



Interdecadal Relationship between the Mean State and El Nino Types

Pei-Hsuan Chung (1) and Tim Li (2)

(1) Department of History and Geography, Taipei Municipal University of Education, Taipei, Taiwan
(phchung@go.tmue.edu.tw), (2) IPRC/SOEST, University of Hawaii at Manoa, Honolulu, Hawaii

Based on the analysis of observational data from 1980 to 2010, It was found that easterly trades and sea surface temperature (SST) gradients across the equatorial Pacific undergo a regime change in 1998/99, with enhanced trades and a significant cooling (warming) over tropical eastern (western) Pacific in the later period. Accompanying this mean state change is more frequent occurrence of central Pacific (CP) El Nino during 1999–2010. The diagnosis of air–sea feedback strength showed that atmospheric precipitation and wind responses to CP El Nino are greater than those to the eastern Pacific (EP) El Nino for given a unit SST anomaly (SSTA) forcing. The oceanic response to the same wind forcing, however, is greater in the EP El Nino than in the CP El Nino.

The role of the mean SST zonal gradient in El Nino selection was investigated through idealized numerical experiments. With the increase of the background zonal SST gradient, the anomalous wind and convection response to a specified EP or CP SSTA shift to the west. Such a difference results in a bifurcation of maximum SSTA tendency, as shown from a simple ocean model. The numerical results support the notion that a shift to the La Nina–like interdecadal mean state is responsible for more frequent occurrence of CP-type El Nino.