Abstract View

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An Analysis of the Low-Frequency Current Fluctuations in the Strait of Georgia, from June 1984 until January 1985

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ABSTRACT

A description of the low-frequency (ap;10 to 30 days period) current fluctuations in the Strait of Georgia is presented. Velocity time series from four cyclesonde moorings and five current meter mooring, spanning the time interval from June 1984 until January 1985, are analyzed. Emphasis is placed on identifying the forcing mechanisms and determining the spatial structure of low-frequency flow.

The nonlinear interaction of semidiurnal tidal constituents with bottom topography caused a near-bottom, low-frequency oscillation that was coherent over the span of the experimental array (ap;11 km). The tides were important elsewhere in the water column too, and altogether directly accounted for 37% of the low-frequency energy in the Strait.

There is evidence of significant wind forcing. An empirical orthogonal function analysis of the vertical structure of the current fluctuations yields strong evidence for the existence of wind-forced Ekman spirals. Typically, the orthogonal modes that dominate the variance near the surface rotate clockwise with depth and are coherent with the wind.

Longitudinal and transverse velocity correlations imply that at some depths the low-frequency current fluctuations are consistent with horizontally nondivergent, isotropic flow. They also suggest horizontal scales of less than 8 km.

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