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[Volume 10, Issue 8 \(August 1980\)](#)

Journal of Physical Oceanography

Article: pp. 1159–1167 | [Abstract](#) | [PDF \(587K\)](#)

Annual Baroclinic Rossby Waves in the Central North Pacific

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(Manuscript received November 19, 1979, in final form March 17, 1980)

DOI: 10.1175/1520-0485(1980)010<1159:ABRWIT>2.0.CO;2

ABSTRACT

We analyze XBT data, collected in the central North Pacific under the NORPAX program (TRANSPAC), by means of inverse methods (cross-spectral fit). We separate the data into two parts: a fluctuation with length scales in the order of the dimensions of the North Pacific basin and a wavelike fluctuation with much shorter scales of a few hundred kilometers. At the annual frequency we find the wavelike fluctuation to consist of a random field of first-order baroclinic Rossby waves traveling basically northwest with wavelengths of ~ 300 km and phase speeds of $\sim 1 \text{ cm s}^{-1}$. The group velocity is directed mainly southwest and is of the order of 1 cm s^{-1} . We describe the fields of temperature, pressure, velocity, sea level elevation, and horizontal and vertical particle displacement associated with the annual baroclinic Rossby waves.

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