

## Proposal for pre-conference workshop – AGILE 2017 Wageningen, Tuesday 9 May 2017

<http://www.agile-online.org/index.php/conference/conference-2017>

### 1. Workshop name/title (and acronym is applicable)

Coping with systemic changes in environmental modelling

### 2. Description of the workshop by listing topic(s), objective(s) and planned outcome(s)

#### 2.1 Topic(s)

Most environmental modellers are familiar with the concept of regime shifts or critical transitions: abrupt changes in the system state as a result of a change in the system drivers. Less attention has been given to the concept of systemic changes: abrupt changes not (or not only) in the system state, but in the whole structure or behaviour of the system. See also a recent special issue in Environmental Modelling & Software: <http://www.sciencedirect.com/science/journal/13648152/75>. Whereas critical transitions can, at least in theory, be reproduced by simulation models, systemic changes cannot, because the change in the system behaviour makes the previously valid simulation model structure invalid. The occurrence of systemic changes thereby affects the validity of future projections made with these models.

#### 2.2 Objective(s)

The objectives of this workshop are:

- To facilitate a dialogue on the difference between critical transitions and systemic changes. Is a systemic change merely a critical transition of a system that we do not understand well enough to model it properly? In other words, is a systemic change an 'artifact' of an incorrect simulation model or is it more?
- To propose methods to identify past systemic changes using historic data of the system. This is not necessarily easy, as systemic changes may not be directly visible in the system state (and thus in the data).
- To identify systems in which systemic change is a potential problem requiring additional attention on the research agenda, and to come up with case studies to evaluate this.
- To explore how environmental modellers can cope with systemic changes. Should

they limit the projection horizon based on the past frequency of occurrence of systemic changes, or include the probability of systemic changes in the error propagation routines, or discard the simulation model altogether?

### **2.3 Planned outcome(s)**

*An outcome can be e.g. the publication of a report, a special issue of an International Journal, a white paper, a book, etc. If you already know the publisher, please provide this information as well.*

The expected outcomes of this workshop are:

- A research or review paper on systemic changes in relation to environmental models written by workshop participants and organizers together.
- The formation of research community on systemic change with the objective to initiate collaborative research and research proposals.

### **3. Abstract**

*This is how you want your workshop to be presented on the conference webpages (maximum 1000 characters)*

Most environmental modellers are familiar with the concept of critical transitions: abrupt changes in the system state as a result of a change in the system drivers. Less attention has been given to the concept of systemic changes: abrupt changes not (or not only) in the system state, but in the whole structure or behaviour of the system. Whereas critical transitions can, at least in theory, be reproduced by simulation models, systemic changes cannot, because the change in the system behaviour makes a previously valid simulation model structure invalid. Thereby, its projections can become invalid too.

In this workshop, we facilitate a dialogue on differences between critical transitions and systemic changes, we consider methods to identify past systemic changes, and we explore how to cope with systemic changes in modelling. We hope to initiate collaborative research, and plan to write a joint paper. More info at: [www.uni-muenster.de/Geoinformatics/en/geosim/events/systemicChange.html](http://www.uni-muenster.de/Geoinformatics/en/geosim/events/systemicChange.html).

### **4. Short description of the intended length (half or full day) and the format of the workshop**

The intended length is half a day. Two or three short interactive presentations of (invited) speakers will be alternated with structured plenary and group discussions.

**5. Brief statement of the relevance of the workshop for AGILE**

The occurrence of systemic changes can have large impacts on the validity of projections of environmental models. We deem it important to make the AGILE community, formed by a wide domain range of environmental modellers as well as the providers of the inputs and the users of the outputs of these models, aware of this issue. At the same time, we want to make use of the expertise within this community to get inputs for our developing research line on systemic change in connection to environmental models.

**6. What is the approximate number of expected participants?**

20

**7. Names and e-mail addresses of the organizing member(s)**

*Leading AGILE member (or sponsor) and contact person:*

Institute for Geoinformatics, University of Münster, Germany

Contact person: Judith Verstegen, [j.a.verstegen@uni-muenster.de](mailto:j.a.verstegen@uni-muenster.de)

*Contributing AGILE members (including the persons involved) – at least one seconding AGILE member is needed:*

Faculty of Geosciences, Utrecht University, the Netherlands

Persons involved: Derek Karssenber, [d.karssenber@uu.nl](mailto:d.karssenber@uu.nl), Oliver Schmitz, [o.schmitz@uu.nl](mailto:o.schmitz@uu.nl)

Department of Information Systems, University of Jaume I, Spain

Persons involved: Mohammad Mehdi Moradi, [moradi@uji.es](mailto:moradi@uji.es)

**8. Additional information about previous workshops, if held.**

This team (apart from Mohammad Mehdi Moradi) has organized an AGILE workshop before, at the 2011 conference in Utrecht, on modelling with PCRaster. Presently, we want to discuss a general environmental modelling issue, independent of modelling paradigm and software package, addressing a wider audience.

**9. Expected resources needed**

*Explain here if you have any special needs (e.g. internet connection, break-out room(s), etc.), what are the expected resources needed. Please take into account that the fee for the*

*workshop (1 day) is fixed at 50€ and this should cover the basic expenses made (coffee breaks, ...). If you need additional support, this request should be directed towards the AGILE Council, but this support cannot be guaranteed.*

One room, a beamer, and a flip-over or whiteboard.

## **10. Other information**

The website mentioned in the abstract (point 3) has not been set up yet. It will be set up if the workshop is accepted. It will contain a more extensive explanation of the concept of systemic change, links to literature, and a workshop programme, including the names and presentation topics of the (invited) speakers.

A special issue about systemic change has recently appeared in the journal *Environmental Modelling and Software* (issue 75, 2016), see <http://www.sciencedirect.com/science/journal/13648152/75>. In this issue different definitions and interpretations of the concept are in use, indicating the timeliness of a facilitated dialogue on the topic.

Submission by e-mail to: Agile2017@wur.nl