



Met Office

Climate Service UK

Working together to prepare for tomorrow





Met Office
Hadley Centre



Climate science today

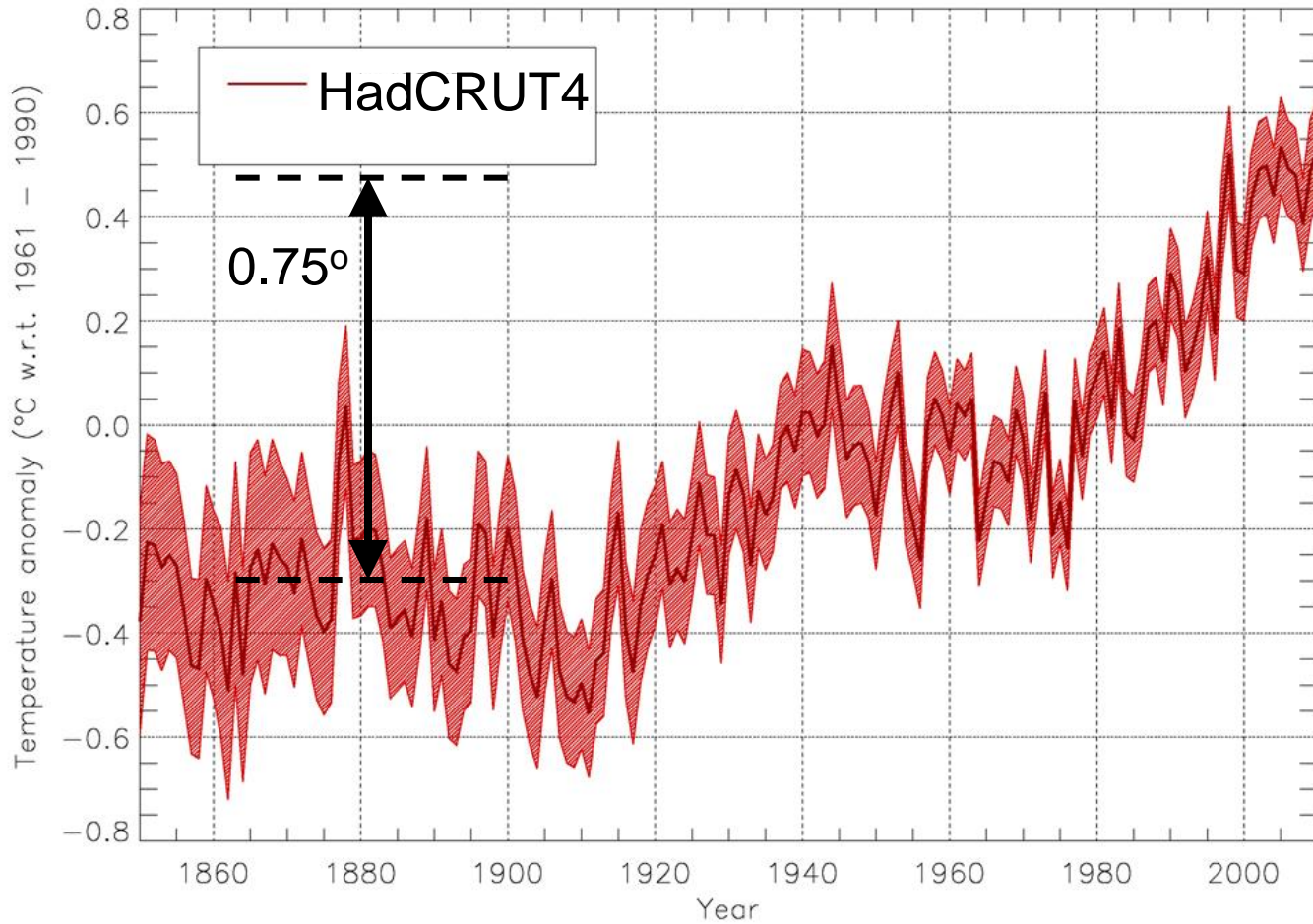
Stephen Belcher
Head of Met Office Hadley Centre

Core responsibilities of MOHC

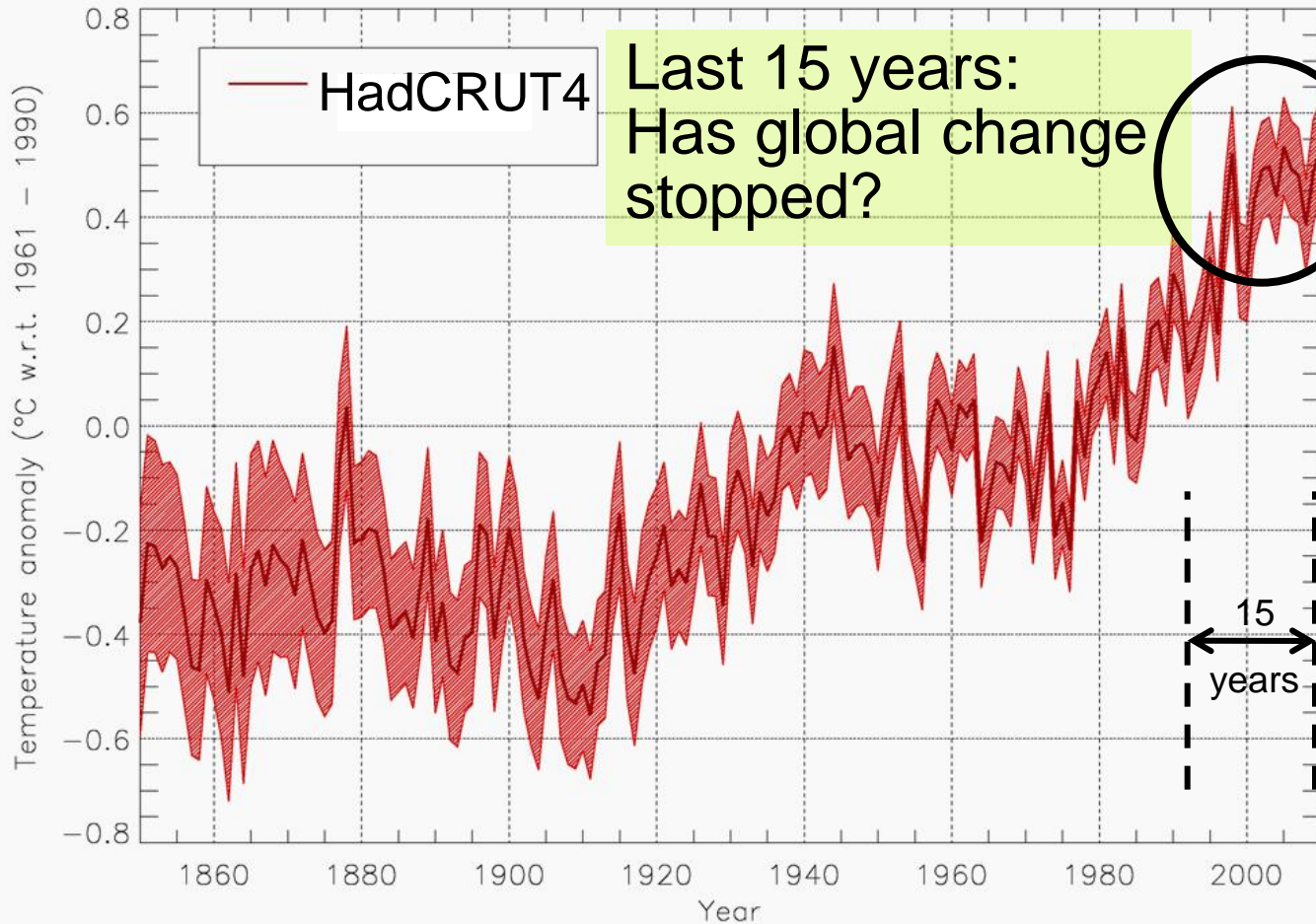
- Monitor climate and attribute changes
- Develop and evaluate climate models
- Provide climate predictions, scenarios, and projections on seasonal, decadal and centennial time scales
- Translate scientific results into advice for Government and industry

“The Met Office Hadley Centre...represents a critical national capability with a central role of meeting the Government’s requirements for climate evidence and advice”

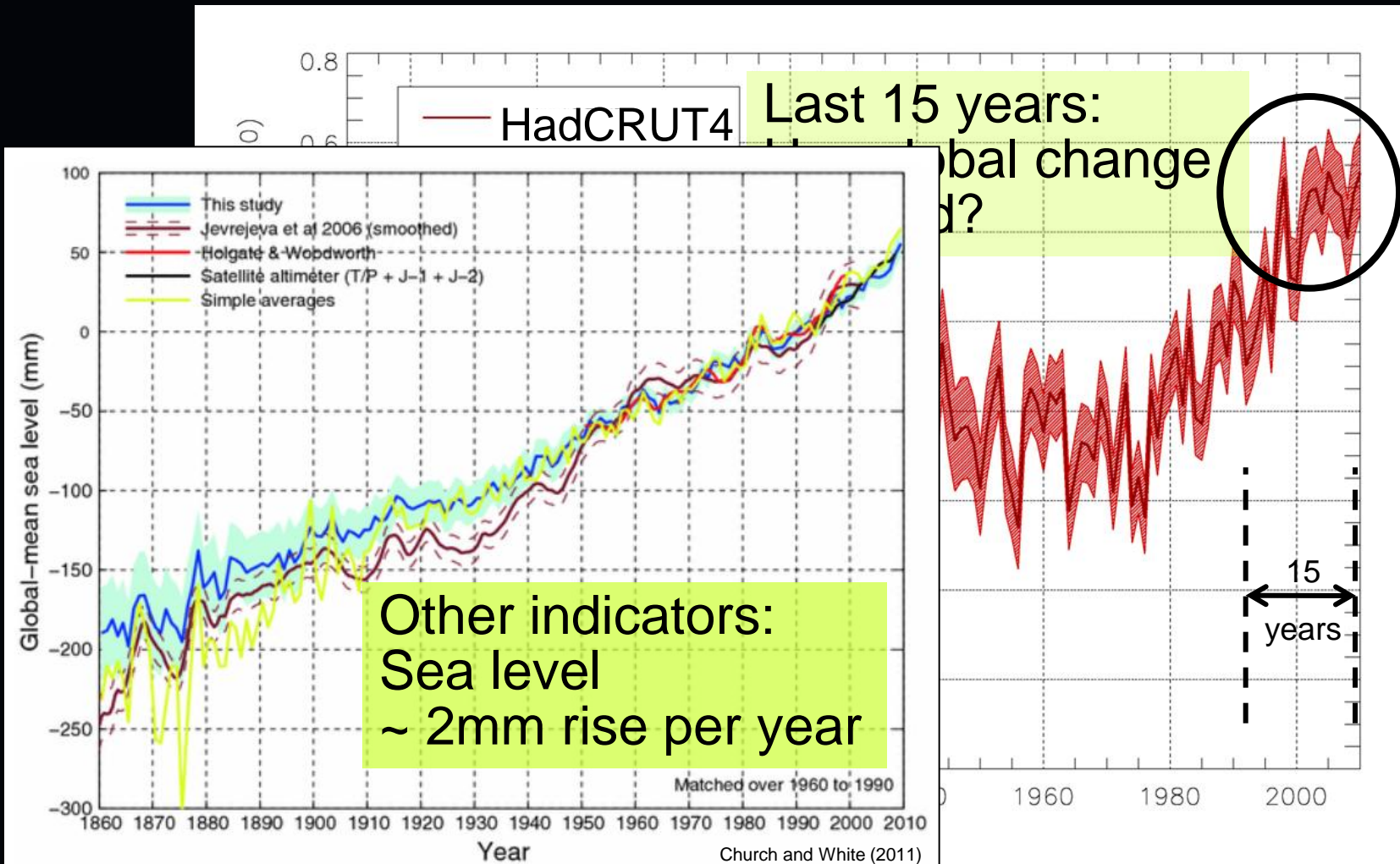
Monitoring the climate system



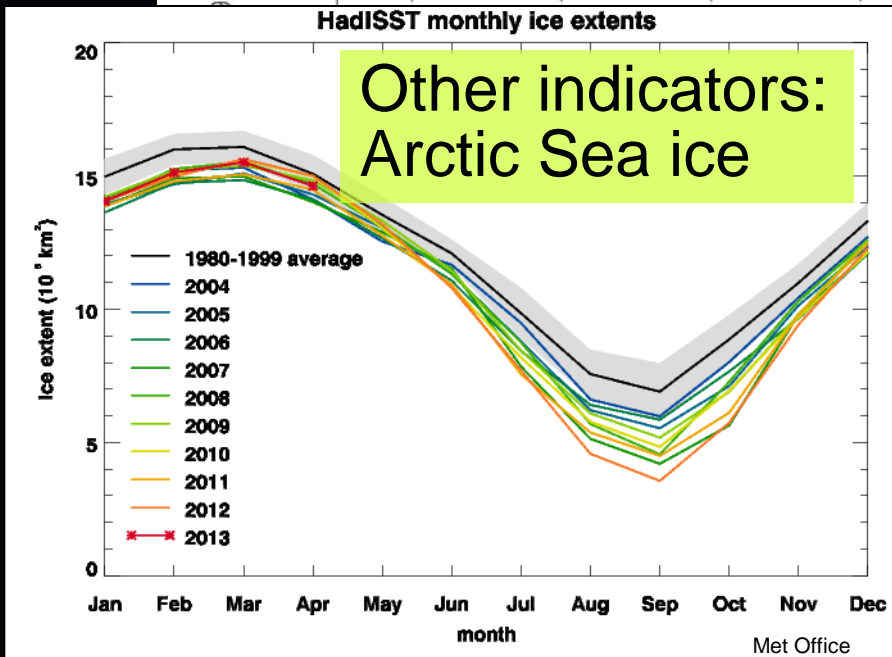
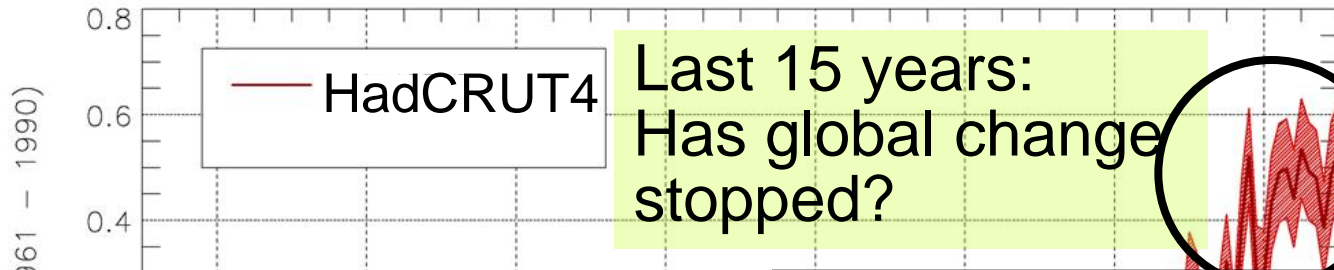
Monitoring the climate system



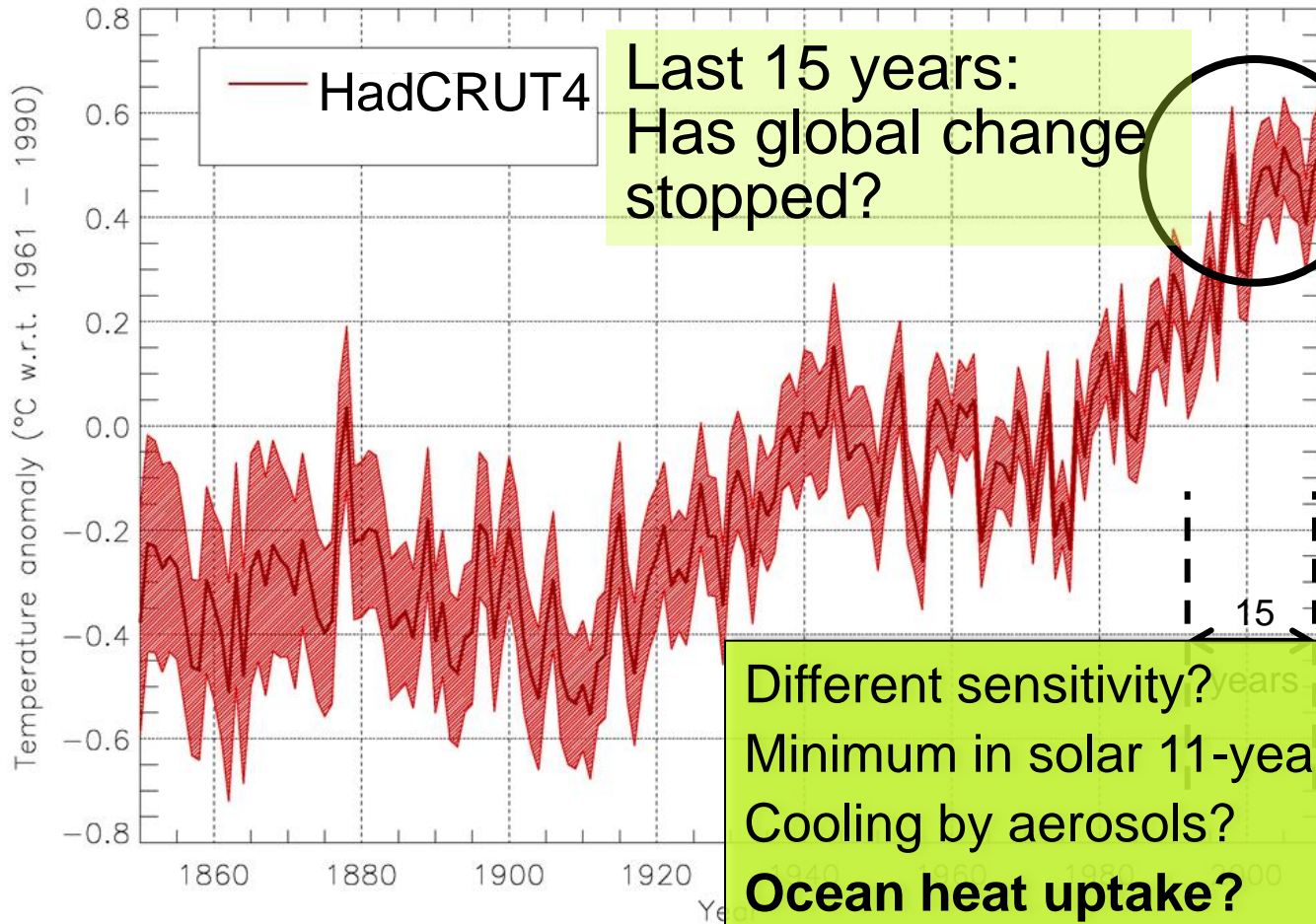
Monitoring the climate system



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Monitoring the climate system



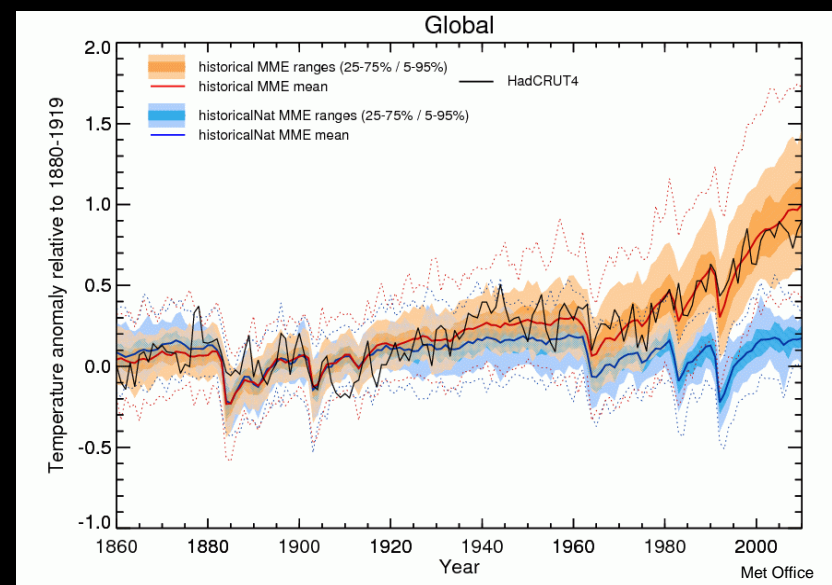
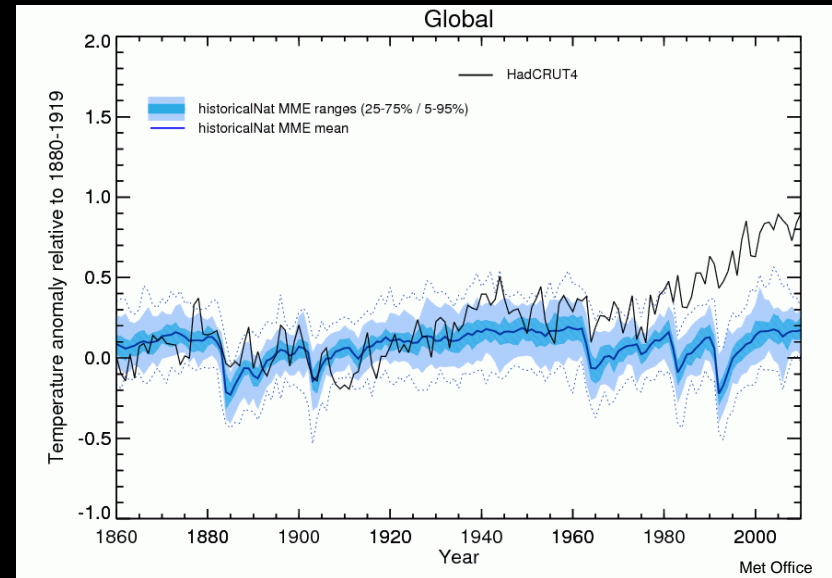
Different sensitivity?
Minimum in solar 11-year cycle?
Cooling by aerosols?
Ocean heat uptake?
Need: sustained observations



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Are human activities responsible?

- Model simulations with only natural forcing do not show warming
- Model simulations with natural and anthropogenic forcing do show warming
- IPCC AR4 (2007):
“Most of global warming of past 50 years *very likely* (odds 9 out of 10) due to human increases in greenhouse gases”



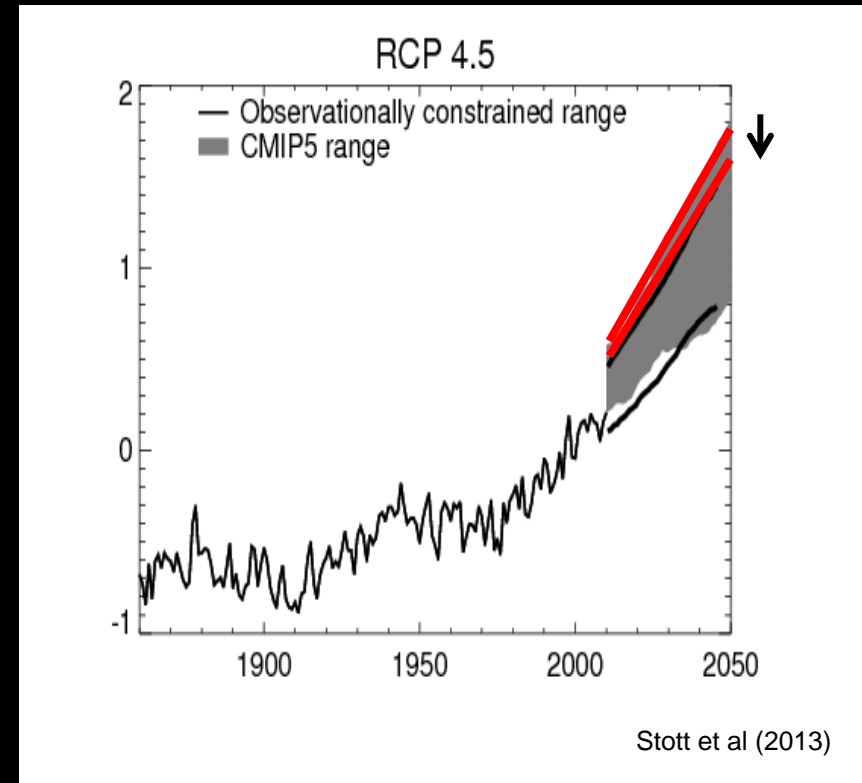
What is the long-term outlook?

Transient Climate Response

“A measure of magnitude of transient warming ($^{\circ}\text{C}$) while the climate is not in equilibrium in response to an increase in CO_2 ”

IPCC AR4 (2007): 1°C to 3°C

Current estimate: 1°C to 2.5°C



Where now for climate science

- IPCC AR4 (2007)

“Changes in the atmosphere, cryosphere and ocean show unequivocally that the world is warming”

“Most of global warming of past 50 years *very likely* (odds 9 out of 10) due to human increases in greenhouse gases”

- Evolving requirement

- Past data and future projections of *regional and local climate* for mitigation, risk-based impact assessment and adaptation strategies

- Shift to near-term 10–40 years ahead: *initialized* prediction
- Need to assess and understand *climate extremes*
- *Variability* similar magnitude as climate change signal

- Development of *Climate Service*

Science to service

- Regional change in next 10-40 years, e.g.
 - European climate
 - Amazon rainforest
 - Arctic sea ice
- Core science required for Climate Service

