Sign in

AMERICAN METEOROLOGICAL SOCIETY
AMS Journals Online

AMS Home | Journals Home | Journal Archive | Subscribe | For Authors | Help | Advanced Search | Search | Go

Abstract View

Volume 11, Issue 9 (September 1981)

Journal of Physical Oceanography
Article: pp. 1205–1214 | Abstract | PDF (894K)

An Estimate of Equatorial Upwelling in the Pacific

Klaus Wyrtki

Department of Oceanography, University of Hawaii, Honolulu 96822

(Manuscript received February 20, 1981, in final form July 7, 1981)

DOI: 10.1175/1520-0485(1981)011<1205:AEOEUI>2.0.CO;2

ABSTRACT

Upwelling in the equatorial Pacific Ocean manifests itself by a tongue of cool water stretching from the Galapagos Islands to the date line. To estimate the rate of upwelling, the mass, heat and salt budgets of the tongue are investigated. The Ekman divergence is determined from wind stress as 84×10^6 m^3 s^{-1}. It is compensated by geostrophic convergence of the same magnitude as determined from the zonal pressure gradient. Since the vertical distribution of the two meridional flows is different, a strong vertical circulation results, which leads to upwelling at a rate of $\sim 50 \times 10^6$ m^3 s^{-1}. A consideration of the heat budget leads to the conclusion that horizontal advection in the South Equatorial Current does contribute to the cool tongue, but that the contribution of upwelling is much larger. The heat budget also indicates that upwelling comes from depths above the core of the undercurrent and that the source water has temperatures only $\sim$ 3°C less than the water flowing out laterally. The seasonal variation of all properties associated with the cool tongue is strong and produces a cross-equatorial flow of water from the summer to the winter hemisphere of $\sim 20 \times 10^6$ m^3 s^{-16}.

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

Search CrossRef for:
- Articles Citing This Article

Search Google Scholar for:
- Klaus Wyrtki

top

© 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
Allen Press, Inc. assists in the online publication of *AMS* journals.