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Horizontal Ocean Circulation Forced by Deep-Water Formation. Part I: An Analytical Study

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ABSTRACT

The horizontal ocean circulation generated by vertical convection is investigated analytically. The stratification is parameterized by a two-layer ocean and attention is focused on the spinup phase when the phenomena can be considered as linear. It is found that the response of the ocean to a two-dimensional idealized thermohaline forcing is baroclinic. A cyclonic gyre is generated in the upper layer, an anticyclonic gyre in the lower layer. Variation of the Coriolis parameter with latitude causes the center of the gyre to drift westward at the speed of long baroclinic Rossby waves.

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