

Reduction of scenario uncertainties through climate models (REDUKLIM)

Project overview



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1. URS Workshop – Day 1
Hannover



Structure

1. Research questions and aims

2. Climate triggers and impacts

3. Uncertainties

4. Summary

Research questions - REDUKLIM



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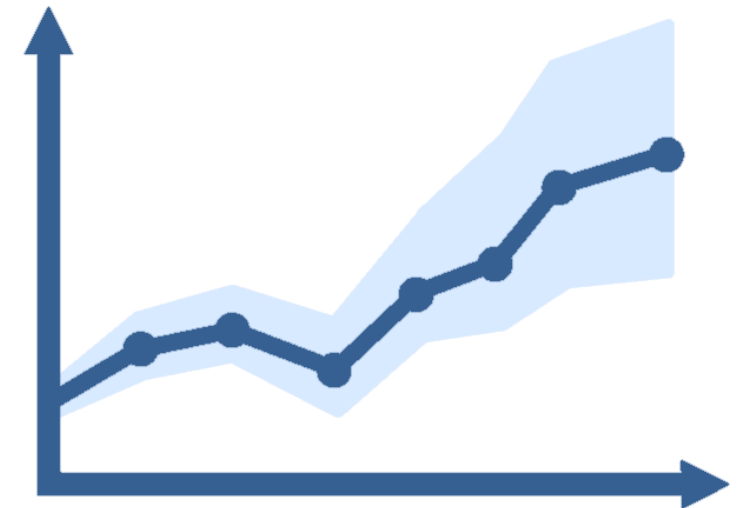


- In how far future glaciations are predictable?
- What are the climatic changes in dependence of anthropogenic CO₂?
 - Change of the glacial cycles and duration?
 - How far the ice-sheet extend can be in future?
- Which climate triggers and impacts are existing?
- How can climate scenarios can be transformed into stylised conditions?
- Which parameters have the biggest influence for the groundwater modelling results?
- How is the influence of uncertainties regarding the safe confinement of radionuclides?

Aims

How can **future climate developments** be taken into account in the context of **long-term safety** and which **uncertainties** do these developments have?

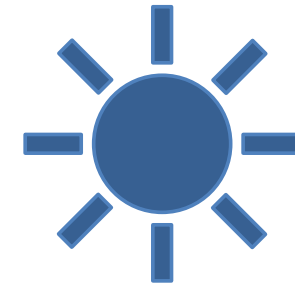
- Assessment period of one million years (EndSiAnfV § 3)
- Consideration of the geological and climatic situation
 - Developing a better understanding of potential future climate developments
 - Linking of climate modelling and groundwater processes for the safety assessment
- Consideration of uncertainties in the context of the site selection
- Create additional confidence in the site selection



Triggers for climate changes

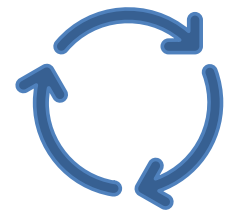
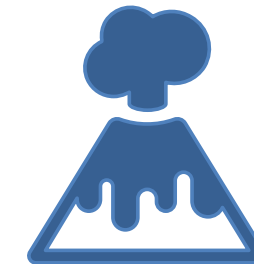
Extra terrestrial factors

- Earth orbit parameters (Milankovic-cycles)
- Solar radiation
- Meteorite impact



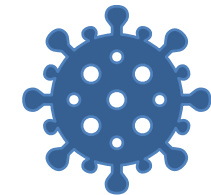
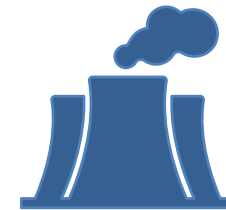
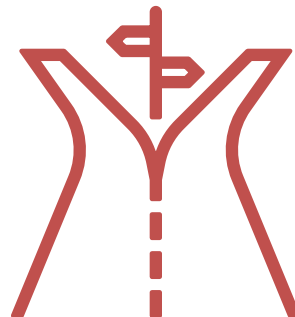
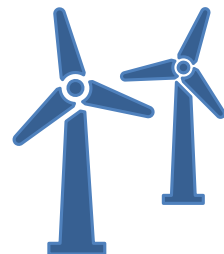
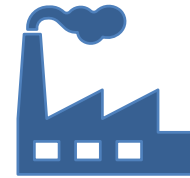
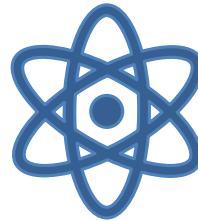
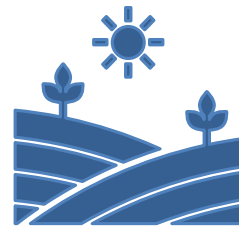
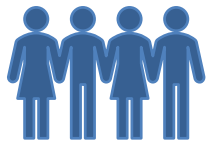
Terrestrial factors

- Plate tectonics
- Vulcanism
- (Material-) Cycles ...



Triggers for climate changes

- ... (Material-) Cycles
- Anthropogenic impacts



Possible impacts of climate changes



Temperature



Glaciation



Pressure
conditions



Isostatic
Adjustment



Permafrost



Chemical reactions



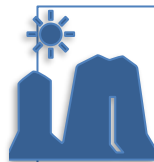
Erosion / Subrosion



Sea level changes



Groundwater
conditions



Glacial valley
formation

Uncertainties in the preliminary safety analyses

Endlagersicherheitsuntersuchungsverordnung (EndlSiUntV) § 11

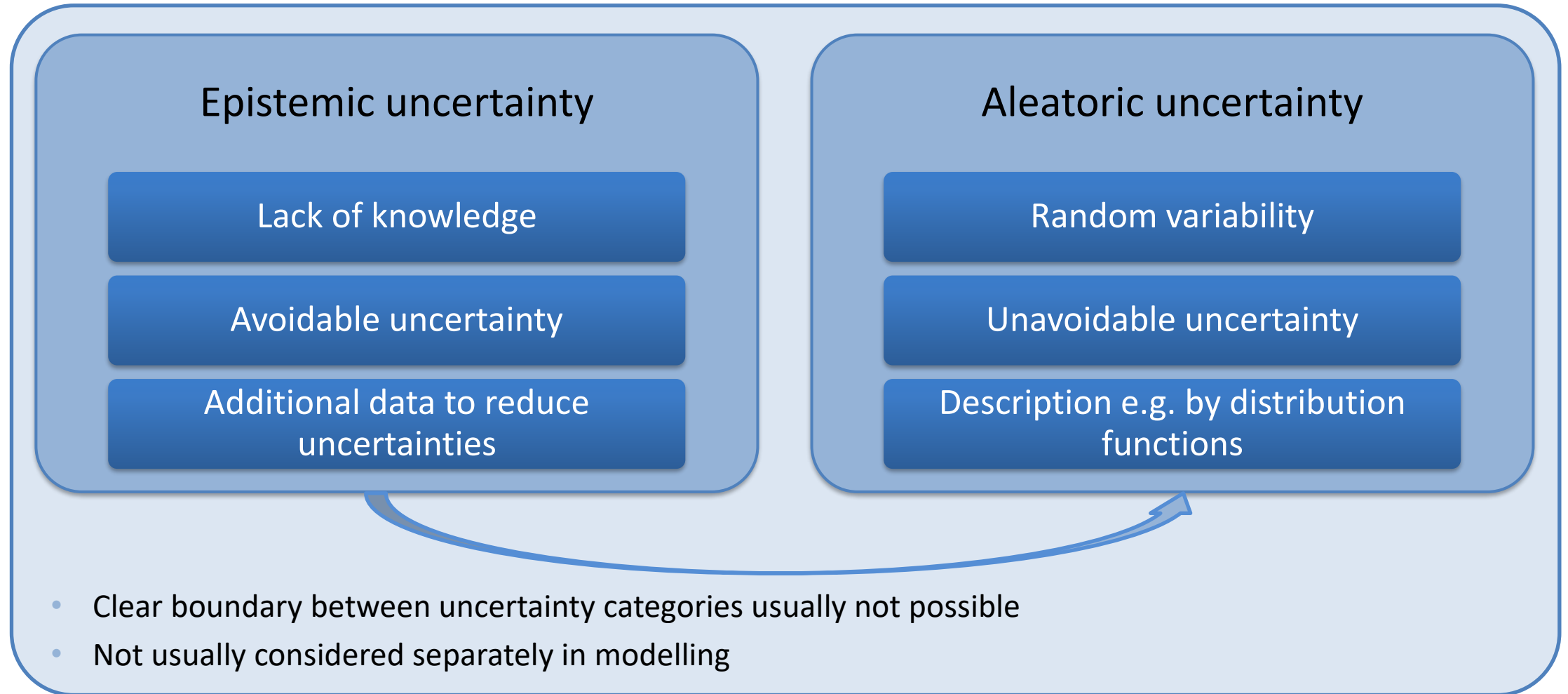
Systematic identification and characterisation of uncertainties

Documentation of the handling of uncertainties and their effects

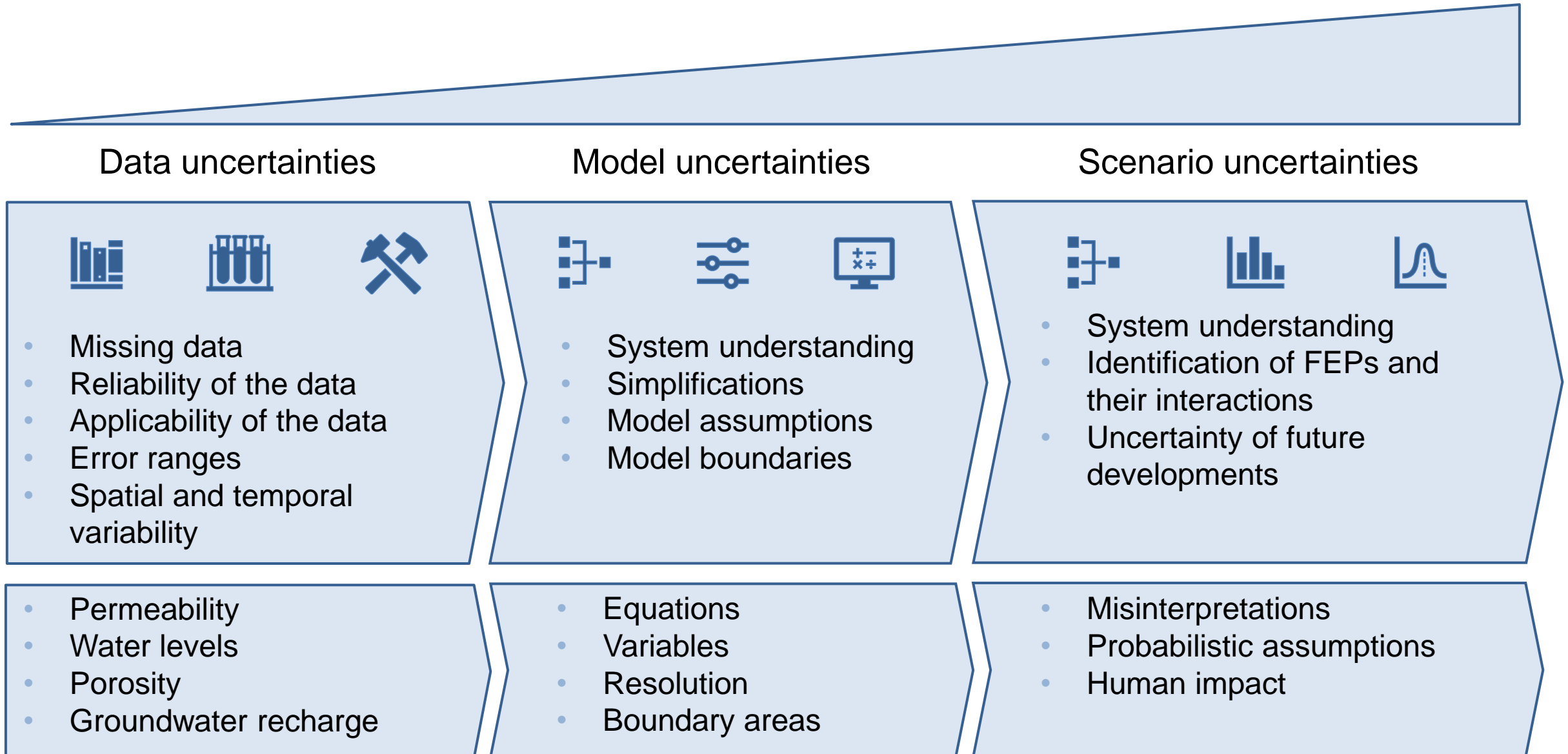
Possibilities for reducing uncertainties by additional actions



Types of uncertainties



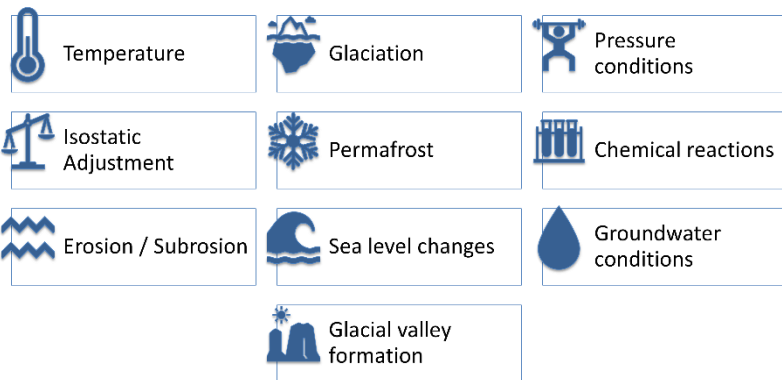
Accumulation of uncertainties



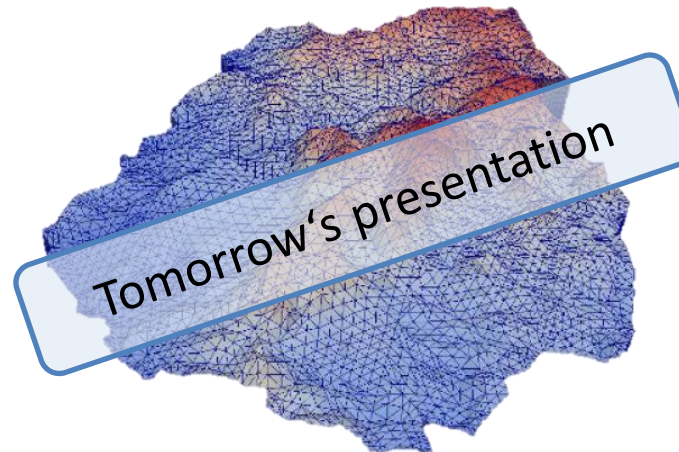
Summary

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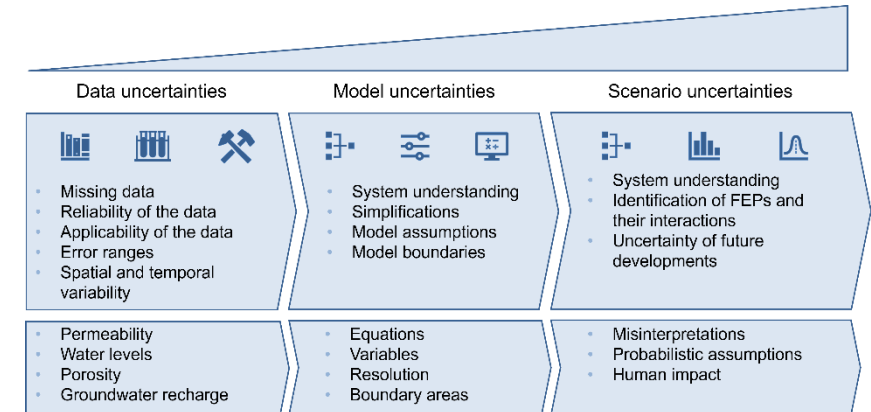
Identify impacts of climate changes



Derive stylised states and run simulations



Quantify uncertainties





Thank you for your attention!

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