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Sea-surface Temperatures in the Northwestern Atlantic in 1984

by

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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 (FNOC) 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 FNOC and the Pacific Environmental Group of the National Marine Fisheries Service, which is co-located with FNOC. An elementary step in the analysis is the computation of average monthly temperatures and anomolies (from 1948-67 means) for each 1° X 1° 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° X 1° 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°C or less than -1°C are shaded.

During 1984 the area off southeastern Nova Scotia (43-46°N, 60-66°W) showed strong positive SST anomalies (up to +2.6°C) in June, a broken, scattered pattern in July and the return of an extensive, strong pattern (up to +2.5°C) in August. There were no consistent or extensive patterns, either positive or negative, in this area for the remainder of the year.

There were no significant, extensive patterns of positive or negative SST anomalies in the Gulf of Maine or over Georges Bank (40-44°N, 66-70°W) during the year.

In the Middle Atlantic Bight (2° longitude coastal band between 36° and 41°N) an extensive pattern of negative SST anomalies, (down to -2.4°C) showed in January, weakened in February and disappeared in March. Strong positive anomalies (up to +3.5°C) appeared in the southern end in May, and a pattern of positive anomalies was seen throughout the Bight in June. However, in July a pattern of negative anomalies was seen in the bight instead. The cool anomalies reappeared in September and October, but were replaced by a warm pattern in November.

Unusual distributions of blue sharks (Prionace glauca) were noted in the Middle Atlantic Bight during June, the period of extensive positive anomalies in SST. As reported by the U.S. Department of Commerce, (1.) catches and tag returns for blue sharks were strikingly lower. "For example, from 1965 thru 1983 at the two-day Bay Shore (N.Y.) Mako Tournament the catch of blue sharks including tagged fish ranged from 59 to 1,187 individuals. In 1984 only 1 blue shark was landed at this tournament. Lower catches of blue sharks were also reported at other tournaments between Cape May, N.J., and Moriches, N.Y., last month. In addition, we normally receive cards for about 1,000 tagged blue sharks from N.J. and N.Y. anglers during the month of June. This year the number is less than 300."

The publication further suggests that the decline in catches was the consequence of unusual distribution, not decreased abundance, and that the unusual distribution (toward offshore areas) may have been caused by low surface layer salinities resulting from abnormally high rainfall and run-off in May.

The validity of either hypothesis, linking the unusual distribution of blue sharks to temperature or salinity anomalies, is unknown at present.

Pooled average SST anomalies for the entire area north of 35°N and

(1) The Shark Tagger - Spring 1984. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service Laboratory, South Ferry Rd., Narragansett, R.I. 02882. July 2, 1984. 2pp.

west of 60°W (Table 1) were weakly positive in all months but January, September and October, when they were weakly negative. In all months the pooled average anomalies were substantially less than one standard deviation from the mean.

The algebraic sum of the twelve monthly pooled average SST anomalies yields a rough index of how anomalous the SST was for the year in this area of the northwestern Atlantic. For 1984 the algebraic sum was +2.51°C, the largest positive sum in the last seven years (1978: - 2.82, 1979: +0.70, 1980: -1.85, 1981: -3.53, 1982: -0.09, 1983: +2.35). This is the second consecutive year of record high positive sums, in the short time series.

Table 1. Monthly mean sea surface temperature anomalies (°C) from the 1948-1967 monthly means for 1984 in the northwestern Atlantic Ocean (35-46°N, 60-76°W).

Month	# of Squares	SST Anom C°	1948-67 Stan Dev
Jan	115	-0.06	1.26
Feb	109	0.33	1.23
Mar	111	0.17	1.49
Apr	116	0.34	1.51
May	131	0.27	1.22
Jun	132	0.69	0.91
Jul	129	0.16	0.89
Aug	127	0.46	0.85
Sep	132	-0.13	0.89
Oct	131	-0.60	0.95
Nov	125	0.35	0.90
Dec	129	0.53	0.91
		Σ=2.51	

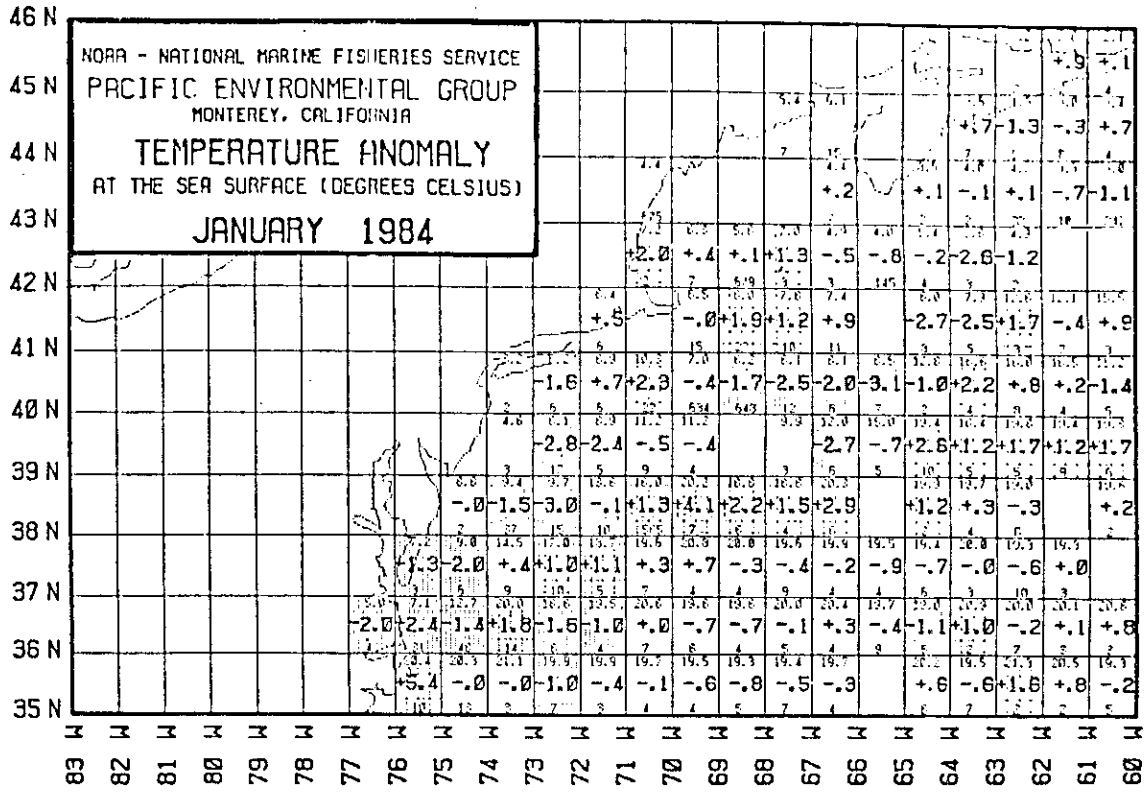

Figure 1. Average sea surface temperature anomalies (°C) for January 1984. Also shown in each 1° square are average sea surface temperatures (upper number) and the number of observations (lower number).

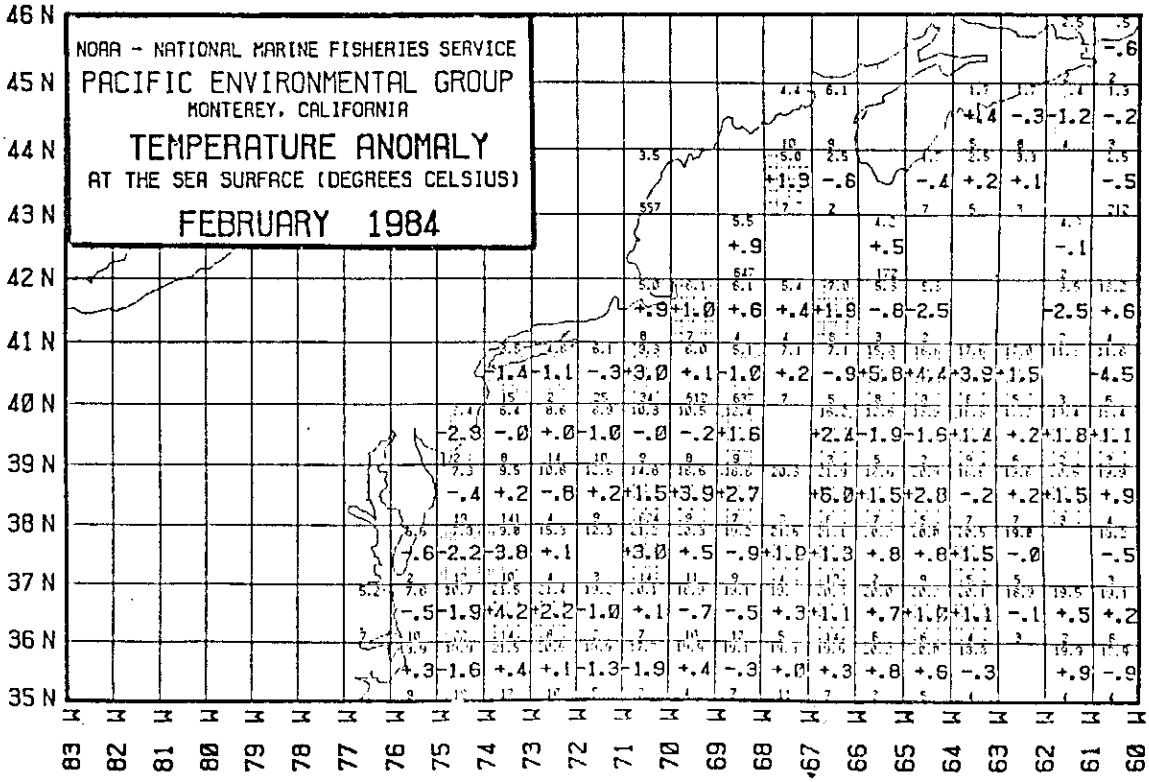

Figure 2. Average sea surface temperature anomalies (°C) for February 1984. Also shown in each 1° square are average sea surface temperatures (upper number) and the number of observations (lower number).

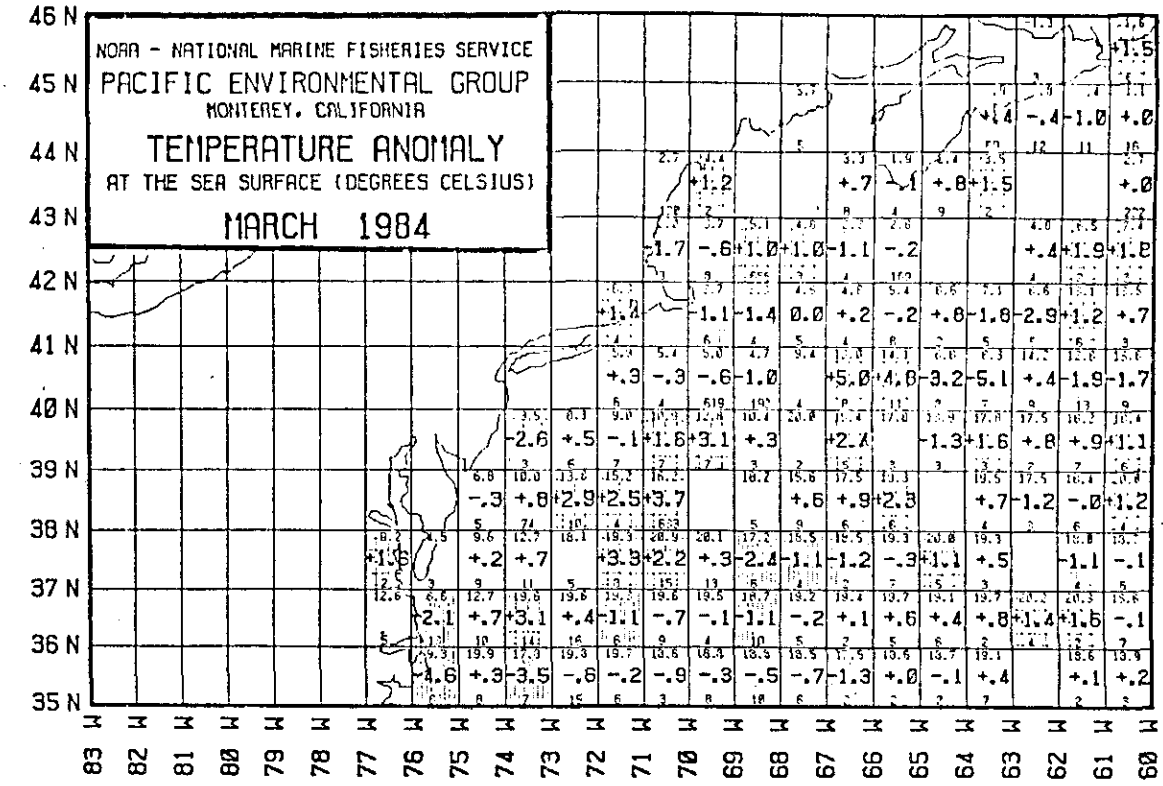

Figure 3. Average sea surface temperature anomalies (°C) for March 1984. Also shown in each 1° square are average sea surface temperatures (upper number) and the number of observations (lower number).

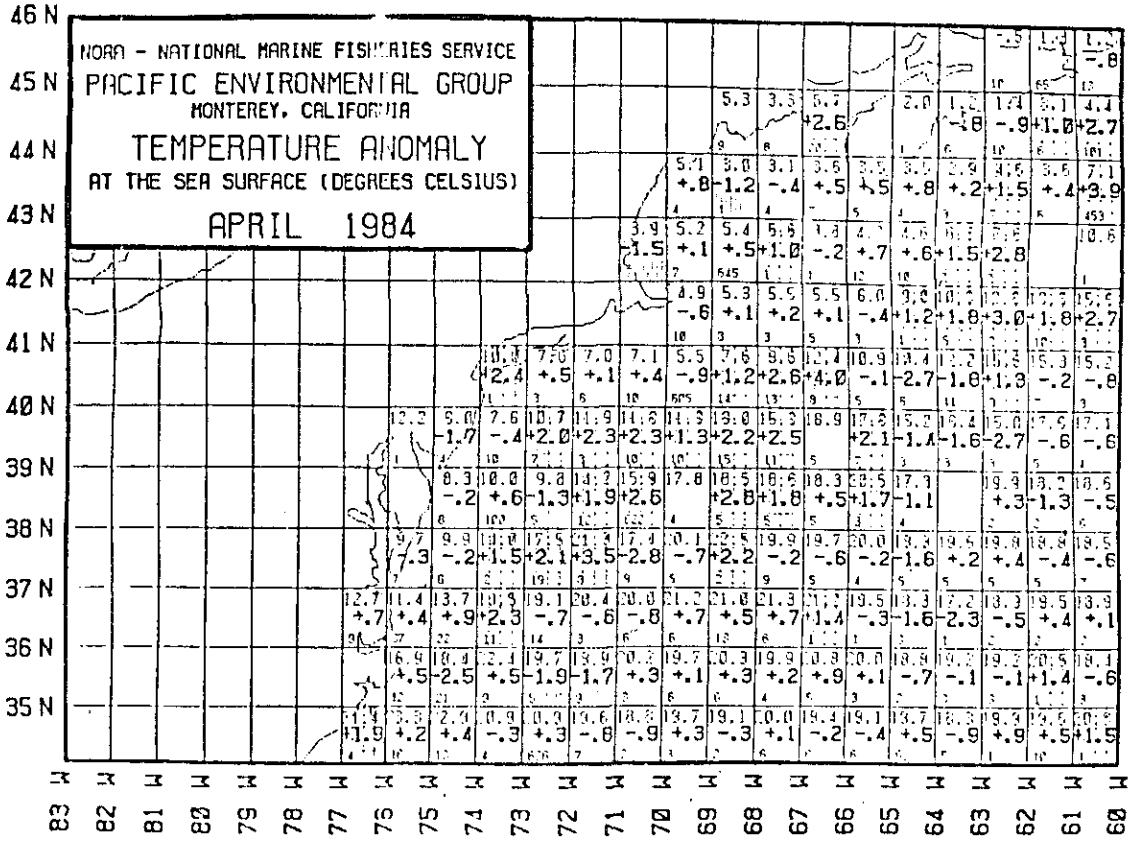

Figure 4. Average sea surface temperature anomalies (°C) for April 1984. Also shown in each 1° square are average sea surface temperatures (upper number) and the number of observations (lower number).

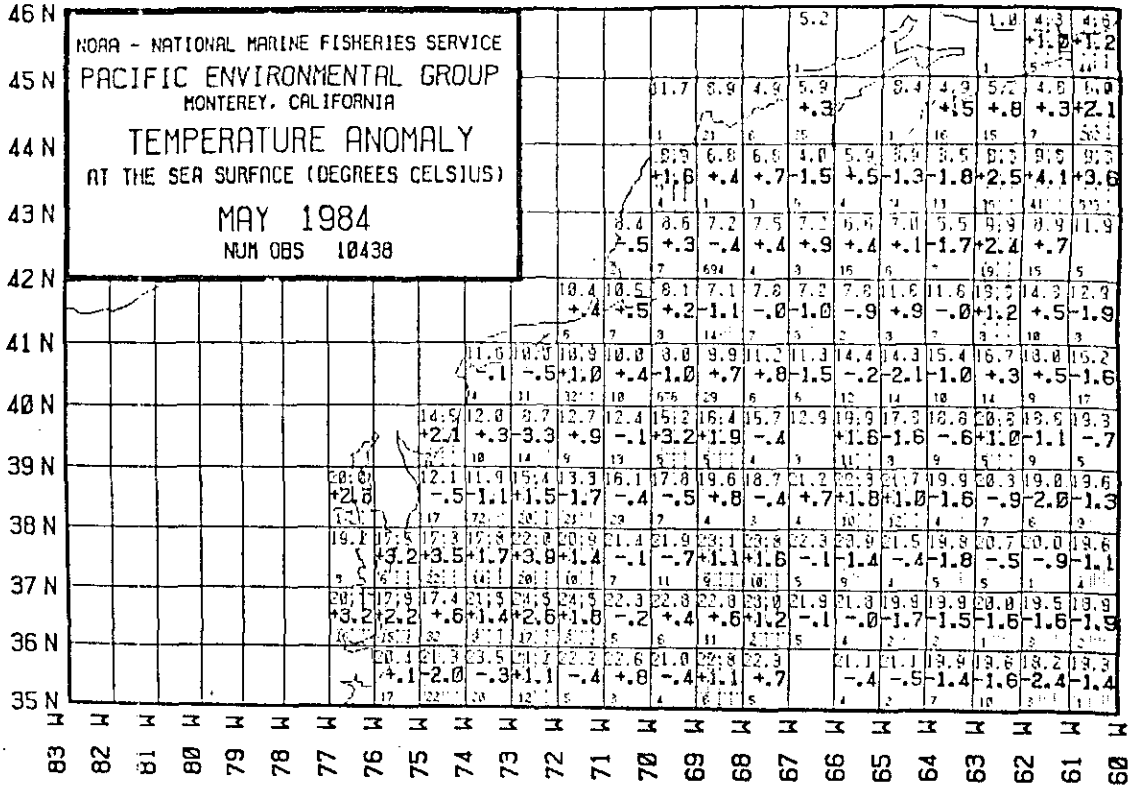

Figure 5. Average sea surface temperature anomalies (°C) for May 1984. Also shown in each 1° square are average sea surface temperatures (upper number) and the number of observations (lower number).

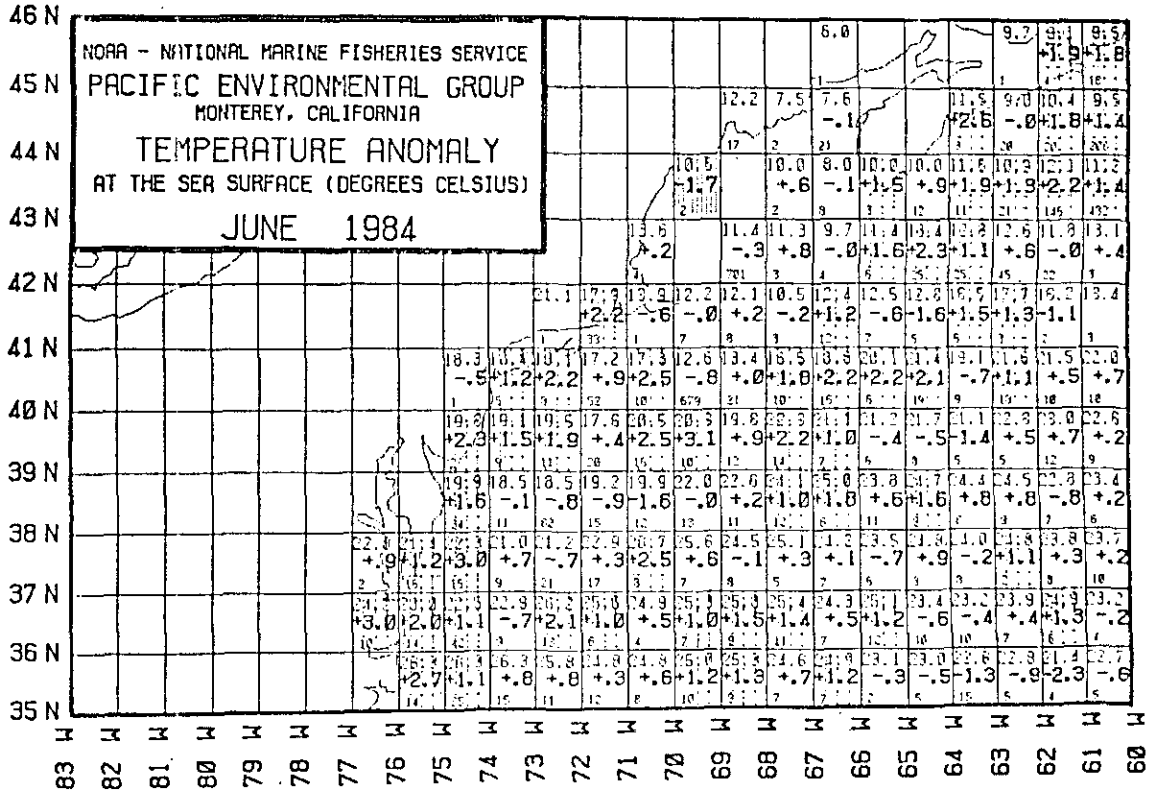

Figure 6. Average sea surface temperature anomalies (°C) for June 1984. Also shown in each 1° square are average sea surface temperatures (upper number) and the number of observations (lower number).

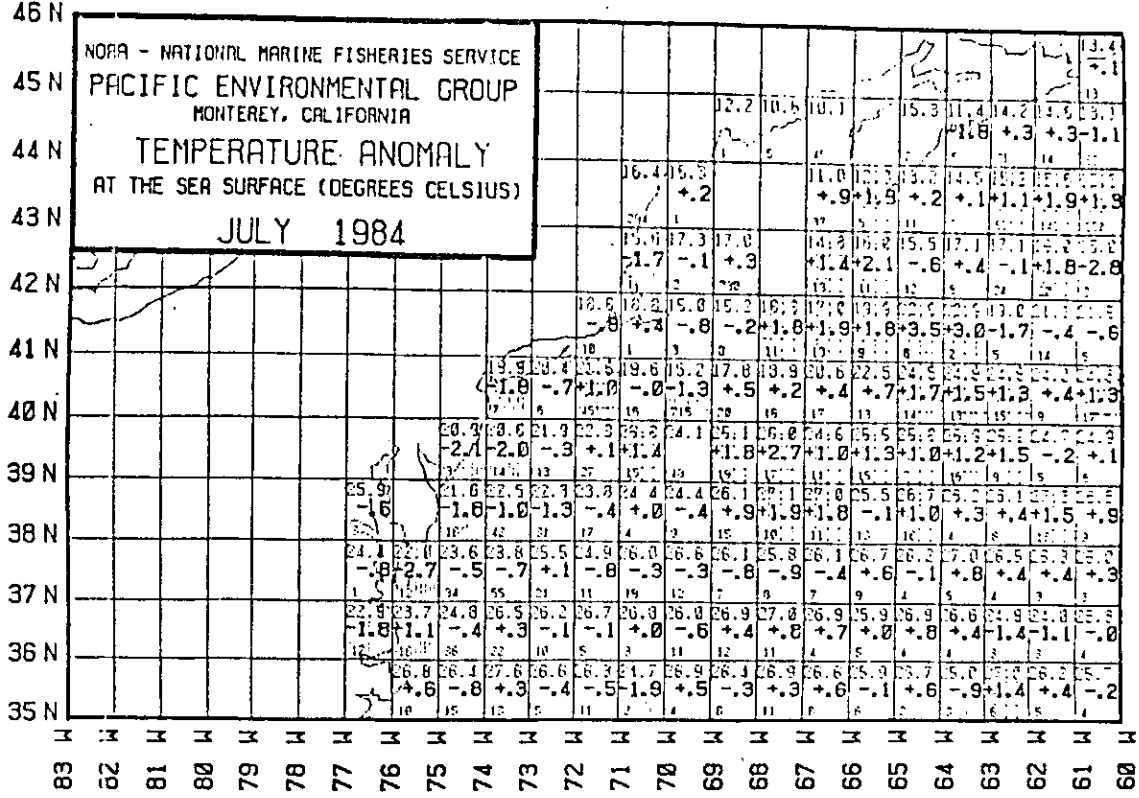

Figure 7. Average sea surface temperature anomalies (°C) for July 1984. Also shown in each 1° square are average sea surface temperatures (upper number) and the number of observations (lower number).

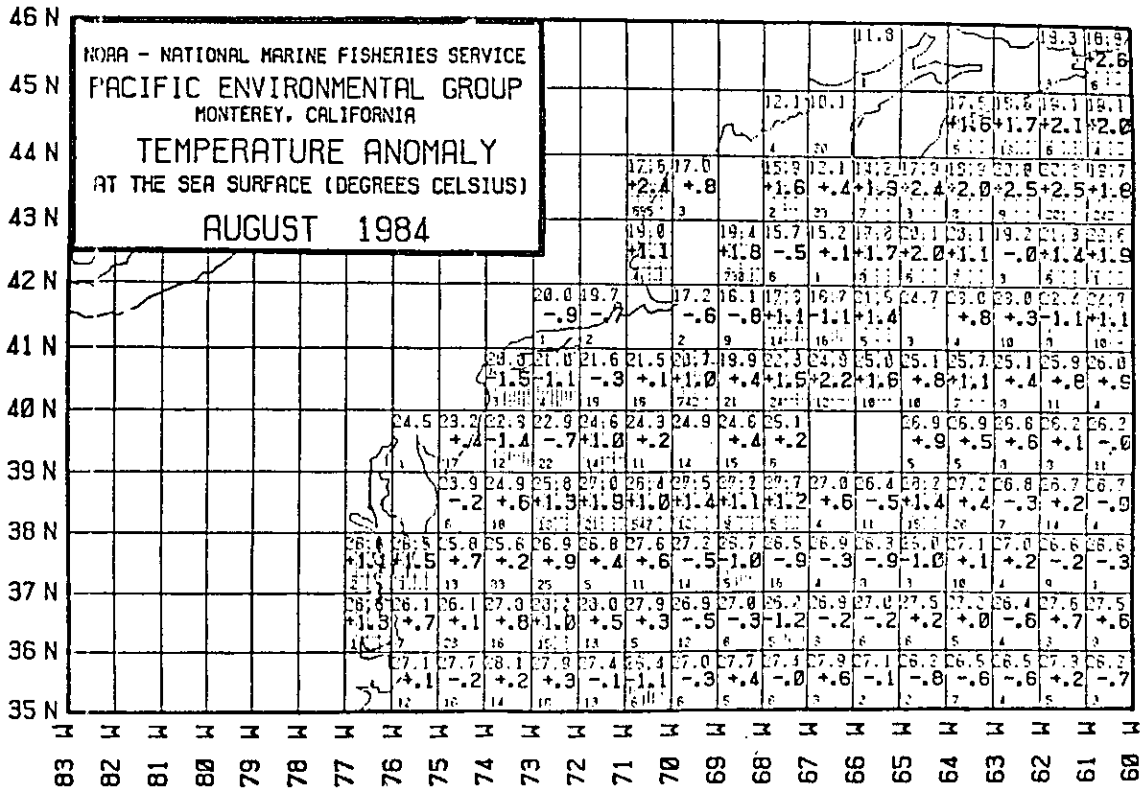

Figure 8. Average sea surface tmeperature anomalies (°C) for August 1984. Also, shown in each 1° square are average sea surface temperatures (upper number) and the number of observations (lower number).

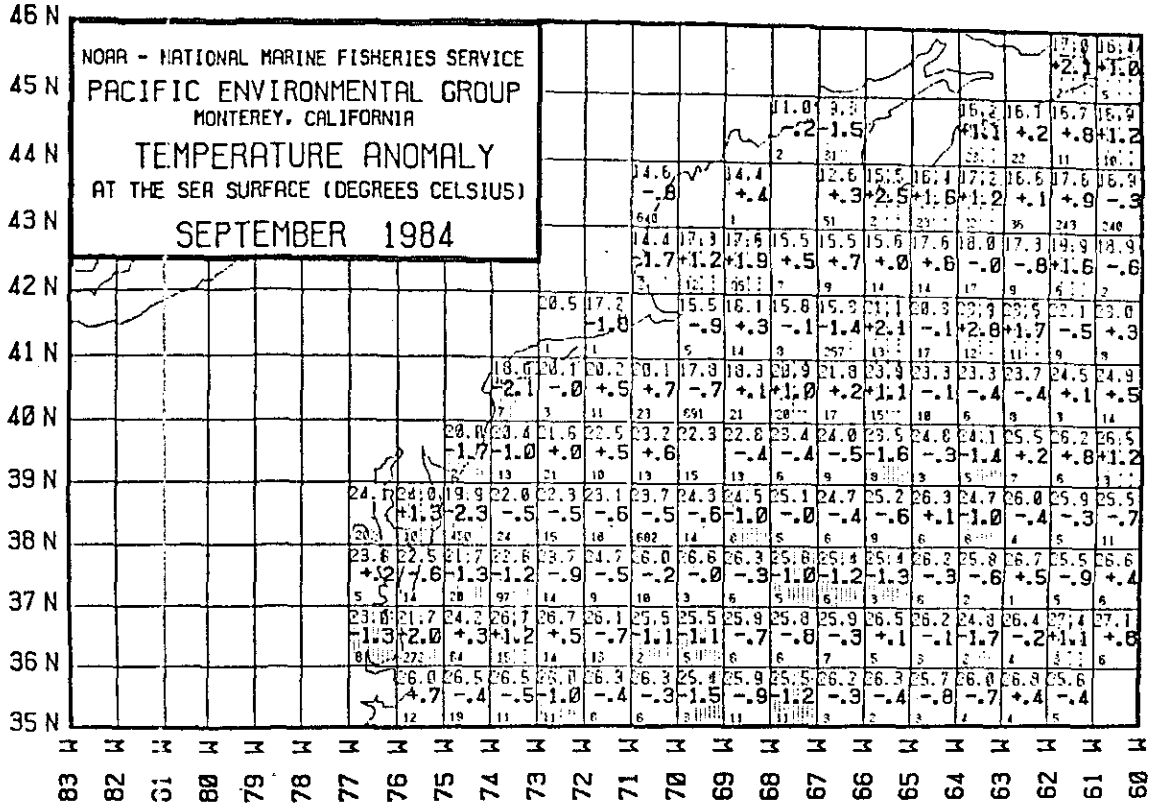

Figure 9. Average sea surface temperature anomalies (°C) for September 1984. Also shown in each 1° square are average sea surface temperatures (upper number) and the number of observations (lower number).

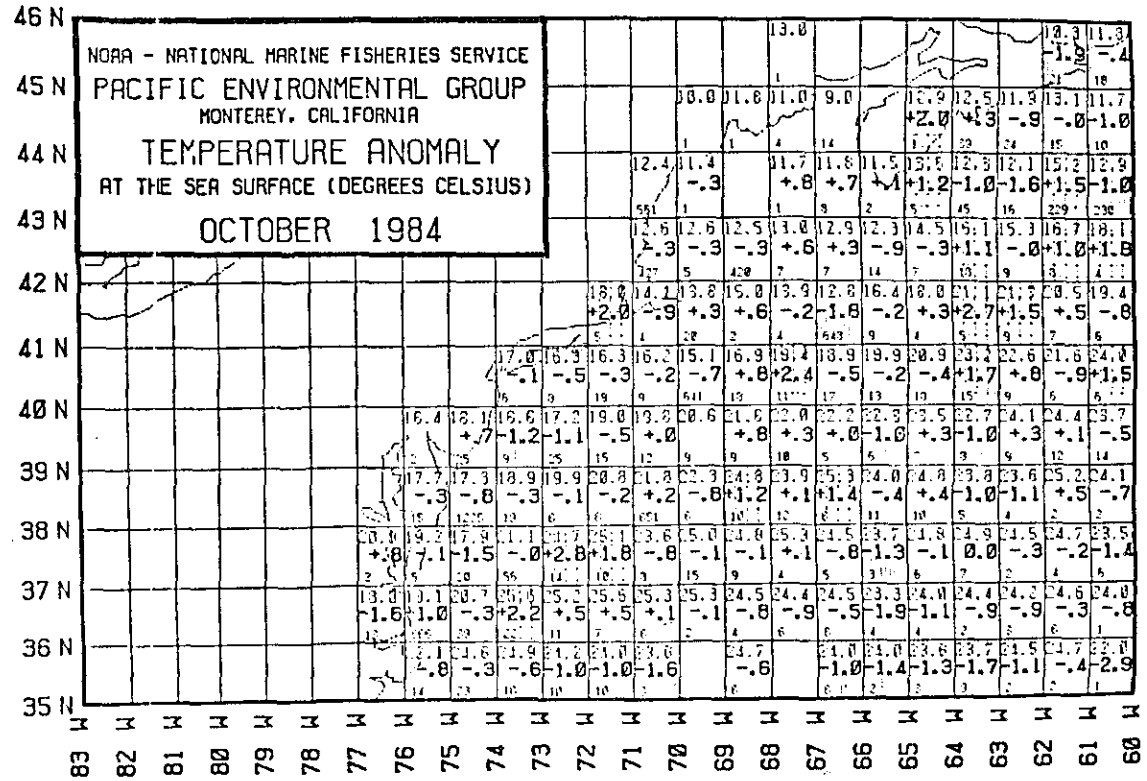

Figure 10. Average sea surface temperature anomalies (°C) for October 1984. Also shown in each 1° square are average sea surface temperatures (upper number) and the number of observations (lower number).

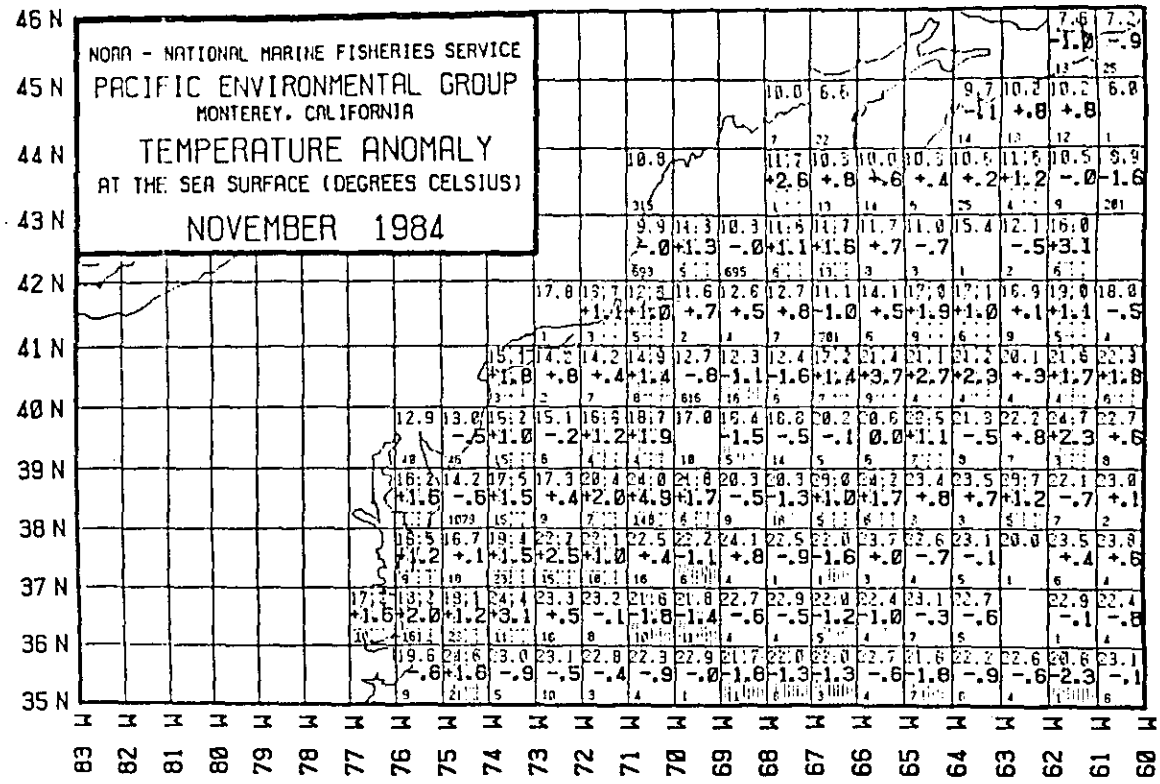

Figure 11. Average sea surface temperature anomalies (°C) for November 1984. Also shown in each 1° square are average sea surface temperatures (upper number) and the number of observations (lower number).

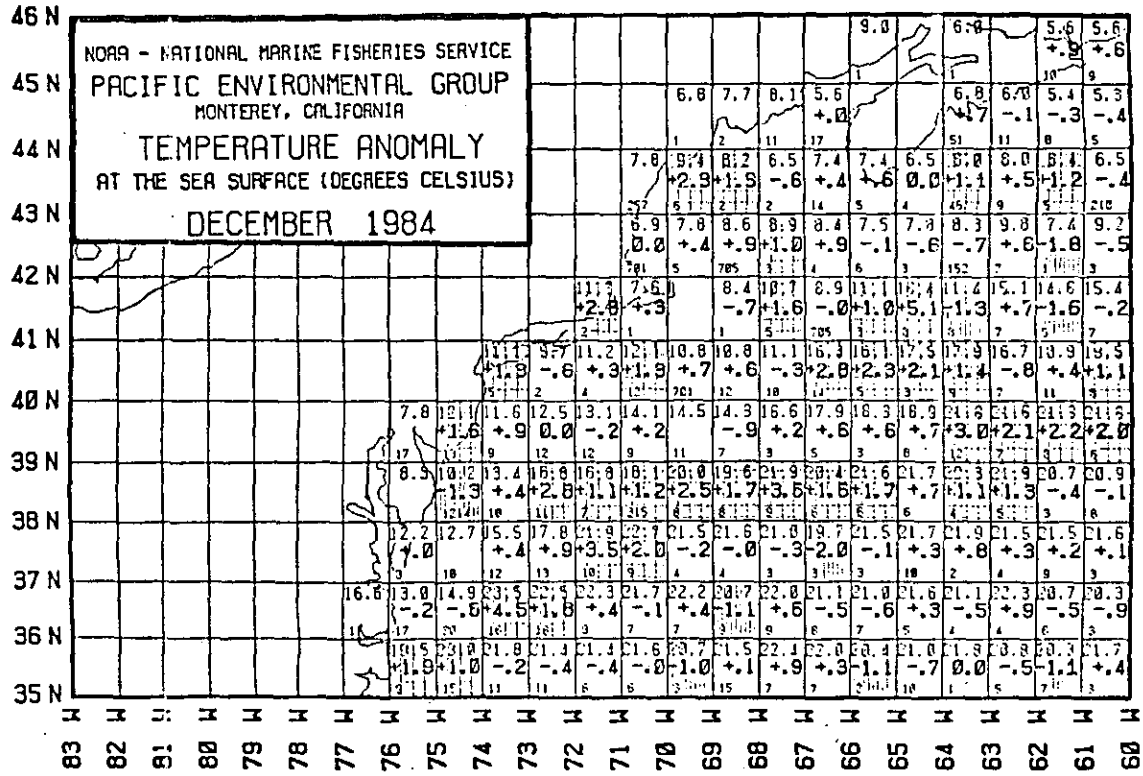

Figure 12. Average sea surface temperature anomalies (°C) for December 1984. Also shown in each 1° square are average sea surface temperatures (upper number) and the number of observations (lower number).