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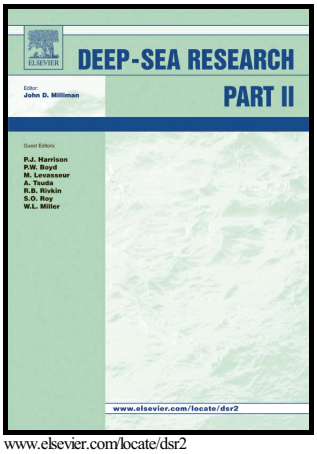

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ABSTRACT

Monterey Bay, California, has been sampled by ship at 2-3 week intervals during 1989-2011. Here we present the resulting time series of temperature, salinity, nitrate, chlorophyll and primary production over the 23-year record and correlate the nonseasonal anomalies and four Pacific Basin-scale climate indices. About half of Monterey Bay variability was captured by the seasonal cycle while half remained in the anomalies. Correlations revealed strong associations between temperature, salinity and nitrate, and weaker correlations between these anomalies and euphotic zone-integrated chlorophyll and primary production. Sub-euphotic zone physical and particularly nitrate anomalies were better predictors of the euphotic zone biological variables than were their surface anomalies. The strongest correlations between temperature, salinity and nitrate anomalies occurred in spring and summer (e.g. during upwelling). Conversely, spring and summer nitrate were less well correlated with the biological variables than during the remaining months due to nonlinearity in the biological response. Lagged cross-correlations generally showed decreasing correlation with increasing lag (0-12 months).

The Monterey Bay anomalies were then correlated with four Pacific Basin-scale climate indices -- the Multivariate ENSO Index (MEI), the Pacific Decadal Oscillation (PDO), the El Niño Modoki Index (EMI), and the North Pacific Gyre Oscillation (NPGO). Temperature, salinity and nitrate were well-correlated to the indices (accounted for 20-25% of the variance) whereas chlorophyll and primary production were weakly- and often insignificantly-correlated with the indices (accounted for 4-10% of the variance). The MEI was most strongly and the EMI least strongly (usually insignificantly) correlated with the anomalies. Most indices were also significantly cross-correlated over the observation period.