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Feedback of tropical cyclones on El Niño diversity

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Understanding of the El Niño phenomenon is improving and several studies have considered the dynamics of El Niño diversity, however, the important role of tropical cyclones has not been reported. Here we show a clear influence of tropical cyclones over the western North Pacific on the spatial pattern of El Niño: By changing the Walker circulation and equatorial thermocline, strong (weak) accumulated cyclone energy helps to shift the center of strongest sea surface temperature anomalies three months later to the equatorial eastern (central) Pacific. The greater number of central-Pacific El Niño events after 1999/2000 may be associated with weaker accumulated cyclone energy in this period. A modified physically based empirical model (ACE+SST model) for predicting El Niño spatial patterns is constructed that captures well the spatiotemporal characteristics of El Niño events. Taking into account the key influence of western North Pacific tropical cyclones on El Niño diversity will improve our understanding and prediction of El Niño.