CHRISTOPHER HEGGERUD, University of Manitoba

Regime shifts in biology and tools to predict them

Regime shifts pose unique challenges when dealing with predictions and management of biological systems yet little headway has been made on understanding when a system might be in a transient state, or if a regime shift is imminent. In particular, given a timeseries, it is difficult to determine the underlying mechanism causing a regime shift, or if one is occurring at all. Through a series of simplifications, we analyze synthetic data known to exhibit crawl-by type transient dynamics or that undergo some nonlinear excursion through state space that appears as a transient dynamic. Using dynamical systems theory, we create metrics that predict transient dynamics and furthermore to understand useful characteristics of the regime shift. These new metrics are additionally compared to typical early warning signals in ecology and the utility of both are discussed