Abstract View

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Wind-Forced Cross-Shelf Circulation on the Northern California Shelf *

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ABSTRACT

Velocity time series are used to study cross-shelf circulation on the northern California shelf and to examine classical ideas of locally wind-forced cross-shelf circulation. A simple linear two-dimensional model of cross-shelf transport is compared to estimates of cross-shelf transport in the near surface, interior, and near bottom. In winter, when wind forcing is brief and episodic, model transports are highly correlated to the total surface flow and show some skill in predicting subsurface cross-shelf flow. The same model does not work well below the surface in summer when persistent upwelling is observed. This suggests a two-dimensional wind-forced model of cross-shelf circulation may have more applicability to the brief wind events observed in winter than to the persistent wind events observed in summer. The reason for this is unclear. Numerous factors not included in the simple linear wind-forced model such as mesoscale features, upwelling fronts, the interaction of flow with topography, baroclinic pressure gradients, remote forcing, and small-scale wind stress all affect cross-shelf circulation. It is possible some of these are more pronounced on the northern California shelf in summer.