



## Abstract View

[Volume 16, Issue 6 \(June 1986\)](#)

### Journal of Physical Oceanography

Article: pp. 1101–1120 | [Abstract](#) | [PDF \(1.20M\)](#)

# Dynamics of Potential Vorticity Fronts and Eddy Detachment

**L.J. Pratt and Melvin E. Stern**

*Graduate School of Oceanography, University of Rhode Island, Kingston RI 02881*

(Manuscript received September 11, 1985, in final form December 27, 1985)

DOI: 10.1175/1520-0485(1986)016<1101:DOPVFA>2.0.CO;2

### ABSTRACT

The formation and detachment of quasi-geostrophic eddies in a  $1\frac{1}{2}$  layer jet is studied using a piecewise uniform potential vorticity model. A vorticity front separates the two pieces, and thus the jet has cusplike character. The evolution of large amplitude initial disturbance (whose origin may be attributed to barotropic-baroclinic instability mechanisms not explicit in our model) is computed by the method of contour dynamics. Certain numerical results such as the steepening of the front prior to eddy detachment can be physically explained in terms of differential mean field advection and vortex induction. Computations are made for a variety of initial conditions and we indicate the amplitude/scale conditions necessary for the detachment of an eddy. The discussion is directed to the problem of the formation of warm/cold rings in the Gulf Stream. The effect of a coast on large perturbations of a jet is also briefly discussed.

#### Options:

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

#### Search CrossRef for:

- [Articles Citing This Article](#)

#### Search Google Scholar for:

- [L.J. Pratt](#)
- [Melvin E. Stern](#)

top ▲

