



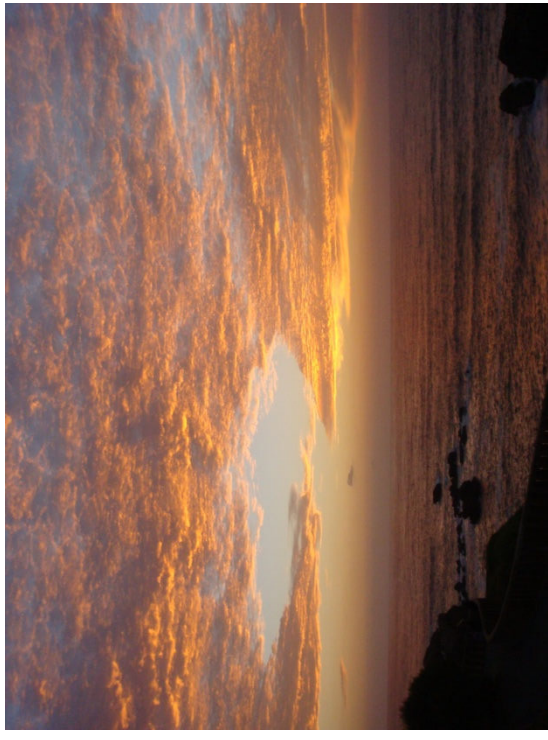
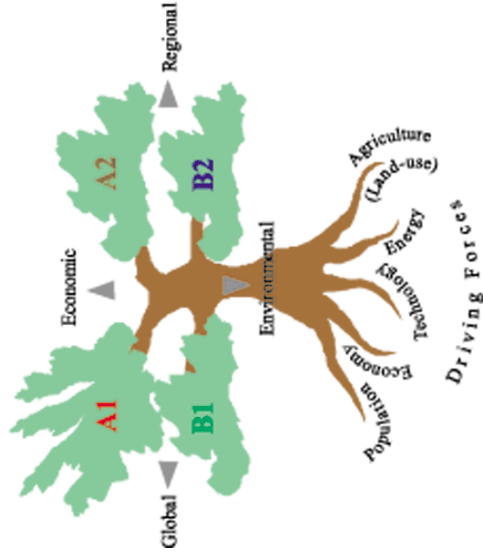
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Climate Change Scenarios and socio-economic implications

*Richard Harding,
CEH, United Kingdom*

SRES Scenarios



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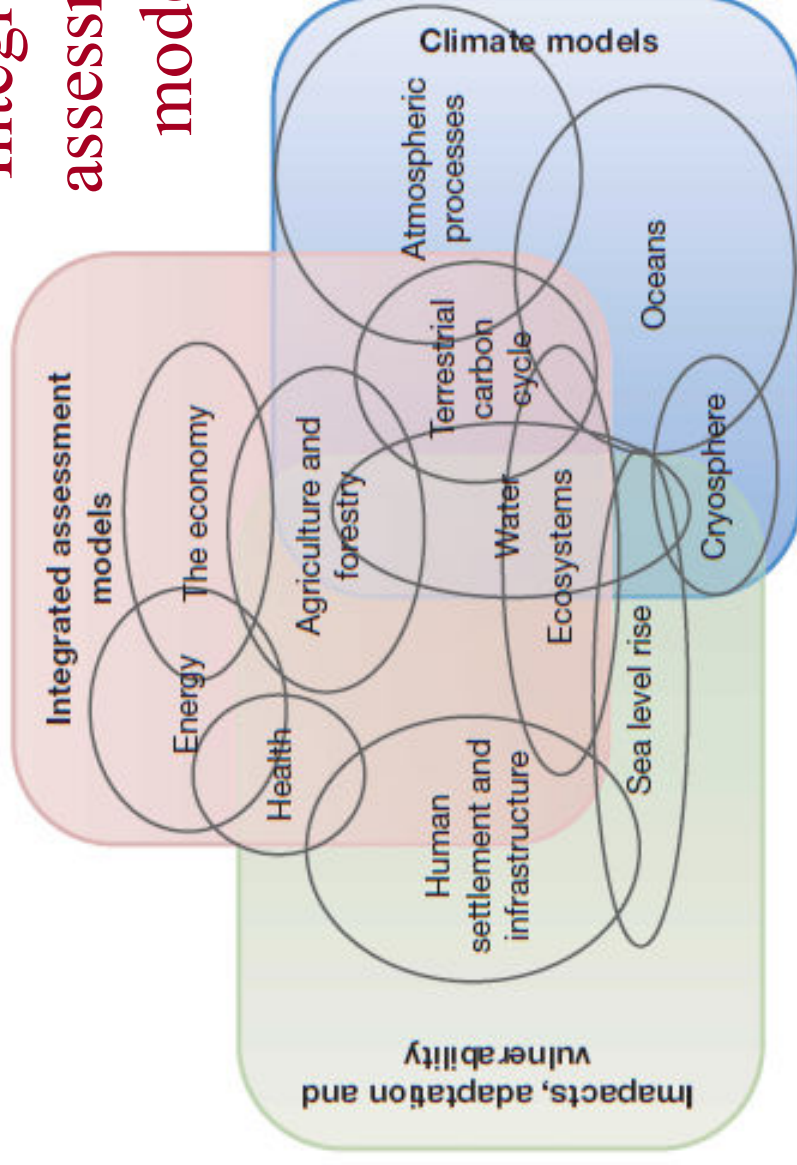


Models for Scenario Analysis

Integrated assessment models

Impacts models

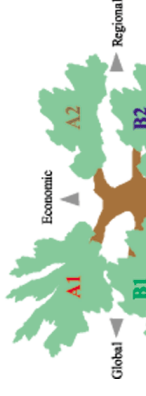
Climate models



Moss et al 2010







The A2 storyline and scenario family describes a very heterogeneous world. The underlying theme is self-reliance and preservation of local identities.

B1

B2

The B2 storyline and scenario family describes a world in which the emphasis is on local solutions to economic, social, and environmental sustainability.



The SPRES Socio-economic Scenarios

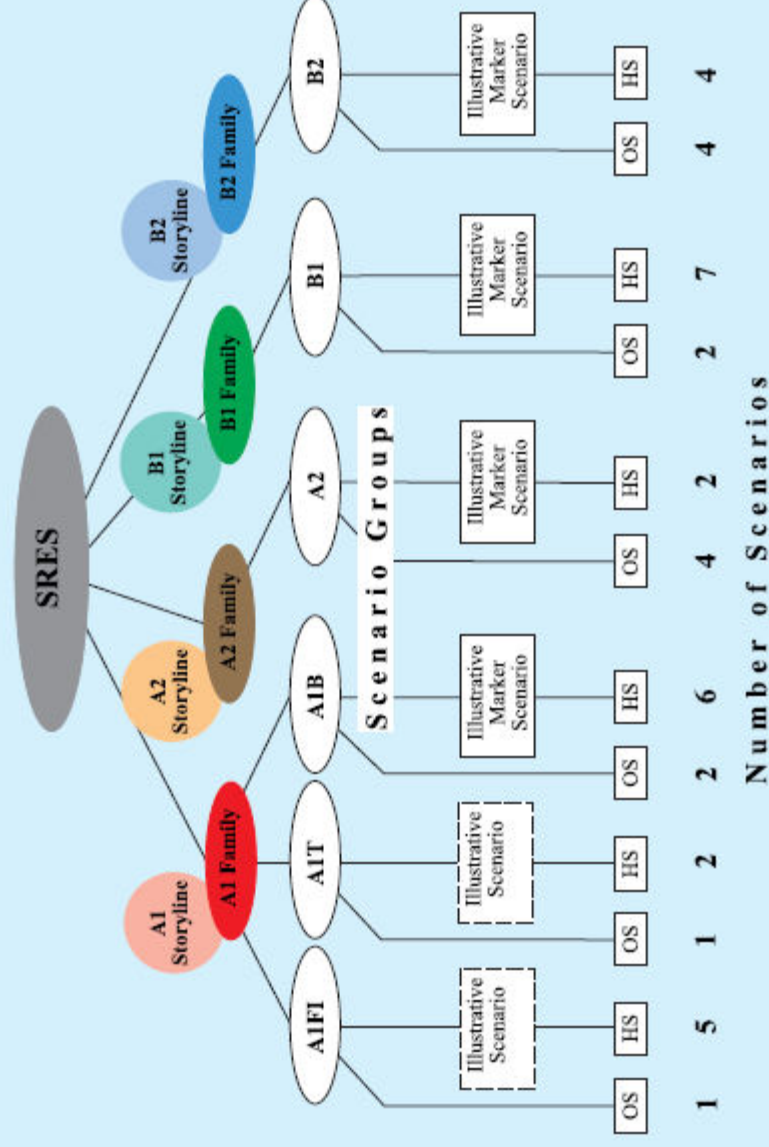




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The main characteristics of the four SRES storylines and scenario families



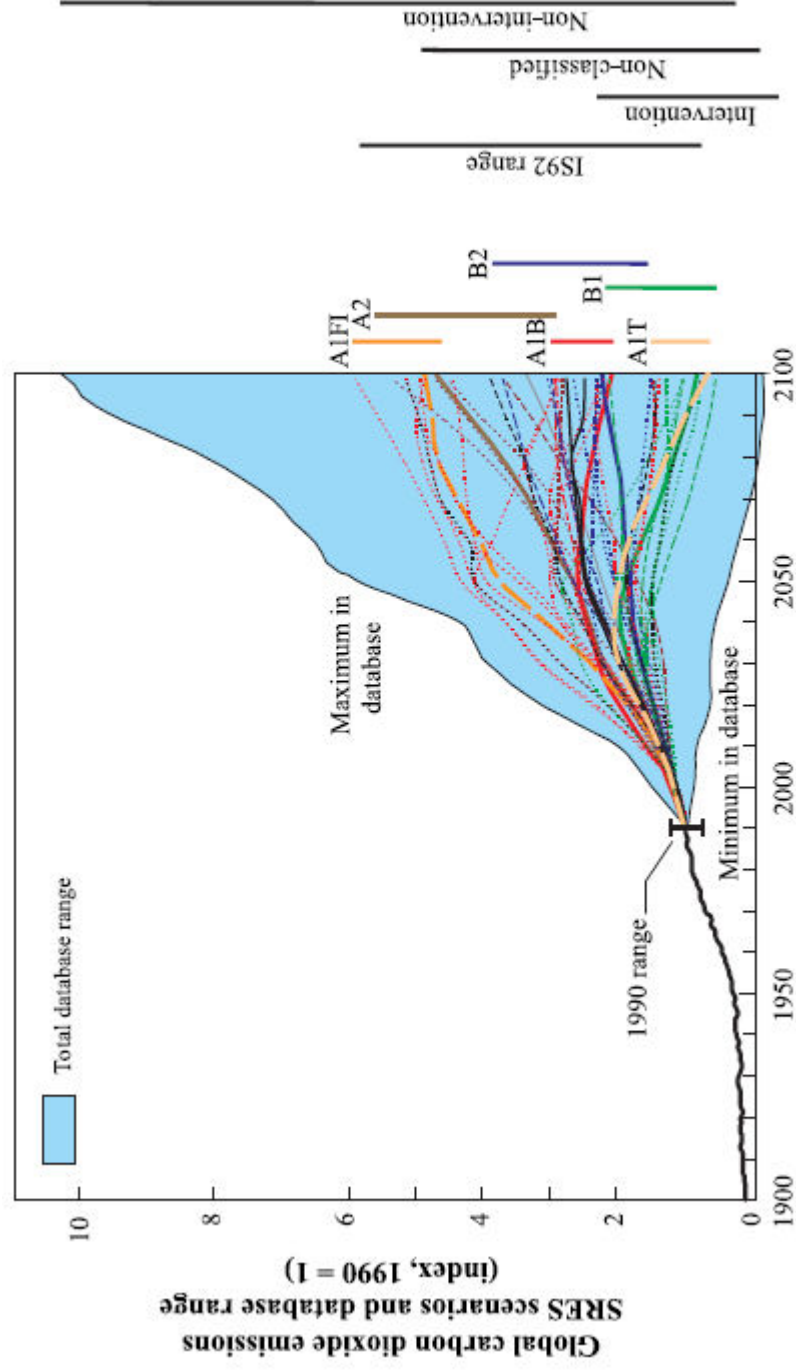
39 ... scenarios





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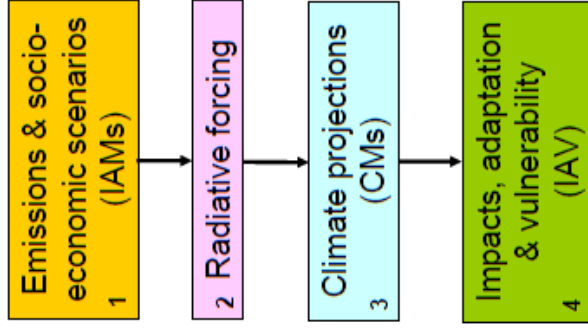


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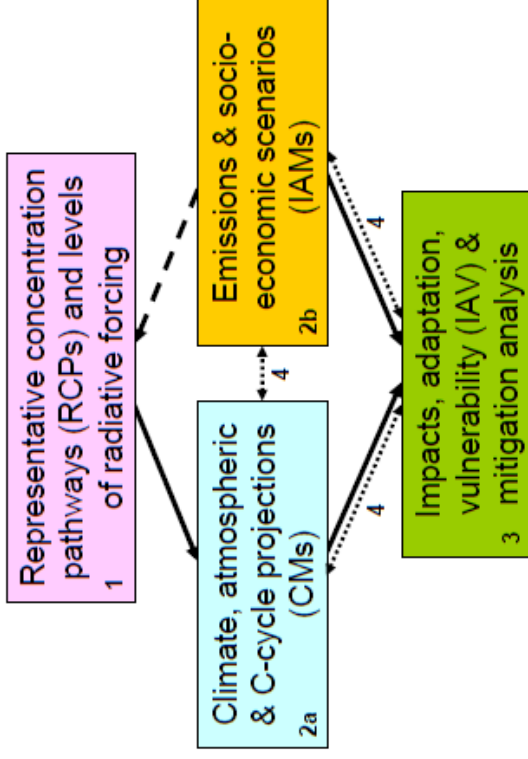
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New parallel approach for AR5

(a) Sequential approach



(b) Parallel approach



Reduce time between scenario generation and impact modelling

More flexible system

Better use of climate model time

More comparability between Climate models

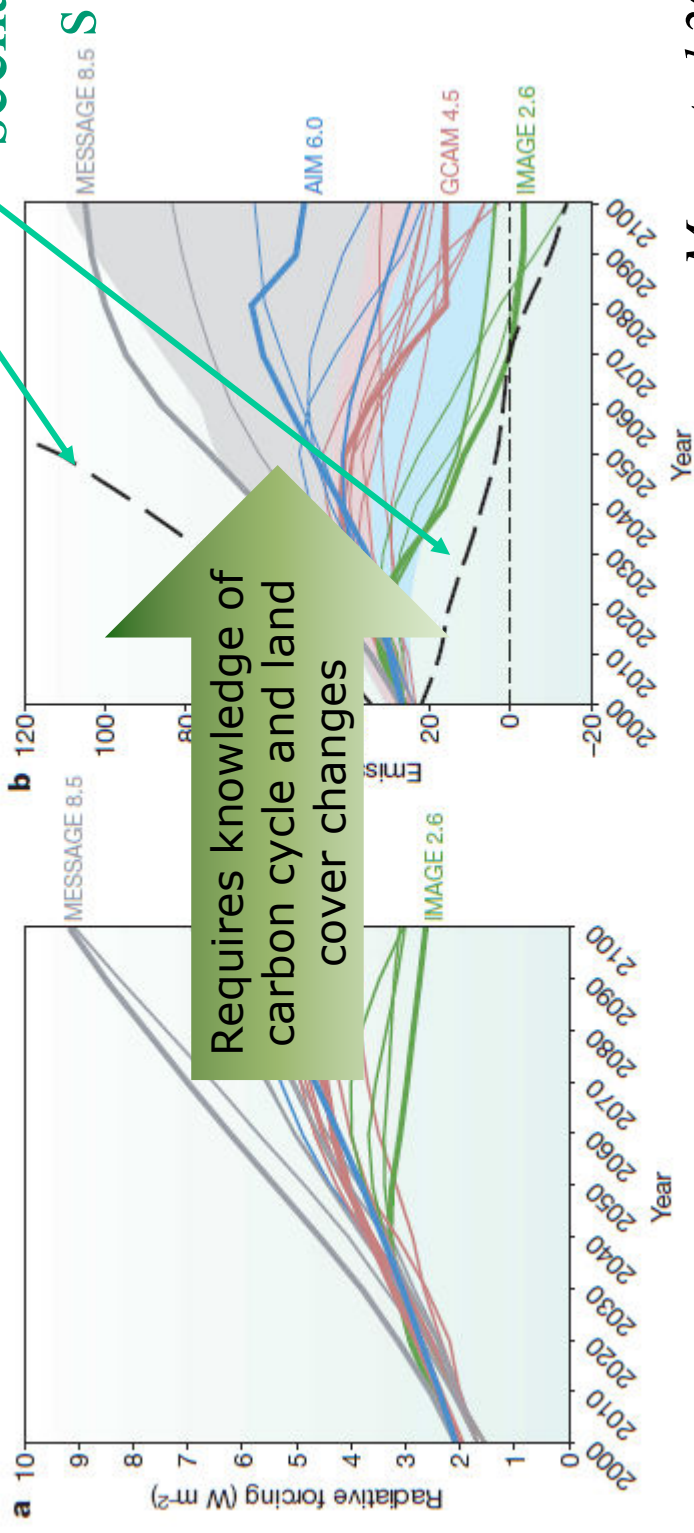


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Representative Concentration Pathways

Range of
SRES
scenario



Moss et al 2010

- Changes in radiative forcing relative to pre-industrial condition
- Energy and industry CO₂ emissions for the RCP candidates.

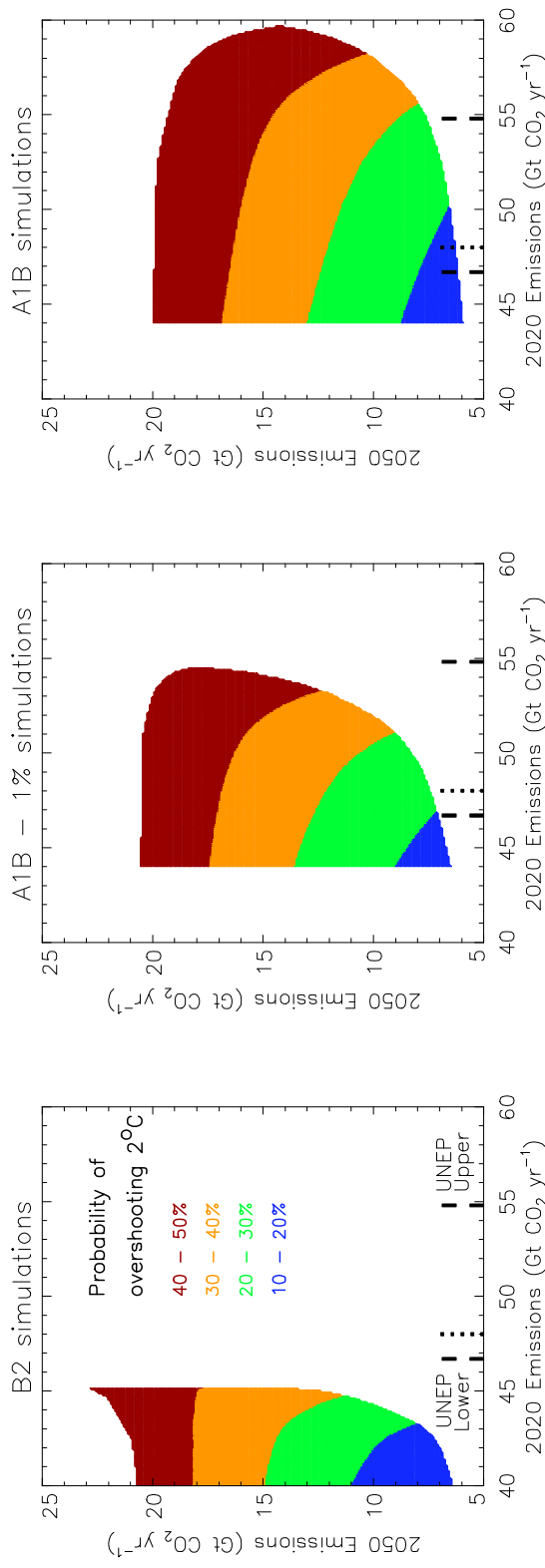




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What 2020 and 2050 emissions ensure we stay below 2°C global warming with 50% or more probability?



- Colour regions above give possible solutions. “White Space” means not possible.
- Strong dependence on current emissions pathway (hence current uncertainty needs to be reduced).



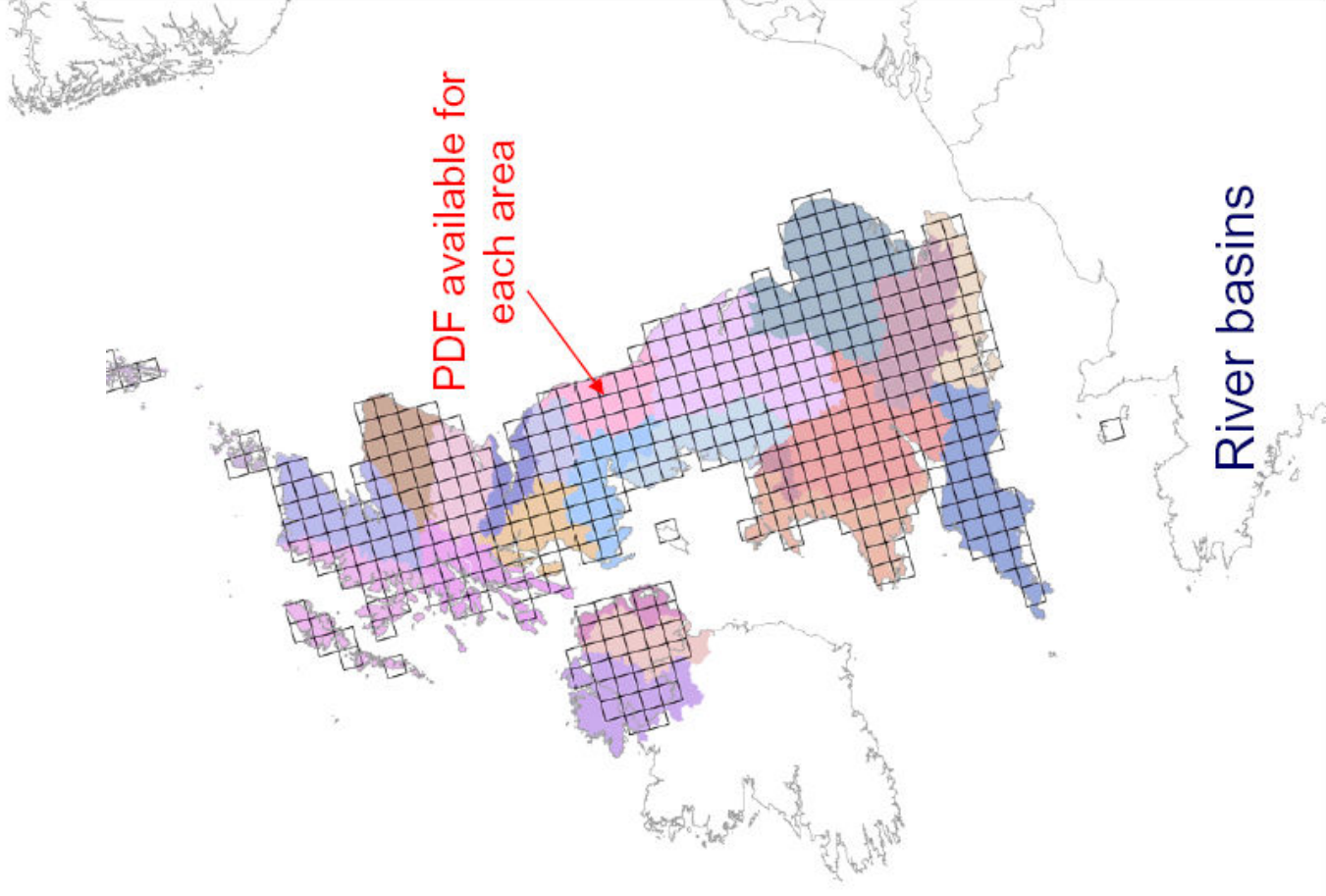
Chris Huntingford (CEH), Jason Lowe (AVOID - Lead) and others

UKCP09

offers:

1.an increased level
of detail

2.Estimates of
uncertainty



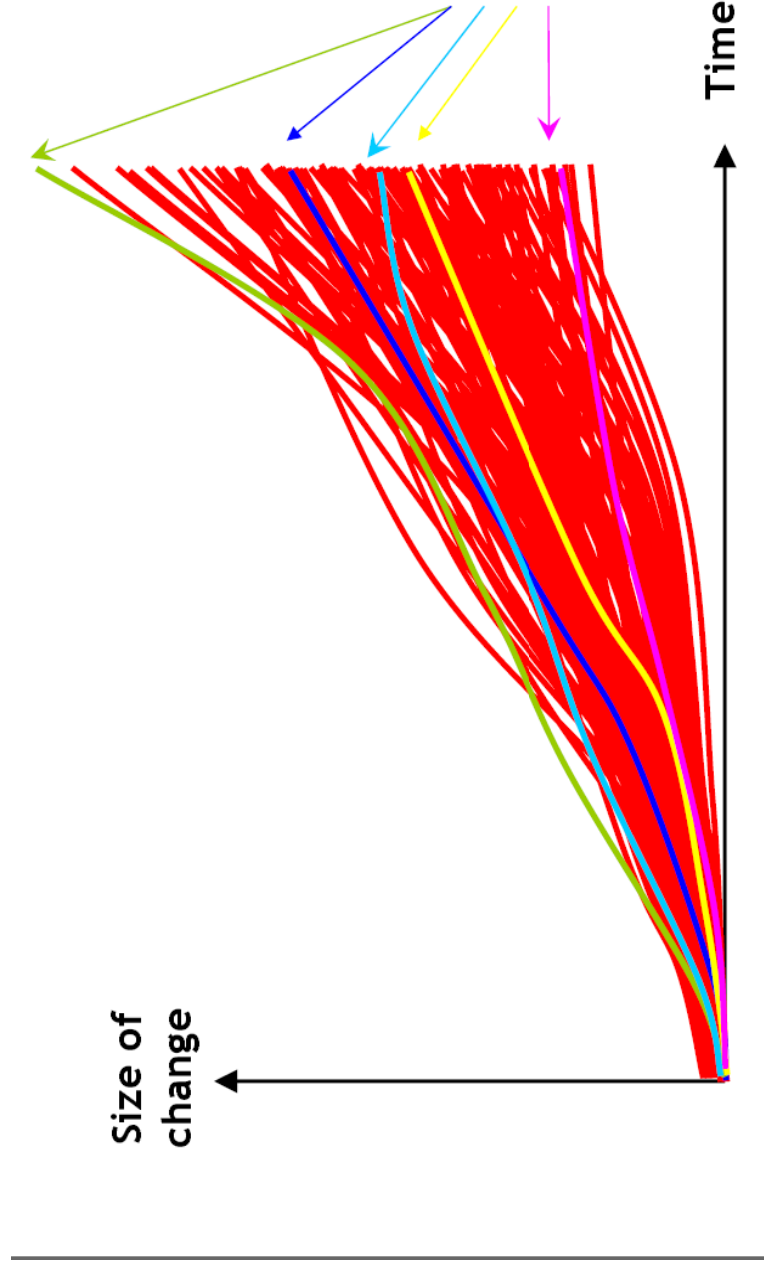


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Regional Model Climate Scenarios UKCP09 – capturing modelling uncertainty

- 31 parameter values
- ~300 versions of the Met Office Hadley Centre climate model
- Single results from other IPCC climate models





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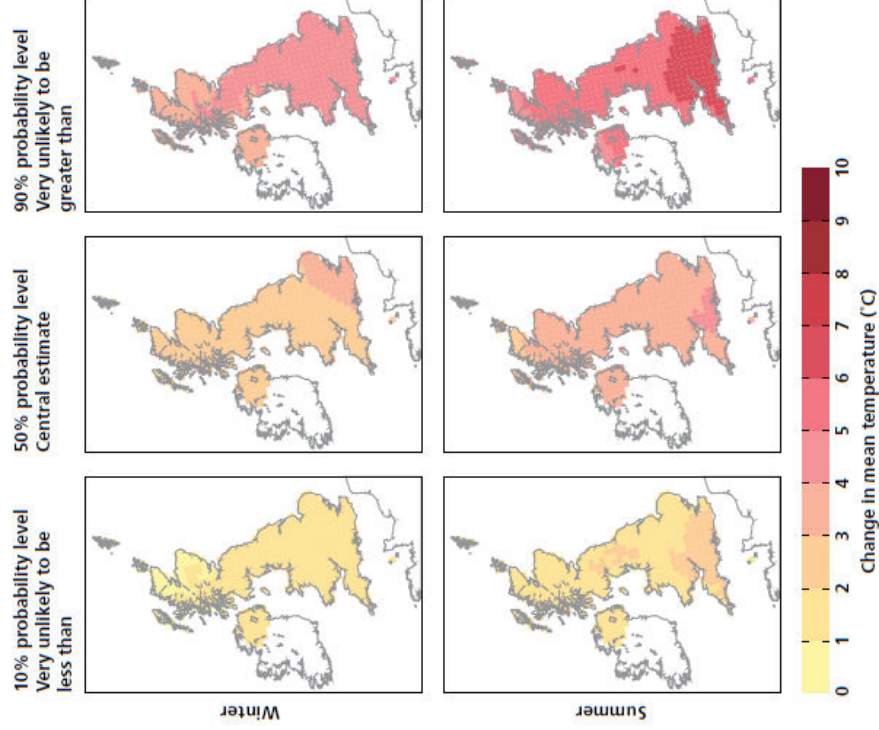
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Regional Model Climate

Scenarios

UKCP09 – capturing modelling uncertainty

Figure 9: 10, 50 and 90% probability levels of changes to the average daily mean temperature ($^{\circ}\text{C}$) of the winter (upper) and summer (lower) by the 2080s, under the Medium emissions scenario.



European Water Use Scenarios

Drivers of water use that might influence future water availability and quality and sectoral water demand within Europe, and so inform the scenario development process include:

- Population and migration
- Economic growth
- Agricultural development
- Technological developments
- Climate change
- Land use change
- National and European policies and legislation

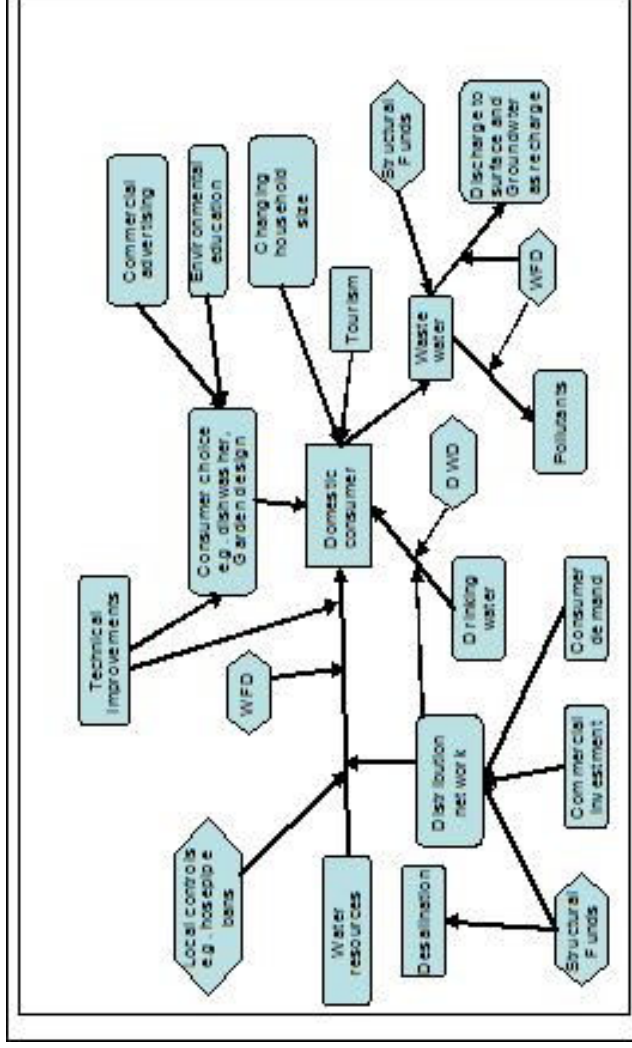




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SCENES: Water Scenarios for Europe and for Neighbouring States



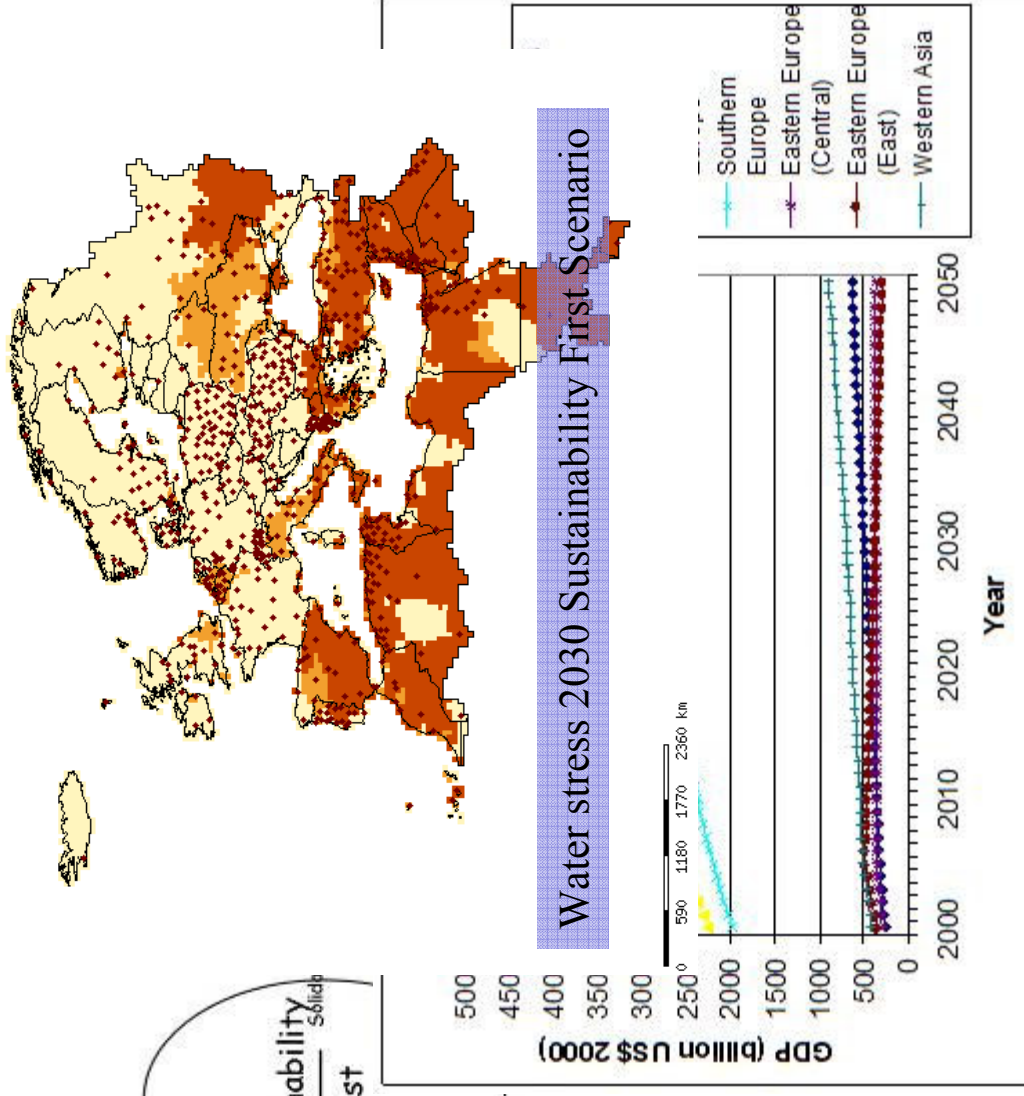
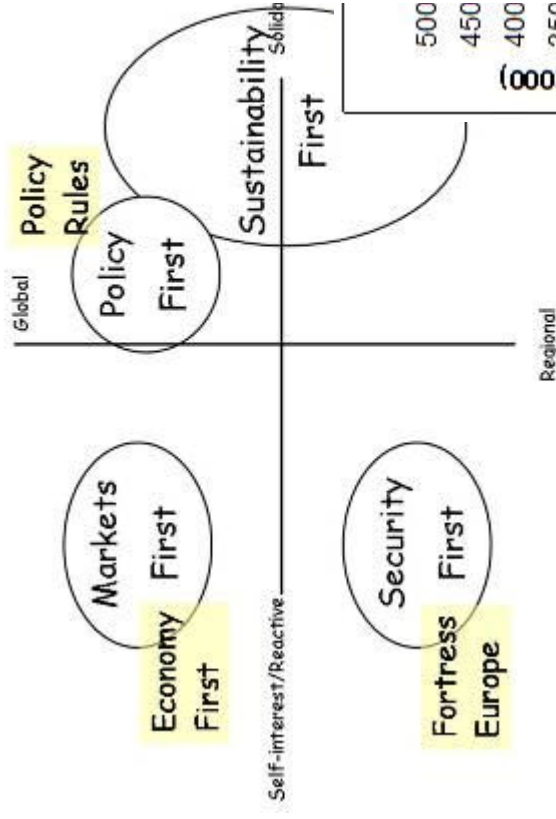
Conceptual policy map for domestic water use

Policy drivers in SCENES

- Water Framework Directive
- Floods Directive & other
- Water Quantity Directives
- Water Quality Directives
- CAP reform & other agricultural policies
- Biodiversity policies



The first-order drafts of storylines of the future outlook of pan-Europe until 2050



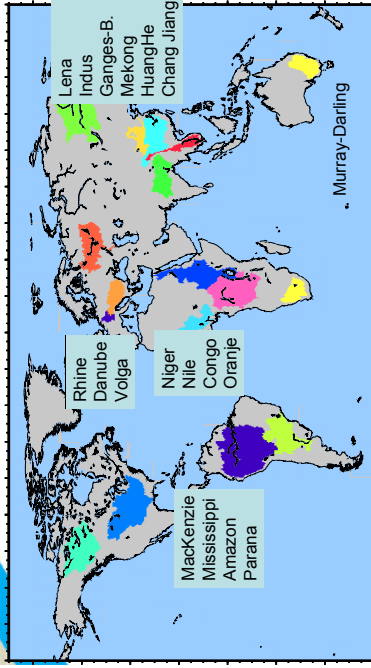
<http://www.1stcellmedia.de/customer/uni/cms/>



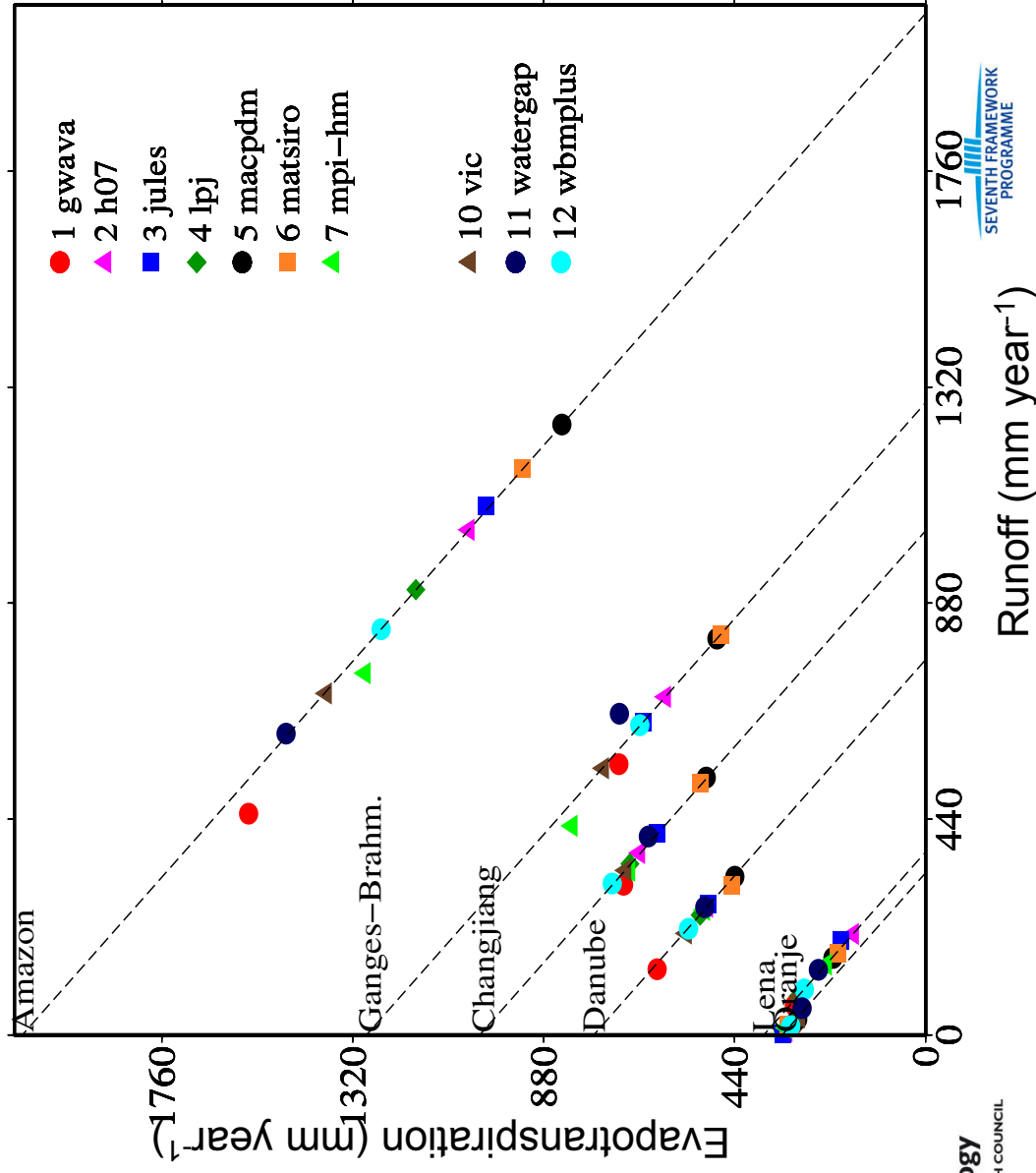


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WaterMIP: mean annual water fluxes



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Concluding remarks

- We need a better dialogue between impacts, adaptation and modelling communities
- Quicker throughput of climate model output to impacts communities
- More use of probabilistic forecasts – including chains of uncertainty
- Better mechanisms to provide policy relevant advice



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Global Extremes Analysis

20th c

ERA40

CRU

21st c

Climate
model output

WATCH forcing
data, 1958-2001

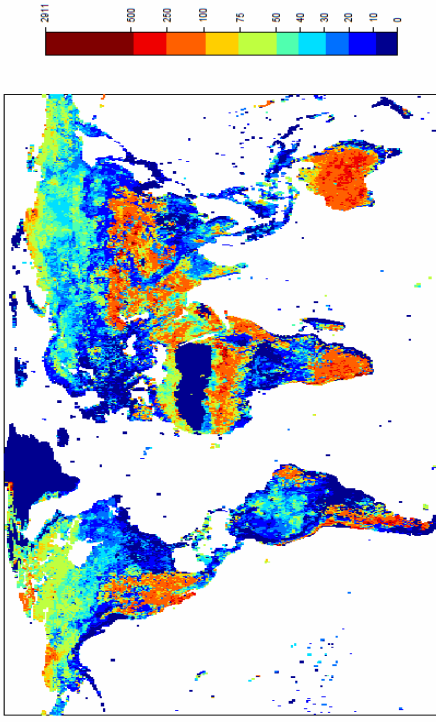
Bias
correction

Multi-model
runoff series
(daily)

Drought and
flood analysis

Runoff Drought:

Mean drought duration per cell (1963-2001)



MPI-HM

Van Huijgevoort *et al.* (ongoing)

