Kennis voor Klimaat

Knowledge for Climate

Project **Theme 1| International flood risk assessment & adaptation**

Description of research

Flooding of coastal and fluvial systems affects several million people globally each year, making it the most impacting natural hazards modern society is subject to. The total population and the economic value of material assets located in zones prone to flooding have increased dramatically over the past decades and is expected to increase even further due to: (a) an overall growth in population and wealth; and (b) increases in sea-level and flood frequency due to climate change. Globally, however, research with respect to flooding and its negative consequences is widely dispersed. Implications of this are that (a) insights in global exposure estimates and trends are limited and (b) new insights and methodologies created internationally are generally not considered in national flood damage models.

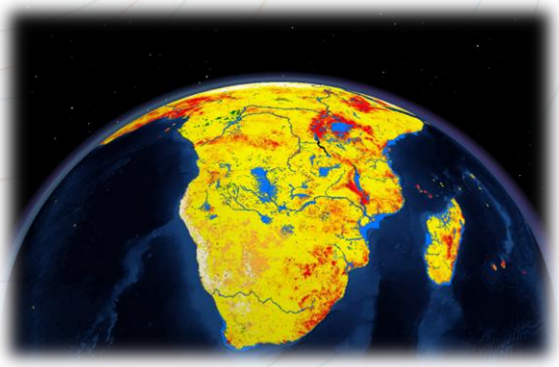
This PhD research focuses on addressing these two issues. First, I have presented a first estimation of global exposure to both river and coastal flooding over a time period of several decades, using two different methodologies (published). Second, I have compared various flood damage estimation methods used in Europe and the United States, and assess their performance on the basis of historic flood events (in review). Third, I will look at socioeconomic development in flood plains in the Netherlands and beyond to see how global trends are linked to local development. Finally, the findings on the different scales will be linked to global adaptation funding and local its use in lowering local flood risk.

Research question

How can we link flood risk trends quantitatively between different scales, from local to global, and how can this knowledge be used to improve adaptation?

The most important conclusions

- Global exposure to river and coastal flooding has increased dramatically over the past decades and will continue to do so, even without considering climate change
- Socioeconomic development is relatively concentrated in flood plains, both nationally and globally
- Uncertainty in nationally applied flood damage models across countries can amount to a factor of 40, which has important implications for land-use planning and optimal protection standards
- The development of a validated global flood damage approach, which is important for global adaptation financing and reinsurance, is feasible, although care should be taken when applying the approach on a smaller scale.



Possible applications from the project

- Assessment and optimisation of global scale disaster adaptation funding (e.g. World Bank)
- Improving national flood damage models (e.g. HIS-SSM in the Netherlands)
- Quantification of the effect of socioeconomic development and adapation policies on flood risk

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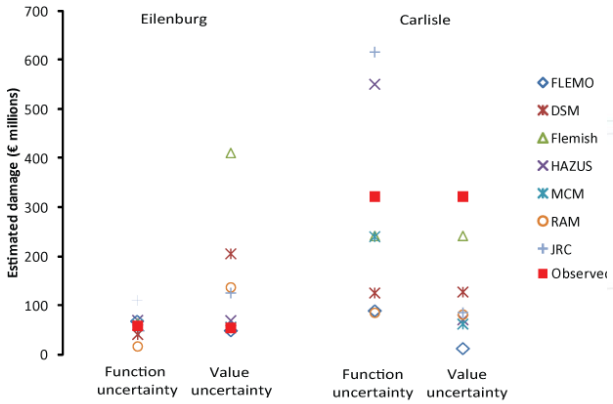
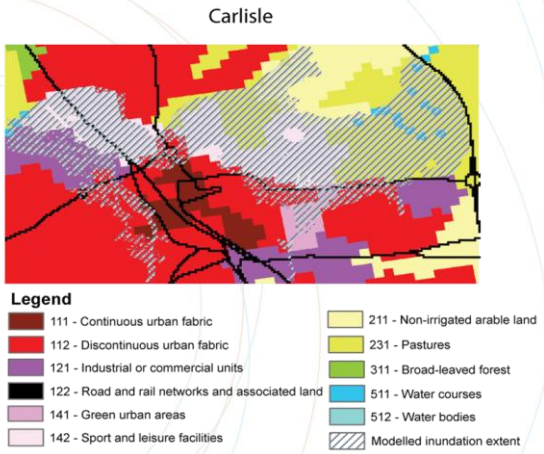


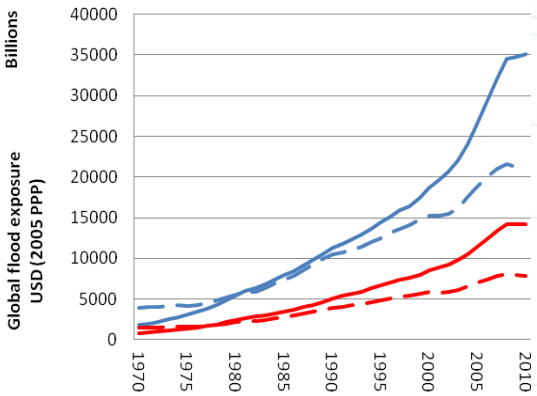
Opportunities for the poject

- Learning from international peers: comparing international methodologies for flood damage assessment can help the improvement of the Dutch approach
- Improving understanding on developments in flood risk due to socioeconomic development on various scales
- Connecting with global players while working on issues that go beyond the Dutch borders offer opportunities for networking and showcasting Dutch expertise

Bottlenecks of the project

- Developing or obtaining a global scale inundation model (solved by collaboration with Deltares)
- Obtaining empirical damage data for damage model comparison (solved by collaboration with EC-JRC and other partners)
- Connecting with global financing institutions to explore the applications in adaptation financing (solved by collaboration with World Bank)
- Connecting local scale flood plain development in the Netherlands (currently in progress by means of an empirical study using microeconomic data).





More information

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