## Abstract View

Volume 17, Issue 5 (May 1987)

**Journal of Physical Oceanography**
Article: pp. 631–643 | Abstract | PDF (880K)

# Flow through Discovery Gap

**P.M. Saunders**

*Institute of Oceanographic Sciences, Wormley, Godalming, Survey, United Kingdom*

(Manuscript received May 8, 1986, in final form November 4, 1986)

DOI: 10.1175/1520-0485(1987)017<0631:FTDG>2.0.CO;2

ABSTRACT

A narrow gap (Discovery Gap) in the East Azores Fracture Zone at 37°N in the eastern Atlantic provides a channel for the exchange of bottom water between the Madeira and Iberian abyssal basins. A detailed survey defines its length (150 km), width (10–50 km), depth of sills (near 4800 m) and sediment thickness (0–500 m). Year-long measurements of deep flow are made from six moorings and ten current meters. Mean flows are about 5 cm $s^{-1}$. These data are supplemented by 10 days of float tracking near 4700 m and numerous density profiles within and around the gap.

A persistent southwest-northeast flow of dense water is found in Discovery Gap, and the flux of water colder than a potential temperature of 2.05°C is measured to be $(0.21 \pm .04) \times 10^6$ $m^3$ $s^{-1}$. This discharge spreads over an area of about $10^{11}$ $m^2$ beyond the Gap exit, where it is warmed both by geothermal heating and by mixing with overlying water. An estimate of 1.5 to 4 $cm^2$ $s^{-1}$ is derived for the diapycnal diffusivity, similar to values determined from much larger channels in the western Atlantic, but the relative importance of boundary versus interior mixing cannot be established.

The cold water arrives from the south along the deep eastern margin; its hydrographic signal is the “piling up” of isotherms against the lower continental rise. New 32°N, about 500 km south of Discovery Gap, the signal is small, and it is proposed that just south of this latitude the eastern boundary current ends.

top


Headquarters: 45 Beacon Street Boston, MA 02108-3693
DC Office: 1120 G Street, NW, Suite 800 Washington DC, 20005-3826
amsinfo@ametsoc.org Phone: 617-227-2425 Fax: 617-742-8718
Allen Press, Inc. assists in the online publication of *AMS* journals.