WATER INFORMATICS SCIENCE & ENGINEERING
EPSRC CENTRE FOR DOCTORAL TRAINING

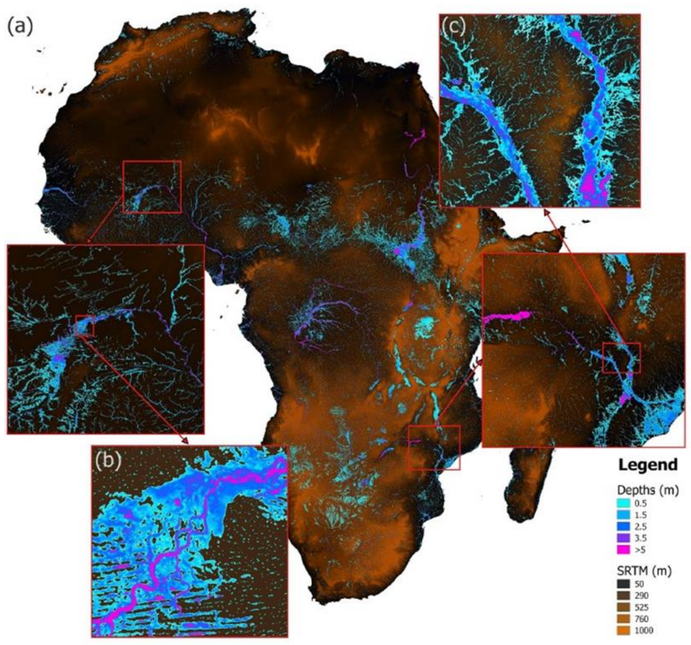
Engineering and Physical Sciences Research Council

Understanding and estimating uncertainty in Global Flood Risk Models

Georgios Sarailidis, University of Bristol, UK
Supervisors: Francesca Pianosi, Thorsten Wagener, JBA Trust

Project Aim

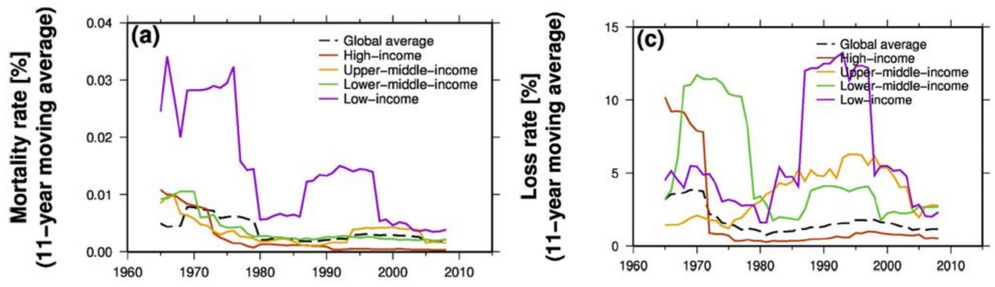
The overall aim of this project is to understand and identify the various sources of uncertainty in Global Flood Risk Models and investigate their implications on flood risk dynamics, flood loss modelling and modelling of adaptation measures.



Source: Sampson et al. (2015), WRR

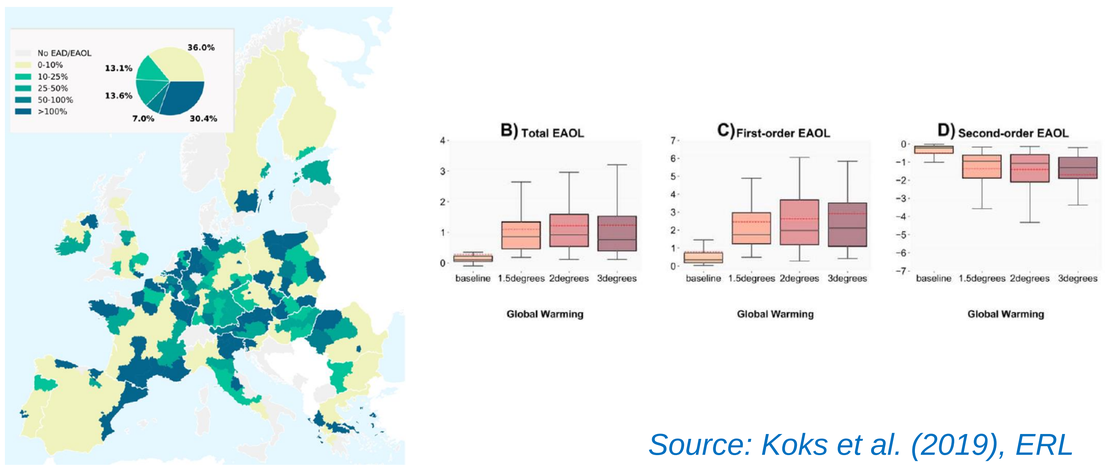
Research Questions

1) How the dynamics in vulnerability and exposure and their interactions and interdependence mechanisms can affect and explain changes in flood risk?



Source: Tanoue et al (2016), Scientific Reports

2) What are the implications, at global scale, in flood risk assessment, if we change the way we model losses in terms of spatial and temporal scale?



Source: Koks et al. (2019), ERL

3) What is the individual and combined effect of the various flood mitigation measures in flood risk at global scales?

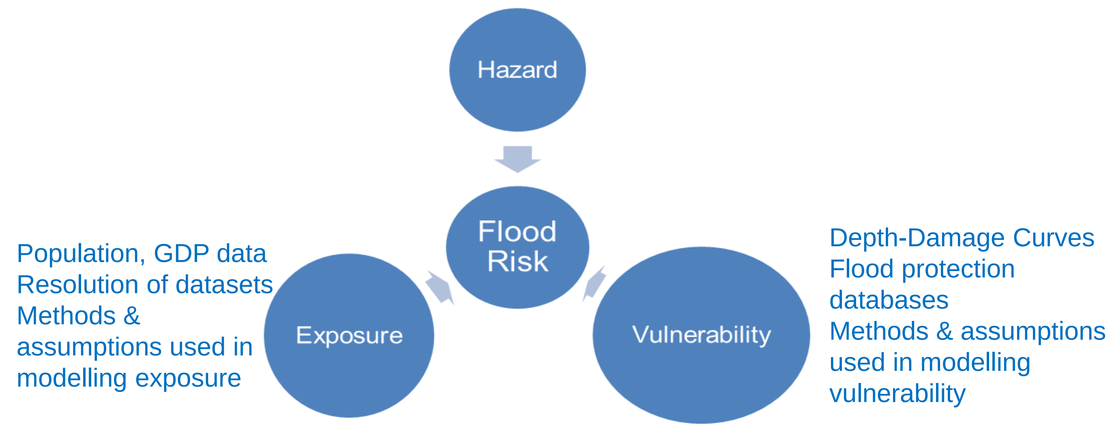
Contact details & Acknowledgements

*Corresponding author:
Georgios Sarailidis
PhD Researcher
University of Bristol
g.sarailidis@bristol.ac.uk

Acknowledgements:
This work is funded by the EPSRC as part of the Centre for Doctoral Training in Water Informatics: Science and Engineering (WISE)

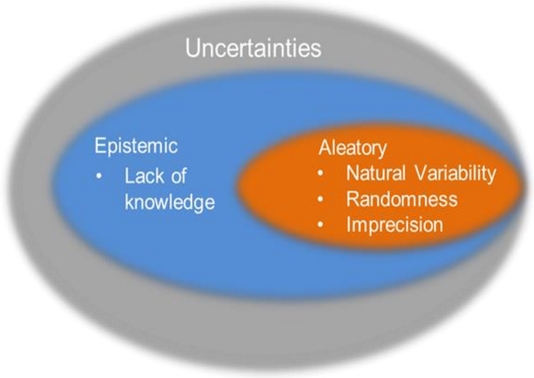
Sources of Uncertainty in Global Flood Risk Models

Any risk assessment involves a modelling cascade, each element of which involves uncertainties, with the potential for the uncertainty in risk to grow, within each component in the cascade (Beven & Lamb, 2018).



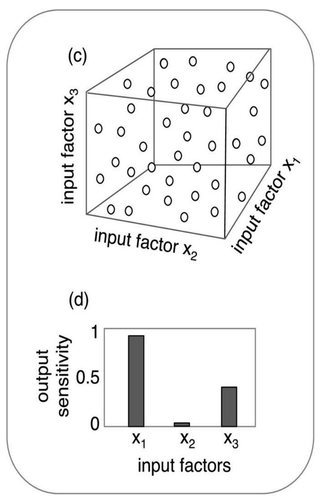
Methods

A first step for our analysis is to understand and decide how we will characterize, represent, treat the various uncertainties in our modelling cascade (Beven et al., 2018a,b).



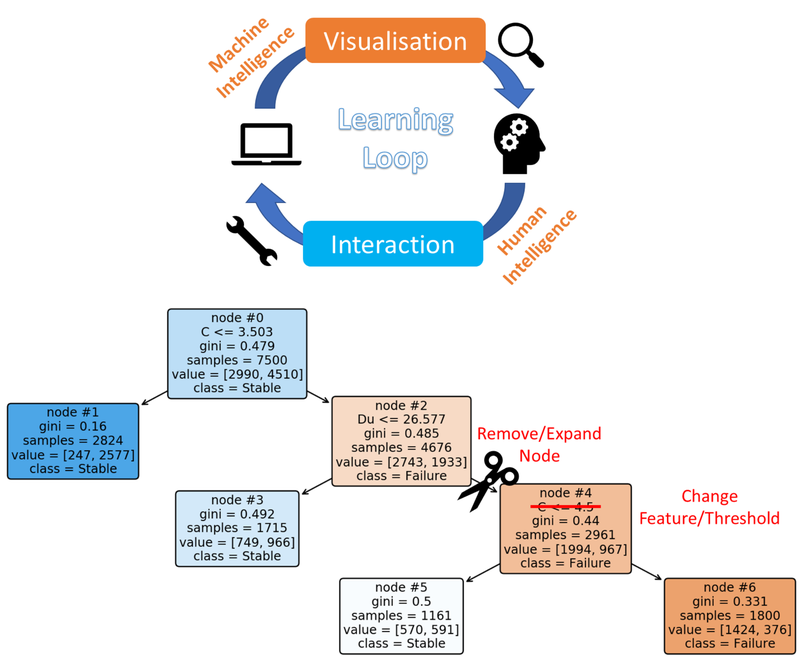
Then, once the model's uncertain inputs are characterized we aim at investigating their sensitivity on the model outputs by adopting different methods:

1) Variance Based Sensitivity Analysis (Safe toolbox: https://www.safetoolbox.info/)



Source: Wagener & Pianosi, (2019) ESR

2) Interactive Classification and Regression Trees (CART)



References

Beven & Lamb (2018) Geological Society, https://doi.org/10.1144/SP408.3.
Beven et al. (2018a) Natural Hazards and Earth System Sciences, https://doi.org/10.5194/nhess-18-2741-2018.
Beven et al. (2018b) Natural Hazards and Earth System Sciences, https://doi.org/10.5194/nhess-18-2769-2018.
Koks et al. (2019) Environmental Research Letters, https://doi.org/10.1088/1748-9326/ab3306
Sampson et al. (2015) Water Resources Research, https://doi.org/10.1002/2015WR016954.
Tanoue et al. (2016) Scientific Reports, https://doi.org/10.1038/srep36021.
Wagener & Pianosi (2019) Earth Science Reviews, https://doi.org/10.1016/j.earscirev.2019.04.006

UNIVERSITY OF EXETER
UNIVERSITY OF BATH
University of BRISTOL
CARDIFF UNIVERSITY
PRIFYSGOL CAERDYDD

www.wisecdt.org.uk