## Abstract View

Volume 9, Issue 4 (July 1979)

**Journal of Physical Oceanography**
Article: pp. 724–738 | Abstract | PDF (947K)

# Subthermocline Countercurrents in the Western Equatorial Atlantic Ocean

**John D. Cochrane, Francis J. Kelly Jr., and Charles R. Olling**

*Department of Oceanography, Texas A&M University, College Station 77843*

(Manuscript received October 25, 1978, in final form January 16, 1978)

DOI: 10.1175/1520-0485(1979)009<0724:SCITWE>2.0.CO;2

ABSTRACT

In each hemisphere of the Atlantic, a permanent countercurrent (eastward flow) having a core about 4.5° from the Equator is present in the subthermocline layer from 80 to 200 cl $t^{-1}$ (centiliters per metric ton). Although currents along the Brazilian coast supply water to the countercurrents, much of the flow in each seems to be internal to the anticyclonic region on its equatorward side. West of 25°W, the region considered here, the south countercurrent is covered largely by westward flow, has a mean width of 209 km, and a mean geostrophic transport of 15 × $10^6$ $m^3$ $s^{-1}$. The north countercurrent often lies below eastward flow, but its core is marked by a subthermocline velocity maximum and a path differing from that of the navifacial core. Between about 50 and 40° W, available data indicate a mean transport of 9 × $10^6$ $m^3$ $s^{-1}$ in February–April and 26 × $10^6$ $m^3$ $s^{-1}$ in July–September, a significant annual variation. From 40 to 28°W, roughly, evidence for a permanent subthermocline countercurrent is strongest. The current has a mean uninterrupted width of 231 km. Its transport shows no significant annual variation and has a mean of 19 × $10^6$ $m^3$ $s^{-1}$. East of about 28°W, the north countercurrent breaks up. The flux mode of the south, and the strong sector of the north, countercurrent is in the layer from 120 to 140 cl $t^{-1}$, the main part of the equatorial thermostad. Transports of the Atlantic subthermocline countercurrents are considerably larger than these reported for their Pacific counterparts.