Abstract View

Volume 14, Issue 10 (October 1984)

Journal of Physical Oceanography
Article: pp. 1551–1559 | Abstract | PDF (615K)

Tidal Motions in the Florida Current

Dennis A. Mayer

NOAA/Atlatic Oceanographic and Meteorological Laboratory, Miami, FL 33149

Kevin D. Leaman and Thomas N. Lee

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

(Manuscript received March 3, 1983, in final form July 19, 1984)

DOI: 10.1175/1520-0485(1984)014<1551:TMITFC>2.0.CO;2

ABSTRACT

A linear relationship exists between sea level and the north component of the depth-averaged tidal velocity in the Straits of Florida. This relationship is used as a one-dimensional model to predict barotropic tidal currents across the Straits near 27°N. Predictions are independent of the choice of a sea-level reference site between Key West and Patrick Air Force Base. The model, when compared with three sets of depth-averaged velocity obtained from current profilers, can account for at least 70% of the variance in the diurnal and semidiurnal tidal bands. The predicted diurnal tidal current is dominant and can account for more than 80% of the predicted tidal energy. Twice a year the one-dimensional model yields a maximum amplitude of 12 cm s^{-1} ± 3.5 cm s^{-1} (rms). This corresponds to a tidal transport of 5.1 × 10^6 m^3 s^{-1} ± 1.5 × 10^6 m^3 s^{-1} (5.1 Sv).