Abstract View

Volume 14, Issue 6 (June 1984)

Journal of Physical Oceanography
Article: pp. 1022–1031 | Abstract | PDF (563K)

Circulation on the Continental Shelf of the Southeastern United States. Part III: Modeling the Winter Wind-Driven Flow

Vassiliki Kourafalou, John D. Wang, and Thomas N. Lee

Rosenstiel School of Marine and Atmospheric Science, University of Miami, Miami, FL 33149

(Manuscript received July 29, 1983, in final form March 19, 1984)

DOI: 10.1175/1520-0485(1984)014<1022:COTCSO>2.0.CO;2

ABSTRACT

A vertically integrated two-dimensional model has been adapted for the study of the wind-driven flow on the South Atlantic Bight (SAB) shelf during the winter season. Wind data are used as an input to the model and current data are used to verify the model results.

Initially, a constant wind field in time and space is applied over the whole domain; the predicted flow pattern shows good agreement with observations. Model results using observed spatially and temporally varying wind fields are also in good agreement with observations. At the shelf-break the comparison is rather poor due to the strong influence of the Gulf Stream in the outer shelf data, which was neglected in the model.

Water particle trajectories resulting from wind forcing, tidal forcing, and from the combined effect of an along-shelf surface slope with tidal forcing are compared. The along-shelf slope seems to have a significant effect on the net displacement of water particles as well as on the along-shelf volume transport. Comparison of momentum balances from model results and observations indicates that low-frequency current variability at midshelf during winter is primarily an Ekman response to local wind forcing.