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Socio-hydrological flood models

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Long-term feedbacks between humans and floods may lead to complex phenomena such as coping strategies, levee effects, call effects, adaptation effects, and poverty traps. Such phenomena cannot be represented by traditional flood risk approaches that are based on scenarios. Instead, dynamic models of the coupled human-flood interactions are needed. These types of models should include both social and hydrological variables as well as other relevant variables, such as economic, environmental, political or technical, in order to adequately represent the feedbacks and processes that are of importance in human-flood systems. These socio-hydrological models may play an important role in integrated flood risk management by exploring a wider range of possible futures, including unexpected phenomena, than is possible by creating and studying scenarios. New insights might come to light about the long term effects of certain measures on society and the natural system. Here we discuss a dynamic framework for flood risk and review the models that are presented in literature. We propose a way forward for socio-hydrological modelling of the human-flood system.