



Abstract View

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Effects of Coastline Geometry on Upwellings

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ABSTRACT

The shallow water equations applied to a two-layer ocean are solved in order to study the effect of capes on upwellings. First, analytical solutions of the linearized version of these equations are given for academic right angle corners. Two cases must be envisaged depending on whether or not the wind, favorable to upwelling, is parallel to one coast or to the other. Then, the nonlinear version of the equations is solved by using a numerical model dealing with the finite elements method. Capes of various shapes are studied. Numerical results can be interpreted in the light of analytical solutions. The major observed phenomena are a difference in the interface elevation between the upwind and downwind coasts, and a generation of currents flowing in opposite direction to the wind in the bottom layer. Both effects are due to the generation of Kelvin waves by the variability of the coast.

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