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The Relationship of the Curl of the Local Wind Stress to the Circulation of the Cayman Sea and the Gulf of Mexico

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ABSTRACT

The curl of the annual mean wind stress is proposed as the forcing mechanism for the anticyclonic gyre observed in the Cayman Sea. A simple wind-driven model is presented to illustrate how a steady-state gyre in the Cayman Sea and another gyre in the western Gulf of Mexico can be spun-up by the wind. The model results also indicate that the exchange of mass between the two basins can be enhanced by the wind field. Temporal changes in the upper layer temperature structure of the Cayman Sea gyre are consistent, qualitatively, with changes predicted by a simple wind-forcing model. The same model does not appear valid in the western Gulf of Mexico.

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