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An Analysis of Subtidal Current Fluctuations in the Middle Atlantic Bight

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ABSTRACT

Subtidal current fluctuations in the Middle Atlantic Bight are examined from current-meter data collected in 1975 and 1976. Spectral analysis provides evidence for both locally wind-forced response and free waves that propagate downshelf³ which are not correlated with the local wind. A simple empirical model has been constructed to fit two linearly independent plane waves to the observed current spectra. Application of the model to the current data obtained at a pair of stations in the New York Bight during the period of 26 October 1975 to 4 April 1976 indicates that the two waves propagate in opposite directions along the coast, and with the additional evidence from rotary-coefficient calculations, it is suggested that they correspond to the forced and free waves speculated upon earlier. The noise level is a free parameter in the model and is determined by adjusting the phase speed of the forced wave to the translation speed of the observed wind field. This gives a 526 km day^{-1} phase speed for the free wave, and the forced wave, free wave and noise compose ~ 41 , 39 and 20% of the total variance.

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