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[Volume 1, Issue 2 \(April 1971\)](#)

Journal of Physical Oceanography

Article: pp. 65–81 | [Abstract](#) | [PDF \(2.39M\)](#)

The 1968–69 Winter as an Outgrowth of Sea and Air Coupling During Antecedent Seasons

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(Manuscript received June 29, 1970)

DOI: 10.1175/1520-0485(1971)001<0065:TWAAOO>2.0.CO;2

ABSTRACT

North Pacific sea surface temperature variations are analyzed as a result of and a controlling factor for the general atmospheric circulation during the period from May 1968 through the subsequent winter, when heavy rains in California, snows in Washington and Oregon, and disappearance of the Hawaiian trade winds occurred. The data indicate that a vast pool of abnormally warm water developed rapidly over southern portions of the North Pacific in June because of an abrupt May-to-June change in atmospheric circulation. This change favored strong subsidence in a deep Pacific anticyclone, dissipation of cloud, and greatly increased insolation. The climatologically stable Pacific anticyclone with its subsidence permitted the warm pool to remain through the subsequent fall. Penetration into the area of the pool by fronts and cold air masses during winter appears to have excited abnormal low-latitude cyclonic developments which transported deep moist air currents from the intertropical convergence zone into California. Gradually, the cyclones set into operation destructive factors which modified and later destroyed the warm pool.

The hypothesized air-sea coupling is documented with surface and upper air charts, ocean temperature data, satellite photos, and other material bearing on the study.

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