



Warming of warm pool sea surface temperature and changes in El Niño activity

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A slow increase of warm pool sea surface temperature (SST) and its association with the change of El Niño activity are investigated with observations and ocean assimilation product. Ocean heat budget analyses are conducted to show that the warming of the mean SST in the warm pool can be linked to an enhanced SST variability in the central Pacific through two physical processes: (1) the warming shifts the tropical Pacific mean state toward a La Niña-like state that strengthens the zonal advection feedback process to increase SST variability in the central Pacific; and (2) the warming strengthens the vertical stratification in the western-to-central equatorial Pacific that enables a larger trapping of momentum flux in the surface active layer to increase central Pacific SST variability. As a result of these two processes, Central Pacific El Niño events, which are characterized by a location of maximum anomalous SST in the central Pacific, have occurred more often as the warm pool gradually warmed. This study concludes that the recent emergence of the Central-Pacific El Niño can be related to the increase of warm pool SST in the western Pacific.