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Promoting access to and reuse of modelling projects - A picture book approach

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Abstract: Use and misuse of simulation models, model documentation, model comparisons and model integration are topics that never vanished from discussion on modelling and simulation. Especially under the frame of collaborative modelling these issues again gain importance. This contribution to the discussion does not offer another technological approach for this task. Here, the focus is put on documenting and assessing models and by this supporting the part of (re-) application of models. Using the metaphor of a collapsible picture book with which modellers, practitioners, stakeholders and other can access regions, models and modelling questions. The approach is suitable for scientific groups, projects or even journals for storing and maintaining their knowledge accumulated through simulation models.

Keywords: Model documentation, Model Meta-Data, Collapsible Picture Book

1. Introduction

In volume 100 of *Ecological Modelling* Müller (1997) stated that “we produced an enormous redundancy” by continuously developing simulation models. Actually this didn't change till today. Thus there is a need to bring modelling and simulation to a next level of applicability by the development of collaborative modelling platforms. This point has been made very strong in the contribution by Voinov et al. (2008), which clearly shows the pros and cons of collaborative modelling using a very technically point of view. In this short response I argue, that this line of thought can be extended and put into application. Within this commentary I would like to add some thoughts on the application part of these developments.

2. A “picture book” concept of making models more useable and consistent

Practitioners as well as scientists approach modelling and simulation developments following three different tracks. It is either

- (1) a certain region, in which a modelling study is to be conducted,
- (2) a certain problem or question to be tackled, and
- (3) a specific modelling approach to be applied or developed.

These three approaches interrelate to each other. E.g. the problem reduces the set of possible model applications or developments; the region of course is closely related to the problems but not exclusively. This makes documenting models, simulations studies and projects difficult. All these three way of approaching a simulation study are of equivalent importance.

The metaphor that appears is that this could be tackled as a collapsible picture book, well known for young children. I mean these picture books that show for instance different animals, the back, the centre and the front on different cards. E.g. you can put together tail and back of a lion with the centre of an elephant and the head of zebra. Actually this is very likely to model application you need to identify solution for high nutrient load (middle part) in a certain catchments (e.g. Patuxent river), first part with a certain model approach, see figure upper part, see figure 1.

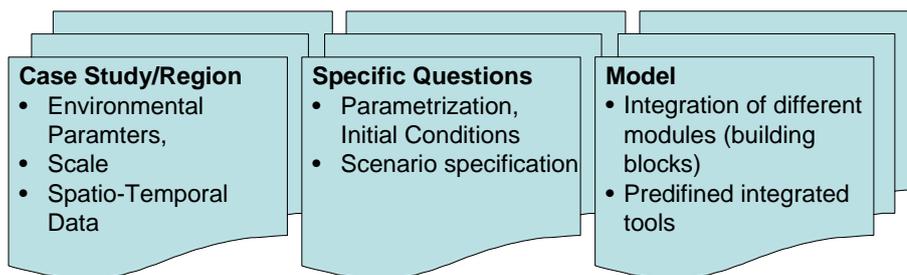


Figure 1. A “picture book” on model applications

Technically spoken, the implementation of such a collapsible picture book is a database with two main n:m-relations linking data sets on regions with scenarios and models. The major argument for such a generic database storing different modelling studies is that there are

- many models that can cope with the same problem fields (such as nutrient loads in catchments)
- many sites that have be analysed by different models (for instance the Elbe River basin)
- many model that have be applied to different regions/sites

The linkage is performed by scenarios.

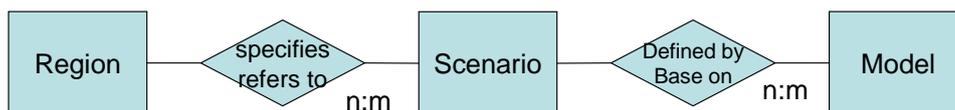


Figure 2. ER-Diagram of “picture book” on model applications.

3. Application and Discussion

The benefit of this approach can be seen for different applications First, research groups need to put effort in maintaining their suite of modelling developments. This task is of high importance, as team members are leaving (Ph.D. thesis finished, projects completed). This is crucial for not reinventing wheels and starting developments all over. Thus documentation and simplification of the model reuse is important. There are several developments available, but did not managed to be part of daily modelling work (Benz, 1997) of even shut down (Plentinger, 1996).

Second, the beginning phase of each new environmental research project is characterized by the question: Is there something out in the universe that we can use of our problem, task or scenario? Ususally meta documentation of models and databases (Bent, 1997) are useless unless results of the application show up. Thus all three parts of our picture book are of high importance.

Third, also journals such as Environmental Modelling and Software should aim at providing a database on their publications and products. The arguments above do support such an approach also for this field of application.

ACKNOWLEDGEMENTS

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