

AMERICAN METEOROLOGICAL SOCIETY

AMS Journals Online

AMS Home

Journals Home

Journal Archive

Subscribe

For Authors

Help

Advanced Search

Search



Abstract View

Volume 11, Issue 1 (January 1981)

Journal of Physical Oceanography

Article: pp. 71–86 | Abstract | PDF (1.01M)

Temperature and Currents on the Southern California Shelf: A Description of the Variability

Clinton D. Winant and Alan W. Bratkovich

Scripps institution of Oceanography, La Jolla, CA 92093

(Manuscript received May 1, 1980, in final form October 28, 1980) DOI: 10.1175/1520-0485(1981)011<0071:TACOTS>2.0.CO;2

ABSTRACT

Temperature and horizontal current observations at three water depths (15, 30 and 60 m) over the Southern California shelf are reported for four discrete periods during 1978-79, roughly corresponding to each of the principal seasons. The vertical structure of temperature changes markedly during the year; the water over the shelf is weakly stratified in the winter (N = 50 cpd) but stratification is stronger in the summer (N = 250 cpd). Seasonal changes in vertically averaged temperature are comparatively unimportant. Long-term averages of the longshore currents are to the south near the surface in all seasons, with amplitudes ranging up to 10 cm s⁻¹ in the winter. During spring and summer, the stratification is accompanied by shear in the vertical structure of these long-term current averages, with surface currents sweeping to the south, but with deeper, colder water flowing in the opposite direction. Currents fluctuating at subtidal frequencies are predominantly alongshore and are strongest during the winter. The major fluctuations in this frequency band may he decomposed into barotropic and baroclinic components; the latter reach their

Options:

- Create Reference
- Email this Article
- Add to MyArchive
- Search AMS Glossary

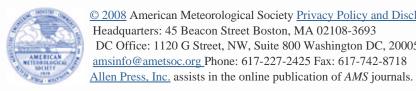
Search CrossRef for:

• Articles Citing This Article

Search Google Scholar for:

- Clinton D. Winant
- Alan W. Bratkovich

maximum amplitudes during the summer. Relations between the barotropic currents, longshore wind stress, and synthetic bottom pressure are remarkably similar to those defined previously off Oregon, although the amplitude of currents is observed to increase with distance offshore. At tidal frequencies, both cross-shelf and longshore modes of fluctuation are important. Neither is well correlated to tidal sea surface elevation over long periods. The principal mode of variability associated with longshore tidal currents is barotropic, while that associated with cross-shelf currents is baroclinic. The motion in the cross-shelf plane resembles that due to a standing gravest-mode internal wave. At supratidal frequencies, internal waves travel onshore during those seasons when the water column is strongly stratified. The propagation characteristics of these high-frequency currents are similar to those expected for shoaling interfacial waves.



© 2008 American Meteorological Society Privacy Policy and Disclaimer Headquarters: 45 Beacon Street Boston, MA 02108-3693 DC Office: 1120 G Street, NW, Suite 800 Washington DC, 20005-3826 amsinfo@ametsoc.org Phone: 617-227-2425 Fax: 617-742-8718