

## Asymmetric transition between El Niño and La Niña and its future change

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The La Niña frequently follows El Niño, but the opposite case is relatively rare. Here, we investigate the main cause on such asymmetric transition between El Niño and La Niña using the current analysis data and CMIP data. According to the recharge oscillator paradigm, we confirmed that the sea surface temperature (SST) anomalies based ENSO index (Nino-3.4) was highly correlated to the equatorial total oceanic heat content anomalies with several month lags. Interestingly, such lagged correlation was much higher in El Niño case compared to La Niña case. It indicates that oceanic inertia built during El Niño event is larger than that during La Niña event, and thus, such oceanic inertia easily triggers La Niña event. The asymmetric oceanic response turns out to be related to the nonlinear atmospheric response to SST. Furthermore, change in the asymmetric transition between El Niño and La Niña under the future global warming is investigated using CMIP data.