

REGIME SHIFTS, TIPPING POINTS AND LONG TRANSIENTS IN MODELS OF COUPLED CLIMATE-BIOTA DYNAMICS

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Geological data apparently suggest that, in the deep past, Earth's climate experienced a few regime shifts such as 'hot Earth' to 'cold Earth' or other way round. Some of those shifts were accompanied by mass extinctions when a significant fraction of life (e.g. as quantified by the number genera or families) got extinct. These and similar phenomena lead to a concept of tipping point. In this paper, we provide a critical revision of the tipping point concept based on the progress in understanding complex systems dynamics made over the last several years. In particular, we show that the concept of tipping point is relative rather than absolute, as it may essentially depend on the spatial and temporal scales at which the dynamics is considered, as well as the scope of the study.