

Important factors for long-term change in ENSO transitivity

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El Nino and La Nina exhibit significant asymmetry in their duration. El Nino tends to turn rapidly into La Nina after the mature, while La Nina tends to persist for up to 2 years. Reconstructed historical sea surface temperatures (SST) show a significantly increase in the intensity of El Nino-Southern Oscillation (ENSO) asymmetry, particularly El Nino transitivity, during the last six decades. Atmospheric observational data have shown that the relationship between El Nino and surface zonal wind anomalies over the equatorial Western Pacific (WP) has strengthened, and anomalous WP easterlies have appeared after the 1970s climate regime shift. To investigate the dependency of ENSO transitivity on its amplitude, a suite of idealized experiments using an atmospheric general circulation model (AGCM) is performed by imposing historical SST and 12 different ENSO-related SST anomalies exhibiting equal spatiotemporal distribution but different amplitude. Our AGCM experiments show strong nonlinearity in the WP zonal wind against the amplitude of the warm phase.

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