Abstract View

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The Subtidal Response of Sea Level to Atmospheric Forcing in the Carolina Capes

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ABSTRACT

The subtidal frequency response of sea level to atmospheric forcing along the coastal region between Cape Hatteras and Charleston is investigated for a four-month period: 1 September-31 December, 1974. It is found that low-frequency sea level fluctuations are preferentially forced by wind stress components which are aligned with the local topography. Also, a localized, one-dimensional model of sea surface response to a clockwise rotating wind for the Charleston coastal regime is developed. The phase spectrum of the alongshore wind component versus sea level as predicted by the model is shown to compare favorably to that derived from actual observations at Charleston, an open ocean coastal site. The model results and observations also suggest that wind-induced fluctuations of coastal sea level are trapped within 40 km of the coast by the combined effects of friction, Coriolis force and bottom topography. The outer shelf is dominated by fluctuations which are less related to wind stress and are attenuated rapidly in the shoreward direction. A reasonable estimate of bottom frictional coefficient, $r = 0.05$ cm s^{-1}, is also established.