Full details

All details held on the selected case study are shown below.

Went live on	Title	Reference
22 Jun 2010	Cutting uncertainty in regional climate predictions offers the UK enormous economic savings	SID0255

Synopsis
At regional scales and over the next four decades, the biggest source of uncertainty in climate predictions is differences between climate models. Focussed research could reduce this by 10-20%, cutting the cost of adaption measures.

Description
Focussing research on reducing uncertainty in climate modelling could offer the UK enormous economic benefits, because it would give more reliable climate predictions over the coming decades, say scientists from the UK's National Centre for Atmospheric Science (NCAS). Better predictions would help policy-makers cut the cost of adapting to climate change.

Three things make climate predictions uncertain: natural variability, the different reponses various climate models have to greenhouse gases, and unknown future emissions. Now a study by researchers based at the Walker Institute, University of Reading, suggests that over the next few decades the biggest cause of uncertainty will be differences between the models themselves - for example, how they represent atmospheric processes.

How much the climate can be expected to vary naturally is the next biggest factor. Both these uncertainties could be reduced with targeted research. For policy-makers, less uncertainty means lower cost, because it narrows the range of conditions they must prepare for.

"The potential to narrow uncertainty is real, and the need is urgent. This should be a major focus for climate science because of its importance to society," says Professor Rowan Sutton, Director of Climate Research for NCAS and a co-author on the study.

Lead author Dr Ed Hawkins explains: "The smaller the region you look at, and the shorter the timescale concerned, the more important natural variation becomes. But over all the timescales relevant to policymakers, our analyses suggest that model uncertainty is also very important. For decadal time scales and regional spatial scales, the best approach may be to target research on reducing 'model uncertainty'."

The study, which looked at the reliability of temperature predictions at regional scales (up to approximately 2,000km) for the next nine decades, drew on data from 15 state-of-the-art climate models and three emissions scenarios. It was the first study of its kind at this spatial scale.

The team estimate that by understanding likely natural variation (at least over the next decade or two), and focussing on model uncertainty, the overall uncertainty in climate predictions for the next 40 years could be cut by 10-20 percent for the UK and Europe, and up to 20 percent elsewhere. Put another way, the likely 'margin of error' around a predicted temperature could be cut by 10 - 20 percent, reducing the range of conditions for which policymakers must prepare.

Understanding how much humans might continue to affect the climate is less important in predicting what's likely to happen - at least for the next few decades. "Some climate change is inevitable, and we will need to adapt," adds Dr Hawkins. "We need to debate where best to target investment in climate science and to consider the return we get, in terms of better climate forecasts and reduced adaptation costs."

"Our work suggests that investments in ocean observations, for example, and their use in setting the initial conditions of climate models and in verifying predictions, could give some of the best returns in improved models and climate forecasts for the next 5-50 years. It is not until the 2050s that the dominant uncertainty is in the unknown future emissions of greenhouse gases."

This work is supported by NERC's RAPID programme.

References and links	
Hyperlinks	1. Allen Press Archive - The potential to narrow uncertainty in regional climate predictions 2. NCAS - Main Media Coverage for the Targeted Investments in Climate Science Press Release 3. NCAS - August 2009 - Targeted investments in climate science could present enormous economic savings for UK and Europe

Impacts

Impact evidence	Focussing research on reducing uncertainty in climate modelling potentially offers the UK enormous economic savings, because it can reduce the 'margin of error' around climate predictions, narrowing the range of conditions policymakers must prepare for.

Research and funding		
Funding type	Research Programme	
Funding partners	*£ Unknown*	Other public sector - Royal Society University Research Fellowship to Rowan Sutton

Researchers at Universities		
Grant reference	NE/C509174/1	
Investigator	Professor RT Sutton	University of Reading, Meteorology
Co-investigator	Dr MR Allen	University of Oxford, Oxford Physics

Researchers at Universities		
Grant reference	NE/G015376/1	
Investigator	Dr TJ Woollings	University of Reading, Meteorology
Co-investigator	Dr E Hawkins	University of Reading, Meteorology

Research and Collaborative Centres	
Centre	National Centre for Atmospheric Science

Classification	
Science themes	Climate system, Earth systems science
Science areas	Atmospheric
Policy areas	Climate/environmental change and impacts, Natural processes, Planning
Keywords	Climate models, Climate predictions, Environment, High resolution models