Geophysical Research Abstracts
Vol. 18, EGU2016-1495, 2016
EGU General Assembly 2016


# How to deal with climate change uncertainty in the planning of engineering systems

Olga Spackova, Beatrice Dittes, and Daniel Straub
Engineering Risk Analysis Group, Technical University Munich, Germany

The effect of extreme events such as floods on the infrastructure and built environment is associated with significant uncertainties: These include the uncertain effect of climate change, uncertainty on extreme event frequency estimation due to limited historic data and imperfect models, and, not least, uncertainty on future socio-economic developments, which determine the damage potential. One option for dealing with these uncertainties is the use of adaptable (flexible) infrastructure that can easily be adjusted in the future without excessive costs. The challenge is in quantifying the value of adaptability and in finding the optimal sequence of decision. Is it worth to build a (potentially more expensive) adaptable system that can be adjusted in the future depending on the future conditions? Or is it more cost-effective to make a conservative design without counting with the possible future changes to the system? What is the optimal timing of the decision to build/adjust the system?

We develop a quantitative decision-support framework for evaluation of alternative infrastructure designs under uncertainties, which:
• probabilistically models the uncertain future (trough a Bayesian approach)
• includes the adaptability of the systems (the costs of future changes)
• takes into account the fact that future decisions will be made under uncertainty as well (using pre-posterior decision analysis)
• allows to identify the optimal capacity and optimal timing to build/adjust the infrastructure.
Application of the decision framework will be demonstrated on an example of flood mitigation planning in Bavaria.