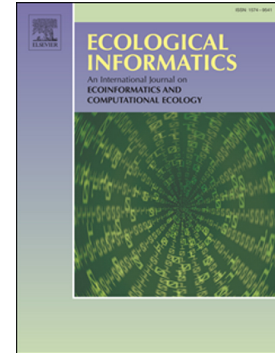


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Hidden variables in a Dynamic Bayesian Network identify ecosystem level change

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Abstract

Ecosystems are known to change in terms of their structure and functioning over time. Modelling this change is a challenge, however, as data are scarce, and models often assume that the relationships between ecosystem components are invariable over time. Dynamic Bayesian Networks (DBN) with hidden variables have been proposed as a method to overcome this challenge, as the hidden variables can capture the unobserved processes. In this paper, we fit a series of DBNs with different hidden variable structures to a system known to have undergone a major structural change, i.e. the Baltic Sea food web. The exact setup of the hidden variables did not considerably affect the result, and the hidden variables picked up a pattern that agrees with previous research on the system dynamics.

Keywords: Dynamic Bayesian Network; hidden variable; ecosystem modelling; Baltic Sea; Gotland Basin

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