A UNITED STATES DEPARTMENT OF COMMERCE PUBLICATION

NOAA Technical Report NMFS SSRF-671

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service

Coastal Upwelling Indices, West Coast of North America, 1946-71

ANDREW BAKUN

SEATTLE, WA
June 1973

National Marine Fisheries Service, Special Scientific Report--Fisheries Series

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NATIONAL MARINE FISHERIES SERVICE

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Coastal Upwelling Indices, West Coast of North America, 1946-71

ANDREW BAKUN[1]

ABSTRACT

A series of monthly indices of intensity of large-scale, wind-induced coastal upwelling at selected locations along the west coast of North America is presented for the period 1946 through 1971. The indices are based on calculations of offshore Ekman surface wind transport from monthly mean surface atmospheric pressure data. Summaries by quarter and by year are included.

The effect of using monthly mean pressure data is evaluated by comparison to a similar series of monthly means of transports computed 6-hourly over a 4½-yr period. The correlation between the two series at any particular location was found to be high. However, the slope of the regression line varies at different locations. Also values off southern California during summer may be amplified relative to other locations as a result of the discontinuity in the atmospheric pressure gradient caused by the coastal mountain range between the thermal low in the interior of southern California and the higher pressure offshore. The conclusion is that these series may be satisfactory indicators of temporal variations of upwelling at each location, but less satisfactory indicators of spatial distributions.

INTRODUCTION

Coastal upwelling can profoundly affect the physical environment of marine organisms. An extreme example is the "El Niño" of the Peru Current where high surface temperatures related to cessation of upwelling have apparently resulted in such dislocation of marine fauna as to have caused starvation of great numbers of guano-producing seabirds (Wooster, 1960). Perhaps even more important from a fishery standpoint is the role of upwelling in the cycle of organic production in the sea, both in transporting nutrient-rich deeper waters into the illuminated surface layers where they are available for production, and in providing virgin water which is sufficiently free from predators to allow accumulation of large phytoplankton blooms (Cushing, 1969). Estimates have run as high as Ryther's (1969) suggestion that upwelling areas comprising about one-tenth of 1% of the ocean surface may produce one-half of the world's harvestable fish supply. Evidently, some indication of fluctuations in the upwelling regime is extremely important to understanding fluctuations in marine populations. This report is an attempt to provide indices of intensity of coastal upwelling off western North America on time and space scales useful to fishery research in general, and to the MARMAP (Marine Resources Monitoring, Assessment and Prediction) program of the National Marine Fisheries Service in particular.

METHOD

It is generally recognized that coastal upwelling in broad, diffuse eastern boundary currents such as the California Current and the eastern portion of the Gulf of Alaska Gyre is largely due to replacement from below of surface water transported offshore by the stress of the wind on the sea surface (Sverdrup et al., 1942, p. 501). Other possible mechanisms producing coastal up-

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welling include upwarping of density surfaces within a geostrophic current (Stommel and Wooster, 1965) and cross-isobar onshore flow at the bottom due to bottom friction (Hsueh and O'Brien, 1971). However, these are more likely to be important in narrower, more intense flows than normally occur in the area covered by this report.

Our present understanding of surface wind transport is based on Ekman's (1905) theory. Under Ekman's assumptions of steady state motion, uniform wind, and infinite homogeneous ocean, the mass transport per unit width of ocean surface is directed 90 degrees to the right (in the Northern Hemisphere) of the direction toward which the wind is blowing and is related to the magnitude of the wind stress by the expression

$$M = \frac{\tau}{f} \tag{1}$$

where M is the mass transport resulting from a wind stress, τ, and f is the Coriolis parameter. This mass transport has come to be called the *Ekman transport*. The layer in which appreciable transport occurs is often referred to as the *Ekman layer* and extends from the surface to depths not exceeding 50 to 100 m. The bottom of the Ekman layer is sometimes identified with the bottom of the homogeneous wind-mixed zone.

Smith (1967) has shown that Yoshida's (1955) expression for the offshore transport in the early stage of coastal upwelling reduces to the Ekman transport expression if the stress is assumed constant. This leads to the conclusion that the Ekman theory gives a valid description of wind-driven offshore flow in the early nonequilibrium phase of upwelling as well as in the later steady-state phase.

The approach taken in generating the indices presented in this report has been to estimate the monthly mean wind stress on the sea surface at points near the coast, from this to compute the Ekman transport, and finally to resolve the component of Ekman transport perpendicular to the coast. The magnitude of the offshore component is considered an indication of the amount of water upwelled through the bottom of the Ekman layer to replace that driven offshore (Fig. 1). Negative values indicate onshore transport or convergence at the coast. Since accumulation of surface waters tends to cause downward displacement of the density structure in the coastal area, this situation is sometimes referred to as *downwelling*.

The basic input data is the wind field over the ocean. However, the distribution of sea-surface wind observations in the near coastal regions of the northeastern Pacific is uneven, both spatially and temporally. The number available for a given area during a given month is often insufficient to form a good estimate of the monthly mean stress on the sea surface. In order to construct a consistent series, use is made of the relationship in mid-latitude regions of wind to atmospheric pressure. Incorporating atmospheric pressure data increases the coverage in data-sparse areas and allows an understanding of the behavior of large-scale pressure systems to aid in providing continuity to the analysis of scattered observations. Therefore, winds derived from analyzed atmospheric pressure fields are used in the production of these indices.

Calculations

The computed values are based on monthly mean pressure fields prepared by Fleet Numerical Weather Central (FNWC). These data are available on a 63 by 63 point square grid which is superimposed on a polar stereographic projection of the Northern Hemisphere (Hughes, 1966). The mesh length is 200 nautical miles at lat. 60°N and decreases southward to about 144 nautical miles at lat. 20°N. The data were transferred to a 3-degree mesh length geographical (spherical coordinates) grid (Fig. 2) using Bessel's central difference formula.

First derivatives of the surface pressure at each grid point were estimated by taking the difference in pressure between the grid points to either side and dividing by the 6-degree angular mesh length. For example, the derivatives of the pressure at point "0" in Figure 3(a) would be approximated as

$$\frac{\partial P}{\partial \phi} \cong \frac{P_1 - P_2}{2h}; \quad \frac{\partial P}{\partial \lambda} \cong \frac{P_4 - P_3}{2h} \tag{2}$$

where ϕ and λ denote the northward and eastward angular coordinates, h is the 3-degree angular mesh length in radians and P_1 denotes the pressure at point "1", etc. The geostrophic wind was computed according to

$$u_g = -\frac{1}{f\rho_a R}\frac{\partial P}{\partial \phi}; \quad v_g = \frac{1}{f\rho_a R \cos\phi}\frac{\partial P}{\partial \lambda} \tag{3}$$

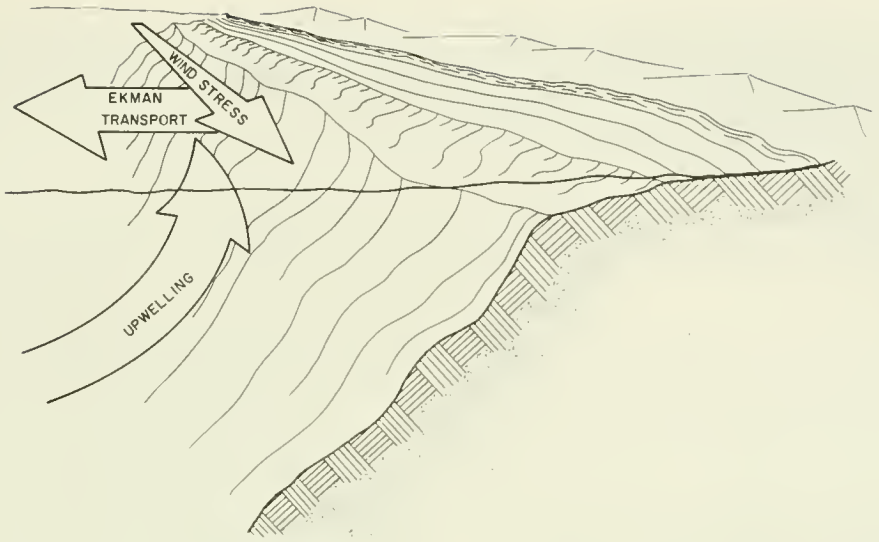


Figure 1.—A conceptual diagram of the coastal upwelling process. The coast of the continent is represented in cutaway view with the ocean to the left of the figure. Offshore transport in the surface Ekman layer due to stress of the wind parallel to the coast on the sea surface is replaced by upwelling from depth.

where v_g and u_g are the respective northward and eastward components of geostrophic wind velocity, f is the Coriolis parameter, ρ_a is the density of air and R is the mean radius of the earth. The density ρ_a was considered constant at 0.00122 g cm^{-1}. An estimate of the wind near the sea surface was formed by rotating the geostrophic wind vector 15 degrees to the left and reducing it by 30% as in Figure 3(b) to approximate frictional effects.

The sea-surface stress was then computed according to the classical square-law formula

$$\vec{\tau} = \rho_a C_d |\vec{v}| \vec{v} \qquad (4)$$

where $\vec{\tau}$ is the stress vector, ρ_a is the density of air, C_d is an empirical drag coefficient, $\vec{v}$ is the estimated wind vector near the sea surface with magnitude $|\vec{v}|$. A relatively high value, 0.0026, of the drag coefficient was used to partially offset the effect of using mean data. Finally, the Ekman transport was computed according to Equation (1). Except for the estimates of the pressure derivatives which necessarily differ because of the different grid format, this calculation procedure is the same as that used by Fofonoff (1960).[2] The offshore transport is determined by resolving the component perpendicular to a line drawn by visual estimation on a bathymetric chart along the dominant trend of a 200-mile segment of coastline centered near the grid point in question.

The indices generated by this method must be considered as indicative of rather large-scale coastal upwelling. The 6-degree gap across which the derivatives are measured as well as the scale of coastline resolution indicates a 100- to 200-mile scale as being appropriate for interpretation of the indices. Certainly, smaller scale upwellings could occur within a larger scale downwelling just as short-term upwellings might occur during a monthly period of average downwelling.

Pressure Data

The number of synoptic surface atmospheric pressure fields available at FNWC for each month during the period 1946-71 is variable. Because of the nonlinear dependence of stress on wind velocity (Equation 4), use of a variable sampling interval destroys the internal consistency of the time-series. For this reason monthly mean

[2] Fofonoff, N. P. 1960. Transport computations for the North Pacific Ocean-1958. Fish Res. Board Can., Manuscr. Rep. Ser. (Oceanogr. Limnol.) 80, 81 p. (Processed.)

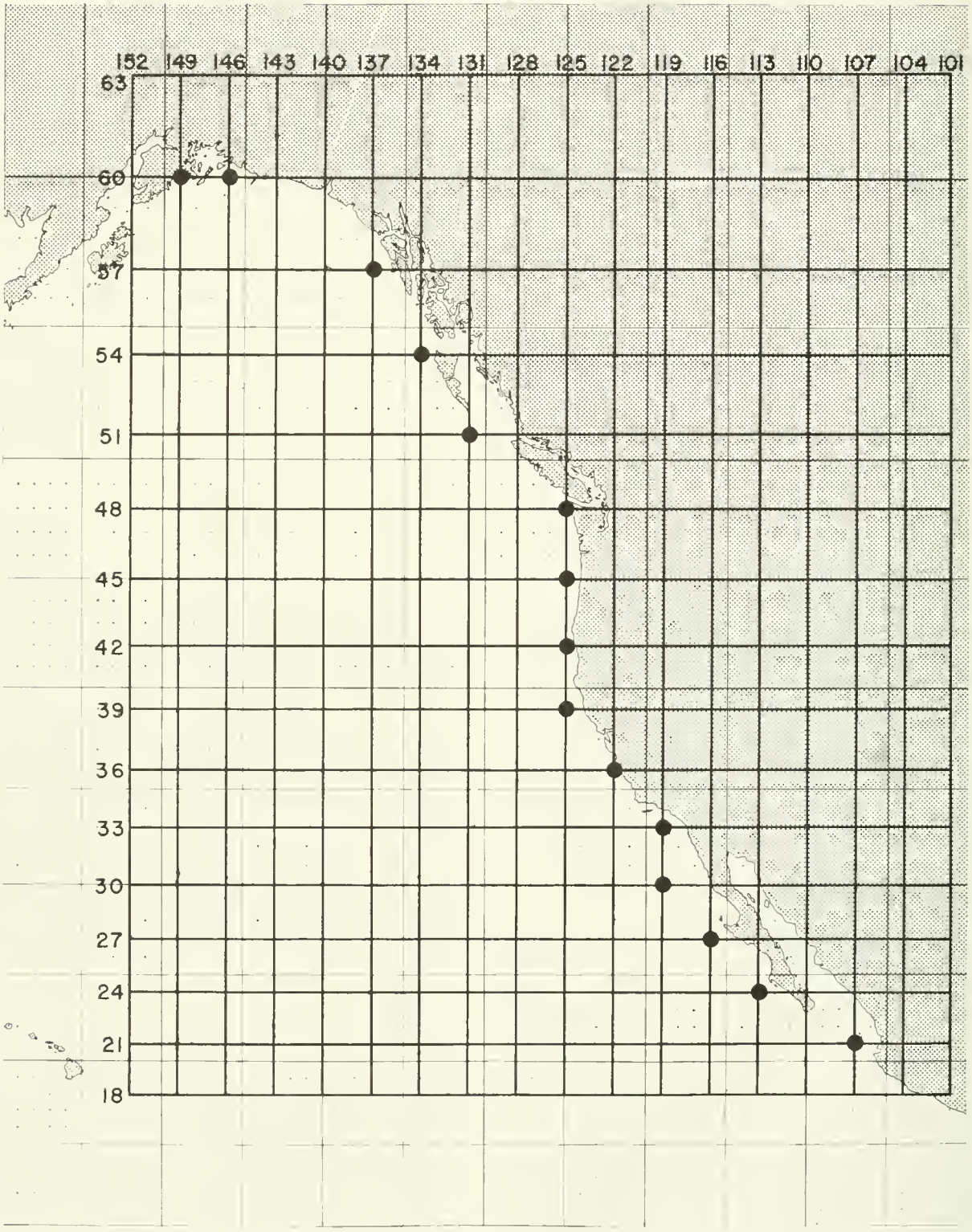
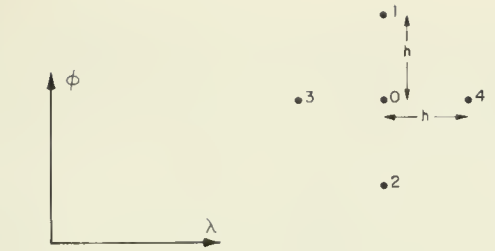
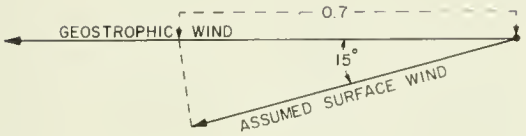


Figure 2.—Data grid. Intersections at which upwelling indices are computed are marked with large dots.



(a)



(b)

Figure 3.—(a) Configuration of data points used to form pressure derivatives. (b) Diagram showing the transformation of the geostrophic wind vector to form an estimate of the wind near the sea surface.

pressure fields were used as input data, thereby making best use of available data within each month while retaining a consistent sampling interval for computation of the stress. The effect of using monthly mean data on the absolute magnitude of the index at each location is discussed in the next section.

The monthly mean fields have been assembled by FNWC from, as far as was possible, 6-hourly (four per day) synoptic fields. Where this frequency was not available, twice per day where available or once per day fields were utilized. This decreased frequency occurs mainly in those years previous to 1963 when FNWC began to produce its own analysis. To extend the series back to 1946, FNWC has collected synoptic fields from the sources listed in Table 1.

Because of the different data sources and the expected trend toward increased detail in later pressure fields due to an expanded system of meteorological observations, care should be used in attempting to discern long-term trends in these upwelling indices. For example, it is difficult to determine how much of the decreased amplitude of the yearly cycle apparent at several of the locations during the earliest several years is real and how much is due to relative smoothing of the data in the earliest pressure fields. The intention has been to produce a series which will give a useful indication of the relative intensity of upwelling by month within any group of fairly contemporaneous years.

Effects of Monthly Mean Data on Calculated Results

Due to the nonlinear linkage of wind to stress (Equation 4) the value of the Ekman transport computed from monthly mean data will be small-

Table 1.—Sources of synoptic surface atmospheric pressure fields used by Fleet Numerical Weather Central in constructing monthly mean fields.

Time period	Source agency	Remarks
Jan. 1946-Mar. 1955	National Climatic Center Ashville, N.C.	Hand analysis of available reports; once per day.
Apr. 1955-Dec. 1959	National Center for Atmospheric Research Boulder, Colo.	National Meteorological Center analysis digitized at alternate gridpoints; twice per day.
Jan. 1960-June 1962	National Climatic Center Asheville, N.C.	Once per day.
July 1962-Dec. 1971	Fleet Numerical Weather Central, Monterey, Calif.	FNWC objective machine analysis. Certain gaps filled with NCC data; four times per day.

er than the monthly mean of Ekman transport computed at synoptic intervals by an amount depending upon the variance of the wind vector within the month. In order to evaluate this effect, a 54-mo series (January 1967 through June 1971) of monthly means of 6-hourly computations of offshore component of Ekman transport was generated for comparison with the corresponding values computed from monthly mean data. The results of the comparison are summarized in Table 2.

Table 2.—Results of comparison of a 54-mo series of monthly means of offshore component of Ekman transport computed 6-hourly to the corresponding series computed from monthly mean data at the selected coastal grid-points.

Location	Rank correlation coefficient	Product-moment correlation coefficient	Slope of least-squares regression line
60°N,149°W	0.99	0.98	0.62
60°N,146°W	0.99	0.98	0.66
57°N,137°W	0.99	0.98	0.66
53°N,134°W	0.97	0.94	0.54
51°N,131°W	0.96	0.94	0.47
48°N,125°W	0.99	0.97	0.48
45°N,125°W	0.99	0.97	0.49
42°N,125°W	0.99	0.96	0.57
39°N,125°W	0.99	0.96	0.68
36°N,122°W	0.99	0.98	0.83
33°N,119°W	0.99	0.99	0.94
30°N,119°W	0.99	0.99	0.98
27°N,116°W	0.95	0.96	0.97
24°N,113°W	0.96	0.96	0.83
21°N,107°W	0.99	0.96	0.59

The high values of the correlation coefficients indicate quite linear relationships between the two sets of series. Thus the distortion introduced into the series at any particular location due to use of monthly mean data is mainly one of absolute magnitude. The relationship of each monthly value to the other monthly values at the location is affected only slightly. This indicates that the series computed from monthly mean data gives an indication of the monthly variations in intensity of upwelling nearly equivalent to that given by the corresponding series of monthly means of values computed each 6 hr.

However, Table 2 shows the slope of the regression line for the two series to be variable from one location to the other. This indicates a change with location in the amount of variability of the wind vector within a month. Thus the use of monthly mean data in conjunction with the nonlinear stress law (Equation 4) gives an erroneous impression of the relative magnitudes of offshore Ekman drift when different locations are compared. For this reason the indices tabulated in this report which are designed to indicate temporal variations at a particular location, should be used with caution as indicators of spatial distributions.

This distortion of the spatial distributions introduced by designing the computational method to minimize distortion of the time-series at each particular location can be illustrated by examining the long-term mean annual cycle of offshore Ekman transport computed in two different ways. Figure 4(a) is a time-series isogram of offshore component of Ekman transport for a long-term composite year computed from actual wind observations taken from the National Climatic Center's file of marine surface observations. The figure summarizes over 75,000 individual wind observations taken by ships at sea over the 20-yr period, 1948 through 1967, within the 1-degree squares shown in the accompanying coastline plot. The Ekman transport was computed for each wind observation and the offshore components were averaged by month for each coastal square. The drag coefficient used with these actual observed winds was 0.0013. Bakun (1971) demonstrated that the spatial distributions obtained in this manner agreed well with the mean annual cycle of sea-surface temperature distributions. Reference to the slopes of the regression lines in Table 2 indicates that since this drag coefficient is half that used with winds computed from monthly mean pressure fields to generate the indices tabulated in this report, rough numerical equivalence between the two transport sets should occur at about lat. 45°N.

Figure 4(b) is a similar isogram constructed from long-term mean monthly values for the same period of the indices derived from monthly mean pressure data. The locations at which the indices were calculated are marked on the accompanying coastline plot. Comparison with Figure 4(a) shows an extreme southward shift and intensification of the point of maximum indicated upwelling.

Figure 4(c) displays the data from Figure 4(b) after having been adjusted to the slopes of the re-

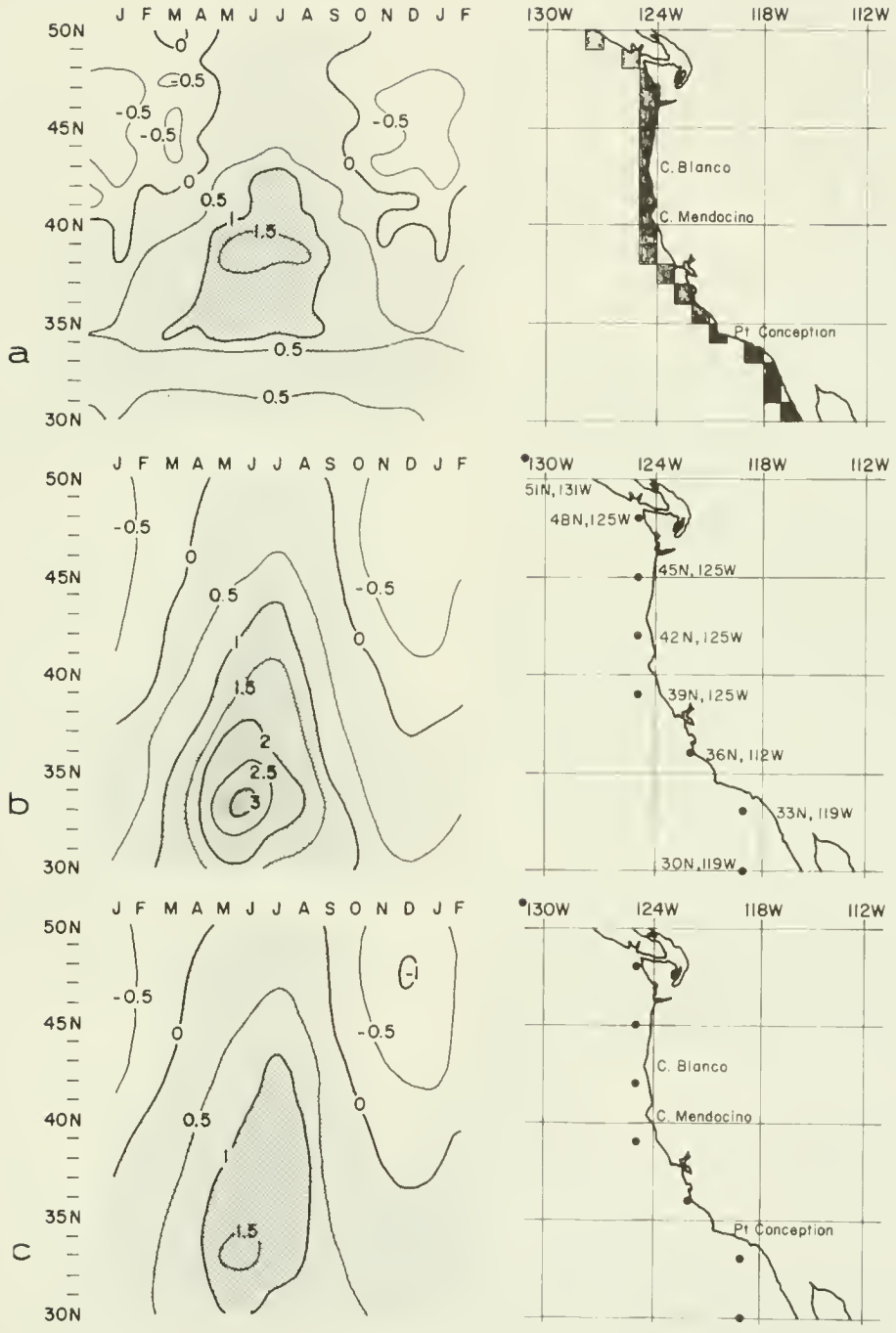


Figure 4.—(a) Long-term mean annual cycle of offshore Ekman transport composited from actual wind observations within the 1-degree squares indicated on the coastline drawing to the right. (b) Long-term mean annual cycle of offshore Ekman transport formed from upwelling indices computed from monthly mean atmospheric pressure data at points indicated by dots on the coastline drawing. (c) Values from Figure 4(a) after having been adjusted to the slopes of the regression lines in Table 2. Units are cubic meters per second per meter of coastline.

gression lines by multiplying each monthly value by 0.5 and by the reciprocal of the slope given in Table 2. The multiplication by 0.5 is necessary because the value of the drag coefficient used to construct Figure 4(a) is half that used for Figure 4(b) whereas the slopes in Table 2 were computed for two series with equal drag coefficients. Multiplication by the reciprocal of the slopes then serves to adjust the data so that the spatial variation in the underestimate of the monthly mean wind stress due to computation from monthly mean atmospheric pressure data as predicted in Table 2 is removed.

The magnitudes and spatial variations displayed in Figure 4(c) are more like those shown in Figure 4(a) than are those in Figure 4(b). Some smoothing of gradients in Figure 4(b) and (c) results from having data points at 3-degree intervals with each point incorporating data across a 6-degree area. This causes some loss in detail and displacement of contours relative to Figure 4(a) where data points are at 1-degree intervals and incorporate data restricted to a 1-degree square area. There remains however a definite shift of the maximum toward southern California in Figure 4(c) relative to Figure 4(a). A possible cause for this shift in maximum upwelling is described in the following section.

An Effect of Coastal Topography

During the summer an intense thermal low develops in the interior of southern California. Due to the 3-degree mesh length of the computation grid, the meridional component of the geostrophic wind at a coastal gridpoint is computed (Equation 2) from a continuous constant pressure gradient between an offshore gridpoint and one on the continent (dashed line in Fig. 5). However, the southern California coastal mountain range causes a discontinuity in this pressure gradient such that the gradient actually in equilibrium with the geostrophic wind (solid line in Fig. 5) may be less than that used in the computations. This leads to an overestimation of the geostrophic wind that in turn leads to an overestimation of the upwelling index. The assumption made in presenting these series as indicators of time variations of intensity of coastal upwelling is that the actual pressure gradient at the coast varies in rough proportion to the total onshore-offshore pressure difference which is used in the computations.

MEAN YEARLY CYCLE OF INDICATED UPWELLING

Having been designed to give a consistant indication of temporal variations at each particular

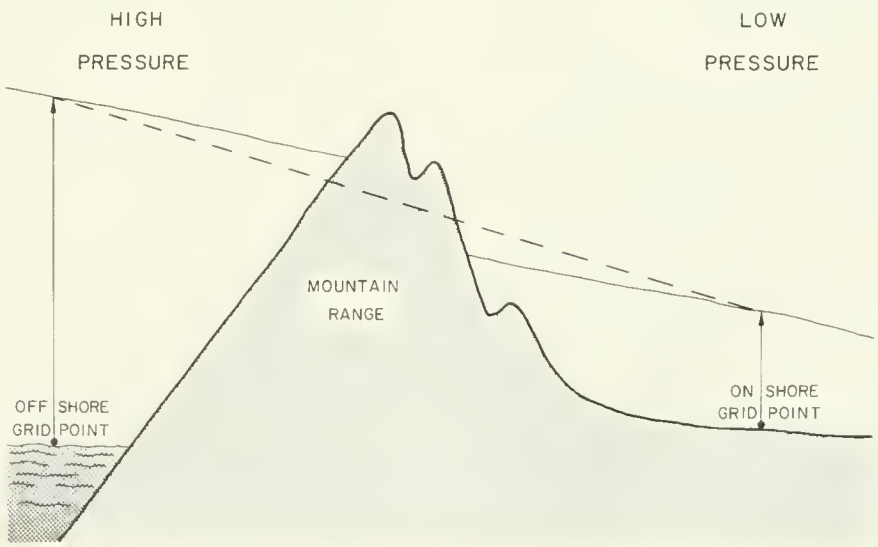


Figure 5.—Height of a constant pressure surface. The slope of the dashed line indicates the assumed gradient used in the calculations. The slope of the solid line indicates the lesser gradient which may exist in reality.

Table 3.—Mean monthly values of the indices for the 20-yr period, 1948-1967. Units are cubic meters per second per 100 m of coastline.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
60°N,149°W	-138	- 86	-46	-11	0	6	6	6	- 3	-26	-73	-109
60°N,146°W	-180	-103	-48	-12	- 2	6	5	3	- 9	-34	-94	-129
57°N,137°W	-212	-117	-51	-24	-11	0	1	-6	-29	-88	-140	-163
54°N,134°W	- 97	- 68	-27	-20	-10	1	3	-1	-23	-82	- 98	- 91
51°N,131°W	- 64	- 36	-12	- 5	4	15	16	12	- 3	-40	- 58	- 57
48°N,125°W	- 90	- 47	-21	0	18	25	34	22	4	-39	- 88	-100
45°N,125°W	- 94	- 47	-15	9	34	48	74	50	16	-20	- 73	- 93
42°N,125°W	- 67	- 28	3	33	79	103	132	91	36	0	- 42	- 57
39°N,125°W	- 13	9	36	69	124	168	182	139	63	20	- 7	- 12
36°N,122°W	11	35	80	121	203	239	198	183	94	49	12	7
33°N,119°W	19	48	120	178	282	312	231	212	137	76	22	10
30°N,119°W	56	77	116	141	199	199	143	142	129	103	65	54
27°N,116°W	71	93	119	148	202	195	114	105	110	106	74	63
24°N,113°W	51	74	93	116	143	129	48	44	49	69	52	39
21°N,107°W	18	39	97	100	87	39	3	5	-14	-15	8	8

location, this set of indices may be admirably suited for describing the spatial variations of timing and duration of upwelling. In Table 3 are listed the long-term monthly mean values of the indices for the 20-yr period, 1948-67. Figure 6 displays plots of these values.

The period of maximum values of the indices is earliest to the south, becoming progressively later in the year with distance to the north. At lat. 21°N the peak is in April. Off the coast of Baja California the peak is in May. A June peak occurs off southern and central California. North of San Francisco the peak is generally in July, with a slight shift back to June at the northern extremity of the Gulf of Alaska.

From the southern tip of Baja California northward to Monterey Bay the mean values of the indices indicate upwelling throughout the year. Northward from San Francisco the season of indicated upwelling becomes progressively restricted, lasting March through October off northern California, April through September off Oregon, May through August off northern Vancouver Island, finally narrowing at lat. 57°N to a scarcely significant positive value of the index during July.

Tabulations of the deviations from these long-term mean values accompany the tabulations of the values of the indices in the Appendix. Graphical plots of both the anomalies and the values of the indices are included.

DISCUSSION

Detailed analysis and interpretation of the time-series plots contained in the Appendix is beyond the scope of this report. However, it may be useful to point out several examples and to speculate briefly upon possible consequences.

Accompanying the plots of the monthly indices for each location are tables of quarterly and annual averages. The following three examples are each illustrative of phenomena occurring basically on one of these three different time-scales. As it happens, the first two concern negative values of the index. Negative values of the index indicate accumulation of wind-transported surface waters at the coast and resulting downwelling.

Short-Term Intense Convergences in the Northern Gulf of Alaska

A glance at the first chart in the Appendix reveals an extreme negative spike in the upwelling index at lat. 60°N, long. 149°W during February 1950. In this case, the indicated convergence is over 4½ times the 20-yr mean value for February. It is interesting to speculate upon the effect of such an anomaly on the density structure of the northern portion of the Alaskan Gyre.

If the given numerical value is accepted as an estimate, we find for February 1950 an anomalous onshore flow of nearly 300 m^3/sec along each

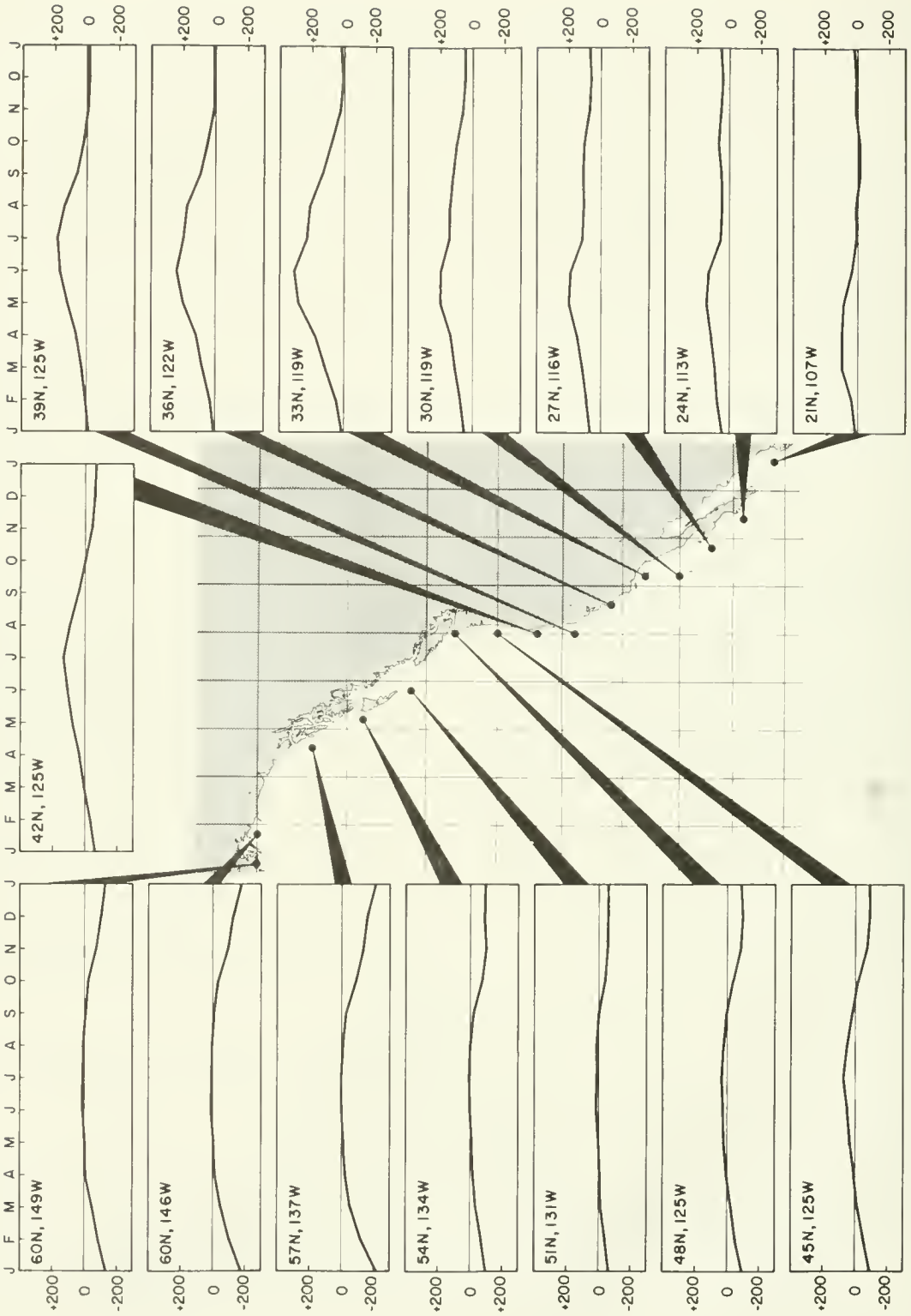


Figure 6.—Mean monthly values of the computed upwelling indices for the 20-yr period, 1948 through through 1967 (m^3 sec^{-1}/per 100 m).

100 m of coastline. Assuming this flow accumulates within a zone extending 300 km offshore, this represents for the 1-mo period a lens of excess surface water about 24 m thick. If the flow away from the coast which must balance this accumulation occurs below the pycnocline the result is a downward shift of the upper density structure an average of 24 m over the shoreward 300 km. Such a shift implies an extreme increase in baroclinicity in this already highly baroclinic area, tending to accelerate the westward geostrophic flow along the northern boundary of the Gulf of Alaska.

The striking negative anomalies for the same month in charts of the index at lat. 60°N, long. 146°W and at lat. 57°N, long. 137°W indicate that this feature existed over the major portion of the northern Gulf of Alaska coastline. This wide geographical extent justifies such a two-dimensional treatment as presented in the previous paragraph. It also indicates a possibly far-reaching effect on the marine environment of this region.

Several similar short-term intense negative values of the index appear in the charts at other times. In each case the major pulse is confined to only one monthly value but has spatial coherence in the Northern Gulf. Most impressive along with February 1950 just discussed are the months of January during the years 1959, 1966, and 1971. January 1971 differs from the others in that the absence of a strong anomaly at lat. 57°N, long. 135°W indicates a lesser eastward extent of the feature.

Periods of Intense Winter Convergence off Washington and Oregon

The monthly charts of the index at lat. 45°N, long. 125°W indicate the periods of December 1957 through February 1958 and January through March 1961 as having been intervals of extreme convergence of wind-drifted surface waters at the coast. Winter of 1958, in particular, exhibits a striking anomaly in the charts for locations extending from lat. 51°N to lat. 39°N. These periods differ from the intense convergences previously described for the more northerly region in containing several successive months of anomalously large negative values of the index rather than a single extreme month and are highly evident in the charts of quarterly summaries presented in the appendix. The effect of this apparent downwelling at the coast upon the density structure would be to accelerate northward flow or to decelerate southward flow. Either situation would favor an anomalous warm advection.

Long-Term Groupings of Mean Yearly Values

In examining these data for long-term or regional trends it is sometimes helpful to filter out some of the shorter term variability by means of annual averages. For example the charts of mean yearly values indicate anomalously high mean annual upwelling throughout the most recent 8-yr period, 1964 through 1971, from Cape Blanco to San Diego (lat. 42°N to lat. 33°N). In contrast, along Baja California (lat. 30°N to lat. 24°N) strikingly low anomalies are indicated for the 4 successive years, 1965 through 1968.

The period 1955 through 1959 has anomalously high values from the Los Angeles Bight to the southernmost point covered by the grid (lat. 33°N to lat. 21°N). In fact, the anomalously high values during this period extend all the way north to the Straits of Juan de Fuca (lat. 48°N) if the year 1958 which is anomalously low in the more northern area is left out. The low yearly mean values for 1958 are largely due to the extremely low first quarter value previously discussed.

Low annual absolute values of the indices are found for the first 4 yr of the series (1946-49) at nearly all locations. As previously mentioned this may be due, at least in part, to relatively sparse data coverage in the early years leading to some smoothing of the gradients used in the computations.

Conclusion

Anomalies of the type discussed may have important marine biological consequences. Vertical displacements of the thermocline due to intense convergences or divergences such as that indicated for February 1950 may affect the depth on the continental shelf where groundfish are located. Anomalous upwellings and downwellings undoubtably affect productivity and the concentrations of primary producers and zooplankton.

They may also affect recruitment and distribution of fishery resources, particularly where the anomaly is of longer term or recurs in successive years.

In view of these possibilities it is hoped that biologists will find the indices presented here to be convenient and suitable for incorporation into studies of the dynamics of biological distributions, and that empirical associations may lead to ecological hypotheses and finally to experiments which can verify both the hypotheses and the indices presented in this report. Finally, although this work was directed primarily toward developing a tool for biological and fisheries research, it is suggested that these indices may find applications in such fields as coastal oceanography, fog research, and studies of climate and weather of coastal regions.

ACKNOWLEDGMENTS

Invaluable discussion and advice was provided by James H. Johnson, Gunter R. Seckel, and Douglas R. McLain of the Pacific Environmental Group, National Marine Fisheries Service, NOAA, throughout this project, from its conception through the completion of the manuscript.

Atmospheric pressure data and electronic computing and plotting facilities were provided by the U.S. Navy, Fleet Numerical Weather Central.

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APPENDIX

Tabulations and plots of coastal upwelling indices

The following pages display the coastal upwelling indices by month, quarter, and year for 15 near-coastal points over the period 1946-71. The display for each location comprises six pages. The first four contain monthly values. The fifth contains quarterly values. The sixth contains the completion of the table of quarterly values and the table of yearly mean values.

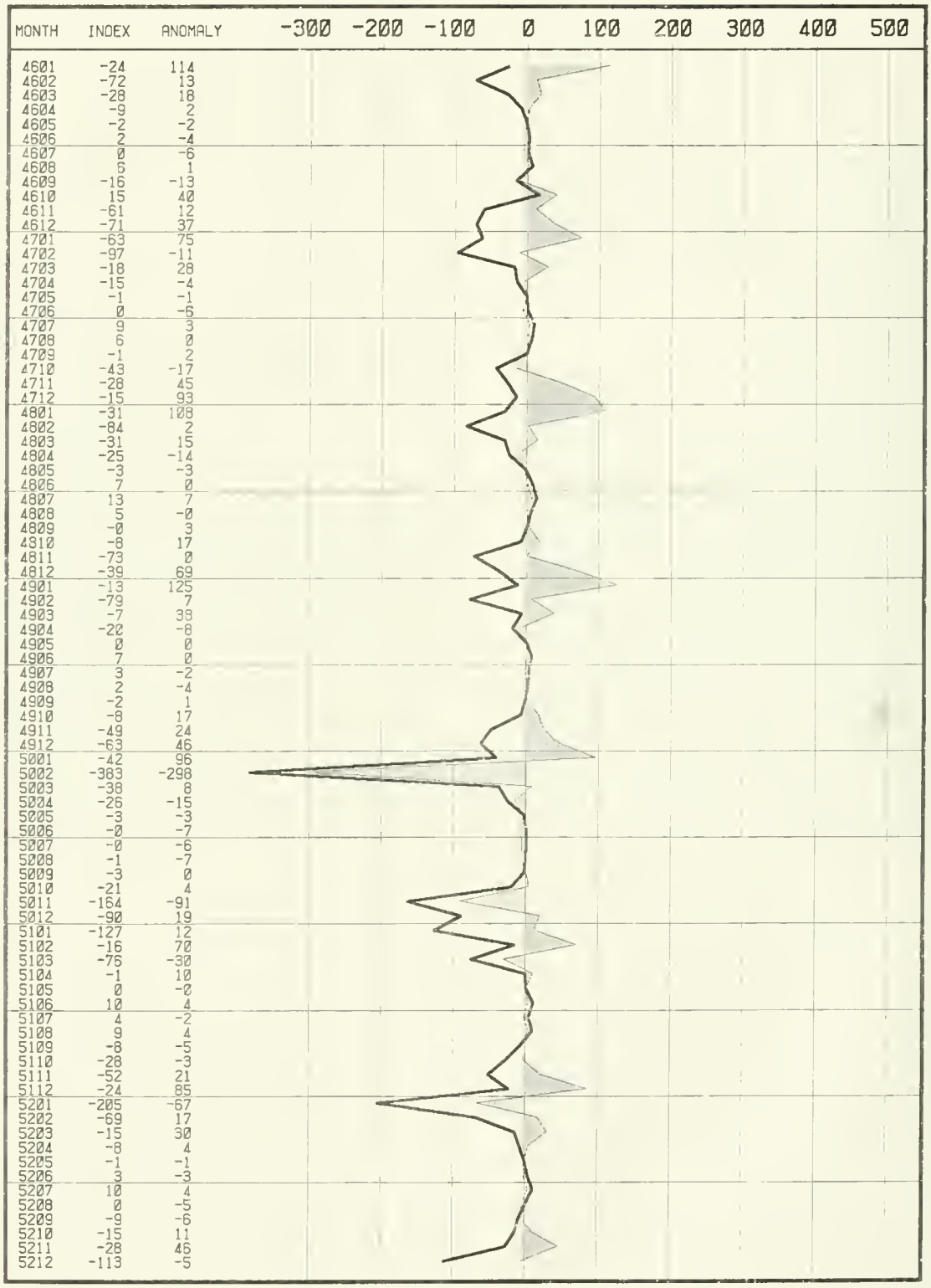
The first column of figures on each page indicates the month, quarter, or year to which the information appearing on the same line pertains. In the tabulations by month, the first two digits refer to the year and the last two to the month. For example, 4601 refers to January 1946. In the tabulations by quarter the first two digits again refer to the year and the last two refer to the quarter. For example, 4601 in this case refers to first quarter (Jan., Feb., Mar.) 1946. In the tabulations by year the year is printed in full.

The second column contains the value of index for each period. The units are metric tons per second per 100 m of coastline. These units may be thought of as indicative of the average amount (metric tons or cubic meters) of water upwelled through the bottom of the Ekman layer each second along each 100 m of a straight line directed along the dominant trend of the coast on a scale of about 200 miles. However, it must be remembered that because of uncertainty in exact values of some of the constants employed and for other reasons outlined in the section on "Method," these indices should be regarded more as indicative of relative flucuations of upwelling intensity at each point than as quantitative measures of absolute magnitude. The quarterly and yearly values are averages of the monthly values weighted by the number of days in each month. An exception to this rule is February which is considered to always contain 28 days in order to avoid a different set of long-term means for leap years. Such refinement is well below the level of sensitivity of these indices.

The third column contains the anomalies or deviations from the long-term mean value of the index at the particular point for the particular month, quarter, or year over the 20-yr period, 1948-67.

The values and anomalies are plotted to the right of each page. The heavy line indicates the values of the upwelling index while the lighter line indicates the anomalies. The deviations of the anomaly line from the zero line are shaded.

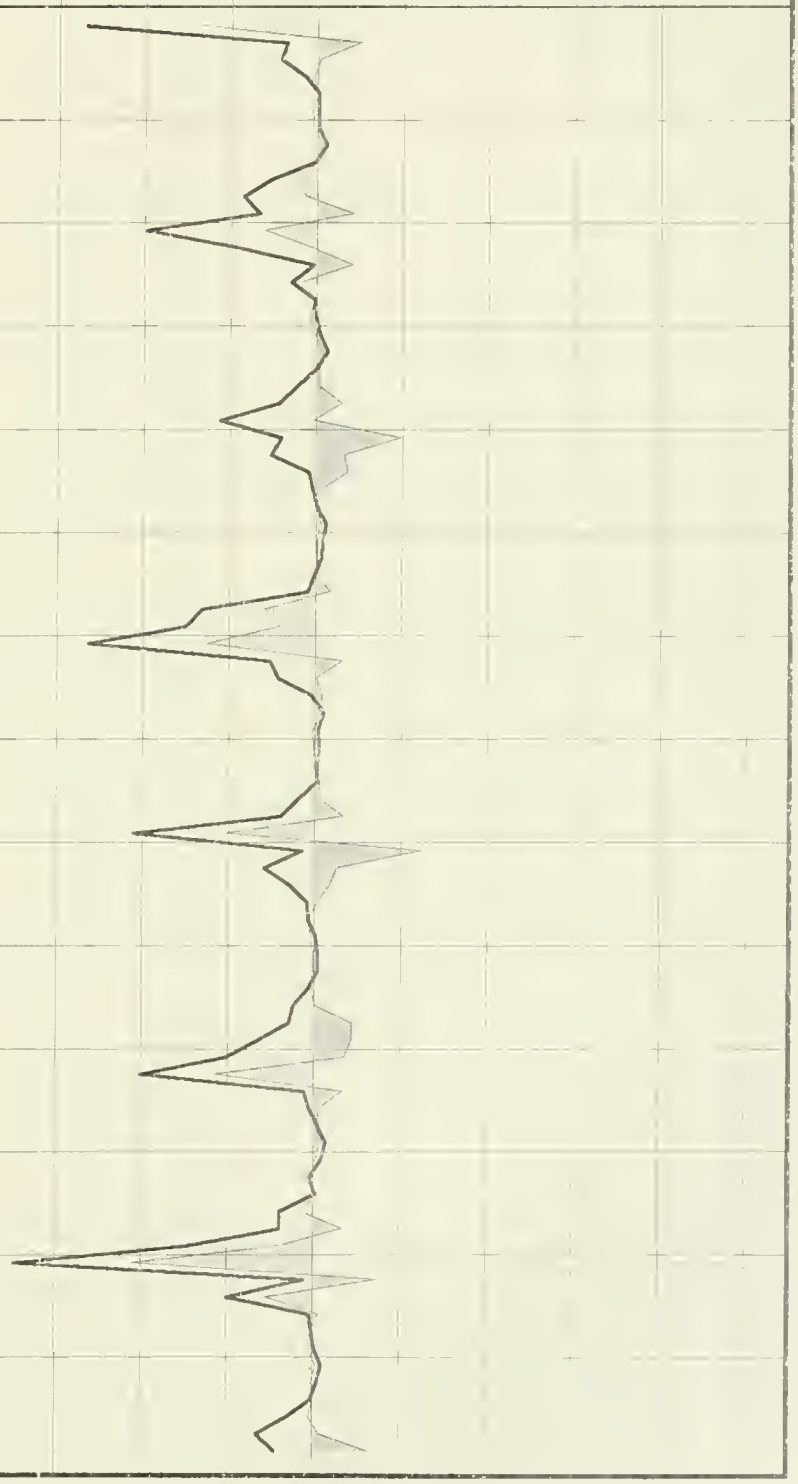
UPWELLING INDEX AT 60N, 149W BY MONTH



MONTH	INDEX	ANOMALY
4601	-24	114
4602	-72	13
4603	-28	18
4604	-9	2
4605	-2	-2
4606	2	-4
4607	0	-6
4608	5	1
4609	-16	-13
4610	15	40
4611	-61	12
4612	-71	37
4701	-63	75
4702	-97	-11
4703	-18	28
4704	-15	-4
4705	-1	-1
4706	0	-6
4707	9	3
4708	6	0
4709	-1	2
4710	-43	-17
4711	-28	45
4712	-15	93
4801	-31	108
4802	-84	2
4803	-31	15
4804	-25	-14
4805	-3	-3
4806	7	0
4807	13	7
4808	5	-0
4809	-0	3
4810	-8	17
4811	-73	0
4812	-39	69
4901	-13	125
4902	-79	7
4903	-7	38
4904	-20	-8
4905	0	0
4906	7	0
4907	3	-2
4908	2	-4
4909	-2	1
4910	-8	17
4911	-49	24
4912	-63	46
5001	-42	96
5002	-383	-298
5003	-38	8
5004	-26	-15
5005	-3	-3
5006	-0	-7
5007	-0	-6
5008	-1	-7
5009	-3	0
5010	-21	4
5011	-164	-91
5012	-90	19
5101	-127	12
5102	-16	70
5103	-76	-30
5104	-1	10
5105	0	-0
5106	10	4
5107	4	-2
5108	9	4
5109	-8	-5
5110	-28	-3
5111	-52	21
5112	-24	85
5201	-205	-67
5202	-69	17
5203	-15	30
5204	-8	4
5205	-1	-1
5206	3	-3
5207	10	4
5208	0	-5
5209	-9	-6
5210	-15	11
5211	-28	46
5212	-113	-5

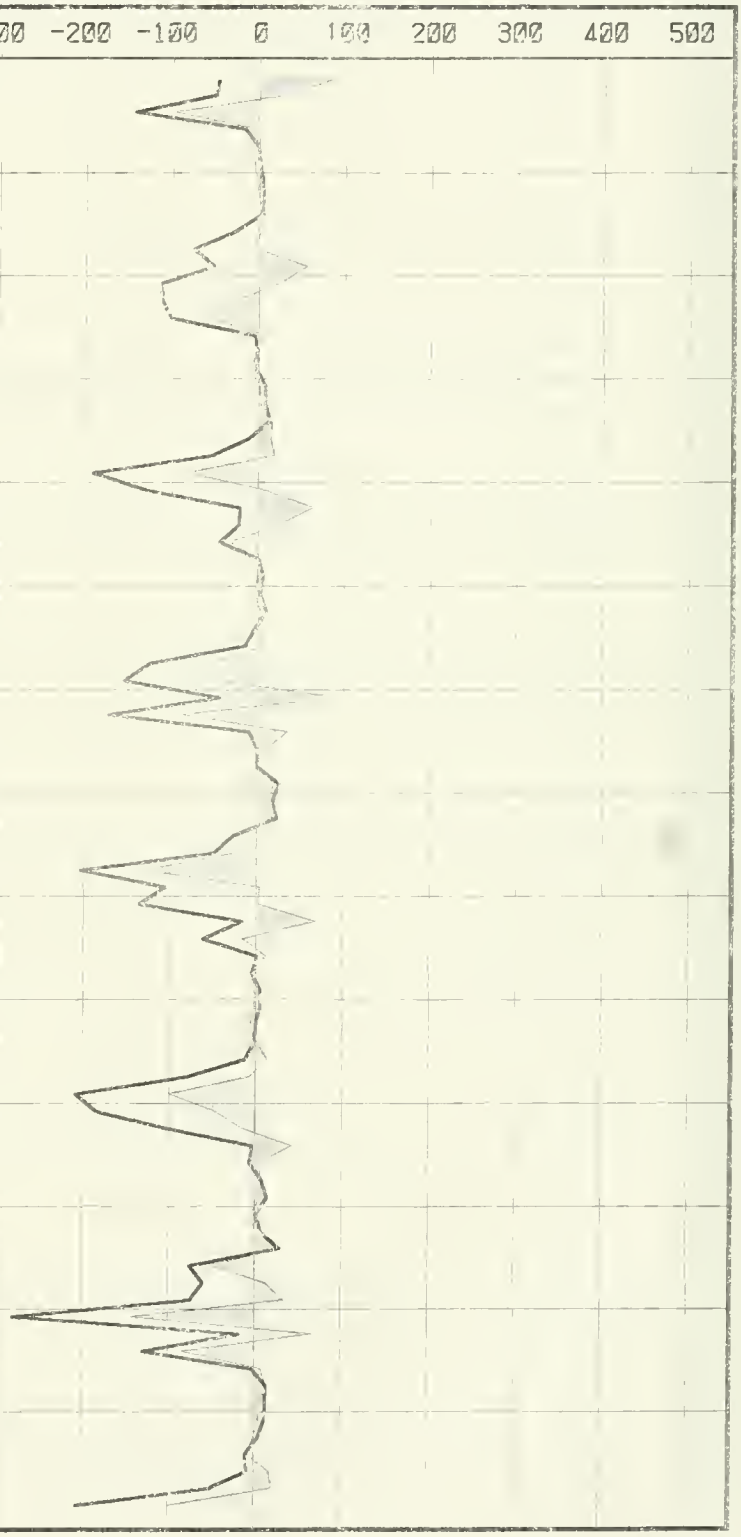
UPWELLING INDEX AT 60N, 149W BY MONTH

MONTH	INDEX	ANOMALY
5301	-273	-135
5302	-36	50
5303	-43	3
5304	-15	-4
5305	1	0
5306	1	-5
5307	1	-5
5308	10	5
5309	-3	1
5310	-54	-29
5311	-86	-13
5312	-67	42
5401	-199	-61
5402	-93	-7
5403	-4	41
5404	-30	-18
5405	-3	-3
5406	-2	-8
5407	3	-3
5408	12	7
5409	-1	3
5410	-23	3
5411	-44	29
5412	-112	-3
5501	-41	98
5502	-53	32
5503	-9	36
5504	-5	7
5505	0	-0
5506	11	5
5507	7	1
5508	6	1
5509	-2	1
5510	-10	16
5511	-132	-59
5512	-151	-42
5601	-264	-126
5602	-54	31
5603	-44	1
5604	-5	7
5605	9	9
5606	3	-3
5607	4	-2
5608	2	-3
5609	2	5
5610	-20	6
5611	-40	33
5612	-211	-103
5701	-15	123
5702	-59	26
5703	-29	17
5704	-9	3
5705	-8	-8
5706	1	-5
5707	3	-2
5708	3	-2
5709	-8	-5
5710	-25	1
5711	-30	43
5712	-66	43
5801	-103	35
5802	-202	-116
5803	-12	33
5804	-6	6
5805	4	3
5806	13	7
5807	8	2
5808	-5	-11
5809	1	4
5810	-40	-15
5811	-40	33
5812	-148	-40
5901	-348	-210
5902	-12	74
5903	-101	-55
5904	-5	6
5905	-2	-2
5906	1	-6
5907	9	3
5908	4	-2
5909	-3	0
5910	-31	-5
5911	-66	7
5912	-45	64



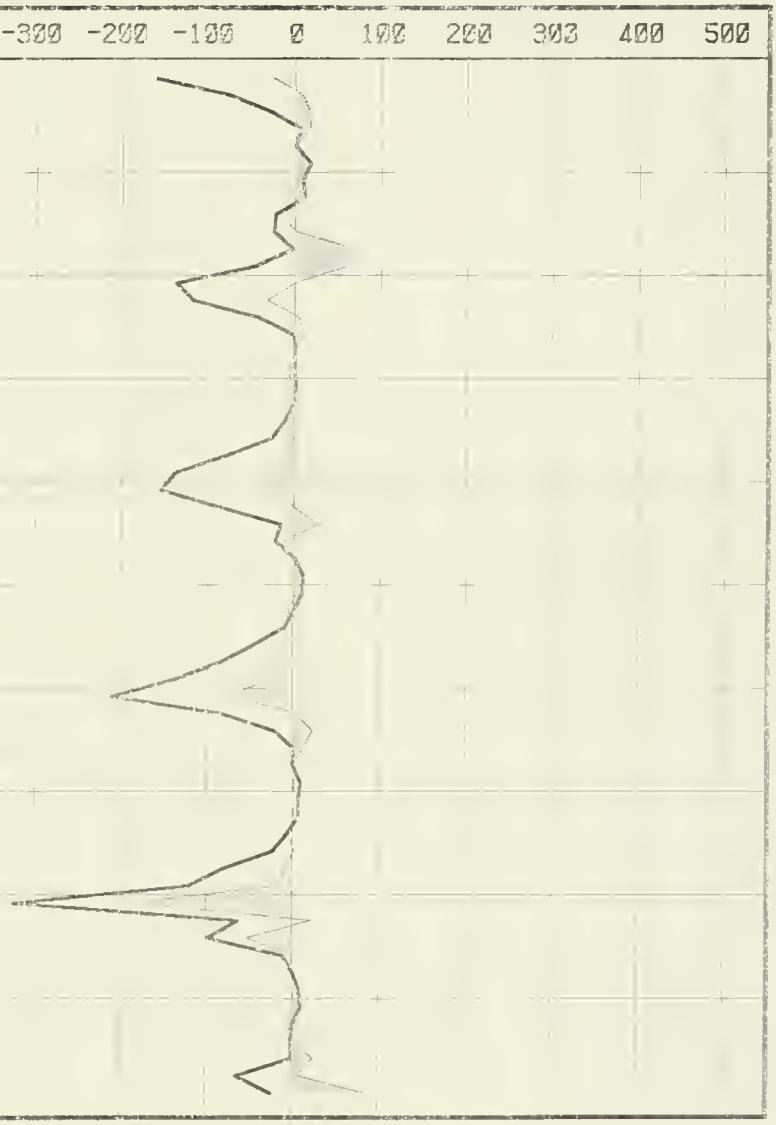
UPWELLING INDEX AT 60N, 149W BY MONTH

MONTH	INDEX	ANOMALY
6001	-48	90
6002	-50	36
6003	-144	-98
6004	-18	-6
6005	-2	-2
6006	0	-5
6007	3	-3
6008	4	-1
6009	2	5
6010	-29	-4
6011	-76	-3
6012	-53	55
6101	-114	24
6102	-113	-27
6103	-102	-57
6104	-5	6
6105	-3	-3
6106	-3	-9
6107	7	1
6108	7	2
6109	12	15
6110	-12	14
6111	-55	18
6112	-192	-83
6201	-130	8
6202	-22	64
6203	-23	23
6204	-45	-33
6205	0	0
6206	5	-1
6207	2	-4
6208	9	3
6209	-4	-1
6210	-15	11
6211	-125	-52
6212	-155	-46
6301	-44	94
6302	-172	-87
6303	-19	35
6304	-1	10
6305	-1	-2
6306	25	19
6307	17	12
6308	22	17
6309	-28	-25
6310	-50	-24
6311	-204	-131
6312	-106	3
6401	-136	2
6402	-17	68
6403	-62	-16
6404	-0	11
6405	-5	-5
6406	4	-2
6407	4	-2
6408	-1	-7
6409	-2	1
6410	-13	13
6411	-80	-7
6412	-209	-100
6501	-185	-47
6502	-101	-15
6503	-4	42
6504	-7	5
6505	7	7
6506	13	6
6507	0	-5
6508	6	0
6509	27	30
6510	-76	-51
6511	-61	12
6512	-76	33
6601	-281	-143
6602	-19	66
6603	-130	-84
6604	-4	7
6605	13	13
6606	12	6
6607	11	5
6608	4	-1
6609	-11	-8
6610	-9	17
6611	-53	20
6612	-207	-99



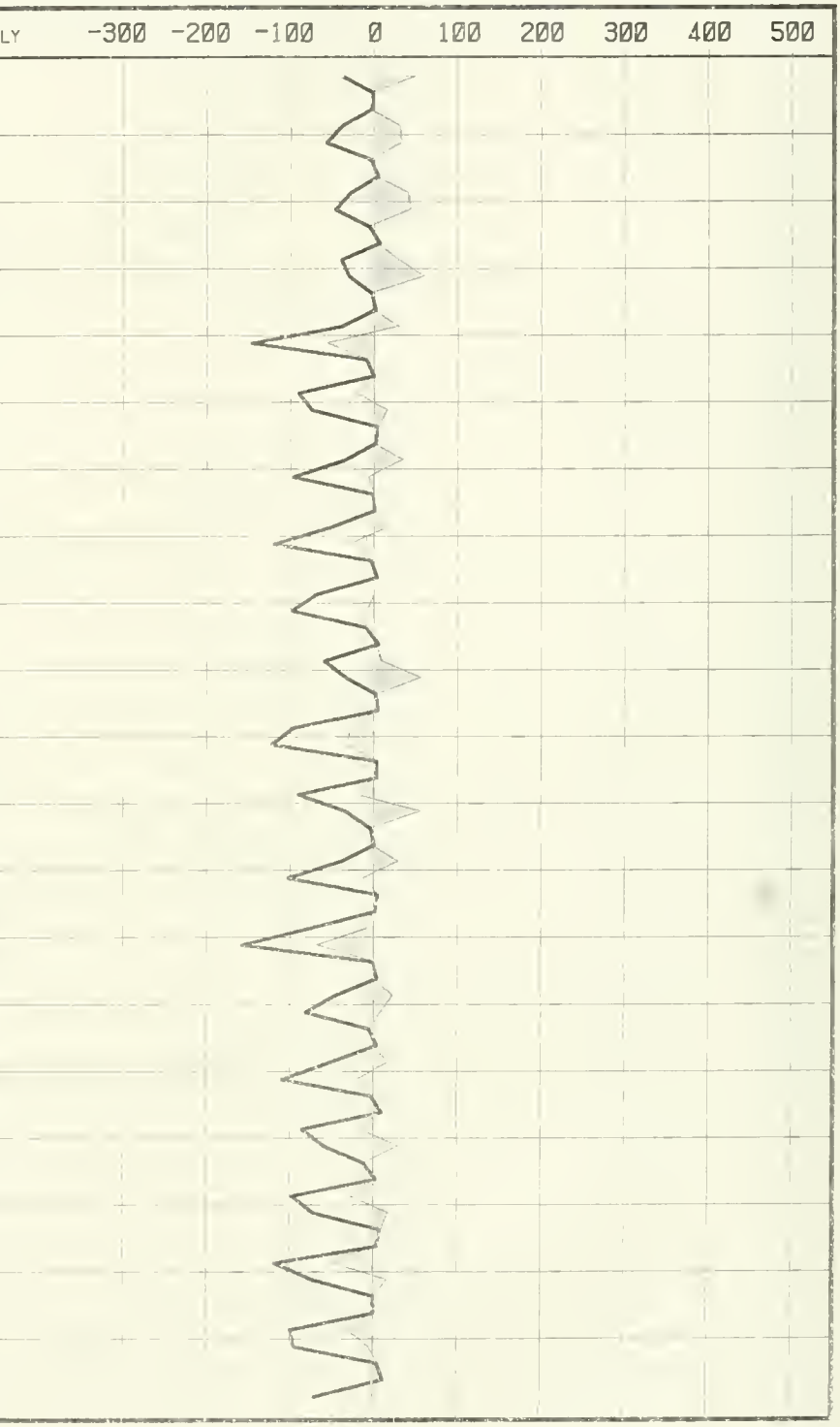
UPWELLING INDEX AT 60N, 149W BY MONTH

MONTH	INDEX	ANOMALY
6701	-165	-27
6702	-78	7
6703	-29	16
6704	5	17
6705	-0	-0
6706	17	11
6707	8	3
6708	11	6
6709	-23	-20
6710	-25	1
6711	-3	70
6712	-47	62
6801	-138	-0
6802	-118	-32
6803	-41	5
6804	-1	11
6805	-0	-0
6806	0	-6
6807	[illegible]	-5
6808	-1	-6
6809	-12	-9
6810	-27	-2
6811	-79	-6
6812	-138	-29
6901	-155	-17
6902	-86	-1
6903	-15	29
6904	-22	-11
6905	-0	-0
6906	10	3
6907	9	3
6908	-0	-6
6909	-11	-8
6910	-46	-20
6911	-85	-12
6912	-139	-30
7001	-211	-72
7002	-84	2
7003	-23	22
7004	0	12
7005	-1	-1
7006	8	1
7007	6	0
7008	6	1
7009	-7	-4
7010	-24	1
7011	-82	-9
7012	-122	-13
7101	-324	-185
7102	-64	22
7103	-99	-53
7104	-12	-1
7105	0	0
7106	7	0
7107	9	3
7108	0	-5
7109	-2	2
7110	-2	24
7111	-66	7
7112	-25	83



UPWELLING INDEX AT 60N, 149W BY QUARTER

QTR.	INDEX	ANOMALY
4601	-40	50
4602	-3	-1
4603	-3	-6
4604	-39	30
4701	-58	32
4702	-5	-4
4703	4	2
4704	-29	40
4801	-47	43
4802	-7	-6
4803	6	3
4804	-40	29
4901	-31	59
4902	-4	-3
4903	1	-2
4904	-40	29
5001	-147	-57
5002	-10	-8
5003	-1	-4
5004	-91	-22
5101	-75	15
5102	3	5
5103	2	-1
5104	-35	34
5201	-97	-7
5202	-2	-0
5203	0	-2
5204	-52	17
5301	-120	-30
5302	-4	-3
5303	3	0
5304	-69	0
5401	-99	-9
5402	-11	-10
5403	5	2
5404	-60	9
5501	-34	56
5502	2	4
5503	4	1
5504	-97	-28
5601	-123	-33
5602	3	4
5603	3	-0
5604	-91	-22
5701	-34	56
5702	-5	-4
5703	-0	-3
5704	-40	29
5801	-103	-13
5802	4	5
5803	1	-1
5804	-77	-8
5901	-158	-68
5902	-2	-0
5903	3	0
5904	-47	22
6001	-82	8
6002	-6	-5
6003	3	0
6004	-53	17
6101	-110	-20
6102	-4	-2
6103	9	6
6104	-86	-17
6201	-50	30
6202	-13	-11
6203	2	-0
6204	-98	-29
6301	-73	17
6302	7	9
6303	4	1
6304	-119	-50
6401	-74	16
6402	-1	1
6403	0	-2
6404	-100	-31
6501	-95	-6
6502	4	6
6503	11	8
6504	-71	-2

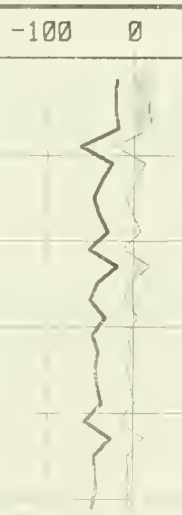


UPWELLING INDEX AT 60N, 149W BY QUARTER

QTR.	INDEX	ANOMALY
6601	-147	-57
6602	7	9
6603	1	-1
6604	-90	-21
6701	-91	-1
6702	7	9
6703	-1	-4
6704	-25	44
6801	-98	-8
6802	-0	1
6803	-4	-7
6804	-81	-12
6901	-86	4
6902	-4	-3
6903	-1	-3
6904	-90	-21
7001	-107	-17
7002	2	4
7003	2	-1
7004	-76	-7
7101	-166	-75
7102	-2	-0
7103	2	-0
7104	-31	38

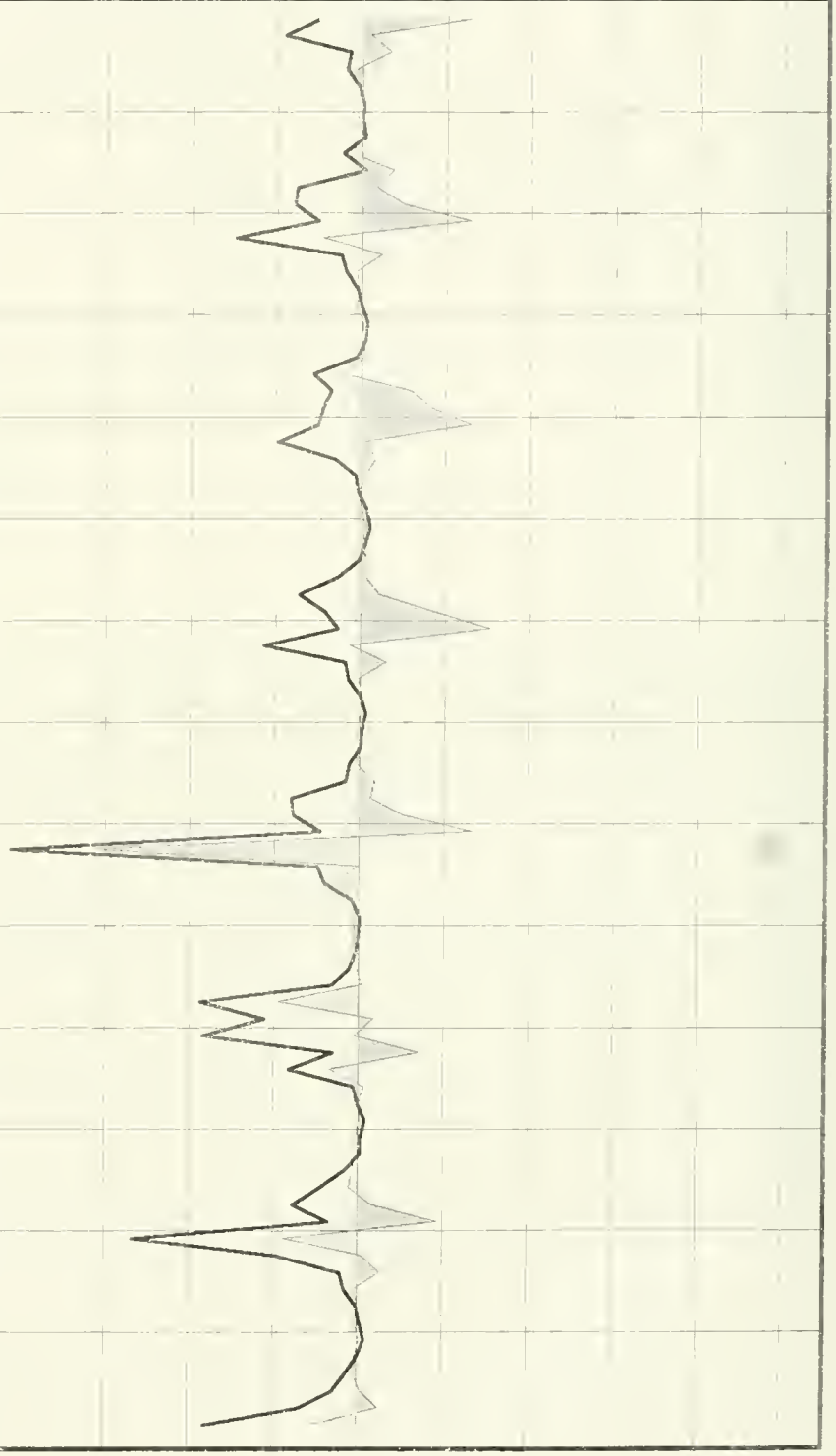
UPWELLING INDEX AT 60N, 149W BY YEAR

YEAR	INDEX	ANOMALY
1946	-21	18
1947	-22	18
1948	-22	17
1949	-19	21
1950	-62	-23
1951	-26	13
1952	-38	2
1953	-47	-8
1954	-41	-2
1955	-31	8
1956	-52	-13
1957	-20	19
1958	-43	-4
1959	-51	-11
1960	-34	5
1961	-48	-8
1962	-42	-3
1963	-45	-6
1964	-43	-4
1965	-38	1
1966	-57	-18
1967	-27	12
1968	-46	-7
1969	-45	-6
1970	-44	-5
1971	-48	-9



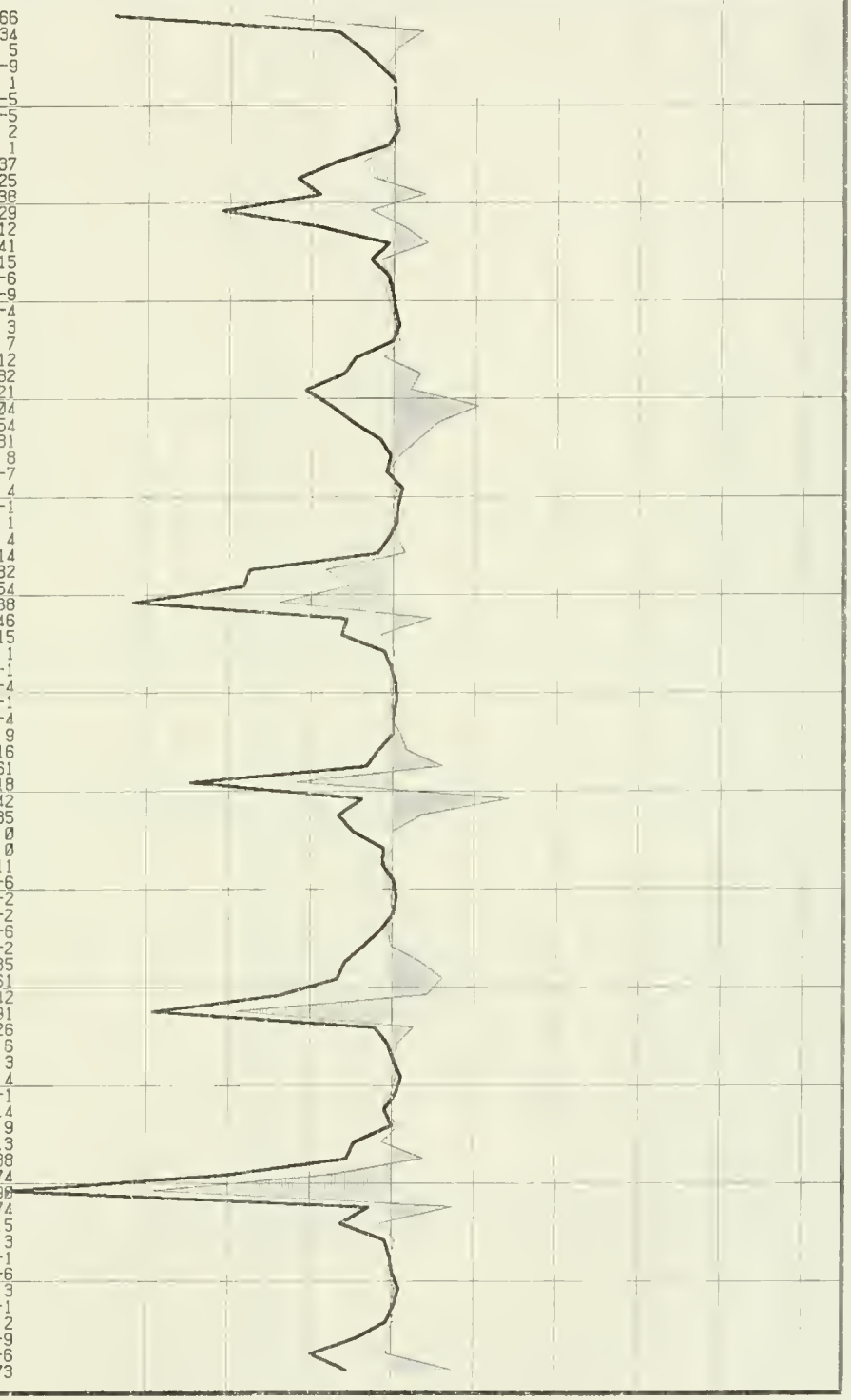
UPWELLING INDEX AT 60N, 146W BY MONTH

MONTH	INDEX	ANOMALY
4601	-51	129
4602	-92	10
4603	-15	33
4604	-19	-7
4605	-5	-3
4606	1	-5
4607	-0	-6
4608	3	-0
4609	-23	-13
4610	3	37
4611	-77	17
4612	-80	49
4701	-52	128
4702	-149	-46
4703	-25	23
4704	-19	-7
4705	-6	-4
4706	-1	-7
4707	6	1
4708	4	0
4709	-5	5
4710	-57	-23
4711	-36	58
4712	-46	83
4801	-51	129
4802	-98	5
4803	-31	17
4804	-7	5
4805	-4	-3
4806	6	-0
4807	10	5
4808	5	2
4809	-3	6
4810	-28	6
4811	-73	21
4812	-43	86
4901	-27	153
4902	-115	-13
4903	-18	30
4904	-15	-3
4905	0	2
4906	6	-0
4907	2	-3
4908	0	-3
4909	-13	-4
4910	-17	17
4911	-81	13
4912	-79	50
5001	-47	133
5002	-412	-309
5003	-50	-2
5004	-42	-30
5005	-9	-7
5006	-0	-7
5007	-1	-6
5008	-4	-7
5009	-12	-3
5010	-32	3
5011	-188	-95
5012	-112	17
5101	-185	-5
5102	-31	71
5103	-83	-35
5104	-7	6
5105	-2	-0
5106	7	1
5107	2	-3
5108	2	-1
5109	-17	-8
5110	-46	-11
5111	-78	16
5112	-36	93
5201	-268	-88
5202	-98	4
5203	-22	26
5204	-17	-5
5205	-2	-0
5206	2	-4
5207	7	2
5208	-1	-4
5209	-15	-6
5210	-30	4
5211	-69	24
5212	-182	-53



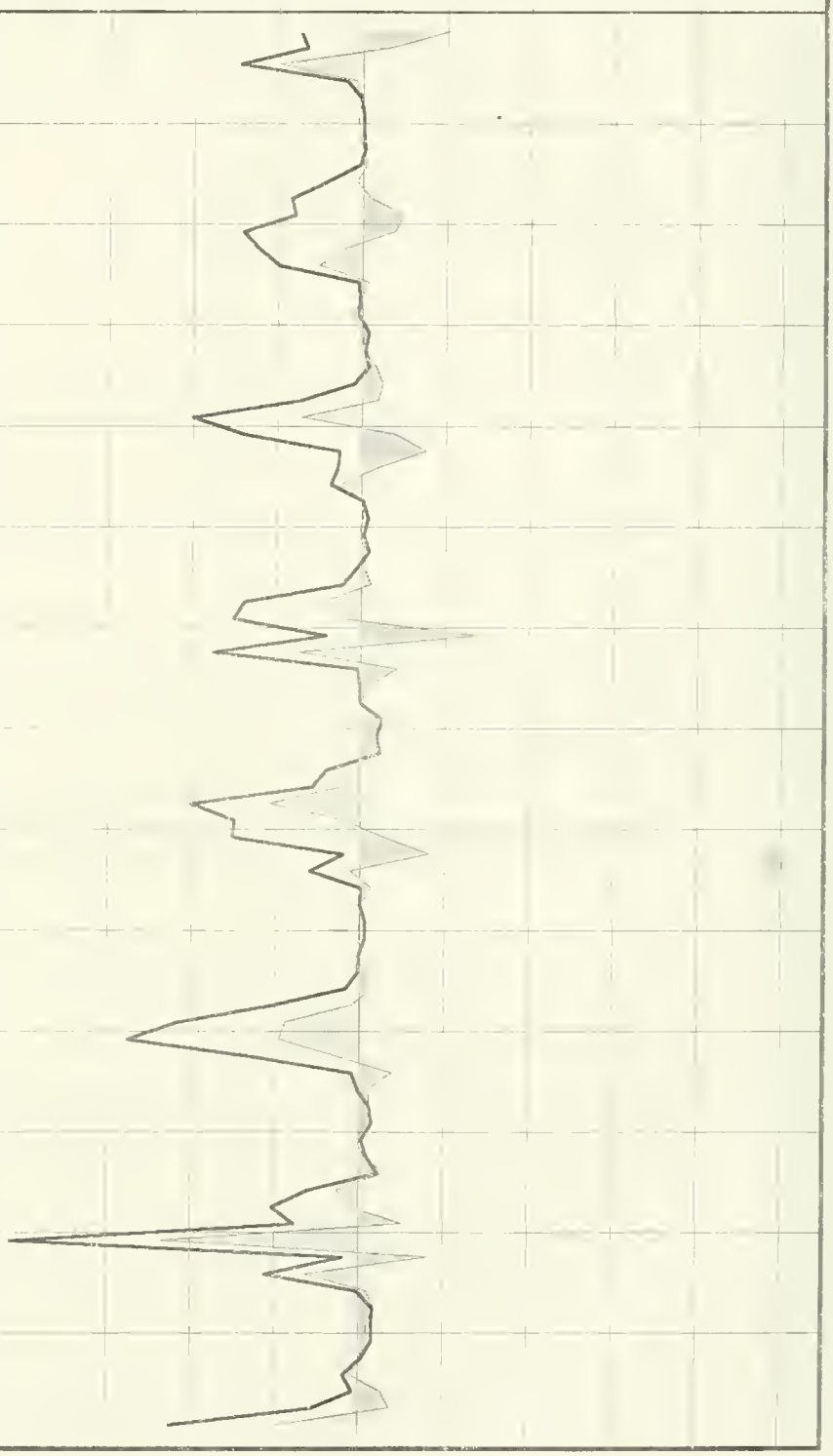
UPWELLING INDEX AT 60N, 146W BY MONTH

MONTH	INDEX	ANOMALY
5301	-346	-166
5302	-69	34
5303	-43	5
5304	-21	-9
5305	-0	1
5306	1	-5
5307	0	-5
5308	5	2
5309	-8	1
5310	-71	-37
5311	-118	-25
5312	-91	38
5401	-209	-29
5402	-91	12
5403	-7	41
5404	-28	-15
5405	-7	-6
5406	-2	-9
5407	1	-4
5408	6	3
5409	-2	7
5410	-47	-12
5411	-61	32
5412	-108	21
5501	-76	104
5502	-49	54
5503	-17	31
5504	-4	8
5505	-9	-7
5506	10	4
5507	5	-1
5508	4	1
5509	-6	4
5510	-20	14
5511	-176	-82
5512	-183	-54
5601	-318	-138
5602	-57	46
5603	-63	-15
5604	-11	1
5605	-3	-1
5606	3	-4
5607	4	-1
5608	-0	-4
5609	-0	9
5610	-18	16
5611	-33	61
5612	-247	-118
5701	-38	142
5702	-67	35
5703	-48	0
5704	-12	0
5705	-13	-11
5706	1	-6
5707	4	-2
5708	1	-2
5709	-15	-6
5710	-36	-2
5711	-59	35
5712	-68	61
5801	-138	42
5802	-293	-191
5803	-22	26
5804	-6	6
5805	1	3
5806	10	4
5807	4	-1
5808	-10	-14
5809	-1	9
5810	-47	-13
5811	-56	38
5812	-202	-74
5901	-470	-290
5902	-29	74
5903	-63	-15
5904	-9	3
5905	-3	-1
5906	0	-6
5907	8	3
5908	2	-1
5909	-7	2
5910	-43	-9
5911	-99	-6
5912	-56	73



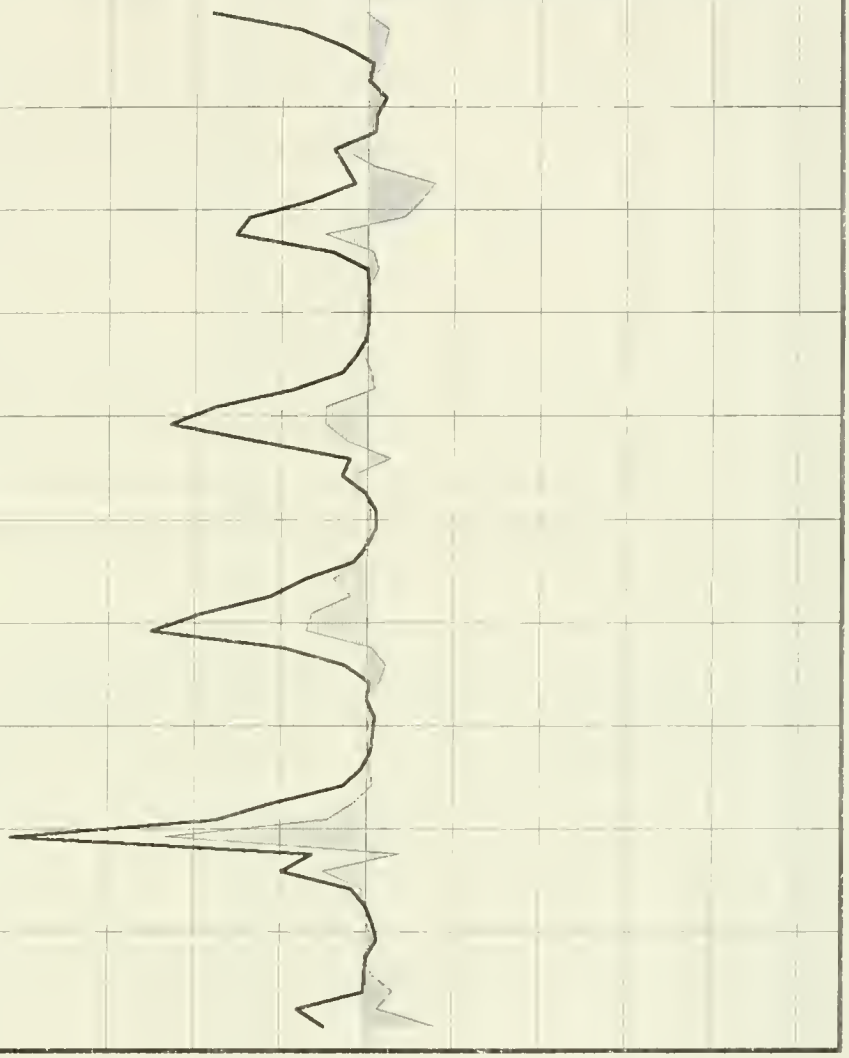
UPWELLING INDEX AT 60N, 146W BY MONTH

MONTH	INDEX	ANOMALY
6001	-75	105
6002	-67	35
6003	-146	-99
6004	-20	-8
6005	-3	-1
6006	0	-6
6007	0	-5
6008	2	-1
6009	-4	5
6010	-42	-8
6011	-85	9
6012	-81	48
6101	-142	38
6102	-124	-21
6103	-100	-52
6104	-5	7
6105	-4	-3
6106	-5	-11
6107	7	2
6108	3	0
6109	7	16
6110	-10	24
6111	-74	19
6112	-201	-72
6201	-140	40
6202	-27	76
6203	-29	19
6204	-37	-25
6205	1	2
6206	7	1
6207	2	-3
6208	8	5
6209	-6	3
6210	-23	11
6211	-139	-46
6212	-152	-23
6301	-42	138
6302	-176	-73
6303	-5	42
6304	-2	10
6305	-2	-1
6306	25	19
6307	18	13
6308	22	19
6309	-41	-32
6310	-58	-23
6311	-202	-108
6312	-150	-21
6401	-153	27
6402	-21	82
6403	-60	-12
6404	0	13
6405	-1	0
6406	5	-1
6407	5	-1
6408	-2	-5
6409	-3	6
6410	-18	16
6411	-105	-11
6412	-218	-89
6501	-276	-96
6502	-131	-28
6503	-10	38
6504	-3	10
6505	11	12
6506	14	8
6507	2	-3
6508	8	5
6509	21	30
6510	-61	-27
6511	-104	-10
6512	-78	51
6601	-415	-235
6602	-20	83
6603	-112	-64
6604	-3	9
6605	16	18
6606	15	9
6607	15	10
6608	3	0
6609	-19	-10
6610	-8	26
6611	-57	37
6612	-225	-96



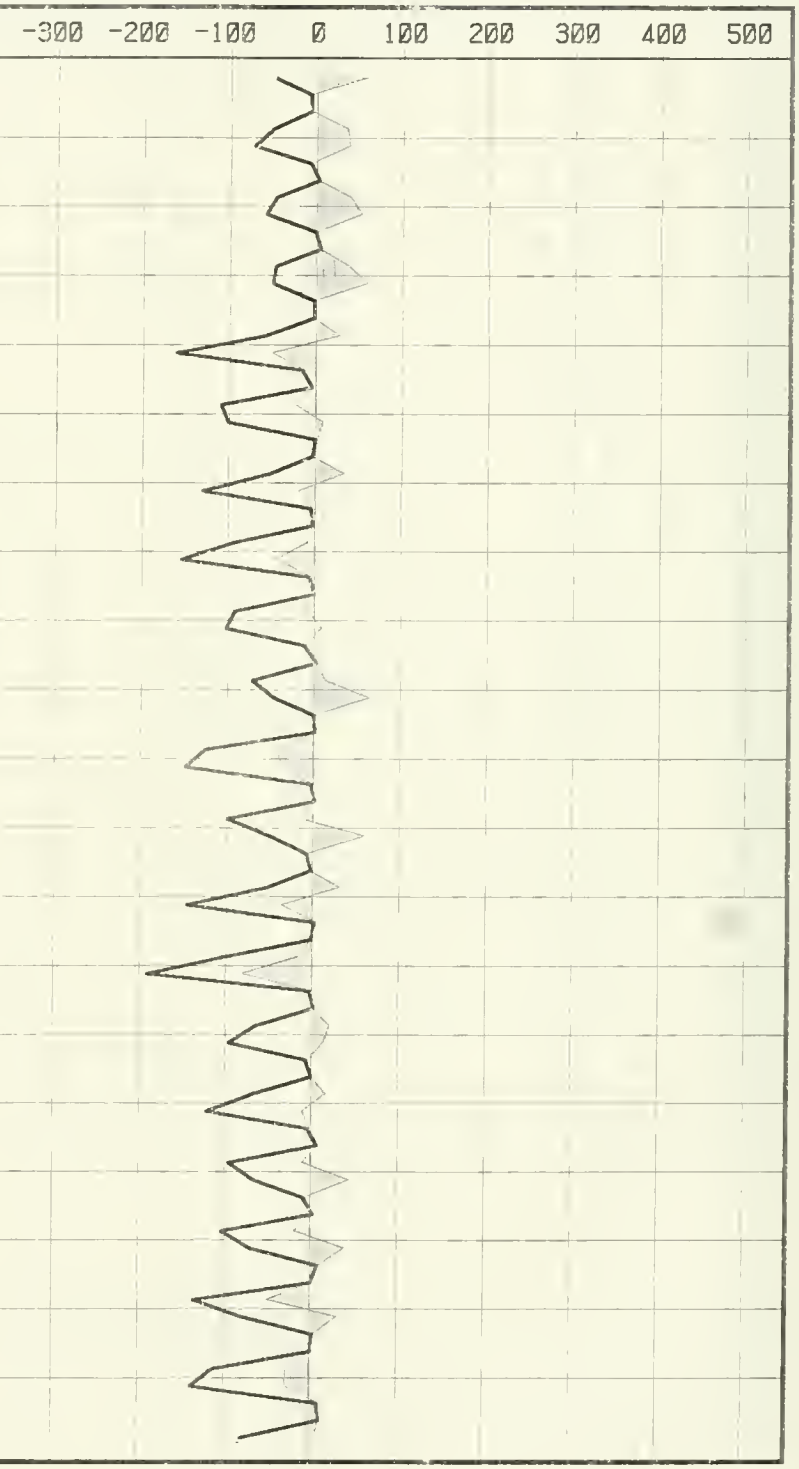
UPWELLING INDEX AT 60N, 146W BY MONTH

MONTH	INDEX	ANOMALY
6701	-185	-4
6702	-80	23
6703	-30	18
6704	5	18
6705	0	2
6706	20	14
6707	9	4
6708	6	5
6709	-40	-31
6710	-28	6
6711	-15	77
6712	-67	62
6801	-138	42
6802	-153	-50
6803	-42	6
6804	-1	12
6805	0	2
6806	1	-5
6807	0	-5
6808	-2	-5
6809	-14	-5
6810	-30	4
6811	-87	7
6812	-177	-48
6901	-229	-49
6902	-126	-24
6903	-21	27
6904	-30	-18
6905	-3	-1
6906	9	3
6907	9	4
6908	-1	-4
6909	-17	-8
6910	-74	-40
6911	-114	-20
6912	-194	-65
7001	-251	-71
7002	-97	5
7003	-27	21
7004	2	14
7005	-1	1
7006	8	2
7007	6	0
7008	4	1
7009	-7	3
7010	-28	6
7011	-109	-15
7012	-175	-46
7101	-413	-233
7102	-64	38
7103	-99	-51
7104	-19	-7
7105	-2	0
7106	6	0
7107	11	6
7108	-1	-4
7109	-3	6
7110	-4	30
7111	-81	13
7112	-50	79



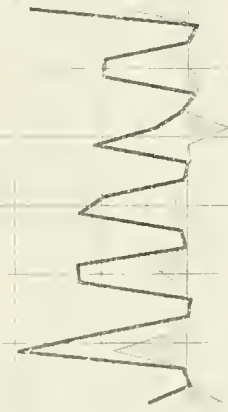
UPWELLING INDEX AT 60N, 146W BY QUARTER

QTR.	INDEX	ANOMALY
4601	-51	59
4602	-8	-5
4603	-7	-6
4604	-51	35
4701	-73	38
4702	-8	-6
4703	2	2
4704	-47	39
4801	-59	52
4802	-2	1
4803	4	4
4804	-48	38
4901	-51	59
4902	-3	-1
4903	-3	-3
4904	-59	27
5001	-162	-51
5002	-17	-14
5003	-5	-5
5004	-110	-24
5101	-102	8
5102	-1	2
5103	-4	-4
5104	-53	33
5201	-131	-20
5202	-6	-3
5203	-3	-3
5204	-94	-9
5301	-155	-45
5302	-7	-4
5303	-1	-1
5304	-93	-8
5401	-103	8
5402	-12	-10
5403	2	2
5404	-72	13
5501	-47	64
5502	-1	2
5503	1	1
5504	-126	-40
5601	-149	-39
5602	-4	-1
5603	1	1
5604	-100	-14
5701	-50	60
5702	-8	-6
5703	-3	-3
5704	-54	31
5801	-146	-35
5802	1	4
5803	-2	-2
5804	-102	-17
5901	-192	-82
5902	-4	-1
5903	1	1
5904	-66	20
6001	-97	13
6002	-8	-5
6003	-1	-1
6004	-69	16
6101	-122	-11
6102	-5	-2
6103	6	6
6104	-96	-10
6201	-67	44
6202	-10	-7
6203	2	2
6204	-104	-19
6301	-71	39
6302	7	9
6303	0	0
6304	-136	-50
6401	-80	31
6402	1	4
6403	-0	-0
6404	-114	-28
6501	-139	-29
6502	7	10
6503	10	10
6504	-81	5



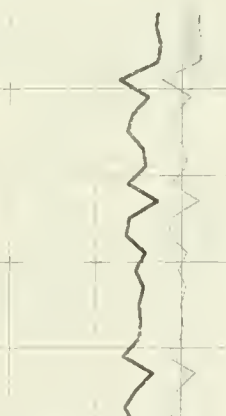
UPWELLING INDEX AT 60N, 146W BY QUARTER

QTR.	INDEX	ANOMALY
6601	-188	-77
6602	9	12
6603	0	0
6604	-97	-12
6701	-99	12
6702	8	11
6703	-7	-7
6704	-38	48
6801	-109	1
6802	0	3
6803	-5	-5
6804	-98	-13
6901	-126	-15
6902	-8	-6
6903	-3	-3
6904	-128	-42
7001	-126	-16
7002	3	6
7003	1	1
7004	-104	-18
7101	-196	-86
7102	-5	-2
7103	3	3
7104	-44	41



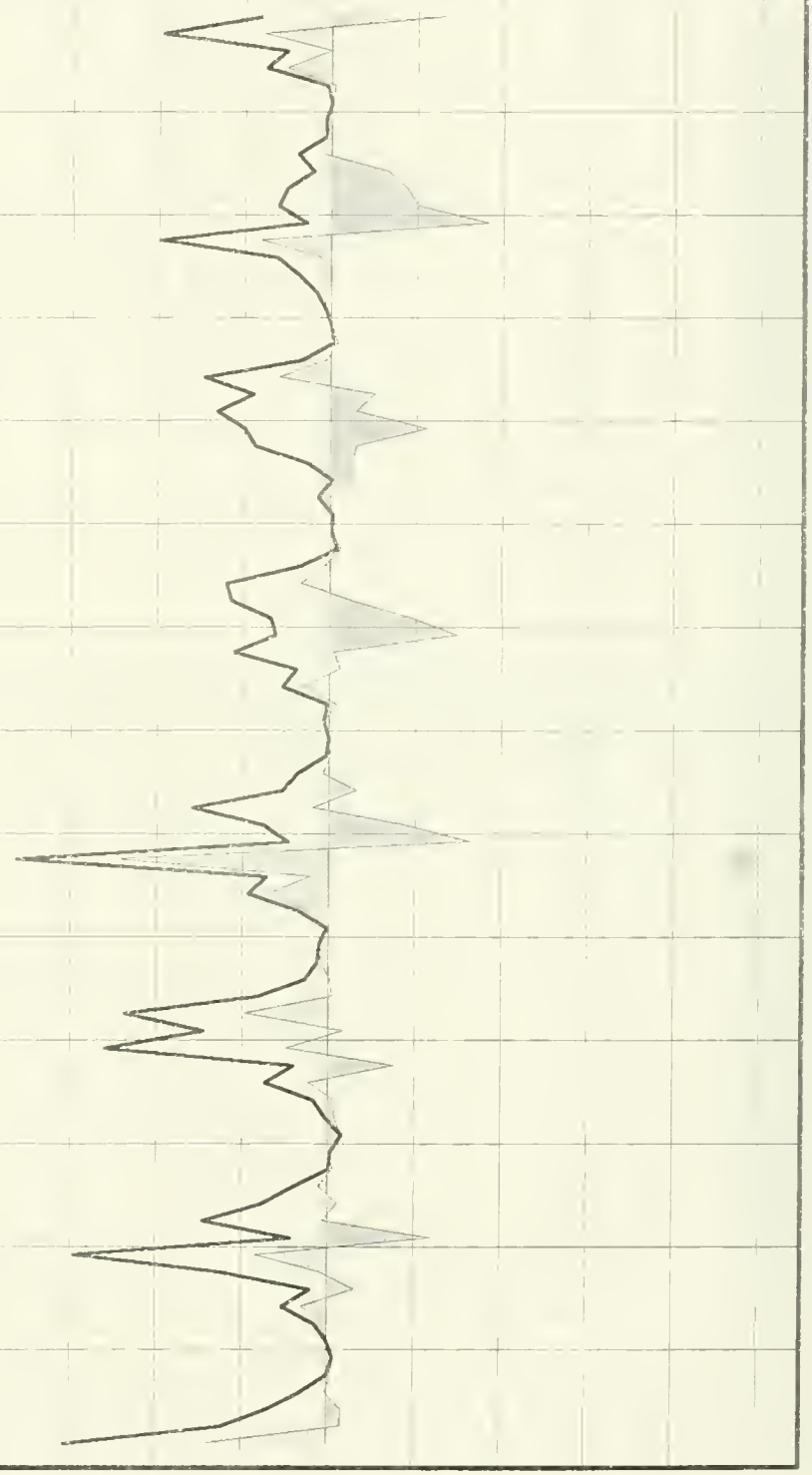
UPWELLING INDEX AT 60N, 146W BY YEAR

YEAR	INDEX	ANOMALY
1946	-29	20
1947	-31	18
1948	-26	24
1949	-29	20
1950	-73	-24
1951	-42	10
1952	-58	-9
1953	-64	-14
1954	-46	3
1955	-43	6
1956	-63	-13
1957	-29	20
1958	-62	-13
1959	-65	-15
1960	-43	6
1961	-54	-4
1962	-45	5
1963	-50	-1
1964	-48	1
1965	-50	-1
1966	-68	-19
1967	-34	16
1968	-53	-4
1969	-66	-16
1970	-56	-7
1971	-60	-11

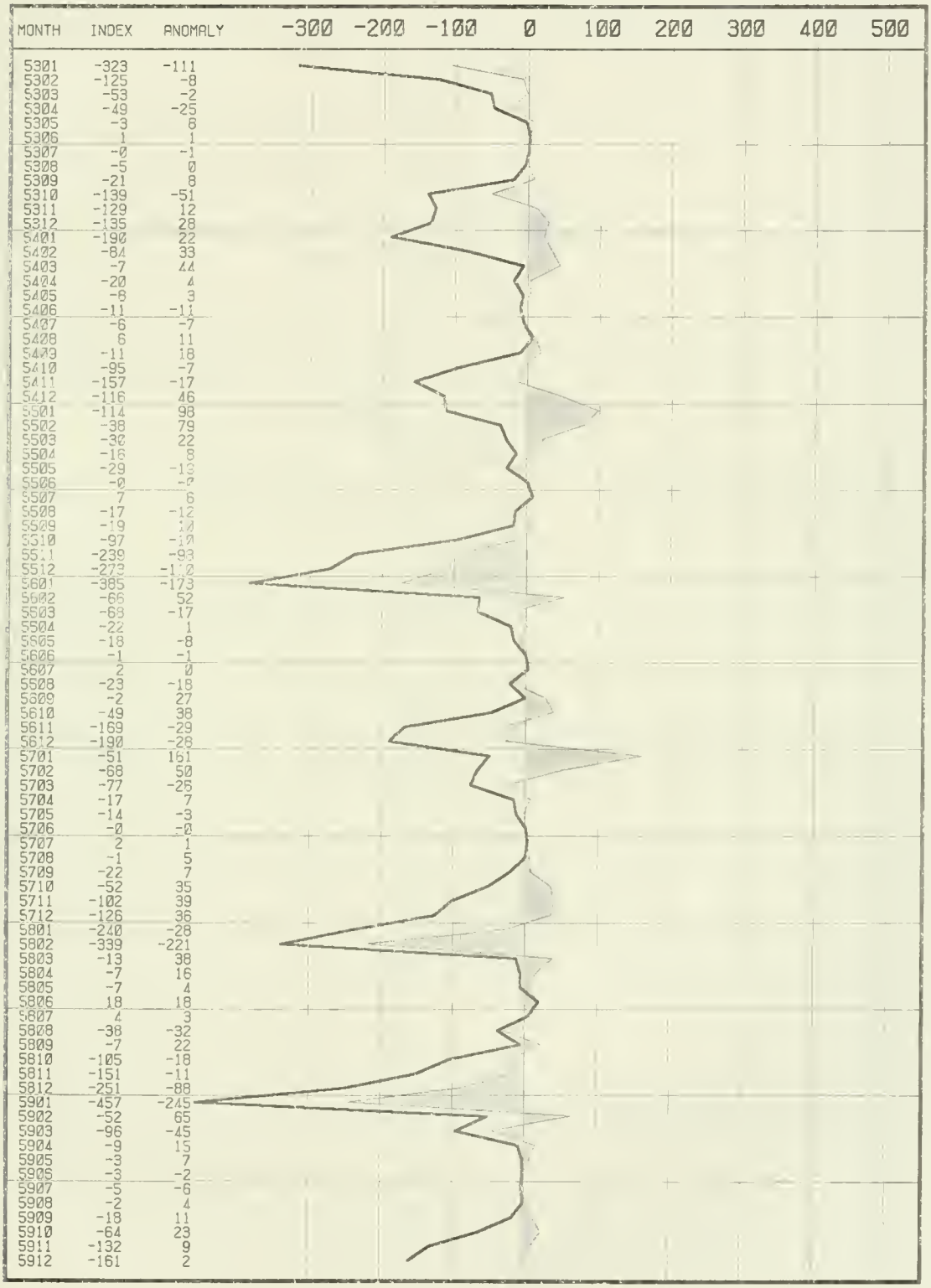


UPWELLING INDEX AT 57N, 137W BY MONTH

MONTH	INDEX	ANOMALY
4601	-80	132
4602	-196	-78
4603	-52	-1
4604	-76	-52
4605	-6	4
4606	0	0
4607	-7	-8
4608	-7	-1
4609	-39	-10
4610	-21	66
4611	-52	88
4612	-62	101
4701	-29	183
4702	-198	-81
4703	-63	-12
4704	-38	-14
4705	-18	-7
4706	-7	-7
4707	-0	-1
4708	2	8
4709	-34	-5
4710	-147	-60
4711	-90	51
4712	-132	30
4801	-100	112
4802	-88	30
4803	-27	24
4804	1	25
4805	-15	-5
4806	2	3
4807	1	-0
4808	7	12
4809	-36	-7
4810	-121	-34
4811	-115	25
4812	-69	94
4901	-64	148
4902	-112	5
4903	-39	12
4904	-55	-31
4905	-3	7
4906	-7	-6
4907	-1	-3
4908	-4	2
4909	-37	-8
4910	-55	32
4911	-159	-19
4912	-77	86
5001	-48	164
5002	-363	-245
5003	-73	-22
5004	-94	-70
5005	-36	-25
5006	-3	-3
5007	-12	-13
5008	-14	-9
5009	-28	1
5010	-83	4
5011	-237	-97
5012	-146	17
5101	-260	-49
5102	-41	76
5103	-74	-23
5104	-18	6
5105	-4	7
5106	15	15
5107	2	1
5108	-0	5
5109	-40	-11
5110	-77	11
5111	-146	-6
5112	-44	119
5201	-296	-84
5202	-126	-9
5203	-21	31
5204	-53	-30
5205	-16	-5
5206	-1	-1
5207	6	5
5208	-1	4
5209	-32	-2
5210	-72	16
5211	-125	15
5212	-307	-144



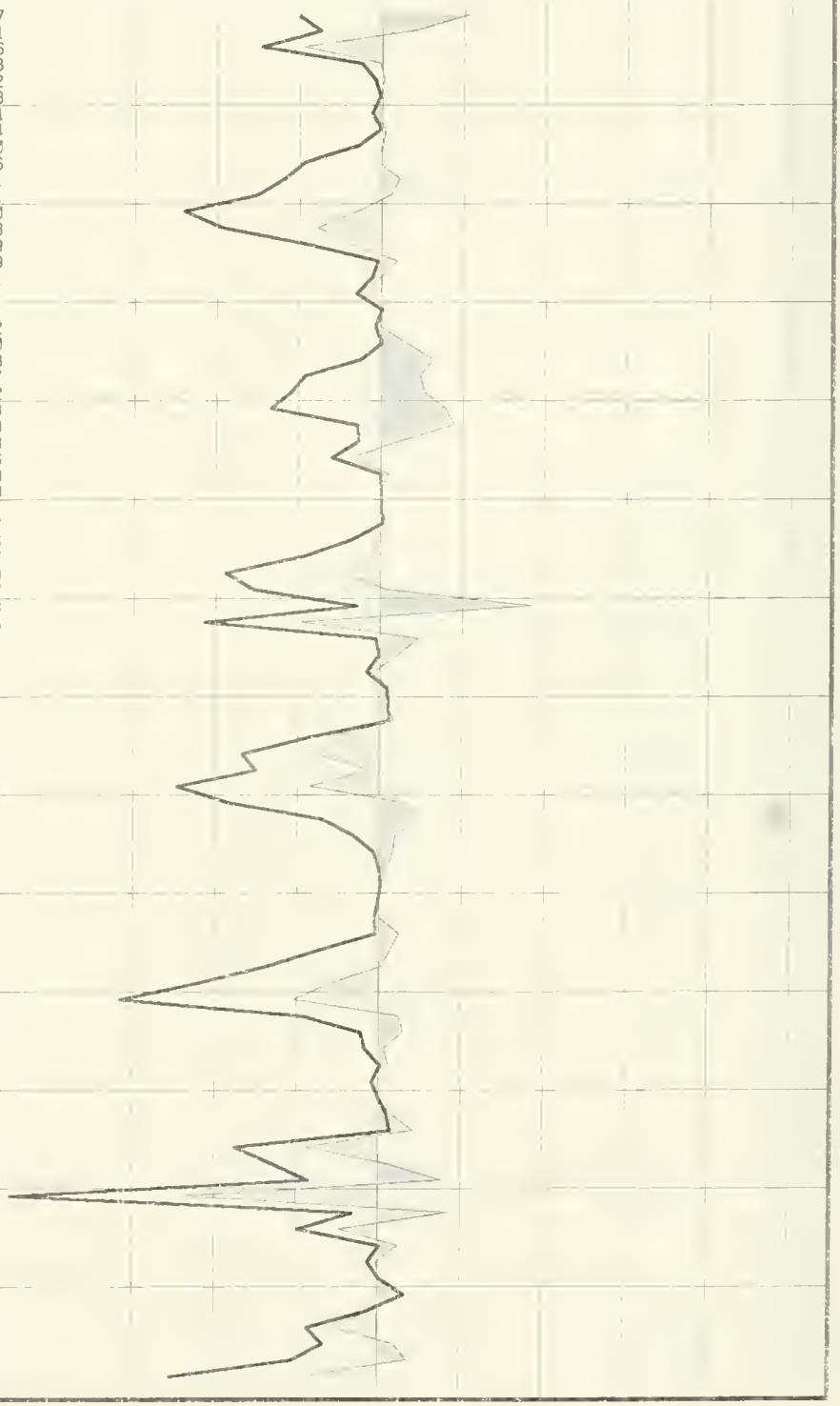
UPWELLING INDEX AT 57N, 137W BY MONTH



MONTH	INDEX	ANOMALY
5301	-323	-111
5302	-125	-8
5303	-53	-2
5304	-49	-25
5305	-3	8
5306	1	1
5307	-0	-1
5308	-5	0
5309	-21	8
5310	-139	-51
5311	-129	12
5312	-135	28
5401	-190	22
5402	-84	33
5403	-7	44
5404	-20	4
5405	-8	3
5406	-11	-11
5407	-6	-7
5408	6	11
5409	-11	18
5410	-95	-7
5411	-157	-17
5412	-116	46
5501	-114	98
5502	-38	79
5503	-30	22
5504	-16	8
5505	-29	-13
5506	-0	-9
5507	7	6
5508	-17	-12
5509	-19	10
5510	-97	-19
5511	-239	-93
5512	-273	-170
5601	-385	-173
5602	-66	52
5603	-68	-17
5604	-22	1
5605	-18	-8
5606	-1	-1
5607	2	0
5608	-23	-16
5609	-2	27
5610	-49	38
5611	-169	-29
5612	-190	-28
5701	-51	161
5702	-68	50
5703	-77	-26
5704	-17	7
5705	-14	-3
5706	-0	-0
5707	2	1
5708	-1	5
5709	-22	7
5710	-52	35
5711	-102	39
5712	-126	36
5801	-240	-28
5802	-339	-221
5803	-13	38
5804	-7	16
5805	-7	4
5806	18	18
5807	4	3
5808	-38	-32
5809	-7	22
5810	-105	-18
5811	-151	-11
5812	-251	-88
5901	-457	-245
5902	-52	65
5903	-96	-45
5904	-9	15
5905	-3	7
5906	-3	-2
5907	-5	-6
5908	-2	4
5909	-18	11
5910	-64	23
5911	-132	9
5912	-161	2

UPWELLING INDEX AT 57N, 137W BY MONTH

MONTH	INDEX	ANOMALY
6001	-124	107
6002	-76	41
6003	-147	-96
6004	-26	-3
6005	-9	2
6006	-3	-3
6007	-13	-14
6008	-2	4
6009	-29	-0
6010	-94	-6
6011	-119	21
6012	-152	11
6101	-241	-30
6102	-195	-78
6103	-90	-39
6104	-5	19
6105	-12	-1
6106	-31	-31
6107	-0	-1
6108	-8	-2
6109	0	30
6110	-25	63
6111	-93	47
6112	-110	52
6201	-134	78
6202	-29	89
6203	-28	23
6204	-60	-36
6205	-1	9
6206	0	0
6207	0	-1
6208	1	7
6209	-36	-6
6210	-94	-7
6211	-189	-49
6212	-155	7
6301	-29	183
6302	-214	-96
6303	-6	46
6304	-2	22
6305	-17	-7
6306	8	8
6307	9	8
6308	10	16
6309	-89	-60
6310	-168	-80
6311	-152	-11
6312	-247	-85
6401	-185	27
6402	-70	47
6403	-32	19
6404	-8	16
6405	-1	10
6406	1	1
6407	-2	-3
6408	-6	-1
6409	-5	24
6410	-74	13
6411	-138	3
6412	-221	-58
6501	-316	-104
6502	-93	24
6503	-23	29
6504	-18	6
6505	1	11
6506	-9	-9
6507	-1	-2
6508	9	15
6509	13	42
6510	-176	-89
6511	-130	10
6512	-86	77
6601	-449	-237
6602	-32	86
6603	-98	-47
6604	1	24
6605	-13	-2
6606	1	1
6607	31	29
6608	-15	-9
6609	-87	-57
6610	-68	19
6611	-106	35
6612	-254	-91

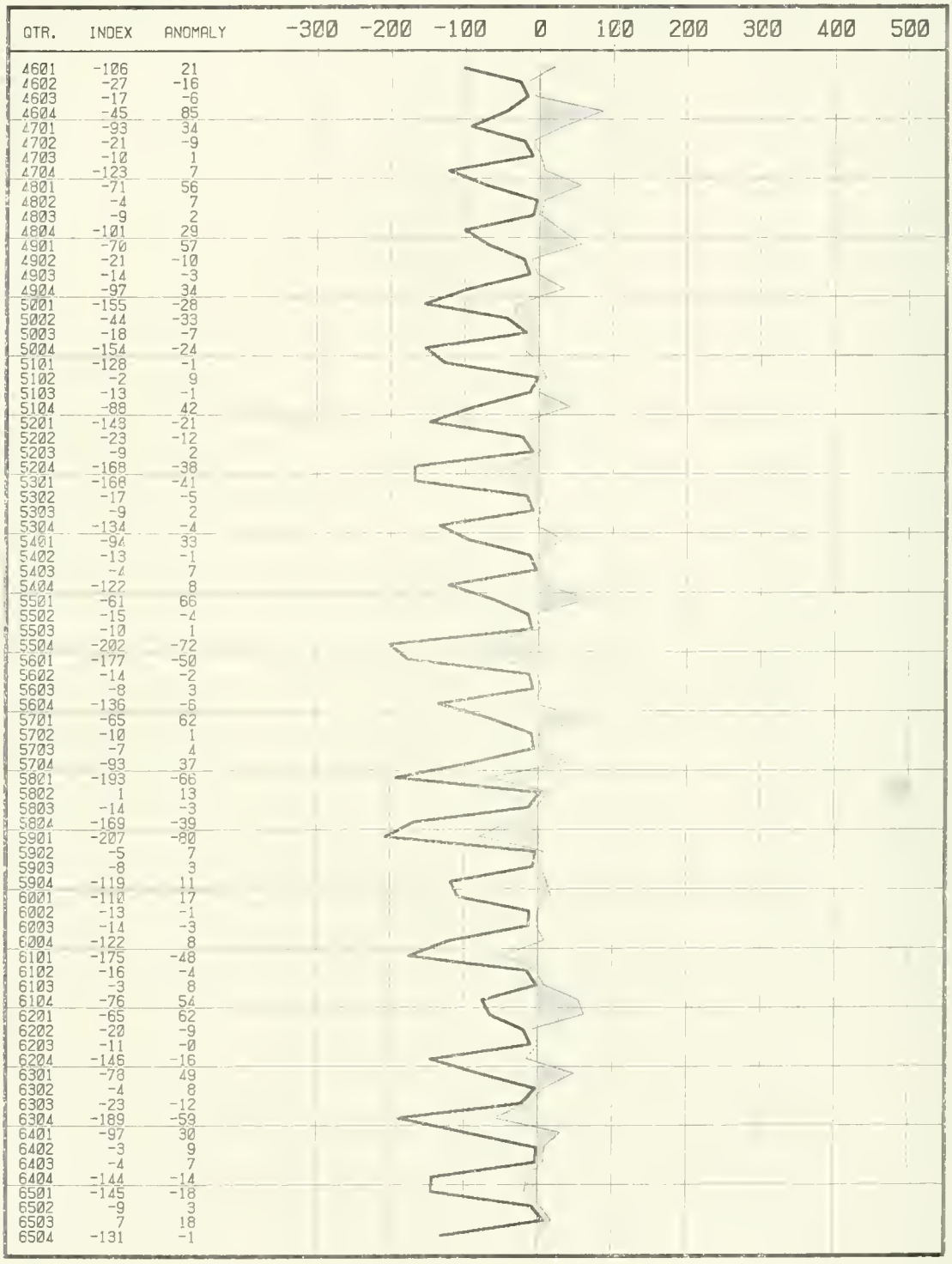


UPWELLING INDEX AT 57N, 137W BY MONTH

MONTH	INDEX	ANOMALY
6701	-249	-37
6702	-137	-20
6703	-23	28
6704	4	28
6705	-2	8
6706	20	20
6707	-0	-1
6708	-9	-3
6709	-78	-48
6710	-42	46
6711	-20	120
6712	-134	29
6801	-90	122
6802	-297	-180
6803	-103	-52
6804	-42	-19
6805	-1	9
6806	-3	-3
6807	-4	-5
6808	-8	-3
6809	-64	-35
6810	-87	1
6811	-210	-69
6812	-257	-95
6901	-251	-39
6902	-176	-59
6903	-47	4
6904	-79	-55
6905	-12	-2
6906	5	5
6907	-6	-7
6908	-6	-0
6909	-34	-5
6910	-163	-76
6911	-163	-23
6912	-341	-178
7001	-200	12
7002	-134	-16
7003	-62	-11
7004	-9	15
7005	-25	-16
7006	-4	-4
7007	-12	-14
7008	-15	-9
7009	-14	16
7010	-34	54
7011	-141	-1
7012	-162	1
7101	-241	-29
7102	-82	35
7103	-61	-10
7104	-49	-26
7105	-29	-19
7106	0	0
7107	8	7
7108	-15	-10
7109	-16	13
7110	-36	51
7111	-103	37
7112	-74	89

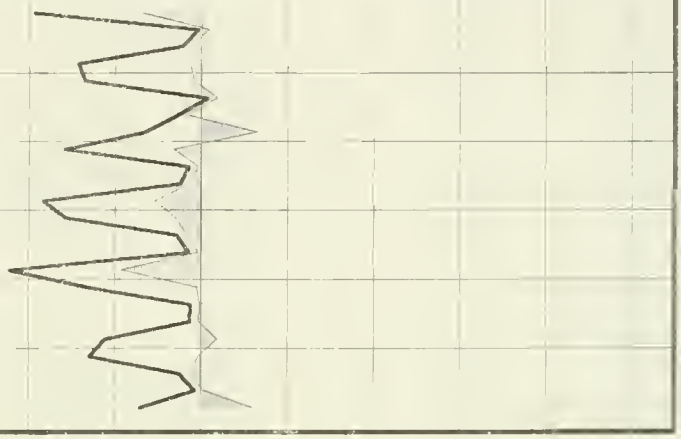
UPWELLING INDEX AT 57N, 137W BY QUARTER

QTR.	INDEX	ANOMALY
4601	-106	21
4602	-27	-16
4603	-17	-6
4604	-45	85
4701	-93	34
4702	-21	-9
4703	-10	1
4704	-123	7
4801	-71	56
4802	-4	7
4803	-9	2
4804	-101	29
4901	-70	57
4902	-21	-10
4903	-14	-3
4904	-97	34
5001	-155	-28
5002	-44	-33
5003	-18	-7
5004	-154	-24
5101	-128	-1
5102	-2	9
5103	-13	-1
5104	-88	42
5201	-148	-21
5202	-23	-12
5203	-9	2
5204	-168	-38
5301	-168	-41
5302	-17	-5
5303	-9	2
5304	-134	-4
5401	-94	33
5402	-13	-1
5403	-4	7
5404	-122	8
5501	-61	66
5502	-15	-4
5503	-10	1
5504	-202	-72
5601	-177	-50
5602	-14	-2
5603	-8	3
5604	-136	-6
5701	-65	62
5702	-10	1
5703	-7	4
5704	-93	37
5801	-193	-66
5802	1	13
5803	-14	-3
5804	-169	-39
5901	-207	-80
5902	-5	7
5903	-8	3
5904	-119	11
6001	-110	17
6002	-13	-1
6003	-14	-3
6004	-122	8
6101	-175	-48
6102	-16	-4
6103	-3	8
6104	-76	54
6201	-65	62
6202	-20	-9
6203	-11	-0
6204	-146	-16
6301	-78	49
6302	-4	8
6303	-23	-12
6304	-189	-59
6401	-97	30
6402	-3	9
6403	-4	7
6404	-144	-14
6501	-145	-18
6502	-9	3
6503	7	18
6504	-131	-1



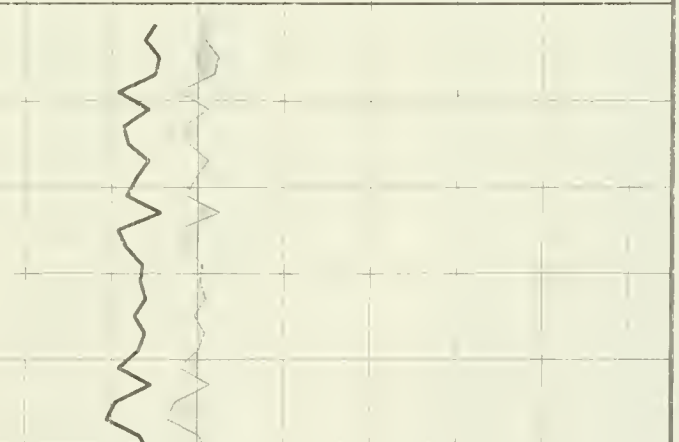
UPWELLING INDEX AT 57N, 137W BY QUARTER

QTR.	INDEX	ANOMALY
6601	-198	-71
6602	-4	8
6603	-23	-12
6604	-143	-13
6701	-136	-9
6702	7	19
6703	-28	-17
6704	-56	65
6801	-159	-32
6802	-15	-4
6803	-25	-14
6804	-184	-54
6901	-158	-30
6902	-29	-17
6903	-15	-4
6904	-223	-93
7001	-132	-5
7002	-13	-2
7003	-14	-3
7004	-112	18
7101	-130	-3
7102	-26	-15
7103	-8	3
7104	-71	59



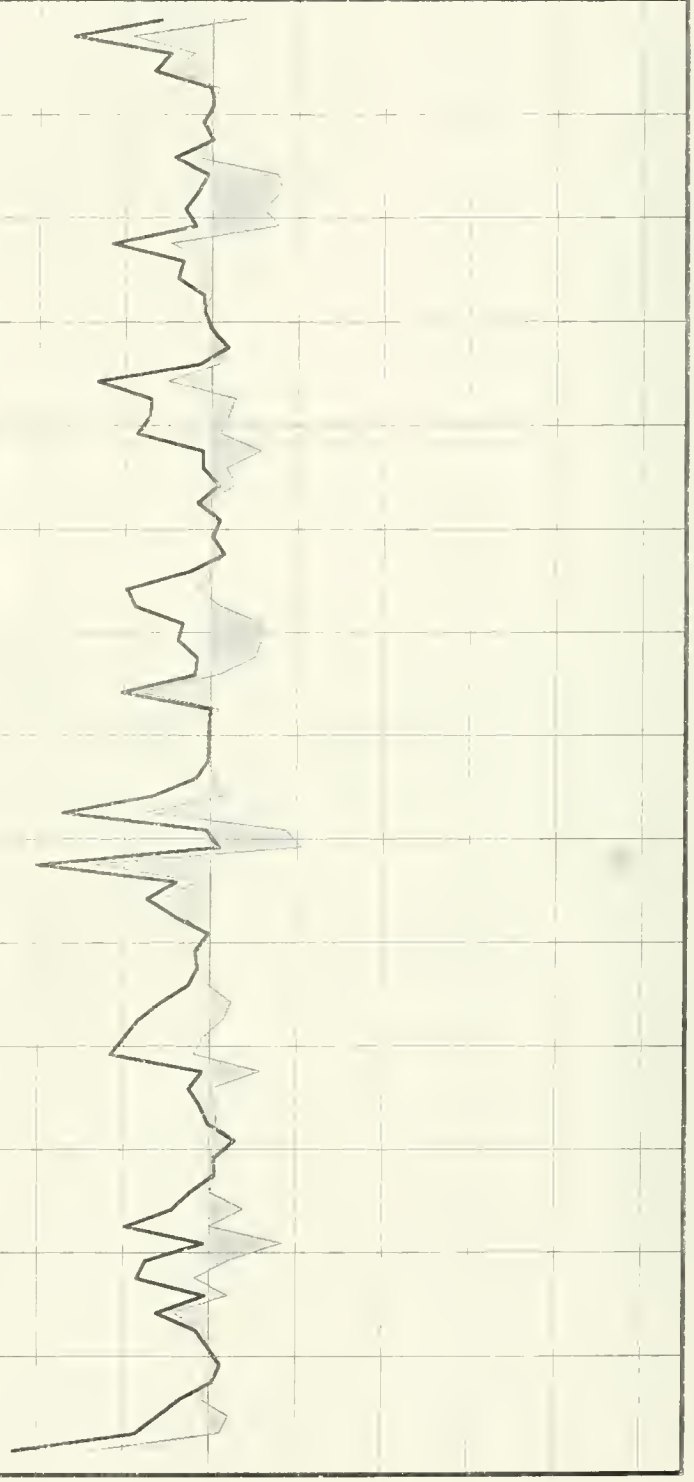
UPWELLING INDEX AT 57N, 137W BY YEAR

YEAR	INDEX	ANOMALY
1946	-49	21
1947	-62	8
1948	-46	23
1949	-50	19
1950	-93	-23
1951	-58	12
1952	-87	-17
1953	-82	-12
1954	-58	12
1955	-72	-3
1956	-83	-14
1957	-44	26
1958	-93	-24
1959	-84	-14
1960	-65	5
1961	-67	3
1962	-61	9
1963	-74	-4
1964	-62	8
1965	-69	1
1966	-92	-22
1967	-55	14
1968	-96	-26
1969	-106	-36
1970	-67	2
1971	-58	11



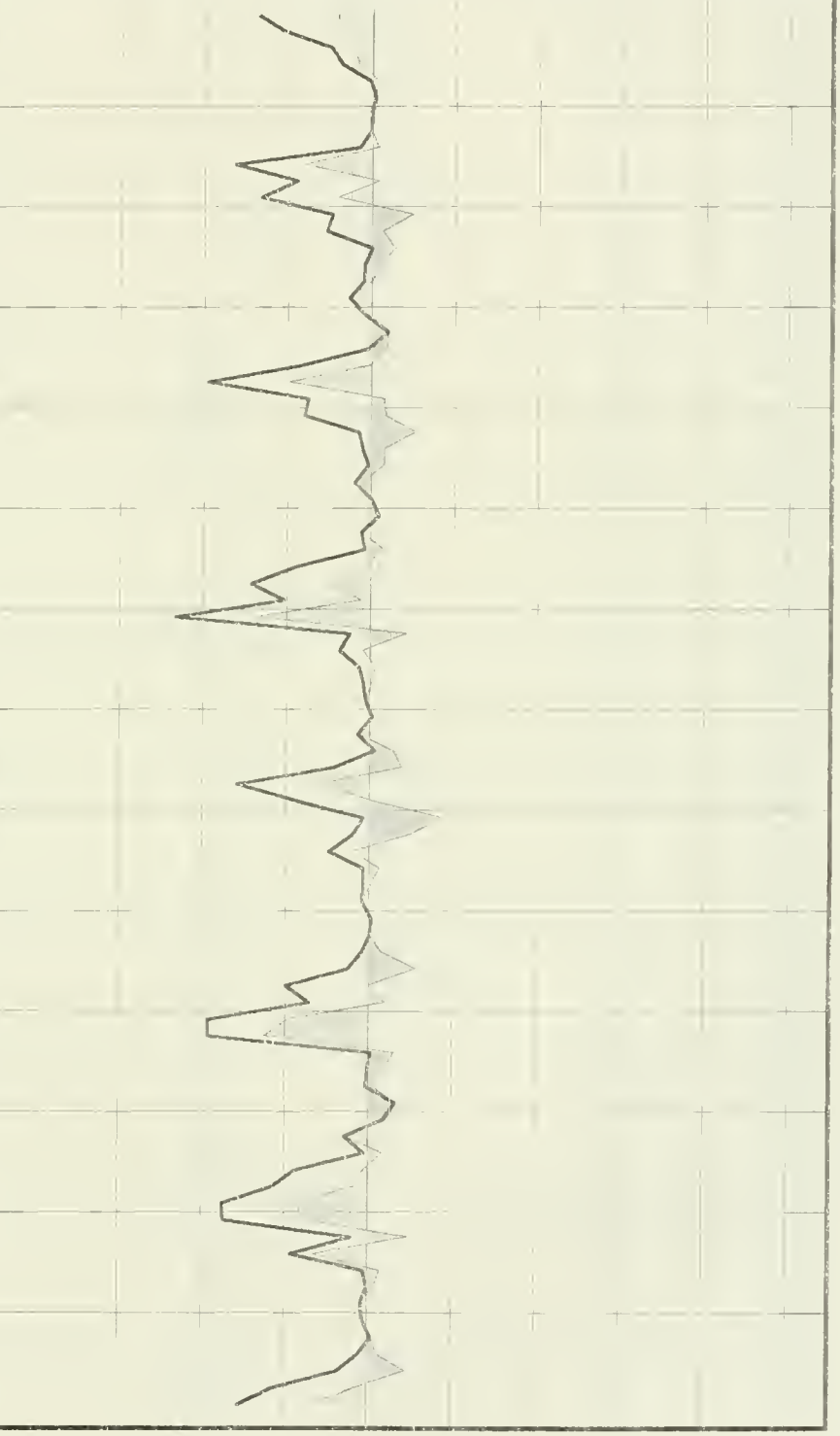
UPWELLING INDEX AT 54N, 134W BY MONTH

MONTH	INDEX	ANOMALY
4601	-57	39
4602	-161	-93
4603	-49	-22
4604	-68	-48
4605	-2	7
4606	0	-0
4607	-11	-14
4608	-0	0
4609	-44	-21
4610	-6	76
4611	-17	81
4612	-32	59
4701	-20	77
4702	-116	-48
4703	-34	-7
4704	-40	-20
4705	-10	-1
4706	-9	-9
4707	0	-3
4708	18	19
4709	-15	9
4710	-133	-51
4711	-71	27
4712	-72	19
4801	-67	10
4802	-11	57
4803	-11	17
4804	8	27
4805	-17	-7
4806	9	9
4807	1	-2
4808	14	15
4809	-26	-3
4810	-98	-16
4811	-89	10
4812	-34	58
4901	-39	58
4902	-17	51
4903	-19	9
4904	-104	-84
4905	-1	9
4906	-3	-4
4907	-3	-6
4908	-4	-4
4909	-18	5
4910	-66	17
4911	-172	-74
4912	-6	86
5001	9	105
5002	-202	-134
5003	-40	-13
5004	-74	-54
5005	-43	-34
5006	-3	-4
5007	-18	-20
5008	-16	-15
5009	-26	-2
5010	-58	24
5011	-84	15
5012	-100	-8
5101	-116	-19
5102	-10	58
5103	-25	2
5104	-12	8
5105	-3	7
5106	28	28
5107	5	2
5108	5	6
5109	-23	-0
5110	-44	38
5111	-98	0
5112	-8	84
5201	-75	22
5202	-85	-17
5203	-6	21
5204	-62	-42
5205	-17	-7
5206	-2	-2
5207	12	10
5208	3	4
5209	-34	-11
5210	-60	22
5211	-87	12
5212	-228	-136



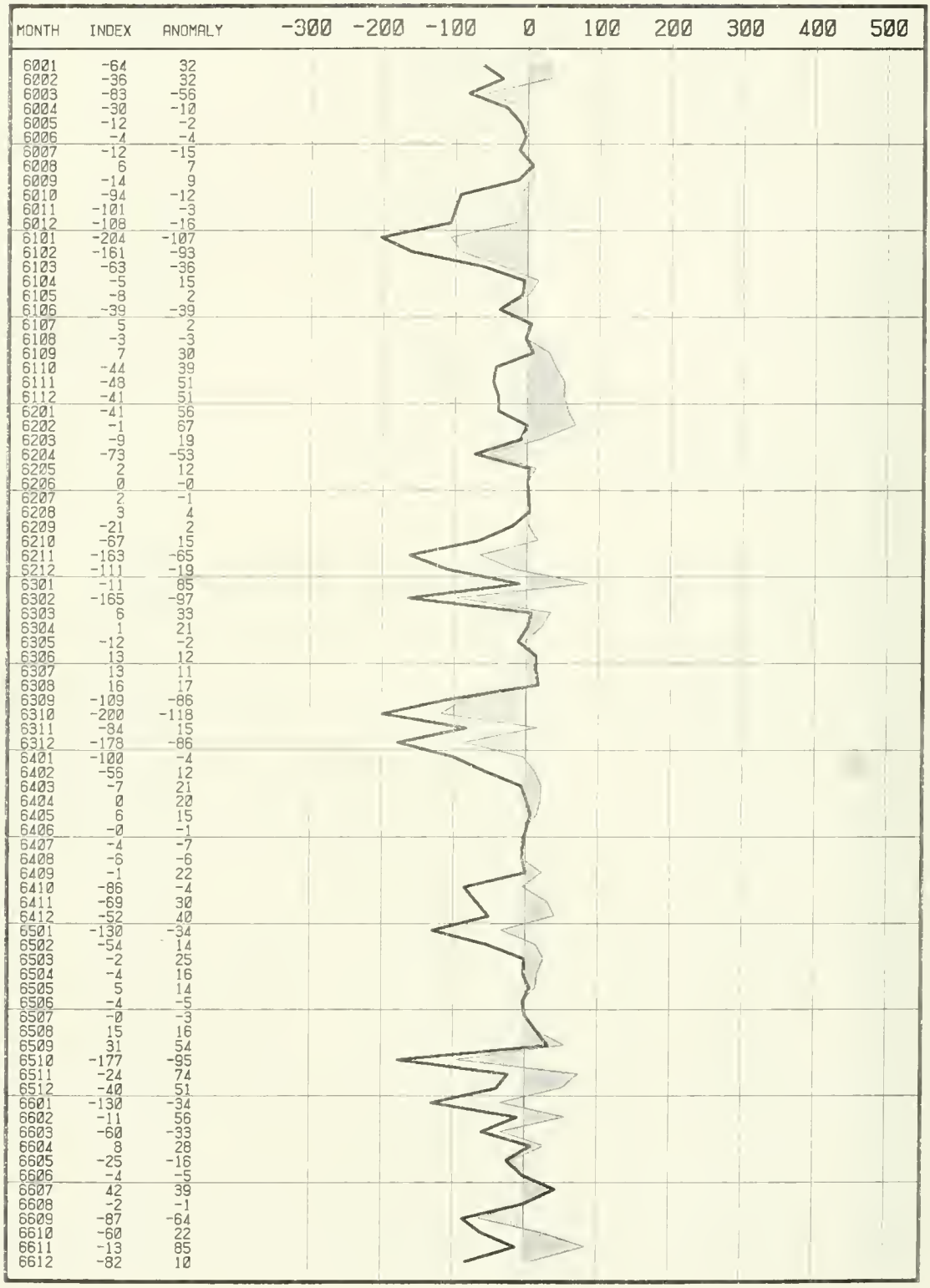
UPWELLING INDEX AT 54N, 134W BY MONTH

MONTH	INDEX	ANOMALY
5301	-139	-42
5302	-108	-40
5303	-52	-23
5304	-37	-17
5305	-3	7
5306	3	2
5307	-1	-4
5308	-2	-1
5309	-16	7
5310	-164	-82
5311	-90	8
5312	-133	-41
5401	-48	49
5402	-54	13
5403	0	27
5404	-9	11
5405	-10	-0
5406	-27	-27
5407	-8	-11
5408	19	19
5409	-4	19
5410	-83	-1
5411	-196	-98
5412	-76	15
5501	-80	17
5502	-15	53
5503	-11	16
5504	-4	15
5505	-20	-11
5506	-0	-1
5507	9	6
5508	-12	-11
5509	-8	15
5510	-90	-8
5511	-143	-45
5512	-104	-12
5601	-233	-136
5602	-25	43
5603	-37	-9
5604	-14	5
5605	-9	1
5606	-6	-6
5607	2	-1
5608	-15	-14
5609	5	28
5610	-44	38
5611	-159	-61
5612	-87	4
5701	-8	89
5702	-21	47
5703	-49	-21
5704	-8	12
5705	-8	1
5706	-9	-9
5707	2	-0
5708	0	1
5709	-9	14
5710	-26	56
5711	-100	-1
5712	-72	19
5801	-193	-96
5802	-193	-125
5803	2	30
5804	-2	18
5805	-4	5
5806	31	31
5807	18	15
5808	-29	-28
5809	-6	17
5810	-88	-6
5811	-116	-17
5812	-176	-84
5901	-171	-77
5902	-21	47
5903	-93	-66
5904	-6	14
5905	-2	7
5906	-9	-10
5907	-6	-9
5908	3	4
5909	-12	11
5910	-37	45
5911	-114	-15
5912	-156	-64



UPWELLING INDEX AT 54N, 134W BY MONTH

MONTH	INDEX	ANOMALY
6001	-64	32
6002	-36	32
6003	-83	-56
6004	-30	-10
6005	-12	-2
6006	-4	-4
6007	-12	-15
6008	6	7
6009	-14	9
6010	-94	-12
6011	-101	-3
6012	-108	-16
6101	-204	-107
6102	-161	-93
6103	-63	-36
6104	-5	15
6105	-8	2
6106	-39	-39
6107	5	2
6108	-3	-3
6109	7	30
6110	-44	39
6111	-48	51
6112	-41	51
6201	-41	56
6202	-1	67
6203	-9	19
6204	-73	-53
6205	2	12
6206	0	-0
6207	2	-1
6208	3	4
6209	-21	2
6210	-67	15
6211	-163	-65
6212	-111	-19
6301	-11	85
6302	-165	-97
6303	6	33
6304	1	21
6305	-12	-2
6306	13	12
6307	13	11
6308	16	17
6309	-109	-86
6310	-200	-118
6311	-84	15
6312	-178	-86
6401	-100	-4
6402	-56	12
6403	-7	21
6404	0	20
6405	6	15
6406	-0	-1
6407	-4	-7
6408	-6	-6
6409	-1	22
6410	-86	-4
6411	-69	30
6412	-52	40
6501	-130	-34
6502	-54	14
6503	-2	25
6504	-4	16
6505	5	14
6506	-4	-5
6507	-0	-3
6508	15	16
6509	31	54
6510	-177	-95
6511	-24	74
6512	-40	51
6601	-130	-34
6602	-11	56
6603	-60	-33
6604	8	28
6605	-25	-16
6606	-4	-5
6607	42	39
6608	-2	-1
6609	-87	-64
6610	-60	22
6611	-13	85
6612	-82	10

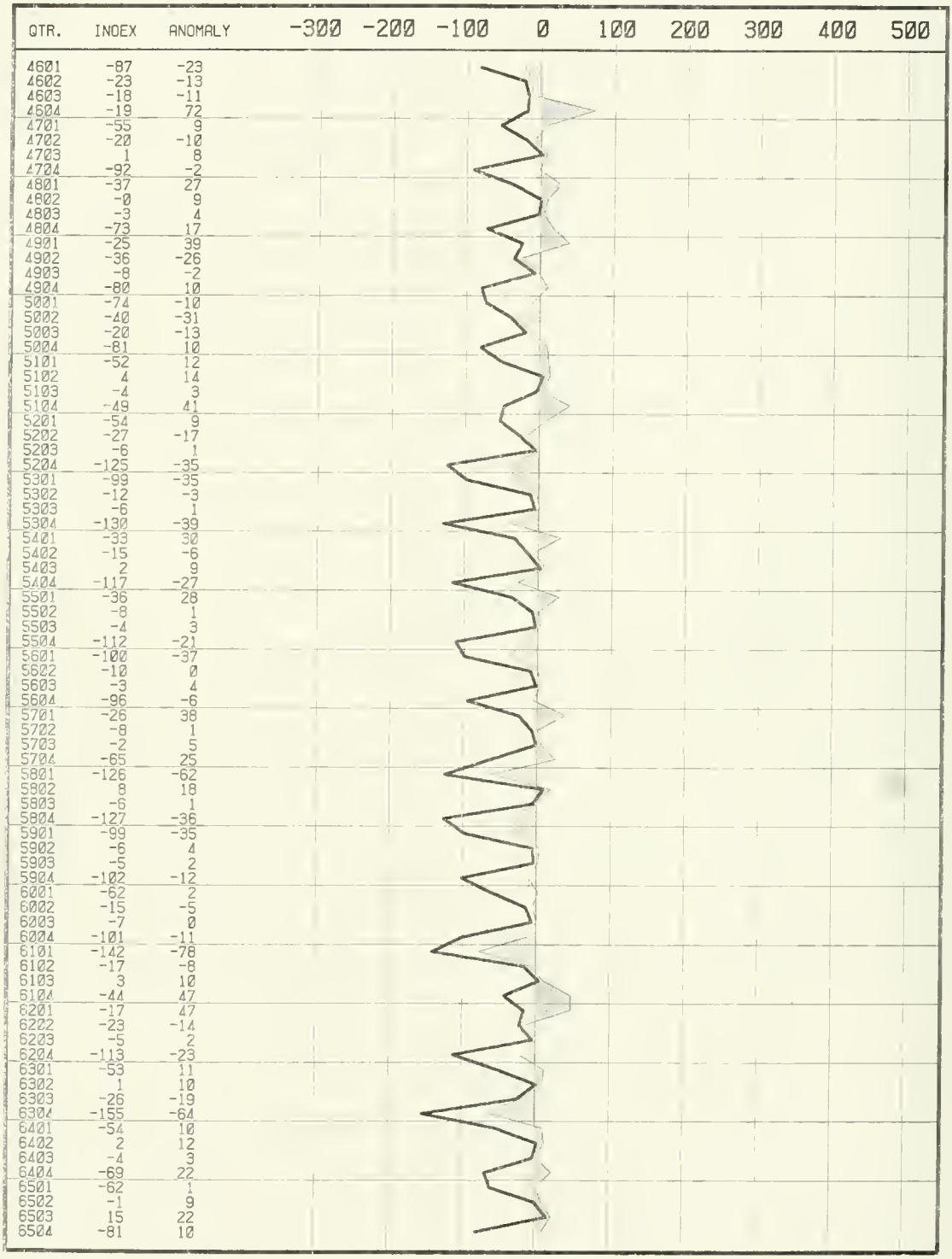


UPWELLING INDEX AT 54N, 134W BY MONTH

MONTH	INDEX	ANOMALY
6701	-70	26
6702	-112	-44
6703	10	37
6704	29	49
6705	-11	-1
6706	36	36
6707	-2	-5
6708	-10	-9
6709	-93	-69
6710	-56	26
6711	-19	79
6712	-40	52
6801	0	97
6802	-200	-132
6803	-81	-54
6804	-42	-22
6805	0	10
6806	-9	-9
6807	-4	-6
6808	-2	-1
6809	-46	-22
6810	-62	20
6811	-183	-85
6812	-57	34
6901	-27	69
6902	-66	2
6903	-27	0
6904	-88	-63
6905	-11	-1
6906	8	7
6907	-11	-14
6908	-13	-12
6909	-22	1
6910	-120	-37
6911	-147	-49
6912	-293	-202
7001	-82	15
7002	-109	-41
7003	-45	-18
7004	-9	11
7005	-48	-38
7006	-4	-5
7007	-7	-10
7008	-6	-6
7009	-11	12
7010	-19	63
7011	-54	44
7012	-50	42
7101	-40	56
7102	-78	-10
7103	-53	-25
7104	-42	-23
7105	-9	1
7106	0	-0
7107	19	16
7108	-19	-18
7109	-8	16
7110	-21	61
7111	-62	37
7112	-9	83

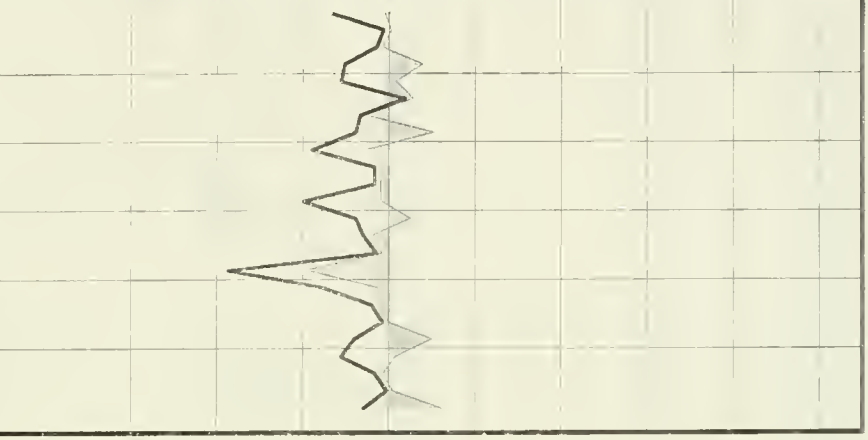
UPWELLING INDEX AT 54N, 134W BY QUARTER

QTR.	INDEX	ANOMALY
4601	-87	-23
4602	-23	-13
4603	-18	-11
4604	-19	72
4701	-55	9
4702	-20	-10
4703	1	8
4704	-92	-2
4801	-37	27
4802	-0	9
4803	-3	4
4804	-73	17
4901	-25	39
4902	-36	-26
4903	-8	-2
4904	-80	10
5001	-74	-10
5002	-40	-31
5003	-20	-13
5004	-81	10
5101	-52	12
5102	4	14
5103	-4	3
5104	-49	41
5201	-54	9
5202	-27	-17
5203	-6	1
5204	-125	-35
5301	-99	-35
5302	-12	-3
5303	-6	1
5304	-130	-39
5401	-33	30
5402	-15	-6
5403	2	9
5404	-117	-27
5501	-36	28
5502	-8	1
5503	-4	3
5504	-112	-21
5601	-100	-37
5602	-10	0
5603	-3	4
5604	-96	-6
5701	-26	38
5702	-8	1
5703	-2	5
5704	-65	25
5801	-126	-62
5802	8	18
5803	-6	1
5804	-127	-36
5901	-99	-35
5902	-6	4
5903	-5	2
5904	-102	-12
6001	-62	2
6002	-15	-5
6003	-7	0
6004	-101	-11
6101	-142	-78
6102	-17	-8
6103	3	10
6104	-44	47
6201	-17	47
6202	-23	-14
6203	-5	2
6204	-113	-23
6301	-53	11
6302	1	10
6303	-26	-19
6304	-155	-64
6401	-54	10
6402	2	12
6403	-4	3
6404	-69	22
6501	-62	1
6502	-1	9
6503	15	22
6504	-81	10



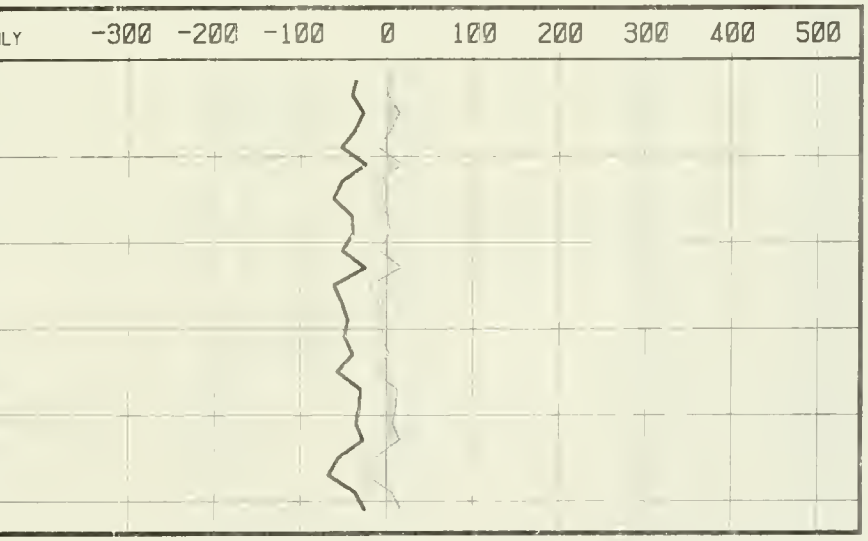
UPWELLING INDEX AT 54N, 134W BY QUARTER

QTR.	INDEX	ANOMALY
6601	-69	-5
6602	-7	2
6603	-15	-8
6604	-52	39
6701	-56	8
6702	18	28
6703	-34	-27
6704	-39	52
6801	-90	-26
6802	-17	-7
6803	-17	-10
6804	-100	-9
6901	-39	25
6902	-30	-21
6903	-15	-8
6904	-187	-96
7001	-78	-14
7002	-21	-11
7003	-8	-1
7004	-41	50
7101	-56	8
7102	-17	-7
7103	-3	4
7104	-30	61



UPWELLING INDEX AT 54N, 134W BY YEAR

YEAR	INDEX	ANOMALY
1946	-36	6
1947	-41	1
1948	-28	14
1949	-37	5
1950	-53	-11
1951	-25	18
1952	-53	-10
1953	-62	-19
1954	-41	2
1955	-40	3
1956	-52	-9
1957	-26	17
1958	-62	-20
1959	-53	-10
1960	-46	-4
1961	-50	-7
1962	-40	3
1963	-58	-16
1964	-31	12
1965	-32	11
1966	-36	7
1967	-28	15
1968	-56	-13
1969	-68	-25
1970	-37	6
1971	-26	16

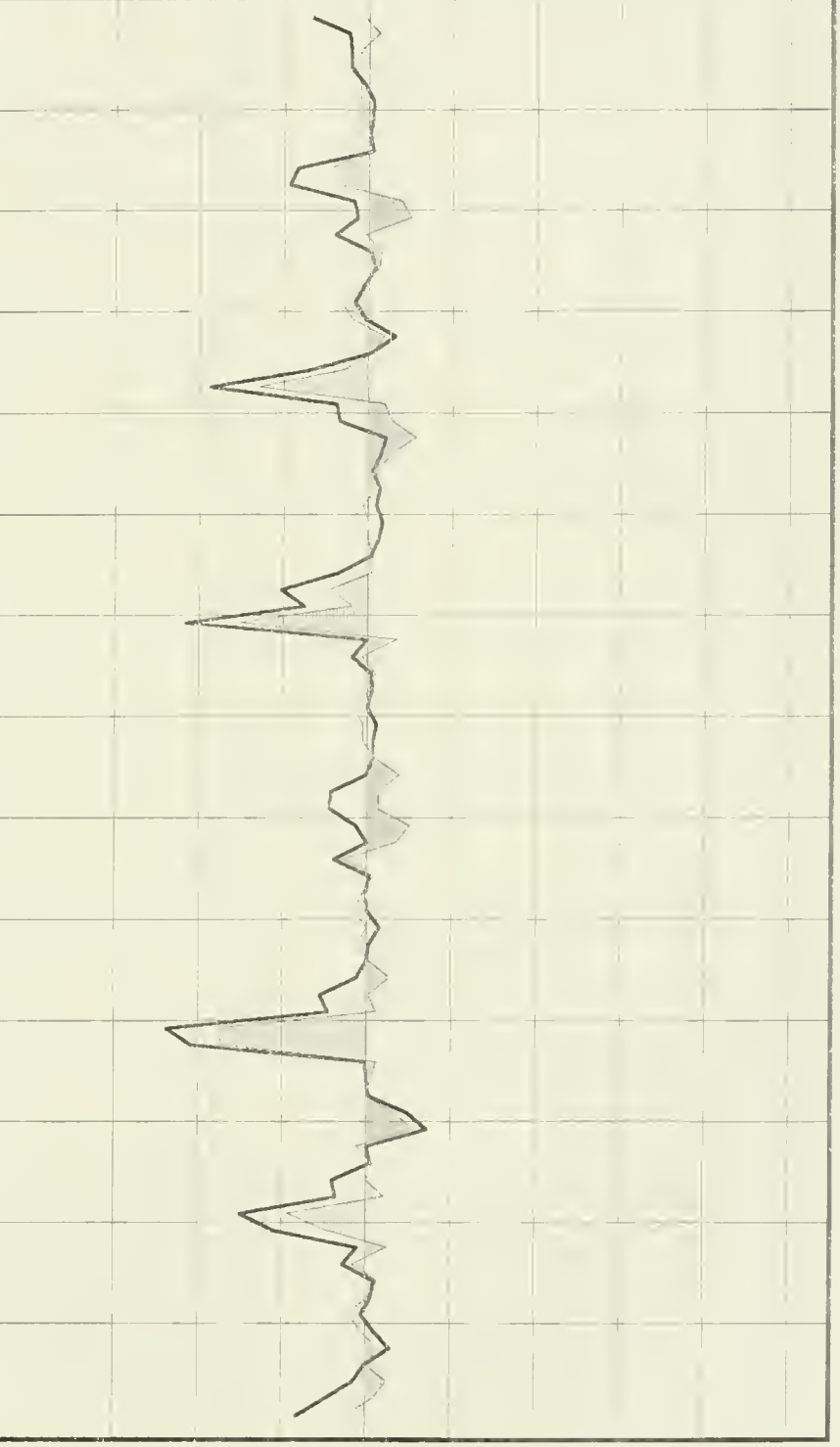


UPWELLING INDEX AT 51N, 131W BY MONTH

MONTH	INDEX	ANOMALY
4601	-48	16
4602	-97	-61
4603	-4	9
4604	-16	-11
4605	1	-2
4606	0	-15
4607	1	-15
4608	12	-1
4609	-10	-7
4610	14	55
4611	-13	44
4612	13	70
4701	12	75
4702	-61	-25
4703	-8	4
4704	-5	0
4705	2	-2
4706	3	-12
4707	-1	-16
4708	44	31
4709	7	10
4710	-68	-27
4711	-6	52
4712	-23	34
4801	-43	21
4802	2	38
4803	1	14
4804	2	8
4805	-7	-11
4806	31	16
4807	11	-5
4808	24	12
4809	2	5
4810	-18	23
4811	16	74
4812	5	62
4901	0	64
4902	-3	32
4903	-12	1
4904	-57	-52
4905	0	-4
4906	26	11
4907	11	-5
4908	-4	-16
4909	-3	-0
4910	-12	28
4911	-154	-96
4912	3	60
5001	0	64
5002	-122	-86
5003	-17	-5
5004	-45	-41
5005	4	0
5006	2	-13
5007	3	-13
5008	-11	-23
5009	-7	-4
5010	-32	8
5011	-40	18
5012	-92	-34
5101	-58	6
5102	-8	28
5103	-3	9
5104	2	8
5105	1	-3
5106	65	49
5107	11	-5
5108	19	7
5109	-3	0
5110	-23	18
5111	-75	-17
5112	-5	53
5201	-39	24
5202	-26	10
5203	20	32
5204	-58	-53
5205	-3	-7
5206	8	-7
5207	23	7
5208	20	8
5209	-4	-1
5210	-31	9
5211	-52	5
5212	-174	-117

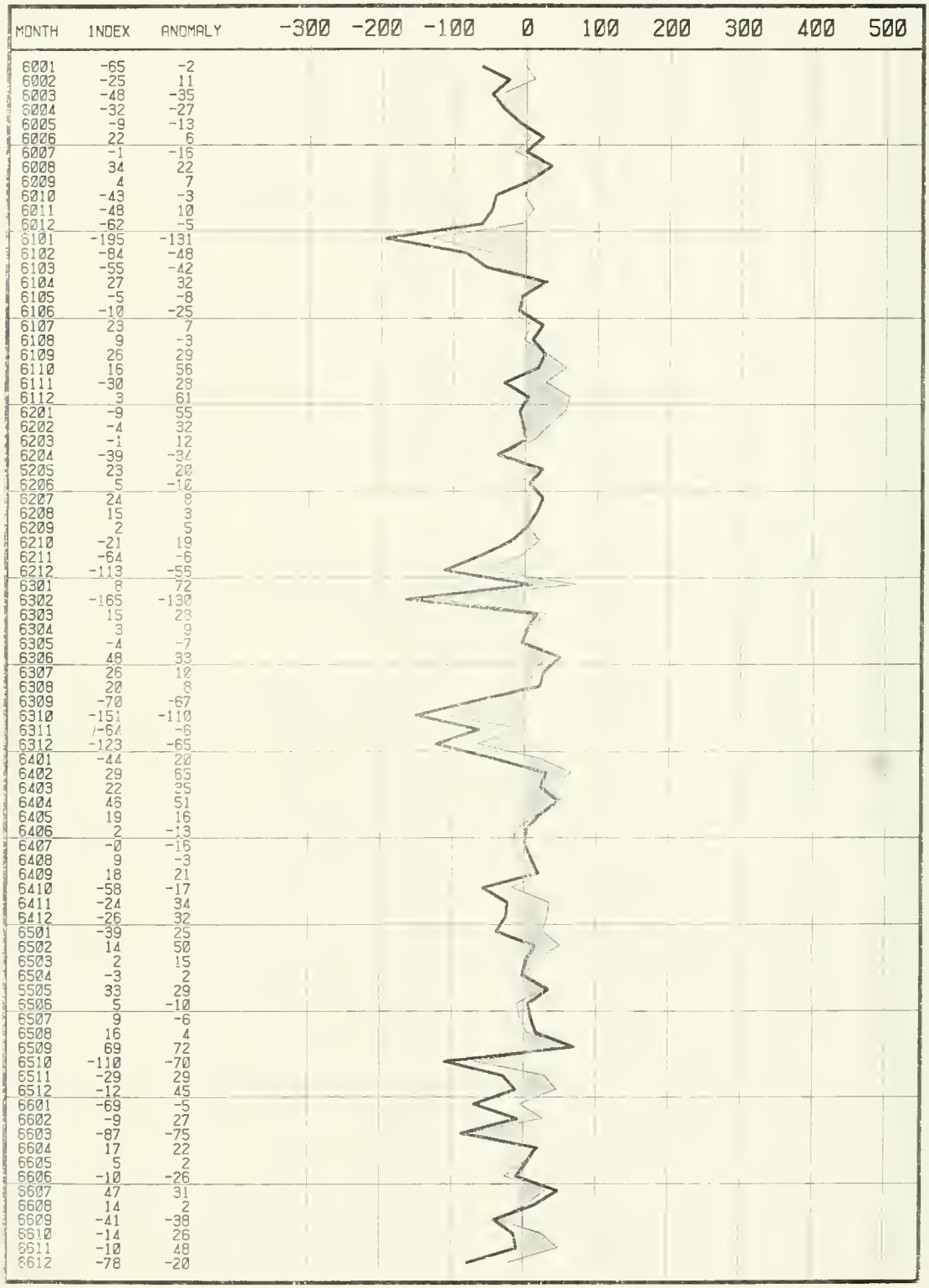
UPWELLING INDEX AT 51N, 131W BY MONTH

MONTH	INDEX	ANOMALY
5301	-70	-6
5302	-24	12
5303	-22	-9
5304	-22	-17
5305	-6	-10
5306	5	-10
5307	4	-11
5308	1	-11
5309	4	7
5310	-85	-45
5311	-94	-37
5312	-18	39
5401	-14	50
5402	-40	-4
5403	2	15
5404	7	12
5405	-5	-8
5406	-17	-32
5407	-4	-20
5408	31	18
5409	2	5
5410	-69	-29
5411	-188	-130
5412	-38	19
5501	-35	28
5502	20	56
5503	14	27
5504	5	10
5505	13	9
5506	9	-6
5507	16	0
5508	12	-1
5509	3	6
5510	-35	5
5511	-103	-45
5512	-76	-19
5601	-216	-152
5602	-1	35
5603	-19	-7
5604	4	9
5605	5	2
5606	-1	-16
5607	10	-6
5608	6	-6
5609	6	9
5610	-2	38
5611	-44	14
5612	-45	12
5701	-14	50
5702	-1	35
5703	-40	-26
5704	2	7
5705	-2	-5
5706	-1	-16
5707	14	-1
5708	2	-11
5709	-1	2
5710	-13	27
5711	-56	2
5712	-47	11
5801	-238	-175
5802	-209	-174
5803	-2	11
5804	-1	5
5805	2	-1
5806	48	33
5807	71	55
5808	-0	-12
5809	4	7
5810	-41	-0
5811	-37	21
5812	-150	-93
5901	-111	-47
5902	-11	25
5903	-28	-16
5904	9	14
5905	6	2
5906	-6	-21
5907	9	-6
5908	28	15
5909	-2	1
5910	-16	25
5911	-49	9
5912	-83	-25



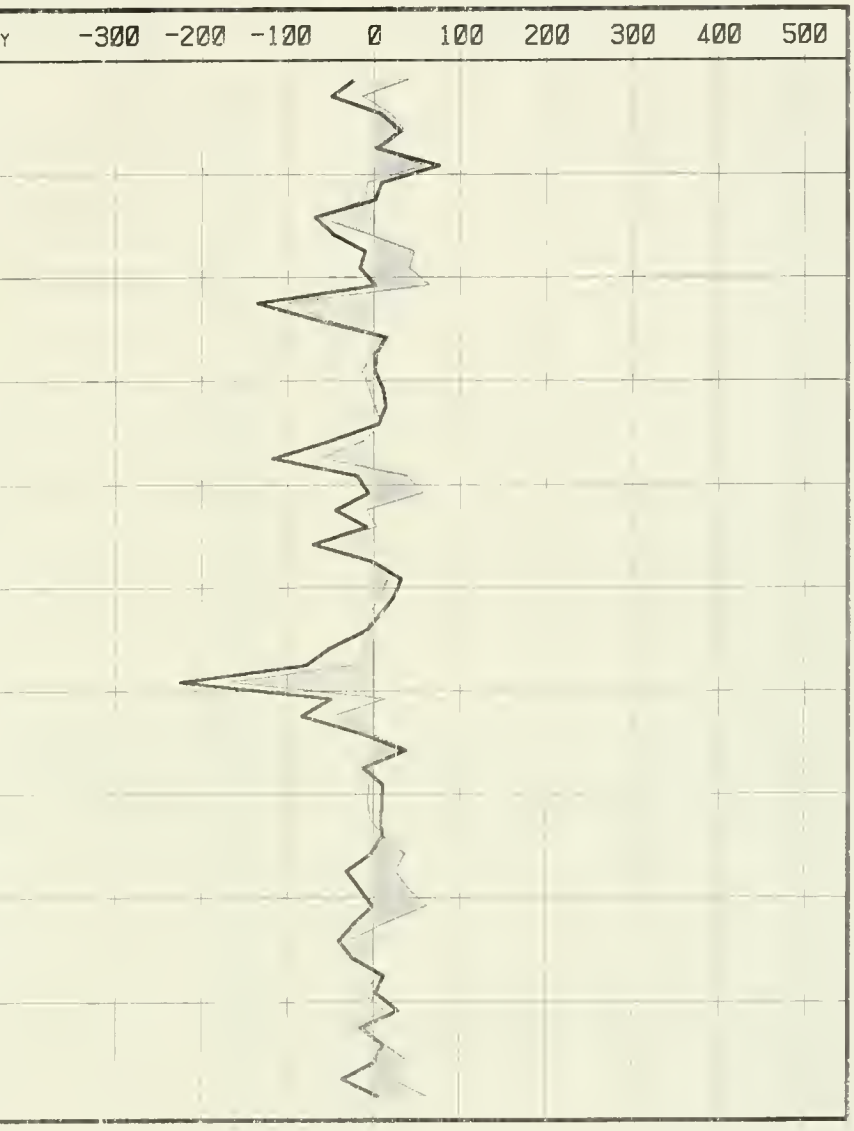
UPWELLING INDEX AT 51N, 131W BY MONTH

MONTH	INDEX	ANOMALY
6001	-65	-2
6002	-25	11
6003	-48	-35
6004	-32	-27
6005	-9	-13
6006	22	6
6007	-1	-16
6008	34	22
6009	4	7
6010	-43	-3
6011	-48	10
6012	-62	-5
6101	-195	-131
6102	-84	-48
6103	-55	-42
6104	27	32
6105	-5	-8
6106	-10	-25
6107	23	7
6108	9	-3
6109	26	29
6110	16	56
6111	-30	28
6112	3	61
6201	-9	55
6202	-4	32
6203	-1	12
6204	-39	-34
5205	23	20
6206	5	-10
6207	24	8
6208	15	3
6209	2	5
6210	-21	19
6211	-64	-6
6212	-113	-56
6301	8	72
6302	-165	-130
6303	15	28
6304	3	9
6305	-4	-7
6306	48	33
6307	26	10
6308	20	8
6309	-70	-67
6310	-151	-110
6311	-64	-6
6312	-123	-65
6401	-44	20
6402	29	65
6403	22	35
6404	46	51
6405	19	16
6406	2	-13
6407	-0	-16
6408	9	-3
6409	18	21
6410	-58	-17
6411	-24	34
6412	-26	32
6501	-39	25
6502	14	50
6503	2	15
6504	-3	2
5505	33	29
6506	5	-10
6507	9	-6
6508	16	4
6509	69	72
6510	-110	-70
6511	-29	29
6512	-12	45
6601	-69	-5
6602	-9	27
6603	-87	-75
6604	17	22
6605	5	2
6606	-10	-26
6607	47	31
6608	14	2
6609	-41	-38
6610	-14	26
6611	-10	48
6612	-78	-20



UPWELLING INDEX AT 51N, 131W BY MONTH

MONTH	INDEX	ANOMALY
6701	-23	40
6702	-50	-14
6703	7	19
6704	30	35
6705	3	-1
6706	75	59
6707	8	-8
6708	1	-11
6709	-69	-66
6710	-48	-7
6711	-11	46
6712	-17	41
6801	1	64
6802	-136	-100
6803	-67	-55
6804	13	19
6805	2	-2
6806	1	-14
6807	10	-6
6808	13	1
6809	5	8
6810	-52	-12
6811	-118	-61
6812	-20	38
6901	-7	57
6902	-45	-9
6903	-9	3
6904	-71	-65
6905	-2	-6
6906	31	16
6907	23	8
6908	8	-5
6909	-3	-6
6910	-51	-11
6911	-79	-21
6912	-225	-167
7001	-50	14
7002	-84	-48
7003	-15	-3
7004	36	42
7005	-12	-16
7006	10	-6
7007	9	-7
7008	8	-4
7009	9	12
7010	-4	36
7011	-32	25
7012	-17	40
7101	-2	62
7102	-23	13
7103	-41	-29
7104	-25	-20
7105	11	7
7106	2	-13
7107	28	12
7108	-15	-27
7109	10	13
7110	1	41
7111	-37	21
7112	5	62

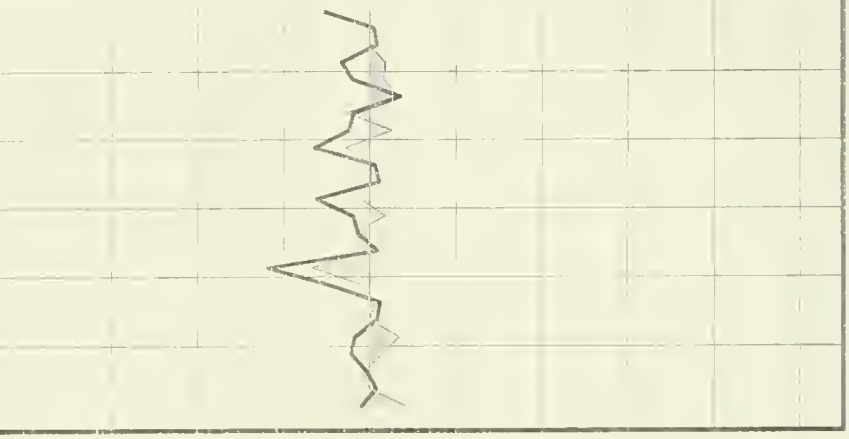


UPWELLING INDEX AT 51N, 131W BY QUARTER

QTR.	INDEX	ANOMALY
4601	-48	-10
4602	-5	-9
4603	1	-8
4604	5	57
4701	-18	19
4702	-0	-5
4703	17	9
4704	-32	19
4801	-14	24
4802	8	4
4803	13	4
4804	1	53
4901	-5	32
4902	-10	-15
4903	1	-7
4904	-53	-2
5001	-44	-6
5002	-13	-18
5003	-5	-14
5004	-55	-3
5101	-24	14
5102	22	18
5103	9	1
5104	-34	18
5201	-15	22
5202	-18	-22
5203	13	5
5204	-86	-35
5301	-39	-2
5302	-8	-12
5303	3	-5
5304	-66	-14
5401	-15	21
5402	-5	-10
5403	10	1
5404	-97	-46
5501	-1	36
5502	9	4
5503	10	2
5504	-71	-19
5601	-81	-44
5602	3	-2
5603	7	-1
5604	-30	22
5701	-19	18
5702	-0	-5
5703	5	-3
5704	-38	13
5801	-148	-110
5802	16	12
5803	25	17
5804	-76	-25
5901	-51	-14
5902	3	-2
5903	12	3
5904	-49	2
6001	-47	-9
6002	-7	-11
6003	12	4
6004	-51	1
6101	-112	-75
6102	4	-0
6103	19	11
6104	-3	48
6201	-5	33
6202	-3	-8
6203	14	5
6204	-66	-14
6301	-43	-6
6302	16	11
6303	-7	-16
6304	-113	-61
6401	2	39
6402	23	18
6403	9	1
6404	-35	16
6501	-8	29
6502	12	7
6503	31	23
6504	-51	1

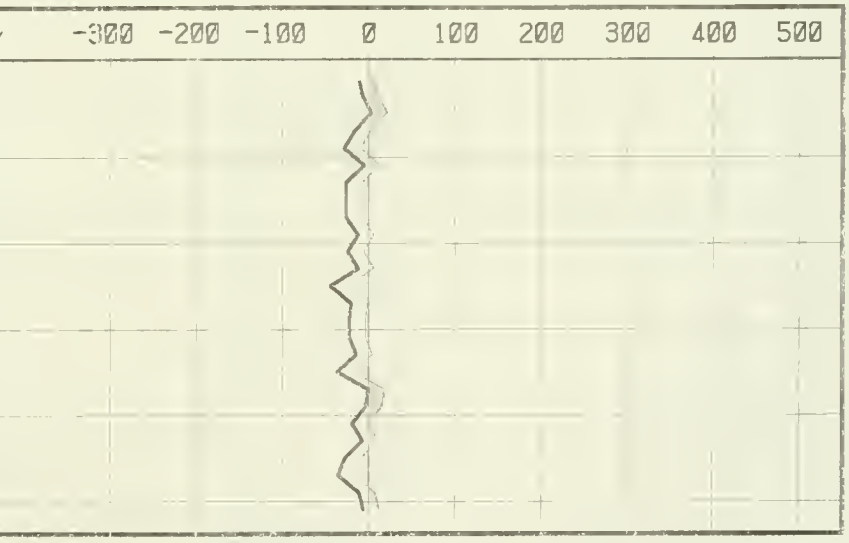
UPWELLING INDEX AT 51N, 131W BY QUARTER

QTR.	INDEX	ANOMALY
6601	-56	-19
6602	4	-1
6603	7	-1
6604	-34	17
6701	-21	6
6702	35	31
6703	-20	-28
6704	-25	26
6801	-65	-28
6802	5	1
6803	10	1
6804	-63	-11
6901	-20	18
6902	-14	-18
6903	8	-1
6904	-119	-67
7001	-48	-1
7002	11	7
7003	8	-0
7004	-18	34
7101	-22	15
7102	-4	-8
7103	7	-1
7104	-10	42



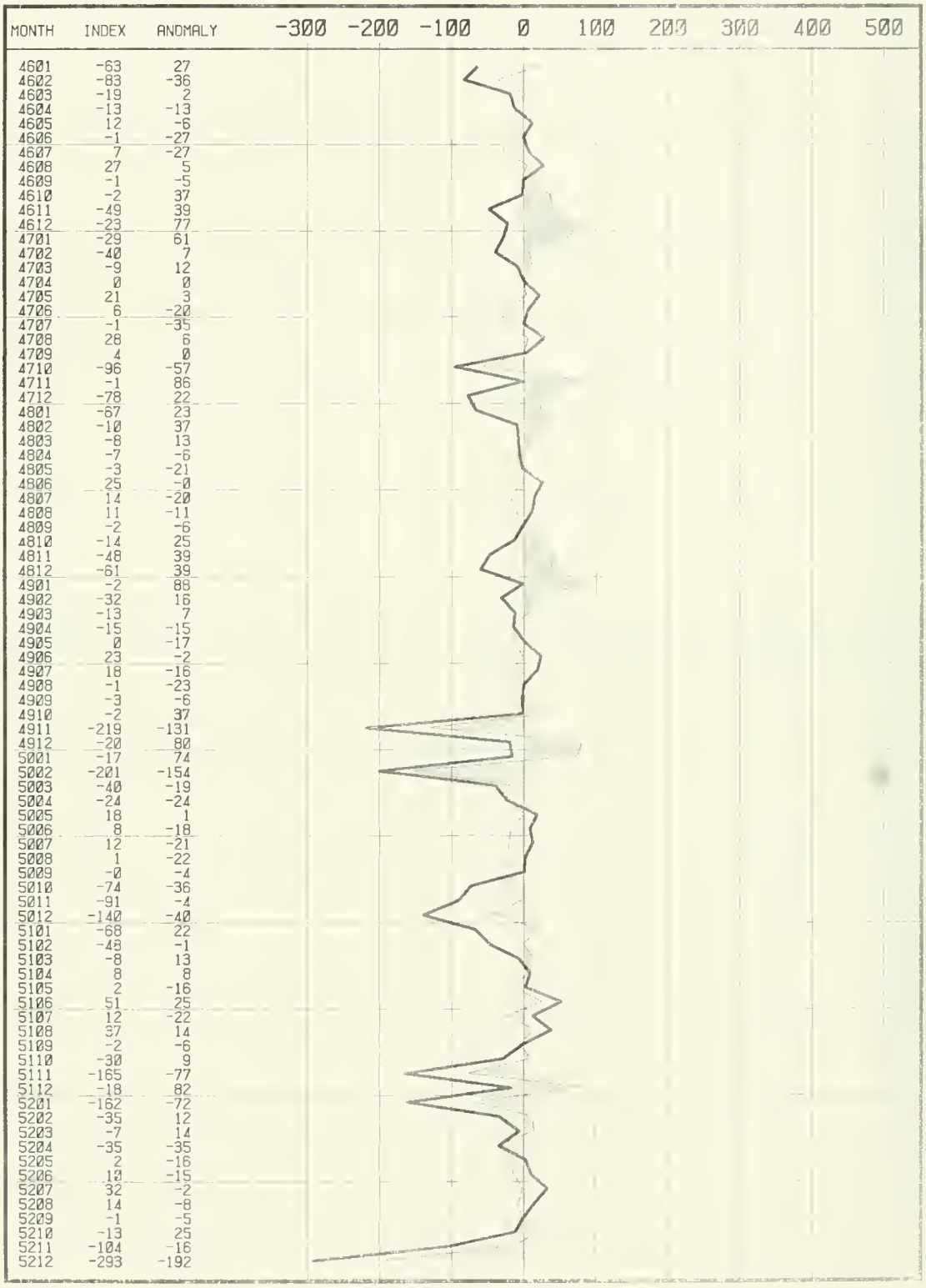
UPWELLING INDEX AT 51N, 131W BY YEAR

YEAR	INDEX	ANOMALY
1946	-12	7
1947	-8	11
1948	2	21
1949	-17	2
1950	-29	-10
1951	-6	13
1952	-27	-8
1953	-27	-8
1954	-27	-8
1955	-13	6
1956	-25	-6
1957	-13	6
1958	-45	-26
1959	-21	-2
1960	-23	-4
1961	-23	-4
1962	-15	4
1963	-37	-18
1964	-1	18
1965	-4	15
1966	-20	-1
1967	-8	11
1968	-28	-9
1969	-36	-17
1970	-12	7
1971	-7	12



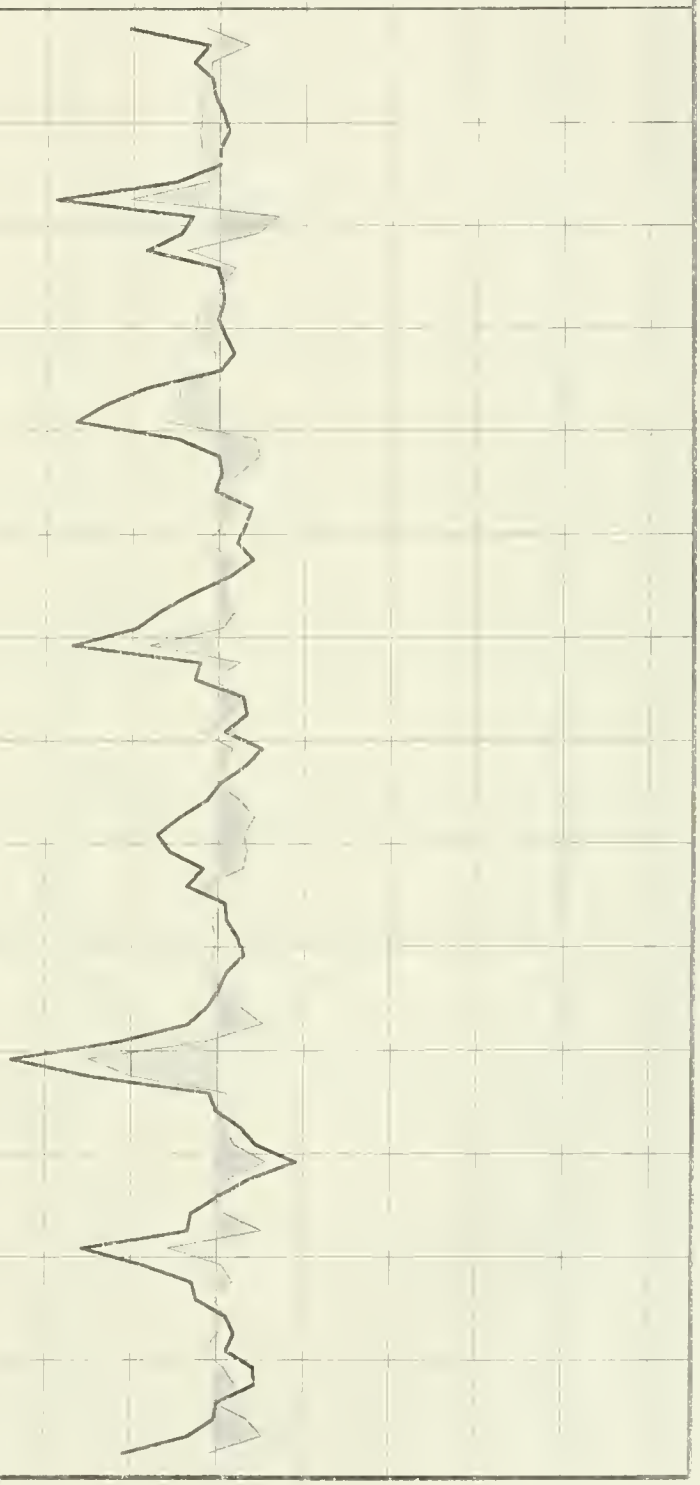
UPWELLING INDEX AT 48N, 125W BY MONTH

MONTH	INDEX	ANOMALY
4601	-63	27
4602	-83	-36
4603	-19	2
4604	-13	-13
4605	12	-6
4606	-1	-27
4607	7	-27
4608	27	5
4609	-1	-5
4610	-2	37
4611	-49	39
4612	-23	77
4701	-29	61
4702	-40	7
4703	-9	12
4704	0	0
4705	21	3
4706	6	-20
4707	-1	-35
4708	28	6
4709	4	0
4710	-96	-57
4711	-1	86
4712	-78	22
4801	-67	23
4802	-10	37
4803	-8	13
4804	-7	-6
4805	-3	-21
4806	25	-0
4807	14	-20
4808	11	-11
4809	-2	-6
4810	-14	25
4811	-48	39
4812	-61	39
4901	-2	88
4902	-32	16
4903	-13	7
4904	-15	-15
4905	0	-17
4906	23	-2
4907	18	-16
4908	-1	-23
4909	-3	-6
4910	-2	37
4911	-219	-131
4912	-20	80
5001	-17	74
5002	-201	-154
5003	-40	-19
5004	-24	-24
5005	18	1
5006	8	-18
5007	12	-21
5008	1	-22
5009	-0	-4
5010	-74	-36
5011	-91	-4
5012	-140	-40
5101	-68	22
5102	-48	-1
5103	-8	13
5104	8	8
5105	2	-16
5106	51	25
5107	12	-22
5108	37	14
5109	-2	-6
5110	-30	9
5111	-165	-77
5112	-18	82
5201	-162	-72
5202	-35	12
5203	-7	14
5204	-35	-35
5205	2	-16
5206	10	-15
5207	32	-2
5208	14	-8
5209	-1	-5
5210	-13	25
5211	-104	-16
5212	-293	-192

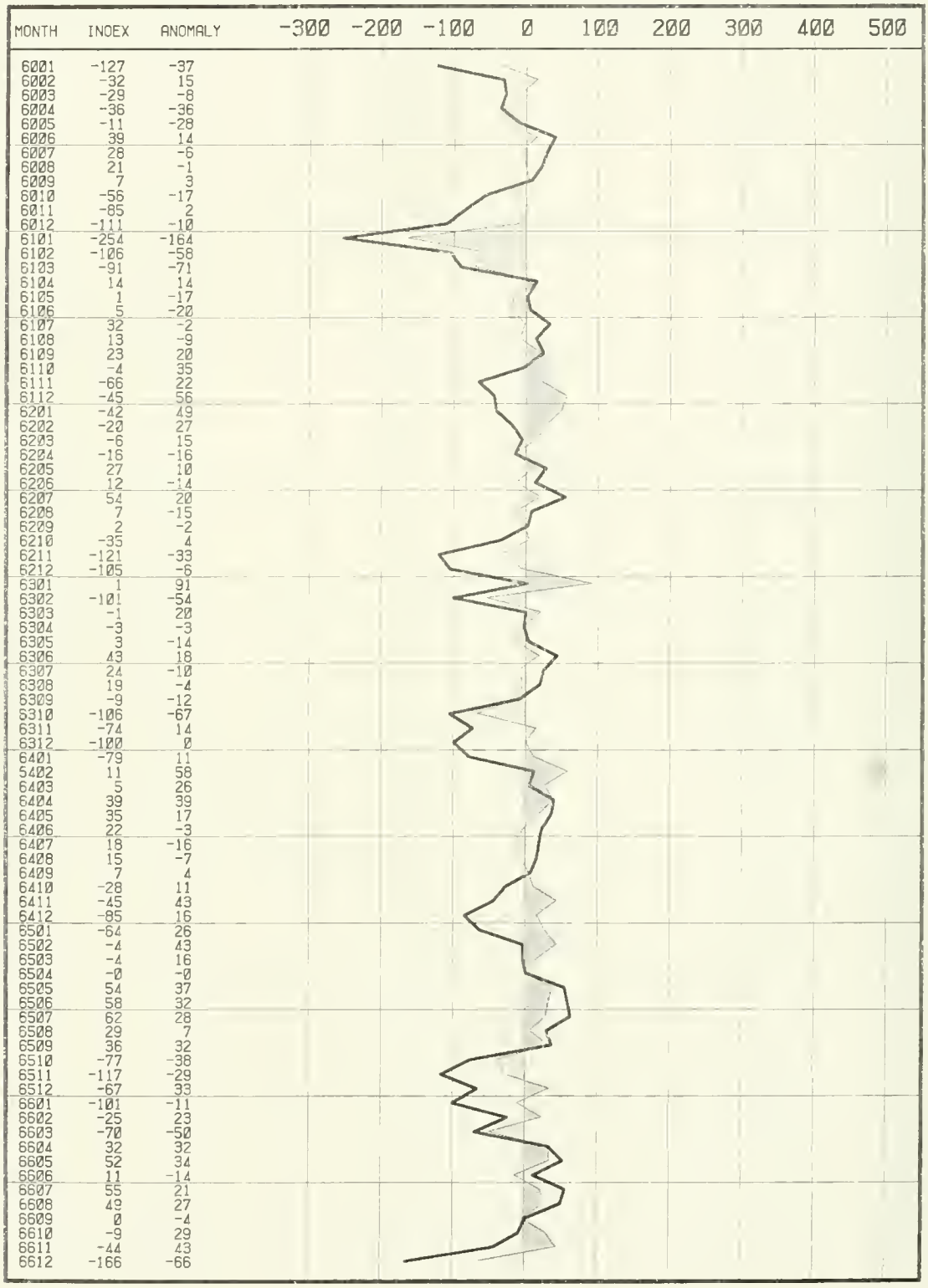


UPWELLING INDEX AT 48N, 125W BY MONTH

MONTH	INDEX	ANOMALY
5301	-108	-17
5302	-13	34
5303	-30	-10
5304	-9	-9
5305	-6	-24
5306	4	-21
5307	10	-23
5308	0	-22
5309	-0	-4
5310	-51	-13
5311	-190	-103
5312	-32	68
5401	-45	45
5402	-85	-38
5403	-3	18
5404	3	3
5405	4	-14
5406	-2	-27
5407	6	-28
5408	16	-6
5409	-0	-4
5410	-85	-46
5411	-133	-45
5412	-166	-65
5501	-49	41
5502	-1	47
5503	2	23
5504	-5	-4
5505	37	20
5506	30	4
5507	20	-14
5508	38	16
5509	11	7
5510	-32	7
5511	-68	19
5512	-96	5
5601	-170	-80
5602	-22	25
5603	-28	-7
5604	28	28
5605	32	14
5606	7	-19
5607	50	16
5608	31	8
5609	2	-2
5610	-14	25
5611	-46	42
5612	-71	30
5701	-57	33
5702	-18	29
5703	-37	-16
5704	8	8
5705	9	-9
5706	22	-3
5707	29	-5
5708	9	-14
5709	0	-4
5710	-13	26
5711	-35	52
5712	-114	-13
5801	-240	-150
5802	-148	-101
5803	-10	11
5804	-3	-3
5805	26	8
5806	44	19
5807	90	56
5808	36	13
5809	1	-2
5810	-31	8
5811	-35	52
5812	-157	-57
5901	-86	5
5902	-30	18
5903	-25	-4
5904	10	10
5905	19	1
5906	10	-16
5907	42	8
5908	43	21
5909	-0	-4
5910	-4	35
5911	-34	53
5912	-109	-8



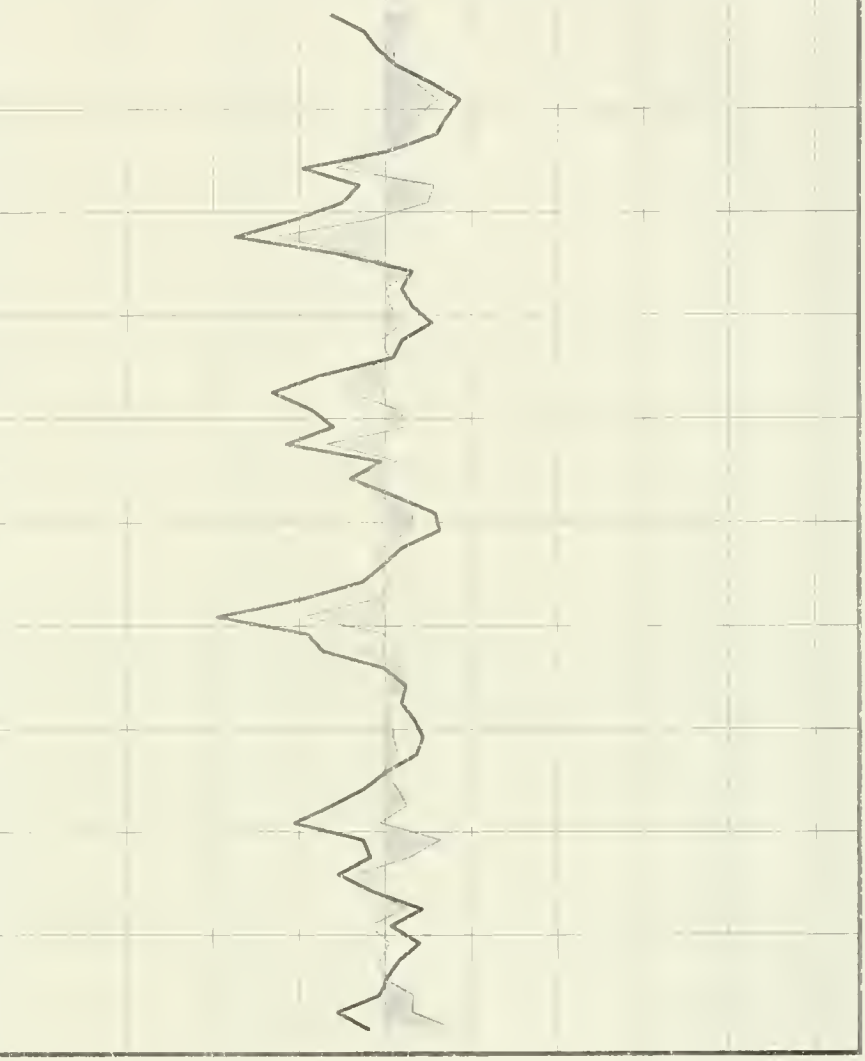
UPWELLING INDEX AT 48N, 125W BY MONTH



MONTH	INDEX	ANOMALY
6001	-127	-37
6002	-32	15
6003	-29	-8
6004	-36	-36
6005	-11	-28
6006	39	14
6007	28	-6
6008	21	-1
6009	7	3
6010	-56	-17
6011	-85	2
6012	-111	-10
6101	-254	-164
6102	-106	-58
6103	-91	-71
6104	14	14
6105	1	-17
6106	5	-20
6107	32	-2
6108	13	-9
6109	23	20
6110	-4	35
6111	-66	22
6112	-45	56
6201	-42	49
6202	-20	27
6203	-6	15
6204	-16	-16
6205	27	10
6206	12	-14
6207	54	20
6208	7	-15
6209	2	-2
6210	-35	4
6211	-121	-33
6212	-105	-6
6301	1	91
6302	-101	-54
6303	-1	20
6304	-3	-3
6305	3	-14
6306	43	18
6307	24	-10
6308	19	-4
6309	-9	-12
6310	-106	-67
6311	-74	14
6312	-100	0
6401	-79	11
6402	11	58
6403	5	26
6404	39	39
6405	35	17
6406	22	-3
6407	18	-16
6408	15	-7
6409	7	4
6410	-28	11
6411	-45	43
6412	-85	16
6501	-64	26
6502	-4	43
6503	-4	16
6504	-0	-0
6505	54	37
6506	58	32
6507	62	28
6508	29	7
6509	36	32
6510	-77	-38
6511	-117	-29
6512	-67	33
6601	-101	-11
6602	-25	23
6603	-70	-50
6604	32	32
6605	52	34
6606	11	-14
6607	55	21
6608	49	27
6609	0	-4
6610	-9	29
6611	-44	43
6612	-166	-66

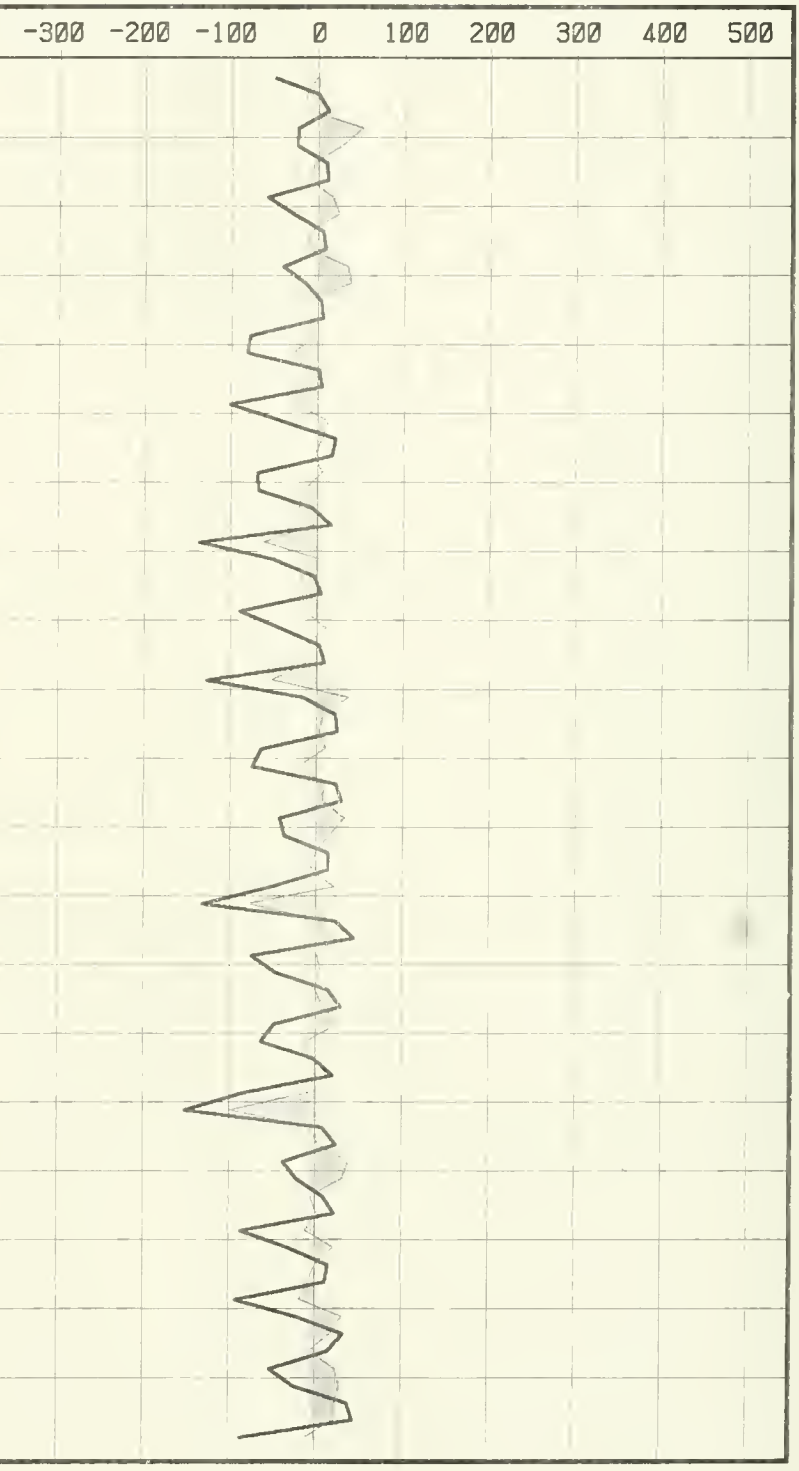
UPWELLING INDEX AT 48N, 125W BY MONTH

MONTH	INDEX	ANOMALY
6701	-67	23
6702	-27	21
6703	-12	8
6704	10	10
6705	51	33
6706	85	60
6707	78	36
6708	58	36
6709	3	-1
6710	-97	-58
6711	-32	56
6712	-51	49
6801	-107	-17
6802	-175	-128
6803	-55	-34
6804	30	30
6805	18	1
6806	30	5
6807	53	20
6808	18	-5
6809	8	4
6810	-76	-37
6811	-132	-44
6812	-87	13
6901	-61	29
6902	-116	-69
6903	-6	14
6904	-41	-41
6905	9	-8
6906	57	32
6907	62	28
6908	18	-4
6909	-3	-7
6910	-27	12
6911	-99	-11
6912	-196	-96
7001	-91	-1
7002	-73	-26
7003	-2	19
7004	23	23
7005	18	1
7006	33	8
7007	43	9
7008	36	14
7009	1	-3
7010	-25	14
7011	-63	25
7012	-106	-6
7101	-26	64
7102	-18	29
7103	-55	-34
7104	-14	-14
7105	42	25
7106	6	-19
7107	39	5
7108	15	-7
7109	1	-3
7110	-7	32
7111	-56	31
7112	-20	81



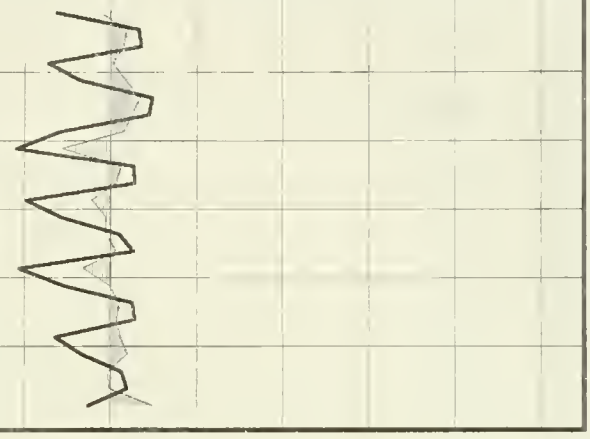
UPWELLING INDEX AT 48N, 125W BY QUARTER

QTR.	INDEX	ANOMALY
4601	-54	-1
4602	-1	-15
4603	11	-9
4604	-24	51
4701	-25	28
4702	9	-5
4703	10	-10
4704	-59	16
4801	-29	24
4802	5	-9
4803	8	-12
4804	-41	34
4901	-15	38
4902	3	-11
4903	5	-15
4904	-79	-3
5001	-82	-29
5002	1	-14
5003	4	-16
5004	-102	-27
5101	-41	12
5102	20	5
5103	16	-4
5104	-70	5
5201	-69	-16
5202	-7	-22
5203	15	-5
5204	-137	-62
5301	-52	1
5302	-4	-18
5303	4	-17
5304	-90	-15
5401	-43	10
5402	2	-13
5403	8	-13
5404	-128	-52
5501	-16	37
5502	21	7
5503	23	3
5504	-65	10
5601	-75	-22
5602	22	8
5603	28	7
5604	-43	32
5701	-38	15
5702	13	-1
5703	13	-7
5704	-54	21
5801	-132	-79
5802	22	8
5803	43	23
5804	-75	1
5901	-47	6
5902	13	-1
5903	28	8
5904	-49	26
6001	-64	-11
6002	-3	-17
6003	19	-1
6004	-84	-6
6101	-152	-99
6102	7	-8
6103	23	3
6104	-38	38
6201	-22	31
6202	8	-6
6203	21	1
6204	-87	-12
6301	-32	21
6302	14	-0
6303	11	-9
6304	-93	-18
6401	-22	31
6402	32	18
6403	14	-6
6404	-53	23
6501	-25	28
6502	37	23
6503	43	22
6504	-87	-11



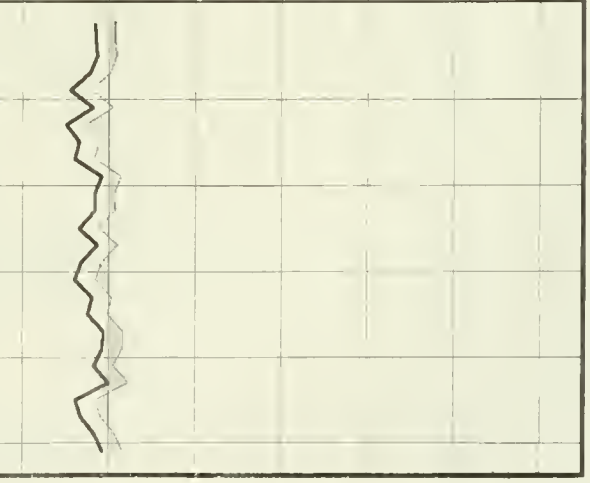
UPWELLING INDEX AT 48N, 125W BY QUARTER

QTR.	INDEX	ANOMALY
6601	-67	-14
6602	32	18
6603	35	15
6604	-73	2
6701	-36	17
6702	48	34
6703	44	24
6704	-60	15
6801	-110	-57
6802	26	12
6803	27	6
6804	-98	-22
6901	-59	-6
6902	9	-6
6903	26	6
6904	-107	-32
7001	-55	-2
7002	25	10
7003	27	7
7004	-65	11
7101	-34	19
7102	12	-3
7103	18	-2
7104	-27	48



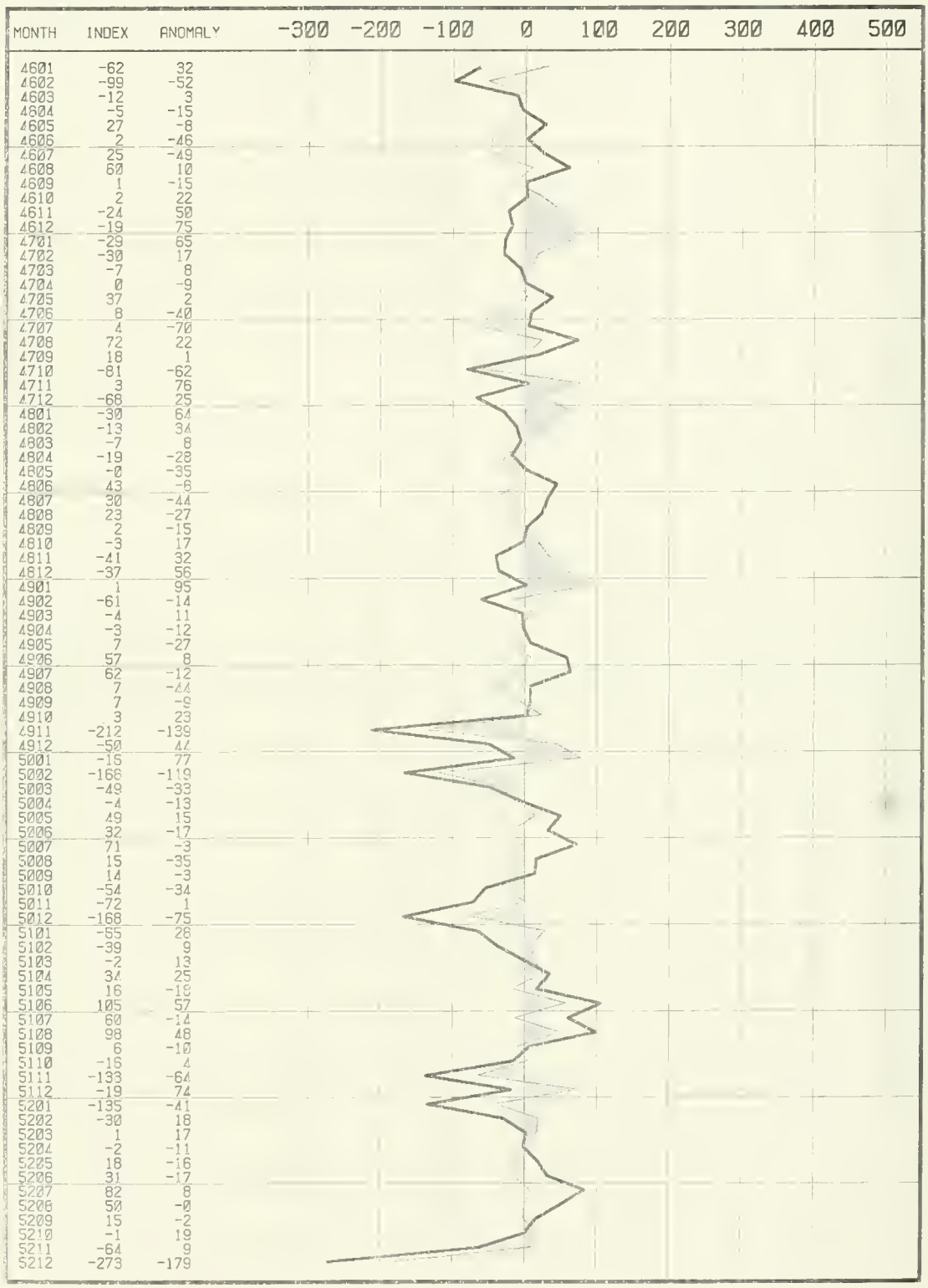
UPWELLING INDEX AT 48N, 125W BY YEAR

YEAR	INDEX	ANOMALY
1946	-17	7
1947	-16	7
1948	-14	9
1949	-22	2
1950	-45	-21
1951	-19	5
1952	-50	-26
1953	-35	-12
1954	-40	-17
1955	-9	14
1956	-17	6
1957	-17	7
1958	-35	-12
1959	-14	10
1960	-33	-9
1961	-40	-16
1962	-20	3
1963	-25	-2
1964	-7	16
1965	-8	16
1966	-18	5
1967	-1	23
1968	-39	-15
1969	-33	-10
1970	-17	7
1971	-8	16



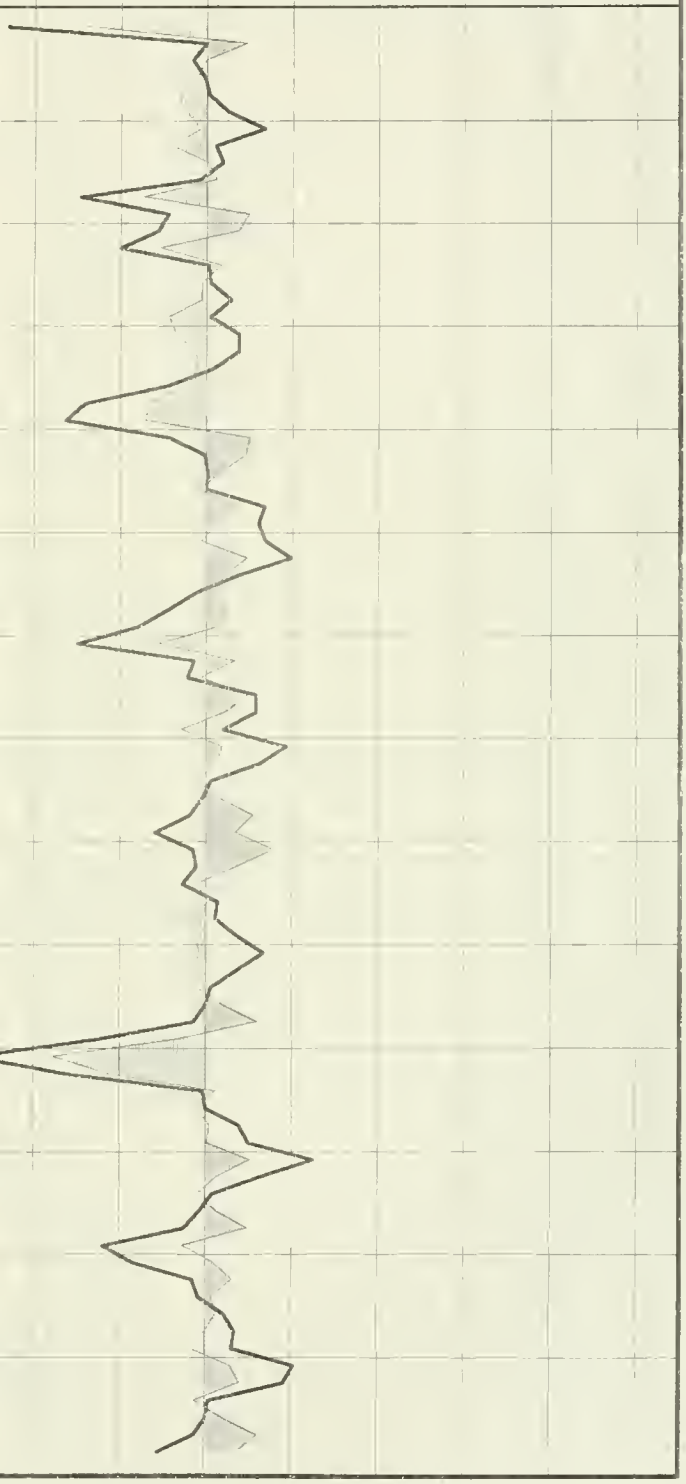
UPWELLING INDEX AT 45N, 125W BY MONTH

MONTH	INDEX	ANOMALY
4601	-62	32
4602	-99	-52
4603	-12	3
4604	-5	-15
4605	27	-8
4606	2	-46
4607	25	-49
4608	60	10
4609	1	-15
4610	2	22
4611	-24	50
4612	-19	75
4701	-29	65
4702	-30	17
4703	-7	8
4704	0	-9
4705	37	2
4706	8	-40
4707	4	-70
4708	72	22
4709	18	1
4710	-81	-62
4711	3	76
4712	-68	25
4801	-30	64
4802	-13	34
4803	-7	8
4804	-19	-28
4805	-0	-35
4806	43	-6
4807	30	-44
4808	23	-27
4809	2	-15
4810	-3	17
4811	-41	32
4812	-37	56
4901	1	95
4902	-61	-14
4903	-4	11
4904	-3	-12
4905	7	-27
4906	57	8
4907	62	-12
4908	7	-44
4909	7	-9
4910	3	23
4911	-212	-139
4912	-50	44
5001	-15	77
5002	-166	-119
5003	-49	-33
5004	-4	-13
5005	49	15
5006	32	-17
5007	71	-3
5008	15	-35
5009	14	-3
5010	-54	-34
5011	-72	1
5012	-168	-75
5101	-55	28
5102	-39	9
5103	-2	13
5104	34	25
5105	16	-18
5106	105	57
5107	60	-14
5108	98	48
5109	6	-10
5110	-16	4
5111	-133	-64
5112	-19	74
5201	-135	-41
5202	-30	18
5203	1	17
5204	-2	-11
5205	18	-16
5206	31	-17
5207	82	8
5208	50	-0
5209	15	-2
5210	-1	19
5211	-64	9
5212	-273	-179



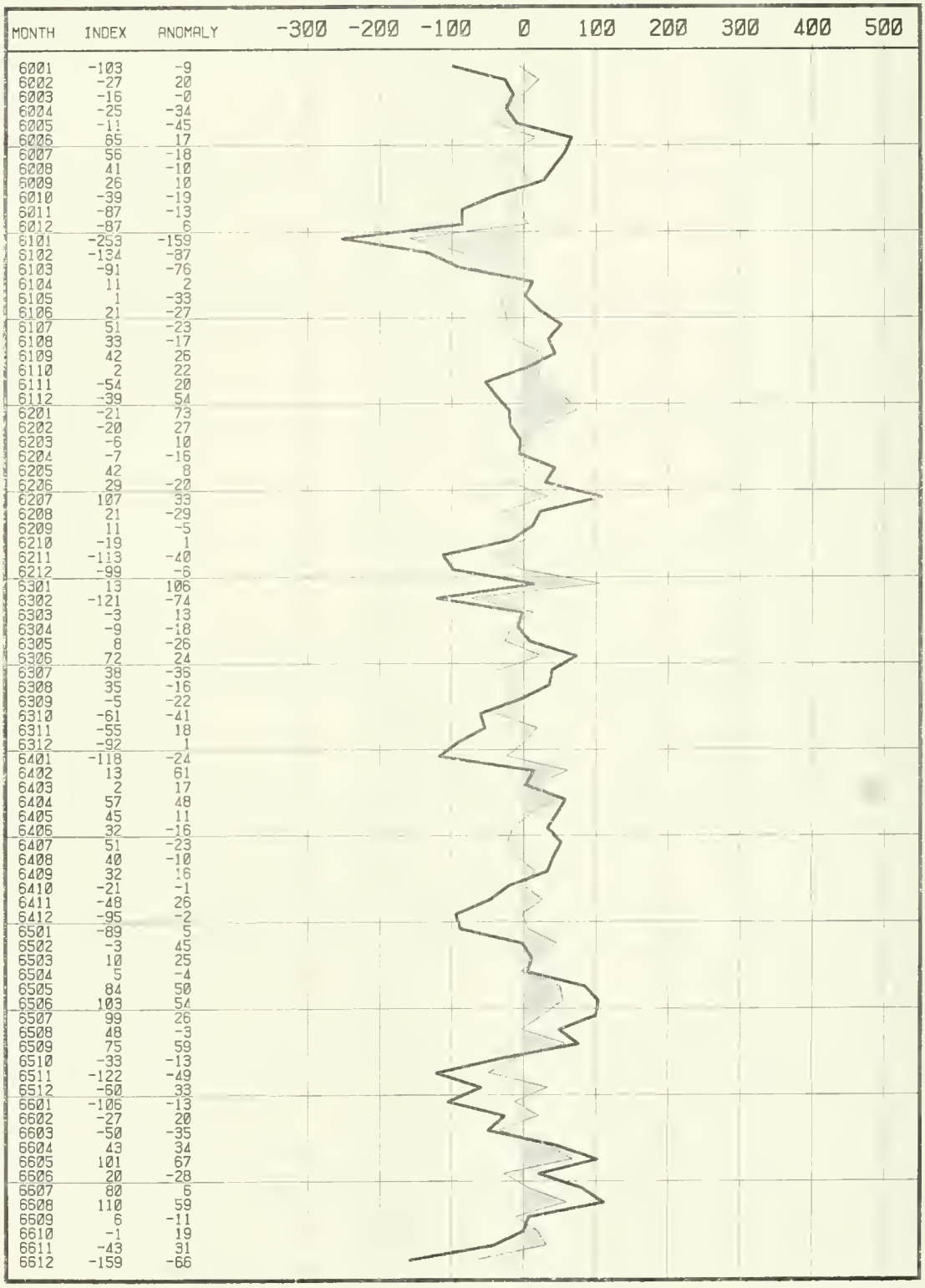
UPWELLING INDEX AT 45N, 125W BY MONTH

MONTH	INDEX	ANOMALY
5301	-235	-141
5302	-1	46
5303	-17	-1
5304	-3	-12
5305	2	-33
5306	24	-25
5307	67	-7
5308	10	-41
5309	18	1
5310	-9	11
5311	-147	-73
5312	-45	49
5401	-57	37
5402	-101	-54
5403	2	17
5404	4	-5
5405	28	-6
5406	4	-44
5407	37	-36
5408	37	-13
5409	7	-10
5410	-47	-27
5411	-141	-68
5412	-164	-71
5501	-44	50
5502	-2	46
5503	1	16
5504	0	-9
5505	67	33
5506	60	12
5507	68	-6
5508	98	47
5509	37	21
5510	-11	9
5511	-44	29
5512	-79	15
5601	-150	-56
5602	-15	33
5603	-22	-6
5604	57	48
5605	57	22
5606	19	-29
5607	92	18
5608	62	12
5609	5	-11
5610	-5	15
5611	-20	54
5612	-60	34
5701	-16	78
5702	-12	35
5703	-28	-12
5704	13	4
5705	10	-24
5706	35	-13
5707	66	-8
5708	35	-16
5709	5	-11
5710	-1	19
5711	-15	59
5712	-125	-32
5801	-271	-177
5802	-162	-114
5803	-4	11
5804	-1	-10
5805	38	4
5806	49	1
5807	124	51
5808	63	13
5809	7	-10
5810	-8	12
5811	-26	48
5812	-120	-27
5901	-85	9
5902	-16	31
5903	-9	7
5904	21	12
5905	33	-1
5906	30	-18
5907	102	29
5908	90	39
5909	3	-13
5910	0	20
5911	-14	60
5912	-56	37

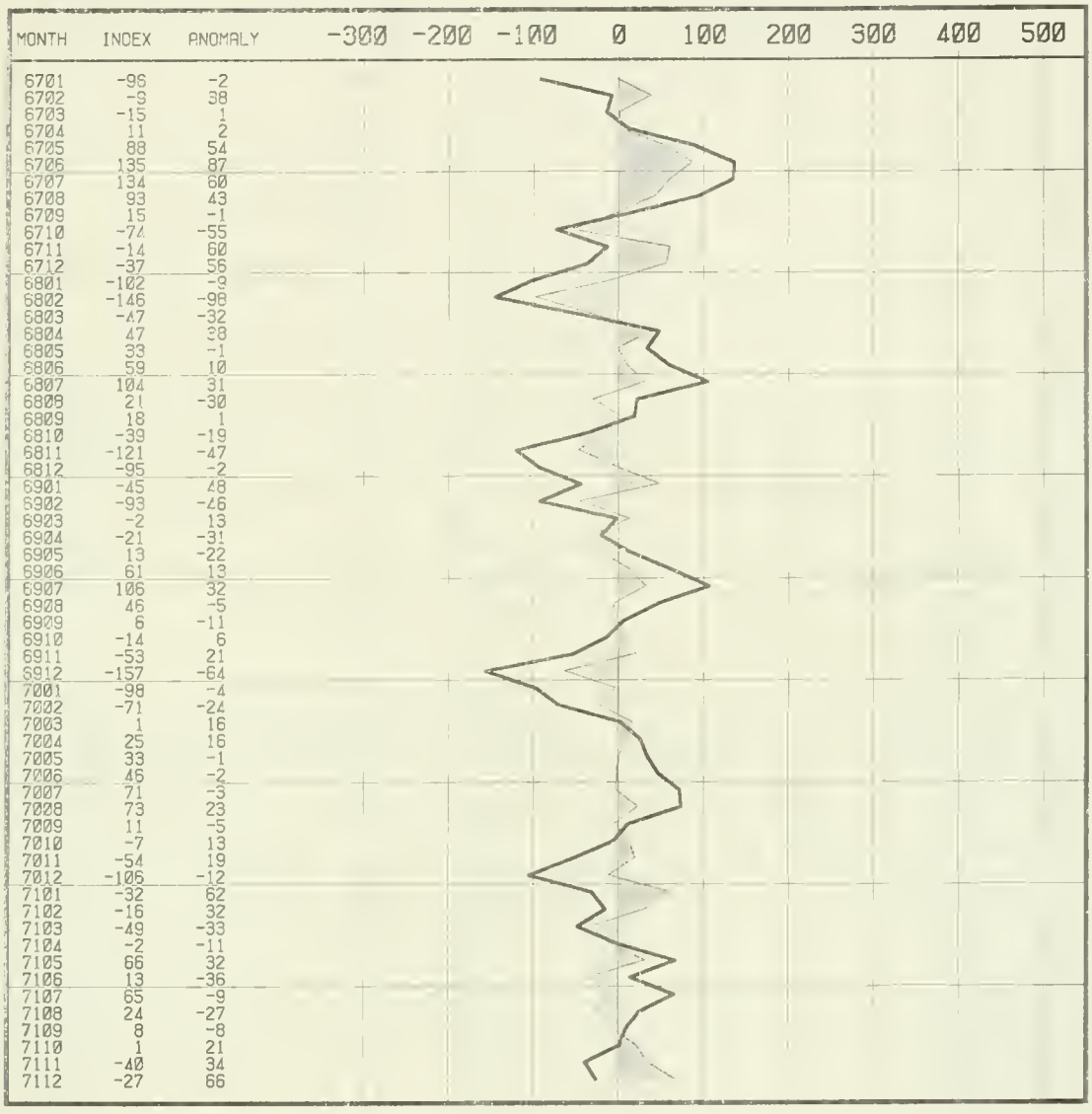


UPWELLING INDEX AT 45N, 125W BY MONTH

MONTH	INDEX	ANOMALY
6001	-103	-9
6002	-27	20
6003	-16	-0
6004	-25	-34
6005	-11	-45
6006	65	17
6007	56	-18
6008	41	-10
6009	26	10
6010	-39	-19
6011	-87	-13
6012	-87	6
6101	-253	-159
6102	-134	-87
6103	-91	-76
6104	11	2
6105	1	-33
6106	21	-27
6107	51	-23
6108	33	-17
6109	42	26
6110	2	22
6111	-54	20
6112	-39	54
6201	-21	73
6202	-20	27
6203	-6	10
6204	-7	-16
6205	42	8
6206	29	-20
6207	107	33
6208	21	-29
6209	11	-5
6210	-19	1
6211	-113	-40
6212	-99	-6
6301	13	106
6302	-121	-74
6303	-3	13
6304	-9	-18
6305	8	-26
6306	72	24
6307	38	-35
6308	35	-16
6309	-5	-22
6310	-61	-41
6311	-55	18
6312	-92	1
6401	-118	-24
6402	13	61
6403	2	17
6404	57	48
6405	45	11
6406	32	-16
6407	51	-23
6408	40	-10
6409	32	16
6410	-21	-1
6411	-48	26
6412	-95	-2
6501	-89	5
6502	-3	45
6503	10	25
6504	5	-4
6505	84	50
6506	103	54
6507	99	26
6508	48	-3
6509	75	59
6510	-33	-13
6511	-122	-49
6512	-60	33
6601	-106	-13
6602	-27	20
6603	-50	-35
6604	43	34
6605	101	67
6606	20	-28
6607	80	6
6608	110	59
6609	6	-11
6610	-1	19
6611	-43	31
6612	-159	-66

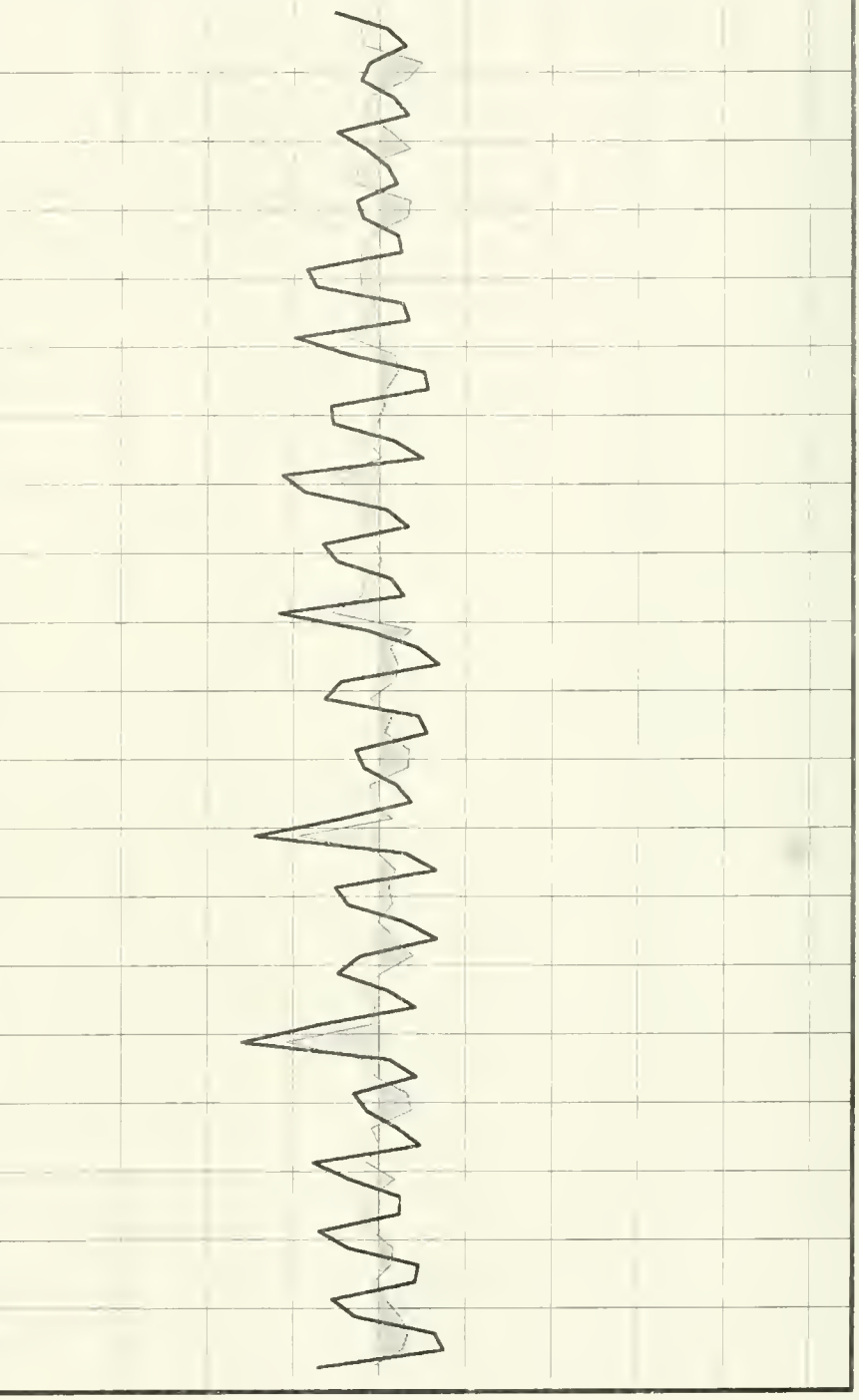


UPWELLING INDEX AT 45N, 125W BY MONTH



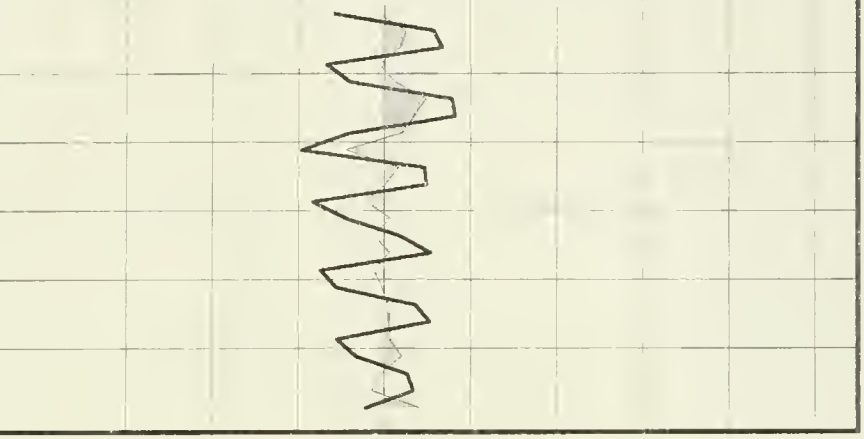
UPWELLING INDEX AT 45N, 125W BY QUARTER

QTR.	INDEX	ANOMALY
4601	-56	-4
4602	8	-23
4603	29	-18
4604	-13	49
4701	-22	31
4702	15	-15
4703	32	-16
4704	-50	12
4801	-17	35
4802	8	-23
4803	19	-29
4804	-27	35
4901	-20	32
4902	20	-11
4903	25	-22
4904	-85	-23
5001	-74	-22
5002	26	-5
5003	33	-14
5004	-98	-36
5101	-35	17
5102	51	21
5103	55	8
5104	-57	5
5201	-55	-3
5202	16	-15
5203	49	2
5204	-113	-51
5301	-87	-35
5302	7	-23
5303	32	-16
5304	-66	-4
5401	-50	2
5402	12	-18
5403	27	-20
5404	-117	-55
5501	-15	37
5502	43	12
5503	68	21
5504	-45	18
5601	-64	-11
5602	44	14
5603	54	7
5604	-28	34
5701	-19	33
5702	19	-11
5703	36	-12
5704	-47	15
5801	-145	-93
5802	29	-2
5803	65	18
5804	-52	11
5901	-37	15
5902	28	-2
5903	66	19
5904	-23	39
6001	-49	3
6002	9	-21
6003	41	-6
6004	-71	-9
6101	-160	-108
6102	11	-20
6103	42	-5
6104	-30	32
6201	-15	37
6202	21	-9
6203	47	-0
6204	-77	-15
6301	-34	18
6302	24	-7
6303	23	-25
6304	-70	-8
6401	-36	16
6402	45	14
6403	41	-6
6404	-55	7
6501	-28	24
6502	64	34
6503	74	27
6504	-71	-9



UPWELLING INDEX AT 45N, 125W BY QUARTER

QTR.	INDEX	ANOMALY
6601	-62	-10
6602	56	25
6603	66	18
6604	-68	-6
6701	-41	11
6702	78	48
6703	81	34
6704	-42	20
6801	-97	-45
6802	46	16
6803	48	1
6804	-84	-22
6901	-45	7
6902	17	-13
6903	53	6
6904	-75	-13
7001	-56	-3
7002	35	4
7003	52	5
7004	-56	6
7101	-33	20
7102	26	-5
7103	33	-15
7104	-22	40

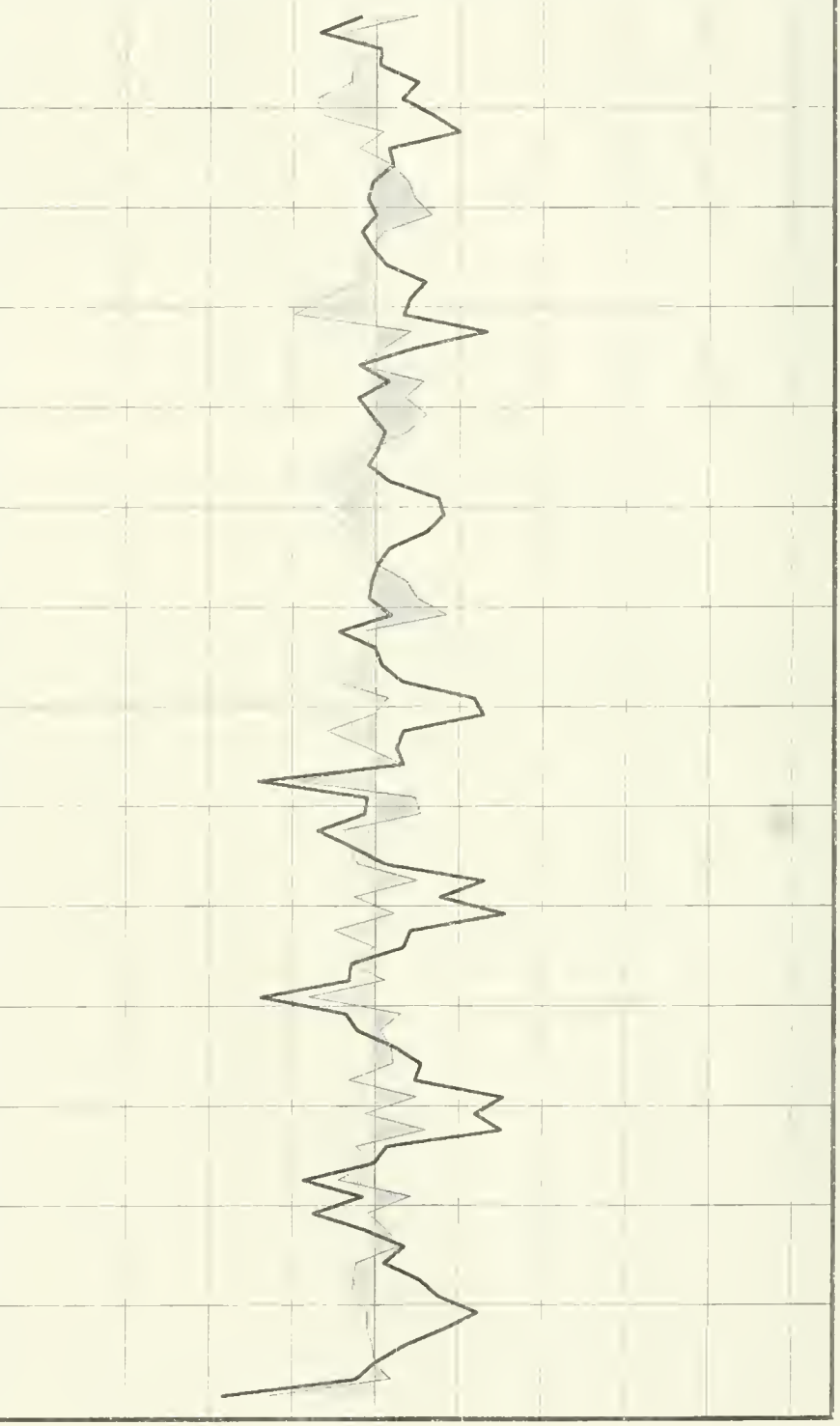


UPWELLING INDEX AT 45N, 125W BY YEAR

YEAR	INDEX	ANOMALY
1946	-8	1
1947	-6	3
1948	-4	5
1949	-15	-6
1950	-28	-19
1951	4	13
1952	-26	-17
1953	-28	-19
1954	-32	-23
1955	13	22
1956	2	11
1957	-3	6
1958	-25	-16
1959	8	17
1960	-17	-8
1961	-34	-25
1962	-6	3
1963	-14	-5
1964	-1	8
1965	10	19
1966	-2	7
1967	19	28
1968	-22	-12
1969	-12	-3
1970	-6	3
1971	1	10

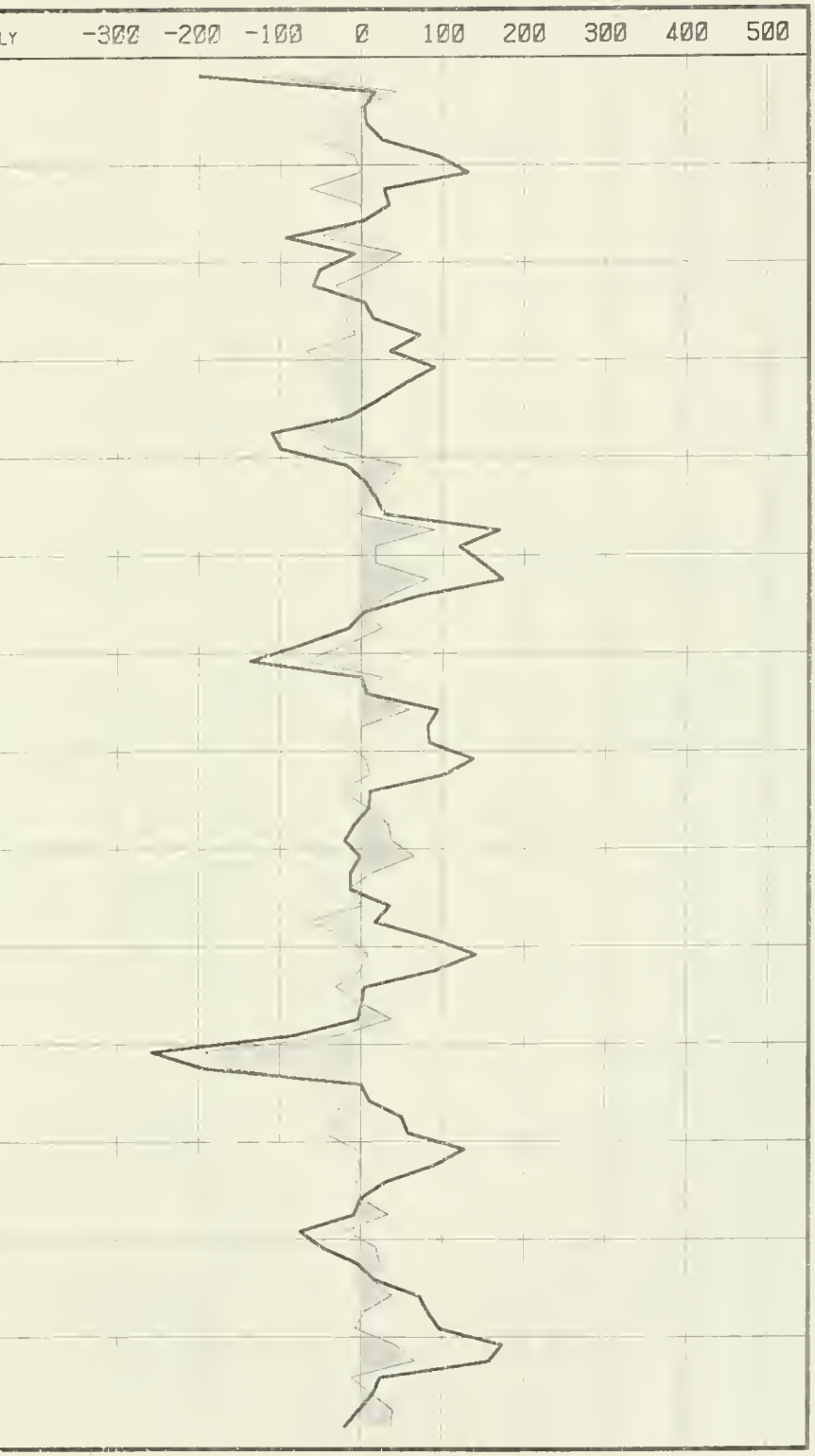
UPWELLING INDEX AT 42N, 125W BY MONTH

MONTH	INDEX	ANOMALY
4601	-16	51
4602	-68	-40
4603	5	2
4604	4	-29
4605	49	-30
4606	30	-73
4607	58	-64
4608	99	8
4609	14	-21
4610	19	19
4611	-5	38
4612	-11	46
4701	-1	66
4702	-18	9
4703	-5	-9
4704	12	-22
4705	58	-21
4706	40	-53
4707	32	-99
4708	132	41
4709	44	9
4710	-21	-22
4711	14	56
4712	-22	35
4801	-7	60
4802	10	38
4803	2	-1
4804	-10	-43
4805	15	-64
4806	74	-29
4807	80	-52
4808	60	-31
4809	15	-20
4810	1	1
4811	-6	36
4812	-9	49
4901	17	64
4902	-45	-17
4903	-1	-5
4904	6	-27
4905	30	-49
4906	117	14
4907	128	-3
4908	32	-59
4909	24	-12
4910	32	32
4911	-141	-98
4912	-11	47
5001	-14	53
5002	-70	-42
5003	-27	-30
5004	11	-22
5005	129	50
5006	77	-26
5007	154	22
5008	41	-50
5009	33	-2
5010	-30	-30
5011	-32	11
5012	-136	-80
5101	-36	30
5102	-22	6
5103	23	19
5104	54	21
5105	47	-32
5106	152	49
5107	119	-12
5108	150	60
5109	13	-23
5110	-2	-2
5111	-87	-45
5112	-16	42
5201	-75	-9
5202	-14	13
5203	34	30
5204	10	-23
5205	53	-26
5206	75	-28
5207	122	-10
5208	81	-10
5209	33	-3
5210	-1	-1
5211	-24	18
5212	-184	-127



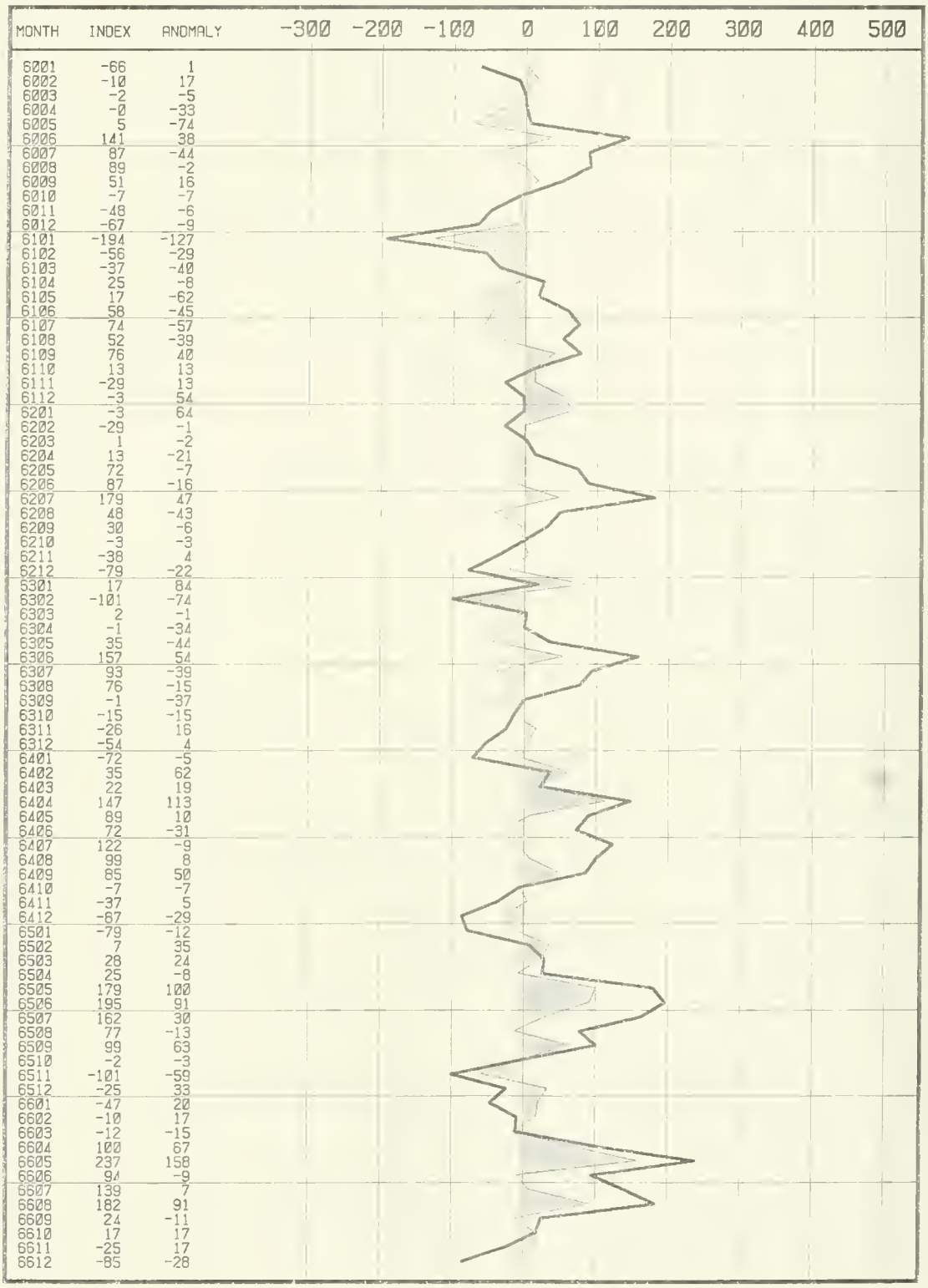
UPWELLING INDEX AT 42N, 125W BY MONTH

MONTH	INDEX	ANOMALY
5301	-204	-137
5302	15	43
5303	3	-1
5304	5	-26
5305	25	-54
5306	94	-9
5307	130	-2
5308	27	-64
5309	33	-2
5310	1	1
5311	-94	-51
5312	-9	48
5401	-52	14
5402	-60	-32
5403	3	-1
5404	14	-19
5405	71	-8
5406	35	-68
5407	89	-43
5408	52	-39
5409	19	-16
5410	-16	-16
5411	-111	-68
5412	-100	-43
5501	-19	48
5502	4	32
5503	17	14
5504	28	-5
5505	169	90
5506	120	17
5507	148	17
5508	173	82
5509	70	34
5510	3	3
5511	-17	26
5512	-75	-18
5601	-137	-70
5602	-1	26
5603	6	3
5604	93	59
5605	81	2
5606	83	-21
5607	137	5
5608	101	10
5609	10	-26
5610	9	9
5611	-9	33
5612	-21	37
5701	-2	65
5702	-14	14
5703	-14	-17
5704	34	1
5705	16	-63
5706	85	-18
5707	140	8
5708	89	-2
5709	3	-32
5710	0	-0
5711	-5	37
5712	-86	-28
5801	-258	-192
5802	-194	-166
5803	-1	-4
5804	9	-24
5805	49	-30
5806	57	-46
5807	126	-6
5808	89	-2
5809	30	-6
5810	-1	-1
5811	-9	33
5812	-75	-18
5901	-49	18
5902	-5	23
5903	15	13
5904	71	38
5905	82	4
5906	96	-7
5907	173	42
5908	157	66
5909	23	-12
5910	14	14
5911	-3	39
5912	-20	37



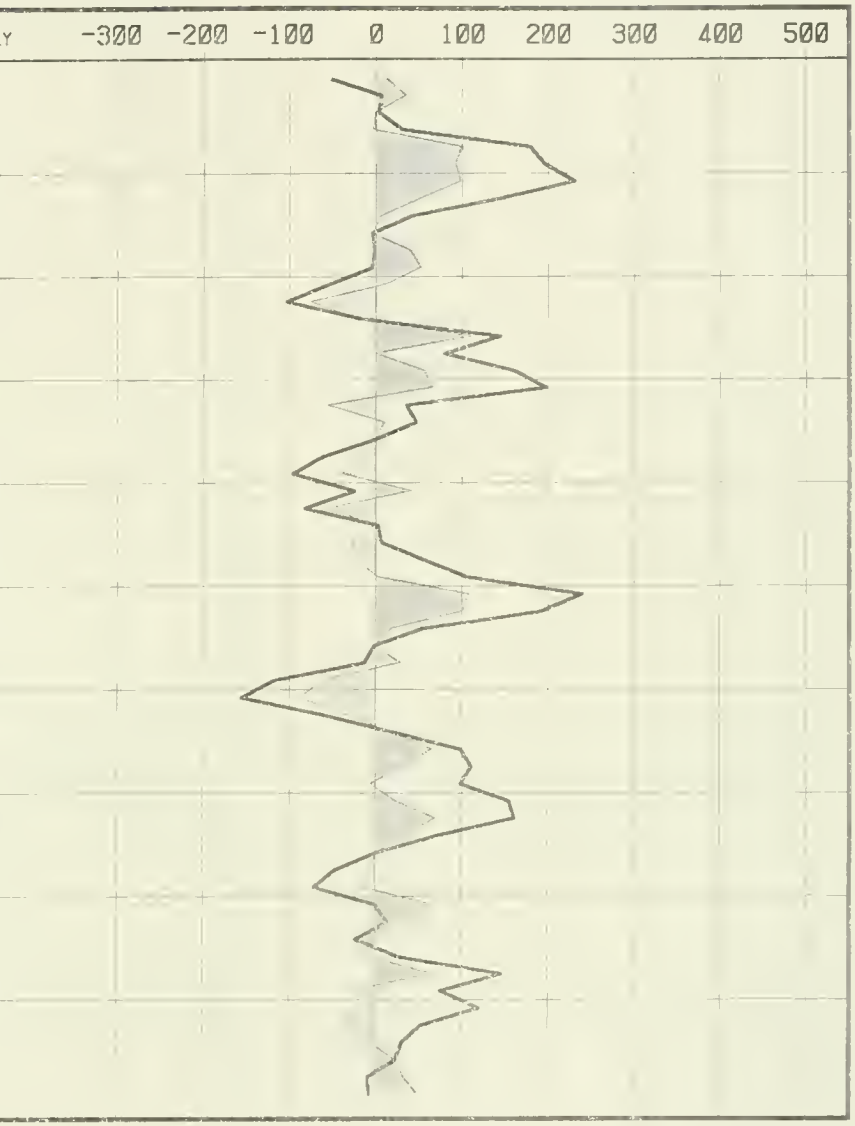
UPWELLING INDEX AT 42N, 125W BY MONTH

MONTH	INDEX	ANOMALY
6001	-66	1
6002	-10	17
6003	-2	-5
6004	-0	-33
6005	5	-74
6006	141	38
6007	87	-44
6008	89	-2
6009	51	16
6010	-7	-7
6011	-48	-6
6012	-67	-9
6101	-194	-127
6102	-56	-29
6103	-37	-40
6104	25	-8
6105	17	-62
6106	58	-45
6107	74	-57
6108	52	-39
6109	76	40
6110	13	13
6111	-29	13
6112	-3	54
6201	-3	64
6202	-29	-1
6203	1	-2
6204	13	-21
6205	72	-7
6206	87	-16
6207	179	47
6208	48	-43
6209	30	-6
6210	-3	-3
6211	-38	4
6212	-79	-22
5301	17	84
6302	-101	-74
6303	2	-1
6304	-1	-34
6305	35	-44
6306	157	54
6307	93	-39
6308	76	-15
6309	-1	-37
6310	-15	-15
6311	-26	16
6312	-54	4
6401	-72	-5
6402	35	62
6403	22	19
6404	147	113
6405	89	10
6406	72	-31
6407	122	-9
6408	99	8
6409	85	50
6410	-7	-7
6411	-37	5
6412	-67	-29
6501	-79	-12
6502	7	35
6503	28	24
6504	25	-8
6505	179	100
6506	195	91
6507	162	30
6508	77	-13
6509	99	63
6510	-2	-3
6511	-101	-59
6512	-25	33
6601	-47	20
6602	-10	17
6603	-12	-15
6604	100	67
6605	237	158
6606	94	-9
6607	139	7
6608	182	91
6609	24	-11
6610	17	17
6611	-25	17
6612	-85	-28



UPWELLING INDEX AT 42N, 125W BY MONTH

MONTH	INDEX	ANOMALY
6701	-55	12
6702	6	34
6703	3	-1
6704	30	-3
6705	178	99
6706	195	92
6707	230	98
6708	142	51
6709	41	5
6710	-5	-5
6711	-2	40
6712	-5	52
6801	-56	10
6802	-104	-75
6803	-17	-21
6804	144	111
6805	79	0
6806	160	56
6807	197	65
6808	35	-56
6809	46	10
6810	-2	-2
6811	-62	-20
6812	-97	-39
6901	-25	41
6902	-83	-55
6903	2	-2
6904	6	-27
6905	55	-24
6906	105	2
6907	239	108
6908	191	100
6909	54	18
6910	-2	-2
6911	-14	28
6912	-119	-61
7001	-156	-89
7002	-62	-34
7003	18	15
7004	98	65
7005	110	31
7006	98	-6
7007	154	23
7008	160	69
7009	71	36
7010	0	0
7011	-43	-6
7012	-72	-14
7101	-1	55
7102	13	41
7103	-23	-26
7104	26	-7
7105	145	66
7106	75	-28
7107	119	-12
7108	52	-39
7109	30	-5
7110	23	23
7111	-9	33
7112	-8	49

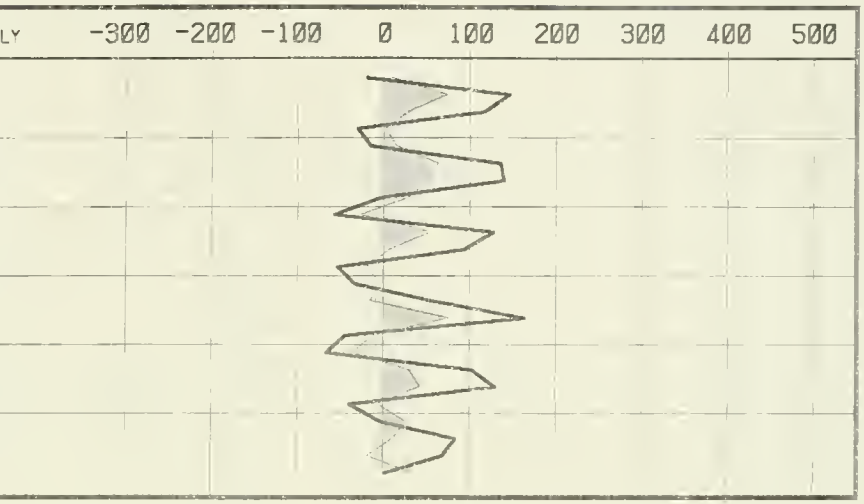


UPWELLING INDEX AT 42N, 125W BY QUARTER

QTR.	INDEX	ANOMALY
4601	-25	6
4602	28	-44
4603	61	-26
4604	1	34
4701	-8	23
4702	37	-35
4703	70	-17
4704	-10	23
4801	1	32
4802	26	-46
4803	52	-35
4804	-5	28
4901	-9	22
4902	51	-21
4903	62	-25
4904	-39	-6
5001	-36	-5
5002	73	1
5003	76	-10
5004	-67	-34
5101	-12	19
5102	84	12
5103	95	8
5104	-34	-1
5201	-19	12
5202	46	-25
5203	79	-8
5204	-70	-37
5301	-65	-34
5302	41	-31
5303	63	-23
5304	-33	-0
5401	-36	-5
5402	40	-32
5403	54	-33
5404	-75	-42
5501	1	31
5502	106	34
5503	131	45
5504	-30	3
5601	-46	-15
5602	85	14
5603	83	-3
5604	-7	26
5701	-10	21
5702	45	-27
5703	78	-9
5704	-30	3
5801	-149	-119
5802	39	-33
5803	82	-4
5804	-29	4
5901	-13	18
5902	83	11
5903	119	32
5904	-3	30
6001	-27	4
6002	48	-24
6003	76	-10
6004	-40	-7
6101	-97	-66
6102	33	-39
6103	67	-19
6104	-6	27
6201	-10	21
6202	57	-15
6203	86	-0
6204	-40	-7
6301	-25	5
6302	63	-9
6303	57	-30
6304	-32	2
6401	-6	24
6402	102	30
6403	102	16
6404	-44	-11
6501	-15	15
6502	134	62
6503	113	26
6504	-42	-9

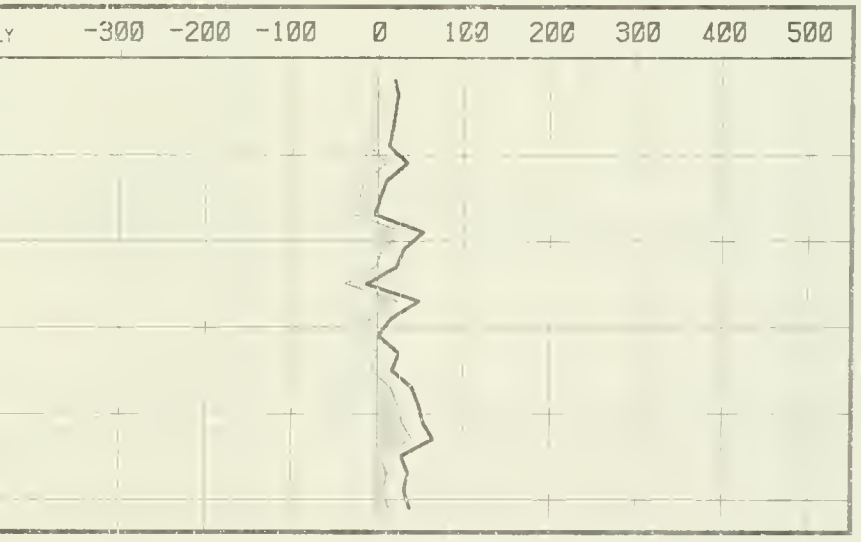
UPWELLING INDEX AT 42N, 125W BY QUARTER

QTR.	INDEX	ANOMALY
6601	-24	7
6602	145	73
6603	116	29
6604	-31	2
6701	-16	14
6702	135	63
6703	139	52
6704	-4	29
6801	-58	-27
6802	127	55
6803	93	7
6804	-54	-20
6901	-34	-4
6902	56	-16
6903	163	76
6904	-45	-12
7001	-67	-36
7002	102	30
7003	129	42
7004	-40	-7
7101	-4	26
7102	83	11
7103	68	-19
7104	2	35



UPWELLING INDEX AT 42N, 125W BY YEAR

YEAR	INDEX	ANOMALY
1946	17	-7
1947	22	-2
1948	19	-5
1949	16	-8
1950	12	-12
1951	33	10
1952	9	-15
1953	2	-22
1954	-4	-28
1955	52	28
1956	29	5
1957	21	-3
1958	-14	-38
1959	47	23
1960	15	-9
1961	-0	-24
1962	24	-0
1963	16	-8
1964	39	15
1965	47	23
1966	52	28
1967	64	40
1968	27	4
1969	35	11
1970	31	8
1971	37	13

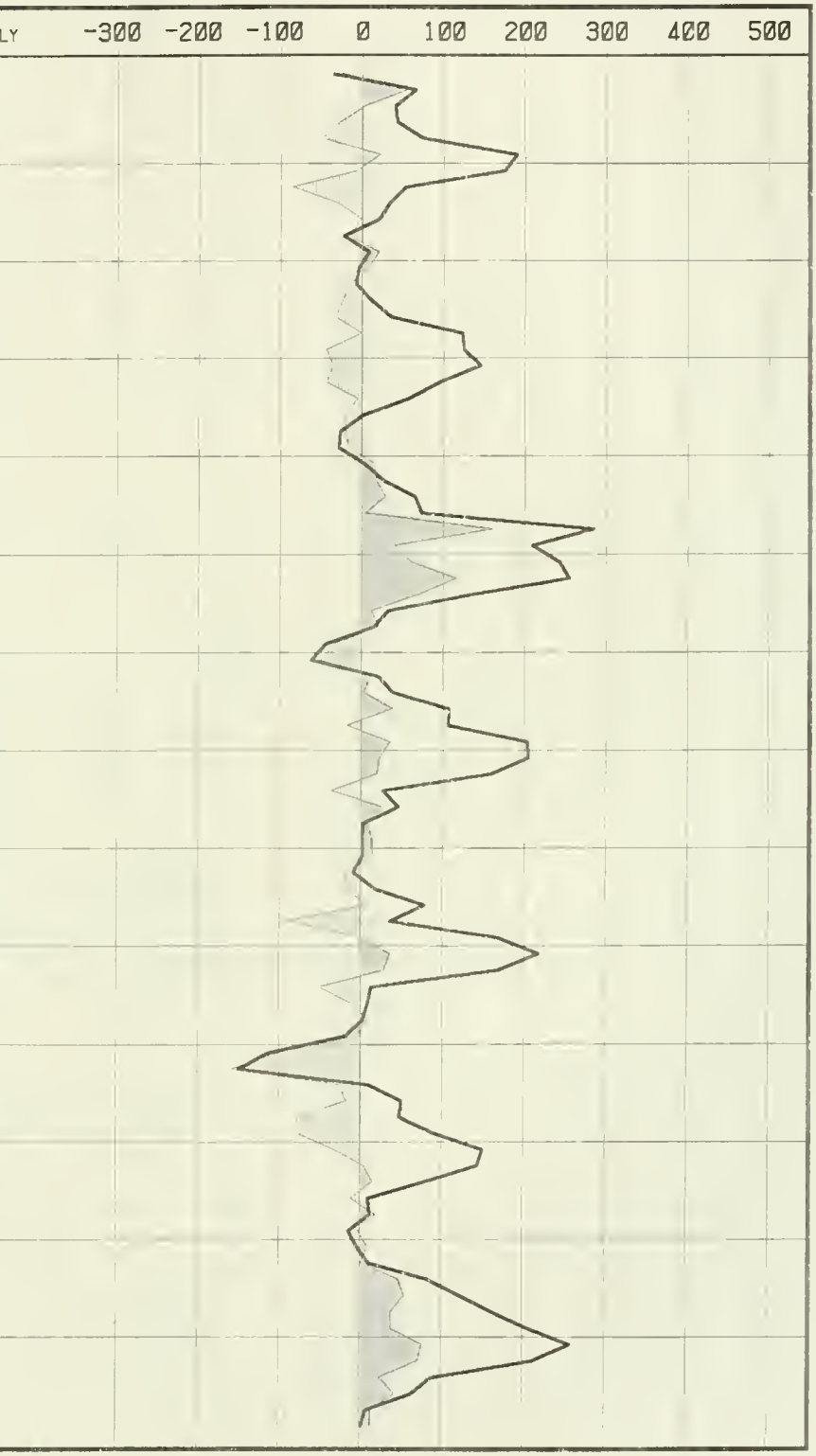


UPWELLING INDEX AT 39N, 125W BY MONTH

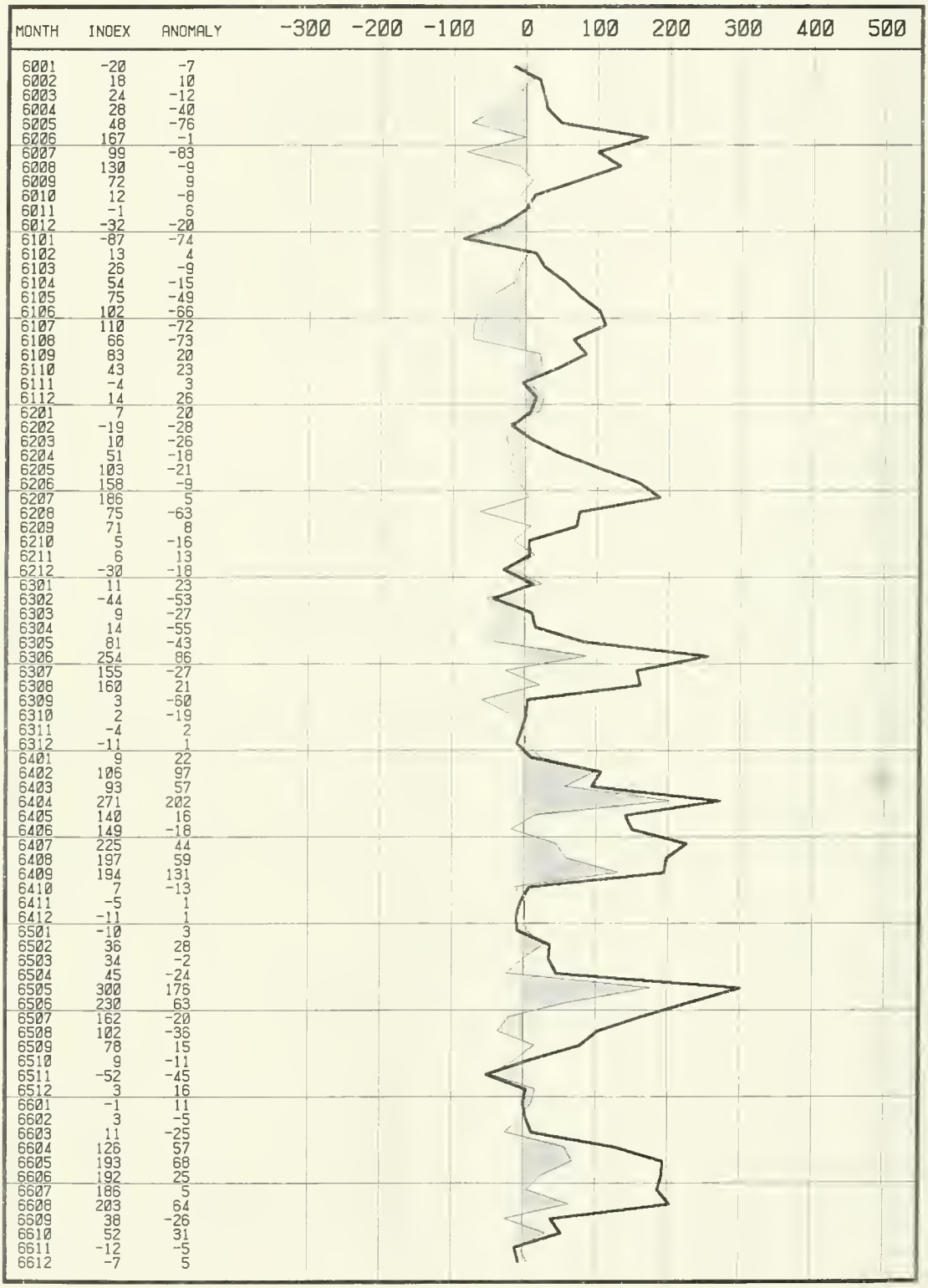
MONTH	INDEX	ANOMALY
4601	6	19
4602	-10	-19
4603	45	9
4604	36	-33
4605	85	-39
4606	111	-56
4607	140	-42
4608	155	16
4609	35	-28
4610	59	39
4611	5	11
4612	-5	7
4701	14	26
4702	-3	-12
4703	2	-34
4704	60	-8
4705	68	-56
4706	122	-45
4707	83	-99
4708	169	31
4709	81	18
4710	9	-11
4711	44	50
4712	1	14
4801	-4	9
4802	49	41
4803	28	-8
4804	7	-62
4805	47	-77
4806	108	-59
4807	148	-34
4808	117	-21
4809	54	-9
4810	12	-9
4811	7	14
4812	7	20
4901	40	53
4902	22	13
4903	-4	-40
4904	44	-25
4905	67	-57
4906	165	-3
4907	160	-22
4908	74	-65
4909	41	-22
4910	65	45
4911	-35	-29
4912	11	23
5001	24	37
5002	-7	-15
5003	12	-24
5004	72	3
5005	210	86
5006	121	-46
5007	205	24
5008	90	-48
5009	48	-15
5010	-6	-26
5011	-0	6
5012	-58	-45
5101	7	20
5102	2	-7
5103	90	54
5104	66	-3
5105	87	-37
5106	170	3
5107	203	21
5108	179	40
5109	33	-31
5110	12	-9
5111	-18	-12
5112	4	17
5201	-3	10
5202	2	-7
5203	104	68
5204	45	-24
5205	100	-24
5206	137	-31
5207	144	-38
5208	126	-12
5209	52	-11
5210	-0	-21
5211	-0	6
5212	-45	-33

UPWELLING INDEX AT 39N, 125W BY MONTH

MONTH	INDEX	ANOMALY
5301	-39	-26
5302	65	56
5303	40	4
5304	42	-27
5305	74	-50
5306	189	22
5307	174	-7
5308	53	-86
5309	33	-30
5310	20	-1
5311	-23	-16
5312	8	20
5401	-5	7
5402	-8	-16
5403	11	-24
5404	35	-33
5405	123	-1
5406	124	-44
5407	145	-36
5408	95	-44
5409	57	-6
5410	1	-20
5411	-27	-20
5412	-29	-17
5501	3	16
5502	26	17
5503	65	29
5504	73	5
5505	284	160
5506	209	41
5507	242	61
5508	254	116
5509	133	70
5510	32	12
5511	14	20
5512	-44	-32
5601	-62	-50
5602	20	11
5603	38	3
5604	107	38
5605	106	-18
5606	203	35
5607	204	22
5608	158	19
5609	26	-37
5610	45	25
5611	2	8
5612	1	13
5701	1	14
5702	-10	-19
5703	16	-20
5704	77	8
5705	35	-89
5706	166	-1
5707	217	35
5708	167	28
5709	12	-51
5710	8	-13
5711	2	9
5712	-19	-6
5801	-113	-100
5802	-150	-158
5803	10	-26
5804	50	-18
5805	47	-77
5806	90	-77
5807	149	-32
5808	143	4
5809	78	15
5810	9	-12
5811	11	18
5812	-15	-3
5901	-4	9
5902	10	1
5903	83	47
5904	123	54
5905	162	38
5906	206	38
5907	257	76
5908	210	71
5909	87	24
5910	63	43
5911	7	13
5912	1	13



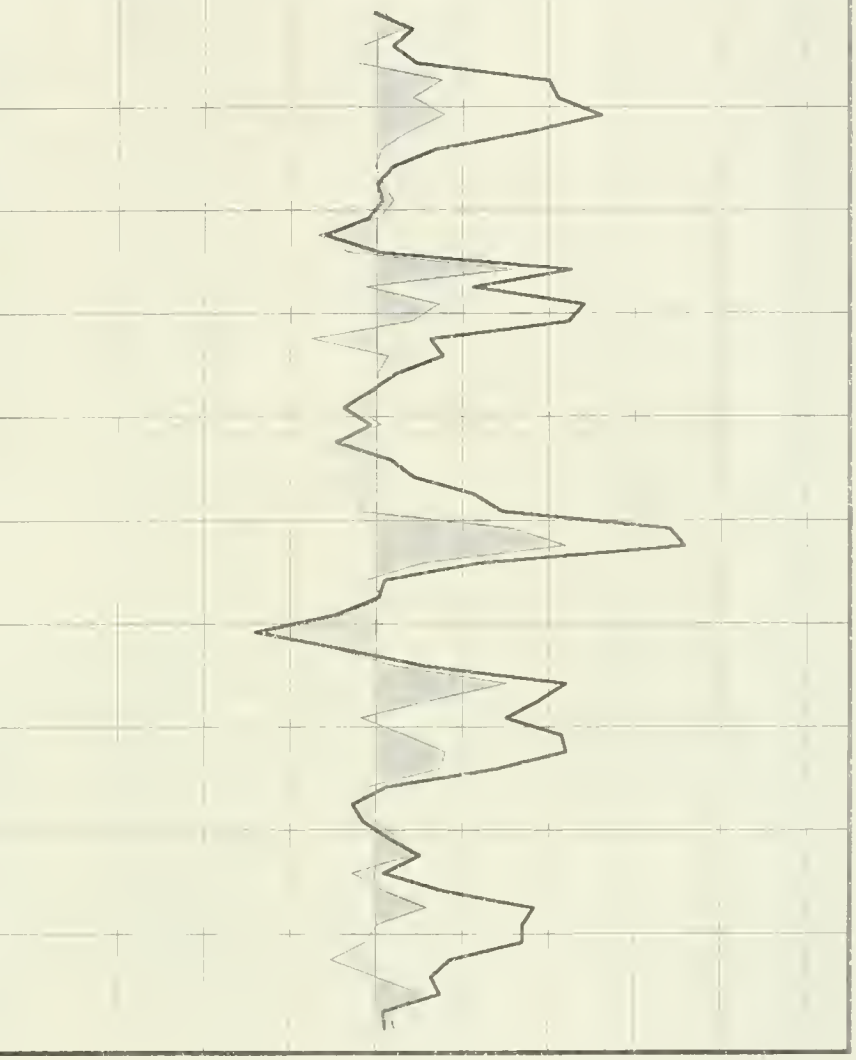
UPWELLING INDEX AT 39N, 125W BY MONTH



MONTH	INDEX	ANOMALY
6001	-20	-7
6002	18	10
6003	24	-12
6004	28	-40
6005	48	-76
6006	167	-1
6007	99	-83
6008	130	-9
6009	72	9
6010	12	-8
6011	-1	6
6012	-32	-20
6101	-87	-74
6102	13	4
6103	26	-9
6104	54	-15
6105	75	-49
6106	102	-66
6107	110	-72
6108	66	-73
6109	83	20
6110	43	23
6111	-4	3
6112	14	26
6201	7	20
6202	-19	-28
6203	10	-26
6204	51	-18
6205	103	-21
6206	158	-9
6207	186	5
6208	75	-63
6209	71	8
6210	5	-16
6211	6	13
6212	-30	-18
6301	11	23
6302	-44	-53
6303	9	-27
6304	14	-55
6305	81	-43
6306	254	86
6307	155	-27
6308	160	21
6309	3	-60
6310	2	-19
6311	-4	2
6312	-11	1
6401	9	22
6402	106	97
6403	93	57
6404	271	202
6405	140	16
6406	149	-18
6407	225	44
6408	197	59
6409	194	131
6410	7	-13
6411	-5	1
6412	-11	1
6501	-10	3
6502	36	28
6503	34	-2
6504	45	-24
6505	300	176
6506	230	63
6507	162	-20
6508	102	-36
6509	78	15
6510	9	-11
6511	-52	-45
6512	3	16
6601	-1	11
6602	3	-5
6603	11	-25
6604	126	57
6605	193	68
6606	192	25
6607	186	5
6608	203	64
6609	38	-26
6610	52	31
6611	-12	-5
6612	-7	5

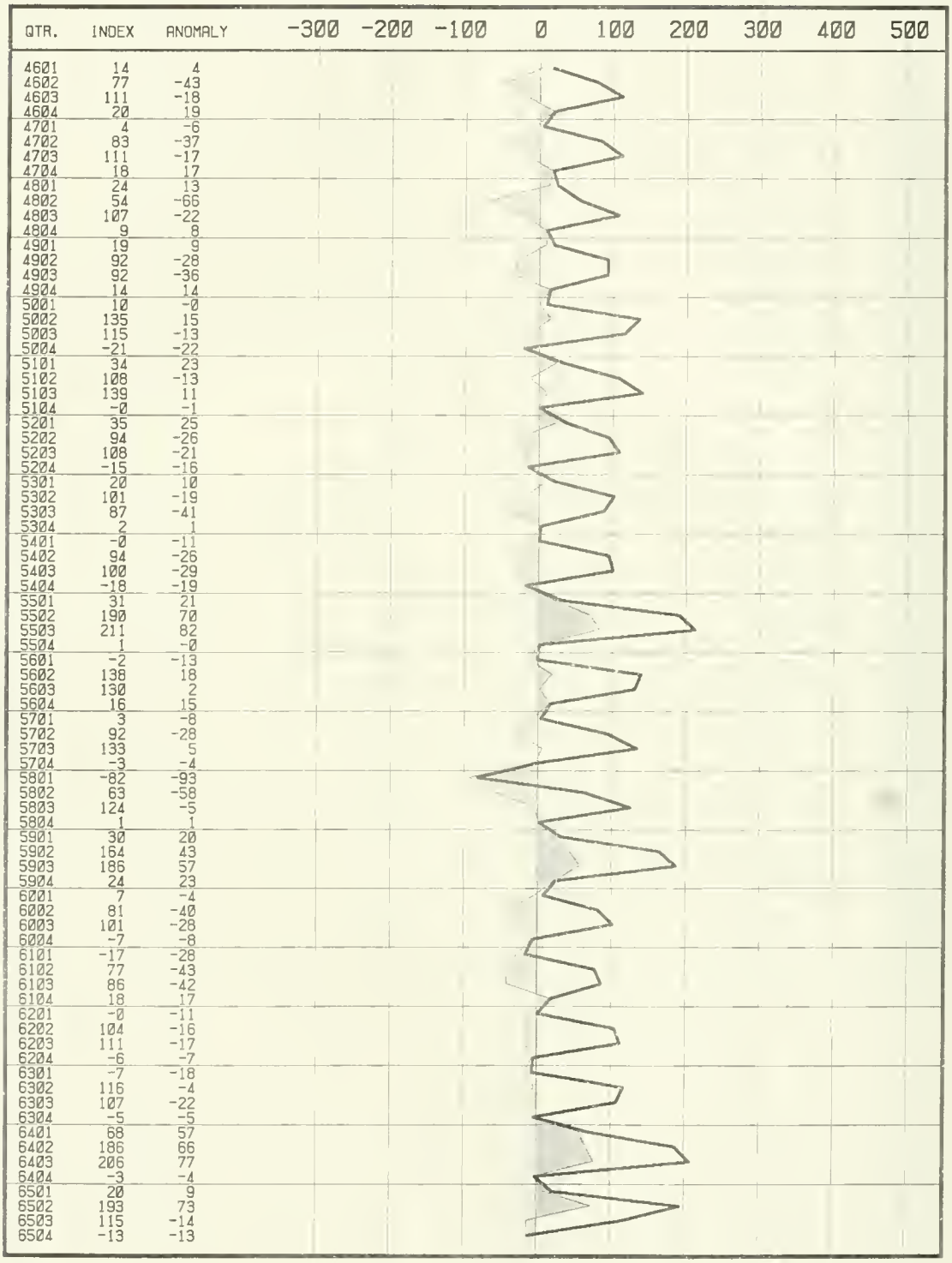
UPWELLING INDEX AT 39N, 125W BY MONTH

MONTH	INDEX	ANOMALY
6701	-7	5
6702	40	32
6703	18	-18
6704	45	-24
6705	199	75
6706	209	42
6707	260	78
6708	174	36
6709	68	5
6710	18	-2
6711	0	7
6712	6	19
6801	-10	3
6802	-60	-68
6803	2	-34
6804	225	157
6805	111	-13
6806	240	72
6807	222	41
6808	62	-76
6809	76	13
6810	22	1
6811	-7	-1
6812	-39	-27
6901	-8	5
6902	-47	-56
6903	16	-20
6904	42	-27
6905	112	-12
6906	145	-22
6907	340	158
6908	357	219
6909	118	55
6910	9	-12
6911	2	8
6912	-48	-35
7001	-141	-128
7002	-40	-49
7003	57	21
7004	219	151
7005	188	64
7006	150	-18
7007	214	33
7008	219	80
7009	137	74
7010	13	-8
7011	-28	-21
7012	-16	-3
7101	14	27
7102	50	41
7103	8	-28
7104	76	8
7105	182	58
7106	169	1
7107	169	-13
7108	85	-53
7109	63	-0
7110	73	53
7111	8	15
7112	9	21



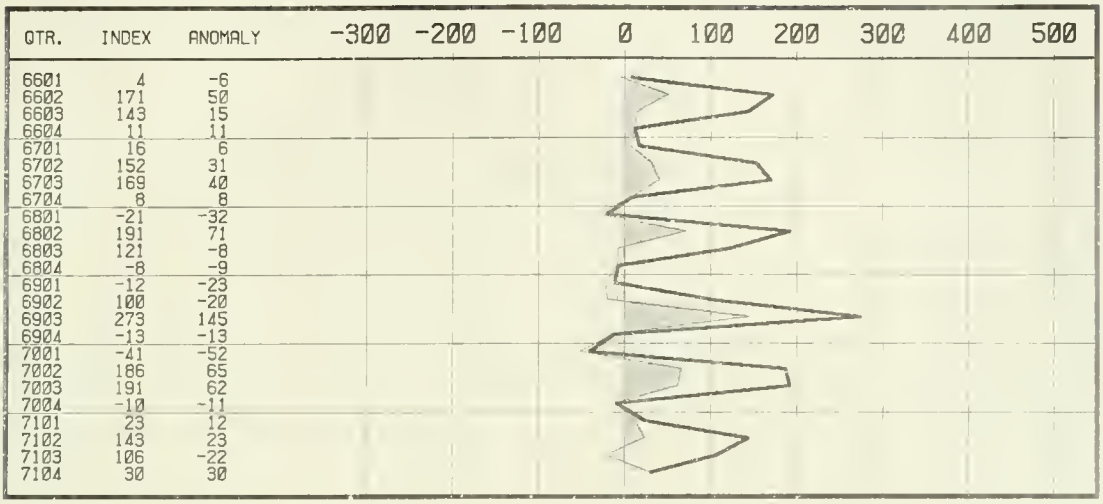
UPWELLING INDEX AT 39N, 125W BY QUARTER

QTR.	INDEX	ANOMALY
4601	14	4
4602	77	-43
4603	111	-18
4604	20	19
4701	4	-6
4702	83	-37
4703	111	-17
4704	18	17
4801	24	13
4802	54	-66
4803	107	-22
4804	9	8
4901	19	9
4902	92	-28
4903	92	-36
4904	14	14
5001	10	-0
5002	135	15
5003	115	-13
5004	-21	-22
5101	34	23
5102	108	-13
5103	139	11
5104	-0	-1
5201	35	25
5202	94	-26
5203	108	-21
5204	-15	-16
5301	20	10
5302	101	-19
5303	87	-41
5304	2	1
5401	-0	-11
5402	94	-26
5403	100	-29
5404	-18	-19
5501	31	21
5502	190	70
5503	211	82
5504	1	-0
5601	-2	-13
5602	138	18
5603	130	2
5604	16	15
5701	3	-8
5702	92	-28
5703	133	5
5704	-3	-4
5801	-82	-93
5802	63	-58
5803	124	-5
5804	1	1
5901	30	20
5902	164	43
5903	186	57
5904	24	23
6001	7	-4
6002	81	-40
6003	101	-28
6004	-7	-8
6101	-17	-28
6102	77	-43
6103	86	-42
6104	18	17
6201	-0	-11
6202	104	-16
6203	111	-17
6204	-6	-7
6301	-7	-18
6302	116	-4
6303	107	-22
6304	-5	-5
6401	68	57
6402	186	66
6403	206	77
6404	-3	-4
6501	20	9
6502	193	73
6503	115	-14
6504	-13	-13



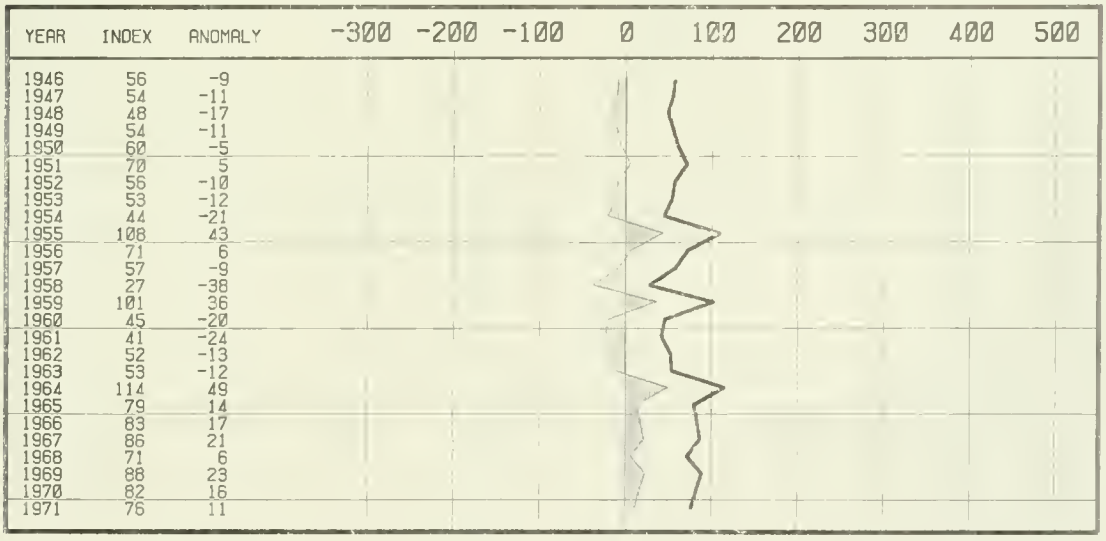
UPWELLING INDEX AT 39N, 125W BY QUARTER

QTR.	INDEX	ANOMALY
6601	4	-6
6602	171	50
6603	143	15
6604	11	11
6701	16	6
6702	152	31
6703	169	40
6704	8	8
6801	-21	-32
6802	191	71
6803	121	-8
6804	-8	-9
6901	-12	-23
6902	100	-20
6903	273	145
6904	-13	-13
7001	-41	-52
7002	186	65
7003	191	62
7004	-10	-11
7101	23	12
7102	143	23
7103	106	-22
7104	30	30



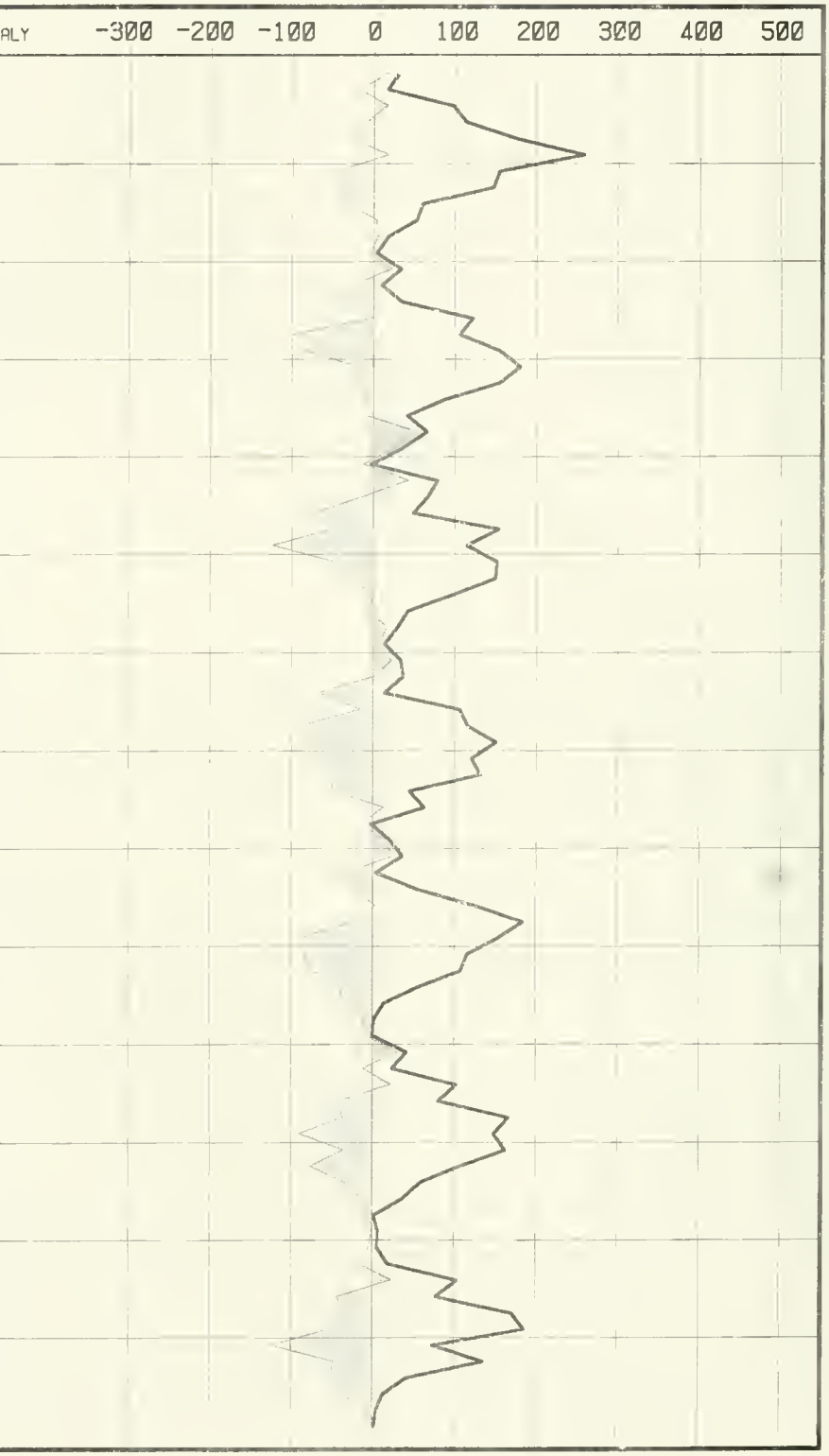
UPWELLING INDEX AT 39N, 125W BY YEAR

YEAR	INDEX	ANOMALY
1946	56	-9
1947	54	-11
1948	48	-17
1949	54	-11
1950	60	-5
1951	70	5
1952	56	-10
1953	53	-12
1954	44	-21
1955	108	43
1956	71	6
1957	57	-9
1958	27	-38
1959	101	36
1960	45	-20
1961	41	-24
1962	52	-13
1963	53	-12
1964	114	49
1965	79	14
1966	83	17
1967	86	21
1968	71	6
1969	88	23
1970	82	16
1971	76	11



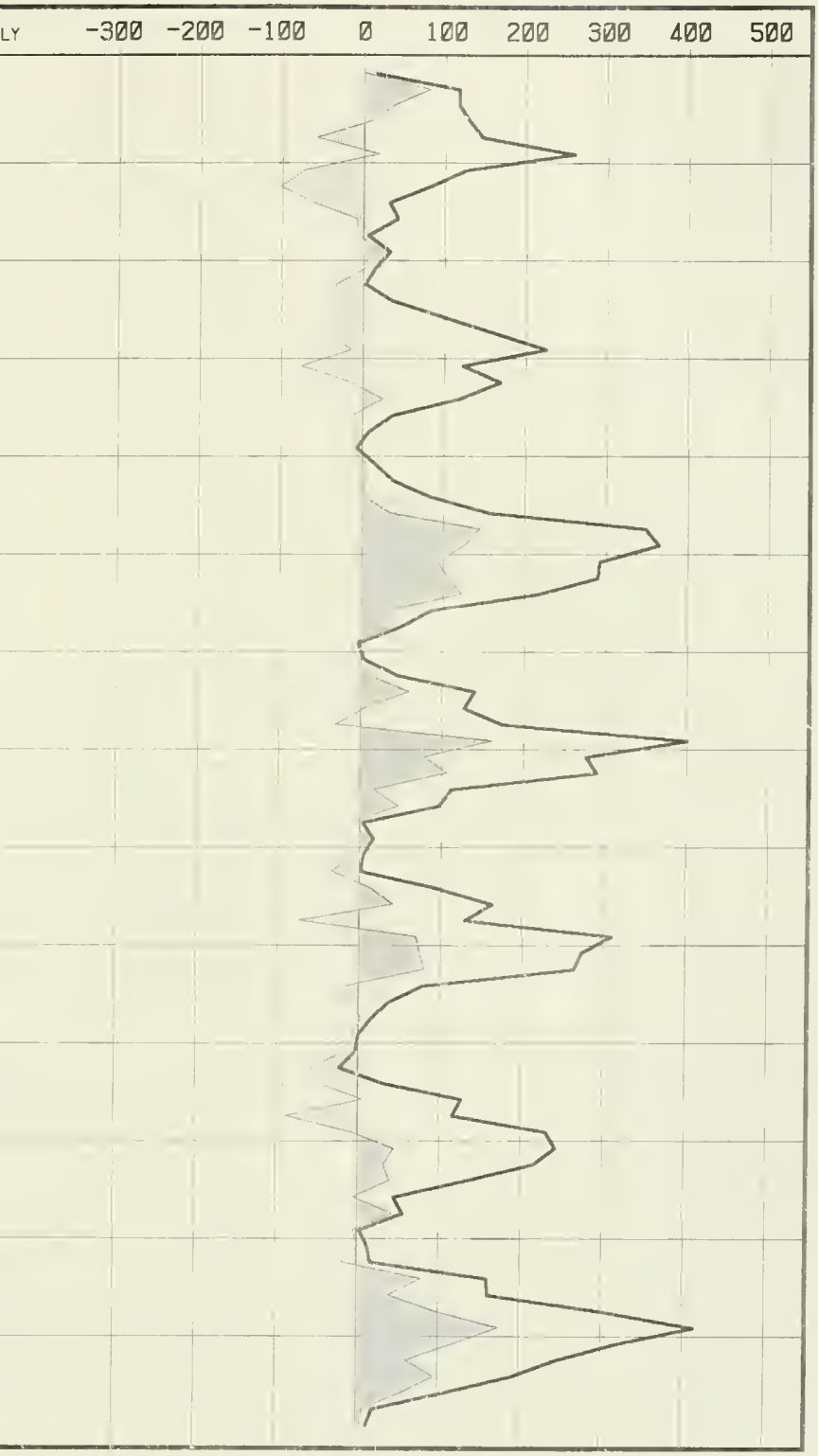
UPWELLING INDEX AT 36N, 122W BY MONTH

MONTH	INDEX	ANOMALY
4601	30	20
4602	16	-19
4603	96	16
4604	112	-9
4605	173	-30
4606	257	18
4607	153	-46
4608	146	-37
4609	59	-35
4610	52	3
4611	17	5
4612	3	-5
4701	33	22
4702	9	-26
4703	34	-46
4704	121	-0
4705	105	-98
4706	154	-85
4707	179	-20
4708	154	-29
4709	87	-7
4710	41	-9
4711	65	53
4712	35	28
4801	-3	-13
4802	78	43
4803	66	-14
4804	48	-73
4805	153	-51
4806	114	-124
4807	151	-48
4808	149	-34
4809	97	3
4810	42	-7
4811	29	17
4812	13	6
4901	33	22
4902	36	1
4903	13	-67
4904	105	-16
4905	115	-88
4906	150	-88
4907	120	-78
4908	131	-52
4909	44	-49
4910	62	13
4911	-3	-15
4912	20	13
5001	35	25
5002	3	-32
5003	53	-27
5004	124	3
5005	183	-20
5006	153	-86
5007	115	-83
5008	107	-76
5009	55	-39
5010	13	-36
5011	1	-11
5012	-1	-8
5101	41	31
5102	23	-12
5103	102	22
5104	80	-41
5105	166	-37
5106	148	-90
5107	162	-36
5108	106	-77
5109	58	-35
5110	36	-13
5111	1	-11
5112	6	-1
5201	5	-5
5202	18	-17
5203	103	23
5204	77	-44
5205	170	-33
5206	185	-53
5207	73	-125
5208	135	-48
5209	41	-53
5210	12	-37
5211	4	-8
5212	1	-7



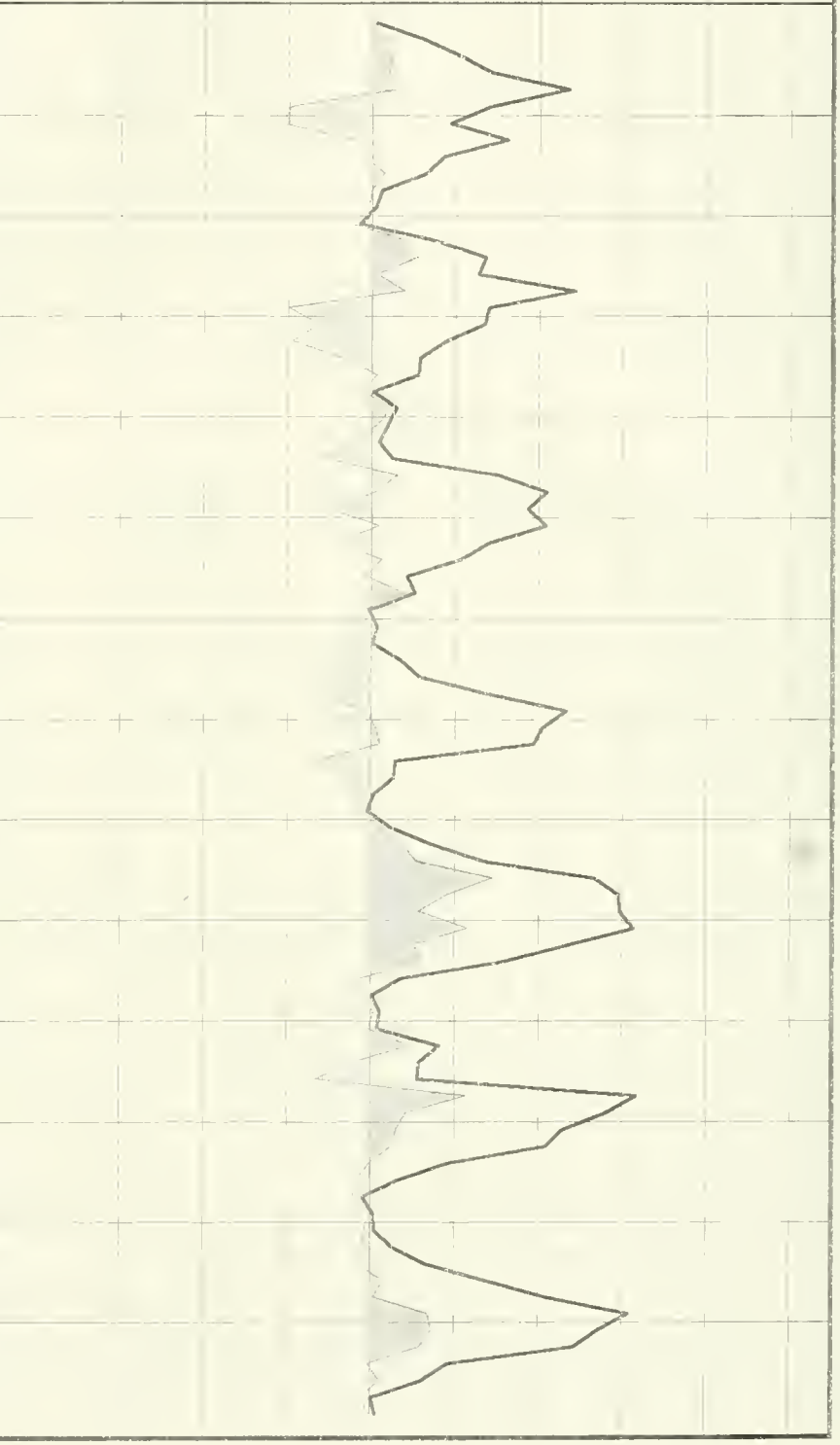
UPWELLING INDEX AT 36N, 122W BY MONTH

MONTH	INDEX	ANOMALY
5301	11	-0
5302	116	81
5303	116	37
5304	129	8
5305	145	-58
5306	258	19
5307	125	-74
5308	81	-102
5309	31	-63
5310	41	-8
5311	5	-7
5312	32	25
5401	14	3
5402	2	-33
5403	34	-46
5404	97	-24
5405	161	-43
5406	224	-15
5407	122	-76
5408	168	-15
5409	118	24
5410	36	-13
5411	7	-5
5412	-8	-15
5501	15	4
5502	37	2
5503	83	3
5504	155	34
5505	347	144
5506	364	126
5507	291	93
5508	289	106
5509	216	122
5510	85	36
5511	48	36
5512	-4	-11
5601	3	-7
5602	45	10
5603	139	59
5604	126	5
5605	173	-31
5606	400	161
5607	276	78
5608	289	106
5609	111	17
5610	96	47
5611	3	-9
5612	16	9
5701	4	-7
5702	1	-34
5703	93	13
5704	162	41
5705	129	-74
5706	309	70
5707	272	74
5708	263	80
5709	78	-16
5710	36	-13
5711	15	3
5712	-1	-8
5801	-4	-15
5802	-24	-59
5803	31	-49
5804	126	5
5805	115	-89
5806	230	-8
5807	242	44
5808	215	32
5809	133	39
5810	44	-5
5811	55	43
5812	2	-5
5901	12	1
5902	16	-19
5903	159	79
5904	160	39
5905	300	97
5906	413	174
5907	318	119
5908	244	61
5909	189	95
5910	105	55
5911	19	7
5912	12	5



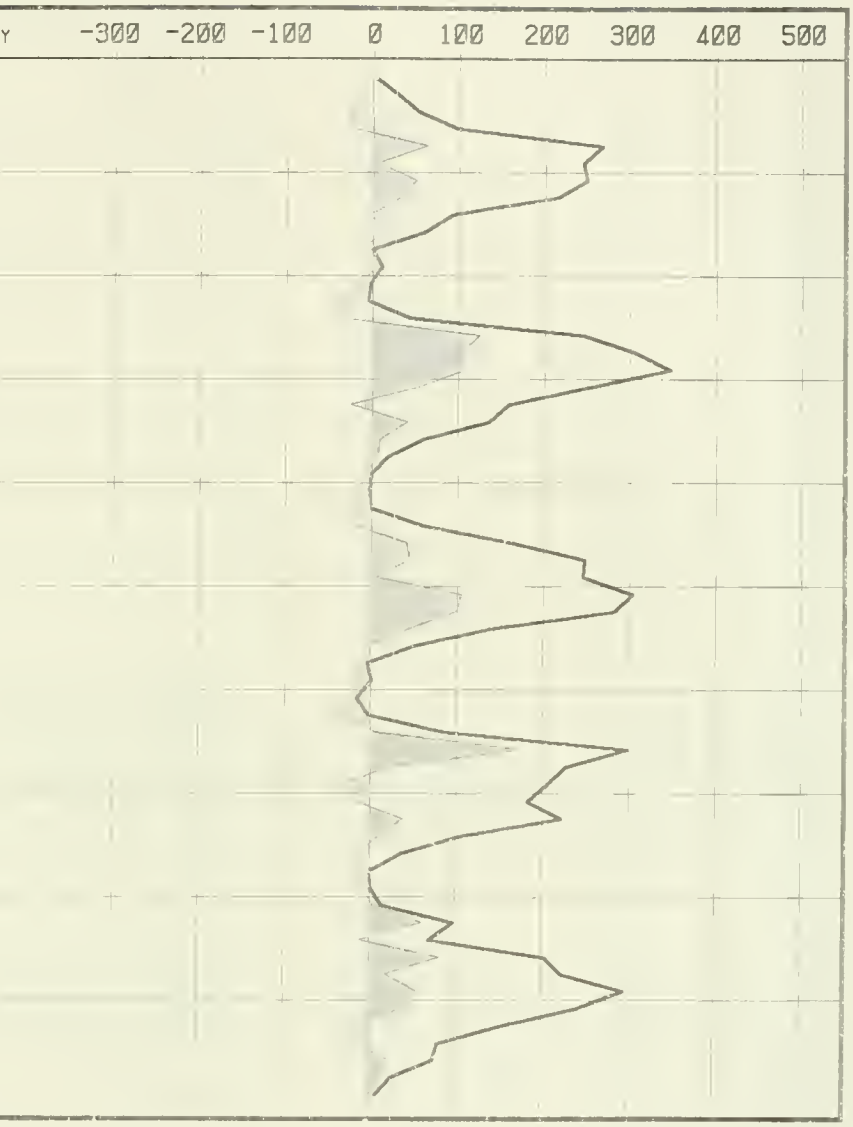
UPWELLING INDEX AT 36N, 122W BY MONTH

MONTH	INDEX	ANOMALY
6001	1	-10
6002	60	25
6003	104	24
6004	141	20
6005	234	31
6006	141	-98
6007	93	-106
6008	161	-22
6009	85	-9
6010	64	14
6011	11	-1
6012	4	-4
6101	-15	-26
6102	74	39
6103	135	55
6104	127	6
6105	242	39
6106	139	-100
6107	134	-64
6108	88	-95
6109	57	-37
6110	55	6
6111	1	-11
6112	29	22
6201	18	7
6202	8	-27
6203	24	-55
6204	151	30
6205	208	5
6206	186	-52
6207	207	9
6208	140	-43
6209	106	12
6210	42	-7
6211	51	39
6212	-3	-10
6301	6	-5
6302	1	-34
6303	34	-46
6304	57	-64
6305	139	-64
6306	232	-7
6307	204	5
6308	193	10
6309	28	-65
6310	26	-23
6311	2	-10
6312	-5	-12
6401	23	12
6402	72	37
6403	134	54
6404	266	145
6405	295	91
6406	296	57
6407	313	115
6408	234	51
6409	155	61
6410	35	-14
6411	1	-11
6412	10	3
6501	7	-3
6502	81	46
6503	57	-22
6504	55	-66
6505	316	113
6506	280	42
6507	228	30
6508	208	25
6509	92	-2
6510	32	-17
6511	-10	-22
6512	3	-4
6601	4	-6
6602	25	-10
6603	64	-16
6604	136	15
6605	208	4
6606	307	68
6607	271	73
6608	242	59
6609	91	-3
6610	60	11
6611	-0	-12
6612	5	-2



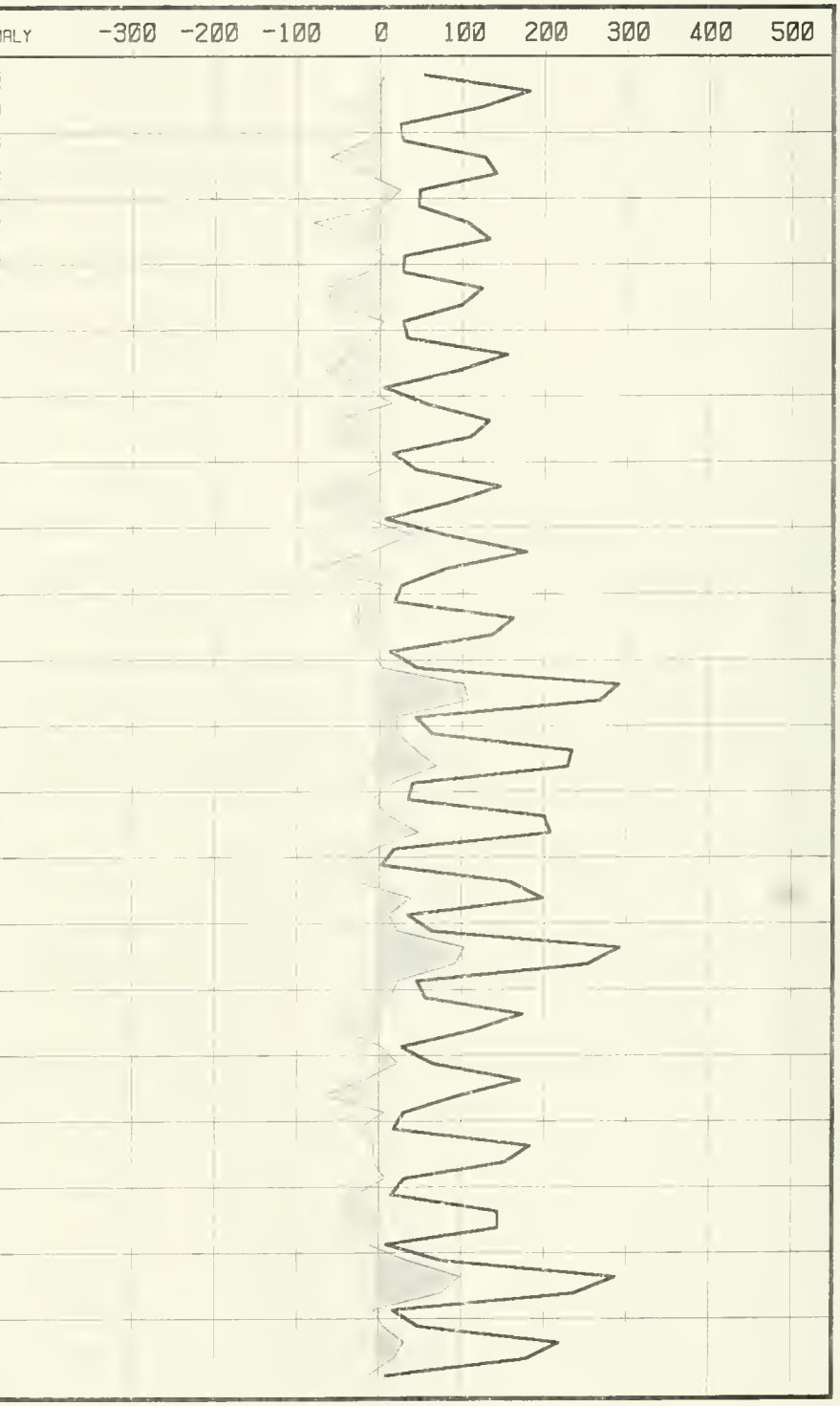
UPWELLING INDEX AT 36N, 122W BY MONTH

MONTH	INDEX	ANOMALY
6701	2	-9
6702	28	-7
6703	52	-28
6704	97	-24
6705	266	63
6706	244	6
6707	243	50
6708	214	32
6709	92	-2
6710	60	11
6711	-1	-13
6712	10	3
6801	-3	-14
6802	-6	-41
6803	43	-37
6804	245	124
6805	306	103
6806	346	108
6807	252	54
6808	153	-25
6809	135	41
6810	59	9
6811	18	6
6812	-1	-8
6901	-3	-14
6902	-1	-36
6903	59	-20
6904	162	41
6905	247	44
6906	245	6
6907	303	104
6908	282	99
6909	139	45
6910	50	0
6911	-5	-17
6912	-0	-7
7001	-17	-27
7002	-3	-38
7003	85	5
7004	297	176
7005	225	23
7006	205	-34
7007	182	-17
7008	221	38
7009	104	10
7010	35	-14
7011	-1	-13
7012	-0	-7
7101	13	3
7102	96	61
7103	68	-12
7104	202	81
7105	222	19
7106	294	55
7107	240	41
7108	152	-31
7109	79	-15
7110	73	24
7111	25	13
7112	7	0



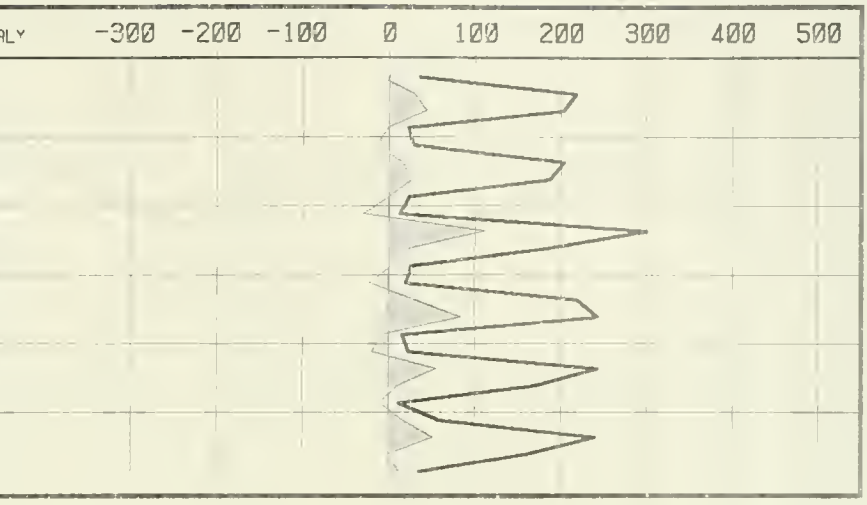
UPWELLING INDEX AT 36N, 122W BY QUARTER

QTR.	INDEX	ANOMALY
4601	49	6
4602	180	-7
4603	120	-39
4604	24	1
4701	26	-16
4702	126	-61
4703	140	-19
4704	47	24
4801	46	4
4802	106	-82
4803	132	-27
4804	28	5
4901	27	-15
4902	123	-64
4903	99	-60
4904	27	4
5001	32	-10
5002	154	-34
5003	93	-66
5004	5	-18
5101	56	14
5102	132	-56
5103	109	-50
5104	15	-8
5201	43	1
5202	145	-43
5203	83	-76
5204	6	-17
5301	80	38
5302	177	-11
5303	80	-79
5304	26	3
5401	17	-25
5402	161	-27
5403	136	-23
5404	12	-11
5501	45	3
5502	289	102
5503	266	107
5504	43	20
5601	63	21
5602	232	44
5603	227	68
5604	39	16
5701	34	-8
5702	199	11
5703	206	47
5704	17	-6
5801	2	-40
5802	157	-31
5803	198	38
5804	34	11
5901	64	22
5902	291	103
5903	251	92
5904	45	23
6001	55	13
6002	173	-15
6003	113	-45
6004	26	3
6101	64	22
6102	170	-18
6103	93	-66
6104	29	6
6201	17	-25
6202	182	-6
6203	152	-7
6204	30	7
6301	14	-28
6302	143	-45
6303	143	-16
6304	8	-15
6401	76	34
6402	286	98
6403	235	76
6404	16	-7
6501	47	5
6502	218	30
6503	177	18
6504	8	-14



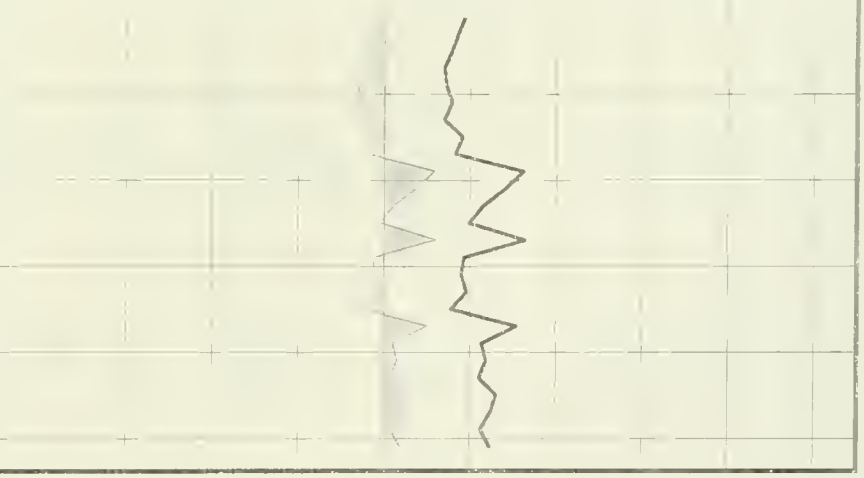
UPWELLING INDEX AT 36N, 122W BY QUARTER

QTR.	INDEX	ANOMALY
6601	31	-11
6602	217	29
6603	202	43
6604	22	-1
6701	27	-15
6702	203	15
6703	186	27
6704	23	0
6801	12	-30
6802	299	111
6803	182	23
6804	25	3
6901	19	-23
6902	218	30
6903	242	83
6904	15	-8
7001	22	-20
7002	242	55
7003	169	10
7004	11	-11
7101	58	16
7102	239	51
7103	158	-1
7104	35	12



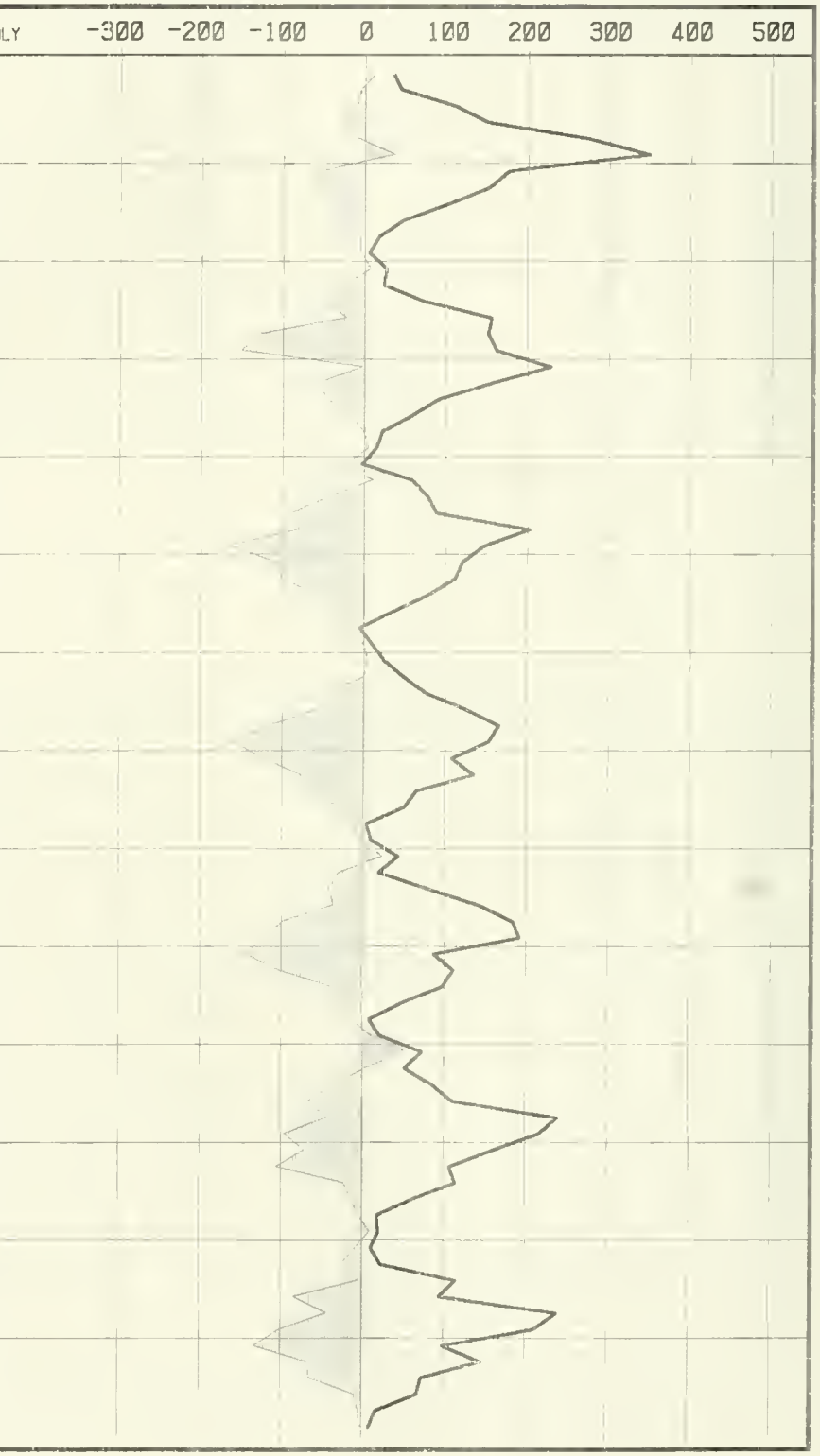
UPWELLING INDEX AT 36N, 122W BY YEAR

YEAR	INDEX	ANOMALY
1946	93	-10
1947	85	-18
1948	78	-25
1949	69	-34
1950	71	-32
1951	78	-25
1952	69	-34
1953	90	-13
1954	82	-21
1955	161	58
1956	140	37
1957	114	11
1958	98	-5
1959	163	60
1960	92	-11
1961	89	-14
1962	95	-8
1963	77	-26
1964	153	50
1965	113	10
1966	118	15
1967	110	7
1968	130	27
1969	124	21
1970	112	8
1971	123	19



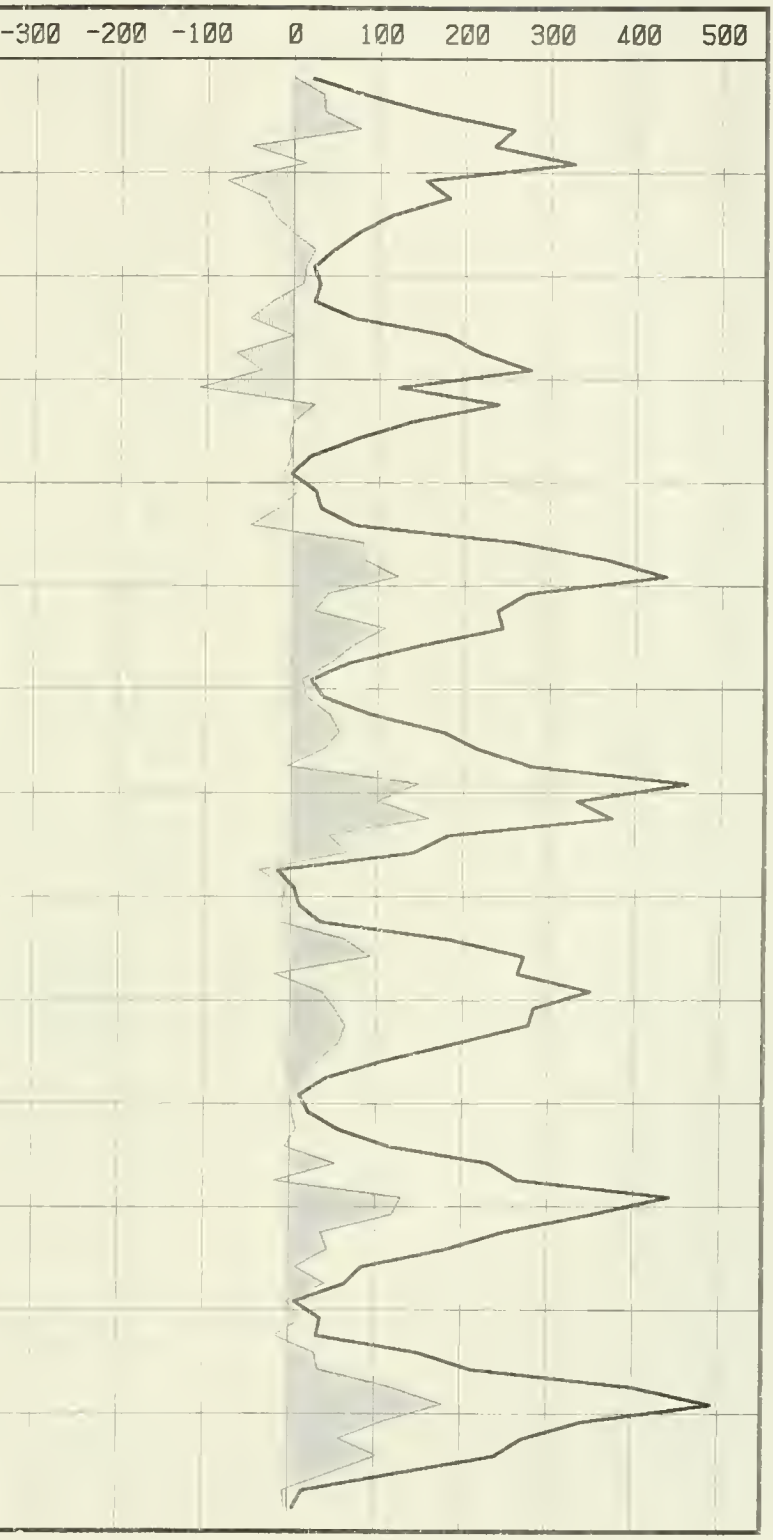
UPWELLING INDEX AT 33N, 119W BY MONTH

MONTH	INDEX	ANOMALY
4601	33	14
4602	43	-5
4603	109	-11
4604	150	-28
4605	273	-9
4606	348	36
4607	176	-55
4608	152	-61
4609	102	-34
4610	47	-29
4611	17	-5
4612	5	-5
4701	26	7
4702	23	-25
4703	73	-47
4704	155	-23
4705	151	-131
4706	161	-151
4707	228	-3
4708	156	-57
4709	91	-46
4710	58	-18
4711	21	-1
4712	14	5
4801	-3	-22
4802	58	10
4803	77	-43
4804	88	-90
4805	202	-80
4806	147	-165
4807	120	-111
4808	111	-101
4809	78	-59
4810	35	-42
4811	-6	-28
4812	9	-1
4901	24	5
4902	48	-0
4903	76	-45
4904	125	-54
4905	165	-117
4906	152	-160
4907	107	-124
4908	134	-78
4909	64	-72
4910	49	-28
4911	3	-19
4912	9	-0
5001	42	23
5002	18	-30
5003	78	-42
5004	141	-37
5005	183	-99
5006	191	-121
5007	86	-145
5008	110	-103
5009	97	-40
5010	46	-31
5011	7	-15
5012	20	10
5101	72	53
5102	51	3
5103	85	-35
5104	110	-68
5105	238	-44
5106	216	-96
5107	159	-72
5108	106	-106
5109	113	-23
5110	61	-15
5111	17	-5
5112	19	9
5201	10	-9
5202	22	-26
5203	114	-6
5204	94	-84
5205	238	-44
5206	210	-102
5207	98	-133
5208	145	-68
5209	72	-65
5210	67	-10
5211	16	-5
5212	8	-2



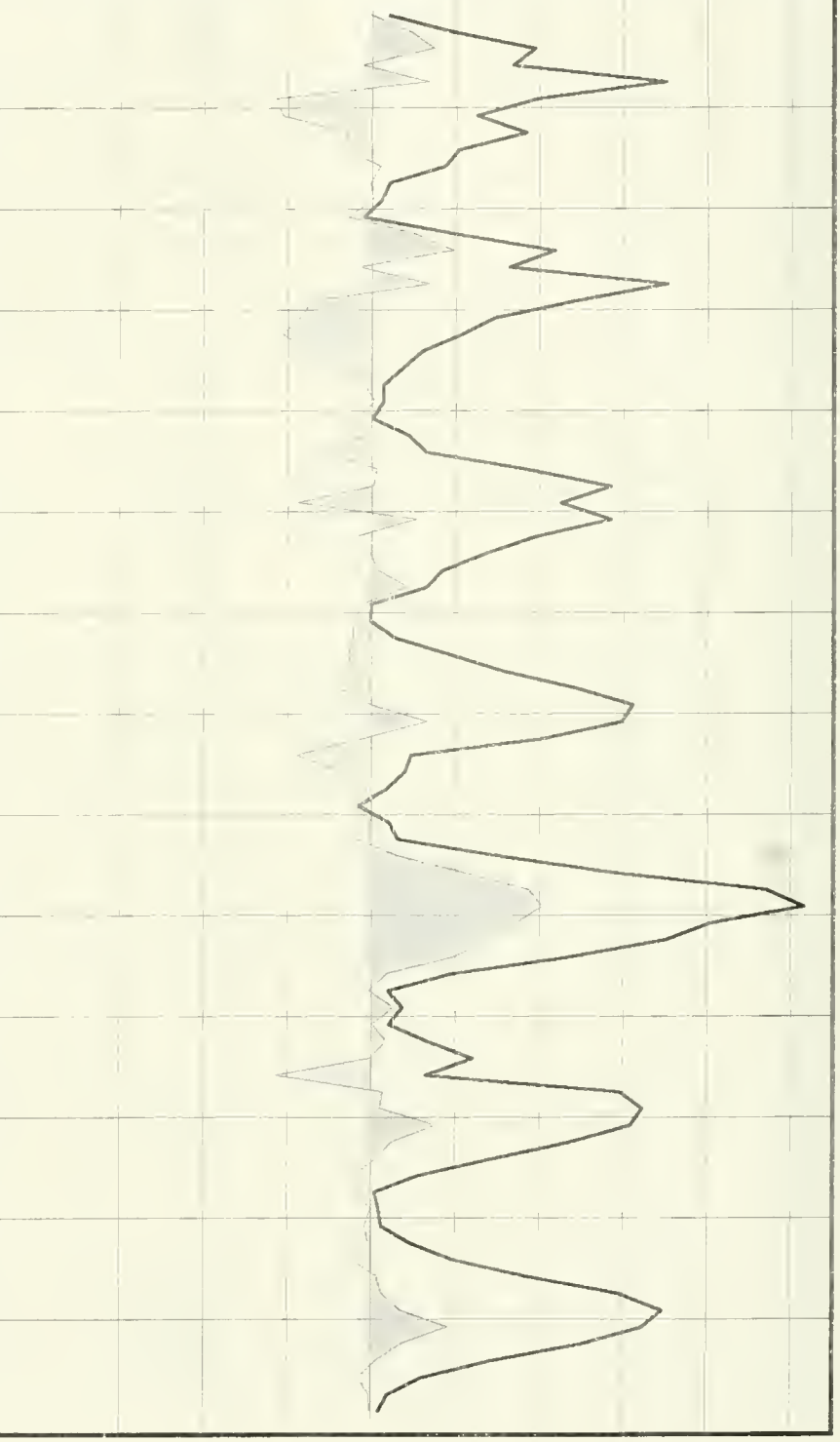
UPWELLING INDEX AT 33N, 119W BY MONTH

MONTH	INDEX	ANOMALY
5301	18	-1
5302	82	34
5303	157	36
5304	255	77
5305	233	-49
5306	326	14
5307	153	-78
5308	180	-33
5309	113	-23
5310	75	-2
5311	47	25
5312	23	14
5401	30	11
5402	24	-25
5403	71	-50
5404	178	-0
5405	216	-66
5406	275	-37
5407	122	-109
5408	238	25
5409	138	1
5410	72	-4
5411	19	-2
5412	-2	-11
5501	26	7
5502	32	-16
5503	71	-49
5504	260	82
5505	365	83
5506	434	122
5507	272	41
5508	238	26
5509	244	108
5510	147	71
5511	67	46
5512	22	12
5601	36	17
5602	92	44
5603	175	55
5604	216	38
5605	277	-5
5606	460	148
5607	331	100
5608	372	160
5609	181	44
5610	142	65
5611	-16	-37
5612	3	-7
5701	9	-10
5702	34	-14
5703	183	63
5704	270	92
5705	263	-19
5706	348	36
5707	282	51
5708	276	64
5709	193	56
5710	109	33
5711	41	19
5712	10	-0
5801	21	2
5802	55	7
5803	115	-6
5804	231	53
5805	264	-18
5806	441	129
5807	350	119
5808	249	37
5809	181	44
5810	84	7
5811	64	42
5812	6	-3
5901	36	17
5902	32	-17
5903	150	30
5904	212	34
5905	400	118
5906	491	179
5907	341	110
5908	271	59
5909	240	104
5910	125	49
5911	16	-6
5912	5	-4



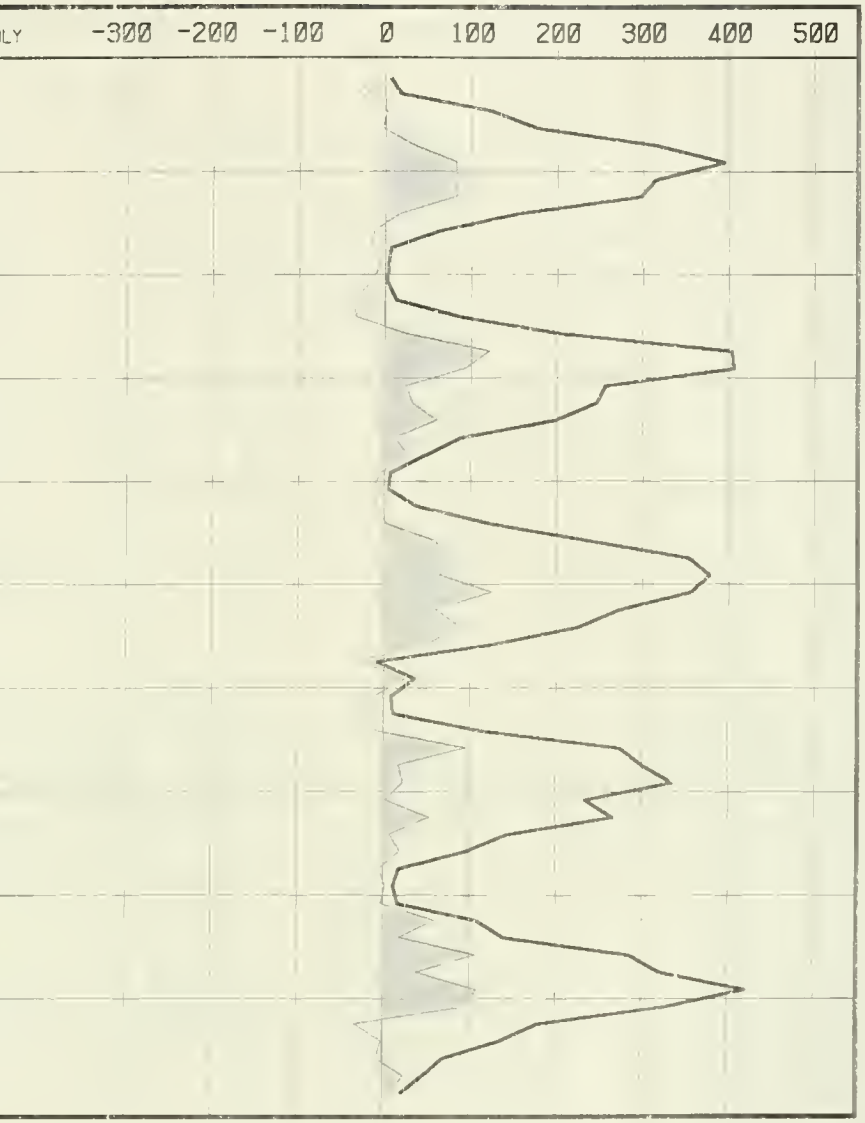
UPWELLING INDEX AT 33N, 119W BY MONTH

MONTH	INDEX	ANOMALY
6001	16	-3
6002	93	45
6003	193	73
6004	167	-11
6005	349	67
6006	197	-115
6007	124	-107
6008	183	-29
6009	103	-34
6010	86	10
6011	20	-2
6012	11	1
6101	-10	-29
6102	99	51
6103	217	97
6104	163	-15
6105	351	69
6106	241	-71
6107	145	-86
6108	106	-106
6109	59	-78
6110	36	-41
6111	13	-9
6112	13	3
6201	-0	-19
6202	43	-6
6203	64	-57
6204	184	6
6205	284	2
6206	224	-88
6207	284	53
6208	194	-18
6209	134	-2
6210	83	7
6211	64	43
6212	-1	-11
6301	-2	-21
6302	27	-22
6303	93	-27
6304	157	-21
6305	242	-40
6306	310	-2
6307	297	66
6308	204	-8
6309	46	-90
6310	39	-37
6311	17	-5
6312	-16	-25
6401	20	1
6402	30	-19
6403	150	30
6404	288	110
6405	469	187
6406	515	203
6407	403	172
6408	350	138
6409	236	100
6410	94	18
6411	19	-3
6412	36	26
6501	20	1
6502	66	17
6503	120	-1
6504	64	-114
6505	295	13
6506	322	10
6507	308	77
6508	236	24
6509	142	5
6510	55	-21
6511	3	-19
6512	8	-1
6601	11	-8
6602	45	-4
6603	96	-25
6604	184	6
6605	294	12
6606	346	34
6607	322	91
6608	249	36
6609	143	6
6610	60	-16
6611	19	-3
6612	8	-2



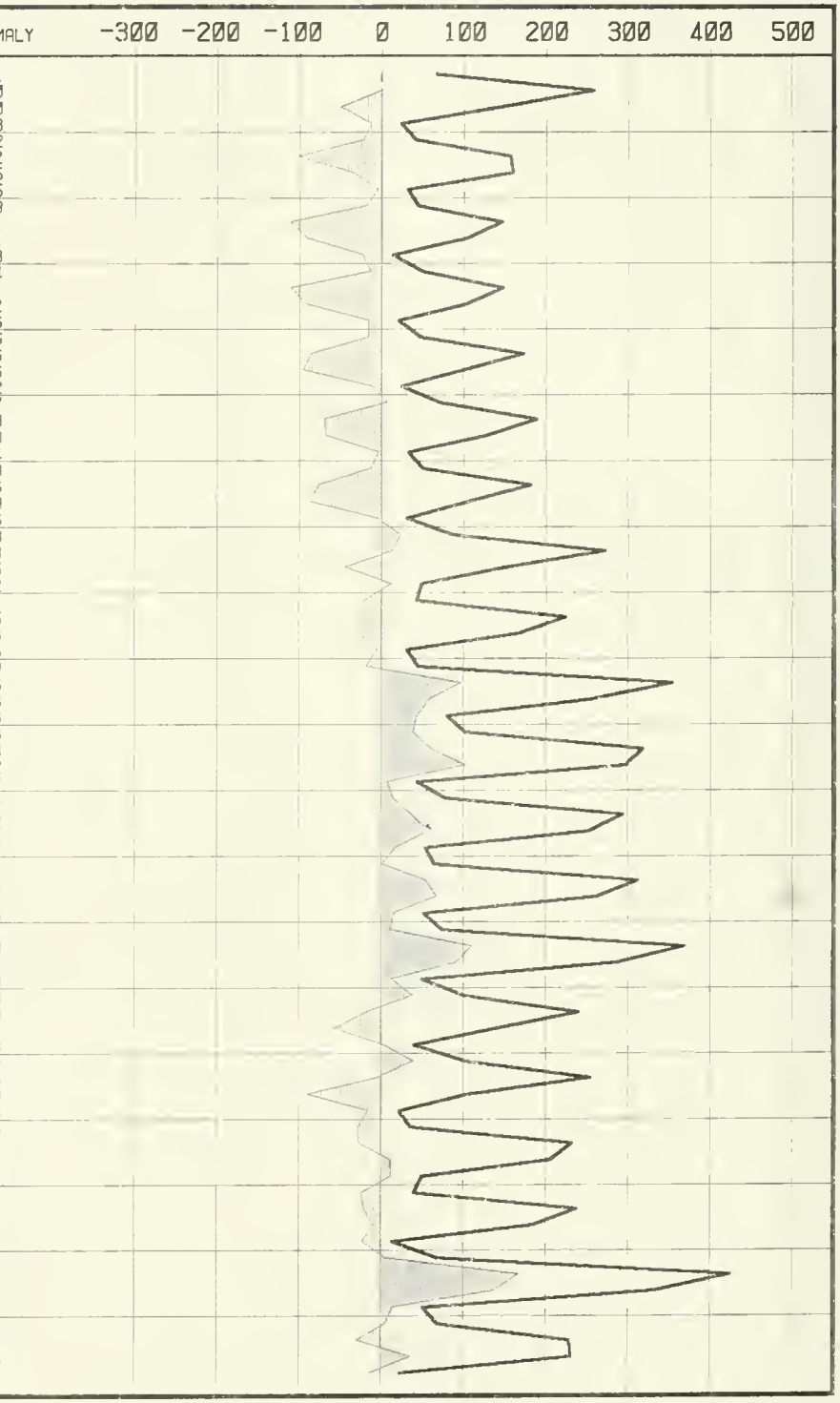
UPWELLING INDEX AT 33N, 119W BY MONTH

MONTH	INDEX	ANOMALY
6701	4	-15
6702	17	-31
6703	122	1
6704	175	-3
6705	315	32
6706	394	82
6707	314	83
6708	296	83
6709	154	17
6710	63	-14
6711	6	-16
6712	3	-6
6801	2	-17
6802	12	-37
6803	86	-34
6804	203	25
6805	403	121
6806	405	93
6807	255	24
6808	245	32
6809	197	60
6810	88	12
6811	47	26
6812	6	-4
6901	4	-15
6902	37	-11
6903	122	2
6904	237	59
6905	353	71
6906	377	65
6907	356	125
6908	273	60
6909	225	88
6910	125	49
6911	-8	-30
6912	35	25
7001	8	-11
7002	10	-38
7003	111	-9
7004	273	95
7005	299	17
7006	334	22
7007	233	2
7008	265	53
7009	143	7
7010	95	19
7011	17	-5
7012	11	2
7101	16	-3
7102	108	60
7103	139	19
7104	285	107
7105	321	39
7106	420	108
7107	328	97
7108	179	-33
7109	134	-2
7110	69	-8
7111	46	24
7112	21	11



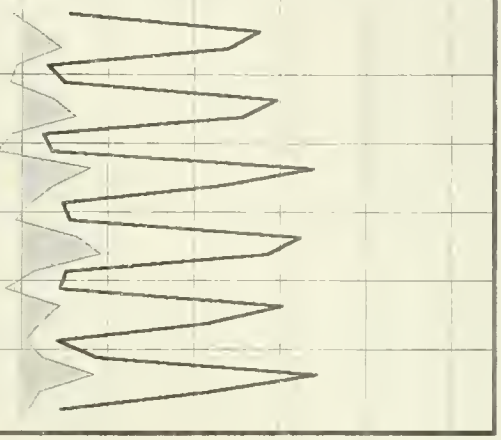
UPWELLING INDEX AT 33N, 119W BY QUARTER

QTR.	INDEX	ANOMALY
4601	62	-1
4602	257	-0
4603	144	-50
4604	23	-13
4701	41	-22
4702	156	-102
4703	159	-35
4704	31	-5
4801	44	-19
4802	146	-111
4803	103	-91
4804	13	-23
4901	49	-14
4902	147	-111
4903	102	-92
4904	20	-16
5001	47	-16
5002	172	-86
5003	98	-96
5004	24	-12
5101	70	7
5102	188	-69
5103	126	-68
5104	32	-4
5201	50	-13
5202	181	-76
5203	105	-89
5204	30	-6
5301	86	23
5302	271	13
5303	149	-45
5304	48	12
5401	42	-21
5402	223	-35
5403	166	-28
5404	30	-6
5501	44	-19
5502	353	96
5503	252	58
5504	79	43
5601	101	38
5602	317	60
5603	296	102
5604	43	7
5701	77	14
5702	293	36
5703	251	57
5704	53	17
5801	64	1
5802	311	54
5803	261	67
5804	51	15
5901	74	11
5902	368	110
5903	285	91
5904	49	13
6001	101	38
6002	239	-19
6003	137	-57
6004	39	3
6101	102	39
6102	253	-5
6103	104	-90
6104	21	-16
6201	35	-28
6202	231	-27
6203	205	11
6204	49	12
6301	39	-24
6302	237	-21
6303	184	-10
6304	13	-23
6401	68	5
6402	424	167
6403	331	137
6404	50	14
6501	68	5
6502	228	-30
6503	230	36
6504	22	-14



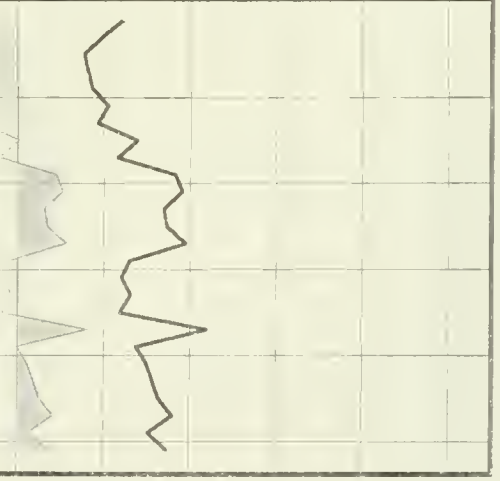
UPWELLING INDEX AT 33N, 119W BY QUARTER

QTR.	INDEX	ANOMALY
6601	51	-12
6602	275	18
6603	239	45
6604	29	-7
6701	49	-14
6702	295	37
6703	256	62
6704	24	-12
6801	34	-29
6802	338	80
6803	232	38
6804	47	11
6901	55	-8
6902	323	65
6903	285	91
6904	51	15
7001	44	-19
7002	302	44
7003	215	21
7004	41	5
7101	87	24
7102	342	84
7103	215	21
7104	45	9



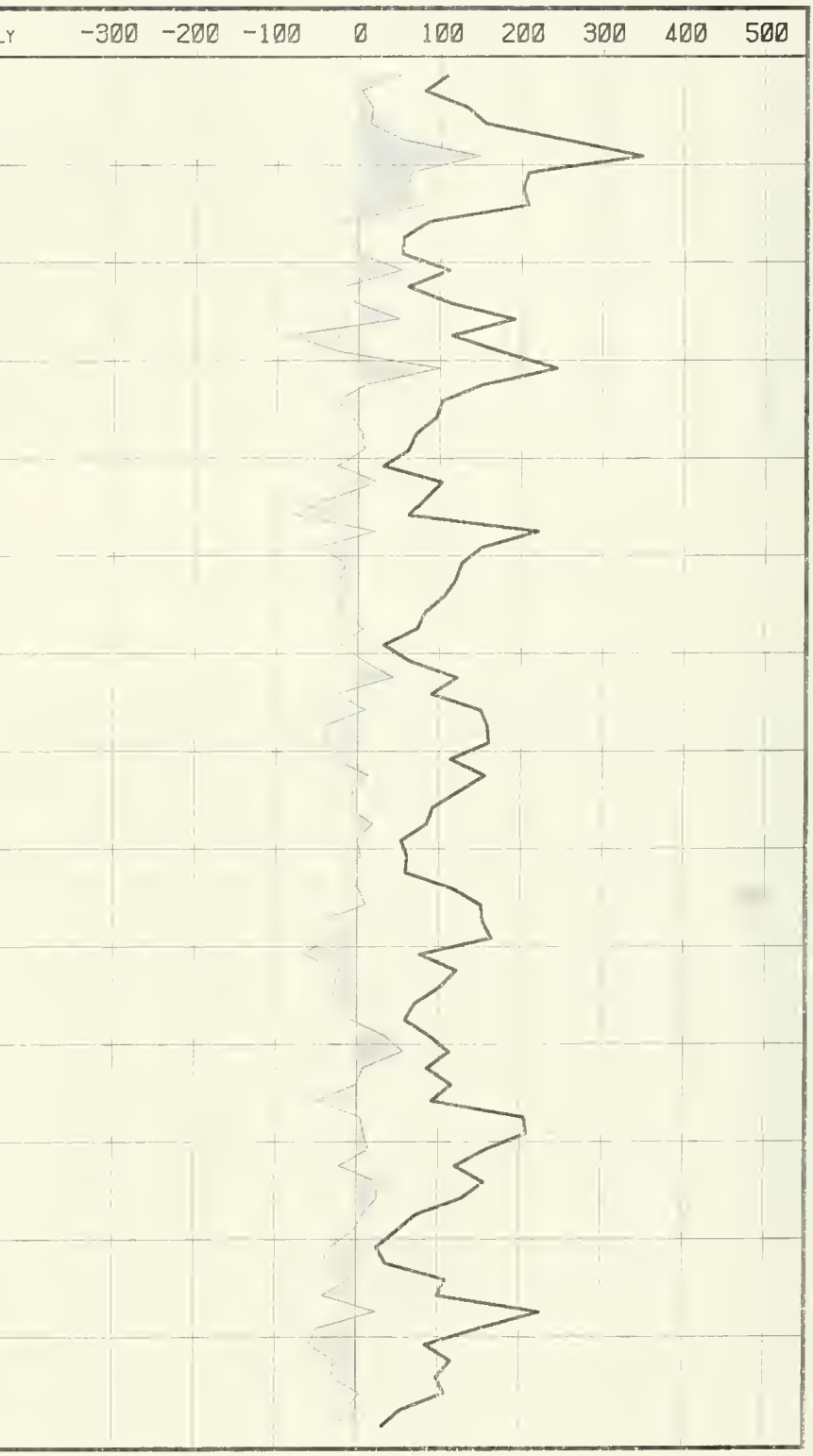
UPWELLING INDEX AT 33N, 119W BY YEAR

YEAR	INDEX	ANOMALY
1946	122	-16
1947	97	-41
1948	76	-61
1949	80	-58
1950	85	-53
1951	104	-34
1952	92	-46
1953	138	1
1954	115	-22
1955	182	44
1956	190	52
1957	169	31
1958	172	34
1959	194	56
1960	129	-9
1961	120	-18
1962	130	-8
1963	118	-19
1964	219	81
1965	137	-1
1966	149	11
1967	156	18
1968	163	25
1969	179	41
1970	151	13
1971	172	34



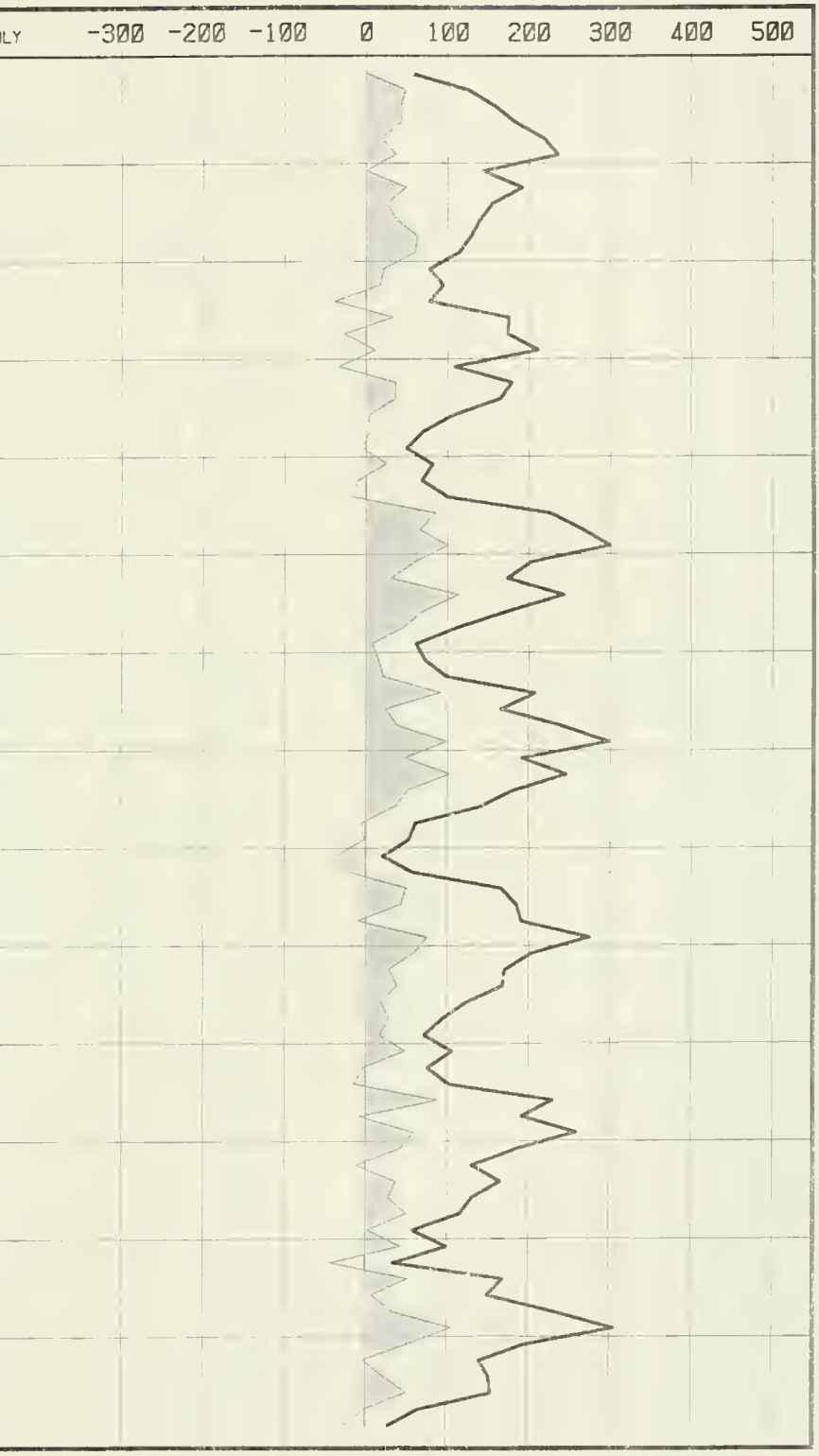
UPWELLING INDEX AT 30N, 119W BY MONTH

MONTH	INDEX	ANOMALY
4601	110	54
4602	80	3
4603	132	16
4604	155	14
4605	252	53
4606	347	148
4607	207	64
4608	201	59
4609	207	79
4610	86	-17
4611	54	-12
4612	53	-1
4701	110	53
4702	60	-17
4703	111	-5
4704	191	50
4705	114	-85
4706	176	-23
4707	243	100
4708	152	10
4709	102	-27
4710	95	-8
4711	70	5
4712	61	7
4801	30	-26
4802	102	24
4803	82	-34
4804	61	-80
4805	220	21
4806	151	-48
4807	126	-16
4808	119	-23
4809	105	-24
4810	81	-21
4811	72	7
4812	31	-22
4901	63	7
4902	121	43
4903	90	-26
4904	150	9
4905	158	-42
4906	160	-38
4907	113	-30
4908	155	13
4909	123	-6
4910	91	-11
4911	84	18
4912	53	-1
5001	60	4
5002	58	-19
5003	117	1
5004	151	10
5005	153	-46
5006	164	-35
5007	76	-66
5008	121	-21
5009	101	-28
5010	70	-33
5011	58	-8
5012	88	34
5101	112	56
5102	85	7
5103	115	-1
5104	91	-50
5105	204	4
5106	207	8
5107	157	14
5108	120	-22
5109	155	26
5110	128	25
5111	73	8
5112	49	-4
5201	24	-32
5202	35	-42
5203	108	-8
5204	99	-42
5205	224	24
5206	150	-49
5207	84	-58
5208	115	-27
5209	98	-31
5210	107	4
5211	54	-12
5212	31	-22



UPWELLING INDEX AT 30N, 119W BY MONTH

MONTH	INDEX	ANOMALY
5301	56	-0
5302	125	48
5303	158	42
5304	183	42
5305	218	19
5306	235	36
5307	143	0
5308	191	49
5309	154	25
5310	139	37
5311	128	63
5312	113	60
5401	77	21
5402	94	17
5403	77	-39
5404	174	33
5405	173	-27
5406	210	11
5407	108	-34
5408	178	36
5409	164	36
5410	105	3
5411	69	4
5412	49	-5
5501	81	25
5502	68	-10
5503	99	-17
5504	226	85
5505	265	66
5506	299	100
5507	202	60
5508	173	31
5509	242	114
5510	173	70
5511	111	46
5512	61	8
5601	72	15
5602	98	21
5603	207	91
5604	165	24
5605	238	38
5606	297	99
5607	191	48
5608	245	103
5609	180	51
5610	139	36
5611	60	-5
5612	52	-2
5701	20	-36
5702	56	-22
5703	165	49
5704	184	43
5705	190	-10
5706	274	75
5707	202	59
5708	170	28
5709	167	38
5710	122	19
5711	93	28
5712	71	17
5801	105	48
5802	75	-3
5803	101	-15
5804	229	89
5805	191	-8
5806	258	59
5807	185	42
5808	130	-12
5809	165	37
5810	130	28
5811	115	50
5812	57	3
5901	99	43
5902	33	-44
5903	168	52
5904	149	8
5905	231	32
5906	304	105
5907	195	52
5908	139	-3
5909	151	22
5910	153	50
5911	64	-1
5912	27	-27

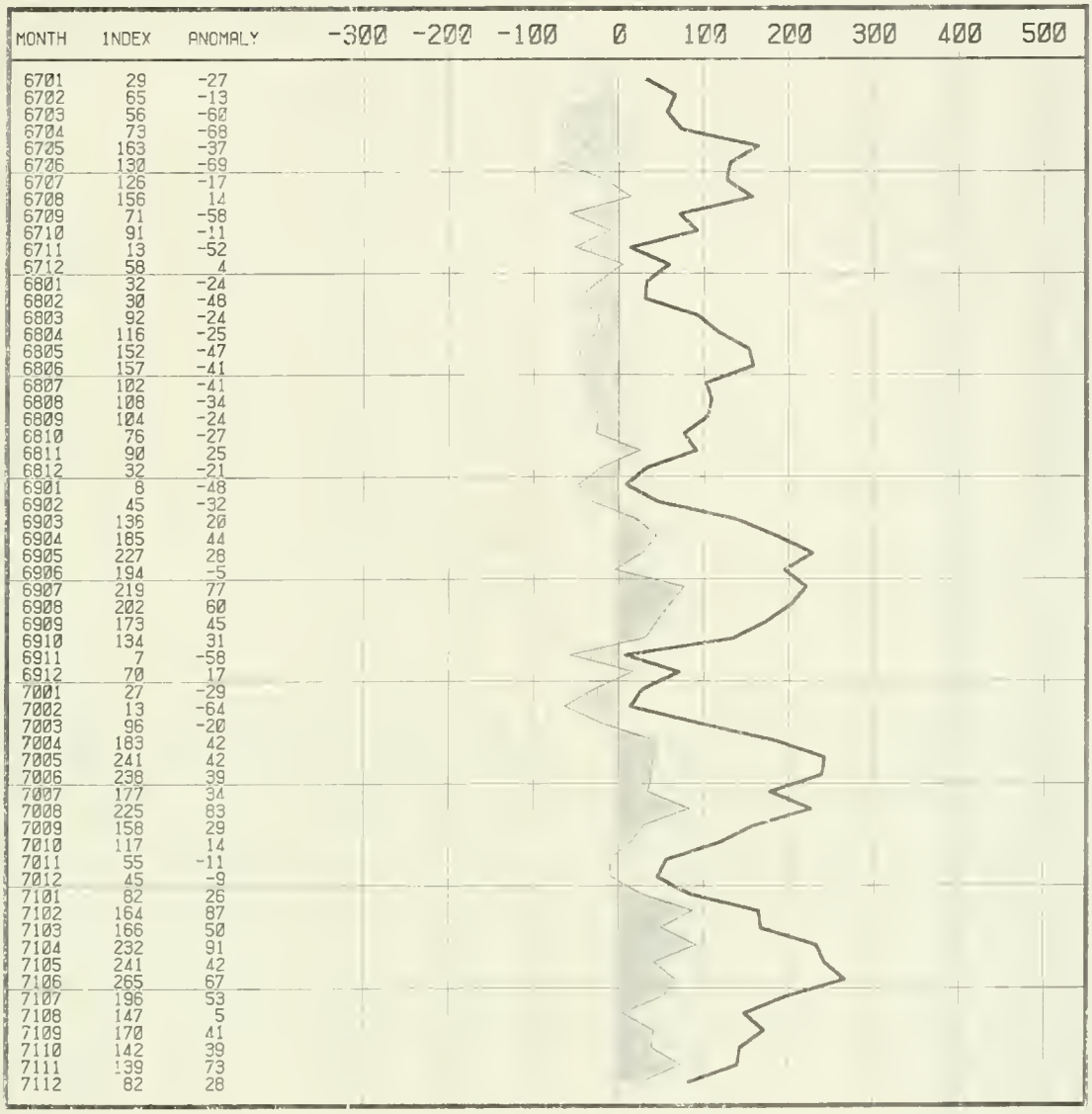


UPWELLING INDEX AT 30N, 119W BY MONTH

MONTH	INDEX	ANOMALY
6001	45	-11
6002	100	23
6003	169	53
6004	144	3
6005	299	100
6006	133	-66
6007	111	-32
6008	138	-4
6009	133	5
6010	121	18
6011	47	-19
6012	66	12
6101	33	-23
6102	157	80
6103	168	52
6104	164	23
6105	210	11
6106	158	-41
6107	94	-48
6108	124	-18
6109	70	-59
6110	66	-36
6111	47	-18
6112	53	-0
6201	49	-8
6202	46	-32
6203	82	-34
6204	189	48
6205	212	13
6206	218	19
6207	155	12
6208	166	24
6209	148	19
6210	97	-6
6211	103	38
6212	32	-22
6301	9	-47
6302	63	-14
6303	87	-29
6304	115	-26
6305	150	-49
6306	163	-35
6307	182	40
6308	131	-11
6309	93	-36
6310	71	-32
6311	63	-2
6312	41	-12
6401	69	13
6402	63	-14
6403	149	33
6404	169	28
6405	225	25
6406	204	5
6407	176	33
6408	134	-8
6409	118	-10
6410	60	-42
6411	38	-28
6412	73	19
6501	44	-12
6502	54	-23
6503	50	-66
6504	39	-101
6505	185	-15
6506	142	-57
6507	95	-48
6508	74	-68
6509	59	-69
6510	58	-45
6511	1	-64
6512	27	-27
6601	44	-12
6602	49	-28
6603	72	-44
6604	64	-77
6605	81	-119
6606	121	-77
6607	132	-11
6608	61	-81
6609	76	-52
6610	51	-51
6611	14	-51
6612	42	-12

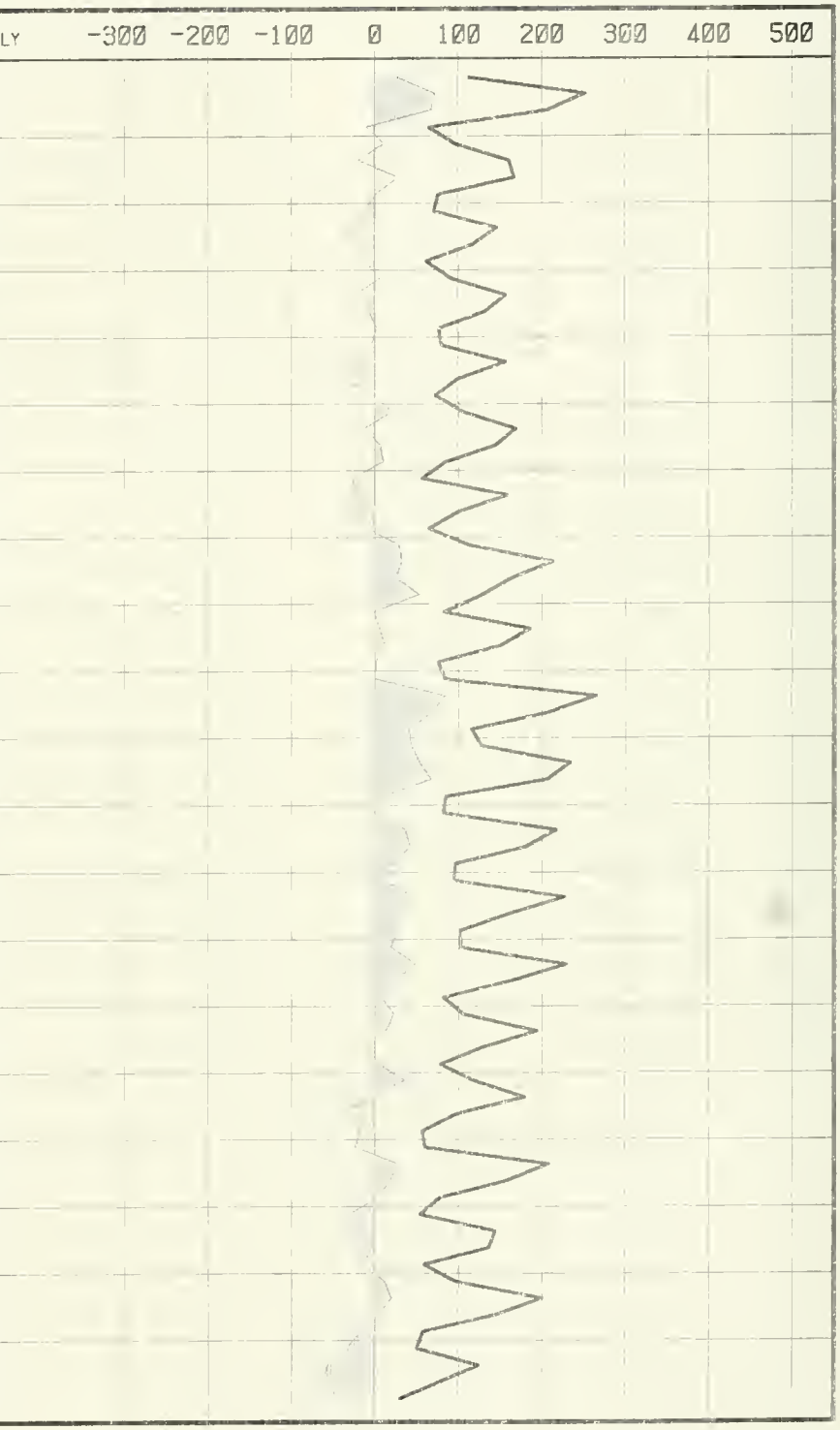
UPWELLING INDEX AT 30N, 119W BY MONTH

MONTH	INDEX	ANOMALY
6701	29	-27
6702	65	-13
6703	56	-60
6704	73	-68
6705	163	-37
6706	130	-69
6707	126	-17
6708	156	14
6709	71	-58
6710	91	-11
6711	13	-52
6712	58	4
6801	32	-24
6802	30	-48
6803	92	-24
6804	116	-25
6805	152	-47
6806	157	-41
6807	102	-41
6808	108	-34
6809	104	-24
6810	76	-27
6811	90	25
6812	32	-21
6901	8	-48
6902	45	-32
6903	136	20
6904	185	44
6905	227	28
6906	194	-5
6907	219	77
6908	202	60
6909	173	45
6910	134	31
6911	7	-58
6912	70	17
7001	27	-29
7002	13	-64
7003	96	-20
7004	183	42
7005	241	42
7006	238	39
7007	177	34
7008	225	83
7009	158	29
7010	117	14
7011	55	-11
7012	45	-9
7101	82	26
7102	164	87
7103	166	50
7104	232	91
7105	241	42
7106	265	67
7107	196	53
7108	147	5
7109	170	41
7110	142	39
7111	139	73
7112	82	28



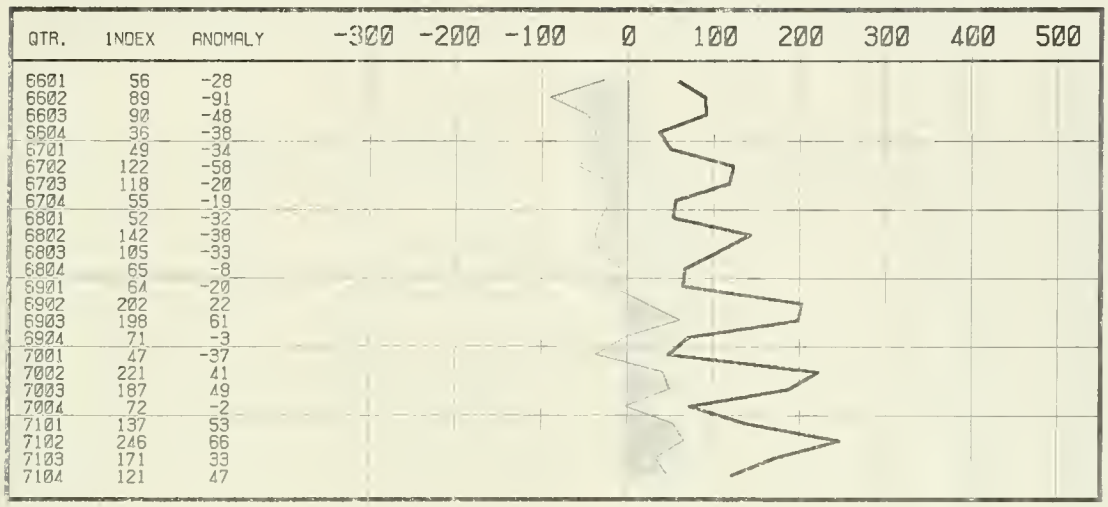
UPWELLING INDEX AT 30N, 119W BY QUARTER

QTR.	INDEX	ANOMALY
4601	108	25
4602	251	71
4603	205	67
4604	64	-10
4701	95	11
4702	160	-20
4703	166	28
4704	75	1
4801	70	-13
4802	145	-35
4803	117	-21
4804	61	-13
4901	90	7
4902	156	-24
4903	131	-7
4904	76	2
5001	79	-4
5002	156	-24
5003	99	-39
5004	72	-2
5101	105	21
5102	168	-12
5103	144	6
5104	84	10
5201	56	-27
5202	158	-22
5203	99	-39
5204	64	-10
5301	113	29
5302	212	32
5303	163	25
5304	127	53
5401	82	-1
5402	185	5
5403	150	12
5404	75	1
5501	83	0
5502	264	84
5503	206	68
5504	115	41
5601	127	43
5602	233	53
5603	205	67
5604	84	10
5701	81	-2
5702	216	36
5703	180	42
5704	95	21
5801	94	11
5802	226	46
5803	160	22
5804	101	26
5901	102	13
5902	228	48
5903	162	24
5904	81	7
6001	105	22
6002	193	13
6003	127	-10
6004	78	4
6101	118	35
6102	178	-2
6103	96	-41
6104	56	-18
6201	59	-24
6202	207	27
6203	156	18
6204	77	3
6301	53	-31
6302	143	-37
6303	136	-2
6304	58	-16
6401	95	11
6402	199	19
6403	143	5
6404	57	-17
6501	49	-34
6502	123	-57
6503	76	-62
6504	29	-45



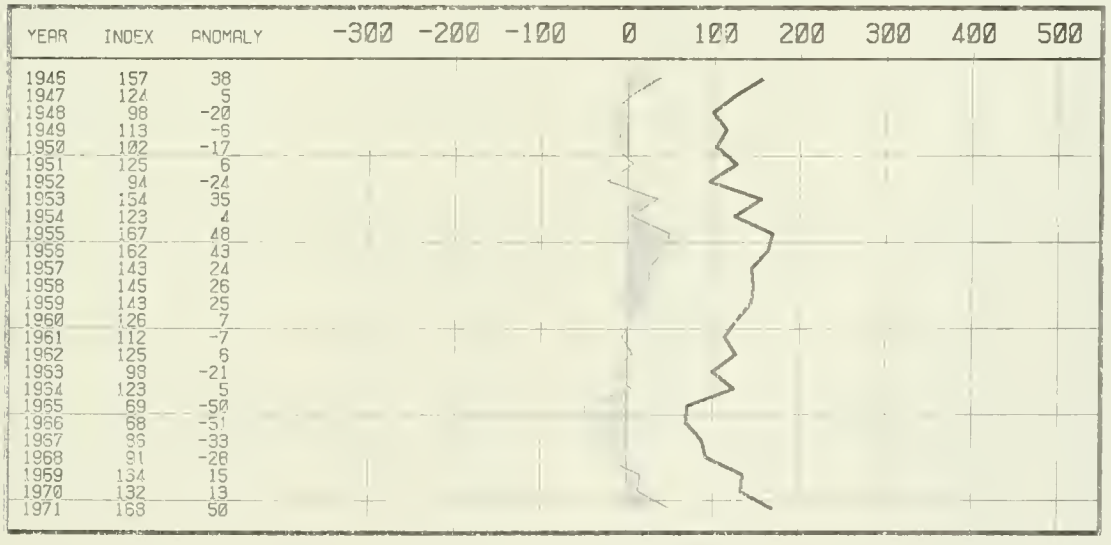
UPWELLING INDEX AT 30N, 119W BY QUARTER

QTR.	INDEX	ANOMALY
6601	56	-28
6602	89	-91
6603	90	-48
6604	36	-38
6701	49	-34
6702	122	-58
6703	118	-20
6704	55	-19
6801	52	-32
6802	142	-38
6803	105	-33
6804	65	-8
6901	64	-20
6902	202	22
6903	198	61
6904	71	-3
7001	47	-37
7002	221	41
7003	187	49
7004	72	-2
7101	137	53
7102	246	66
7103	171	33
7104	121	47



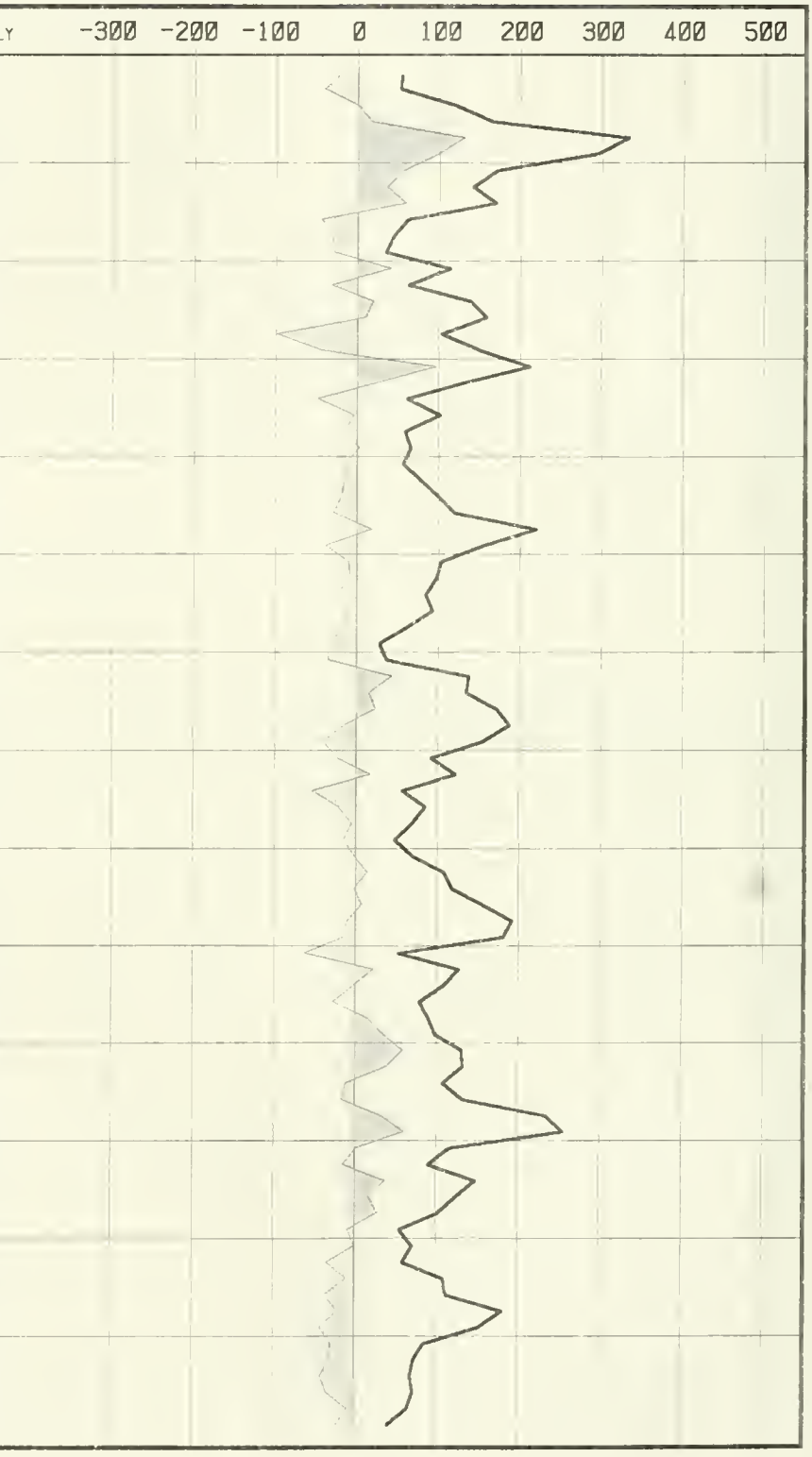
UPWELLING INDEX AT 30N, 119W BY YEAR

YEAR	INDEX	ANOMALY
1946	157	38
1947	124	5
1948	98	-20
1949	113	-6
1950	102	-17
1951	125	6
1952	94	-24
1953	154	35
1954	123	4
1955	167	48
1956	162	43
1957	143	24
1958	145	26
1959	143	25
1960	126	7
1961	112	-7
1962	125	6
1963	98	-21
1964	123	5
1965	69	-50
1966	68	-51
1967	86	-33
1968	91	-28
1969	134	15
1970	132	13
1971	168	50



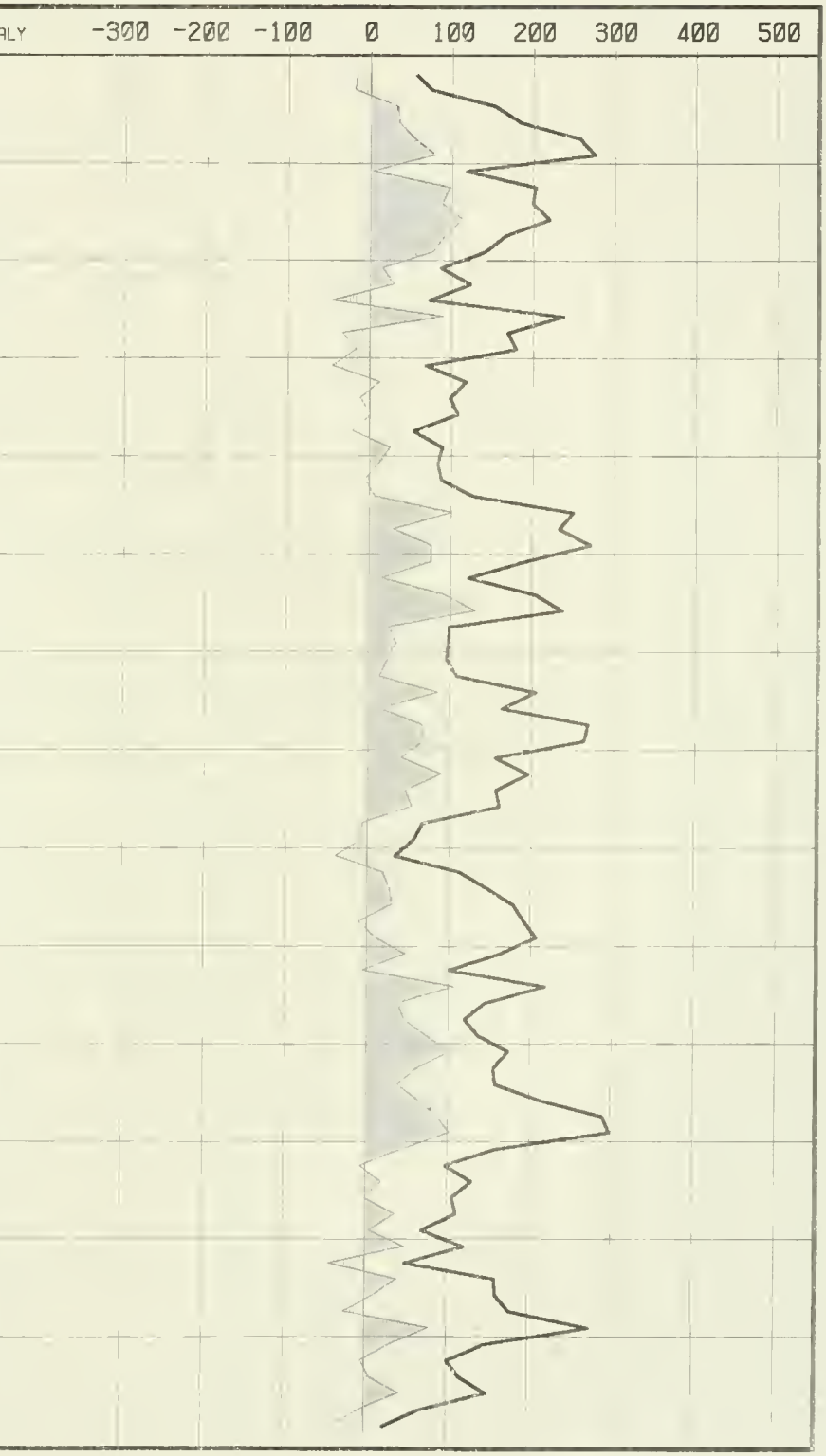
UPWELLING INDEX AT 27N, 116W BY MONTH

MONTH	INDEX	ANOMALY
4601	53	-19
4602	52	-41
4603	119	0
4604	165	17
4605	332	130
4606	294	100
4607	171	57
4608	141	36
4609	169	59
4610	61	-45
4611	44	-30
4612	34	-29
4701	113	41
4702	62	-32
4703	138	19
4704	158	10
4705	103	-99
4706	150	-44
4707	211	97
4708	130	25
4709	61	-49
4710	101	-5
4711	58	-16
4712	65	2
4801	56	-15
4802	77	-16
4803	99	-20
4804	119	-29
4805	219	18
4806	155	-39
4807	103	-11
4808	97	-8
4809	84	-26
4810	92	-14
4811	61	-13
4812	27	-36
4901	36	-35
4902	137	43
4903	134	15
4904	171	23
4905	187	-15
4906	154	-41
4907	91	-23
4908	121	17
4909	56	-54
4910	84	-22
4911	68	-6
4912	47	-16
5001	69	-2
5002	107	14
5003	117	-2
5004	155	7
5005	191	-11
5006	180	-15
5007	52	-63
5008	126	22
5009	107	-3
5010	78	-28
5011	89	15
5012	97	34
5101	130	58
5102	131	38
5103	107	-12
5104	131	-17
5105	233	32
5106	254	60
5107	115	1
5108	89	-15
5109	147	37
5110	123	17
5111	101	27
5112	54	-9
5201	70	-1
5202	58	-35
5203	108	-11
5204	111	-37
5205	180	-22
5206	151	-43
5207	84	-30
5208	72	-32
5209	68	-42
5210	71	-35
5211	64	-10
5212	40	-23



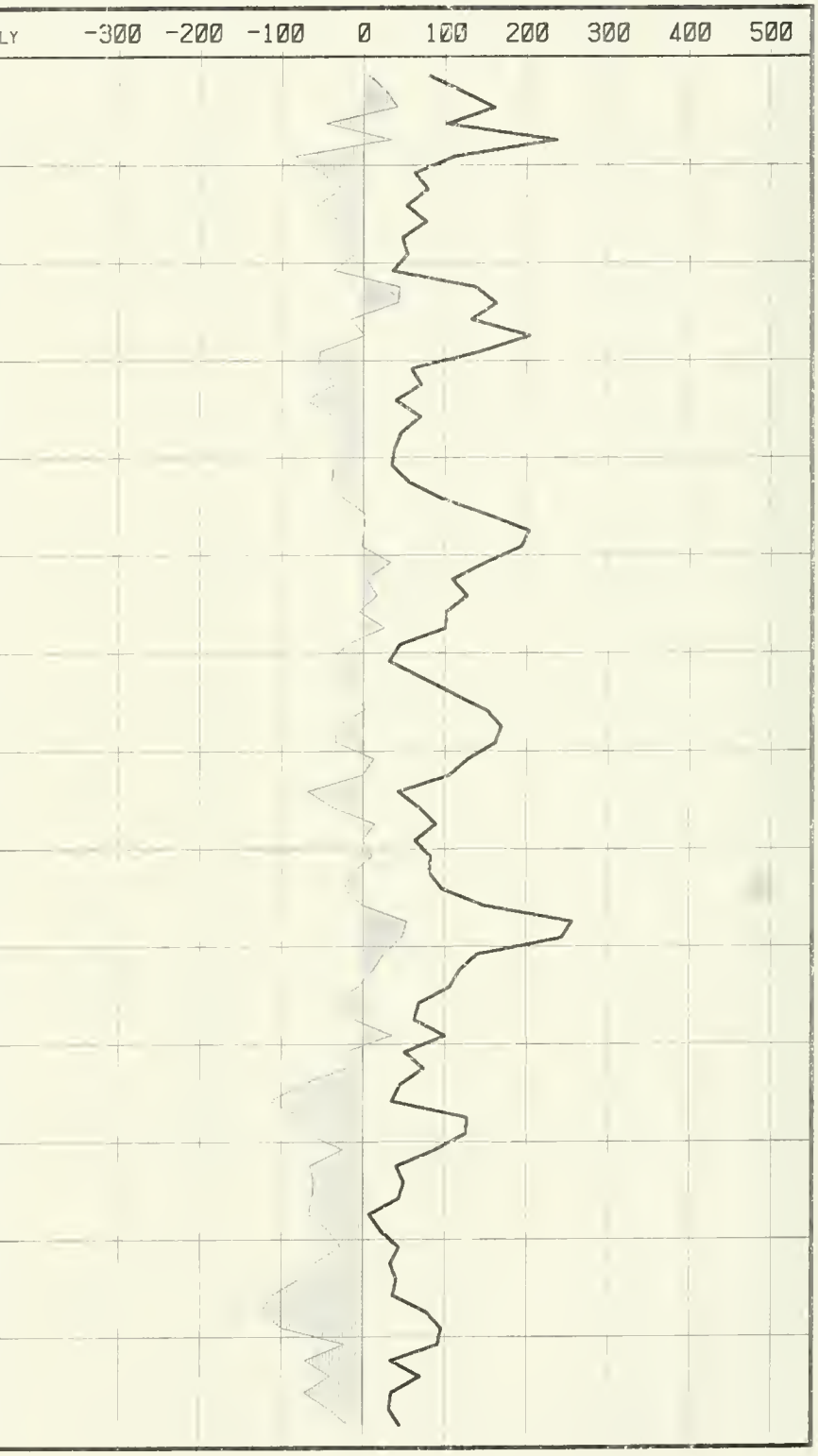
UPWELLING INDEX AT 27N, 116W BY MONTH

MONTH	INDEX	ANOMALY
5301	54	-17
5302	74	-19
5303	152	33
5304	183	35
5305	256	54
5306	274	79
5307	117	3
5308	202	97
5309	198	88
5310	219	113
5311	165	91
5312	140	77
5401	86	15
5402	122	29
5403	72	-47
5404	236	89
5405	168	-34
5406	178	-17
5407	68	-46
5408	117	12
5409	98	-12
5410	107	1
5411	53	-21
5412	88	25
5501	83	11
5502	87	-6
5503	126	7
5504	249	101
5505	232	30
5506	270	76
5507	190	76
5508	121	16
5509	202	92
5510	236	130
5511	98	25
5512	97	33
5601	95	23
5602	107	13
5603	204	85
5604	163	15
5605	266	66
5606	263	68
5607	155	41
5608	195	90
5609	156	46
5610	160	54
5611	67	-7
5612	56	-8
5701	33	-39
5702	112	19
5703	146	27
5704	178	30
5705	191	-11
5706	206	11
5707	161	47
5708	100	-5
5709	217	107
5710	144	38
5711	119	46
5712	136	73
5801	173	102
5802	155	62
5803	157	38
5804	213	65
5805	289	87
5806	297	102
5807	158	44
5808	97	-7
5809	129	19
5810	105	-1
5811	110	36
5812	68	5
5901	120	48
5902	48	-45
5903	158	39
5904	159	11
5905	176	-26
5906	273	78
5907	146	31
5908	100	-5
5909	115	5
5910	148	42
5911	67	-7
5912	22	-41

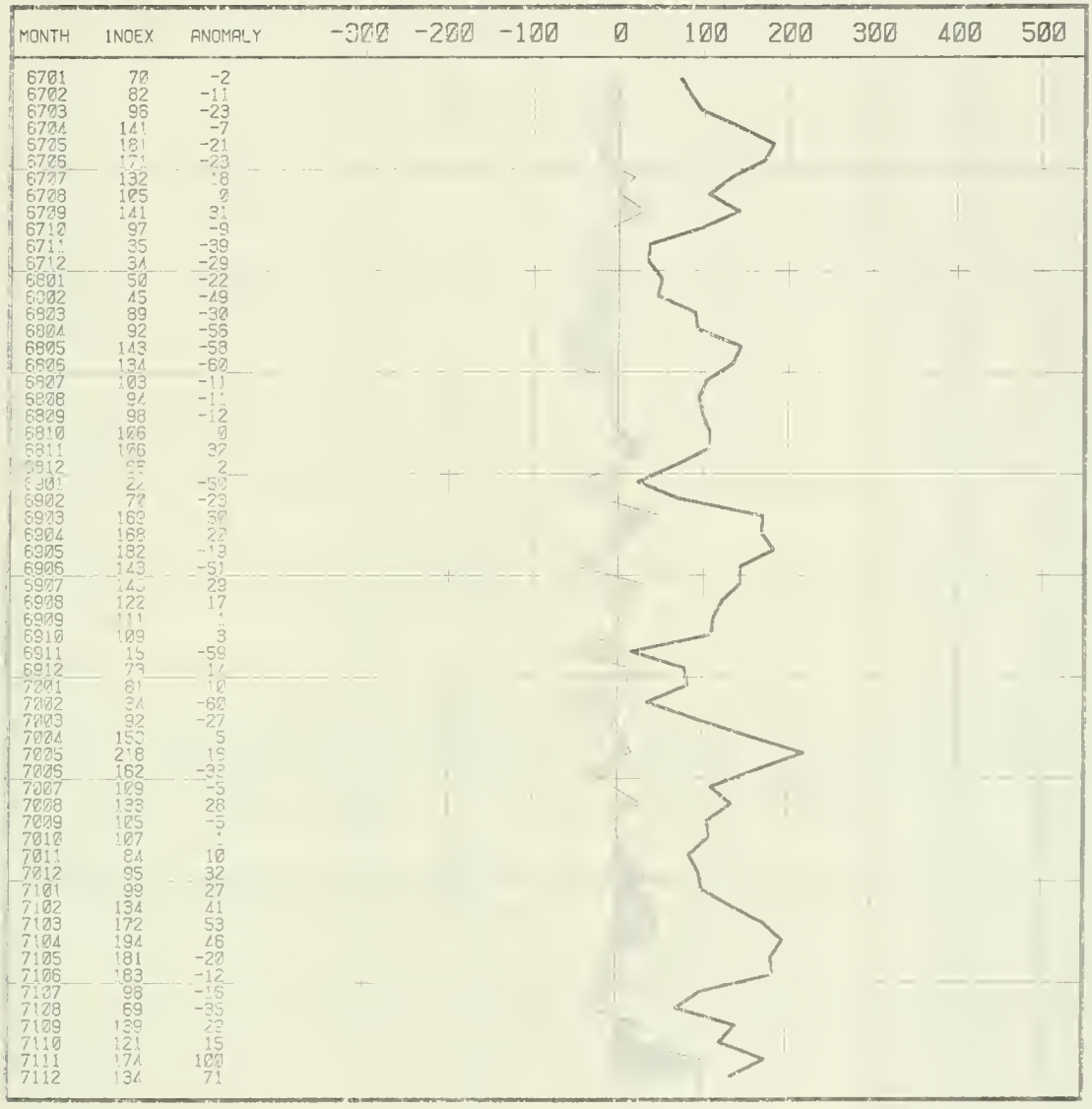


UPWELLING INDEX AT 27N, 116W BY MONTH

MONTH	INDEX	ANOMALY
6001	77	5
6002	120	27
6003	160	41
6004	102	-46
6005	236	34
6006	111	-84
6007	62	-52
6008	78	-27
6009	52	-58
6010	76	-30
6011	47	-27
6012	53	-11
6101	35	-37
6102	137	44
6103	162	42
6104	132	-16
6105	203	1
6106	140	-54
6107	58	-56
6108	70	-35
6109	39	-71
6110	69	-37
6111	45	-29
6112	37	-27
6201	34	-37
6202	54	-39
6203	93	-26
6204	150	2
6205	202	0
6206	193	-2
6207	148	33
6208	108	4
6209	126	16
6210	101	-5
6211	100	26
6212	44	-19
6301	31	-41
6302	71	-22
6303	110	-9
6304	150	2
6305	168	-33
6306	161	-34
6307	127	13
6308	104	-1
6309	42	-68
6310	68	-38
6311	88	14
6312	63	-1
6401	82	11
6402	80	-13
6403	96	-24
6404	146	-2
6405	255	53
6406	242	47
6407	139	25
6408	117	12
6409	105	-6
6410	67	-39
6411	62	-12
6412	99	35
6501	50	-21
6502	73	-20
6503	44	-75
6504	34	-114
6505	126	-76
6506	125	-69
6507	88	-26
6508	40	-65
6509	49	-61
6510	43	-63
6511	7	-67
6512	21	-42
6601	43	-28
6602	33	-60
6603	40	-79
6604	36	-112
6605	77	-125
6606	95	-99
6607	91	-23
6608	33	-71
6609	69	-41
6610	34	-72
6611	31	-43
6612	44	-19



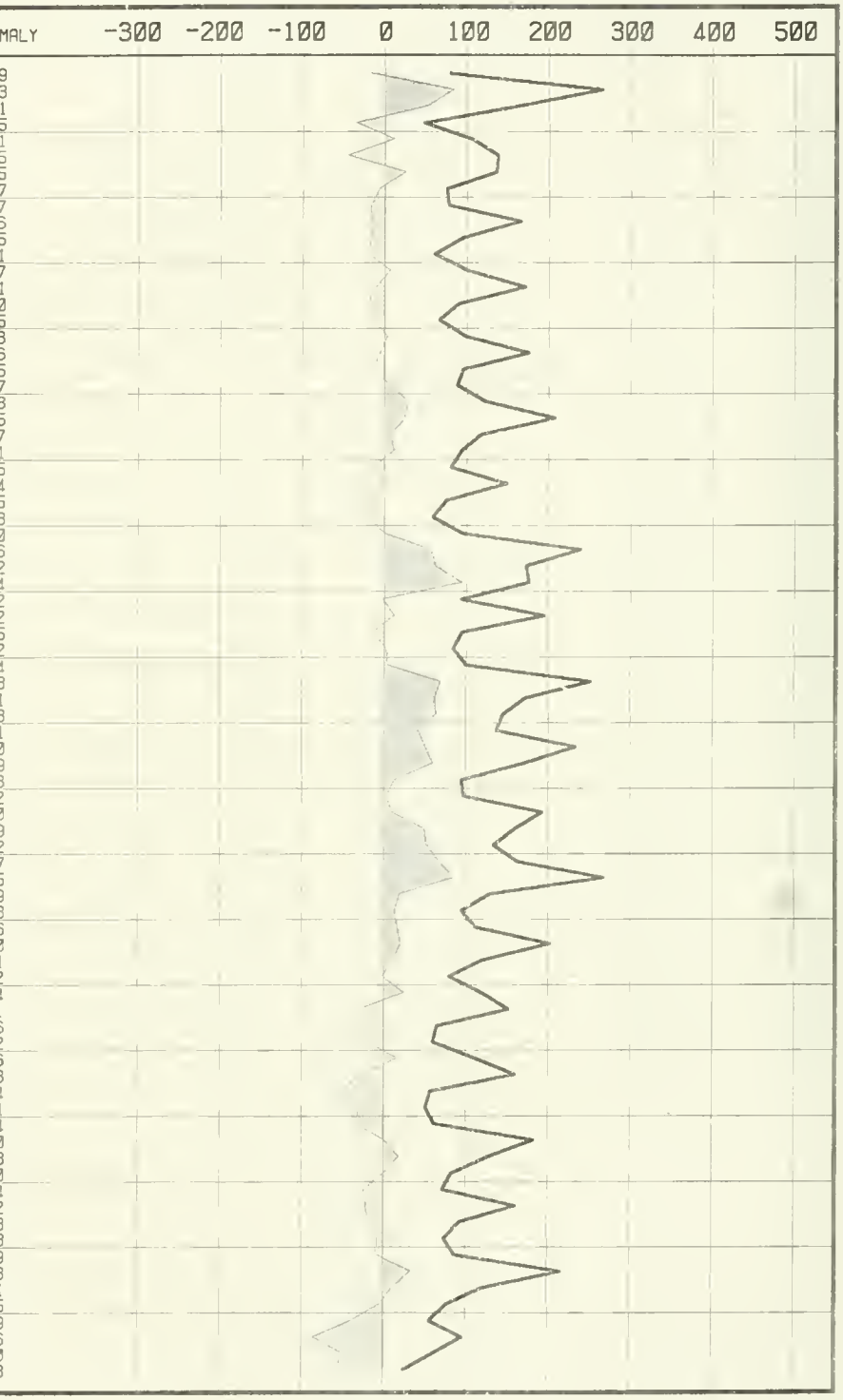
UPWELLING INDEX AT 27N, 116W BY MONTH



MONTH	INDEX	ANOMALY
6701	70	-2
6702	82	-11
6703	96	-23
6704	141	-7
6705	181	-21
6706	171	-23
6707	132	18
6708	105	0
6709	141	31
6710	97	-9
6711	35	-39
6712	34	-29
6801	50	-22
6802	45	-49
6803	89	-30
6804	92	-56
6805	143	-58
6806	134	-60
6807	103	-11
6808	94	-1
6809	98	-12
6810	106	0
6811	106	32
6812	65	2
6901	24	-50
6902	72	-23
6903	160	50
6904	168	22
6905	182	-13
6906	145	-51
6907	145	29
6908	122	17
6909	111	1
6910	109	3
6911	15	-59
6912	73	12
7001	81	10
7002	34	-60
7003	92	-27
7004	150	5
7005	218	19
7006	162	-33
7007	109	-5
7008	133	28
7009	105	-5
7010	107	1
7011	84	10
7012	95	32
7101	99	27
7102	134	41
7103	172	53
7104	194	46
7105	181	-20
7106	183	-12
7107	98	-16
7108	69	-35
7109	139	23
7110	121	15
7111	174	100
7112	134	71

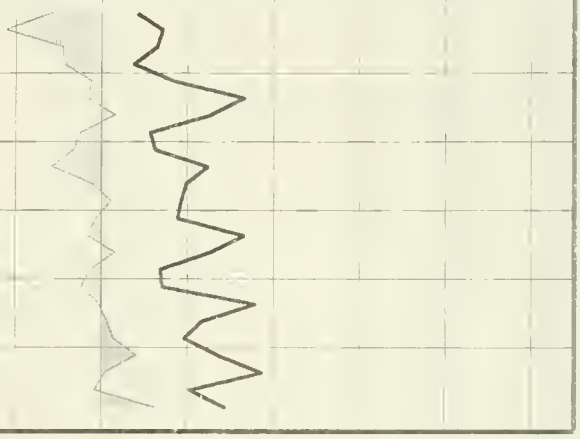
UPWELLING INDEX AT 27N, 116W BY QUARTER

QTR.	INDEX	ANOMALY
4601	75	-19
4602	264	83
4603	160	51
4604	47	-35
4701	106	11
4702	137	-45
4703	135	25
4704	75	-7
4801	77	-17
4802	165	-16
4803	95	-15
4804	60	-21
4901	101	7
4902	171	-11
4903	90	-20
4904	66	-15
5001	98	3
5002	175	-6
5003	95	-15
5004	88	7
5101	122	28
5102	207	25
5103	117	7
5104	93	11
5201	80	-15
5202	148	-34
5203	75	-35
5204	58	-23
5301	94	-0
5302	238	56
5303	172	62
5304	175	94
5401	93	-2
5402	194	12
5403	94	-15
5404	83	2
5501	99	4
5502	250	68
5503	171	61
5504	144	63
5601	136	41
5602	232	50
5603	169	59
5604	94	13
5701	96	2
5702	192	10
5703	159	49
5704	133	52
5801	162	67
5802	267	85
5803	128	19
5804	94	13
5901	111	16
5902	202	20
5903	120	11
5904	79	-2
6001	119	24
6002	151	-31
6003	64	-46
6004	59	-22
6101	110	16
6102	159	-23
6103	56	-54
6104	50	-31
6201	61	-34
6202	182	0
6203	127	18
6204	82	0
6301	71	-24
6302	160	-22
6303	92	-18
6304	73	-8
6401	86	-9
6402	215	33
6403	120	11
6404	76	-5
6501	55	-39
6502	95	-86
6503	59	-50
6504	24	-58



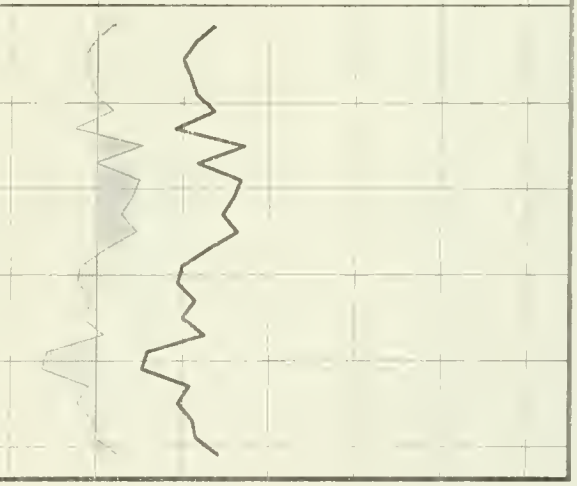
UPWELLING INDEX AT 27N, 116W BY QUARTER

QTR.	INDEX	ANOMALY
6601	39	-56
6602	70	-112
6603	64	-45
6604	37	-44
6701	83	-12
6702	165	-17
6703	126	16
6704	56	-25
6801	62	-33
6802	123	-58
6803	98	-11
6804	92	11
6901	88	-7
6902	165	-17
6903	125	16
6904	68	-13
7001	70	-24
7002	178	-3
7003	116	6
7004	96	14
7101	135	40
7102	186	4
7103	102	-8
7104	143	62



UPWELLING INDEX AT 27N, 116W BY YEAR

YEAR	INDEX	ANOMALY
1946	137	20
1947	113	-4
1948	99	-17
1949	107	-10
1950	114	-3
1951	135	18
1952	90	-27
1953	170	53
1954	116	-1
1955	166	49
1956	158	41
1957	145	28
1958	162	46
1959	128	11
1960	98	-19
1961	93	-23
1962	113	-4
1963	99	-18
1964	124	8
1965	58	-58
1966	52	-64
1967	107	-10
1968	94	-23
1969	111	-5
1970	115	-2
1971	141	25

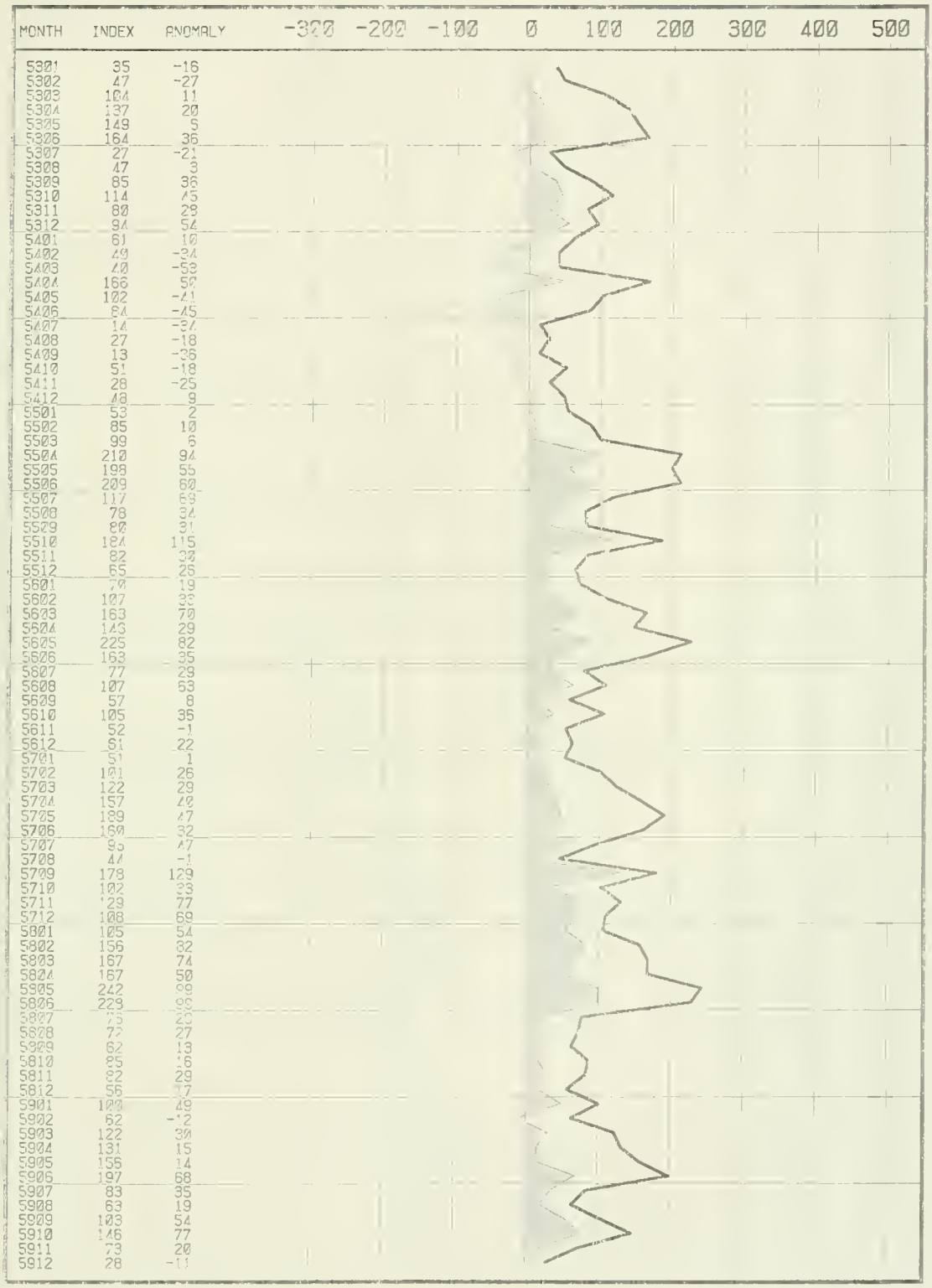


UPWELLING INDEX AT 24N, 113W BY MONTH

MONTH	INDEX	ANOMALY
4601	55	5
4602	54	-21
4603	113	20
4604	134	17
4605	253	110
4606	166	38
4607	62	14
4608	57	12
4609	50	1
4610	16	-53
4611	28	-24
4612	10	-29
4701	36	-15
4702	53	-21
4703	101	8
4704	89	-27
4705	52	-91
4706	53	-76
4707	130	82
4708	68	23
4709	15	-34
4710	81	11
4711	41	-11
4712	42	3
4801	11	-40
4802	36	-39
4803	120	27
4804	98	-19
4805	126	-17
4806	78	-50
4807	42	-6
4808	32	-13
4809	11	-38
4810	56	-13
4811	47	-5
4812	27	-13
4901	19	-32
4902	114	40
4903	109	15
4904	122	6
4905	122	-21
4906	85	-44
4907	28	-20
4908	32	-13
4909	2	-47
4910	55	-14
4911	28	-24
4912	28	-12
5001	33	-18
5002	95	20
5003	100	7
5004	101	-15
5005	157	14
5006	139	11
5007	17	-31
5008	91	46
5009	78	29
5010	16	-53
5011	63	11
5012	34	-5
5101	91	40
5102	147	73
5103	92	-0
5104	142	26
5105	195	52
5106	180	52
5107	36	-12
5108	20	-25
5109	82	33
5110	74	5
5111	94	41
5112	37	-2
5201	72	22
5202	69	-5
5203	79	-14
5204	87	-30
5205	97	-45
5206	97	-31
5207	30	-17
5208	27	-18
5209	10	-39
5210	35	-34
5211	31	-21
5212	32	-8

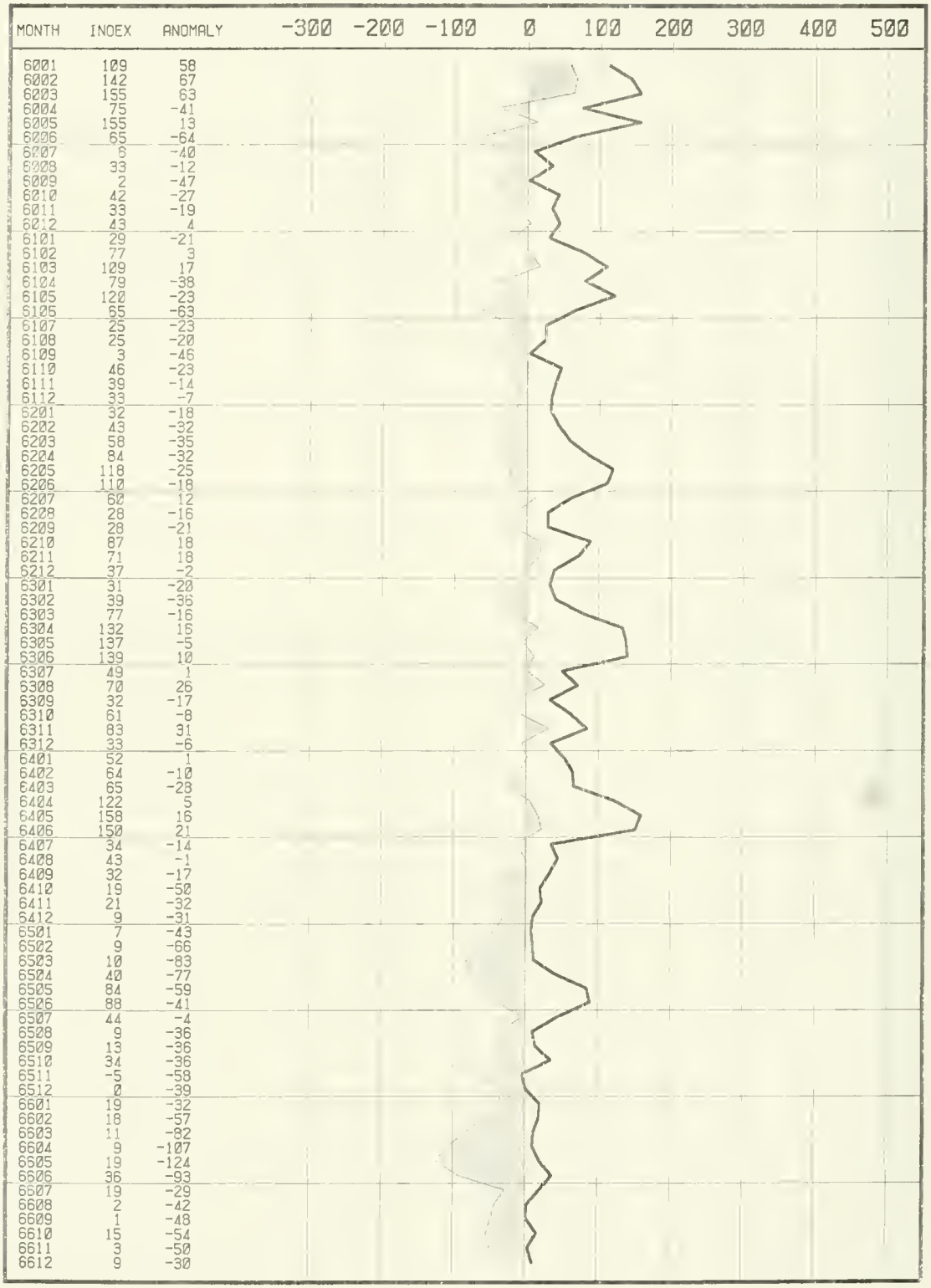
UPWELLING INDEX 9T 24N, 113W BY MONTH

MONTH	INDEX	ANOMALY
5301	35	-16
5302	47	-27
5303	104	11
5304	137	20
5305	149	6
5306	164	36
5307	27	-21
5308	47	3
5309	85	36
5310	114	45
5311	80	29
5312	94	54
5401	61	10
5402	40	-34
5403	40	-53
5404	166	50
5405	102	-41
5406	84	-45
5407	14	-37
5408	27	-18
5409	13	-36
5410	51	-18
5411	28	-25
5412	48	9
5501	53	2
5502	85	10
5503	99	6
5504	210	94
5505	198	55
5506	209	60
5507	117	69
5508	78	34
5509	80	31
5510	184	115
5511	82	32
5512	65	26
5601	70	19
5602	107	33
5603	163	70
5604	143	29
5605	225	82
5606	163	35
5607	77	29
5608	107	53
5609	57	8
5610	105	35
5611	52	-1
5612	61	22
5701	51	1
5702	101	26
5703	122	29
5704	157	40
5705	189	47
5706	180	32
5707	95	47
5708	44	-1
5709	178	129
5710	102	33
5711	129	77
5712	108	69
5801	105	54
5802	156	82
5803	167	74
5804	167	50
5805	242	99
5806	228	99
5807	75	28
5808	72	27
5809	62	13
5810	85	16
5811	82	29
5812	56	17
5901	100	49
5902	62	-12
5903	122	30
5904	131	15
5905	156	14
5906	197	68
5907	83	35
5908	63	19
5909	103	54
5910	146	77
5911	73	20
5912	28	-11



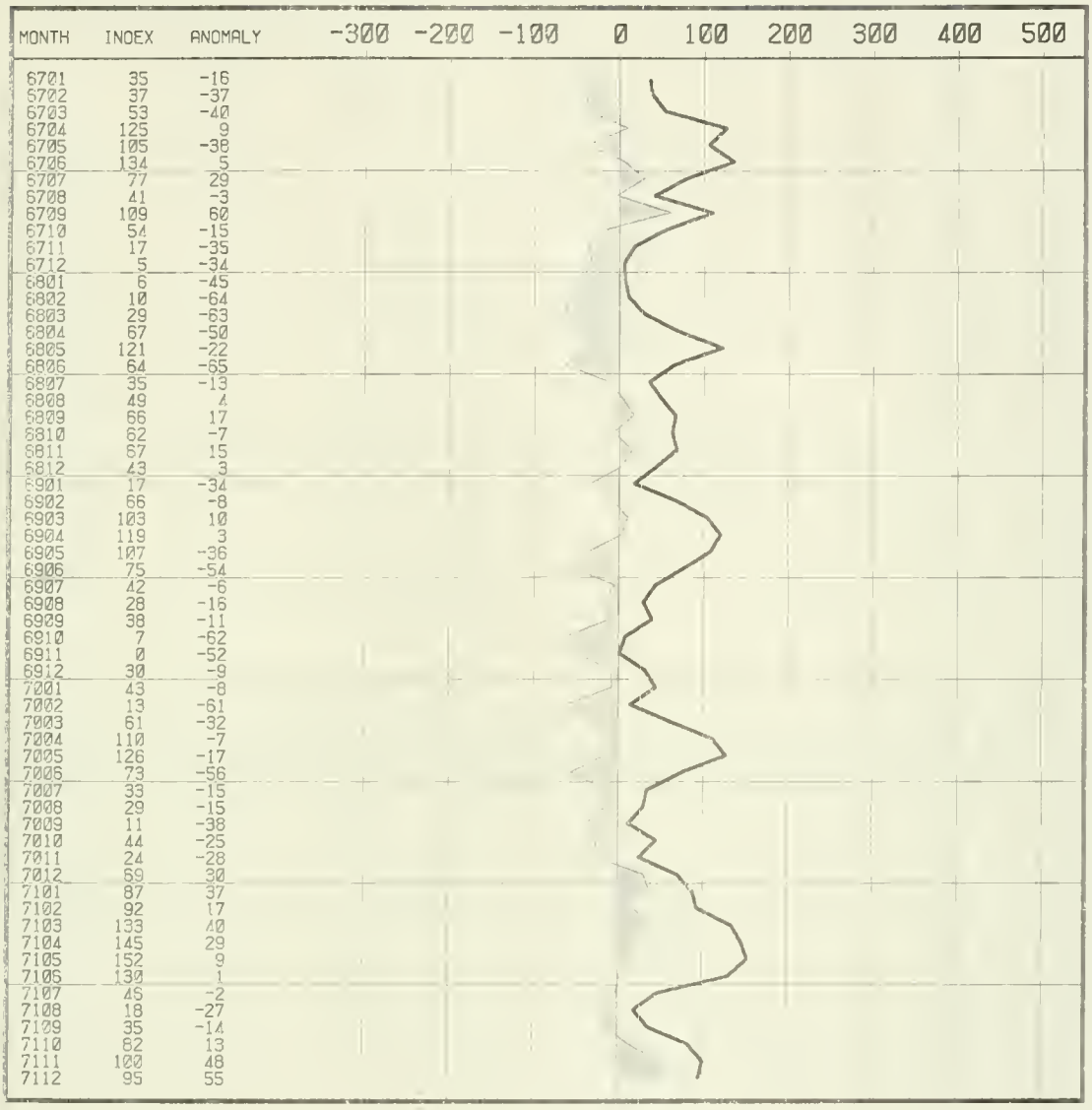
UPWELLING INDEX AT 24N, 113W BY MONTH

MONTH	INDEX	ANOMALY
6001	109	58
6002	142	67
6003	155	63
6004	75	-41
6005	155	13
6006	65	-64
6007	8	-40
6008	33	-12
6009	2	-47
6010	42	-27
6011	33	-19
6012	43	4
6101	29	-21
6102	77	3
6103	109	17
6104	79	-38
6105	120	-23
6106	65	-63
6107	25	-23
6108	25	-20
6109	3	-46
6110	46	-23
6111	39	-14
6112	33	-7
6201	32	-18
6202	43	-32
6203	58	-35
6204	84	-32
6205	118	-25
6206	110	-18
6207	60	12
6208	28	-16
6209	28	-21
6210	87	18
6211	71	18
6212	37	-2
6301	31	-20
6302	39	-36
6303	77	-16
6304	132	16
6305	137	-5
6306	139	10
6307	49	1
6308	70	26
6309	32	-17
6310	61	-8
6311	83	31
6312	33	-6
6401	52	1
6402	64	-10
6403	65	-28
6404	122	5
6405	158	16
6406	150	21
6407	34	-14
6408	43	-1
6409	32	-17
6410	19	-50
6411	21	-32
6412	9	-31
6501	7	-43
6502	9	-66
6503	10	-83
6504	40	-77
6505	84	-59
6506	88	-41
6507	44	-4
6508	9	-36
6509	13	-36
6510	34	-36
6511	-5	-58
6512	0	-39
6601	19	-32
6602	18	-57
6603	11	-82
6604	9	-107
6605	19	-124
6606	36	-93
6607	19	-29
6608	2	-42
6609	1	-48
6610	15	-54
6611	3	-50
6612	9	-30



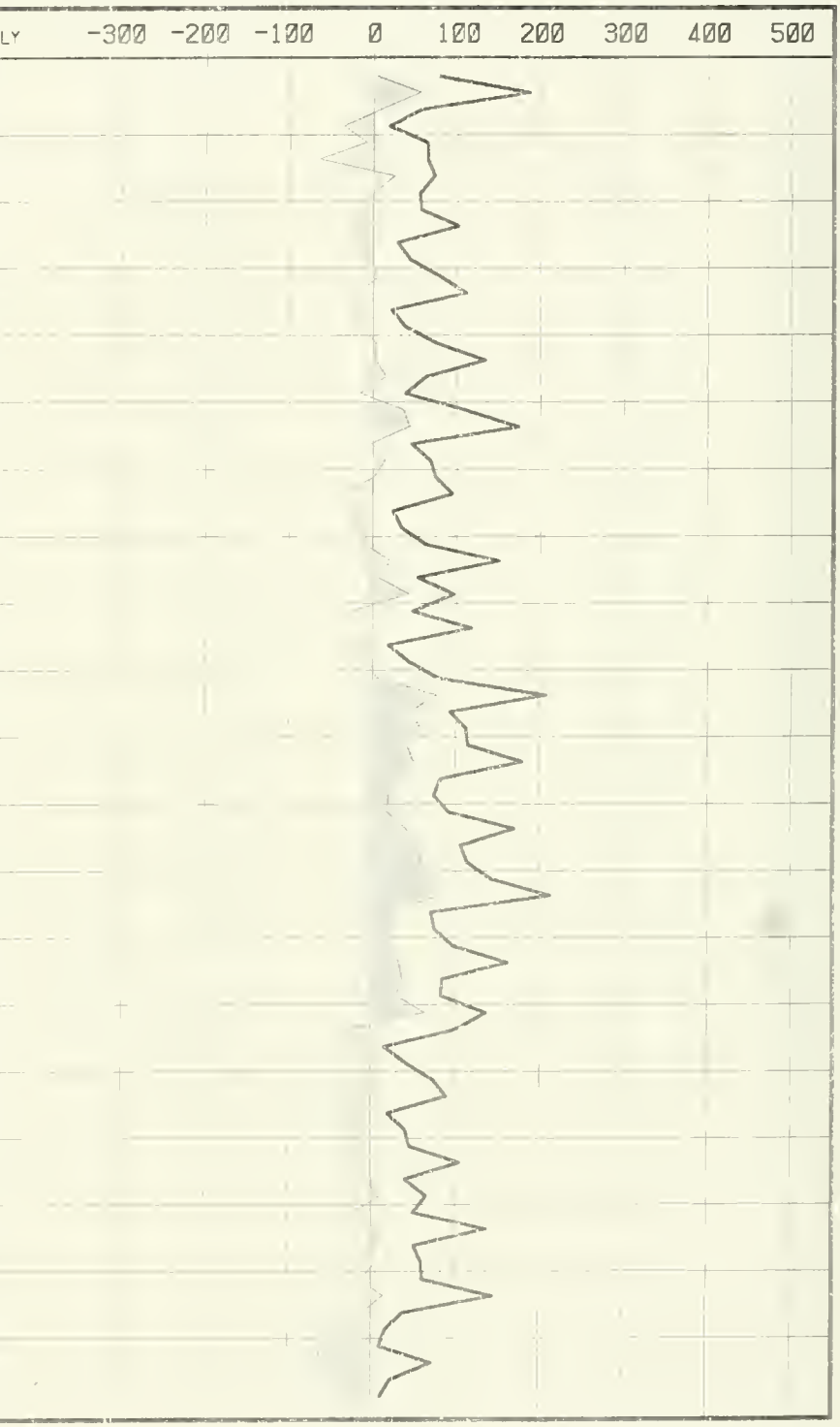
UPWELLING INDEX AT 24N, 113W BY MONTH

MONTH	INDEX	ANOMALY
6701	35	-16
6702	37	-37
6703	53	-40
6704	125	9
6705	105	-38
6706	134	5
6707	77	29
6708	41	-3
6709	109	60
6710	54	-15
6711	17	-35
6712	5	-34
6801	6	-45
6802	10	-64
6803	29	-63
6804	67	-50
6805	121	-22
6806	64	-65
6807	35	-13
6808	49	4
6809	66	17
6810	62	-7
6811	67	15
6812	43	3
6901	17	-34
6902	66	-8
6903	103	10
6904	119	3
6905	107	-36
6906	75	-54
6907	42	-6
6908	28	-16
6909	38	-11
6910	7	-62
6911	0	-52
6912	30	-9
7001	43	-8
7002	13	-61
7003	61	-32
7004	110	-7
7005	126	-17
7006	73	-56
7007	33	-15
7008	29	-15
7009	11	-38
7010	44	-25
7011	24	-28
7012	69	30
7101	87	37
7102	92	17
7103	133	40
7104	145	29
7105	152	9
7106	130	1
7107	45	-2
7108	18	-27
7109	35	-14
7110	82	13
7111	100	48
7112	95	55



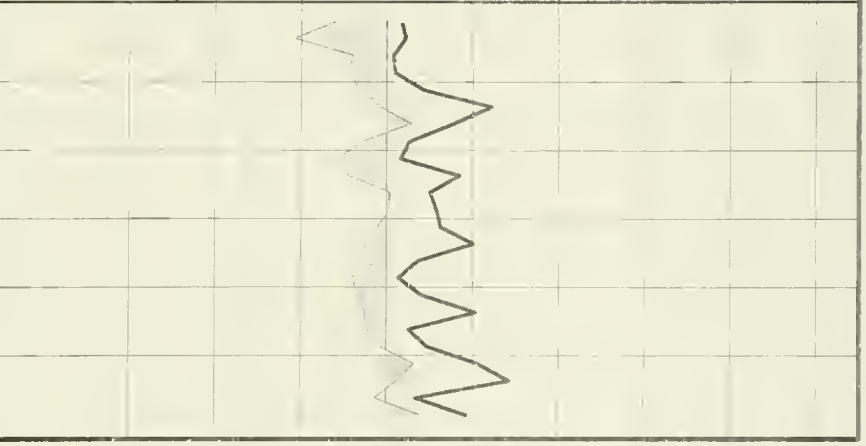
UPWELLING INDEX AT 24N, 113W BY QUARTER

QTR.	INDEX	ANOMALY
4601	75	2
4602	185	56
4603	56	9
4604	18	-36
4701	64	-9
4702	64	-65
4703	72	25
4704	55	1
4801	56	-16
4802	101	-28
4803	28	-19
4804	43	-10
4901	79	7
4902	110	-20
4903	21	-26
4904	37	-16
5001	75	3
5002	133	3
5003	62	15
5004	38	-16
5101	109	36
5102	173	43
5103	45	-2
5104	68	12
5201	74	1
5202	94	-35
5203	23	-25
5204	33	-21
5301	62	-10
5302	150	21
5303	53	6
5304	96	43
5401	47	-25
5402	117	-12
5403	18	-29
5404	42	-11
5501	78	6
5502	206	76
5503	92	45
5504	111	57
5601	113	41
5602	178	49
5603	81	34
5604	73	19
5701	91	18
5702	169	40
5703	105	56
5704	113	59
5801	142	70
5802	212	83
5803	70	23
5804	74	21
5901	96	23
5902	161	32
5903	83	36
5904	82	29
6001	135	63
6002	99	-30
6003	14	-33
6004	40	-14
6101	72	-1
6102	88	-41
6103	18	-29
6104	39	-14
6201	44	-28
6202	104	-25
6203	39	-9
6204	65	11
6301	49	-23
6302	136	7
6303	50	3
6304	59	5
6401	60	-12
6402	144	14
6403	37	-11
6404	16	-38
6501	9	-64
6502	71	-59
6503	22	-25
6504	10	-44



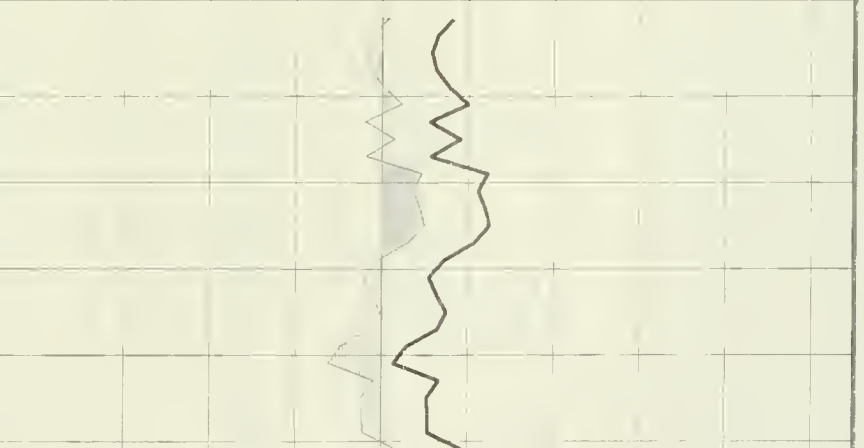
UPWELLING INDEX AT 24N, 113W BY QUARTER

QTR.	INDEX	ANOMALY
6601	16	-57
6602	21	-108
6603	7	-40
6604	9	-45
6701	42	-31
6702	121	-8
6703	76	28
6704	26	-28
6801	15	-57
6802	84	-45
6803	50	3
6804	57	4
6901	62	-11
6902	100	-29
6903	36	-11
6904	13	-41
7001	40	-33
7002	103	-26
7003	25	-23
7004	46	-8
7101	105	32
7102	142	13
7103	33	-14
7104	92	39



UPWELLING INDEX AT 24N, 113W BY YEAR

YEAR	INDEX	ANOMALY
1946	83	8
1947	64	-12
1948	57	-18
1949	62	-14
1950	77	1
1951	99	23
1952	55	-20
1953	90	15
1954	56	-19
1955	122	46
1956	111	36
1957	119	44
1958	124	49
1959	106	30
1960	72	-4
1961	54	-21
1962	63	-13
1963	74	-2
1964	64	-12
1965	28	-48
1966	13	-62
1967	66	-10
1968	52	-24
1969	53	-23
1970	53	-22
1971	93	17

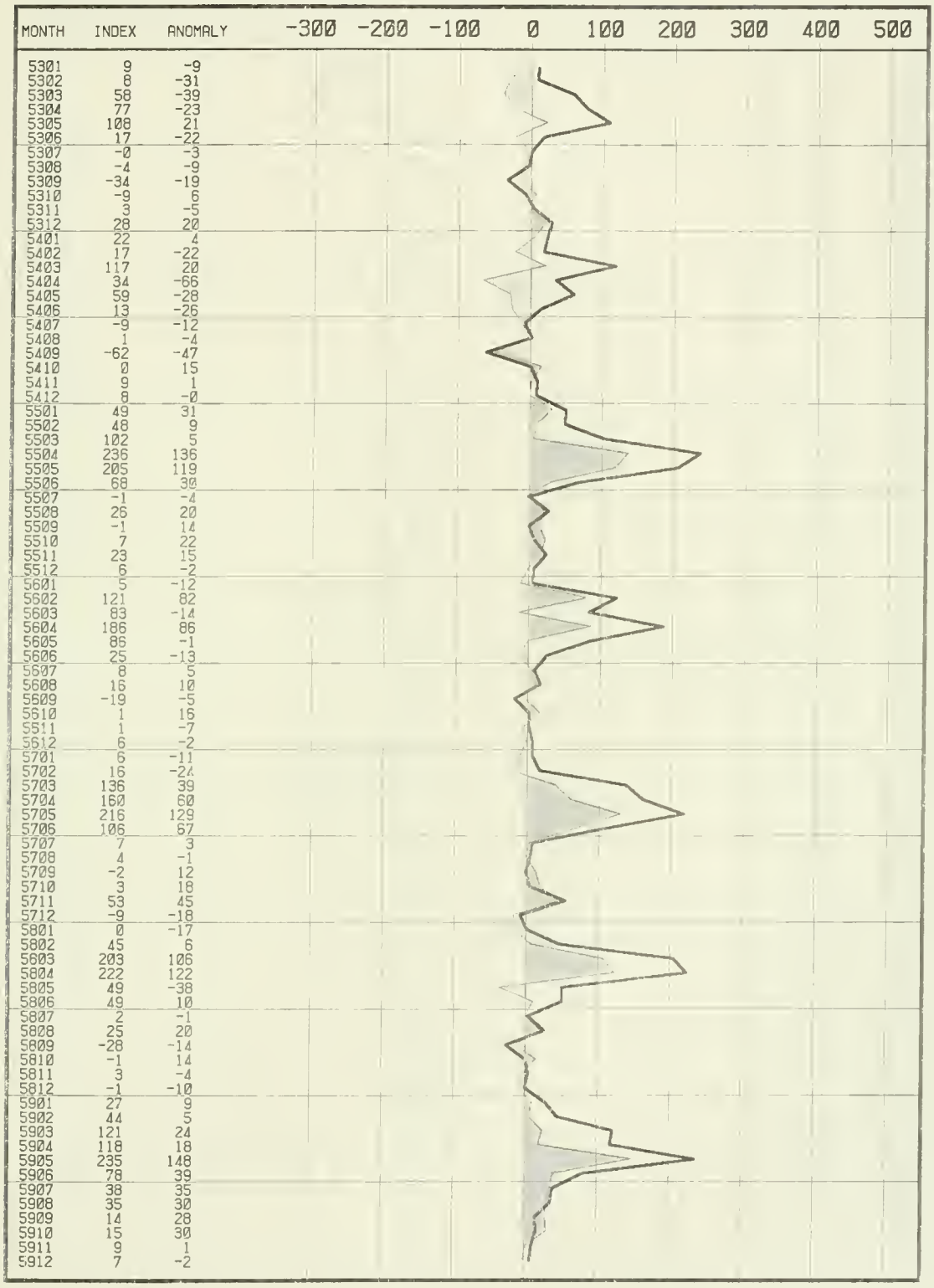


UPWELLING INDEX AT 21N, 107W BY MONTH

MONTH	INDEX	ANOMALY
4601	32	14
4602	29	-11
4603	59	-38
4604	19	-81
4605	61	-26
4606	29	-9
4607	-2	-5
4608	0	-5
4609	-3	12
4610	0	15
4611	14	6
4612	-23	-31
4701	17	-1
4702	34	-5
4703	33	-64
4704	53	-47
4705	11	-76
4706	17	-22
4707	1	-2
4708	0	-5
4709	-18	-4
4710	2	17
4711	3	-4
4712	-6	-15
4801	-6	-24
4802	18	-21
4803	129	32
4804	50	-50
4805	61	-26
4806	45	6
4807	0	-3
4808	2	-4
4809	-11	4
4810	-14	1
4811	-7	-15
4812	-7	-16
4901	7	-10
4902	7	-33
4903	37	-60
4904	46	-54
4905	23	-64
4906	9	-30
4907	-0	-3
4908	-1	-6
4909	-35	-20
4910	1	15
4911	-24	-32
4912	6	-2
5001	11	-7
5002	13	-27
5003	34	-63
5004	28	-72
5005	76	-11
5006	11	-28
5007	-18	-21
5008	5	-0
5009	0	15
5010	-43	-28
5011	-7	-15
5012	-18	-26
5101	16	-2
5102	40	1
5103	53	-44
5104	147	47
5105	101	14
5106	52	13
5107	-0	-4
5108	-19	-24
5109	-12	2
5110	-4	11
5111	2	-6
5112	9	1
5201	0	-17
5202	9	-30
5203	94	-3
5204	38	-62
5205	26	-61
5206	-0	-39
5207	-15	-19
5208	0	-5
5209	-32	-18
5210	-31	-16
5211	12	4
5212	31	23

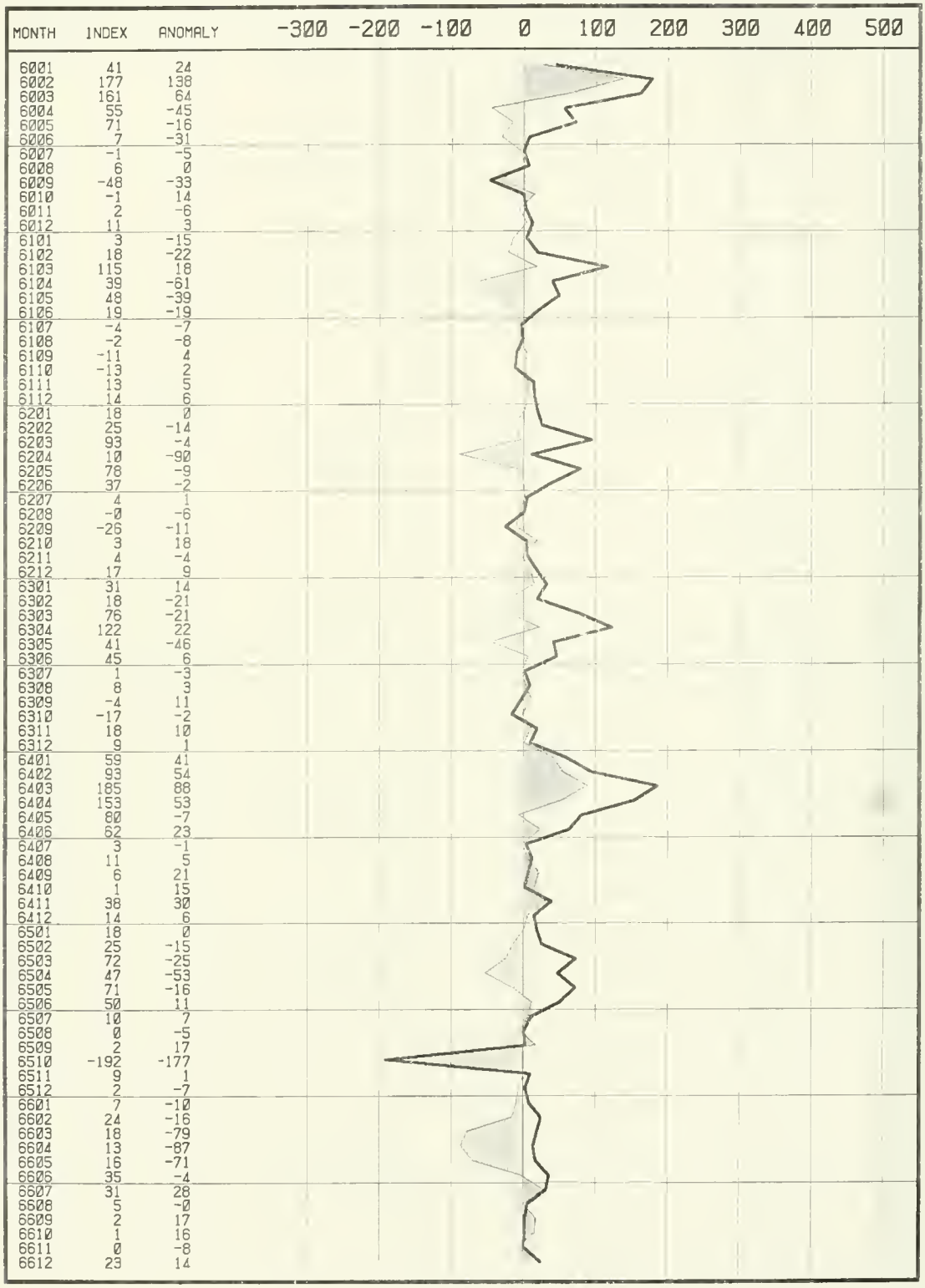
UPWELLING INDEX AT 21N, 107W BY MONTH

MONTH	INDEX	ANOMALY
5301	9	-9
5302	8	-31
5303	58	-39
5304	77	-23
5305	108	21
5306	17	-22
5307	-0	-3
5308	-4	-9
5309	-34	-19
5310	-9	6
5311	3	-5
5312	28	20
5401	22	4
5402	17	-22
5403	117	20
5404	34	-66
5405	59	-28
5406	13	-26
5407	-9	-12
5408	1	-4
5409	-62	-47
5410	0	15
5411	9	1
5412	8	-0
5501	49	31
5502	48	9
5503	102	5
5504	236	136
5505	205	119
5506	68	30
5507	-1	-4
5508	26	20
5509	-1	14
5510	7	22
5511	23	15
5512	6	-2
5601	5	-12
5602	121	82
5603	83	-14
5604	186	86
5605	86	-1
5606	25	-13
5607	8	5
5608	16	10
5609	-19	-5
5610	1	16
5611	1	-7
5612	6	-2
5701	6	-11
5702	16	-24
5703	136	39
5704	160	60
5705	216	129
5706	106	57
5707	7	3
5708	4	-1
5709	-2	12
5710	3	18
5711	53	45
5712	-9	-18
5801	0	-17
5802	45	6
5803	203	106
5804	222	122
5805	49	-38
5806	49	10
5807	2	-1
5808	25	20
5809	-28	-14
5810	-1	14
5811	3	-4
5812	-1	-10
5901	27	9
5902	44	5
5903	121	24
5904	118	18
5905	235	148
5906	78	39
5907	38	35
5908	35	30
5909	14	28
5910	15	30
5911	9	1
5912	7	-2



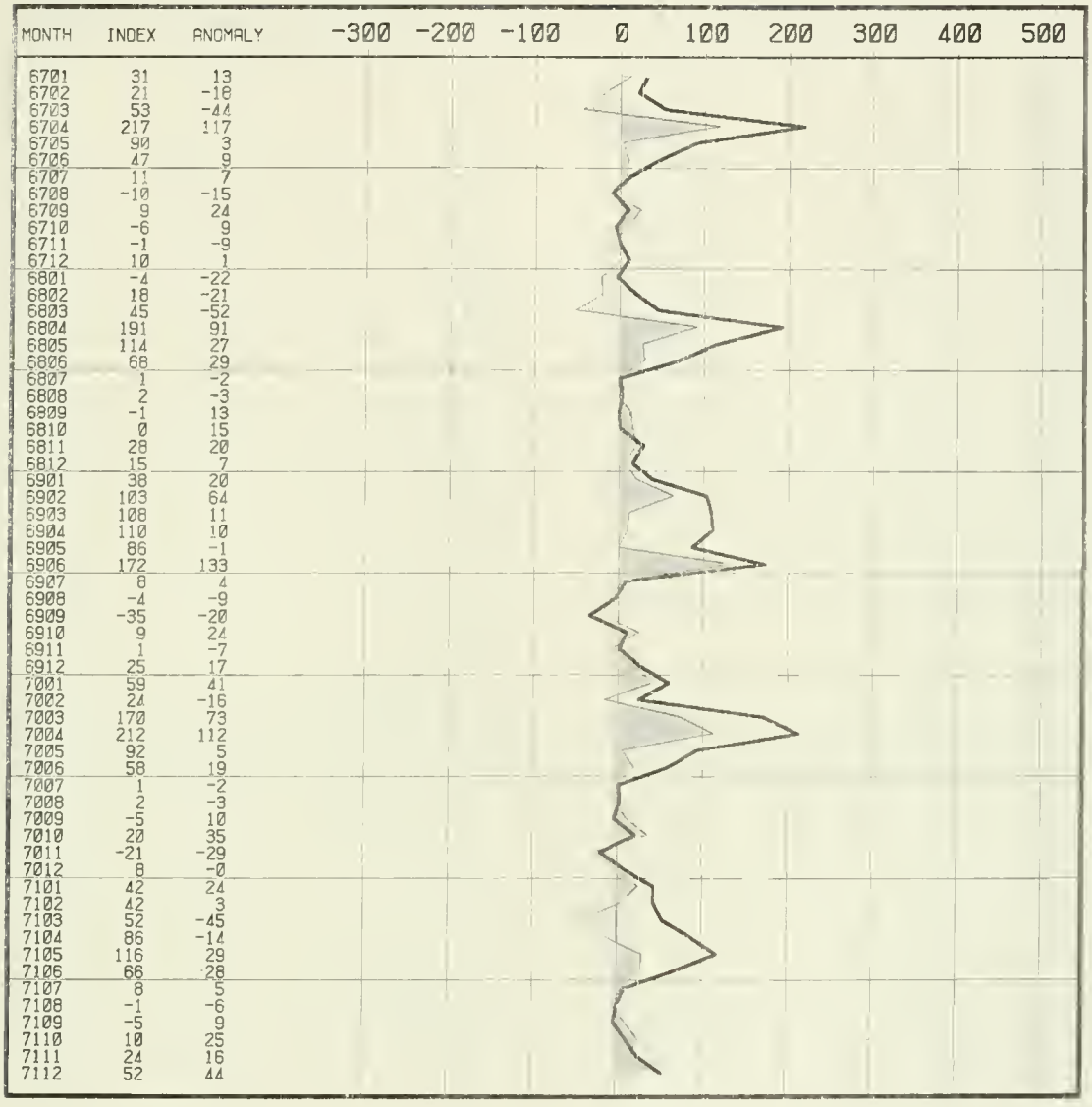
UPWELLING INDEX AT 21N, 107W BY MONTH

MONTH	INDEX	ANOMALY
6001	41	24
6002	177	138
6003	161	64
6004	55	-45
6005	71	-16
6006	7	-31
6007	-1	-5
6008	6	0
6009	-48	-33
6010	-1	14
6011	2	-6
6012	11	3
6101	3	-15
6102	18	-22
6103	115	18
6104	39	-61
6105	48	-39
6106	19	-19
6107	-4	-7
6108	-2	-8
6109	-11	4
6110	-13	2
6111	13	5
6112	14	6
6201	18	0
6202	25	-14
6203	93	-4
6204	10	-90
6205	78	-9
6206	37	-2
6207	4	1
6208	-0	-6
6209	-26	-11
6210	3	18
6211	4	-4
6212	17	9
6301	31	14
6302	18	-21
6303	76	-21
6304	122	22
6305	41	-46
6306	45	6
6307	1	-3
6308	8	3
6309	-4	11
6310	-17	-2
6311	18	10
6312	9	1
6401	59	41
6402	93	54
6403	185	88
6404	153	53
6405	80	-7
6406	62	23
6407	3	-1
6408	11	5
6409	6	21
6410	1	15
6411	38	30
6412	14	6
6501	18	0
6502	25	-15
6503	72	-25
6504	47	-53
6505	71	-16
6506	50	11
6507	10	7
6508	0	-5
6509	2	17
6510	-192	-177
6511	9	1
6512	2	-7
6601	7	-10
6602	24	-16
6603	18	-79
6604	13	-87
6605	16	-71
6606	35	-4
6607	31	28
6608	5	-0
6609	2	17
6610	1	16
6611	0	-8
6612	23	14



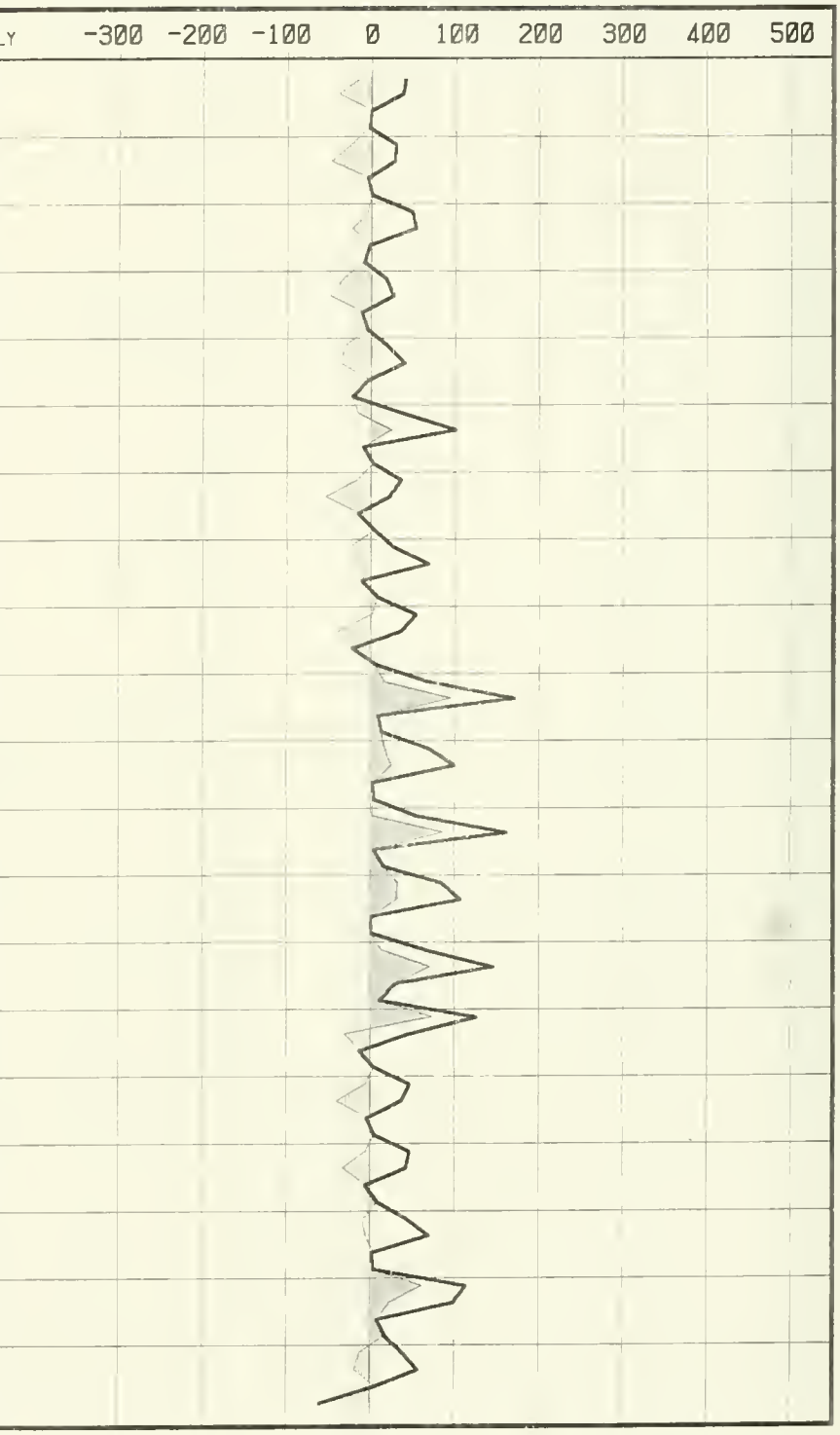
UPWELLING INDEX AT 21N, 107W BY MONTH

MONTH	INDEX	ANOMALY
6701	31	13
6702	21	-10
6703	53	-44
6704	217	117
6705	90	3
6706	47	9
6707	11	7
6708	-10	-15
6709	9	24
6710	-6	9
6711	-1	-9
6712	10	1
6801	-4	-22
6802	18	-21
6803	45	-52
6804	191	91
6805	114	27
6806	68	29
6807	1	-2
6808	2	-3
6809	-1	13
6810	0	15
6811	28	20
6812	15	7
6901	38	20
6902	103	64
6903	108	11
6904	110	10
6905	86	-1
6906	172	133
6907	8	4
6908	-4	-9
6909	-35	-20
6910	9	24
6911	1	-7
6912	25	17
7001	59	41
7002	24	-16
7003	170	73
7004	212	112
7005	92	5
7006	58	19
7007	1	-2
7008	2	-3
7009	-5	10
7010	20	35
7011	-21	-29
7012	8	-0
7101	42	24
7102	42	3
7103	52	-45
7104	86	-14
7105	116	29
7106	66	28
7107	8	5
7108	-1	-6
7109	-5	9
7110	10	25
7111	24	16
7112	52	44



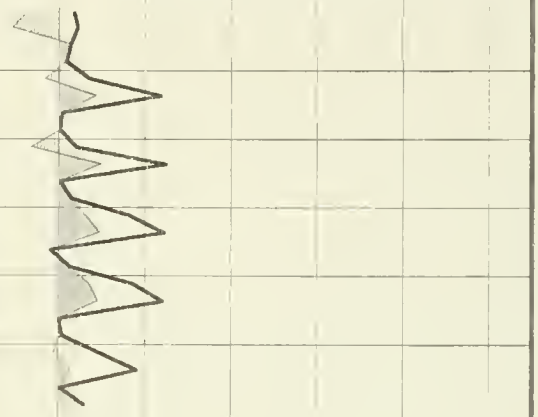
UPWELLING INDEX AT 21N, 107W BY QUARTER

QTR.	INDEX	ANOMALY
4601	40	-11
4602	37	-39
4603	-1	0
4604	-3	-4
4701	28	-24
4702	27	-48
4703	-5	-4
4704	-0	-1
4801	48	-4
4802	52	-23
4803	-3	-1
4804	-9	-10
4901	17	-34
4902	26	-49
4903	-12	-10
4904	-5	-6
5001	19	-32
5002	39	-37
5003	-4	-2
5004	-23	-23
5101	36	-16
5102	100	24
5103	-10	-9
5104	2	2
5201	35	-17
5202	21	-54
5203	-16	-14
5204	4	3
5301	26	-26
5302	68	-7
5303	-12	-11
5304	8	7
5401	53	1
5402	35	-40
5403	-23	-21
5404	6	5
5501	67	15
5502	170	95
5503	8	10
5504	12	12
5601	68	16
5602	99	24
5603	2	4
5604	3	2
5701	54	2
5702	161	86
5703	3	5
5704	15	15
5801	84	32
5802	106	31
5803	-0	2
5804	0	0
5901	65	13
5902	145	70
5903	29	31
5904	10	10
6001	125	73
6002	45	-31
6003	-14	-12
6004	4	4
6101	46	-6
6102	36	-40
6103	-5	-4
6104	4	4
6201	46	-6
6202	42	-33
6203	-7	-5
6204	8	8
6301	43	-9
6302	69	-6
6303	2	4
6304	3	3
6401	113	61
6402	98	23
6403	7	8
6404	17	17
6501	38	-13
6502	56	-19
6503	4	6
6504	-61	-62



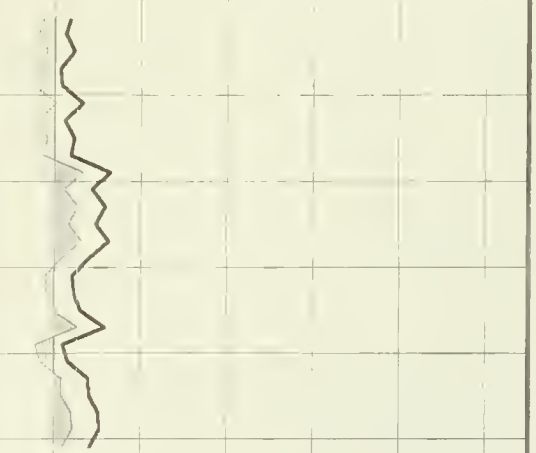
UPWELLING INDEX AT 21N, 107W BY QUARTER

QTR.	INDEX	ANOMALY
6601	16	-36
6602	21	-54
6603	13	15
6604	8	8
6701	35	-15
6702	118	43
6703	3	5
6704	1	1
6801	20	-32
6802	124	49
6803	1	2
6804	14	14
6901	82	31
6902	122	47
6903	-10	-8
6904	12	12
7001	86	35
7002	120	45
7003	-0	1
7004	3	2
7101	46	-6
7102	90	14
7103	1	2
7104	29	28



UPWELLING INDEX AT 21N, 107W BY YEAR

YEAR	INDEX	ANOMALY
1946	18	-13
1947	12	-19
1948	22	-9
1949	6	-25
1950	8	-24
1951	32	1
1952	11	-20
1953	22	-9
1954	18	-14
1955	64	33
1956	43	11
1957	58	27
1958	47	16
1959	62	31
1960	39	8
1961	20	-11
1962	22	-9
1963	29	-2
1964	58	27
1965	9	-22
1966	15	-17
1967	39	8
1968	40	8
1969	51	20
1970	52	21
1971	41	10



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