

Climate Science to Inform Climate Choices



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Taking the planet into uncharted territory

- Impacts of climate change will be felt most profoundly through hazardous weather and climate extremes
- Can we provide society with a 'road map' indicating what climate variations and changes may be expected to occur, where, and with what implications?
- How can we make society more resilient and better prepared for hazardous weather and climate extremes arising from climate variability and change?



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PARIS2015
UN CLIMATE CHANGE CONFERENCE
COP21·CMP11

- Over 190 countries signed up to reduce emissions, with the target to stay within a 2°C world.



UN World Conference on
Disaster Risk Reduction
2015 Sendai Japan

- 15-year agreement for the substantial reduction of disaster risk and losses in lives, livelihoods and health.

SUSTAINABLE DEVELOPMENT GOALS



- 2030 agenda with 17 goals to end poverty and hunger, improve health and education, making cities more sustainable, combating climate change, and protecting oceans and forests.

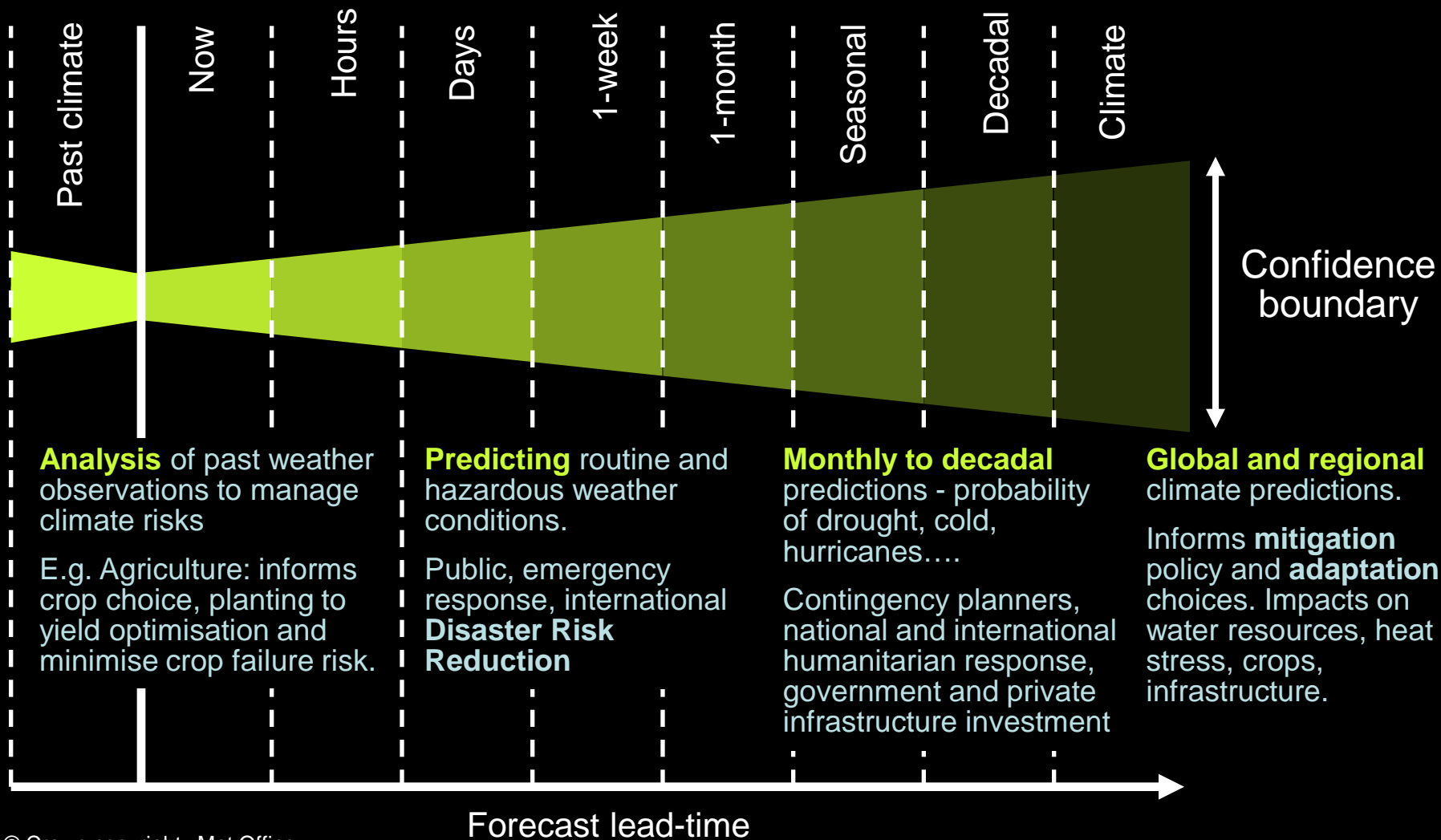
**Understanding and Quantifying Climate Risk is
at the Core of these Actions**



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Mitigating weather and climate risk: Forewarned is forearmed

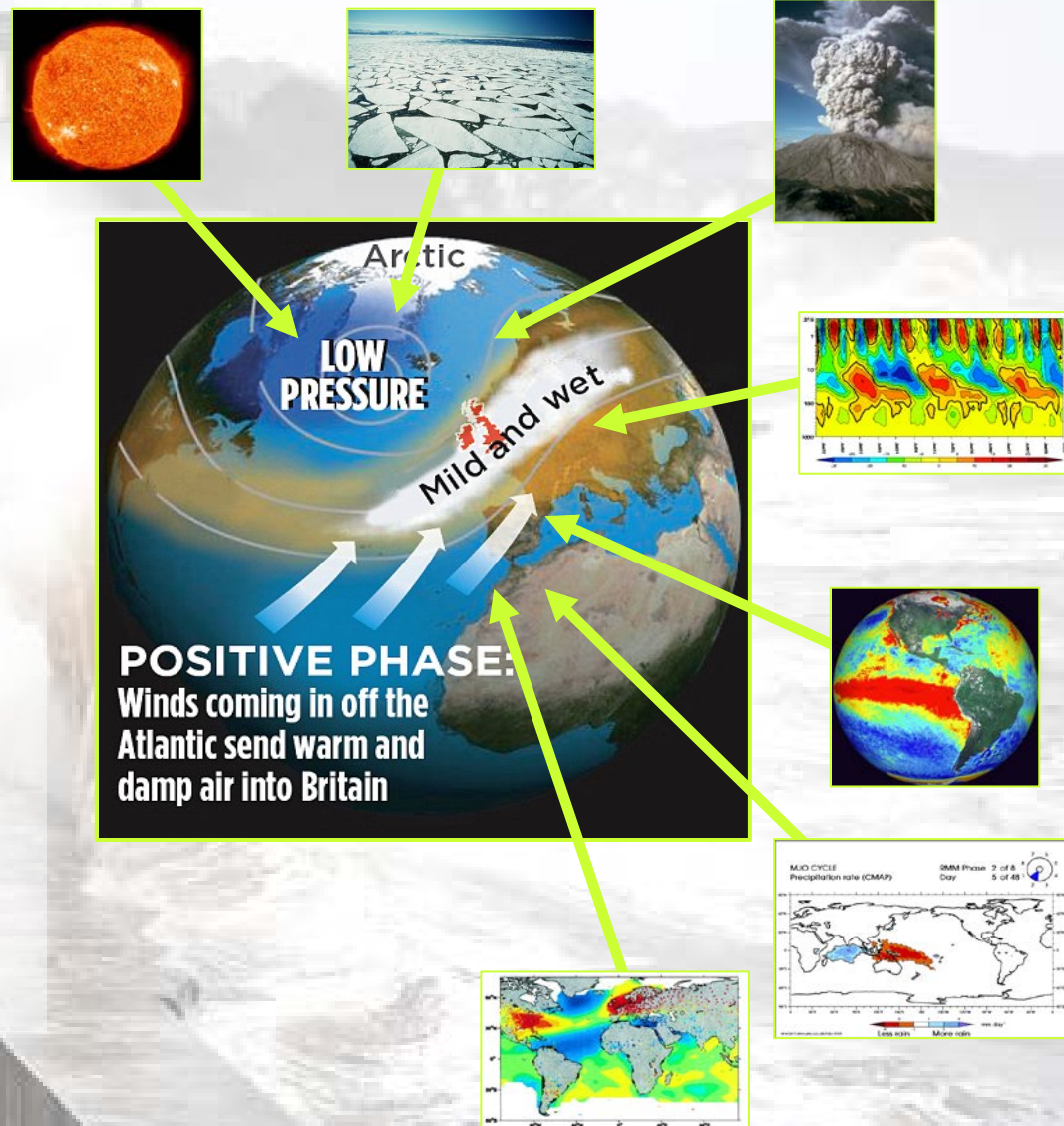
Essential support to decision making on all timescales



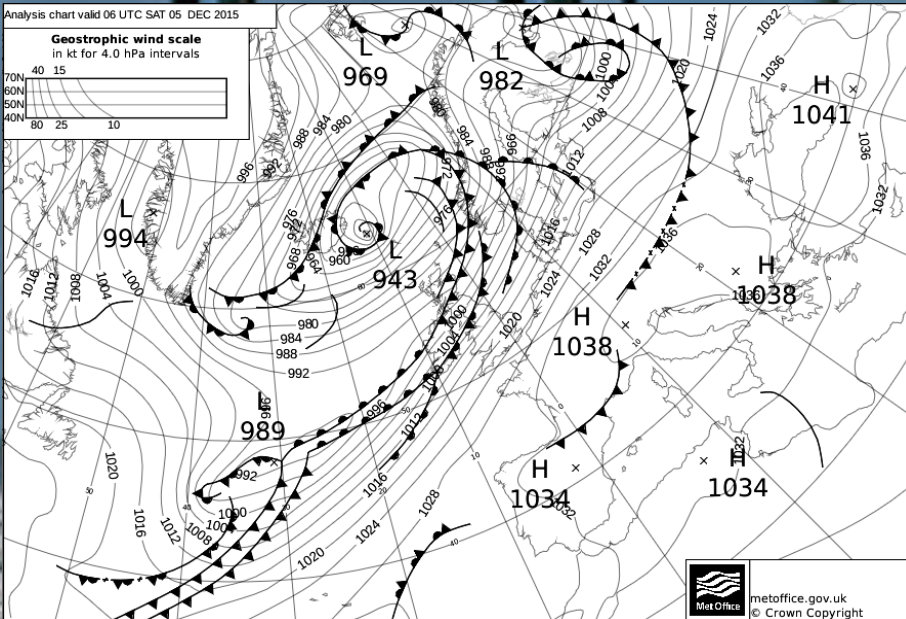
Seasonal forecasting: Understanding our near-term risks

There are many drivers of our seasonal weather

October and November predictions for Winter 2015/16 noted that ***the risk of spells of windy of even stormy weather is expected to be greater than usual for the time of year***



Surprised again! How bad could our rainfall be?



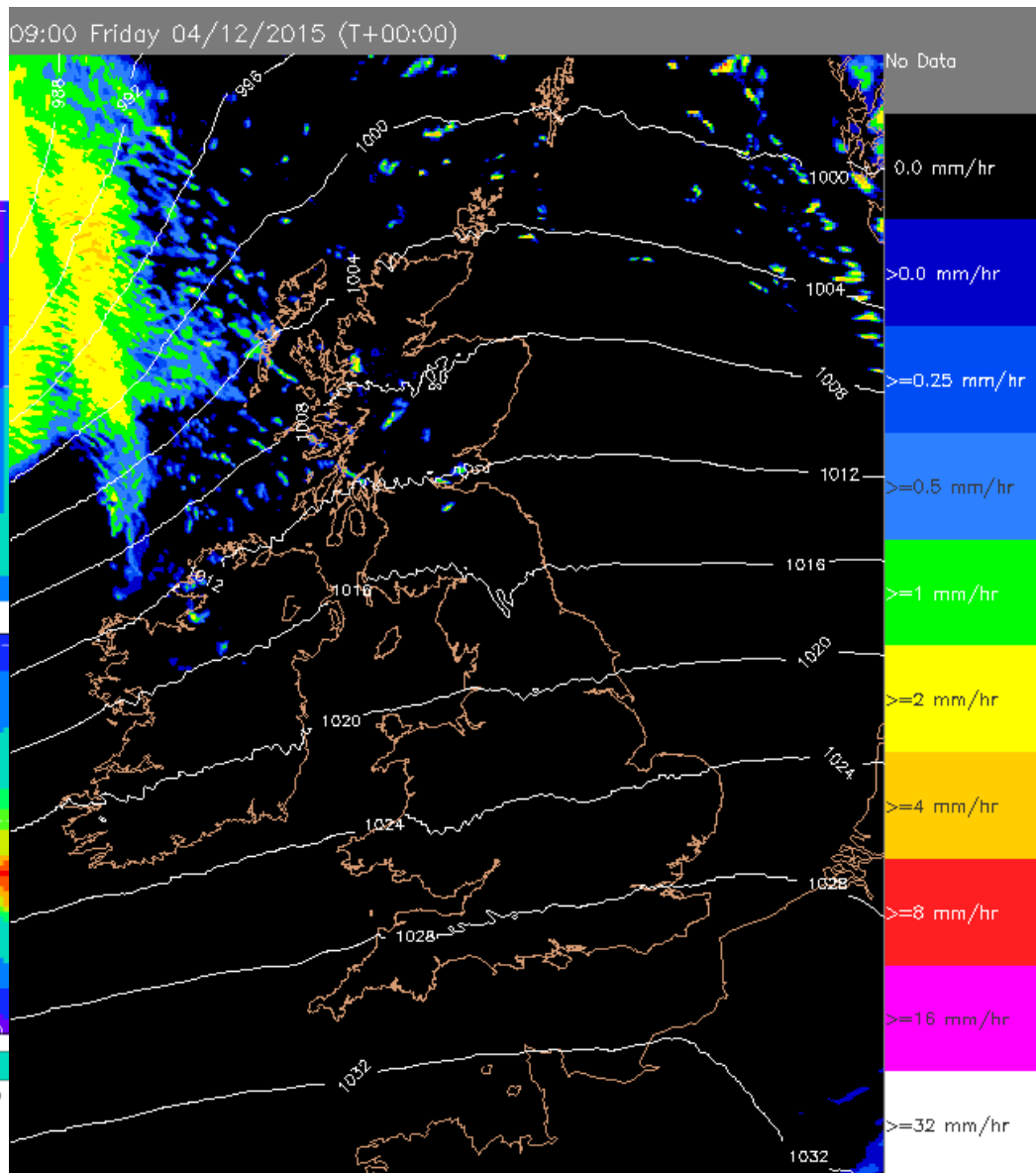
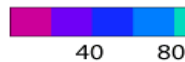
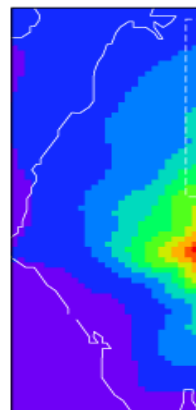
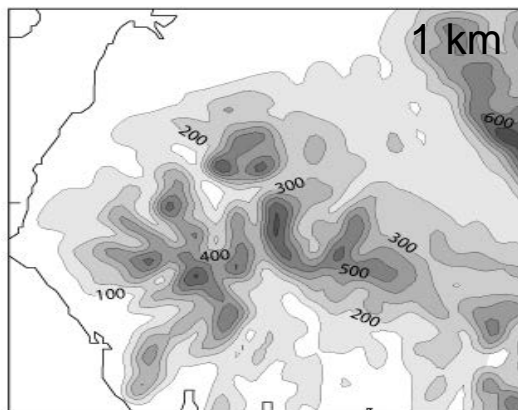
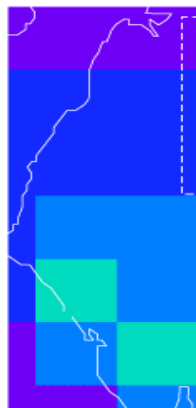
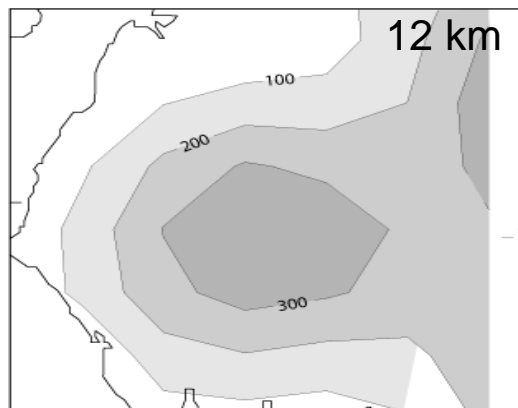
Analysis at 0600 on 5th December 2015



Storm Desmond 5-6 December 2015

Rainfall record for a 24-hour period was broken, with
341.4mm recorded at Honister Pass in the Lake District

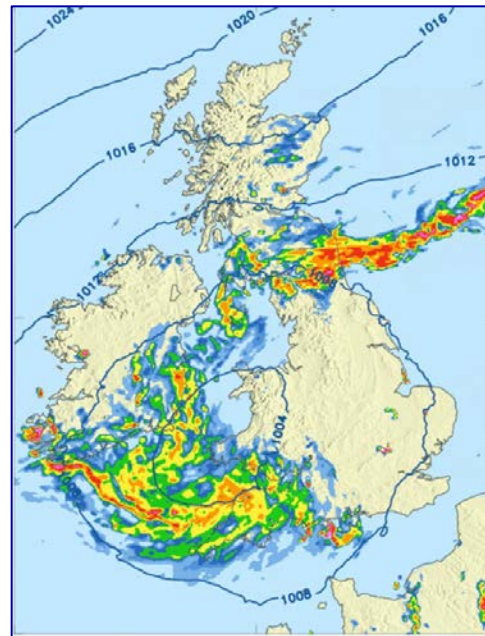
Kilometre scale rainfall forecast



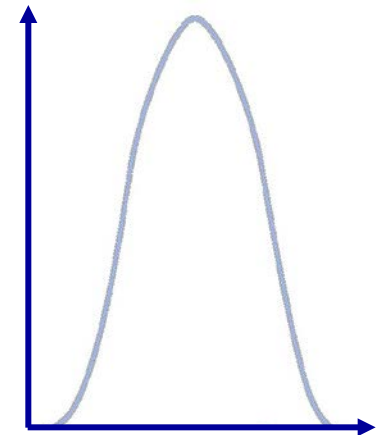
Seamless Prediction: From Global to Local



N x Global coupled
predictions at ~10km :
Synoptic drivers



<N x Regional predictions at
~1km:
**Local
meteorology/environment**



PDF of local hazard:
Impacts

Surprised again!
Is this climate change?



Storm Desmond 5-6 December 2015

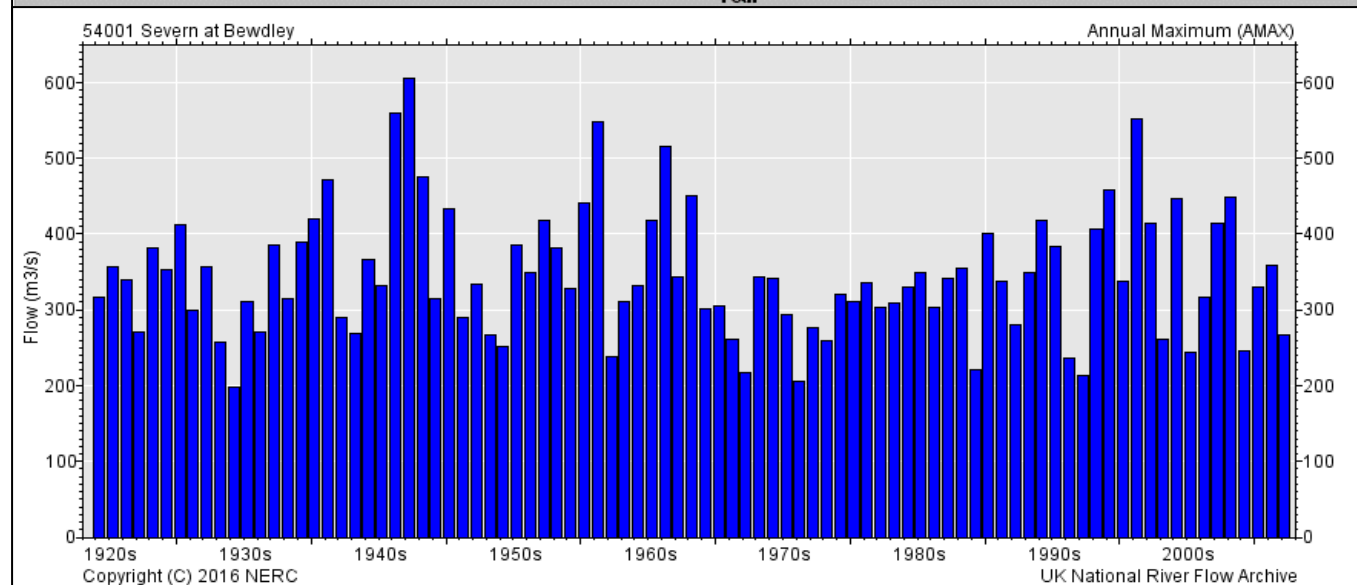
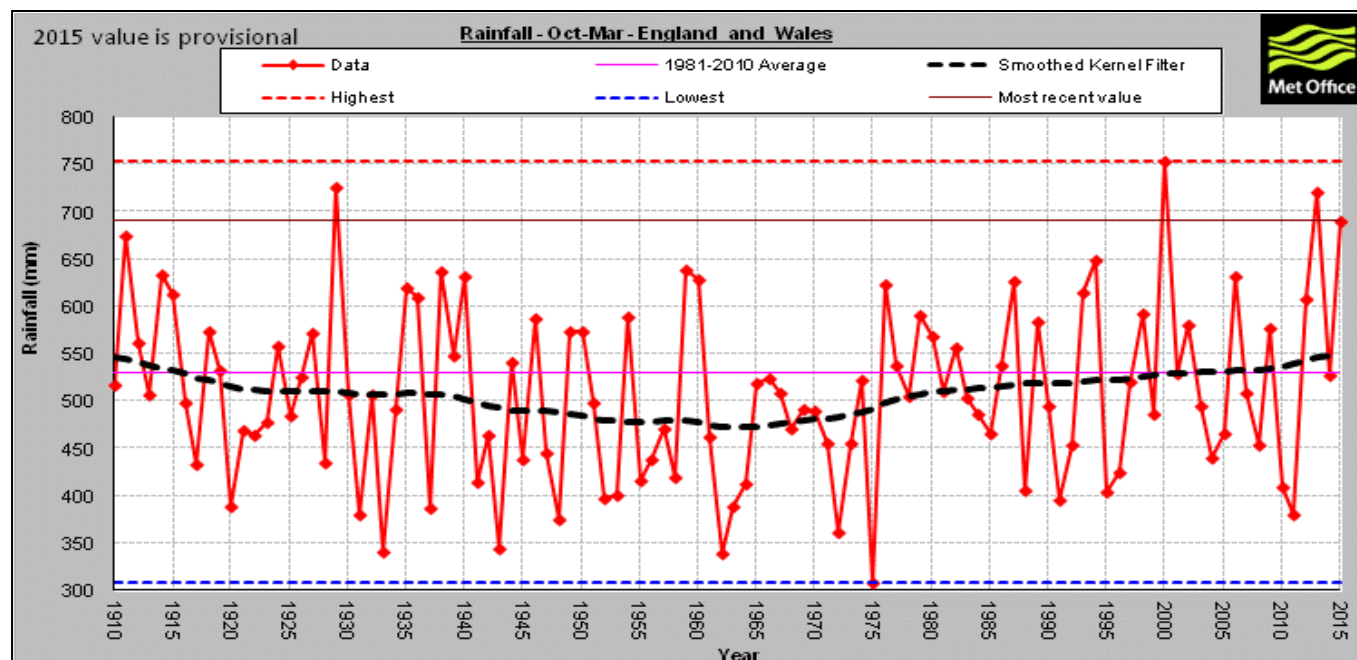
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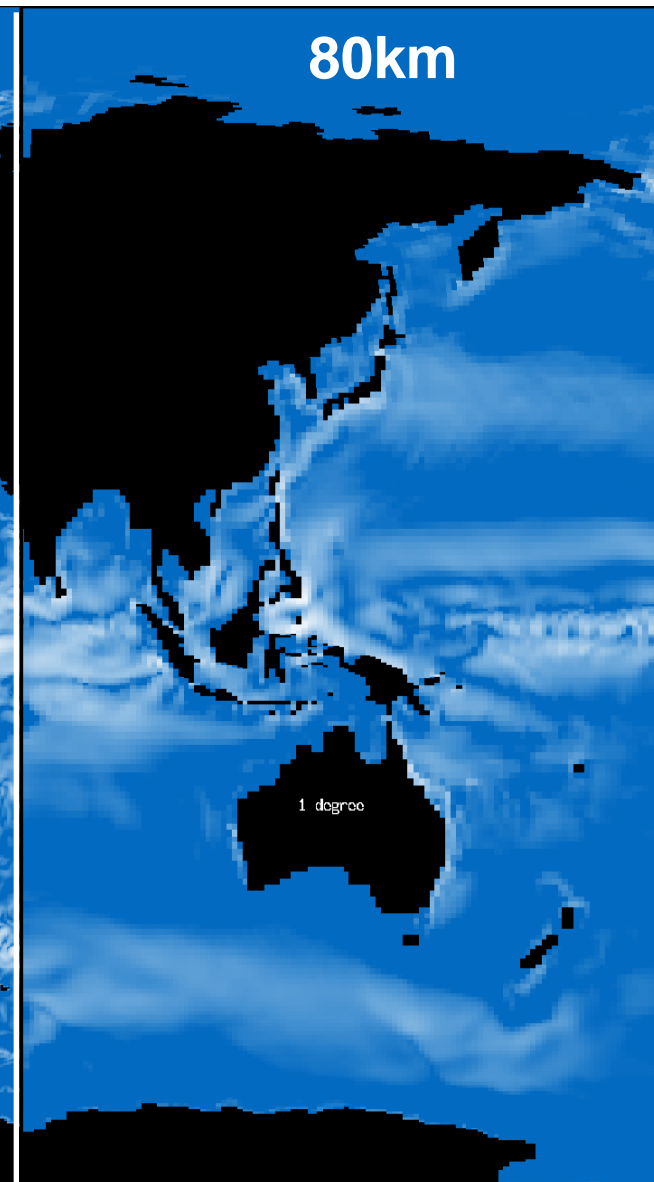
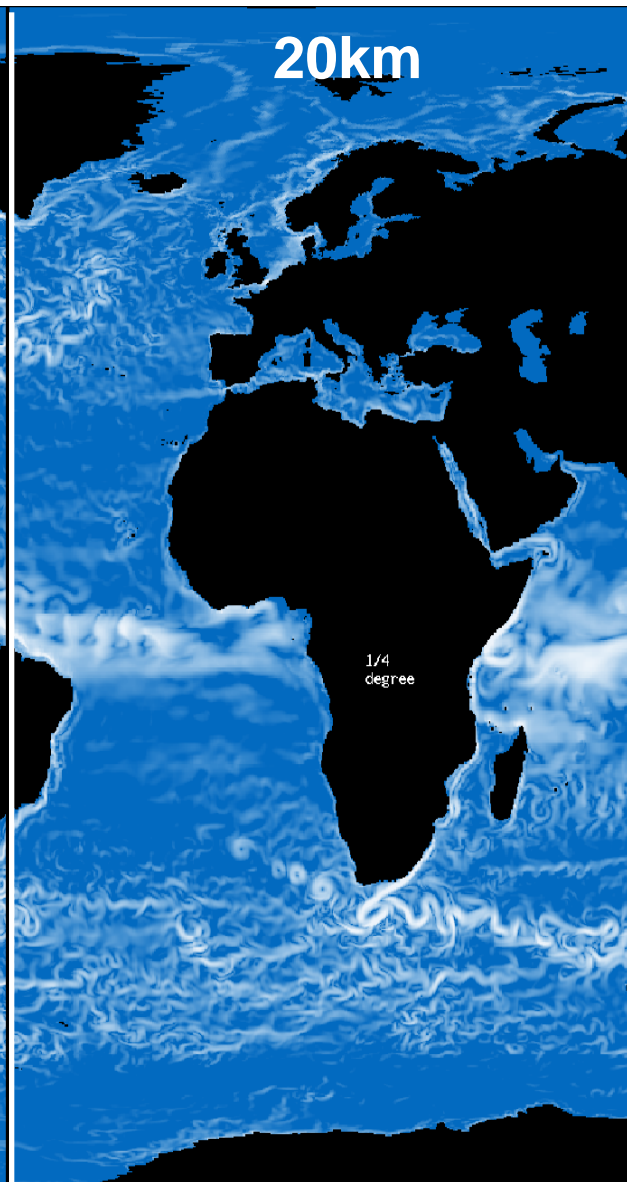
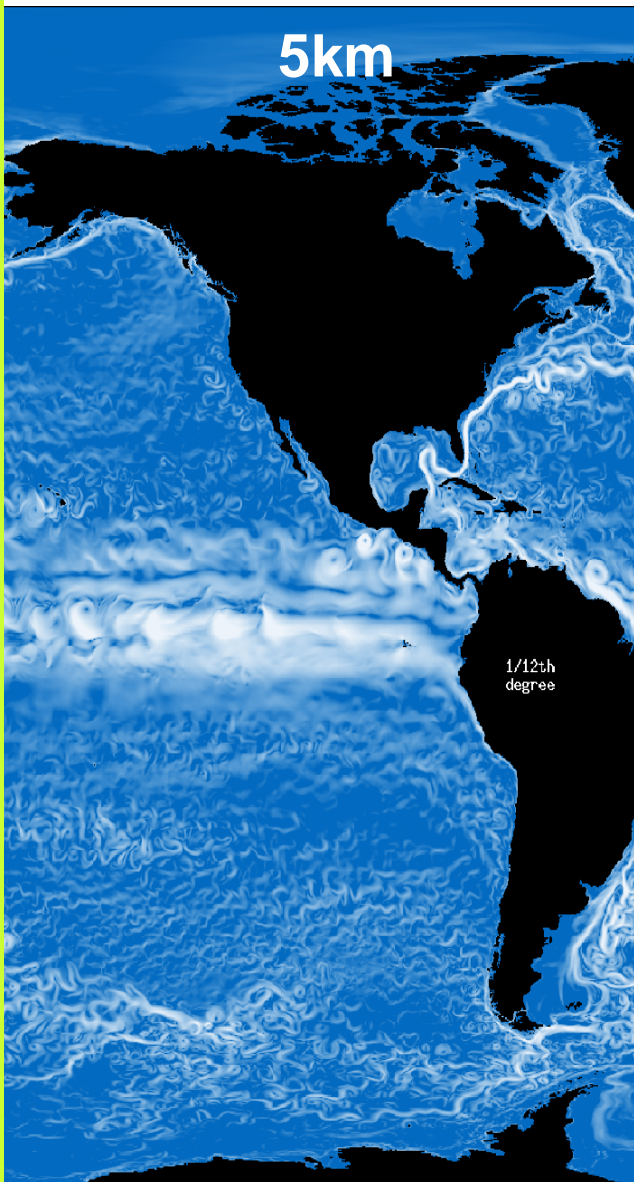
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Evolving landscape of risk from natural variability?

Rain-rich/flood-rich,
rain-poor/flood-poor
periods

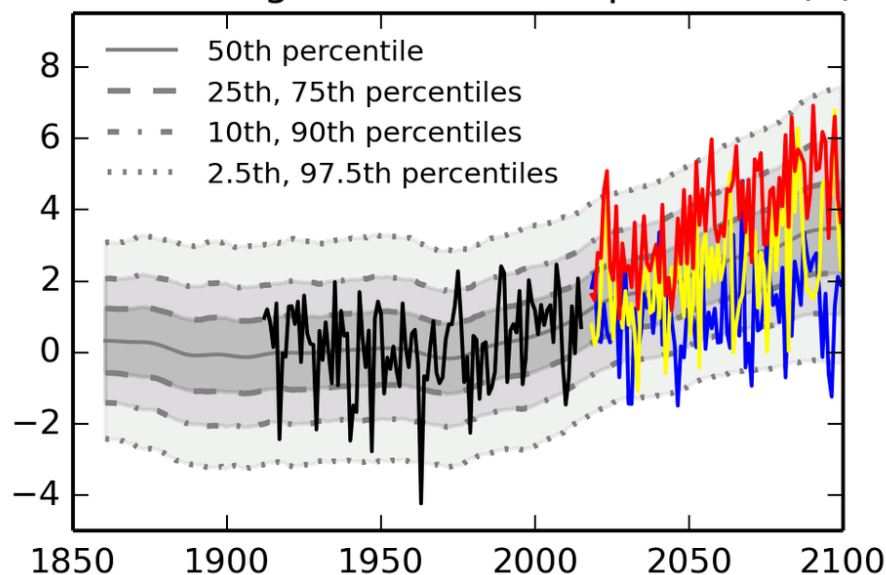


Resolving Ocean Currents



Expanding Envelope of Risk

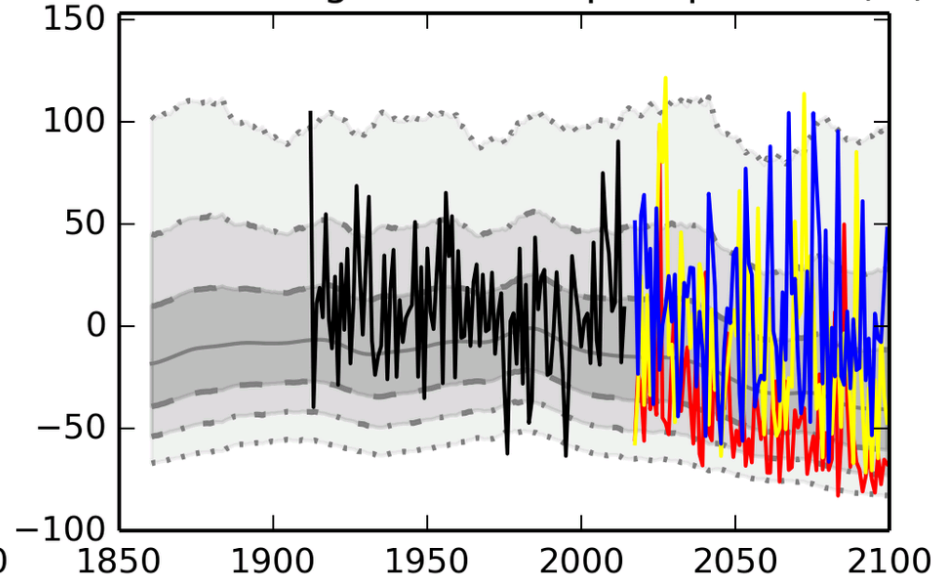
Winter England-Wales temperature (K)



Warmer, wetter winters, but...

- Chance of cold winter doesn't disappear - still 4% by 2100.

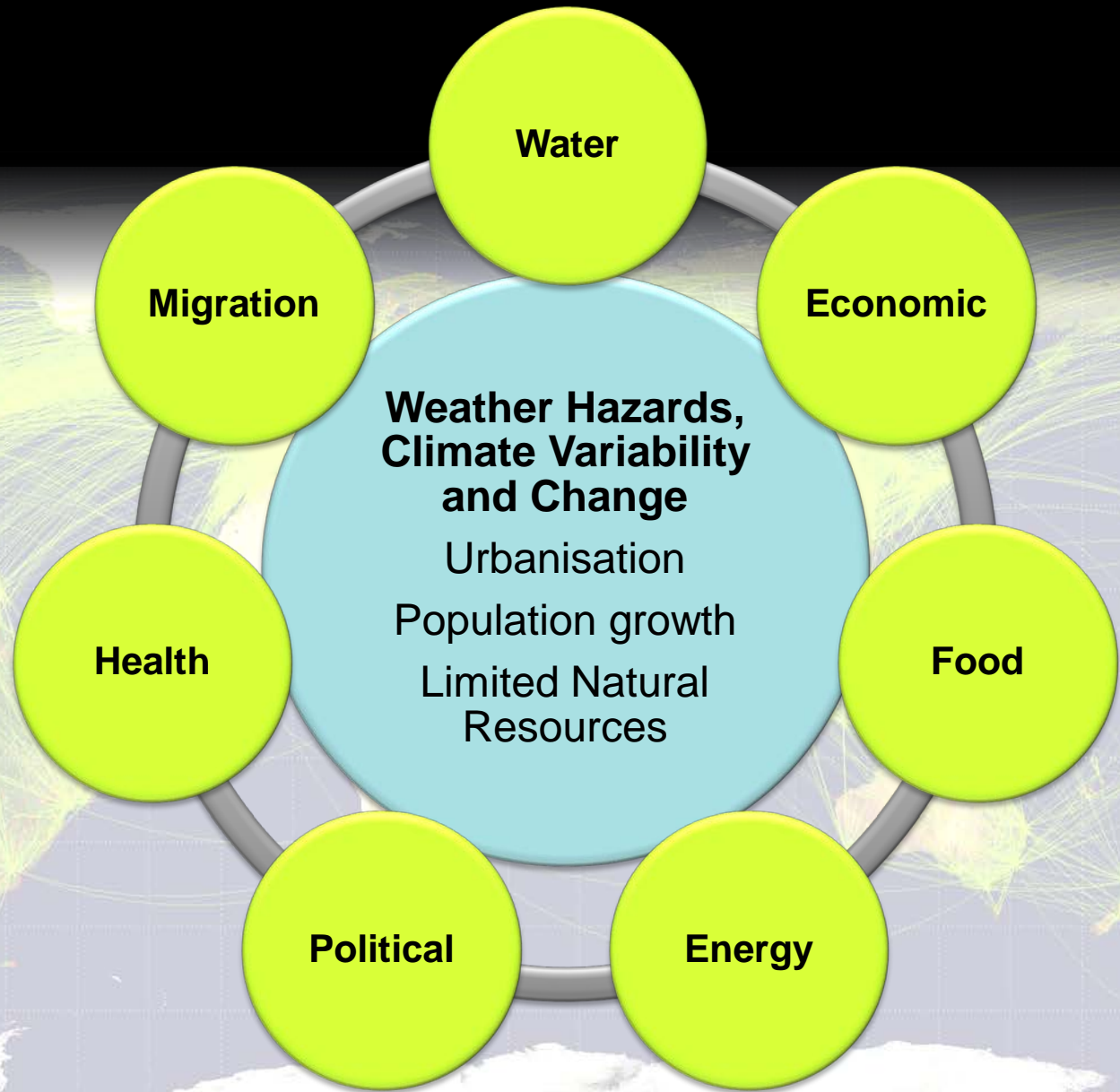
Summer England-Wales precipitation (%)



Hotter, drier summers, but...

- Chance for a "very wet" summer reduces only slowly from 18% to 10% over the 21st century.

Exposure to extreme weather and climate events threatens to derail the sustainability of economic development and social welfare across the globe, and to threaten the securities on which we rely for our health and well-being.



Questions

