

Title:

Predicting adaptive behaviour of flood prone residents in an agent-based modelling approach

Abstract:

Among the range of potential natural hazard events, flooding is the most common and regularly devastating. Flooding causes significant adverse impacts that are assumed to increase in the future due to a combination of socio-economic development and a changing climate. Therefore, understanding the processes that generate and limit (potential) flood impacts is an important research topic. Integrated flood risk management approaches that request more efforts and adaptive behaviour from flood-prone residents are on the rise, but not fully understood by now.

Agent-based modeling (ABM) allow us to reproduce complex dynamic systems, with a strength on the interaction of humans and their environment. Flood risk assessments using agent-based approaches already have been presented successfully, showing that they can be a powerful tool to reflect complex decision pathways and individual behaviours. Here, the integration of individual precautionary behaviour has proven to be an important component to estimate risks. This was implemented in different ways but without assessing different types of behaviour or evidence-based individual dynamics due to the lack of data. Recent studies based on longitudinal surveys (panel data) showed different types of dynamic precautionary behaviour among residents such as low adaptive and well prepared types.

Integrating insights from such evidence-based trajectories of adaptive behaviour in an ABM enables a novel, multi-disciplinary approach. It is assumed that the consideration of a more heterogeneous adaptation in a model facilitates a more detailed insight in complex dynamic risk assessments. Such a model can be further used to study different scenarios, e.g. the effect of changing policies. In particular, we aim to gain insights into how low adaptive types of flood-prone residents might be encouraged to take action.