



Human driven transitions in complex model ecosystems

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Human activities have been observed to be impacting ecosystems across the globe, leading to reduced ecosystem functioning, altered trophic and biomass structure and ultimately ecosystem collapse. Previous attempts to understand global human impacts on ecosystems have usually relied on statistical models, which do not explicitly model the processes underlying the functioning of ecosystems, represent only a small proportion of organisms and do not adequately capture complex non-linear and dynamic responses of ecosystems to perturbations.

We use a mechanistic ecosystem model (1), which simulates the underlying processes structuring ecosystems and can thus capture complex and dynamic interactions, to investigate boundaries of complex ecosystems to human perturbation. We explore several drivers including human appropriation of net primary production and harvesting of animal biomass.

We also present an analysis of the key interactions between biotic, societal and abiotic earth system components, considering why and how we might think about these couplings.

References:

M. B. J. Harfoot et al., Emergent global patterns of ecosystem structure and function from a mechanistic general ecosystem model., *PLoS Biol.* 12, e1001841 (2014).