Evasion of tipping in complex systems

Abstract: The concept of tipping points helps inform our understanding of the catastrophic effects that global change may have on ecosystems, Earth system components, and the whole Earth system. Here, we pose that spatial pattern formation can aid complex systems to evade tipping points. Evading tipping points through various pathways may be relevant for many ecosystems and Earth system components that hitherto have been identified as tipping prone, including for the AMOC and the entire Earth system.

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His research and teaching is about Ecology, Environmental Sciences, and current topics on Global Change and Ecosystems. His research concentrates on Spatial Ecology and Global Change.

Ecosystems self-organize into spatial patterns, demonstrating a characteristic of complex systems and resilience. In complex systems, structures at larger scales emerge spontaneously from processes operating at smaller scales. Understanding and modelling these processes enables us to interpret such signals of spatial self-organization in terms of ecosystem's resilience, tipping points, and its likelihood of critical transitions toward alternate assemblages, guided by new rules and different processes. Also, our research shows that processes and feedbacks at disparate locations and spatial scales are linked, implying feedbacks between ecosystems, earth systems and the (global) climate. This is important in the light of global change, because human survival depends on ecosystem services.

His research has been published in more than 100 articles in international refereed scientific journals, including top journals such as Nature and Science.