

# New emergence of the Southern Indian Ocean Dipole as a trigger for Central Pacific El Niño since the 2000s

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Despite decades of effort, predicting the El Niño-Southern Oscillation (ENSO) since the 2000s has become increasingly challenging (Barnston et al., 2012). This is partly caused by a weakened coupling between the ENSO and well-known precursors in tropical ocean basins (Li et al., 2020), particularly in the Indian Ocean (Han and Wang, 2021). Here we show that the Southern Indian Ocean Dipole (SIOD), which is characterized by east-west oriented sea surface temperature (SST) dipole pattern over the southern Indian Ocean, becomes a key precursor of the Central Pacific El Niño events since the 2000s at a 14-month lead. Interestingly, the previously revealed precursors accelerate the transition of ENSO phase (Izumo et al., 2010; Ham et al., 2013), while the SIOD prolongs the ENSO period. Anomalous westerlies over the equatorial western Pacific led by the positive SIOD result in the development of a Central Pacific El Niño event in the subsequent year. The SIOD after the 2000s persists longer due to the westward shifted ENSO events, which eventually intensifies the impact of the SIOD on the subsequent ENSO evolution.

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