



## **Interpreting stable and unstable ecosystem model behaviour**

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Large-scale ecosystem models describe the fluxes of energy and matter within terrestrial ecosystem, using mechanistic descriptions of ecosystem processes such as photosynthesis, decomposition, mineralization, transpiration, evaporation, net primary production or net ecosystem carbon exchange. Currently, this type of ecosystem models is the main tool for analysing the carbon balance of terrestrial ecosystem under scenarios of climate change. In this paper model simulations for three different ecosystems (Scots pine, Cembran pine and Common beech forest ecosystems) are analysed using the attractors of model behaviour, which are reconstructed from quasi-periodic model outputs. Stable and unstable attractor configurations are discussed according to (i) their ecological interpretation and (ii) the implications of the respective attractor configurations on predictive power of model outputs. The results show that large-scale ecosystem models may be used to: (i) determine the amount of information needed to model ecosystem behaviour, (ii) estimate the current resilience status of the modelled ecosystem, and (iii) detect situations where model application delivers meaningless results.