Abstract View

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Predictability of Sea Surface Temperature and Sea Level Pressure Anomalies over the North Pacific Ocean

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ABSTRACT

Nonseasonal variability of sea level pressure (SLP) and sea surface temperature (SST) in the mid-latitude North Pacific Ocean is examined. The objective is examination of the basic scales of the variability and determination of possible causal connections which might allow prediction of short-term climatic (time scales between a month and a year) variability.

Using empirical orthogonal function descriptions of the spatial structure, it is found that SLP variability is concentrated in a few large-scale modes but has a nearly white frequency spectrum. SST variability is spatially complex (being spread over many spatial modes, some of which have small-scale changes) but is dominated by low-frequency changes.

The use of linear statistical estimators to examine predictability is discussed and the importance of limiting the number of candidate data used in a correlation starch is underscored. Using linear statistical predictors, it is found that (A) SST anomalies can be predicted from SST observations several months in advance with measurable skill, (B) the anomalous SLP variability can be specified from simultaneous SST data with significant skill, thus showing the fields are related, and (C) future SLP anomalous variability cannot be predicted from SST data although previous SLP can be specified. The fact that previous SLP variability is better specified by SST data than is simultaneous SLP variability, coupled with a complete inability to predict future SLP anomalies, suggests that, in the region studied and on the time scales of a month to a year, the observed connection between SST and SLP variabilities is the result of the atmosphere driving the ocean.

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