Abstract View

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The Mediterranean Outflow—A Simple Advection-Diffusion Model

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ABSTRACT

The influence of the subtropical gyre on the spread of Mediterranean Water in the Atlantic is discussed in terms of a simple horizontal advection-diffusion model. The northern, southern and western boundaries of a rectangular ocean are treated as salt sinks while the distribution of salinity on the east coast representing the highly saline Mediterranean Water is a sine curve. The velocity distribution for the subtropical gyre is that given by Stommel and includes westward intensification. Salinity distributions are calculated for various values of the Peclet number, and for oceanographically reasonable values they indicate that the gyre passes through the high-salinity tongue and advects it toward the south and west. The model is consistent with the observed salinity distribution of the mid-layers of the North Atlantic.