



El Niño—Southern Oscillation frequency cascade

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The El Niño—Southern Oscillation (ENSO) phenomenon, the most pronounced feature of internally generated climate variability, occurs on interannual timescales and impacts the global climate system through an interaction with the annual cycle. The tight coupling between ENSO and the annual cycle is particularly pronounced over the tropical Western Pacific. Here we show that this nonlinear interaction results in a frequency cascade in the atmospheric circulation, which is characterized by deterministic high-frequency variability on near-annual and subannual timescales. Through climate model experiments and observational analysis, it is documented that a substantial fraction of the anomalous Northwest Pacific anticyclone variability, which is the main atmospheric link between ENSO and the East Asian Monsoon system, can be explained by these interactions and is thus deterministic and potentially predictable.