

Natural variation in ENSO flavors

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Using a multivariate, "patterns-based", red noise approach to 50 years of observed tropical SST, thermocline depth, and zonal wind stress seasonal anomalies, it is shown that natural random variations can account for the observed variability of Central Pacific (CP) and Eastern Pacific (EP) ENSO events. The recent multidecadal increase in the number of CP events relative to EP events, which has been hypothesized to be connected to anthropogenic change in the state of the ocean, is also found to be consistent with multivariate red noise and hence with stationary statistics. ENSO "flavors" are the consequence of differing combinations of two initially orthogonal spatial patterns that are precursors to CP or EP events of both signs. These precursors can be excited by random weather forcing and subsequently result in SST anomaly amplification primarily through surface or thermocline feedbacks, respectively.