



## Abstract View

[Volume 16, Issue 10 \(October 1986\)](#)

### Journal of Physical Oceanography

Article: pp. 1683–1693 | [Abstract](#) | [PDF \(920K\)](#)

# Mass, Heat and Freshwater Fluxes in the South Indian Ocean

**Lee-Lueng Fu**

*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA 91109*

(Manuscript received July 3, 1985, in final form April 8, 1986)

DOI: 10.1175/1520-0485(1986)016<1683:MHAFI>2.0.CO;2

### ABSTRACT

Six hydrographic sections were used to examine the circulation and property fluxes in the South Indian Ocean from 10° to 32°S. The calculations were made by applying an inverse method to the data. In the interior of the South Indian Ocean, the geostrophic flow is generally northward. At 18°S, the northward interior mass flux is balanced by the southward Ekman mass flux at the surface, whereas at 32°S the northward interior mass flux is balanced by the southward mass flux of the Agulhas Current. There is a weak, southward mass flux of  $6 \times 10^9 \text{ kg s}^{-1}$  in the Mozambique Channel. The rate of water exchange between the Pacific Ocean and the Indian Ocean is dependent on the choice of the initial reference level used in the inverse calculation. The choice of 1500 m, the depth of the deep oxygen minimum, has led to a flux of water from the Pacific Ocean to the Indian Ocean at a rate of  $6.6 \times 10^9 \text{ kg s}^{-1}$ .

Heat flux calculations indicate that the Indian Ocean is exporting heat to the rest of the world's oceans at a rate of  $-0.69 \times 10^{15} \text{ Wat}$  at 18°S and  $-0.25 \times 10^{15} \text{ Wat}$  at 32°S (negative values being southward). The geostrophic component of the heat flux is dominated by its barotropic component. There is a convergence of freshwater flux in the area between 18° and 32°S, but the magnitudes of the freshwater fluxes are less than hydrological estimates by an order of magnitude. The requirement of a freshwater flux as large as the hydrological estimates drives abnormal horizontal and vertical mass fluxes.

#### Options:

- [Create Reference](#)
- [Email this Article](#)
- [Add to MyArchive](#)
- [Search AMS Glossary](#)

#### Search CrossRef for:

- [Articles Citing This Article](#)

#### Search Google Scholar for:

- [Lee-Lueng Fu](#)



© 2008 American Meteorological Society [Privacy Policy and Disclaimer](#)

Headquarters: 45 Beacon Street Boston, MA 02108-3693

DC Office: 1120 G Street, NW, Suite 800 Washington DC, 20005-3826

[amsinfo@ametsoc.org](mailto:amsinfo@ametsoc.org) Phone: 617-227-2425 Fax: 617-742-8718

[Allen Press, Inc.](#) assists in the online publication of *AMS* journals.