Abstract View

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Some Statistical and Synoptic Characteristics Associated with El Niño

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ABSTRACT

A 49-year time series of sea surface temperatures along the Peruvian coast is analyzed in order to find antecedent and subsequent indicators of El Niño (abnormally warm water) and its inverse. Precursory signs show up in certain statistics gathered seasons before the event, and these should be useful in forecasting the occurrence or non-occurrence of this economically important phenomenon.

The macroscale processes implied by the above data are explored with the help of Northern Hemisphere pressure patterns and geostrophic wind profiles. There is a strengthening of the North Pacific winter westerlies when El Niño occurs as suggested by Bjerknes, that is, through momentum transports from a variable Hadley cell. However, El Niño appears to be associated with an appreciably weakened Pacific High over the eastern third of the North Pacific during the preceding year. This lends support to the theory that generation of El Niño is a long-term large-scale process in which reduced wind strew permits an accelerated equatorial countercurrent and diminished equatorial upwelling.