Abstract View

Volume 13, Issue 9 (September 1983)

Journal of Physical Oceanography
Article: pp. 1564–1588 | Abstract | PDF (2.13M)

Seasonal Variability from a Model of the Tropical Atlantic Ocean

Antonio J. Busalacchi

Mesoscale Air-Sea Interaction Group, Florida State University, Tallahassee 32306

Joël Picaut

Laboratorie d'Oceanographie Physique, Universite de Bretagne Occidentale, 29200 Brest, France

(Manuscript received December 13, 1982, in final form June 3, 1983)

DOI: 10.1175/1520-0485(1983)013<1564:SVFAMO>2.0.CO;2

ABSTRACT

A numerical model incorporating a single baroclinic mode and realistic coastline geometry is used to analyze the linear, dynamic response to estimates of the seasonal wind field over the tropical Atlantic Ocean. The forced periodic response consists of a spatially dependent combination of a locally forced response, Kelvin waves, Rossby waves and multiple wave reflections. The seasonal displacements of the model pycnocline are compared with observed dynamic height. Annual and semiannual fluctuations dominate the seasonal signal throughout the basin. In general, the distribution of amplitude and phase are similar for annual changes in dynamic height and pycnocline depth. Major features of the seasonal response are reproduced, e.g., east-west changes in pycnocline depth about a nodal point at the equator, the seasonal pycnocline movement along the northern and southern coast of the Guinea Gulf, and a significant changes of phase in the ocean variability north and south of the ITCZ. The relative importance between local and remote forcing is determined for several parts of the model basin. The wind-driven annual signal in the idealized Gulf of Guinea is due to equatorial zonal wind stress fluctuations west of the Gulf. The semi-annual response in the Gulf of Guinea is a result of zonal and meridional wind stress fluctuations in the eastern half of the tropical Atlantic. The seasonal response in the western equatorial and northernmost parts of the model basin are primarily local.

top

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.