O-V3

A divergent quasigeostrophic model for wind-driven oceanic fluctuations in a closed basin

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The oceanic current and sea level fluctuations driven by the fluctuating component of a wind stress field are analyzed by considering a linear, deterministic, barotropic, quasigeostrophic model on the β-plane in a circular domain. Divergent and nondivergent forced solutions are obtained analytically and their structure in different frequency ranges is discussed. For parameter values roughly representative of the Mediterranean Sea, divergent oscillations with a clear boundary layer character are found in the range T<O(1 month) while a Rossby wave-like behavior can be observed for higher forcing periods. Finally, a comparison between divergent and nondivergent solutions reveals the inadequacy of the rigid-lid approximation for sufficiently high frequencies.

O-V4

Upwelling induced by periodic wind stress

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In this note we exhibit analytical solutions for the upwelling and the coastal currents induced by a periodic wind stress. We present solutions for an infinite deep ocean and for a shallow ocean. there is upwelling only when the period of the forcing is longer than the inertial period, i.e. $f > \omega$. When the period of the forcing is shorter than the inertial period, i.e. $f < \omega$, there is not upwelling but propagating waves. Application to the Mediterranean sea-land breeze regime will be presented.

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