

## Concepts and models of coupled systems

Maurits Ertsen

Delft University of Technology, Department of Water Management, Department of Water Management, Delft, Netherlands  
(m.w.ertsen@tudelft.nl)

In this paper, I will especially focus on the question of the position of human agency, social networks and complex co-evolutionary interactions in socio-hydrological models. The long term perspective of complex systems' modeling typically focuses on regional or global spatial scales and century/millennium time scales. It is still a challenge to relate correlations in outcomes defined at those longer and larger scales to the causalities at the shorter and smaller scales. How do we move today to the next 1000 years in the same way that our ancestors did move from their today to our present, in the small steps that produce reality? Please note, I am not arguing long term work is not interesting or the like. I just pose the question how to deal with the problem that we employ relations with hindsight that matter to us, but not necessarily to the agents that produced the relations we think we have observed. I would like to push the socio-hydrological community a little into rethinking how to deal with complexity, with the aim to bring together the timescales of humans and complexity. I will provide one or two examples of how larger-scale and longer-term observations on water flows and environmental loads can be broken down into smaller-scale and shorter-term production processes of these same loads.