



## Abstract View

[Volume 17, Issue 11 \(November 1987\)](#)

### Journal of Physical Oceanography

Article: pp. 1978–1985 | [Abstract](#) | [PDF \(615K\)](#)

## An Inertial Theory of the Equatorial Undercurrent

**Joseph Pedlosky**

*Department of Physical Oceanography, Woods Hole Oceanography Institution, Woods Hole, MA 02543*

(Manuscript received May 11, 1987)

DOI: 10.1175/1520-0485(1987)017<1978:AITOTE>2.0.CO;2

### ABSTRACT

An inertial nonlinear model of the equatorial undercurrent is presented. The model is a simple two-layer model whose lower layer represents the undercurrent. The flow in the lower layer preserves potential vorticity and Bernoulli function. The former includes the relative vorticity of the current and the latter includes the current's kinetic energy. The required relation between the potential vorticity and the Bernoulli function is determined by matching the solution far from the equator with the ventilated thermocline theory of Luyten et al.

The model describes an eastward-accelerating undercurrent fed by a general wedge-shaped meridional circulation pattern. The general character of the meridional and zonal flow, as well as the magnitudes of the undercurrent velocity, the current width and thermocline depth agree reasonably well with observations.

#### Options:

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

#### Search CrossRef for:

- [Articles Citing This Article](#)

#### Search Google Scholar for:

- [Joseph Pedlosky](#)



[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.