Abstract View

Volume 9, Issue 2 (March 1979)

Journal of Physical Oceanography
Article: pp. 244–253 | Abstract | PDF (735K)

Topographic Rossby Waves off East Australia: Identification and Role in Shelf Circulation

Christopher Garrett

CSIRO Division of Fisheries and Oceanography, Cronulla, N.S.W. 2230, Australia

(Manuscript received May 3, 1978, in final form August 21, 1978)

DOI: 10.1175/1520-0485(1979)009<0244:TRWOEA>2.0.CO;2

ABSTRACT

Hamon *et al.*(1975) analyzed two years of surface current data from ships' set along two tracks parallel to 560 km of the east Australian shelf and found a phase lag of 10 days between long (120 day) period current fluctuations 19 km offshore and 6.5 km offshore. This is explained in terms of the propagation characteristics of topographic waves on the continental shelf. It is shown that these current fluctuations can lead to a significant amount of coastal upwelling as they are damped out by bottom friction. The average circulation on the east Australian shelf is discussed. The simplest response to the known longshore pressure gradient would be a steady longshore current and upwelling circulation, but it is shown that this is incompatible with a heat budget for the water on the shelf. Hence something other than bottom friction is required to balance most of the longshore pressure gradient; the onshore momentum flux of the topographic waves identified in the current data is shown to be a likely candidate. The implications of this interpretation for the circulation in deeper water off the shelf are discussed.