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Changes in El Niño response to an increase of warm pool SST

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The variability of warm pool sea surface temperature (SST) and its association with the tropical Pacific mean state and El Niño are investigated with observations and ocean assimilation products. The leading mode of warm pool SST variability identified by an EOF analysis is found to reflect two important and related processes: a slow shift of the tropical Pacific mean SST toward a La Niña-like state and an increasing occurrence of the Central-Pacific El Niño. The warming of the warm pool in this EOF mode is accompanied by a cooling trend in the eastern tropical Pacific. At the same time, the equatorial thermocline has risen in the central Pacific, making the region a favorable location for the upwelling feedback process to aid in the generation of SST variability. As a result, Central-Pacific El Niño events have occurred more often as the warm pool gradually warmed. This study concludes that the recent emergence of the Central-Pacific El Niño is related to an increase of warm pool SST, and that the warm pool is able to detect not only the degree of global warming but also changes in El Niño type.