The State of the eastern North Pacific in the first half of 1996

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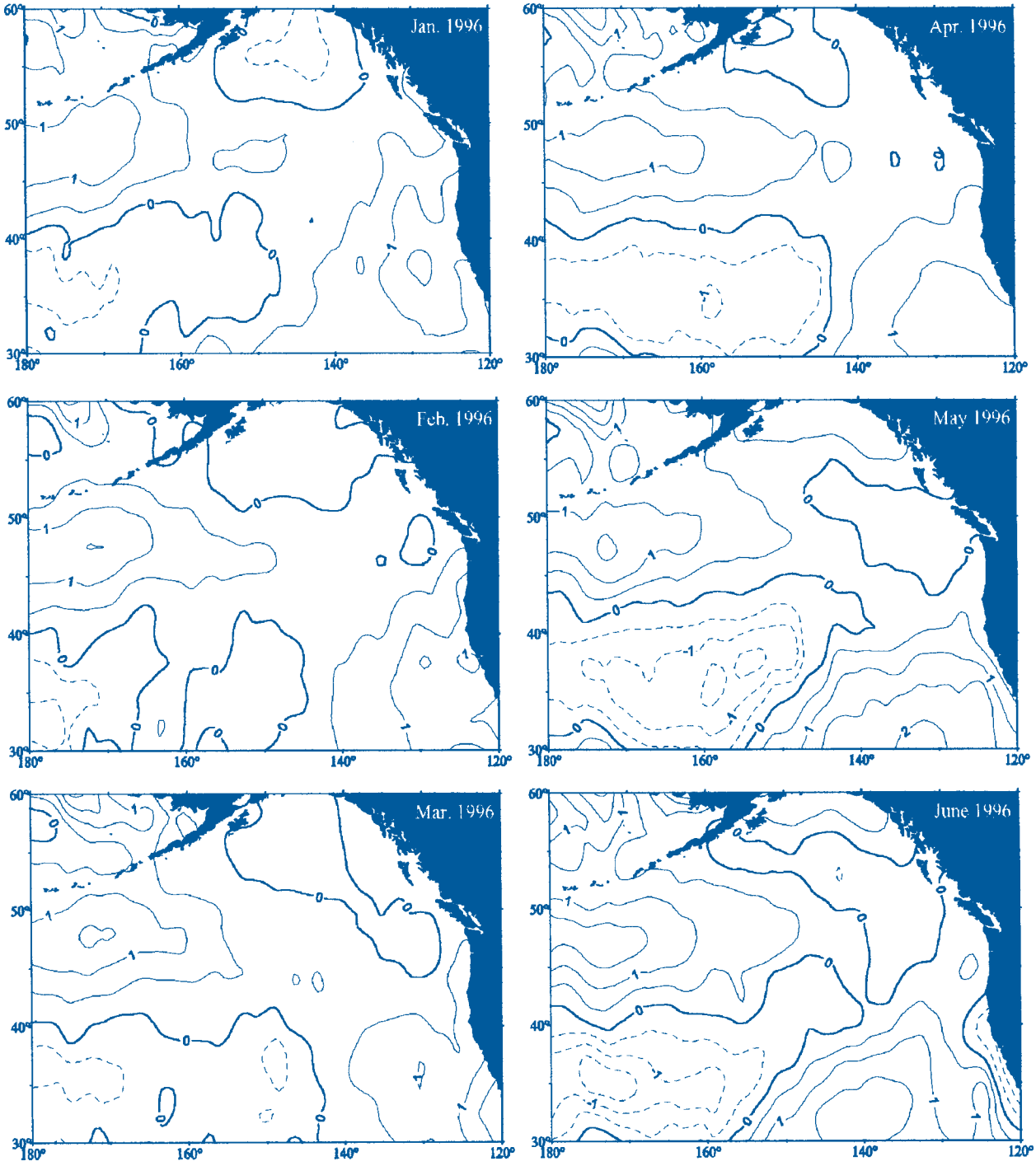
Dr. Howard Freeland is Head of the Ocean Science and Productivity Division at the Institute of Ocean Sciences (Department of Fisheries and Oceans, Canada). Dr. Freeland is interested in the climatic state of the ocean and low frequency variability. Presently, he is responsible for the maintenance of Line-P, a line of CTD stations that has been monitored for over 40 years between the mouth of the Juan de Fuca Strait and Ocean Weather Station Papa at 50˚N and 145˚W (also known as WOCE Repeat Hydrography Line PR6). Dr. Freeland was the scientist primarily responsible for Canadian interests in the WOCE Lines P15 & P1. Earlier this year he was the winner of the Applied Oceanography Prize awarded annually by the Canadian Meteorological and Oceanographic Society.

Sea surface temperatures (SST) were close to normal in the Gulf of Alaska through the first half of 1996. In the maps of SST anomalies (see *Figure*) two significant departures from the mean state appear both in the far western part of the North Pacific. The warm anomaly centered near 47˚N and 170˚W contains anomalies up to 1.5˚C above normal and is continuous with a warm anomaly appearing, but not worthy of mention, in the western Pacific maps presented by Teruko Manabe in paper on "The State of the western North Pacific in the first half of 1996" (this issue). The cold anomaly to the south of the warm anomaly appears to be the eastward extension of the cold event that dominates the maps of SST anomaly in the western North Pacific. This event affected the eastern Pacific only weakly early in the year but appeared to be growing steadily as the year progressed and in June was showing evidence of becoming the dominant influence on sea surface temperatures in the eastern North Pacific.

Within the Gulf of Alaska SST anomalies were rarely significantly different from normal. This is important for the fisheries of British Columbia as we use SST anomalies to forecast some aspects of the migration paths of sockeye salmon. Off the coast of California SSTs were significantly above normal through the early part of 1996, but a coastal cold anomaly developed very suddenly in June, most probably due to an early onset to the upwelling season.

Conditions along the west coast of the Americas are largely determined by evolving conditions in the equatorial Pacific. Late in 1995 the persistent El Niño that dominated conditions through the early 1990s relaxed, at last, to near normal conditions and early in 1996 moved into a range of values suggestive of mild La Niña conditions. Most computer models suggest that the ocean will remain somewhere between a mild La Niña condition and normal conditions through the winter of 1996/97. The implication being that we do not expect and significant anomalies to develop in the N.E. Pacific Ocean during 1997.

A longer term concern exists in the N.E. Pacific. In recent years we have seen dissolved nitrate fall to zero late in the summer along large sections of Line P (from the mouth of the Juan de Fuca Strait, 48˚30'N 124˚30'W, to Ocean Station Papa, 50˚N 145˚W). This has not happened before and suggests a change in the climatic state of the N.E. that is acting to reduce the over-winter supply of nutrients to the near-surface layers. This could have a significant impact on the ecology of the N.E. Pacific.



Monthly mean sea-surface temperature anomalies in the eastern half of the North Pacific Ocean. The anomalies are departures from a mean computed over 1982 to 1996. Contour interval is 0.5˚C, negative anomalies are shown by dashed lines, and the zero contour is shown bold.