



## **Extratropical Forcing and the Emergence of Central-Pacific El Niño**

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A newly released reanalysis dataset covering the period 1979 to 2009 is analyzed to show that the sea surface temperature (SST) variability in the tropical central Pacific is more closely related to the SST variability in the tropical eastern Pacific before 1990 but more closely related to sea level pressure (SLP) variations associated with the North Pacific Oscillation (NPO) after 1990. Only during the period after 1990 can the NPO excite large SST variability in the tropical central Pacific. Related to this change, El Niño Southern Oscillation (ENSO) SST anomalies tend to spread from the eastern to central tropical Pacific before 1990 in a pattern resembling that associated with the Eastern-Pacific (EP) type of ENSO, but are more closely connected to SST variability in the subtropical north Pacific after 1990 with a pattern resembling that of the Central-Pacific (CP) type of ENSO. This study concludes that the increased influence of the NPO on the tropical Pacific is a likely reason for the increasing occurrence of the CP type of ENSO since 1990. An analysis of the mean atmospheric circulation during these two periods suggests that the increased NPO influence is associated with a strengthening Hadley circulation and a weakening Walker circulation after 1990.