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A Numerical Study of the Effects of Coastline Geometry on Wind-Induced Upwelling in the Gulf of Lions

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ABSTRACT

An attempt is made to explain the fixed locations of coastal upwelling centers in the Gulf of Lions as a function of the coastline geometry alone. The semi-implicit numerical model, based on two-layer shallow water equations, uses a spatial discretization with triangular finite elements. Vertical mixing is shown to play an important role in determining the final shape of the upwelling centers. It is conjectured that an observed upwelling filament results from the straining and stretching of a coastal upwelling center by the observed anticyclonic circulation farther offshore.

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