Modelling systemic change in coupled socio-environmental systems (SES)
A thematic issue of Environmental Modelling and Software

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CALL FOR PAPERS

This thematic issue of *Environmental Modelling and Software* focuses on modelling systemic change in coupled socio-environmental systems, with an emphasis on how model design is (or should be) aimed at representing the processes and consequences of systemic change, and how such changes may be governed. We particularly welcome contributions that address specific challenges associated with modelling systemic change in coupled socio-environmental systems as opposed to other systems. We encourage submissions from a broad range of modelling approaches, with case studies in diverse geographical regions.

Systemic changes include such things as:

- the formation of new institutions, rules or norms governing behaviour,
- regime shifts in SES,
- new classes of entity being formed, or new types of relationships between them,
- the introduction of new processes and changes in feedback loops in SES,
- changes in the set of exogenous variables to which the system is sensitive, or other changes in relevance of variables in or affecting the system,
- reorganisation of networks of interaction, possibly entailing different interaction topologies.

These changes may be coupled with a collapse in existing (formal and informal) institutions, loss of key hubs in interaction networks, irrelevance of classification criteria, or entities no longer interrelating in a particular way. Since such changes may themselves be seen as disturbances, a systemic change can be understood as the propagation of a disturbance throughout the system, leading to a long-term change in the way the system is organised. All these issues pose challenges for modelling.

The primary goal of the thematic issue is to address questions of model design, and how this needs to be approached differently to cater for systemic change. Authors are encouraged to ensure that their articles discuss as many as possible / appropriate of the following:

- Is the systemic change endogenously or exogenously driven?
- Does the systemic change originate in the human or environmental system?
- How does the systemic change propagate between the human and environmental systems? How do changes in one system affect the other system?

- To what extent is the disturbance leading to the systemic change perceived as 'sudden'? Over what time period does it operate, and over what time period do its effects persist?
- Did the disturbance affect or was it caused by processes at multiple scales? If so – how did you model cross-scale interactions?
- How is the severity of the shock perceived by actors within the system? What are the key variables that show the disturbance and systemic change occurring, and what magnitude of change is involved?
- To what extent is the disturbance and systemic change planned, anticipated or expected by actors within the system?
- What response options are available and executed in the social system?
- To what extent does the context of the disturbance affect its perception as such?
- How has modelling systemic change affected decisions about system boundary? What feedback loops have been put in or left out? How has it affected modelling of behaviour, adaptivity, networks and representation of model entities as constants and endogenous or exogenous variables?
- What was the reason for adopting the modelling approach used to study the systemic change? Why were other approaches rejected?
- What conceptual and methodological challenges did you find specific to representing systemic changes and responses to them, and how did you deal with them?
- What challenges did you find in modelling systemic changes in socio-environmental systems (as opposed to other kinds of system, e.g. an environmental or economic system), and how did you address them?
- What are the limitations of modelling for this purpose? How can we tackle uncertainty, which is a major issue for models of systemic change? What valuable insights can models provide given these limitations?

Timetable

1 February 2013: Deadline for 1,000 word extended abstracts to be sent to the organisers to the 'systemic change and resilience modelling' email: SCRM@iemss.org

1 March 2013: Feedback on abstracts.

1 June 2013: Deadline for full paper submissions.

August 2013: Notification to authors.

November 2013: Receipt of final papers.

For more information, contact the editors on SCRM@iemss.org, or see the special issue webpage: http://www.iemss.org/society/index.php/special-issues.