Abstract View

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Coastal-Trapped Waves behind a Large Continental Shelf Island, Southern Great Barrier Reef

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ABSTRACT

The salient features of subinertial frequency fluctuations of current, sea level, temperature and wind stress observed within the Capricornia section of the Great Barrier Reef are interpreted by comparison with coastal-trapped wave (CTW) theories Near-coastal currents and sea levels are modeled with some success by a theory of first-mode wind-forced barotropic continental shelf waves with geographical origin at Fraser Island, the southern across-shelf boundary of the study region. However, current and temperature variations of period 8–10 days on the continental slope are observed to have energy far in excess of that generated by the local wind. Decomposition of the observed alongshore velocity field in terms of baroclinic CTW modes indicates the signal is predominantly a second- or third-mode wave propagating equatorward at 0.4–0.6 m s^{-1}. These modes have most of their energy flux propagating along the continental slope, and the energy levels indicate that the source region lies to the south of Fraser Island. The possible biological and geological relevance of CTW activity within the study region is briefly discussed.