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A Model of the Semiannual Oscillation in the Equatorial Indian Ocean

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ABSTRACT

Luyten and Roemmich have shown a strong semiannual signal in zonal velocity in the upper, western part of the equatorial Indian Ocean. Their observations are modeled by assuming that they are directly forced by the observed semiannual component of zonal wind stress, which is relatively large in the equatorial Indian Ocean. The model is linear, periodic, has linear damping, uses the long-wave approximation, and can be solved analytically. A good comparison with the observations is obtained for the phase of the oscillation across the array. The predicted magnitude is somewhat smaller than in the observations. The model sensitivity to friction and the spatial distribution of the wind stress is explored. Some additional model simplifications are discussed, but it is concluded that they all detract substantially from the comparison. The main conclusion is that the observations can be accounted for as a directly forced response to the semiannual component of the near-equatorial zonal winds.

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