## Abstract View

Volume 18, Issue 1 (January 1988)

**Journal of Physical Oceanography**
Article: pp. 89–106 | Abstract | PDF (1.76M)

# Potential Vorticity Distribution in the North Pacific

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(Manuscript received August 28, 1986, in final form July 20, 1987)

DOI: 10.1175/1520-0485(1988)018<0089:PVDITN>2.0.CO;2

ABSTRACT

Vertical sections and maps of potential vorticity $\rho^{-1} f \partial\rho/\partial z$ for the North Pacific are presented. On shallow isopycnals, high potential vorticity is found in the tropics, subpolar gyre, and along the eastern boundary of the subtropical gyre, all associated with Ekman upwelling. Low potential vorticity is found in the western subtropical gyre (subtropical mode water), in a separate patch near the sea surface in the eastern subtropical gyre and extending around the gyre, and near sea-surface outcrops in the subpolar gyre; the last is analogous to the subpolar mode water of the North Atlantic and Southern Ocean.

Meridional gradients of potential vorticity are high between the subtropical and subpolar gyres at densities which outcrop only in the subpolar gyre; lateral gradients of potential vorticity are low in large regions of the subtropical gyre on these isopycnals. On slightly denser isopycnals which do not outcrop in the North Pacific, there are large regions of low potential vorticity gradients which cross the subtropical-subpolar gyre boundary. These regions decrease in area with depth and vanish between 2500 and 3000 meters. Regions of low lateral gradients of potential vorticity are surrounded by and overlie regions where the meridional gradient of potential vorticity is approximately $\beta$. In the abyssal waters, below 3500 meters, meridional potential vorticity gradients again decrease, perhaps associated with slow geothermal heating. The depth and shape of the region wheel potential vorticity is relatively uniform or possesses closed contours is noted and related to theories of wind-driven circulation.