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# Hydro-JULES

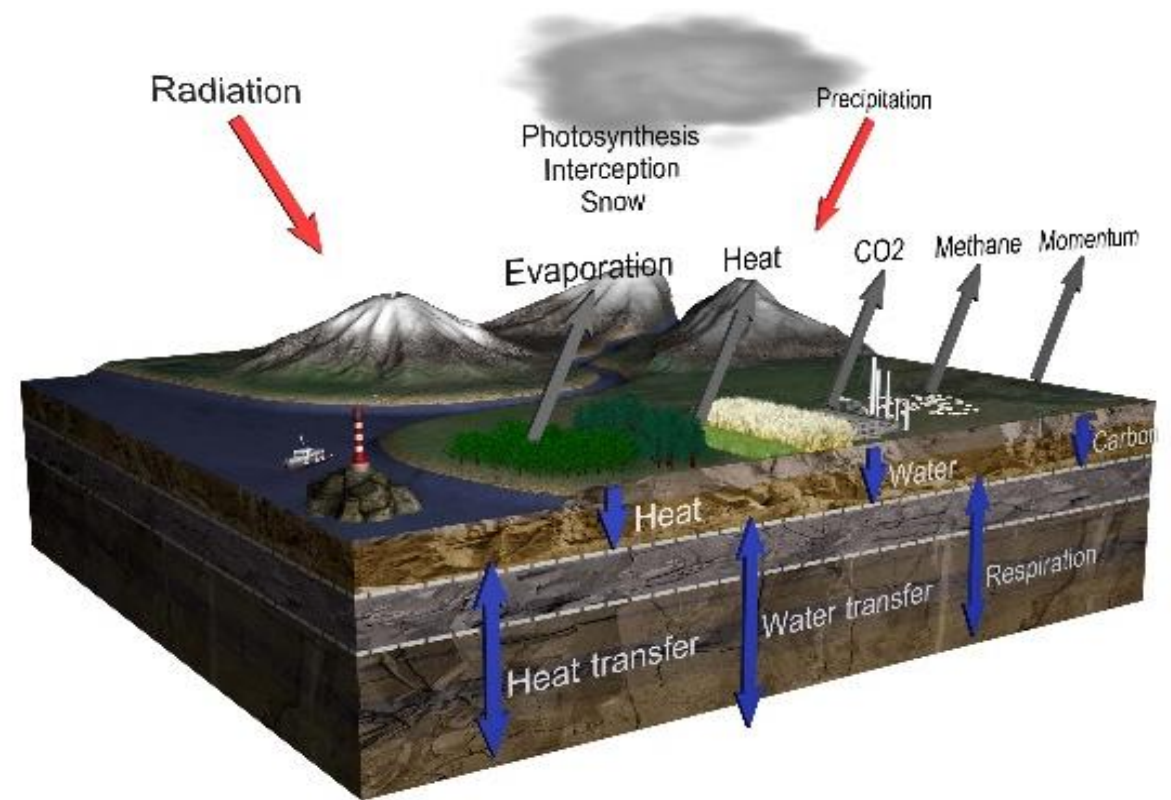
Next generation land-surface and  
hydrological predictions

Simon Dadson  
Centre for Ecology and Hydrology

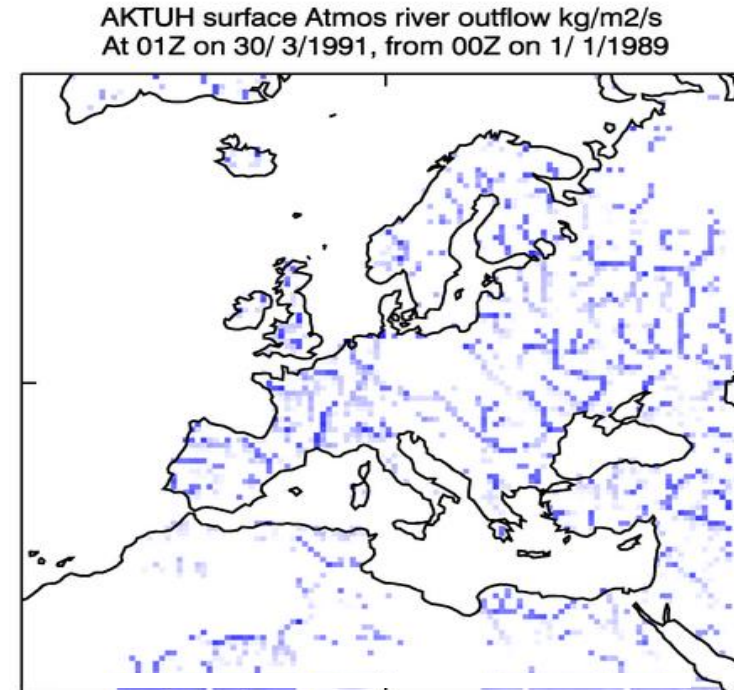
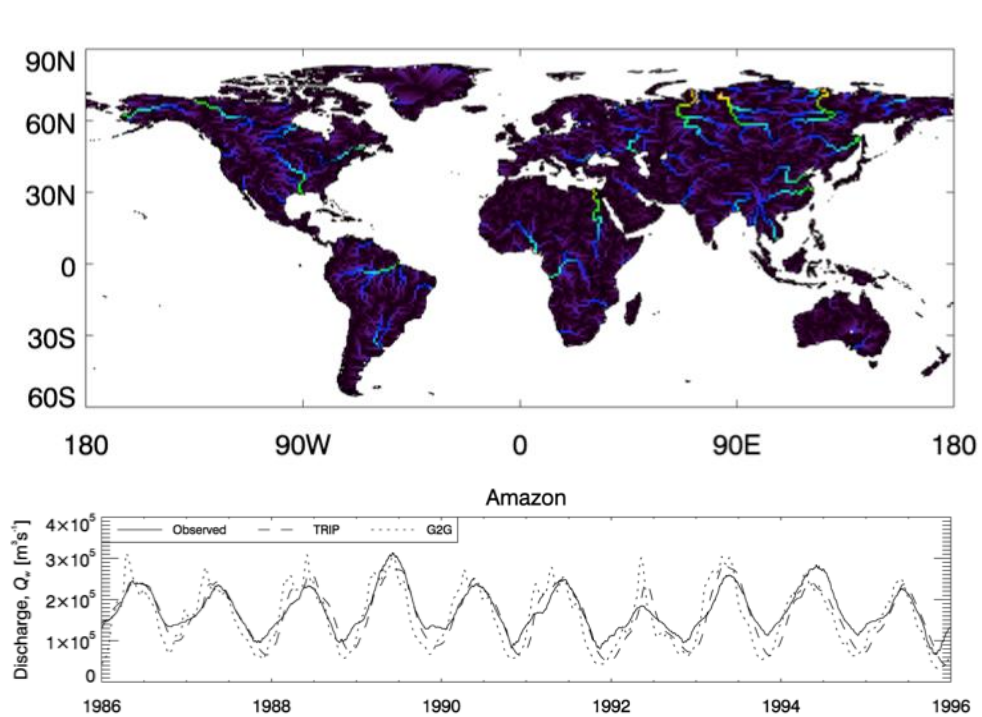


## Hydro-JULES: NERC LTS-M NC Programme

- Aim: To produce a fully integrated, open source coupled model of the terrestrial water cycle linked to the Joint UK Land Environment Simulator (JULES)
- Deliver a major advance in land-surface and hydrological science
- CEH-led 5 yr LTS-M programme to CEH, BGS and NCAS



# Hydro-JULES



Dadson, S. J. et al., 2011, *J. Hydrology*.

- Land surface models underpin results in climate change and Earth system science
- Hydrological models are needed to make reliable predictions
- Converging on commensurable scales ( $0.5^\circ$  Global; 1 km National)

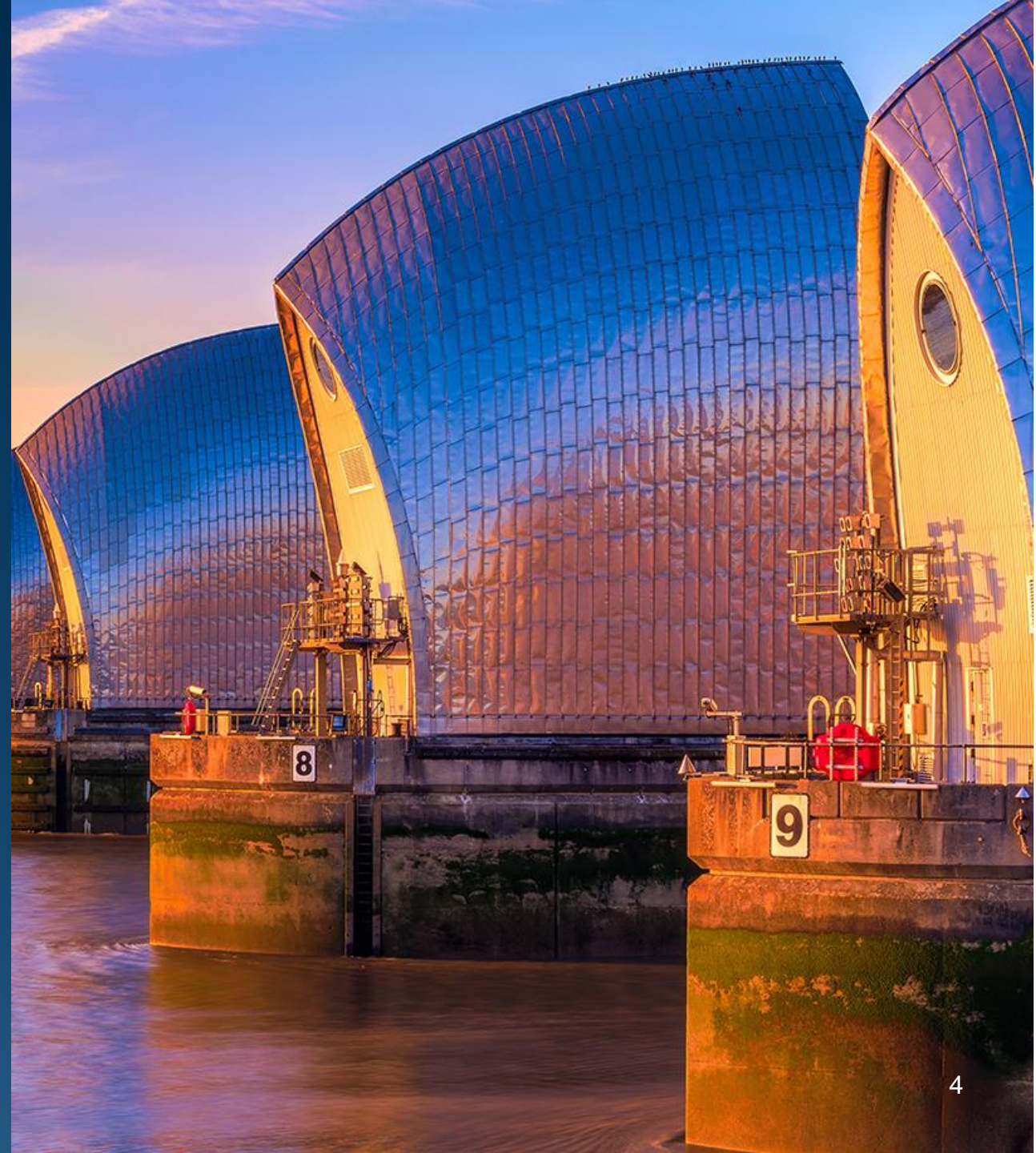


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## Key Science Questions I

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- Responses to current and future climate variability
- Effects of high-intensity convective precipitation
- Response to land use change & management





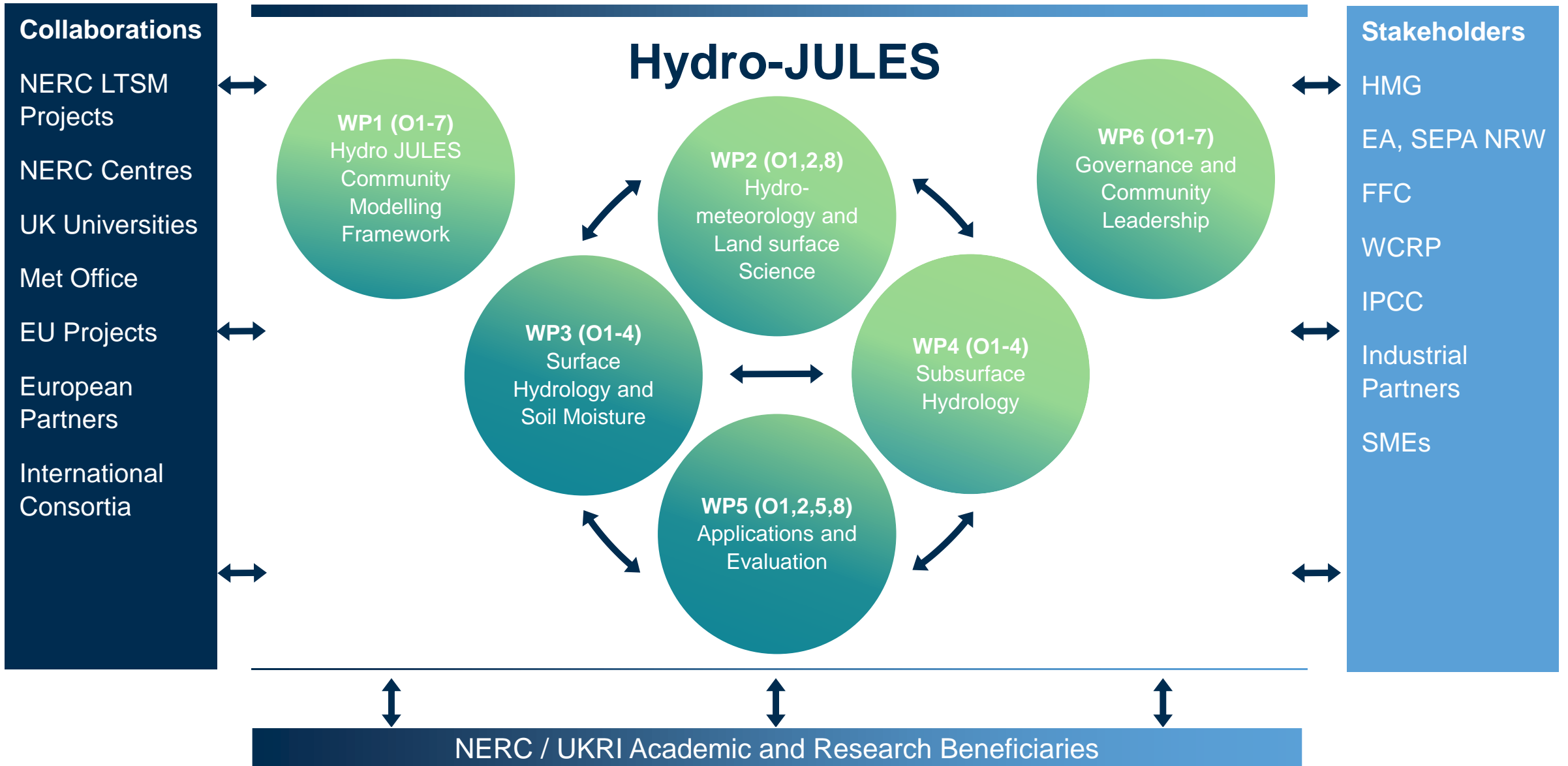
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## Key Science Questions II

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- Changing biogeochemistry and nutrient cycles
- Data assimilation to improve predictions
- Uncertainty and sensitivity in the process chain





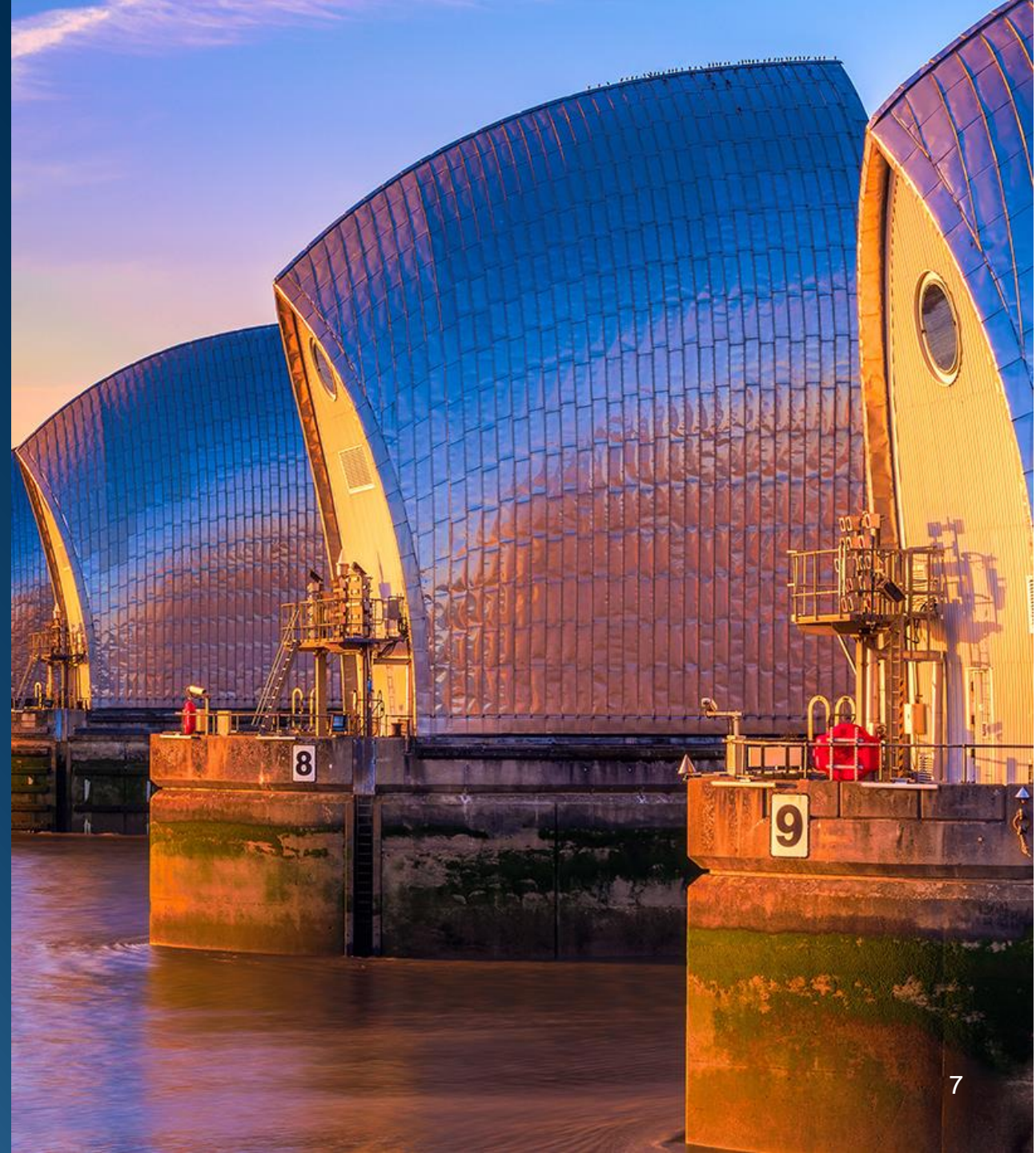


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## Key Science Questions I

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- Responses to current and future climate variability
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## State of the art process representation

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- Groundwater (lateral, heterogeneous)
  - Soil hydraulics (macropore flow, spatial properties)
  - Evaporation (soil, vegetation, canopy)
  - Inundation (fluvial, groundwater)
  - Anthropogenic influences (dams, abstractions, irrigation)
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- Uncertainties in process chain
  - Interoperable components
  - Data assimilation from novel sources



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## Partnerships, engagement, sustainability

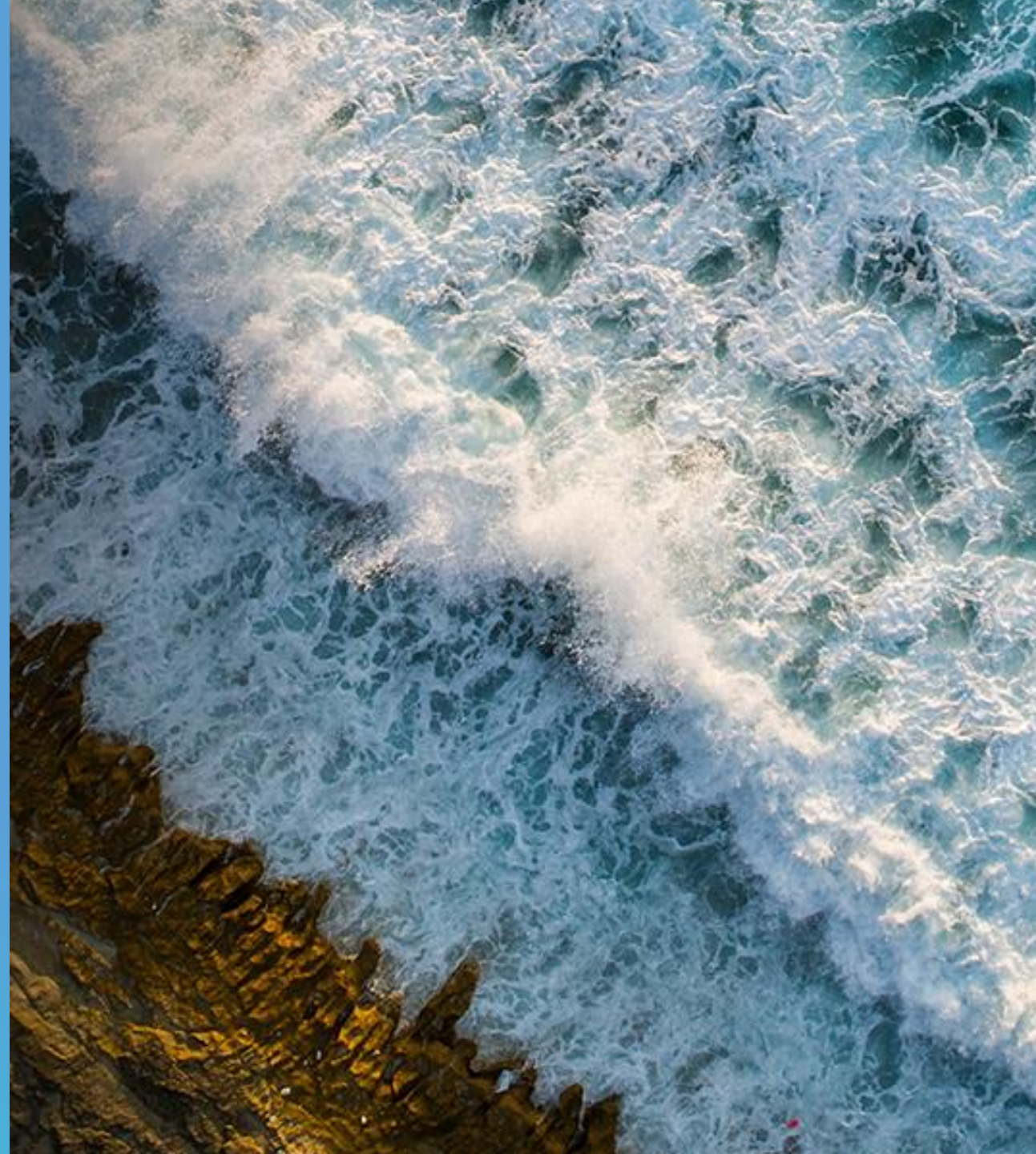
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### Community building

- Outreach
- HEIs, government, private

### Additional Funding

- Highlight topics
- Strategic programmes
- Joint funding calls
- Capital investment



### **Summer Student Programme**

- paid internships for current graduate students
- applications open March 2020

### **Visiting Scientist Programme**

- collaborative proposals from post-PhD scientists
- cover travel and subsistence for 1-3 months

### **Annual Science Conference**

- “Next Generation Land-surface and Hydrological Predictions”
- 11<sup>th</sup> September 2019, Royal Society, London



# Q&A

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