Examining El Niño Diversity in Recent Warm Pool Migration Events

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Abstract

What do satellite observations of the Pacific Ocean's surface temperature reveal about the differences between eastern Pacific (EP) and central Pacific (CP) El Niño events and their climatic impacts? We aim to examine these two types of ENSO by exploring the temporal variation of the location and the size of the western Pacific warm pool (WPWP) centroid. We analyzed the WPWP zonal variability, an indicator of El Niño, from 1982 to 2011 by applying Hilbert Huang Transform (HHT) to the sea surface temperature (SST). HHT contains two processes: Ensemble Empirical Mode Decomposition (EEMD) and Hilbert Huang Spectrum (HHS). Analysis shows that the long-term trend of the zonal centroid movement is migrating to the west by 3.78° from the mean location during the past 30 years. These analysis techniques isolated two separate time series for CP and EP events and showed that these two types of El Niño operate at different time-scales. The zonal component of the centroid of the WPWP is shown to have different energy and frequency dynamics during EP and CP El Niño events.