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Developing an Integrated River Model for the Grensmaas; Combining Integrated Assessment Modeling and Agent Based Social Simulation

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In this paper we present the concepts for an Integrated River Model (IRM) that will describe the impacts of river management strategies for the river Meuse in the Dutch province of Limburg with a time horizon of approximately 50 years. The currently ongoing river engineering project Grensmaas serves as a case study. The IRM will be coupled to an Agent Based Social Simulation (ABSS) model that represents the negotiation process between the stakeholders of the Grensmaas project. The virtue of this approach is a better understanding of the social dynamics of river management, of stakeholder interests and of salient environmental uncertainties. For a plausible description of the negotiation process the IRM should be able to reflect multiple stakeholder perspectives on river management. Moreover, the model should be suitable for use in a participatory setting for validation of the combined IA – ABSS model. This leads to a number of distinct model requirements: the model should be complete, valid, and interactive, and uncertainties must be made explicit. On the basis of the first requirement, completeness, we discuss conceptual model design. We then line out the salient uncertainties in river management, and discuss how these are to be included in the model. Finally we discuss model implementation, also in relation to the last two requirements of interactivity and validity. We thereby focus on spatial schematization, model equations, and the possible use of existing software modules. The guiding line of the talk thus leads from the concepts of social dynamics and stakeholder perspectives towards very practical implementation guidelines for Integrated River Models.