

THE RELATIONSHIP BETWEEN THE WIND
AND SEA-SURFACE TEMPERATURE
IN THE EQUATORIAL PACIFIC

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ABSTRACT

Graphic and correlation analyses are used to examine the relationship between the wind and sea-surface temperature in the equatorial Pacific between South America and the dateline. The wind is determined from successive satellite photographs of low-level cloud motions. Surface temperatures are acquired from ship observations, although satellite-derived temperatures could have been used for certain areas of the equatorial Pacific. In the eastern equatorial Pacific (90°W - 130°W), the annual cycles of the meridional component of the wind and sea-surface temperature are related. When the wind direction becomes more southerly, the meridional component increases, and the surface temperature declines. The surface temperature later increases as the wind shifts to an easterly direction, and the meridional component weakens. The correlation analysis shows that the surface temperature usually changes about one month after the change in the wind. At 130°W , the sea-surface temperature often coincides with short period fluctuations in the zonal component. During periods when the surface temperature should have increased because of a weakening meridional component, it was decreasing due to a strengthening zonal component. In the equatorial region

surrounding 150°W , the change in sea-surface temperature is related to the inter-annual variation of the zonal component. In the vicinity of 170°W , no relationship between the fluctuations in the wind and surface temperature is found. Wind related processes such as local equatorial upwelling, horizontal advection, and movement of the warmer water north of the oceanic equatorial front are responsible for most of the fluctuation in surface temperature in the equatorial Pacific.