

EFFECTO DEL CAMBIO CLIMÁTICO EN LAS PESQUERÍAS Y LOS MARICULTIVOS DE MÉXICO

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TABLE 1. (continued)

El Niño Event	Event Strength	Confidence Rating	Information Sources
1844–1845	S+	5	<i>Spruce</i> [1864], <i>Eguiguren</i> [1894], <i>Labarthe</i> [1914], <i>Portocarrero</i> [1926], and <i>Taulis</i> [1934]
1864	S	5	<i>Spruce</i> [1864], <i>Eguiguren</i> [1864], and <i>Taulis</i> [1934]
1871	S+	5	<i>Hutchinson</i> [1873], <i>Eguiguren</i> [1894], <i>Tizon y Bueno</i> [1907], <i>Sievers</i> [1914], <i>Labarthe</i> [1914], <i>Bachmann</i> [1921], <i>Portocarrero</i> [1926], and <i>Gaudron</i> [1925]
1877–1878	VS	5	<i>Eguiguren</i> [1894], <i>Palma</i> [1894], <i>Melo</i> [1913], <i>Sievers</i> [1914], <i>Labarthe</i> [1914], <i>Bachmann</i> [1921], <i>Portocarrero</i> [1926], <i>Murphy</i> [1926], <i>Taulis</i> [1934], and <i>Kiladis and Diaz</i> [1986]
1884	S+	5	<i>Eguiguren</i> [1894], <i>Sievers</i> [1914], <i>Labarthe</i> [1914], <i>Bachmann</i> [1921], <i>Murphy</i> [1925], and <i>Portocarrero</i> [1926]
1891	VS	5	<i>Carranza</i> [1891], <i>Eguiguren</i> [1894], <i>Fuchs</i> [1907], <i>Labarthe</i> [1914], <i>Sievers</i> [1914], <i>Bachmann</i> [1921], <i>Zegarra</i> [1926], <i>Murphy</i> [1926], <i>Portocarrero</i> [1926], <i>Nials et al.</i> [1979], and <i>Taulis</i> [1934]
1899–1900	S	5	<i>Labarthe</i> [1914], <i>Bachmann</i> [1921], <i>Murphy</i> [1923], <i>Portocarrero</i> [1926], <i>Hutchinson</i> [1950], <i>Taulis</i> [1934], and <i>El Comercio</i> (February 10, 1899)
1911–1912	S	4	<i>Forbes</i> [1914], <i>Labarthe</i> [1914], <i>Bowman</i> [1916], <i>Lavalle y Garcia</i> [1917], <i>Balen</i> [1925], <i>Portocarrero</i> [1926], <i>Vogt</i> [1940], <i>Hutchinson</i> [1950], and <i>Schweigger</i> [1961]
1917	S	5	<i>Lavalle y Garcia</i> [1917], <i>Murphy</i> [1923], <i>Balen</i> [1925], <i>Portocarrero</i> [1926], <i>Petersen</i> [1935], <i>Hutchinson</i> [1950], and <i>Schweigger</i> [1961]
1925–1926	VS	5	<i>Murphy</i> [1926], <i>Zegarra</i> [1926], <i>Berry</i> [1927], <i>Petersen</i> [1935], <i>Vogt</i> [1940], <i>Mears</i> [1944], <i>Hutchinson</i> [1950], <i>Rudolph</i> [1953], <i>Nials et al.</i> [1979], and <i>Mugica</i> [1983]
1932	S	5	<i>Petersen</i> [1935], <i>Sheppard</i> [1933], <i>Vogt</i> [1940], <i>Mears</i> [1944], <i>Hutchinson</i> [1950], <i>Rudolph</i> [1953], and <i>Mugica</i> [1983]
1940–1941	S	5	<i>Lobell</i> [1942], <i>Mears</i> [1944], <i>Hutchinson</i> [1950], <i>Sears</i> [1954], <i>Schweigger</i> [1961], <i>Wooster</i> [1960], <i>Mugica</i> [1983], and <i>Quinn and Zopf</i> [1984]
1957–1958	S	5	<i>Wooster</i> [1960], <i>Schweigger</i> [1961], <i>Bjerknes</i> [1966], <i>Idyll</i> [1973], <i>Miller and Laurs</i> [1975], <i>Caviedes</i> [1975], and <i>Mugica</i> [1983]
1972–1973	S	5	<i>Idyll</i> [1973], <i>Wooster and Guillen</i> [1974], <i>Miller and Laurs</i> [1975], <i>Ramage</i> [1975], <i>Caviedes</i> [1975], <i>Nials et al.</i> [1979], and <i>Mugica</i> [1983]
1982–1983	VS	5	<i>Mugica</i> [1983], <i>Rasmusson and Hall</i> [1983], <i>Rasmusson and Wallace</i> [1983], <i>Quiroz</i> [1983], <i>Smith</i> [1983], <i>Canby</i> [1984], <i>Woodman</i> [1984], <i>Quinn and Neal</i> [1984], and <i>Caviedes</i> [1984]

S, strong; VS, very strong. See text for more information on confidence rating.

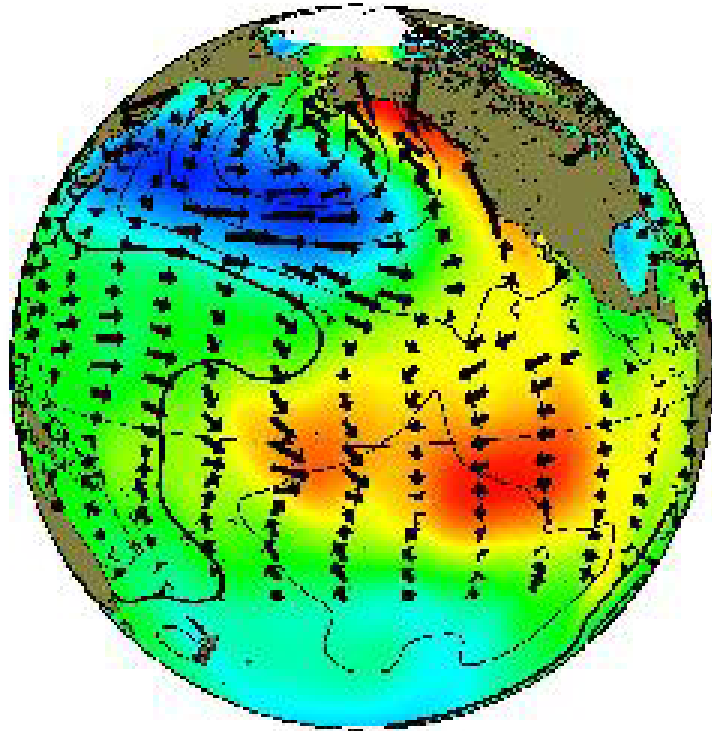
TABLE 2. El Niño Events of Moderate and Near-Moderate Intensities, Their Confidence Ratings, and Information Sources

El Niño Event	Event Strength	Confidence Rating	Information Sources
1806–1807	M	3	<i>Stevenson</i> [1829], <i>Remy</i> [1931], and <i>Unanue</i>
1812	M	4	<i>Palma</i> [1894] and <i>Gonzalez</i> [1913]
1817	M+	5	<i>Eguiguren</i> [1894], <i>Labarthe</i> [1914],
			<i>Portocarrero</i> [1926], and <i>Taulis</i> [1934]
1819	M+	4	<i>Eguiguren</i> [1894] and <i>Taulis</i> [1934]
1821	M	5	<i>Eguiguren</i> [1894], <i>Fuchs</i> [1925], <i>Remy</i>
			[1931], and <i>Taulis</i> [1934]
1824	M	5	<i>Spruce</i> [1864], <i>Basadre</i> [1884], and <i>Eguiguren</i>
1832	M	5	<i>Spruce</i> [1864], and <i>Eguiguren</i> [1894]
1837	M	5	<i>Eguiguren</i> [1894], <i>Labarthe</i> [1914],
			<i>Portocarrero</i> [1926], and <i>Taulis</i> [1934]
1850	M	5	<i>Eguiguren</i> [1894], <i>Fuchs</i> [1925], and <i>Taulis</i>
1854	W/M	4	<i>Spruce</i> [1864], <i>Eguiguren</i> [1894], and <i>Taulis</i>
1857–1858	M+	5	<i>Eguiguren</i> [1894], <i>Labarthe</i> [1914],
			<i>Portocarrero</i> [1926], <i>Gaudron</i> [1925],
			<i>Zegarra</i> [1926], and <i>Taulis</i> [1934]
1860	M	4	<i>Labarthe</i> [1914], <i>Portocarrero</i> [1926], and <i>T</i>
1866	M	4	<i>Eguiguren</i> [1894], <i>Labarthe</i> [1914],
			<i>Bachmann</i> [1921], and <i>Portocarrero</i> [1926]
1867–1868	M	4	<i>El Comercio</i> (January 10, 1872), <i>Raimondi</i>
			[1897], <i>Taulis</i> [1934], and <i>Eguiguren</i> [189
1874	M	4	<i>Bravo</i> [1903], <i>La Patria</i> (February 9, 1874),
			and <i>Bachmann</i> [1921]
1880	M	4	<i>Eguiguren</i> [1894], <i>Puls</i> [1895], and <i>Taulis</i> [
1887–1889	W/M	5	<i>Eguiguren</i> [1894], <i>Labarthe</i> [1914],
			<i>Portocarrero</i> [1926], and <i>Taulis</i> [1934]
1896–1897	M+	4	<i>Bravo</i> [1903], <i>El Comercio</i> (February 3, 1897,
			and February 22, 1897), and <i>Bachmann</i> [1
1902	M+	4	<i>El Comercio</i> (February 17, 1902), <i>Bachmann</i>
			[1921], and <i>Taulis</i> [1934]
1905	W/M	4	<i>Bachmann</i> [1921], and <i>Taulis</i> [1934]
1907	M	3	<i>Remy</i> [1931], and <i>Paz Soldan</i> [1908]
1914	M+	5	<i>Labarthe</i> [1914], <i>Portocarrero</i> [1926],
			<i>Petersen</i> [1935], <i>Taulis</i> [1934], and <i>Schwe</i>
1918–1919	W/M	5	<i>Murphy</i> [1923], <i>Portocarrero</i> [1926],
			<i>Vogr</i> [1940], <i>Hutchinson</i> [1950], and
			<i>Taulis</i> [1934]
1923	M	5	<i>Lavalle y Garcia</i> [1924], <i>Baien</i> [1925],
			<i>Zegarra</i> [1926], <i>Gunther</i> [1936],
			<i>Hutchinson</i> [1950], and <i>Schweiggger</i> [1961]
1930–1931	W/M	5	<i>Petersen</i> [1935], <i>Hutchinson</i> [1950],
			<i>Schweiggger</i> [1961], <i>Miller and Laurs</i>
			[1975], and <i>Woodman</i> [1984]
1939	M+	5	<i>Vogr</i> [1940], <i>Schweiggger</i> [1940], <i>Mears</i>
			[1944], <i>Hutchinson</i> [1950], <i>Sears</i> [1954],
			<i>Mugica</i> [1983], and <i>Woodman</i> [1984]
1943	M+	5	<i>Schweiggger</i> [1961], <i>Miller and Laurs</i>
			[1975], <i>Caviedes</i> [1975], <i>Mugica</i> [1983],
			and <i>Woodman</i> [1984]
1951	W/M	5	<i>Garcia Mendez</i> [1953], <i>Schweiggger</i> [1961],
			<i>Wooster and Guillen</i> [1974], and <i>Miller</i>
			and <i>Laurs</i> [1975]
1953	M+	5	<i>Rudolph</i> [1953], <i>Sears</i> [1954], <i>Wooster and</i>
			<i>Jennings</i> [1955], <i>Merriman</i> [1955], <i>Avila</i>
			[1953], <i>Schweiggger</i> [1961], <i>Mugica</i> [1983],
			and <i>Woodman</i> [1984]
1965	M+	5	<i>Guillen</i> [1967, 1971], <i>Stevenson et al.</i>
			[1970], <i>Wooster and Guillen</i> [1974], <i>Miller</i>
			and <i>Laurs</i> [1975], <i>Caviedes</i> [1975], <i>Mugica</i>
			[1983], and <i>Woodman</i> [1984]
1976	M	5	<i>Quinn</i> [1977, 1980], <i>Smith</i> [1983], <i>Cercs</i>
			[1981], <i>Mugica</i> [1983], <i>Rasmusson and</i>
			<i>Hall</i> [1983], <i>Quinn and Neal</i> [1983], and
			<i>Woodman</i> [1984]
1987	M	4	Based on SSTs being very close to SCOR
			criteria, Peruvian fishery catch has
			been greatly reduced, and rainfall
			has been relatively high at Piura
			Airport (as provided by R. Mugica,
			Universidad Piura, Piura, Peru).

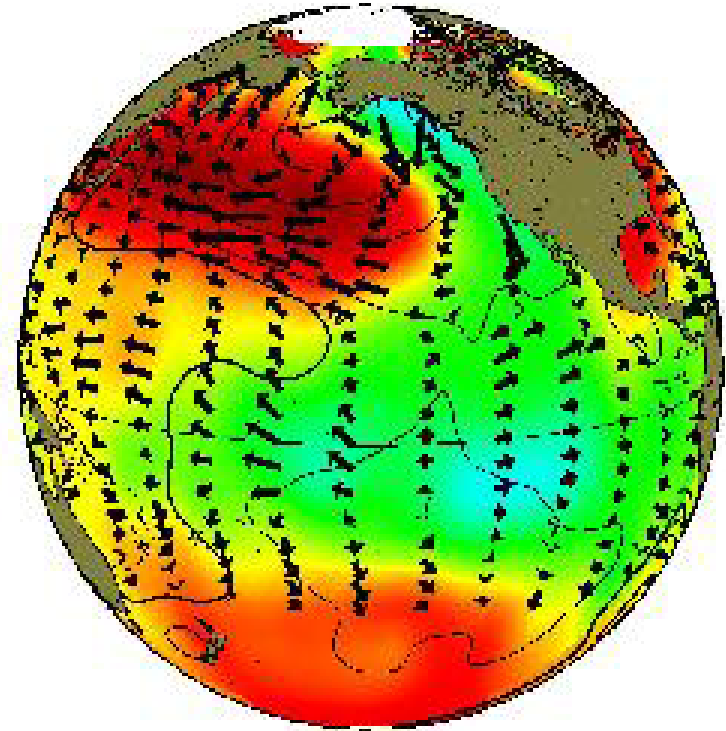
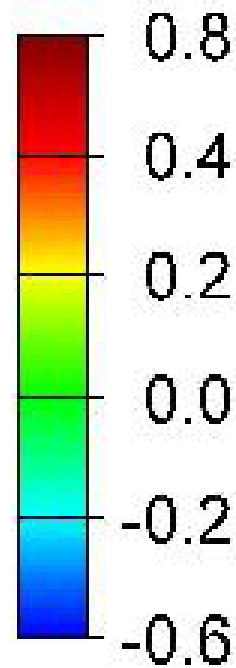
M, moderate; W/M, near moderate. See text for more information on confidence ratings.

*Typical wintertime Sea Surface Temperature (colors),
Sea Level Pressure (contours) and surface wind stress (arrows) anomaly
patterns during warm and cool phases of PDO*

warm phase



cool phase



Monthly values for the PDO Index: 1900 – May 2006

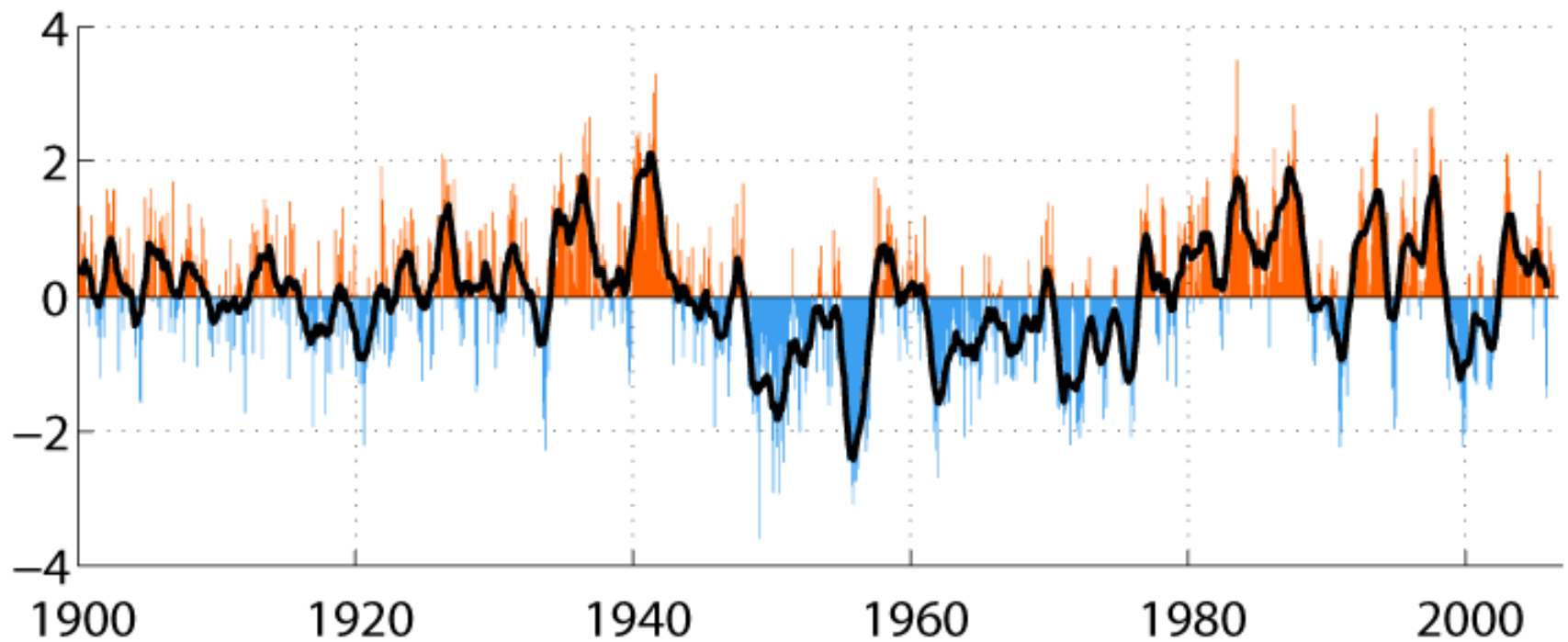
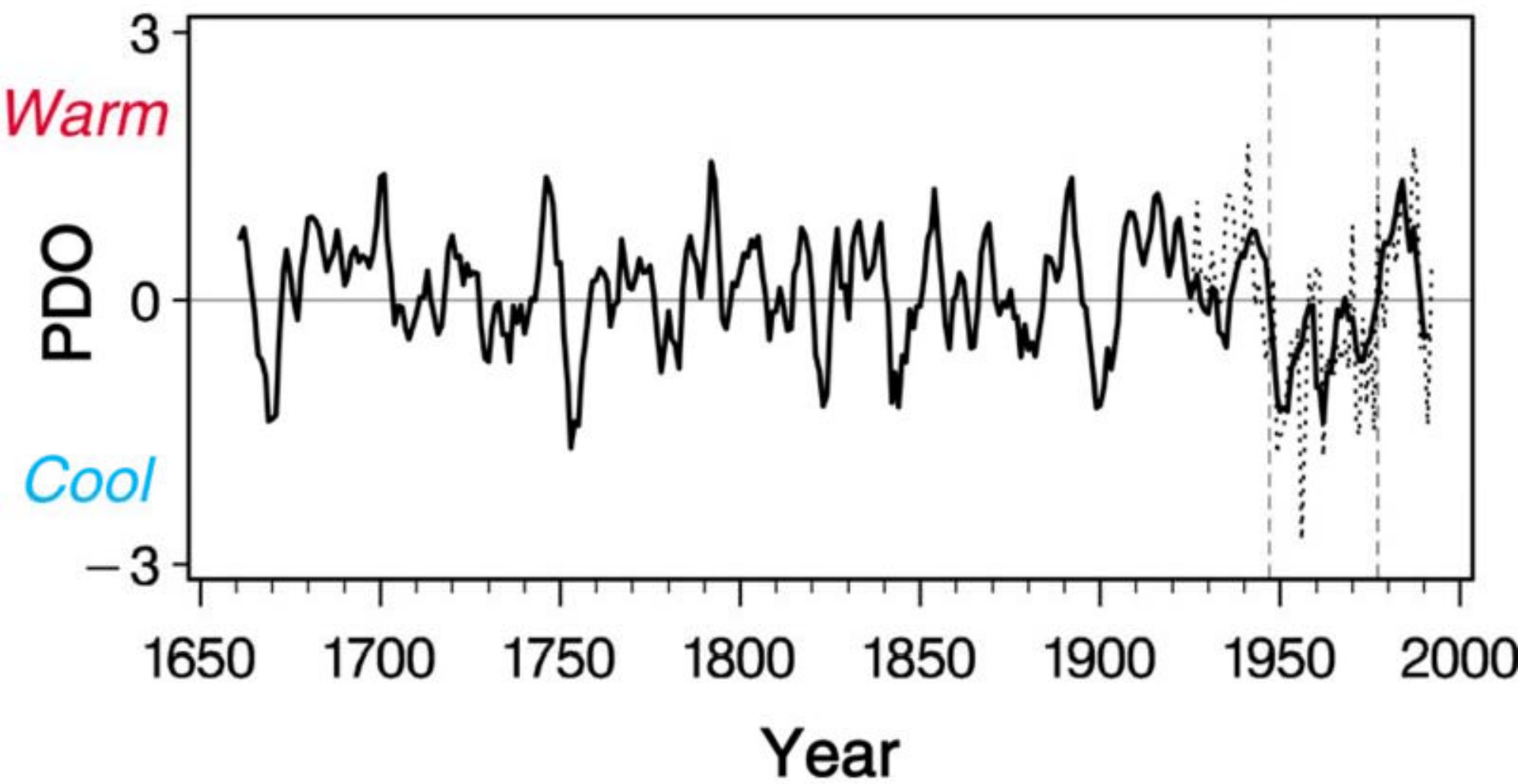
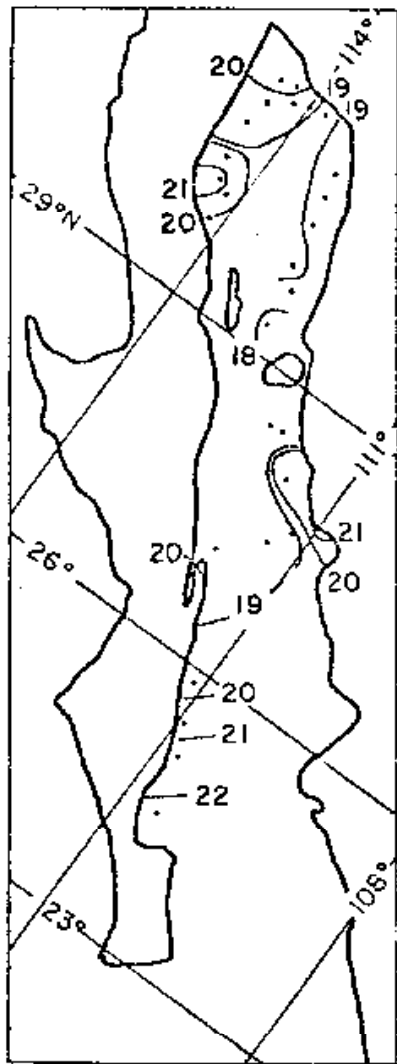


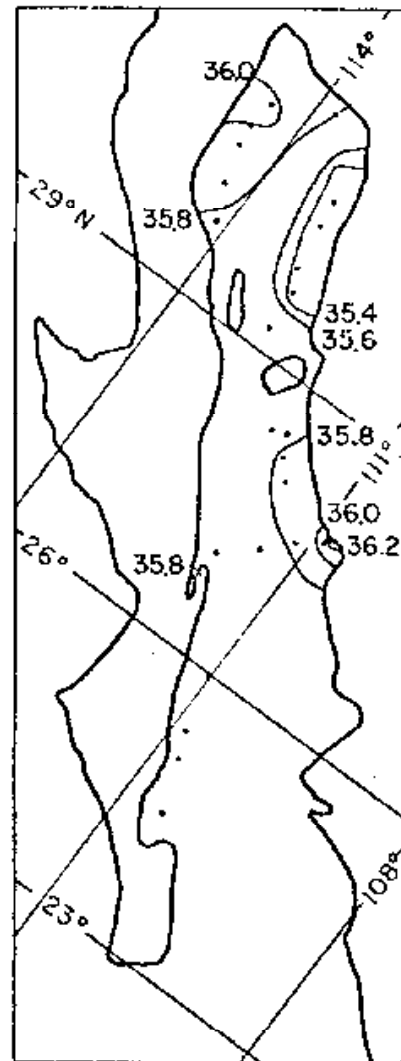
Figure source: Climate Impacts Group



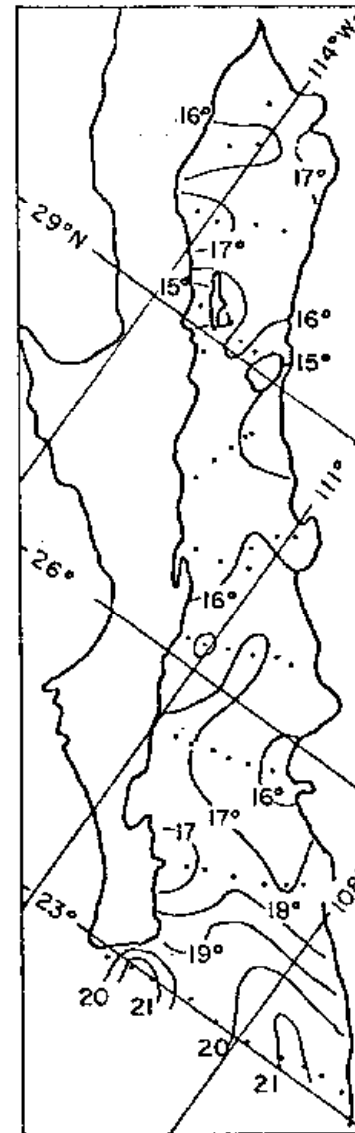
Left: T °C and Salinity distributions for March, 1889 (Albatross cruise)
Right: T °C and Salinity distribution for February-March, 1939 (E.W. Scripps cruise)



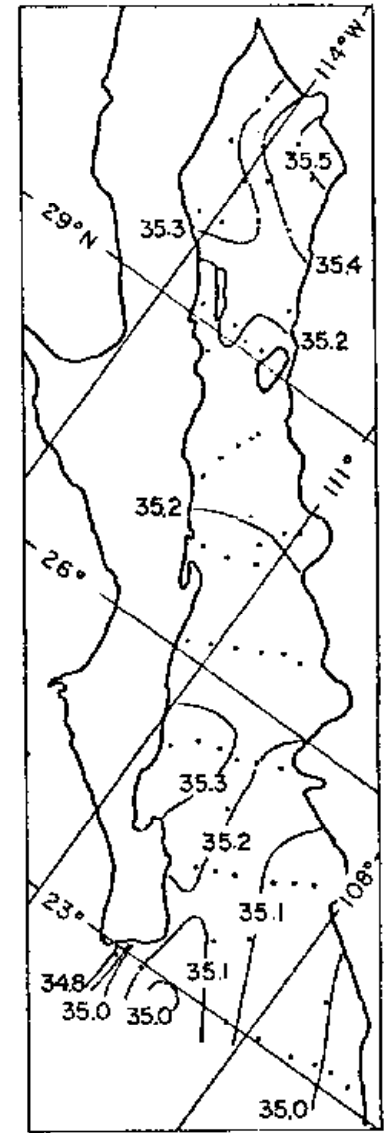
TEMP. (°C)



SAL. (‰)



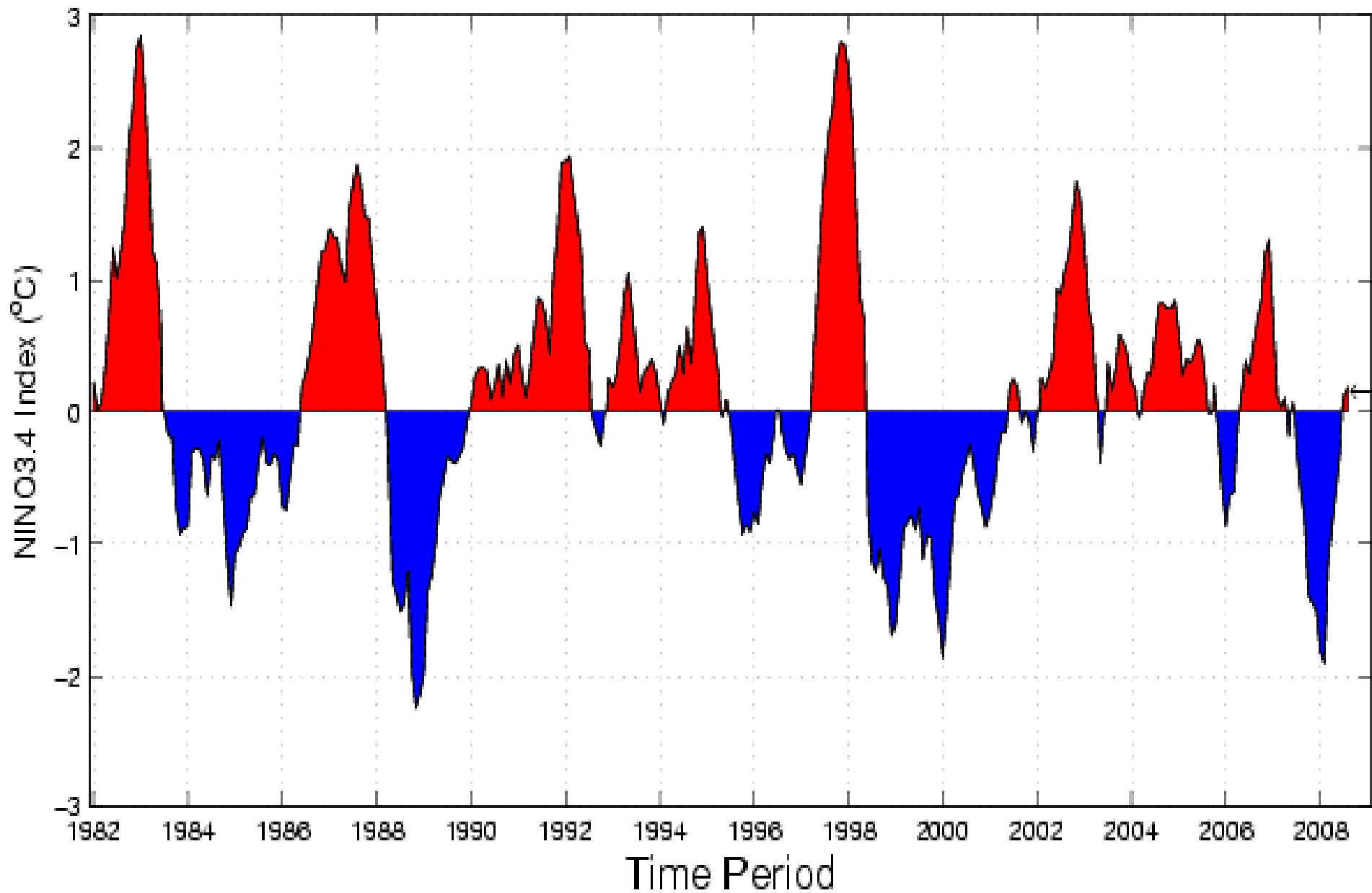
TEMP. (°C)



SAL. (‰)

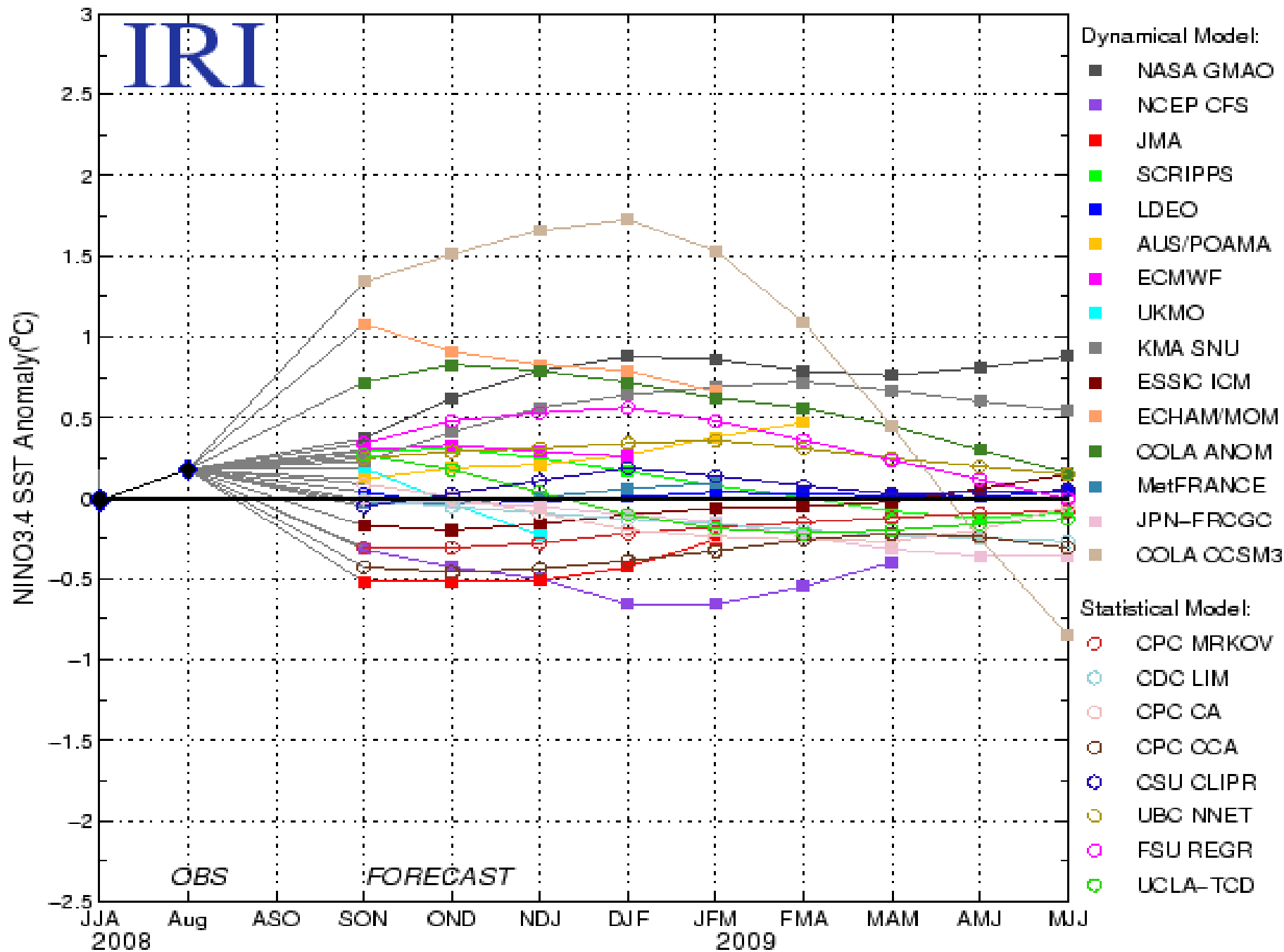
Aun sin una comprensión teórica apropiada, la información sobre el estado de la ODP mejora las predicciones del clima de Norte América de estación a estación y de año a año por su tendencia a persistir por varios años. Desde el punto de vista de los impactos en la sociedad, el conocimiento de la ODP es importante porque muestra que las condiciones "normales" del clima pueden variar en escalas de tiempo comparables a la duración de la vida humana .

Historical Sea Surface Temperature Index



Model Forecasts of ENSO from *Sep 2008*

IRI



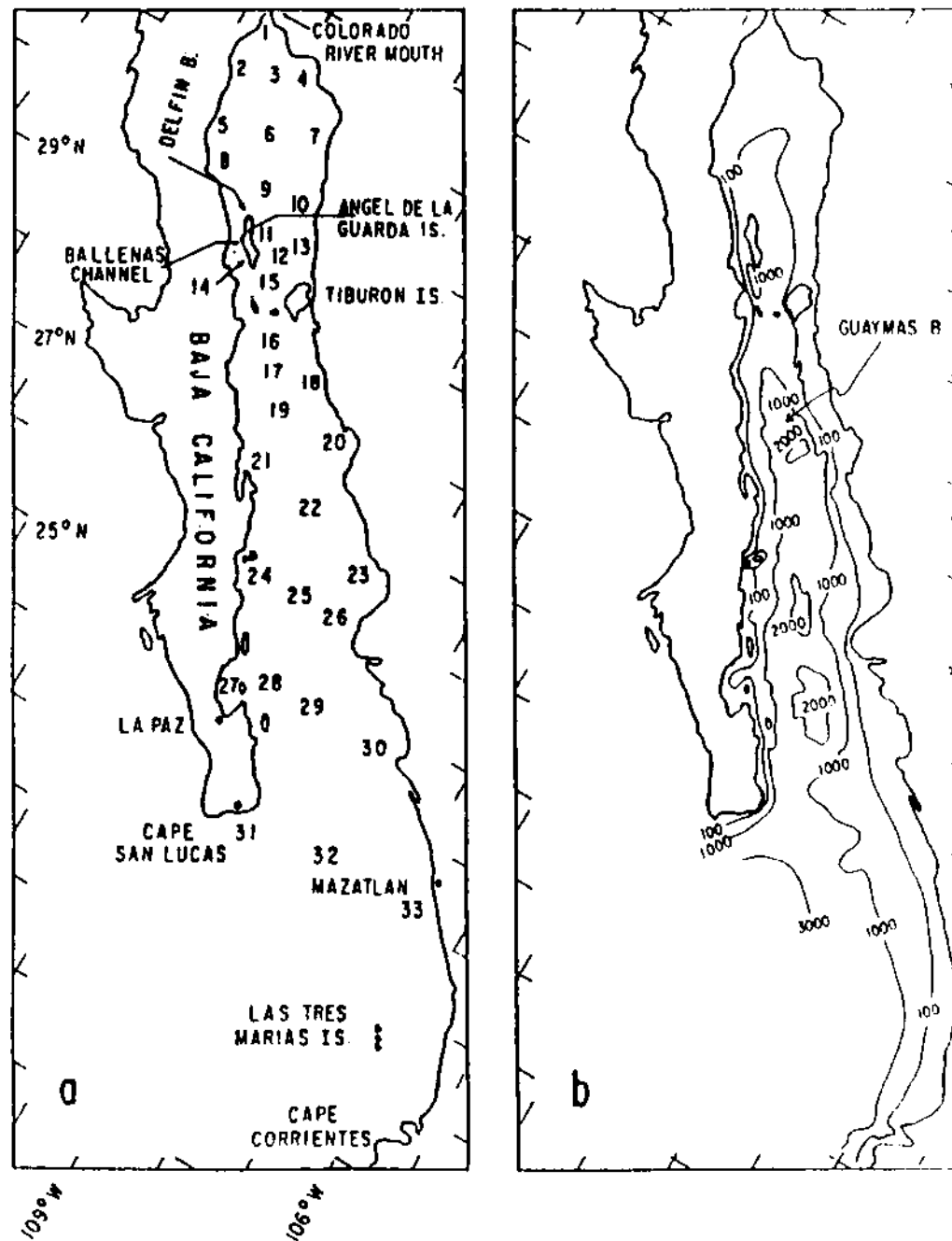


Figure 1. (a) Geographic locations for the generation of the time series and names of locations mentioned in the text, and (b) general bathymetry.

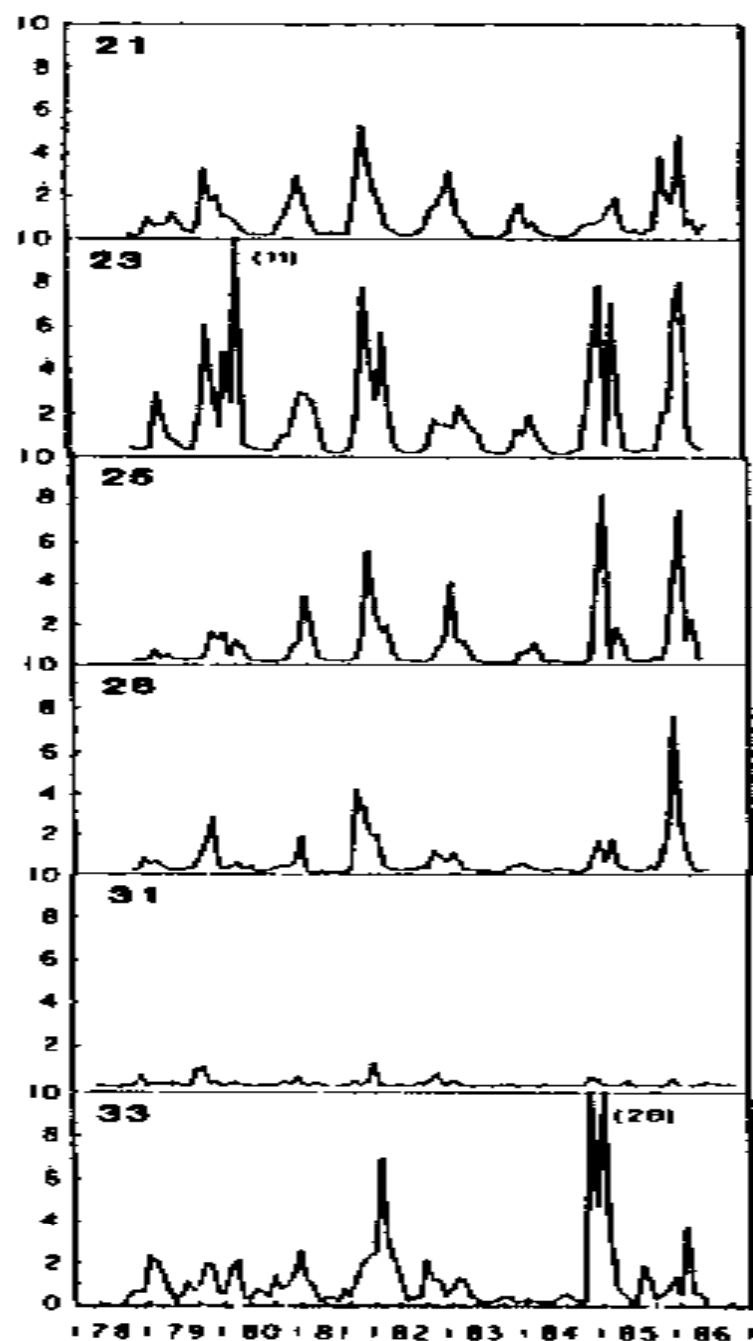
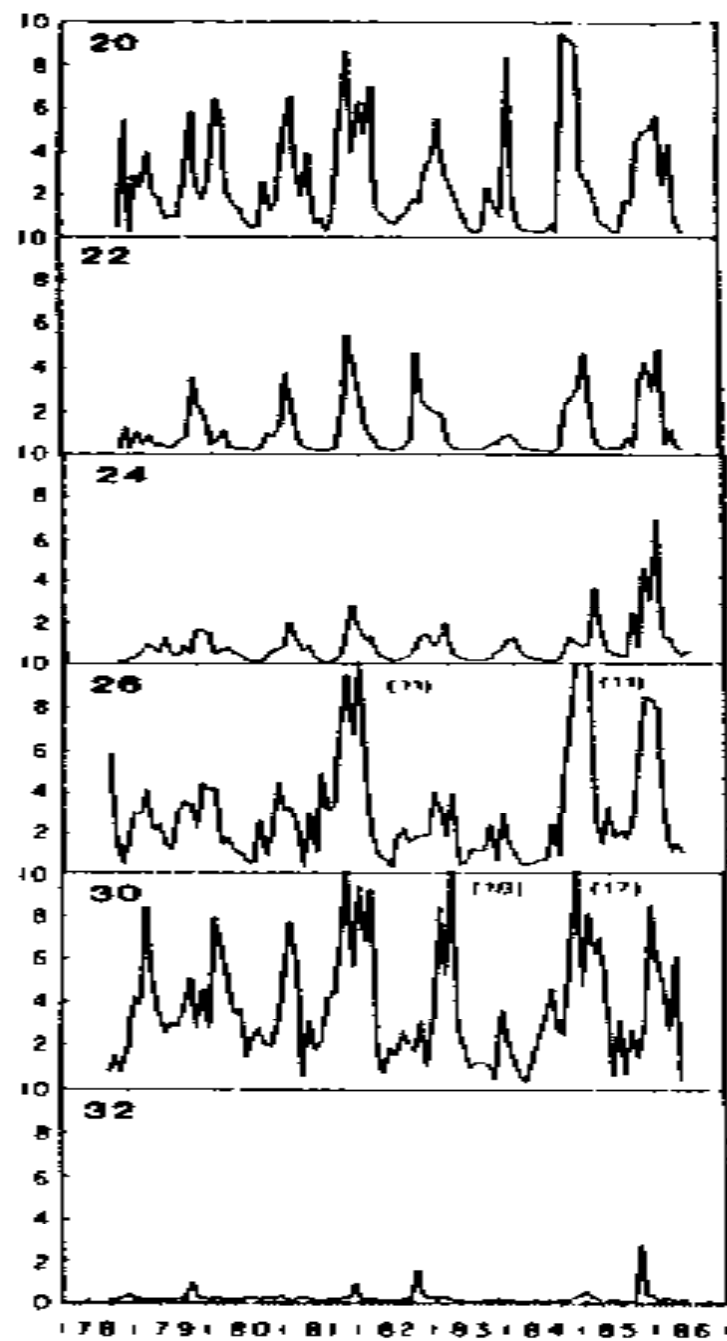


Figure 2b. Same as for Figure 2a, for locations 20–33.

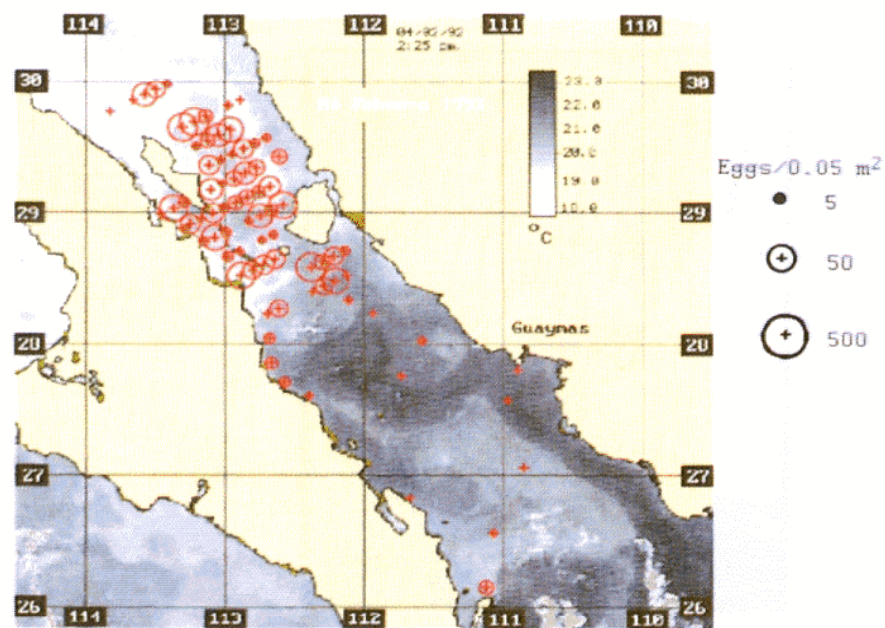


Fig. 3. Distribution of anchovy eggs, overlaid on the SST image (AVHRR/HRPT) captured on 4 February 1992.

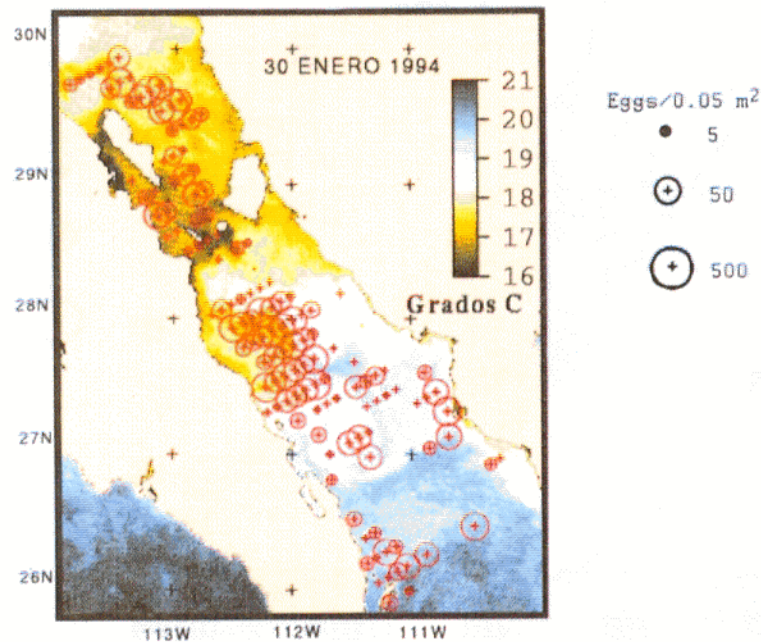


Fig. 5. Distribution of anchovy eggs, overlaid on the SST image (AVHRR/HRPT) captured on 30 January 1994.

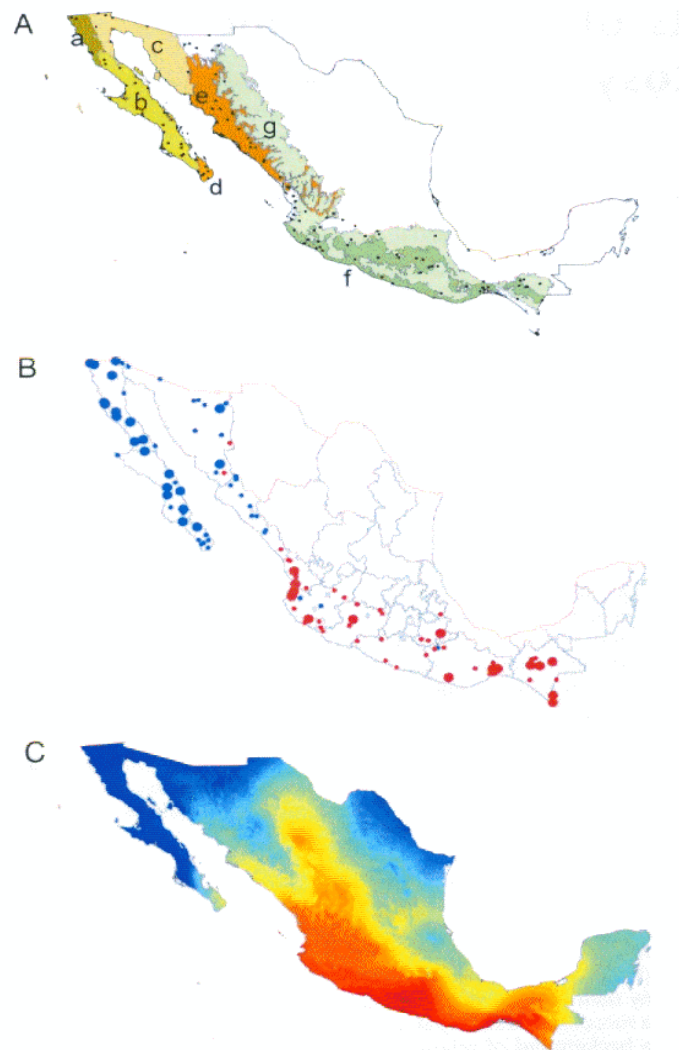


Fig. 1. The climatic and ecoregional dryland gradient along the Pacific coast of Mexico. (A) The dry ecoregions of the Pacific coast: mediterranean California (a), Baja Californian Desert (b), Sonoran Desert (c), Cape Region Thornscrubs and Dry Forests (d), Sinaloan Thornscrubs and Dry Forests (e), and Tropical Dry Forests (f); the high-elevation oak and conifer forests of the Sierra Madre and the Transversal Volcanic Range are shown for reference (g). The dots in the figure mark the location of the weather stations used in the analysis. (B) Correlation between mean annual SOI values and mean total annual precipitation: Blue dots indicate negative correlation, and red dots indicate positive values. Large dots indicate statistically significant correlations ($P < 0.05$) according to the F test. (C) Concentration of winter-spring rainfall in Mexico calculated from 1-km resolution interpolated climate surfaces. Blue colors indicate areas with a high proportion of annual precipitation falling between December and April (winter-spring precipitation), and red colors indicate areas where winter-spring rainfall is very low or nonexistent, and hence where summer and fall rains dominate.