



Due to technical problems, there is a delay in posting the full text version of articles. We hope to have this resolved soon. In the meantime please see the PDF version of articles.

Abstract View

[Volume 2, Issue 3 \(July 1972\)](#)

Journal of Physical Oceanography

Article: pp. 212–217 | [Abstract](#) | [PDF \(1.19M\)](#)

Large-Scale Atmospheric Response to the 1964–65 Pacific Equatorial Warming

J. Bjerknes

Dept. of Meteorology, University of California, Los Angeles

(Manuscript received January 21, 1972, in final form February 21, 1972)

DOI: 10.1175/1520-0485(1972)002<0212:LSARTT>2.0.CO;2

ABSTRACT

Time series of surface winds and sea surface temperatures at Canton Island, covering the period 1962–67, are interpreted to show that the major changes in the temperature of the large central and eastern equatorial Pacific area are caused by the varying strength of the easterly winds and inherent variation in upwelling.

The feedback effects of the ocean temperature variations upon the atmosphere are illustrated by a comparison of the average November 1964 sounding with that of November 1965. In the cold ocean case (1964) the atmosphere has a pronounced stable layer between 900 and 800 mb, preventing convection and rainfall, and in the warm ocean case (1965) the heat supply from the ocean eliminates the atmospheric stability and activates heavy rainfall. The resulting vertical thermal expansion of the tropical troposphere from 1964 to 1965 is demonstrated by 200-mb topographic maps showing the emergence of two new anticyclonic centers symmetrically straddling the equator at the longitude of the maximum ocean warming. The same tropospheric heating can be seen to have been carried far eastward by the upper tropospheric winds, although with diminishing amplitude.

A side effect of the widespread warming of the tropical belt of the atmosphere shows up in the increase of exchange of angular momentum with the neighboring subtropical belt, whereby the subtropical westerly jet strengthens in 1965 compared to 1964 all the way from the central Pacific to the eastern Mediterranean.

The implications of the described ocean-atmosphere interaction for interannual climatic change, and the possible forecasting thereof, are mentioned. It is stressed that climatic forecasting will call for extensive additional coordinated research by oceanographers and meteorologists.

Options:

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

Search CrossRef for:

- [Articles Citing This Article](#)

Search Google Scholar for:

- [J. Bjerknes](#)

top ▲



© 2009 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 Phone: 617-227-2425 Fax: 617-742-8718
[Allen Press, Inc.](#) assists in the online publication of *AMS* journals.