

# Demonstrating UK Climate Projections (UKCP09)

ENVEC 2009

Winter Gardens, Weston-super-Mare, October 8, 2009.

Dr Paul Bowyer, UK Climate Impacts Programme

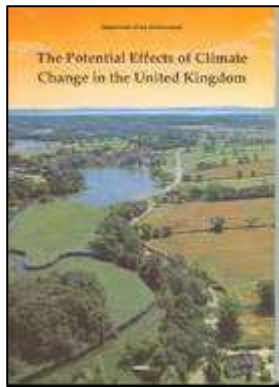


# Outline

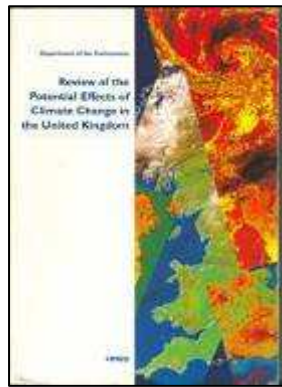
- UK Climate Projections (UKCP09) in Context
- UKCP09 – Generating Probabilistic Projections
- Access to and Support of UKCP09
- Climate Projections: South West England
- Summary

# UK Climate Projections in Context

- UK climate scenarios produced since 1991
- UKCIP published climate scenarios in 1998 and 2002
- Each version has become more detailed, building upon:
  - improved scientific knowledge
  - increased computing power
  - stakeholder requirements
- Each has represented best scientific understanding at that time
- Audience has evolved and grown



CCIRG91



CCIRG96



UKCIP98



UKCIP02



UKCIP09

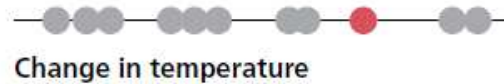


UKCIPnext

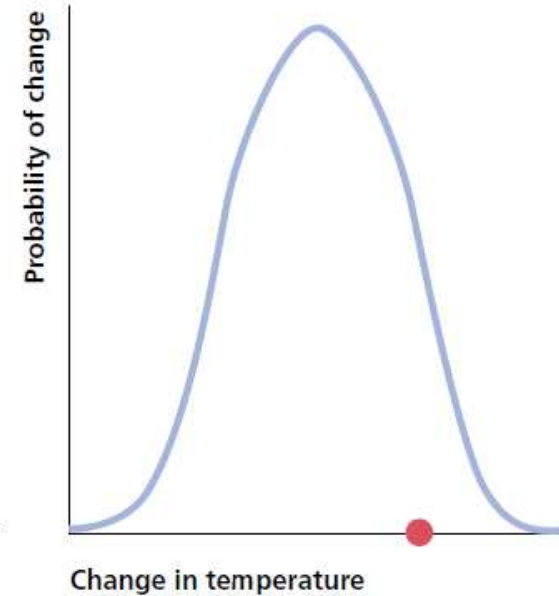
# UK Climate Projections in Context (2)



UKCIP02 gave a single estimate of change in temperature



Using many models would give a range of different changes in temperature, but no information on which to use



UKCP09 gives the probability of different amounts of change in temperature

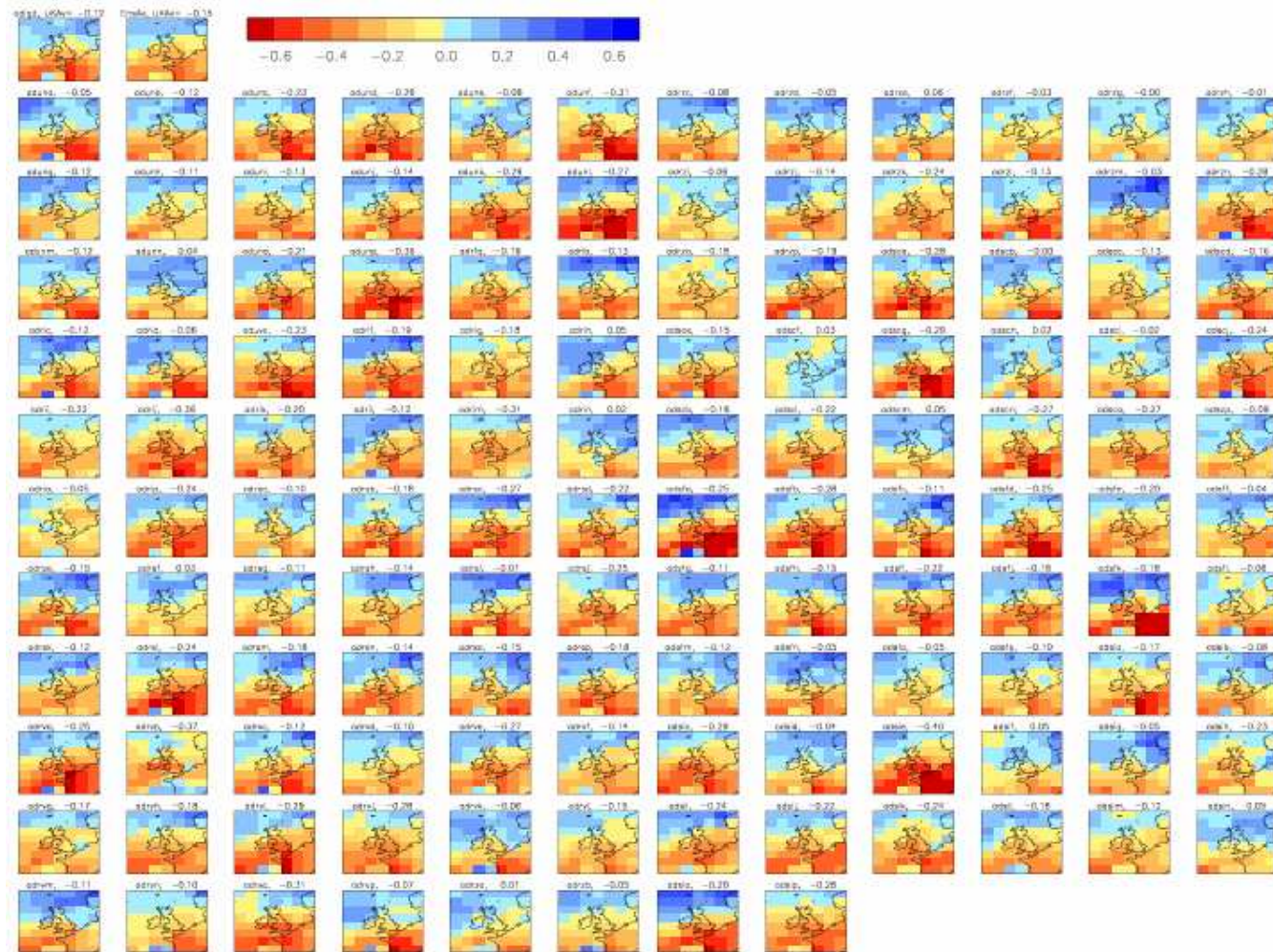
# What is Available in UKCP09?

- UKCP09 is the most comprehensive package of climate information for the UK to date, includes various data sources:
- **Observed data** – Trends report published December 2007
- **Probabilistic projections** (land and marine atmosphere variables)
- **Sea level rise projections** (absolute and relative)
- **Storm surge projections**
- **Multi-level ocean projections** (expected November 2009)
- **Waves** (data not available yet)
- **Weather Generator**

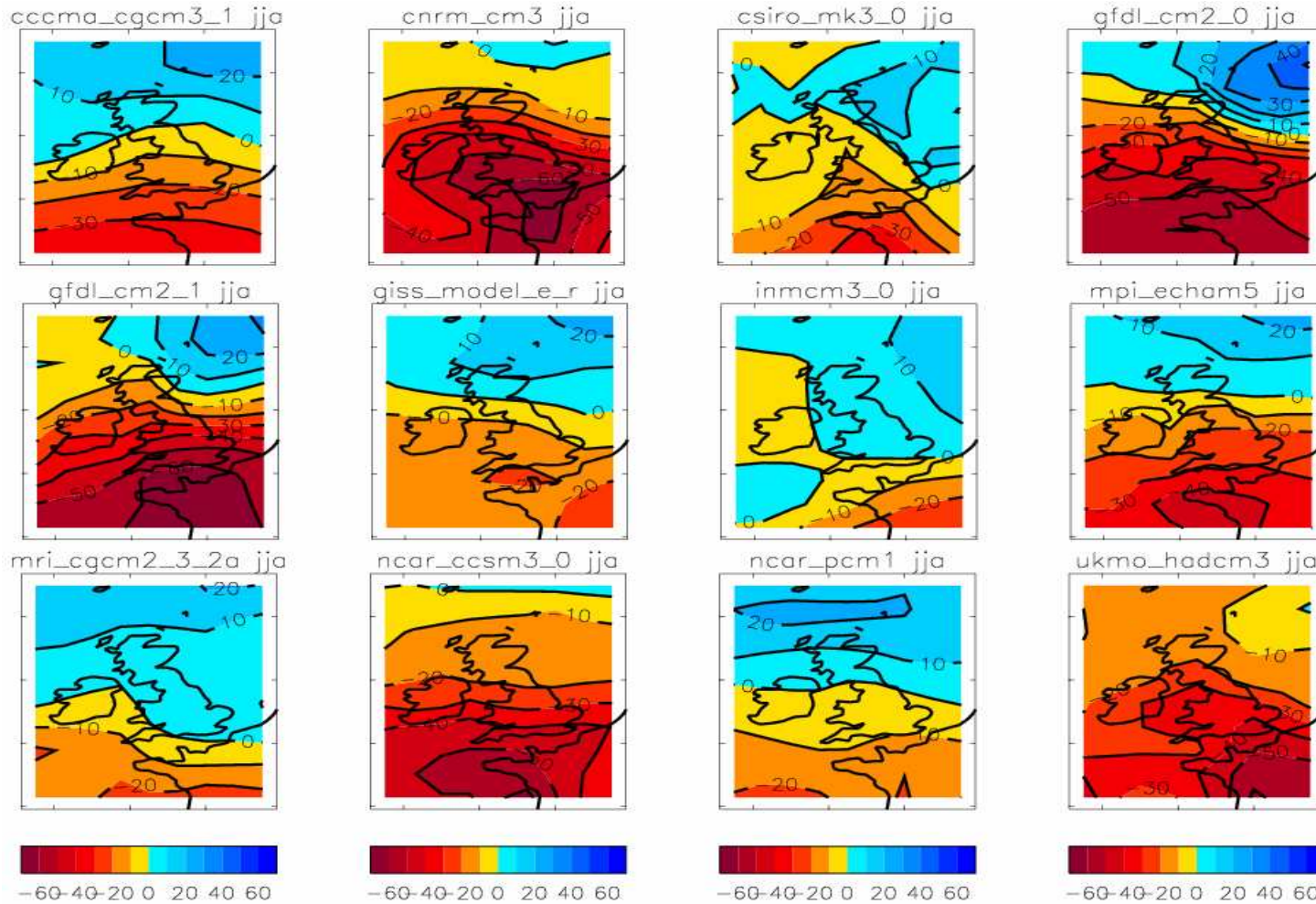
# What is so Special About UKCP09?

- Major known sources of modelling uncertainty are quantified
  - Parameter error (PPE), and structural error (MME)
  - Process uncertainty – C cycle, sulphate aerosols
- Probabilistic projections – using a range of model simulations, observations and statistical techniques → robust decision making
- Dedicated user-interface for ease of access to data
- Finer spatial and temporal resolution in the projections
- Support package – training programme (PiP), user guidance, helpdesk, FAQs

# Modelling Uncertainty – Parameterisation Errors (PPE)



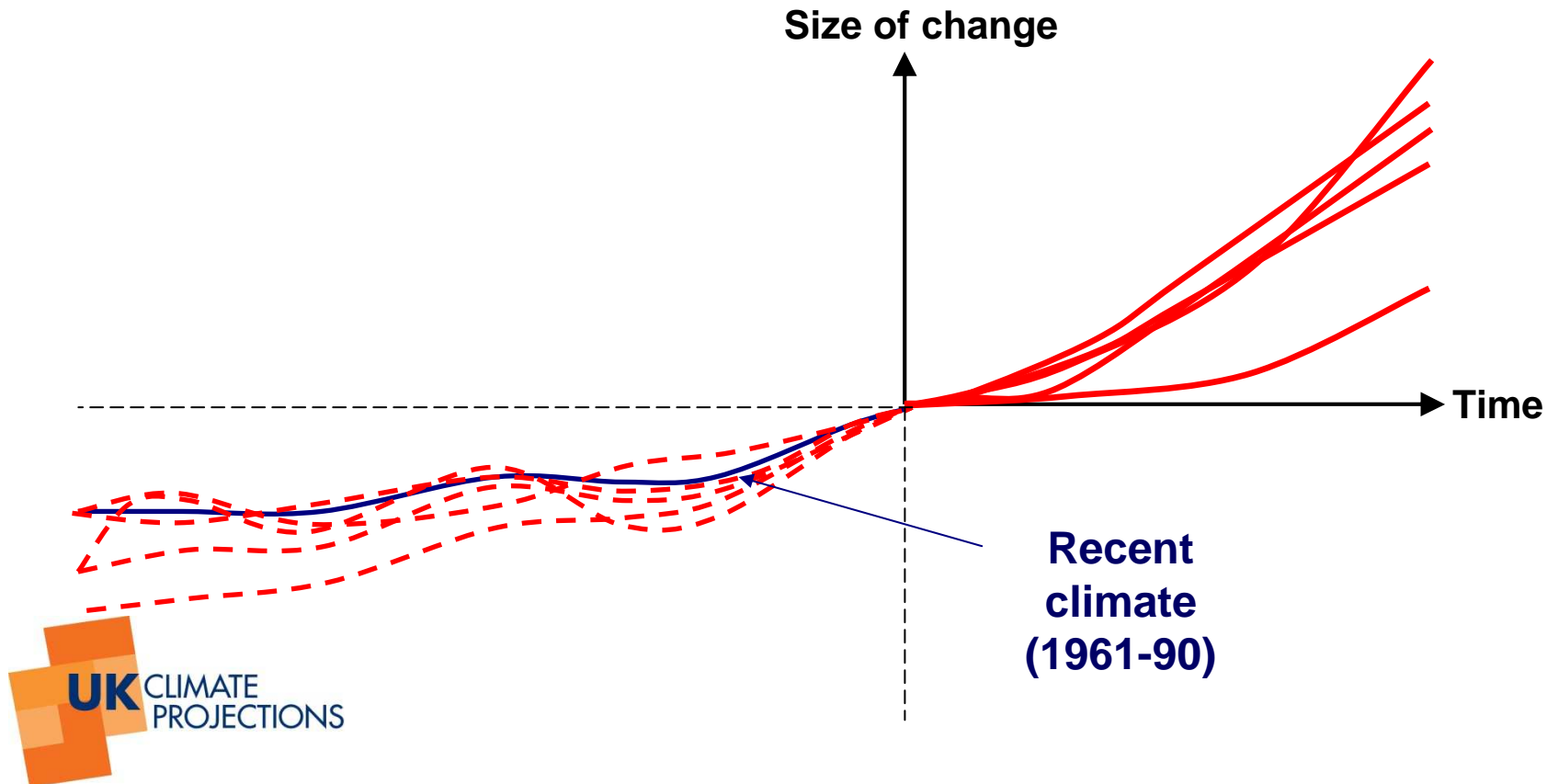
# Modelling Uncertainty – Structural Errors (MME)



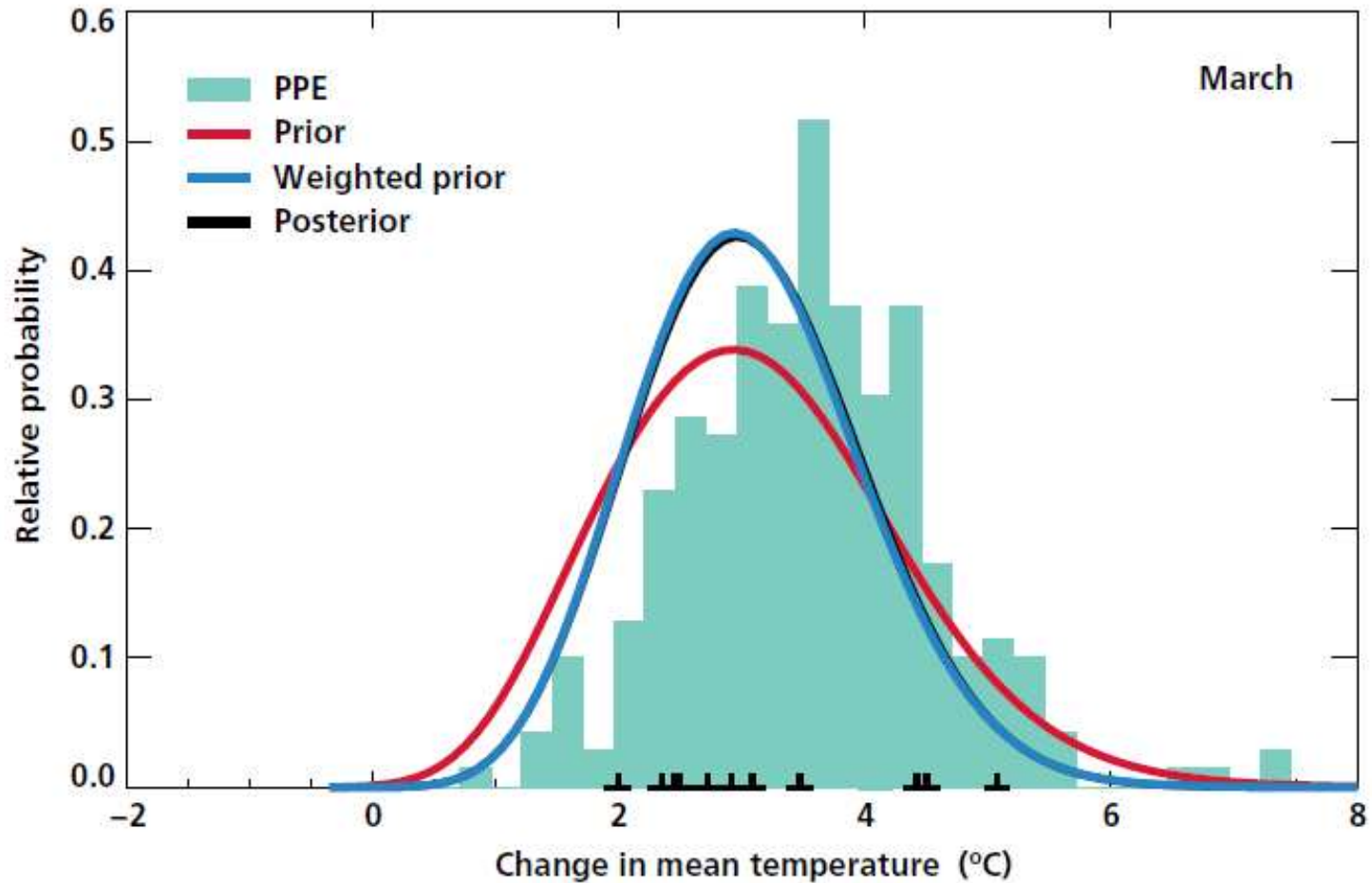


# Generating Probabilistic Projections (1)

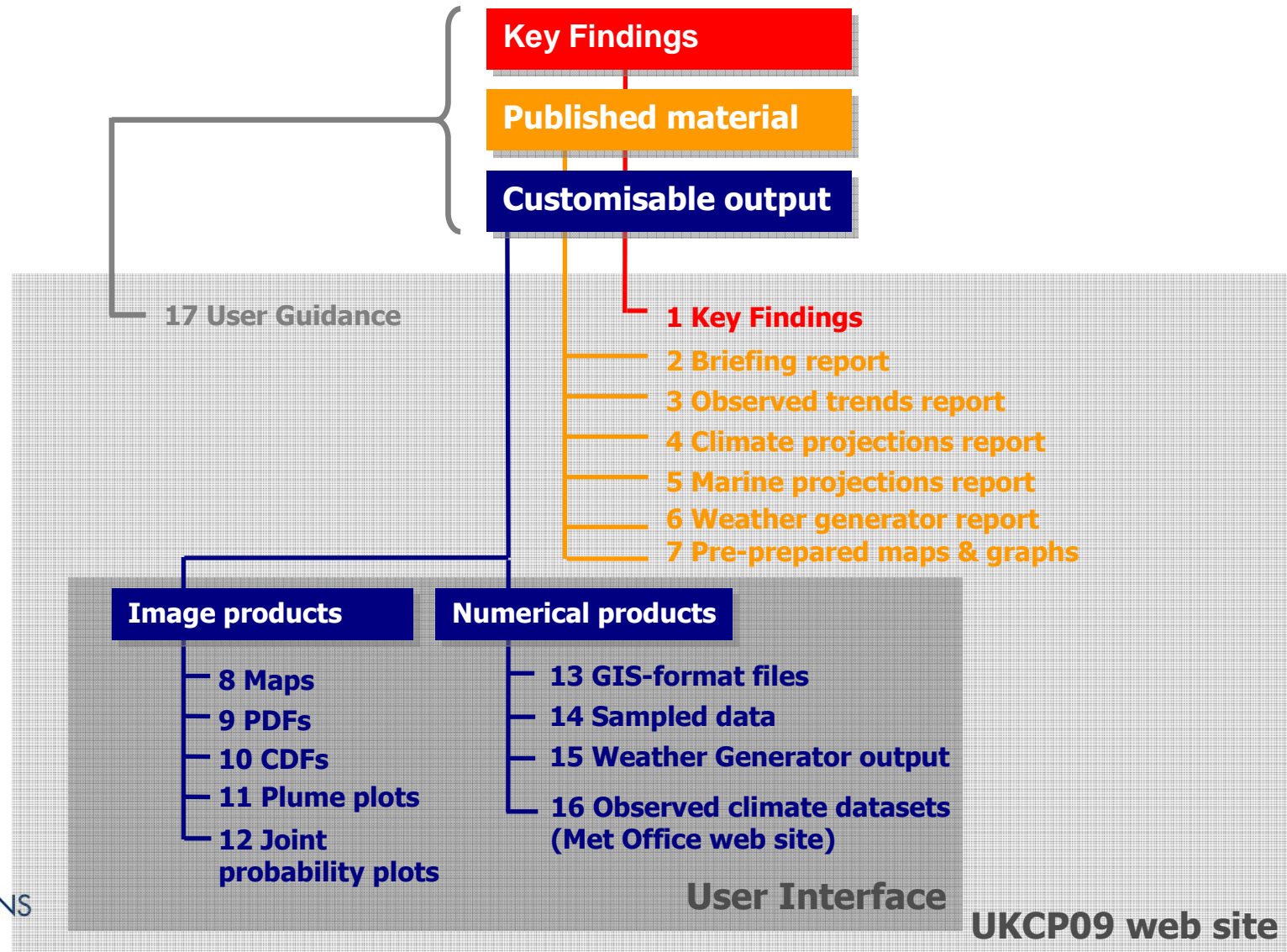
- The only way we have of assessing the quality of climate models is to assess how closely they accord with observed climate
- It is assumed that models which are better at representing past climate will be better at representing future climate



# Generating Probabilistic Projections (2)



# Access and Support (1): Products Available



# Access and Support (2): UKCP09 User Interface



Start Page My Jobs My Details Using UKCP09 UI Manual Need help?

Logged in as:  
paul.bowyer@uk...  
[Logout](#)

Logged in users: 6

You have no pending jobs.  
See [My Jobs](#) for previously run jobs.

Request Status:

Request Summary:

Data Source:  
UK Probabilistic Projections of Climate Change over Land

Climate Change Type:  
Future Climate Change Only

Variable(s):  
Change in mean temperature (°C)

Emission Scenario(s):  
Medium

Time Period(s):  
2040-2069

Temporal Average(s):  
Summer (JJA)

Location Type:  
25km Grid Box

Location(s):  
-10 W, 48 S...

Data Type:  
CDF data


Output Type:  
Map

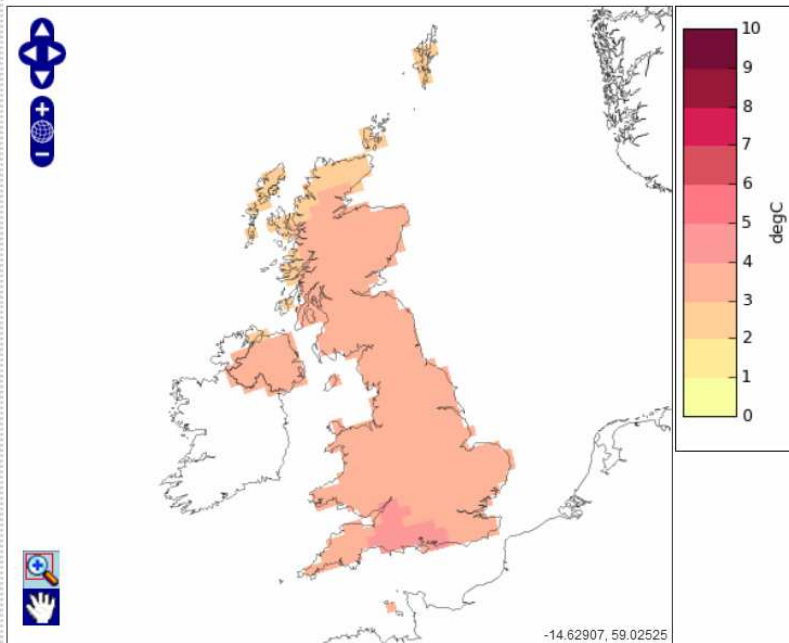
Output Format Type:  
Image

Output Format:  
PNG

## Viewing and modifying your output

The [Graphics page](#) allows you to modify the output that has been generated in response to your request. Here you can make changes to the look of the plot or modify the contents of your data request to update the plot.

At any time you can download the plot or its underlying data in various formats  using the buttons in the bottom right corner.



## Configure your plot

### Show data values over map

Click to view numeric data values over your map.

### Show UKCP09 boundaries on plot

Note that these are not visible on the preview map above.

No boundaries displayed

### Font Size

## Change your request

### Climate Change Type

### Variable

### Emissions Scenario

### Time Period

### Temporal Average

### Probability Level

### Location

North   
West   East  
  
South

[Reload map with current settings](#)

## Save your request

Image size

[Save Image As](#)

## Important information about the use of shapefiles

[Save Data As](#)



# Access and Support (3)

- Training
  - Series of regional PiP events
  - E-learning
- User guidance
  - Web based resource that is designed to help users make sense of UKCP09, appropriate uses/inappropriate uses, worked examples, guiding principles, helpdesk and FAQs, and more
  - An evolving resource as we learn more about the projections and how to use them

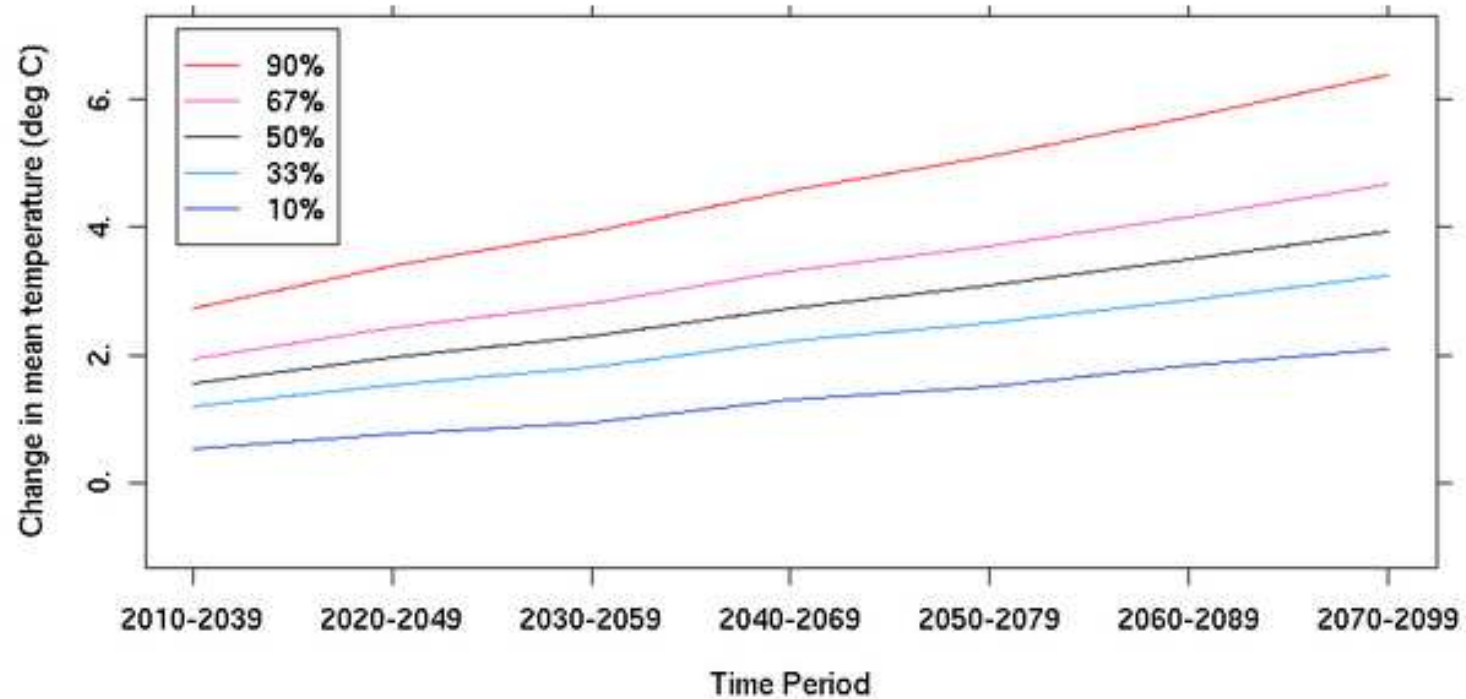
# South West England Projections: Summer Mean Temperature Change



## Plot Details:

Data Source: Probabilistic Land  
Future Climate Change: True  
Variables: temp\_dmean\_tmean\_60s  
Emissions Scenario: Medium  
Time Period: 2010-2039, \_\_, 2070-2099

Temporal Average: JJA  
Spatial Average: Region  
Location: South West England  
Probability Data Type: cdf

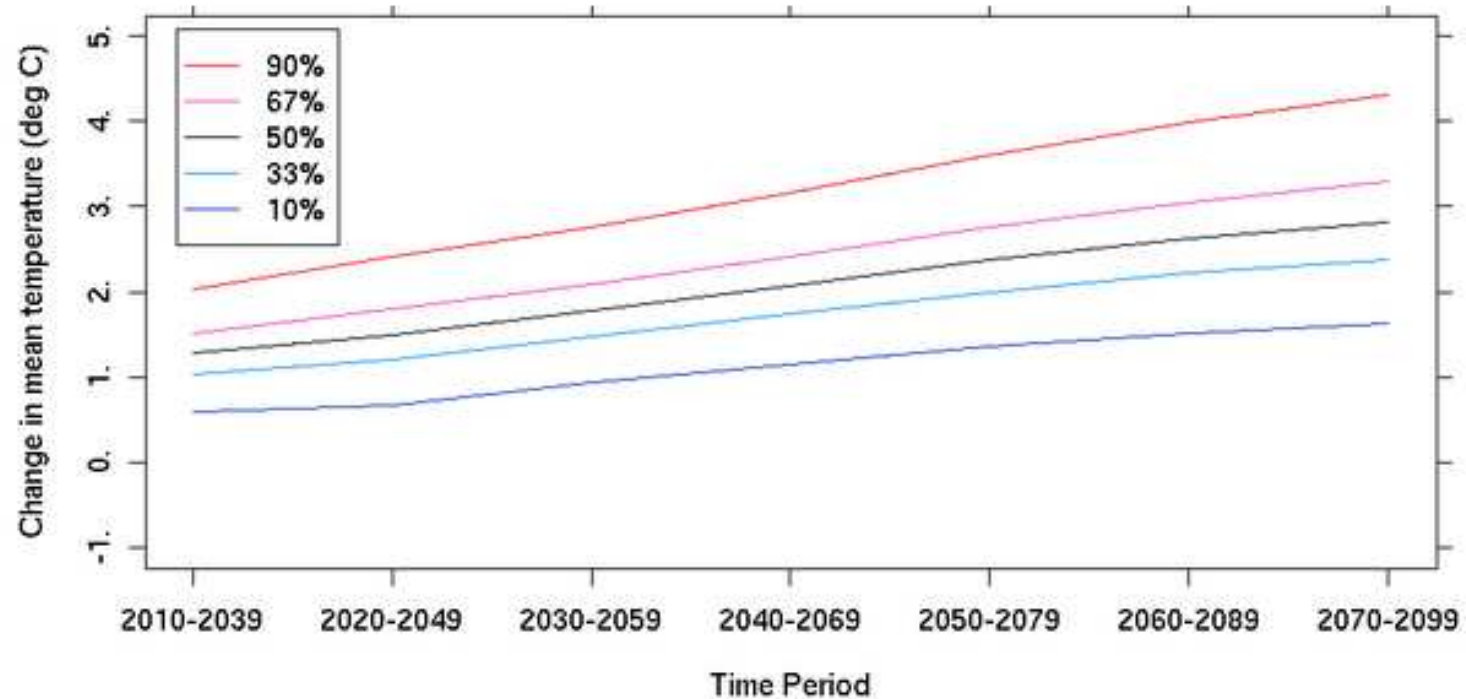


# South West England Projections: Winter Mean Temperature Change



## Plot Details:

Data Source: Probabilistic Land	Temporal Average: DJF
Future Climate Change: True	Spatial Average: Region
Variables: temp_dmean_tmean_ab3	Location: South West England
Emissions Scenario: Medium	Probability Data Type: cdf
Time Period: 2010-2039, __, 2070-2099	



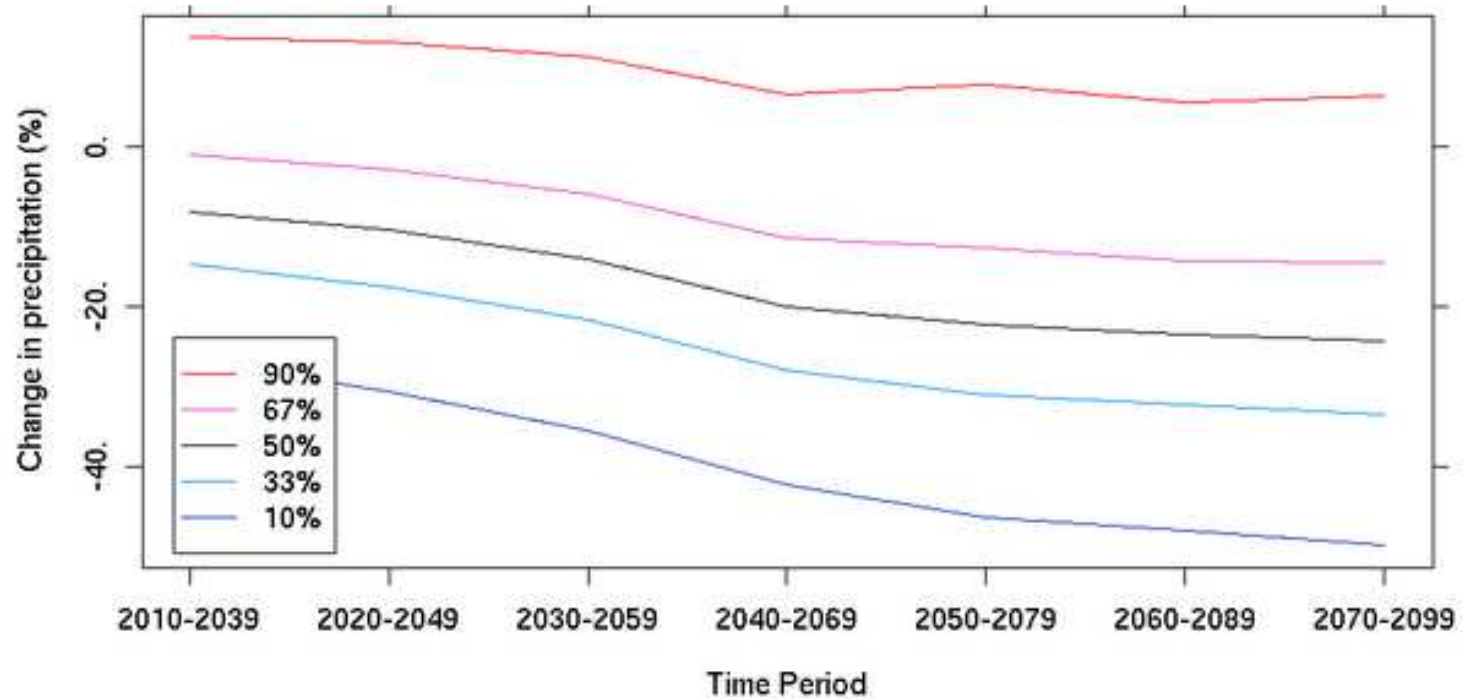
# South West England Projections: Summer Precipitation Change



## Plot Details:

Data Source: Probabilistic Land  
Future Climate Change: True  
Variables: precip\_dmean\_tmean\_perc  
Emissions Scenario: Medium  
Time Period: 2010-2039, \_\_, 2070-2099

Temporal Average: JJA  
Spatial Average: Region  
Location: South West England  
Probability Data Type: cdf



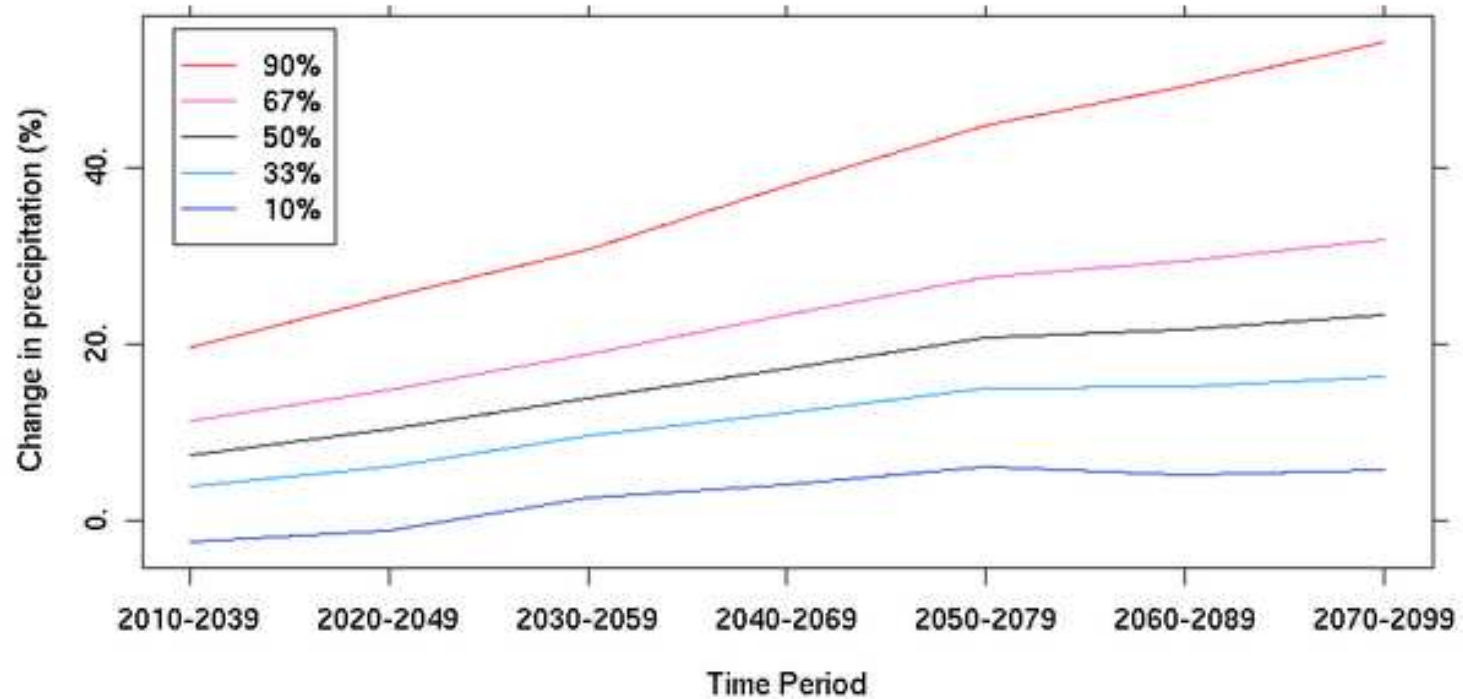


# South West England Projections: Winter Precipitation Change



## Plot Details:

Data Source: Probabilistic Land	Temporal Average: DJF
Future Climate Change: True	Spatial Average: Region
Variables: precip_dmean_tmean_perc	Location: South West England
Emissions Scenario: Medium	Probability Data Type: cdf
Time Period: 2010-2039, ..., 2070-2099	

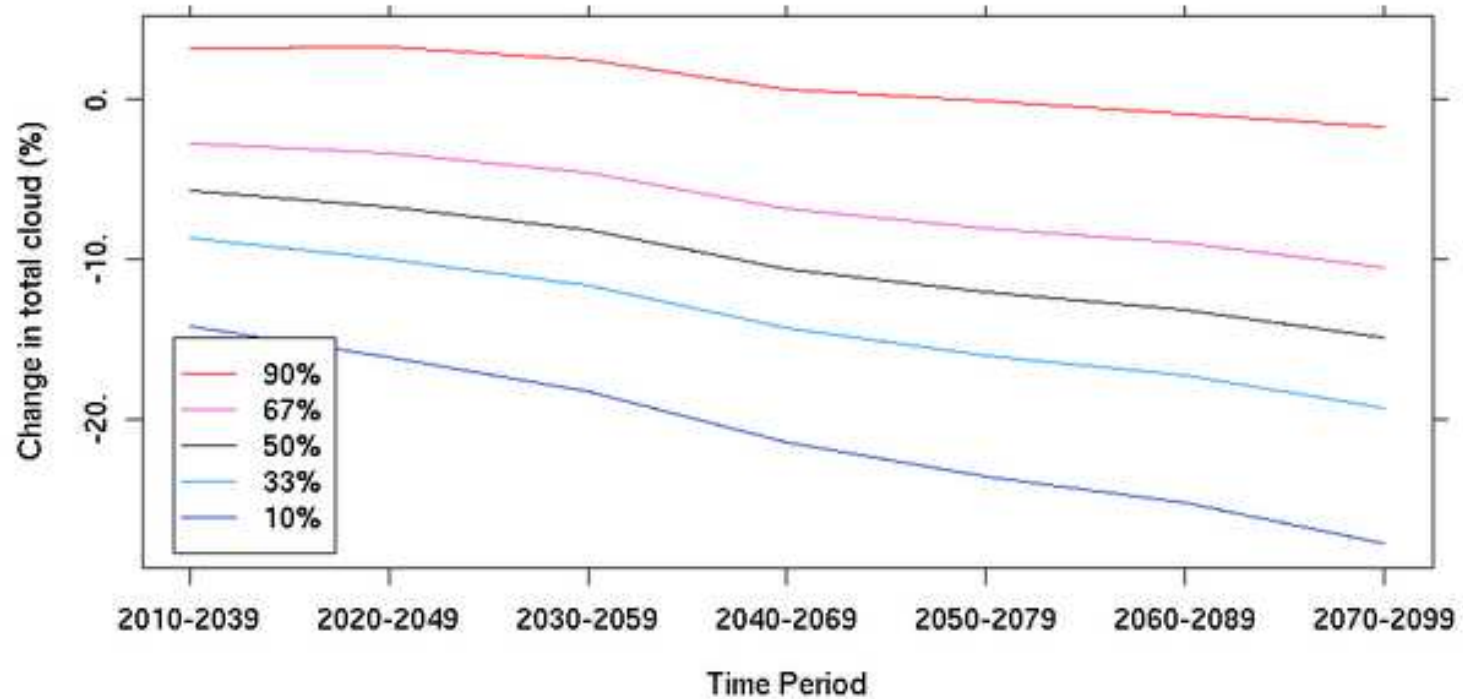


# South West England Projections: Summer Cloud Cover Change



## Plot Details:

Data Source: Probabilistic Land	Temporal Average: JJA
Future Climate Change: True	Spatial Average: Region
Variables: totalcloud_dmean_tmean_perc	Location: South West England
Emissions Scenario: Medium	Probability Data Type: cdf
Time Period: 2010-2039, ..., 2070-2099	



# Using UKCP09 in Your Decisions

- Using UKCP09 will be harder than UKCIP02
- **BUT** it will be worth the effort
- To adapt, you need to know:
  - Your system's sensitivity to climate
  - Your own attitude to risk
  - What the climate could do
- Probabilistic climate information allows more robust decisions
- UKCIP have a range of tools to help you in this process e.g. BACLIAT, Adaptation Wizard

# Summary

- Probabilistic projections (land and marine) for the whole of the UK – quantification of uncertainty, current state of the art
- UKCP09 is not just the probabilistic projections
  - Sea level rise, storm surge, multi-level ocean, waves
  - Weather generator (daily data)
  - Observed data
- Freely available and obtained from the UKCP09 web-site and the UKCP09 User Interface
- UKCIP is providing support, is keen to develop case studies where people have used UKCP09, and has a range of tools to help with making adaptation decisions

# Useful Links

## **UKCP09:**

<http://ukclimateprojections.defra.gov.uk>

## **UKCP09 User Interface (Projections Data):**

<http://ukclimateprojections-ui.defra.gov.uk/ui/admin/login.php>

## **UKCP09 Gridded Observed Data:**

<http://www.metoffice.gov.uk/climatechange/science/monitoring/ukcp09/>

## **UKCIP:**

<http://www.ukcip.org.uk>

**Helpdesk:** [enquiries@ukcip.org.uk](mailto:enquiries@ukcip.org.uk)

