Abstract View

Volume 13, Issue 7 (July 1983)

Journal of Physical Oceanography
Article: pp. 1269–1274 | Abstract | PDF (506K)

A Tritium Box Model of the North Atlantic Thermocline

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(Manuscript received July 30, 1982, in final form April 13, 1983)

DOI: 10.1175/1520-0485(1983)013<1269:ATBMOT>2.0.CO;2

ABSTRACT

A box model of 1972 tritium observations on isopycnal surface in the main thermocline of the North Atlantic subtropical gyre is used to estimate the time scales and volume of exchange of the thermocline with respect to surface waters. The flux of water between the surface and the thermocline implied by this model ($\sim 40 \times 10^6$ m^3 s^{-1}) greatly exceeds the downward Ekman pumping ($\sim 8 \times 10^6$ m^3 s^{-1}). This suggests that mixing and convective overturning are the dominant mechanisms for exchange between surface waters and the interior geostrophic flow. The flux rate is approximately the same size as conventions estimates of the Sverdrup transport. This suggests that ventilation of the thermocline may occur by recirculation combined with a very efficient exchange across the poleward boundary of the gyre.