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Modelling social ecological dynamics with transfers of vulnerability and robustness. Examples with adaptation to coastal vulnerability

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Modelling social ecological dynamics with transfers of vulnerability and robustness. Examples with adaptation to coastal vulnerability

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Abstract: Adaption patterns undertaken by policy makers within their own jurisdiction may bump in adaptation patterns undertaken by others at their own level. The consequences of these interactions may lead to mutual reinforcement or to cancelling each policy maker's adaptation capacity. In this presentation, we consider following Anderies (2014) that autonomous SES have their own adaptive management as an autonomous feedback loop. We take on seriously the concept of pluralism of agency in SES: any goal can be used as the root for a specific feedback loop. We identify the interactions between these loops to characterize transfers of vulnerability or robustness as a mechanistic process, without any need to assume some intention for transfer. We justify this representation through its capacity to encompass for narratives observed in coastal case studies in France, South Africa and England. This network of adaptation feedback loops, as a minimal representation of adaption in complex social ecological systems, enables to identify possible connections between adaptive management autonomous processes. We came up with five types of interactions including direct and indirect impacts generated by a process, but also competition on resources as well as sharing of infrastructure. We explain how this model encounters successfully for observed adaptation patterns facing transfer across stake, time and spatial scales, related to farm adaptation to drought, beach maintenance and flood insurance system. Sharing of infrastructure and elements of control appears as equally important among connections between adaptation processes. This weakness raises the issue of suitable policy arenas to handle these transfers.

Keywords: vulnerability; robustness; coastal management; feedback loops.