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Shapes of Deep Density-Depth Curves

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ABSTRACT

Deep density-depth curves often show faint curvature reversals, stability maxima etc. Relationships between these features and the field of motion are explored here, in reference to the South Pacific, for interior regions and western boundary current. For the former, an assumed balance between vertical advection and vertical diffusion of density implies downward movement where there is positive curvature in the density-depth curve, in association with equatorward flow of the bottom water; it is argued that such flow is a likely feature of the interaction between a stratified deep western boundary current and a stratified interior. Illustrative (though somewhat unrealistic) analytical examples are given. In the western boundary region it is the difference between local and interior densities which seems to be related to details of the velocity distribution, but only in special (and unlikely) circumstances is there a Correspondence across the boundary region between the shape of the perturbation density-depth curve and the motion field. Some comments are made concerning the implications for the interpretation of hydrographic data.

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