

Northwest Atlantic



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Revised

Sea Surface Temperatures in the Northwestern Atlantic in 1983

by

Douglas R. McLain

Pacific Environmental Group, NMFS/NOAA, c/o Fleet Numerical Oceanography Center
Monterey, California, USA 93940

and

Merton C. Ingham

Atlantic Environmental Group, NMFS/NOAA, South Ferry Road,
Narragansett, Rhode Island, USA, 02882

Sea surface temperature (SST) data, principally collected from cooling water intakes of merchant ships, are reported in radio weather messages and log books transmitted to the U.S. Fleet Numerical Oceanography Center (FNOOC) and the National Climatic Data Center for processing and archiving. The "real-time" reports of the data base provided by the radio messages are analyzed by FNOOC and the Pacific Environmental Group of the National Marine Fisheries Service, which is co-located with FNOOC. An elementary step in the analysis is the computation of average monthly temperatures and anomalies (from 1948-67 means) for each $1^{\circ} \times 1^{\circ}$ square for which at least two reasonable SST observations have been reported during the month. The average SST's, anomalies and number of observations are then printed in the $1^{\circ} \times 1^{\circ}$ squares they characterize to produce a map such as the one shown in figure 1. To facilitate interpretation of the data, anomalies greater than $+1^{\circ}\text{C}$ or less than -1°C are shaded.

The most significant SST anomaly shown in the mapped area during 1983 appeared off southeastern Nova Scotia in May and persisted through October (Figs. 5 - 10). The region of anomalously warm water extended to the eastern boundary of the mapped area and generally involved 8 or more 1° squares showing temperatures greater than 1°C above the long term mean, except during August when only 4 squares were involved. The largest anomaly in the period was $+4.4^{\circ}\text{C}$ in the 1° square off Halifax during July, but that was based on only 6 observations. Squares which involved more than 100 observations showed anomalies ranging from $+1.0$ to $+3.0^{\circ}\text{C}$.

A variable band of negative anomalies appeared in May and continued through September in the vicinity of southern Georges Bank (40-41°N, 65-70°W). This feature was most pronounced in August, when the anomaly for the 40-41°N, 68-69°W square was - 5.4°C, based on 594 observations (mostly from a moored meteorological buoy). However, the disparity between this square and its neighbor to the west, showing an anomaly of - 2.2°C based on 660 observations (from another buoy) suggests that there is a bias in either the observational data or the long-term mean climatology for one square or the other. Since other squares in the band show anomalies ranging from -1.7 to -2.7, the bias probably lies in the 40-41°N, 68-69°W square. Also, the mean temperature value in that square is lower by 2-4°C than in neighboring squares to the east, west and north, so the bias must exist in the observational data. The reason for this bias is unknown to us at this time.

A pattern of positive anomalies seen in the Gulf of Maine (42-44°N, 66-70°W) during October - December 1982 continued during January and February 1983, weakened in March and April, and disappeared in April.

Pooled average SST anomalies for the entire area north of 35°N and west of 60°W (Table 1) were weakly positive for all months except July, August and December, when they were weakly negative. All of the anomalies were much smaller than the monthly standard deviations.

The algebraic sum of the twelve monthly area mean anomalies yields a rough index of how anomalous the sea surface temperature was for the year in this area of the northwestern Atlantic. For 1983 the algebraic sum was 2.35°C which is the largest positive sum in the last six years (1978: -2.82, 1979: 0.70, 1980: -1.85, 1981: -3.53, 1982: -0.09°C).

Table 1. Monthly mean sea surface temperature anomalies (°C)
from the 1948-1967 monthly means for 1983 in the
Northwestern Atlantic Ocean (35 -46°N, 60 -76°W)

MONTH	NUMBER OF 1° SQUARES	SST ANOM. (°C)	1948-67 STAN. DEV. (°C)
JAN	98	0.57	1.26
FEB	125	0.25	1.23
MAR	121	0.36	1.49
APR	126	0.30	1.51
MAY	132	0.42	1.22
JUN	129	0.38	0.91
JUL	127	0.04	0.89
AUG	132	0.20	0.85
SEP	132	0.30	0.89
OCT	130	0.26	0.95
NOV	126	0.08	0.90
DEC	126	0.33	0.91

$\Sigma = 2.35$

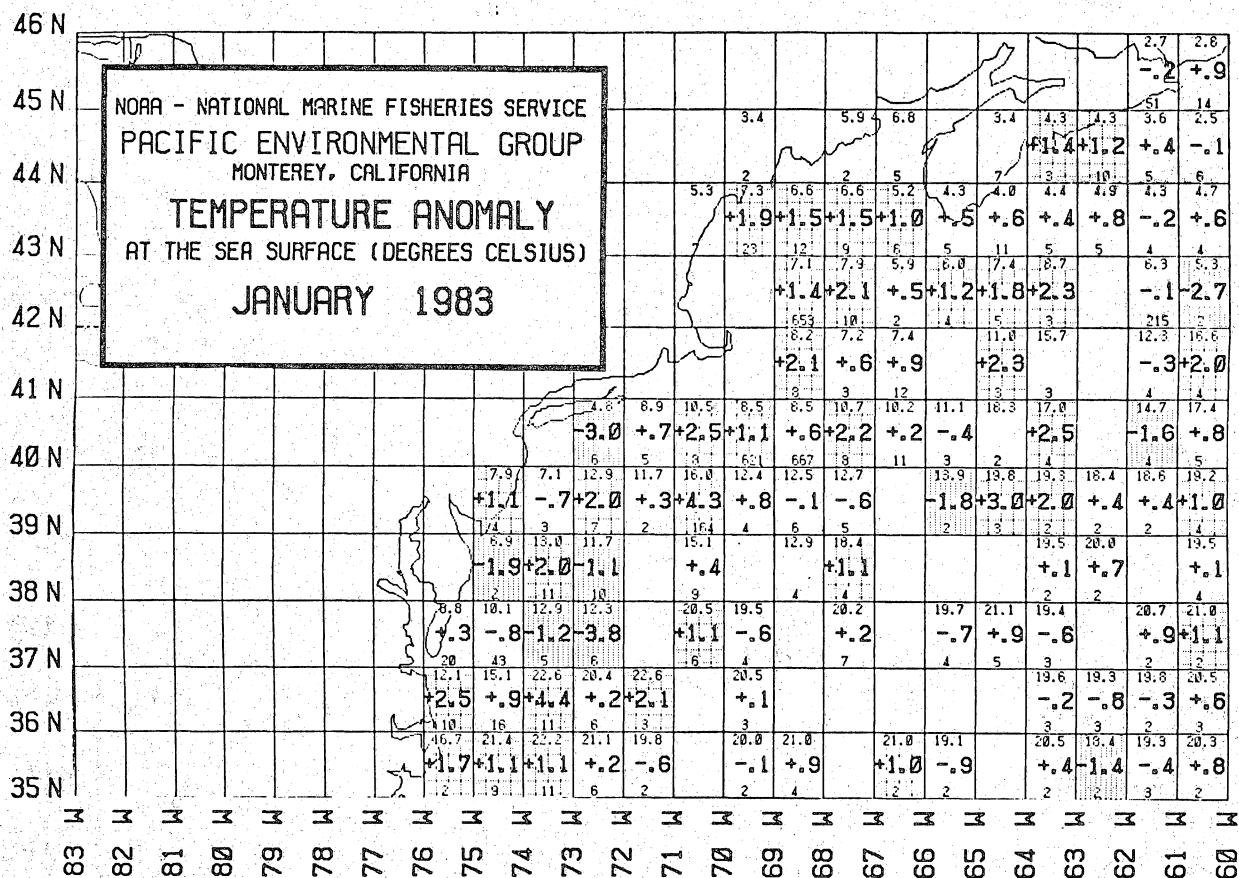


Figure 1. Average sea surface temperature anomalies ($^{\circ}\text{C}$) for January 1983.
Also shown in each 1° square are average sea surface temperatures
(upper number) and the number of observations (lower number).

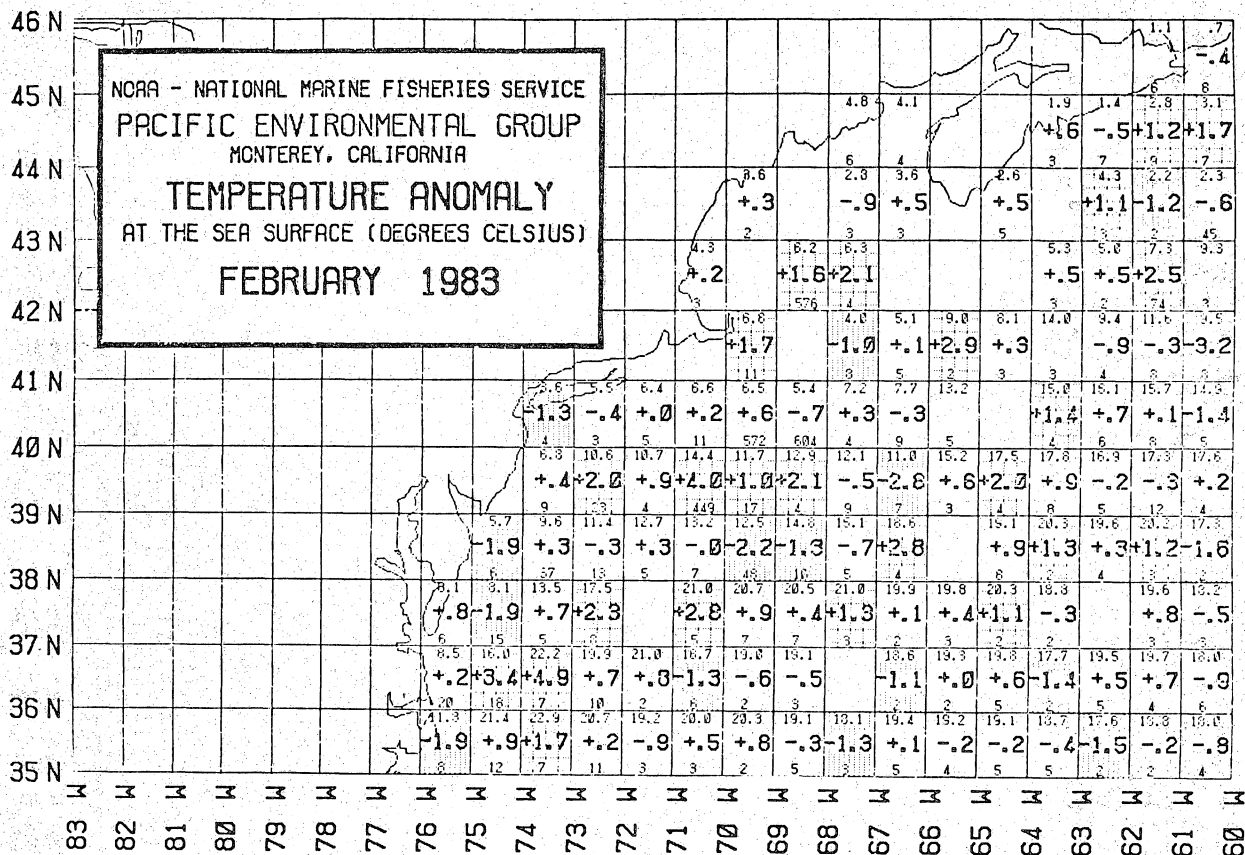


Figure 2. Average sea surface temperature anomalies ($^{\circ}\text{C}$) for February 1983.
Also shown in each 1° square are average sea surface temperatures
(upper number) and the number of observations (lower number).

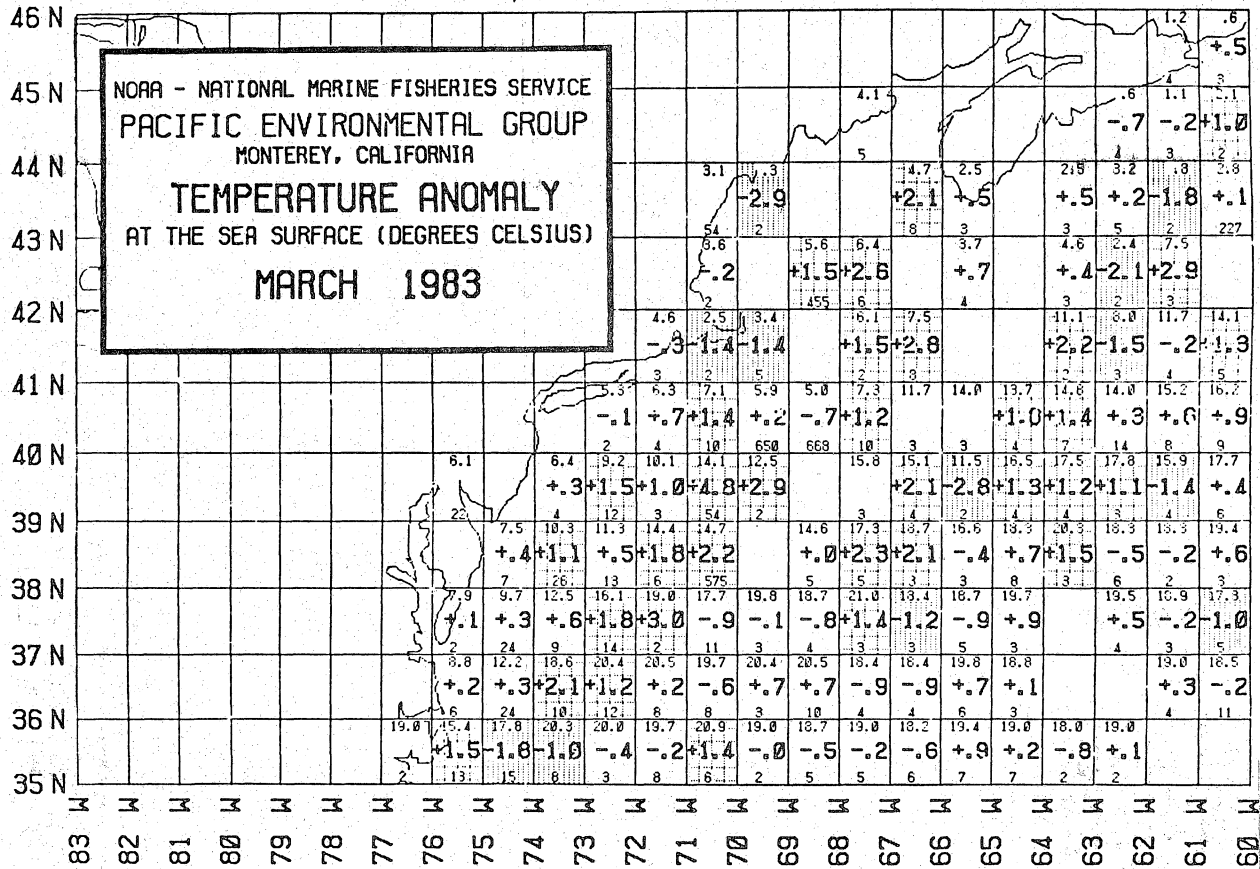


Figure 3. Average sea surface temperature anomalies ($^{\circ}\text{C}$) for March 1983.
Also shown in each 1° square are average sea surface temperatures (upper number) and the number of observations (lower number).

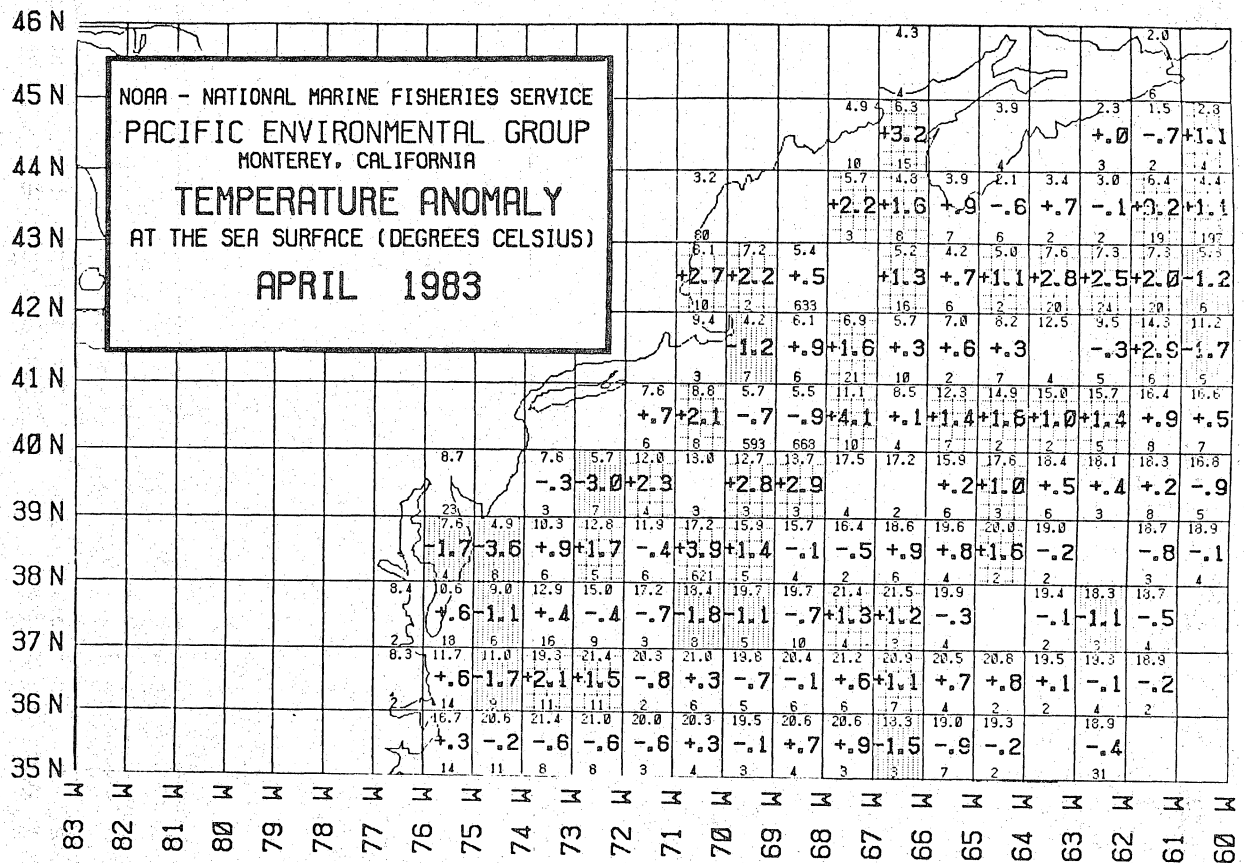


Figure 4. Average sea surface temperature anomalies ($^{\circ}\text{C}$) for April 1983.
Also shown in each 1° square are average sea surface temperatures (upper number) and the number of observations (lower number).

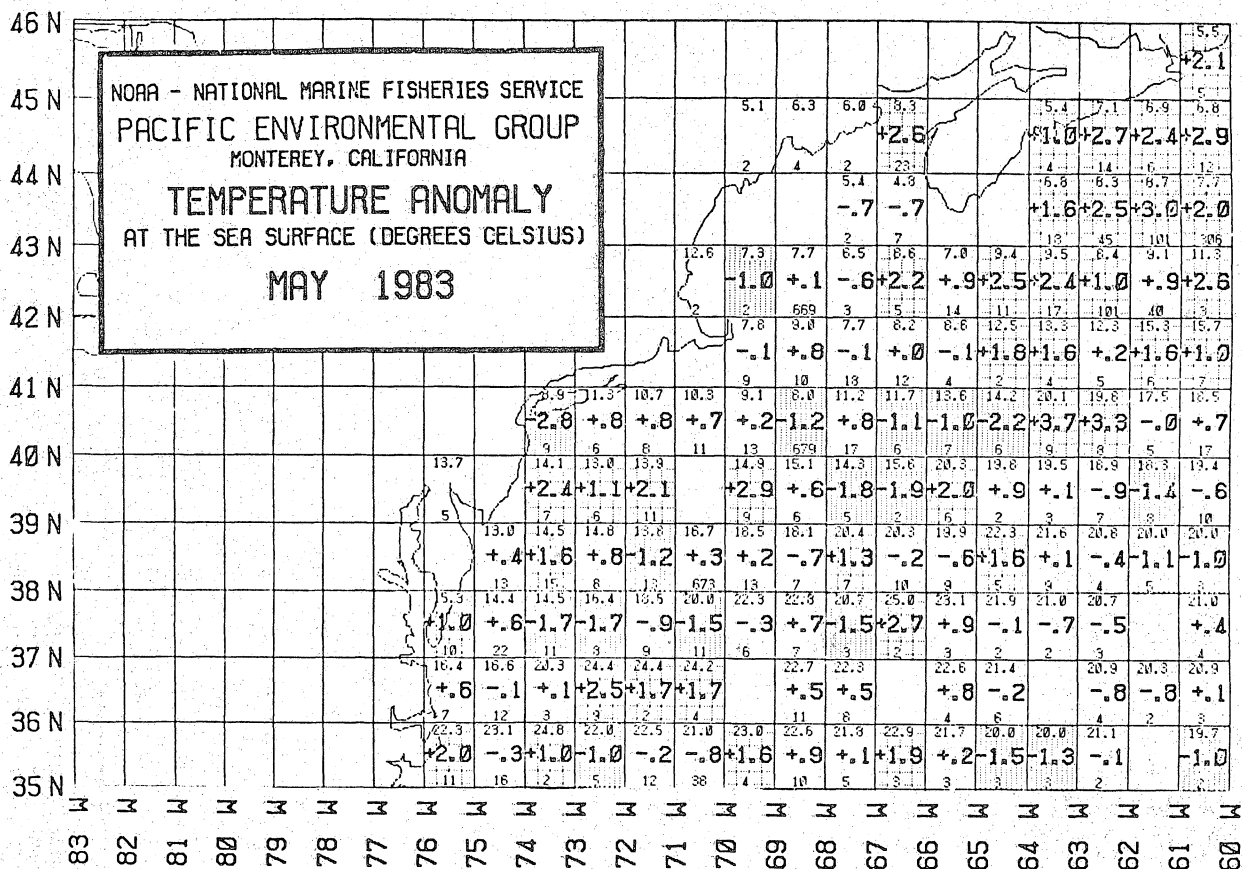


Figure 5. Average sea surface temperature anomalies ($^{\circ}\text{C}$) for May 1983.
Also shown in each 1° square are average sea surface temperatures (upper number) and the number of observations (lower number).

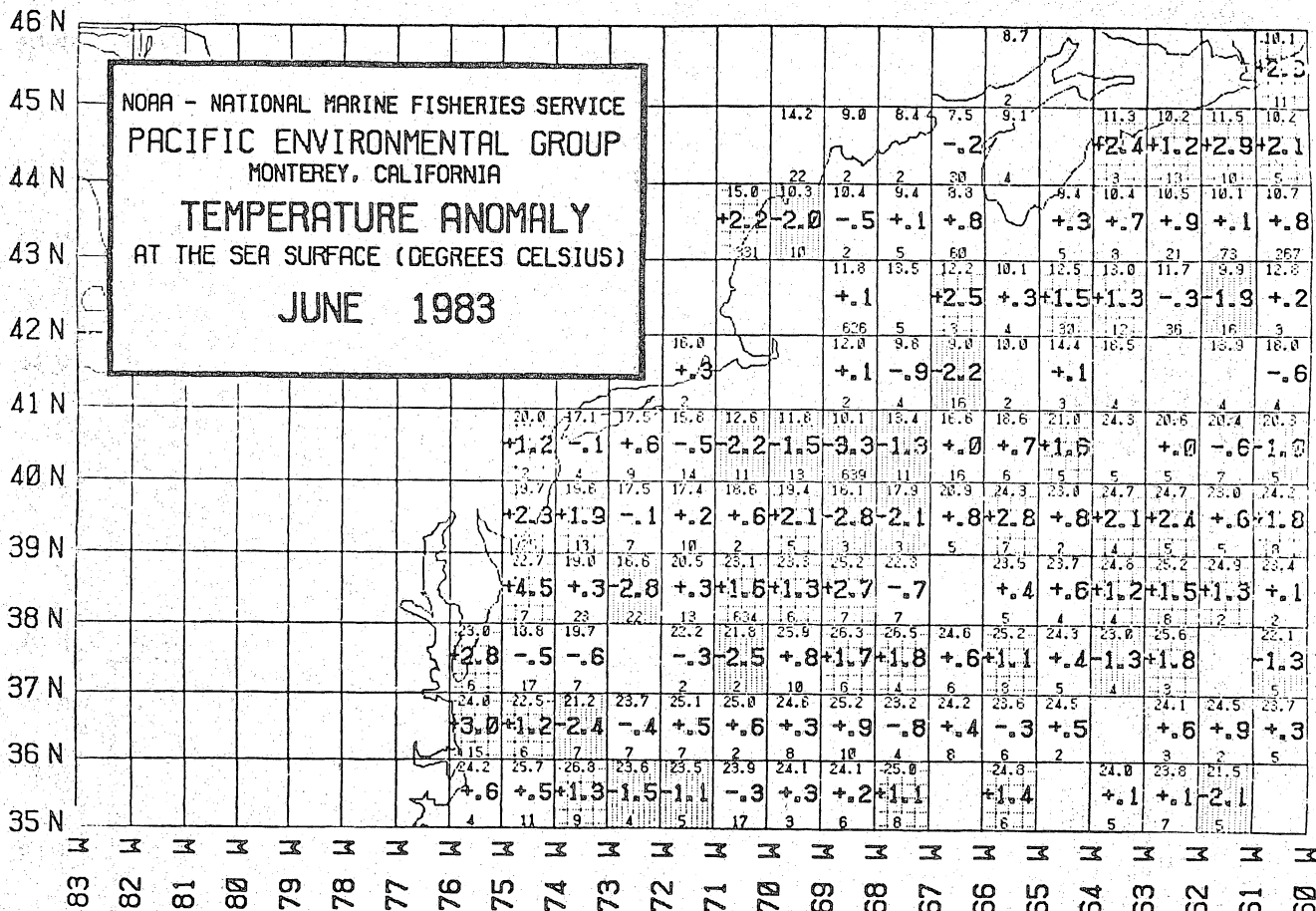


Figure 6. Average sea surface temperature anomalies ($^{\circ}\text{C}$) for June 1983.
Also shown in each 1° square are average sea surface temperatures (upper number) and the number of observations (lower number).

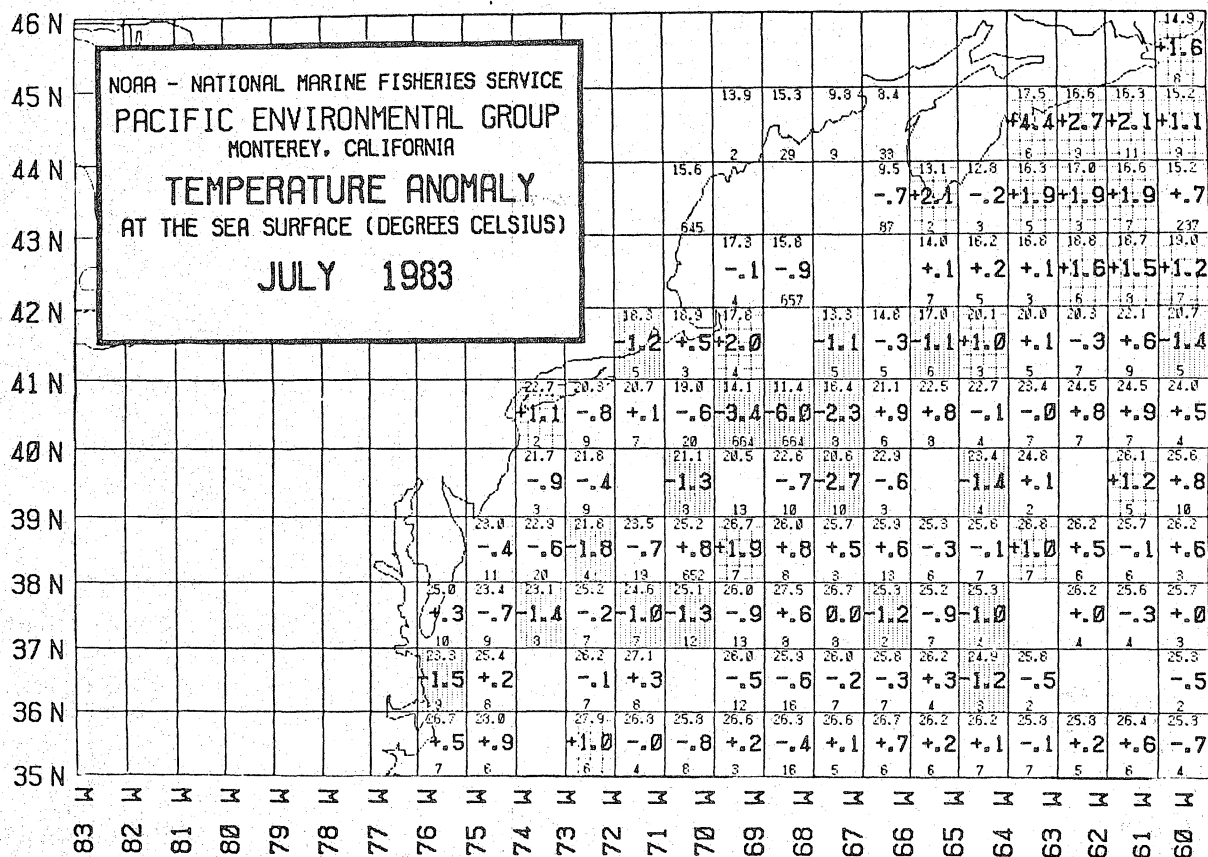


Figure 7. Average sea surface temperature anomalies ($^{\circ}\text{C}$) for July 1983.
Also shown in each 1° square are average sea surface temperatures
(upper number) and the number of observations (lower number).

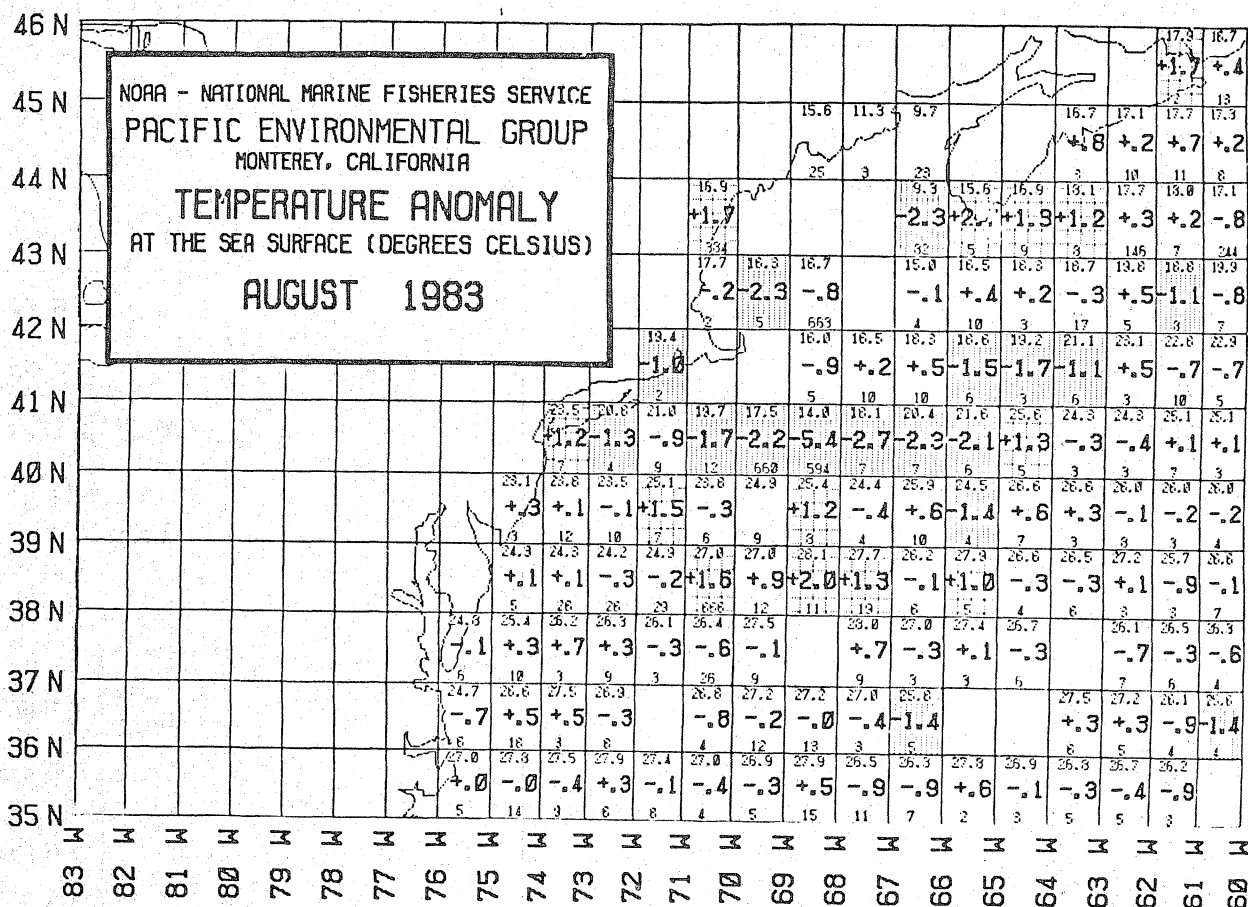


Figure 8. Average sea surface temperature anomalies ($^{\circ}\text{C}$) for August 1983.
Also shown in each 1° square are average sea surface temperatures
(upper number) and the number of observations (lower number).

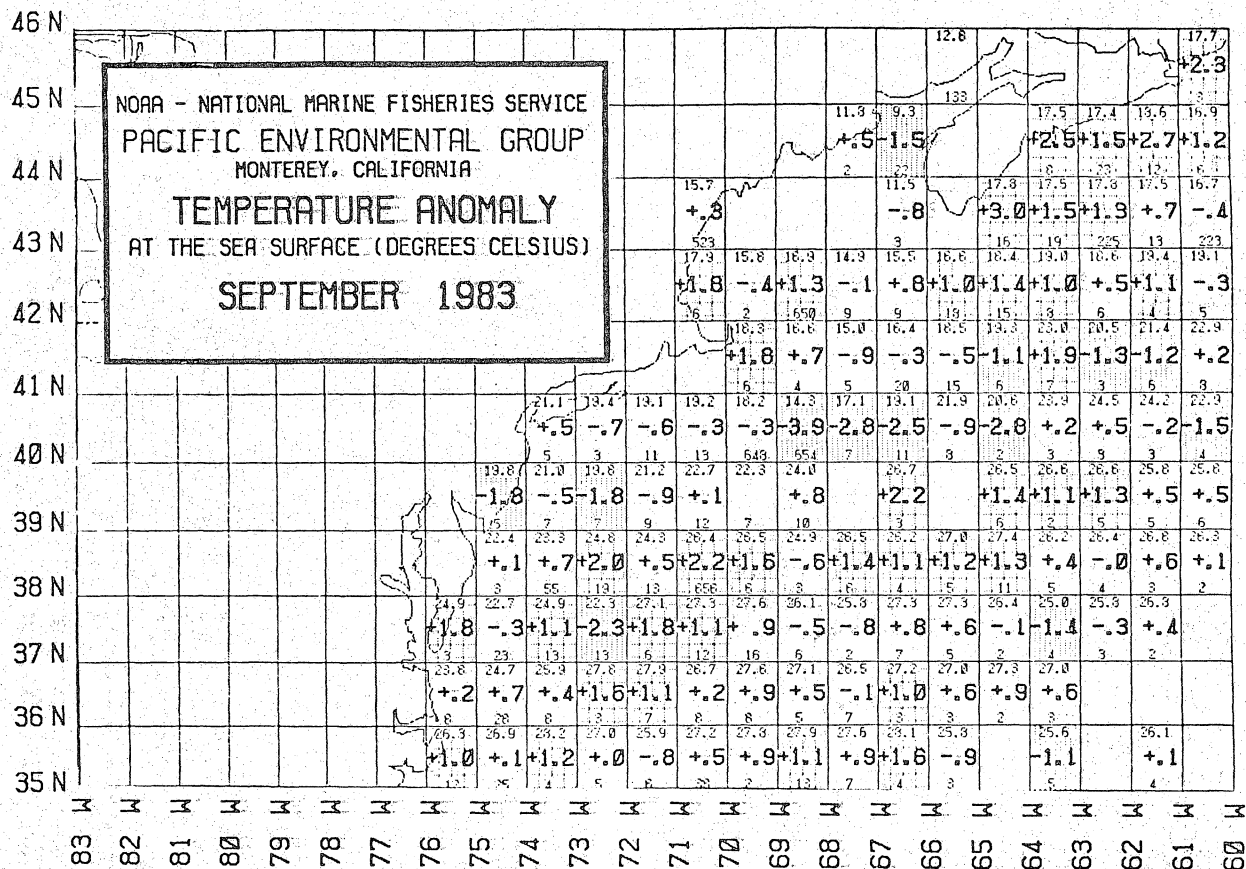


Figure 9. Average sea surface temperature anomalies ($^{\circ}\text{C}$) for September 1983. Also shown in each 1° square are average sea surface temperatures (upper number) and the number of observations (lower number).

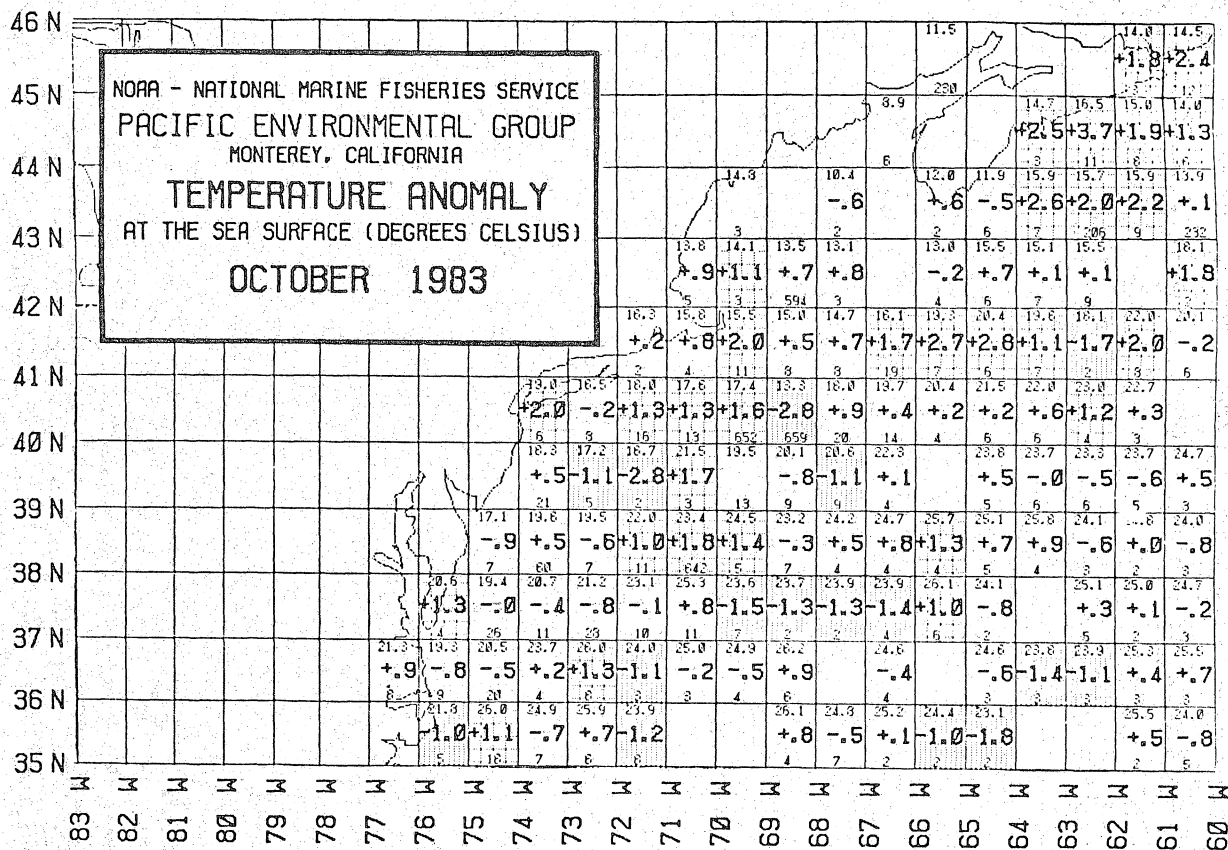


Figure 10. Average sea surface temperature anomalies ($^{\circ}\text{C}$) for October 1983. Also shown in each 1° square are average sea surface temperatures (upper number) and the number of observations (lower number).

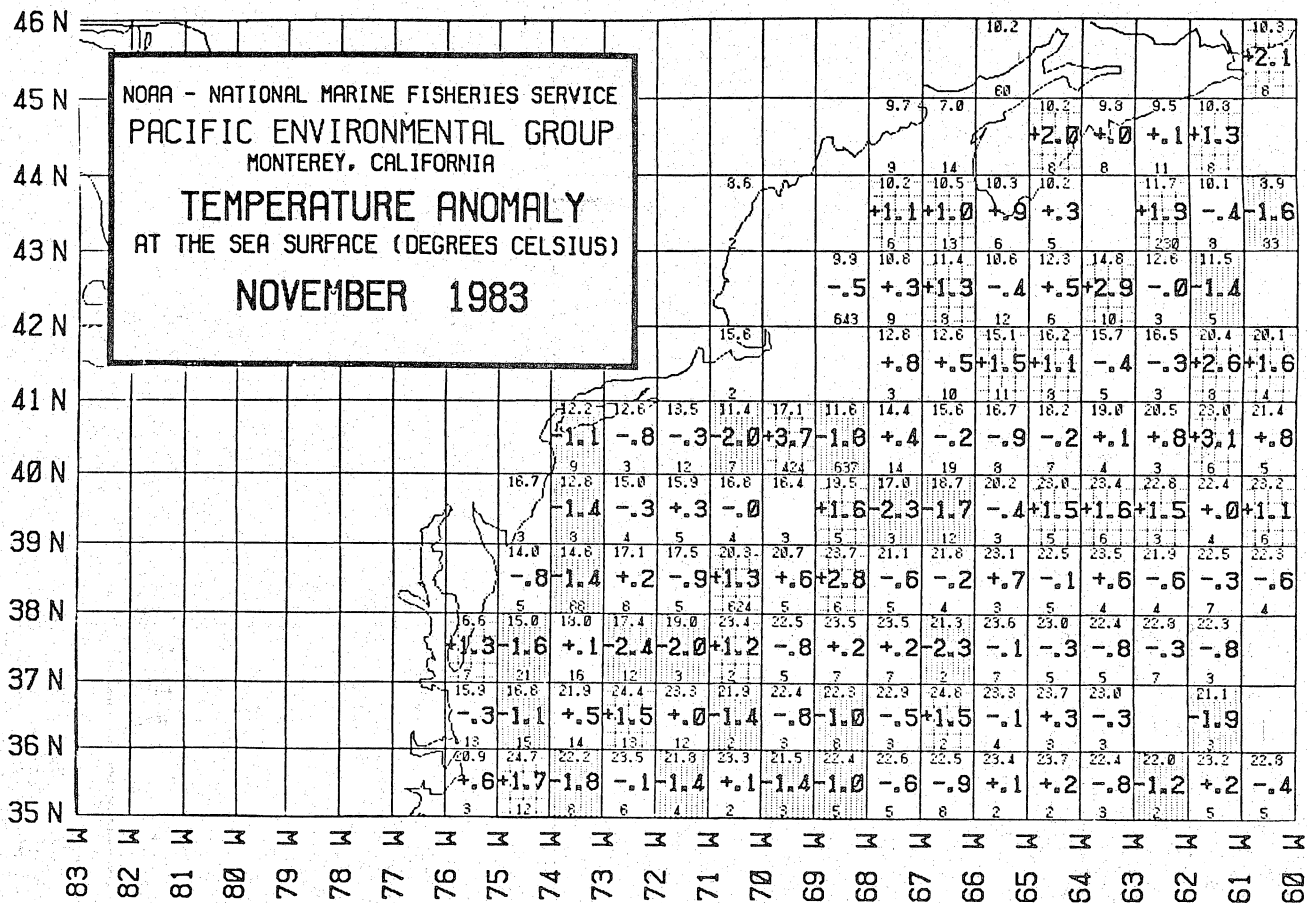


Figure 11. Average sea surface temperature anomalies ($^{\circ}\text{C}$) for November 1983. Also shown in each 1° square are average sea surface temperatures (upper number) and the number of observations (lower number).

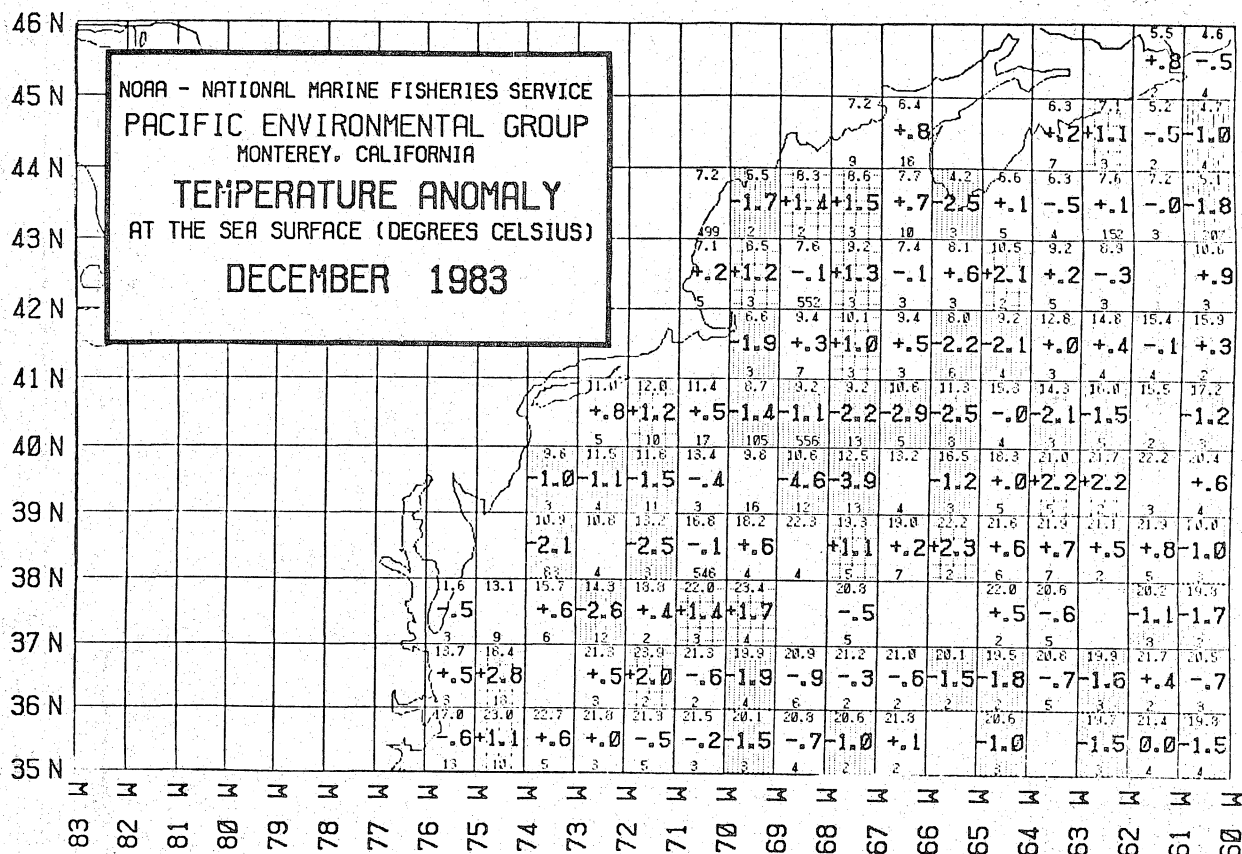


Figure 12. Average sea surface temperature anomalies ($^{\circ}\text{C}$) for December 1983. Also shown in each 1° square are average sea surface temperatures (upper number) and the number of observations (lower number).

