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Timing El Niño: analytical results

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The El Niño Southern Oscillation (ENSO) is the leading mode of interannual variability in the global climate system. A complex collection of geophysical causes contributes to it, and many efforts have been made to reduce its representation to a simple model that describes its mean features and the fluctuations. Up to now the results have mainly been on the stationary statistical properties but here, for the first time, we obtain an analytical result for the timing of El Niño events. We arrive to that introducing in this field an approach derived from the context of the foundation of Thermodynamics: the role of the "microscopic" system is played by the atmosphere, while the El Niño ocean variables play the role of the "macroscopic" system. Thus, as for Thermodynamics, El Niño emerges as a universal large scale property from a general class of complex systems.

References: Bianucci, M. "Analytical probability density function for the statistics of the ENSO phenomenon: Asymmetry and power law tail". Geophysical Research Letters 43, 386–394 (2016).