



Critical transition analysis of the deterministic wind-driven ocean circulation

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Critical transitions represent that class of bifurcations for which the new state of the system represents a completely different dynamical regime relative to the previous state of the system. Critical transitions have been described in a broad band of different scientific fields, ranging from ecosystems to financial markets and the climate system. A central question in this context is, whether it is possible to predict a critical transition by so-called early-warning signals.

Here we focus on a critical transition present in a deterministic model of the wind-driven ocean circulation. In order to find a possible set of critical transition indicators, we develop a new approach of defining networks of the ocean circulation, and therewith present a detailed analysis of the topology of the ocean circulation while the system approaches the critical transition.