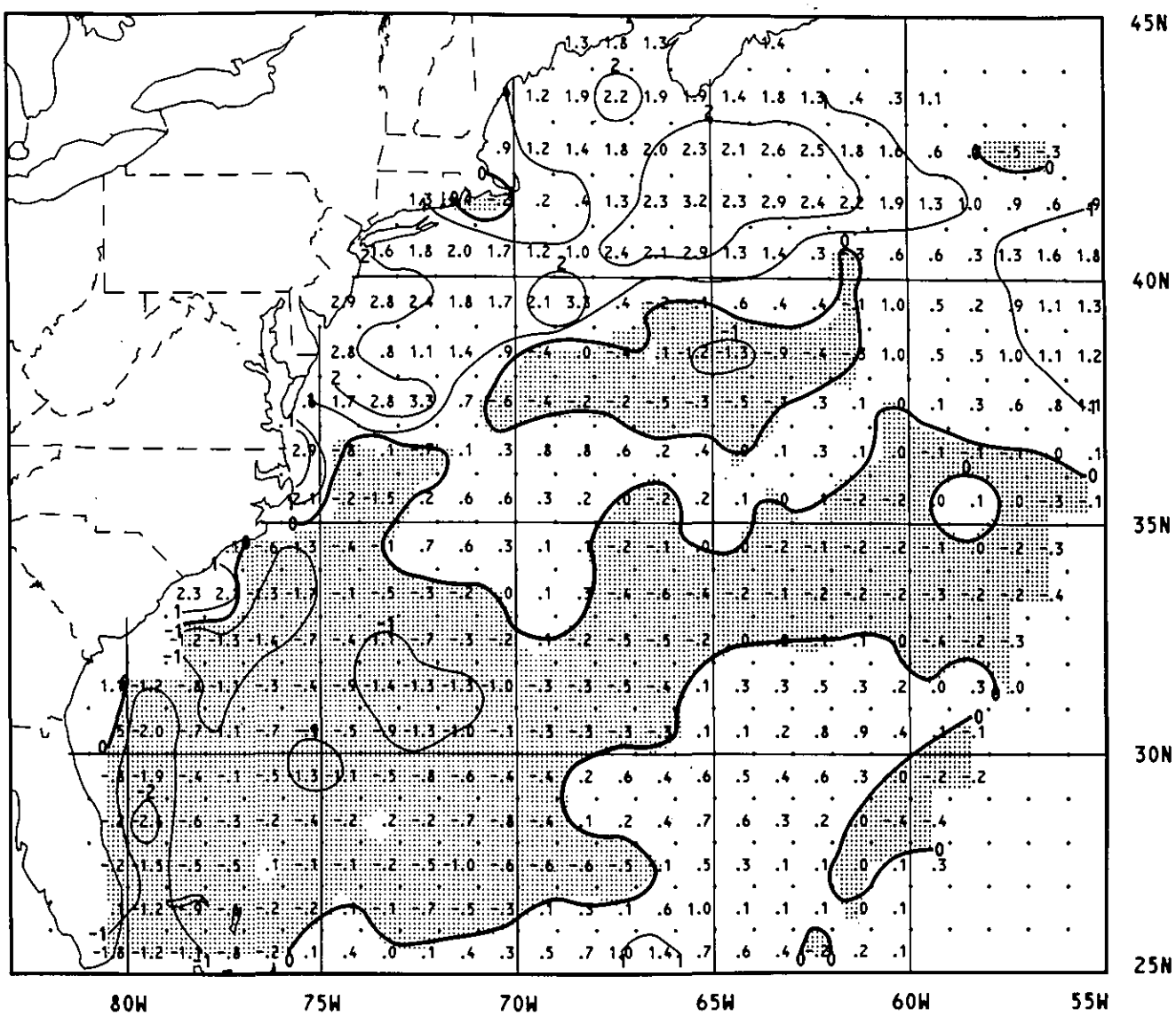
Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.

EAST COAST SST-ANOMALY



Gulf of Mexico
SST--MONTHLY ANOMALY (°C)
March 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.

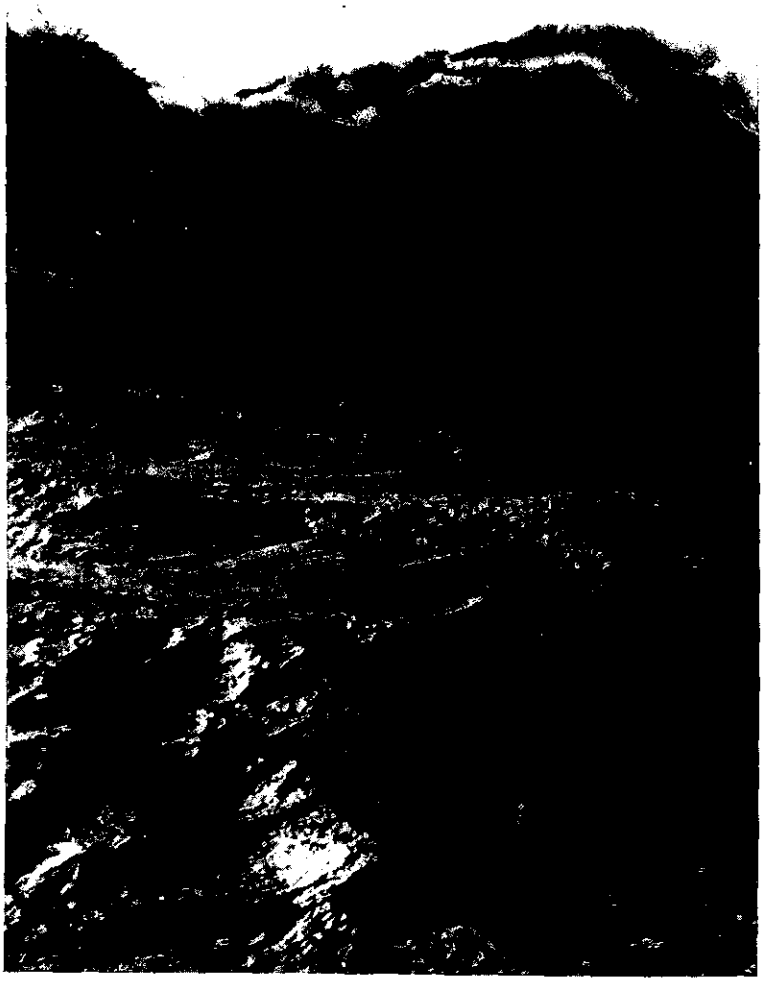


NW Atlantic Ocean
SST--MONTHLY ANOMALY (°C)
March 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.

OCEANOGRAPHIC Monthly Summary

Volume III Number 4 April 1983



Contents

3 OceaNotes

4 Pacific SST - monthly mean, ship and buoy data

6 Pacific SST - anomaly

8 Pacific SST - monthly mean, satellite data

10 Atlantic SST - monthly mean, ship and buoy data

11 Atlantic SST - anomaly

12 Atlantic SST - monthly mean, satellite data

13 Satellite Image of the Month

14 Bering Sea/North Slope ICE, with text

15 West Coast OCEAN FEATURES, with text

16 West Coast SST - monthly mean

17 West Coast SST - anomaly

18 East Coast OCEAN FEATURES, with text

20 East Coast SST - monthly mean

22 East Coast SST - anomaly

24 Subscription Information

U.S. DEPARTMENT OF COMMERCE • National Oceanic and Atmospheric Administration
National Weather Service
National Environmental Satellite, Data, and Information Service

Oceanographic Monthly Summary is published by the National Weather Service and the National Environmental Satellite, Data, and Information Service (NESDIS). *Oceanographic Monthly Summary* contains sea surface temperature (SST) analyses on both regional and ocean basin scales for the Atlantic and Pacific Oceans. Two ocean basin SST analyses are presented, one based on in-situ data and another based solely on satellite data. An ocean basin SST anomaly derived from the in-situ data is also shown; it uses the National Climatic Center (NCC) Climatology*. The regional SST analyses are based upon a combination of in-situ and satellite data measurements. The regional SST anomalies use the Robinson-Bauer Climatology*. *Oceanographic Monthly Summary* also contains Alaskan sea ice information and ocean feature information for contiguous U.S. ocean regions.

Oceanographic Monthly Summary welcomes articles containing information of interest to *Oceanographic Monthly Summary* readers, such as, news on operational oceanography, unusual ocean feature phenomena, etc. Contributions should be sent to the editor (address below). Accepted material will appear in the OceaNotes section of *Oceanographic Monthly Summary*. Contributions can be published as quickly as the next monthly issue.

If you are interested in receiving *Oceanographic Monthly Summary* regularly, please refer to the back cover for subscription information.

*Reynolds, R.W., 1982. A Monthly Averaged Climatology of Sea Surface Temperatures; *NOAA Technical Report NWS 31.*

*Robinson, M.K., 1976. Atlas of North Pacific Ocean Monthly Mean Temperatures and Mean Salinities of the Surface Layer; *NavOceano Ref. Pub. 2.*

Robinson, M.K., R. A. Bauer and E.H. Schroeder, 1979. Atlas of North Atlantic-Indian Ocean Monthly Mean Temperatures and Mean Salinities of the Surface Layer; *NavOceano Ref. Pub. 18.*

Oceanographic Monthly Summary
Editor: Steve Auer
National Meteorological Center, W/NMC21
National Weather Service, NOAA
Washington, DC 20233
(telephone: 301/763-8133)
Assistant Editor: Jenifer Wartha Clark
Synoptic Analysis Branch, S/DS23
NESDIS, NOAA
Washington, DC 20233
(telephone: 301/763-8446)

SST Computer Analyses are prepared by:
William H. Gemmill
Marine Products Branch, W/NMC21
National Meteorological Center
National Weather Service, NOAA
Washington, DC 20233
(telephone: 301/763-8133)

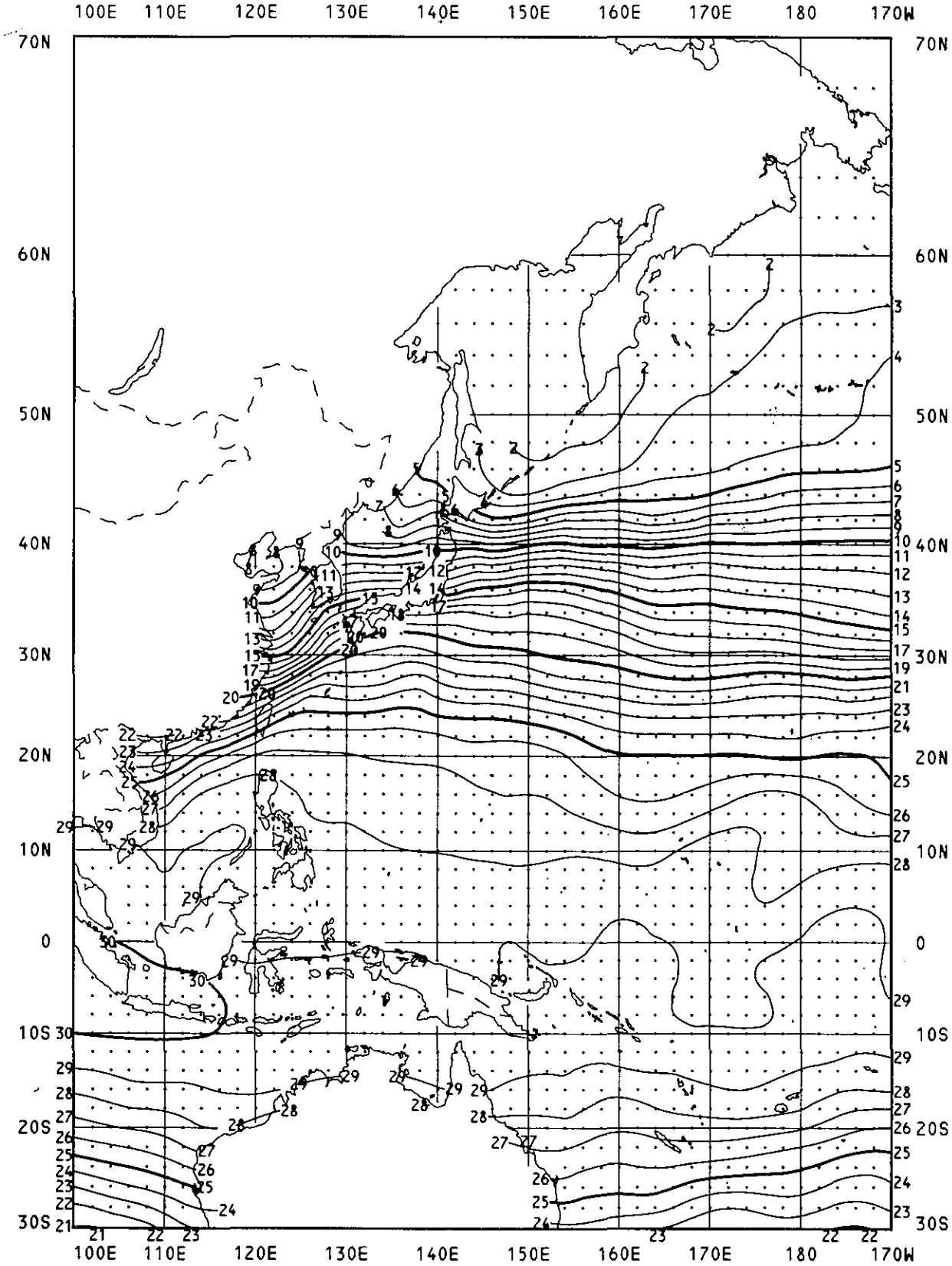
NEW SATELLITE-ONLY MONTHLY MEAN SST ANALYSES

Inaugurated in this April 1983 issue are three sectors of a global (65°N to 30°S) monthly mean sea surface temperature analysis, from the National Environmental Satellite, Data, and Information Service (NESDIS), based solely on satellite infrared measurements (pp. 8, 9, 12). These two-degree latitude and longitude summaries correspond to the CAC monthly means (pp. 4, 5, 10) based solely on in-situ data (ship and buoy observations). These two sets of monthly means are thus derived from entirely independent data bases. The NESDIS satellite temperatures are produced daily using a multi-channel technique (visible and infrared) for cloud-filtering and atmospheric corrections (McClain, et. al., 1982) that became operational in November 1981. The daily satellite retrievals are collected in 2.5 degree latitude/longitude grid boxes for computation of the monthly mean, but are transposed to a two-degree grid for charts in this publication. The NESDIS satellite-only analyses in general show somewhat more detail than the CAC ship/buoy-only analyses (e.g., compare in the Gulf Stream region) primarily because a non-linear filter was applied to the latter to cope with areas of sparse or no data. There are other differences between the CAC and NESDIS analyses, but discussions of these will come in later issues.

BOUND VOLUMES OF OMS AVAILABLE

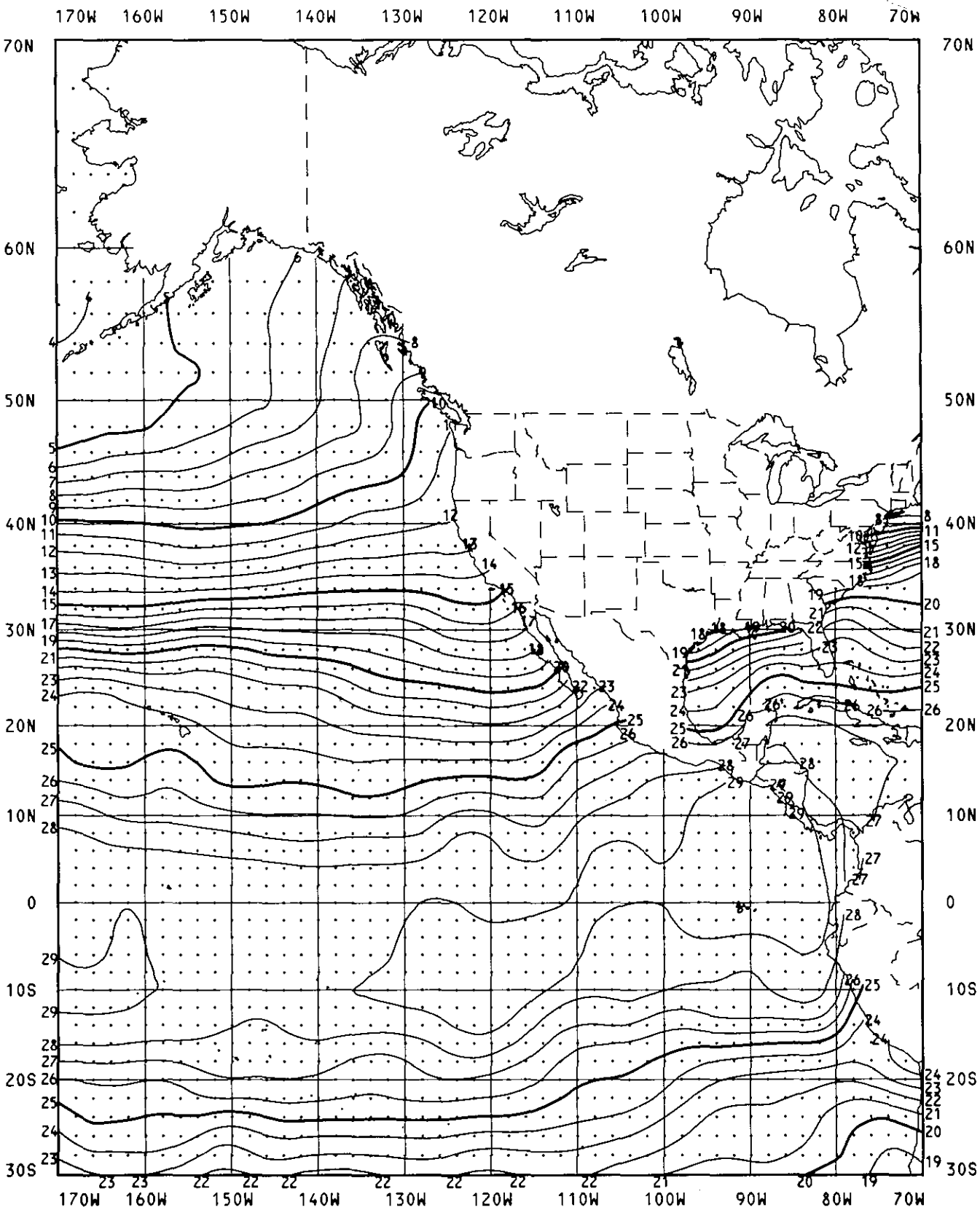
Several hard back bound copies of volumes I and II of *Oceanographic Monthly Summary* are now available for sale upon request. These handsome booklets contain the first 24 issues dating from January 1981 thru December 1982, and, in addition, contain the SST climatology. The cost per copy is $40.00, plus postage. Interested parties may contact the editor. If demand is sufficiently greater than supply, we will order new bindings.

McClain, E.P., W.G. Pichel, C.C. Walton, Z. Ahmad, J. Sutton, 1983. Multi-channel Improvements to Satellite Derived Global Sea Surface Temperatures. *Advances in Space Research, Vol. II, No. 6, pp. 43-47.*



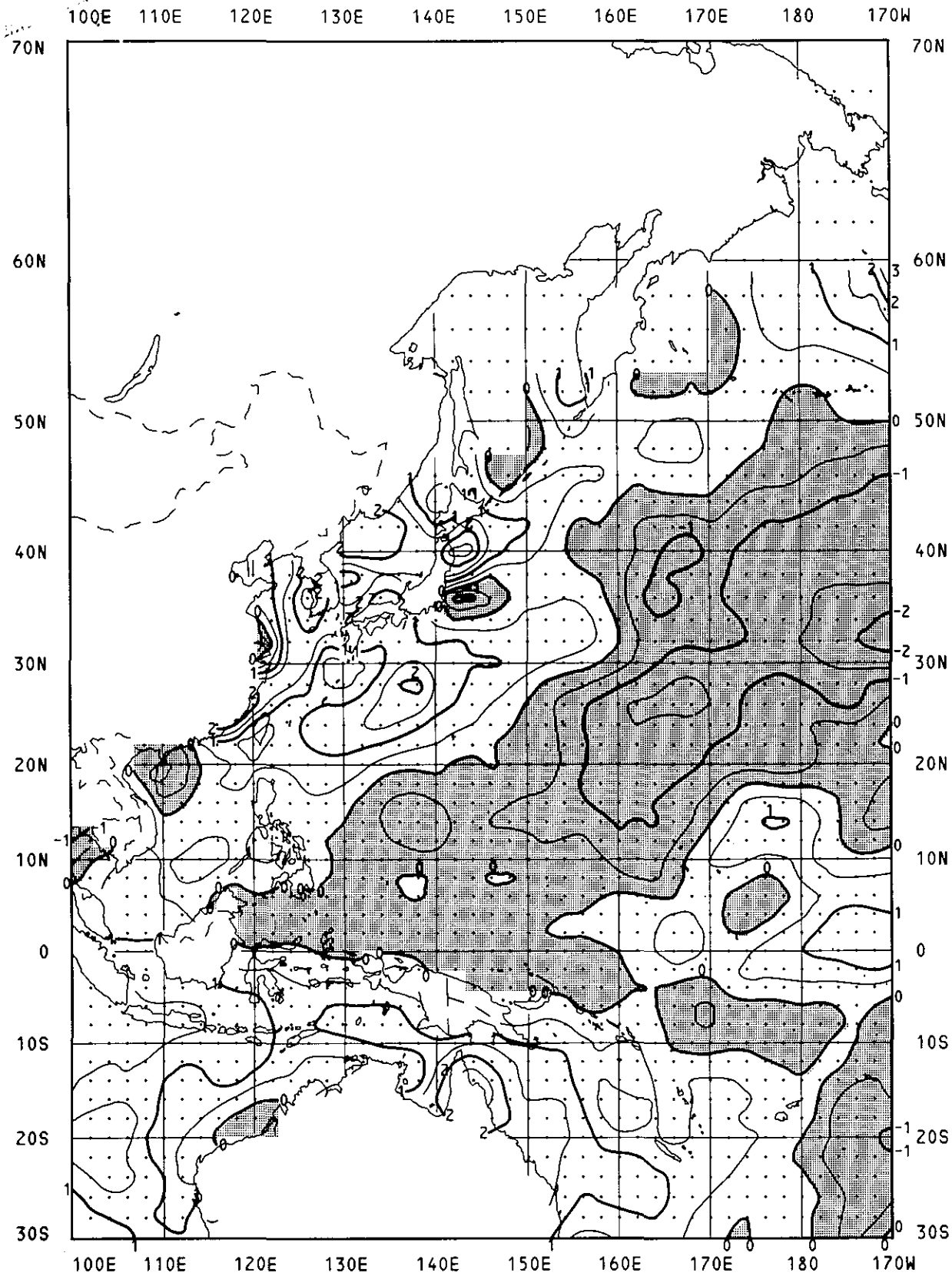
Western Pacific Ocean
SST--MONTHLY MEAN (°C)
SHIP and BUOY DATA
APRIL 1983

Monthly mean sea surface temperature is the mean of in-situ data [ships and buoys] within two-degree quadrangles Contour line interval is 1.0°C.



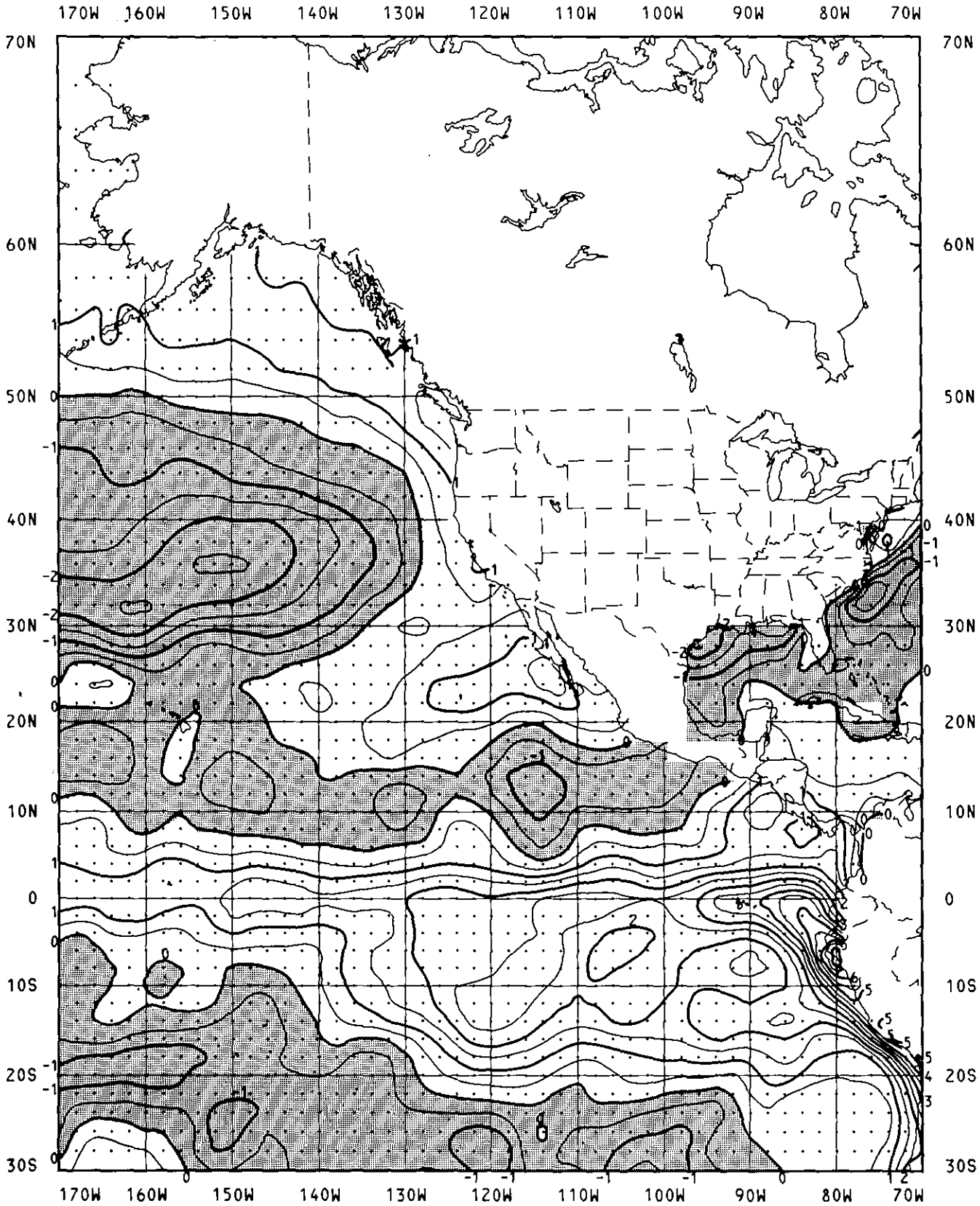
Eastern Pacific Ocean
SST--MONTHLY MEAN (°C)
SHIP and BUOY DATA
APRIL 1983

Monthly mean sea surface temperature is the mean of in-situ data [ships and buoys] within two-degree quadrangles Contour line interval is 1.0°C.



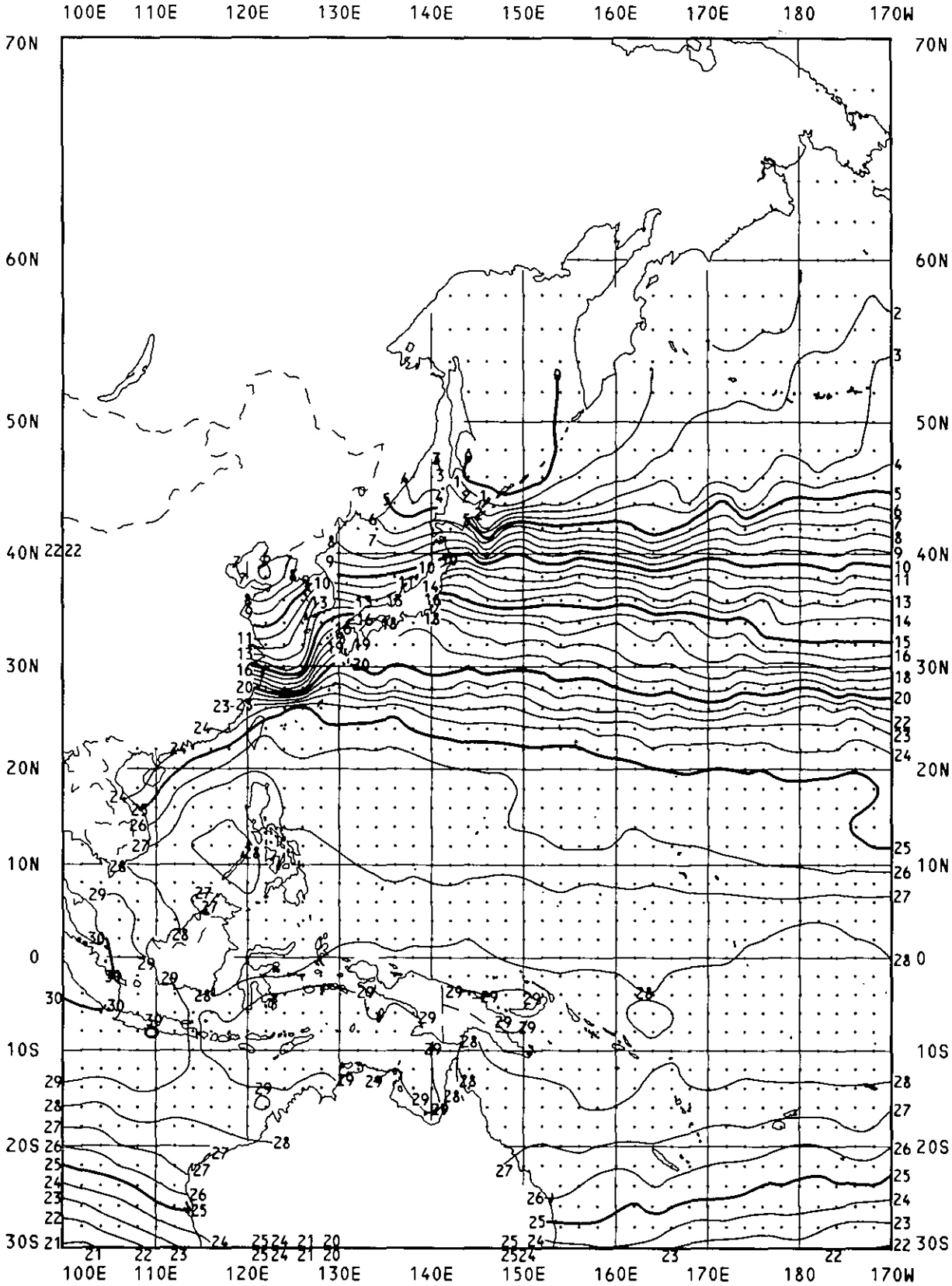
Western Pacific Ocean
SST--MONTHLY ANOMALY (°C)
SHIP and BUOY DATA
APRIL 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.



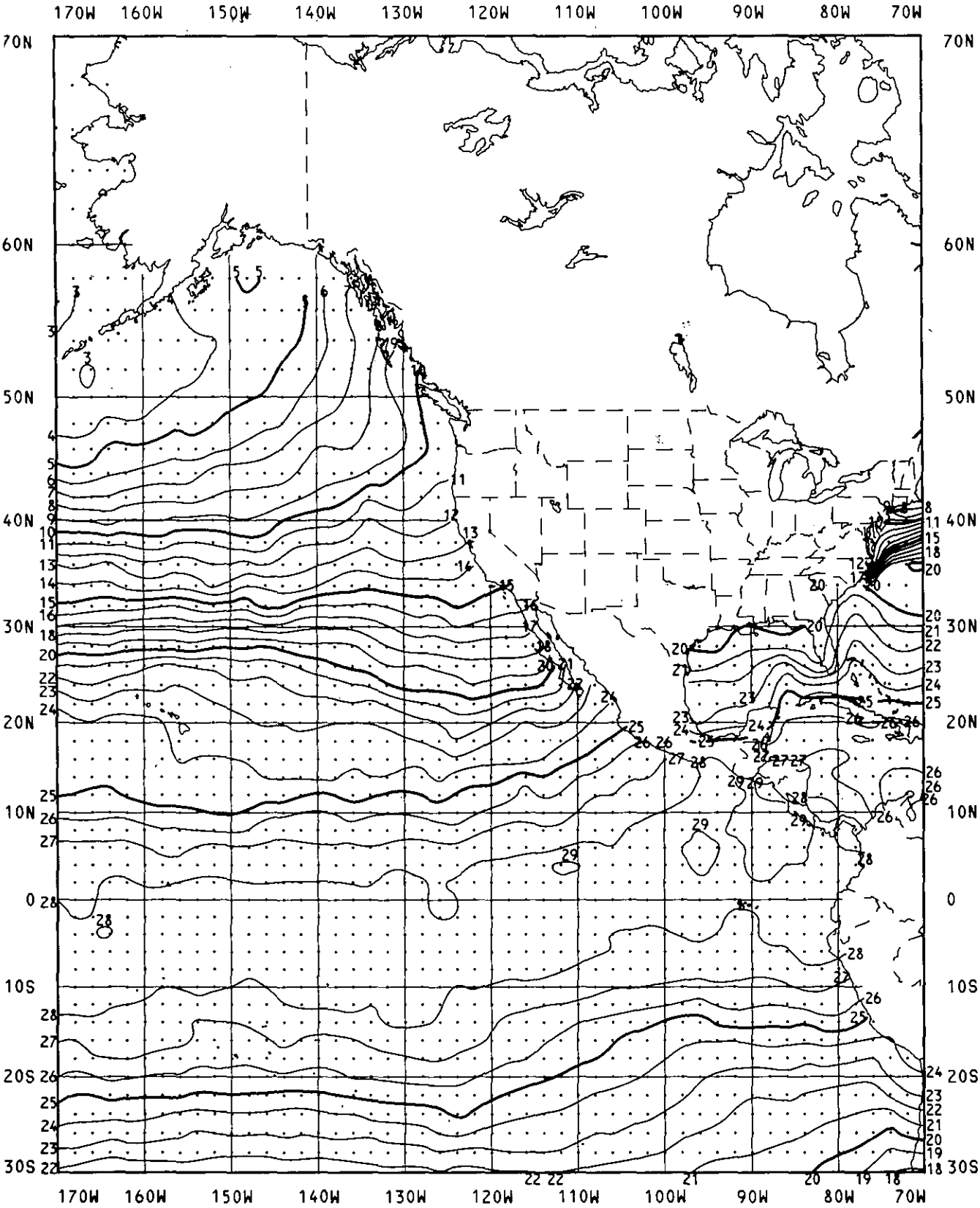
Eastern Pacific Ocean
SST--MONTHLY ANOMALY (°C)
SHIP and BUOY DATA
APRIL 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.



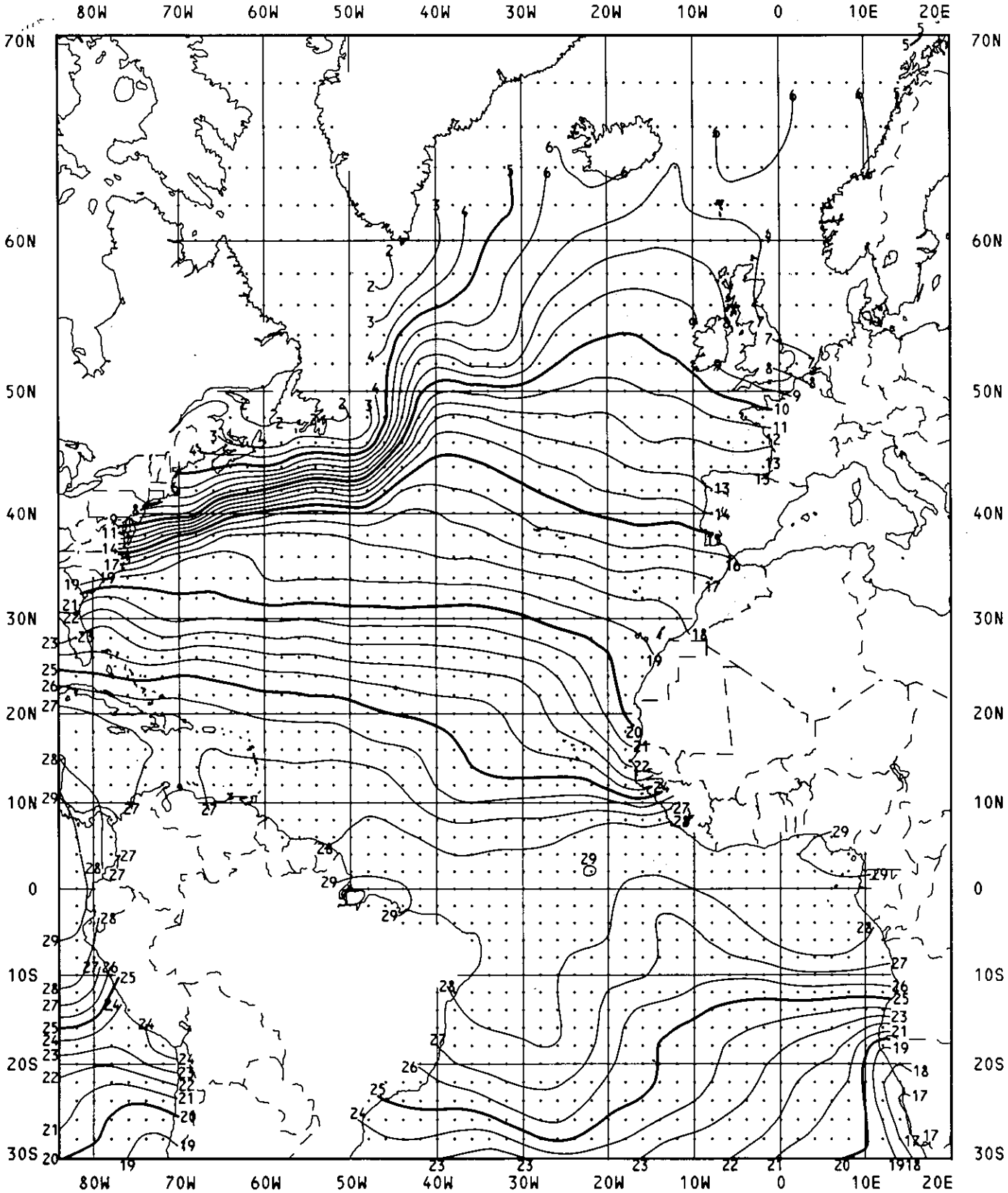
Western Pacific Ocean
SST--MONTHLY MEAN (°C)
SATELLITE DATA
APRIL 1983

Monthly mean sea surface temperature is the mean of satellite data within two-degree quadrangles Contour line interval is 1.0°C.



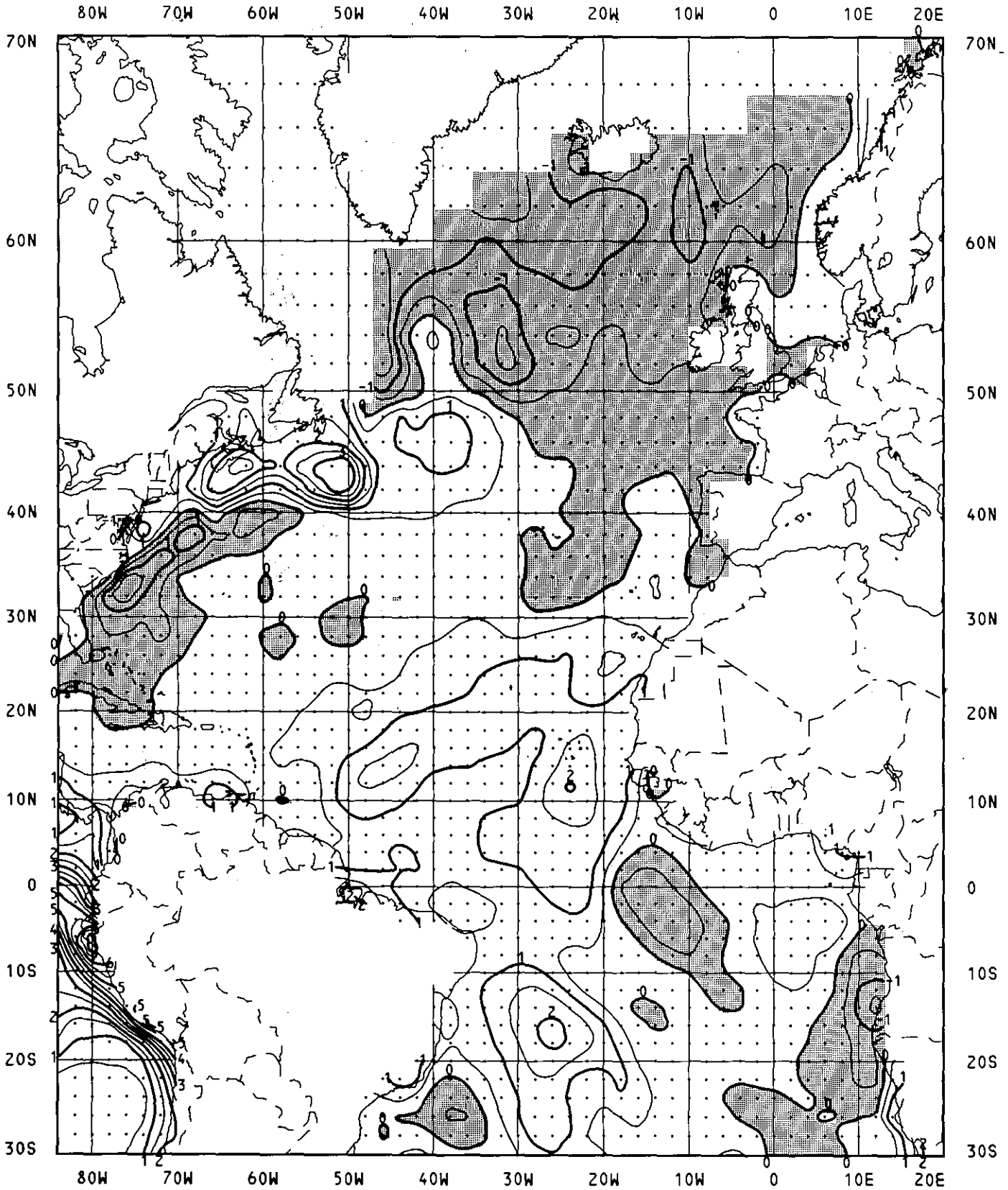
Eastern Pacific Ocean
SST--MONTHLY MEAN (°C)
SATELLITE DATA
APRIL 1983

Monthly mean sea surface temperature is the mean of satellite data within two-degree quadrangles Contour line interval is 1.0°C.



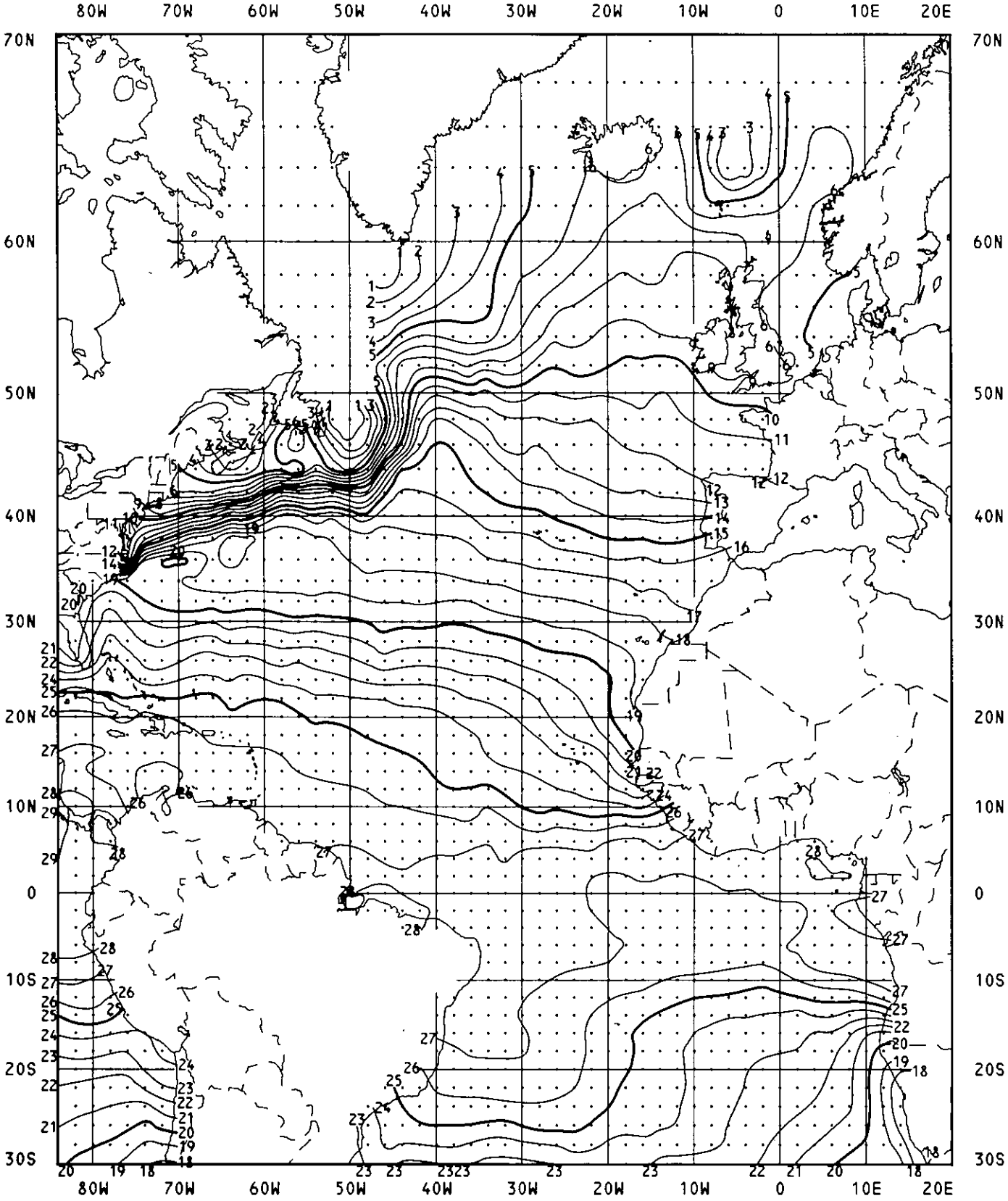
Atlantic Ocean
SST--MONTHLY MEAN (°C)
SHIP and BUOY DATA
APRIL 1983

Monthly mean sea surface temperature is the mean of in-situ data [ships and buoys] within two-degree quadrangles Contour line interval is 1.0°C.



Atlantic Ocean
SST--MONTHLY ANOMALY (°C)
SHIP and BUOY DATA
APRIL 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.



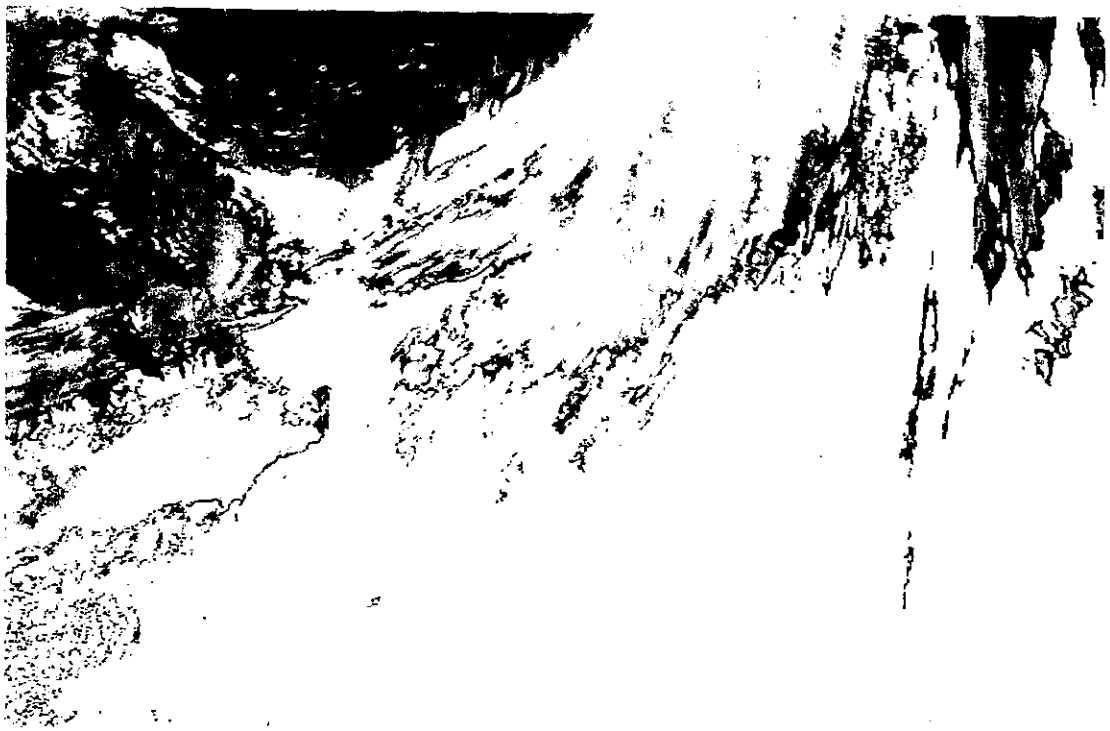
Atlantic Ocean
SST--MONTHLY MEAN (°C)
SATELLITE DATA
APRIL 1983

Monthly mean sea surface temperature is the mean of satellite data within two-degree quadrangles
Contour line interval is 1.0°C.

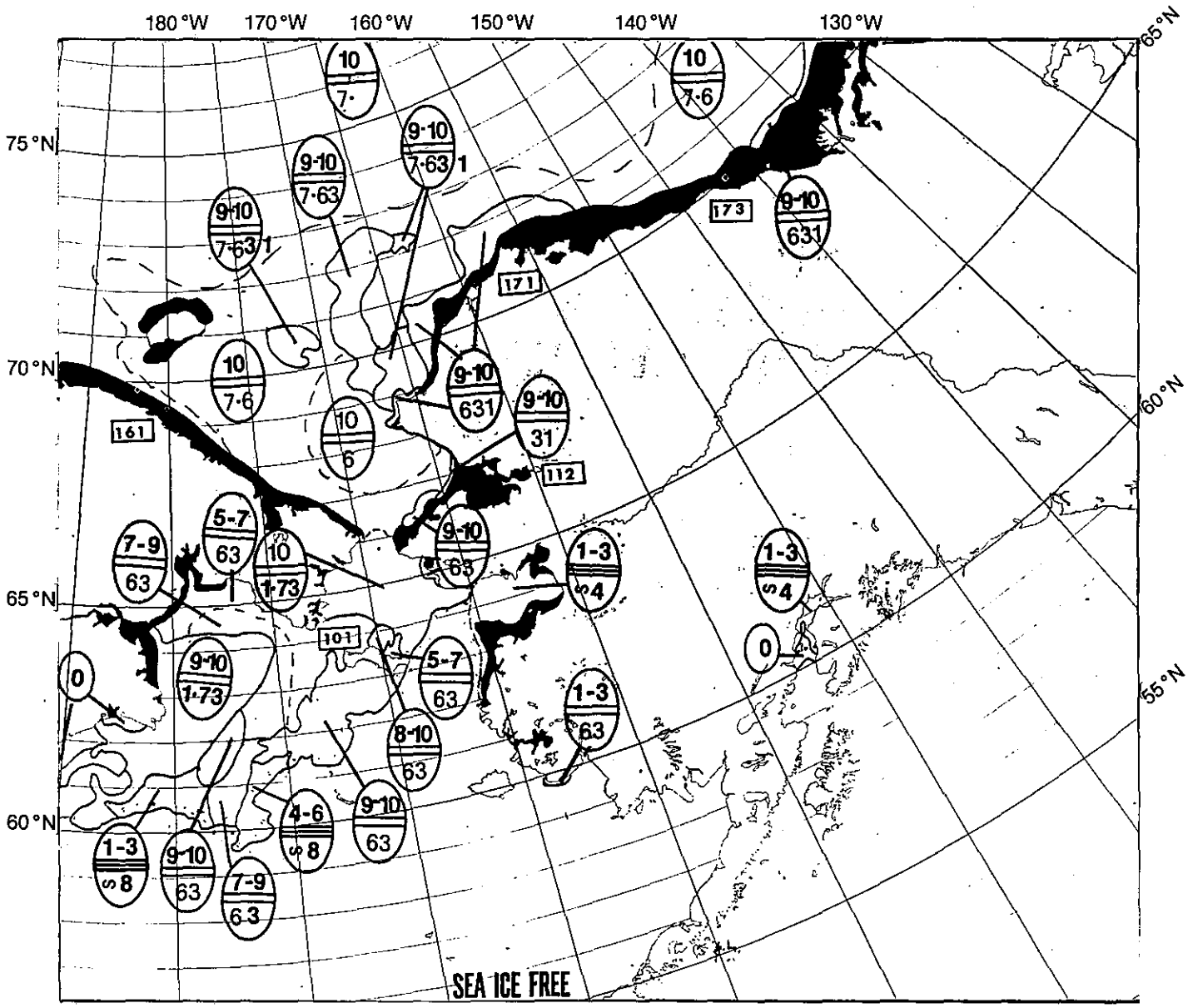
SATELLITE IMAGE OF THE MONTH

Marcia L. Weaks
Environmental Products Branch, E/SP22
NESDIS, NOAA
Washington, DC 20233
301/763-8142

This NOAA-7 LAC/IR image is a view of northern Japan and a portion of the western Pacific. The warmest waters correspond to the darkest gray shades on the image. Shown here is a part of the Kuroshio current (bottom right), and two warm eddies (east of extreme northern Japan). The features are relatively warm when compared to cooler waters to the North. The larger, circular eddy is approximately 225 km in diameter; the smaller eddy about 80 km in diameter. Although not apparent here, the warm eddies probably developed from a meander in the Kuroshio current.



BERING SEA / NORTH SLOPE ICE ANALYSIS



C = Total ice concentration in the area in tenths.

C_a, C_b, C_c = Concentration of thickest (C_a), 2nd thickest (C_b), and 3rd thickest (C_c) ice

S_a, S_b, S_c = Stage of development of thickest (S_a), 2nd thickest (S_b), and 3rd thickest (S_c) ice.

-C = Concentration of ice within area(s) of strips and patches.

STAGE(S) OF DEVELOPMENT (THICKNESS)

1 = New ice (0-10 cm)
3 = Young ice (10-30 cm)
6 = First year (30-200 cm)
7 = First year thin (30-70 cm)
1. = First year medium (70-120 cm)
4. = First year thick (120-200 cm)
7. = Old ice (survived at least one summer's melt)

EXAMPLES

125 Theoretical thickness of this season's growth (cm).

Fast ice. Sea ice which forms and remains fast along the coast.

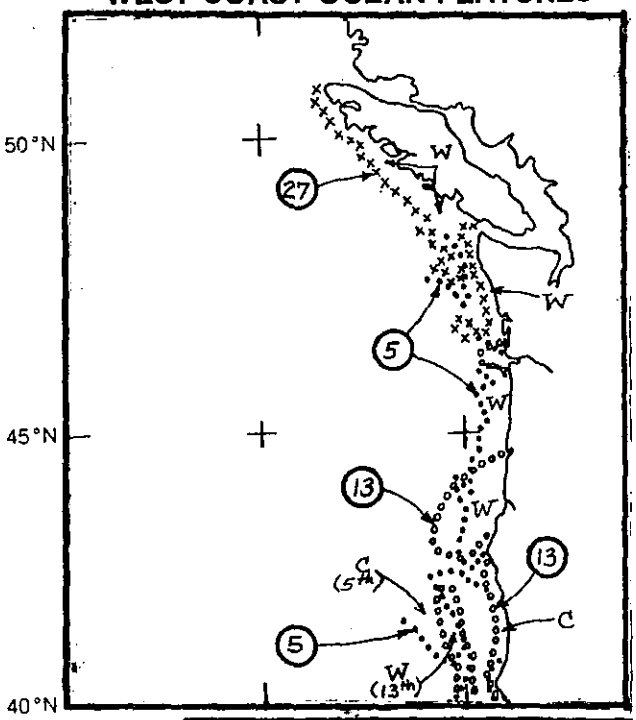
Ice boundary visually or satellite observed.

Ice boundary estimated.

APRIL 1983

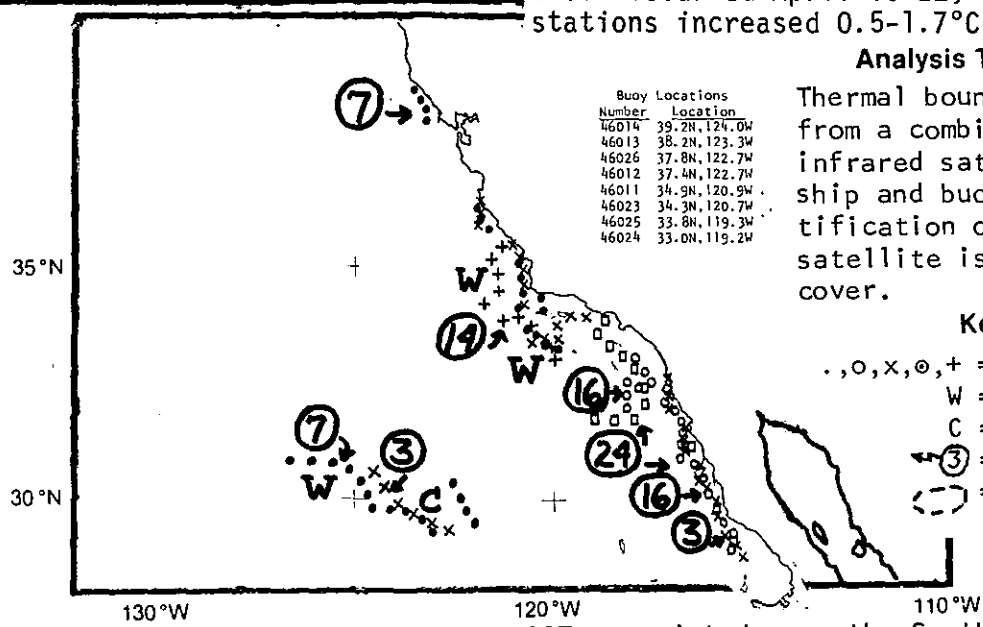
The mean monthly surface pressure circulation shows a 1000 mb low in the Bering Sea near 56°N 180° and a 1030 mb high in the Arctic Ocean near 79°N 169°W. In the eastern Bering Sea geostrophic surface winds are predominantly southerly. North of the Bering Strait winds are easterly. The observed April Arctic surface pressure circulation has been found to have a high correlation with a very favorable extended summer navigation ice seasons along the Alaskan north coast. The mean monthly air temperatures at all of the routinely monitored Alaskan coastal stations on the North Slope and along the Bering Sea are above normal. The theoretical ice thickness at Kotzebue (67°N 163°W) is 28 cm less than the normal, whereas Barrow (71°N 157°W) and Barter Island (70°N 144°W) are 8 cm and 5 cm, respectively, greater than normal. The current ice edge position ranges 200-400 km north of the historical mean east of 175°W to the area between St. Lawrence Island and the Alaskan mainland. West of 175°W the ice edge is near the historical mean.

WEST COAST OCEAN FEATURES



APRIL 1983

Spring transition began gradually in the north panel area, being somewhat masked by continuing large-scale warm SST anomalies along the West Coast associated with El Nino in the equatorial Pacific. Coastal locations continue to exhibit the strongest warm anomalies, generally 1-2°C, but reaching as high as 3.7°C at Grays Harbor (47°N 124°W). Offshore buoys reported mean SSTs about 0.5°C above normal, with no major departures from a slow, steady increasing trend. Overall, SSTs throughout the area showed an average increase of 0.5°C over March values. A period of weak and unsteady early season coastal upwelling, primarily from Cape Blanco (43°N 124°W) southward, occurred during April 3-12. This was verified by an observed SST drop of 1.2°C at the buoy at 40.8°N 124.5°W during the same period, and by a weak thermal boundary seen on April 13 satellite imagery. The most significant coastal warming episode occurred April 15-22, when SSTs at coastal stations increased 0.5-1.7°C.



Buoy Locations

Number	Location
46014	39.2N,124.0W
46013	38.2N,123.3W
46026	37.8N,122.7W
46012	37.4N,122.7W
46011	34.9N,120.9W
46023	34.3N,120.7W
46025	33.8N,119.3W
46024	33.0N,119.2W

Analysis Techniques

Thermal boundaries are determined from a combination of enhanced infrared satellite imagery and ship and buoy observations. Identification of these features by satellite is limited by cloud cover.

Key

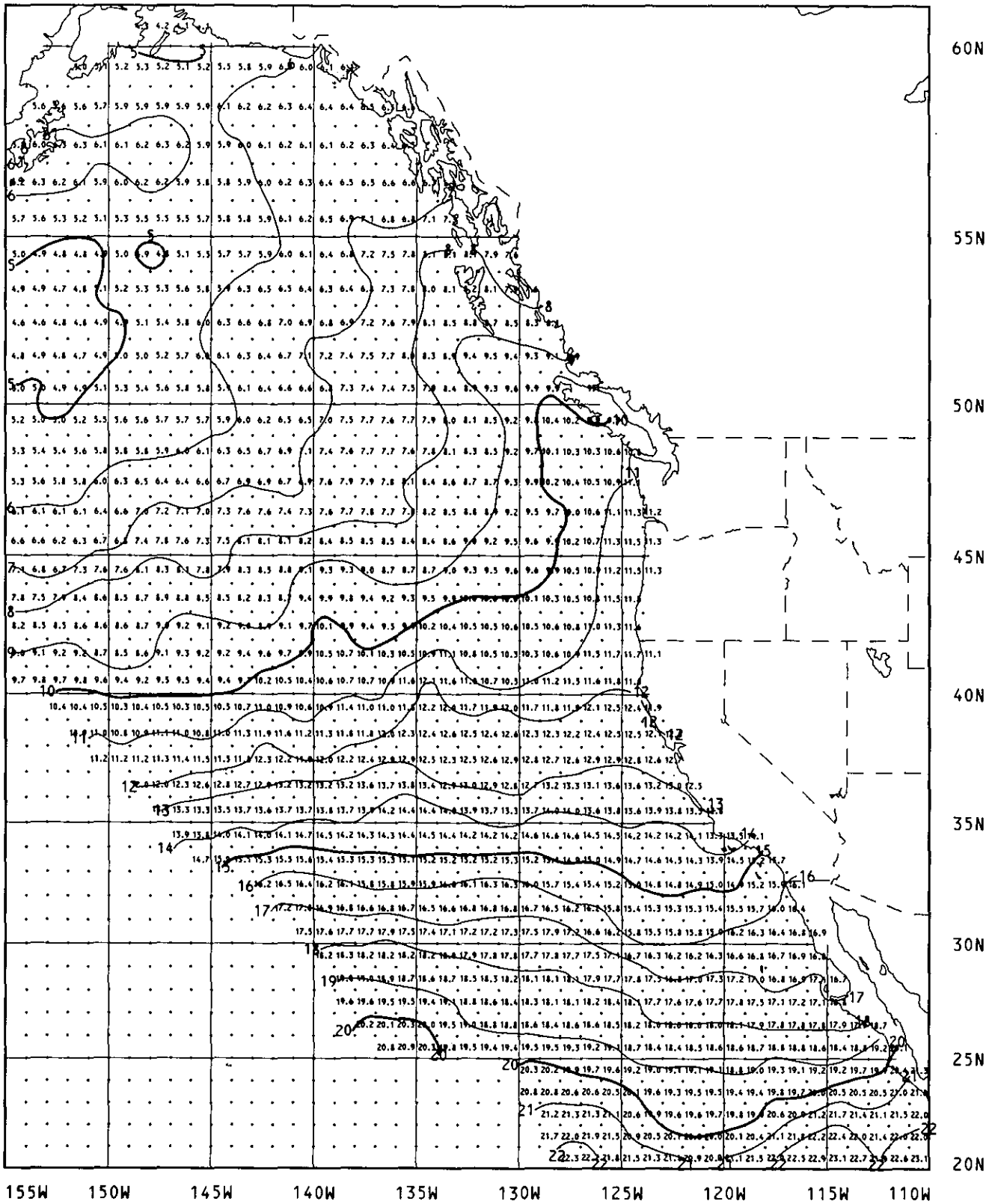
.,o,x,⊙,+ = thermal boundaries
W = warm
C = cold
(3) = date of feature
(dashed) = outline of water mass feature

Abnormally warm SSTs persisted over the South Panel Area (SPA) from the coast to 125°W during April continuing a pattern that begin in Nov. 1982. Although mean SSTs were 1.0-2.0°C above normal in this region, these values are about 1.5°C cooler than those recorded during the peak of the warm event in Feb. 1983. Elsewhere over the SPA, monthly mean SSTs were 0.5-1.5°C below normal west of 130°W as they have been since March 1982. Average April SSTs changed little from March except within 100 km of the coast where 1.0-1.5°C cooling occurred. This was mainly due to weak coastal upwelling during April 1-15 which was strongest off Pt. Conception and along the northern Baja coast. However, frequent periods of southerly surface winds after April 15 halted the upwelling, and coastal SSTs increased 1.0-2.0°C.

Buoy No.	Avg. SST	Std. Dev.
46014	12.5	0.4
46013	11.9	0.7
46026	12.7	0.7
46012	12.8	0.6
46011	13.6	0.5
46023	13.2	0.6
46025	14.9	0.7
46024	14.8	0.5

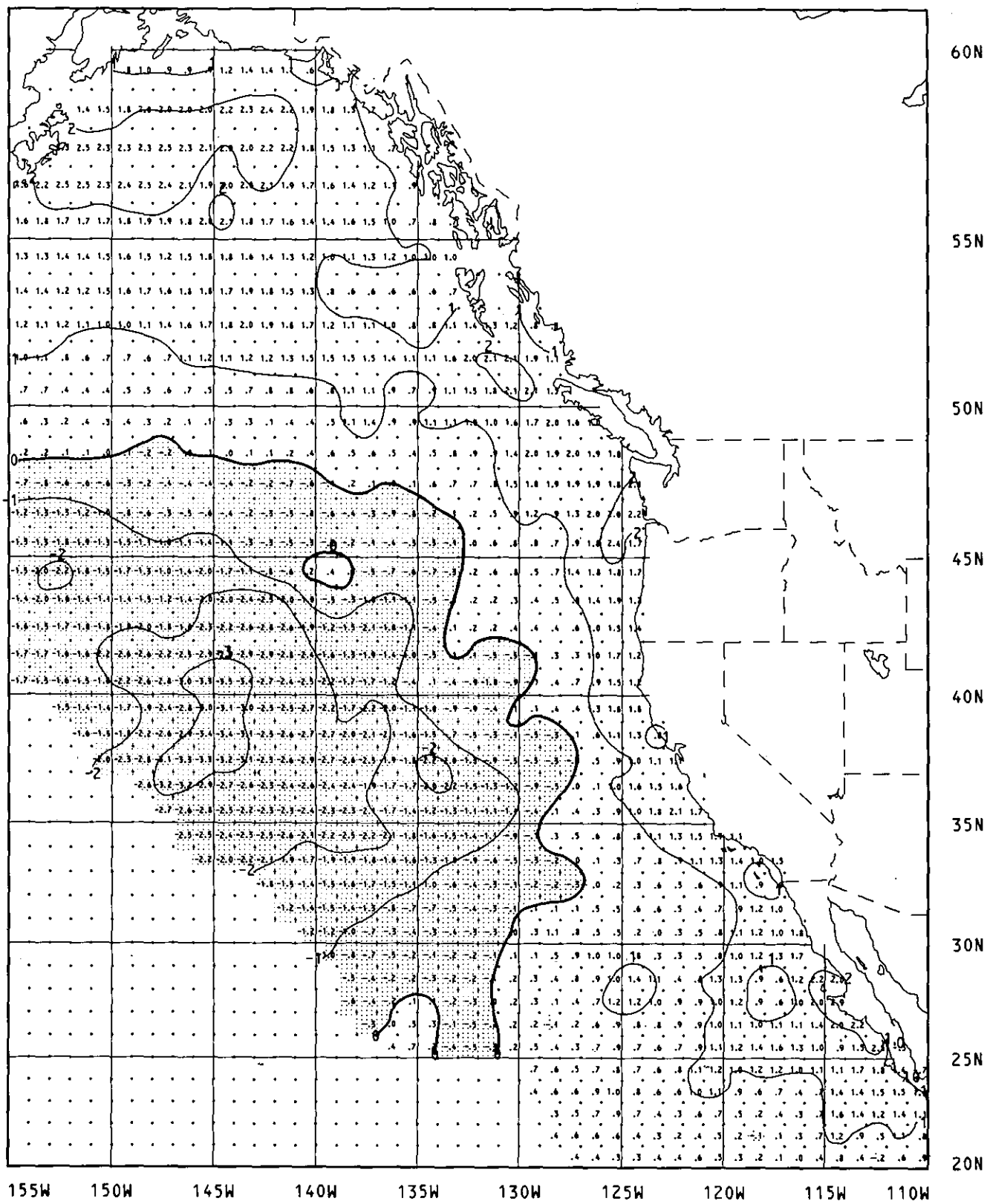
North Panel
Kent Short
Seattle Ocean Services Unit
National Weather Service/NOAA
7600 Sand Point Way NE
Bin C15700
Seattle, WA 98115
206/527-6105

South Panel
Larry Breaker
Satellite Field Service Station
NESDIS/NOAA
660 Price Avenue
Redwood City, CA 94063
415/364-2422



West Coast
SST--MONTHLY MEAN (°C)
April 1983

Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.



West Coast
SST--MONTHLY ANOMALY (°C)
April 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.

The end of this month's positions of the Gulf Stream System and its associated eddies are shown for the NW Atlantic and the Gulf of Mexico. The Gulf Stream and Loop Current boundaries are located by infrared satellite imagery or XBT (expendable bathythermograph) data. Anticyclonic eddies are labeled a-z in the Gulf of Mexico and 1-99 in the NW Atlantic. Cyclonic eddies are labeled A-Z. Arrows on eddies indicate direction of circulation. Warm-core or anticyclonic eddies rotate clockwise; cold-core or cyclonic eddies rotate counterclockwise. The line to the eddy center shows the net translation since last month or since last observed. Eddies or sections of the Gulf

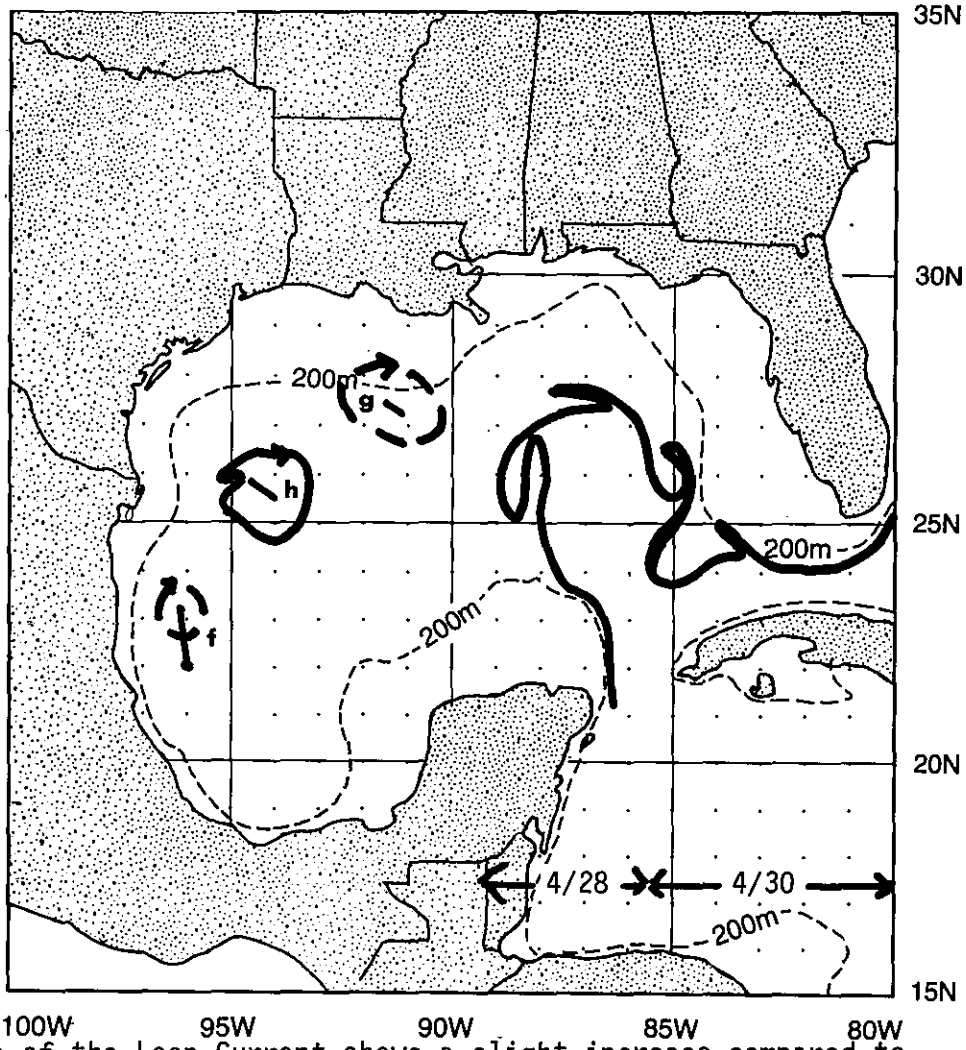
EAST COAST OCEAN FEATURES

Stream System which were not observed during the month are not shown on the analysis chart. The long arrows at the bottom of the chart indicate the date of data used.

Data used in this analysis include:
- NOAA satellite infrared imagery, NESDIS
- Bathythermograph data, National Meteorological Center of National Weather Service
- Oceanographic Analysis, A daily detailed analysis issued by National Weather Service/NESDIS

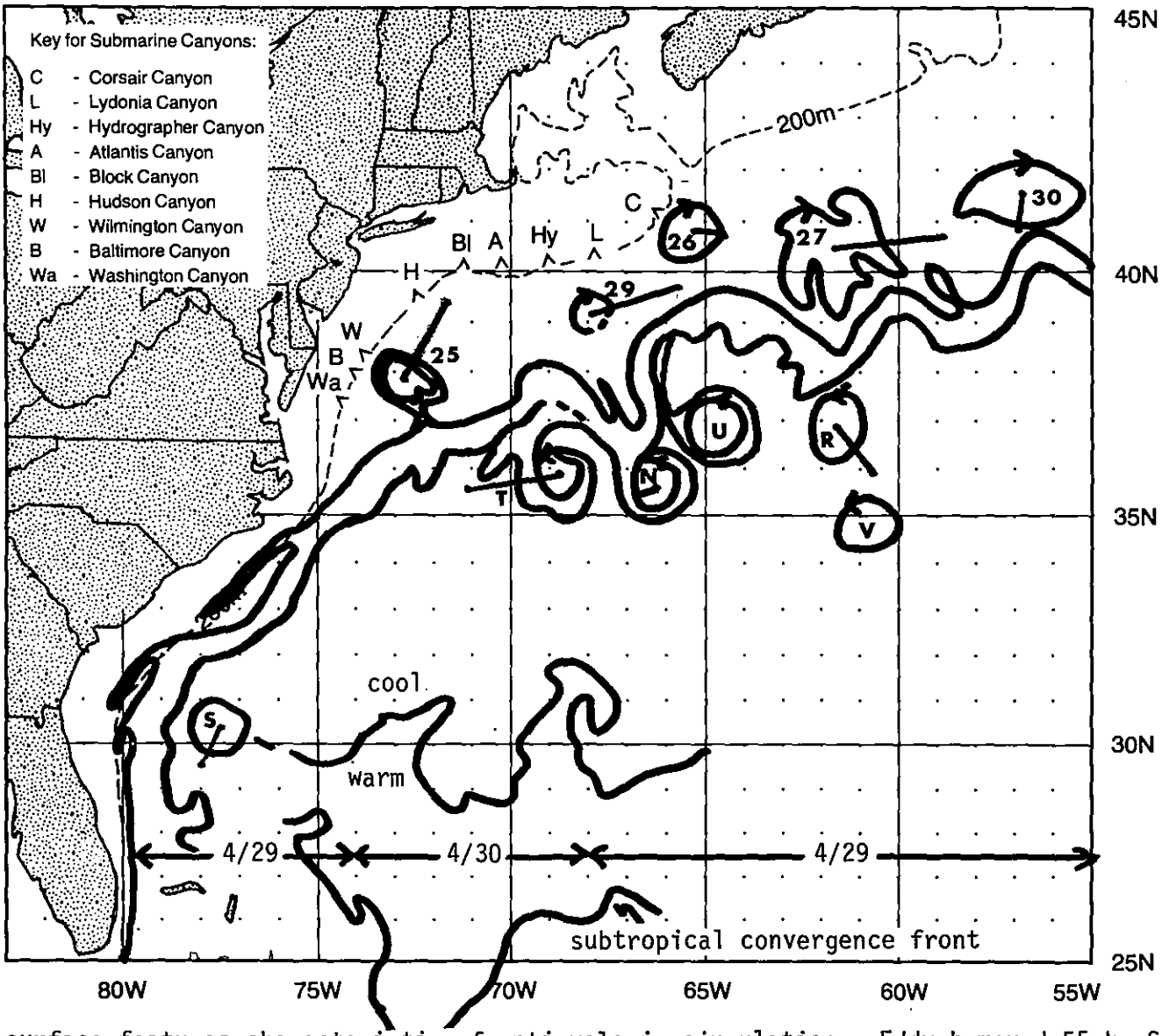
Jenifer Wartha Clark
Synoptic Anal. Br., S/DS23
NESDIS/NOAA
Washington, DC 20233
301/763-8446

Ann Bell
Steve Auer
Nat. Met. Center, W/NMC21
Nat. Weather Service, NOAA
Washington, DC 20233
301/763-8133



APRIL 1983

The end-of-April amplitude of the Loop Current shows a slight increase compared to the end-of-March position. The portion of the Loop north of 24°30N pinched off about April 18 forming short-lived anticyclonic eddy i centered near 26°N 87°W. This eddy was absorbed back into the Loop about April 26. Anticyclonic eddy g translated 25 km NW when last observed on April 20. A drifting buoy deployed by the NOAA Data Buoy Center apparently remains within eddy f. The position of eddy f is estimated from the buoy's April tracking. Eddy f has apparently translated 120 km NNW. The warm feature observed since late January in the vicinity of 25°30N 94°W has been labeled eddy h because GOES satellite imagery from April 27 revealed

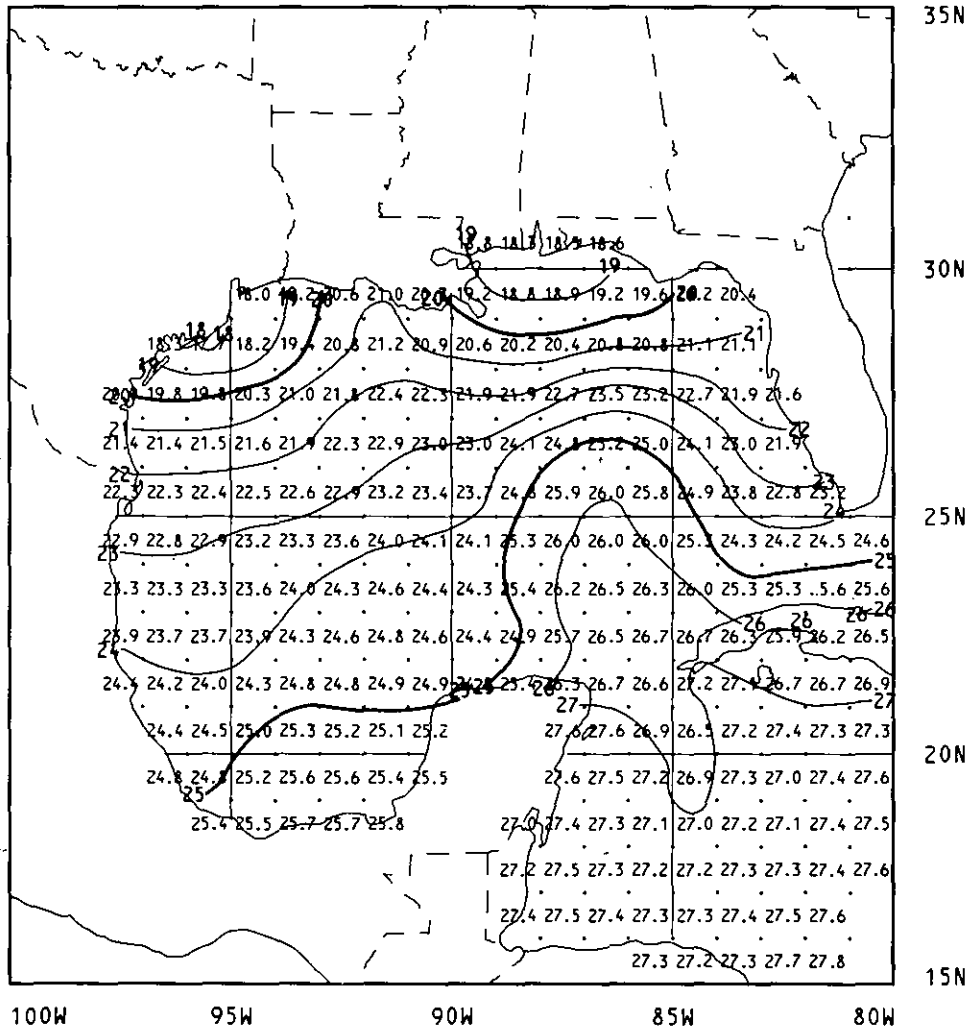


surface features characteristic of anticyclonic circulation. Eddy h moved 55 km SE April 3-27.

The Gulf Stream formed no new anticyclonic eddies this month, but one was absorbed. The location of eddy 25 is uncertain. It was faintly discerned on April 18 near 38°30N 72°30W. On April 30, a long anticyclonically-curved warm tongue containing a cool center was observed near 37°30N 72°30W. A warm eddy-like feature was also detected near 39°30N 71°30W. The former feature is probably eddy 25. Eddy 29 interacted with a Gulf Stream meander near 39°N 66°W during early April. Eddy 29 translated 210 km WSW. Eddy 26 moved 75 km W. Eddy 28 interacted with a Stream meander beginning about April 8 near 41°N 63°W and was apparently absorbed into the Stream about April 23, but it merged again about April 25 near 40°30N 63°W. Finally, eddy 28 merged with eddy 27 about April 29 near 40°30N 62°W. Eddy 27 translated 250 km WSW. Eddy 30 moved 73 km NNE.

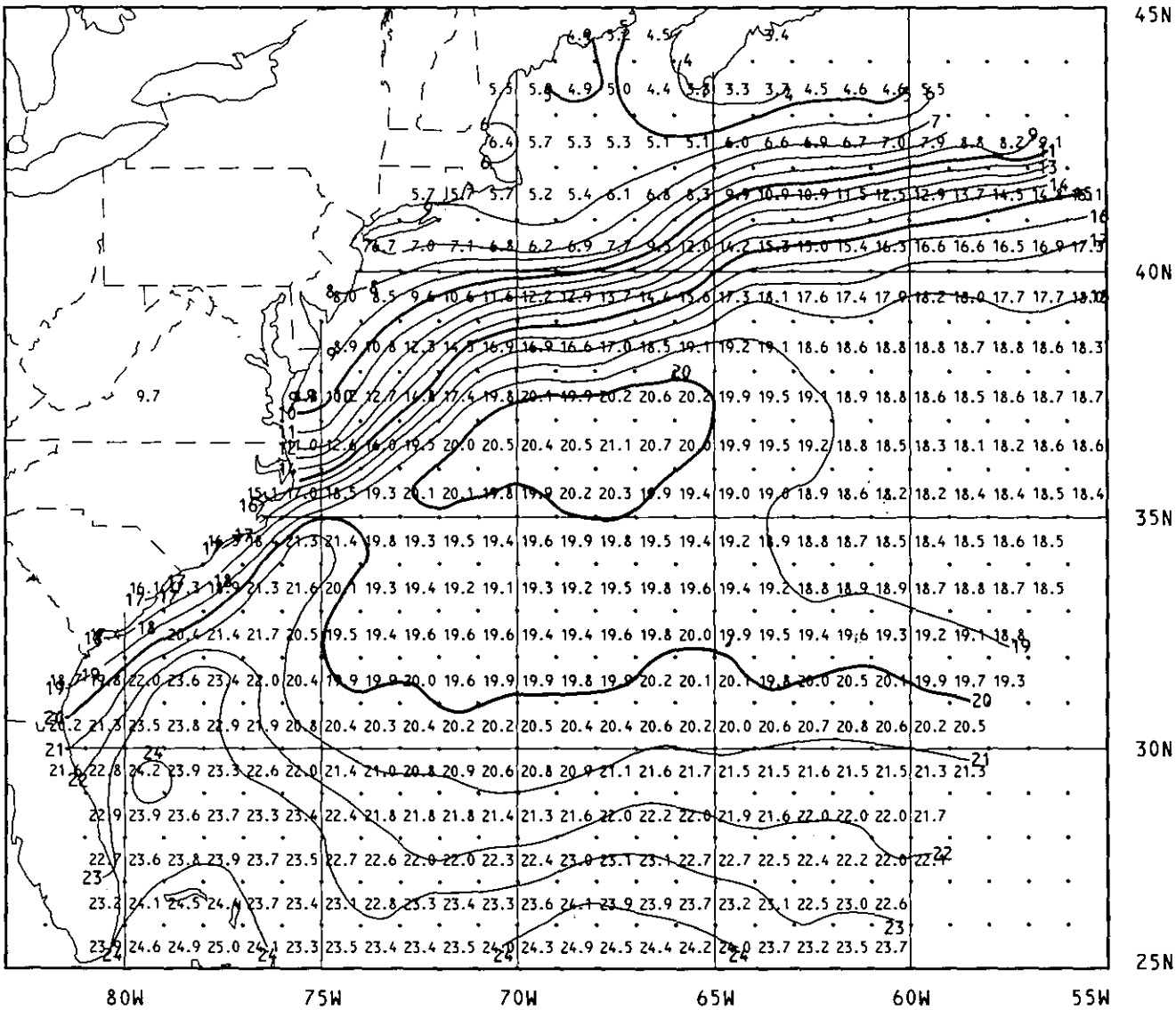
Two newly observed cyclonic eddies were observed. Cyclonic eddy U formed from a meander near 37°30N 64°W about April 13. The origin of eddy V is unknown. Eddy R translated 45 km WNW. Eddy T became attached to the Stream and was advected downstream April 13-22 yielding a monthly translation of 220 km ENE. The Gulf Stream has also advected eddy N downstream since April 28. Eddy N translated 45 km ENE. Eddy S translated 110 km NE. Eddy Q was not observed. The subtropical convergence front was observed on April 24. A secondary front was observed along 30°N on April 27.

EAST COAST SST-
MONTHLY MEAN



Gulf of Mexico
SST--MONTHLY MEAN (°C)
April 1983

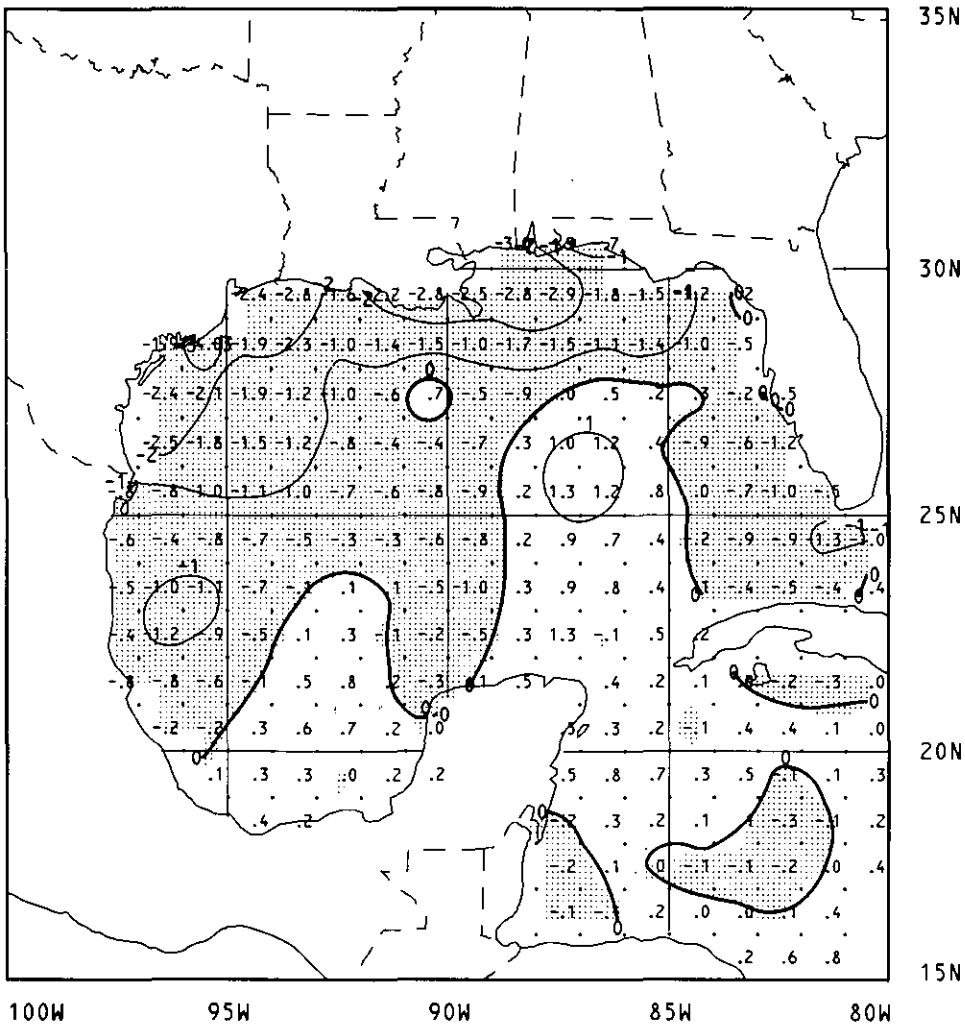
Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.



NW Atlantic Ocean
SST--MONTHLY MEAN (°C)
April 1983

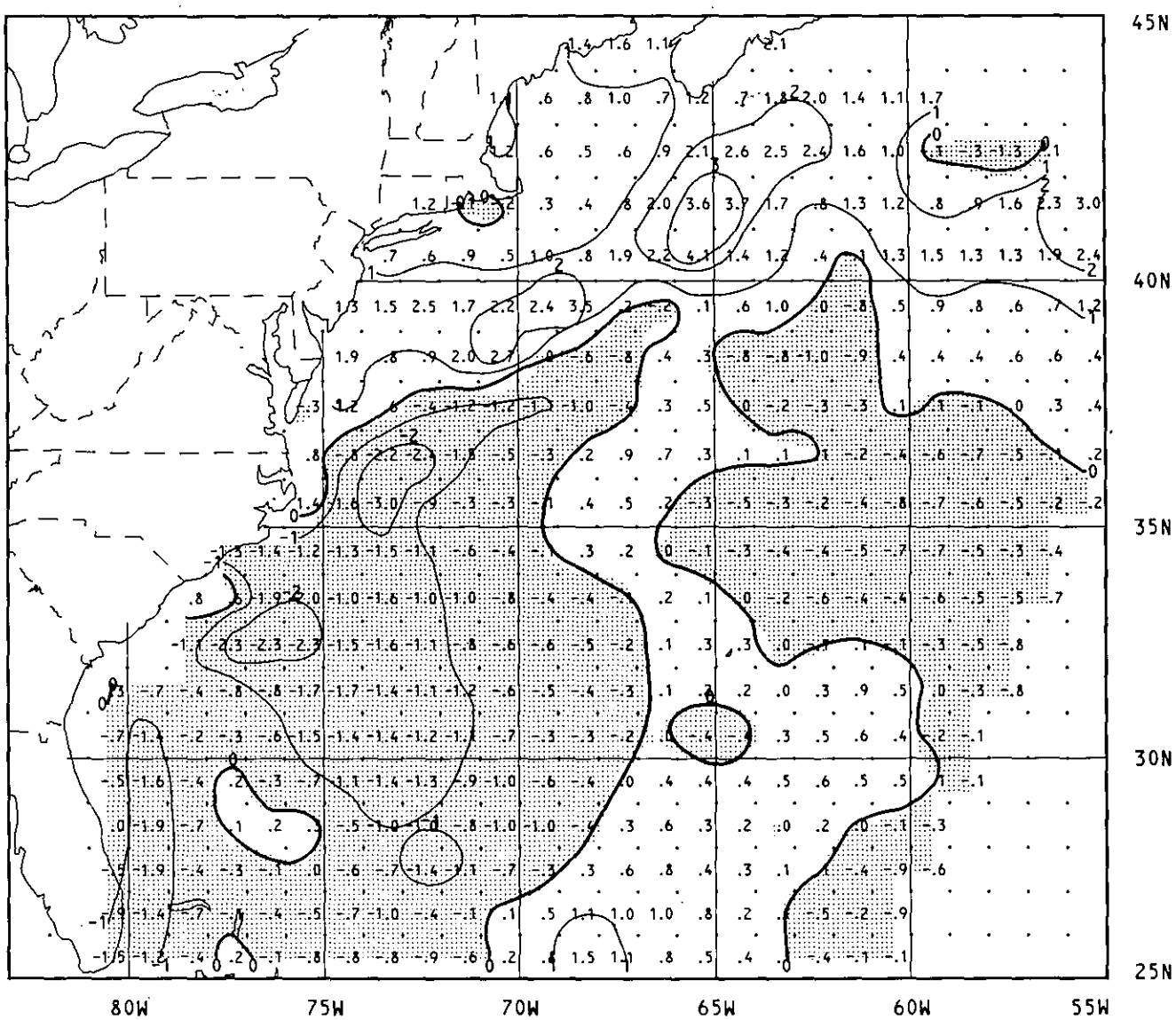
Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.

EAST COAST SST-ANOMALY



Gulf of Mexico
SST--MONTHLY ANOMALY (°C)
April 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.

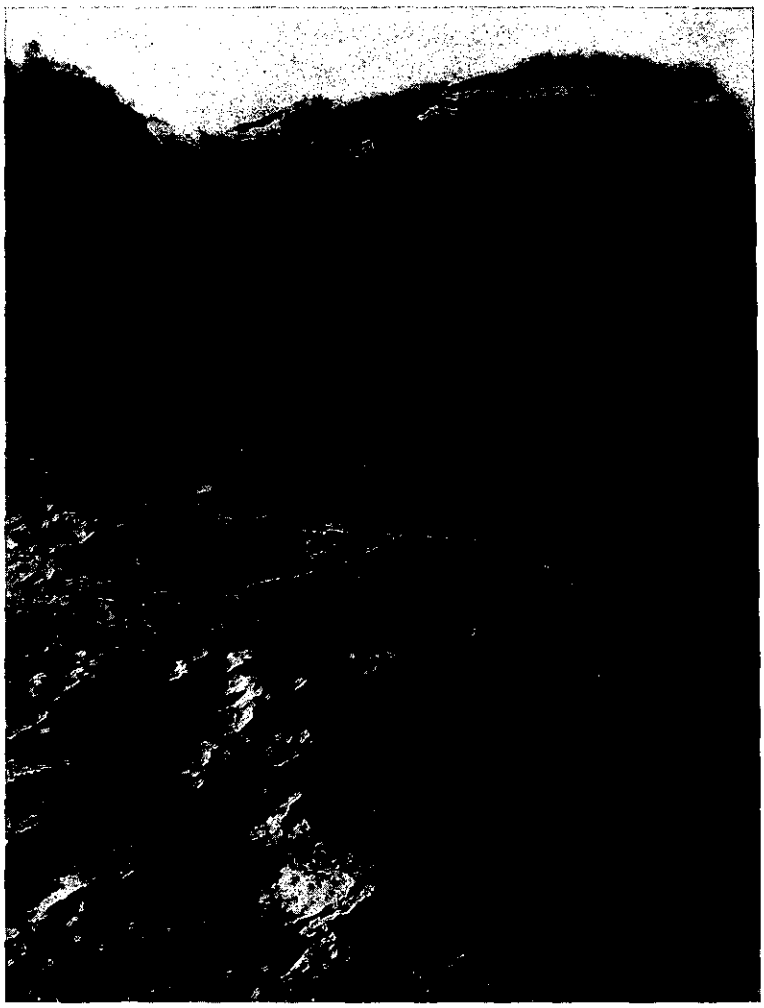


NW Atlantic Ocean
SST--MONTHLY ANOMALY (°C)
April 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.

OCEANOGRAPHIC Monthly Summary

Volume III Number 5 May 1983



Contents

3 OceaNotes

4 Pacific SST - monthly mean, ship and buoy data

6 Pacific SST - anomaly

8 Pacific SST - monthly mean, satellite data

10 Atlantic SST - monthly mean, ship and buoy data

11 Atlantic SST - anomaly

12 Atlantic SST - monthly mean, satellite data

13 Satellite IMAGE of the Month

14 Bering Sea/North Slope ICE, with text

15 West Coast OCEAN FEATURES, with text

16 West Coast SST - monthly mean

17 West Coast SST - anomaly

18 East Coast OCEAN FEATURES, with text

20 East Coast SST - monthly mean

22 East Coast SST - anomaly

24 Subscription Information

U.S. DEPARTMENT OF COMMERCE • National Oceanic and Atmospheric Administration
National Weather Service
National Environmental Satellite, Data, and Information Service

Oceanographic Monthly Summary is published by the National Weather Service and the National Environmental Satellite, Data, and Information Service (NESDIS). *Oceanographic Monthly Summary* contains sea surface temperature (SST) analyses on both regional and ocean basin scales for the Atlantic and Pacific Oceans. Two ocean basin SST analyses are presented, one based on in-situ data and another based solely on satellite data. An ocean basin SST anomaly derived from the in-situ data is also shown; it uses the National Climatic Center (NCC) Climatology*. The regional SST analyses are based upon a combination of in-situ and satellite data measurements. The regional SST anomalies use the Robinson-Bauer Climatology*. *Oceanographic Monthly Summary* also contains Alaskan sea ice information and ocean feature information for contiguous U.S. ocean regions.

Oceanographic Monthly Summary welcomes articles containing information of interest to *Oceanographic Monthly Summary* readers, such as, news on operational oceanography, unusual ocean feature phenomena, etc. Contributions should be sent to the editor (address below). Accepted material will appear in the OceaNotes section of *Oceanographic Monthly Summary*. Contributions can be published as quickly as the next monthly issue.

If you are interested in receiving *Oceanographic Monthly Summary* regularly, please refer to the back cover for subscription information.

*Reynolds, R.W., 1982. A Monthly Averaged Climatology of Sea Surface Temperatures; *NOAA Technical Report NWS 31.*

*Robinson, M.K., 1976. Atlas of North Pacific Ocean Monthly Mean Temperatures and Mean Salinities of the Surface Layer; *NavOceano Ref. Pub. 2.*

Robinson, M.K., R. A. Bauer and E.H. Schroeder, 1979. Atlas of North Atlantic-Indian Ocean Monthly Mean Temperatures and Mean Salinities of the Surface Layer; *NavOceano Ref. Pub. 18.*

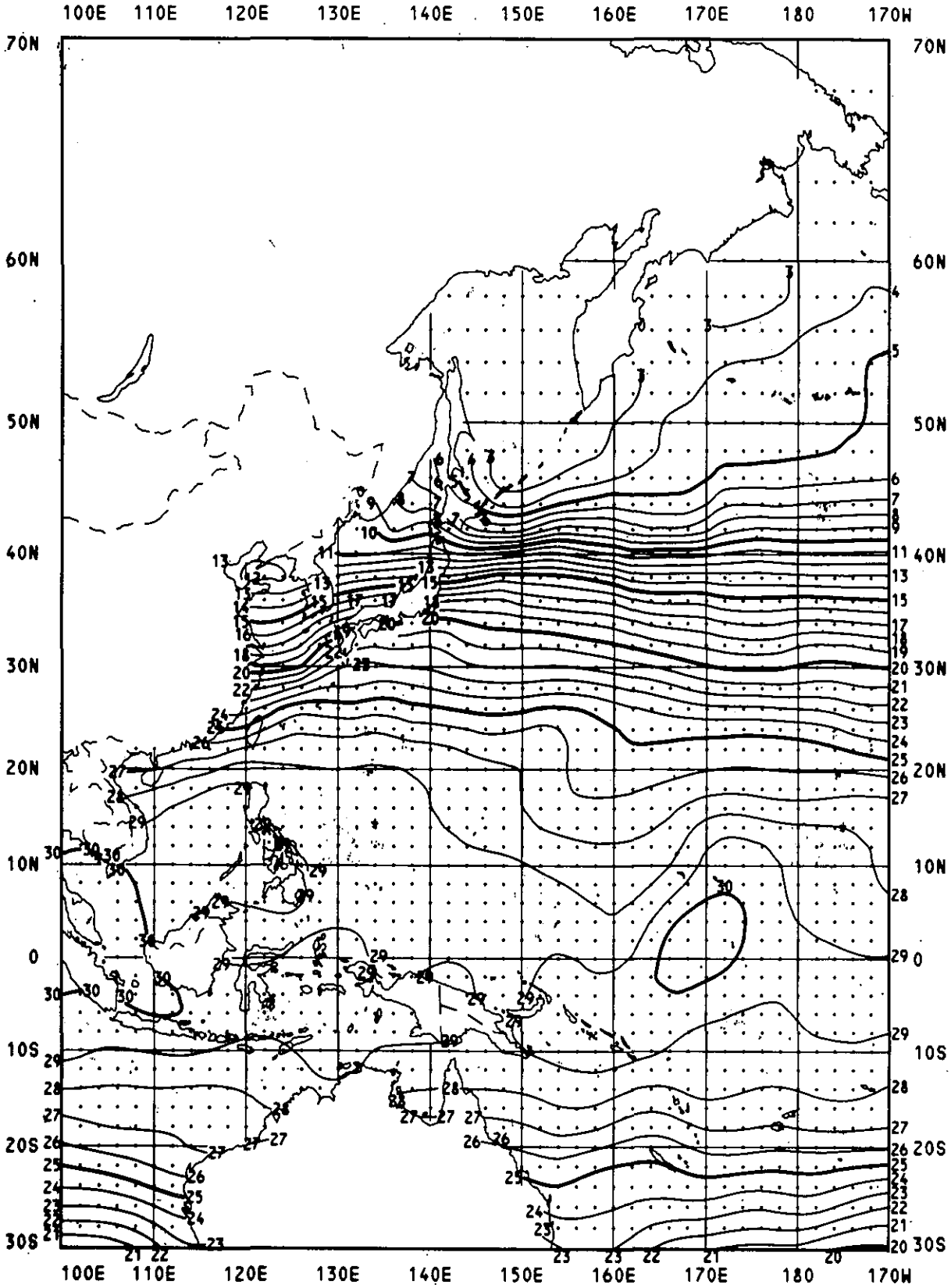
Oceanographic Monthly Summary
Editor: Steve Auer
National Meteorological Center, W/NMC21
National Weather Service, NOAA
Washington, DC 20233
(telephone: 301/763-8133)
Assistant Editor: Jenifer Wartha Clark
Synoptic Analysis Branch, S/DS23
NESDIS, NOAA
Washington, DC 20233
(telephone: 301/763-8446)

SST Computer Analyses are prepared by:
William H. Gemmill
Marine Products Branch, W/NMC21
National Meteorological Center
National Weather Service, NOAA
Washington, DC 20233
(telephone: 301/763-8133)

A NEW ADDITION TO *OCEANOGRAPHIC MONTHLY SUMMARY*

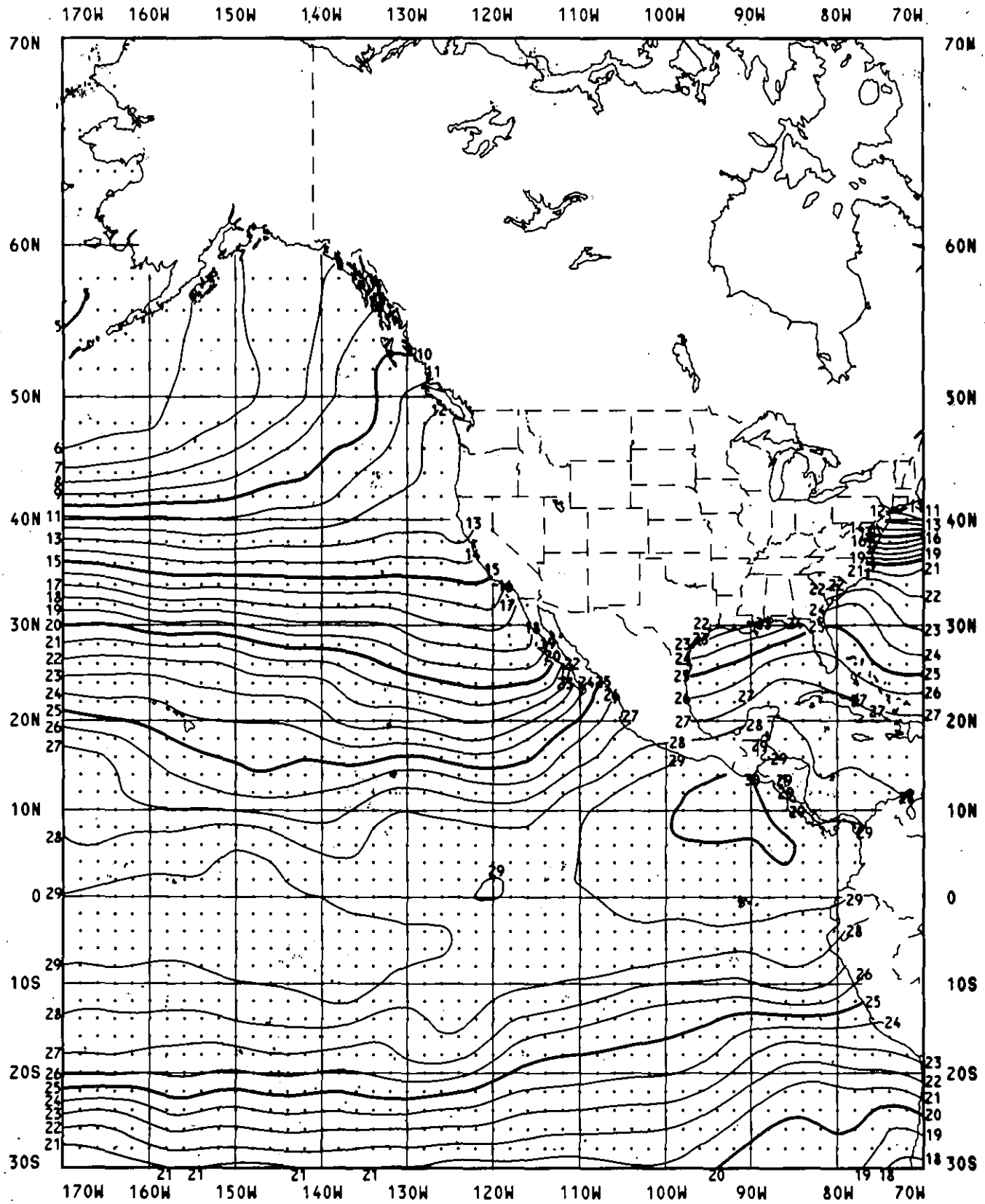
Beginning with the March 1983 issue, a Satellite Image of the Month is being presented in this publication (p. 13). Marcia Weaks, a NESDIS oceanographer, will be contributing this feature. The basic content will be the best satellite image collected by NESDIS each month in terms of oceanographic interest and reproductive print quality and an accompanying article on the oceanographic phenomena displayed in the image.

Unfortunately, this feature has had a rocky start. In last month's (April) issue, the image was poorly reproduced in the printing process. In an effort to make some amends, that image is reproduced below. It (hopefully) shows the western Pacific Ocean area off northern Japan. In the bottom right, a section of the Kuroshio Current is seen. North of the Kuroshio, in the cooler waters, are seen two warm anticyclonic eddies. This image was taken on May 4, 1983.



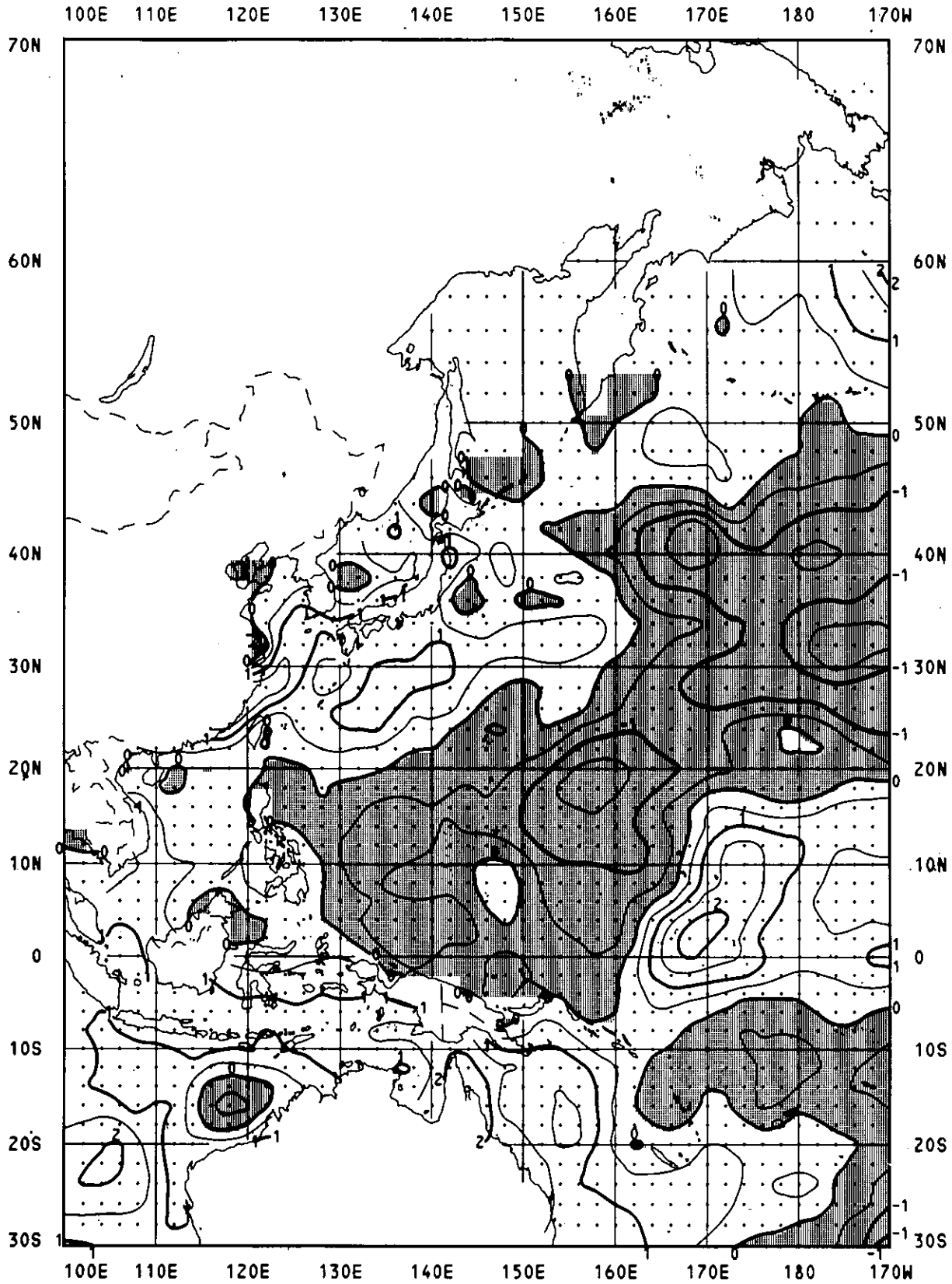
Western Pacific Ocean
SST--MONTHLY MEAN (°C)
SHIP and BUOY DATA
May 1983

Monthly mean sea surface temperature is the mean of in-situ data (ships and buoys) within two-degree quadrangles. Contour line interval is 1.0°C.



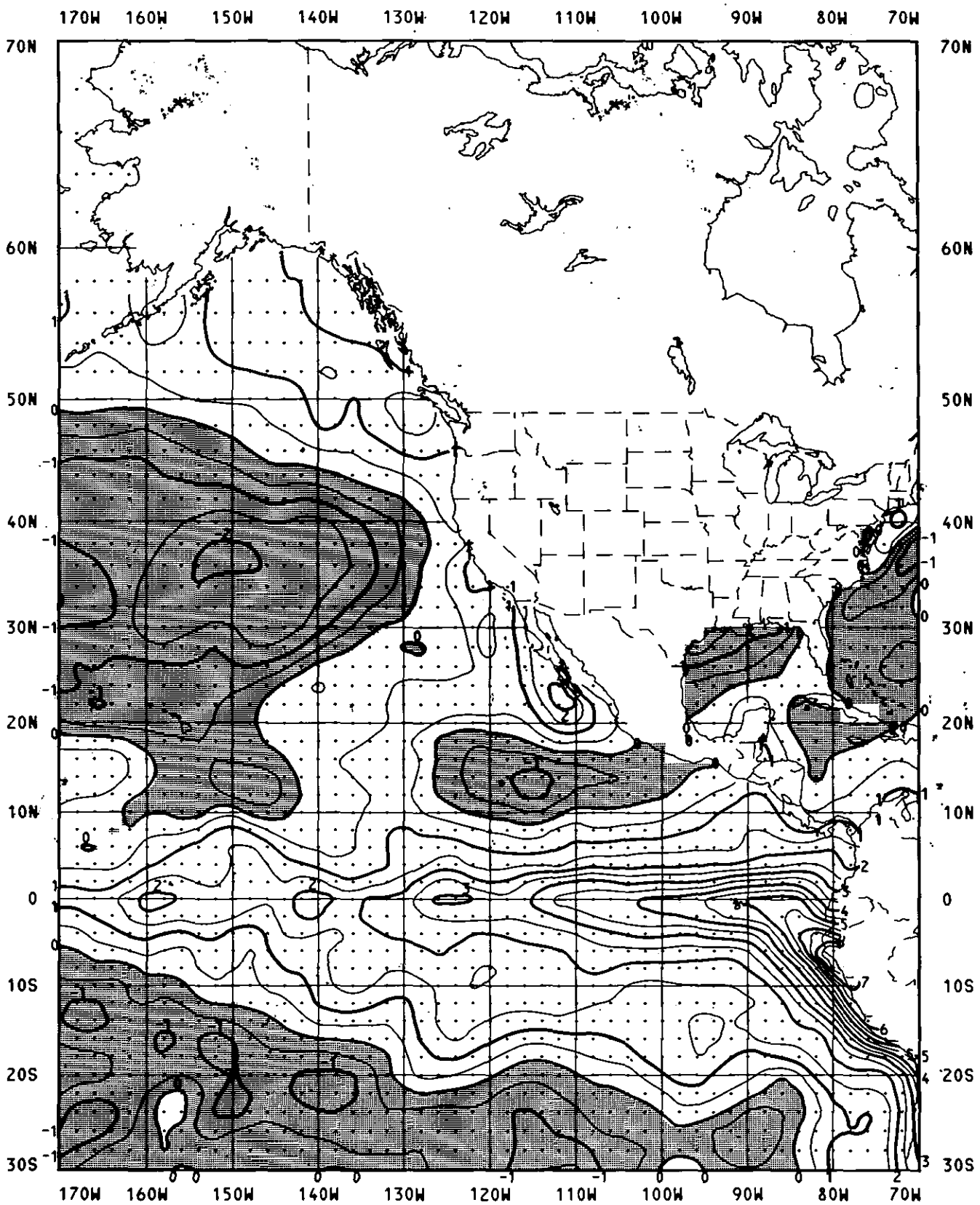
Eastern Pacific Ocean
SST--MONTHLY MEAN (°C)
SHIP and BUOY DATA
May 1983

Monthly mean sea surface temperature is the mean of in-situ data (ships and buoys) within two-degree quadrangles. Contour line interval is 1.0°C



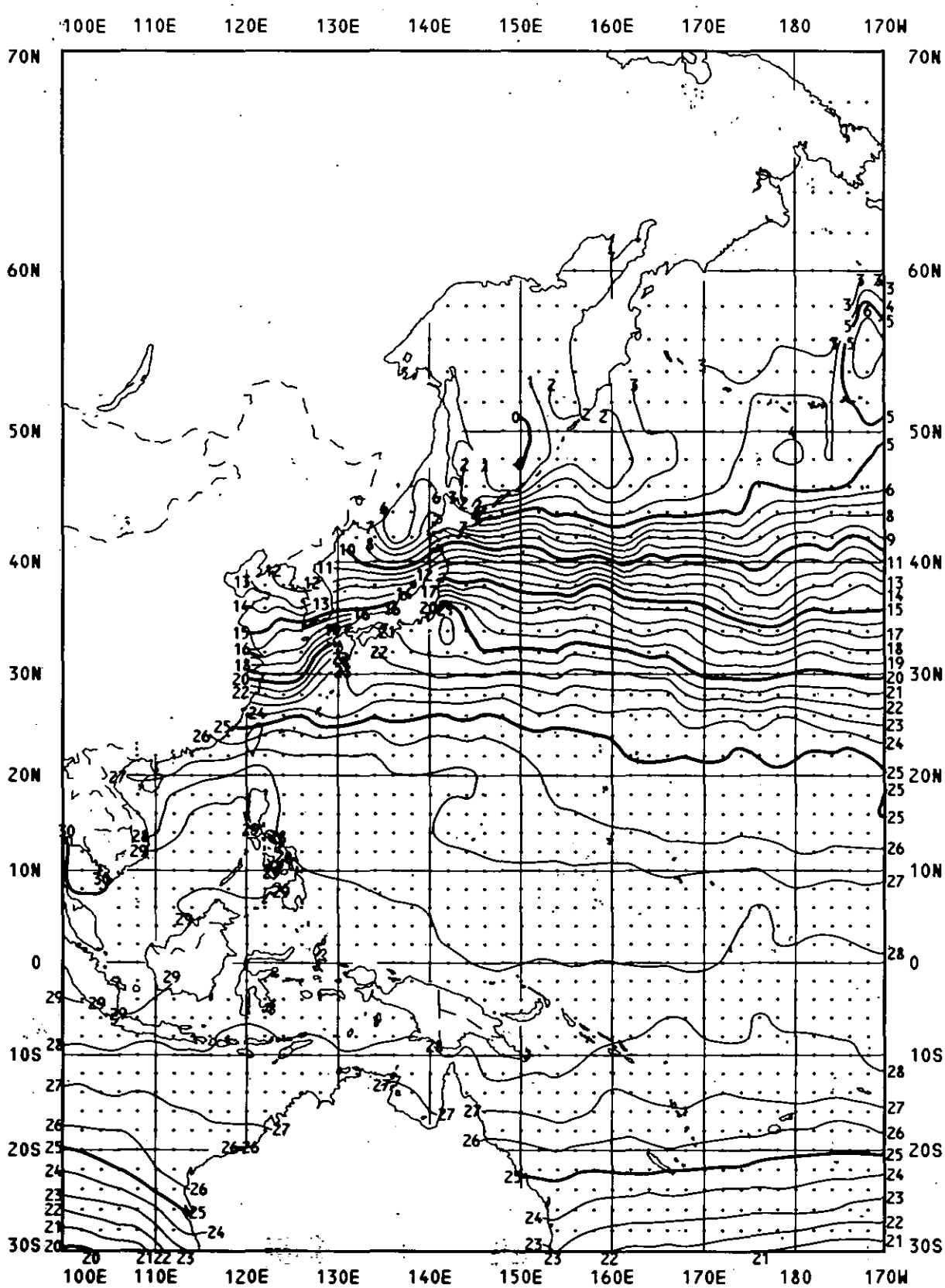
Western Pacific Ocean
SST--MONTHLY ANOMALY (°C)
SHIP and BUOY DATA
May 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.



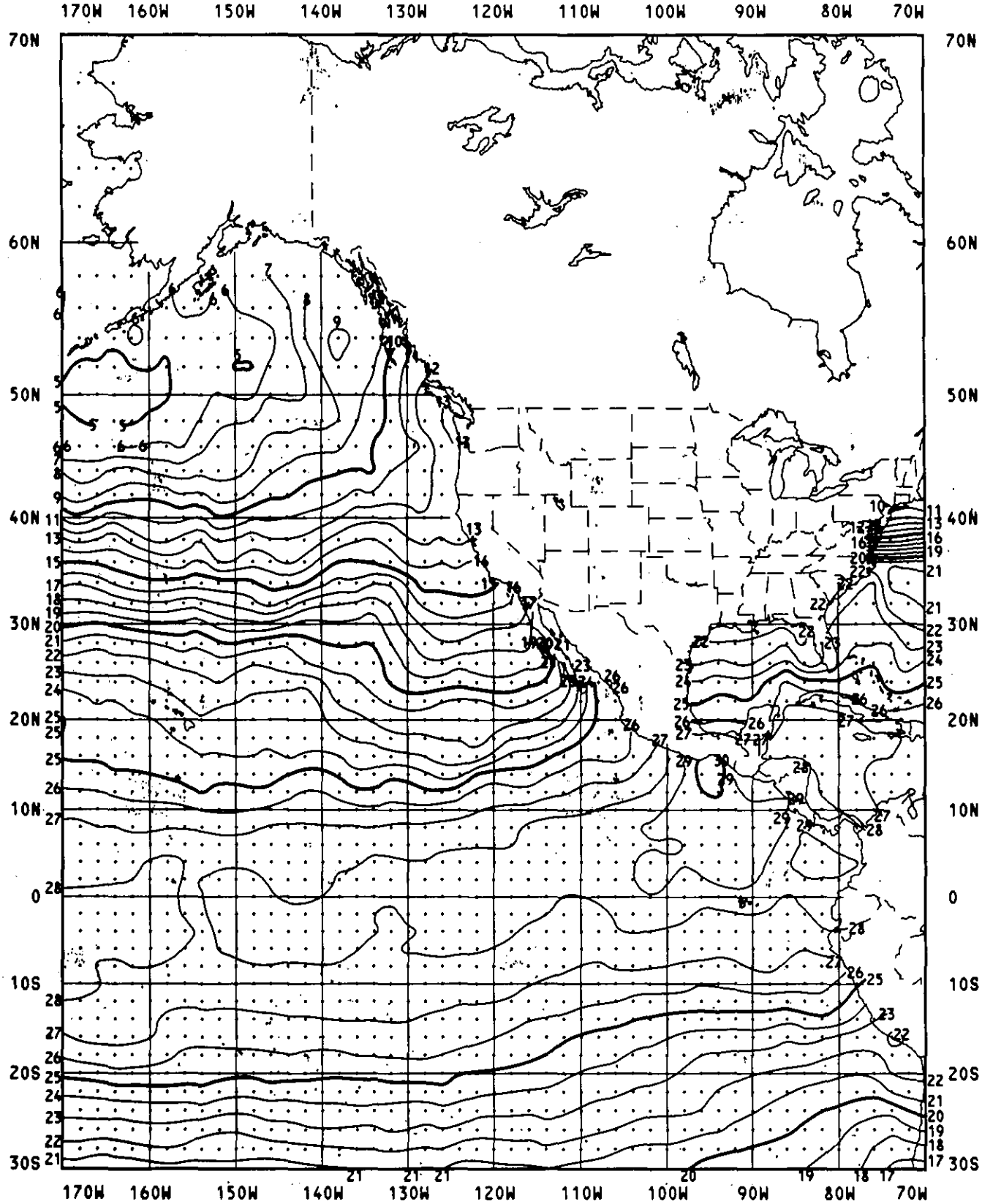
Eastern Pacific Ocean
SST--MONTHLY ANOMALY (°C)
SHIP and BUOY DATA
May 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.



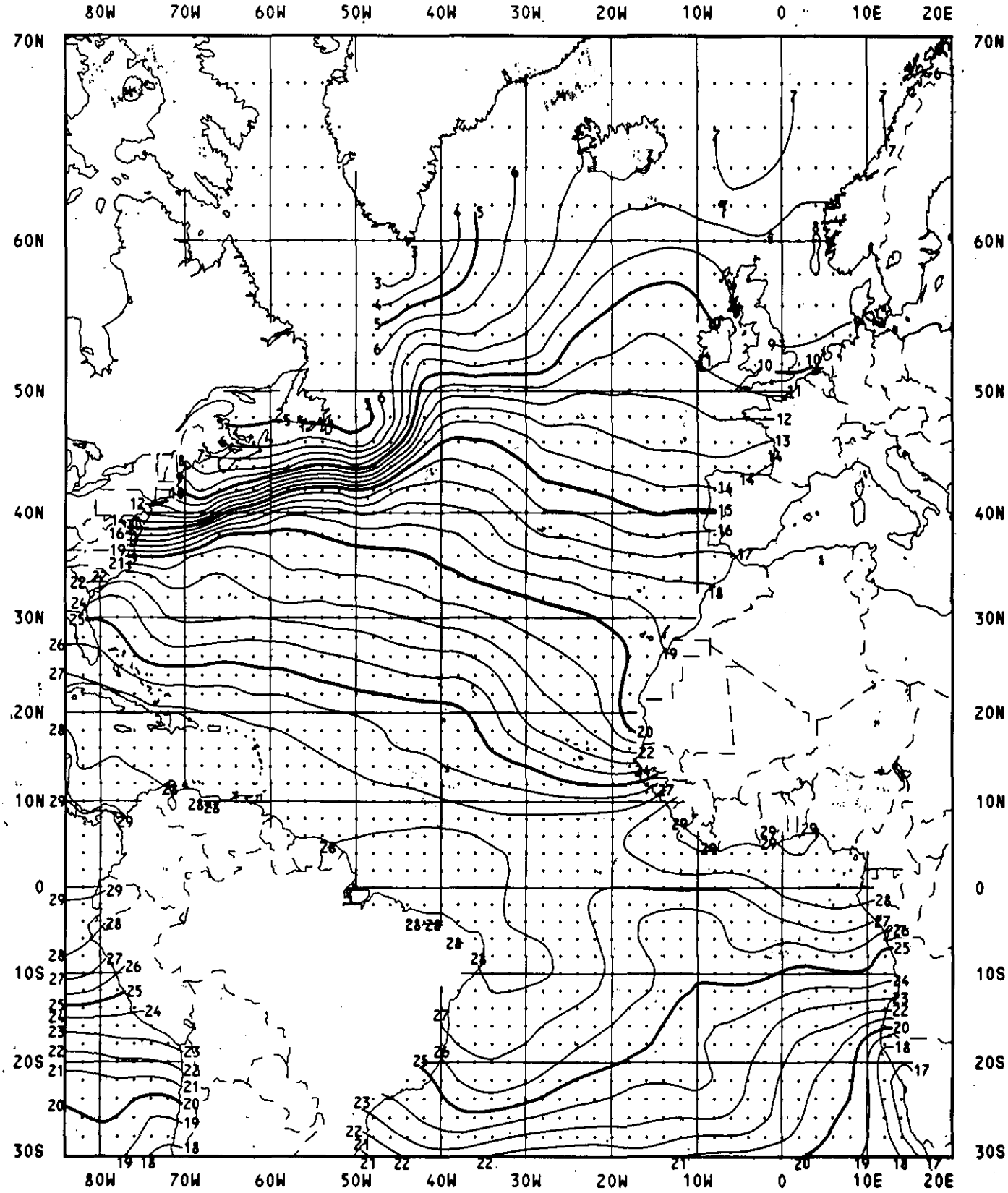
Western Pacific Ocean
SST--MONTHLY MEAN (°C)
SATELLITE DATA
May 1983

Monthly mean sea surface temperature is the mean of satellite data within two-degree quadrangles. Contour line interval is 1.0°C.



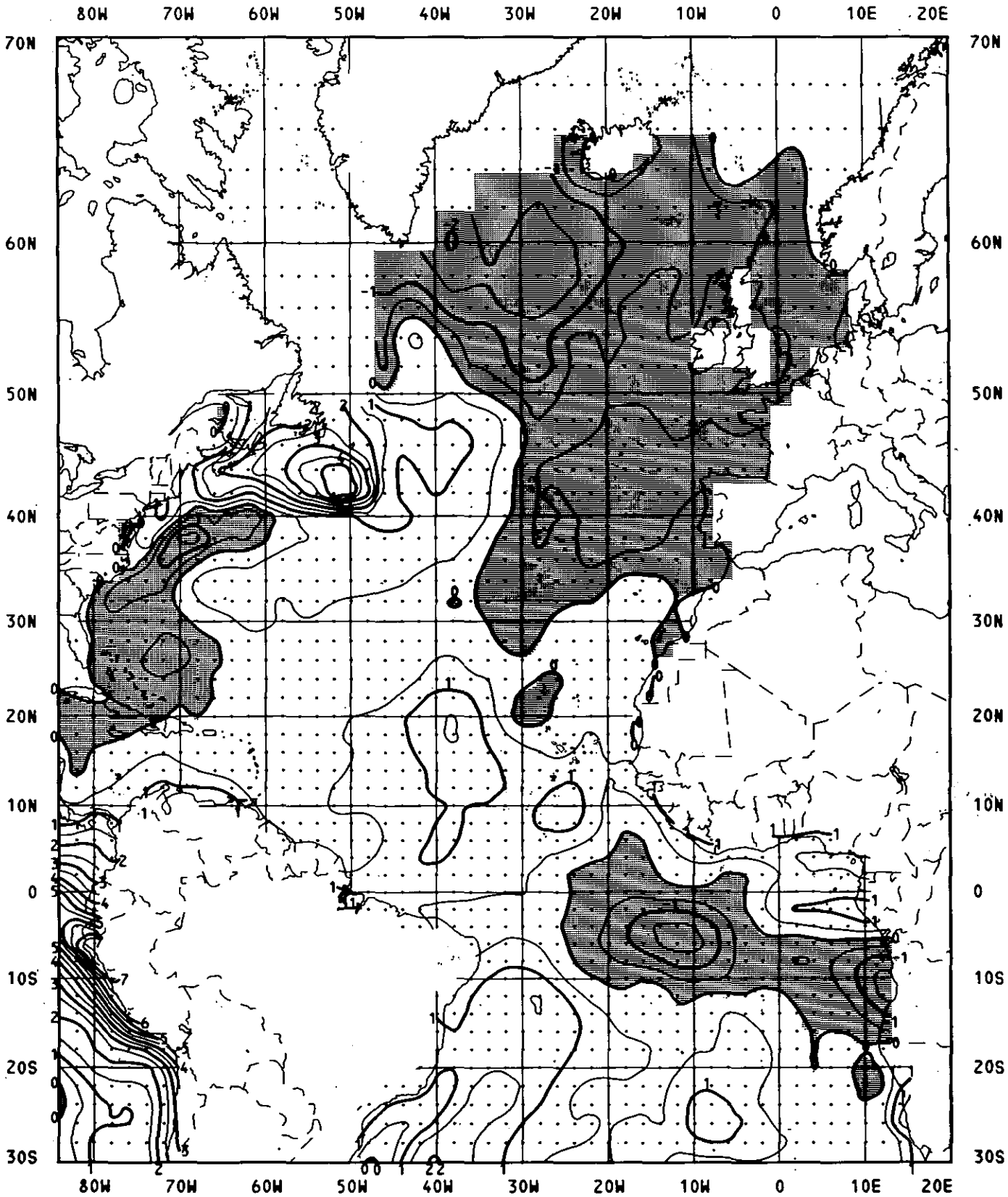
Eastern Pacific Ocean
SST--MONTHLY MEAN (°C)
SATELLITE DATA
May 1983

Monthly mean sea surface temperature is the mean of satellite data within two-degree quadrangles. Contour line interval is 1.0°C.



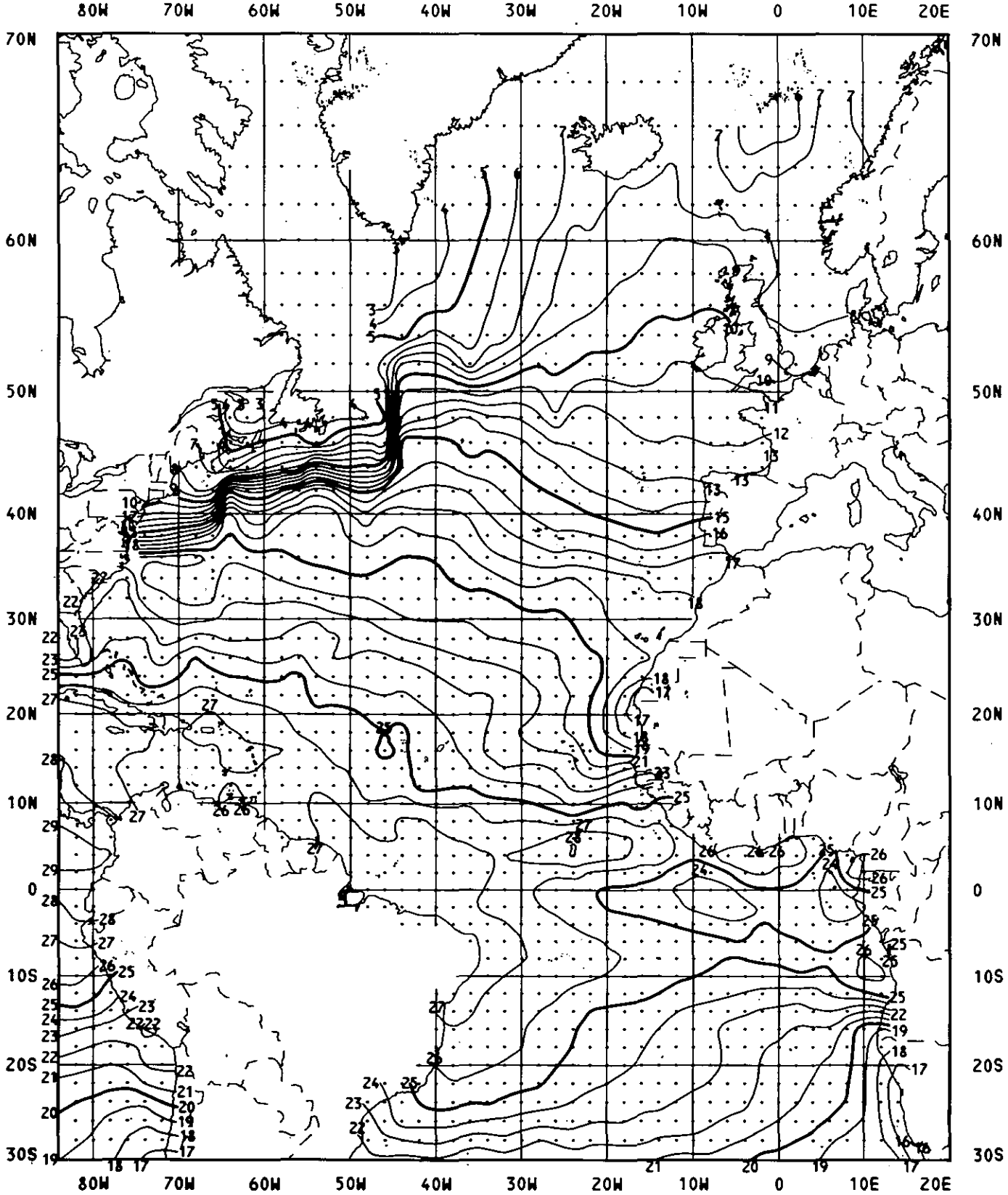
Atlantic Ocean
SST--MONTHLY MEAN (°C)
SHIP and BUOY DATA
May 1983

Monthly mean sea surface temperature is the mean of in-situ data (ships and buoys) within two-degree quadrangles. Contour line interval is 1.0°C.



Atlantic Ocean
SST--MONTHLY ANOMALY (°C)
SHIP and BUOY DATA
May 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.



Atlantic Ocean
SST--MONTHLY MEAN (°C)
SATELLITE DATA
May 1983

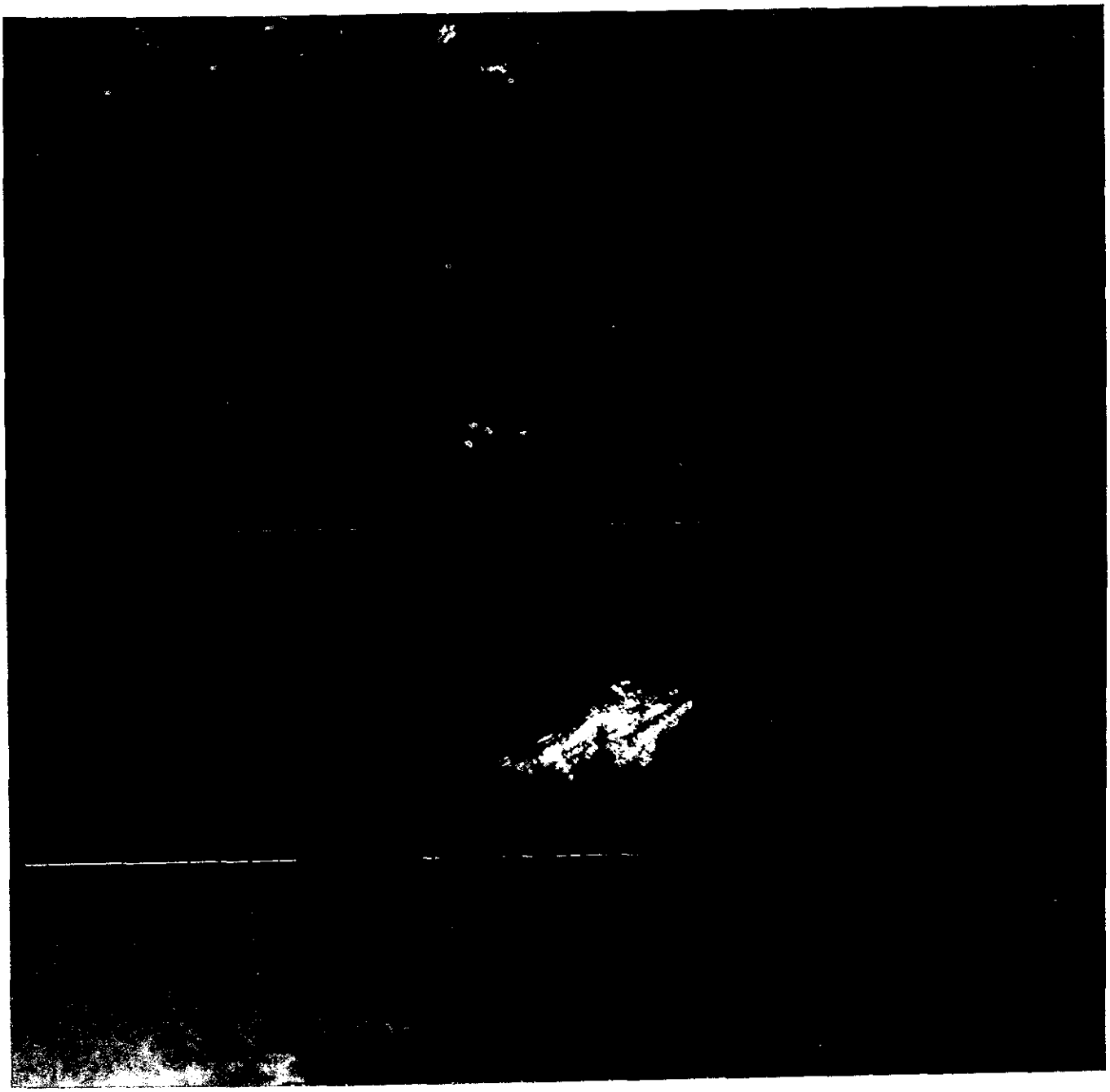
Monthly mean sea surface temperature is the mean of satellite data within two-degree quadrangles. Contour line interval is 1.0°C.

SATELLITE IMAGE OF THE MONTH

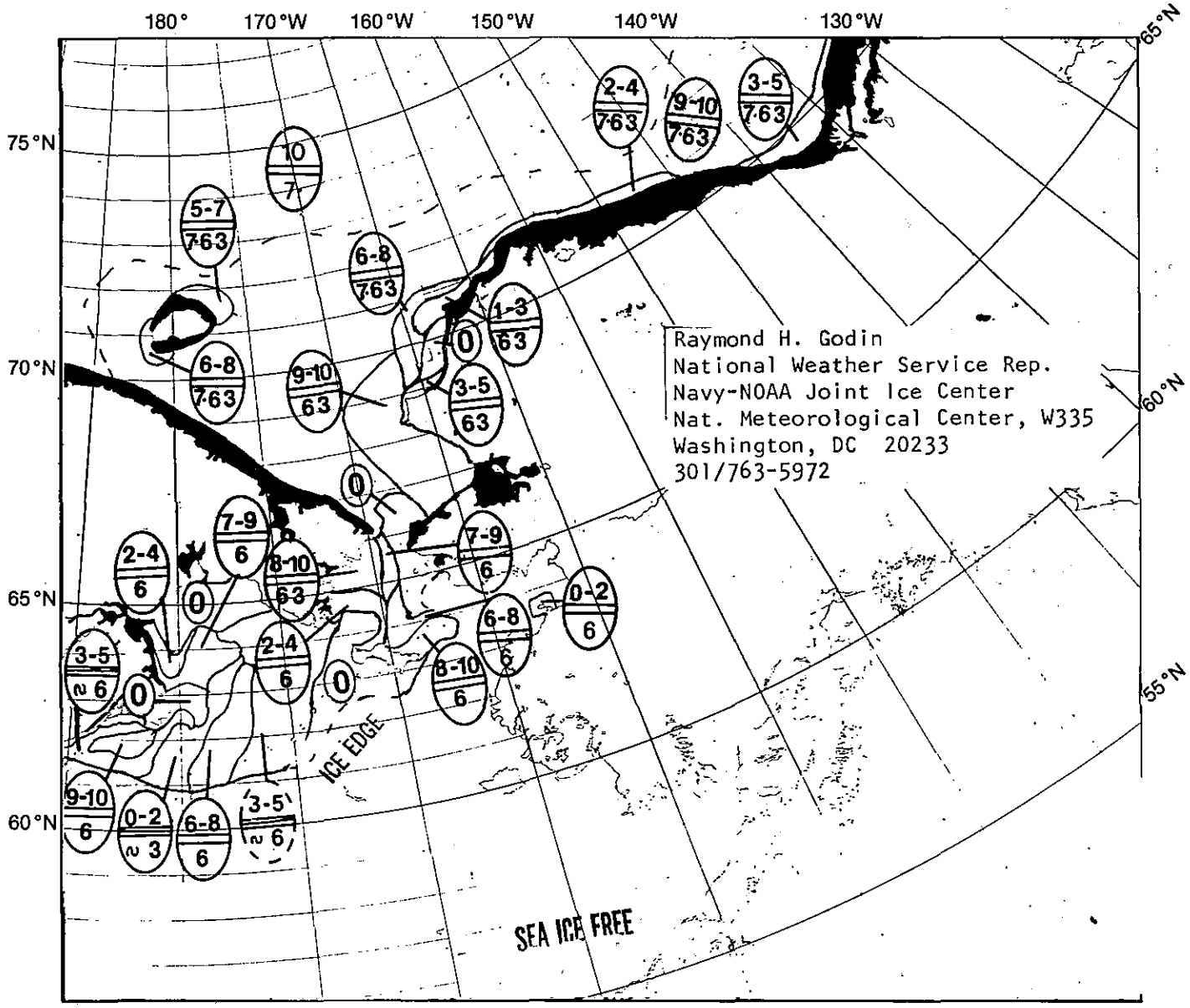
Marcia L. Weaks
Environmental Products Branch, E/SP22
NESDIS, NOAA
Washington, DC 20233
301/763-8142

ARABIAN SEA UPWELLING

This NOAA-7 infrared satellite image from June 5, 1983, shows upwelling in the northwest Arabian Sea off the coastline of Oman (lower right). Upwelling in this region usually begins in the late spring when local southwesterly alongshore winds strengthen the large scale oceanic (Monsoon) circulation , producing areas of upwelling that are prominent in satellite infrared imagery. When the upwelling circulation becomes developed, tongues of cool, upwelled water reach far beyond the coastline. The strongest local upwelling is often associated with coastal headlands, which is evident in this image.



BERING SEA / NORTH SLOPE ICE ANALYSIS



C = Total ice concentration in the area in tenths.
C_a, C_b, C_c = Concentration of thickest (C_a), 2nd thickest (C_b), and 3rd thickest (C_c) ice
S_a, S_b, S_c = Stage of development of thickest (S_a), 2nd thickest (S_b), and 3rd thickest (S_c) ice.
~C = Concentration of ice within area(s) of strips and patches.

STAGE(S) OF DEVELOPMENT (THICKNESS)

1 = New ice (0-10 cm)
3 = Young ice (10-30 cm)
6 = First year (30-200 cm)
7 = First year thin (30-70 cm)
1. = First year medium (70-120 cm)
4. = First year thick (120-200 cm)
7. = Old ice (survived at least one summer's melt)

EXAMPLES

125 Theoretical thickness of this season's growth (cm).

Fast ice. Sea ice which forms and remains fast along the coast.

Ice boundary visually or satellite observed.

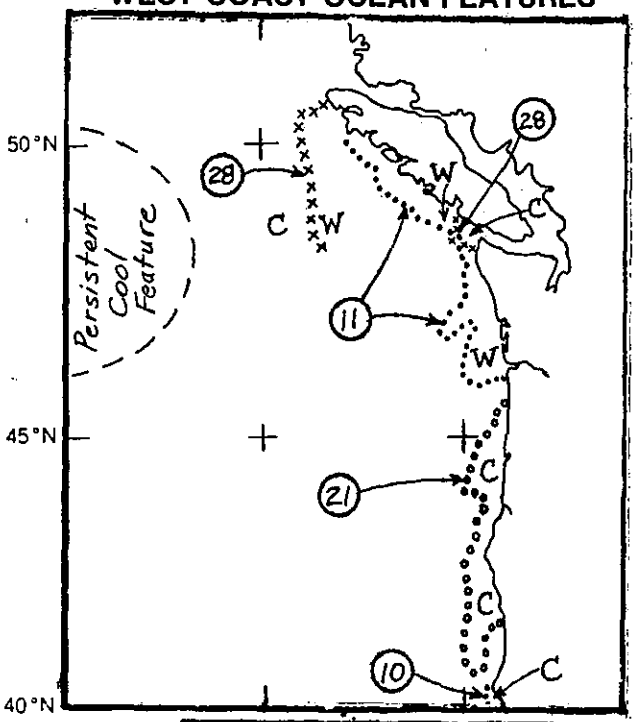
Ice boundary estimated.

MAY 1983

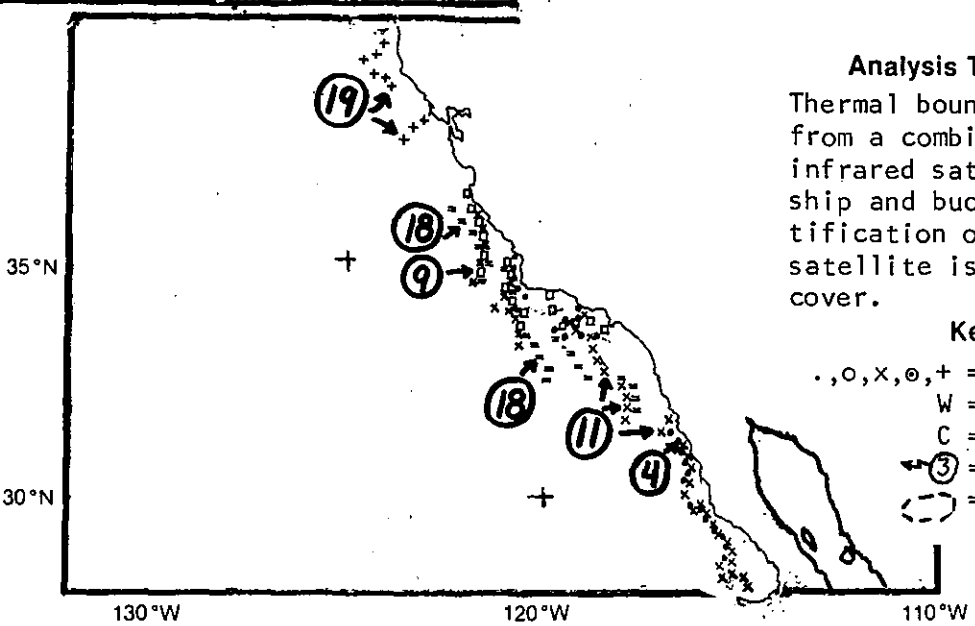
The mean monthly surface pressure circulation shows a 1025 mb high near 75°N 160°W and a 1006 mb low near 54°N 170°W. Geostrophic surface winds are easterly throughout ice covered Alaskan waters. The mean monthly air temperature at Barrow (71°N 157°W) is below normal. South of the Bering Strait, air temperatures range from much above normal at Nome (64°N 165°W) to above normal at more southern stations. In the Bering Sea east of 170°W, the effects of easterly winds and anomalously warm temperatures are mostly reflected in the ice free coastal zone. In the western Bering Sea, cold northerly winds have maintained sea ice as far south as 60°N. North of the Bering Strait, shore and flaw leads are observed along the Beaufort and Chukchi Sea coastlines. The current ice edge position east of 175°W is 140 km north of the historical mean. West of 175°W the ice edge is 110 km south of the mean.

WEST COAST OCEAN FEATURES

MAY 1983



Springtime warming, persistent positive SST anomalies, and the onset of significant coastal upwelling characterized the north panel area. SST increases over April values averaged about 1.5°C for both offshore and coastal waters. The overall coastal warming occurred in spite of a strong coastal upwelling event south of 45°N during May 13-22, during which a 1.1°C SST drop was recorded by the buoy at 40.8°N, 124.5°W. The strongest upwelling-favorable winds were observed on May 20; and an associated ocean thermal boundary was seen on May 21 satellite imagery. Despite this event, upwelling was below normal for May for the entire coast, due to a less-than-normal mean northerly wind component. Positive SST anomalies associated with the equatorial El Nino event continue over most of the area, remaining strongest nearshore. The largest anomalies, greater than 3°C, were observed at Washington coastal stations.



Analysis Techniques

Thermal boundaries are determined from a combination of enhanced infrared satellite imagery and ship and buoy observations. Identification of these features by satellite is limited by cloud cover.

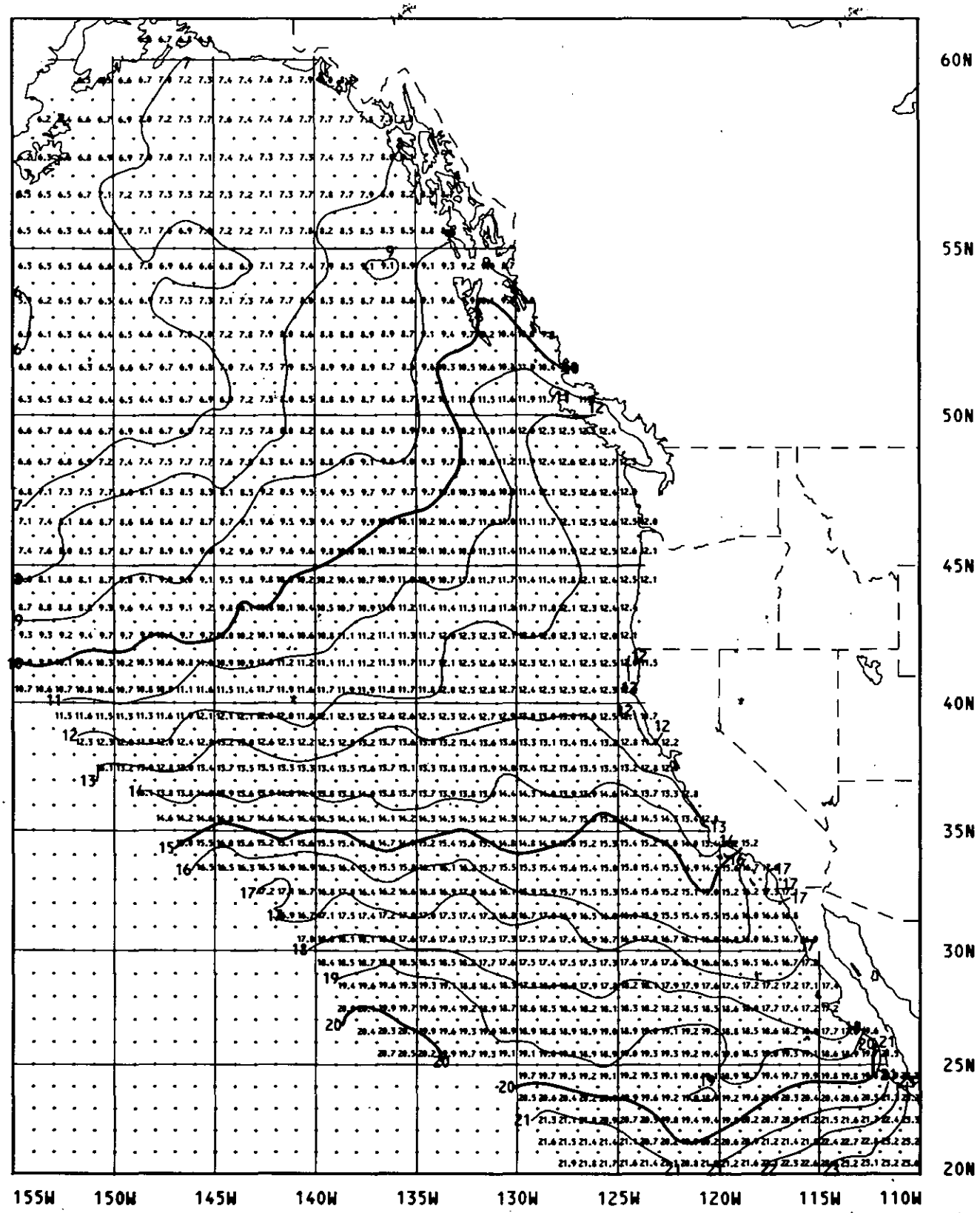
Key

.,o,x,⊙,+ = thermal boundaries
W = warm
C = cold
(3) = date of feature
(dashed) = outline of water mass feature

The weather patterns tended toward more normal conditions during May as compared to the previous months in 1983. Strong northwesterly surface winds finally became persistent and dominant over the coastal waters by the end of the first week in May and continued throughout the month. Average SSTs remained warmer than normal from the coast to 125°W; however, the anomalies of +0.5-1.0°C were about 0.5°C lower than last month. The pool of cooler than normal water west of 128°W and north of 32°N has generally persisted since last spring and intensified somewhat since April with SSTs 1.0-2.0°C below normal in this region during May. Average SSTs increased by about 0.5°C from April to May except along the coast from 34°N to 40°N where SSTs dropped 0.2°C due to increase upwelling. Upwelling was strongest from May 9-20; the lowest coastal temperatures occurred from May 15-18. Coastal stratus clouds blocked satellite coverage May 20-31.

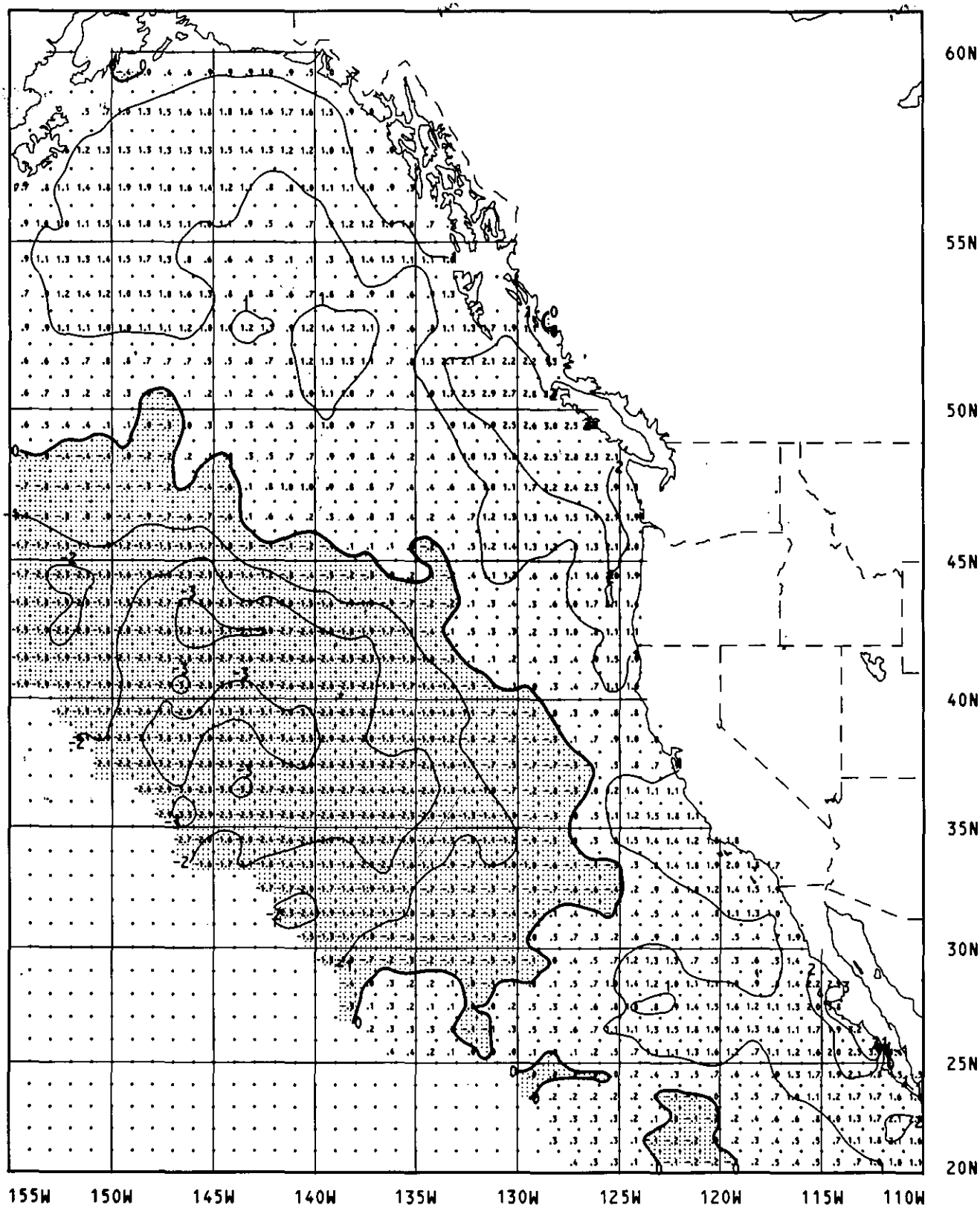
North Panel
Kent Short
Seattle Ocean Services Unit
National Weather Service/NOAA
7600 Sand Point Way NE
Bin C15700
Seattle, WA 98115
206/527-6105

South Panel
Dave Linder
Satellite Field Service Station
NESDIS/NOAA
660 Price Avenue
Redwood City, CA 94063
415/364-2422



West Coast
SST--MONTHLY MEAN (°C)
May 1983

Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.



West Coast
SST--MONTHLY ANOMALY (°C)
May 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.

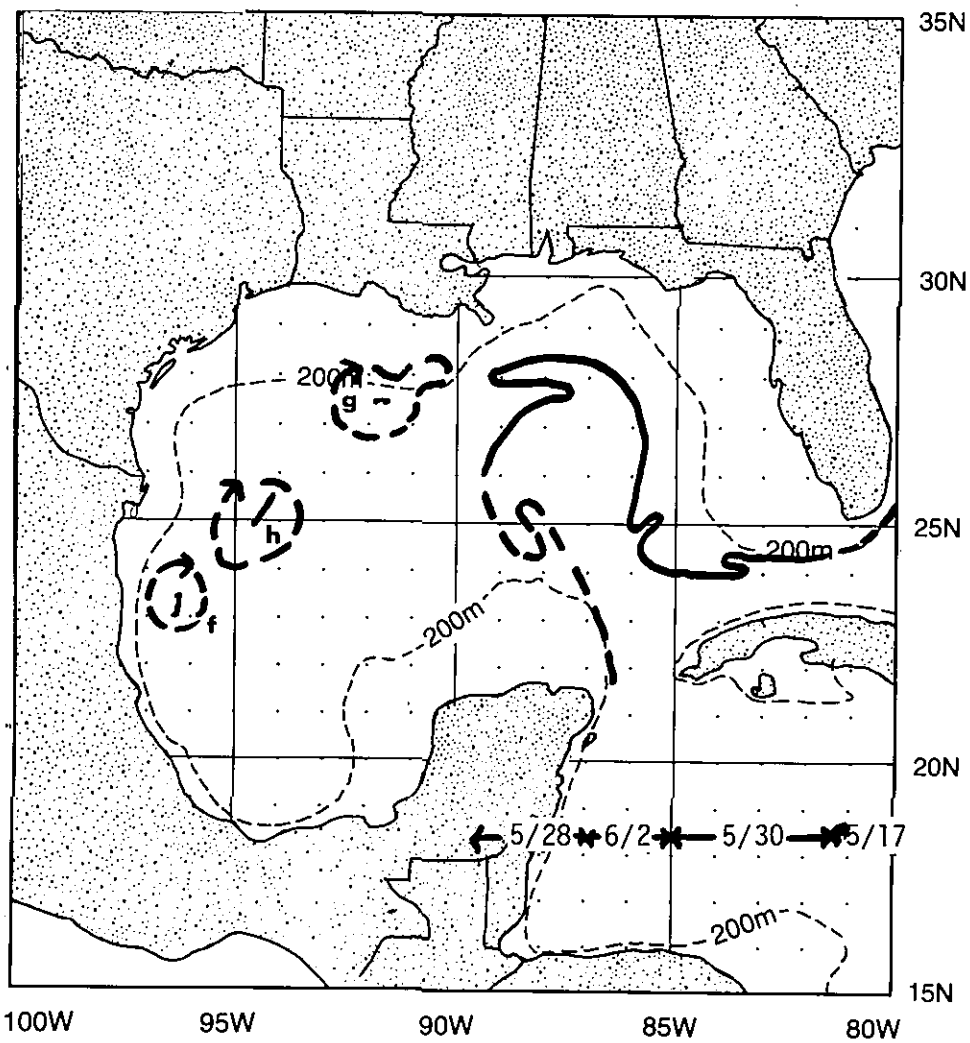
EAST COAST OCEAN FEATURES

The end of this month's positions of the Gulf Stream System and its associated eddies are shown for the NW Atlantic and the Gulf of Mexico. The Gulf Stream and Loop Current boundaries are located by infrared satellite imagery or XBT (expendable bathythermograph) data. Anticyclonic eddies are labeled a-z in the Gulf of Mexico and 1-99 in the NW Atlantic. Cyclonic eddies are labeled A-Z. Arrows on eddies indicate direction of circulation. Warm-core or anticyclonic eddies rotate clockwise; cold-core or cyclonic eddies rotate counterclockwise. The line to the eddy center shows the net translation since last month or since last observed. Eddies or sections of the Gulf Stream System which were not observed during the month are not shown on the analysis chart. The long arrows at the bottom of the chart indicate the date of data used.

Data used in this analysis include:
- NOAA satellite infrared imagery, NESDIS
- Bathythermograph data, National Meteorological Center of National Weather Service
- Oceanographic Analysis, A daily detailed analysis issued by National Weather Service/NESDIS

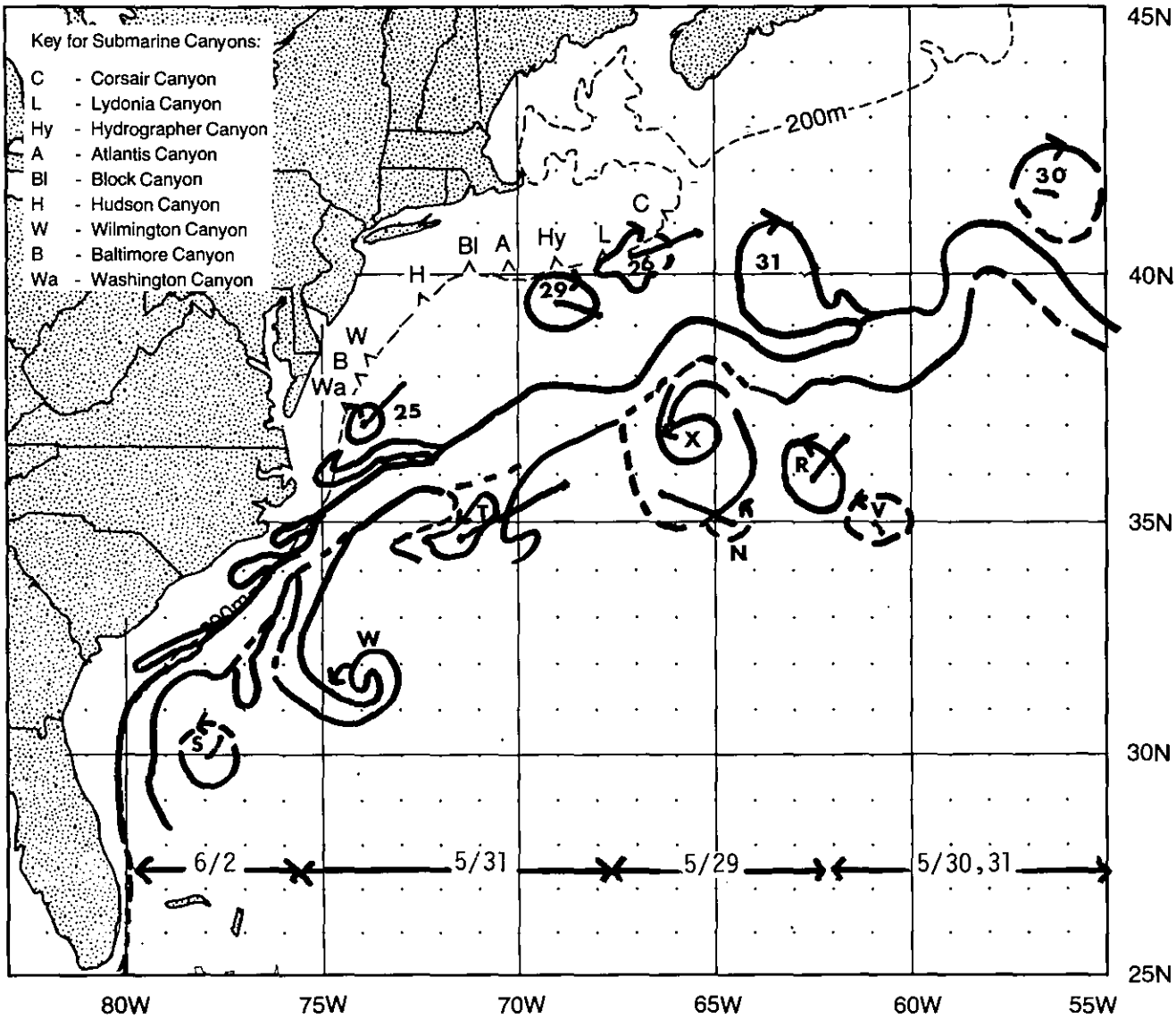
Jenifer Wartha Clark
Synoptic Anal. Br., S/DS23
NESDIS/NOAA
Washington, DC 20233
301/763-8446

Ann Bell
Nat. Met. Center, W/NMC21
Nat. Weather Service, NOAA
Washington, DC 20233
301/763-8133



MAY 1983

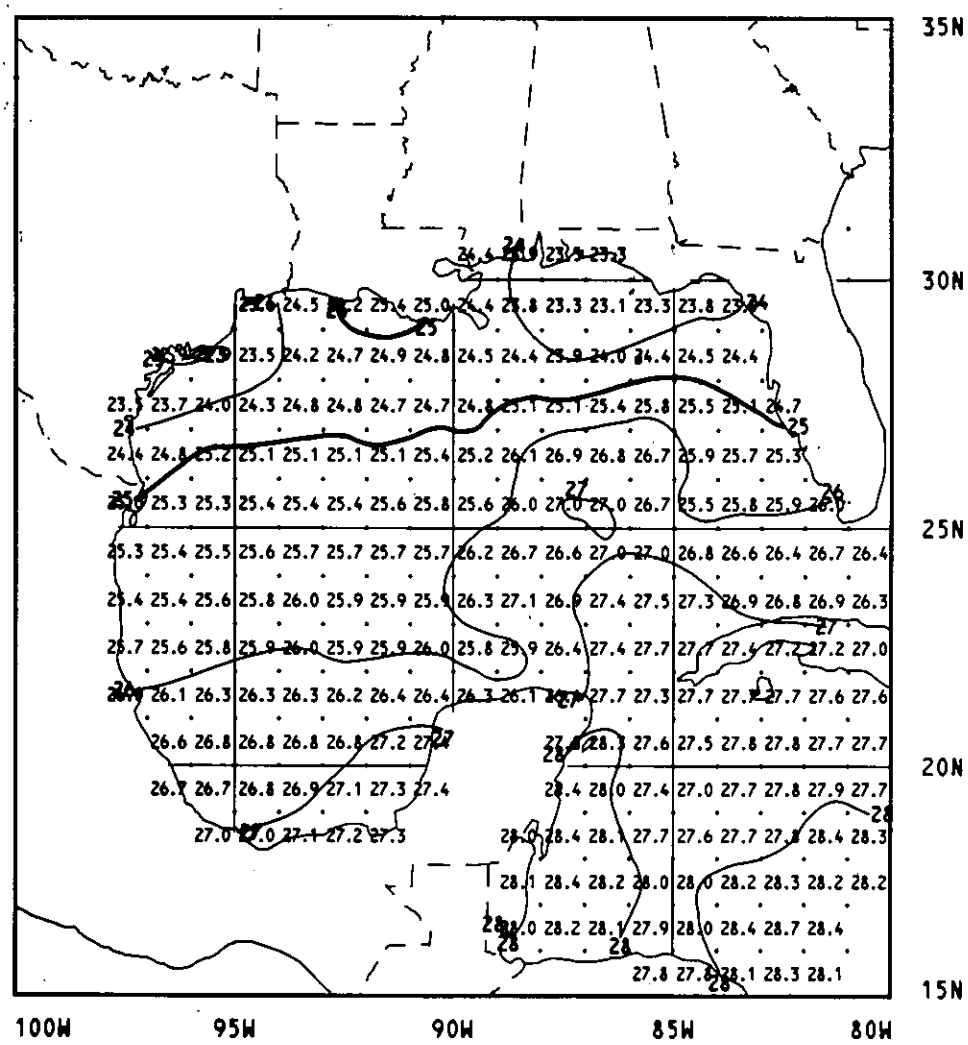
The end-of-May amplitude of the Loop Current in the Gulf of Mexico increased about 30 km N from the end-of-April position. Due to seasonal heating, thermal features in the Gulf of Mexico are becoming less discernible. The southwestern edge of the Loop was last clearly observed on May 15. Anticyclonic eddy g, last observed on May 4, translated 25 km W since April 20. Eddy h, last observed on May 11, moved 75 km SW since April 25. A drifting buoy deployed by the NOAA Data Buoy Center still remains within eddy f. The position of eddy f is estimated from the buoy's May tracking. Eddy f has apparently translated 35 km N.



One anticyclonic eddy formed and one was absorbed by the Gulf Stream during May. Anticyclonic eddy 27 translated 130 km WSW and was absorbed by a Stream meander near 39°30N 63°W about May 19, forming a larger amplitude open meander. About May 29, new eddy 31 formed and separated from this same meander. Eddy 25 traveled 120 km SW. Eddy 29 moved 90 km WNW. Eddy 26 translated 150 km SW. Eddy 30 interacted with a Stream meander near 40°30N 55°30W for a few days around May 18. Eddy 30 translated 35 km ESE in May.

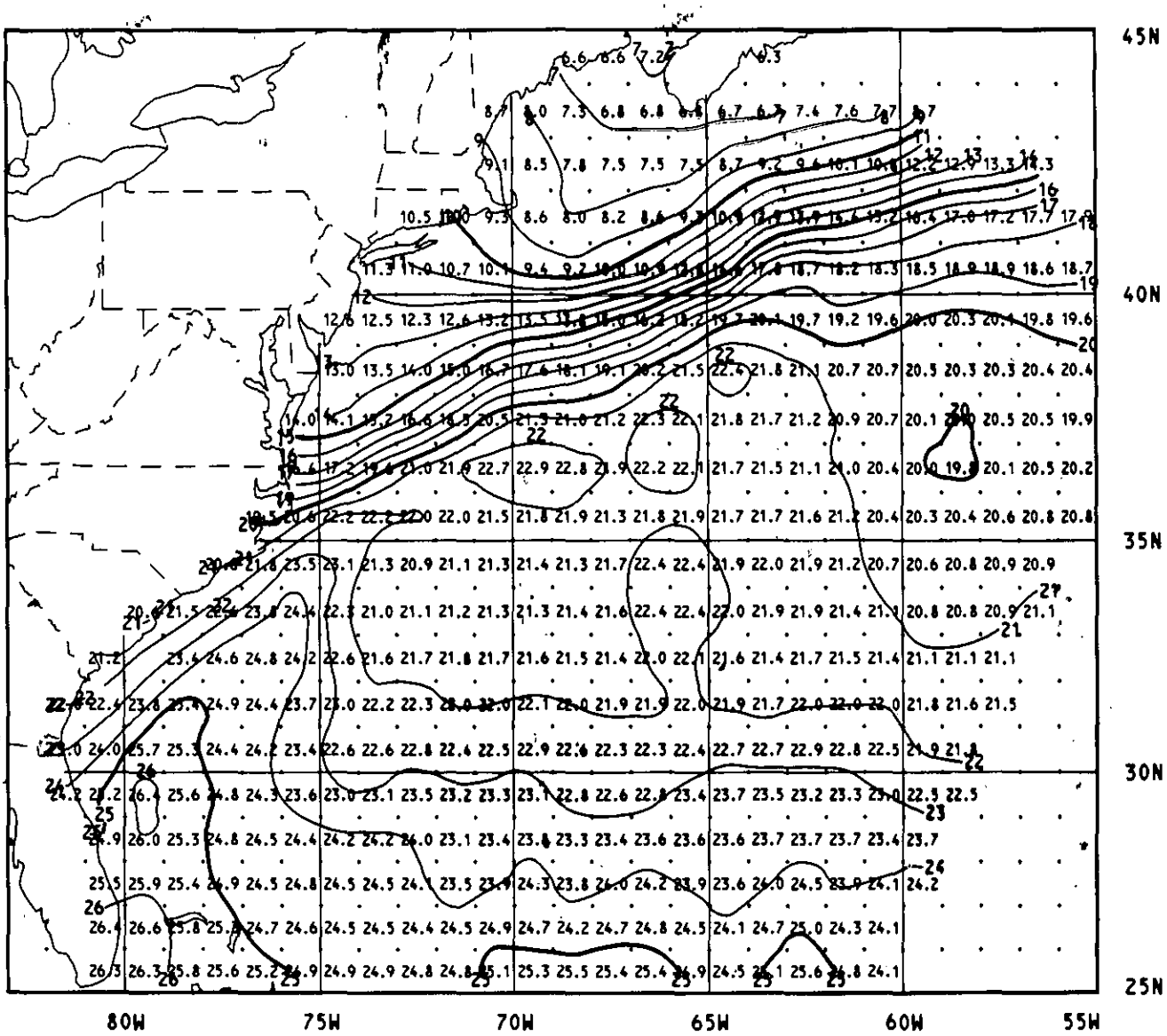
Two newly observed cyclonic eddies were detected and at least one eddy was absorbed. Cyclonic eddy W was first discerned on May 28; its origin is unknown. A narrow northwest-southeast oriented Stream meander near 37°N 67°W rapidly increased in amplitude from 80-120 km during May 2-9. This meander pinched-off about May 9 forming new eddy X. Eddy U translated about 130 km NE by May 18 when a Stream meander apparently absorbed it near 38°N 64°W. Eddy S has oscillated back and forth during the past few months. Eddy S moved 110 km SSW from January through March, 110 km NE during April, and 55 km SW during May. Eddy T apparently traveled 275 km SW. Eddy N moved 160 km SE when last observed on May 14. Eddy R translated 120 km SW. Eddy V moved 30 km WNW when last observed on May 11. The subtropical convergence front was not detected on satellite imagery due to seasonal heating which has relaxed the surface temperature gradient structure.

EAST COAST SST-
MONTHLY MEAN



Gulf of Mexico
SST--MONTHLY MEAN (°C)
May 1983

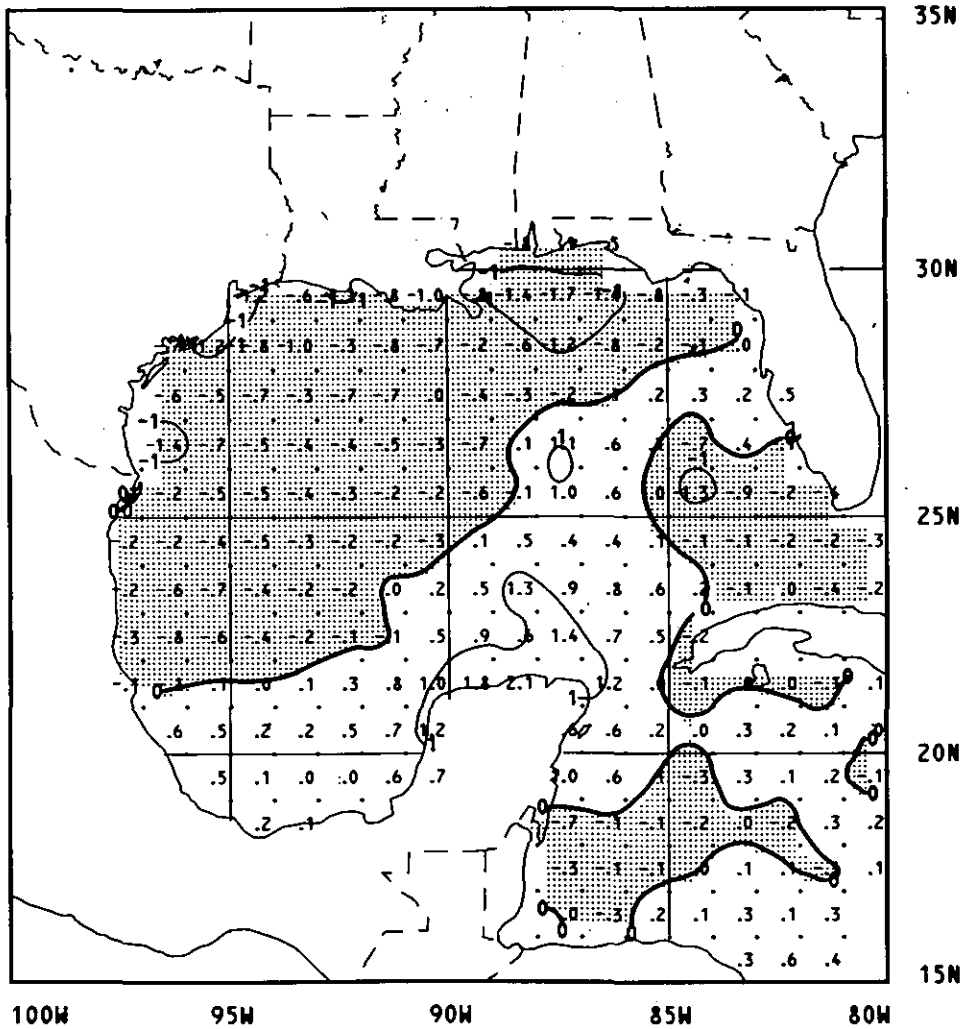
Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.



NW Atlantic Ocean
SST--MONTHLY MEAN (°C)
May 1983

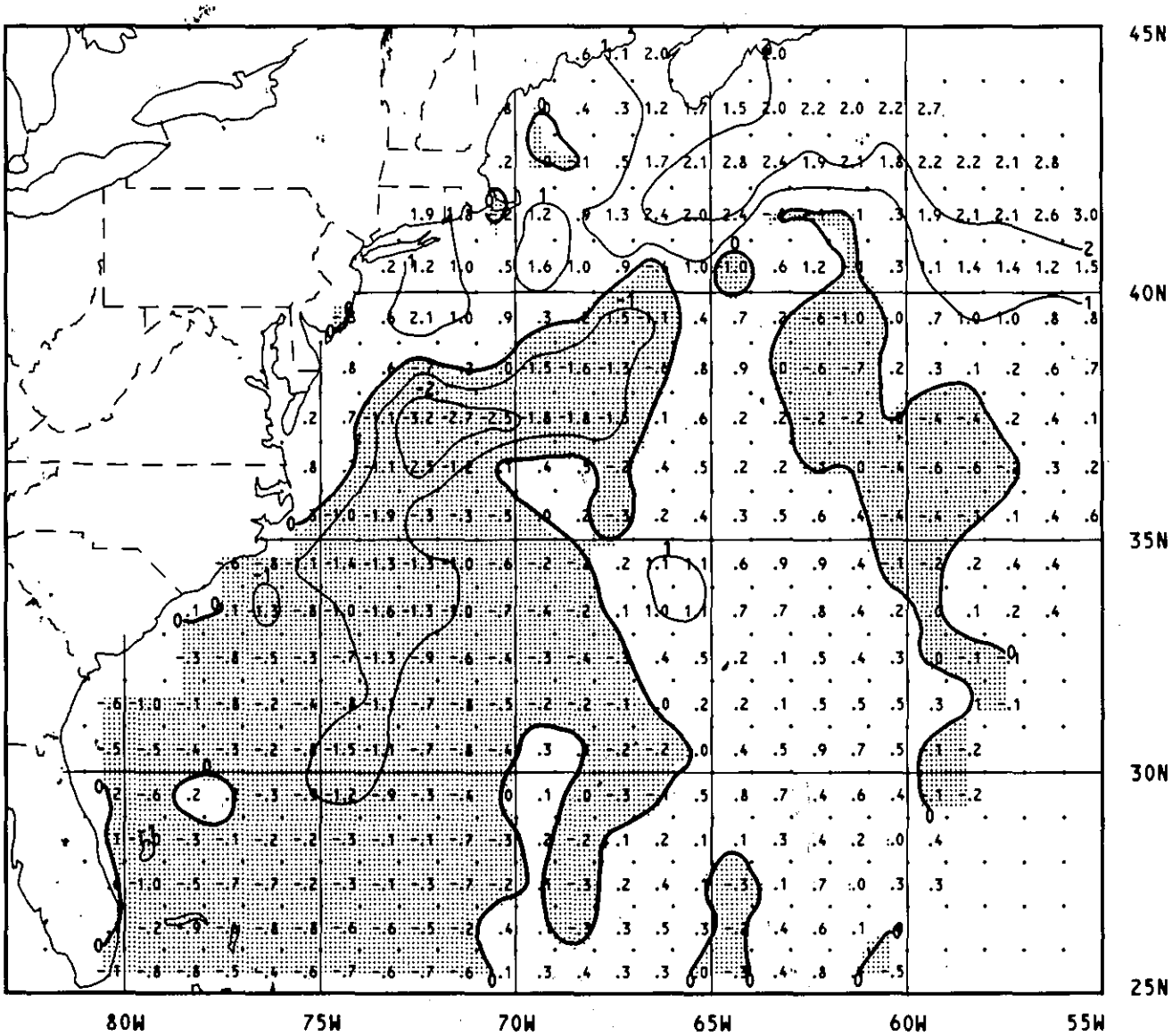
Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.

EAST COAST SST-ANOMALY



Gulf of Mexico
SST--MONTHLY ANOMALY (°C)
May 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.



NW Atlantic Ocean
SST--MONTHLY ANOMALY (°C)
May 1983

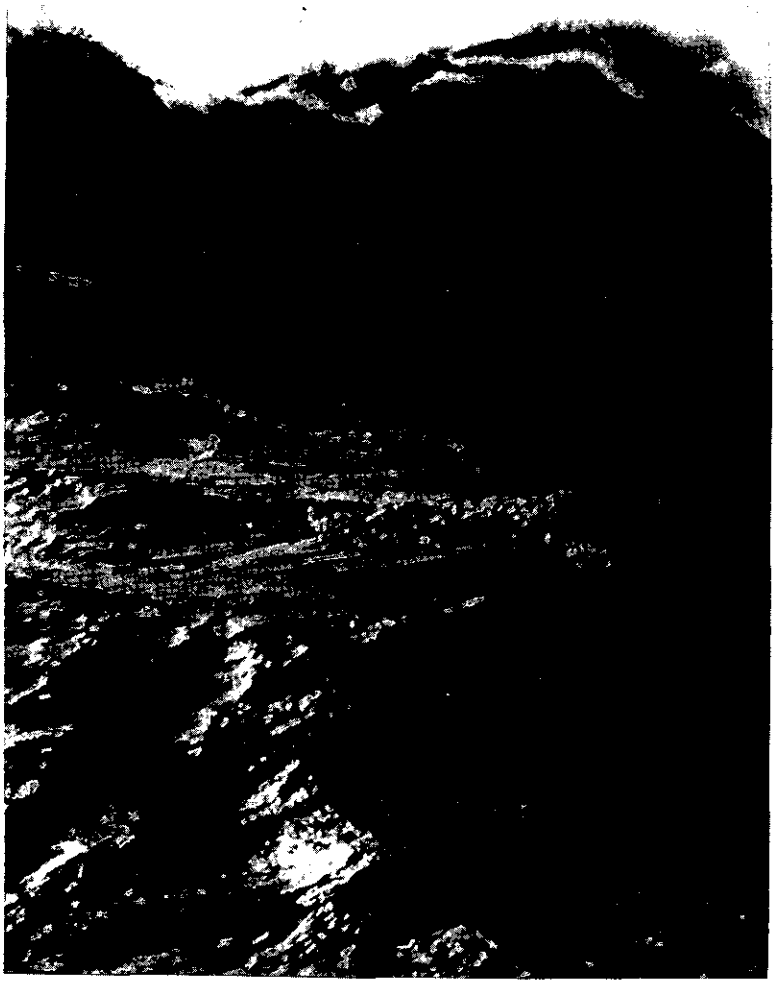
Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.

NOAA LISD SEATTLE

OCEANOGRAPHIC Monthly Summary

Volume III Number 6

June 1983



Contents

3 OceaNotes

4 Pacific SST - monthly mean, ship and buoy data

6 Pacific SST - anomaly

8 Pacific SST - monthly mean, satellite data

10 Atlantic SST - monthly mean, ship and buoy data

11 Atlantic SST - anomaly

12 Atlantic SST - monthly mean, satellite data

13 Satellite IMAGE of the Month

14 Bering Sea/North Slope ICE, with text

15 West Coast OCEAN FEATURES, with text

16 West Coast SST - monthly mean

17 West Coast SST - anomaly

18 East Coast OCEAN FEATURES, with text

20 East Coast SST - monthly mean

22 East Coast SST - anomaly

24 Subscription Information

U.S. DEPARTMENT OF COMMERCE • National Oceanic and Atmospheric Administration
National Weather Service
National Environmental Satellite, Data, and Information Service

Oceanographic Monthly Summary is published by the National Weather Service and the National Environmental Satellite, Data, and Information Service (NESDIS). *Oceanographic Monthly Summary* contains sea surface temperature (SST) analyses on both regional and ocean basin scales for the Atlantic and Pacific Oceans. Two ocean basin SST analyses are presented, one based on in-situ data and another based solely on satellite data. An ocean basin SST anomaly derived from the in-situ data is also shown; it uses the National Climatic Center (NCC) Climatology*. The regional SST analyses are based upon a combination of in-situ and satellite data measurements. The regional SST anomalies use the Robinson-Bauer Climatology*. *Oceanographic Monthly Summary* also contains Alaskan sea ice information and ocean feature information for contiguous U.S. ocean regions.

Oceanographic Monthly Summary welcomes articles containing information of interest to *Oceanographic Monthly Summary* readers, such as, news on operational oceanography, unusual ocean feature phenomena, etc. Contributions should be sent to the editor (address below). Accepted material will appear in the OceaNotes section of *Oceanographic Monthly Summary*. Contributions can be published as quickly as the next monthly issue.

If you are interested in receiving *Oceanographic Monthly Summary* regularly, please refer to the back cover for subscription information.

*Reynolds, R.W., 1982. A Monthly Averaged Climatology of Sea Surface Temperatures; *NOAA Technical Report NWS 31.*

*Robinson, M.K., 1976. Atlas of North Pacific Ocean Monthly Mean Temperatures and Mean Salinities of the Surface Layer; *NavOceano Ref. Pub. 2.*

Robinson, M.K., R. A. Bauer and E.H. Schroeder, 1979. Atlas of North Atlantic-Indian Ocean Monthly Mean Temperatures and Mean Salinities of the Surface Layer; *NavOceano Ref. Pub. 18.*

Oceanographic Monthly Summary
Editor: Steve Auer
National Meteorological Center, W/NMC21
National Weather Service, NOAA
Washington, DC 20233
(telephone: 301/763-8133)
Assistant Editor: Jenifer Wartha Clark
Synoptic Analysis Branch, S/DS23
NESDIS, NOAA
Washington, DC 20233
(telephone: 301/763-8446)

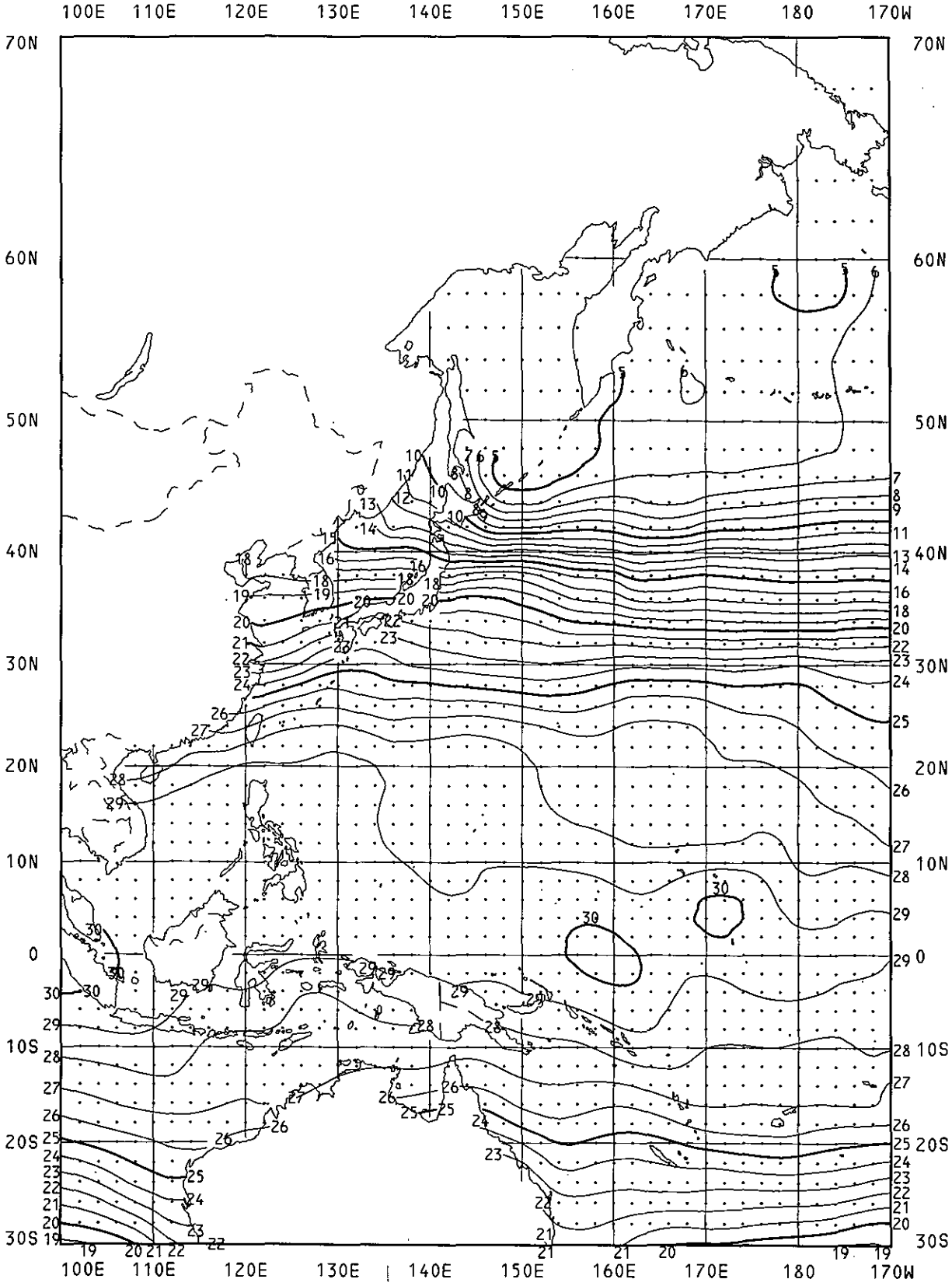
SST Computer Analyses are prepared by:
William H. Gemmill
Marine Products Branch, W/NMC21
National Meteorological Center
National Weather Service, NOAA
Washington, DC 20233
(telephone: 301/763-8133)

SATELLITE SST - JUNE 1983

The aerosol from the April 1982 eruption of El Chichon continues to produce a negative offset of from 0.5° to 1.0°C in the satellite-derived multichannel SST over a large portion of the globe. Satellite-ship SST differences exceeding -0.5°C are especially prevalent between 25°S and 20°N, with a notable increase being observed in the Southern Hemisphere during the past month.

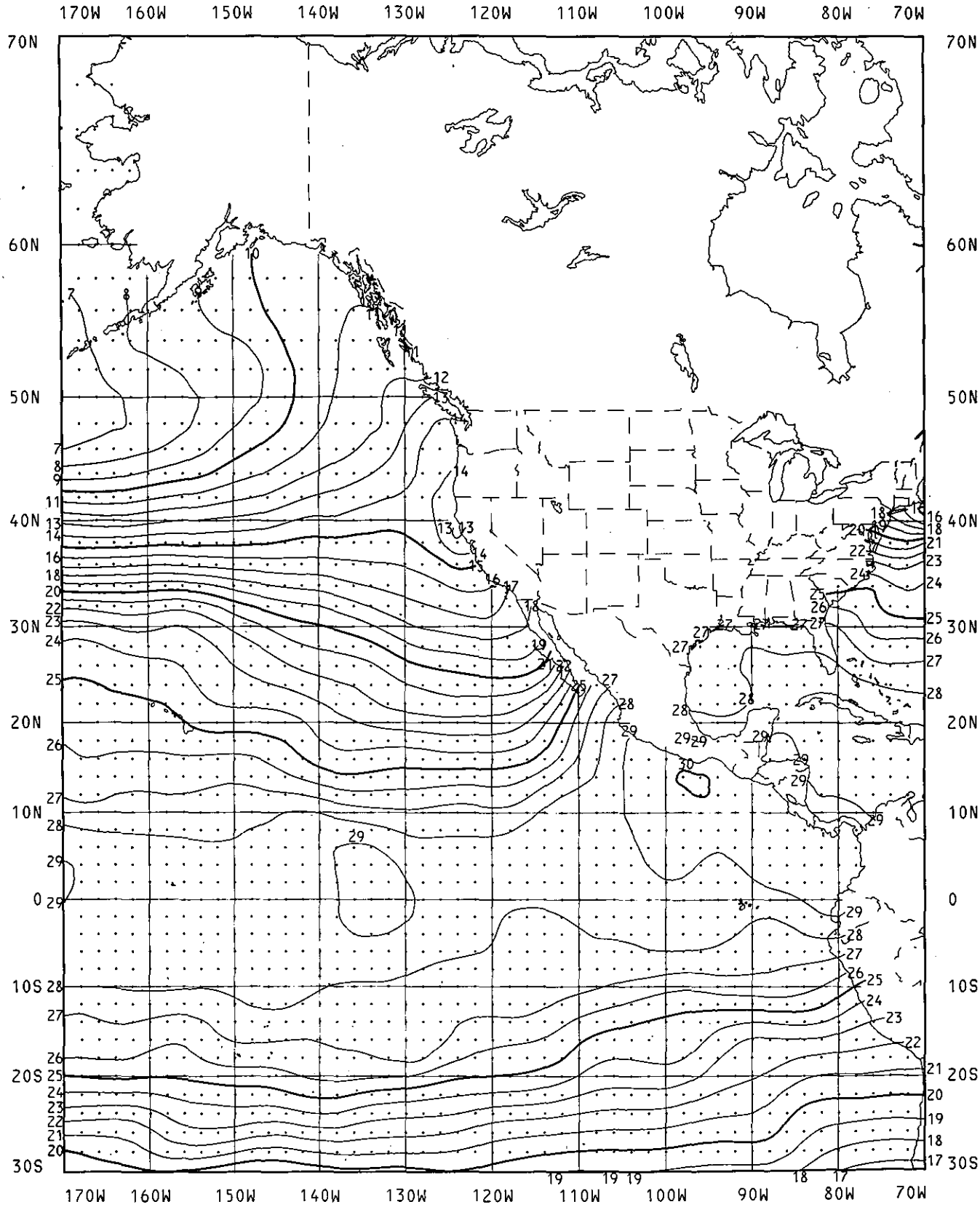
Slightly more error is creeping into satellite retrievals from noise in one of the infrared channels on the satellite radiometer. This increased noise level requires 5 or more SSTs in a given two-degree quadrangle before inclusion in the analyzed chart. Analysis of the western North Pacific poleward of 40°N was excluded for this reason. NESDIS is attempting to correct this noise problem.

Satellite data are showing a trend toward lower temperatures (below 27°C) west of the Galapagos along the equator (105° to 130°W) indicating a weakening of the El Nino condition, which is still quite intense nearer the coast. The satellite analysis in the eastern North Atlantic and tropical Atlantic continues to show more detail than the ship analysis, although some of the lower satellite temperatures off Africa around 20°N are due to Saharan dust being carried westward by low level winds. This aerosol, like El Chichon, causes a negative bias on the satellite-derived SSTs in a limited area off Africa.



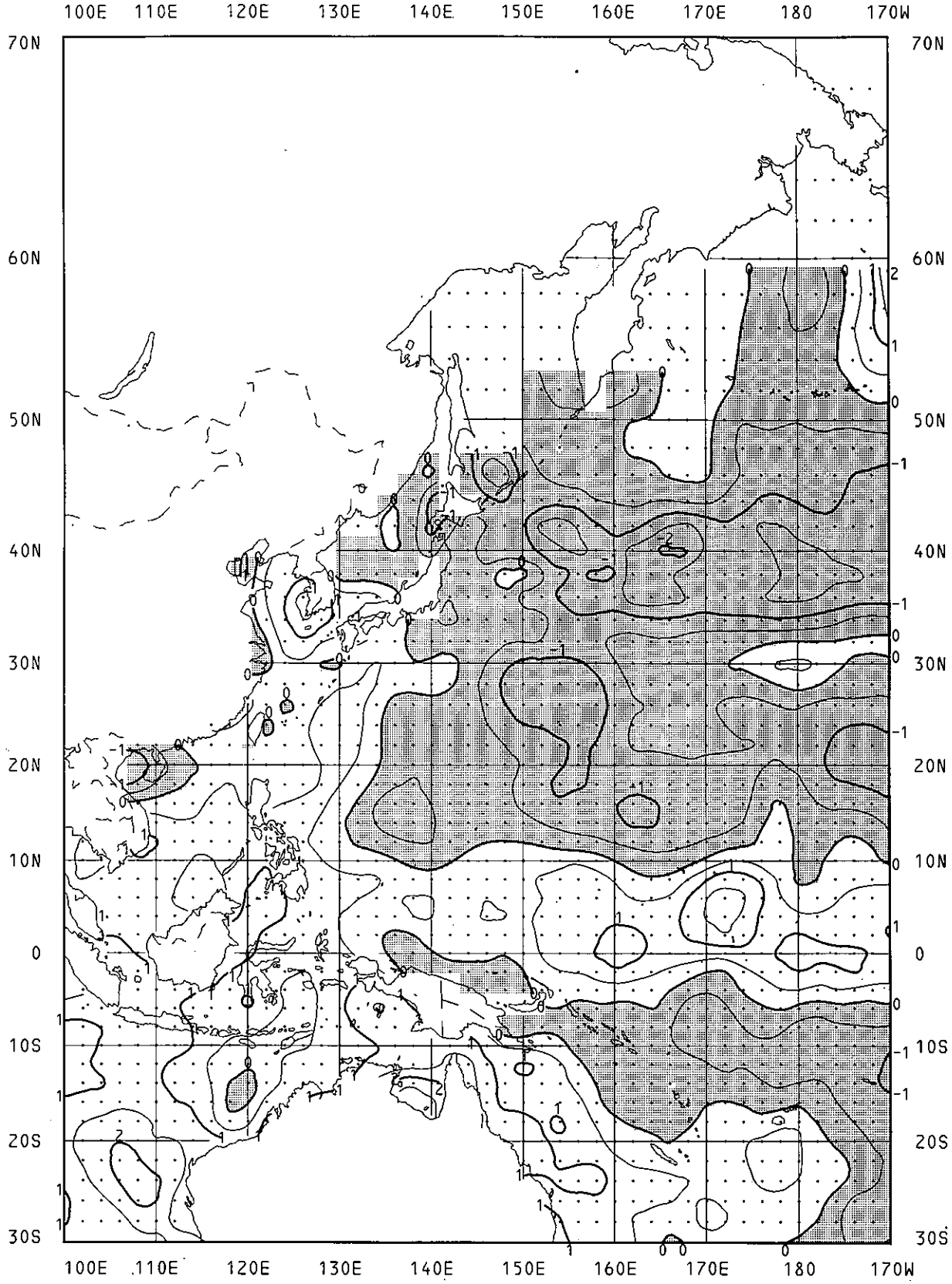
Western Pacific Ocean
SST--MONTHLY MEAN (°C)
SHIP and BUOY DATA
June 1983

Monthly mean sea surface temperature is the mean of in-situ data (ships and buoys) within two-degree quadrangles. Contour line **interval is 1.0°C.**



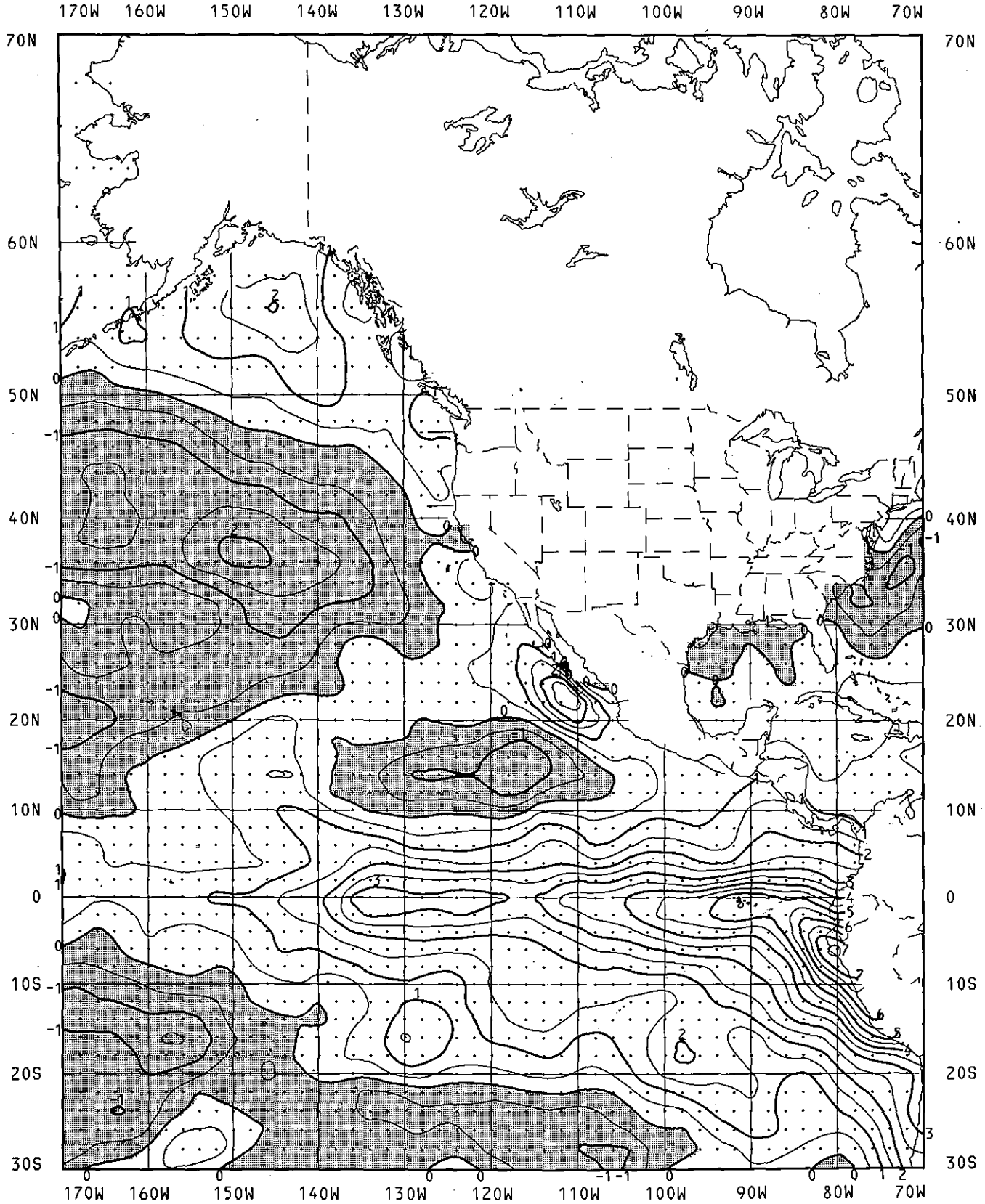
Eastern Pacific Ocean
SST--MONTHLY MEAN (°C)
SHIP and BUOY DATA
June 1983

Monthly mean sea surface temperature is the mean of in-situ data (ships and buoys) within two-degree quadrangles. Contour line interval is 1.0°C.



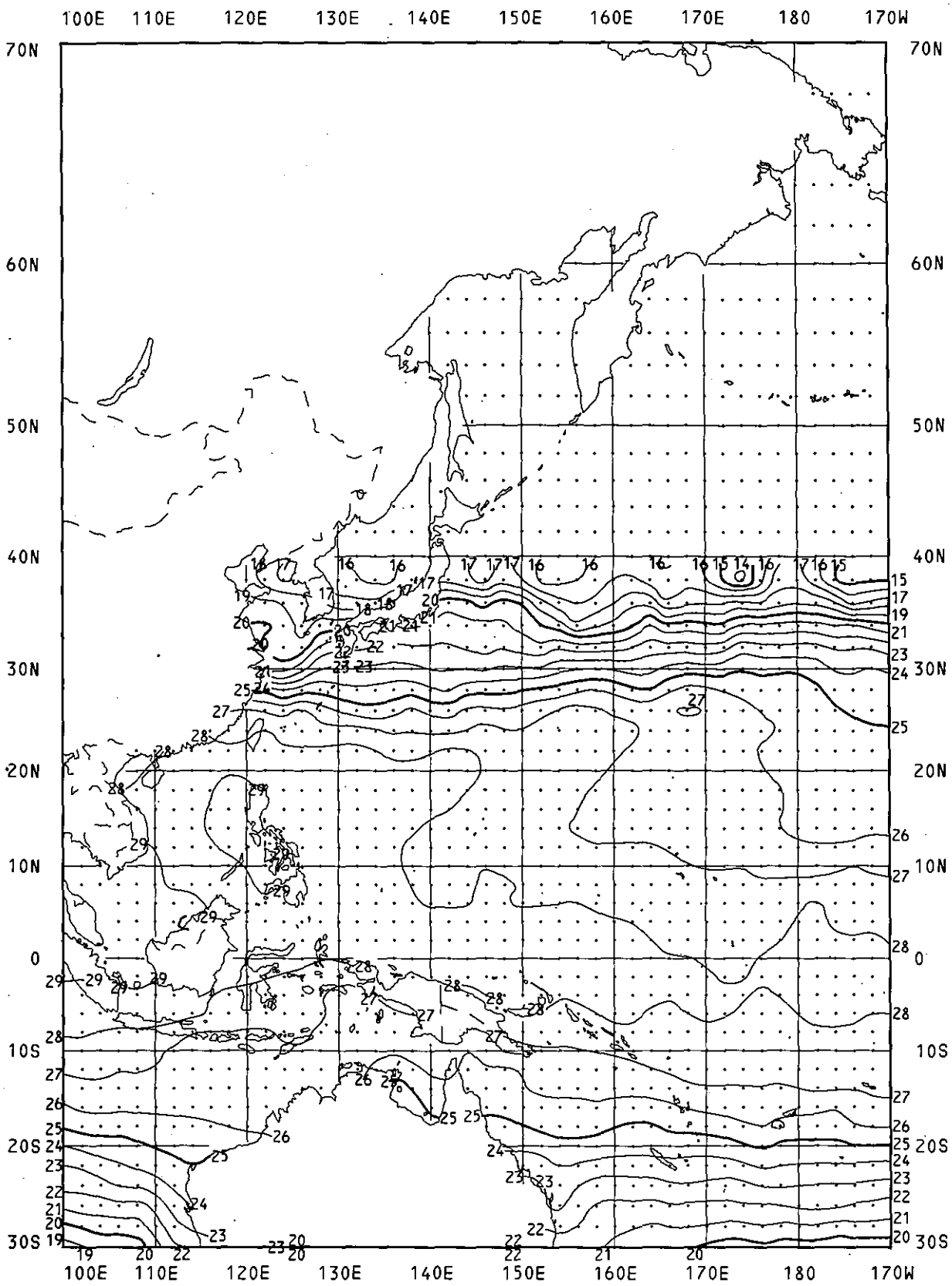
Western Pacific Ocean
SST--MONTHLY ANOMALY (°C)
SHIP and BUOY DATA
June 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.



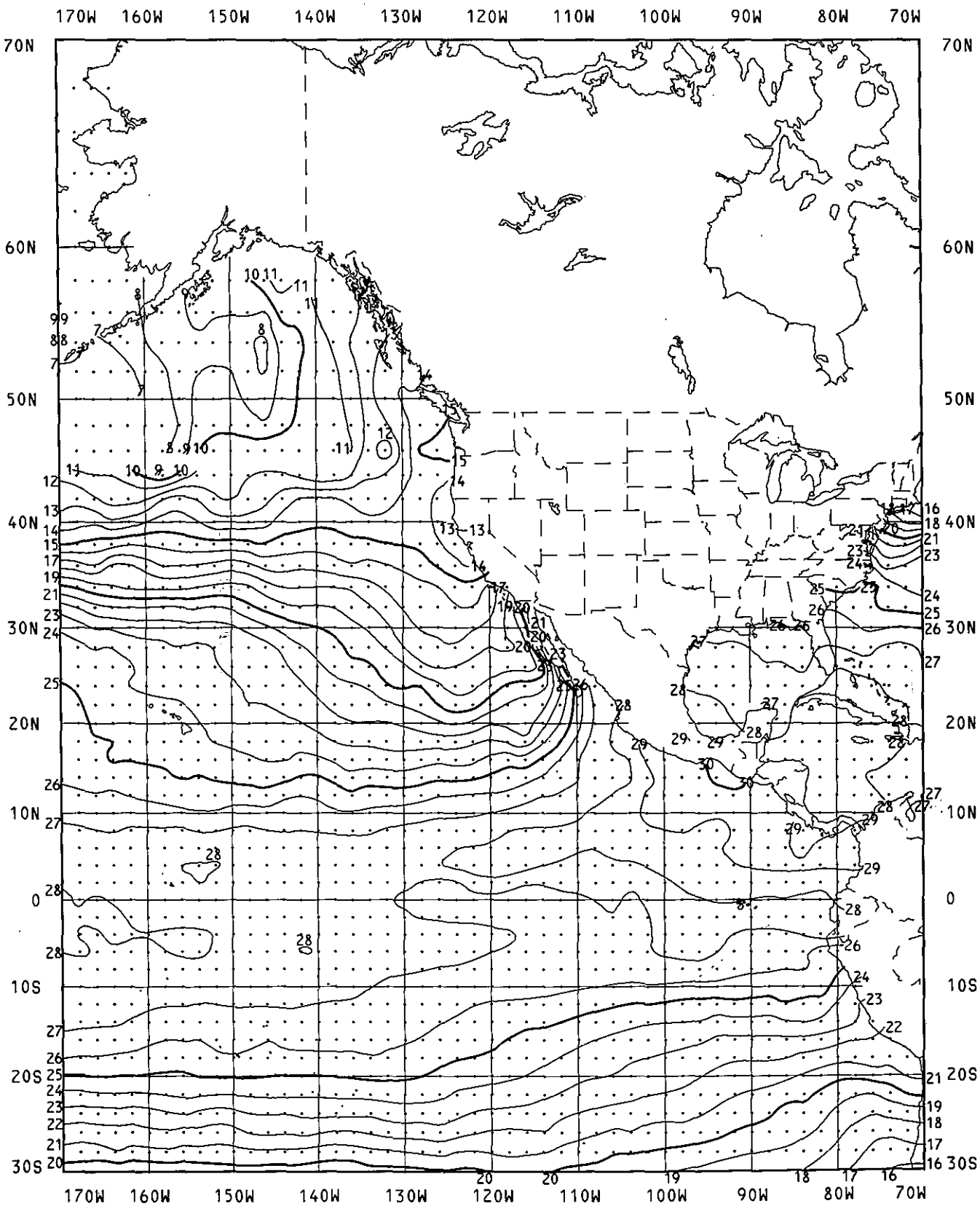
Eastern Pacific Ocean
SST--MONTHLY ANOMALY (°C)
SHIP and BUOY DATA
June 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.



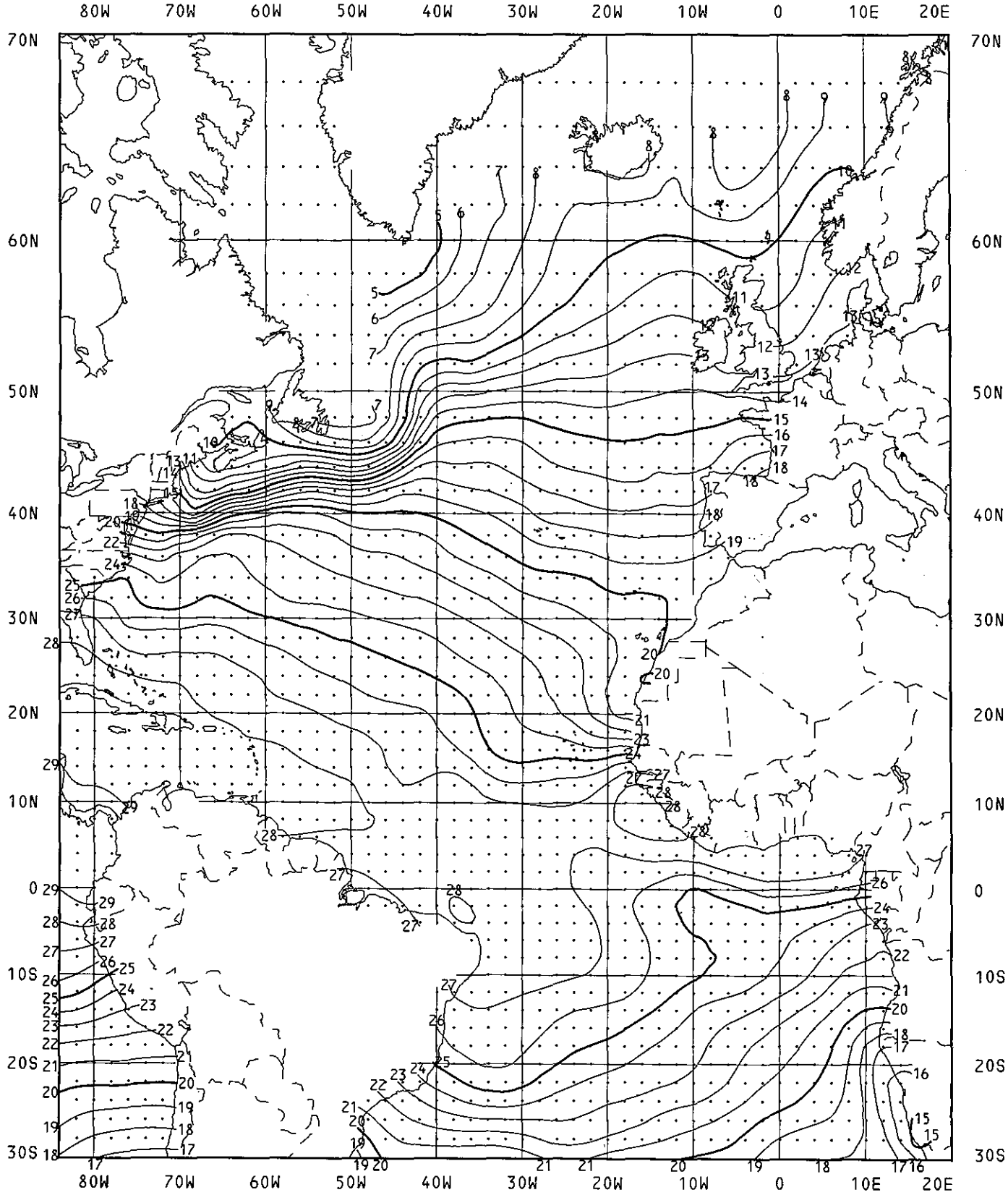
Western Pacific Ocean
SST--MONTHLY MEAN (°C).
SATELLITE DATA
June 1983

Monthly mean sea surface temperature is the mean of satellite data within two-degree quadrangles. Contour line interval is 1.0°C.



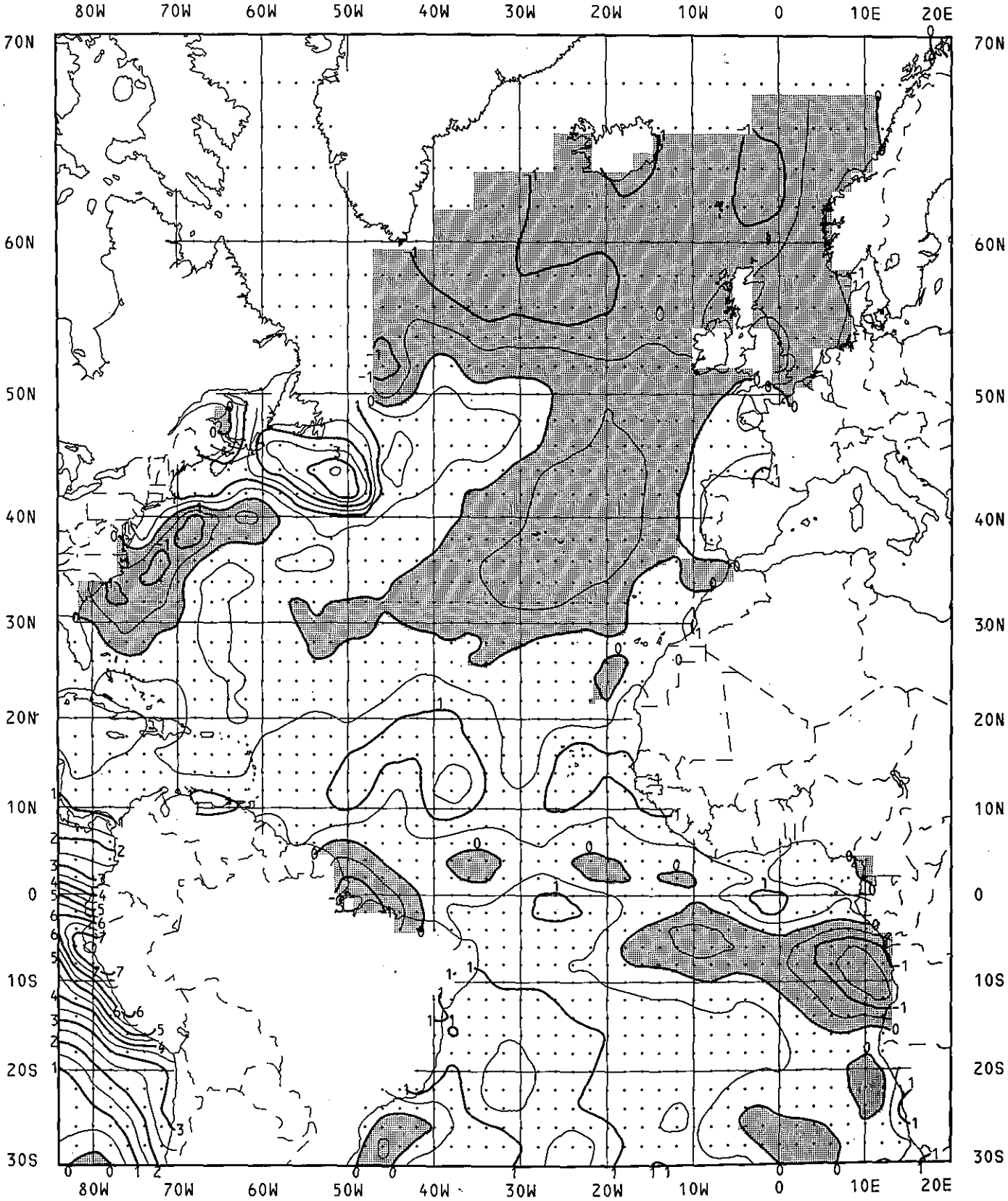
Eastern Pacific Ocean
SST--MONTHLY MEAN (°C)
SATELLITE DATA
June 1983

Monthly mean sea surface temperature is the mean of satellite data within two-degree quadrangles. Contour line interval is 1.0°C.



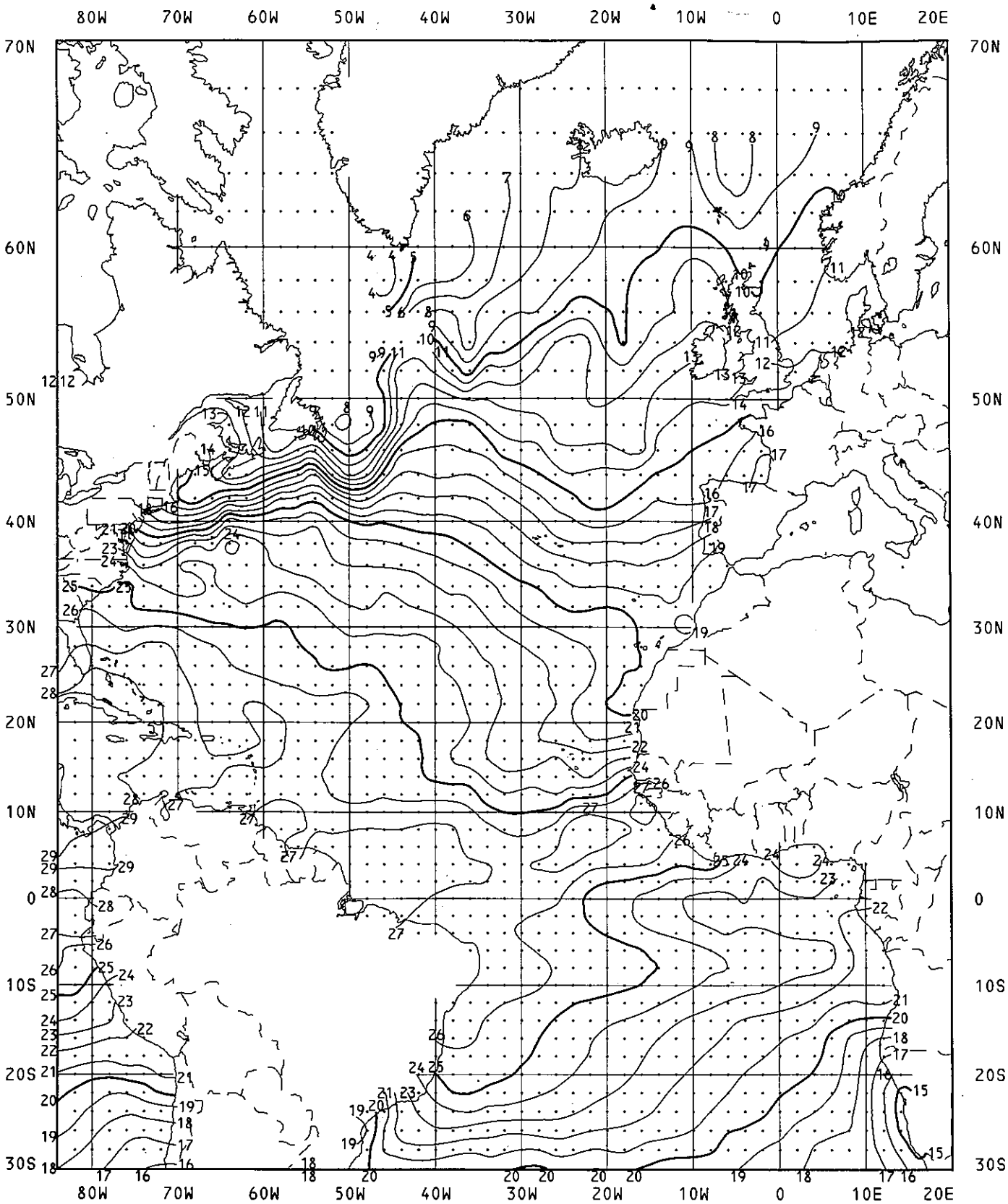
Atlantic Ocean
SST--MONTHLY MEAN (°C)
SHIP and BUOY DATA
June 1983

Monthly mean sea surface temperature is the mean of in-situ data (ships and buoys) within two-degree quadrangles. Contour line interval is 1.0°C.



Atlantic Ocean
SST--MONTHLY ANOMALY (°C)
SHIP and BUOY DATA
June 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.



Atlantic Ocean
SST--MONTHLY MEAN (°C)
SATELLITE DATA
June 1983

Monthly mean sea surface temperature is the mean of satellite data within two-degree quadrangles. Contour line interval is 1.0°C.

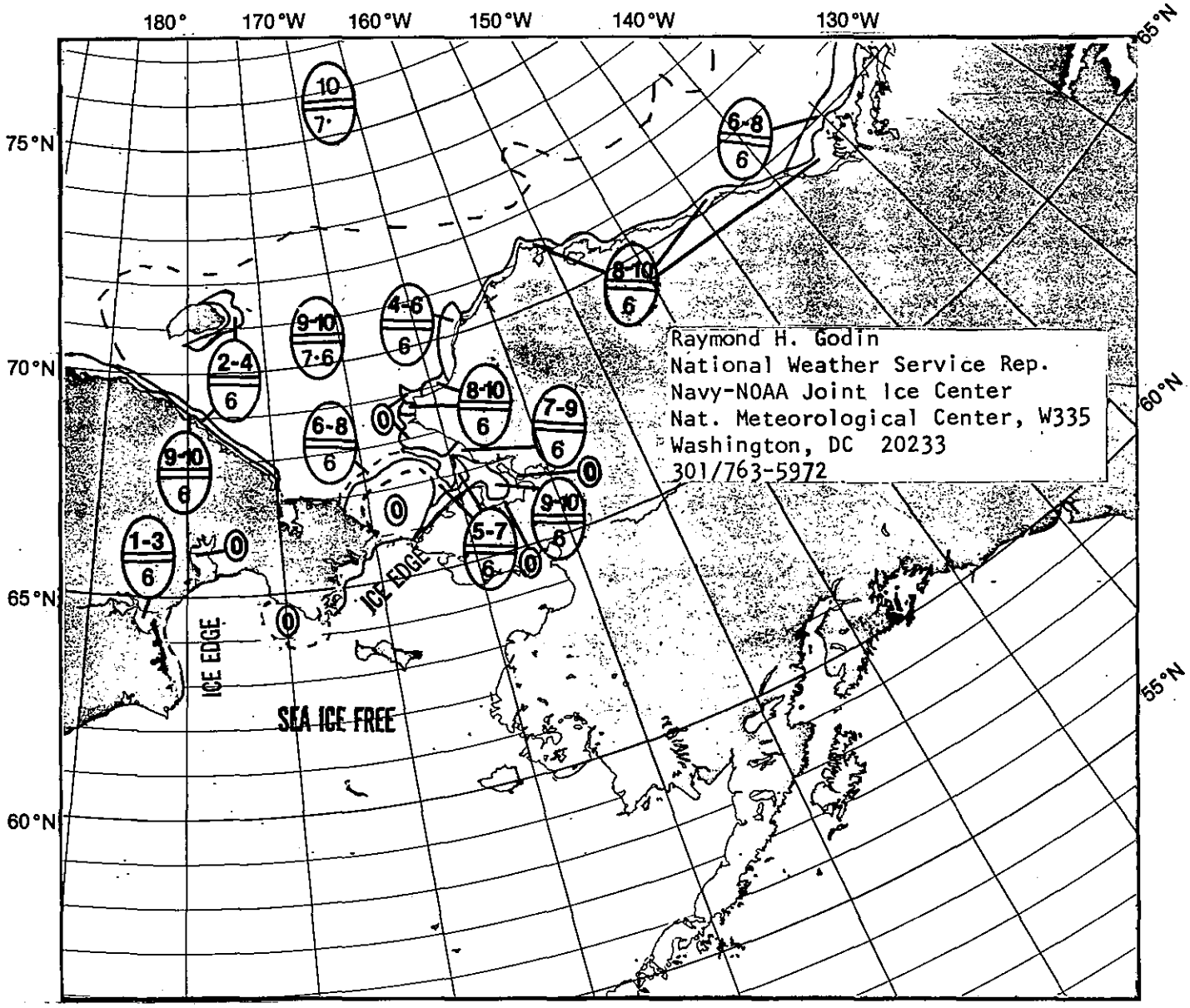
SATELLITE IMAGE OF THE MONTH

Marcia L. Weaks
Environmental Products Branch, E/SP22
NESDIS, NOAA
Washington, DC 20233
301/763-8142

Lake Breeze Effect

This NOAA-7 visible satellite image of the Great Lakes from June 1, 1983, for 3 p.m. local time, illustrates an effect known as lake breeze. An edge of clouds around each lake marks the extent of the lake breeze. This breeze blows from the surface of the lake onshore during the day and reaches a maximum in the afternoon. Analogous to the sea breeze circulation, the lake breeze is induced by differential heating between the land and the water. The depth of the lake is another important factor in the strength of the circulation. Although not evident in this image, shallow lakes heat up quickly and are less effective in producing the lake breeze effect. Generally, lake breeze effects tend to be weaker than sea breeze effects.

BERING SEA / NORTH SLOPE ICE ANALYSIS



C = Total ice concentration in the area in tenths.

C_a, C_b, C_c = Concentration of thickest (C_a), 2nd thickest (C_b), and 3rd thickest (C_c) ice

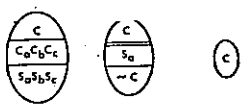
S_a, S_b, S_c = Stage of development of thickest (S_a), 2nd thickest (S_b), and 3rd thickest (S_c) ice.

-C = Concentration of ice within area(s) of strips and patches.

STAGE(S) OF DEVELOPMENT (THICKNESS)

1 = New ice (0-10 cm)
3 = Young ice (10-30 cm)
6 = First year (30-200 cm)
7 = First year thin (30-70 cm)
1. = First year medium (70-120 cm)
4. = First year thick (120-200 cm)
7. = Old ice (survived at least one summer's melt)

EXAMPLES



125 Theoretical thickness of this season's growth (cm).

Fast ice. Sea ice which forms and remains fast along the coast.

Ice boundary visually or satellite observed.

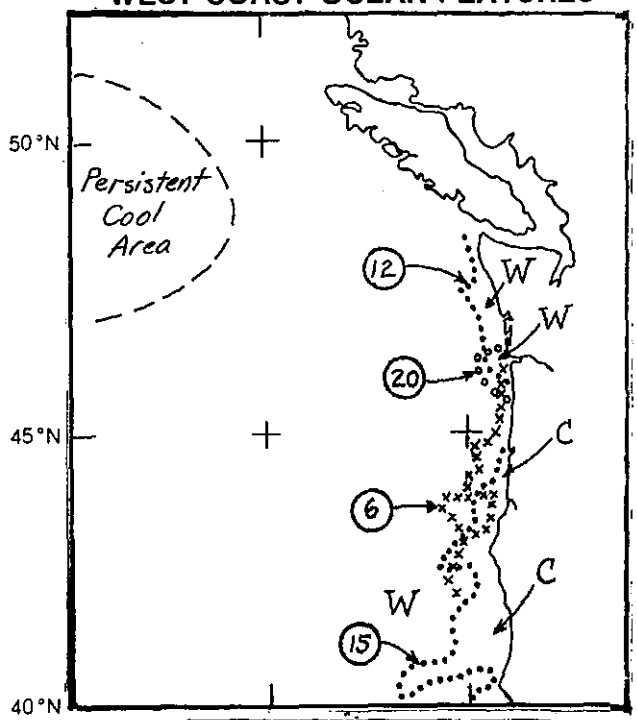
Ice boundary estimated.

June 1983

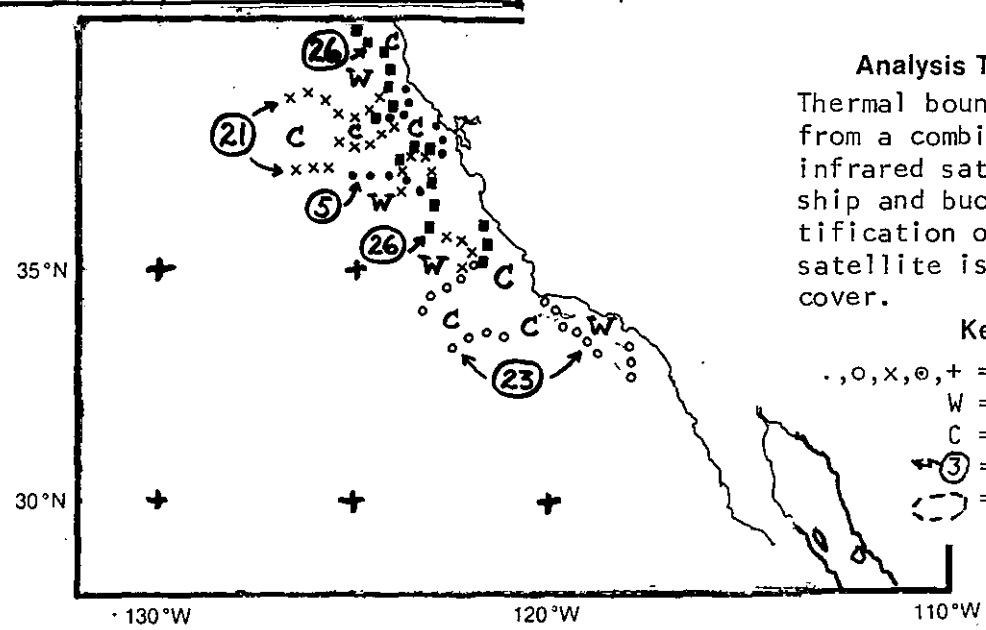
The mean monthly surface pressure circulation depicts a weak pressure gradient with light and variable geostrophic winds affecting Alaskan ice covered waters. Above normal mean monthly air temperatures were observed at Barrow (71°N 157°W) and Nome (64°N 165°W). With the exception of sheltered bays and coves the remaining fast ice along the north slope and Chukchi Sea coastline has broken up. Scattered open water polynyas are observed in the south central and south eastern Chukchi Sea. Normally an extensive open water lead is observed from the Bering Strait extending along the coast to Point Franklin (71°N 159°W). The current ice edge position is 200 km south of the historical mean.

WEST COAST OCEAN FEATURES

JUNE 1983



The anomalous warming event associated with the equatorial El Nino is still evident in the north panel area. Warm SST anomalies were below 1.0°C at offshore buoys and at coastal stations along the southern Oregon and northern California coasts. However, anomalies along the northern Oregon and Washington coasts have not diminished, remaining a very significant 2-3°C above normal. Coastal upwelling has been below normal along the entire coast, accounting for a portion of the coastal warm SST anomaly. The only significant upwelling occurred during the first week of the month, along the southern Oregon/northern California coast, where SSTs as low as 11°C were recorded. Seasonal warming was superimposed on the anomalous conditions, with SSTs at all offshore and coastal stations showing fairly steady increases of 1.5-1.8°C over the month. A largely uneventful weather regime did not cause any major disruptions in the SST warming.



Analysis Techniques

Thermal boundaries are determined from a combination of enhanced infrared satellite imagery and ship and buoy observations. Identification of these features by satellite is limited by cloud cover.

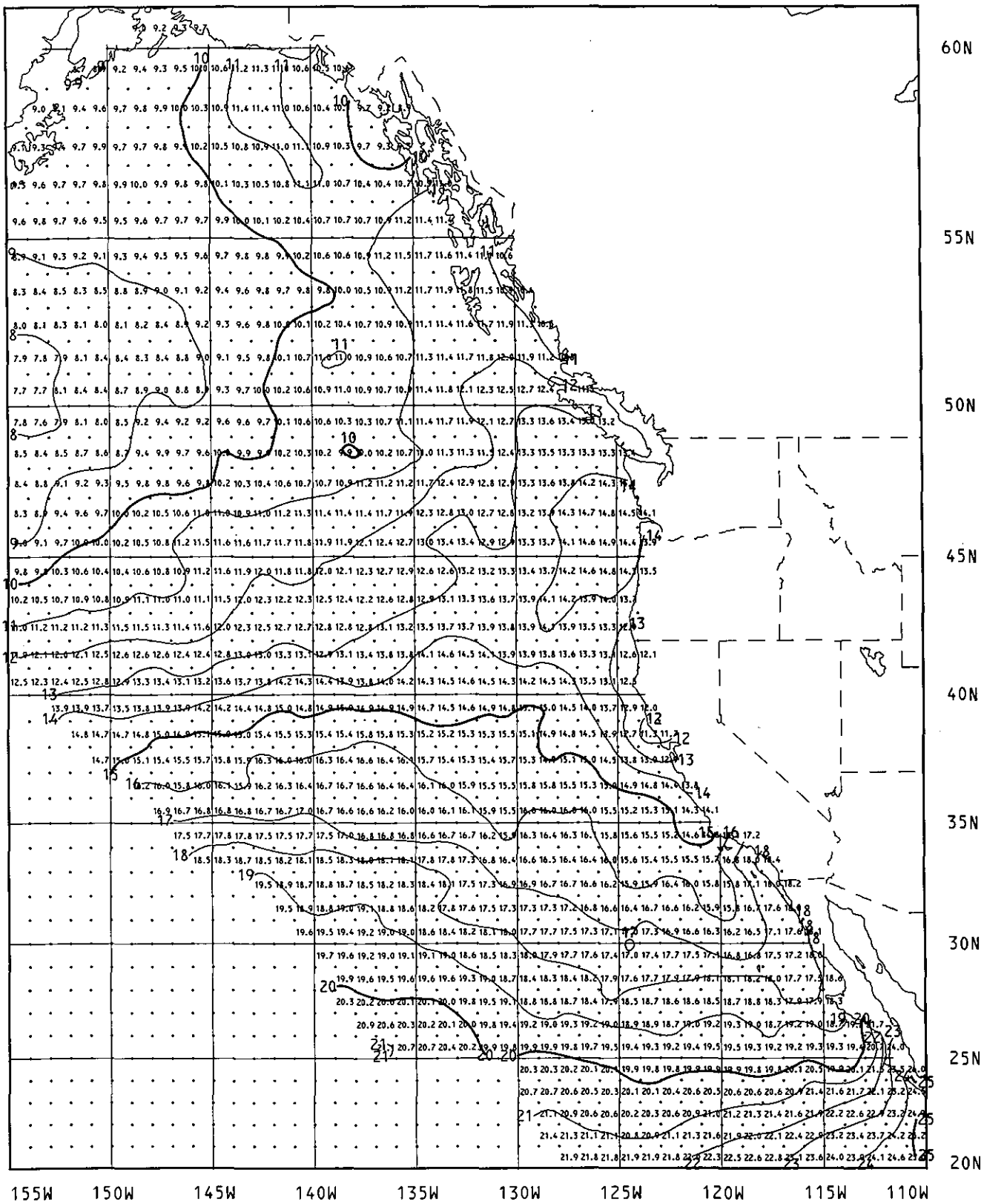
Key

.,o,x,⊙,+ = thermal boundaries
W = warm
C = cold
(3) = date of feature
(dashed) = outline of water mass feature

Seasonal warming was dominant over the south panel area during June as mean SSTs rose 1.0°-2.0°C from May's values except in the upwelling region within 100 km of the coast north of 35°N where SSTs decreased about 0.5°C. The anomalous cool water west of 130°W and north of 30°N persisted; SSTs in this area were 0.5°-1.5°C below normal. El Nino-related positive SST anomalies of 0.5°-1.0°C continued south of 35°N from the coast to 125°W. SSTs were also 0.5°-1.0°C above normal between 125° and 128°W north of 39°N. Moderate to strong coastal upwelling occurred throughout the month north of 35°N but was weak south of there. The coastal buoys reported their lowest SSTs during June 19-30 with the coldest upwelled water from 38°-40°N between 123°W and 125°W. Late in June, SSTs at the buoy at 38.2°N 123.3°W were consistently below 10°C for the first time since last summer.

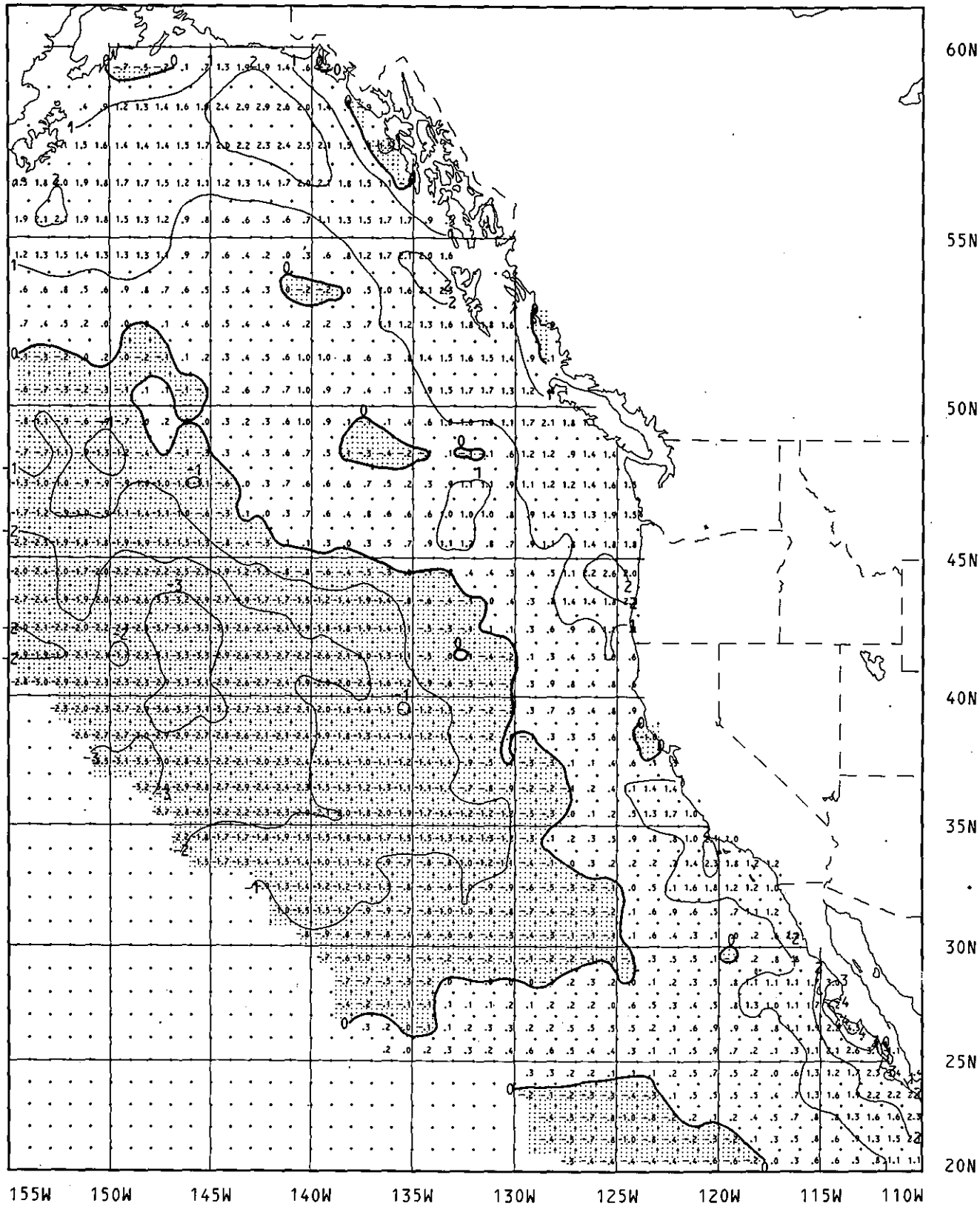
North Panel
Kent Short
Seattle Ocean Services Unit
National Weather Service/NOAA
7600 Sand Point Way NE
Bin C15700
Seattle, WA 98115
206/527-6105

South Panel
Dave Linder
Satellite Field Service Station
NESDIS/NOAA
660 Price Avenue
Redwood City, CA 94063
415/364-2422



West Coast
SST--MONTHLY MEAN (°C)
June 1983

Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.



West Coast
SST--MONTHLY ANOMALY (°C)
June 1983

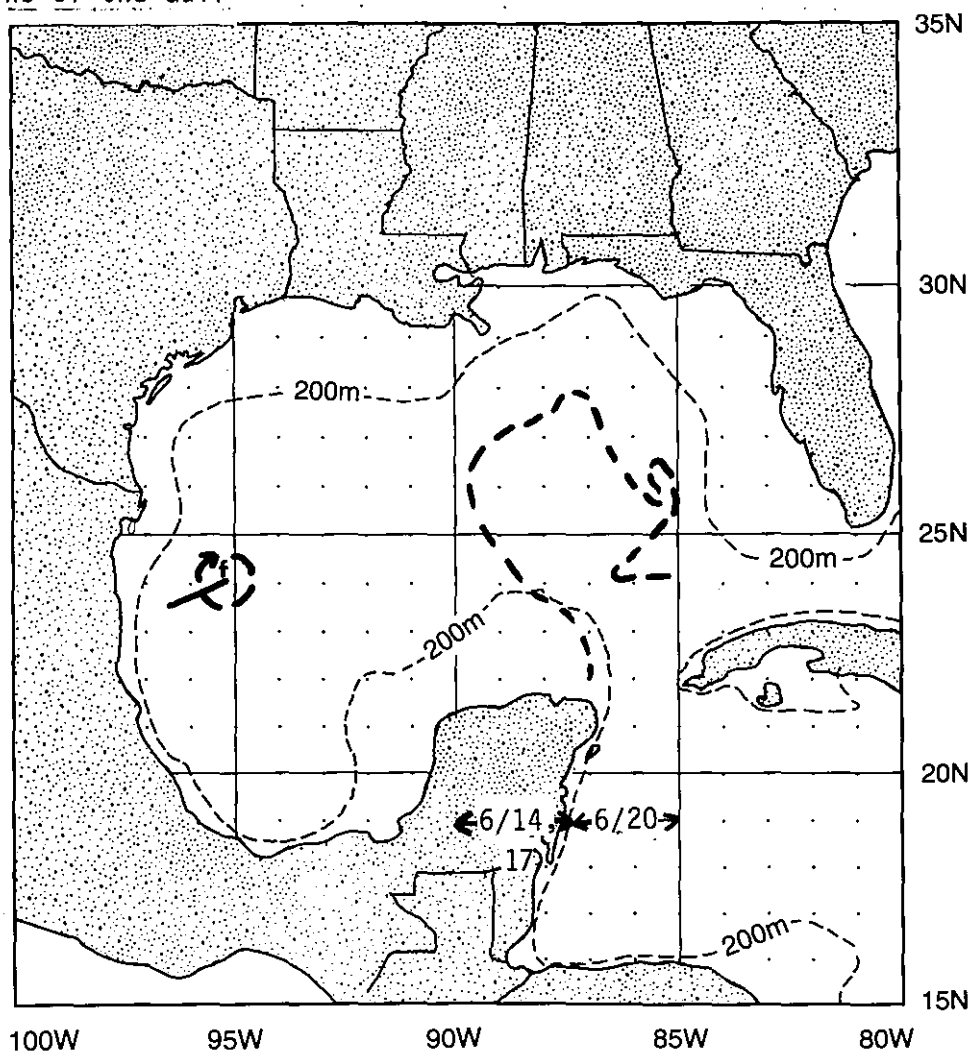
Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.

The end of this month's positions of the Gulf Stream System and its associated eddies are shown for the NW Atlantic and the Gulf of Mexico. The Gulf Stream and Loop Current boundaries are located by infrared satellite imagery or XBT (expendable bathythermograph) data. Anticyclonic eddies are labeled a-z in the Gulf of Mexico and 1-99 in the NW Atlantic. Cyclonic eddies are labeled A-Z. Arrows on eddies indicate direction of circulation. Warm-core or anticyclonic eddies rotate clockwise; cold-core or cyclonic eddies rotate counterclockwise. The line to the eddy center shows the net translation since last month or since last observed. Eddies or sections of the Gulf Stream System which were not observed during the month are not shown on the analysis chart. The long arrows at the bottom of the chart indicate the date of data used.

Data used in this analysis include:
- NOAA satellite infrared imagery, NESDIS
- Bathythermograph data, National Meteorological Center of National Weather Service
- Oceanographic Analysis, A daily detailed analysis issued by National Weather Service/NESDIS

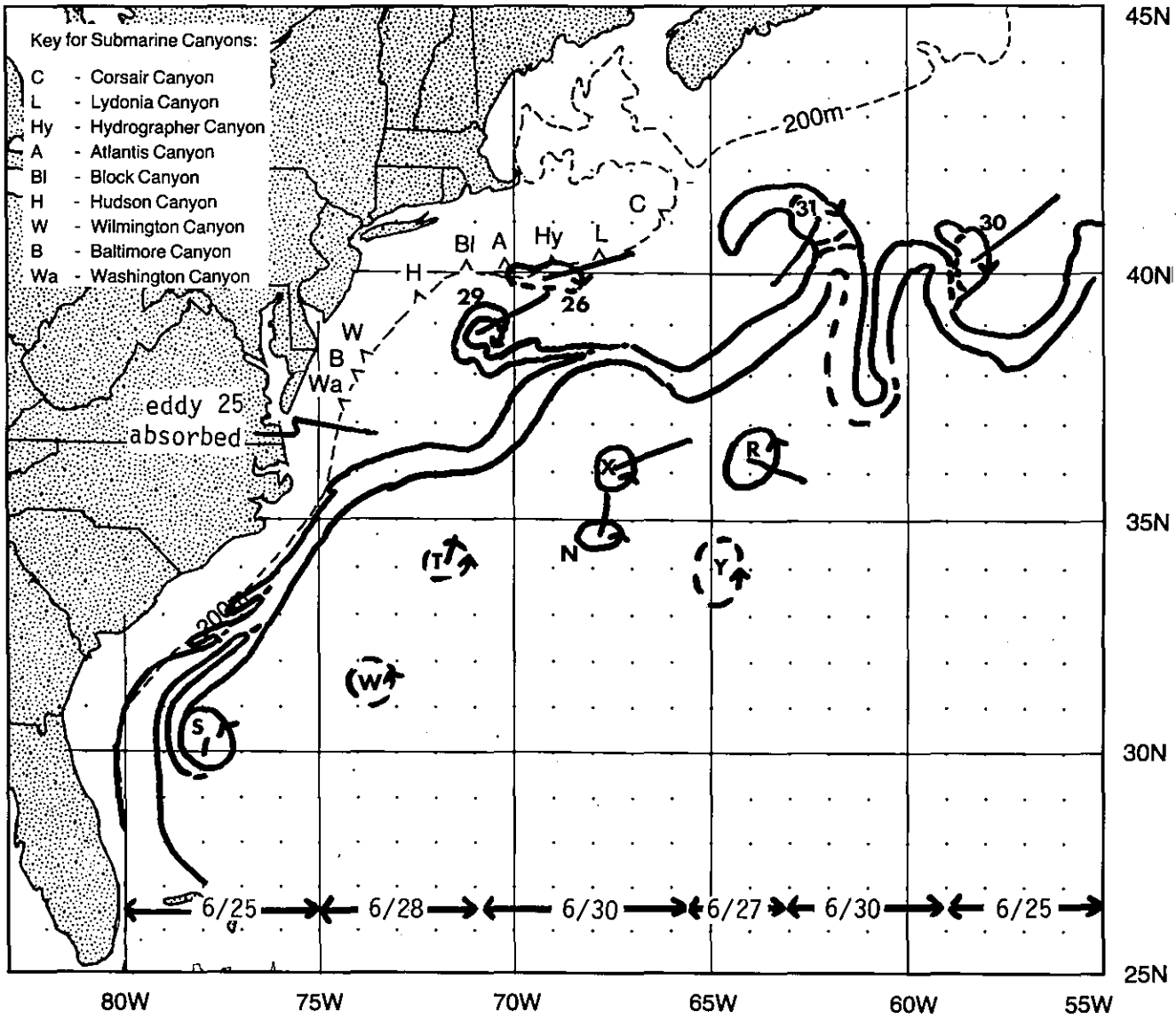
Jenifer Wartha Clark
Synoptic Anal. Br., S/DS23
NESDIS/NOAA
Washington, DC 20233
301/763-8446

Ann Bell
Nat. Met. Center, W/NMC21
Nat. Weather Service, NOAA
Washington, DC 20233
301/763-8133



JUNE 1983

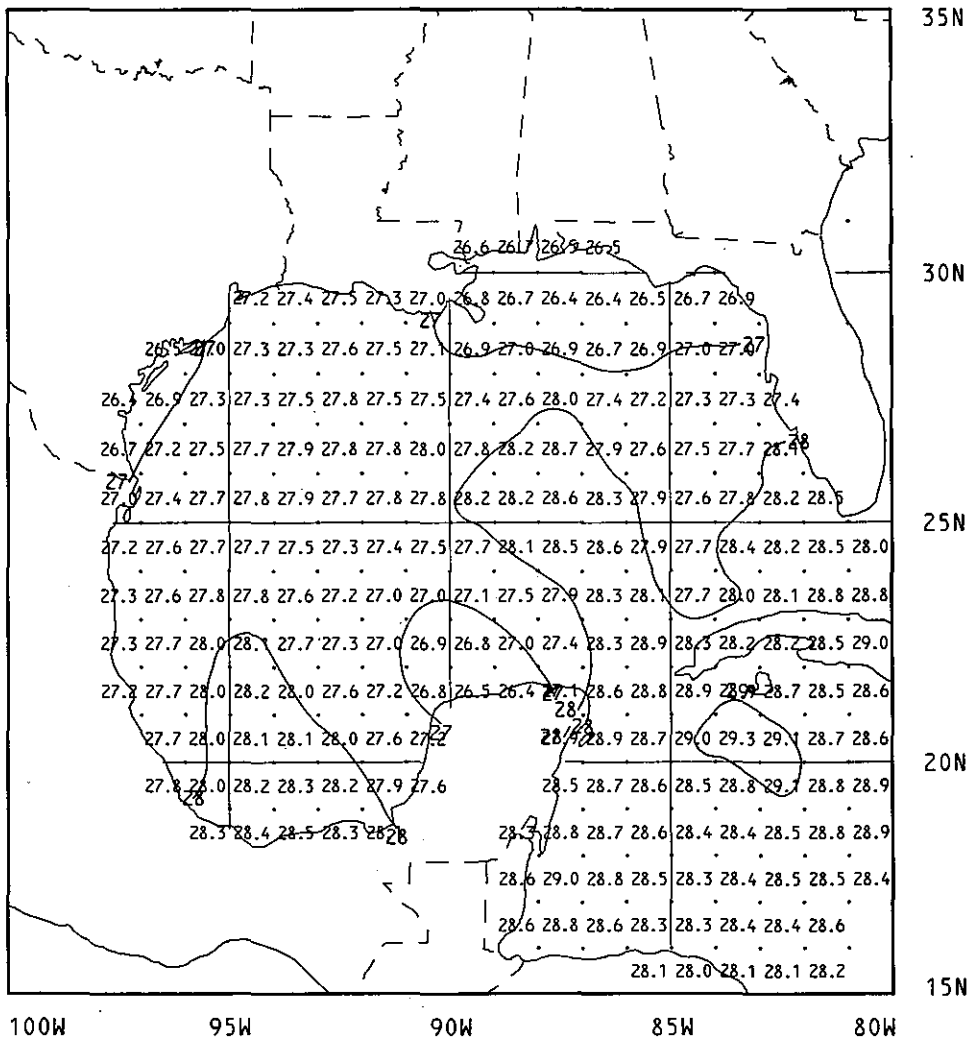
The Loop Current was last partially observed by the Miami Satellite Field Service Station using geostationary satellite data on June 20. At that time the Loop Current amplitude had increased about 25 km N from the end-of-May position. The Loop Current appears to be pinching off forming a new warm eddy. Due to seasonal heating, thermal features in the Gulf of Mexico were not discernible after June 20. The Loop Current from 80°W to 85°W near 25°N was not observed during June. A drifting buoy deployed by the NOAA Data Buoy Center still remains within eddy f. The position of eddy f is estimated from the buoy's June tracking. Eddy f has apparently translated 150 km NE.



A prominent feature in the end-of-June Gulf Stream is the large amplitude trough near 37°30N 61°W. Anticyclonic eddy 31 moved 150 km NE and began interacting with a meander near 41°N 63°W on June 24. Satellite imagery shows that eddy 25 was absorbed by the Gulf Stream near 37°N 73°30W around June 13. Also, Horizon Marine, a private oceanographic company in Massachusetts, found no evidence to support the existence of eddy 25 on June 14-15 by using expendable current probes and XBT's. Eddy 29 translated 175 km SW while eddy 26 traveled 170 km WSW. Eddy 30 decreased in surface diameter from 200 km near 41°30N 56°W last month to 80 km on June 25 near 40°30N 58°30W. Eddy 30 moved 220 km SW.

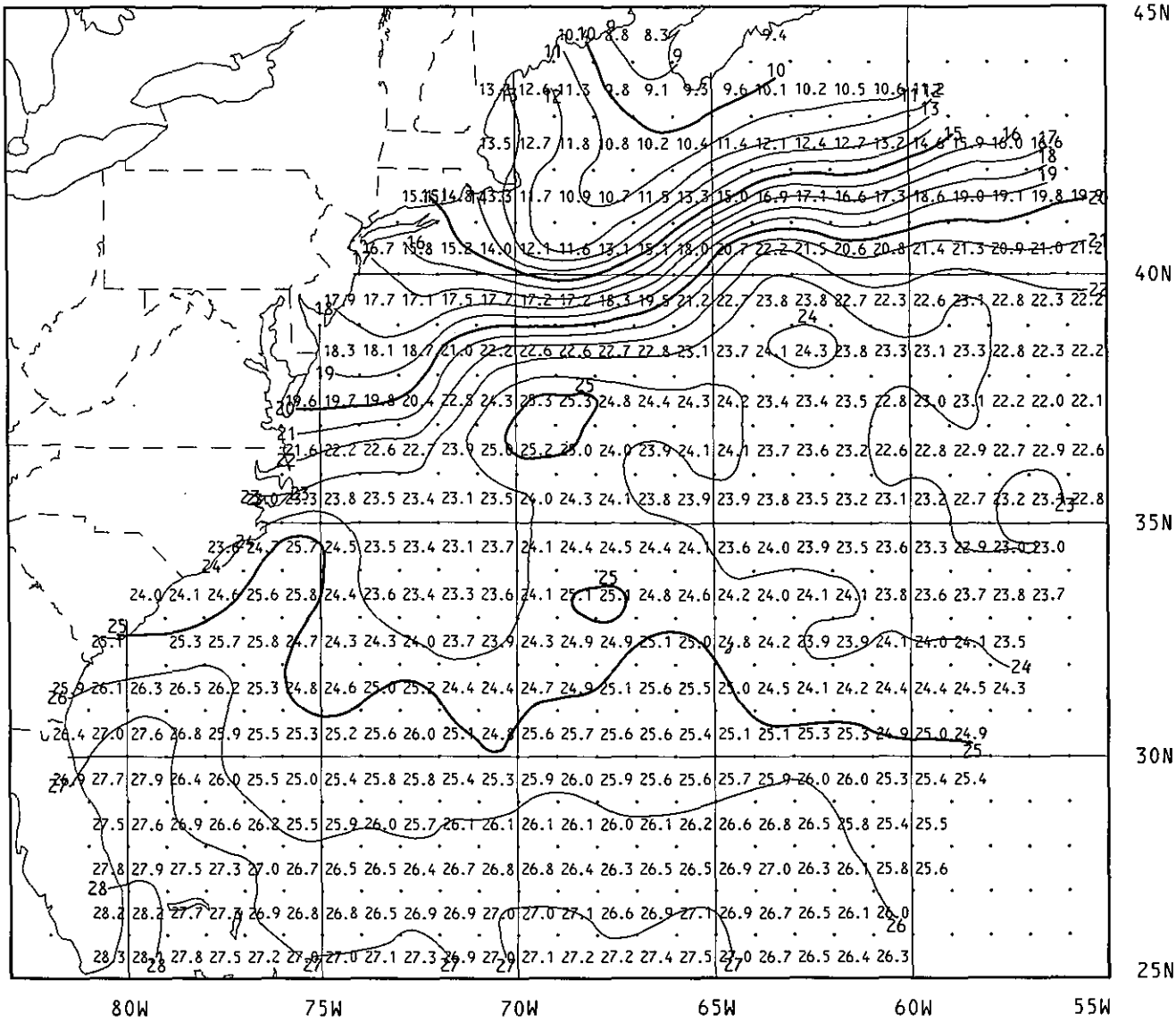
Cyclonic eddy R apparently was absorbed by a Stream meander on June 13 near 37°N 62°30W and then emerged again on June 16 near 36°30N 62°30W. Eddy R's net translation was 130 km NW since last month. Newly observed cyclonic eddy Y was detected on June 14 centered near 34°N 65°W north of Bermuda. Eddy X traveled 155 km SW. Eddy S continues to oscillate on a generally north-south axis. From January through March eddy S translated 110 km SSW, 110 km NE during April, 55 km SW during May, and 45 km N during June. Eddy W was last observed on June 2. Eddy T traveled 45 km SSW from May 28 to June 3 when it was last observed. Eddy N, last month reported to have translated 160 km SE, actually translated 130 km WNW near 35°30N 67°30W and then 110 km SSW by June 30. June satellite imagery did not detect the western boundary of the Gulf Stream from 25°N to 28°N along 80°W due to seasonal heating.

EAST COAST SST-
MONTHLY MEAN



Gulf of Mexico
SST--MONTHLY MEAN (°C)
June 1983

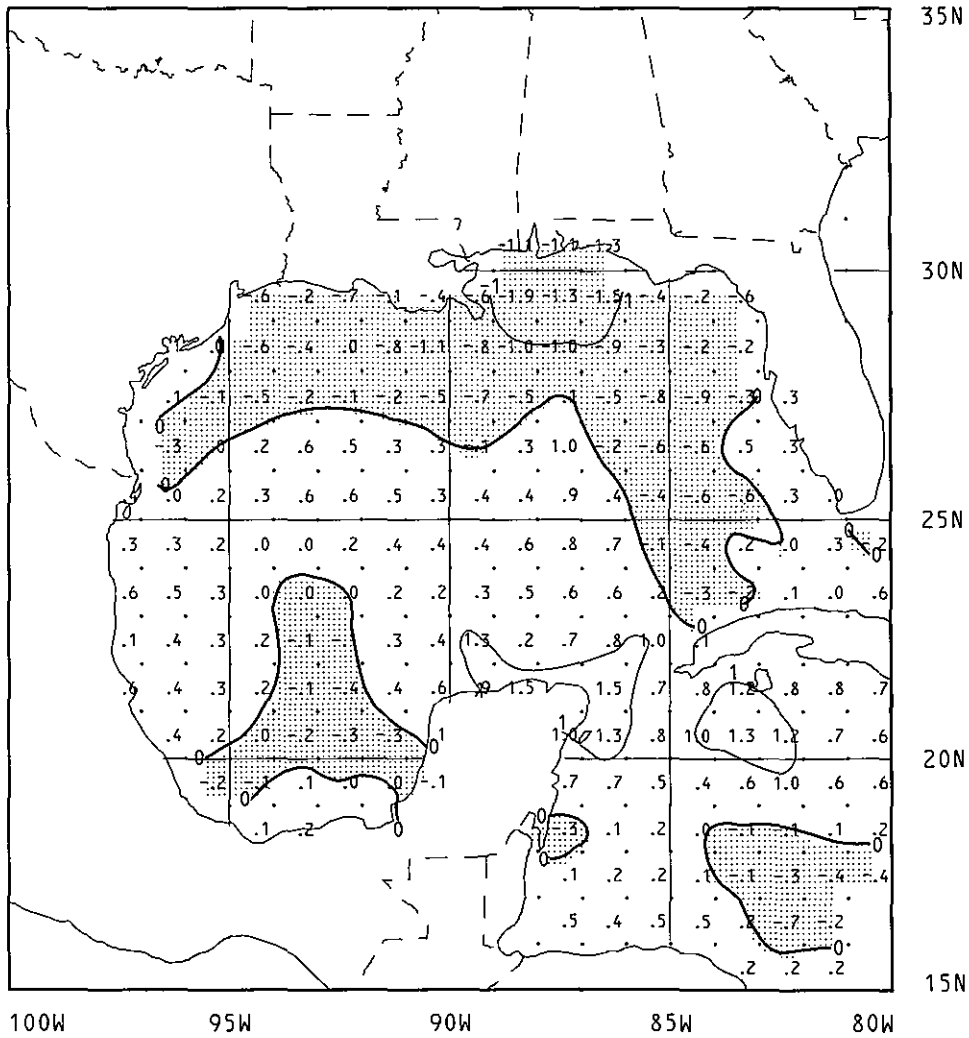
Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.



NW Atlantic Ocean
SST--MONTHLY MEAN (°C)
June 1983

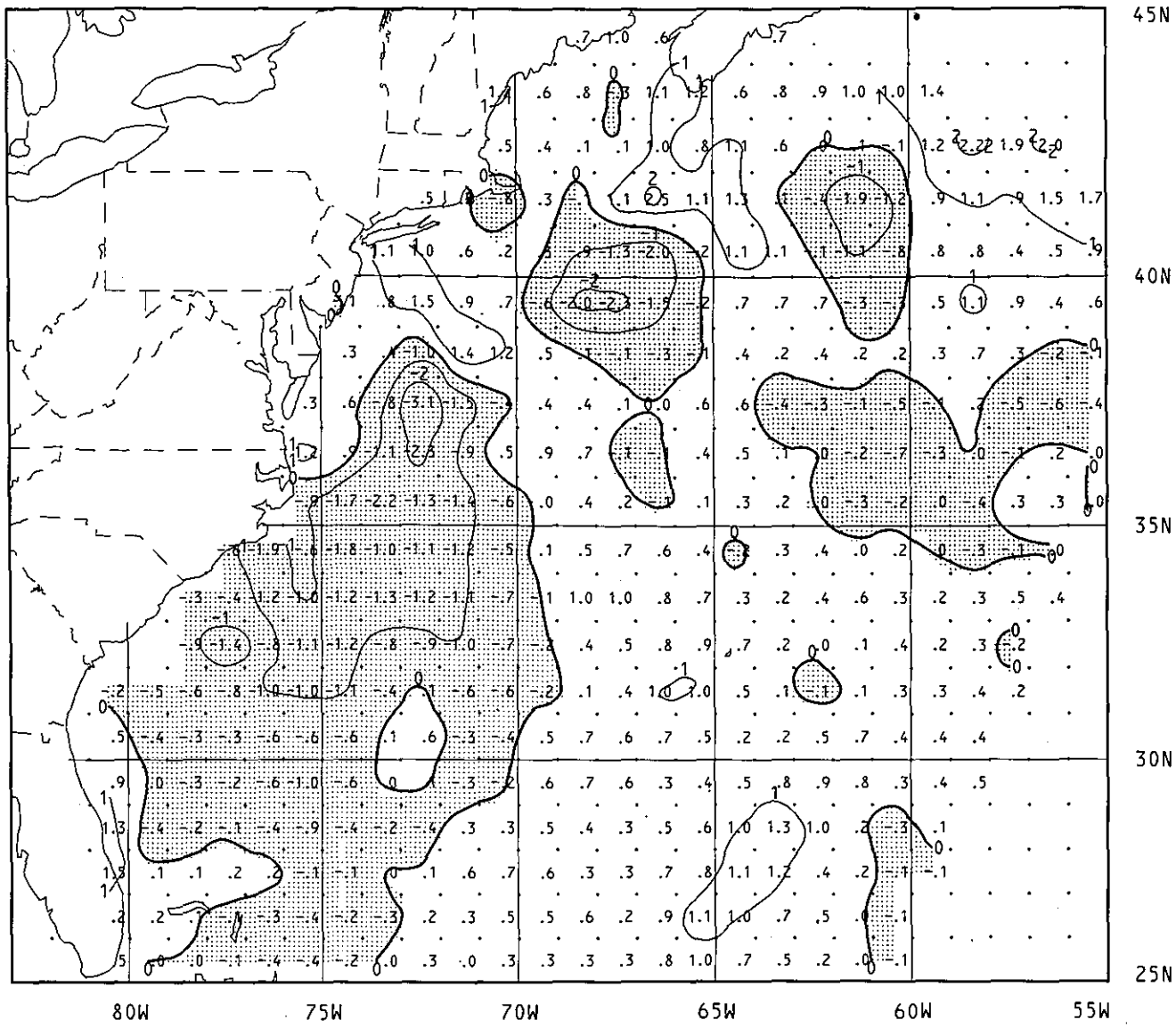
Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.

EAST COAST SST-ANOMALY



Gulf of Mexico
SST--MONTHLY ANOMALY (°C)
June 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.



NW Atlantic Ocean
SST--MONTHLY ANOMALY (°C)
June 1983

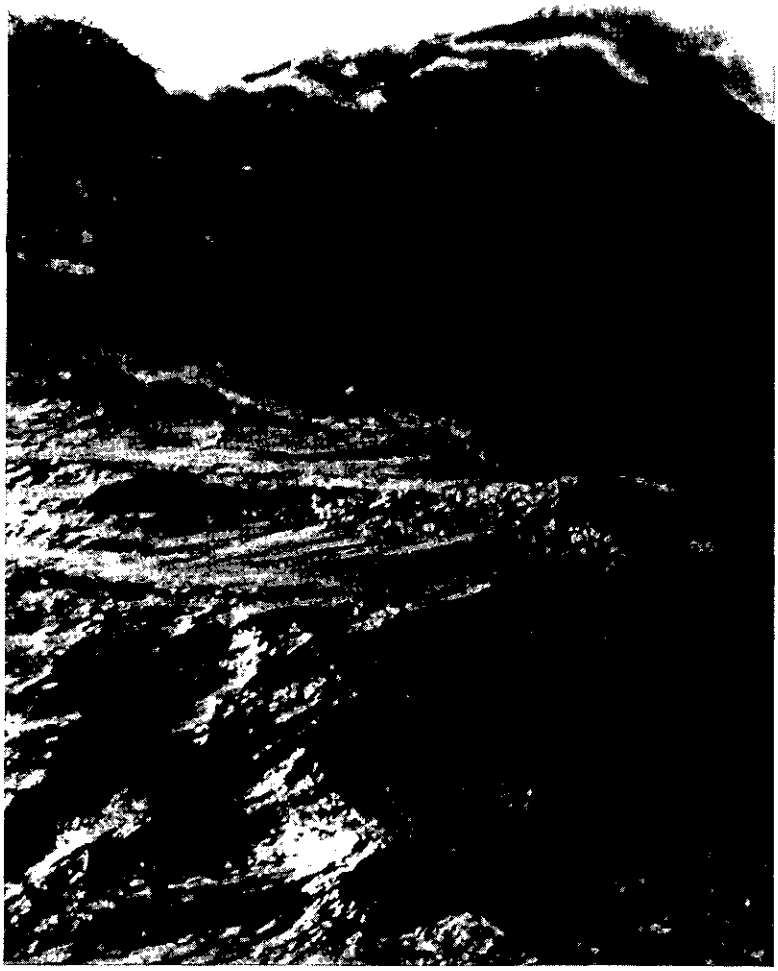
Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.

OCEANOGRAPHIC Monthly Summary

Volume III Number 7

NOAA LISD SEATTLE

July 1983



Contents

3 OceaNotes

4 Pacific SST - monthly mean, ship and buoy data

6 Pacific SST - anomaly

8 Pacific SST - monthly mean, satellite data

10 Atlantic SST - monthly mean, ship and buoy data

11 Atlantic SST - anomaly

12 Atlantic SST - monthly mean, satellite data

13 Satellite IMAGE of the Month

14 Bering Sea/North Slope ICE, with text

15 West Coast OCEAN FEATURES, with text

16 West Coast SST - monthly mean

17 West Coast SST - anomaly

18 East Coast OCEAN FEATURES, with text

20 East Coast SST - monthly mean

22 East Coast SST - anomaly

24 Subscription Information

U.S. DEPARTMENT OF COMMERCE • National Oceanic and Atmospheric Administration
National Weather Service
National Environmental Satellite, Data, and Information Service

Oceanographic Monthly Summary is published by the National Weather Service and the National Environmental Satellite, Data, and Information Service (NESDIS). *Oceanographic Monthly Summary* contains sea surface temperature (SST) analyses on both regional and ocean basin scales for the Atlantic and Pacific Oceans. Two ocean basin SST analyses are presented, one based on in-situ data and another based solely on satellite data. An ocean basin SST anomaly derived from the in-situ data is also shown; it uses the National Climatic Center (NCC) Climatology*. The regional SST analyses are based upon a combination of in-situ and satellite data measurements. The regional SST anomalies use the Robinson-Bauer Climatology*. *Oceanographic Monthly Summary* also contains Alaskan sea ice information and ocean feature information for contiguous U.S. ocean regions.

Oceanographic Monthly Summary welcomes articles containing information of interest to *Oceanographic Monthly Summary* readers, such as, news on operational oceanography, unusual ocean feature phenomena, etc. Contributions should be sent to the editor (address below). Accepted material will appear in the OceaNotes section of *Oceanographic Monthly Summary*. Contributions can be published as quickly as the next monthly issue.

If you are interested in receiving *Oceanographic Monthly Summary* regularly, please refer to the back cover for subscription information.

*Reynolds, R.W., 1982. A Monthly Averaged Climatology of Sea Surface Temperatures; *NOAA Technical Report NWS 31*.

*Robinson, M.K., 1976. Atlas of North Pacific Ocean Monthly Mean Temperatures and Mean Salinities of the Surface Layer; *NavOceano Ref. Pub. 2*.

Robinson, M.K., R. A. Bauer and E.H. Schroeder, 1979. Atlas of North Atlantic-Indian Ocean Monthly Mean Temperatures and Mean Salinities of the Surface Layer; *NavOceano Ref. Pub. 18*.

Oceanographic Monthly Summary
Editor: Steve Auer
National Meteorological Center, W/NMC21
National Weather Service, NOAA
Washington, DC 20233
(telephone: 301/763-8133)
Assistant Editor: Jenifer Wartha Clark
Synoptic Analysis Branch, S/DS23
NESDIS, NOAA
Washington, DC 20233
(telephone: 301/763-8446)

SST Computer Analyses are prepared by:
William H. Gemmill
Marine Products Branch, W/NMC21
National Meteorological Center
National Weather Service, NOAA
Washington, DC 20233
(telephone: 301/763-8133)

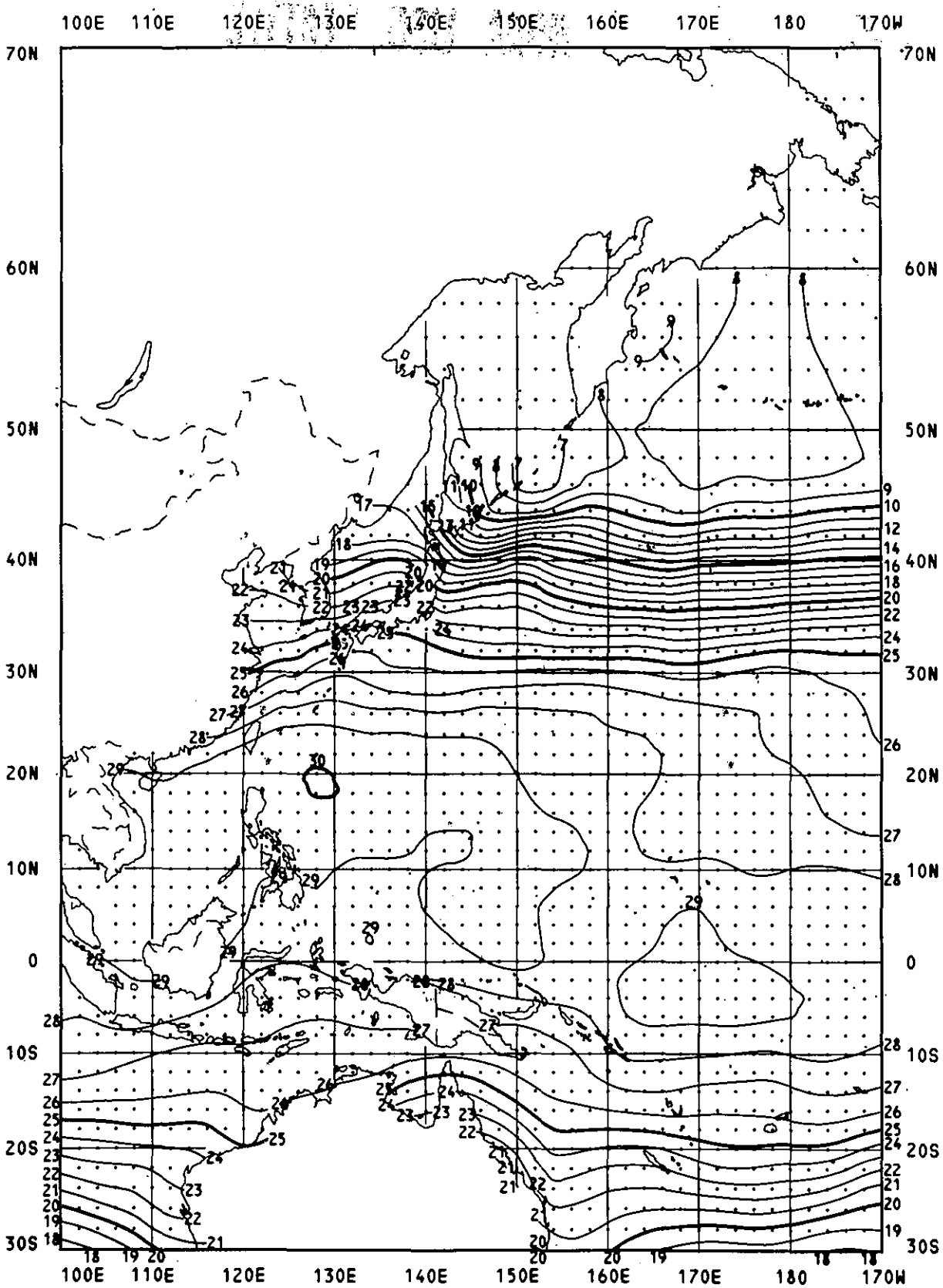
NOAA LISD SEATTLE

A NEW PUBLICATION FOR MARINER'S AVAILABLE

A publication entitled "Satellite Observed Oceanographic Analyses and Sea Surface Thermal Analyses" is now available to the public free of charge. The joint authors are Jenifer Wartha-Clark and Reggie Lawrence, both oceanographers at NESDIS, and Gef Flimlin, marine extension agent for the New Jersey Sea Grant Extension Service. This publication explains two operational oceanographic products largely derived from real-time satellite data that are made available to the public on a daily and weekly basis. The first product is the daily joint NESDIS/NWS Oceanographic Analysis which depicts positions of the Gulf Stream, warm eddies, cold eddies, shelf water, slope water, and Sargasso Sea water in the Atlantic and Gulf of Mexico. The second product is the Sea Surface Thermal Analysis which depicts highly detailed surface isotherm structure in the Gulf Stream area east of Cape Hatteras from 35°N to 45°N.

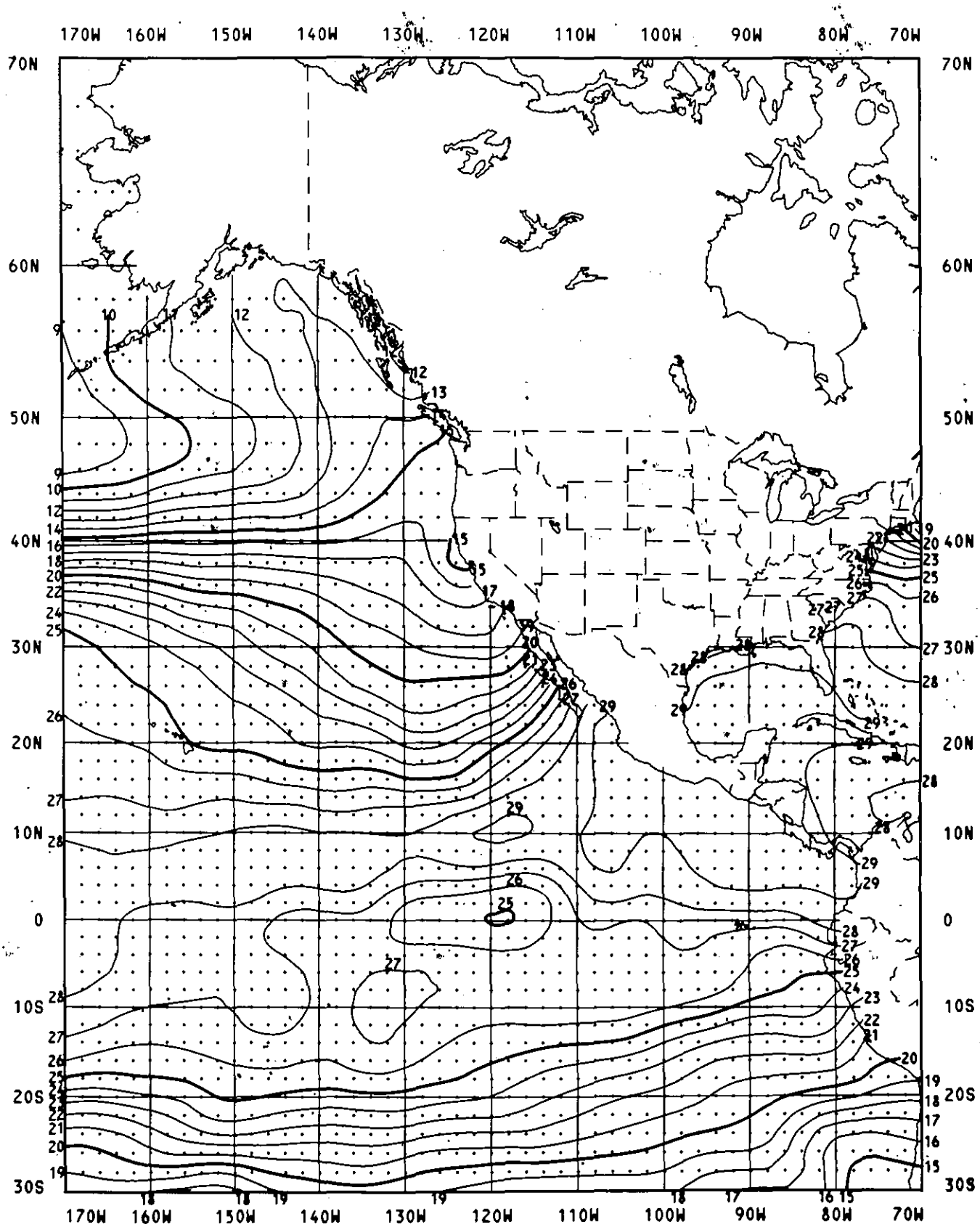
The publication was written to help acquaint fishers and recreational boaters with these available oceanographic products and to help them better use the information contained in them. The publication explains how to correctly interpret and use the analyses. The temperature fronts or thermal boundaries depicted on these analyses are often rich in nutrients which attract fish. By correctly using these oceanographic charts, fishers can be guided to these areas of high fish concentration and thereby yeild higher catches and save money, time and fuel.

If you are interested in receiving this publication, please contact Jenifer Wartha-Clark at (301) 763-8444 or write her at NOAA/NESDIS, World Weather Building Room 401, Washington, DC. 20233.



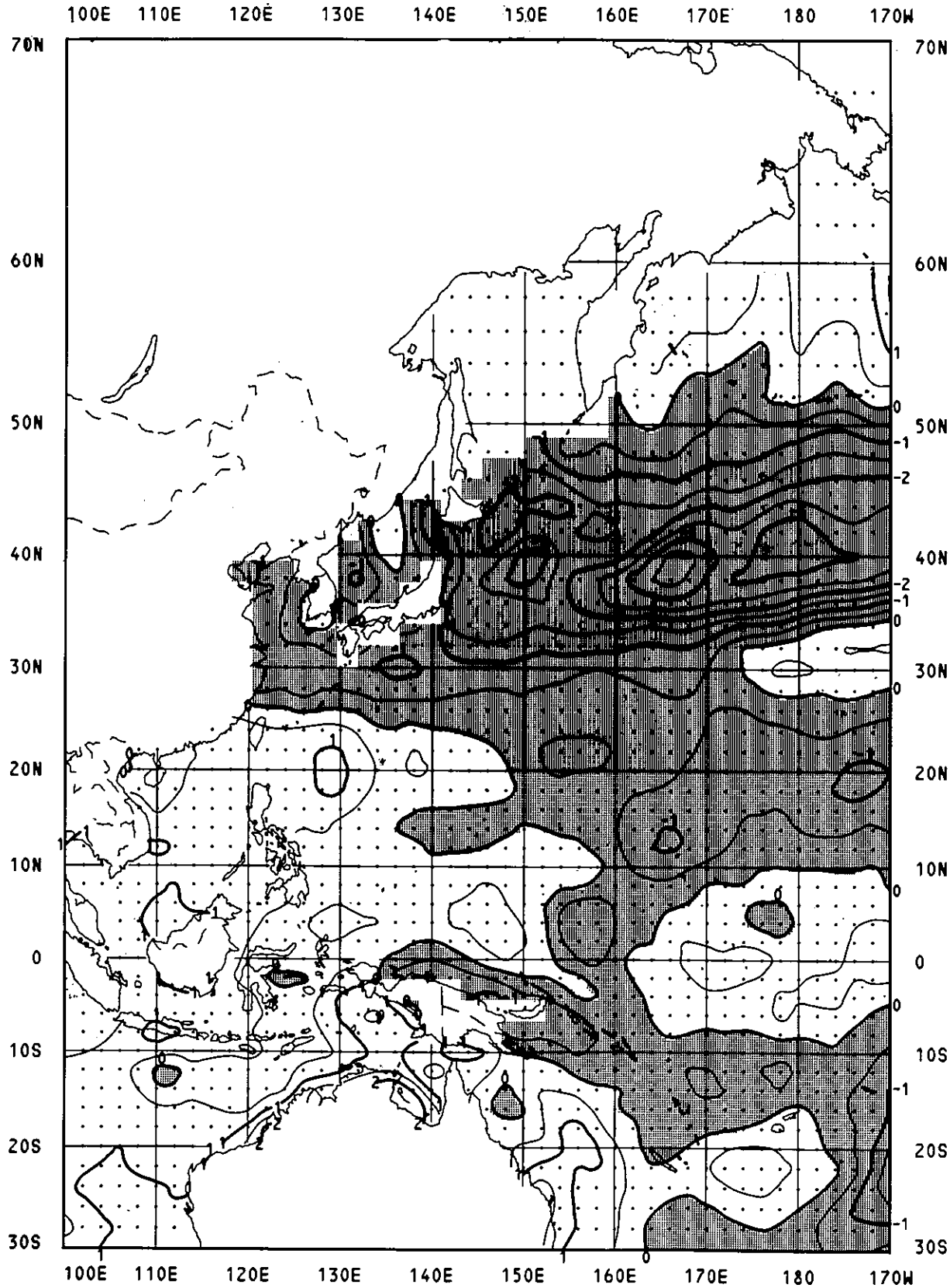
Western Pacific Ocean
SST--MONTHLY MEAN (°C)
SHIP and BUOY DATA
July 1983

Monthly mean sea surface temperature is the mean of in-situ data (ships and buoys) within two-degree quadrangles. Contour line interval is 1.0°C



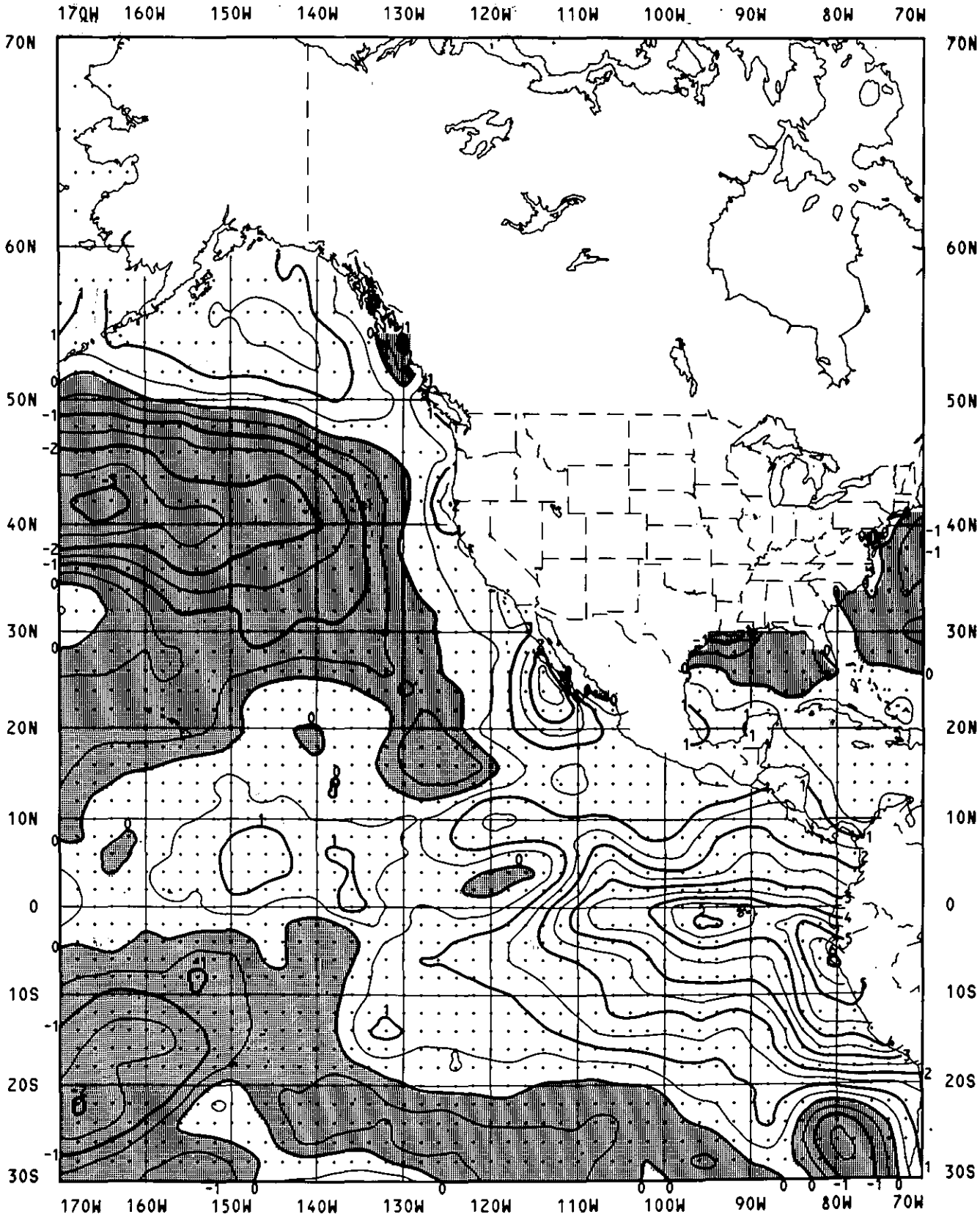
Eastern Pacific Ocean
SST--MONTHLY MEAN (°C)
SHIP and BUOY DATA
July 1983

Monthly mean sea surface temperature is the mean of in-situ data (ships and buoys) within two-degree quadrangles. Contour line interval is 1.0°C



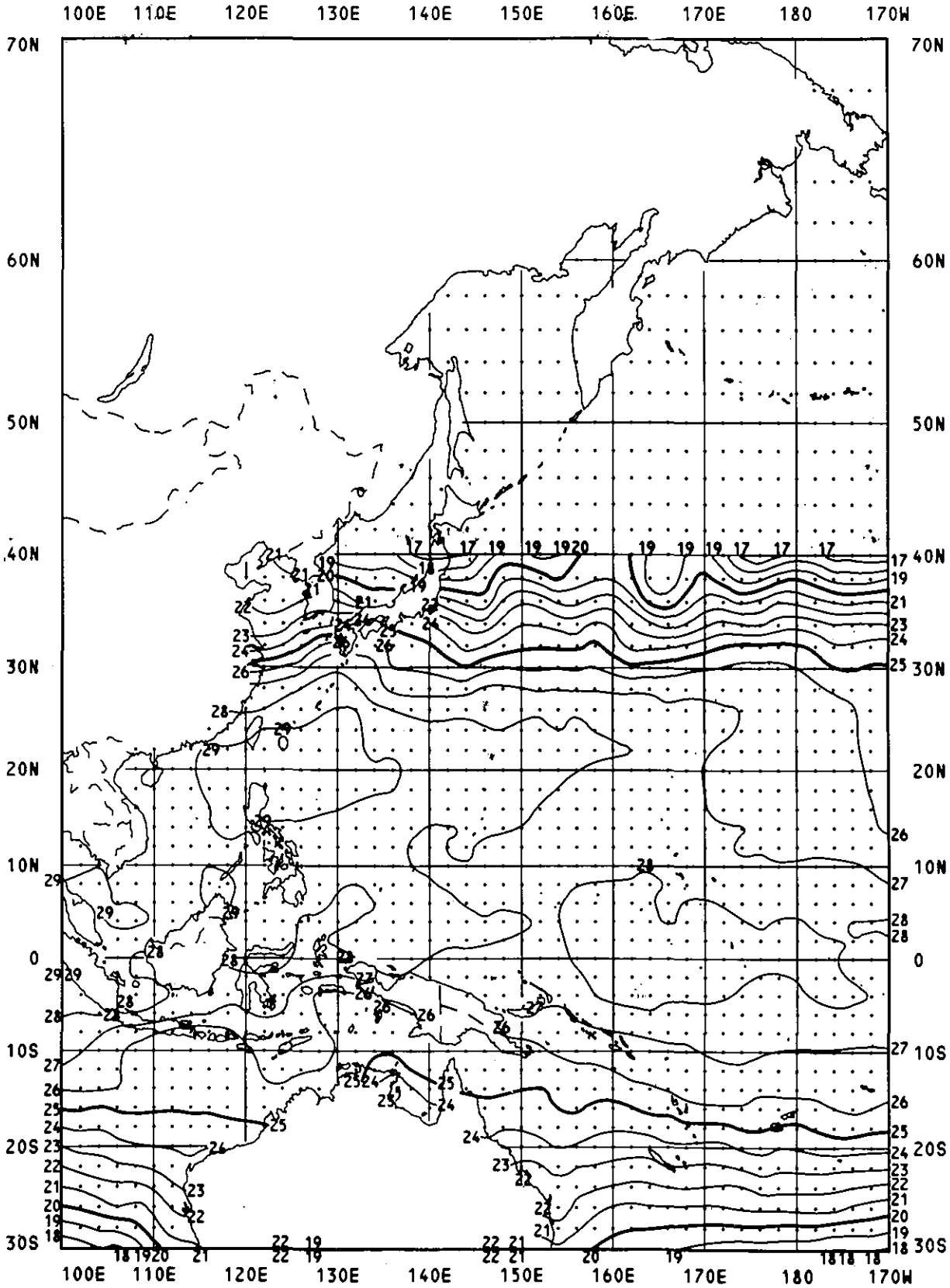
Western Pacific Ocean
SST--MONTHLY ANOMALY (°C)
SHIP and BUOY DATA
July 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.



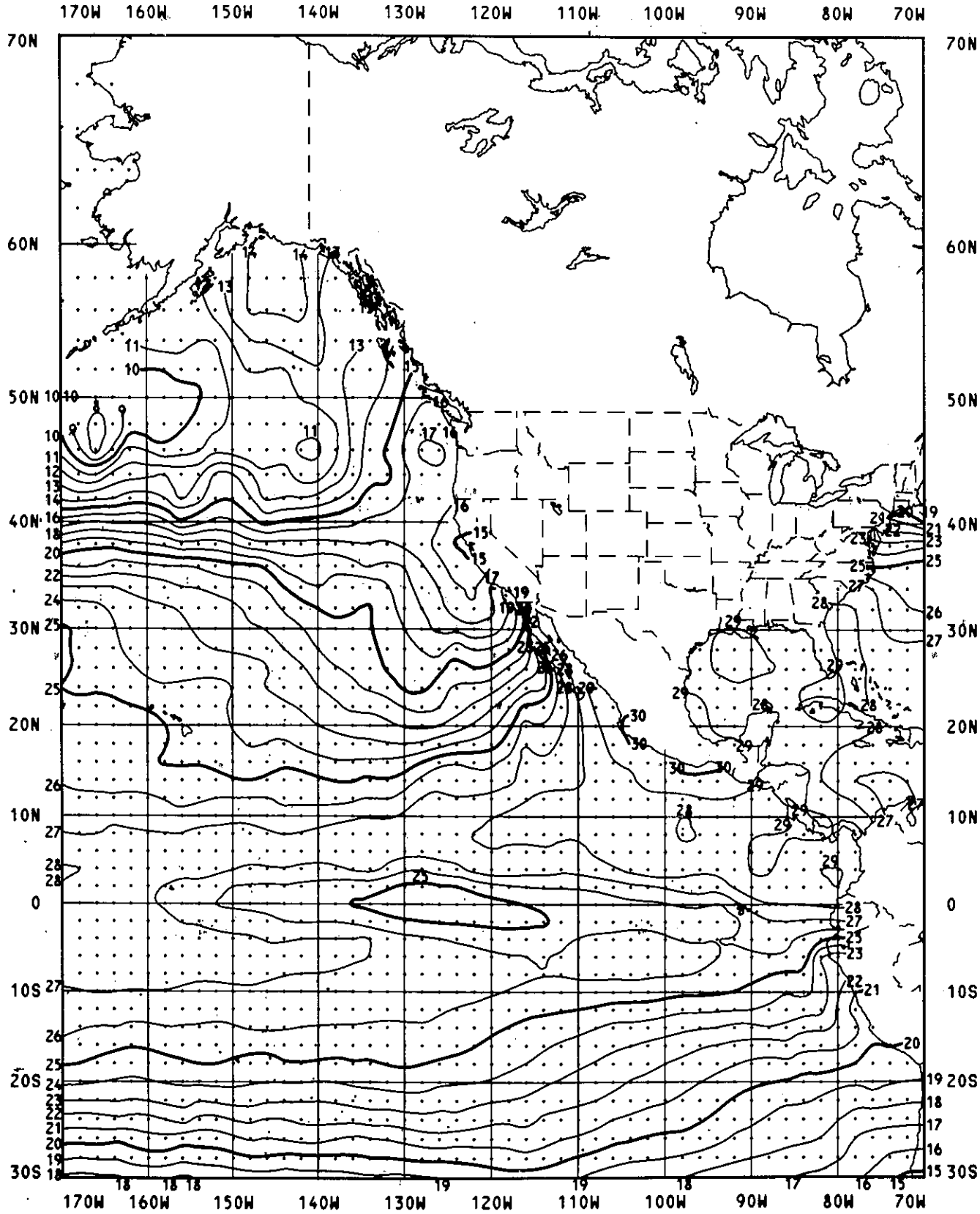
Eastern Pacific Ocean
SST--MONTHLY ANOMALY (°C)
SHIP and BUOY DATA
July 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.



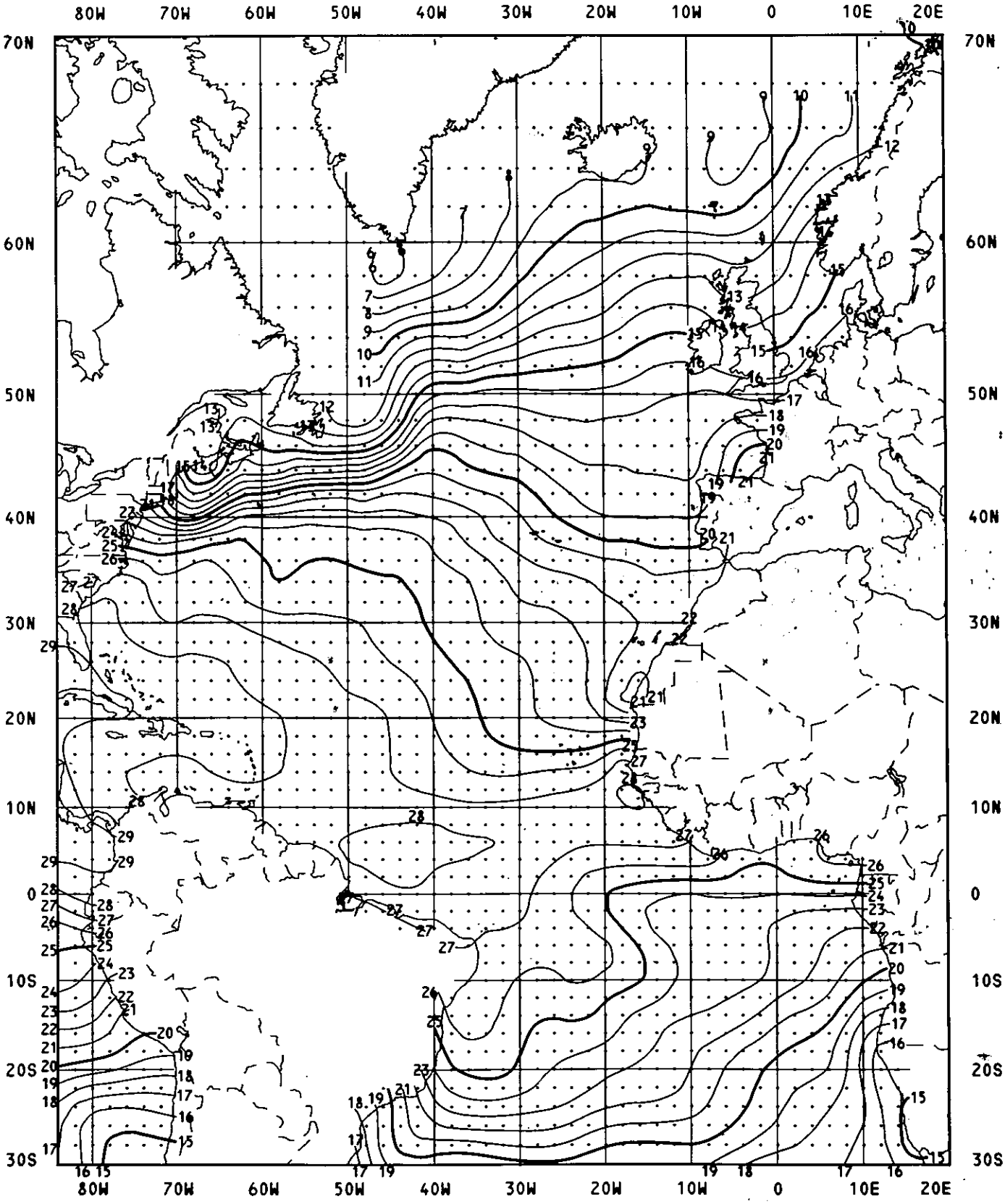
Western Pacific Ocean
SST--MONTHLY MEAN (°C)
SATELLITE DATA
July 1983

Monthly mean sea surface temperature is the mean of satellite data within two-degree quadrangles. Contour line interval is 1.0°C.



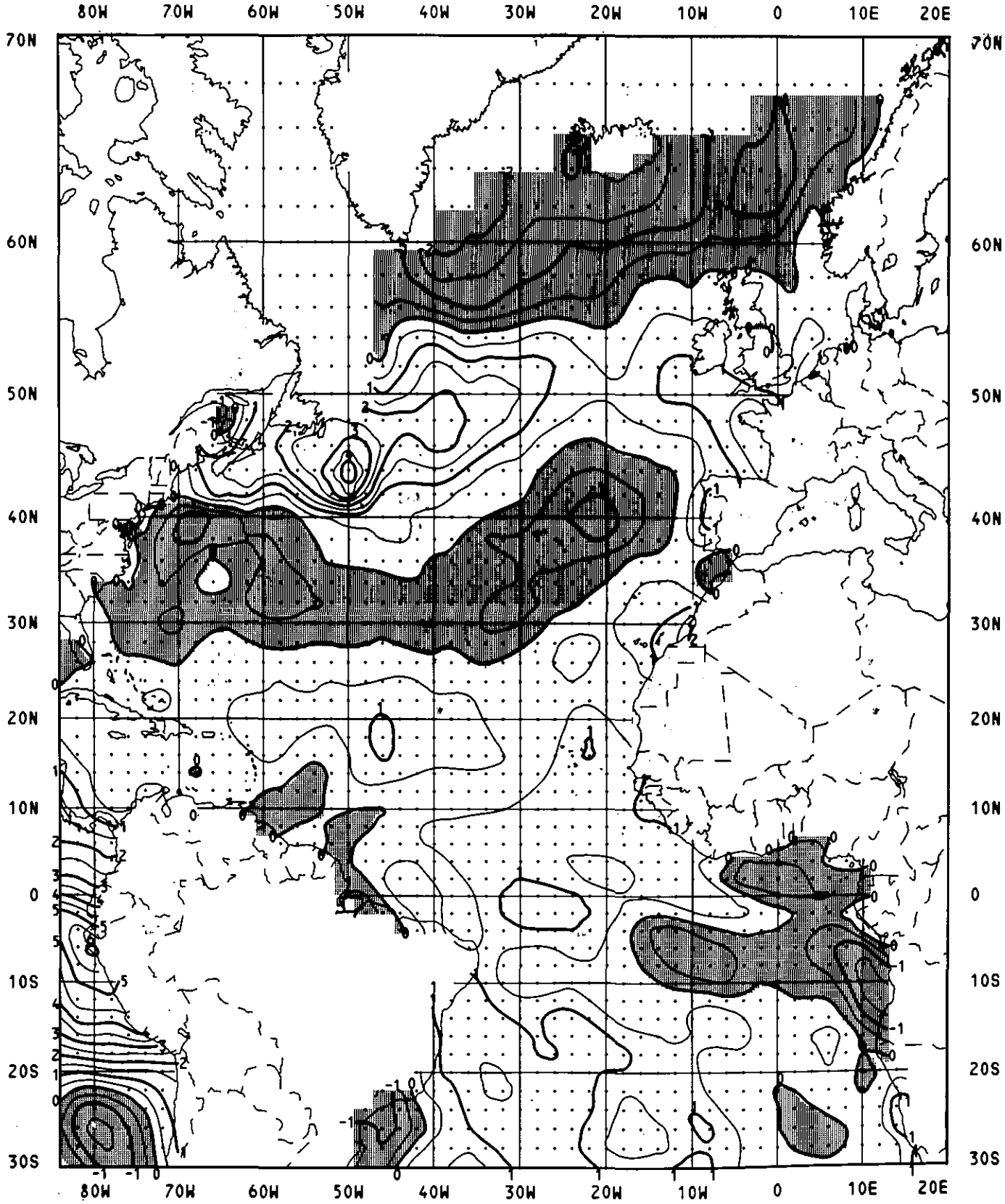
Eastern Pacific Ocean
SST--MONTHLY MEAN (°C)
SATELLITE DATA
July 1983

Monthly mean sea surface temperature is the mean of satellite data within two-degree quadrangles. Contour line interval is 1.0°C.



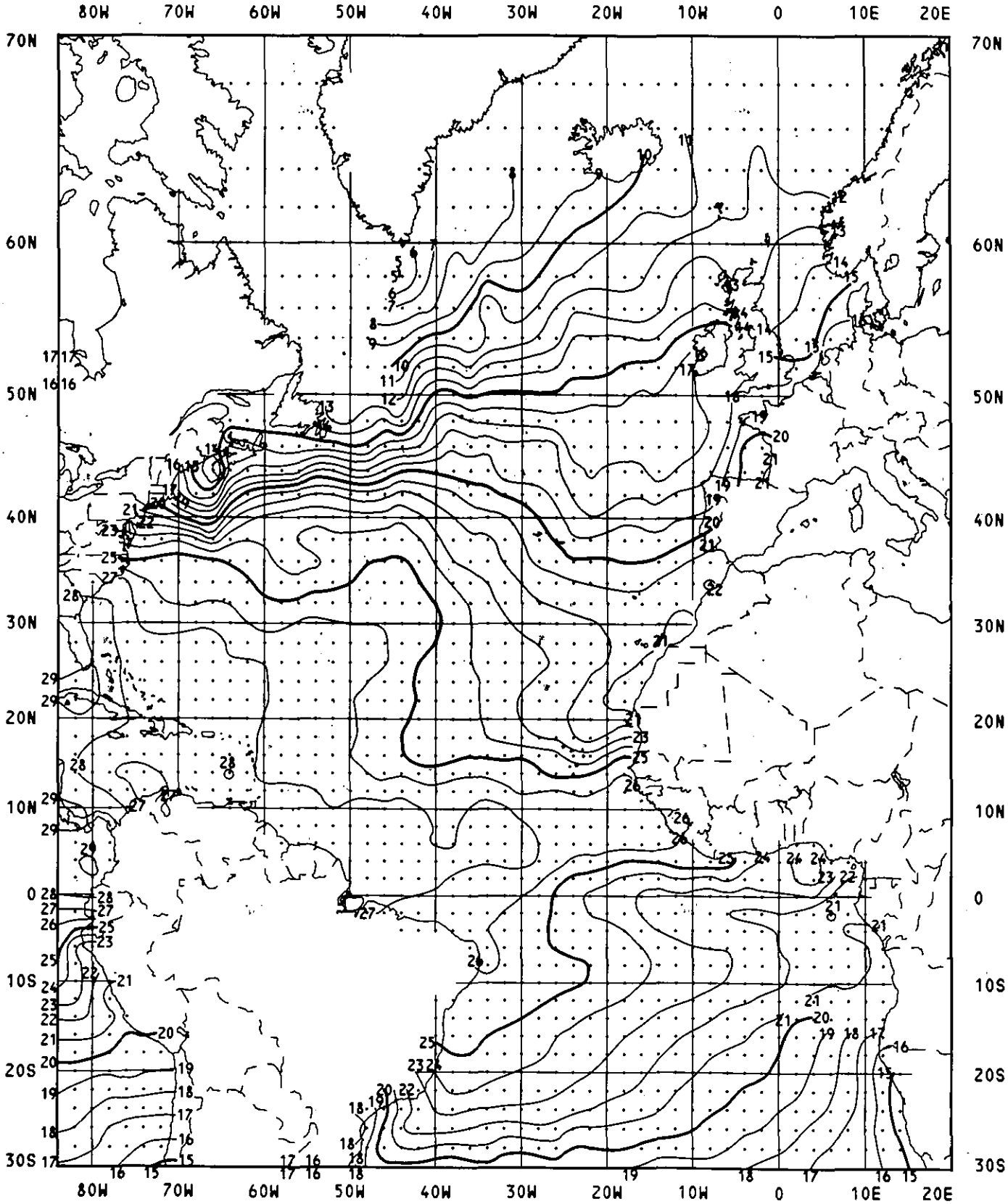
Atlantic Ocean
SST--MONTHLY MEAN (°C)
SHIP and BUOY DATA
July 1983

Monthly mean sea surface temperature is the mean of in-situ data (ships and buoys) within two-degree quadrangles. Contour line interval is 1.0°C



Atlantic Ocean
SST--MONTHLY ANOMALY (°C)
SHIP and BUOY DATA
July 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.



Atlantic Ocean
SST--MONTHLY MEAN (°C)
SATELLITE DATA
July 1983

Monthly mean sea surface temperature is the mean of satellite data within two-degree quadrangles. Contour line interval is 1.0°C.

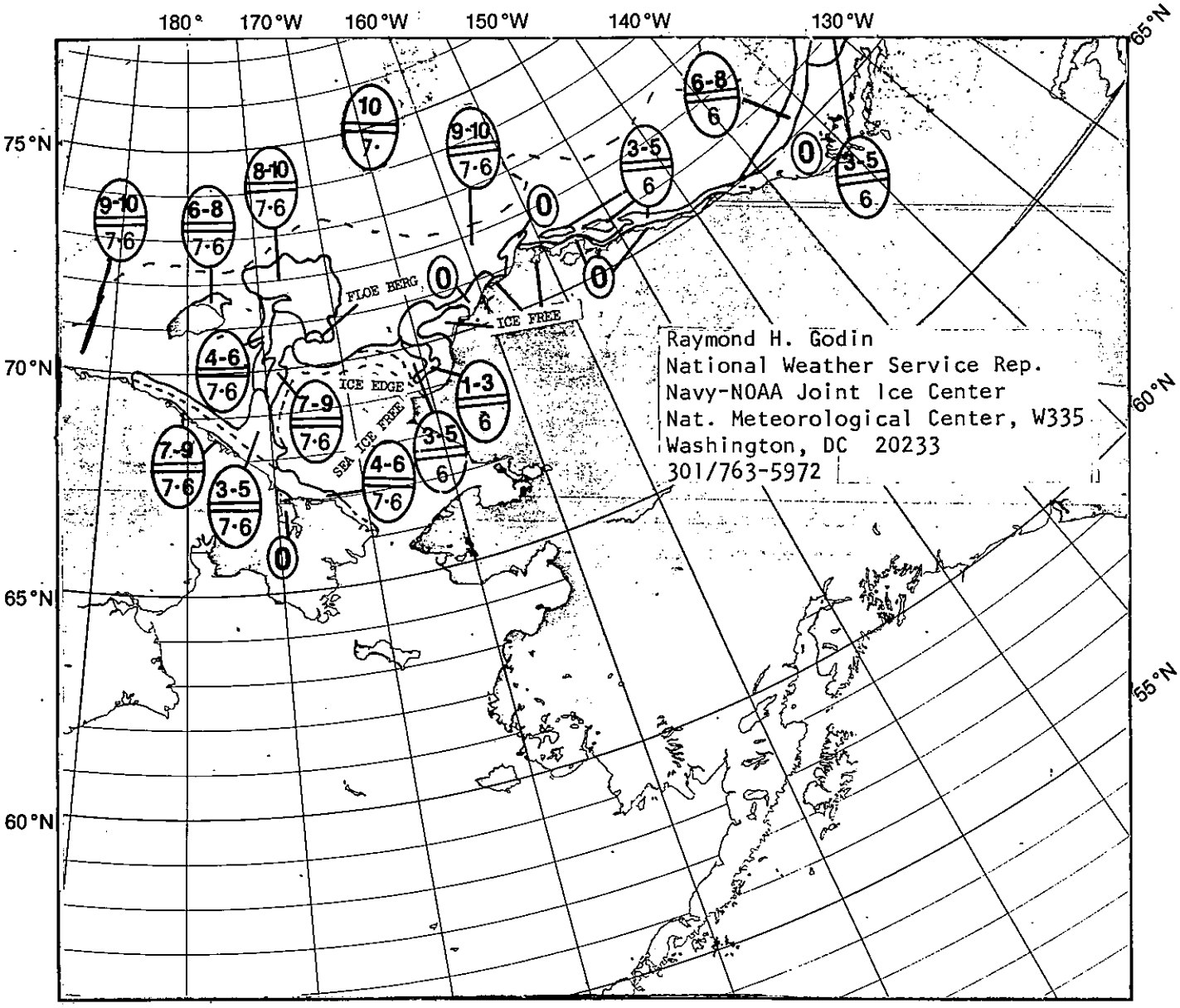
SATELLITE IMAGE OF THE MONTH

Marcia L. Weaks
Environmental Products Branch, E/SP22
NESDIS, NOAA
Washington, DC 20233
301/763-8142

Mediterranean Sea Upwelling

The central Mediterranean Sea is shown in this NOAA-7 infrared satellite image taken July 21, 1983. Darker shades indicate regions of warmer surface temperatures and lighter shades are regions of cooler temperatures. In this image, the darkest shaded areas are land. The north coast of Africa is seen along the bottom of the image; Sicily, the bottom tip of the Italian Peninsula, and the Balkan Peninsula are seen along the top. Cool patches of possibly upwelled water are seen as white shades to the west of Sicily and Crete (center of right margin). A few surface ship weather reports indicated the presence of northerly winds during this period, which are conducive to upwelling off the western coasts of the islands. However, there may be other physical and dynamical factors involved in the presence of these cool water patches.

BERING SEA / NORTH SLOPE ICE ANALYSIS



C = Total ice concentration in the area in tenths.

C_a, C_b, C_c = Concentration of thickest (C_a), 2nd thickest (C_b), and 3rd thickest (C_c) ice

S_a, S_b, S_c = Stage of development of thickest (S_a), 2nd thickest (S_b), and 3rd thickest (S_c) ice.

~C = Concentration of ice within area(s) of strips and patches.

STAGE(S) OF DEVELOPMENT (THICKNESS)

1 = New ice (0-10 cm)
3 = Young ice (10-30 cm)
6 = First year (30-200 cm)
7 = First year thin (30-70 cm)
1. = First year medium (70-120 cm)
4. = First year thick (120-200 cm)
7. = Old ice (survived at least one summer's melt)

EXAMPLES

125 Theoretical thickness of this season's growth (cm).

Fast ice. Sea ice which forms and remains fast along the coast.

Ice boundary visually or satellite observed.

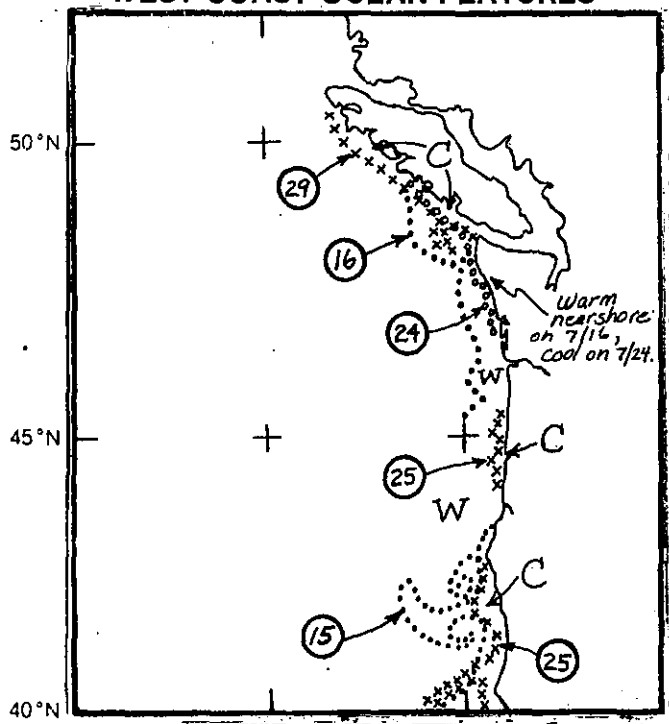
Ice boundary estimated.

JULY 1983

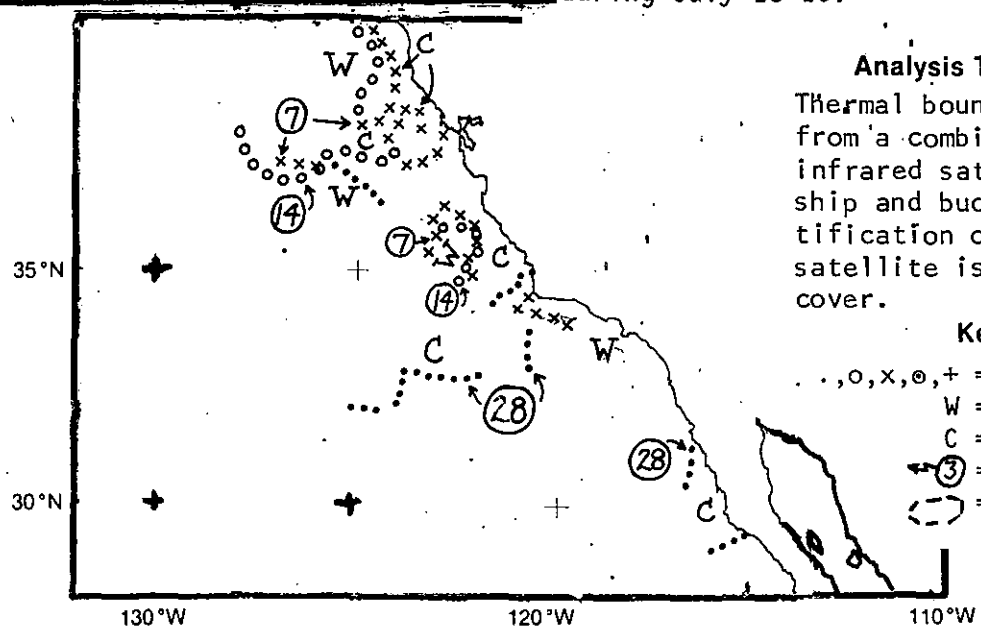
The mean monthly surface pressure circulation depicts a 1016 mb high pressure center near 74°N 150°W. Easterly geostrophic winds affect Alaskan ice covered waters. Normal mean monthly air temperatures were observed at Barrow (71°N 157°W). An above normal ice edge recession rate in the Chukchi Sea has resulted in a near normal positioning of the ice edge. An extensive open water and ice free lead extending from the southern Chukchi Sea to Point Franklin (71°N 159°W) has developed. Elsewhere, narrow shore leads occasionally blocked by ice are observed along the north coast from the Barrow vicinity to the Canadian border. The Bering Sea became ice free during the first week of July when the last remaining ice in the Gulf of Anadyr (65°N 180°) ablated.

WEST COAST OCEAN FEATURES

JULY 1983



Although SSTs are still above normal over much of the north panel area, the strength and extent of the warm anomaly is declining. Offshore buoys, which recorded a steady warming of 2°C over the month, showed monthly mean SSTs near or only slightly above normal. Coastal and nearshore stations SSTs warmed about 1.5°C, and averaged about 1°C above normal. The largest warm anomalies, in the range of 1-2°C, were found along the southern Washington and northern Oregon coasts. Upwelling was below normal for the entire coast, due to a weakness or absence of normal northwesterly wind. One short-lived upwelling event was observed on the Washington coast on July 22-25, and resulted in significant temporary drops in SST, ranging from 2.5-4.0°C. Otherwise, upwelling was largely confined to the southern Oregon-northern California coasts. The most significant upwelling event on that part of the coast occurred during July 13-16.



Analysis Techniques

Thermal boundaries are determined from a combination of enhanced infrared satellite imagery and ship and buoy observations. Identification of these features by satellite is limited by cloud cover.

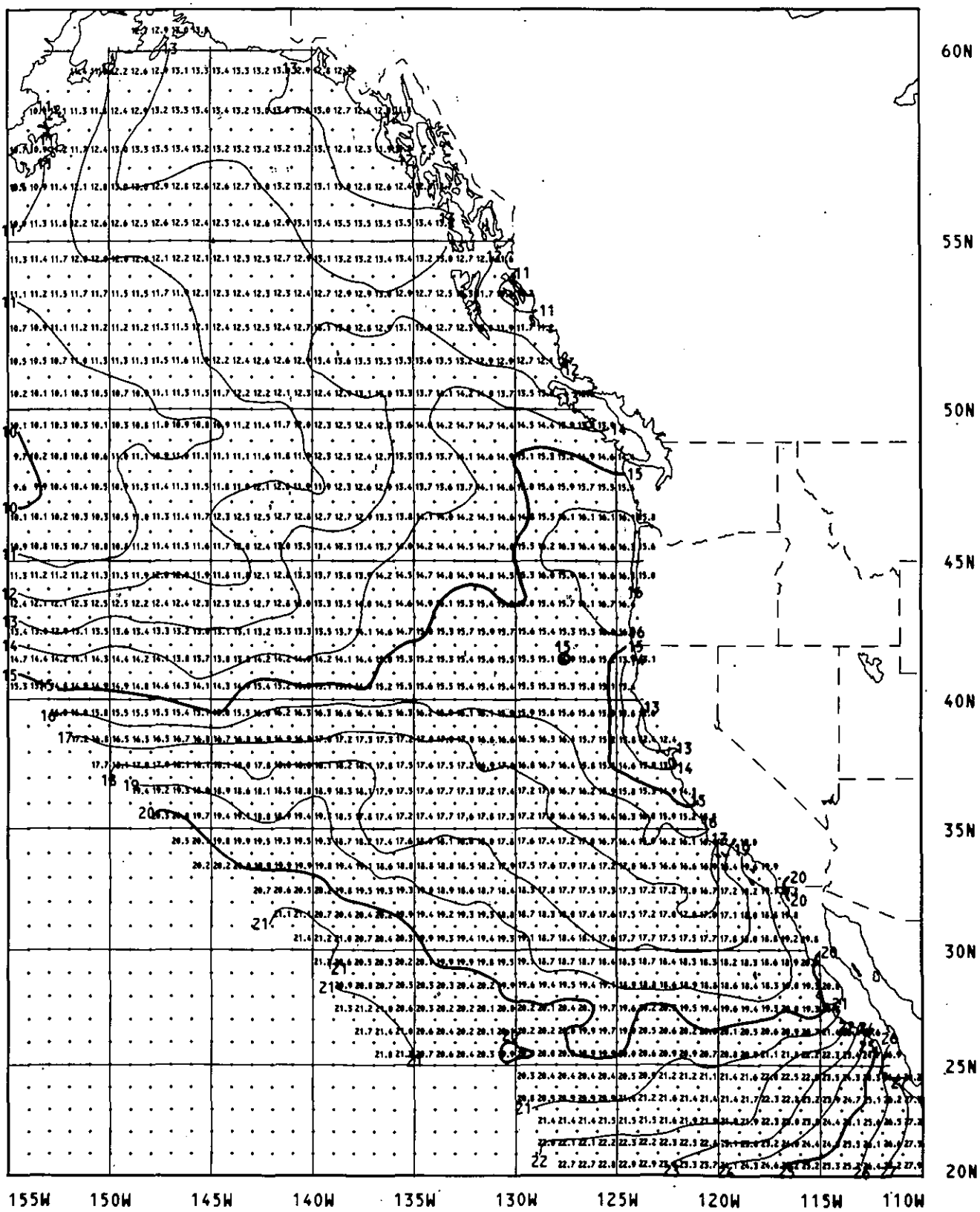
Key

. . ,o,x,⊙,+ = thermal boundaries
W = warm
C = cold
(3) = date of feature
= outline of water mass feature

July was characterized by weaker than normal coastal upwelling and a continuation of cooler than normal water west of 130°W. The upwelling was strongest July 10-15. Weak upwelling occurred most of the month between 34.5°N and 37°N and also along the Baja coast south of 32°N. Mean SSTs increased between 0.5-2.0°C during the month; the greatest warming was north of 35°N and west of 130°W, and the least warming was south of 30°N. This seasonal warming was not enough to dissipate the pool of colder than normal water west of 130°W and north of 30°N that has persisted for over a year. The water in this area averaged 0.5°C (along 130°W) to 1.5°C (along 136°W) below normal. Warm anomalies of 1.0-1.5°C occurred in the southern California Bight and off the coast north of 40°N.

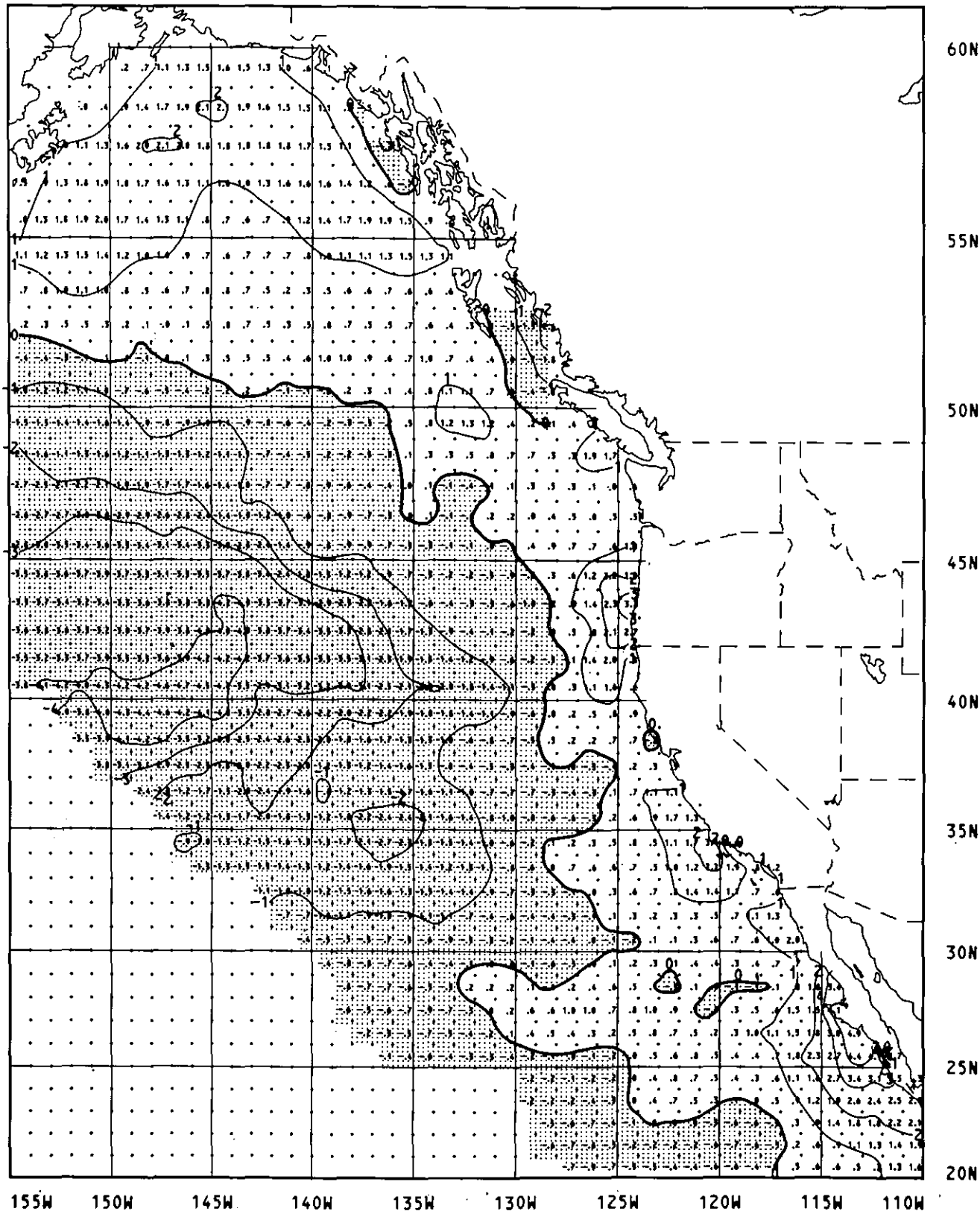
North Panel
Kent Short
Seattle Ocean Services Unit
National Weather Service/NOAA
7600 Sand Point Way NE
Bin C15700
Seattle, WA 98115
206/527-6105

South Panel
Dave Linder
Satellite Field Service Station
NESDIS/NOAA
660 Price Avenue
Redwood City, CA 94063
415/364-2422



West Coast
SST--MONTHLY MEAN (°C)
July 1983

Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.



West Coast
SST--MONTHLY ANOMALY (°C)
July 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.

The end of this month's positions of the Gulf Stream System and its associated eddies are shown for the NW Atlantic and the Gulf of Mexico. The Gulf Stream and Loop Current boundaries are located by infrared satellite imagery or XBT (expendable bathythermograph) data. Anticyclonic eddies are labeled a-z in the Gulf of Mexico and 1-99 in the NW Atlantic. Cyclonic eddies are labeled A-Z. Arrows on eddies indicate direction of circulation. Warm-core or anticyclonic eddies rotate clockwise; cold-core or cyclonic eddies rotate counterclockwise. The line to the eddy center shows the net translation since last month or since last observed. Eddies or sections of the Gulf

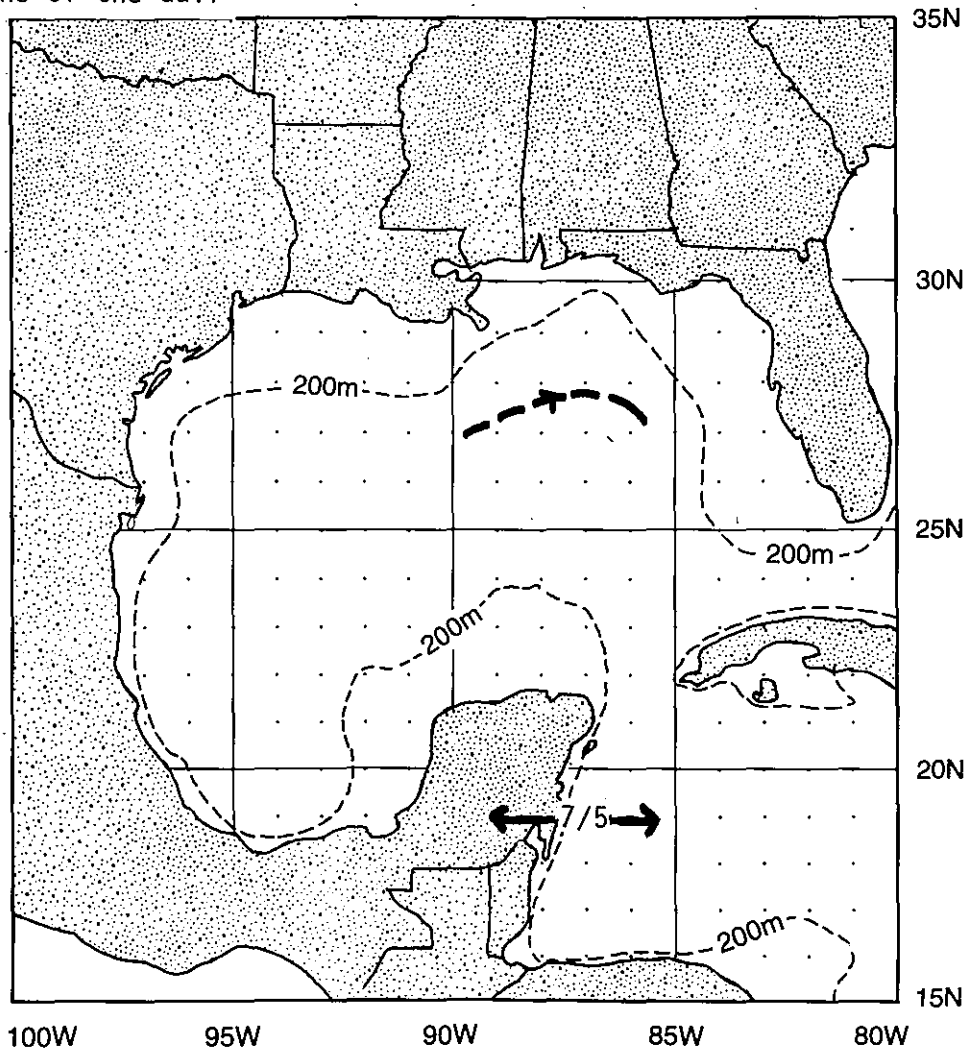
EAST COAST OCEAN FEATURES

Stream System which were not observed during the month are not shown on the analysis chart. The long arrows at the bottom of the chart indicate the date of data used.

Data used in this analysis include:
- NOAA satellite infrared imagery, NESDIS
- Bathythermograph data, National Meteorological Center of National Weather Service
- Oceanographic Analysis, A daily detailed analysis issued by National Weather Service/NESDIS

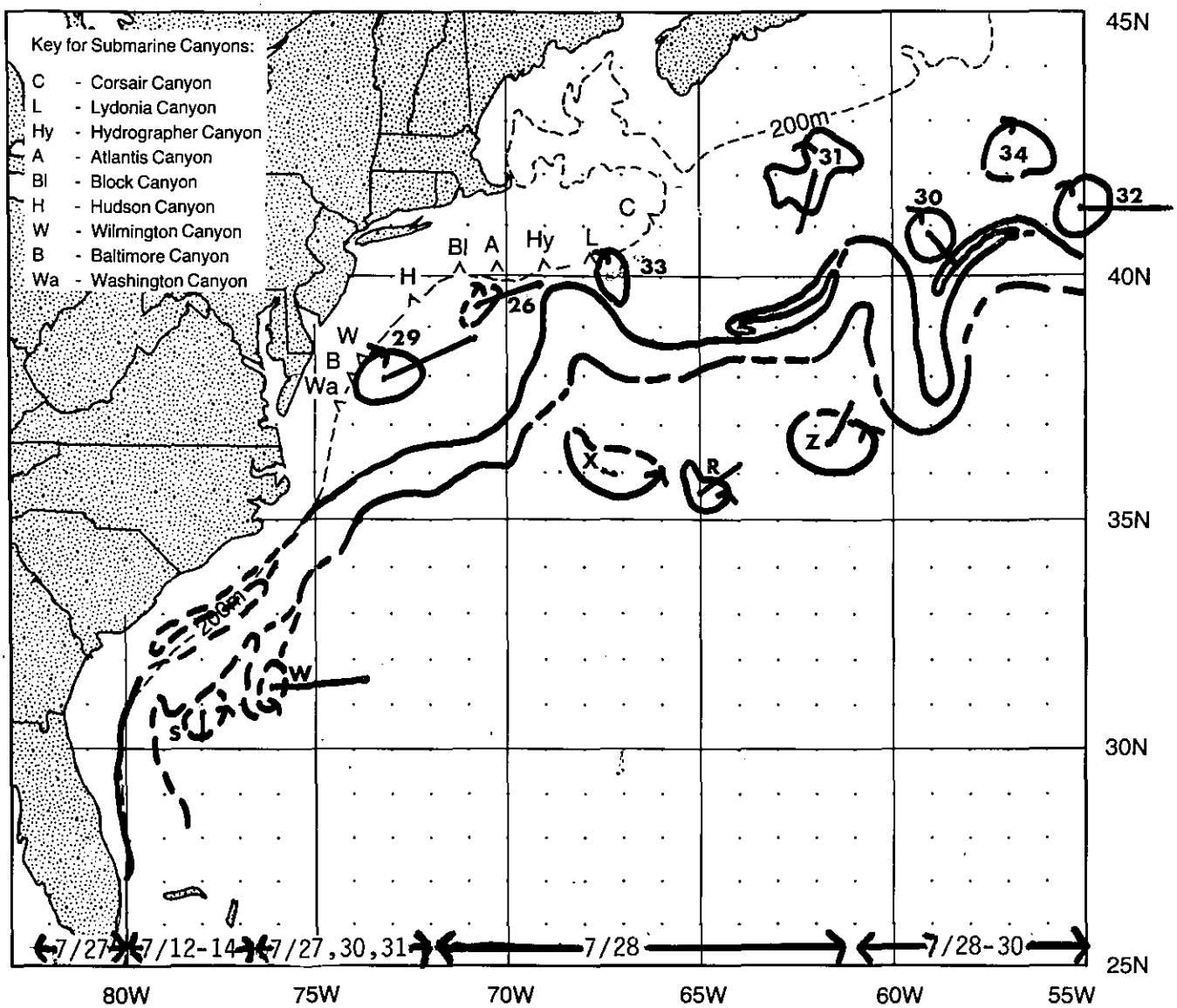
Jenifer Wartha Clark
Synoptic Anal. Br., S/DS23
NESDIS/NOAA
Washington, DC 20233
301/763-8446

Ann Bell
Nat. Met. Center, W/NMC21
Nat. Weather Service, NOAA
Washington, DC 20233
301/763-8133



JULY 1983

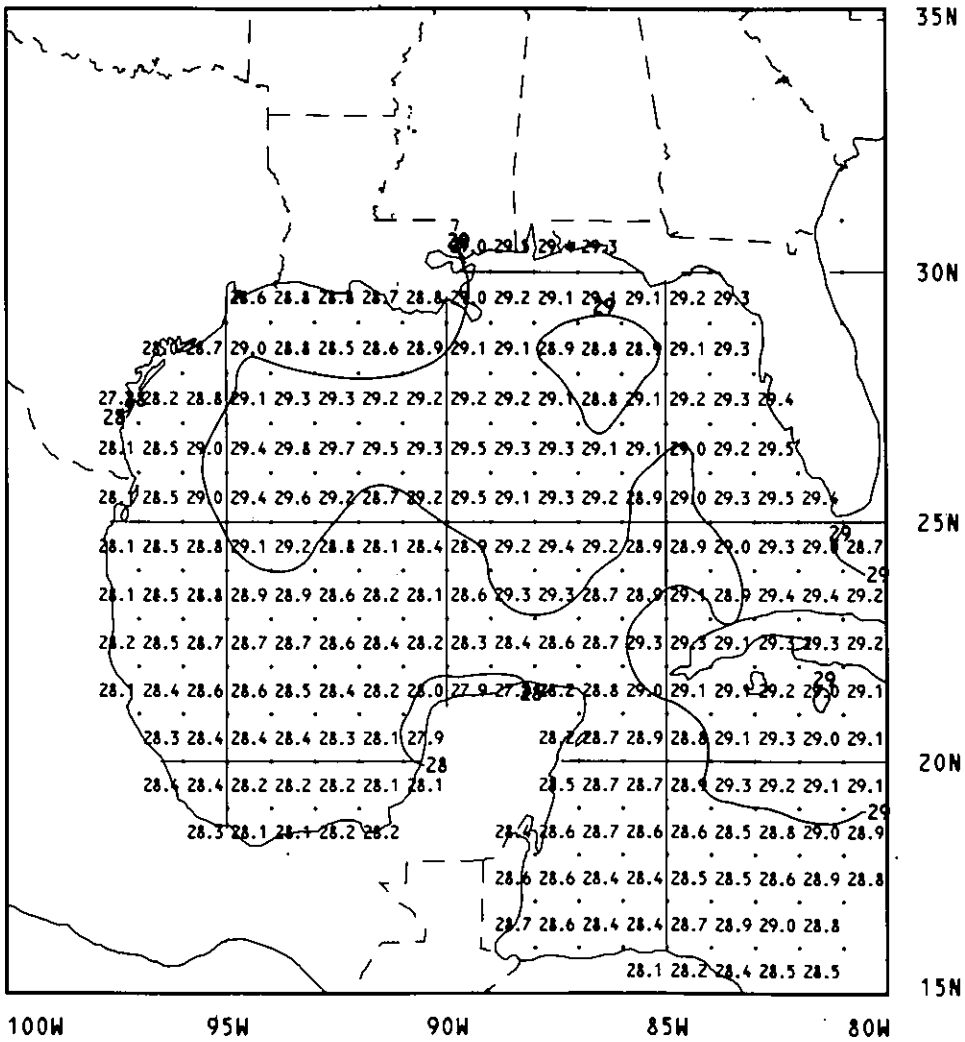
Near isothermal SST conditions have prevailed since early July in the Gulf of Mexico. The Loop Current was last partially discerned on July 5 by the Miami Satellite Field Service Station using geostationary satellite data. The drifting data buoy deployed by the NOAA Data Buoy Center indicates that eddy f no longer exists. Eddy f apparently moved 255 km E from July 1-25 before dissipating.



A significant feature in the end-of-July Gulf Stream is the large amplitude trough near 38°N 59°W. During July, one anticyclonic eddy was formed and two anticyclonic eddies were newly observed. Anticyclonic eddy 32 was formed from a Stream meander near 41°N 53°W on June 18. Eddy 32 moved 45 km N in June and 200 km W in July. Eddy 33 was first observed on July 11 near 41°N 65°W; its origin is unknown. Eddy 33 has moved 225 km SW. Eddy 34, whose origin is also unknown, was first observed on July 28. Eddy 29 translated 225 km SW. Eddy 26 moved 140 km WSW. Eddy 30 moved 85 km NW when last observed on July 24. Eddy 31 translated 130 km NNE.

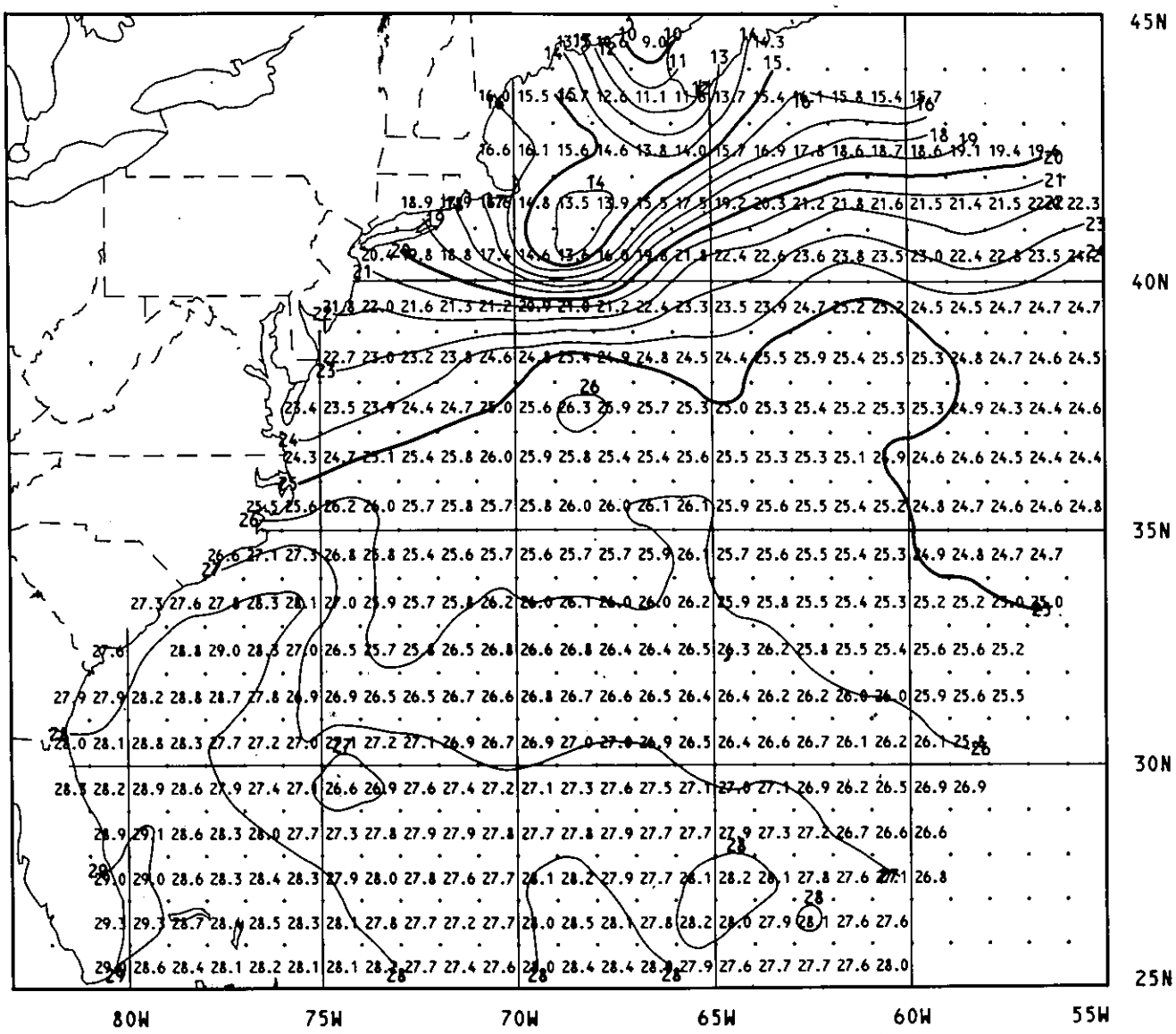
One cyclonic eddy was formed during July. New eddy Z was formed from a large amplitude trough near 37°30N 61°W on July 1. Eddy Z traveled 110 km SW by July 28. Eddy S traveled 45 km N when last observed on July 12. Eddy W, previously observed on June 2, apparently translated 235 km W when it was last observed on July 14. Eddy X translated 15 km E. Eddy R moved 110 km SW.

EAST COAST SST-
MONTHLY MEAN



Gulf of Mexico
SST--MONTHLY MEAN (°C)
July 1983

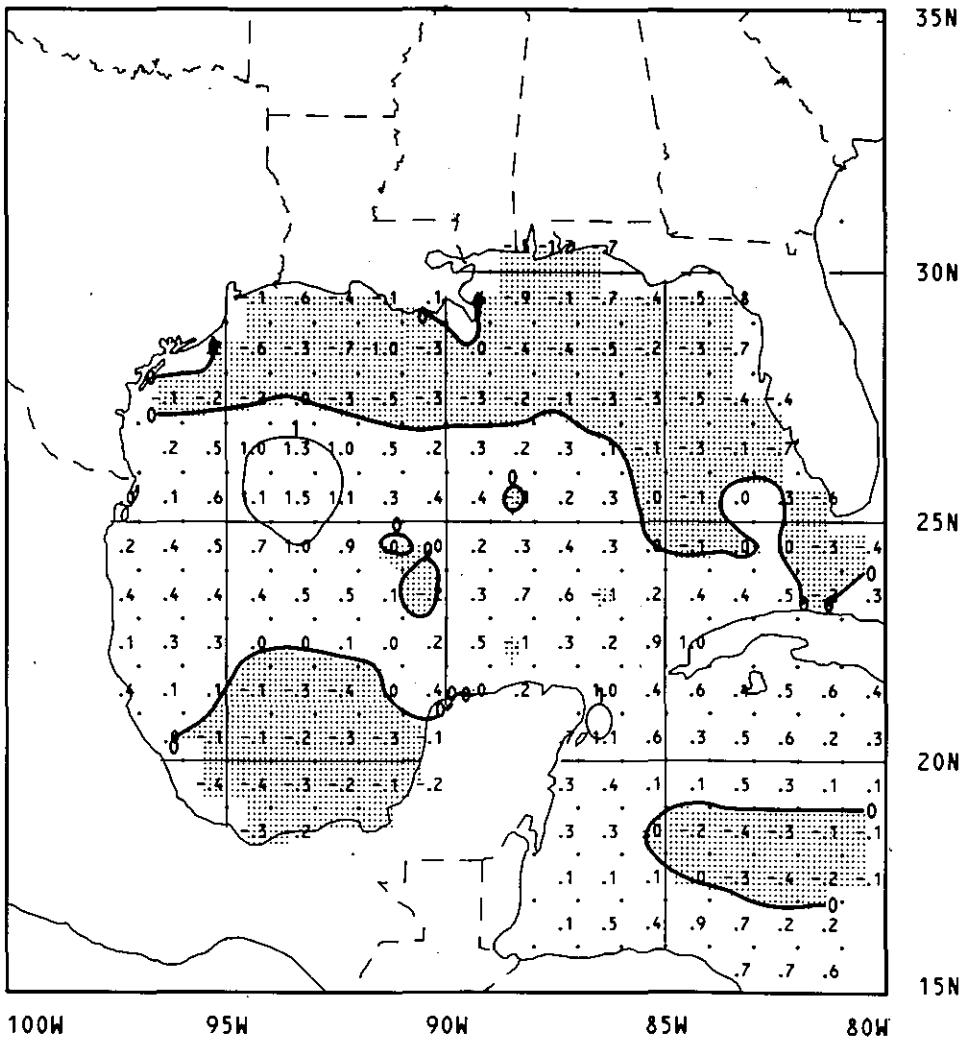
Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.



NW Atlantic Ocean
SST--MONTHLY MEAN (°C)
July 1983

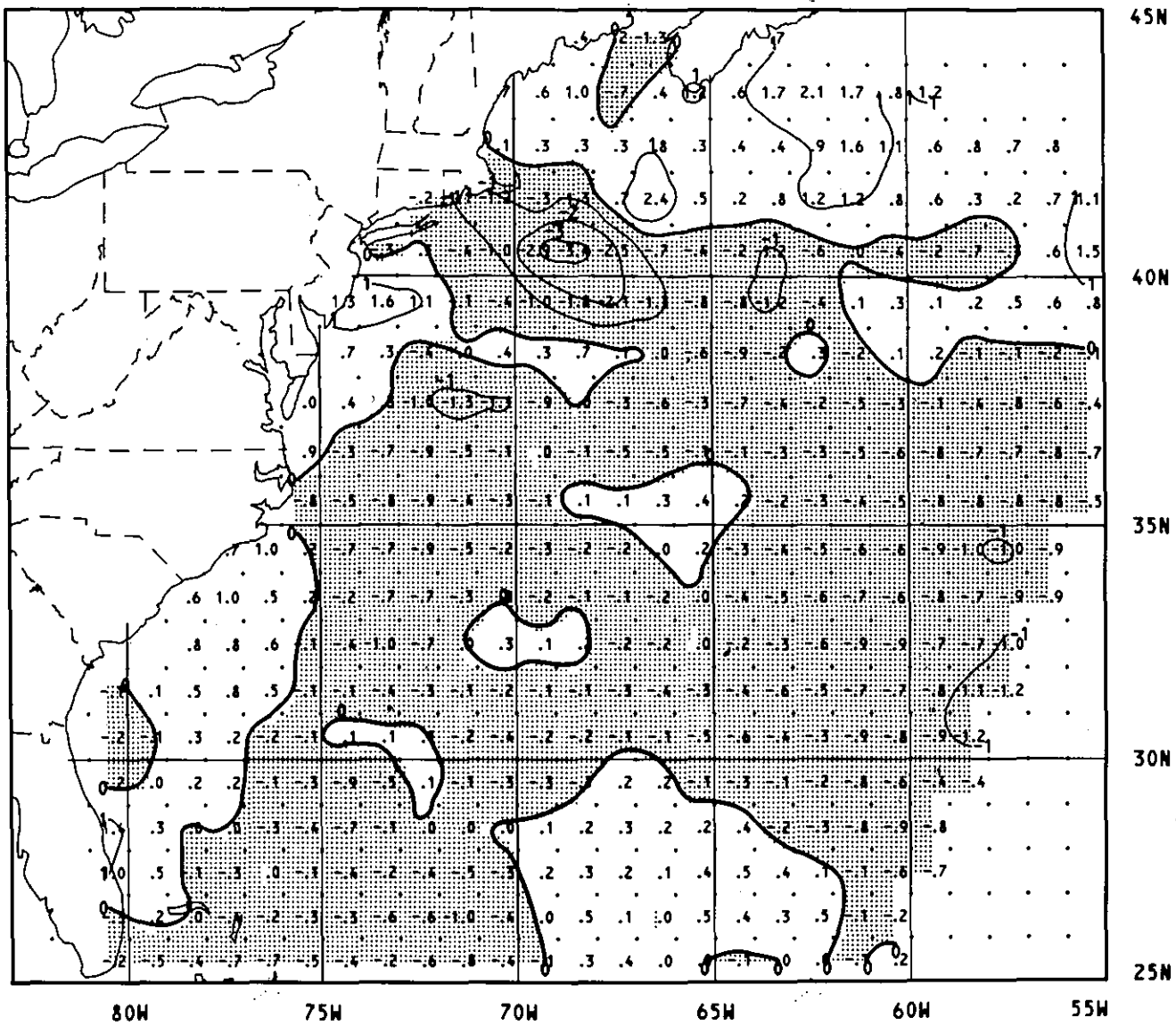
Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.

EAST COAST SST-ANOMALY



Gulf of Mexico
SST--MONTHLY ANOMALY (°C)
July 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.



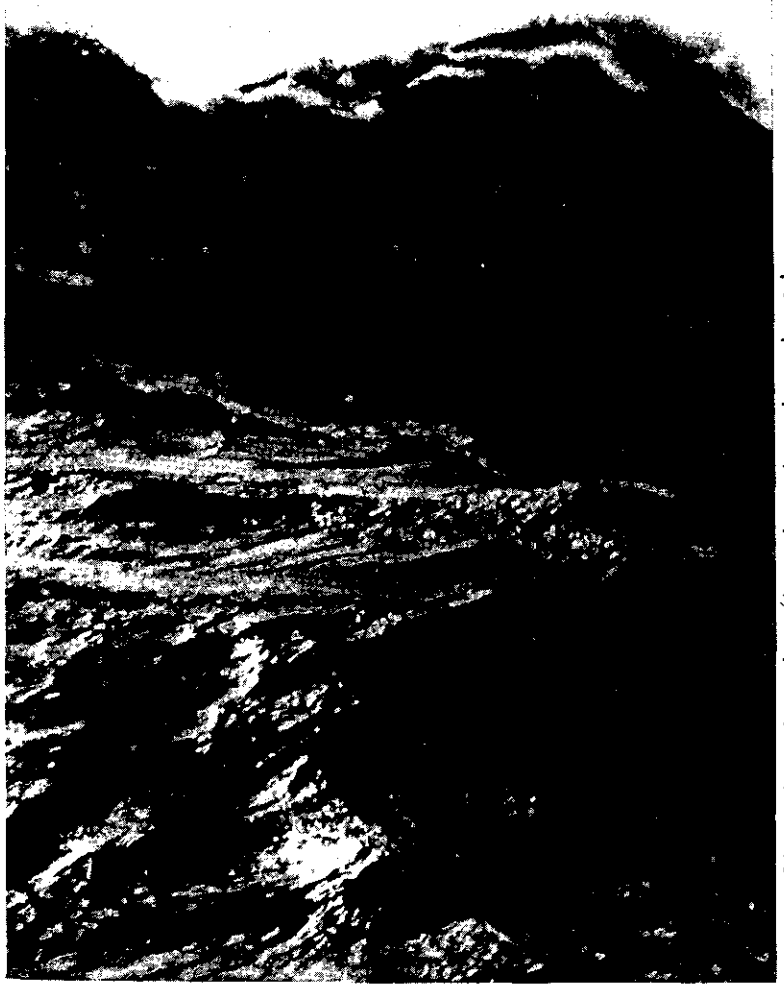
NW Atlantic Ocean
SST--MONTHLY ANOMALY (°C)
July 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.

NOAA LISD SEATTLE

OCEANOGRAPHIC Monthly Summary

Volume III Number 8 August 1983



Contents

3 OceaNotes

4 Pacific SST - monthly mean, ship and buoy data

6 Pacific SST - anomaly

8 Pacific SST - monthly mean, satellite data

10 Atlantic SST - monthly mean, ship and buoy data

11 Atlantic SST - anomaly

12 Atlantic SST - monthly mean, satellite data

13 Satellite IMAGE of the Month

14 Bering Sea/North Slope ICE, with text

15 West Coast OCEAN FEATURES, with text

16 West Coast SST - monthly mean

17 West Coast SST - anomaly

18 East Coast OCEAN FEATURES, with text

20 East Coast SST - monthly mean

22 East Coast SST - anomaly

24 Subscription Information

U.S. DEPARTMENT OF COMMERCE • National Oceanic and Atmospheric Administration
National Weather Service
National Environmental Satellite, Data, and Information Service

Oceanographic Monthly Summary is published by the National Weather Service and the National Environmental Satellite, Data, and Information Service (NESDIS). *Oceanographic Monthly Summary* contains sea surface temperature (SST) analyses on both regional and ocean basin scales for the Atlantic and Pacific Oceans. Two ocean basin SST analyses are presented, one based on in-situ data and another based solely on satellite data. An ocean basin SST anomaly derived from the in-situ data is also shown; it uses the National Climatic Center (NCC) Climatology*. The regional SST analyses are based upon a combination of in-situ and satellite data measurements. The regional SST anomalies use the Robinson-Bauer Climatology*. *Oceanographic Monthly Summary* also contains Alaskan sea ice information and ocean feature information for contiguous U.S. ocean regions.

Oceanographic Monthly Summary welcomes articles containing information of interest to *Oceanographic Monthly Summary* readers, such as, news on operational oceanography, unusual ocean feature phenomena, etc. Contributions should be sent to the editor (address below). Accepted material will appear in the OceaNotes section of *Oceanographic Monthly Summary*. Contributions can be published as quickly as the next monthly issue.

If you are interested in receiving *Oceanographic Monthly Summary* regularly, please refer to the back cover for subscription information.

*Reynolds, R.W., 1982. A Monthly Averaged Climatology of Sea Surface Temperatures; *NOAA Technical Report NWS 31.*

*Robinson, M.K., 1976. Atlas of North Pacific Ocean Monthly Mean Temperatures and Mean Salinities of the Surface Layer; *NavOceano Ref. Pub. 2.*

Robinson, M.K., R. A. Bauer and E.H. Schroeder, 1979. Atlas of North Atlantic-Indian Ocean Monthly Mean Temperatures and Mean Salinities of the Surface Layer; *NavOceano Ref. Pub. 18.*

Oceanographic Monthly Summary

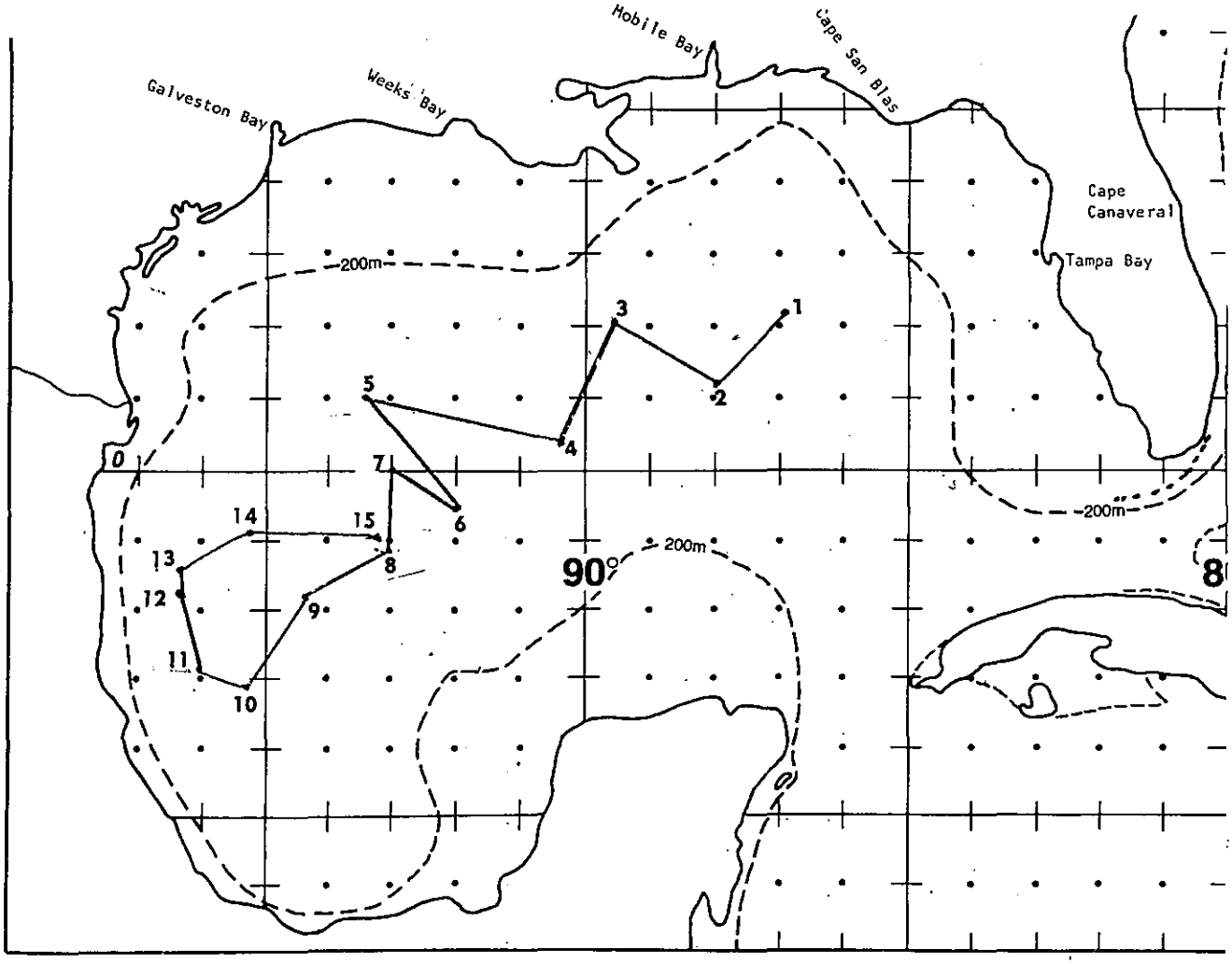
Editor: Jenifer Wartha-Clark
NOAA, NESDIS
Satellite Field Service Station
Washington, DC 20233
(Telephone: (301) 763-8444)

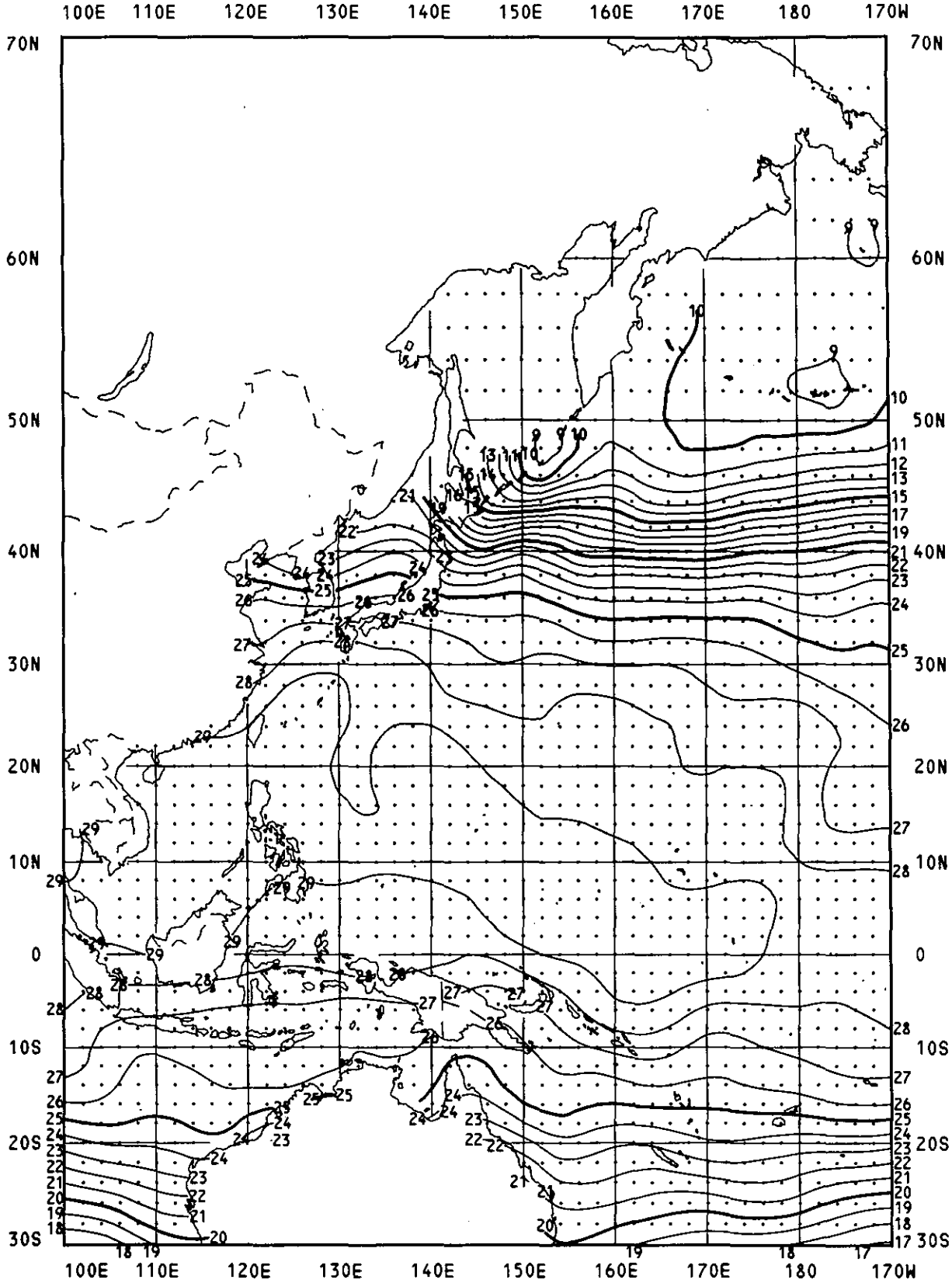
Assistant Editor: Ann Bell
NOAA, NWS
National Meteorological Center, W/NMC21
Washington, DC 20233
(Telephone: (301) 763-8056)

SST Computer Analyses are prepared by:
William H. Gemmill
Marine Products Branch, W/NMC21
National Meteorological Center
National Weather Service, NOAA
Washington, DC 20233
(Telephone: (301) 763-8133)

LIFE OF ANTICYCLONIC EDDY f IN THE GULF OF MEXICO 1982-83

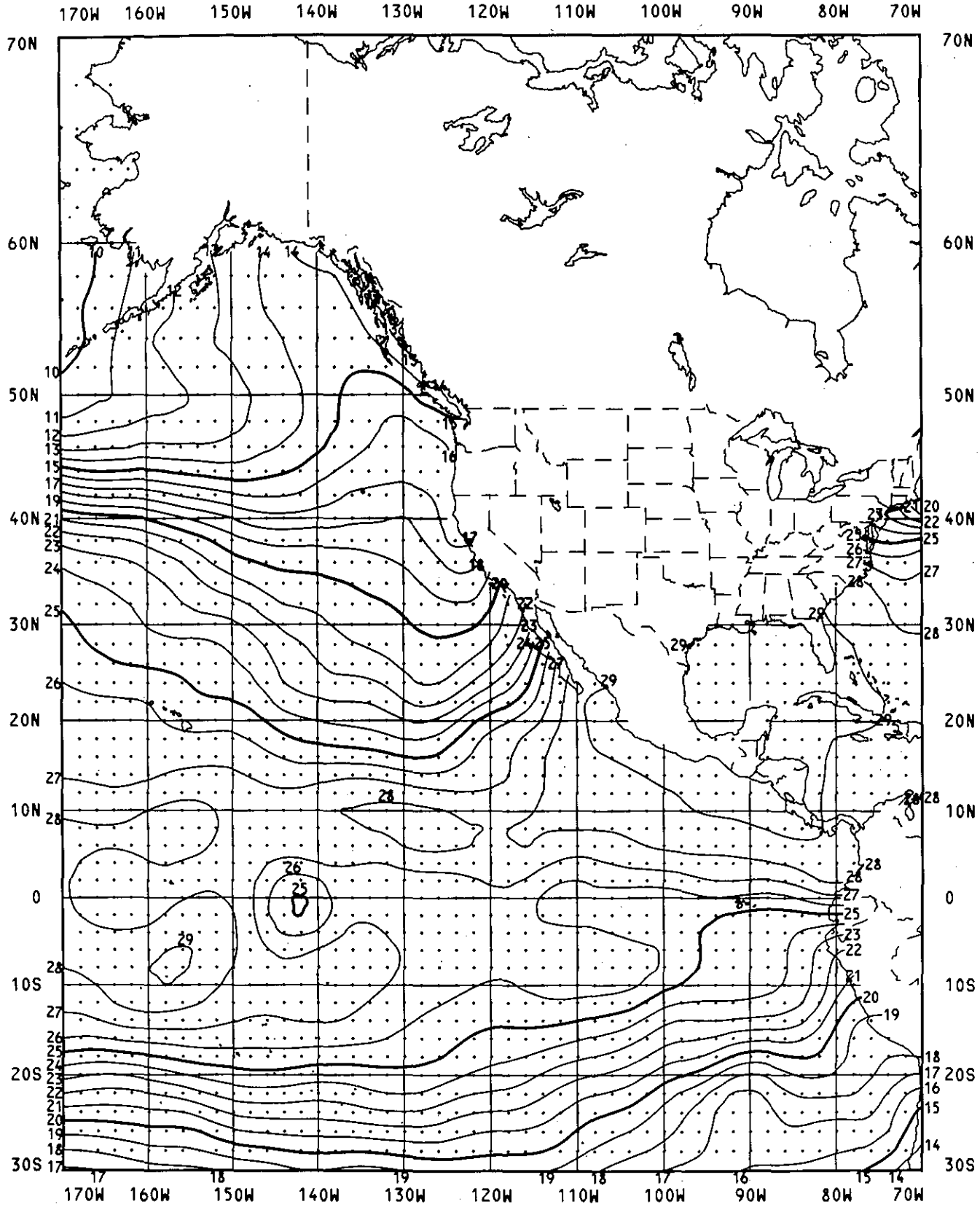
The plot below shows the track of anticyclonic eddy f in the Gulf of Mexico, from its formation in May 1982 until its dissipation in July 1983. Satellite imagery, XBT and AXBT surveys, and a drifting data buoy were used to track eddy f. Generally, eddy f moved SW during the period. First eddy f formed from a meander in the Loop Current around the end-of-May 1982 (position 1). Eddy f was determined from an XBT survey in June 1982 by the Atlantic Environmental Group of the National Marine Fisheries Service (position 2). The eddy was estimated from XBT data in August and September, 1982 (positions 3 and 4). in October 1982 eddy f was not observed; however, a warm eddy-like feature centered near 26°N 93°30W was seen in both the monthly mean SST and monthly anomaly SST charts of the Gulf of Mexico (position 5). Positions were estimated from AXBT survey in December 1982 and January 1983 (positions 6-9). In February 1983 eddy f was estimated from a drifting data buoy provided by the NOAA Data Buoy Center (position 10). Eddy f was partially observed in March 1983 on satellite imagery (position 11). Eddy f was tracked by a drifting data buoy from April-July 1983 (postions 12-15). Finally around the end-of-July 1983 eddy f dissipated.





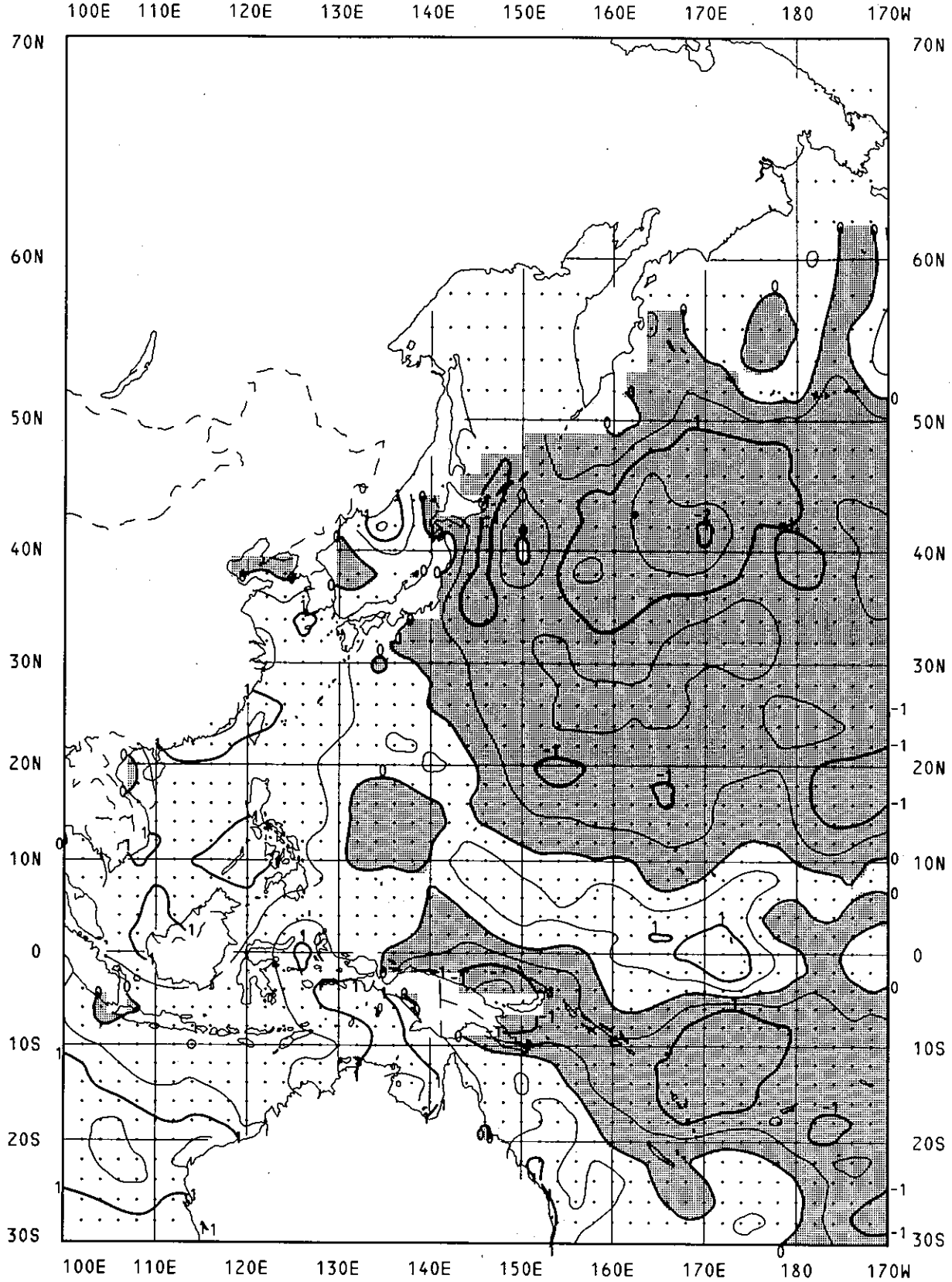
Western Pacific Ocean
SST--MONTHLY MEAN (°C)
SHIP and BUOY DATA
August 1983

Monthly mean sea surface temperature is the mean of in-situ data (ships and buoys) within two-degree quadrangles. Contour line interval is 1.0°C.



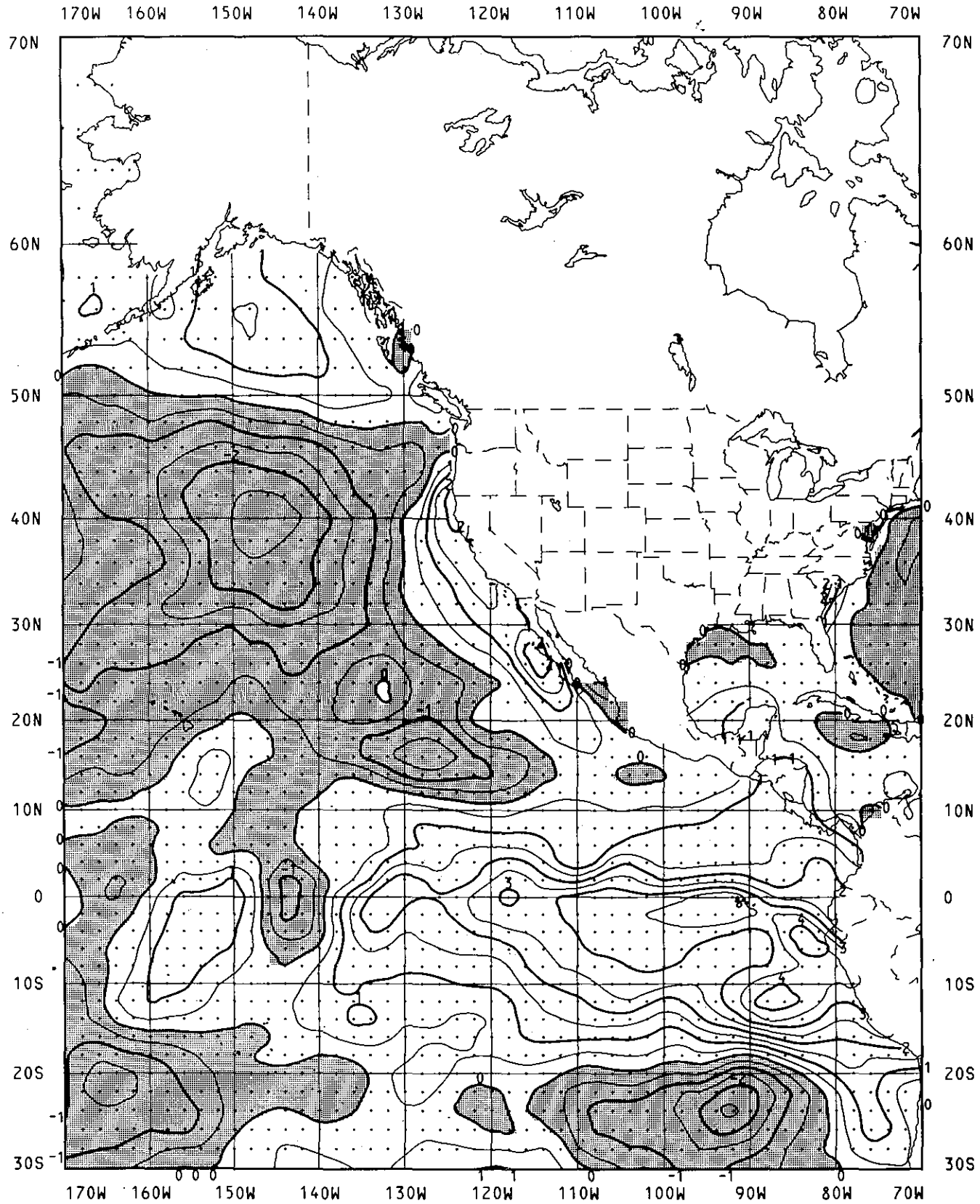
Eastern Pacific Ocean
SST--MONTHLY MEAN (°C)
SHIP and BUOY DATA
August 1983

Monthly mean sea surface temperature is the mean of in-situ data (ships and buoys) within two-degree quadrangles. Contour line interval is 1.0°C.



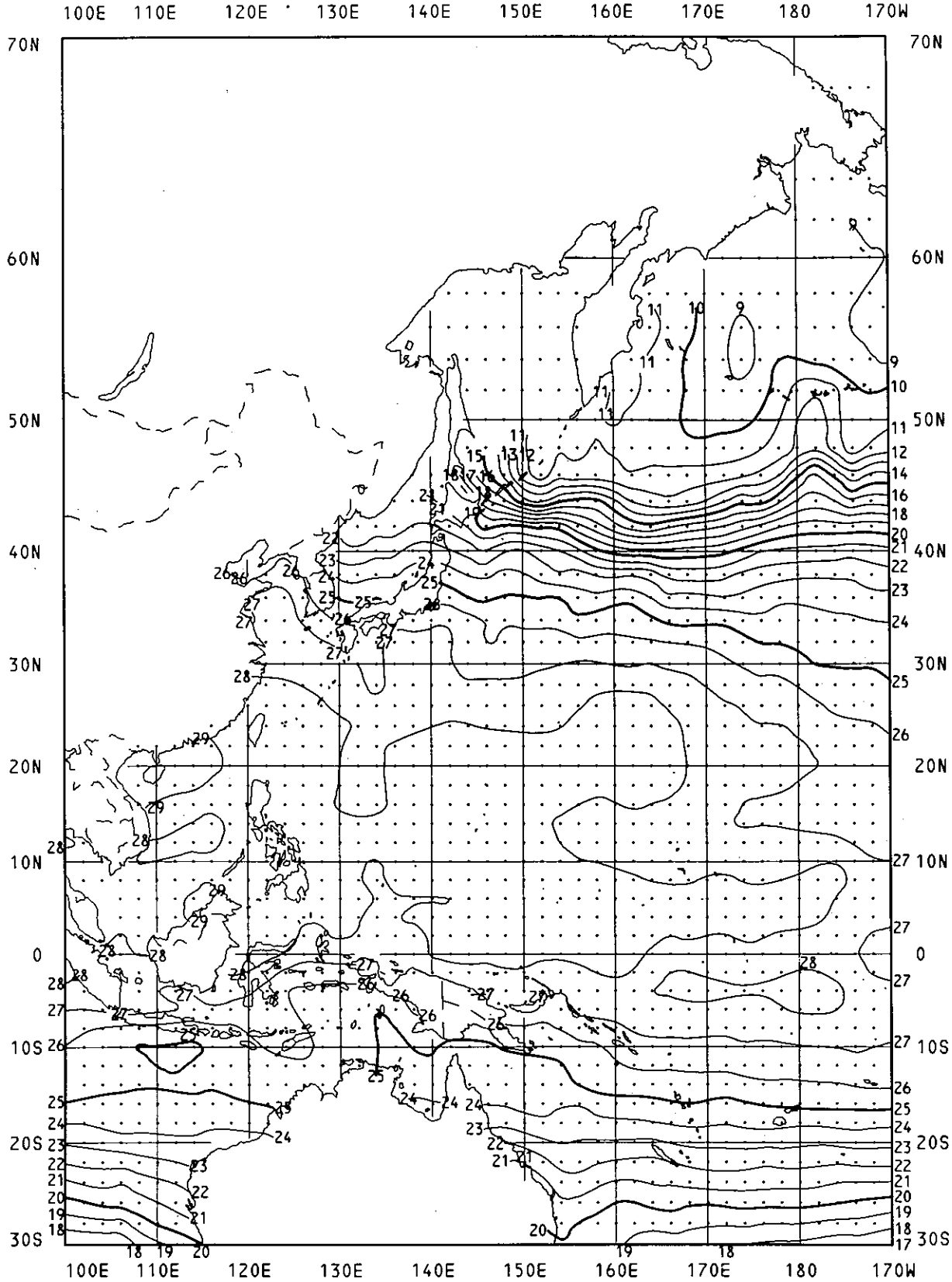
Western Pacific Ocean
SST--MONTHLY ANOMALY (°C)
SHIP and BUOY DATA
August 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.



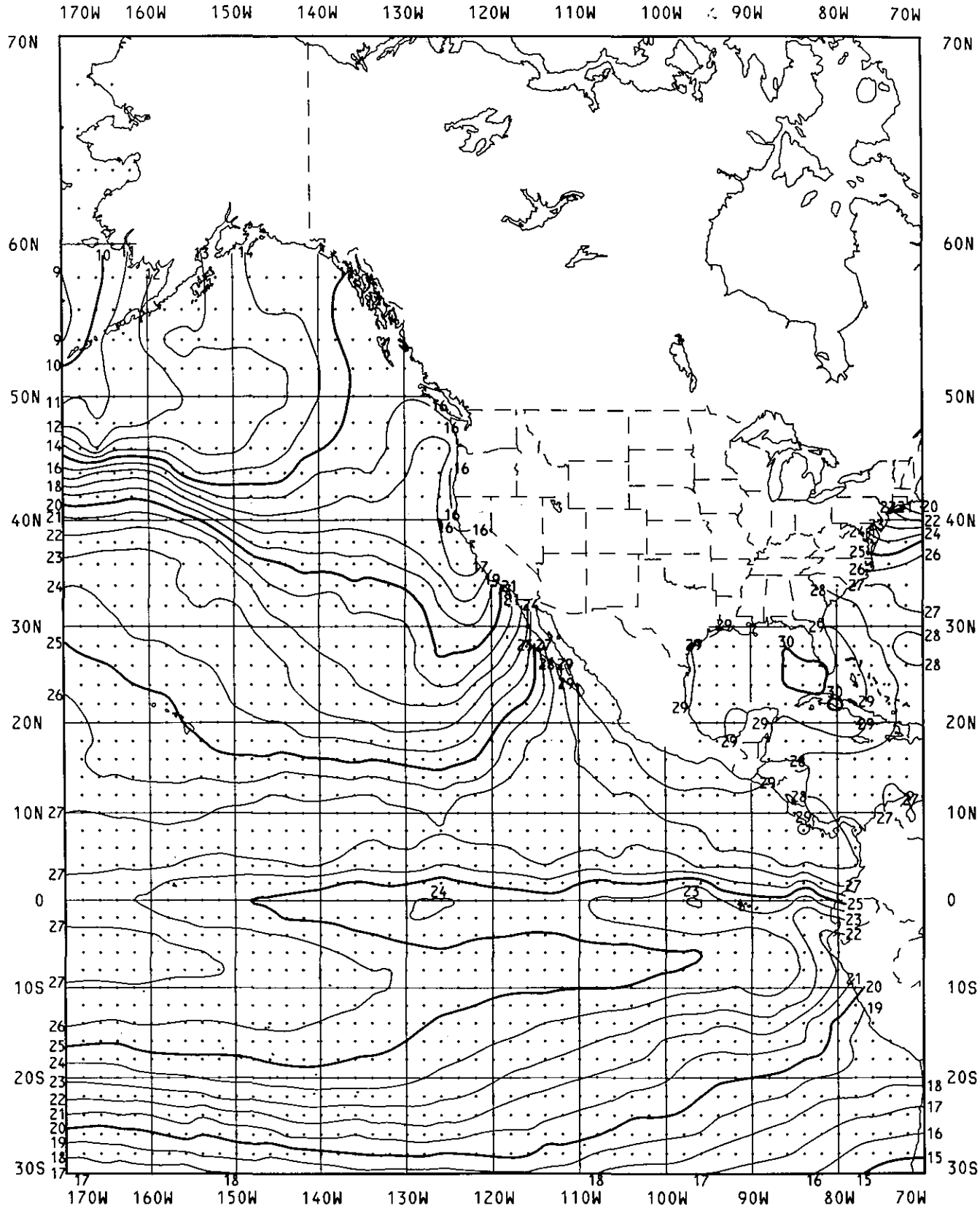
Eastern Pacific Ocean
SST--MONTHLY ANOMALY (°C)
SHIP and BUOY DATA
August 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.



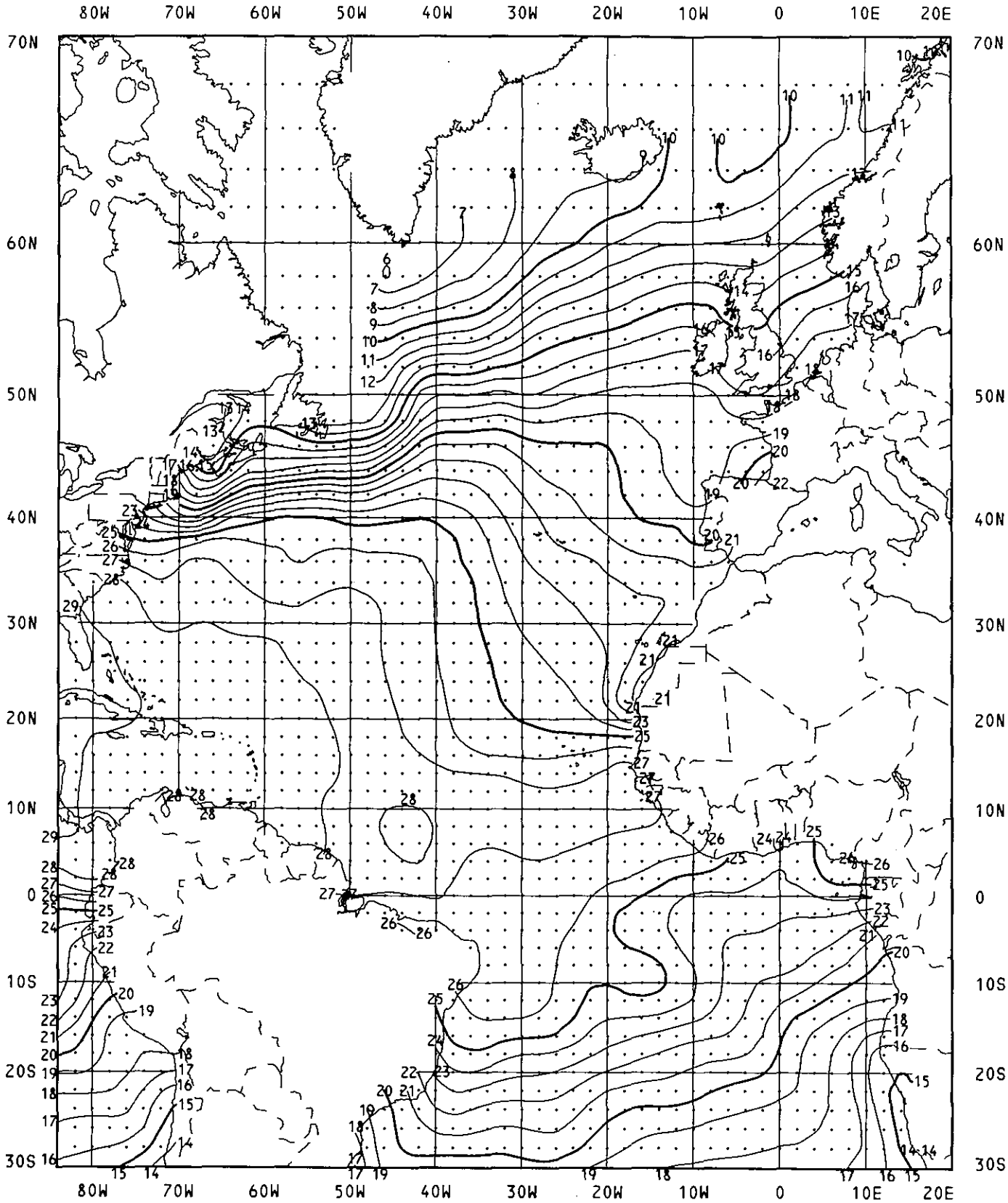
Western Pacific Ocean
SST--MONTHLY MEAN (°C)
SATELLITE DATA
August 1983

Monthly mean sea surface temperature is the mean of satellite data within two-degree quadrangles. Contour line interval is 1.0°C.



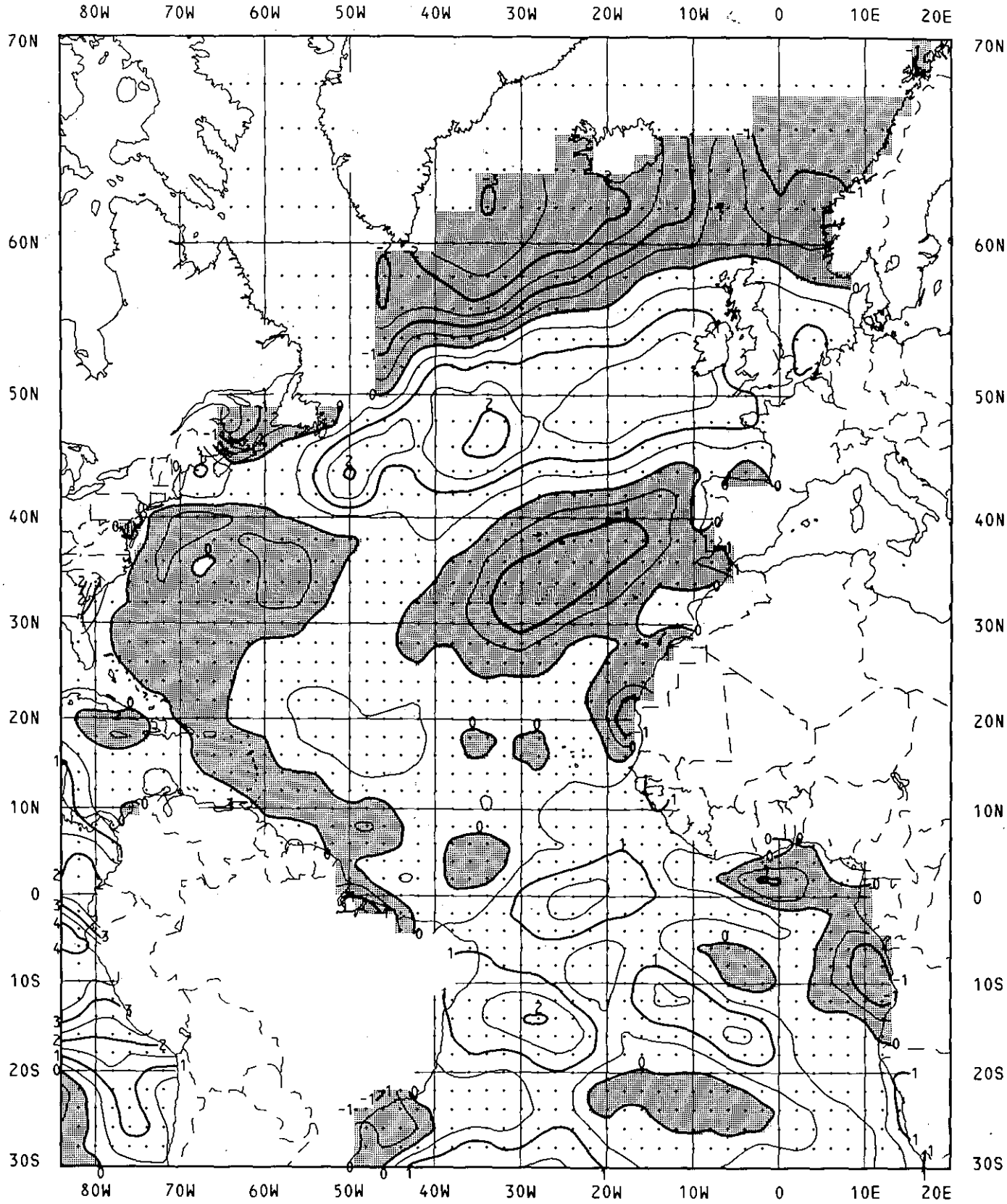
Eastern Pacific Ocean
SST--MONTHLY MEAN (°C)
SATELLITE DATA
August 1983

Monthly mean sea surface temperature is the mean of satellite data within two-degree quadrangles. Contour line interval is 1.0°C.



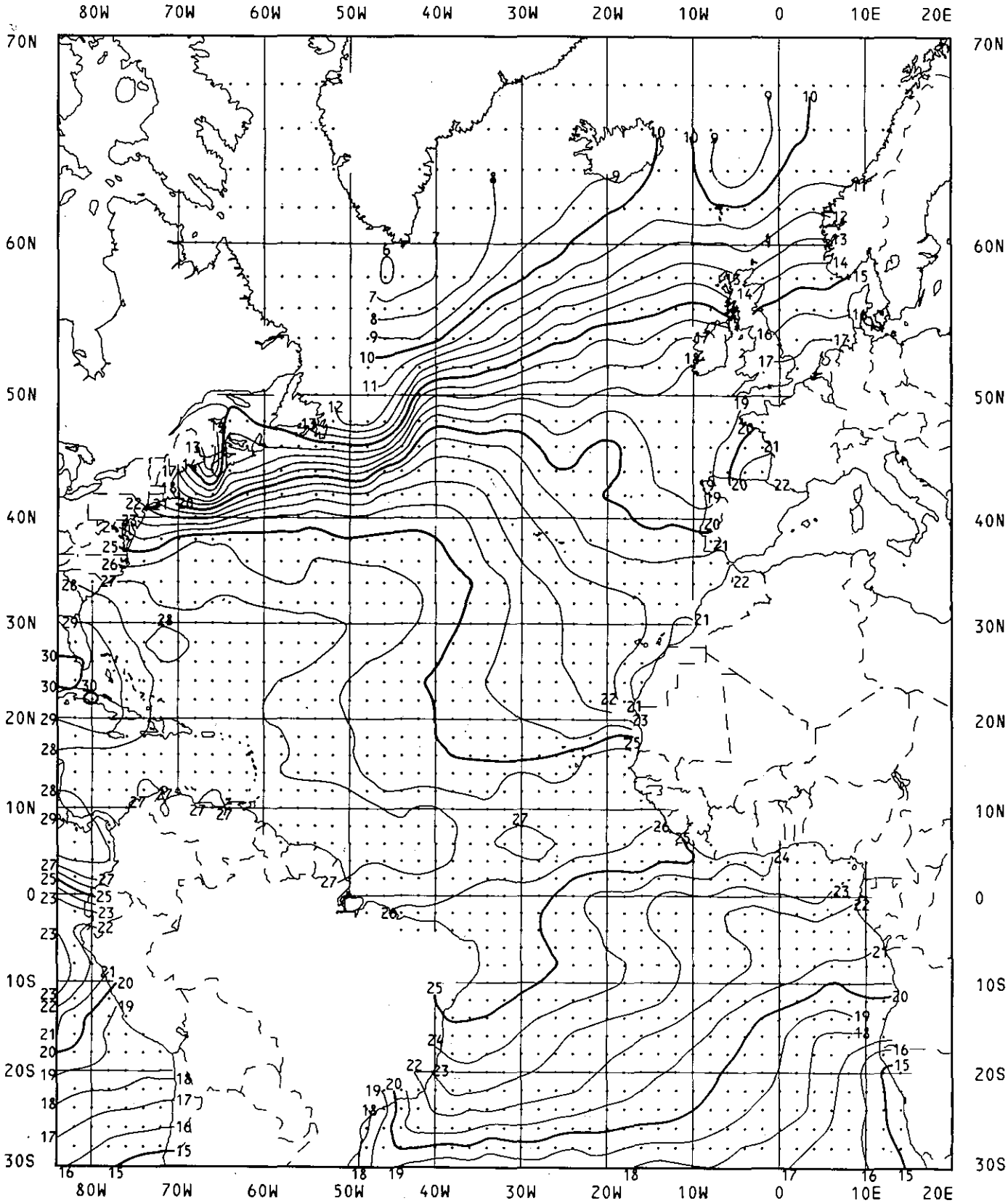
Atlantic Ocean
SST--MONTHLY MEAN (°C)
SHIP and BUOY DATA
August 1983

Monthly mean sea surface temperature is the mean of in-situ data (ships and buoys) within two-degree quadrangles. Contour line interval is 1.0°C



Atlantic Ocean
SST--MONTHLY ANOMALY (°C)
SHIP and BUOY DATA
August 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.



Atlantic Ocean
SST--MONTHLY MEAN (°C)
SATELLITE DATA
August 1983

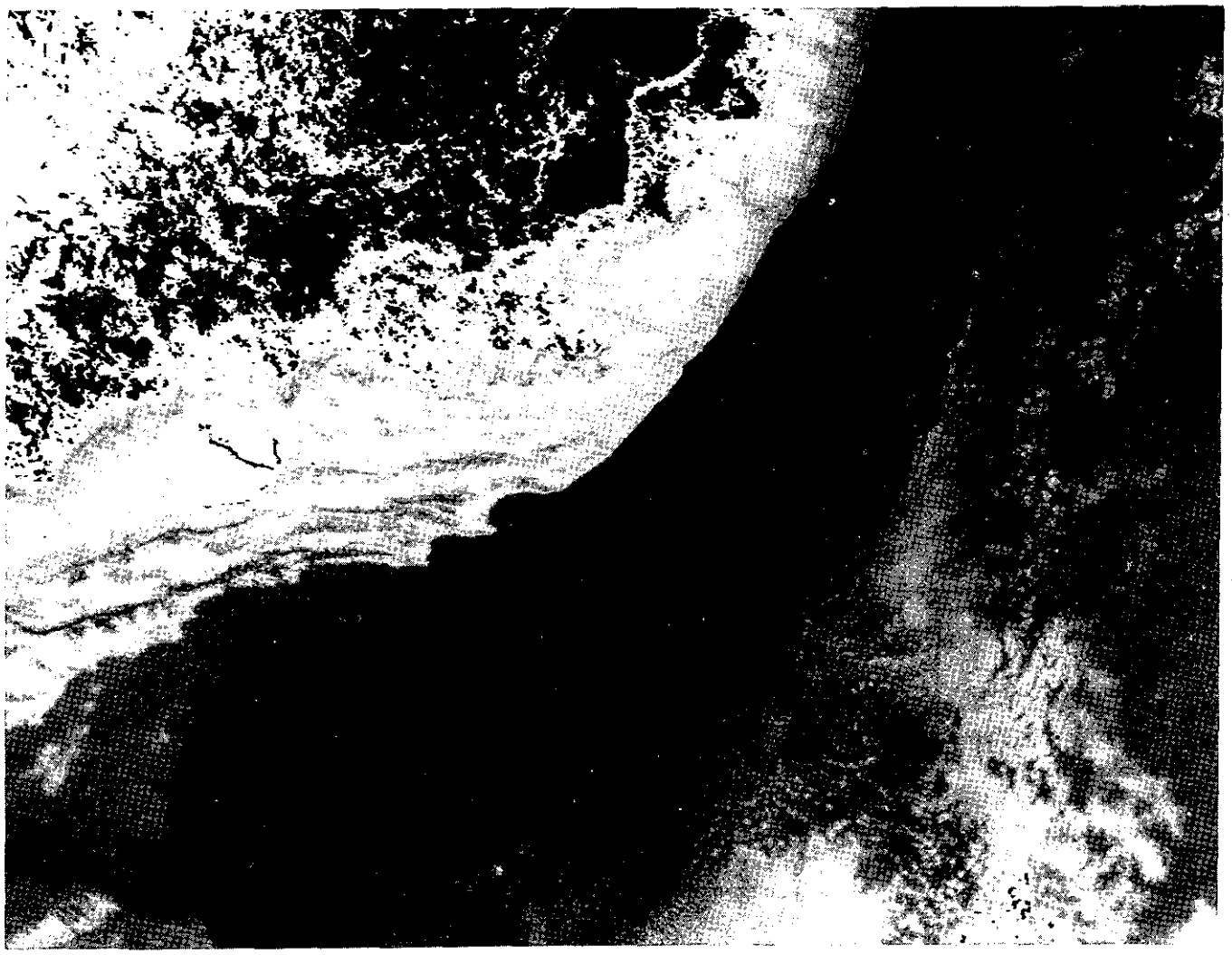
Monthly mean sea surface temperature is the mean of satellite data within two-degree quadrangles. Contour line interval is 1.0°C.

SATELLITE IMAGE OF THE MONTH

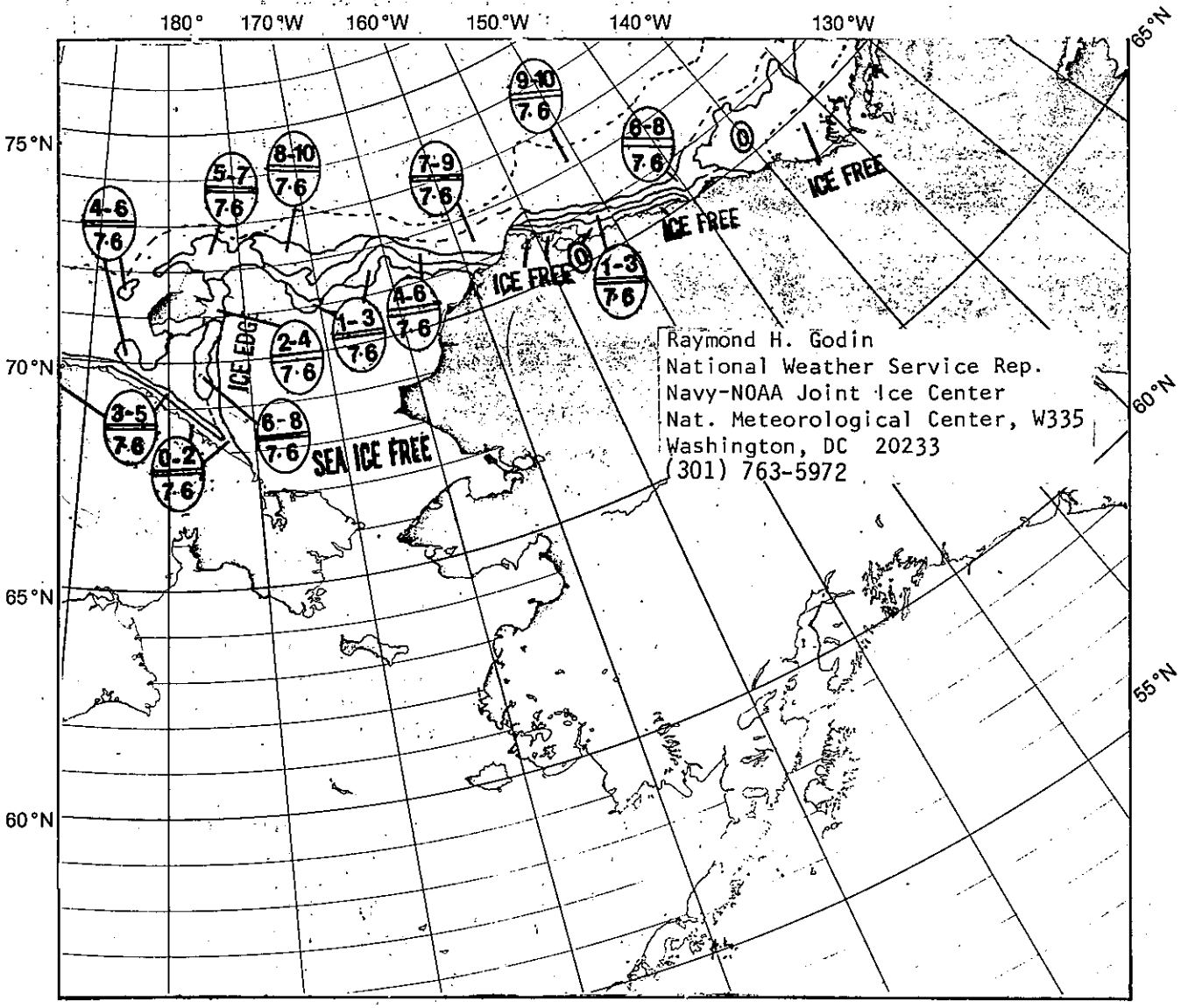
Marcia L. Weaks
Environmental Products Branch, E/SP22
NESDIS, NOAA
Washington, DC 20233
(301) 763-8142

The Agulhas Current

This NOAA-7 infrared image of the South African area was taken August 13, 1983. The light gray area in the left half of the picture is southern Africa. Along the southeast African coast, dipping to the south near the southern tip, is a dark band of warmer water which marks the location of the Agulhas Current. It is a western boundary current, which is similar to the Gulf Stream and Kuroshio systems. Occasionally, warm and cold eddy circulations have been detected by satellite sensors or by ship-derived data. Anticyclonic cold eddies are usually found to the east of the current while cyclonic warm eddies are found to the west and south. Once the current leaves the southern coast, it turns eastward and joins the Antarctic Circumpolar Current.



BERING SEA / NORTH SLOPE ICE ANALYSIS



C = Total ice concentration in the area in tenths.

C_a, C_b, C_c = Concentration of thickest (C_a), 2nd thickest (C_b), and 3rd thickest (C_c) ice

S_a, S_b, S_c = Stage of development of thickest (S_a), 2nd thickest (S_b), and 3rd thickest (S_c) ice.

-C = Concentration of ice within area(s) of strips and patches.

STAGE(S) OF DEVELOPMENT (THICKNESS)

1 = New ice (0-10 cm)
3 = Young ice (10-30 cm)
6 = First year (30-200 cm)
7 = First year thin (30-70 cm)
1. = First year medium (70-120 cm)
4. = First year thick (120-200 cm)
7. = Old ice (survived at least one summer's melt)

EXAMPLES

125 Theoretical thickness of this season's growth (cm).

Fast ice. Sea ice which forms and remains fast along the coast.

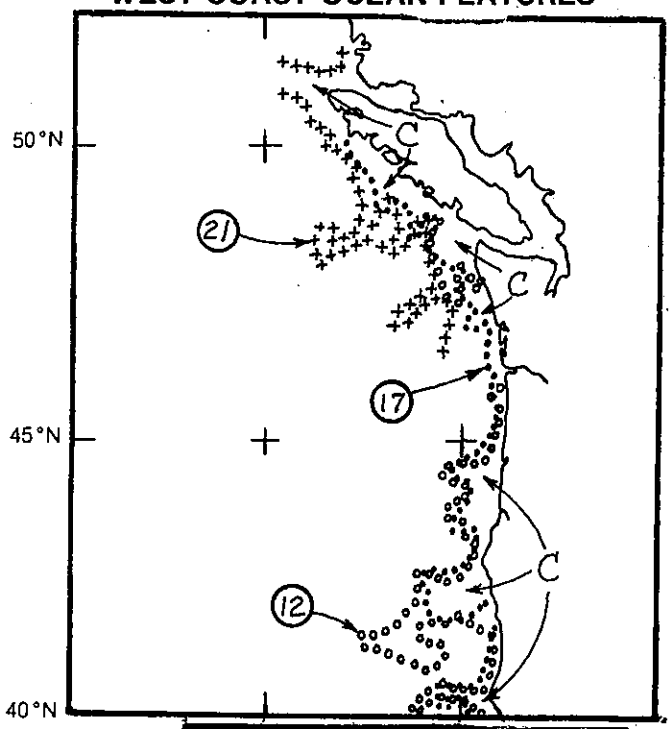
Ice boundary visually or satellite observed.

Ice boundary estimated.

AUGUST 1983

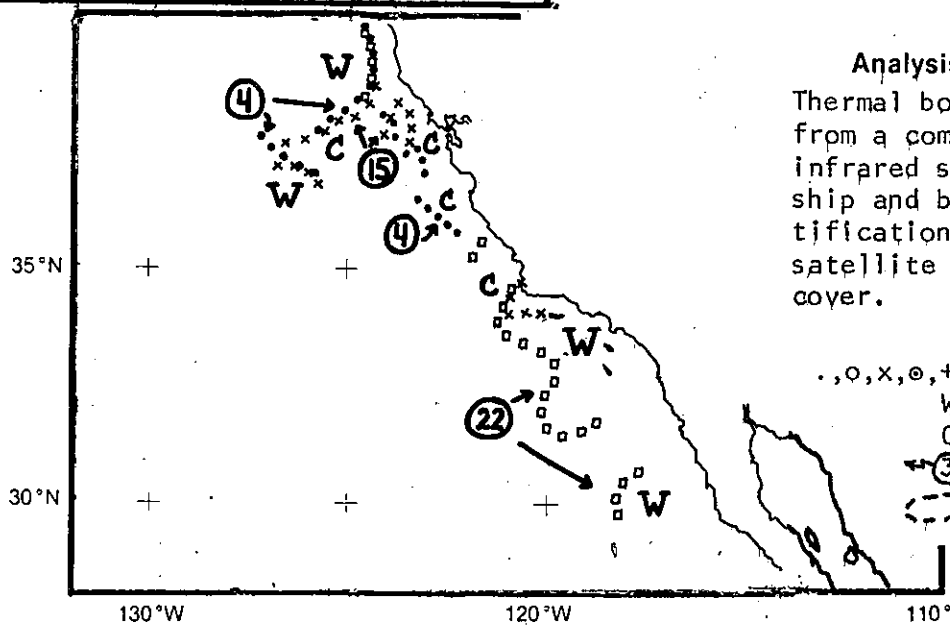
The mean monthly surface pressure circulation depicts a trough extending from the central Arctic Ocean along the 165°W longitude meridian. Light westerly geostrophic winds affect Alaskan ice covered waters west of Barrow (71°N 157°W) and light southerlies east of Barrow. A free drifting buoy located near 75°N 155°W on July 31 drifted 25 km eastward during the month. Below normal mean monthly air temperatures were observed at Barrow. During the month the ice edge receded from 20 km along the western Alaskan coast to 200 km in the north-western Chukchi Sea. A coastal lead extending from Point Franklin (71°N 159°W) to Barrow has been intermittently closed. A narrow coastal lead east of Barrow has been open throughout most of the month. The current ice edge postion is 70 km south of the historical mean position along the North Coast east of Point Franklin. The below normal air temperatures and periodic north westerly winds have hindered normal ice break-up patterns.

WEST COAST OCEAN FEATURES



AUGUST 1983

SSTs returned to near normal or slightly below normal over most of the north panel area. The only exception was the buoy at 41°N 125°W, which remained 1.5°C above normal. SSTs at most coastal and nearshore stations showed slight overall cooling during the month. The greatest cooling was near the Columbia River mouth (46°N 124°W) where temperatures averaged 1-2°C lower than in July. Minimum temperatures at all coastal stations occurred during the period August 12-19 when the strongest and most persistent northerly winds were occurring. Although winds were generally light over the region, there was a more uniform northwesterly component than earlier in the summer, resulting in weak, but more persistent coastal upwelling along much of the coast. Meanwhile, normal seasonal warming continued in offshore waters, with mean SST increases of about 1.5°C.



Analysis Techniques

Thermal boundaries are determined from a combination of enhanced infrared satellite imagery and ship and buoy observations. Identification of these features by satellite is limited by cloud cover.

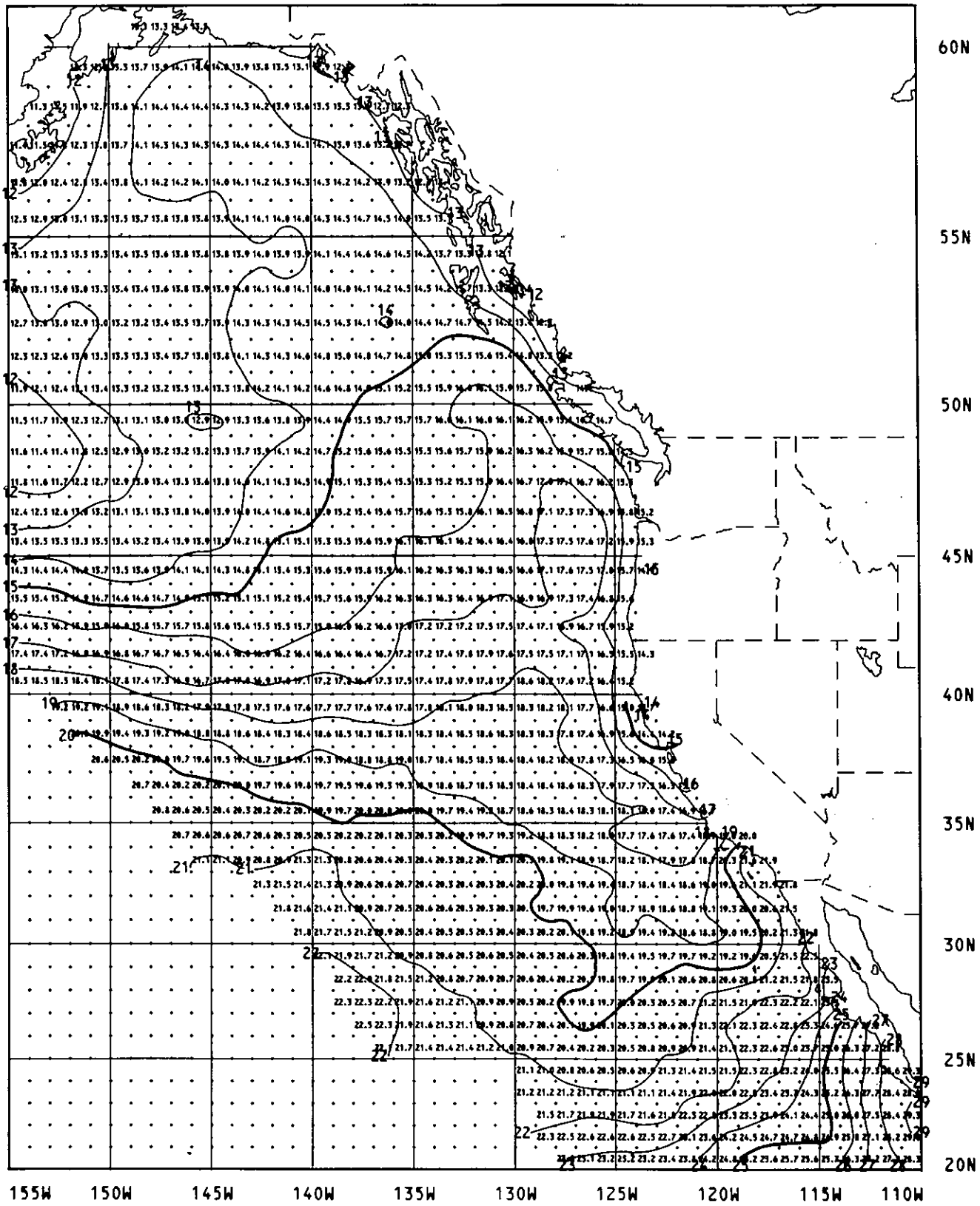
Key

.,o,x,⊙,+ = thermal boundaries
W = warm
C = cold
(3) = date of feature
(- -) = outline of water mass feature

North Panel
Kent Short
NOAA/Northwest Regional Ocean Service Center
7600 Sand Point Way NE
Bin C15700
Seattle, WA 98115
(206) 527-6604

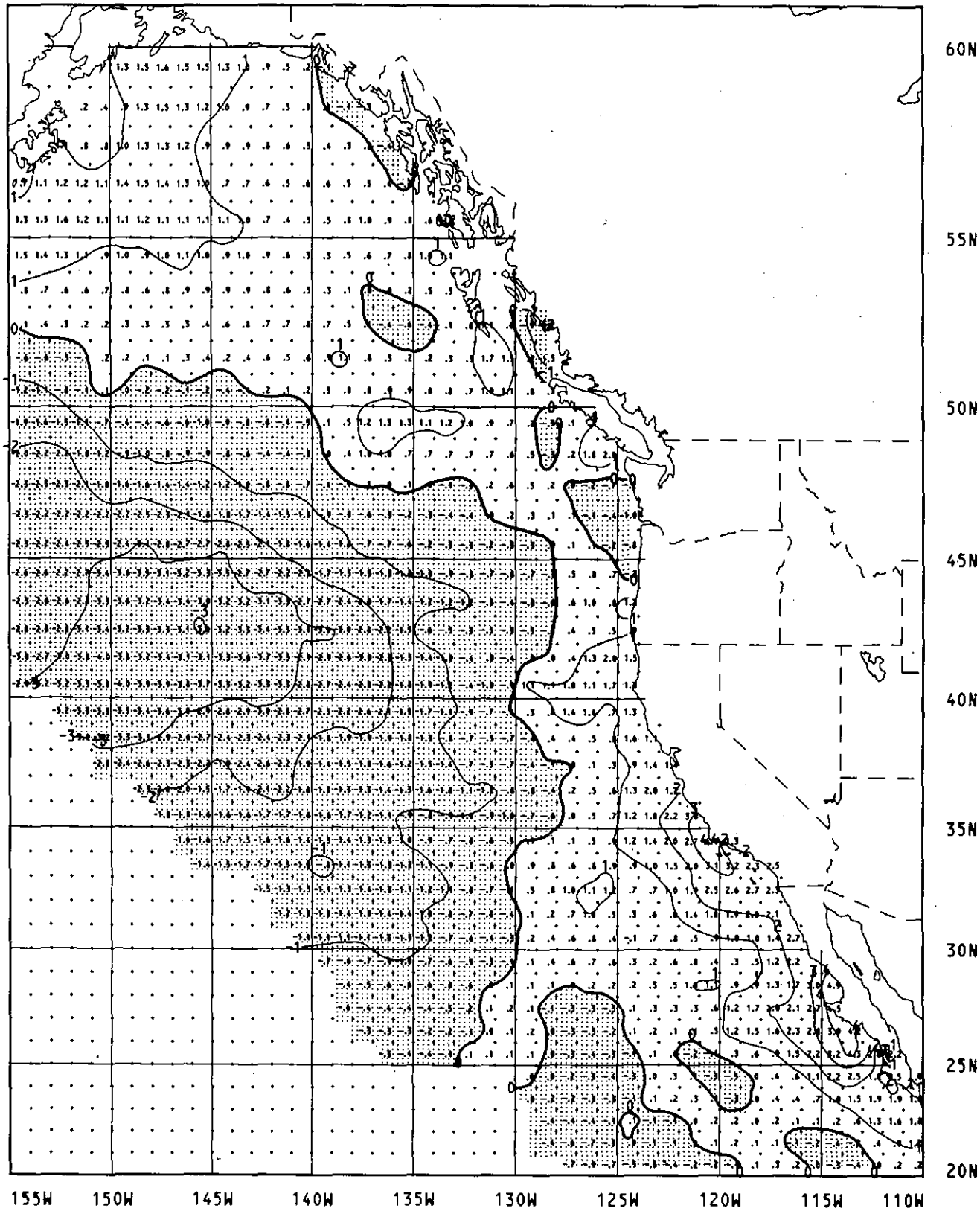
South Panel
Ernest Daghir
NOAA/NESDIS
Satellite Field Service Station
660 Price Avenue
Redwood City, CA 94063
(415) 364-2422

August was characterized by weaker than normal upwelling along the coast and by the continued cool anomaly west of 130°W. Upwelling was strongest at the beginning of the month along the central and northern California coasts, but decreased gradually the remainder of August. SSTs in this area increased from 11°C to 15°C. Weak upwelling occurred in the last half of the month from 34°-36°N. Little upwelling was observed along Baja California because of continued low clouds. Mean monthly SSTs along the coast increased from 1.2°-2.4°C. The greatest warming was between 30° and 34°N and the least warming was between 34.5° and 37.5°N. The expected seasonal warming had little effect on the cooler than normal water west of 130°W and north of 30°N. Warm anomalies of at least 1.0°C occurred along the entire coastal area. An anomaly of 1.5°C to over 2.0°C was found north of 39°N, and an anomaly of 1.5°C was found along Baja from 29° to 34°N.



West Coast
SST--MONTHLY MEAN (°C)
August 1983

Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.



West Coast
SST--MONTHLY ANOMALY (°C)
August 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.

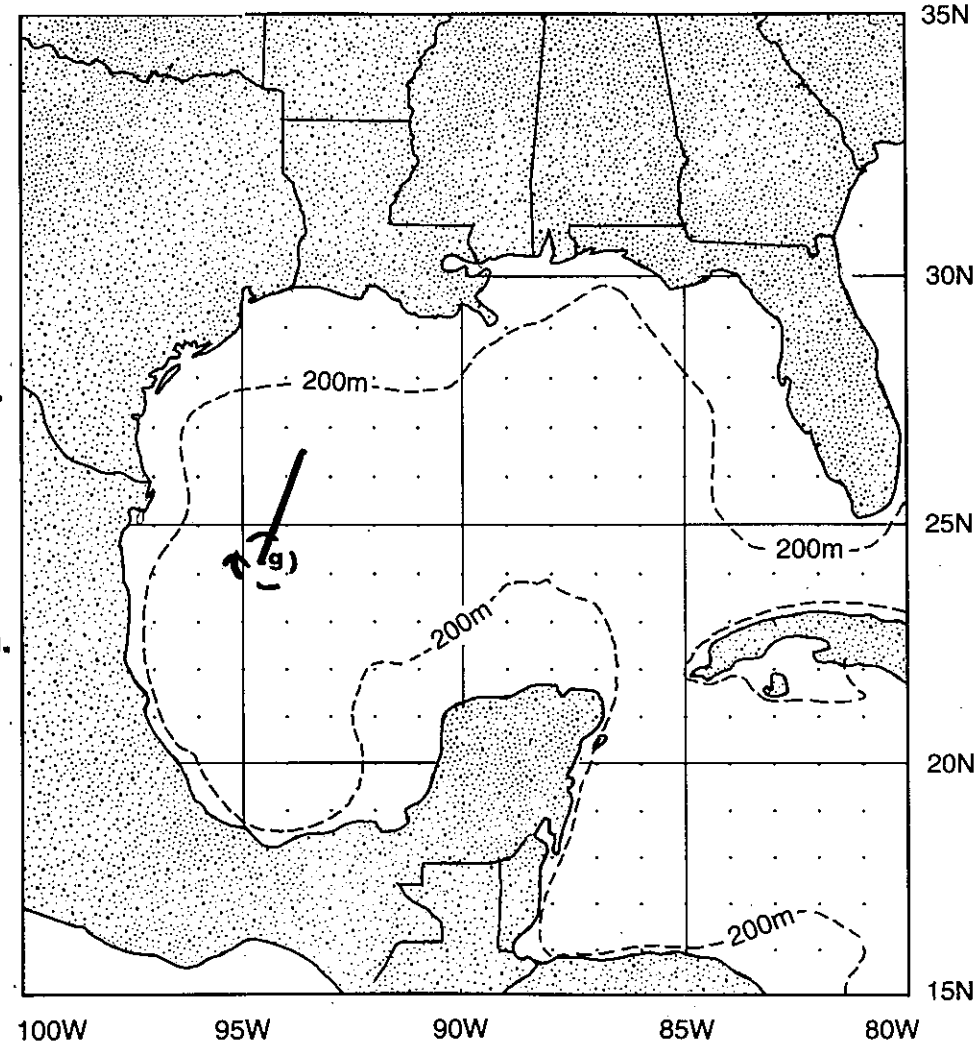
EAST COAST OCEAN FEATURES

The end of this month's positions of the Gulf Stream System and its associated eddies are shown for the NW Atlantic and the Gulf of Mexico. The Gulf Stream and Loop Current boundaries are located by infrared satellite imagery or XBT (expendable bathythermograph) data. Anticyclonic eddies are labeled a-z in the Gulf of Mexico and 1-99 in the NW Atlantic. Cyclonic eddies are labeled A-Z. Arrows on eddies indicate direction of circulation. Warm-core or anticyclonic eddies rotate clockwise; cold-core or cyclonic eddies rotate counterclockwise. The line to the eddy center shows the net translation since last month or since last observed. Eddies or sections of the Gulf Stream System which were not observed during the month are not shown on the analysis chart. The long arrows at the bottom of the chart indicate the date of data used.

Data used in this analysis include:
- NOAA satellite infrared imagery, NESDIS
- Bathythermograph data, National Meteorological Center of National Weather Service
- Oceanographic Analysis, A daily detailed analysis issued by National Weather Service/NESDIS

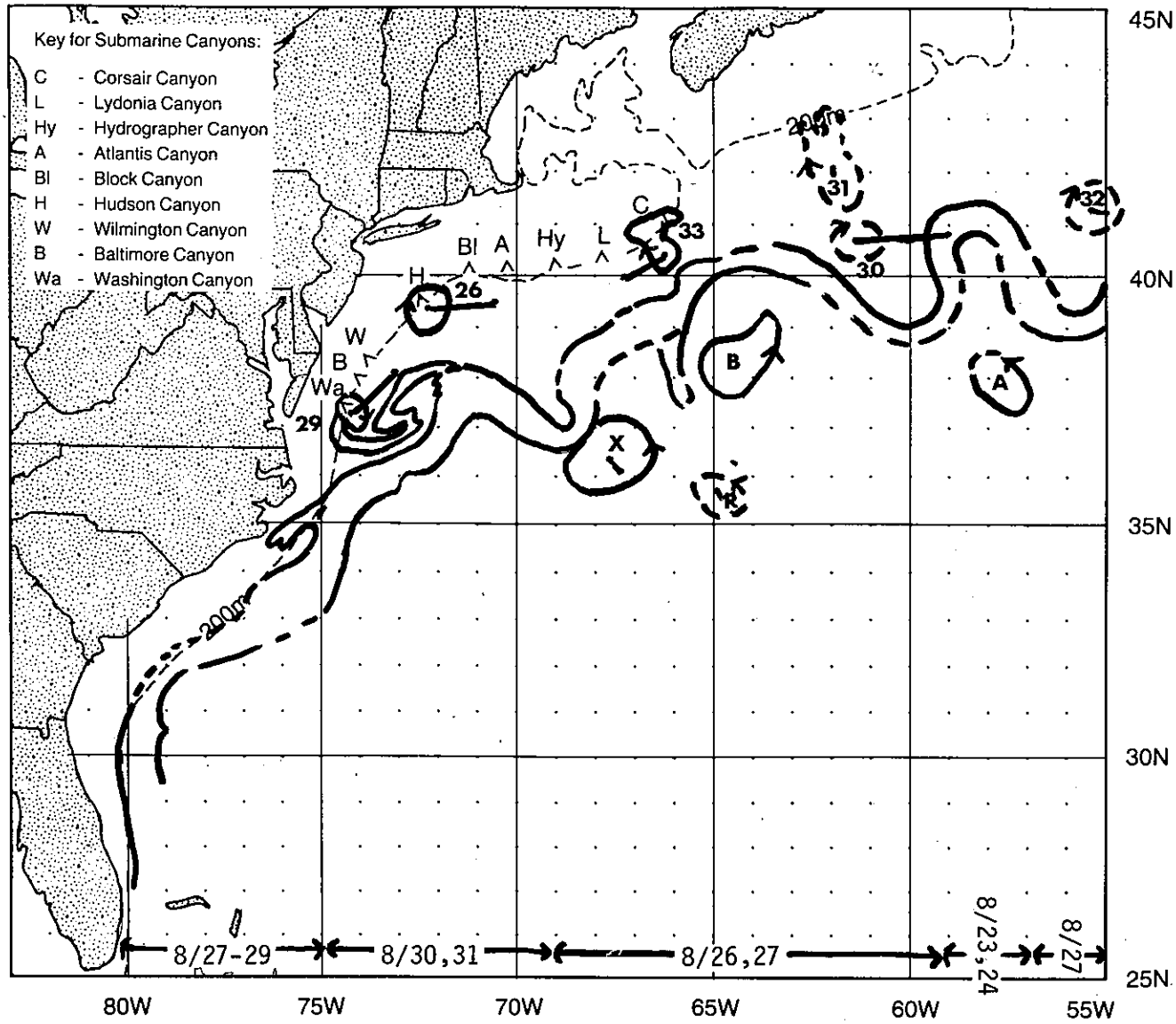
Jenifer Wartha-Clark
NOAA/NESDIS
Satellite Field Service Sta.
Washington, DC 20233
(301) 763-8444

Ann Bell
NOAA/NWS
National Meteorological Cen.
Washington, DC 20233
(301) 763-8056



AUGUST 1983

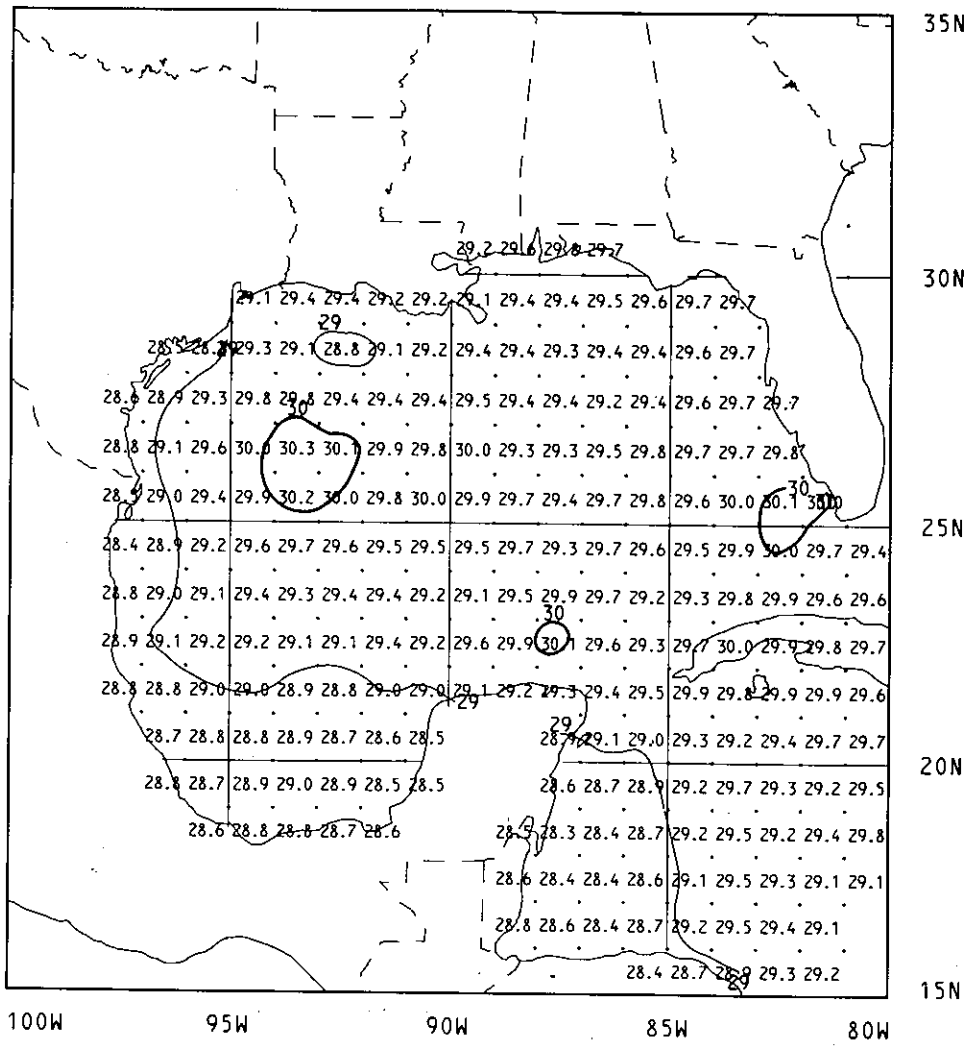
Near isothermal conditions have prevailed in the Gulf of Mexico since early July. August mean SSTs ranged from 28-31°C. A drifting data buoy was deployed by the NOAA Data Buoy Center within eddy g. The position of eddy g is estimated from the buoy's August tracking. Eddy g has apparently translated 250 km SSW during August.



A prominent Gulf Stream feature in the end-of-August analysis is the long warm water filament from the crest at 38°N 72°W to eddy 29. Anticyclonic eddy 29 moved 130 km SW. Eddy 26 translated 145 km W. Eddy 33 traveled 95 km NE. Eddy 31 apparently moved 10 km N when it was last partially observed on August 3. Eddy 30 interacted with a Gulf Stream meander near 41°N 59°W on August 4. Eddy 30 then apparently rapidly moved 195 km W when last partially observed on August 8. Eddy 32 translated 25 km WNW when last partially observed on August 13.

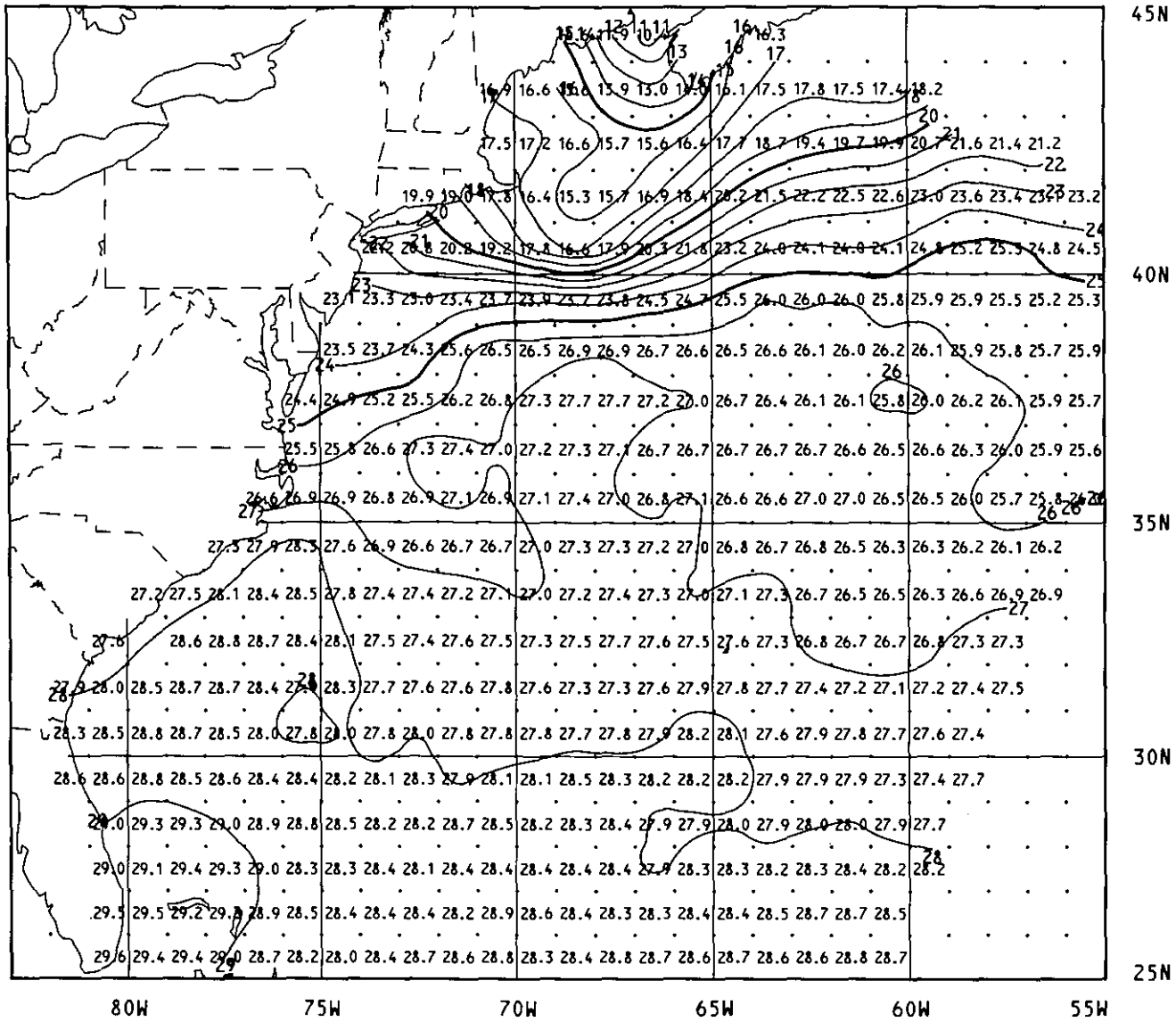
Two cyclonic eddies were formed during August. New eddy A formed from a large amplitude trough near 38°N 58°W on August 6. New eddy B formed from a Gulf Stream meander near 38°N 64°30W on August 21. Eddy X traveled 35 km NW. Eddy R translated 25 km SE when last observed on August 2.

EAST COAST SST-
MONTHLY MEAN



Gulf of Mexico
SST--MONTHLY MEAN (°C)
August 1983

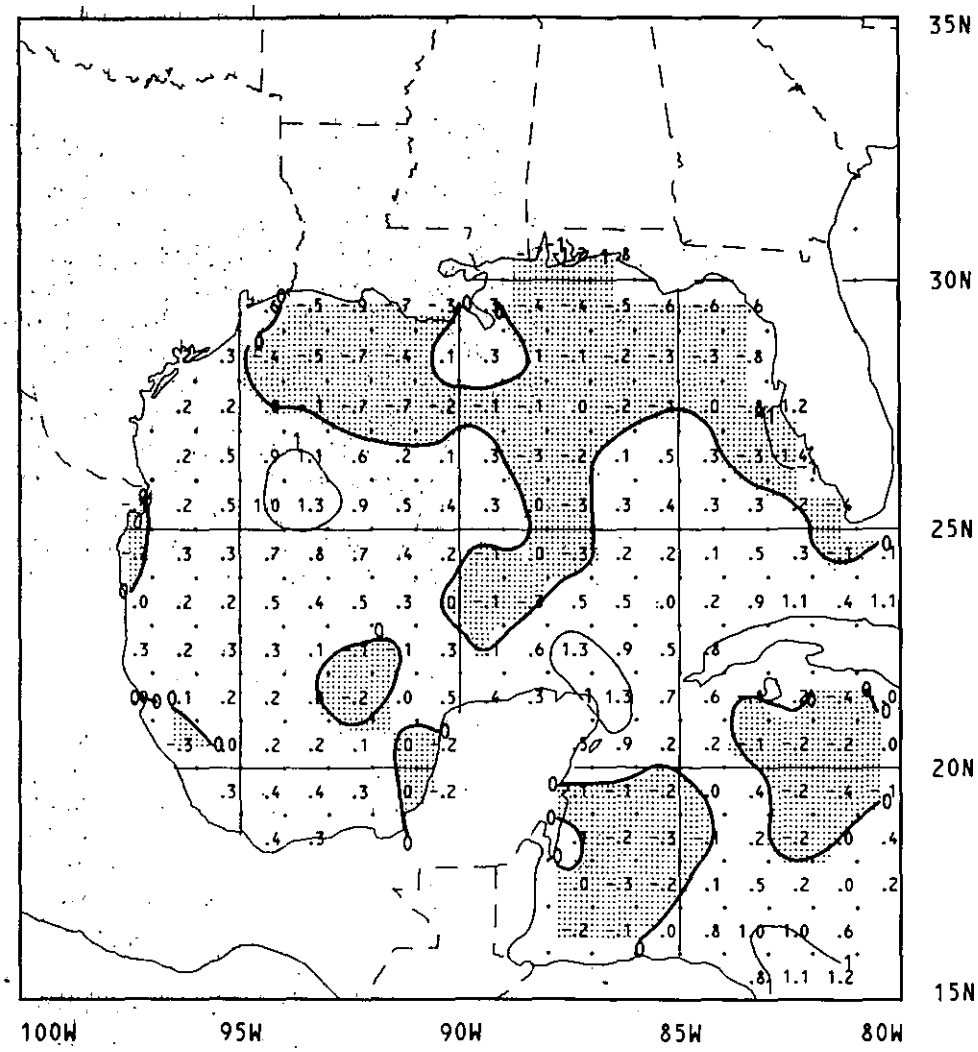
Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.



NW Atlantic Ocean
SST--MONTHLY MEAN (°C)
August 1983

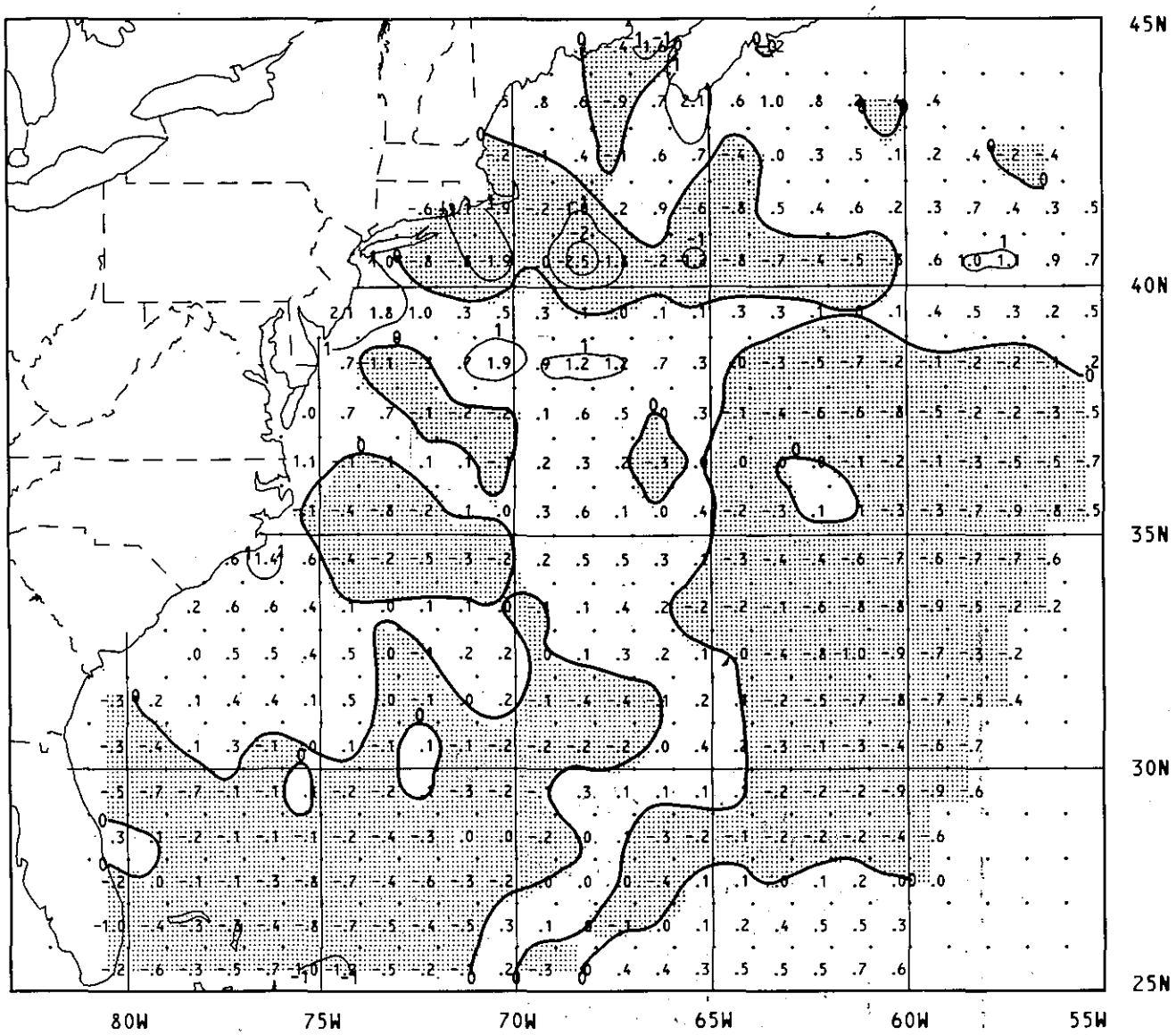
Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.

EAST COAST SST-ANOMALY



Gulf of Mexico
SST--MONTHLY ANOMALY (°C)
August 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.



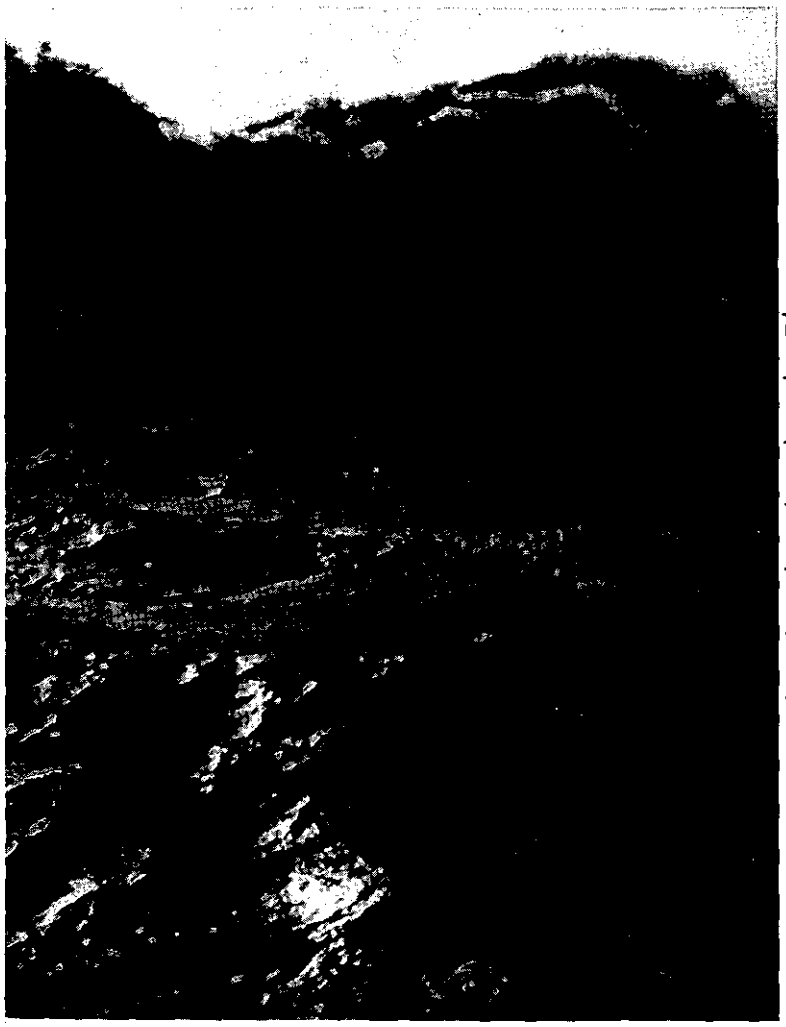
NW Atlantic Ocean
SST--MONTHLY ANOMALY (°C)
August 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.

NOAA LISD SEATTLE

OCEANOGRAPHIC Monthly Summary

Volume III Number 9 September 1983



Contents

3 OceaNotes

4 Pacific SST - monthly mean, ship and buoy data

6 Pacific SST - anomaly

8 Pacific SST - monthly mean, satellite data

10 Atlantic SST - monthly mean, ship and buoy data

11 Atlantic SST - anomaly

12 Atlantic SST - monthly mean, satellite data

13 Satellite IMAGE of the Month

14 Bering Sea/North Slope ICE, with text

15 West Coast OCEAN FEATURES, with text

16 West Coast SST - monthly mean

17 West Coast SST - anomaly

18 East Coast OCEAN FEATURES, with text

20 East Coast SST - monthly mean

22 East Coast SST - anomaly

24 Subscription Information

U.S. DEPARTMENT OF COMMERCE • National Oceanic and Atmospheric Administration
National Weather Service
National Environmental Satellite, Data, and Information Service

Oceanographic Monthly Summary is published by the National Weather Service and the National Environmental Satellite, Data, and Information Service (NESDIS). *Oceanographic Monthly Summary* contains sea surface temperature (SST) analyses on both regional and ocean basin scales for the Atlantic and Pacific Oceans. Two ocean basin SST analyses are presented, one based on in-situ data and another based solely on satellite data. An ocean basin SST anomaly derived from the in-situ data is also shown; it uses the National Climatic Center (NCC) Climatology*. The regional SST analyses are based upon a combination of in-situ and satellite data measurements. The regional SST anomalies use the Robinson-Bauer Climatology*. *Oceanographic Monthly Summary* also contains Alaskan sea ice information and ocean feature information for contiguous U.S. ocean regions.

Oceanographic Monthly Summary welcomes articles containing information of interest to *Oceanographic Monthly Summary* readers, such as, news on operational oceanography, unusual ocean feature phenomena, etc. Contributions should be sent to the editor (address below). Accepted material will appear in the OceaNotes section of *Oceanographic Monthly Summary*. Contributions can be published as quickly as the next monthly issue.

If you are interested in receiving *Oceanographic Monthly Summary* regularly, please refer to the back cover for subscription information.

*Reynolds, R.W., 1982. A Monthly Averaged Climatology of Sea Surface Temperatures; *NOAA Technical Report NWS 31.*

*Robinson, M.K., 1976. Atlas of North Pacific Ocean Monthly Mean Temperatures and Mean Salinities of the Surface Layer; *NavOceano Ref. Pub. 2.*

Robinson, M.K., R. A. Bauer and E.H. Schroeder, 1979. Atlas of North Atlantic-Indian Ocean Monthly Mean Temperatures and Mean Salinities of the Surface Layer; *NavOceano Ref. Pub. 18.*

Oceanographic Monthly Summary

Editor: Jenifer Wartha-Clark
NOAA, NWS
Washington, DC 20233
Telephone: (301) 763-8088

Assistant Editor: Ann Bell
NOAA, NWS
National Meteorological Center, W/NMC21
Washington, DC 20233
(Telephone: (301) 763-8056)

SST Computer Analyses are prepared by:
William H. Gemmill
Marine Products Branch, W/NMC21
National Meteorological Center
National Weather Service, NOAA
Washington, DC 20233
(Telephone: (301) 763-8133)

THE WEST COAST WARMING EVENT OF 1982-83

Kent S. Short
Northwest Ocean Service Center, NOAA

The much-publicized El Nino in the equatorial Pacific has been a major oceanographic event. The coastal waters off the West Coast of the U.S. have undergone a related significant warming event. The accompanying graphs document this West Coast warming. These graphs were derived from the monthly mean anomaly charts from this publication, and have been divided into the North and South Panel areas shown on p. 15. The plots cover a one-year period from July 1982 to July 1983. Note that in both areas the extent of the warm anomaly (Figs. 1 and 2) reached its peak in February or March, then decreased in April. However, in the North Panel area, a secondary warming event occurred in May. The temporary cooling in April was also seen in both areas on the maximum anomaly plots (Fig. 3). Also note that while the areal extent of warm anomaly is on the decline, the value of the maximum anomaly within each area remains, as of July 1983, at or near its highest monthly value (+3°C in both cases). Finally, figs. 1 and 2 indicate that despite the decline in the extent of the warm anomaly, approximately 60% of both areas is still covered by anomalously warm water. At the time of this writing, the August data was not available, so the trend beyond July has not been evaluated. Some researchers have speculated that more warming events may occur before this overall episode is completed.

Fig. 1 - Percentage of North Panel area (see p. 15) covered by warm anomaly of various magnitudes. Top curve denotes all warm anomaly area. Middle curve denotes warm anomaly $\geq$1°C. Bottom curve denotes warm anomaly $\geq$2°C.

Fig. 2 - Same as Fig. 1, for South Panel area.

Fig. 3 - Maximum values of mean monthly warm anomaly found within each area.

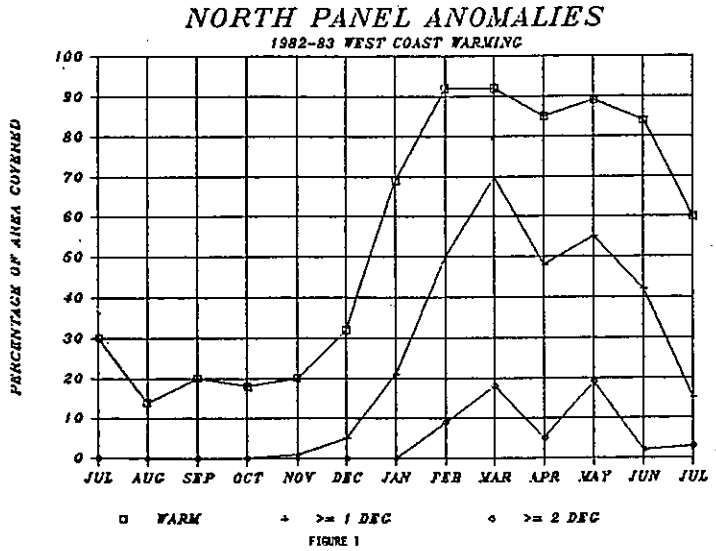


FIGURE 1

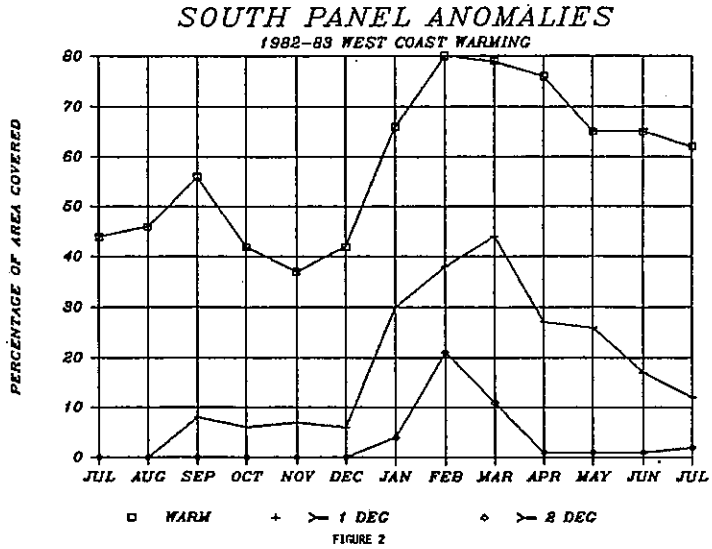


FIGURE 2

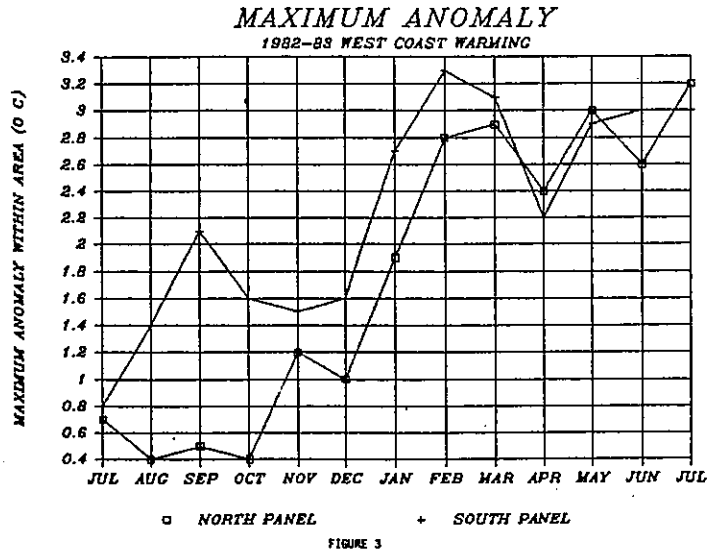
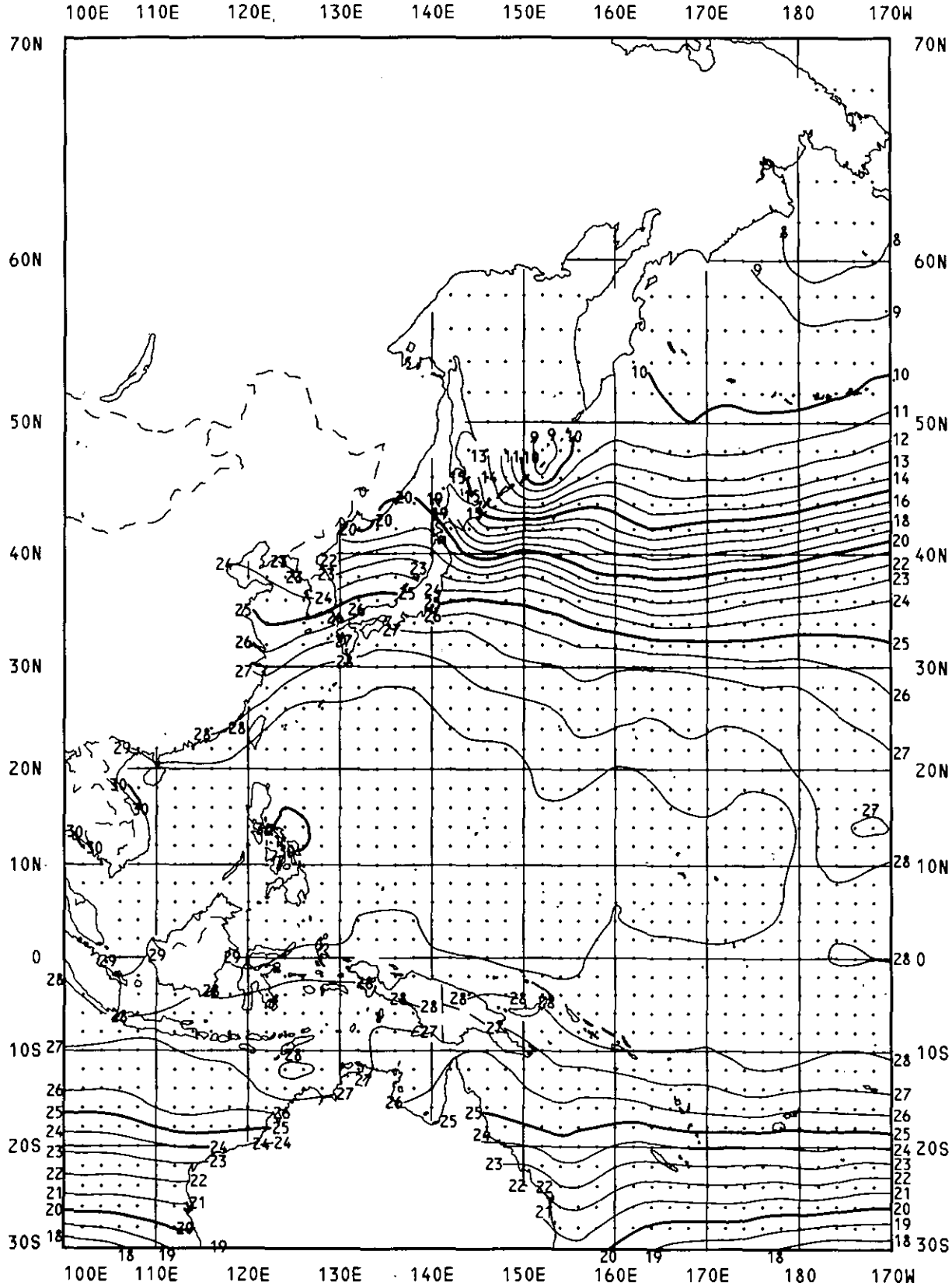
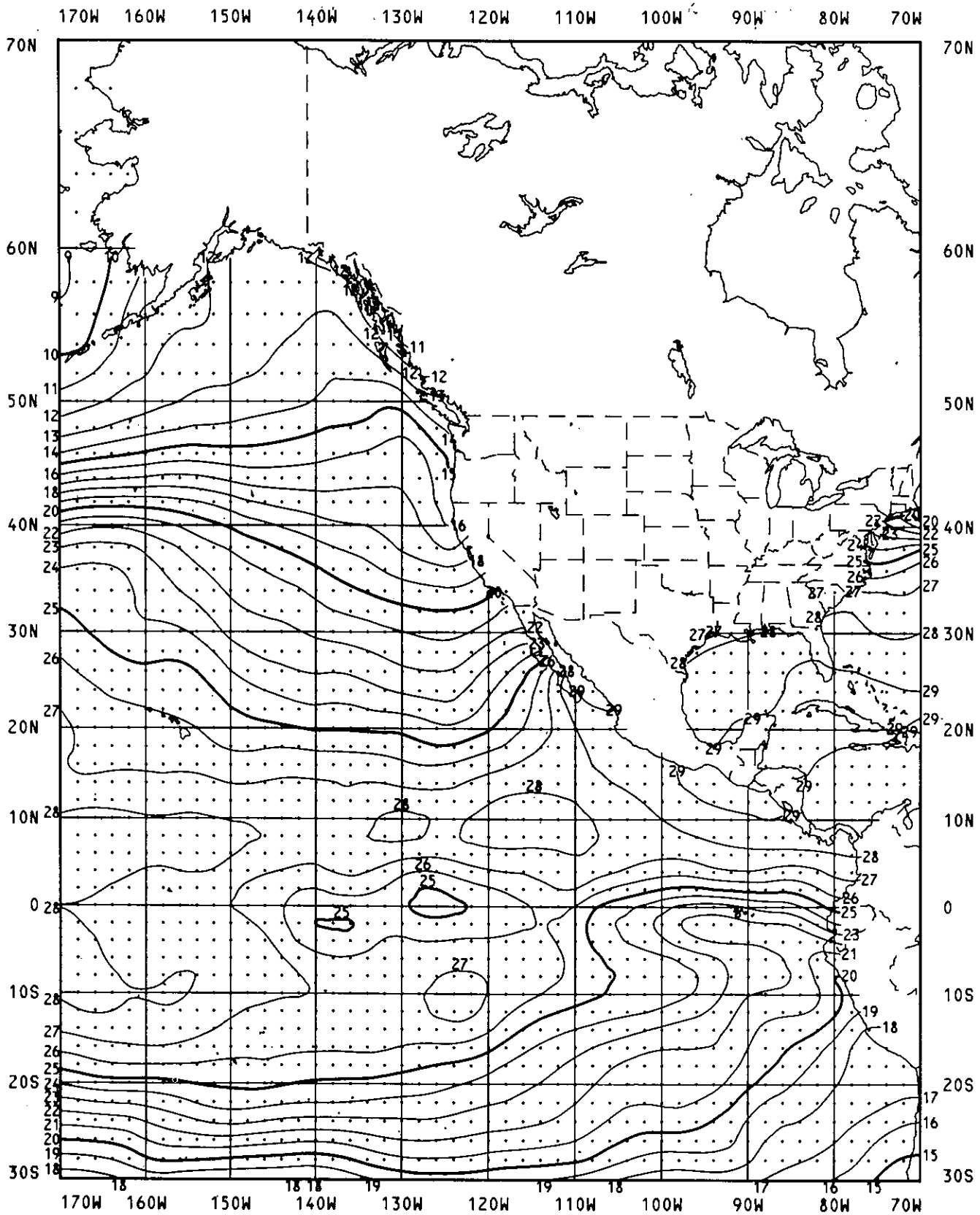


FIGURE 3



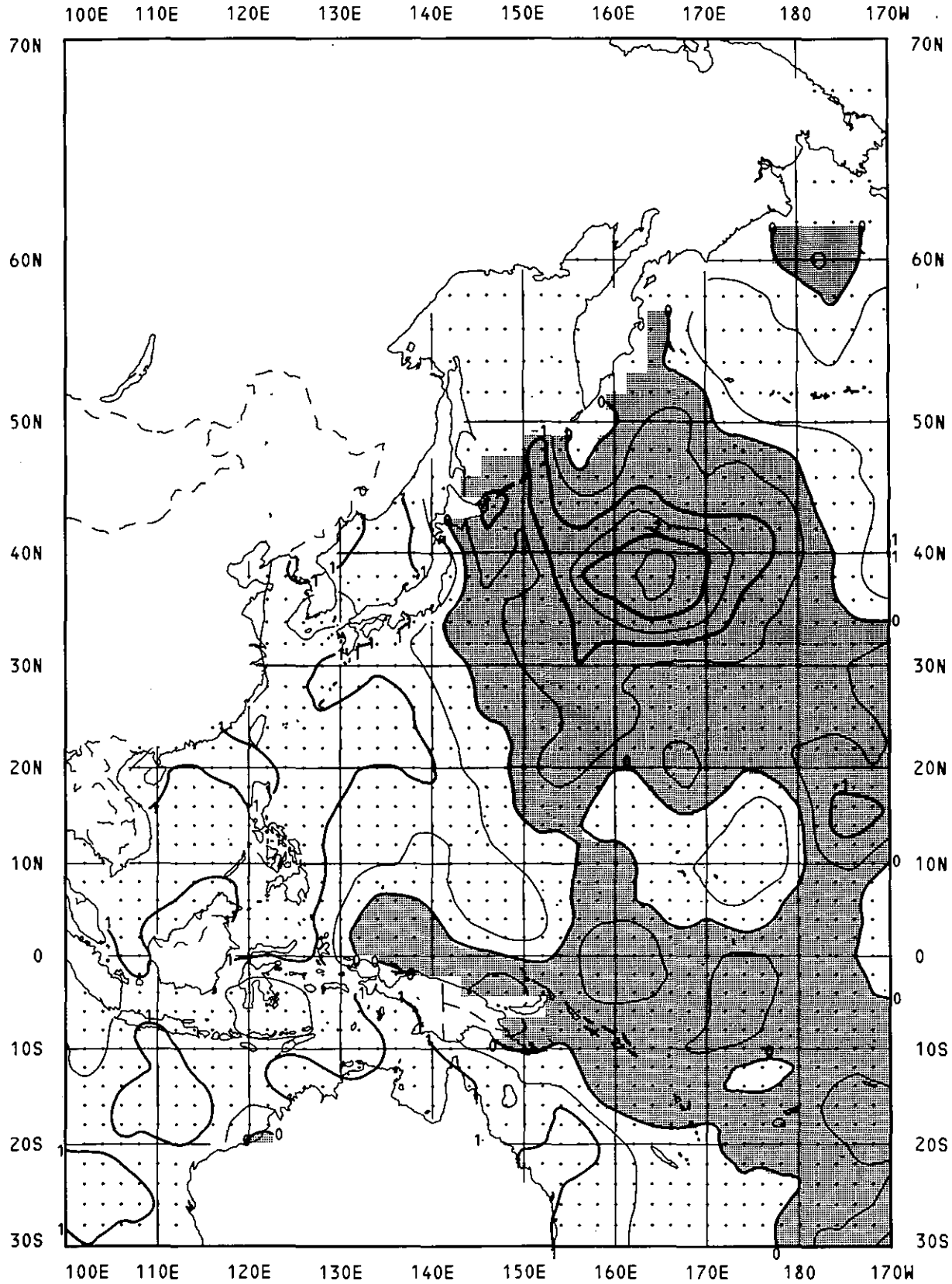
Western Pacific Ocean
SST--MONTHLY MEAN (°C)
SHIP and BUOY DATA
September 1983

Monthly mean sea surface temperature is the mean of in-situ data (ships and buoys) within two-degree quadrangles. Contour line interval is 1.0°C.



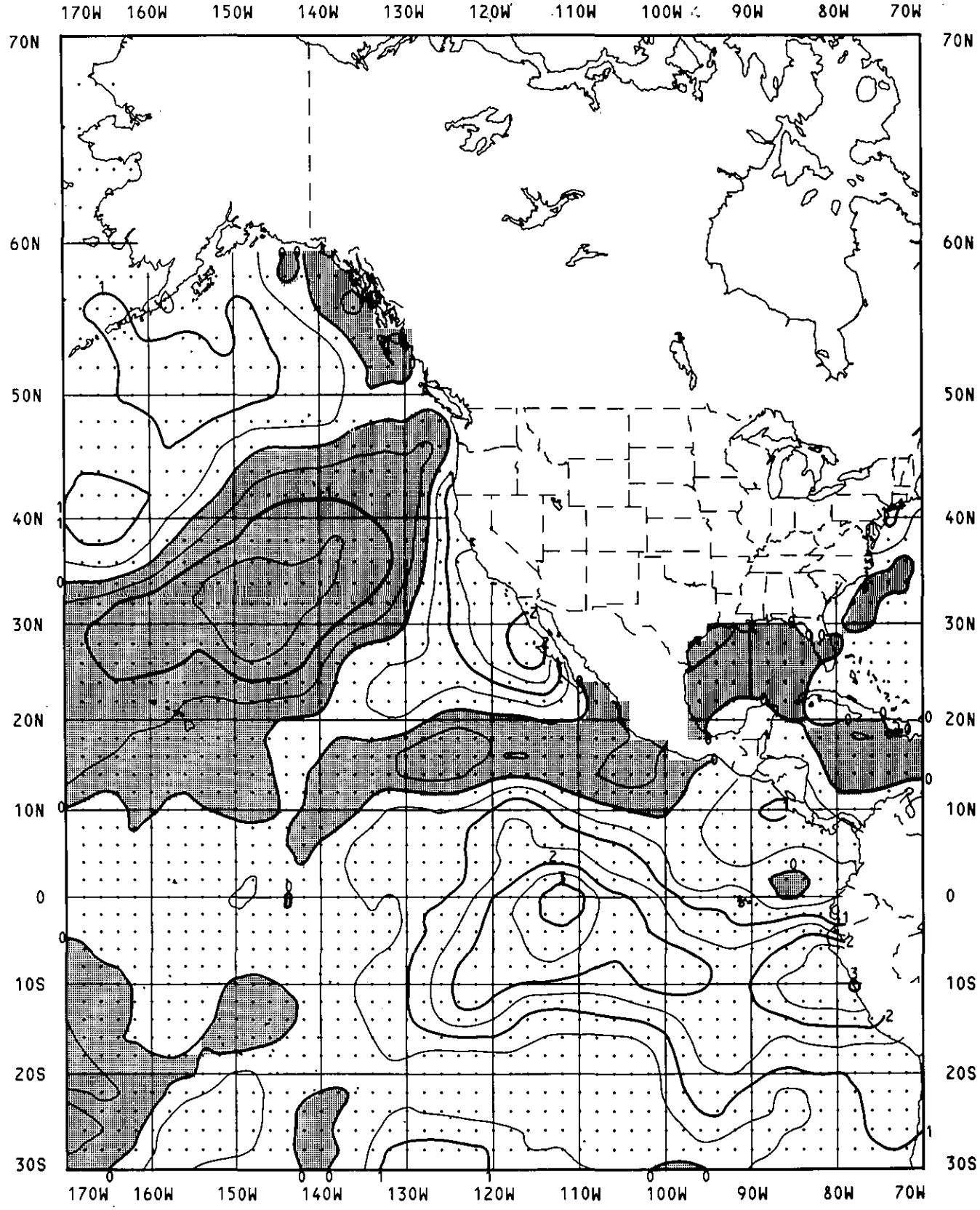
Eastern Pacific Ocean
SST--MONTHLY MEAN (°C)
SHIP and BUOY DATA
September 1983

Monthly mean sea surface temperature is the mean of in-situ data (ships and buoys) within two-degree quadrangles. Contour line interval is 1.0°C.



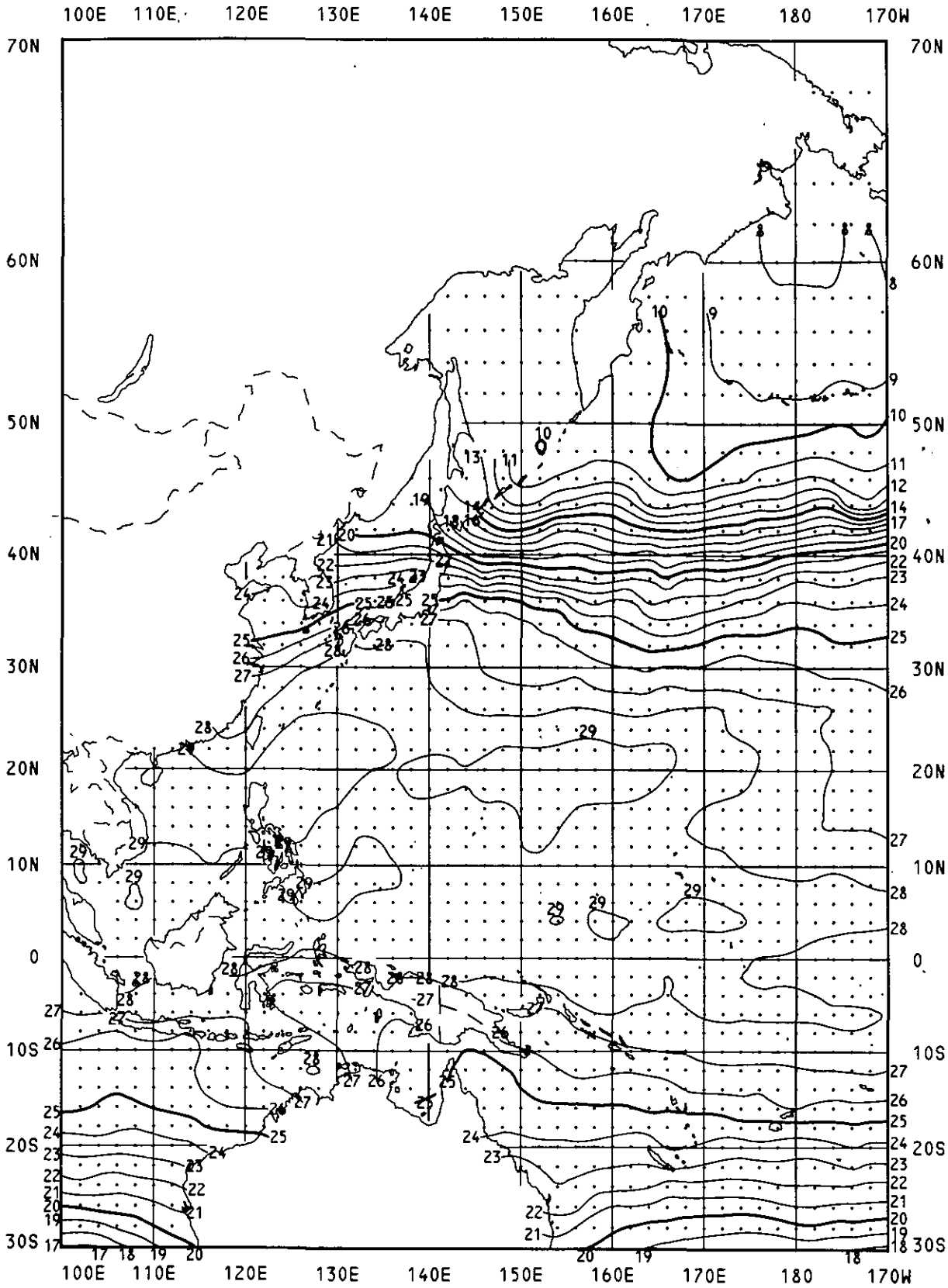
Western Pacific Ocean
SST--MONTHLY ANOMALY (°C)
SHIP and BUOY DATA
September 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.



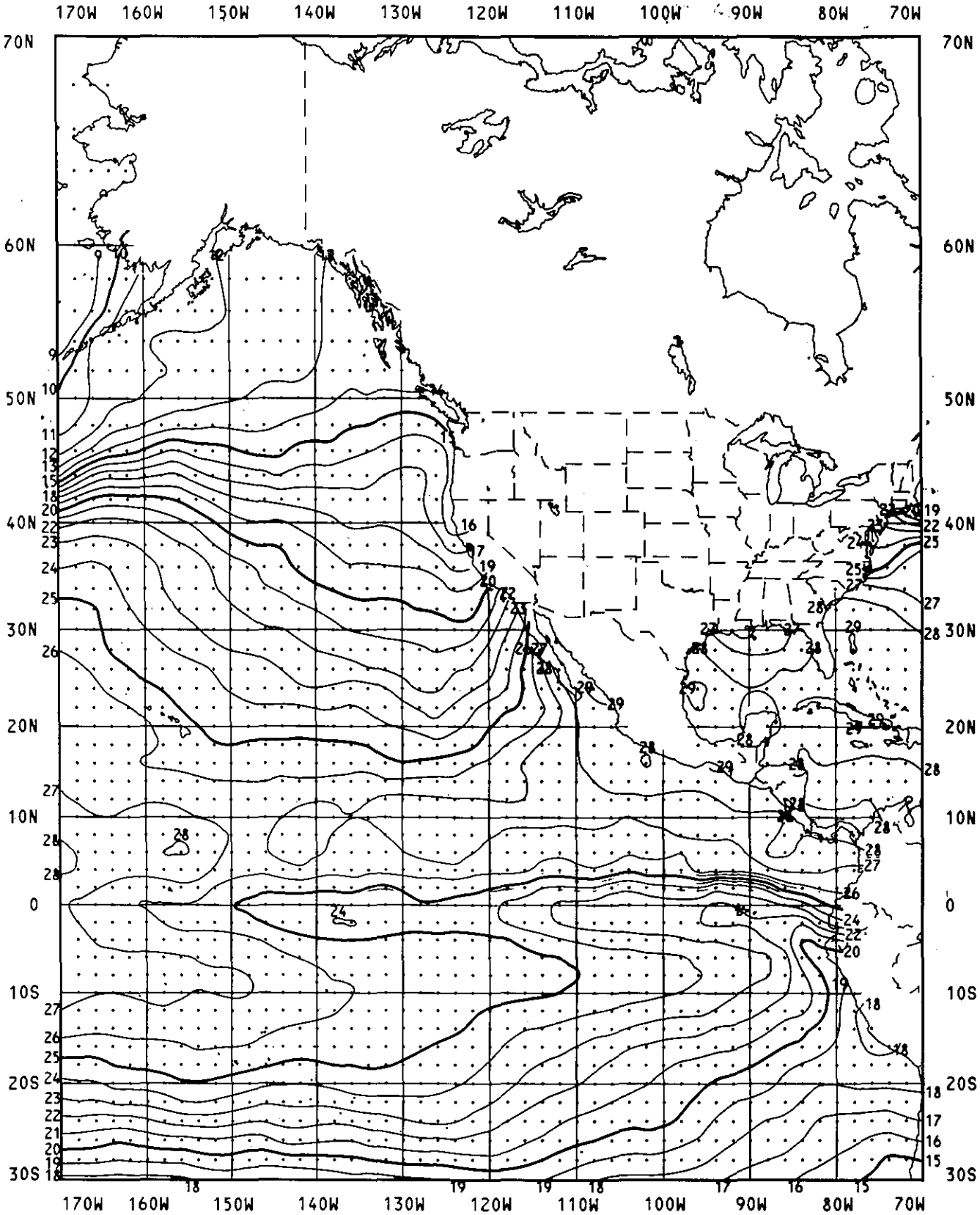
Eastern Pacific Ocean
SST--MONTHLY ANOMALY (°C)
SHIP and BUOY DATA
September 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.



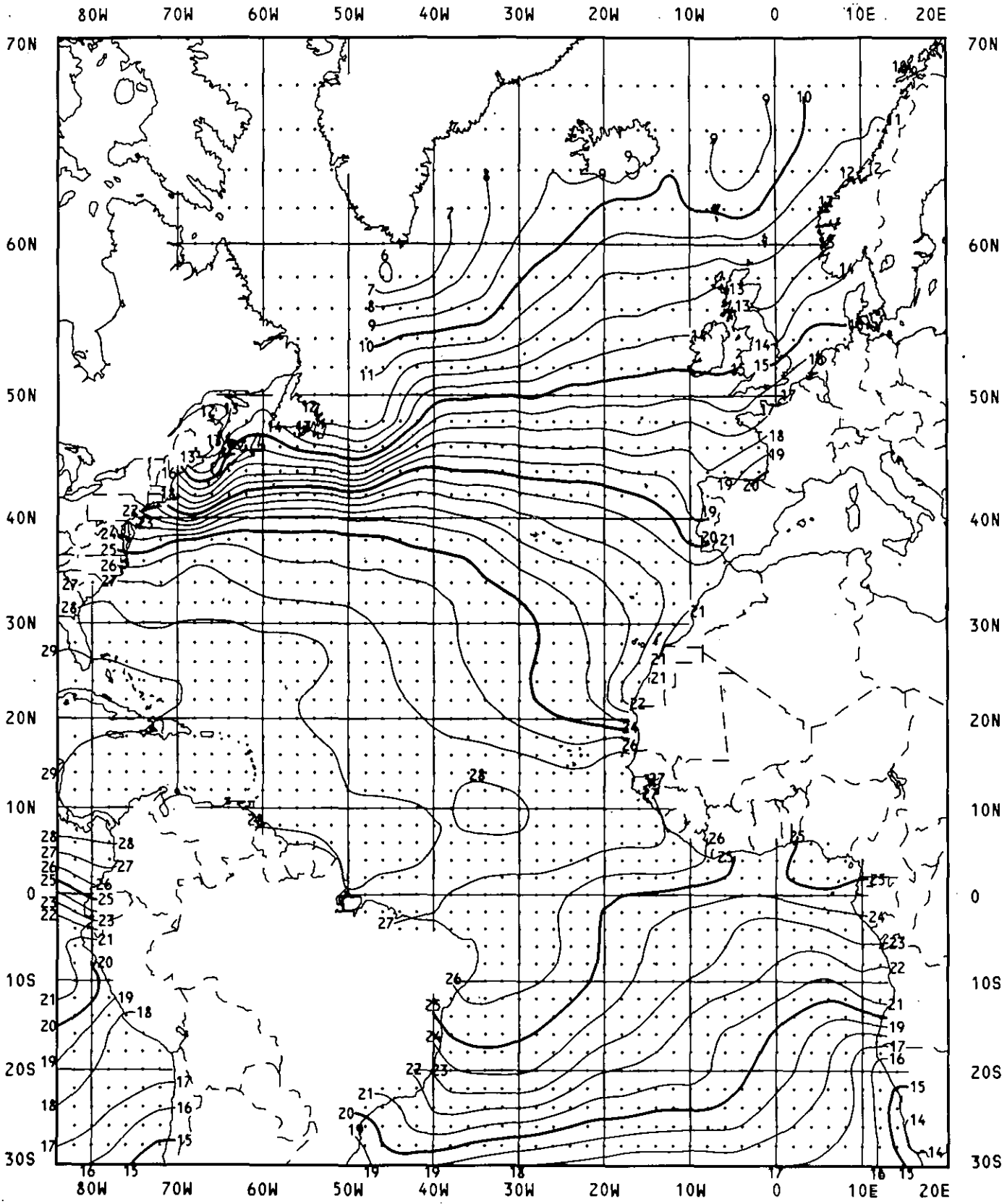
Western Pacific Ocean
SST--MONTHLY MEAN (°C)
SATELLITE DATA
September 1983

Monthly mean sea surface temperature is the mean of satellite data within two-degree quadrangles. Contour line interval is 1.0°C.



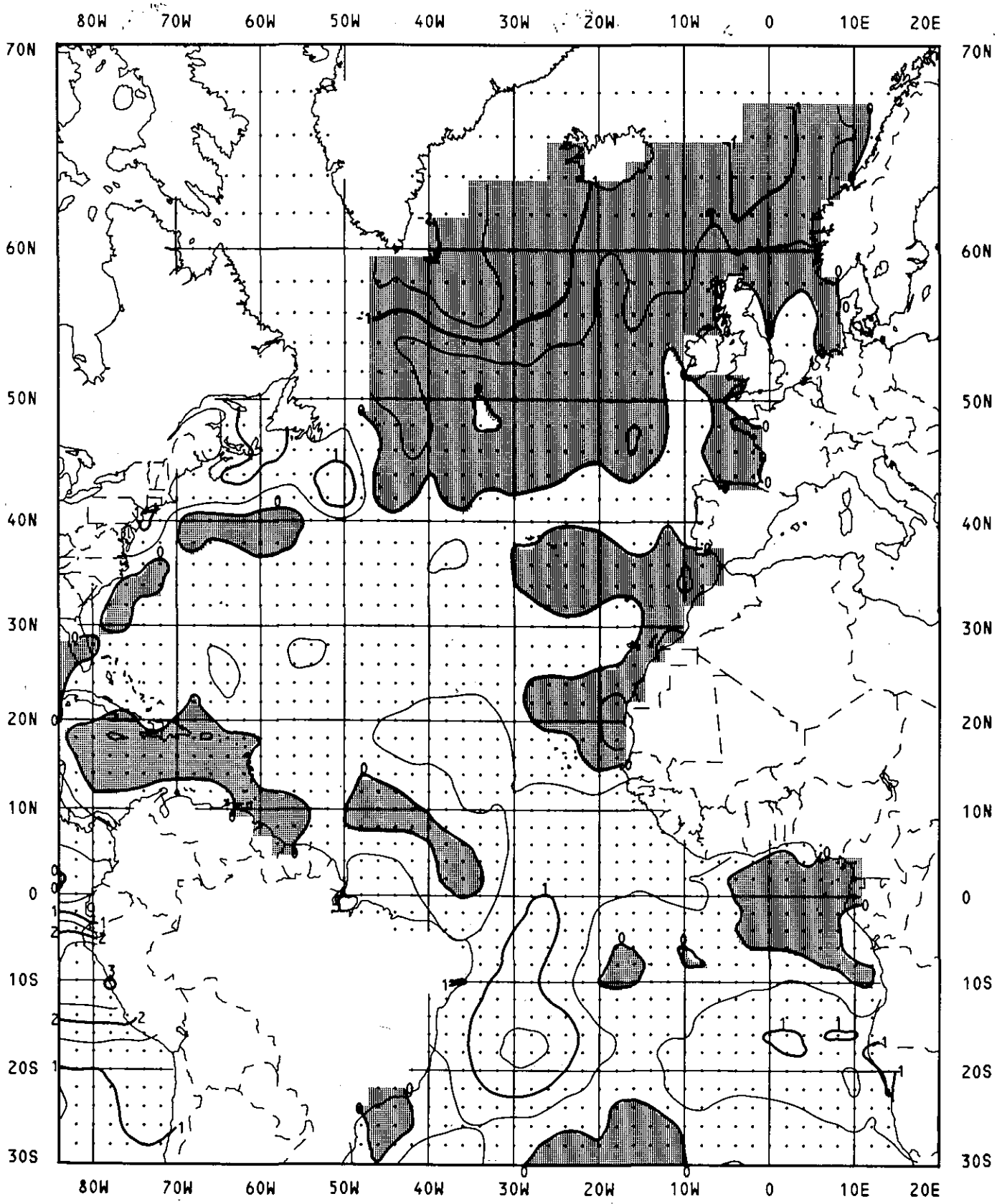
Eastern Pacific Ocean
SST--MONTHLY MEAN (°C)
SATELLITE DATA
September 1983

Monthly mean sea surface temperature is the mean of satellite data within two-degree quadrangles. Contour line interval is 1.0°C.



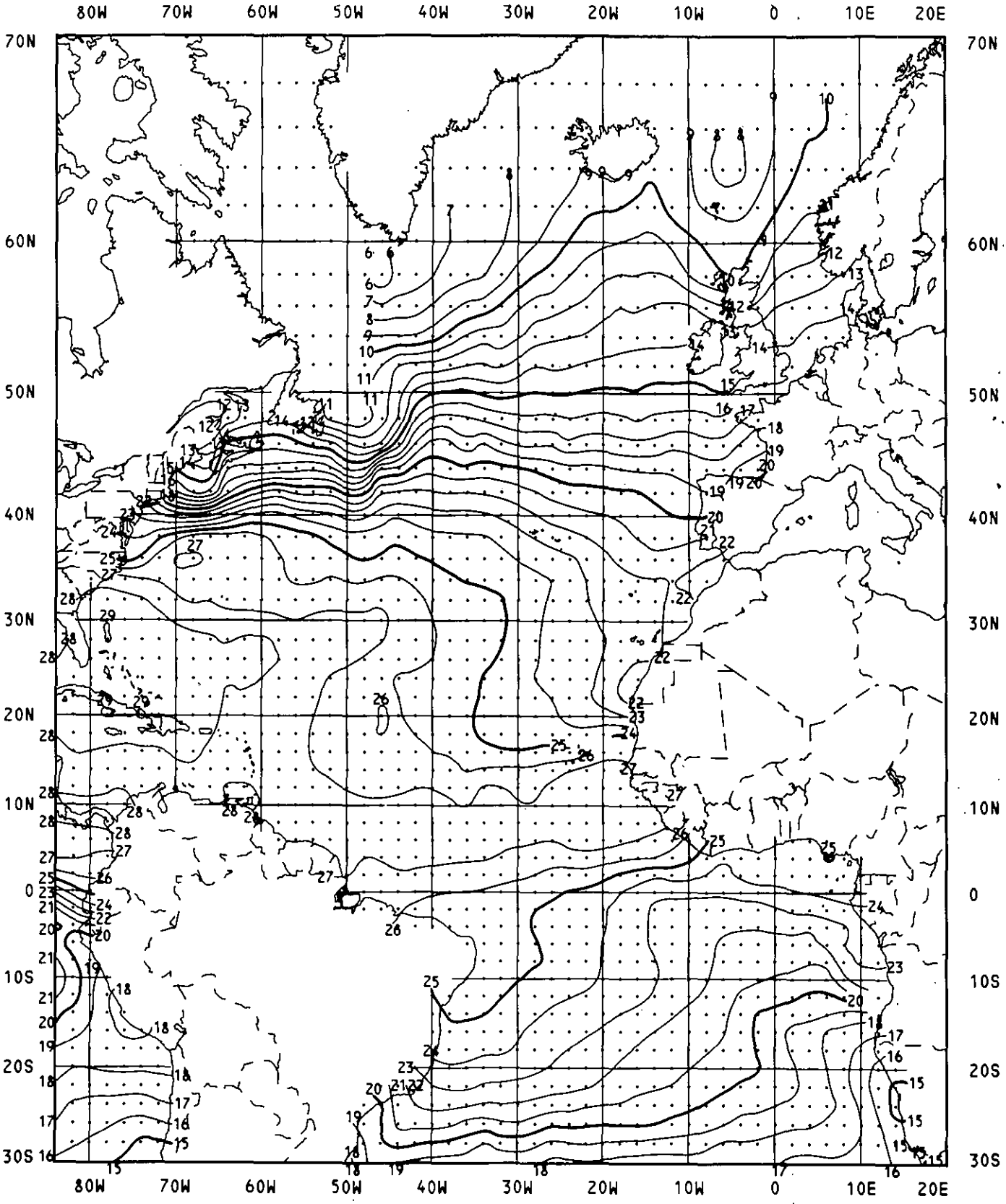
Atlantic Ocean
SST--MONTHLY MEAN (°C)
SHIP and BUOY DATA
September 1983

Monthly mean sea surface temperature is the mean of in-situ data (ships and buoys) within two-degree quadrangles. Contour line interval is 1.0°C.



Atlantic Ocean
SST--MONTHLY ANOMALY (°C)
SHIP and BUOY DATA
September 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.



Atlantic Ocean
SST--MONTHLY MEAN (°C)
SATELLITE DATA
September 1983

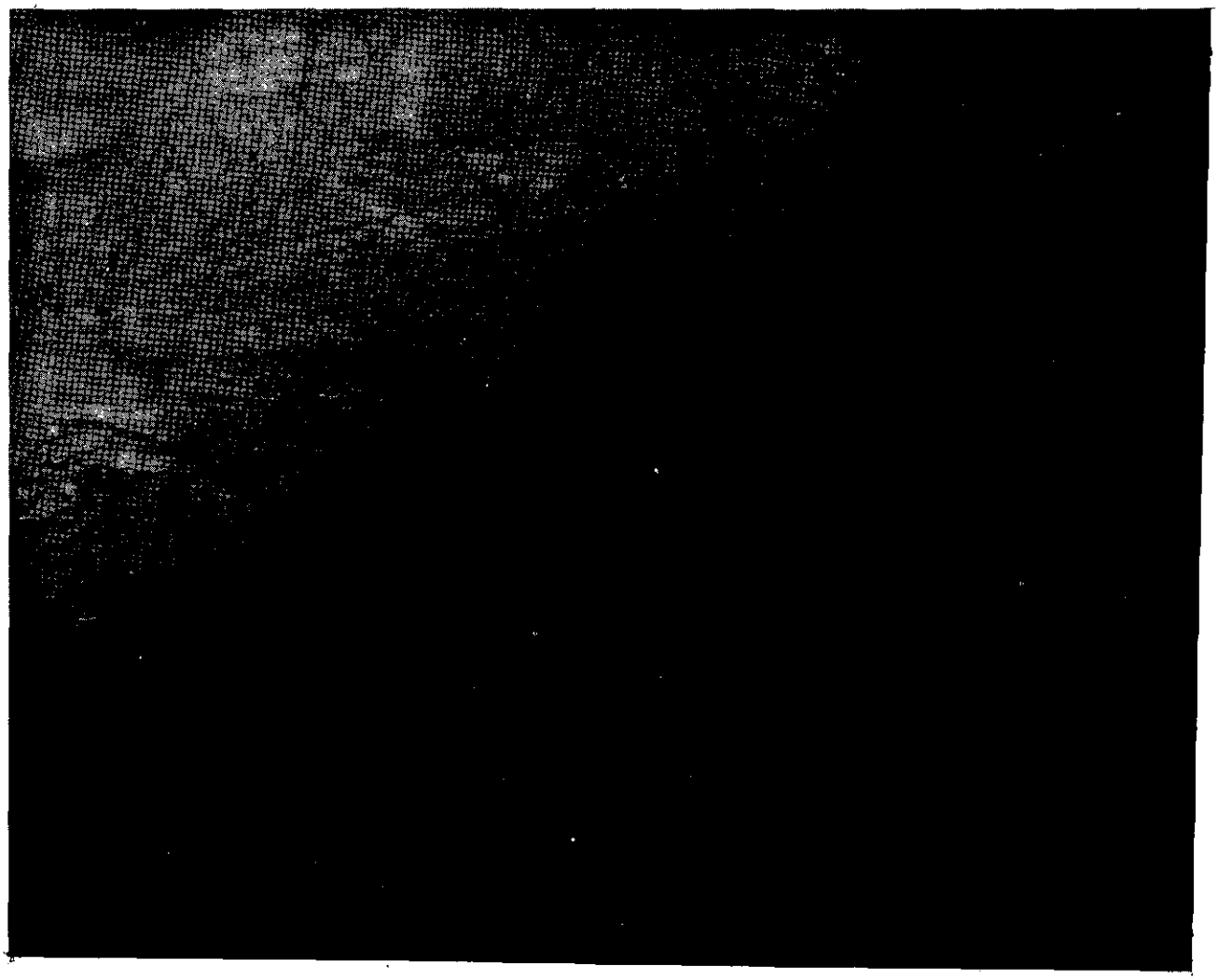
Monthly mean sea surface temperature is the mean of satellite data within two-degree quadrangles. Contour line interval is 1.0°C.

SATELLITE IMAGE OF THE MONTH

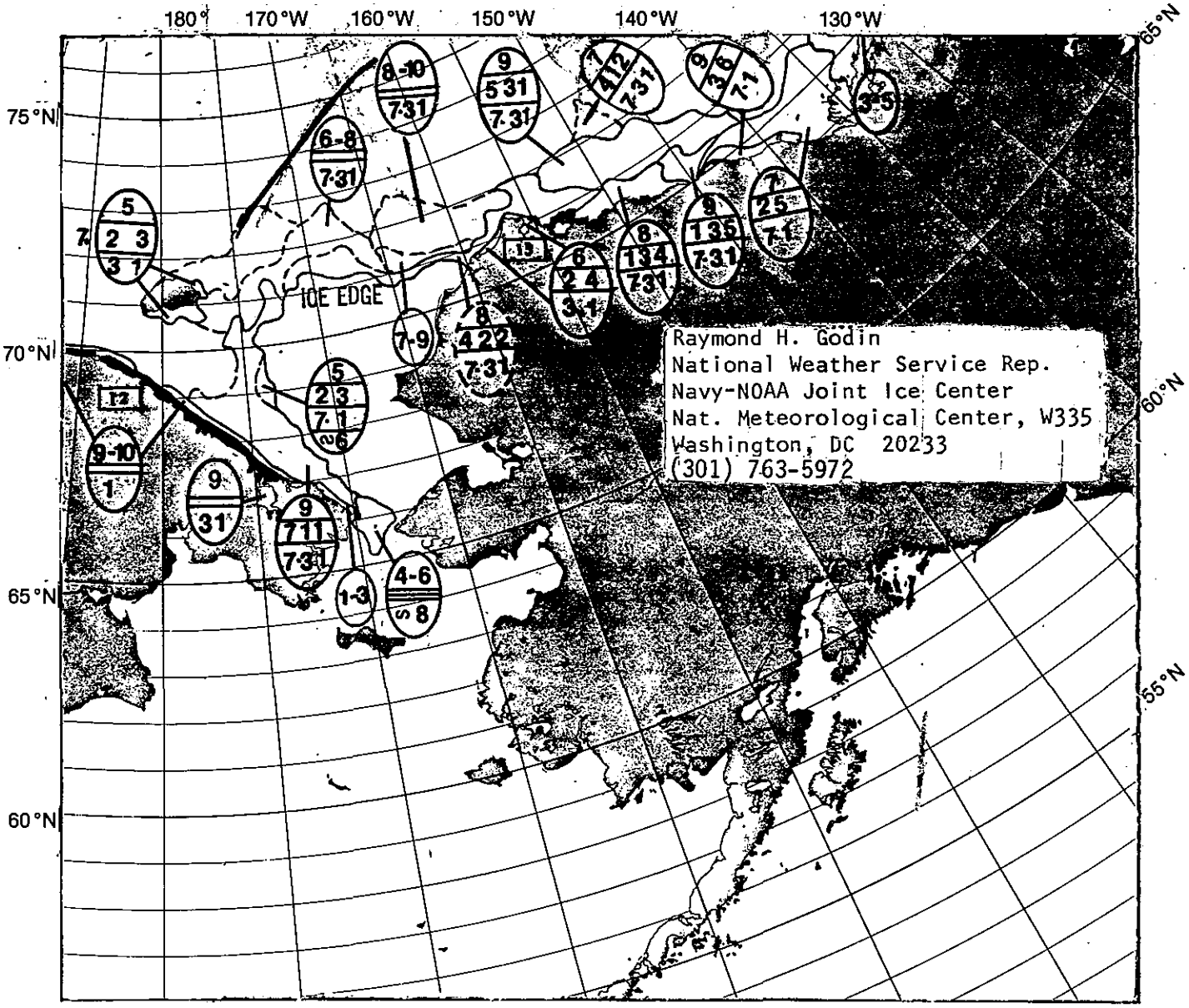
Marcia L. Weaks
Environmental Products Branch, E/SP22
NESDIS, NOAA
Washington, DC 20233
(301) 763-8142

ROSS SEA

This infrared NOAA-8 satellite image of the Ross Sea in Antarctica was taken September 18, 1983. Ice areas can be differentiated from clouds in satellite images because ice usually appears brighter. Several areal concentrations of ice are present in the left half of the image. The uniform portion above the line is ice of 9-10 tenths concentration. In other words, 90-100% of the area is covered with ice. The lighter gray patchy areas below the line are areal ice concentrations of either 6-8 or 4-6 tenths (40-80% of the area is ice covered). Lesser concentrations of ice appear as darker gray shades. The very darkest shades are open water. Because this time of year is springtime in the Southern Hemisphere, the ice extent around Antarctica is close to a maximum. With the emergence of sunlight after a sunless winter, melt season will soon begin.



BERING SEA / NORTH SLOPE ICE ANALYSIS



C = Total ice concentration in the area in tenths.

C_a, C_b, C_c = Concentration of thickest (C_a), 2nd thickest (C_b), and 3rd thickest (C_c) ice

S_a, S_b, S_c = Stage of development of thickest (S_a), 2nd thickest (S_b), and 3rd thickest (S_c) ice.

~C = Concentration of ice within area(s) of strips and patches.

STAGE(S) OF DEVELOPMENT (THICKNESS)

1 = New ice (0-10 cm)
3 = Young ice (10-30 cm)
6 = First year (30-200 cm)
7 = First year thin (30-70 cm)
1. = First year medium (70-120 cm)
4. = First year thick (120-200 cm)
7. = Old ice (survived at least one summer's melt)

EXAMPLES

125 Theoretical thickness of this season's growth (cm).

Fast ice. Sea ice which forms and remains fast along the coast.

Ice boundary visually or satellite observed.

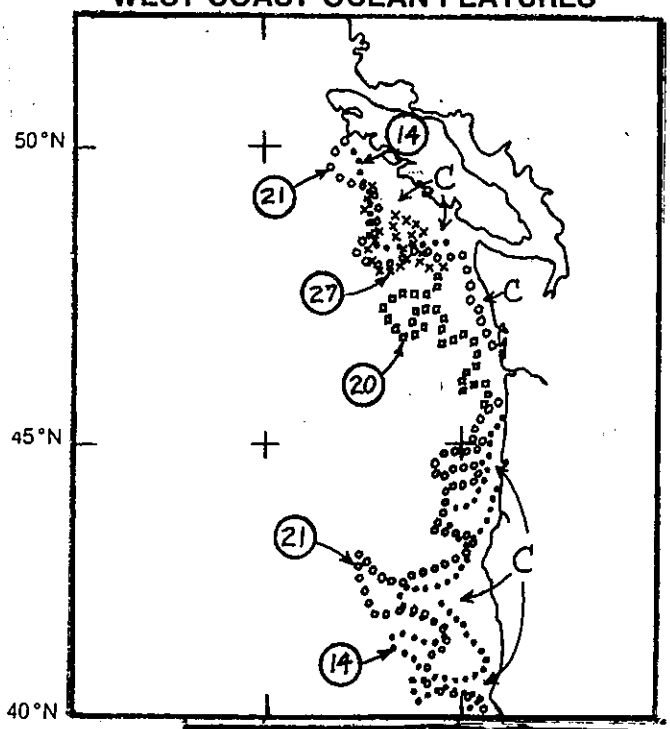
Ice boundary estimated.

SEPTEMBER 1983

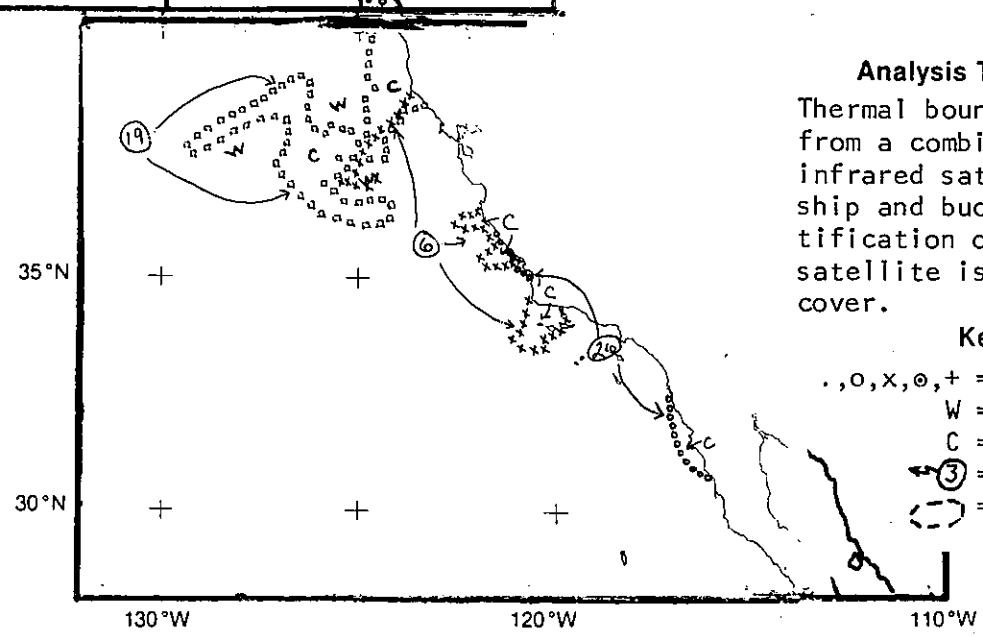
The mean monthly surface pressure circulation depicts a 1005 mb low pressure center near 80°N 160°W. Strong northwesterly geostrophic winds affect ice covered waters west of Barrow (71°N 157°W). Much below normal mean monthly air temperatures and a theoretical ice thickness accumulation of 15 cm of newly formed ice were observed at Barrow. During the month the ice edge expanded from 100 to 200 km west of 170°W. East of 170°W little change was observed. In normal seasons the ice edge continues to recede through late September. For this season ice edge expansion was underway in early September. The current ice edge position is 75 km south of the historical mean east of Barrow and 110 to 140 km south of the mean west of Barrow. Heavy drifting of ice along the Siberian coast has brought ice south of the Bering Strait. In a recently completed evaluation, the 1983 ice season is ranked 25 out of a 31-year record of increasing severity.

WEST COAST OCEAN FEATURES

SEPTEMBER 1983



SST values at all stations started the month at or near the highest yearly values, then decreased dramatically by the end of the month as Autumn transition appeared on schedule. In offshore areas, SSTs dropped by about 1°C between the beginning and end of the month. Decreases at coastal stations were more dramatic, ranging from 5°C at southern Washington stations to 3°C near Cape Mendocino (40°N 124°W). The coastal cooling associated with the seasonal transition was augmented by greater than normal coastal upwelling along the entire coast. The most rapid cooling occurred during September 15-19, when most coastal and near-shore stations reported drops between 1 and 3°C. This corresponded to a period of very strong upwelling along the coast south of 47°N. Monthly mean SSTs at all stations were near or slightly below their normal values, indicating that no resurgence of anomalous warming occurred.



Analysis Techniques

Thermal boundaries are determined from a combination of enhanced infrared satellite imagery and ship and buoy observations. Identification of these features by satellite is limited by cloud cover.

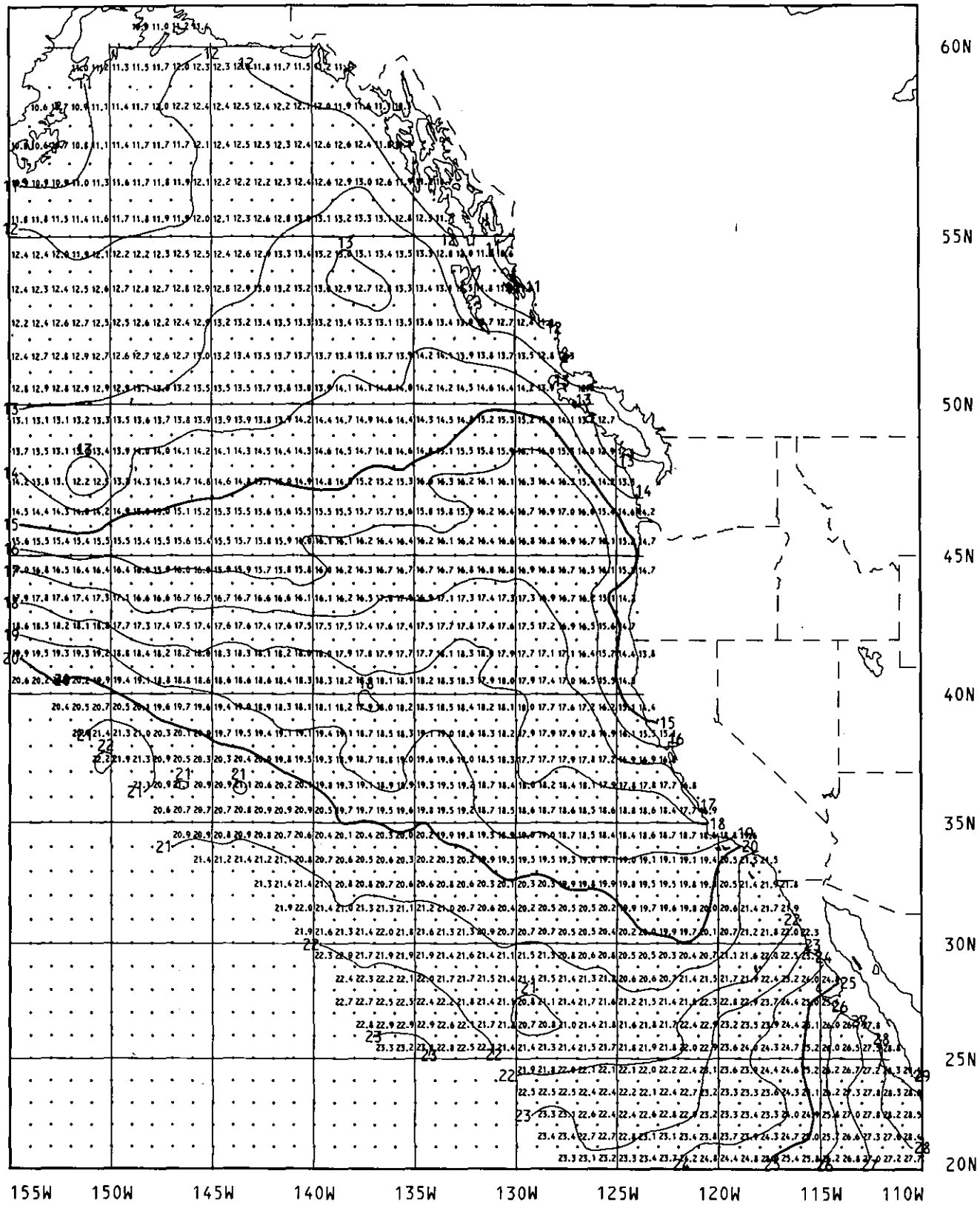
Key

.,o,x,⊙,+ = thermal boundaries
W = warm
C = cold
(3) = date of feature
(- -) = outline of water mass feature

North Panel
Kent Short
NOAA/Northwest Regional Ocean Service Center
7600 Sand Point Way NE
Bin C15700
Seattle, WA 98115
(206) 527-6604

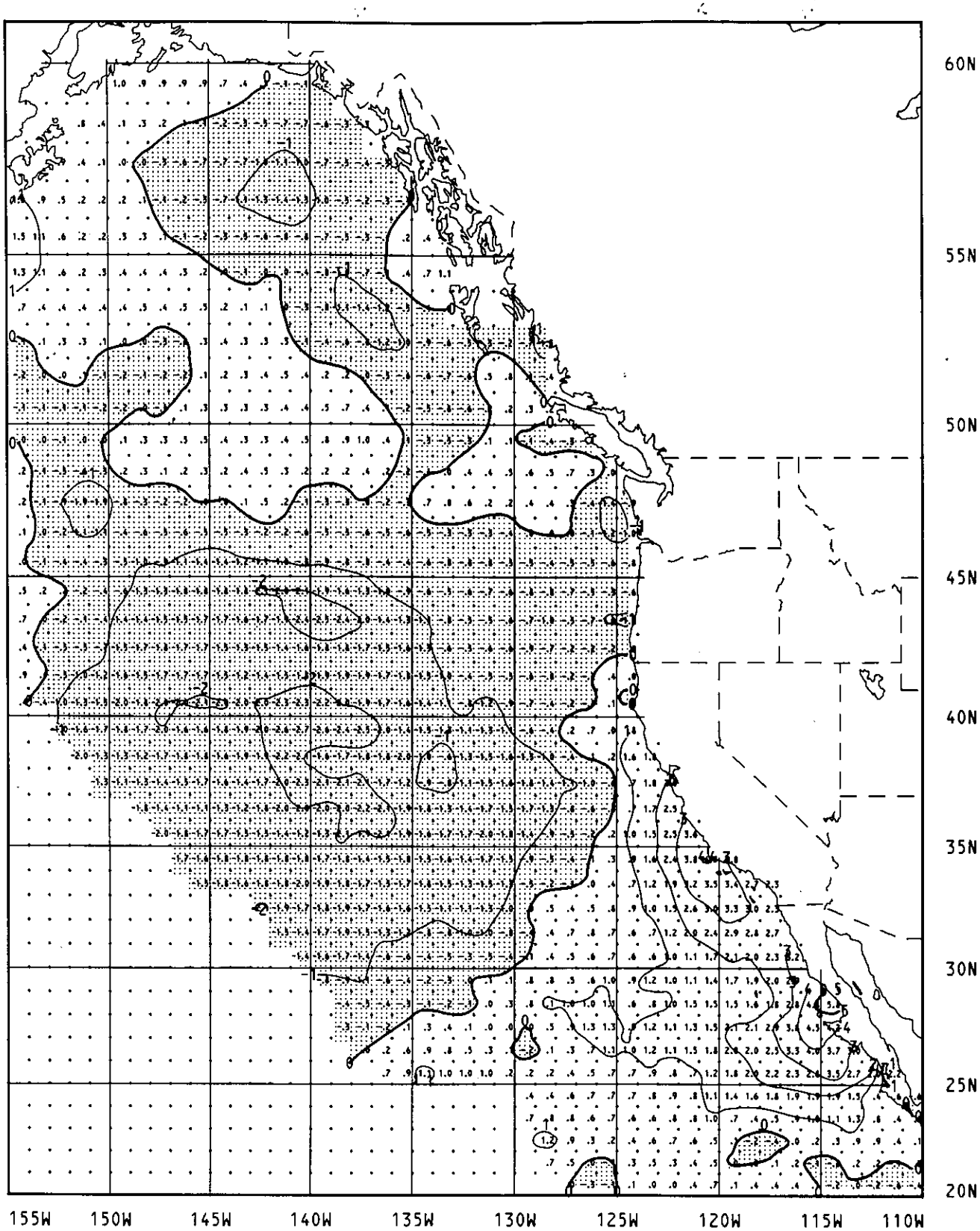
South Panel
Ernest Daghir
NOAA/NESDIS
Satellite Field Service Station
660 Price Avenue
Redwood City, CA 94063
(415) 364-2422

Weaker than normal upwelling continued during September due to a low frequency of sustained northwesterly winds. Upwelling was strongest September 13-19 particularly near Pt. Arena and Cape Mendocino but was generally weak during the remainder of September. Very little upwelling was observed along the Baja California coastline. Mean monthly SSTs along the entire coast were above normal and ranged from 0.5°C at 38°N to 4.0°C around San Diego at 33°N. The mean SSTs north of 30°N and west of 128°W were 1.5°C below normal. Warm anomalies ranging from 0.5° to 2.0°C were found along the coast from San Francisco Bay to Baja with the greatest warming occurring around Pt. Conception. There was a cool anomaly of 0.5° to 1.0°C near the coast between 38° and 40°N.



West Coast
SST--MONTHLY MEAN (°C)
September 1983

Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.



West Coast
SST--MONTHLY ANOMALY (°C)
September 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.

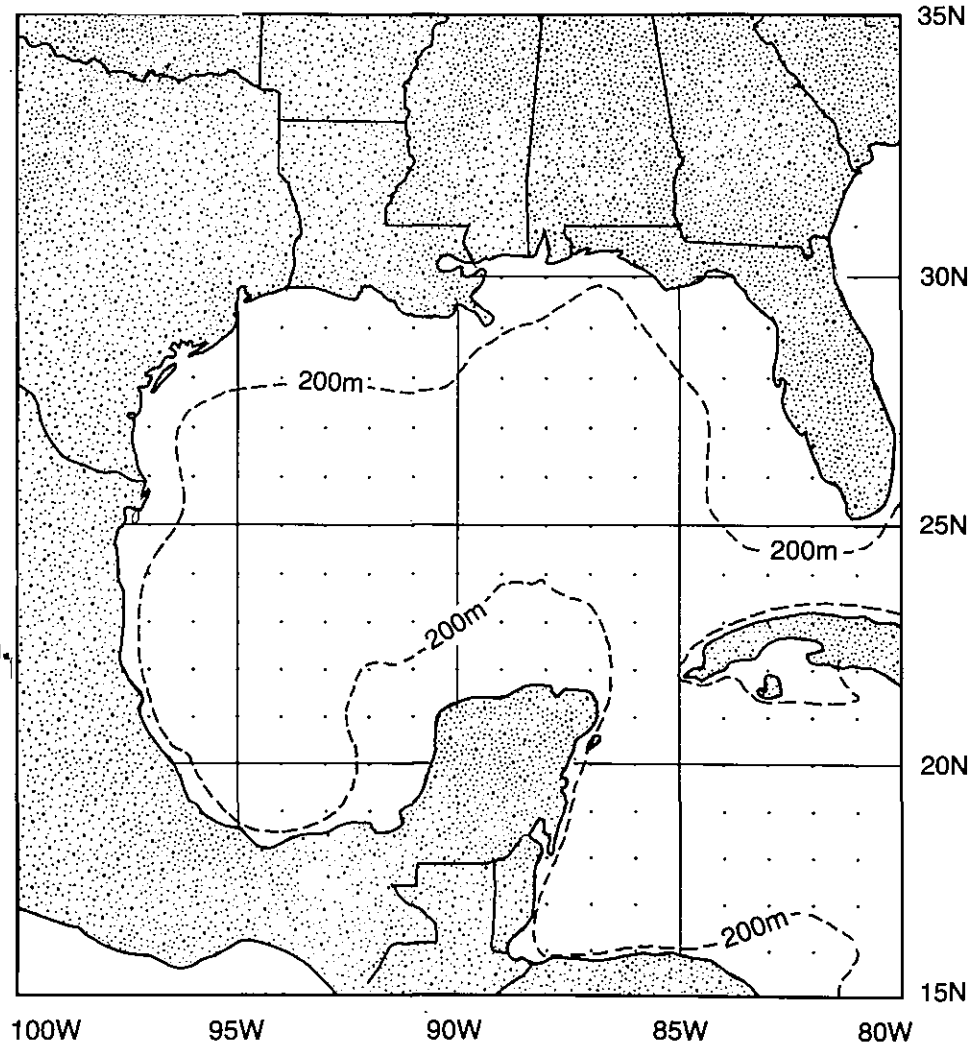
EAST COAST OCEAN FEATURES

The end of this month's positions of the Gulf Stream System and its associated eddies are shown for the NW Atlantic and the Gulf of Mexico. The Gulf Stream and Loop Current boundaries are located by infrared satellite imagery or XBT (expendable bathythermograph) data. Anticyclonic eddies are labeled a-z in the Gulf of Mexico and 1-99 in the NW Atlantic. Cyclonic eddies are labeled A-Z. Arrows on eddies indicate direction of circulation. Warm-core or anticyclonic eddies rotate clockwise; cold-core or cyclonic eddies rotate counterclockwise. The line to the eddy center shows the net translation since last month or since last observed. Eddies or sections of the Gulf Stream System which were not observed during the month are not shown on the analysis chart. The long arrows at the bottom of the chart indicate the date of data used.

Data used in this analysis include:
- NOAA satellite infrared imagery, NESDIS
- Bathythermograph data, National Meteorological Center of National Weather Service
- Oceanographic Analysis, A daily detailed analysis issued by National Weather Service/NESDIS

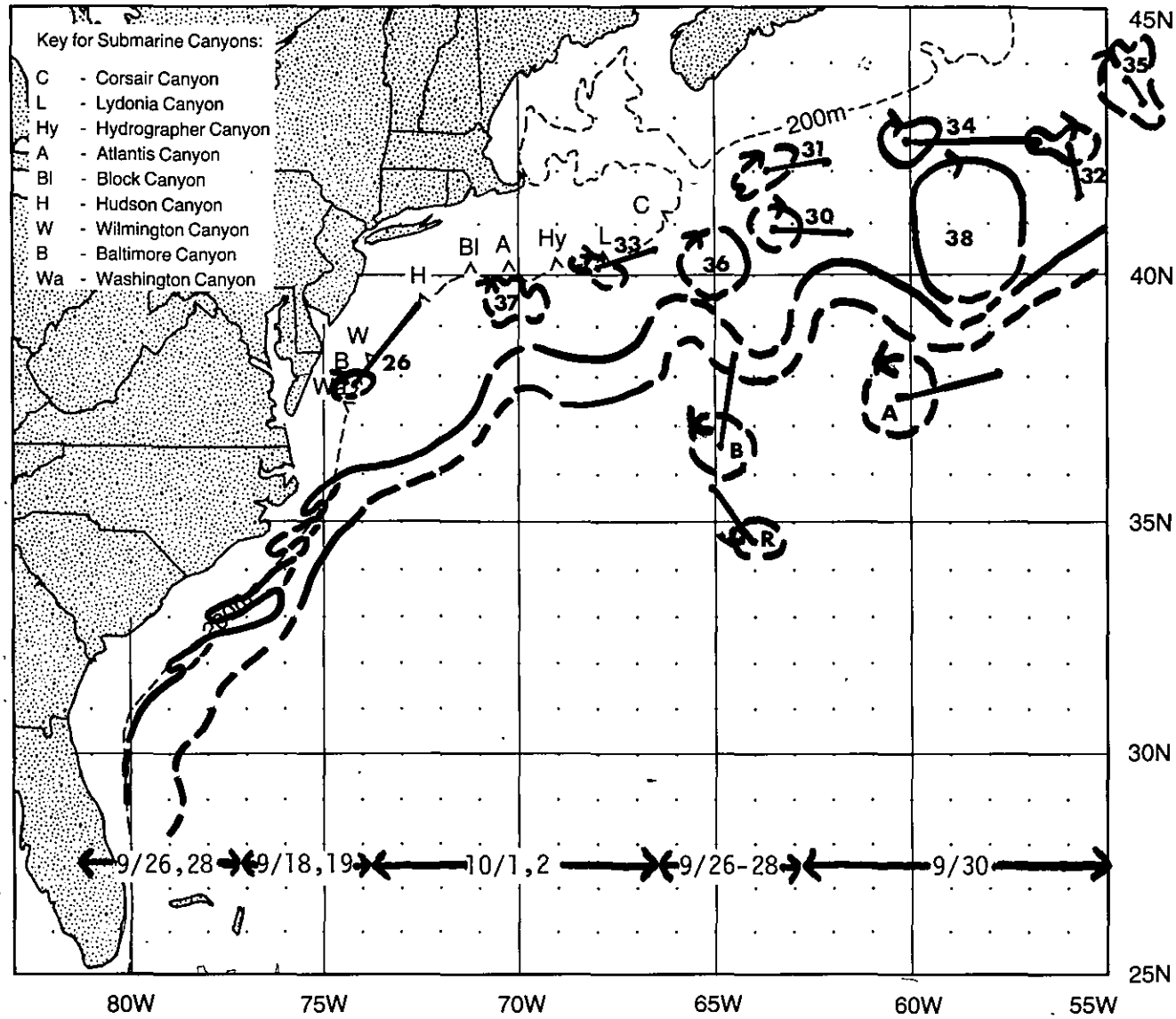
Jenifer Wartha-Clark
NOAA/NWS
Washington, DC 20233
(301) 763-8088

Ann Bell
NOAA/NWS
National Meteorological Cen.
Washington, DC 20233
(301) 763-8056



SEPTEMBER 1983

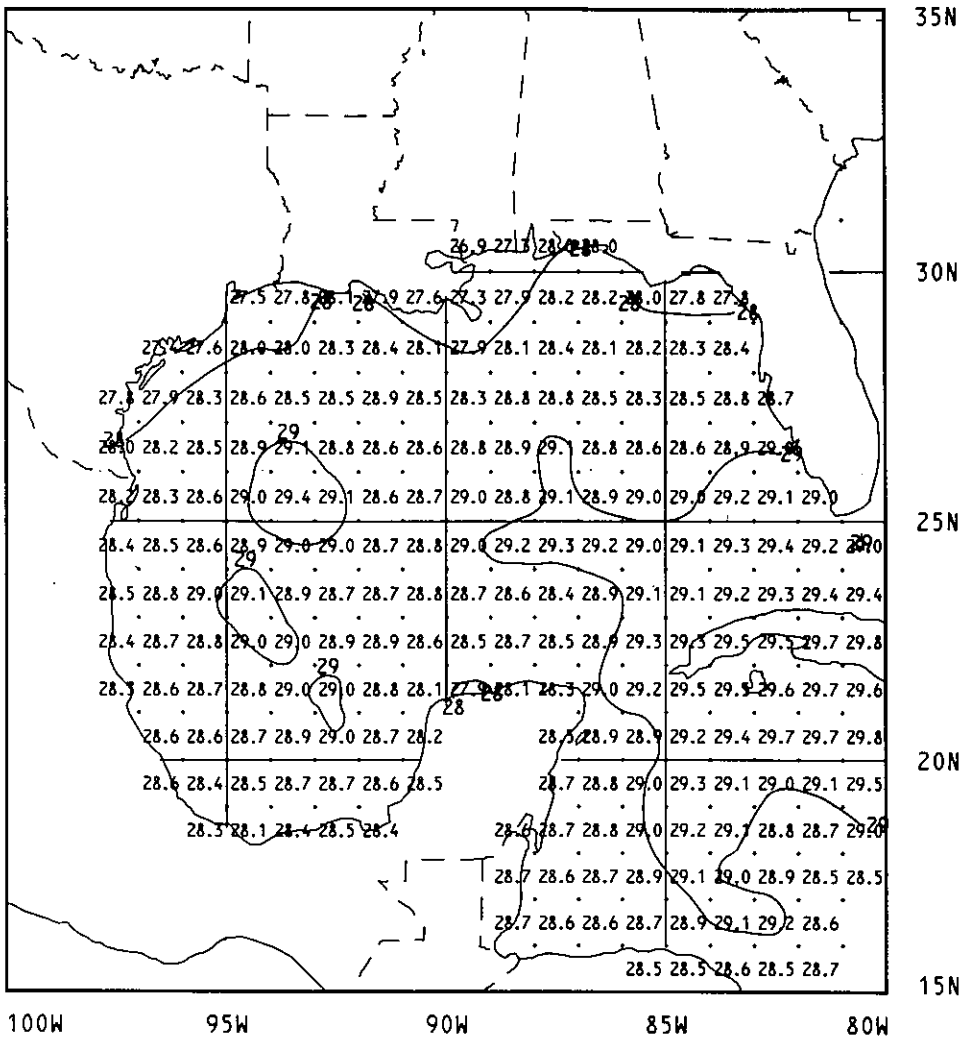
Near isothermal conditions have prevailed in the Gulf of Mexico since early July. The NOAA Data Buoy Center suspects that eddy g no longer exists. Hurricane Alicia and Barry apparently pushed the drifting data buoy out of the area. Eddy g apparently moved 85 km WSW from September 1-20 before dissipating.



One anticyclonic eddy was absorbed by the Gulf Stream and three were formed during September. Eddy 29 was absorbed by the Gulf Stream near 36°N 74°W on September 18. Eddy 36 formed from a Gulf Stream meander near 40°N 65°W on September 9. Eddy 37 apparently was formed from a long warm water filament associated with the Gulf Stream near 39°N 69°30W around September 19. Eddy 38 was formed from a Gulf Stream meander near 42°N 58°W on September 21. Two anticyclonic eddies were newly named during September. Eddy 34 was first partially observed on July 28 near 42°30N 56°30W. Its origin was not known. It was not listed as a new eddy in the August 1983 OMS because it was only observed once (during July). During September, eddy 34 was observed repeatedly. Eddy 34 translated 380 km W from July 28-September 30. Eddy 35, first observed near 43°N 54°W on July 28, moved 55 km NW by September 22. Eddy 26 moved 235 km SW. Eddy 33 moved 140 km WSW when last observed on September 16. Eddy 30 translated 180 km W. Eddy 32 translated 110 km NNW. Eddy 31 moved 130 km W when last observed on September 21. The South Wall of the Gulf Stream was last seen by satellite imagery on September 21 and 22.

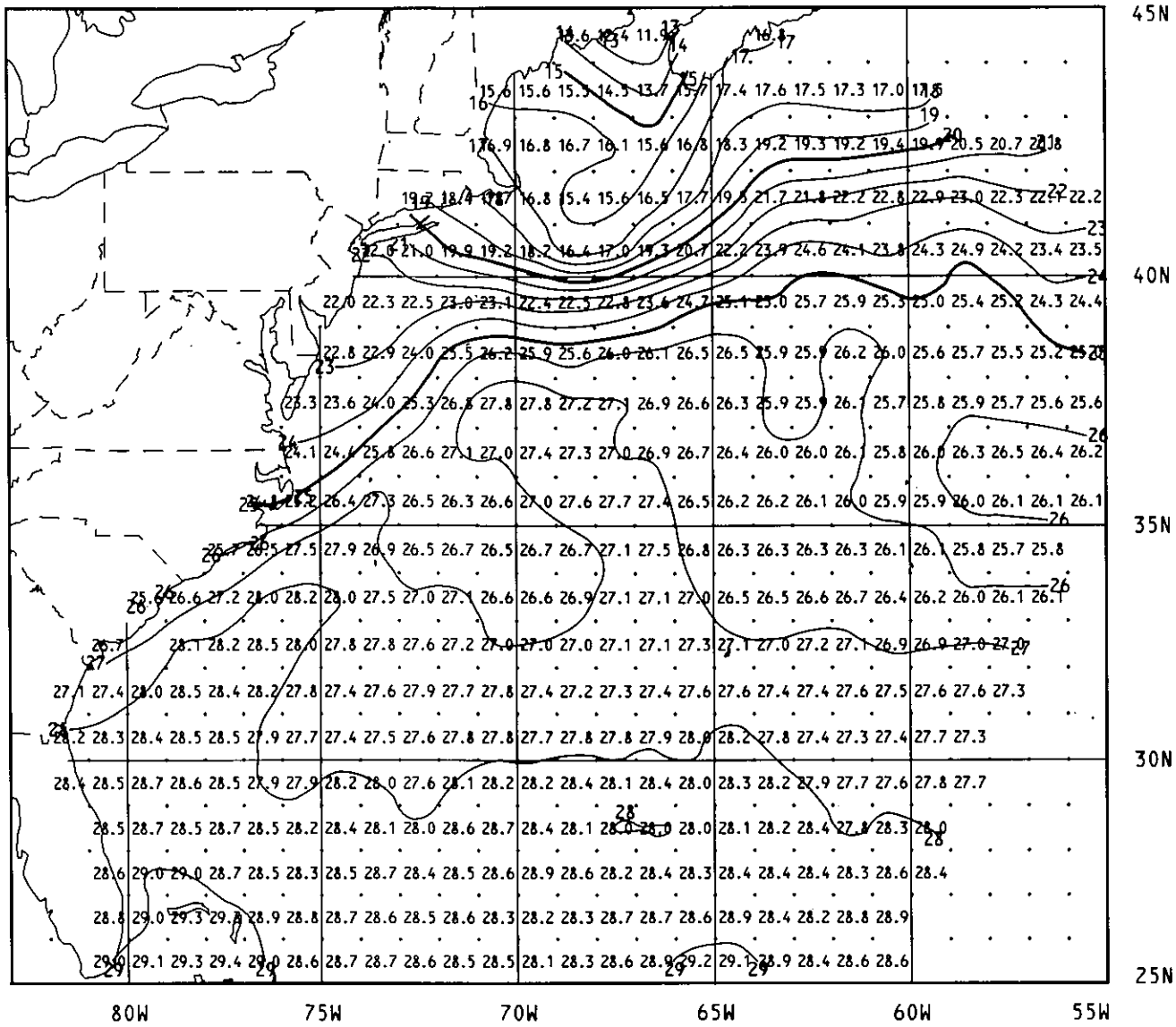
One cyclonic eddy was absorbed by the Gulf Stream during the month. Eddy X was absorbed by a Gulf Stream meander near 37°N 68°W on September 5. Eddy B was absorbed by a Gulf Stream meander near 37°N 64°W on September 10 but emerged again near 37°N 65°W on September 12. Eddy B moved 225 km SSW when last partially observed on September 21. Eddy A moved 235 km WSW when last partially observed around September 12. Eddy R traveled 150 km SE when last partially observed on September 10.

EAST COAST SST-
MONTHLY MEAN



Gulf of Mexico
SST--MONTHLY MEAN (°C)
September 1983

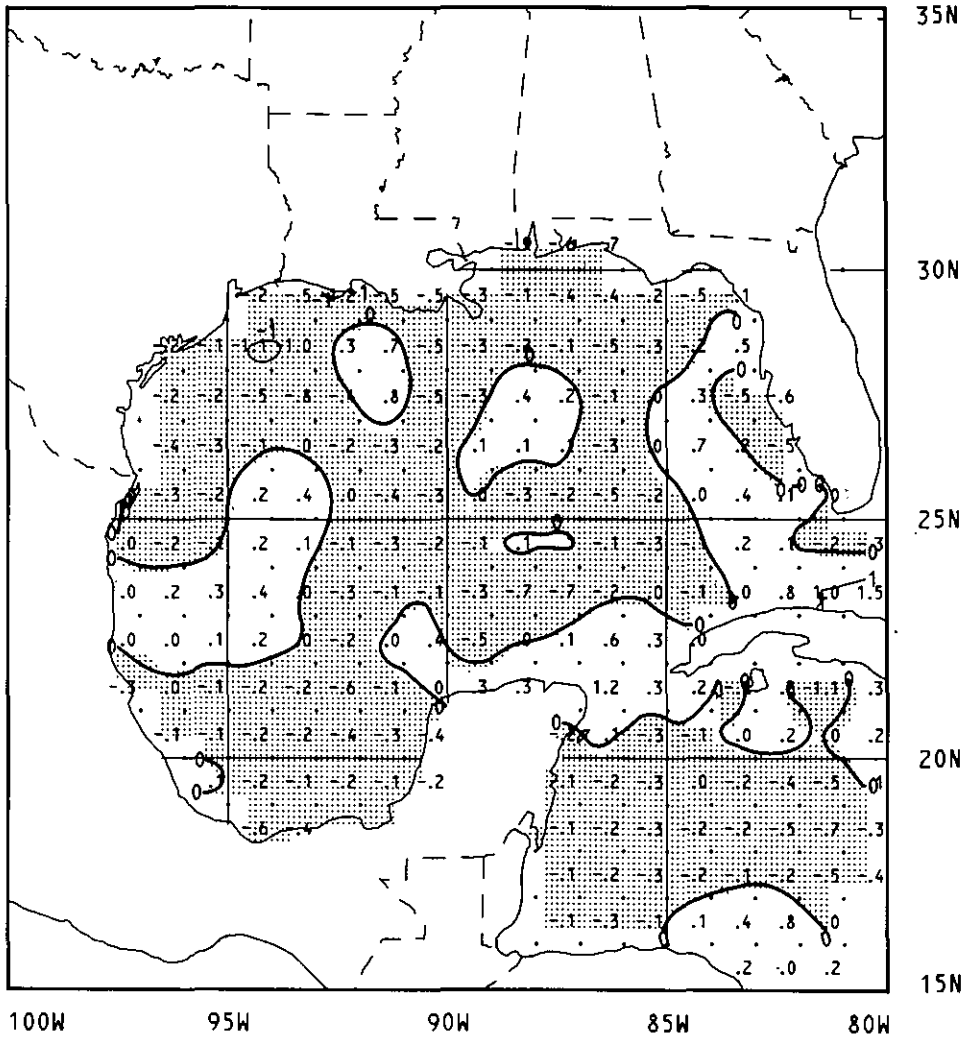
Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.



NW Atlantic Ocean
SST--MONTHLY MEAN (°C)
September 1983

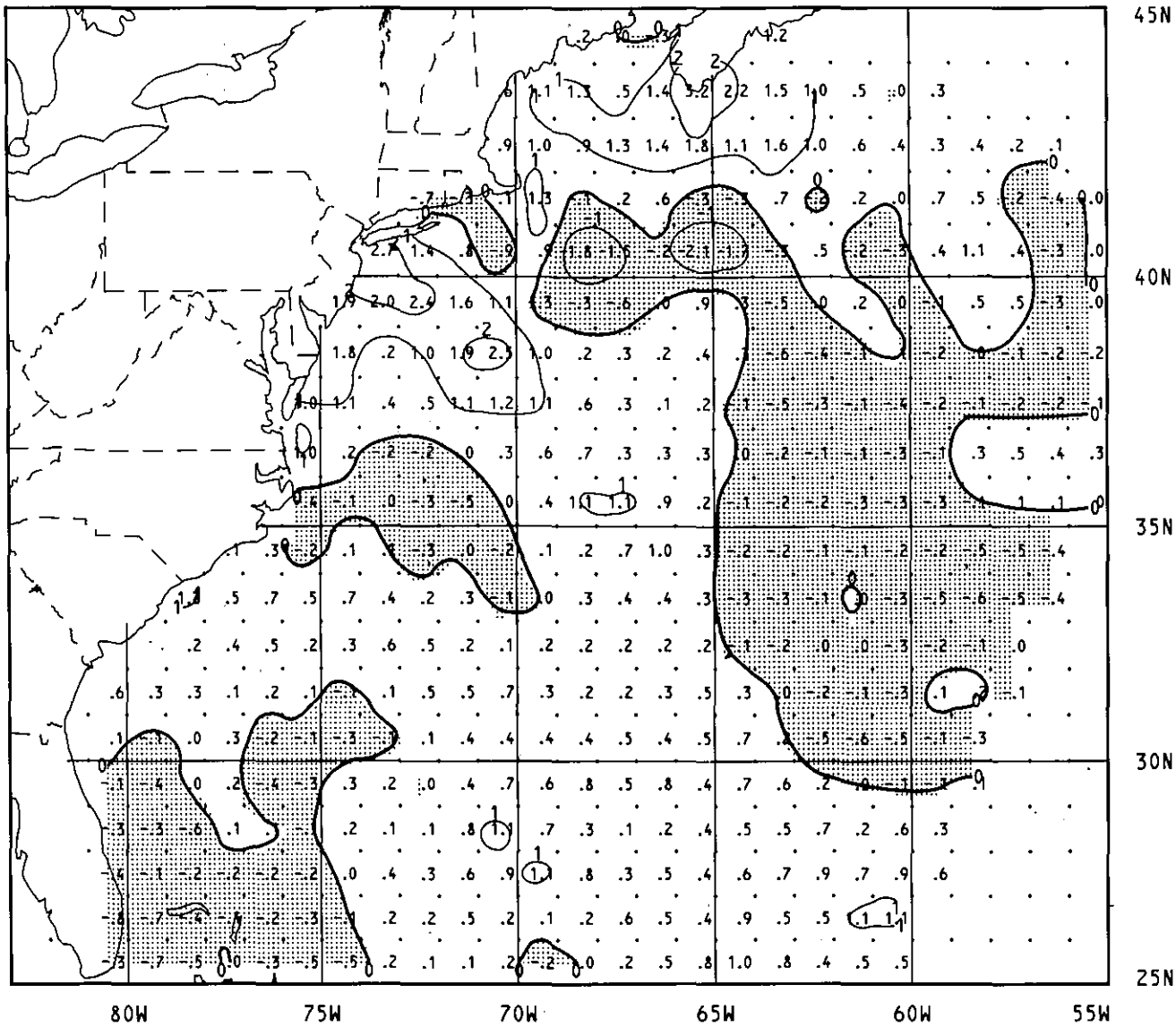
Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.

EAST COAST SST-ANOMALY



Gulf of Mexico
SST--MONTHLY ANOMALY (°C)
September 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.



NW Atlantic Ocean
SST--MONTHLY ANOMALY (°C)
September 1983

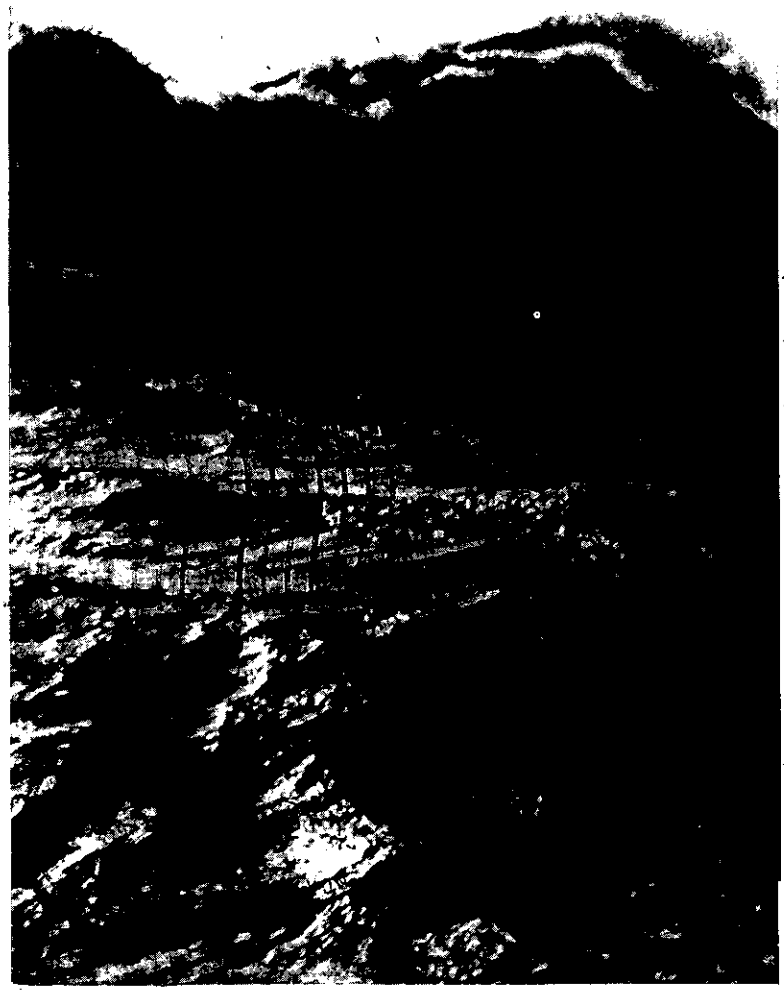
Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.

*U.S. GOVERNMENT PRINTING OFFICE : 1983 0-421-013/408

NOAA LISD SEATTLE

OCEANOGRAPHIC Monthly Summary

Volume III Number 10 October 1983



Contents

3 OceaNotes

4 Pacific SST - monthly mean, ship and buoy data

6 Pacific SST - anomaly

8 Pacific SST - monthly mean, satellite data

10 Atlantic SST - monthly mean, ship and buoy data

11 Atlantic SST - anomaly

12 Atlantic SST - monthly mean, satellite data

13 Satellite IMAGE of the Month

14 Bering Sea/North Slope ICE, with text

15 West Coast OCEAN FEATURES, with text

16 West Coast SST - monthly mean

17 West Coast SST - anomaly

18 East Coast OCEAN FEATURES, with text

20 East Coast SST - monthly mean

22 East Coast SST - anomaly

24 Subscription Information

U.S. DEPARTMENT OF COMMERCE • National Oceanic and Atmospheric Administration
National Weather Service
National Environmental Satellite, Data, and Information Service

Oceanographic Monthly Summary is published by the National Weather Service and the National Environmental Satellite, Data, and Information Service (NESDIS). *Oceanographic Monthly Summary* contains sea surface temperature (SST) analyses on both regional and ocean basin scales for the Atlantic and Pacific Oceans. Two ocean basin SST analyses are presented, one based on in-situ data and another based solely on satellite data. An ocean basin SST anomaly derived from the in-situ data is also shown; it uses the National Climatic Center (NCC) Climatology*. The regional SST analyses are based upon a combination of in-situ and satellite data measurements. The regional SST anomalies use the Robinson-Bauer Climatology*. *Oceanographic Monthly Summary* also contains Alaskan sea ice information and ocean feature information for contiguous U.S. ocean regions.

Oceanographic Monthly Summary welcomes articles containing information of interest to *Oceanographic Monthly Summary* readers, such as, news on operational oceanography, unusual ocean feature phenomena, etc. Contributions should be sent to the editor (address below). Accepted material will appear in the OceaNotes section of *Oceanographic Monthly Summary*. Contributions can be published as quickly as the next monthly issue.

If you are interested in receiving *Oceanographic Monthly Summary* regularly, please refer to the back cover for subscription information.

*Reynolds, R.W., 1982. A Monthly Averaged Climatology of Sea Surface Temperatures; *NOAA Technical Report NWS 31.*

*Robinson, M.K., 1976. Atlas of North Pacific Ocean Monthly Mean Temperatures and Mean Salinities of the Surface Layer; *NavOceano Ref. Pub. 2.*

Robinson, M.K., R. A. Bauer and E.H. Schroeder, 1979. Atlas of North Atlantic-Indian Ocean Monthly Mean Temperatures and Mean Salinities of the Surface Layer; *NavOceano Ref. Pub. 18.*

Oceanographic Monthly Summary

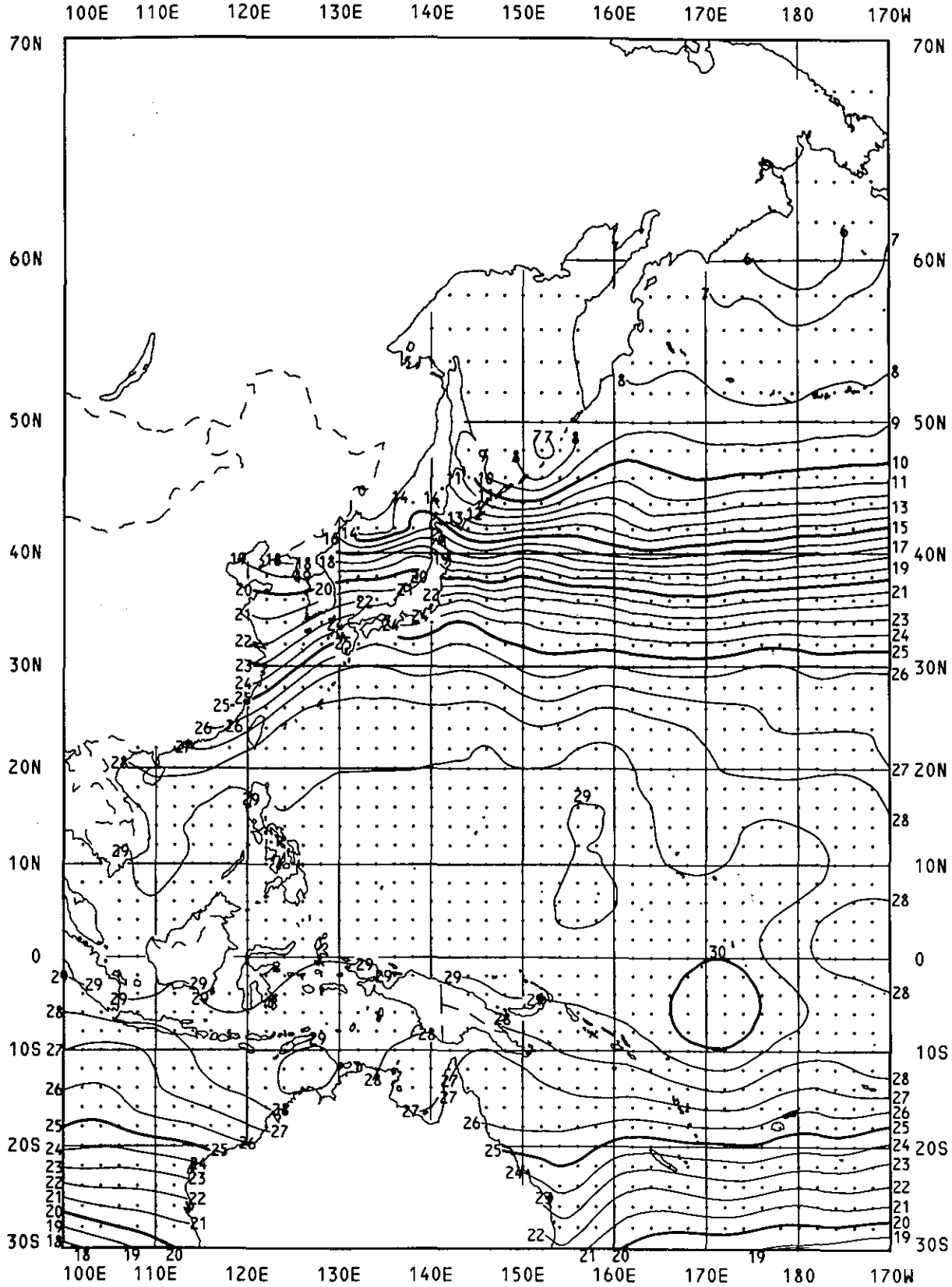
Editor: Jenifer Wartha-Clark
NOAA, NWS
Washington, DC 20233
(Telephone: (301) 763-8088)

Assistant Editor: Ann Bell
NOAA, NWS
National Meteorological Center, W/NMC21
Washington, DC 20233
(Telephone: (301) 763-8133)

SST Computer Analyses are prepared by:
William H. Gemmill
Marine Products Branch, W/NMC21
National Meteorological Center
National Weather Service, NOAA
Washington, DC 20233
(Telephone: (301) 763-8133)

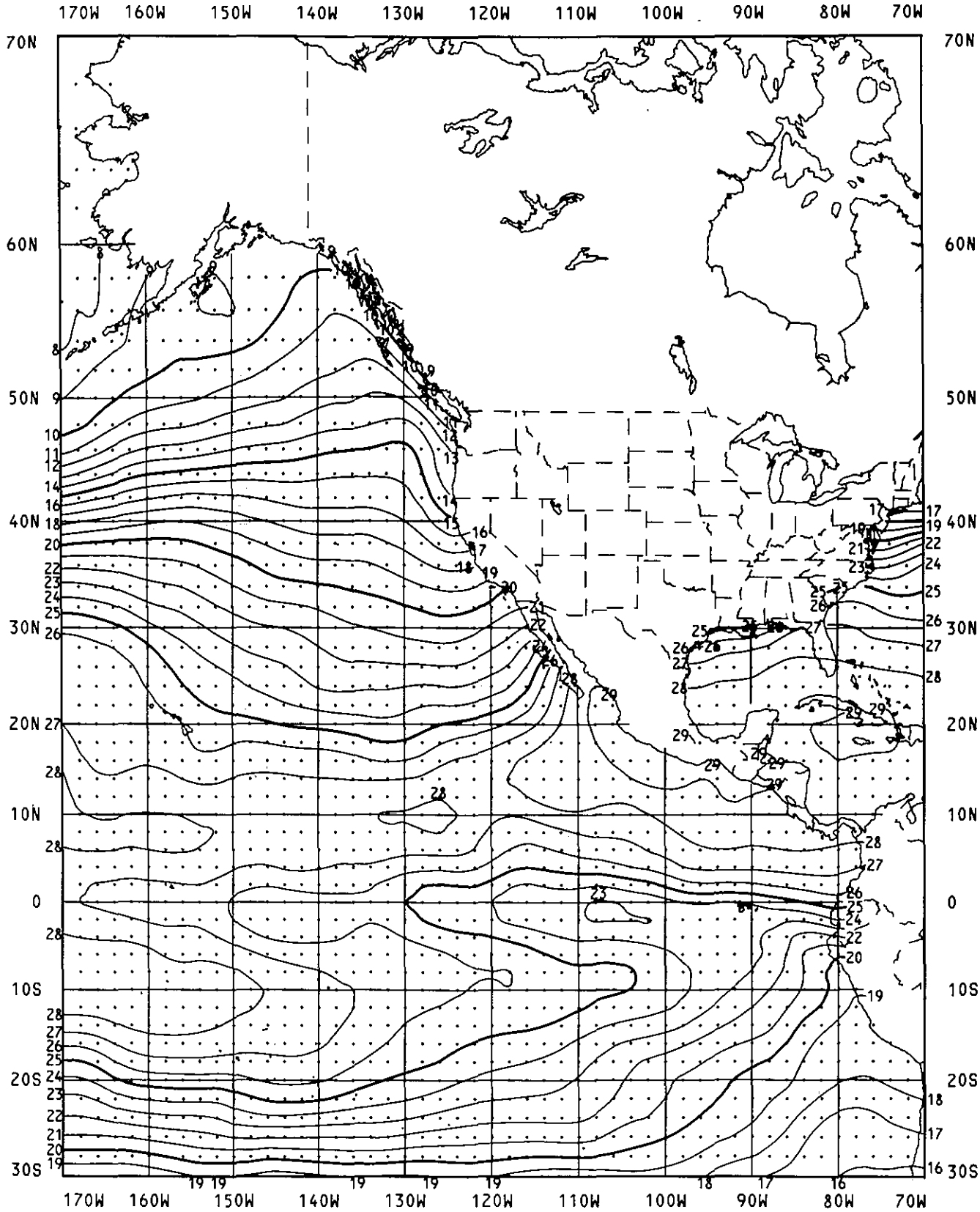
SATELLITE SEA SURFACE TEMPERATURE IMPROVEMENTS

The accuracy and geographic coverage of nighttime satellite sea surface temperatures degraded during July and August as a result of increased noise in one of the satellite instrument channels. Production of nighttime satellite measurements was halted on July 25. In an attempt to solve the noise problem, the instrument was heated for the period September 20-28 in order to drive pollutants off the sensor optics and electronics. No satellite sea surface temperature measurements were made during this period. The heating procedure eliminated 98% of the noise. Nighttime satellite-buoy comparisons once again show root mean square (RMS) differences of less than 1°C. Daytime RMS differences continue to be slightly greater than 1°C.



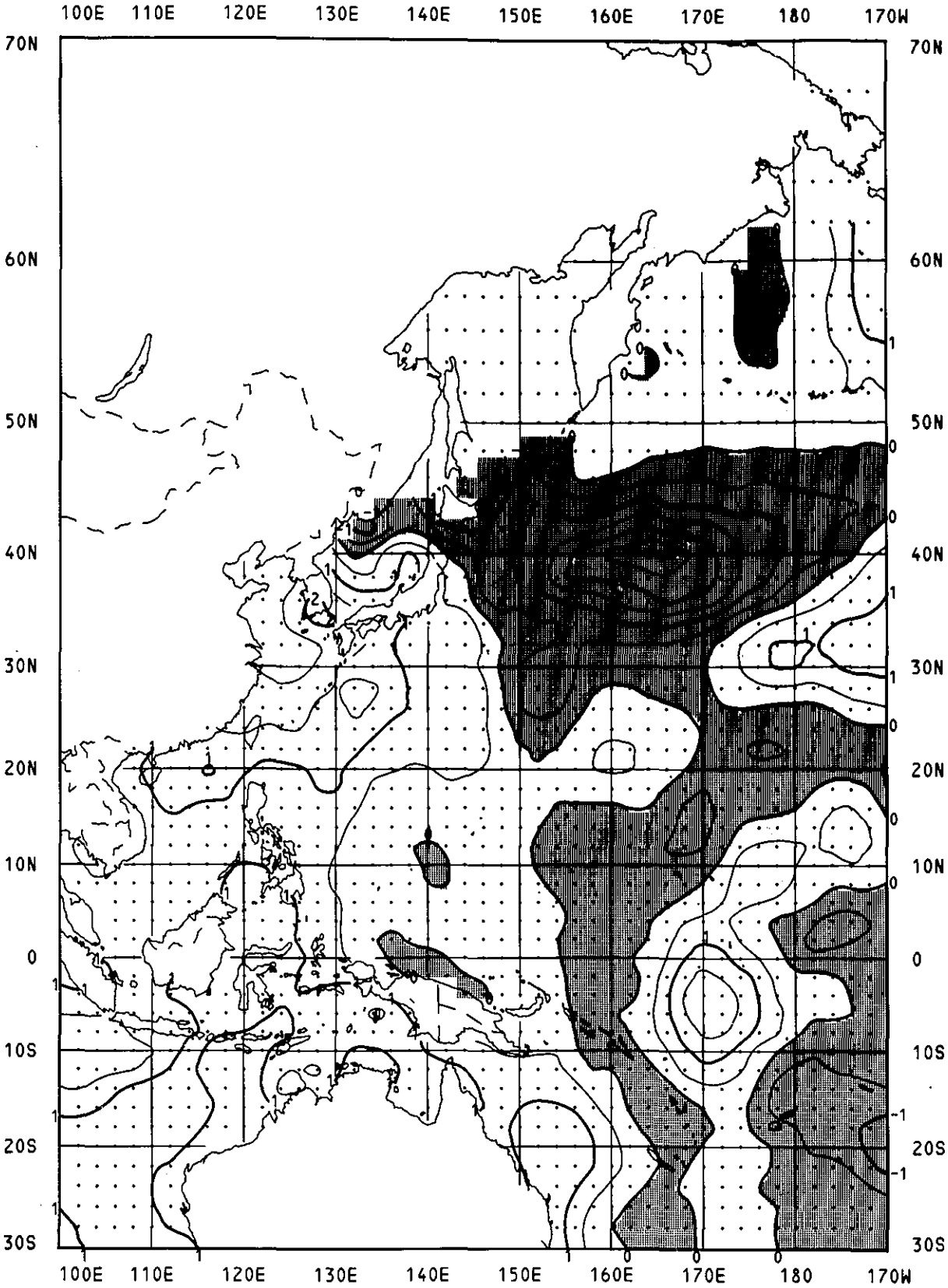
Western Pacific Ocean
SST--MONTHLY MEAN (°C)
SHIP and BUOY DATA
October 1983

Monthly mean sea surface temperature is the mean of in-situ data (ships and buoys) within two-degree quadrangles. Contour line interval is 1.0°C.



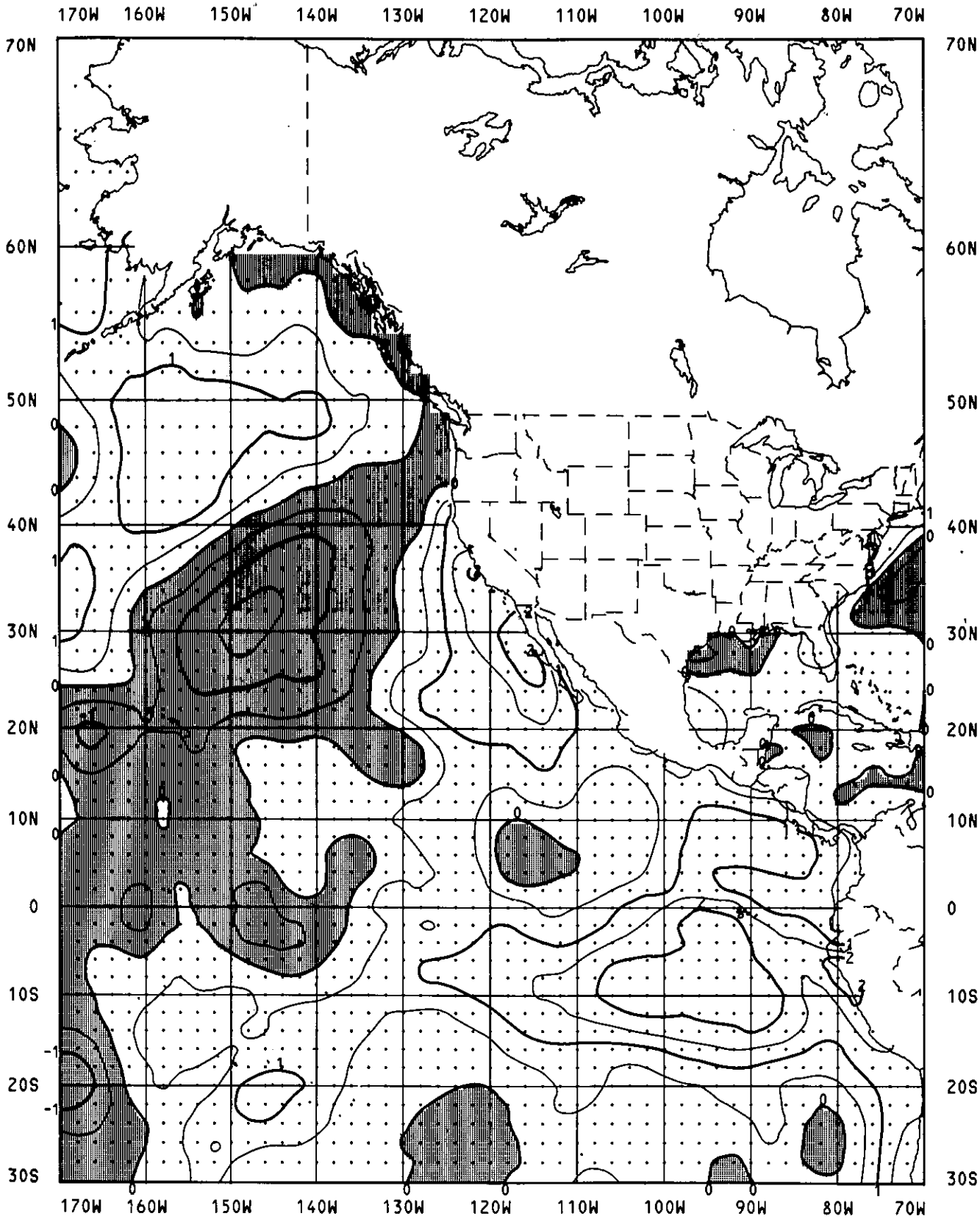
Eastern Pacific Ocean
SST--MONTHLY MEAN (°C)
SHIP and BUOY DATA
October 1983

Monthly mean sea surface temperature is the mean of in-situ data (ships and buoys) within two-degree quadrangles. Contour line interval is 1.0°C.



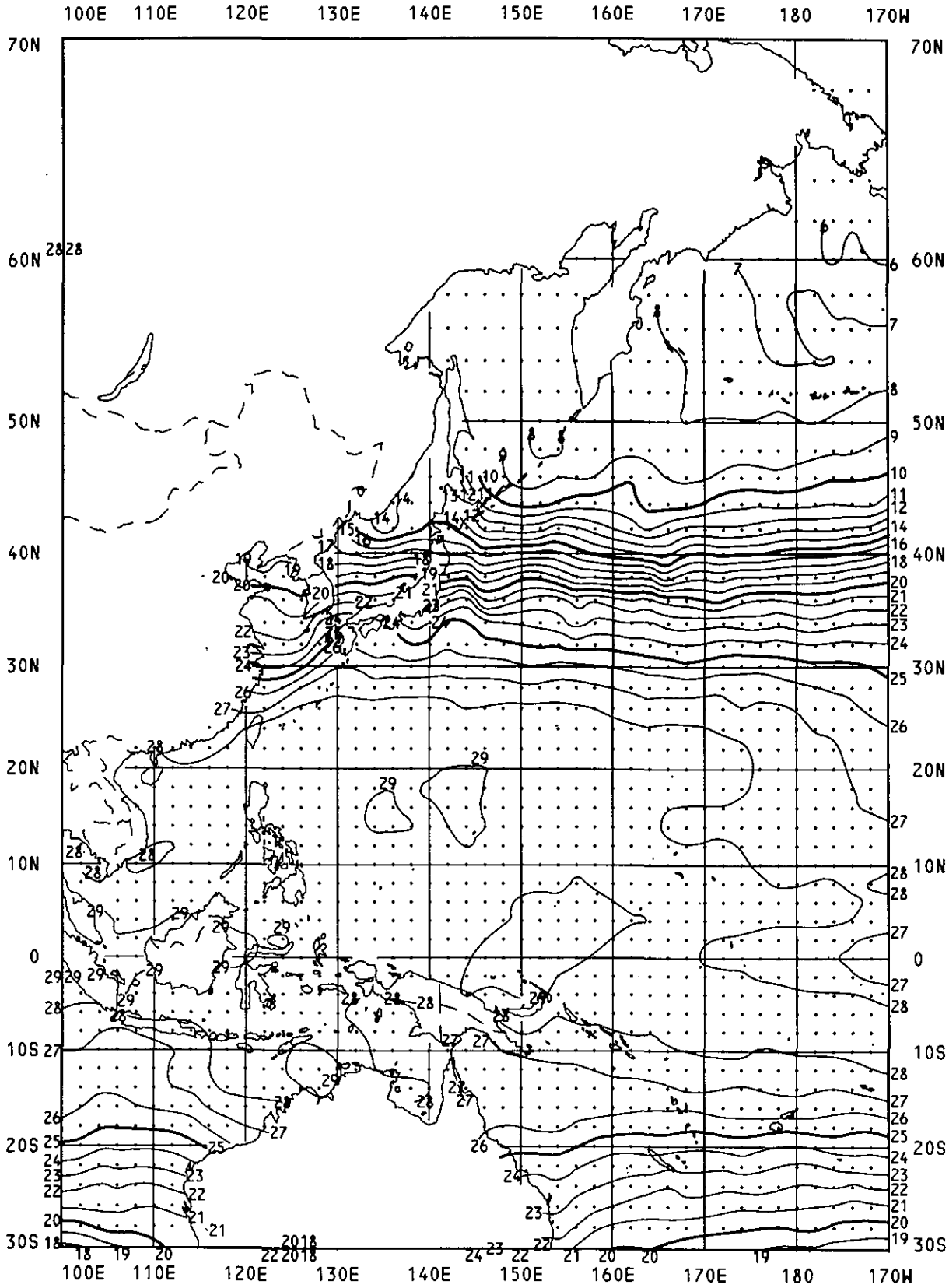
Western Pacific Ocean
SST--MONTHLY ANOMALY (°C)
SHIP and BUOY DATA
October 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.



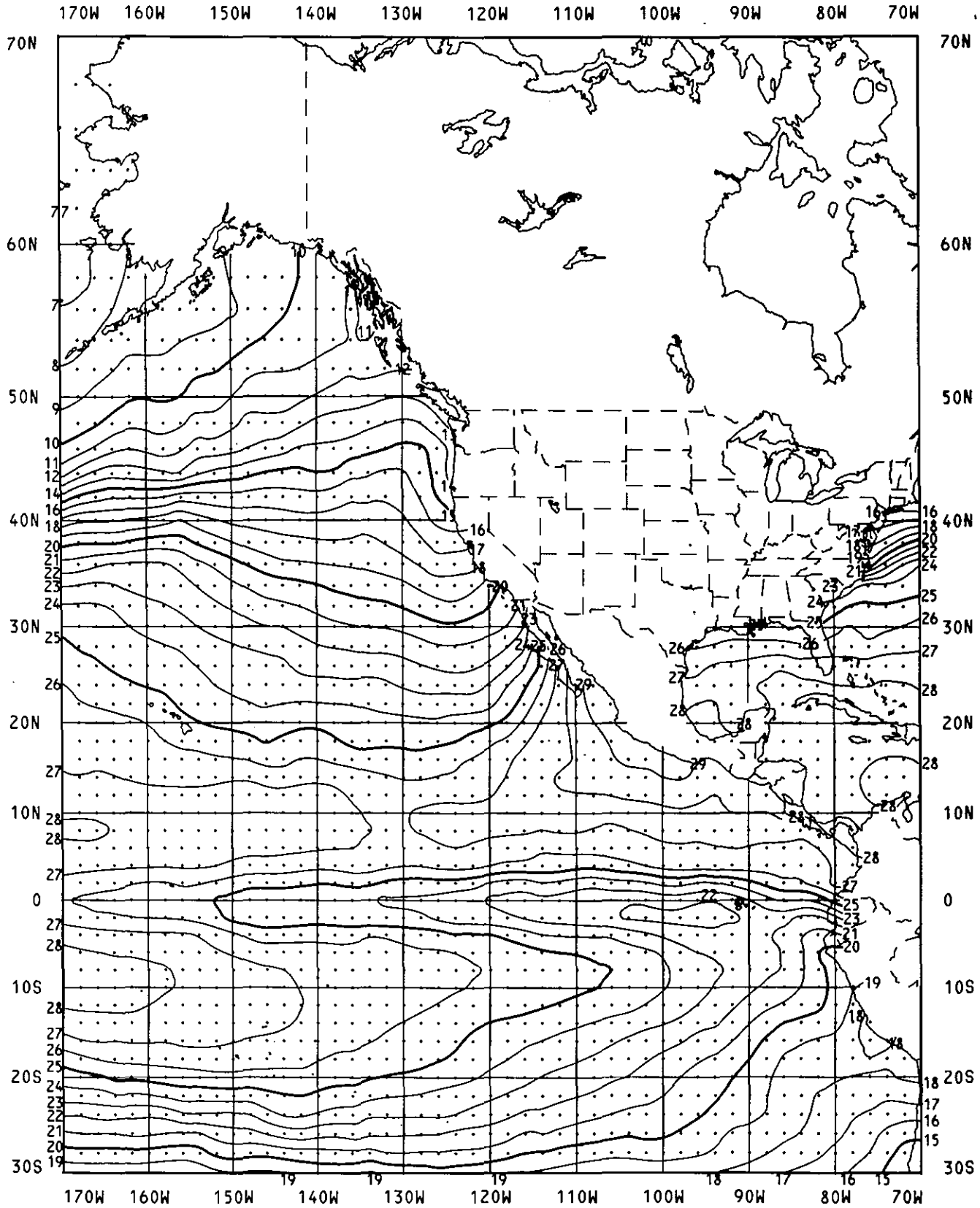
Eastern Pacific Ocean
SST--MONTHLY ANOMALY (°C)
SHIP and BUOY DATA
October 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.



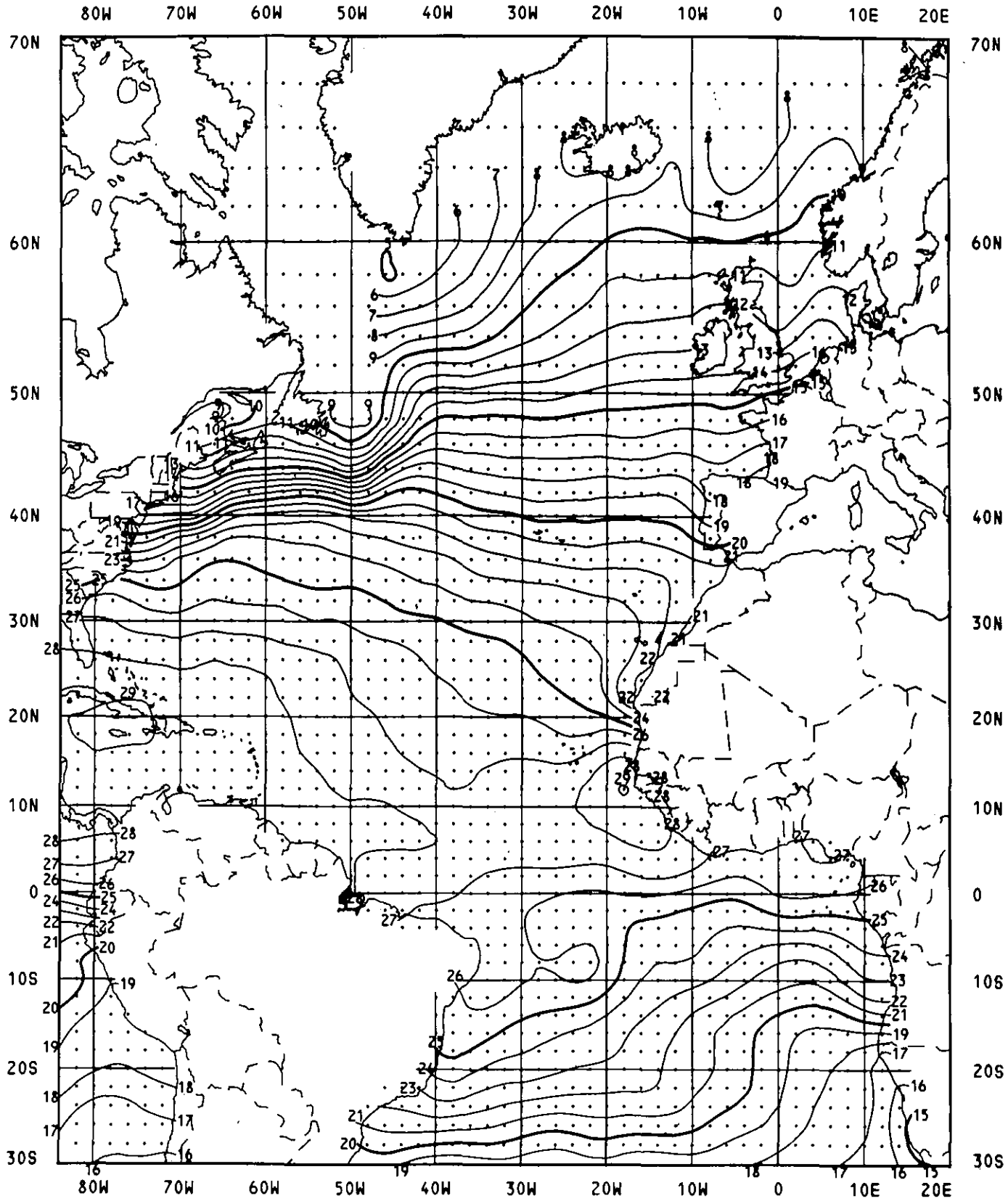
Western Pacific Ocean
SST--MONTHLY MEAN (°C)
SATELLITE DATA
October 1983

Monthly mean sea surface temperature is the mean of satellite data within two-degree quadrangles. Contour line interval is 1.0°C.



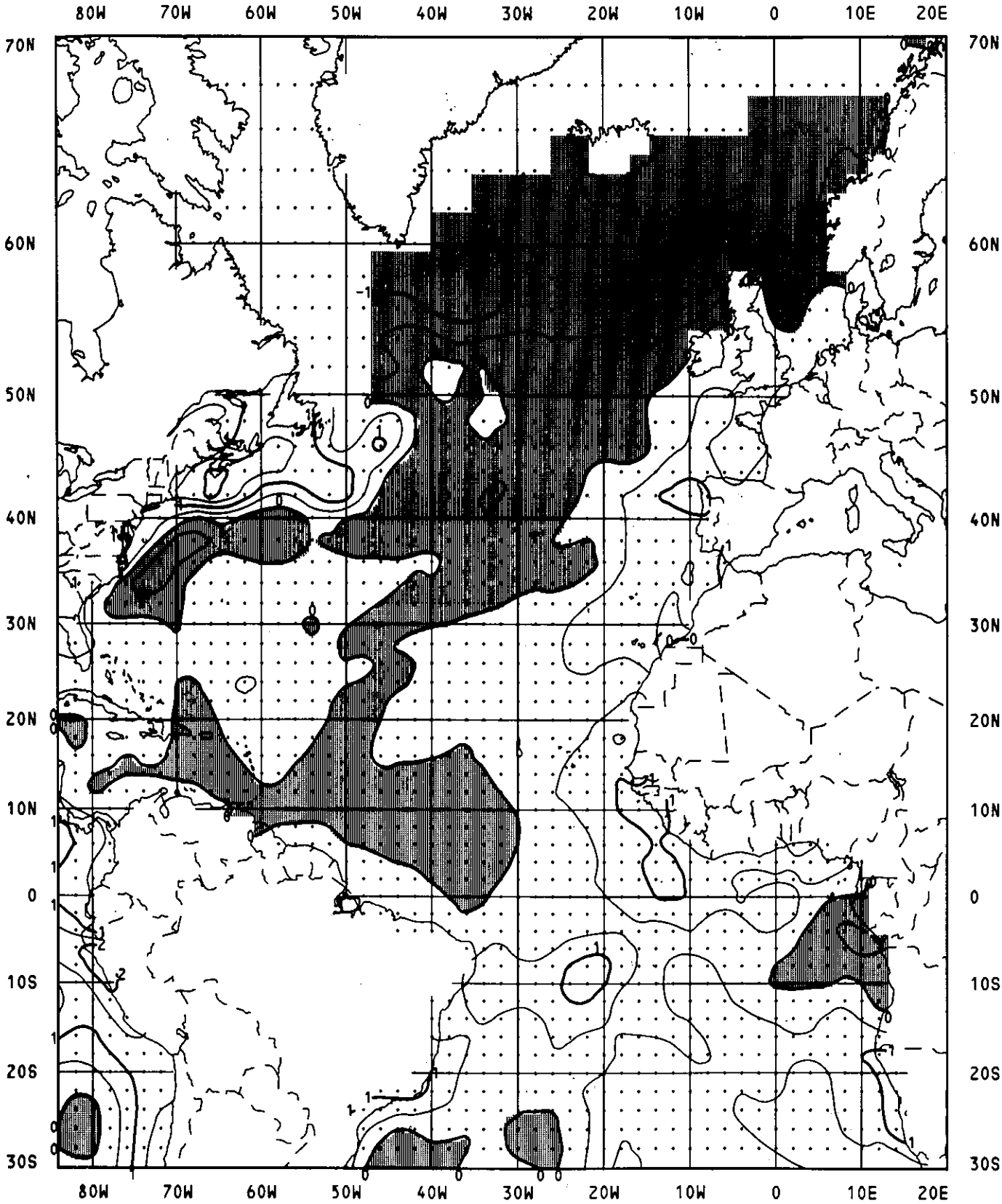
Eastern Pacific Ocean
SST--MONTHLY MEAN (°C)
SATELLITE DATA
October 1983

Monthly mean sea surface temperature is the mean of satellite data within two-degree quadrangles. Contour line interval is 1.0°C.



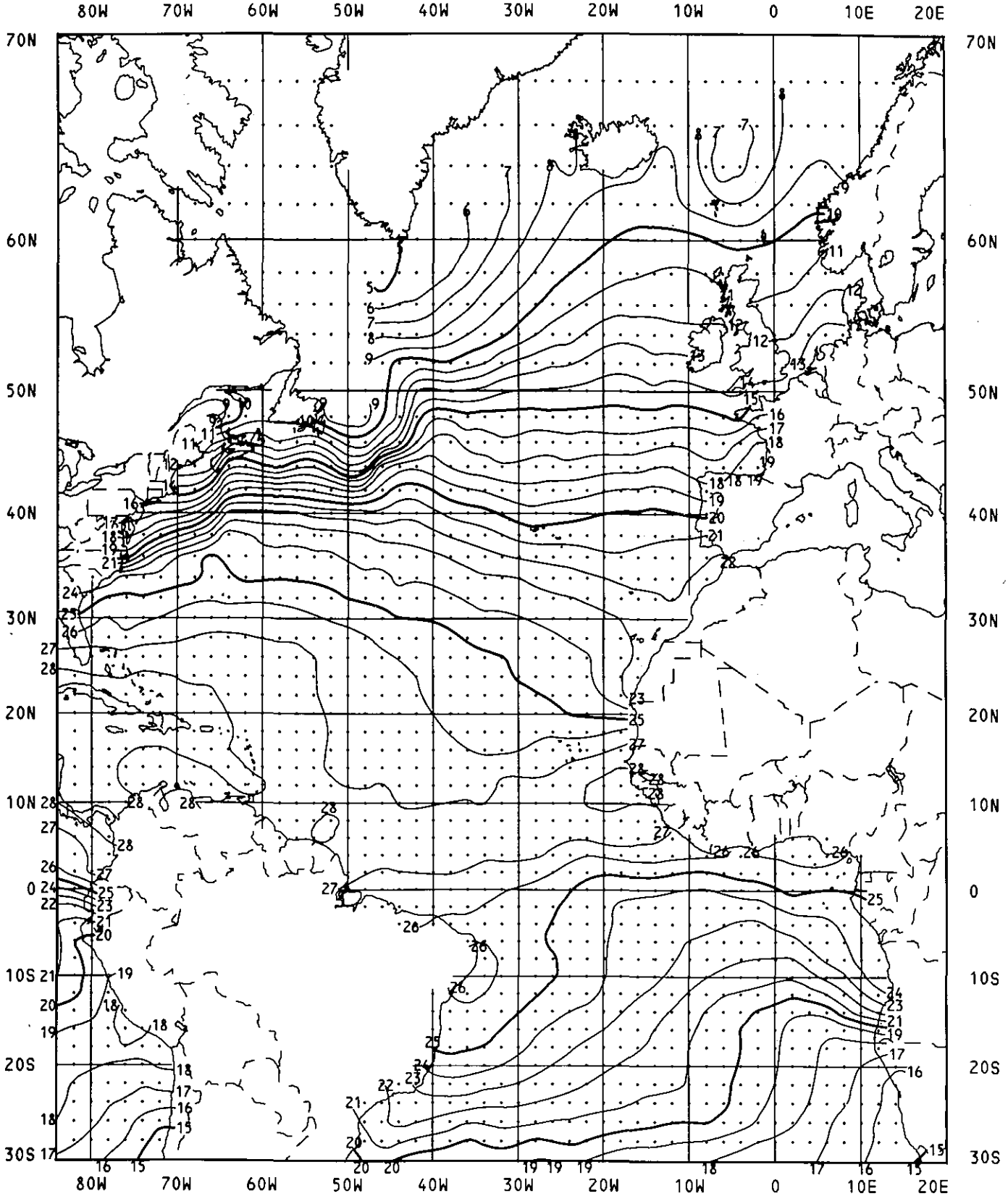
Atlantic Ocean
SST--MONTHLY MEAN (°C)
SHIP and BUOY DATA
October 1983

Monthly mean sea surface temperature is the mean of in-situ data (ships and buoys) within two-degree quadrangles. Contour line interval is 1.0°C.



Atlantic Ocean
SST--MONTHLY ANOMALY (°C)
SHIP and BUOY DATA
October 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.



Atlantic Ocean
SST--MONTHLY MEAN (°C)
SATELLITE DATA
October 1983

Monthly mean sea surface temperature is the mean of satellite data within two-degree quadrangles. Contour line interval is 1.0°C.

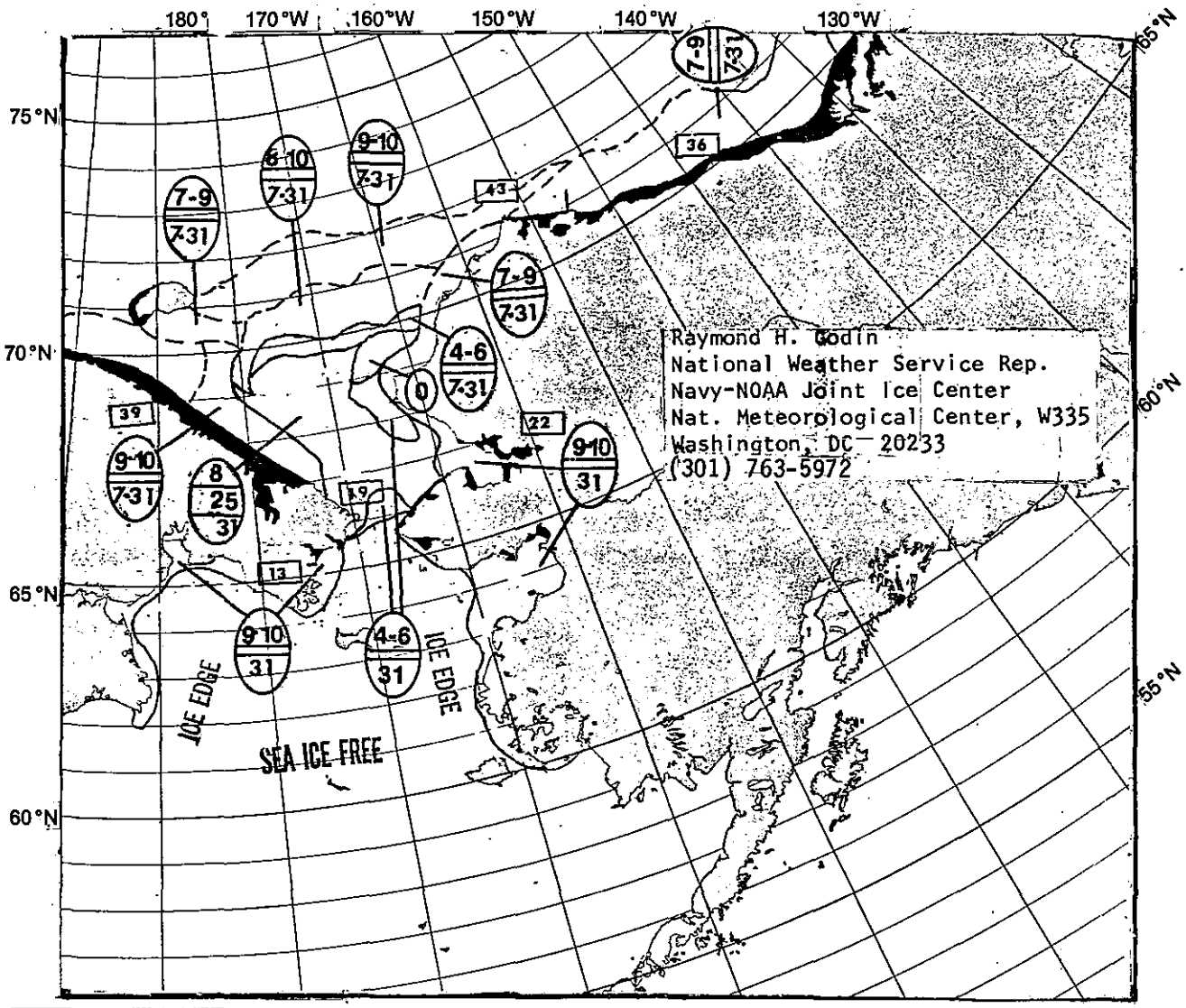
SATELLITE IMAGE OF THE MONTH

Marcia L. Weaks
Environmental Products Branch, E/SP22
NESDIS, NOAA
Washington, DC 20233
(301) 763-8142

SHELF WAVES IN NORTHERN ARABIAN SEA?

This NOAA-7 infrared satellite image was taken on October 24, 1983 and illustrates a pattern of upwelled water along the shores of Pakistan and Iran. The light gray wave-like areas hugging the coast are patches of cool water that represent a wave-like response of the water to large-scale wind-driven circulation. On the synoptic scale, the monsoon creates an easterly component that blows along the shoreline. This easterly component along with the Coriolis force transports the surface water 90° to the right or offshore. Unusual topography in the coastal areas may also be a factor in the oceanic response, although a relationship has not been established yet. In order to understand the phenomena, "ground truth" data such as vertical temperature and velocity profiles should be compared to features on the satellite imagery. The wave-like features or shelf waves have been observed continuously from October 9 to early November. Crest and trough features appear to propagate to the west.

BERING SEA / NORTH SLOPE ICE ANALYSIS



C = Total ice concentration in the area in tenths.

C_a, C_b, C_c = Concentration of thickest (C_a), 2nd thickest (C_b), and 3rd thickest (C_c) ice

S_a, S_b, S_c = Stage of development of thickest (S_a), 2nd thickest (S_b), and 3rd thickest (S_c) ice.

-C = Concentration of ice within area(s) of strips and patches.

STAGE(S) OF DEVELOPMENT (THICKNESS)

1 = New ice (0-10 cm)
3 = Young ice (10-30 cm)
6 = First year (30-200 cm)
7 = First year thin (30-70 cm)
1. = First year medium (70-120 cm)
4. = First year thick (120-200 cm)
7. = Old ice (survived at least one summer's melt)

EXAMPLES

125 Theoretical thickness of this season's growth (cm).

Fast Ice. Sea ice which forms and remains fast along the coast.

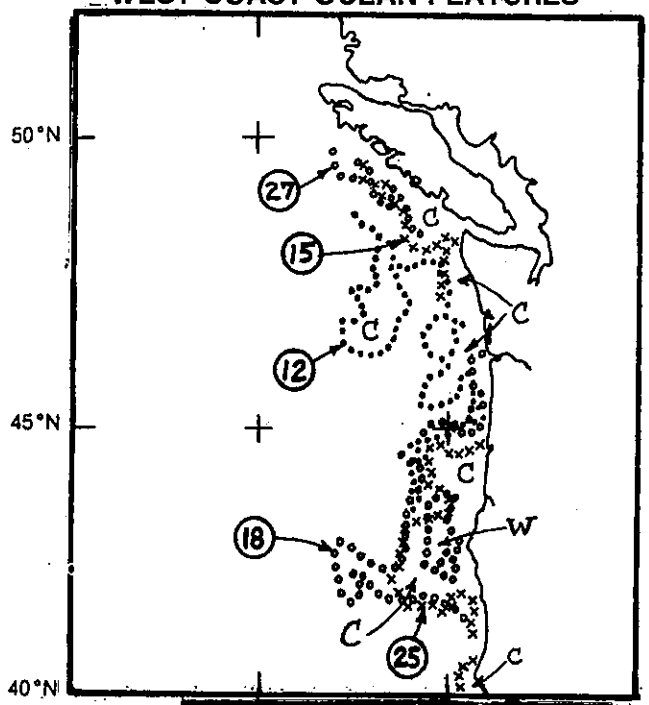
Ice boundary visually or satellite observed.

Ice boundary estimated.

OCTOBER 1983

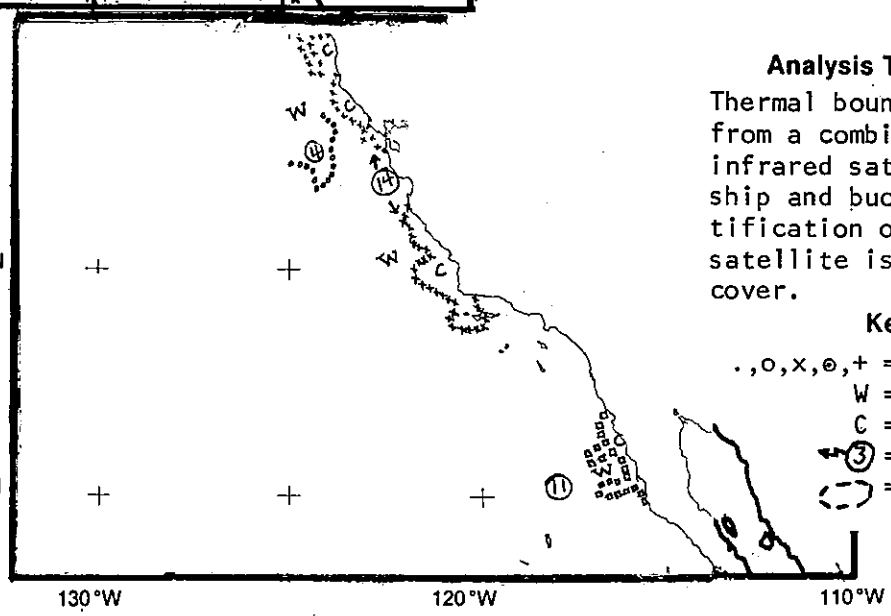
The mean monthly surface pressure circulation depicts low pressure centers of 1006 mb near 60°N 170°W and 1005 mb near 58°N 150°W. Easterly geostrophic winds affect all Alaskan ice covered waters. Much below normal mean monthly air temperatures and a greater than normal theoretical ice thickness accumulation of 43 cm were observed at Barrow (71°N 157°W). Late in the month freeze-up of the central Chukchi Sea occurred approximately two weeks ahead of normal. New and young ice are forming along the Alaskan coastline extending to 60°N. The current ice edge position is near the historical median west of 175°W. Elsewhere the ice edge is generally between median and maximum extremes. The severe ice conditions along the east Siberian coastline continued through October as much below normal temperatures and northerly winds continued to persist.

WEST COAST OCEAN FEATURES



OCTOBER 1983

Normal seasonal changes were observed during the month in the north panel area. Slow, steady cooling of about 1°C over the month occurred in offshore areas. Coastal SSTs showed some short-term fluctuations, with no net changes from the beginning to the end of the month. When averaged over the month, the largest changes in SSTs occurred at coastal stations near river outflows, where rapidly-cooling land runoff affects the nearshore water. Northern Oregon and southern Washington stations near the Columbia River mouth showed decreases of 2-3°C over September means. The only reporting station which observed an overall warming for the month was the buoy near Cape Mendocino (41°N 125°W), which reported a mean monthly SST 0.8°C higher than in September. This is attributed to normal seasonal relaxation of coastal upwelling. Winds over the north panel area were generally light during the month.



Analysis Techniques

Thermal boundaries are determined from a combination of enhanced infrared satellite imagery and ship and buoy observations. Identification of these features by satellite is limited by cloud cover.

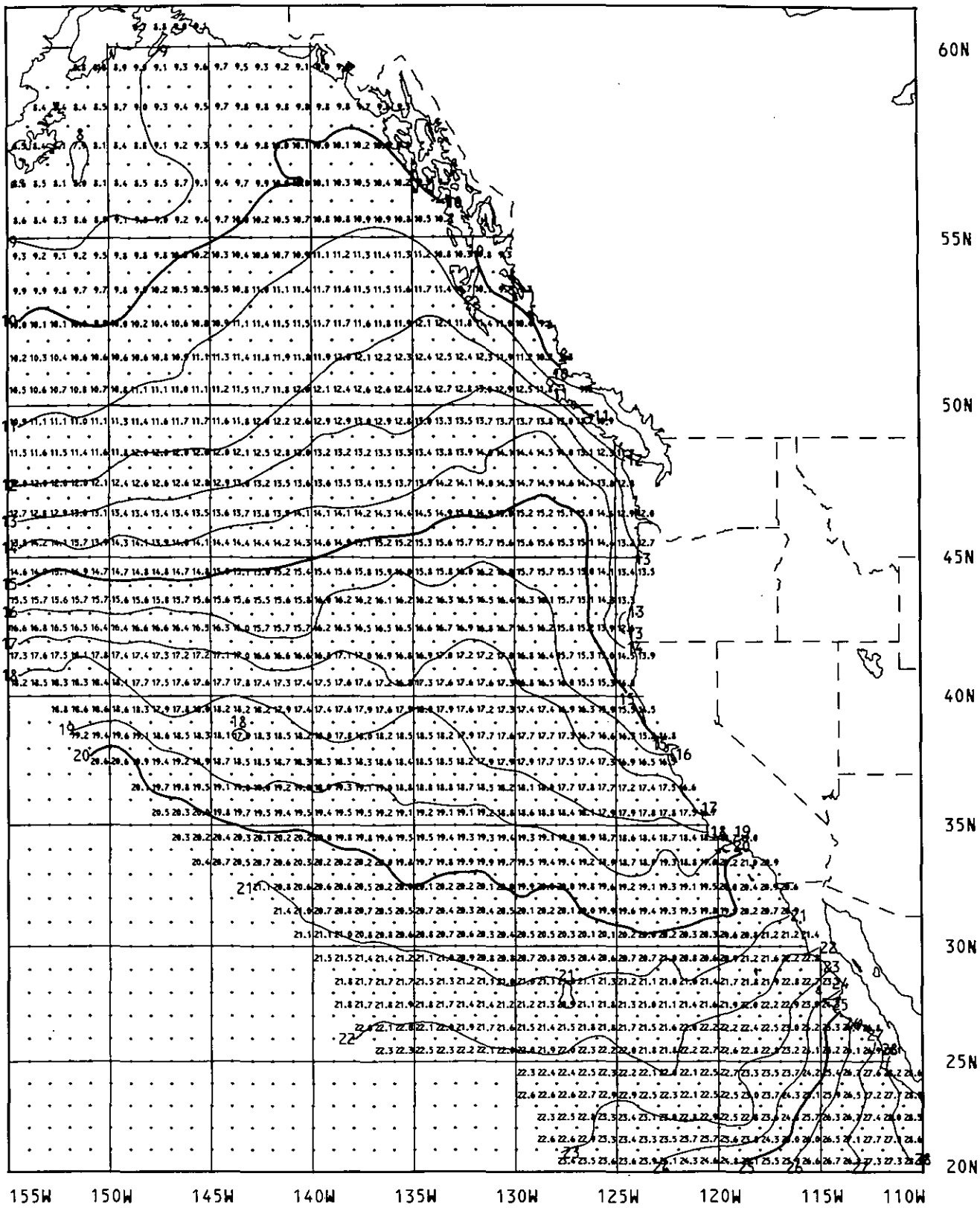
Key

.,o,x,⊙,+ = thermal boundaries
W = warm
C = cold
③ = date of feature
(dashed) = outline of water mass feature

North Panel
Kent Short
NOAA/Northwest Regional Ocean Service Center
7600 Sand Point Way NE
Bin C15700
Seattle, WA 98115
(206) 527-6604

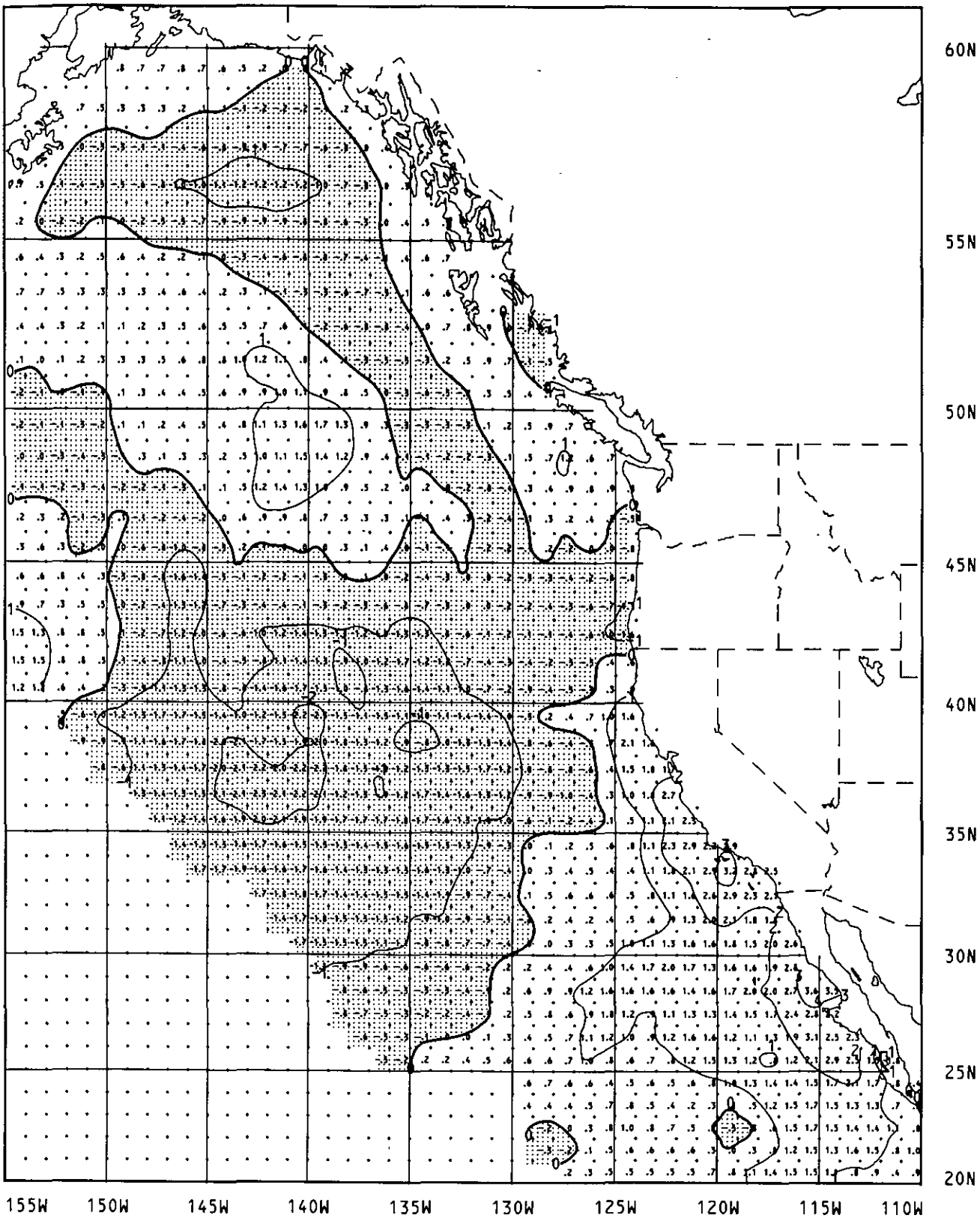
South Panel
Ernest Daghir
NOAA/NESDIS
Satellite Field Service Station
660 Price Avenue
Redwood City, CA 94063
(415) 364-2422

Seasonal cooling was dominant over most of the region since mean SSTs decreased up to 1.0°C from September's values. The only exception was an elongated area at 125°W and near the coast at 38°N where slight warming occurred. The anomalously cool water west of 130°W and north of 30°N persisted with values of 0.5°C to 1.0°C below normal. Upwelling was generally weak during the month; October is usually considered the end of the upwelling season along the California coast. One upwelling event occurred around October 14 due to strong northwesterly winds. Little upwelling was observed along Baja. El Nino related positive SST anomalies continue. Values range from 1.0°C (near Cape Mendocino at 38°N) to 3.0°C (off the San Diego coast near 32°N). The strength and extent of the warm temperature anomaly is apparently declining.



West Coast
SST--MONTHLY MEAN (°C)
October 1983

Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.



West Coast
SST--MONTHLY ANOMALY (°C)
October 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.

The end of this month's positions of the Gulf Stream System and its associated eddies are shown for the NW Atlantic and the Gulf of Mexico. The Gulf Stream and Loop Current boundaries are located by infrared satellite imagery or XBT (expendable bathythermograph) data. Anticyclonic eddies are labeled a-z in the Gulf of Mexico and 1-99 in the NW Atlantic. Cyclonic eddies are labeled A-Z. Arrows on eddies indicate direction of circulation. Warm-core or anticyclonic eddies rotate clockwise; cold-core or cyclonic eddies rotate counterclockwise. The line to the eddy center shows the net translation since last month or since last observed. Eddies or sections of the Gulf

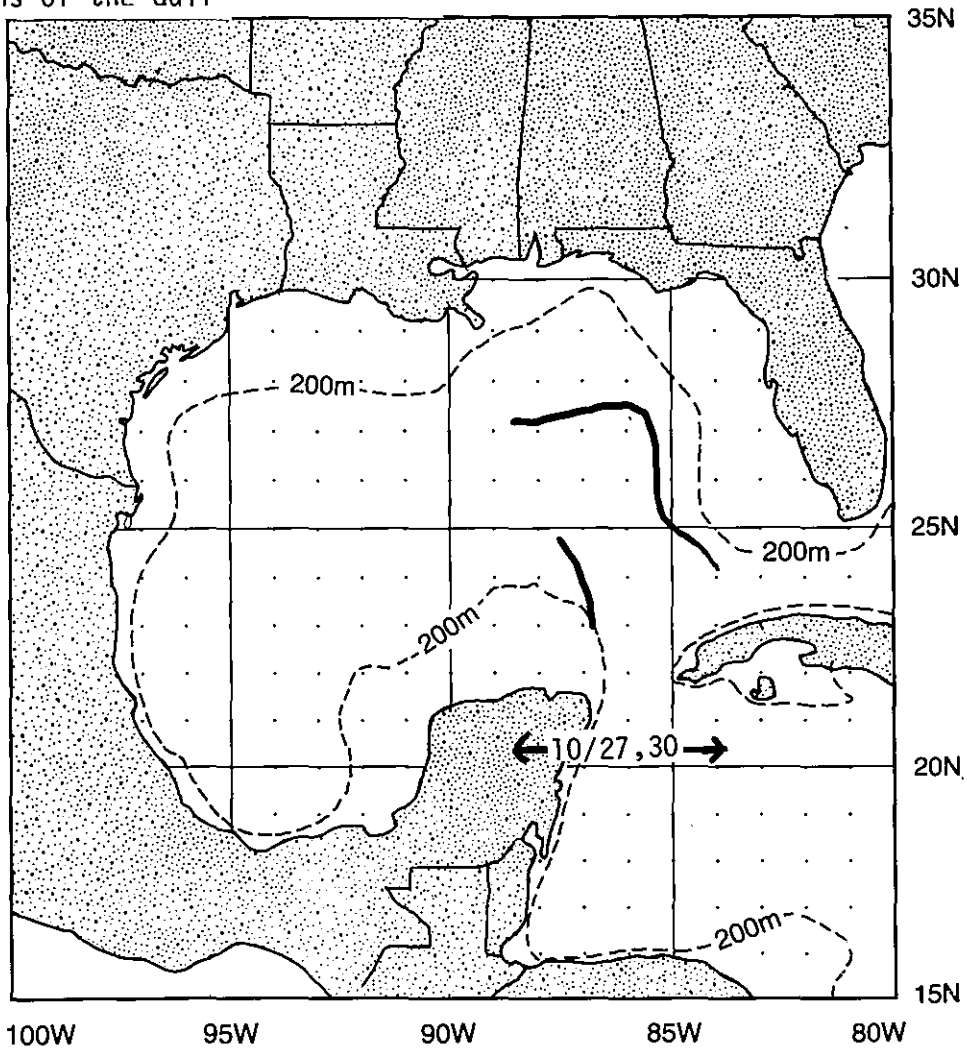
EAST COAST OCEAN FEATURES

Stream System which were not observed during the month are not shown on the analysis chart. The long arrows at the bottom of the chart indicate the date of data used.

Data used in this analysis include:
- NOAA satellite infrared imagery, NESDIS
- Bathythermograph data, National Meteorological Center of National Weather Service
- Oceanographic Analysis, A daily detailed analysis issued by National Weather Service/NESDIS

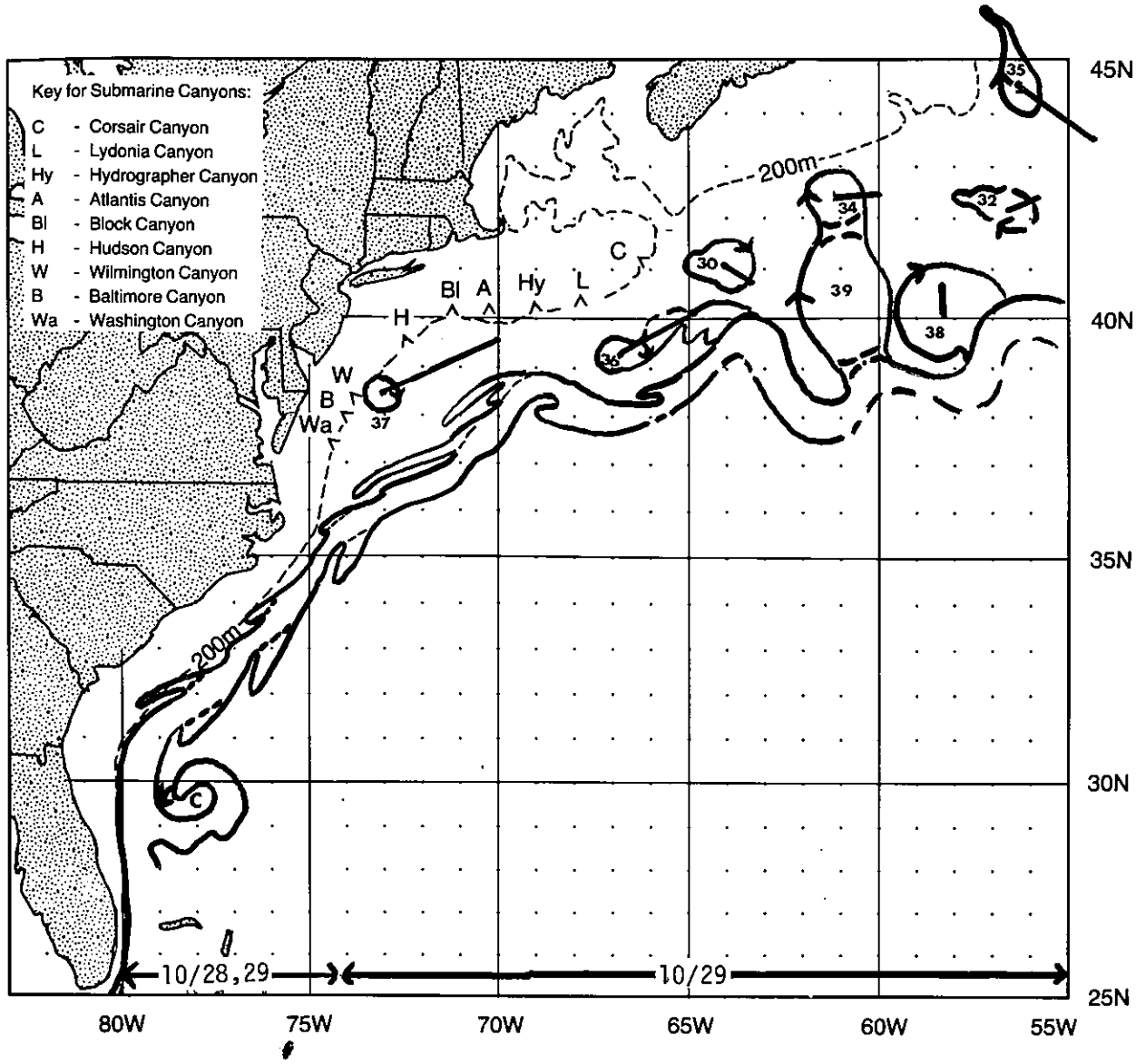
Jenifer Wartha-Clark
NOAA/NWS
Washington, DC 20233
(301) 763-8088

Ann Bell
NOAA/NWS
National Meteorological Cen.
Washington, DC 20233
(301) 763-8133



OCTOBER 1983

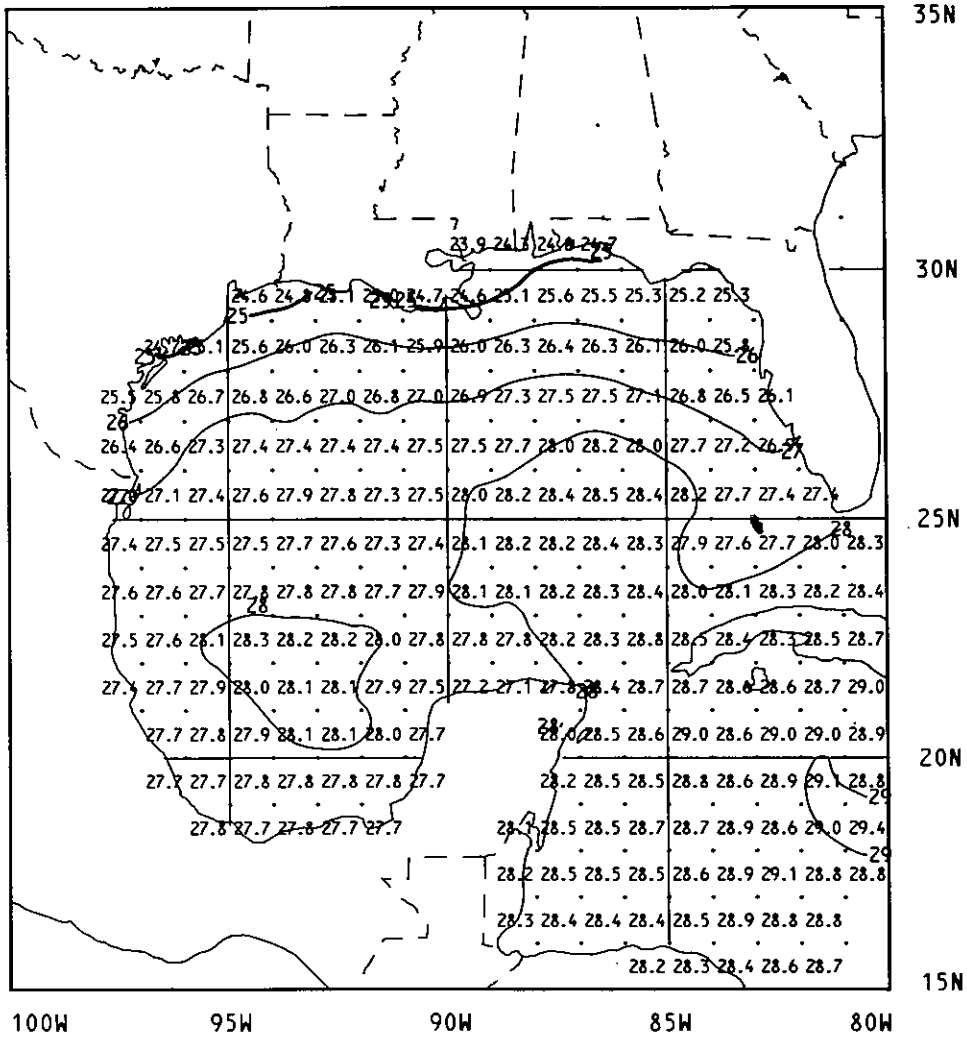
The Loop Current in the Gulf of Mexico, last observed by satellite infrared imagery on June 20, is partially discernible as a weak thermal gradient on October 27 and 30 imagery. XBT data from October 25-29 near 27°N 88°W was in agreement with the satellite derived location of the Loop Current.



One anticyclonic eddy formed during October. Eddy 39 apparently formed from a large meander near 41°N 61°W about October 29. One anticyclonic eddy was absorbed by the Gulf Stream and two apparently dissipated during October. Eddy 26 translated 165 km SSE and was apparently absorbed by the Gulf Stream near 36°30N 73°30W around October 28. Eddy 33 moved 165 km W from September 16 to October 12 when it was last observed near 40°N 69°W. It apparently dissipated during the latter half of the month. Eddy 31 was not observed during October. However, a clear satellite infrared image on October 10 showed no evidence of an eddy near 42°N 64°W. Therefore, eddy 31 is assumed to have dissipated. Eddies 37 and 36 traveled 280 km SW and 195 km SW, respectively. Eddy 30 moved 65 km NW. Eddy 34 translated 85 km W and appears to be interacting with new eddy 39. Eddy 38 moved 55 km S and appears to be interacting with the Gulf Stream near 40°N 57°W. Eddy 32 translated 75 km WSW while eddy 35 translated 185 km NW.

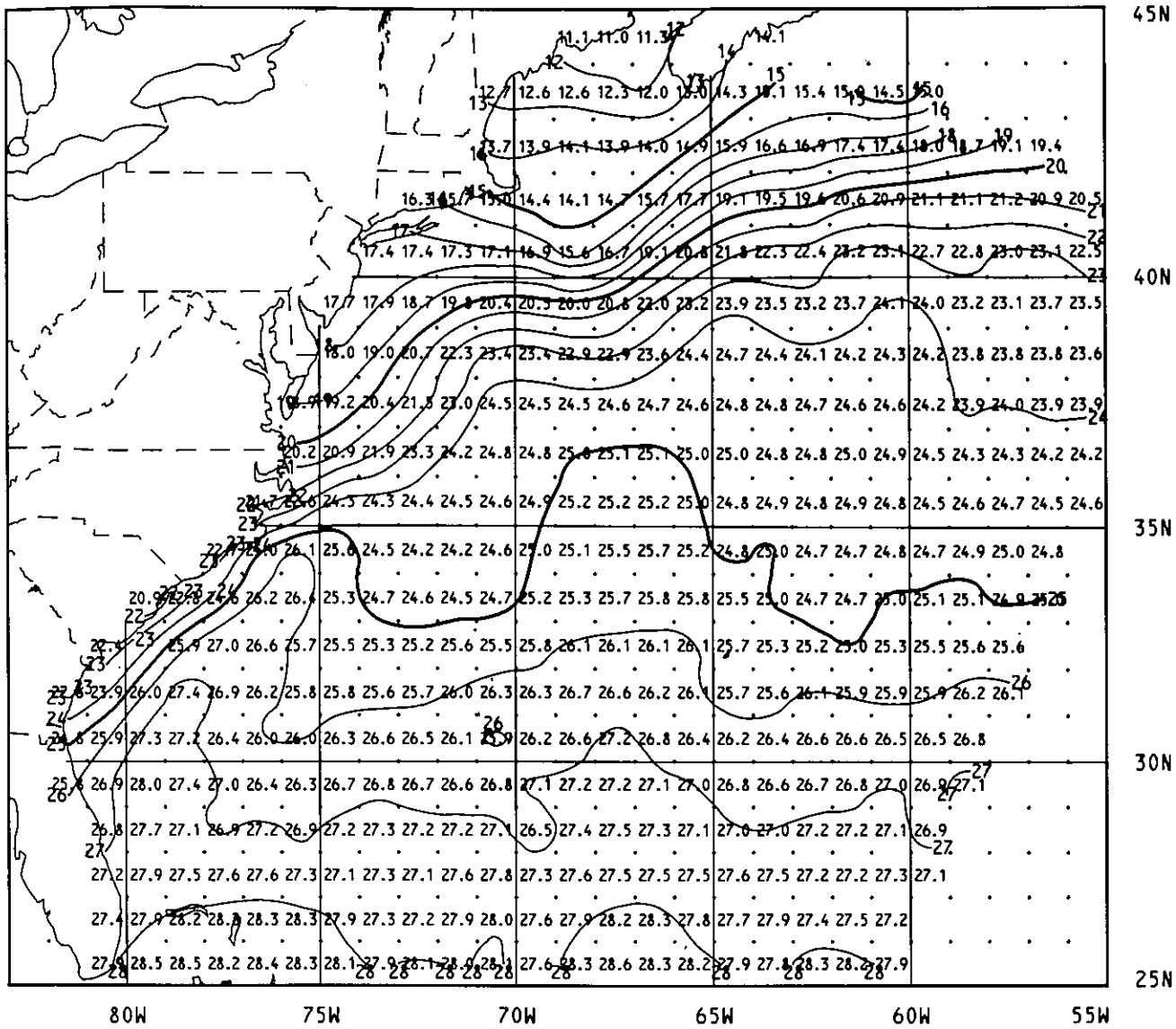
Cyclonic eddies A, B, and R were not observed during October and were eliminated from the chart. Cloud cover and isothermal conditions during the summer hinder the tracking and identification of cold eddies. Eddy C was newly observed on October 29. It's origin is unknown and it may be a previously observed eddy.

EAST COAST SST-
MONTHLY MEAN



Gulf of Mexico
SST--MONTHLY MEAN (°C)
October 1983

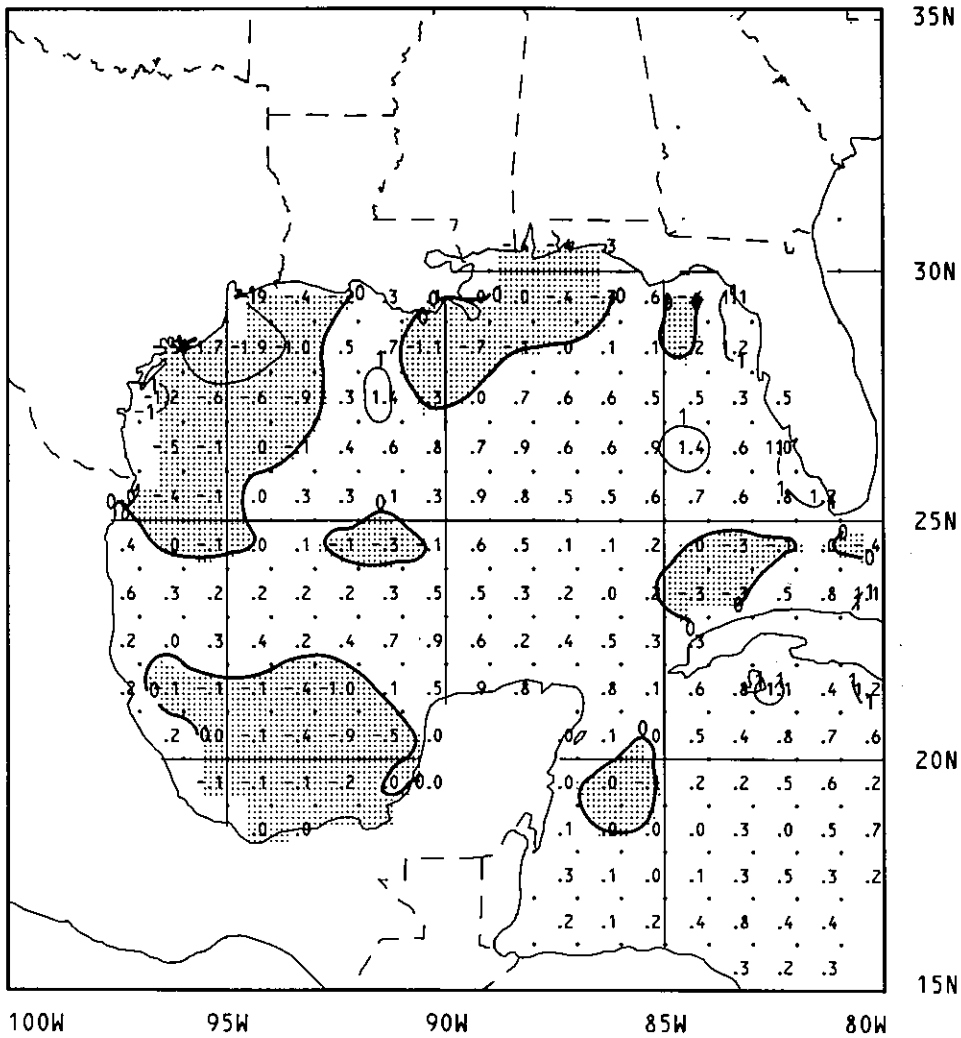
Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.



NW Atlantic Ocean
SST--MONTHLY MEAN (°C)
October 1983

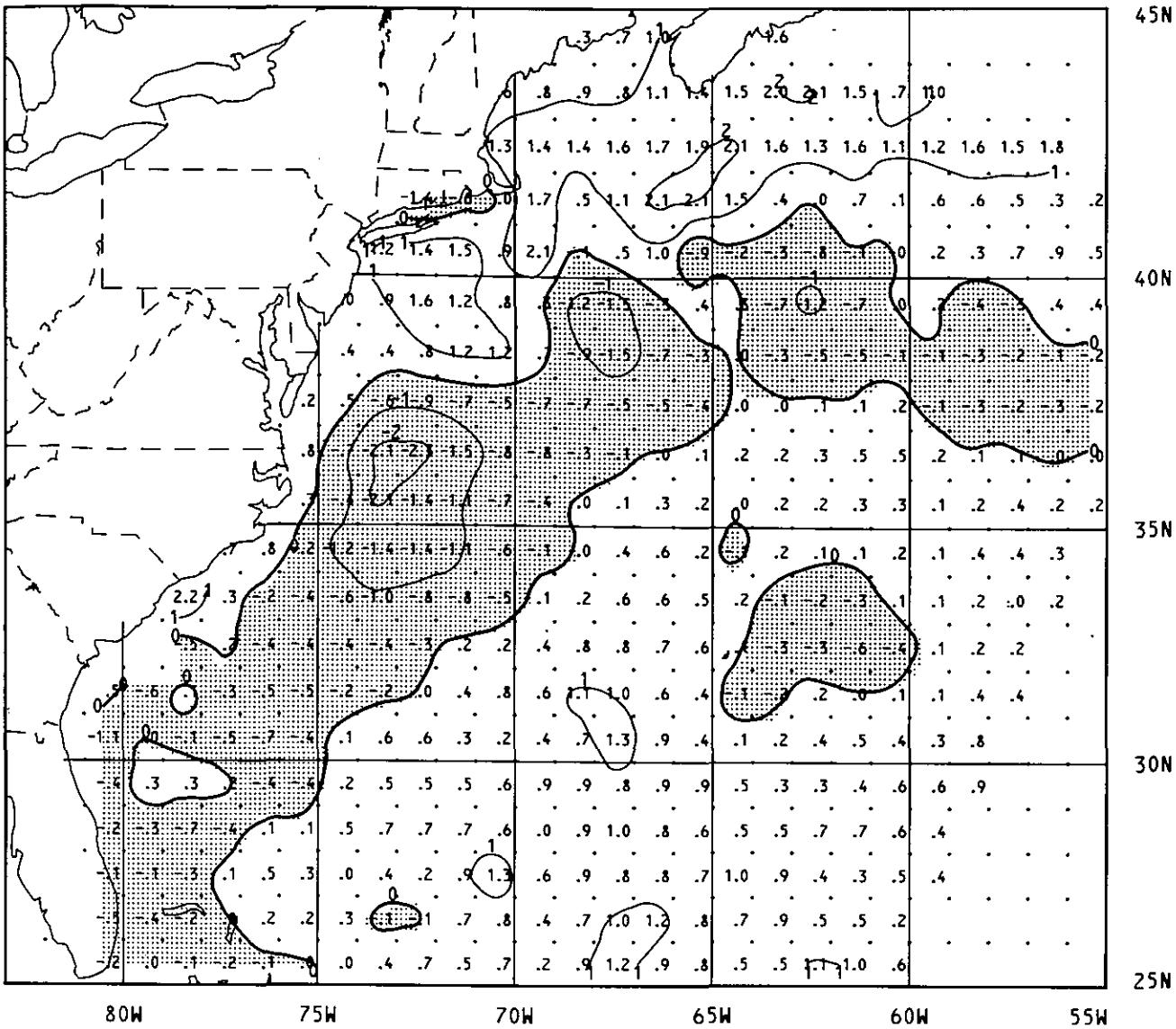
Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.

EAST COAST SST-ANOMALY



Gulf of Mexico
SST--MONTHLY ANOMALY (°C)
October 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.



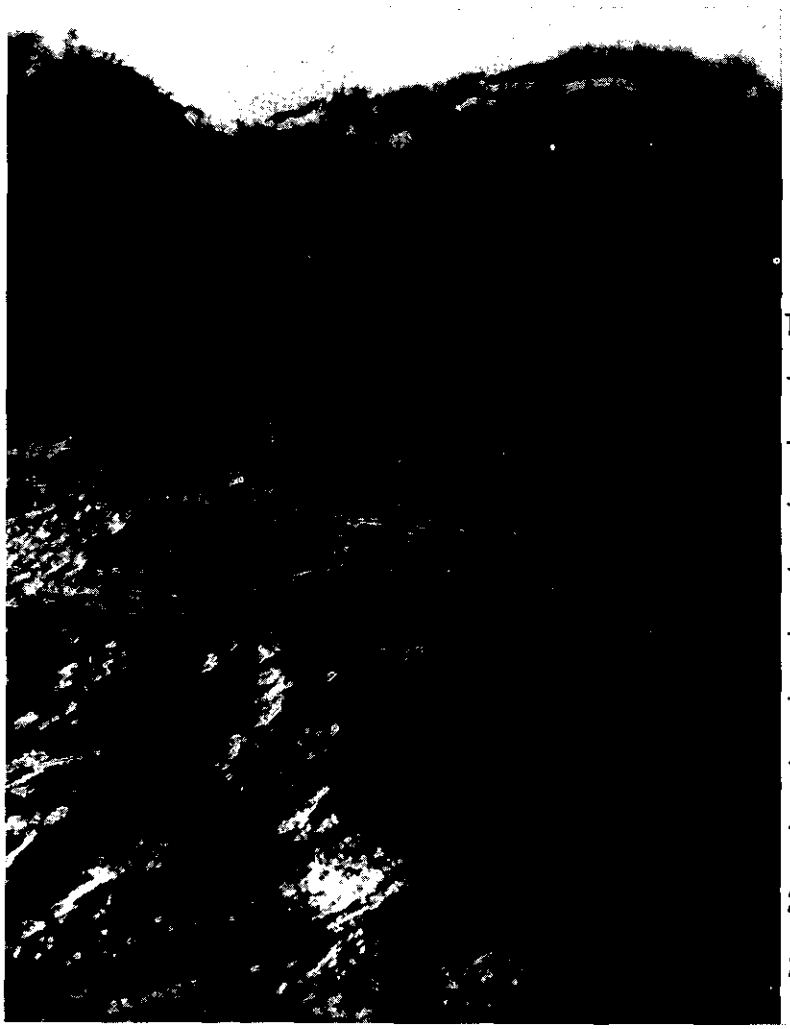
NW Atlantic Ocean
SST--MONTHLY ANOMALY (°C)
October 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.

OCEANOGRAPHIC Monthly Summary

Volume III Number 11 November 1983

NOAA LISD SEATTLE



Contents

3 OceaNotes

4 Pacific SST - monthly mean, ship and buoy data

6 Pacific SST - anomaly

8 Pacific SST - monthly mean, satellite data

10 Atlantic SST - monthly mean, ship and buoy data

11 Atlantic SST - anomaly

12 Atlantic SST - monthly mean, satellite data

13 Satellite IMAGE of the Month

14 Bering Sea/North Slope ICE, with text

15 West Coast OCEAN FEATURES, with text

16 West Coast SST - monthly mean

17 West Coast SST - anomaly

18 East Coast OCEAN FEATURES, with text

20 East Coast SST - monthly mean

22 East Coast SST - anomaly

24 Subscription Information

U.S. DEPARTMENT OF COMMERCE • National Oceanic and Atmospheric Administration
National Weather Service
National Environmental Satellite, Data, and Information Service

Oceanographic Monthly Summary is published by the National Weather Service and the National Environmental Satellite, Data, and Information Service (NESDIS). *Oceanographic Monthly Summary* contains sea surface temperature (SST) analyses on both regional and ocean basin scales for the Atlantic and Pacific Oceans. Two ocean basin SST analyses are presented, one based on in-situ data and another based solely on satellite data. An ocean basin SST anomaly derived from the in-situ data is also shown; it uses the National Climatic Center (NCC) Climatology*. The regional SST analyses are based upon a combination of in-situ and satellite data measurements. The regional SST anomalies use the Robinson-Bauer Climatology*. *Oceanographic Monthly Summary* also contains Alaskan sea ice infromation and ocean feature information for contiguous U.S. ocean regions.

Oceanographic Monthly Summary welcomes articles containing information of interest to *Oceanographic Monthly Summary* readers, such as, news on operational oceanography, unusual ocean feature phenomena, etc. Contributions should be sent to the editor (address below). Accepted material will appear in the OceaNotes section of *Oceanographic Monthly Summary*. Contributions can be published as quickly as the next monthly issue.

If you are interested in receiving *Oceanographic Monthly Summary* regularly, please refer to the back cover for subscription information.

*Reynolds, R.W., 1982. A Monthly Averaged Climatology of Sea Surface Temperatures; *NOAA Technical Report NWS 31.*

*Robinson, M.K., 1976. Atlas of North Pacific Ocean Monthly Mean Temperatures and Mean Salinities of the Surface Layer; *NavOceano Ref. Pub. 2.*

Robinson, M.K., R. A. Bauer and E.H. Schroeder, 1979. Atlas of North Atlantic-Indian Ocean Monthly Mean Temperatures and Mean Salinities of the Surface Layer; *NavOceano Ref. Pub. 18.*

Oceanographic Monthly Summary

Editor: Jenifer Wartha-Clark
NOAA, NWS
Washington, DC 20233
(Telephone: (301) 763-8088)

Assistant Editor: Ann Bell
NOAA, NWS
National Meteorological Center, W/NMC21
Washington, DC 20233
(Telephone: (301) 763-8133)

SST Computer Analyses are prepared by:
William H. Gemmill
Marine Products Branch, W/NMC21
National Meteorological Center
National Weather Service, NOAA
Washington, DC 20233
(Telephone: (301) 763-8133)

NWS/NESS Oceanographic Products

Oceanographic products including SST and OFA (Ocean Feature Analysis) are available to the public on daily and weekly bases by various dissemination means. This partial list of products contains the dissemination methods and schedules for receiving them. The listing is broken into two parts. Part I contains a description of each product and the product area. The names in parenthesis after the product area are the information contacts who can answer questions about the products. The page number given with each information contact contains their phone number and mailing address. Part II of the listing shows how one may receive the chart products listed in Part I. Schedule times are given in GMT (Greenwich Mean Time) or ELT (Eastern Local Time). The dissemination methods are radiofacsimile, auto-telecopier, and weekly mail; some charts are disseminated by more than one method. To receive a chart by radiofacsimile, set your radiofacsimile recorder at the given transmission frequency. To receive a chart by auto-telecopier, dial the given phone number into any telecopier equipment. The auto-telecopiers can handle only a few calls at one time, so keep trying, if they are busy. To receive a chart by mail, write to the information contact and provide your mailing address and the specific chart desired.

I. List of Available Products

West Coast

1. SST + OFA -California to Baja - (Ernest Daghir - see p. 15)
2. SST + OFA -Washington and Oregon - (Kent Short - see p. 15)
3. 5-day SST -Gulf of Alaska to Baja - (John Kundrat - 301/763-8133)
4. 15-day SST -Gulf of Alaska to Baja - (Vera Gerald - 301/763-8133)

East Coast

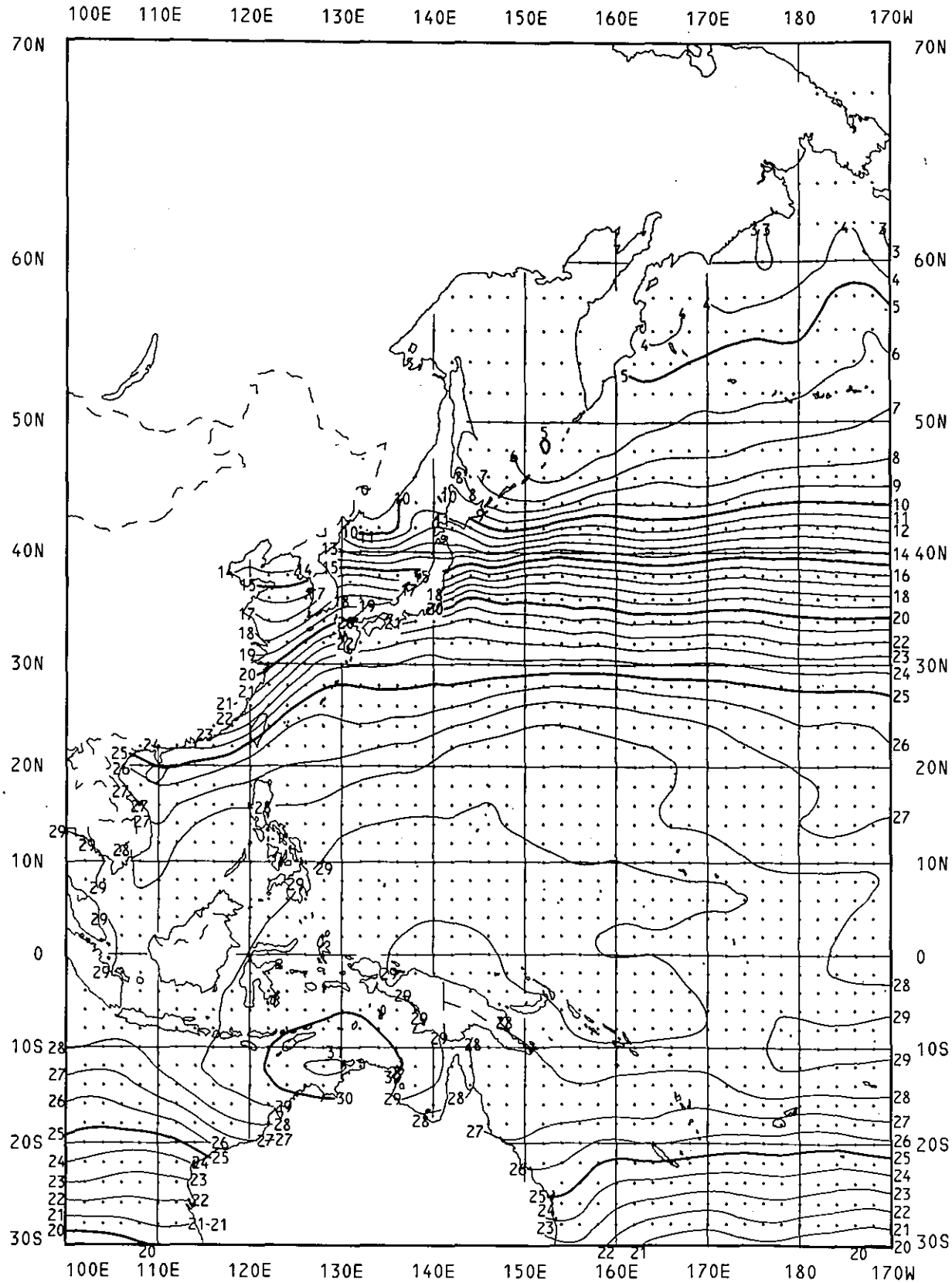
5. OFA -Gulf of Mexico to Cape Hatteras - (Jenifer W. Clark - see p. 2)
6. OFA -Cape Hatteras to Grand Banks - (Jenifer W. Clark - see p. 2)
7. OFA -Gulf of Mexico - (Steve Baig - 305/350-4310)
8. OFA -Florida Straits to Cape Hatteras - (Steve Baig - 305/350-4310)
9. Synoptic SST-Cape Hatteras to 65°W - (Reginald Lawrence - 301/763-8444)
10. 5-day SST -Gulf of Mexico - (John Kundrat - 301/763-8133)
11. 5-day SST -East Coast to 55°W - (John Kundrat - 301/763-8133)

Hemispheric

12. 2-day SST -Northern Hemisphere - (John Kundrat - 301/763-8133)
13. 2-day SST -Southern Hemisphere - (John Kundrat - 301/763-8133)
14. 2-day SST -Global Strip 50°N to 50°S - (John Kundrat - 301/763-8133)
15. 15-day SST Anomaly - Global Strip 50°N to 50°S - (John Kundrat - 301/763-8133)
16. Ice Analysis-Northern Hemisphere - (Ray Godin - 301/763-8133)

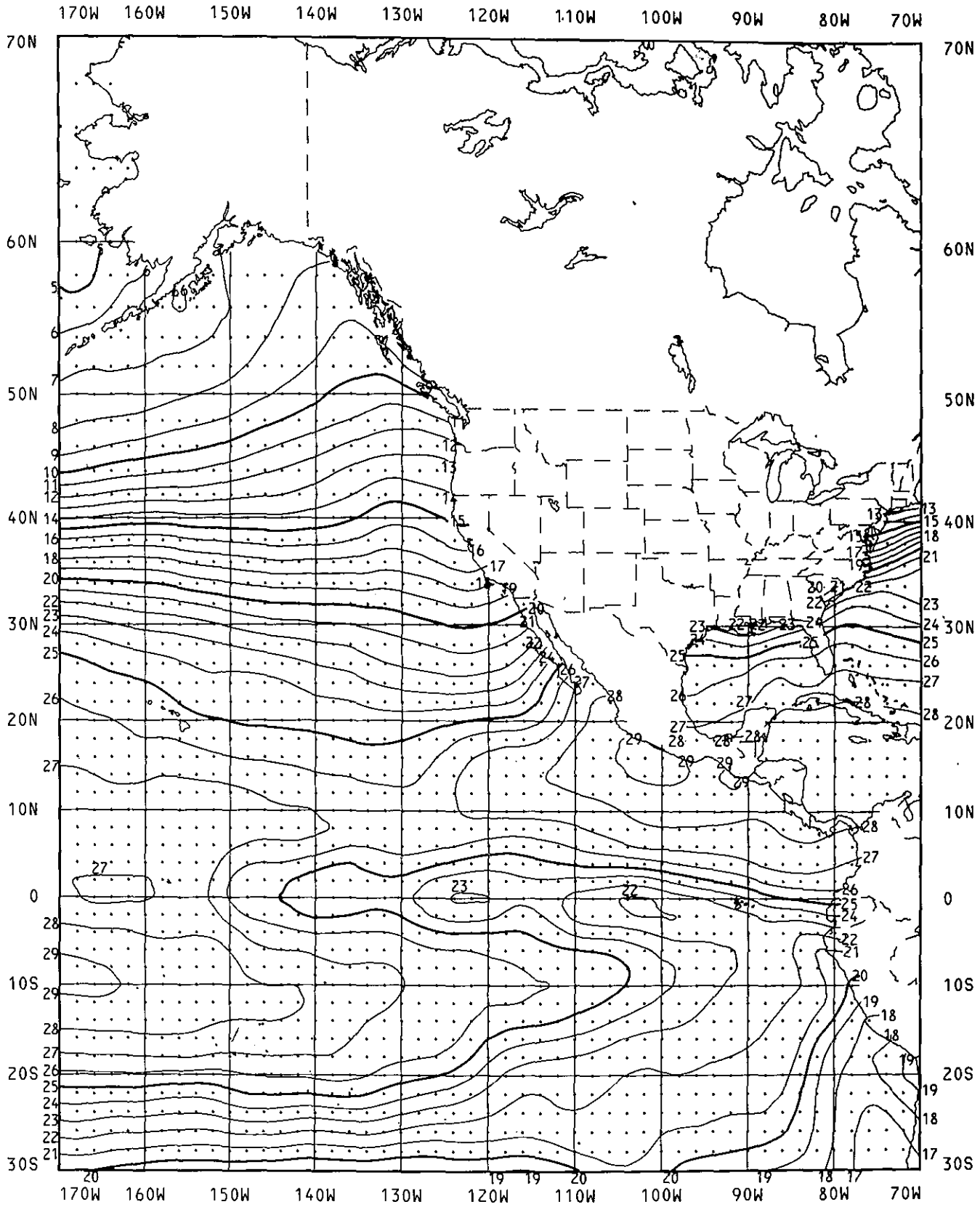
II. Product Dissemination and Schedule

Product #		Dissemination Method		Schedule Time
2,3	-	Radiofacsimile, kHz = 4344.1, 8680.1, 12728.1, 17149.8	-	daily 1500 GMT
10	-	Radiofacsimile, kHz 9290, 9389.5, 11035.0	-	W 1212 (GMT)
11	-	Radiofacsimile, kHz 9290, 9389.5, 11035.0	-	Th-Tu 1212 (GMT)
1	-	Auto-telecopier 415/364-2599	-	daily anytime
5	-	Auto-telecopier 301/763-8333	-	Tu,Th 1700-1900 (ELT)
5	-	Auto-telecopier 301/763-8333	-	W,F 0930-1130 (ELT)
6	-	Auto-telecopier 301/763-8333	-	M,W,F 1700-1900 (ELT)
6	-	Auto-telecopier 301/763-8040	-	M,W,F 1600-0830 (ELT)
6	-	Auto-telecopier 301/763-8333	-	M,Tu,Th 0930-1130 (ELT)
6	-	Auto-telecopier 301/763-8040	-	M,Tu,Th 1300-1600 (ELT)
7	-	Auto-telecopier 305/661-0738	-	daily 0800-1400, 2000-0200 (ELT)
8	-	Auto-telecopier 305/661-0738	-	daily 1400-2000, 0200-0800 (ELT)
9	-	Auto-telecopier 301/763-8040	-	M-F 0830-1300 (ELT)
2-4,10-16	-	Weekly mail, send address to information contact		
5,6,9	-	Weekly mail, (cost involved) information contact has details.		



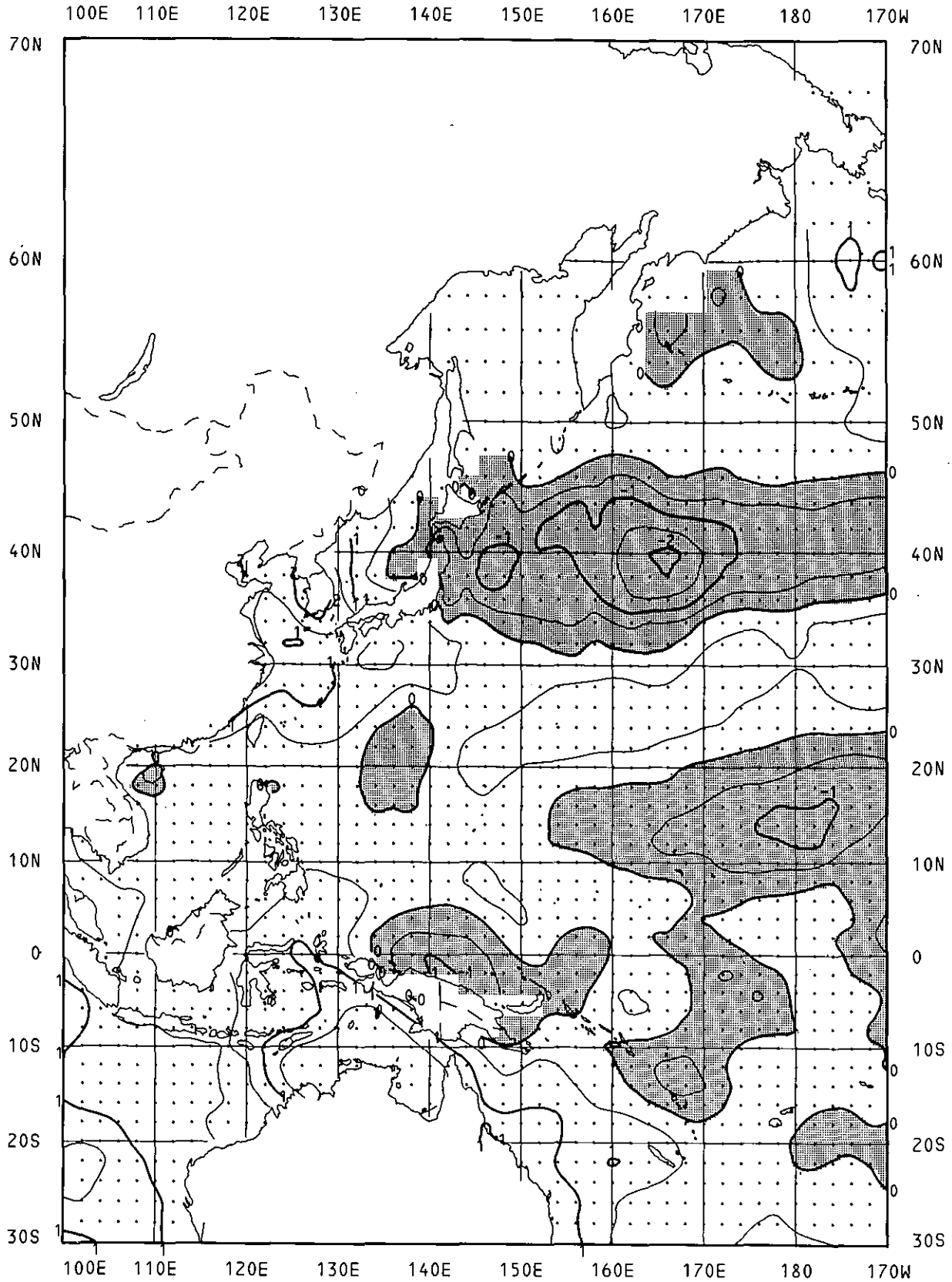
Western Pacific Ocean
SST--MONTHLY MEAN (°C)
SHIP and BUOY DATA
November 1983

Monthly mean sea surface temperature is the mean of in-situ data (ships and buoys) within two-degree quadrangles. Contour line interval is 1.0°C.



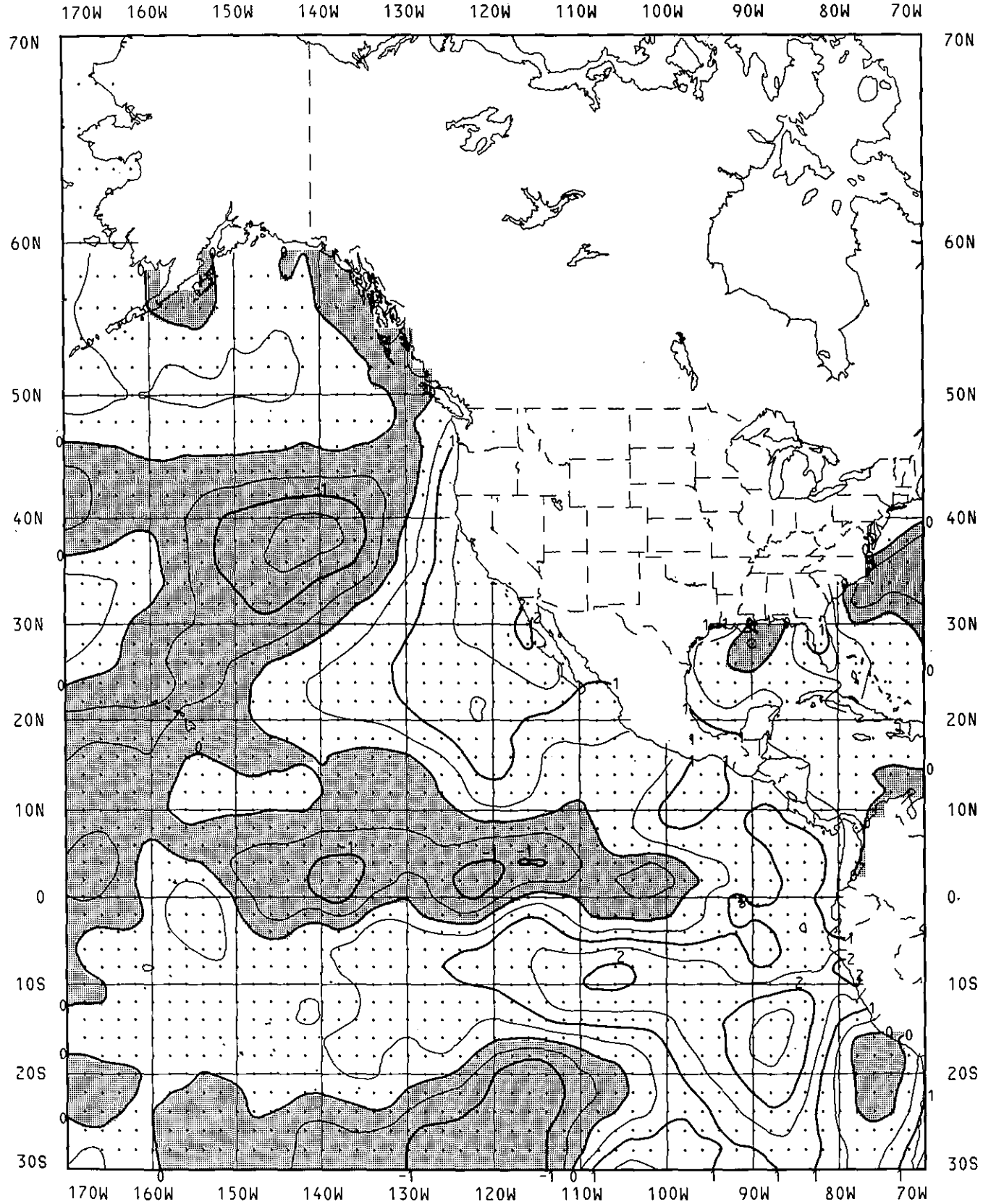
Eastern Pacific Ocean
SST--MONTHLY MEAN (°C)
SHIP and BUOY DATA
November 1983

Monthly mean sea surface temperature is the mean of in-situ data (ships and buoys) within two-degree quadrangles. Contour line interval is 1.0°C.



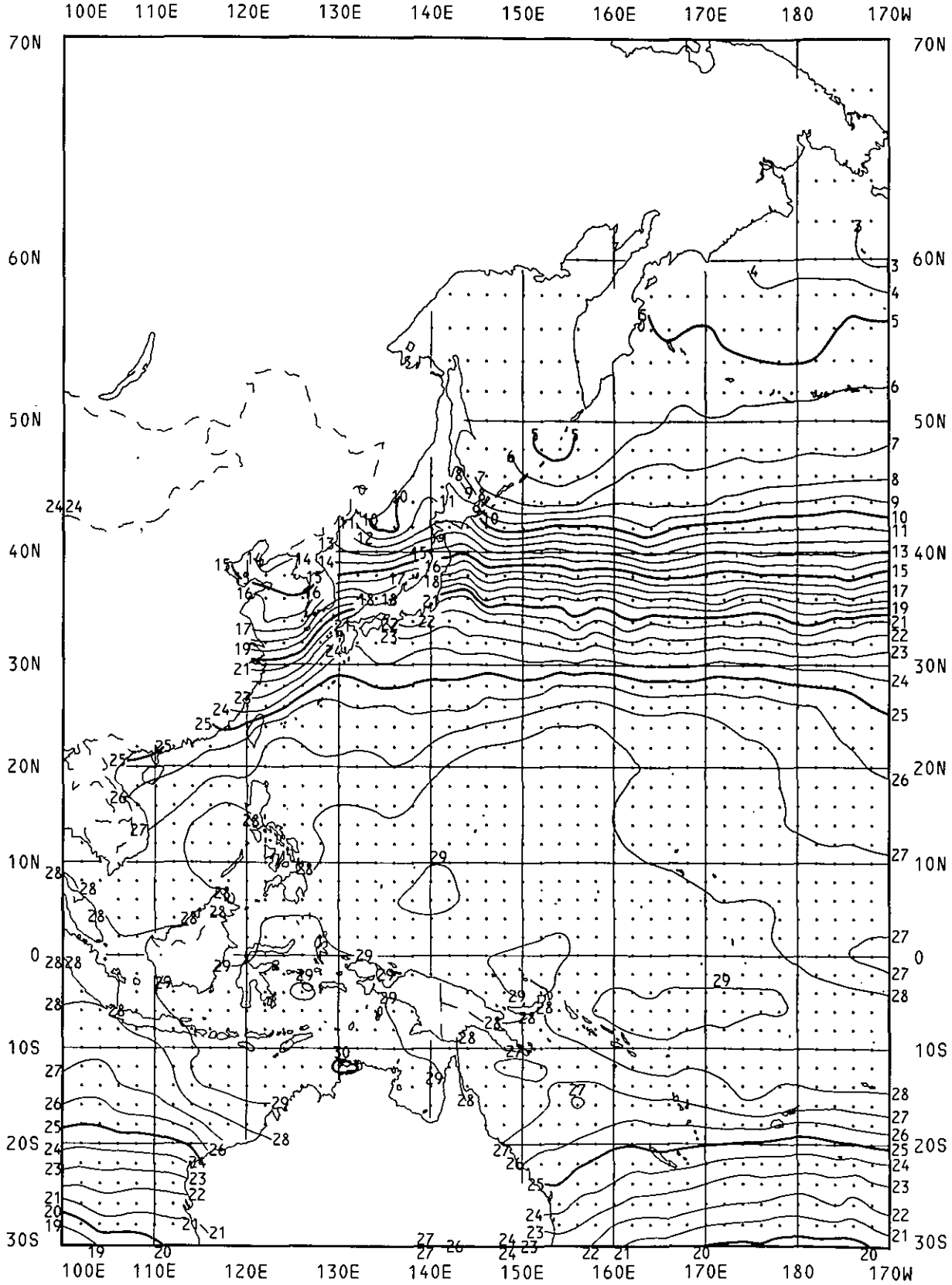
Western Pacific Ocean
SST--MONTHLY ANOMALY (°C)
SHIP and BUOY DATA
November 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.



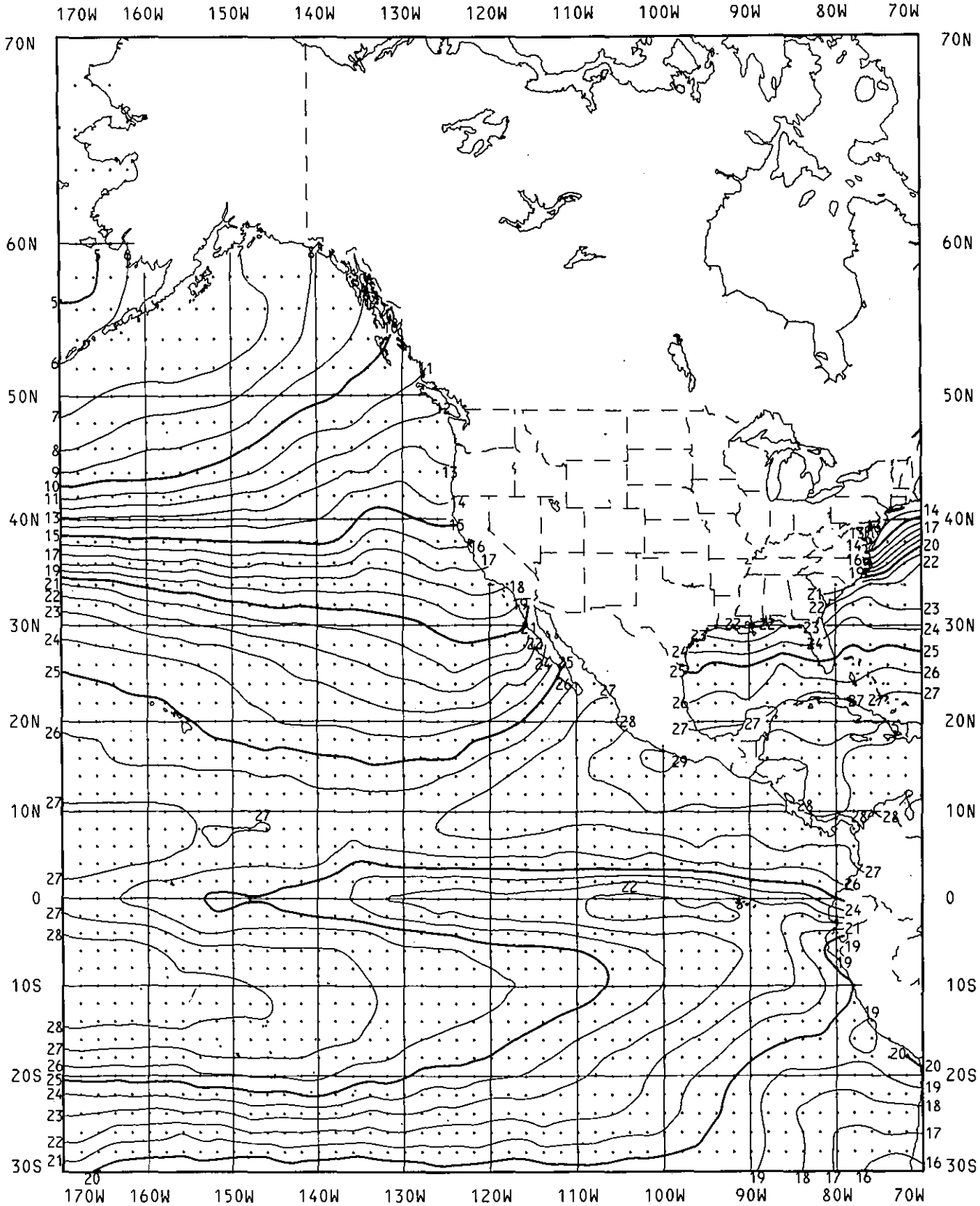
Eastern Pacific Ocean
SST--MONTHLY ANOMALY (°C)
SHIP and BUOY DATA
November 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.



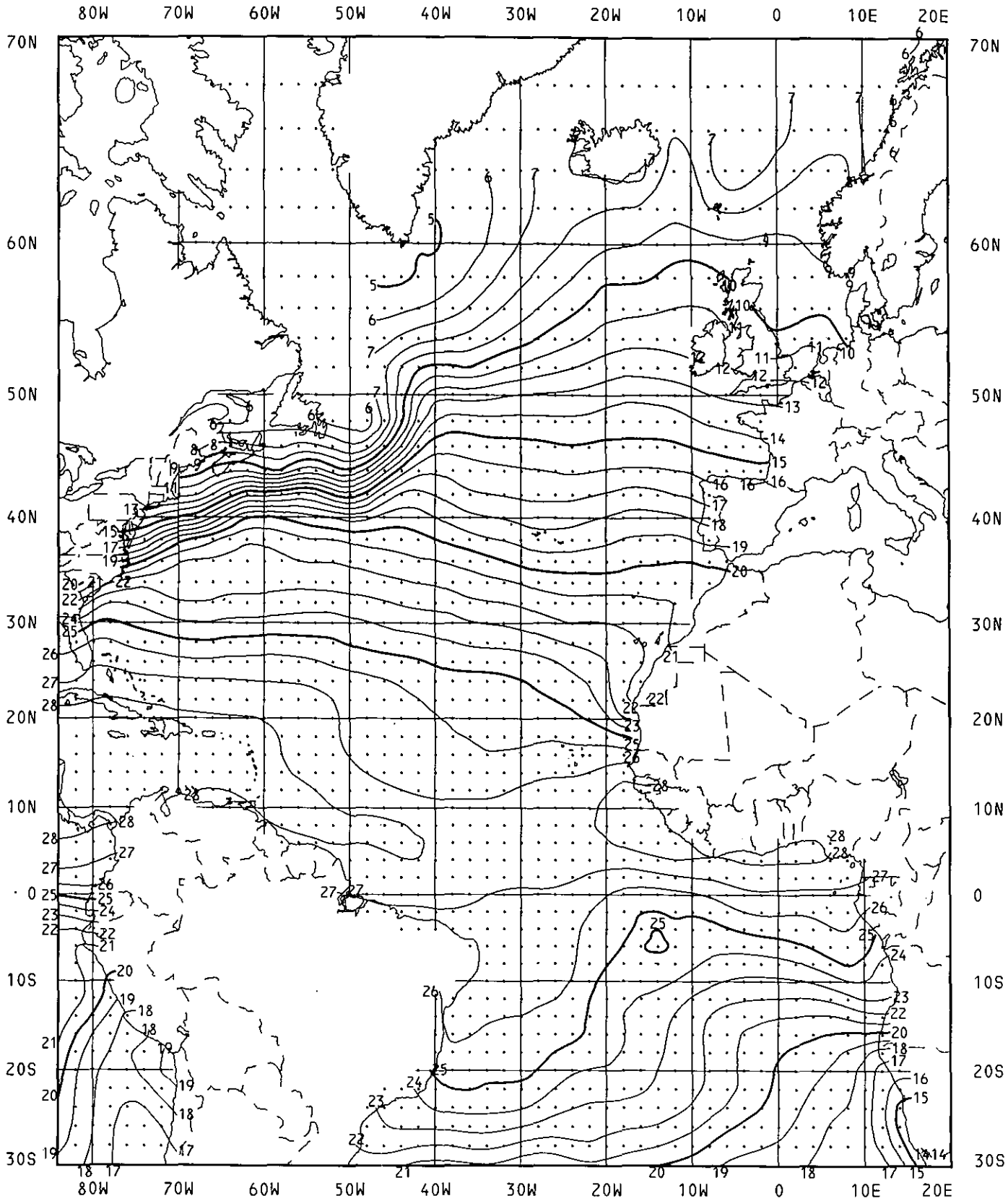
Western Pacific Ocean
SST--MONTHLY MEAN (°C)
SATELLITE DATA
November 1983

Monthly mean sea surface temperature is the mean of satellite data within two-degree quadrangles. Contour line interval is 1.0°C.



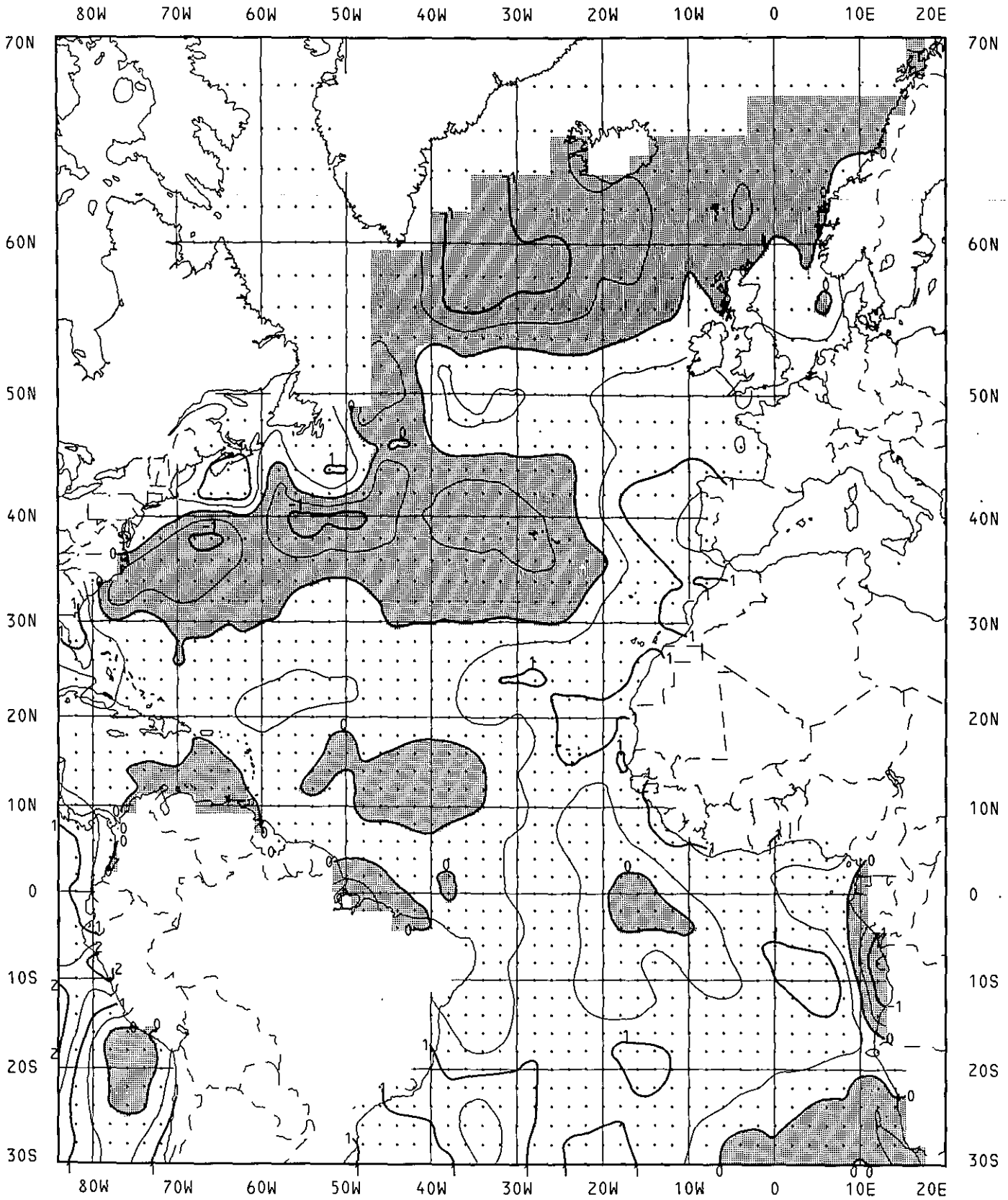
Eastern Pacific Ocean
SST--MONTHLY MEAN (°C)
SATELLITE DATA
November 1983

Monthly mean sea surface temperature is the mean of satellite data within two-degree quadrangles. Contour line interval is 1.0°C.



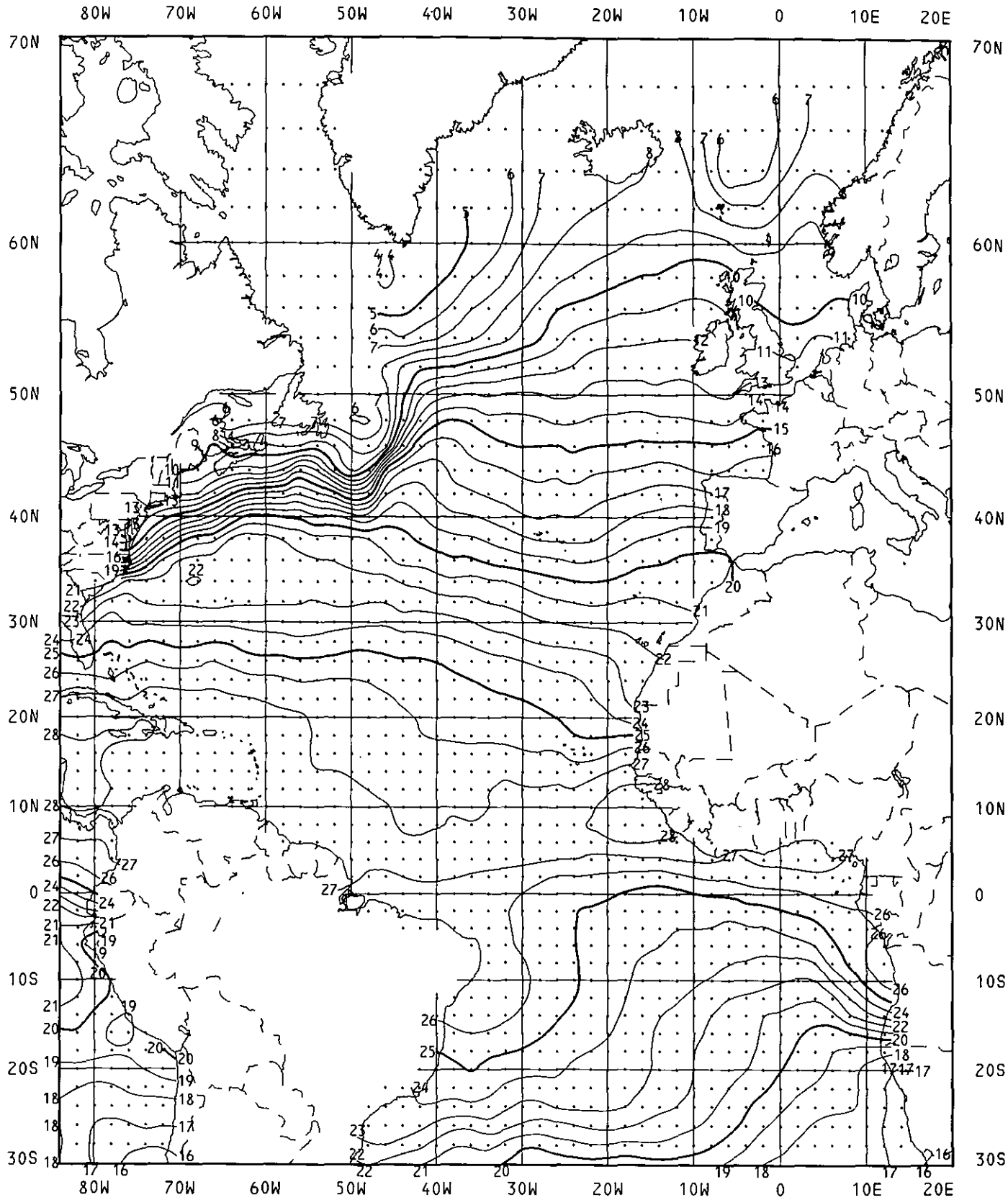
Atlantic Ocean
SST--MONTHLY MEAN (°C)
SHIP and BUOY DATA
November 1983

Monthly mean sea surface temperature is the mean of in-situ data (ships and buoys) within two-degree quadrangles. Contour line interval is 1.0°C.



Atlantic Ocean
SST--MONTHLY ANOMALY (°C)
SHIP and BUOY DATA
November 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.



Atlantic Ocean
SST--MONTHLY MEAN (°C)
SATELLITE DATA
November 1983

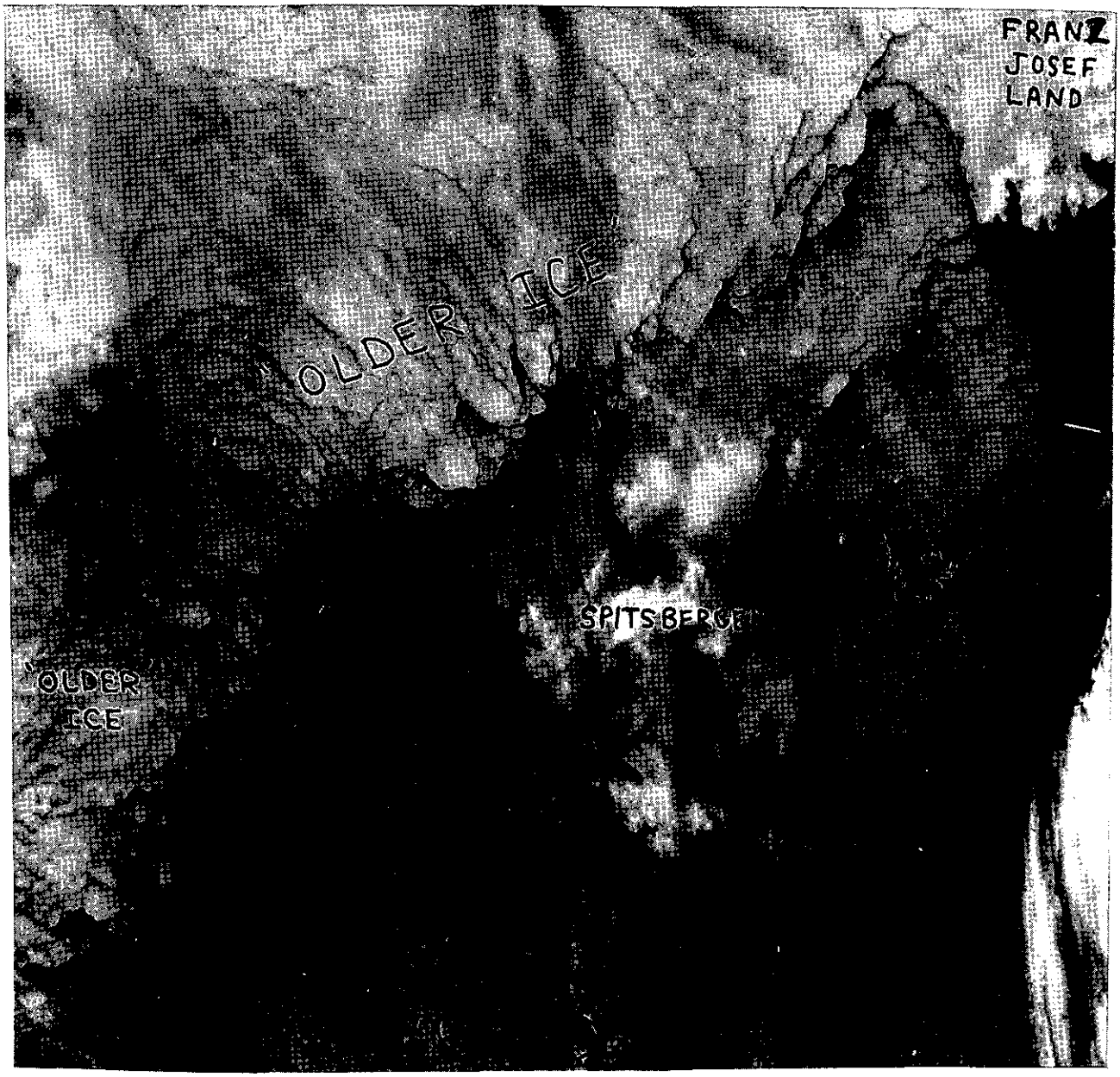
Monthly mean sea surface temperature is the mean of satellite data within two-degree quadrangles. Contour line interval is 1.0°C.

SATELLITE IMAGE OF THE MONTH

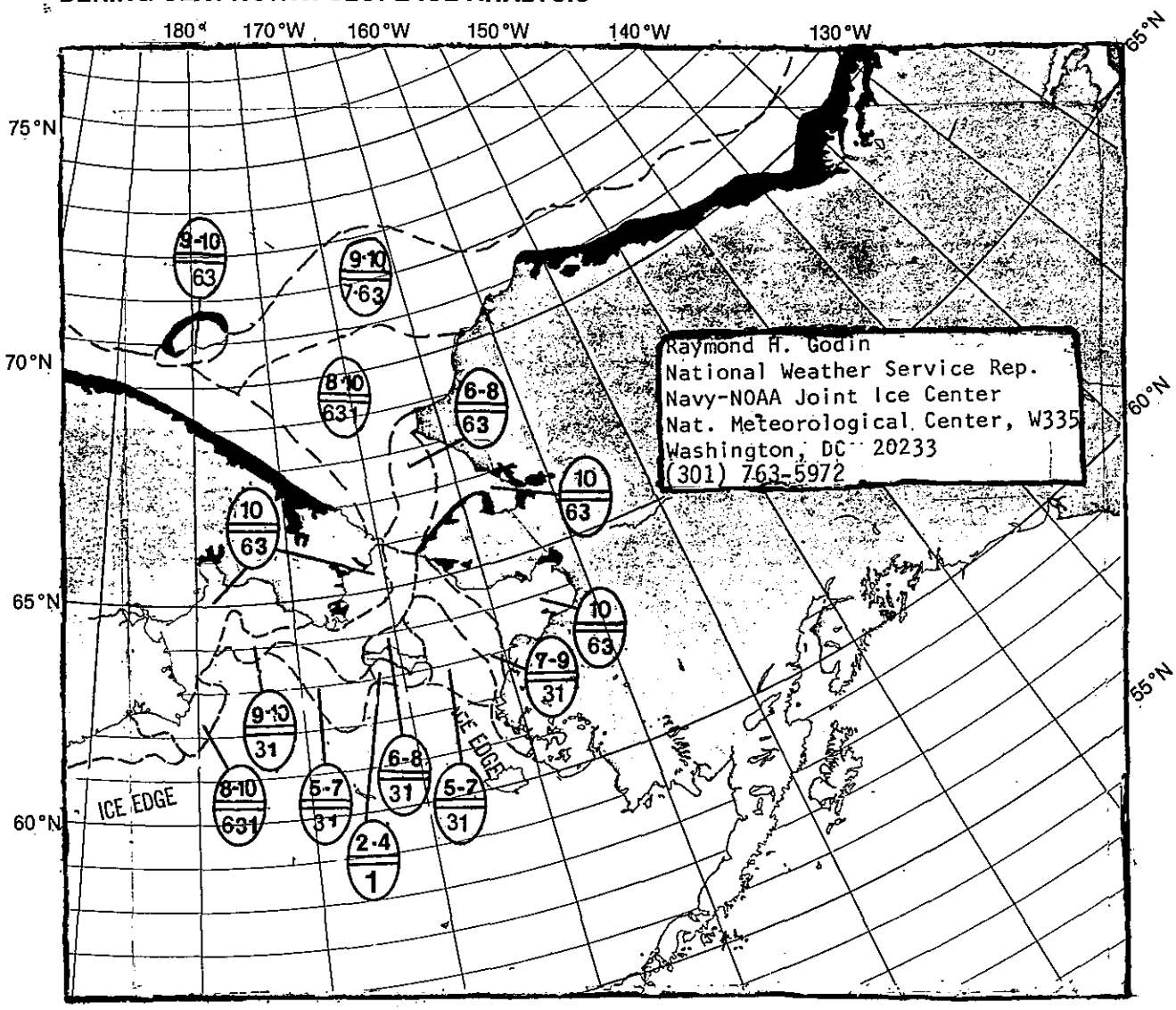
Marcia L. Weaks
Environmental Products Branch, E/SP22
NESDIS, NOAA
Washington, DC 20233
(301) 763-8142

ICE IN THE ARCTIC OCEAN/GREENLAND SEA

This NOAA-7 infrared satellite image taken November 18, 1983, illustrates the position of the ice edge in the Arctic Ocean and the eastern Greenland Sea. In the middle of the picture, the island of Spitsbergen is surrounded by ice on most of it's eastern and northern boundaries. The youngest ice is found to the east of Spitsbergen and is 0-30 cm thick. Ice thicknesses found in other portions of the image vary from 30 cm to 200 cm, including some ice that has survived one summer's melt. Younger, thinner ice usually corresponds to darker gray shades, while older, thicker ice is whiter and contains fracture lines. The dotted/solid line indicates the estimated/satellite determined position of the ice edge. Ice growth in this area is slightly greater than normal.



BERING SEA / NORTH SLOPE ICE ANALYSIS



C = Total ice concentration in the area in tenths.

C_a, C_b, C_c = Concentration of thickest (C_a), 2nd thickest (C_b), and 3rd thickest (C_c) ice

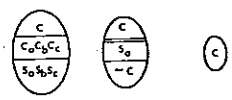
S_a, S_b, S_c = Stage of development of thickest (S_a), 2nd thickest (S_b), and 3rd thickest (S_c) ice.

-C = Concentration of ice within area(s) of strips and patches.

STAGE(S) OF DEVELOPMENT (THICKNESS)

1 = New ice (0-10 cm)
3 = Young ice (10-30 cm)
6 = First year (30-200 cm)
7 = First year thin (30-70 cm)
1. = First year medium (70-120 cm)
4. = First year thick (120-200 cm)
7. = Old ice (survived at least one summer's melt)

EXAMPLES



125 — Theoretical thickness of this season's growth (cm).

Fast ice. Sea ice which forms and remains fast along the coast.

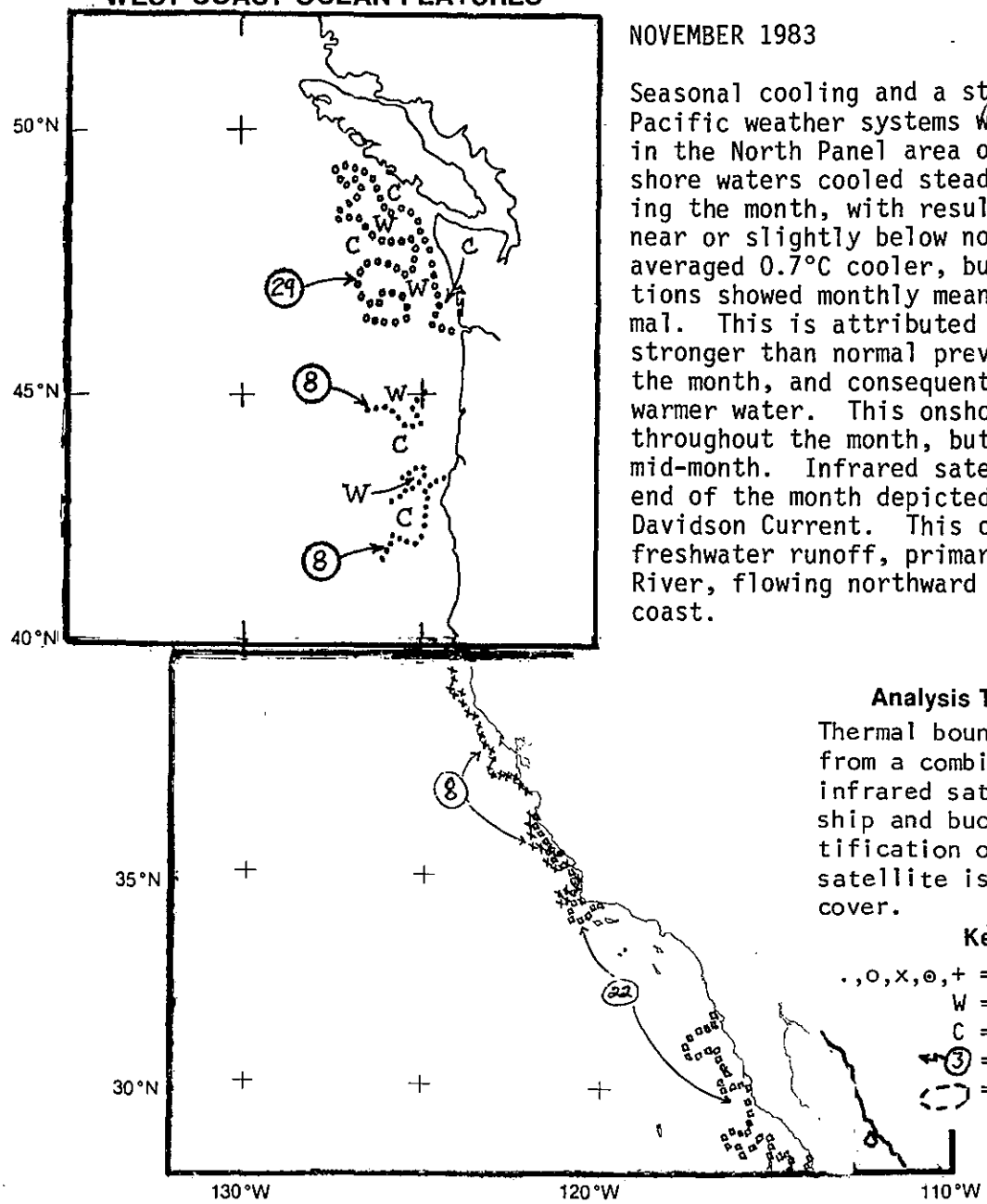
Ice boundary visually or satellite observed.

Ice boundary estimated.

NOVEMBER 1983

The mean monthly surface pressure circulation depicts a 989 mb low pressure center near 56°N 170°W. Geostrophic winds affecting ice covered waters are easterly east of 170°W and northeasterly west of 170°W. In the Bering Sea above normal mean monthly surface air temperatures were generally observed at selected coastal stations. At Barrow (71°N 157°W) normal air temperatures were recorded. During the month the ice edge receded 15 to 25 km along the Alaskan coast south of 62°N. Elsewhere the ice edge expanded from Norton Sound and the Alaskan and Soviet coastal areas into the north central Bering Sea near St. Lawrence Island (63°N 170°W). Ice conditions adjacent to the coast in the Bering Sea consist primarily of first year and young ice north of 63°N. Young and new ice are observed in the more southerly coastal areas and in the central Bering Sea. The current ice edge position is near the historical median north of 62°N and generally between median and minimum extremes south of 62°N.

WEST COAST OCEAN FEATURES



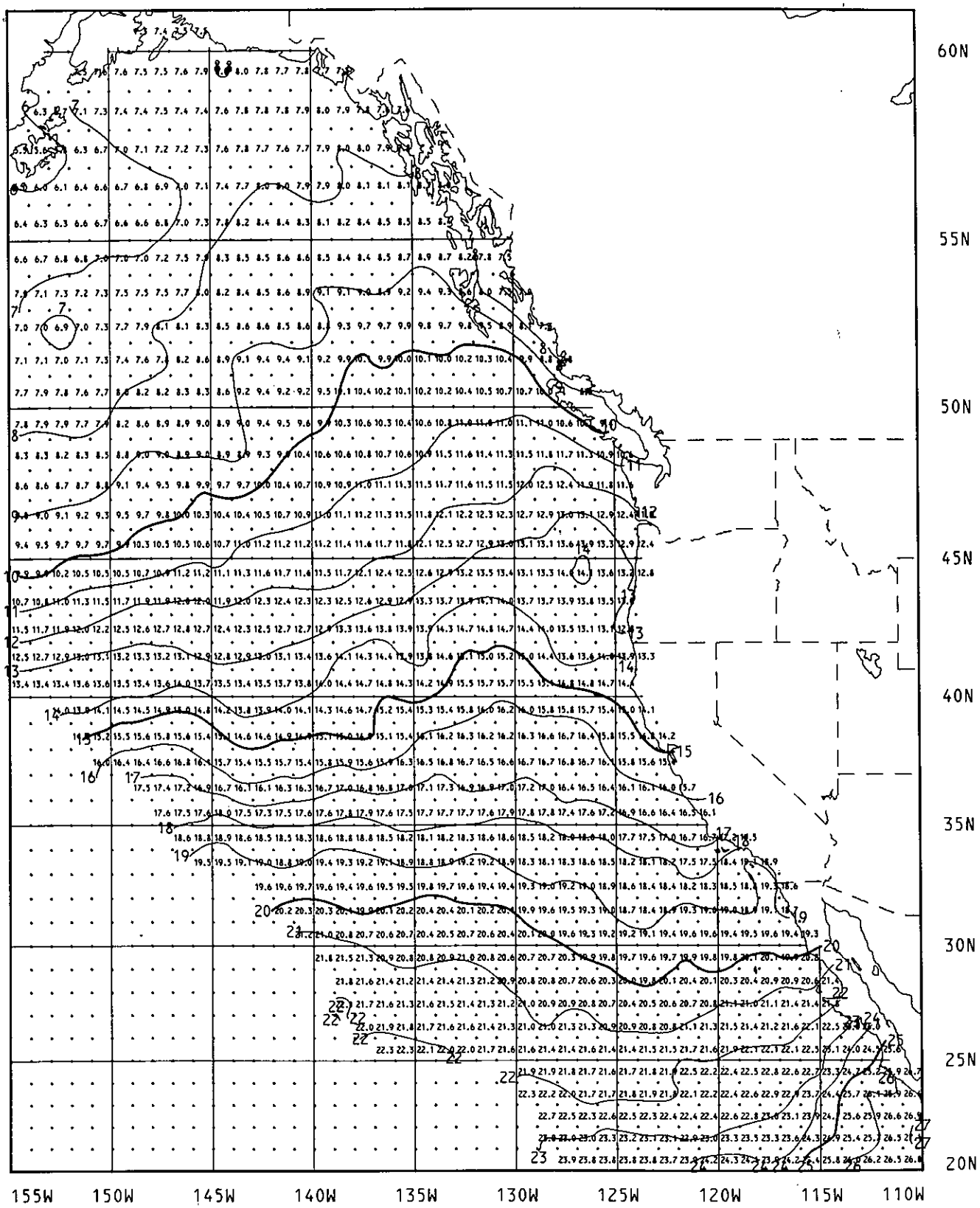
NOVEMBER 1983

Seasonal cooling and a steady stream of vigorous Pacific weather systems were dominant factors in the North Panel area ocean conditions. Offshore waters cooled steadily by about 2.5°C during the month, with resultant mean SSTs being near or slightly below normal. Coastal SSTs averaged 0.7°C cooler, but several coastal stations showed monthly means 0.9-1.8°C above normal. This is attributed to more southerly and stronger than normal prevailing winds during the month, and consequent onshore transport of warmer water. This onshore transport persisted throughout the month, but was strongest near mid-month. Infrared satellite imagery from the end of the month depicted a well-established Davidson Current. This current was seen as cold freshwater runoff, primarily from the Columbia River, flowing northward along the Washington coast.

North Panel
Kent Short
NOAA/Northwest Regional Ocean Service Center
7600 Sand Point Way NE
Bin C15700
Seattle, WA 98115
(206) 527-6604

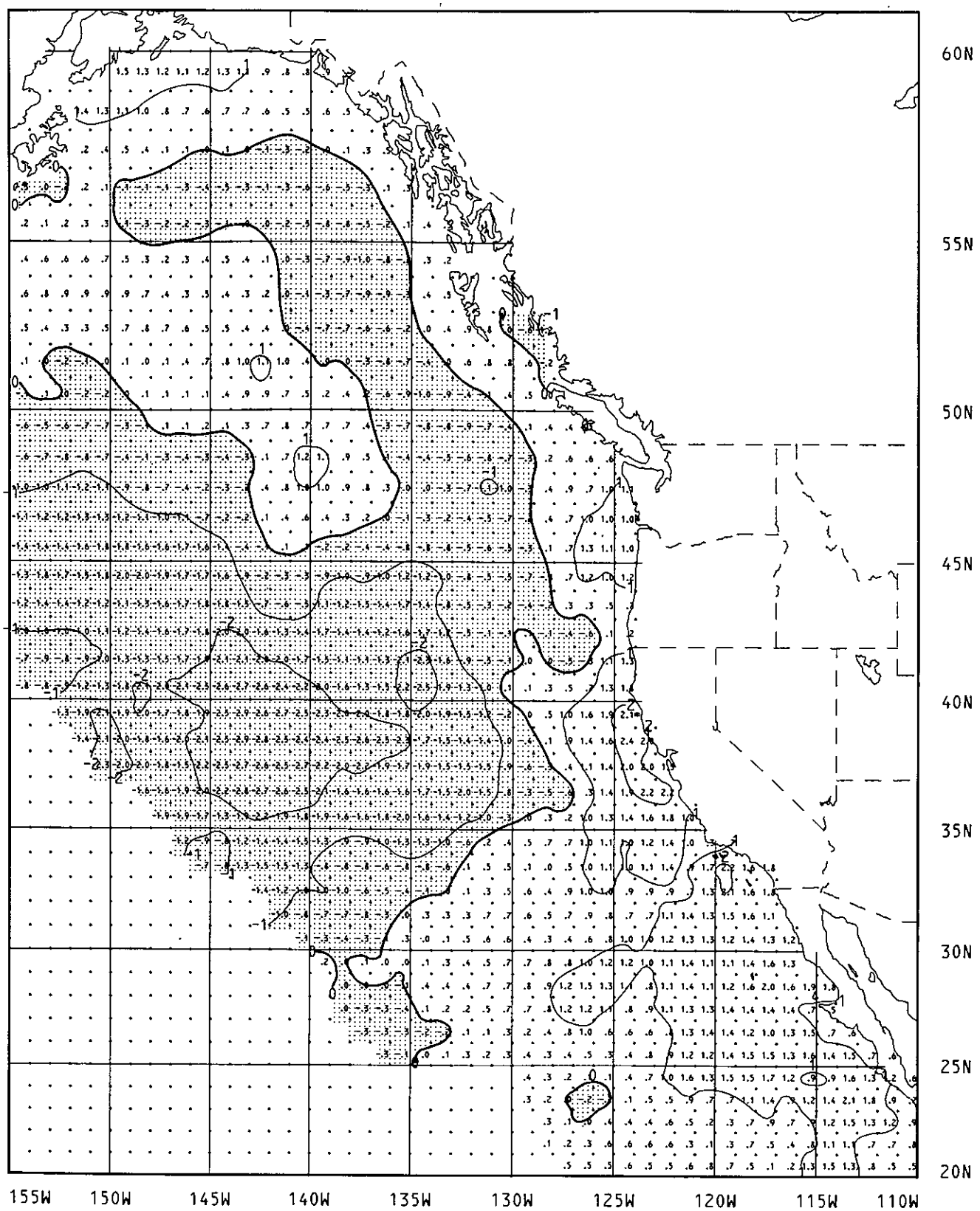
South Panel
Ernest Daghir
NOAA/NESDIS
Satellite Field Service Station
660 Price Avenue
Redwood City, CA 94063
(415) 364-2422

Seasonal cooling continued over the entire south panel area with SSTs decreasing from 0.5°C to 3.0°C from October's values. The area of maximum cooling was north of 34°N and west of 131°W; the area of least cooling was south of 34°N and between 126° and 132°W. Cooling along the entire coast was 1.0° to 1.5°C. The anomalously cool water north of 30°N and west of 130°W persists as well as the anomalously warm water east of 128°W. The maximum warm anomaly of 2.0°C was adjacent to the coast from Monterey Bay north to Cape Mendocino and from Pt. Conception southward to Baja, California. Two minor upwelling events occurred during the month, one around November 8 and another on November 22.



West Coast
SST--MONTHLY MEAN (°C)
November 1983

Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.



West Coast
SST--MONTHLY ANOMALY (°C)
November 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.

The end of this month's positions of the Gulf Stream System and its associated eddies are shown for the NW Atlantic and the Gulf of Mexico. The Gulf Stream and Loop Current boundaries are located by infrared satellite imagery or XBT (expendable bathythermograph) data. Anticyclonic eddies are labeled a-z in the Gulf of Mexico and 1-99 in the NW Atlantic. Cyclonic eddies are labeled A-Z. Arrows on eddies indicate direction of circulation. Warm-core or anticyclonic eddies rotate clockwise; cold-core or cyclonic eddies rotate counterclockwise. The line to the eddy center shows the net translation since last month or since last observed. Eddies or sections of the Gulf

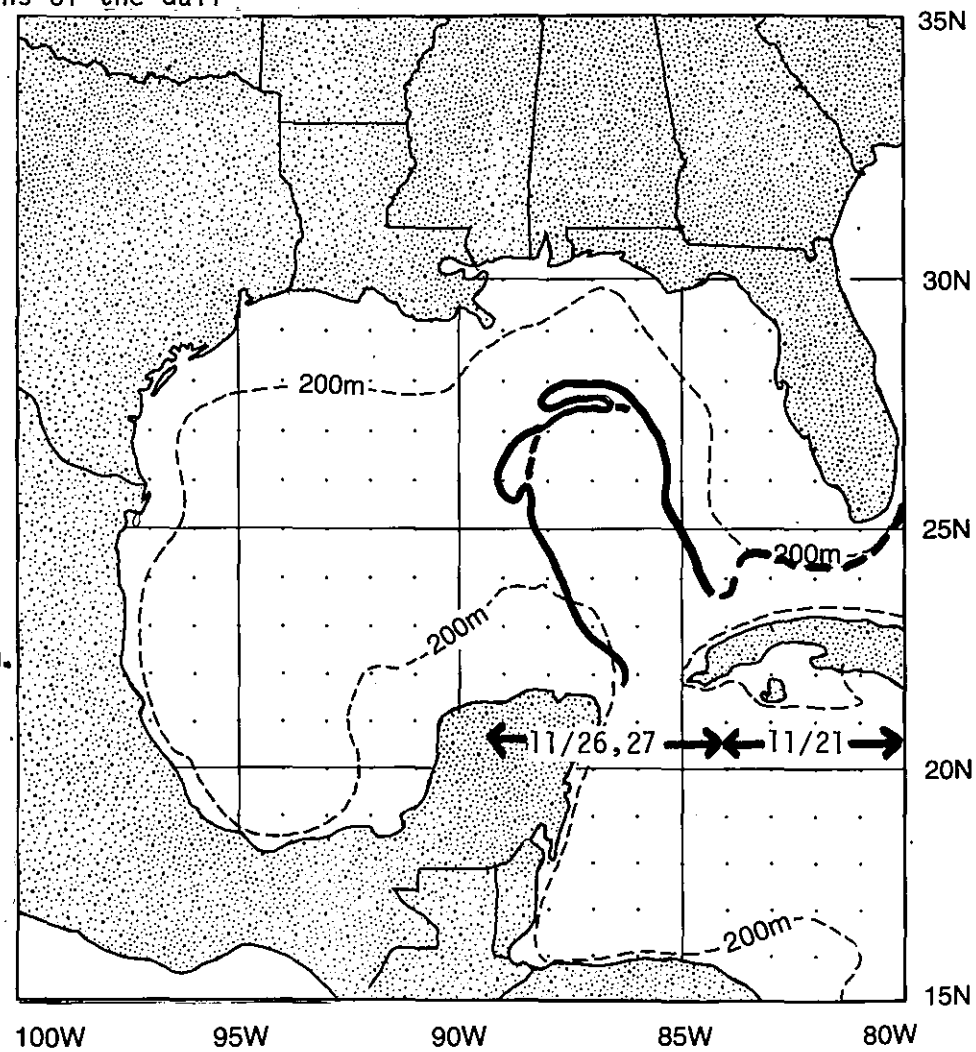
EAST COAST OCEAN FEATURES

Stream System which were not observed during the month are not shown on the analysis chart. The long arrows at the bottom of the chart indicate the date of data used.

Data used in this analysis include:
- NOAA satellite infrared imagery, NESDIS
- Bathythermograph data, National Meteorological Center of National Weather Service
- Oceanographic Analysis, A daily detailed analysis issued by National Weather Service/NESDIS

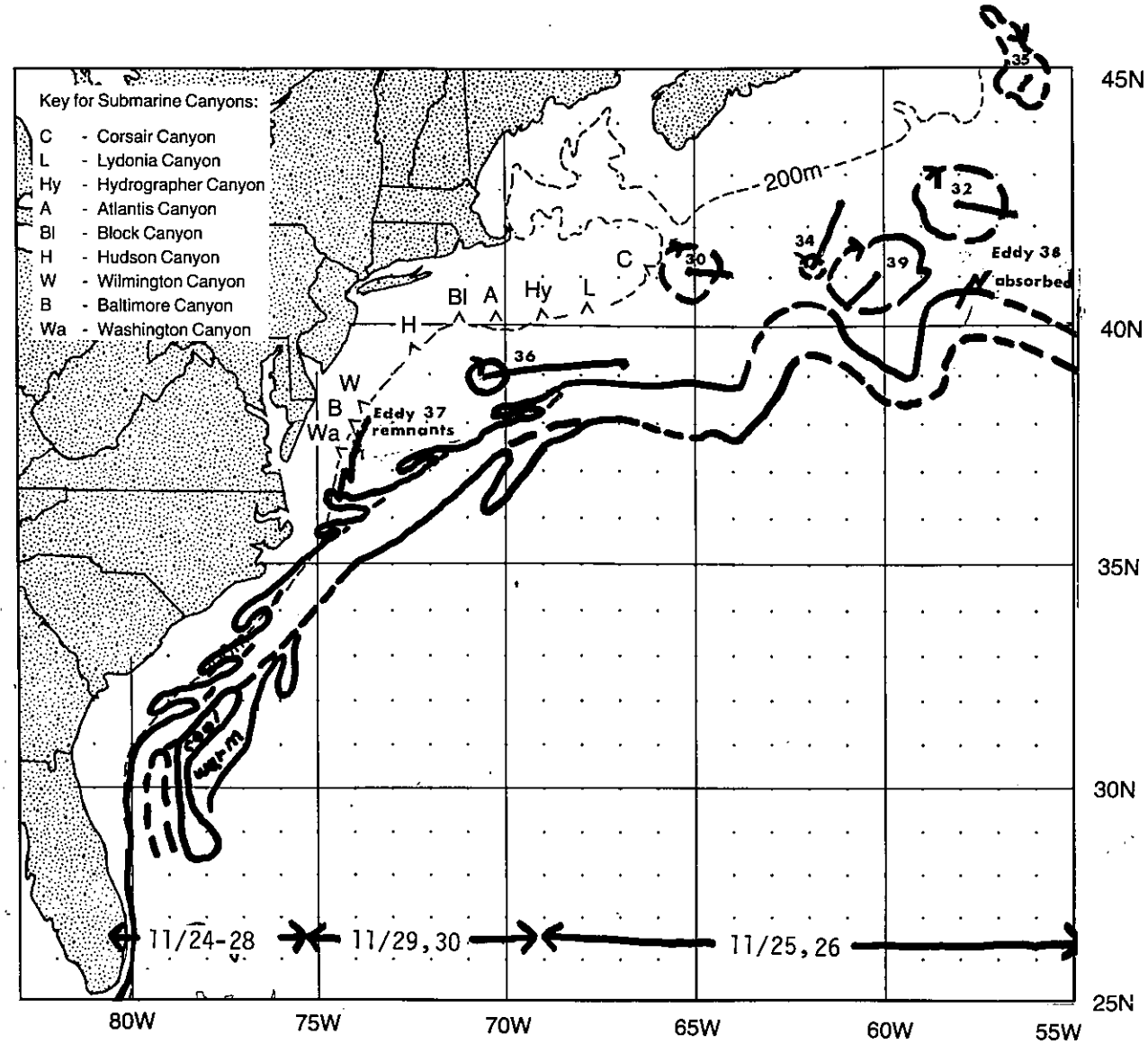
Jenifer Wartha-Clark
NOAA/NWS
Washington, DC 20233
(301) 763-8088

Ann Bell
NOAA/NWS
National Meteorological Cen.
Washington, DC 20233
(301) 763-8133



NOVEMBER 1983

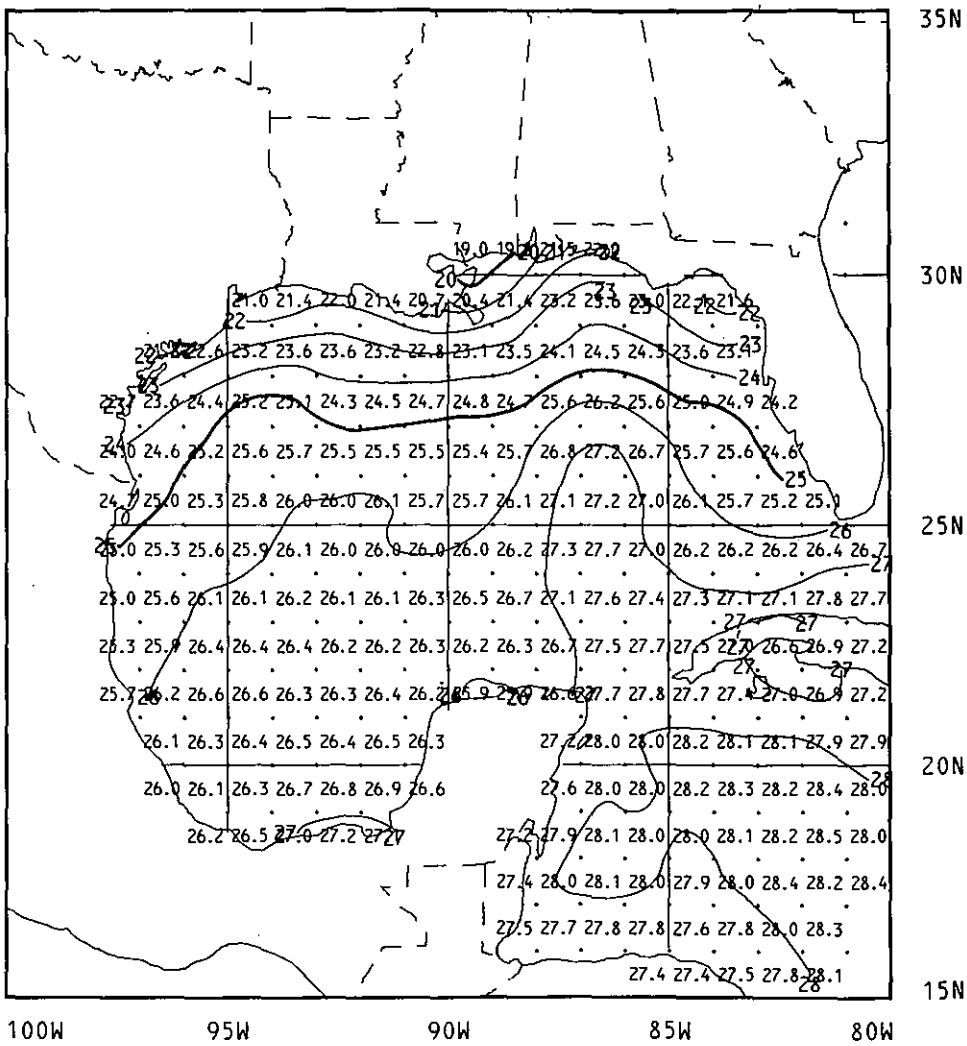
The amplitude of the Loop Current at the end-of-November shows a slight increase compared to the end-of-October position.



Two anticyclonic eddies were absorbed by the Gulf Stream in November. Eddy 37 presumably traveled 285 km SSW before being absorbed by the Gulf Stream near 36°N 74°30W on November 27. Eddy 38 traveled 35 km NNE and was seemingly absorbed by a Gulf Stream meander near 40°30N 58°W around November 25. Eddy 30 moved 90 km W when it was last observed on November 20. Eddy 34 apparently moved 140 km SSW when it was last partially observed on November 25. Eddy 36 traveled 315 km W. Eddy 39 moved 90 km NE. Eddy 35, last detected on November 3, seemingly moved 25 km NNE. Eddy 32 apparently moved 110 km WNW.

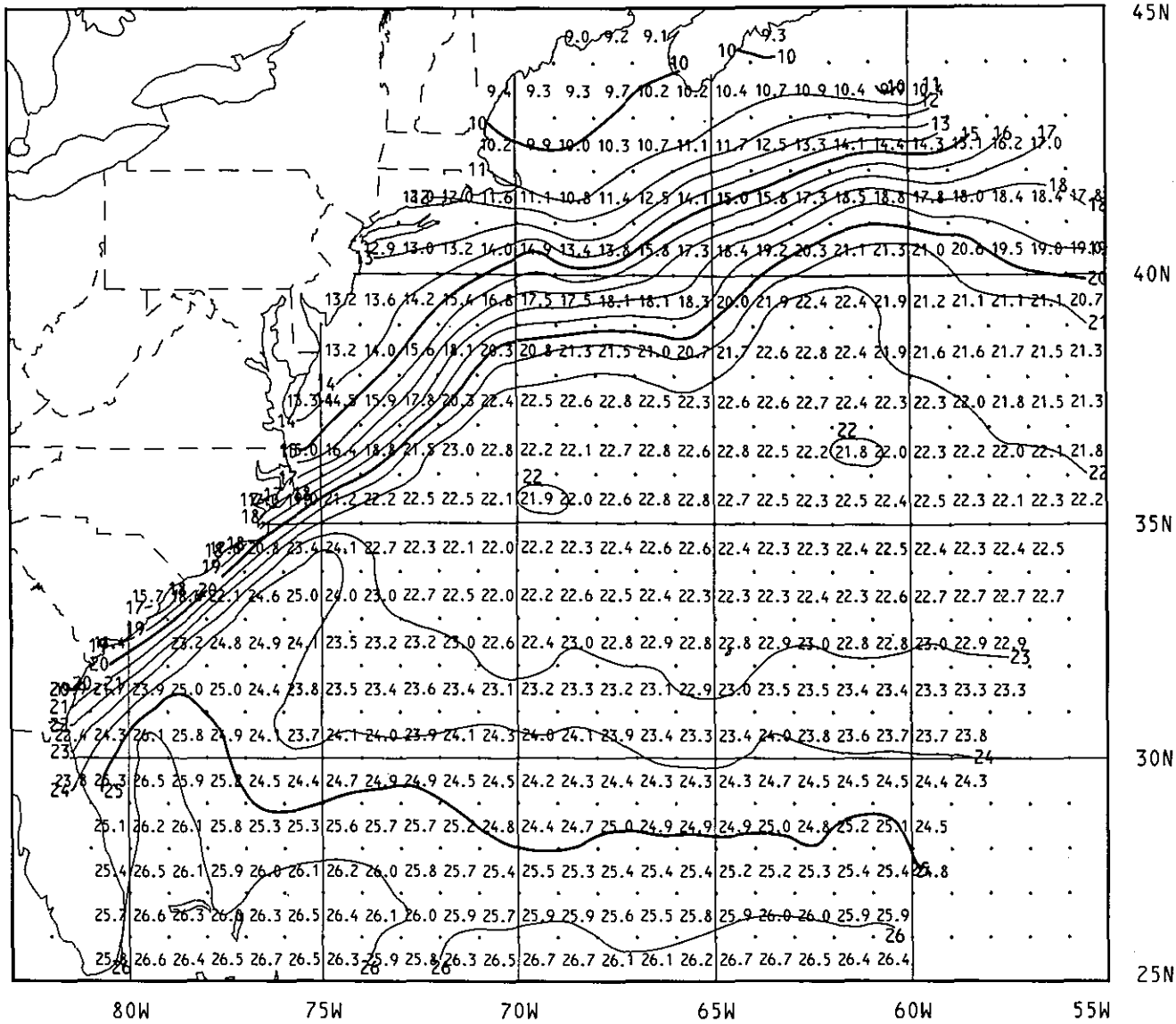
One cyclonic eddy was apparently absorbed during November. Due to much cloudiness, eddy C was last detected on November 14. It is suspected that eddy C dissipated in the cool tongue of water near 32°N 77°W to 28°30N 78°W.

EAST COAST SST-
MONTHLY MEAN



Gulf of Mexico
SST--MONTHLY MEAN (°C)
November 1983

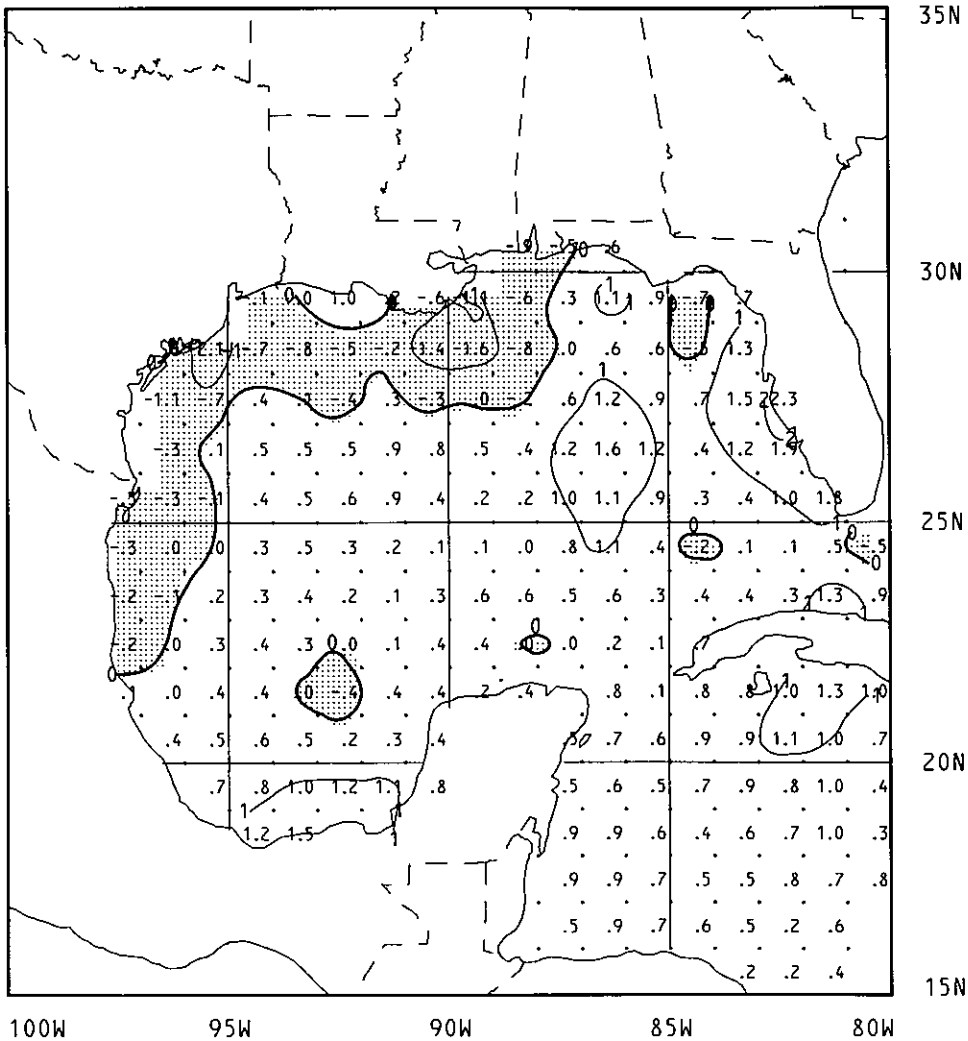
Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.



NW Atlantic Ocean
SST--MONTHLY MEAN (°C)
November 1983

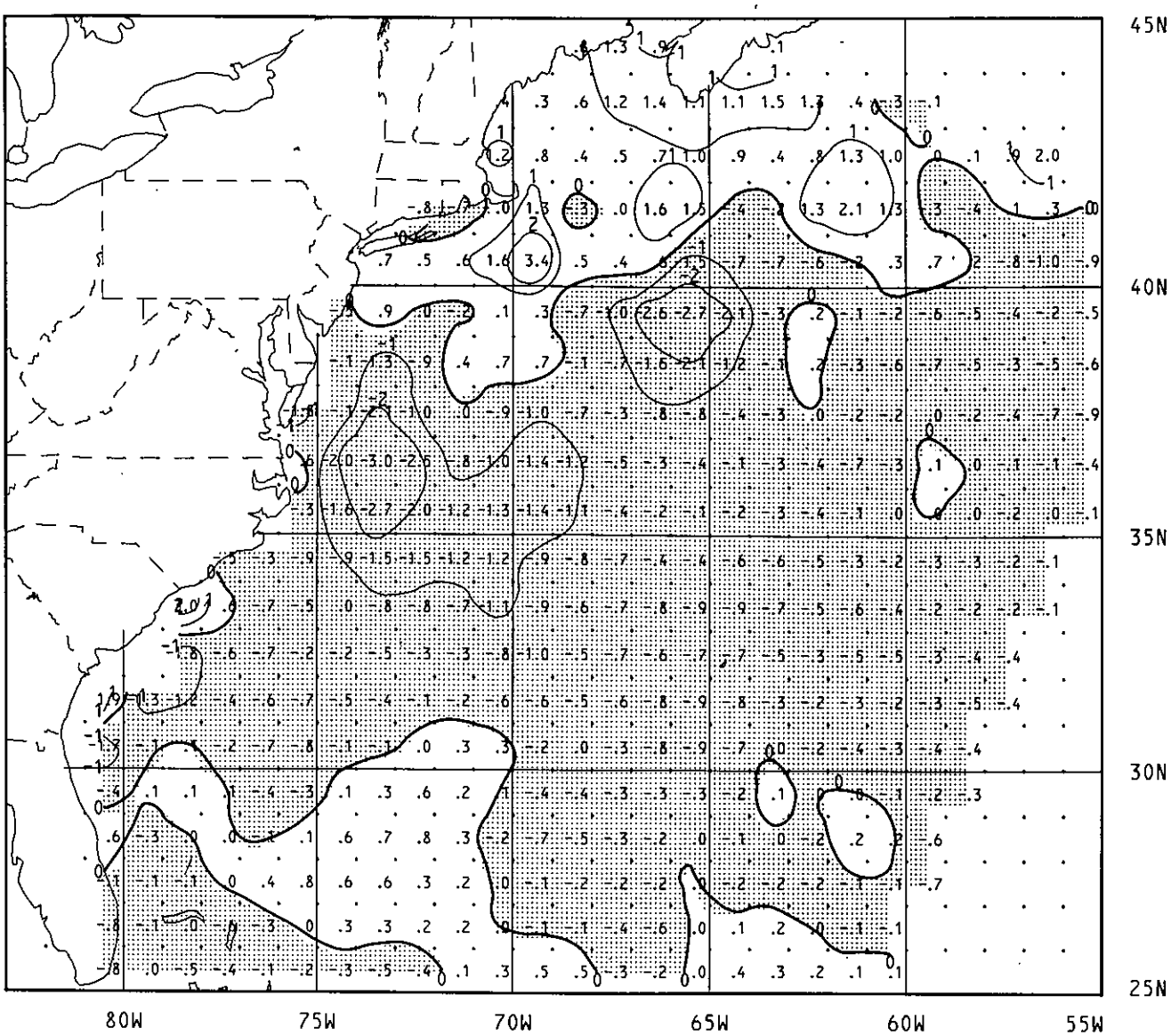
Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.

EAST COAST SST-ANOMALY



Gulf of Mexico
SST--MONTHLY ANOMALY (°C)
November 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.

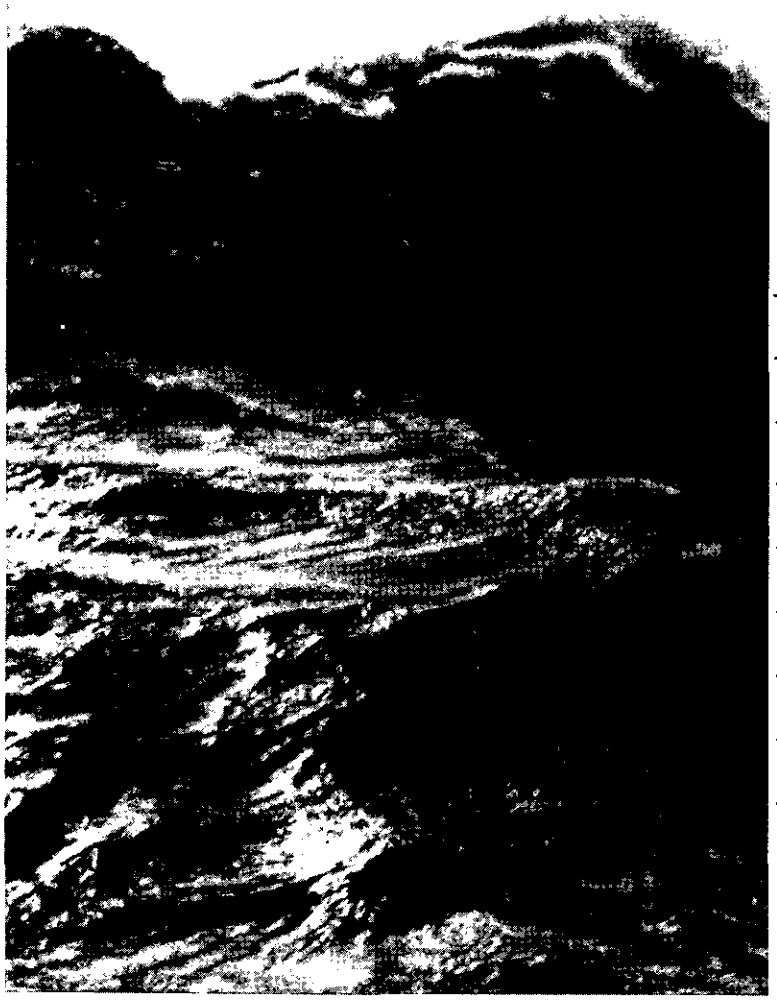


NW Atlantic Ocean
SST--MONTHLY ANOMALY (°C)
November 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.

OCEANOGRAPHIC Monthly Summary

Volume III Number 12 NOAA LISD SEATTLE December 1983



Contents

3 OceaNotes

4 Pacific SST - monthly mean, ship and buoy data

6 Pacific SST - anomaly

8 Pacific SST - monthly mean, satellite data

10 Atlantic SST - monthly mean, ship and buoy data

11 Atlantic SST - anomaly

12 Atlantic SST - monthly mean, satellite data

13 Satellite IMAGE of the Month

14 Bering Sea/North Slope ICE, with text

15 West Coast OCEAN FEATURES, with text

16 West Coast SST - monthly mean

17 West Coast SST - anomaly

18 East Coast OCEAN FEATURES, with text

20 East Coast SST - monthly mean

22 East Coast SST - anomaly

24 Subscription Information

U.S. DEPARTMENT OF COMMERCE • National Oceanic and Atmospheric Administration
National Weather Service
National Environmental Satellite, Data, and Information Service

Oceanographic Monthly Summary is published by the National Weather Service and the National Environmental Satellite, Data, and Information Service (NESDIS). *Oceanographic Monthly Summary* contains sea surface temperature (SST) analyses on both regional and ocean basin scales for the Atlantic and Pacific Oceans. Two ocean basin SST analyses are presented, one based on in-situ data and another based solely on satellite data. An ocean basin SST anomaly derived from the in-situ data is also shown; it uses the National Climatic Center (NCC) Climatology*. The regional SST analyses are based upon a combination of in-situ and satellite data measurements. The regional SST anomalies use the Robinson-Bauer Climatology*. *Oceanographic Monthly Summary* also contains Alaskan sea ice infromation and ocean feature information for contiguous U.S. ocean regions.

Oceanographic Monthly Summary welcomes articles containing information of interest to *Oceanographic Monthly Summary* readers, such as, news on operational oceanography, unusual ocean feature phenomena, etc. Contributions should be sent to the editor (address below). Accepted material will appear in the OceaNotes section of *Oceanographic Monthly Summary*. Contributions can be published as quickly as the next monthly issue.

If you are interested in receiving *Oceanographic Monthly Summary* regularly, please refer to the back cover for subscription information.

*Reynolds, R.W., 1982. A Monthly Averaged Climatology of Sea Surface Temperatures; *NOAA Technical Report NWS 31.*

*Robinson, M.K., 1976. Atlas of North Pacific Ocean Monthly Mean Temperatures and Mean Salinities of the Surface Layer; *NavOceano Ref. Pub. 2.*

Robinson, M.K., R. A. Bauer and E.H. Schroeder, 1979. Atlas of North Atlantic-Indian Ocean Monthly Mean Temperatures and Mean Salinities of the Surface Layer; *NavOceano Ref. Pub. 18.*

Oceanographic Monthly Summary

Editor: Jenifer Wartha-Clark
NOAA, NWS
Washington, DC 20233
(Telephone: (301) 763-8239)

Assistant Editor: Ann Bell
NOAA, NWS
National Meteorological Center, W/NMC21
Washington, DC 20233
(Telephone: (301) 763-8133)

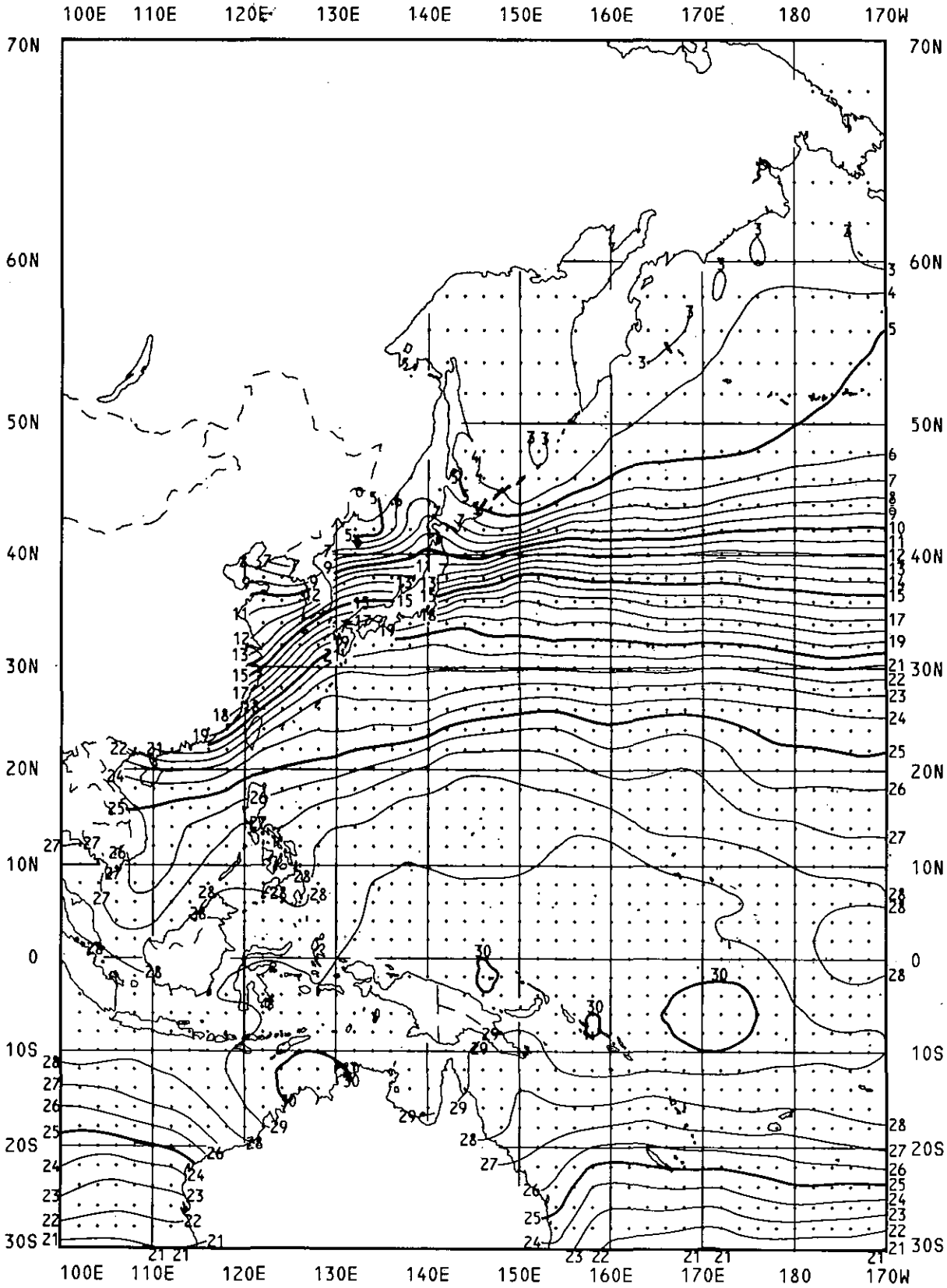
SST Computer Analyses are prepared by:
William H. Gemmill
Marine Products Branch, W/NMC21
National Meteorological Center
National Weather Service, NOAA
Washington, DC 20233
(Telephone: (301) 763-8133)

A NEW GULF STREAM PUBLICATION AVAILABLE

A publication entitled "Gulf Stream System Landward Surface Edge Statistics" is now available to the public free of charge. The author is Stephen J. Auer, an oceanographer at NWS.

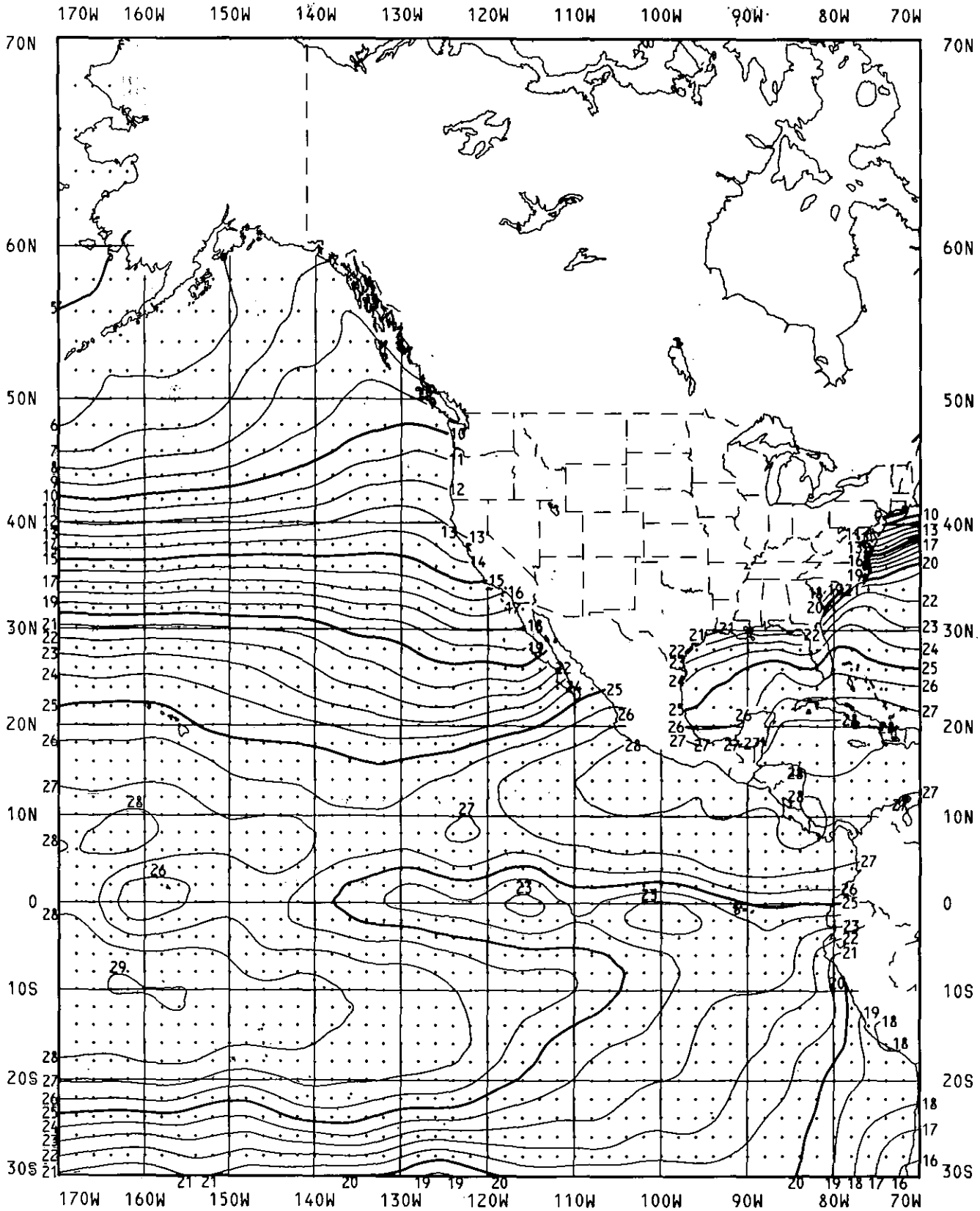
This publication represents a statistical evaluation of the mean position, standard deviation, and maximum northward and southward positions of the Gulf Stream System landward surface edge. The Gulf Stream System's edge is named a "landward surface edge" to signify that it is the edge nearest to the North American continental land mass. The Gulf Stream System is divided into two regions: the Loop Current and the Gulf Stream. These statistics are derived from the initial year of the daily Oceanographic Analysis (May 28, 1980 - May 29, 1981), which contains synoptic frontal locations of the Gulf Stream System. This publication describes the daily Oceanographic Analysis, provides details in the Gulf Stream features data file and statistics program, presents the resultant Gulf Stream System landward surface edge statistics, and compares these statistics to those of two other surveys. The Oceanographic Analysis is a joint operational product of the National Weather Service and National Environmental Satellite, Data, and Information Service.

If you are interested in receiving this publication please contact Jenifer Wartha Clark at (301) 763-8239 or Ann Bell at (301) 763-8133.



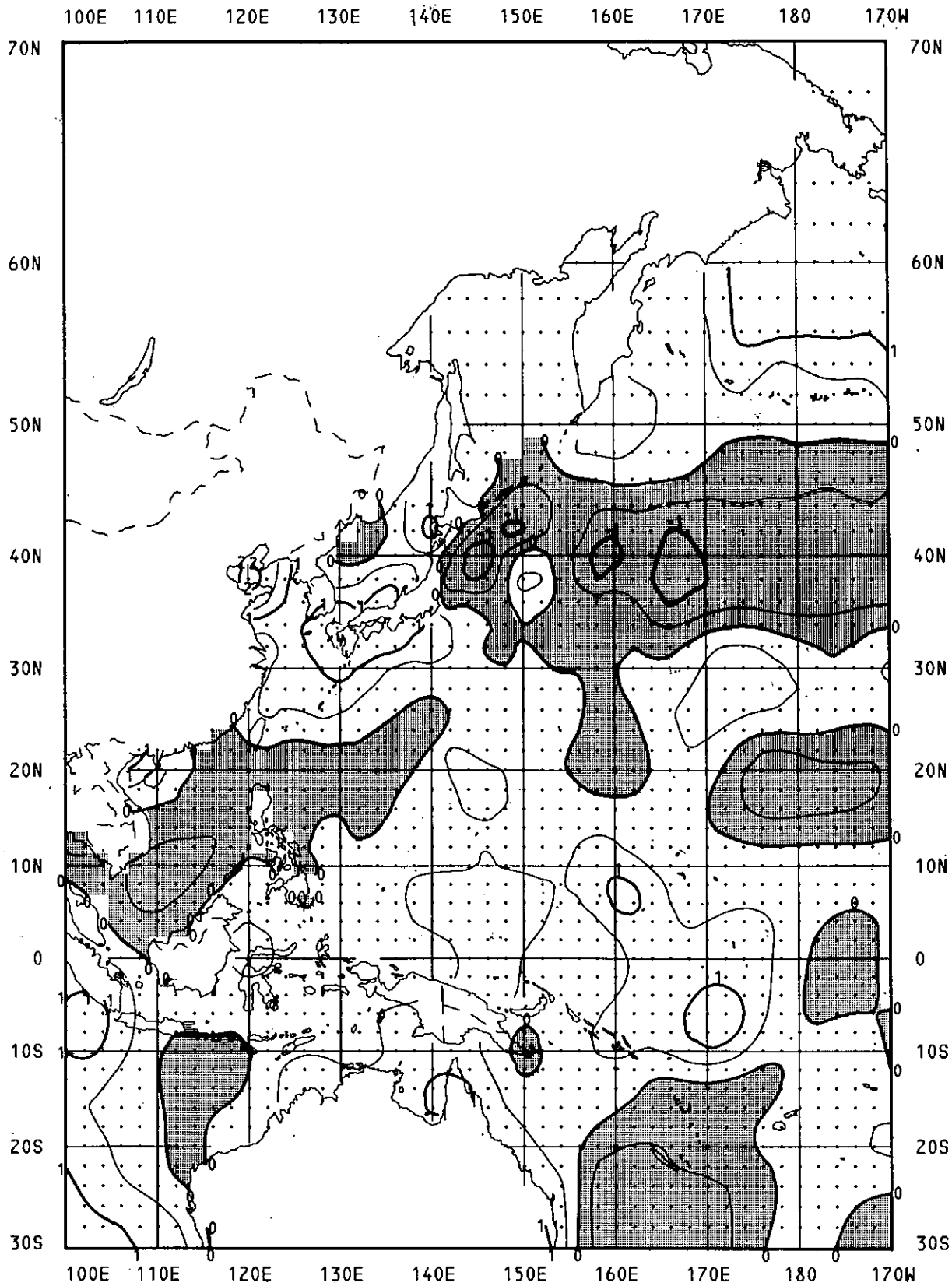
Western Pacific Ocean
SST--MONTHLY MEAN (°C)
SHIP and BUOY DATA
December 1983

Monthly mean sea surface temperature is the mean of in-situ data (ships and buoys) within two-degree quadrangles. Contour line interval is 1.0°C.



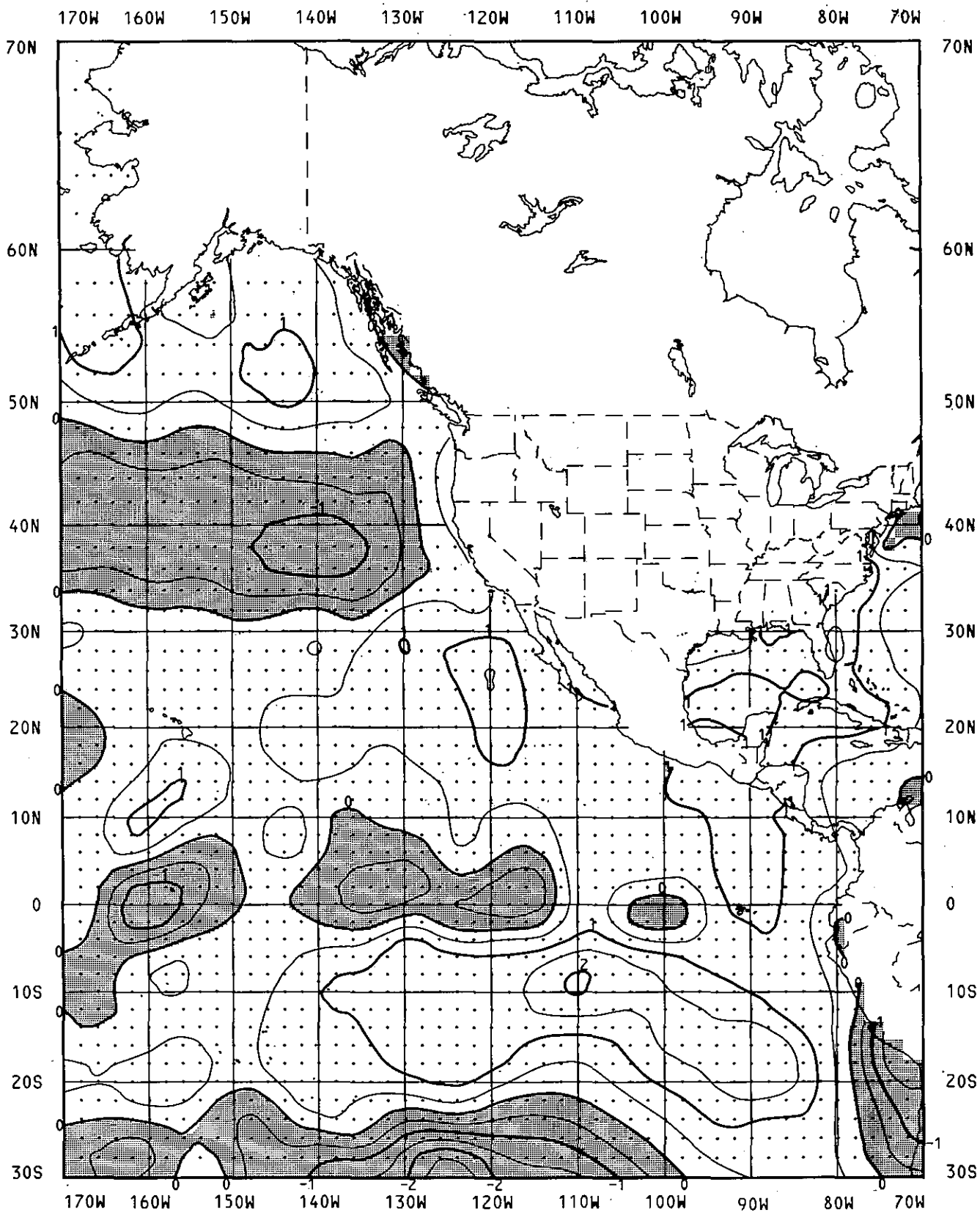
Eastern Pacific Ocean
SST--MONTHLY MEAN (°C)
SHIP and BUOY DATA
December 1983

Monthly mean sea surface temperature is the mean of in-situ data (ships and buoys) within two-degree quadrangles. Contour line interval is 1.0°C.



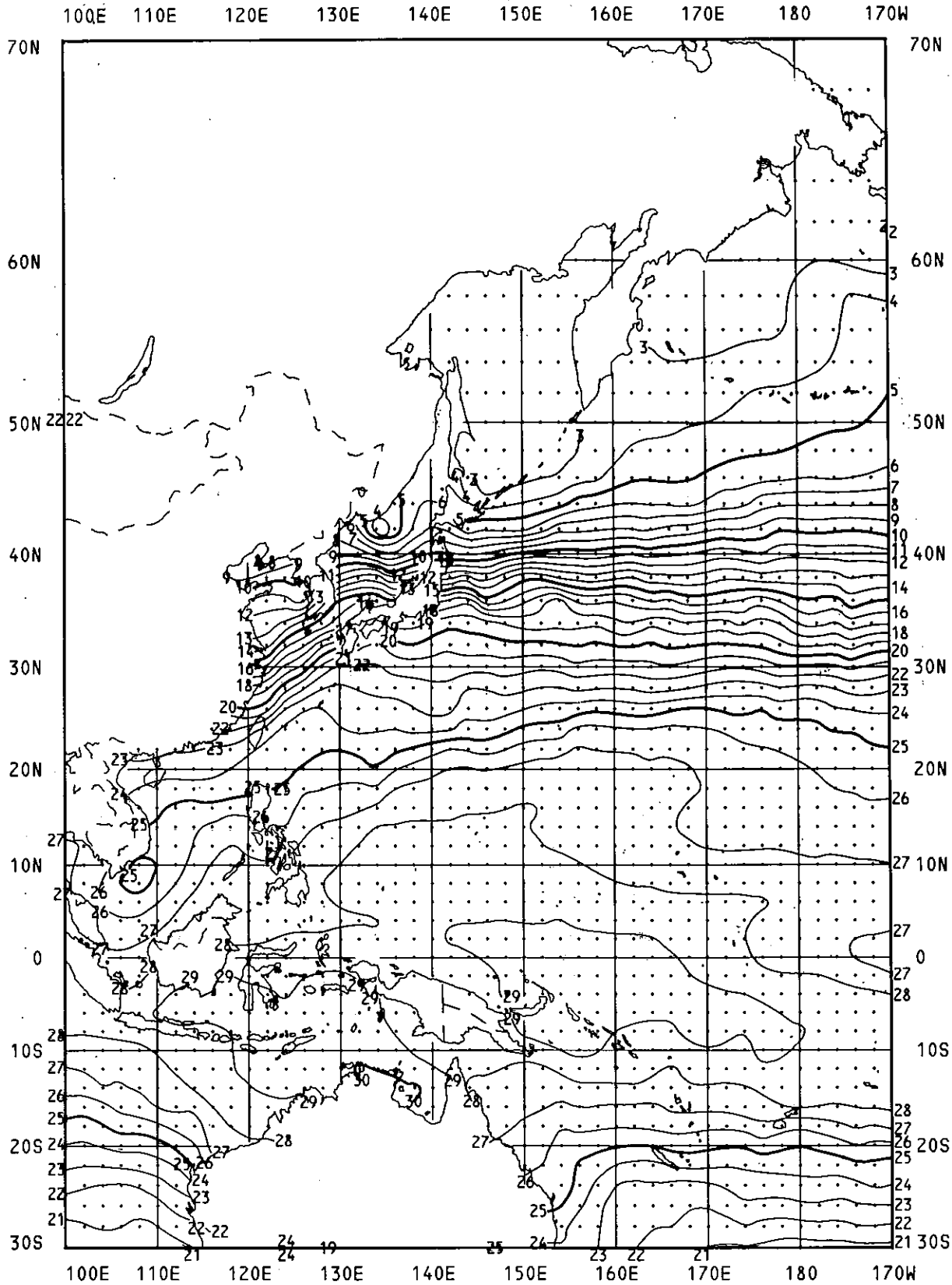
Western Pacific Ocean
SST--MONTHLY ANOMALY (°C)
SHIP and BUOY DATA
December 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.



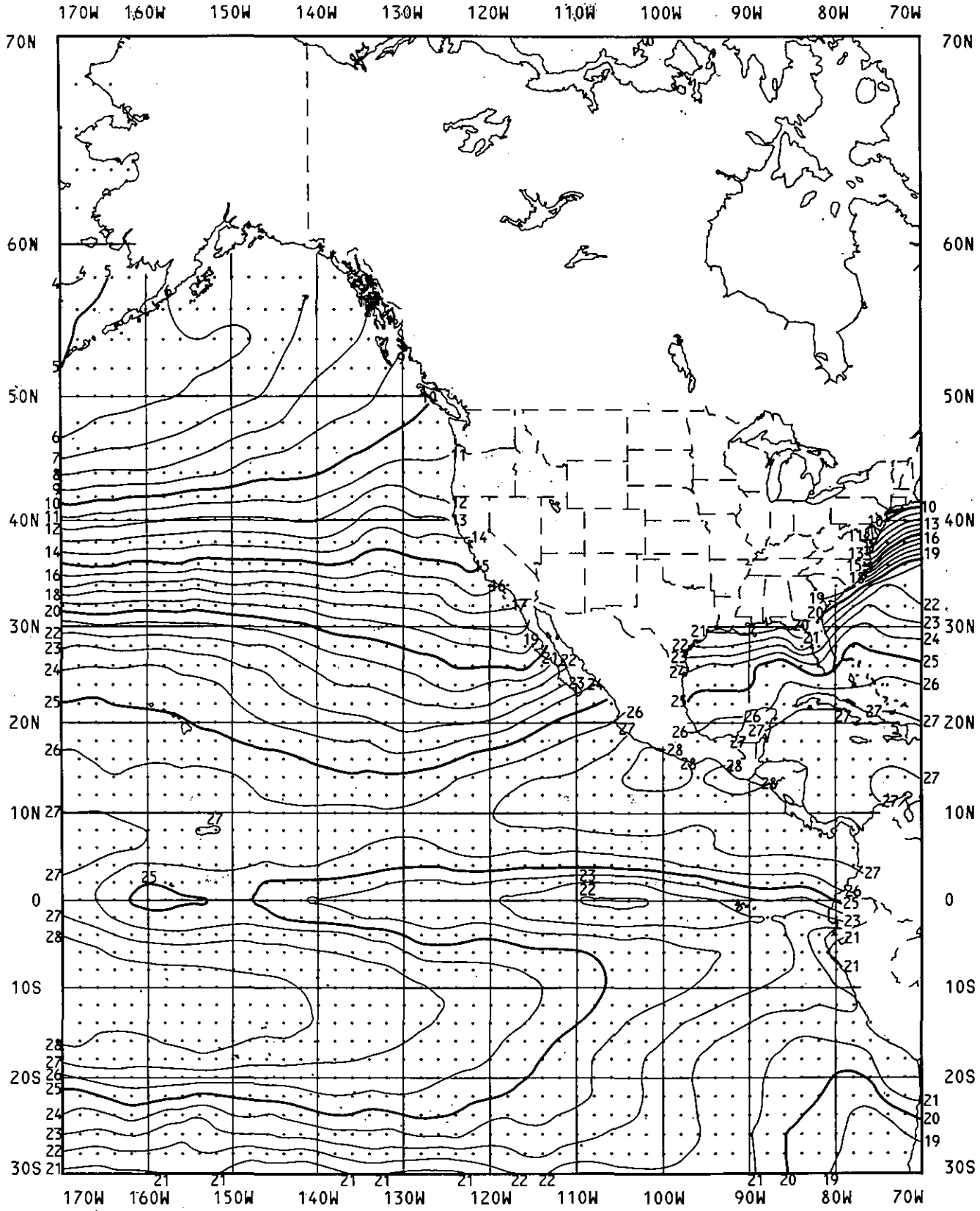
Eastern Pacific Ocean
SST--MONTHLY ANOMALY (°C)
SHIP and BUOY DATA
December 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.



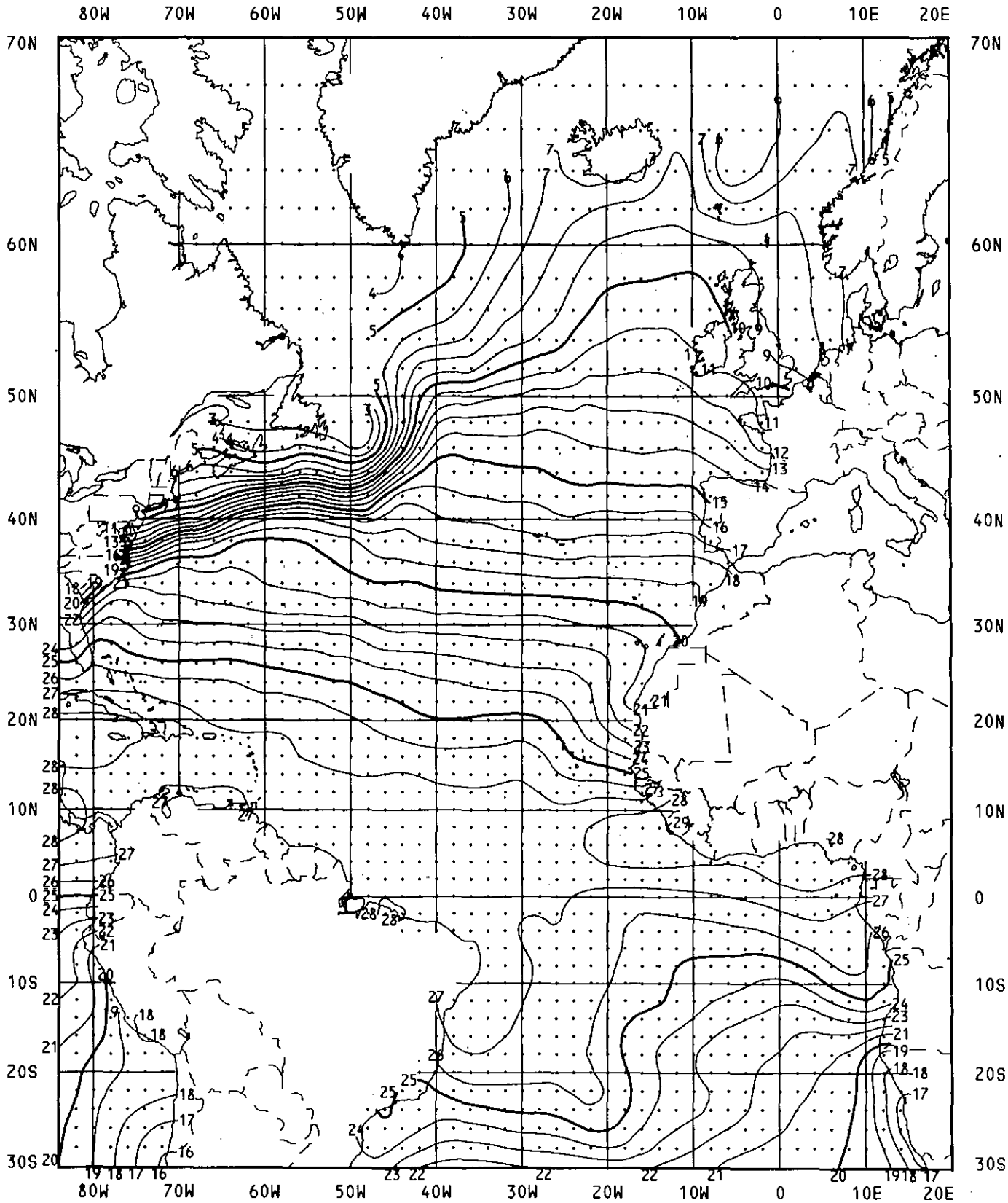
Western Pacific Ocean
SST--MONTHLY MEAN (°C)
SATELLITE DATA
December 1983

Monthly mean sea surface temperature is the mean of satellite data within two-degree quadrangles. Contour line interval is 1.0°C.



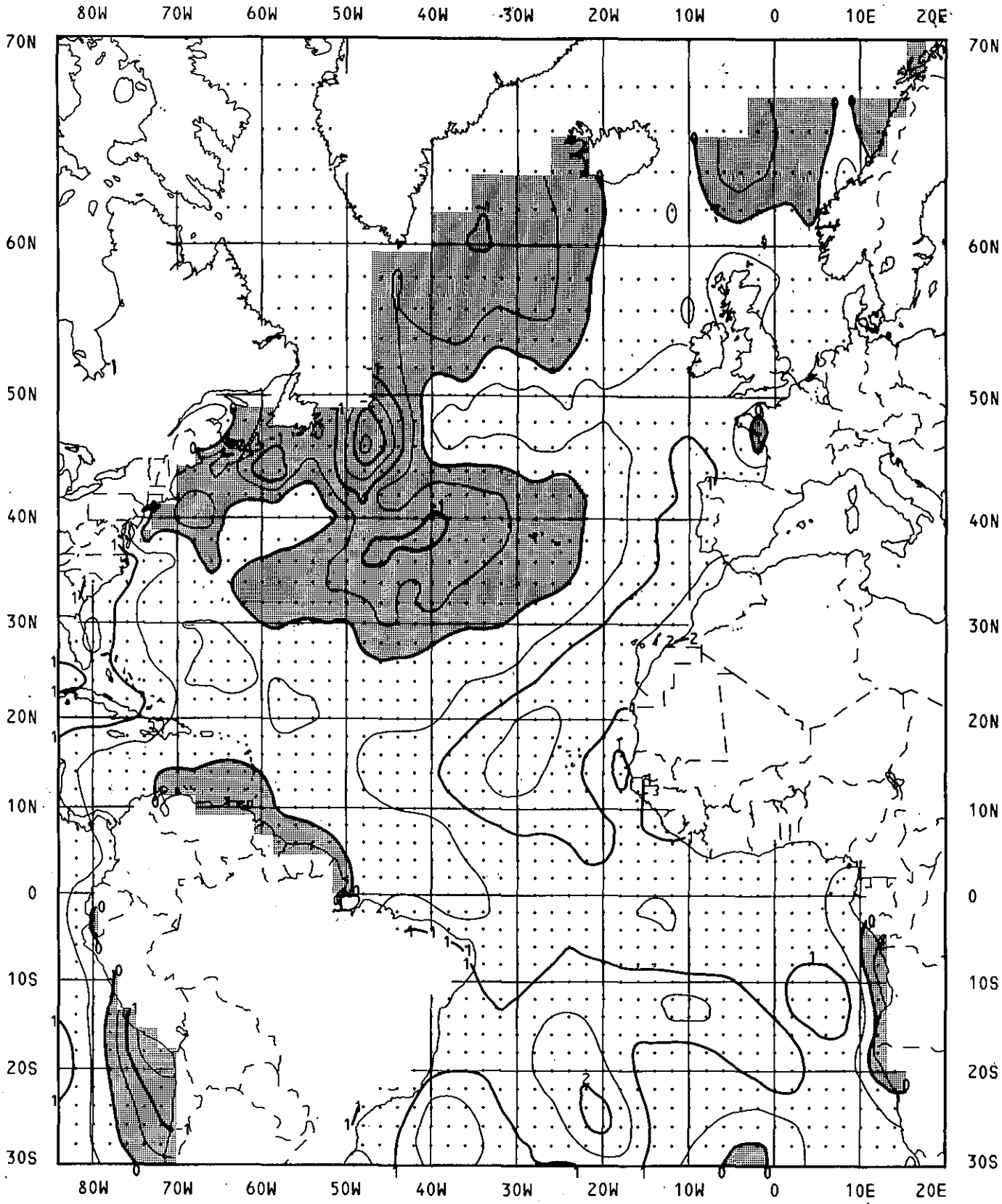
Eastern Pacific Ocean
SST--MONTHLY MEAN (°C)
SATELLITE DATA
December 1983

Monthly mean sea surface temperature is the mean of satellite data within two-degree quadrangles. Contour line interval is 1.0°C.



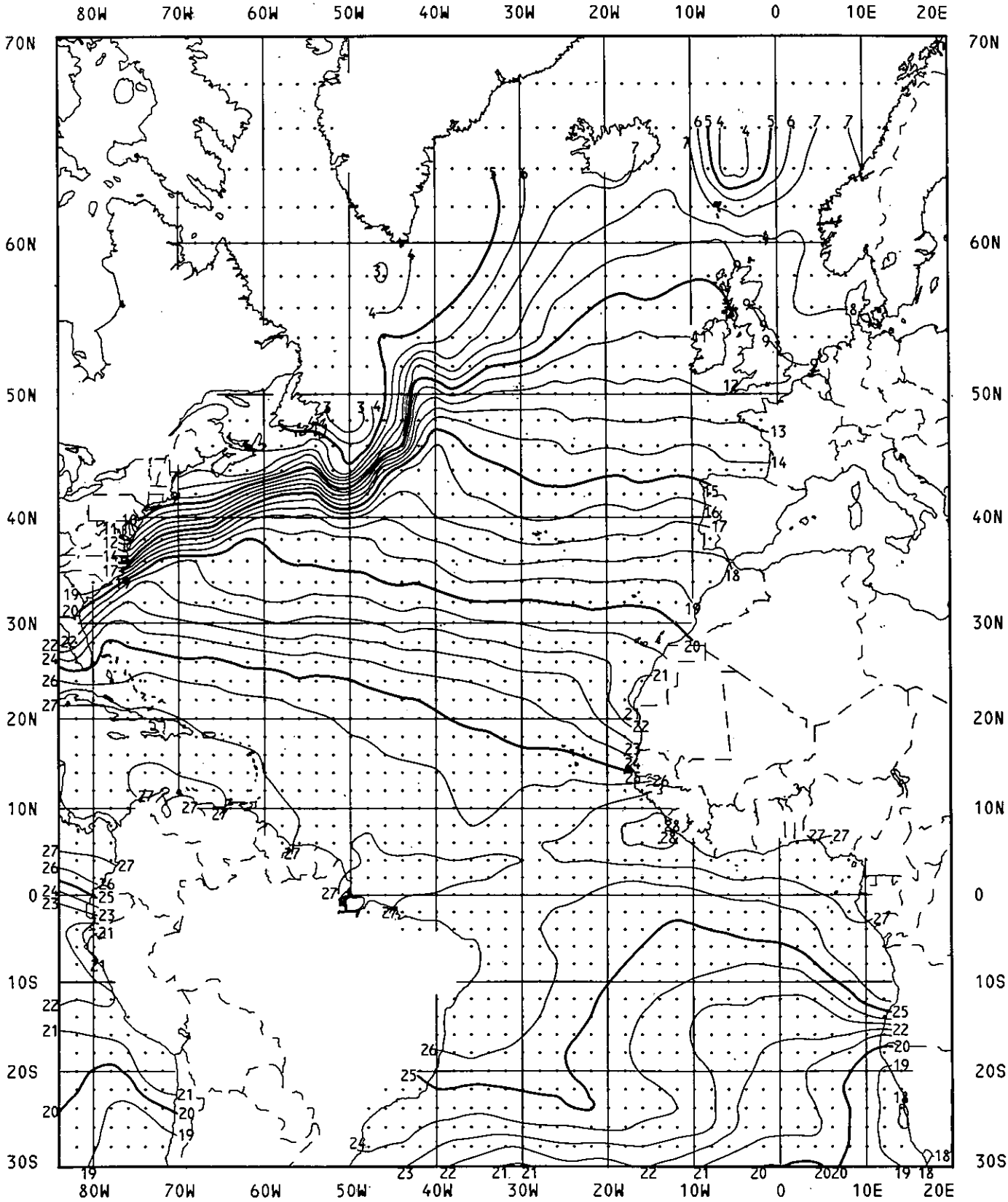
Atlantic Ocean
SST--MONTHLY MEAN (°C)
SHIP and BUOY DATA
December 1983

Monthly mean sea surface temperature is the mean of in-situ data (ships and buoys) within two-degree quadrangles. Contour line interval is 1.0°C.



Atlantic Ocean
SST--MONTHLY ANOMALY (°C)
SHIP and BUOY DATA
December 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 0.5°C.



Atlantic Ocean
SST--MONTHLY MEAN (°C)
SATELLITE DATA
December 1983

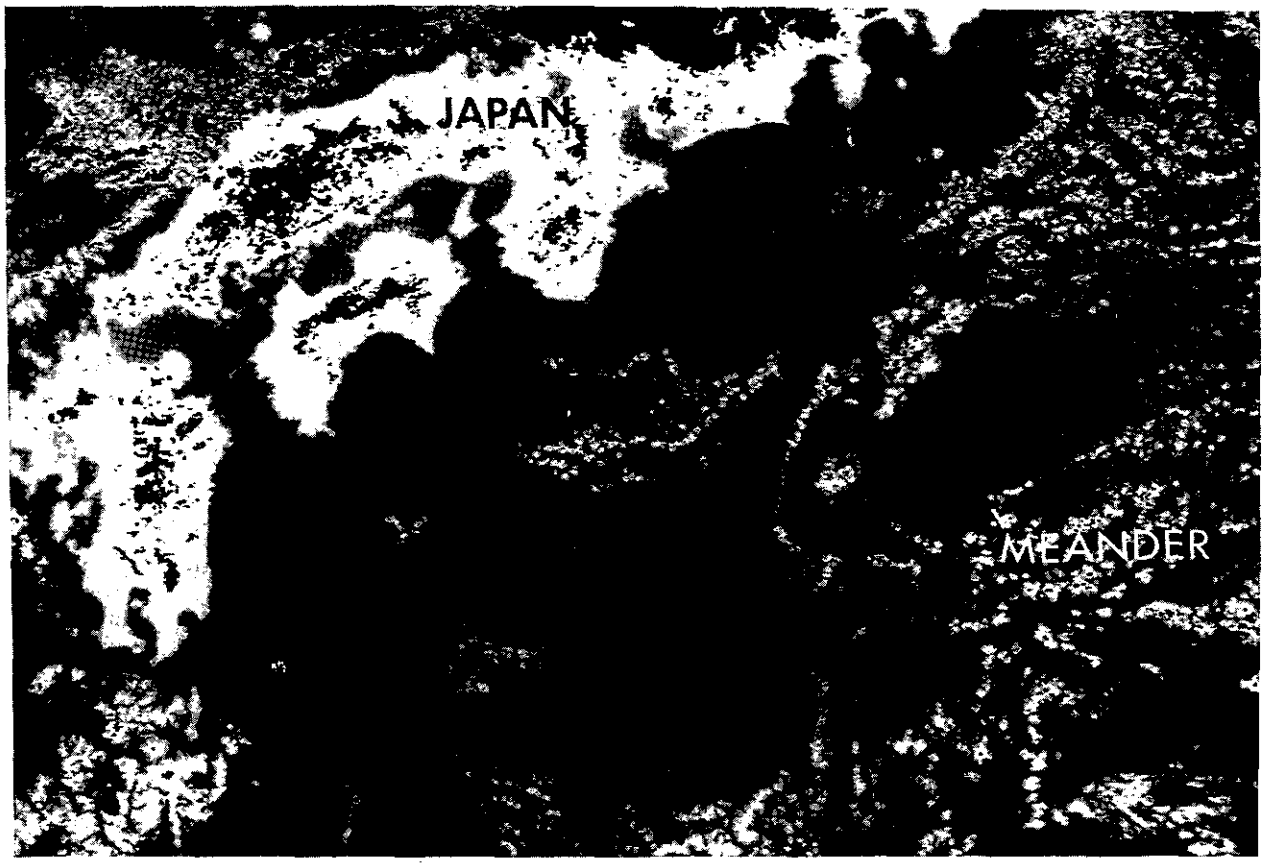
Monthly mean sea surface temperature is the mean of satellite data within two-degree quadrangles. Contour line interval is 1.0°C.

SATELLITE IMAGE OF THE MONTH

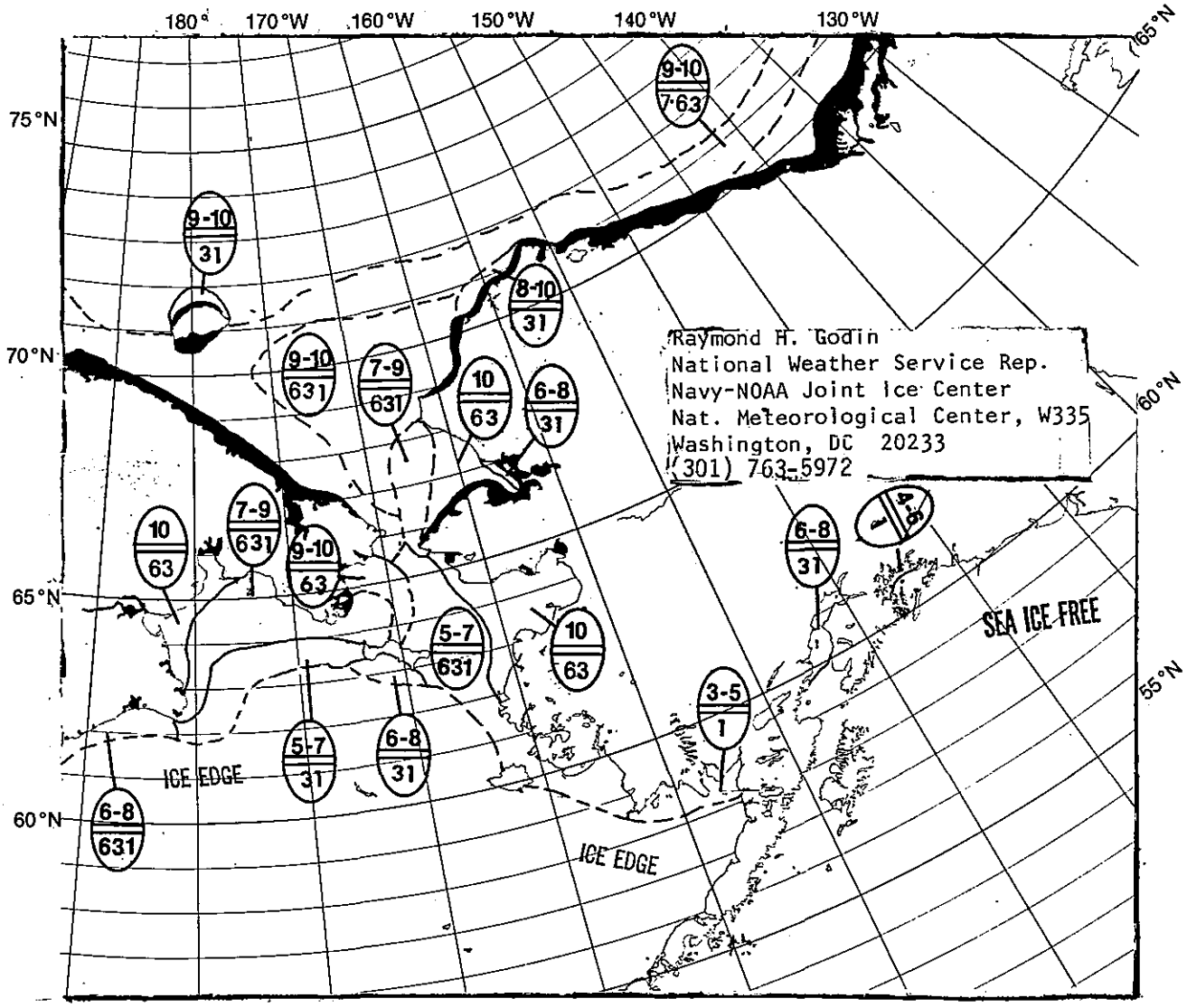
Marcia L. Weaks
Environmental Products Branch, E/SP22
NESDIS, NOAA
Washington, DC 20233
(301) 763-8142

KUROSHIO CURRENT

This NOAA-7 infrared satellite image illustrates the position of the Kuroshio current on December 9, 1983. The large light grey areas in the upper center are the islands of Japan. To the north of Japan is the sea of Japan where several currents interact to produce oceanographic structure discernible from satellite infrared sensors. The more dramatic oceanographic structure is found south and east of Japan - the Kuroshio Current. Darker grey shades mark the position of this western boundary current. A relatively large meander is positioned over the Izu Ridge, a topographic feature that has a demonstrated effect on Kuroshio current paths. Researchers have found two stable paths near Japan - a zonal path and a meandering path. Each mode may be present for several years. The pattern shown in the image is probably associated with the meandering path mode.



BERING SEA / NORTH SLOPE ICE ANALYSIS



C = Total ice concentration in the area in tenths.

C_a, C_b, C_c = Concentration of thickest (C_a), 2nd thickest (C_b), and 3rd thickest (C_c) ice

S_a, S_b, S_c = Stage of development of thickest (S_a), 2nd thickest (S_b), and 3rd thickest (S_c) ice.

-C = Concentration of ice within area(s) of strips and patches.

STAGE(S) OF DEVELOPMENT (THICKNESS)

1 = New ice (0-10 cm)
3 = Young ice (10-30 cm)
6 = First year (30-200 cm)
7 = First year thin (30-70 cm)
1. = First year medium (70-120 cm)
4. = First year thick (120-200 cm)
7. = Old ice (survived at least one summer's melt)

EXAMPLES

125 — Theoretical thickness of this season's growth (cm).

Fast ice. Sea ice which forms and remains fast along the coast.

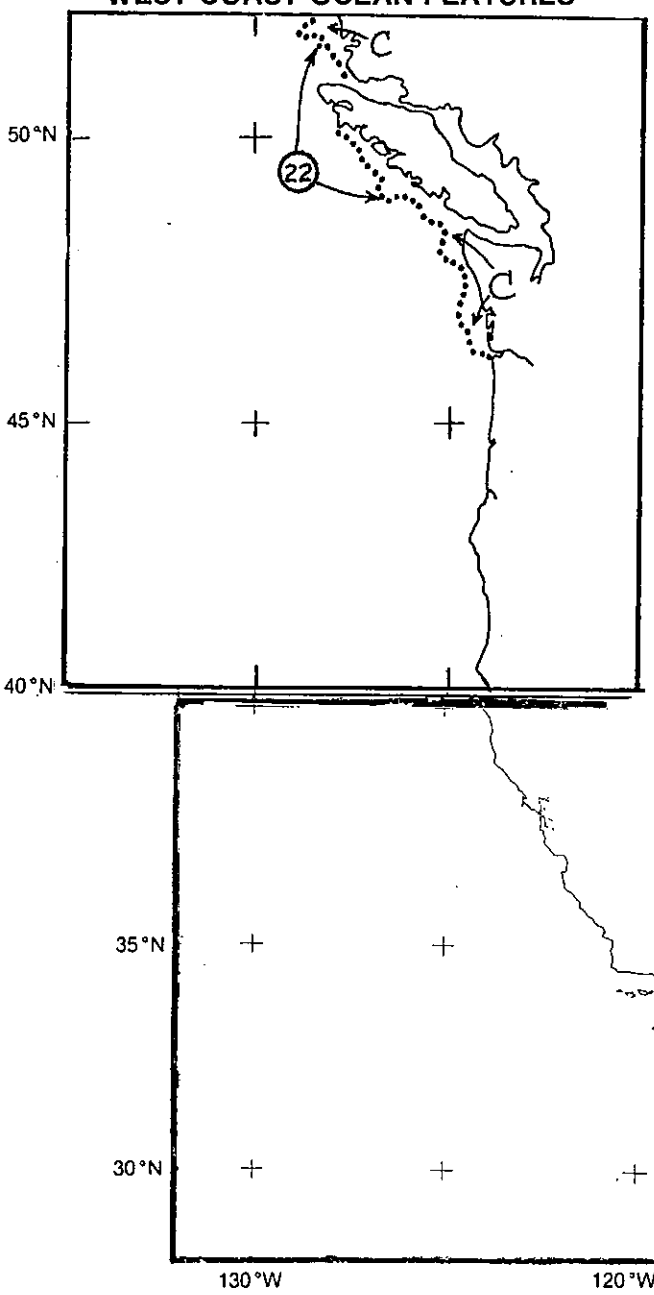
Ice boundary visually or satellite observed.

Ice boundary estimated.

DECEMBER 1983

The mean monthly surface pressure circulation depicts a 994 mb low pressure center near 54°N 170°E and a 1032 mb high pressure center near 62°N and 130°W. Southeasterly geostrophic surface winds were observed throughout Alaskan ice covered waters in the Bering and Chukchi Seas. Southerly winds were observed in the Beaufort Sea. Above to much above normal monthly mean surface air temperatures were observed at all the routinely monitored coastal stations throughout Alaska. During the month the ice edge expanded from 50 to 75 km east of 165°W and changed little to the west. By mid-month new and young ice had formed in Cook Inlet. In the Bering Sea, ice conditions adjacent to the Alaskan coast south of 60°N consist primarily of young and new ice. Fast ice is observed in the protected bays of the northern Bering Sea and along much of the Beaufort and Chukchi Sea coastlines. The current ice edge position is near the historical median east of 163°W and between the median and minimum extremes elsewhere.

WEST COAST OCEAN FEATURES



DECEMBER 1983

Largely uneventful wintertime cooling characterized the North Panel area. SSTs at coastal and offshore stations decreased by 1.2-1.8°C during the month. The cooling was somewhat accelerated December 19-25 due to several days of strong and very cold offshore winds. During this time, cold freshwater runoff lowered SSTs to 4-5°C in coastal estuaries such as Grays Harbor and the Columbia River mouth. Otherwise, there were no significant departures from normal seasonal values. A well established Davidson Current continued to be evident on satellite imagery, which showed cold river runoff flowing northward along the Washington and Vancouver Island coasts. Although depicted once on the accompanying figure, this cold near-shore flow was seen in the same approximate location on several occasions during the month. Cold 7-8°C water was consistently observed north of Vancouver Island along the British Columbia coast.

Analysis Techniques

Thermal boundaries are determined from a combination of enhanced infrared satellite imagery and ship and buoy observations. Identification of these features by satellite is limited by cloud cover.

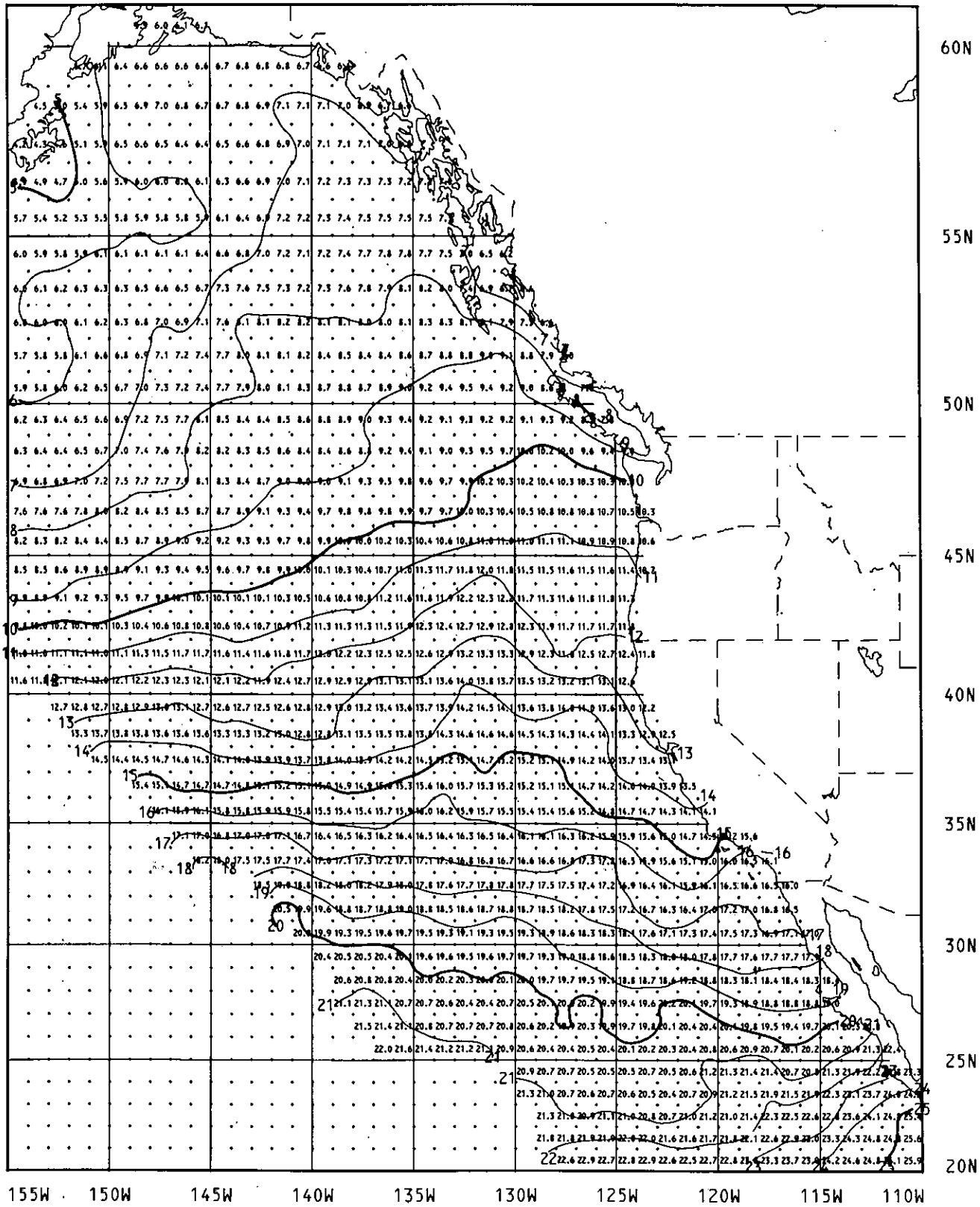
Key

.,o,x,⊙,+ = thermal boundaries
W = warm
C = cold
③ = date of feature
⬭ = outline of water mass feature

North Panel
Kent Short
NOAA/Northwest Regional Ocean Service Center
7600 Sand Point Way NE
Bin C15700
Seattle, WA 98115
(206) 527-6604

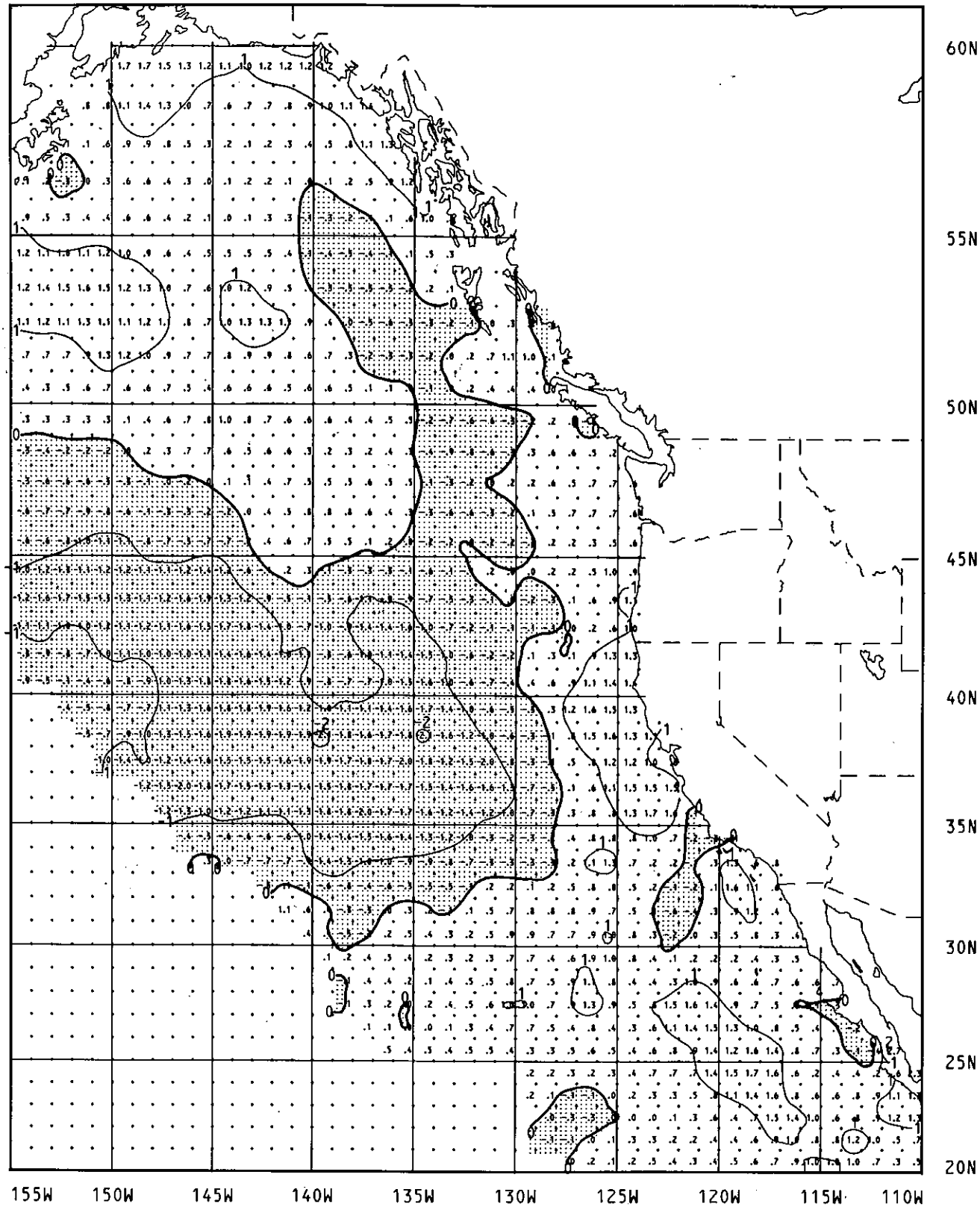
South Panel
Ernest Daghir
NOAA/NESDIS
Satellite Field Service Station
660 Price Avenue
Redwood City, CA 94063
(415) 364-2422

The steady decline of SSTs over the South Panel was evident during the month with a return to seasonal climatological normals. Temperatures over the entire region declined 1.5°C to 2.0°C with a small area near San Diego cooling off approximately 2.7°C. The area of least cooling was in the southwest portion near 30°N and between 128°-136°W. The anomalously cool water west of 130°W and north of 30°N continues as well as the anomalously warm water east of 128°W. The maximum warm anomaly of 1.5°C was adjacent to the coast from just north of San Francisco Bay to the Oregon border. The only occurrence of upwelling was along the Baja, California peninsula on December 6 and 13.



West Coast
SST--MONTHLY MEAN (°C)
December 1983

Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.



West Coast
SST--MONTHLY ANOMALY (°C)
December 1983

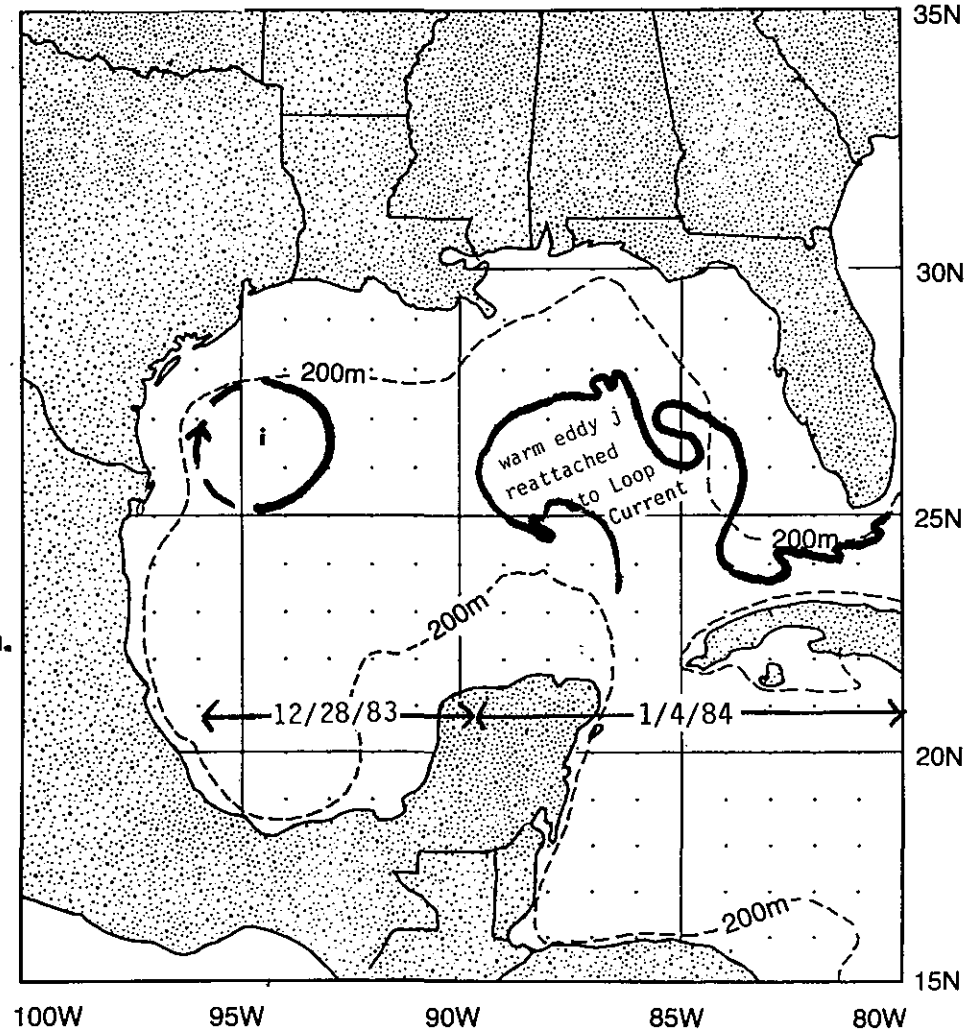
Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.

The end of this month's positions of the Gulf Stream System and its associated eddies are shown for the NW Atlantic and the Gulf of Mexico. The Gulf Stream and Loop Current boundaries are located by infrared satellite imagery or XBT (expendable bathythermograph) data. Anticyclonic eddies are labeled a-z in the Gulf of Mexico and 1-99 in the NW Atlantic. Cyclonic eddies are labeled A-Z. Arrows on eddies indicate direction of circulation. Warm-core or anticyclonic eddies rotate clockwise; cold-core or cyclonic eddies rotate counterclockwise. The line to the eddy center shows the net translation since last month or since last observed. Eddies or sections of the Gulf Stream System which were not observed during the month are not shown on the analysis chart. The long arrows at the bottom of the chart indicate the date of data used.

Data used in this analysis include:
- NOAA satellite infrared imagery, NESDIS
- Bathythermograph data, National Meteorological Center of National Weather Service
- Oceanographic Analysis, A daily detailed analysis issued by National Weather Service/NESDIS

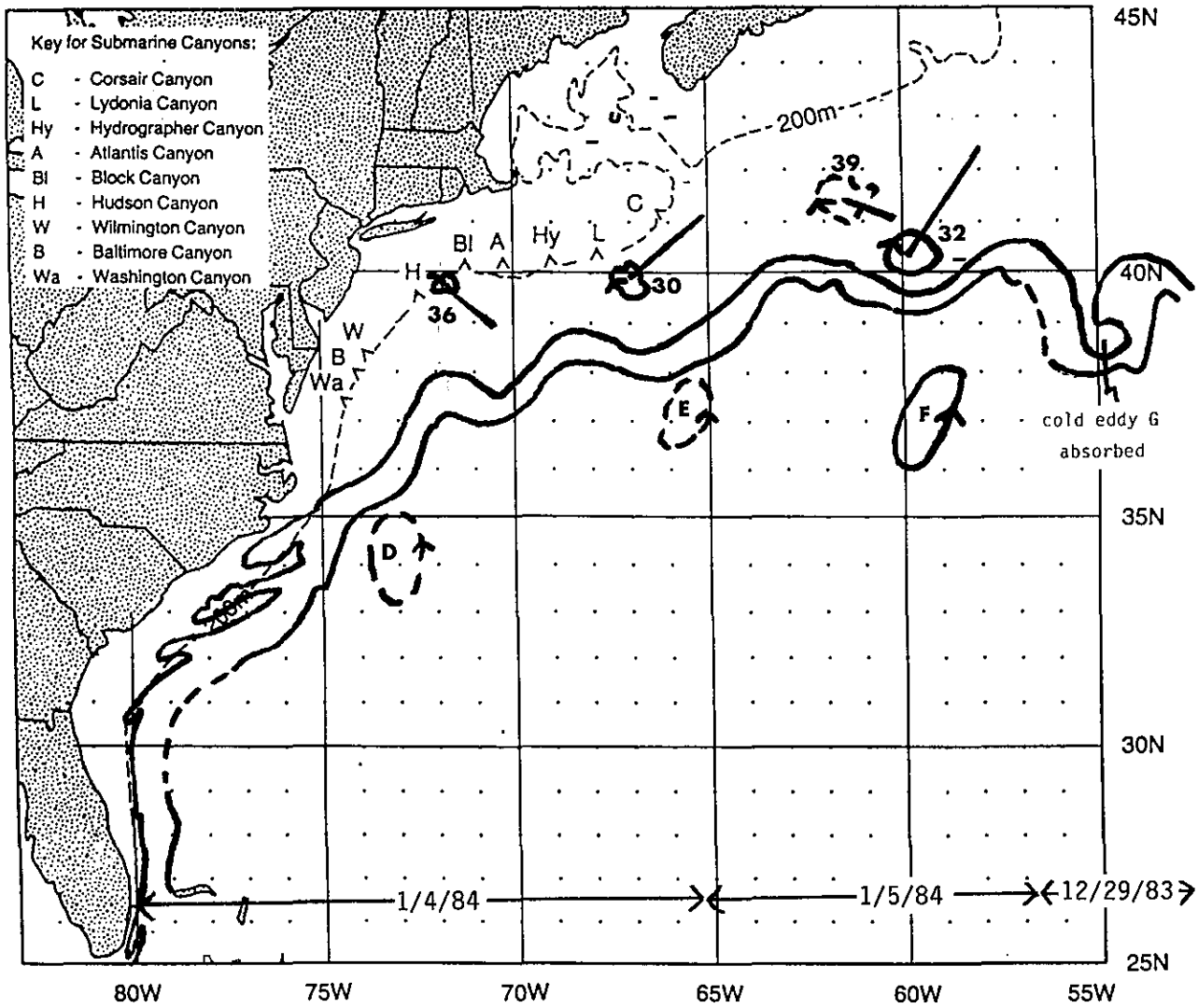
Jenifer Wartha-Clark
NOAA/NWS
Washington, DC 20233
(301) 763-8239

Ann Bell
NOAA/NWS
National Meteorological Cen.
Washington, DC 20233
(301) 763-8133



December 1983

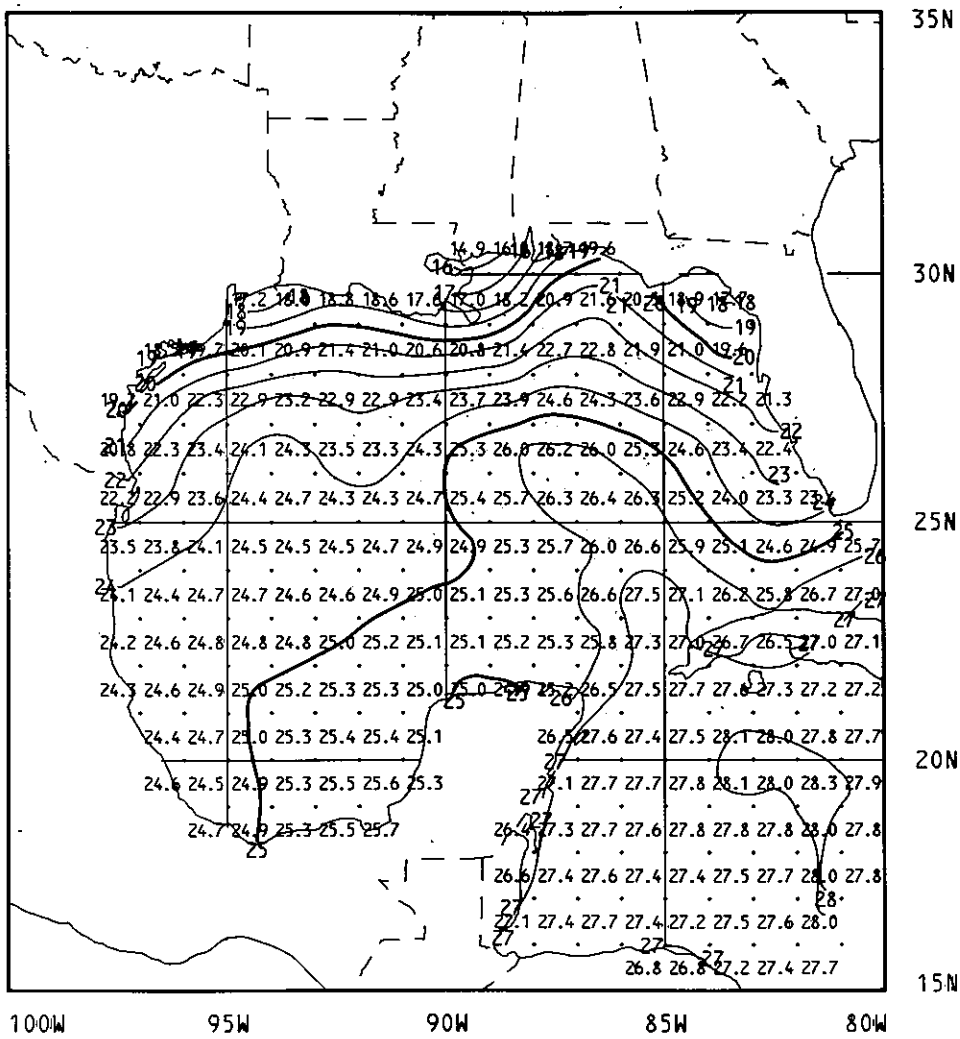
The Loop Current in the Gulf of Mexico pinched off anticyclonic eddy j on December 11 centered near 26°30N 87°W with a diameter of approximately 290 km. On December 28 eddy j reattached to the Loop Current. Eddy i was first clearly observed by satellite imagery on December 11. Conoco Oil Company confirmed the existence of eddy i on December 14; Current speeds of 1.5 knots were documented in eddy i.



Anticyclonic eddies 34 and 35 were not observed during December. Eddy 34 may have been absorbed by eddy 39, and eddy 35 may have dissipated in the shelf waters. Eddy 36 was difficult to track due to cloud cover during most of December. A very weak warm feature, presumably eddy 36, was observed on January 4 near 39°30N 71°30W. Eddy 36 apparently translated 140 km NW. Eddy 30 moved 220 km SW. Eddy 39 traveled 120 km WNW when it was last observed on December 17. Eddy 32 translated 270 km SW.

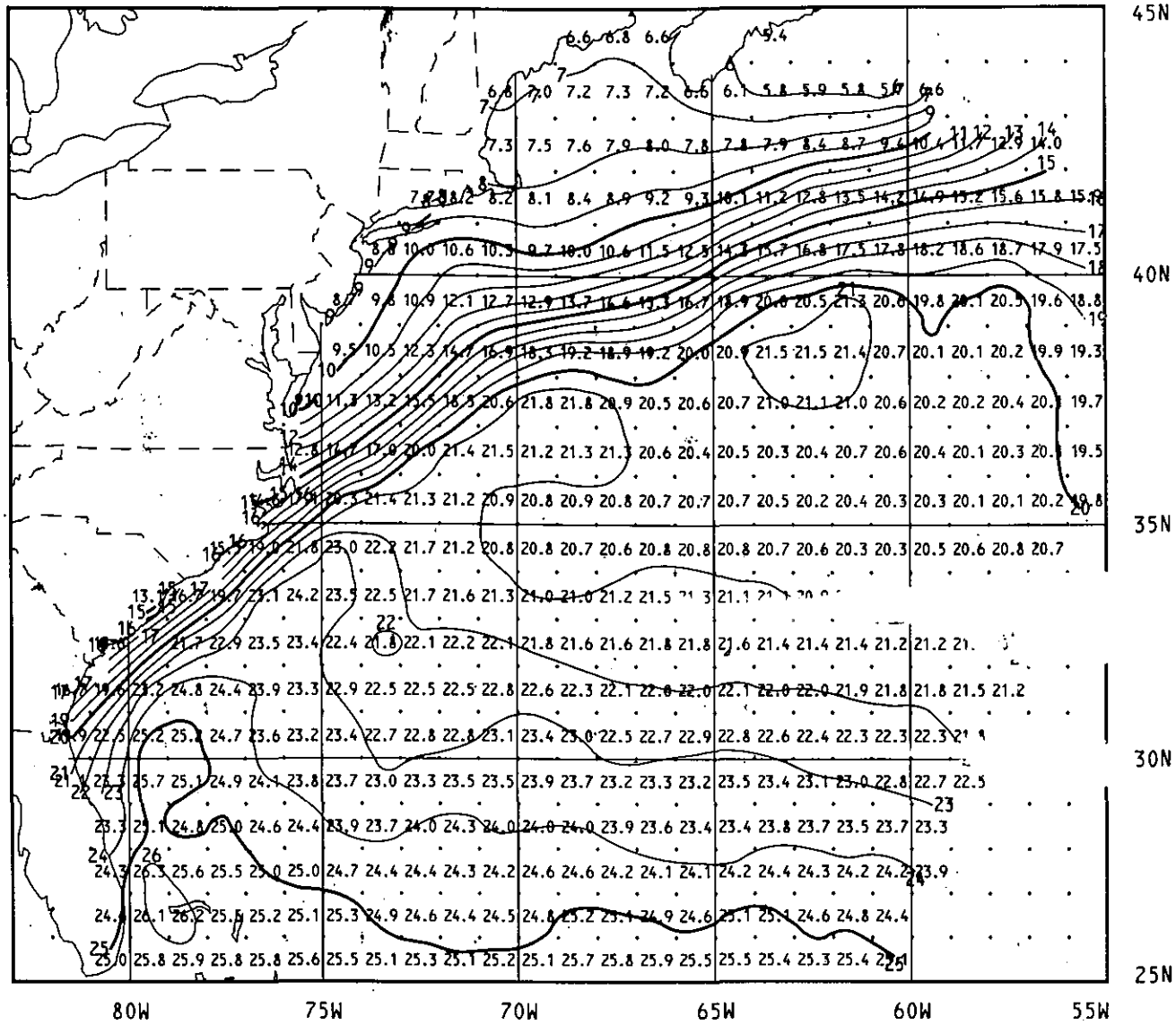
Four cyclonic eddies were newly observed during December. Eddy D was observed December 1-11. Its origin is not known. Eddy E was observed on December 10 and 14. Its origin is not known. Eddy F formed from a Gulf Stream meander near 38°N 60°W on December 14. Eddy G formed on December 15 from a Gulf Stream meander near 38°N 55°30W, but was absorbed on December 30 by a Gulf Stream meander near 38°N 55°W.

EAST COAST SST-
MONTHLY MEAN



Gulf of Mexico
SST--MONTHLY MEAN (°C)
December 1983

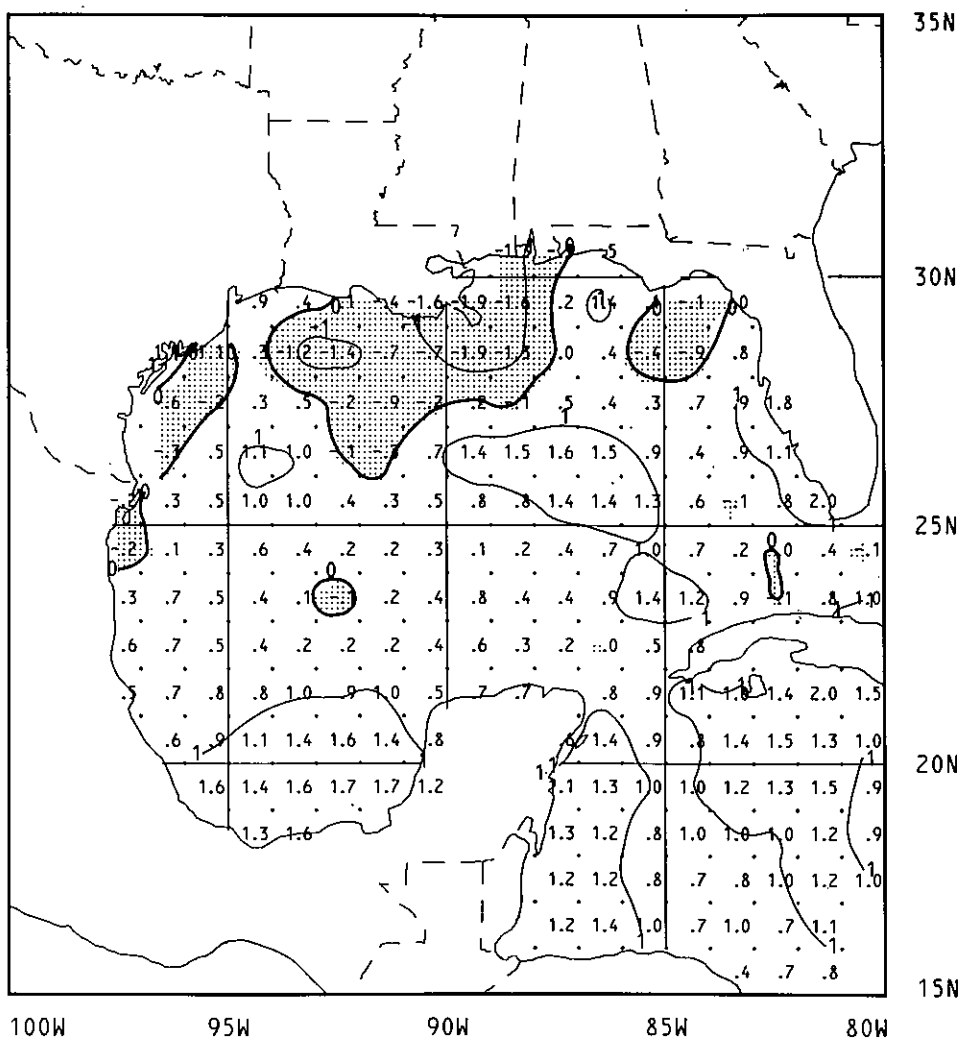
Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.



NW Atlantic Ocean
SST--MONTHLY MEAN (°C)
December 1983

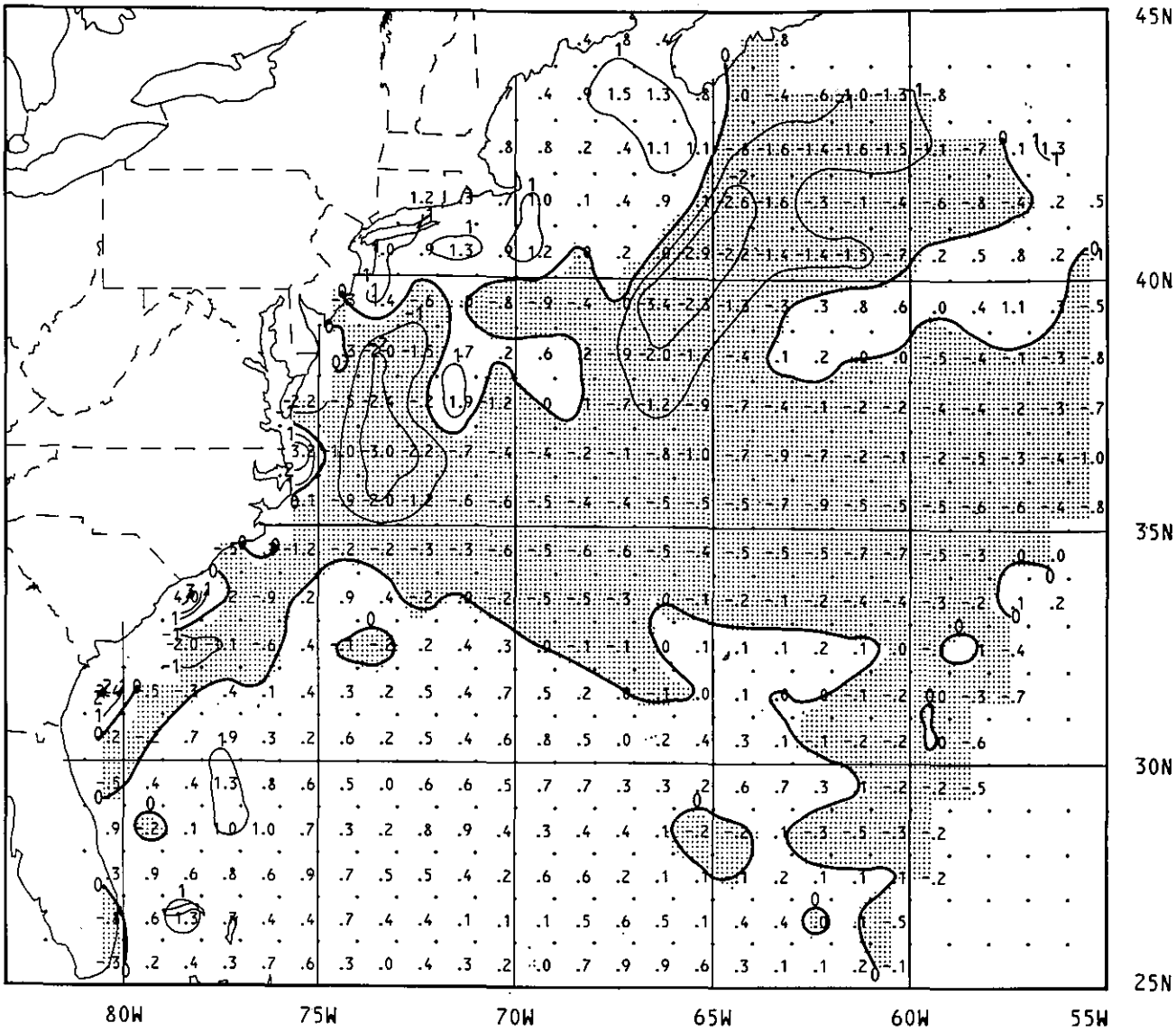
Monthly mean sea surface temperature is the mean of twice-weekly analyses using ship, buoy, and satellite observations. Contour line interval is 1.0°C.

EAST COAST SST-ANOMALY



Gulf of Mexico
SST--MONTHLY ANOMALY (°C)
December 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.



NW Atlantic Ocean
SST--MONTHLY ANOMALY (°C)
December 1983

Monthly anomaly is the difference between the monthly mean sea surface temperature and the climatological monthly mean value -- shading shows where the monthly mean is colder than climatology. Contour line interval is 1.0°C.