

# UKCIP Approach to Adaptation

## The UK 'Adapting' to changing weather and climate

Taiwan, November 2008



# content

The need for 'Adaptation'

What is 'Adaptation' ?

Role of UK Central Government

Role of UKCIP (UK Climate Impacts Programme)

Alternative approaches to exploring 'Impacts' and 'Adaptation'

Combining current vulnerability and future scenarios

Overall approach to decision-making - UKCIP tools

# UK and Taiwan

## UK



245,000km<sup>2</sup>

51°N

60million

250p/km<sup>2</sup>

marine temperate

## Taiwan



36,000km<sup>2</sup>

23°N

23million

600p/km<sup>2</sup>

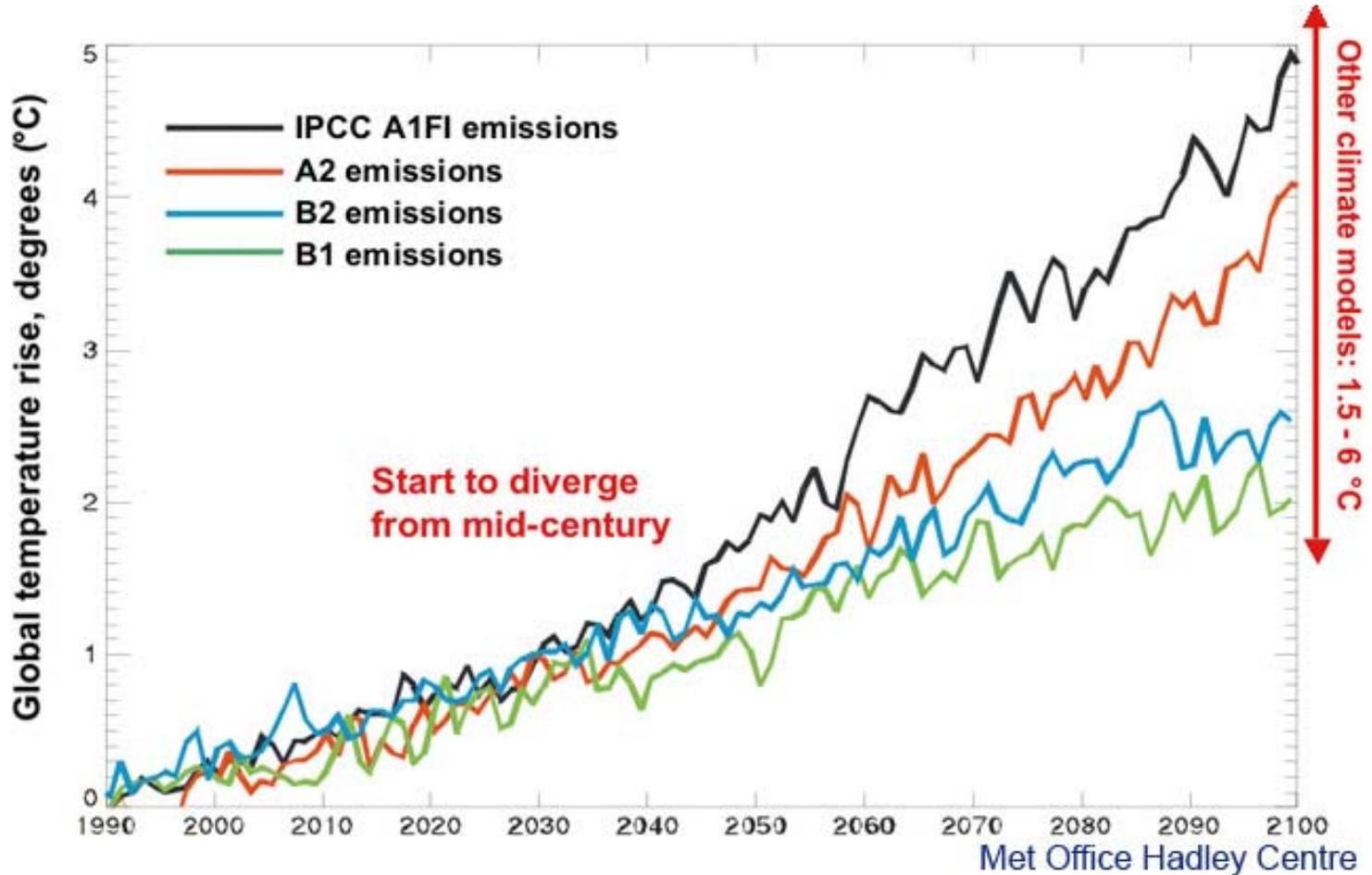
marine tropical

# The need for Adaptation



# Science of Climate Futures

climate change is unavoidable



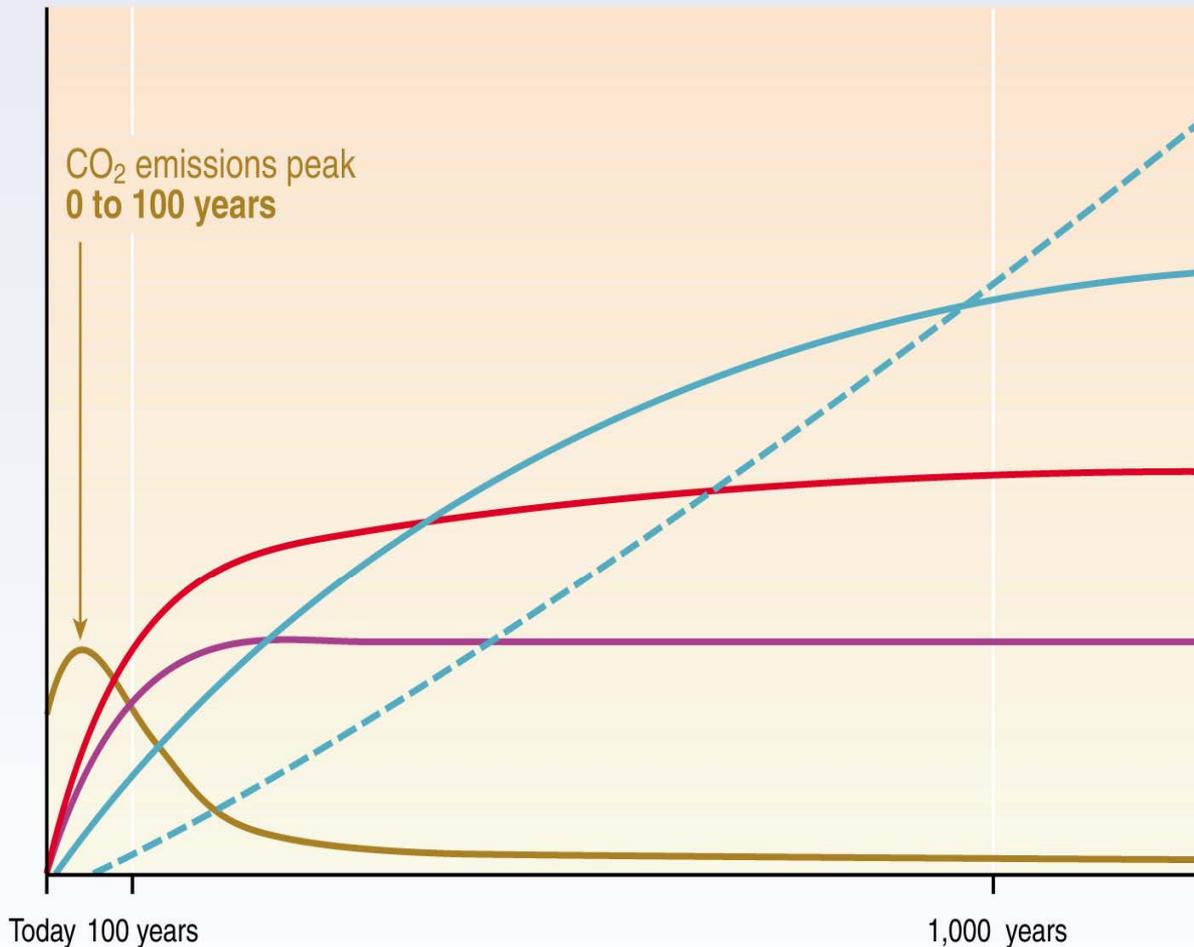
# Science of Climate Futures

unavoidable climate change is long lasting

## CO<sub>2</sub> concentration, temperature, and sea level continue to rise long after emissions are reduced

Magnitude of response

Time taken to reach equilibrium



Sea-level rise due to ice melting:  
**several millennia**

Sea-level rise due to thermal expansion:  
**centuries to millennia**

Temperature stabilization:  
**a few centuries**

CO<sub>2</sub> stabilization:  
**100 to 300 years**

CO<sub>2</sub> emissions

# Twin Responses to Climate Change

**“There are two methods of curing the mischiefs of faction:  
the one by removing its causes, the other by controlling its effects.”**

**James Madison et al, The Federalist Papers**

1. mitigation of climate change

slow down global warming by reducing greenhouse gas emissions

2. adaptation to climate change

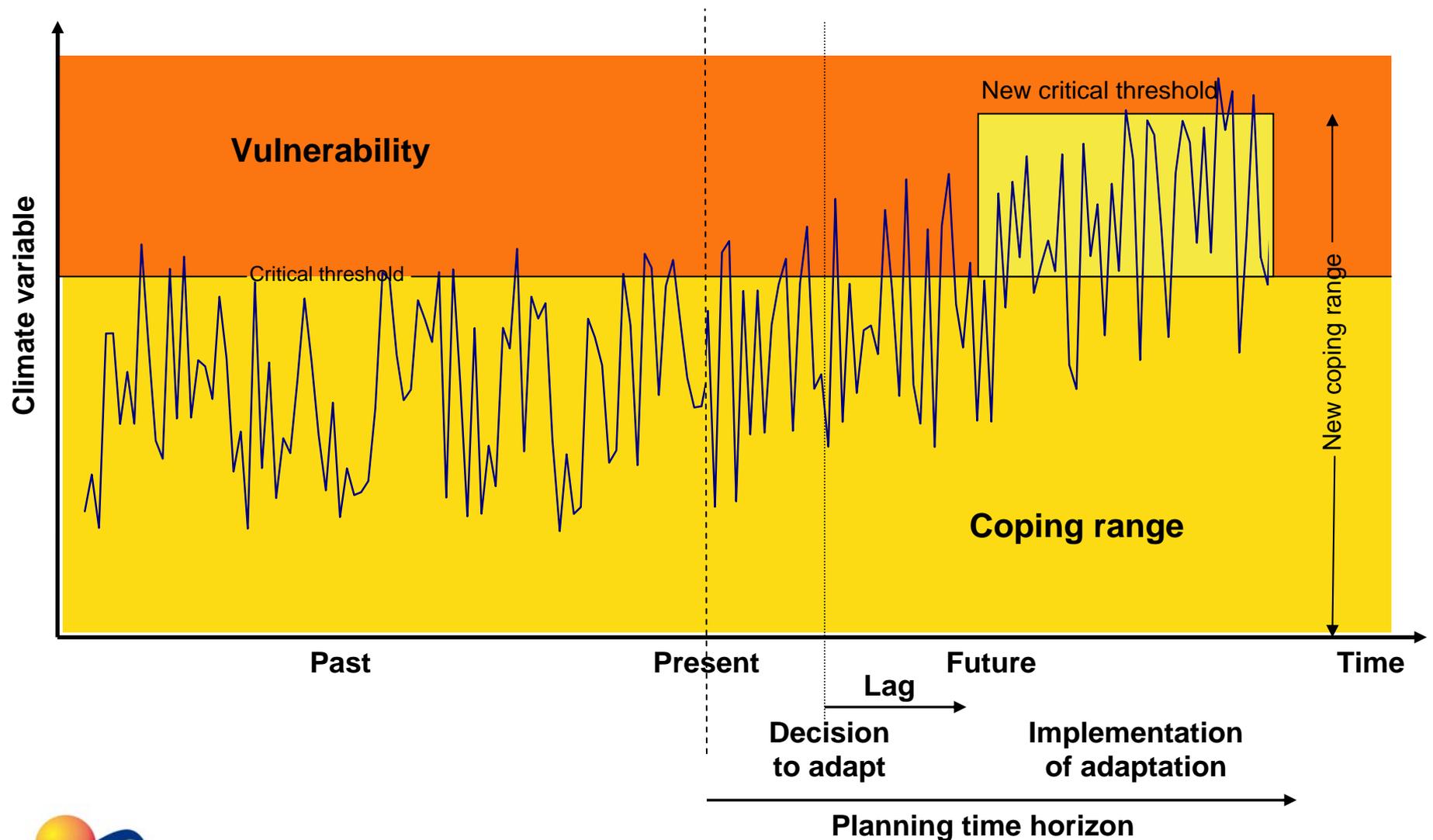
respond to the predicted impacts of unavoidable climate change

- the terms ‘weather related risks’ and ‘climate risks’ may be more useful when considering impacts and adaptation
- beware also of the use of the word ‘adaptation’ as meaning ‘adapting to a low-carbon economy’.

# Why adapt a local authority to Climate Change?

- Maintain council's service provision and political commitments
- Support vulnerable members of community
- Exploit (business) opportunities where they exist
- Manage risks proportionate to other risks
- Manage strategic assets and long-term investment
- Achieve Business Continuity for council etc. and local business
- Avoid unnecessary expenditure arising from impacts

# What is Adaptation?



# Distinguish between weather and climate

## Climate

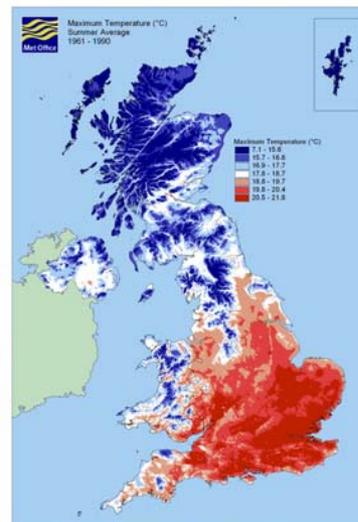
- the average weather in a locality over a thirty year period

*"Climate is what you expect –*

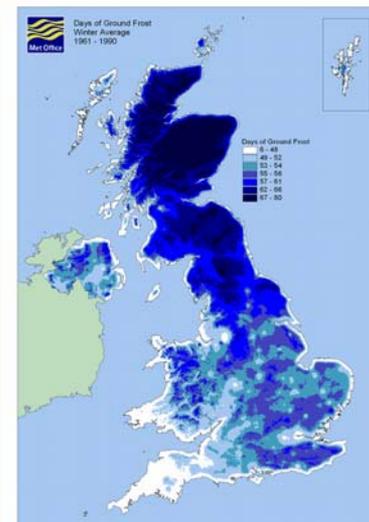
*weather is what you get!"* R.A. Heinlein 1973

## Weather

- what it is doing outside right now
- It is mainly extreme weather events, and their impacts, that present risks to society.



Max temp,  
Summer av. 1961-1990



Days of ground frost  
Winter av., 1961-1990



Oxford Eastern By-Pass: October 11th 2006

# Some typical impacts expected in the UK

## But remember that impacts are very specific to locality

- increased risk of flooding and coastal erosion
- pressure on drainage systems
- possible winter storm damage
- habitat loss
- summer water shortages
- low river/stream flows especially in summer
- increased subsidence risk in vulnerable locations
- increased thermal discomfort in buildings in summer
- reduced demand for winter heating
- increased demand for summer cooling
- drought impacts on crops and livestock
- etc

# Adaptation to changing weather might include:

- taking a bottle of water with you on the underground in summer
- having siestas in the middle of the day to avoid high temperatures
- more co-operation between agencies to reduce flood risk
- growing new varieties of potatoes to perform better in new climate
- undertaking research into potential impacts on vulnerable groups
- issuing sunblocker to primary schools in the south
- planting vegetation in uplands to reduce rate/quantity of run-off
- reducing/eliminating space-heating in offices in the south
- reducing paved areas in urban locations to reduce run-off
- landowners creating reservoirs to use winter water for summer use
- buying property in the north of and outside urban heat islands
- building eco-towns above 5m contour and etc
- etc

# Role of UK Central Government



# Role of UK Central Government

New Adaptation to Climate Change (ACC) Team in Defra

Works with other central government departments

Commissions research on impacts and adaptation

Commissions scenarios for future climate from Hadley Centre

'Mitigation' now with new Dept of Energy and Climate Change (DECC)

Climate Change Bill: Mitigation: targets for emissions reduction

Climate Change Bill: Adaptation: risk-based assessment of public bodies

Sponsors and oversees UKCIP

# Changing social and political context

**Stern Review**

**Carrier bags, air miles,**

**Climate Change Bills**

**Climate Change Declarations**

**Performance Indicators for Local Authorities**

**2006 Heatwave in England**

**2007 floods in Gloucestershire etc**

**Pitt Review on flooding**

**Forthcoming UKCIP08 Scenarios**

**UK Adaptation Policy Framework (APF)**

**New Defra Team (Adaptation to Climate Change: ACC)**

**[www.defra.gov.uk/environment/climatechange/adapt](http://www.defra.gov.uk/environment/climatechange/adapt)**



# The UK Climate Impacts Programme (UKCIP)

*“helps organisations to assess how they might be affected by climate change, so that they can prepare for its impacts”.*

- Set up by UK Government in 1997
- funded by Defra
- based at University of Oxford

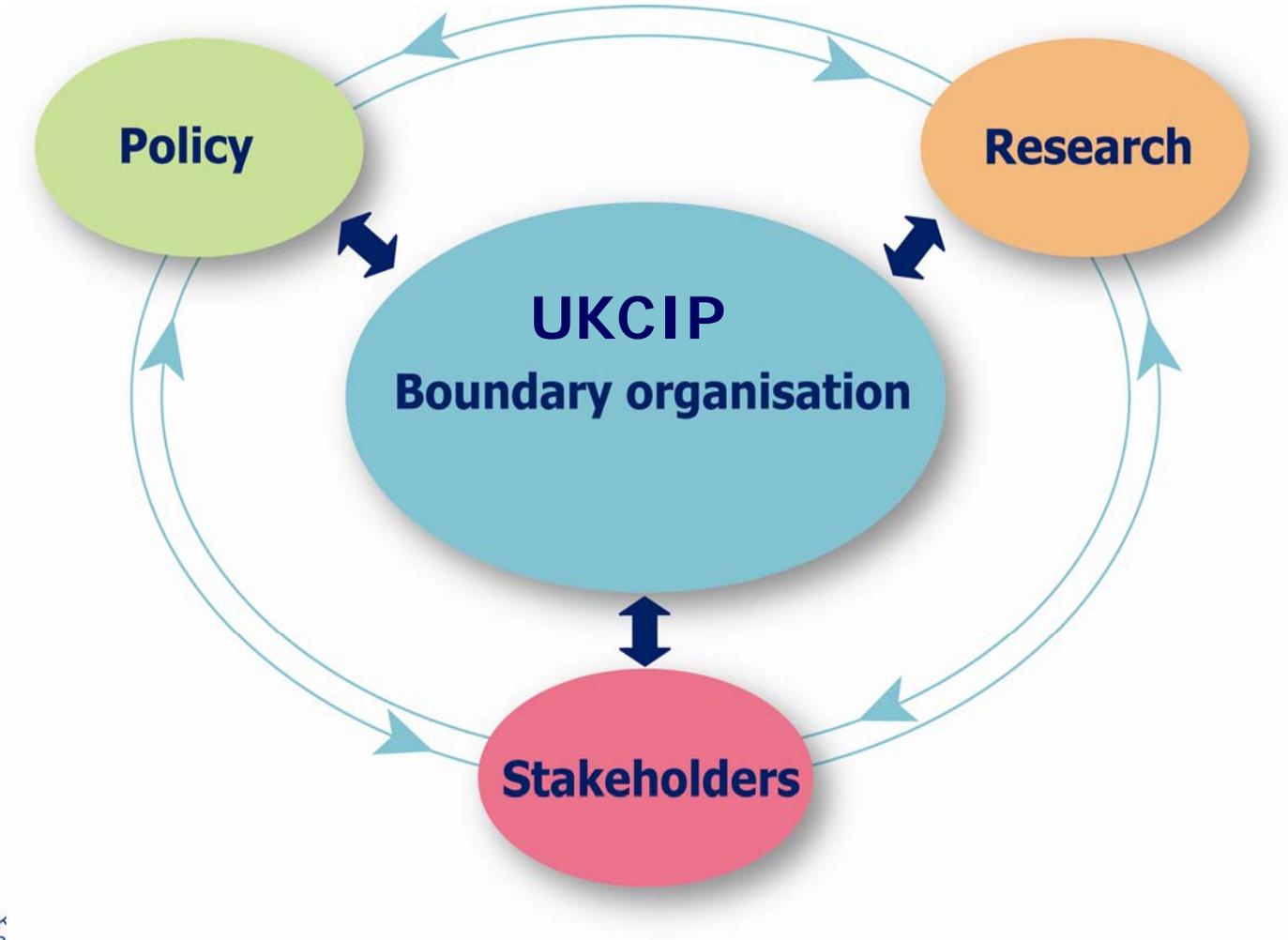
## Works through:

- stakeholder-led research
- partnerships
- programmes, and
- capacity building

Provides common tools and datasets. All freely available on request, or over the internet

# UKCIP is a 'boundary organisation'

UKCIP facilitates relationships between three groups of key actors



# UKCIP Work Programme

- 1 - Understand Vulnerability Impacts and Adaptation:  
Impact research, UKCIP08, National Risk Assessment
- 2 - Resources to support adaptation:  
Targets & Indicators, “Learning thro’ doing”, Wizard, other tools
- 3 - Build Capacity for Adaptation in stakeholders:  
Central Government, Climate Change Bill, Regions, LAs, Business
- 4 - Support UKCIP through communications:  
Website, Stakeholder community, Training, E-learning
- 5 - Learning From and Sharing Internationally.

# UKCIP Stakeholders

- Central Government Departments
- Agencies and Utilities (Environment Agency, Water Companies)
- Devolved Administrations (Scotland, Wales, Northern Ireland)
- 9 English Regions
- Local Government
- Business, business-facing organisations (Professions, Trade Bodies)
- Scientific and Academic Communities

Target stakeholders are professional decision-makers and planners.

UKCIP does **not** work with the general public and householders.

# Creating a Well Adapting Organisation

## Building Adaptive Capacity (BAC)

- undertaking research, institutional change, education and training,
- creating standards and legislation, management, and resources
- developing policies, plans, strategies

## Delivering Adaptation Actions (DAA)

- building flood defences or managing retreat
- putting more nails in a roof tile, increasing the diameter of a drain
- creating 'siesta' times in a business or a locality

# Two different approaches to Adaptation

## Scenarios Approach

typically used in 'Developed' Countries

(main approach of UKCIP)

using science-based, modelled projections of future weather and climate with which to explore potential impacts and responses

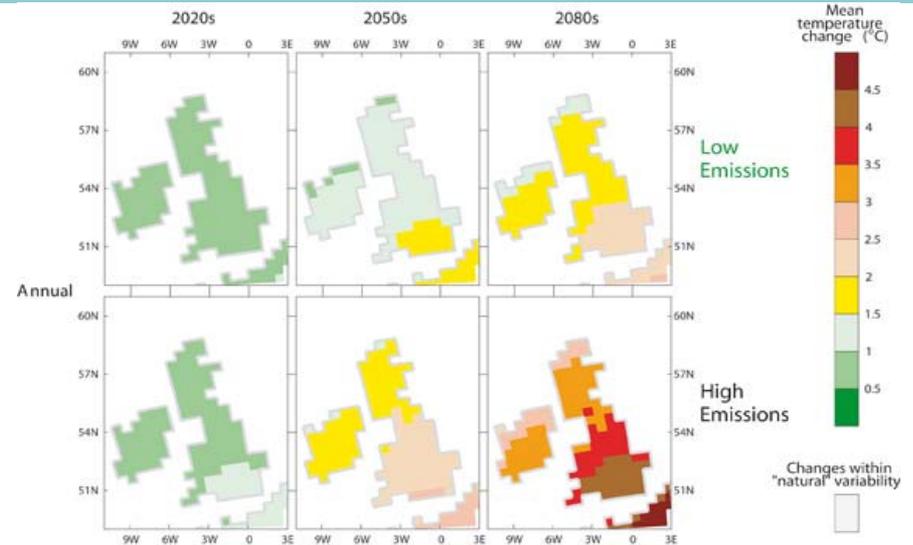
## Vulnerability Approach

typically used in 'Developing' Countries

(of increasing interest to UKCIP)

understanding the sensitivity of a system to climate variability, its exposure to risk and inherent capacity to adapt

depends on physical, social and economic characteristics as well as locality



# Scenarios led approach

- Focus on Climate Change – assumes “today” is OK
- Led by physical science model developers
- Uncertainty remains a barrier to decision-making
- Climate remains a separate issue
- Decision-makers will always need better data

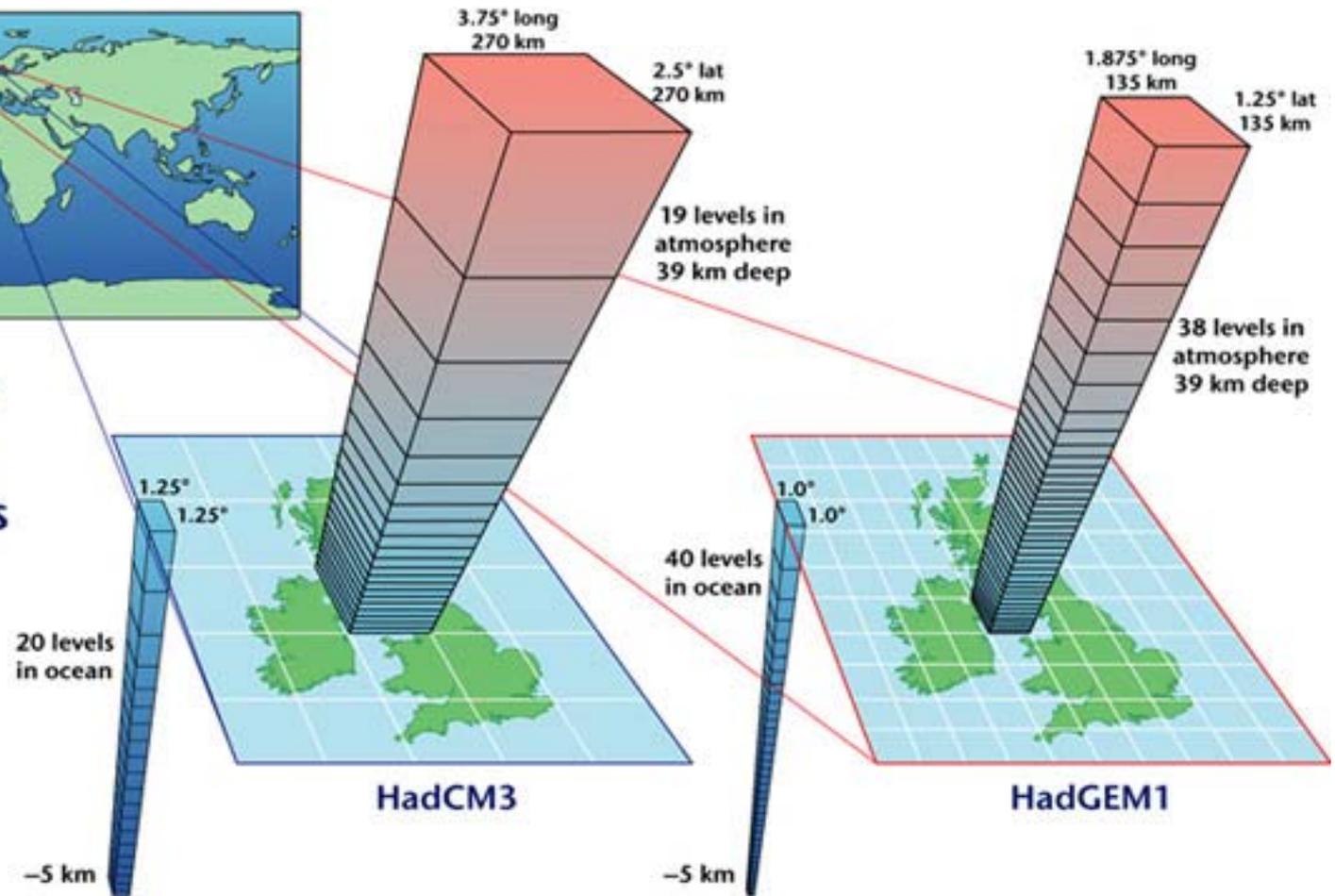
# Vulnerability led approach

- Focus on Climate Risks –assumes “today” needs attention
- Led by decision-makers
- Assess and manage current risks, then turn to future
- Uncertainty is made explicit and addressed
- Climate considerations are easier to mainstream into everyday
- Immediate benefits to “day job”

# Climate Scenarios: Physical Models



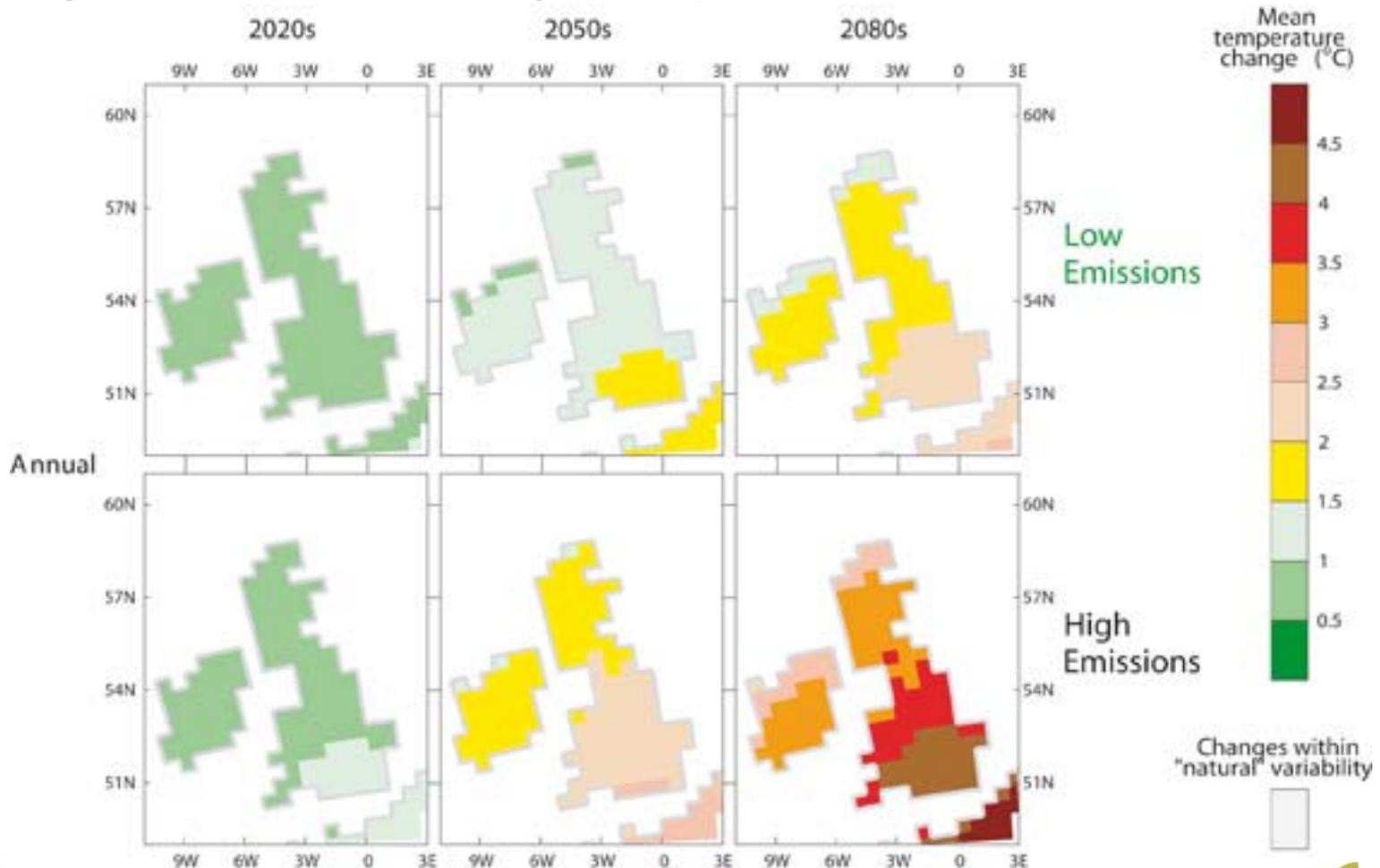
## Progression of Hadley Centre climate models



Met Office Hadley Centre

# Climate Projections for UK based on UKCIP02

## Changes in annual average temperature in UK



# Climate Projections for UK based on UKCIP02

Headline messages in a simple summary: no numbers; no maps

## Changes in annual / seasonal averages

- hotter, drier summers
- milder, wetter winters
- rising sea levels

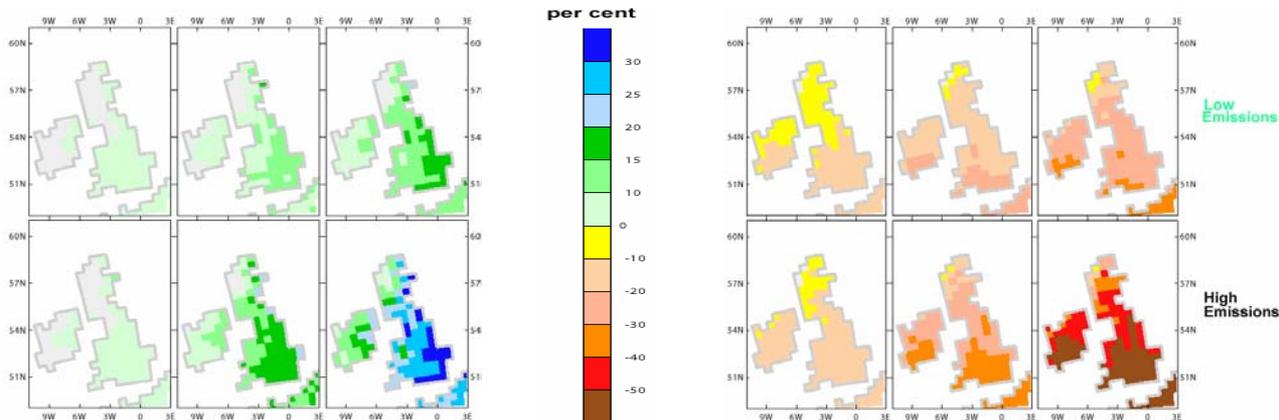
## Changes in extremes (both frequency and intensity)

- more very hot days
- more intense downpours of rain
- shorter return periods for high water levels at coast

*This level of understanding is enough for many decision types*

# Perceived limits of a Scenario-based approach

- presented in long time scales: but business planning horizon is short
- describes future **climate**: but we are more interested in **weather**
- includes high levels of uncertainty both in the models and in GHG emissions, so not considered a sensible basis for decision-making
- only offers projections of weather and not its impacts
- further investigation seems complex, so no action likely



# vulnerability

**Vulnerability: the extent to which a natural or social system is susceptible to sustaining damage from climate change. A function of the sensitivity of a system to changes in climate and the ability of the system to adapt to changes in climate. (*Adapted from IPCC, 2001*)**

## **Weather events manifest themselves locally**

eg torrential downpours of rain, wind/storm damage

## **Vulnerability to weather events is determined locally**

- physical conditions: coastal location, flood plain, topography, soil, geology
- economy: tourism, agriculture
- building stock: historic, 1960s, recent
- Ability of community and its organisations to respond to impacts



# A modest version of a vulnerability approach

## A Local Climate Impacts Profile: an LCLIP

### Start with Consequences of current local weather events

Offers a simple entry point to what can seem complex data:

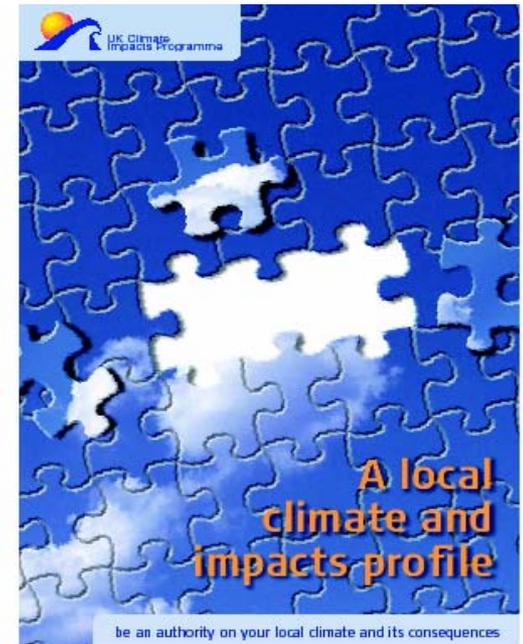
- based on popular media reports, not on challenging science
- based on explicitly local impacts
- relates real consequences to real weather events

Helps a Local Authority to understand better:

- the impacts and consequences of current extreme weather events
- the responses of councils and others to such events

Provides evidence with which to:

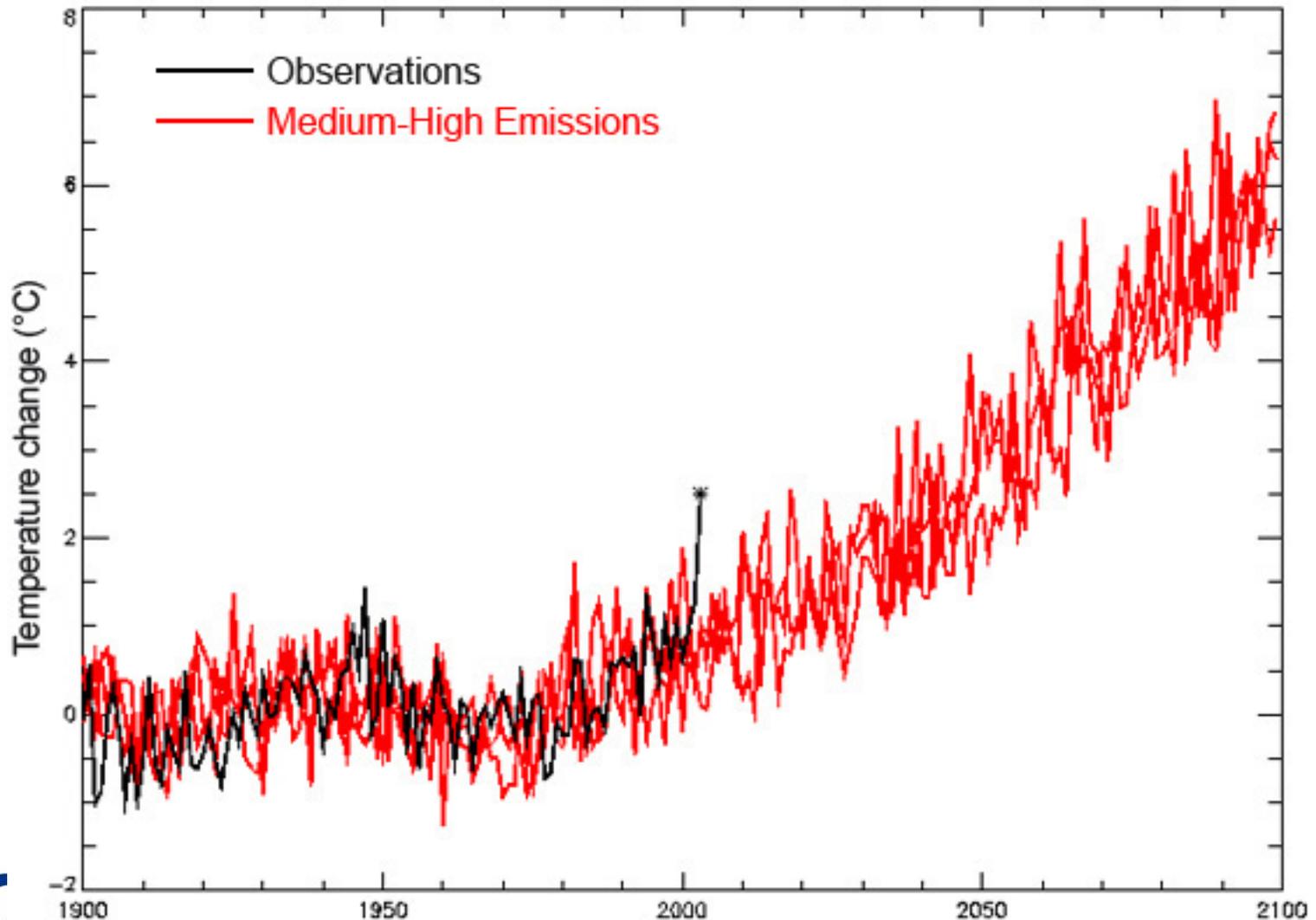
- approach management, service managers, elected council politicians
- determine thresholds for certain key impacts
- drive prioritisation and preparedness in the organisation



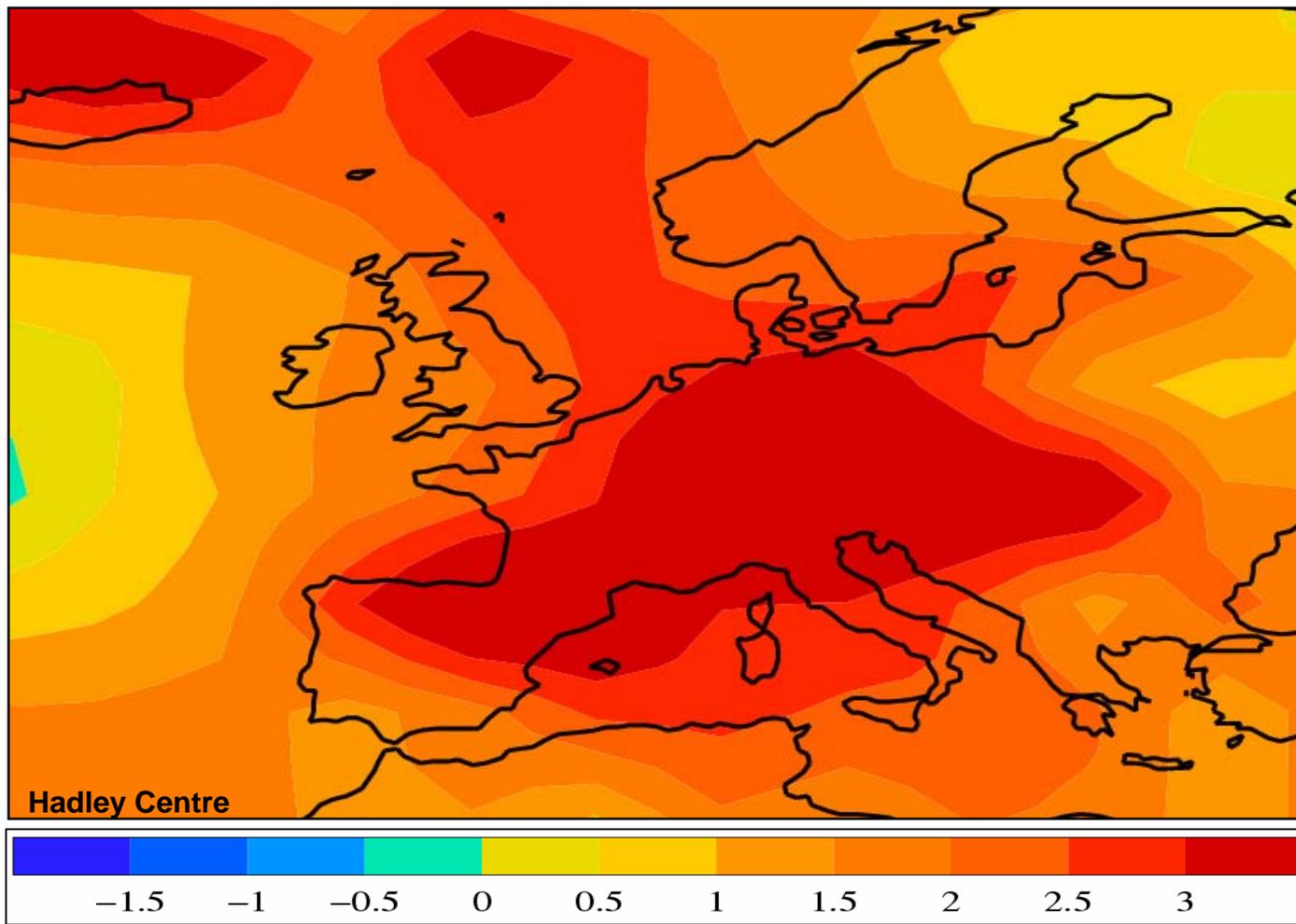


# Scenarios based approach

European summer temperatures 1900 to 2100



# Vulnerability based approach: the heat wave in Europe of 2003



**Europe:**

**30,000 deaths**  
attributed to the heat  
wave

**Forest fires and crop**  
damage seriously  
impacted economy

**Economic losses in**  
excess of £7.5bn

**England (3-14/8/03):**

**Excess mortality**

**All ages: 2091(17%)**

**>75: 1781(23%)**

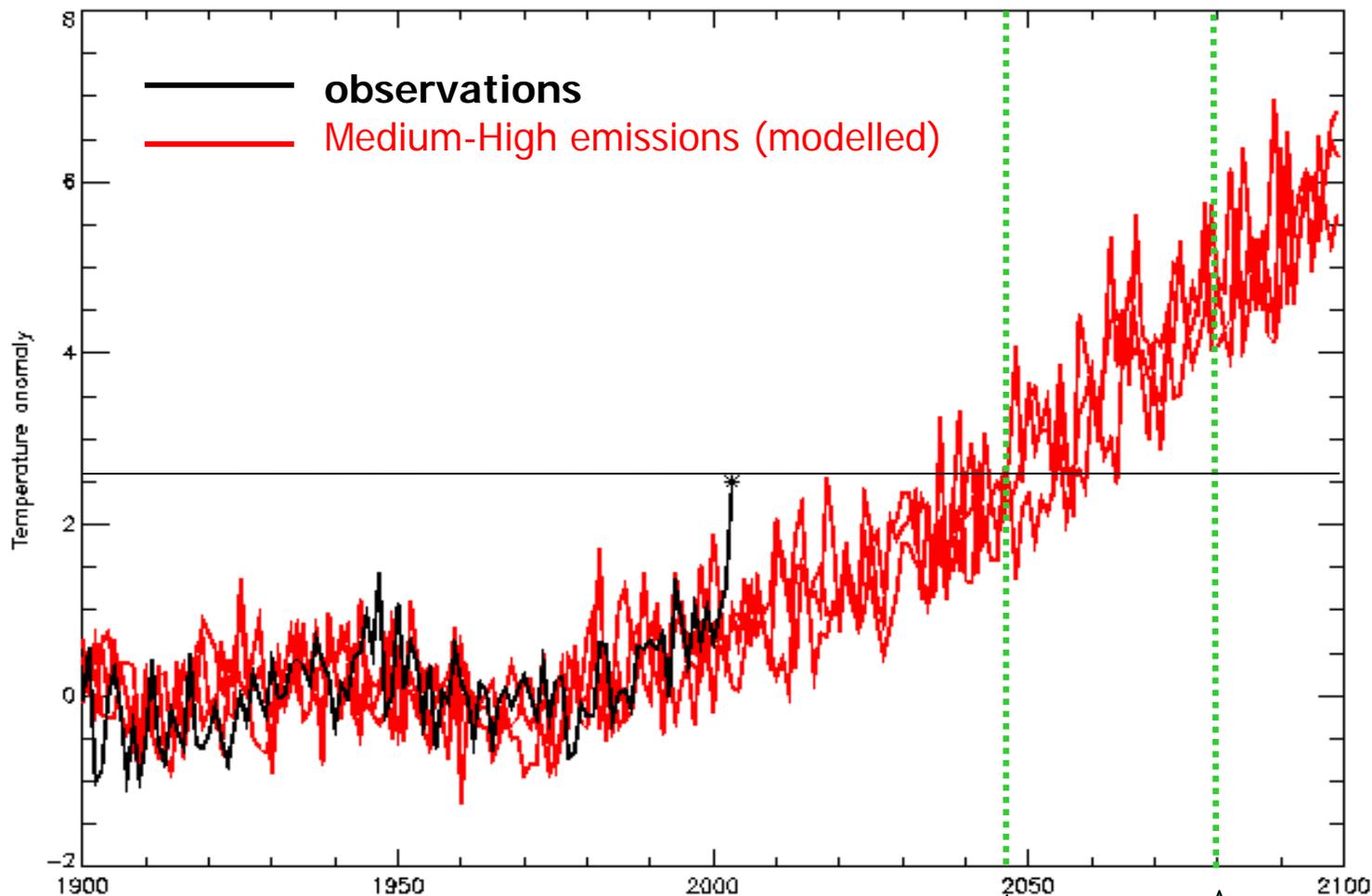
**Emergency hospital**  
admissions (>75)

**1490 (6%)**

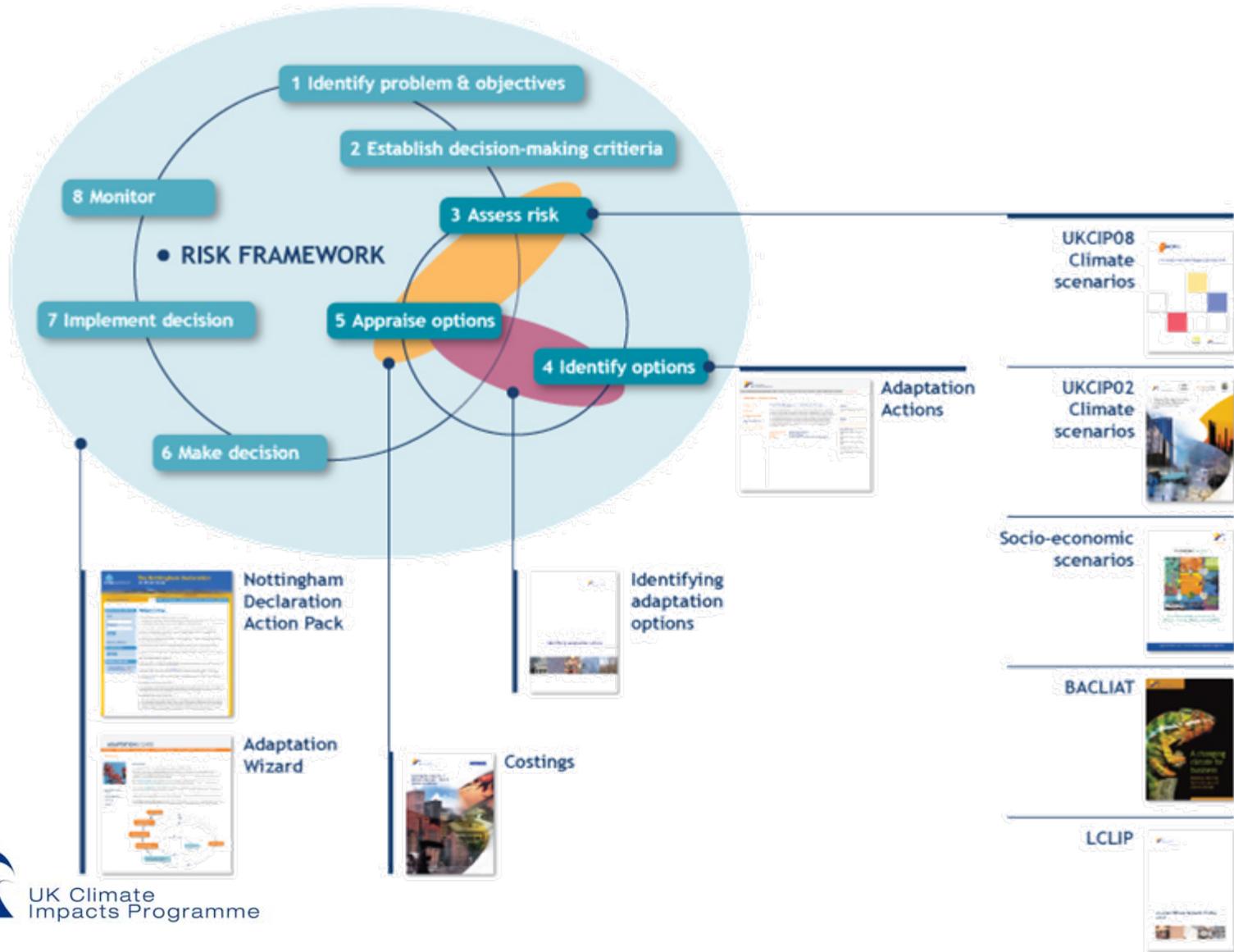
# UKCIP suggests a combination of the two approaches

The type of 2003 summer could be normal by 2040s, cool by 2080s

European  
summer  
temperatures

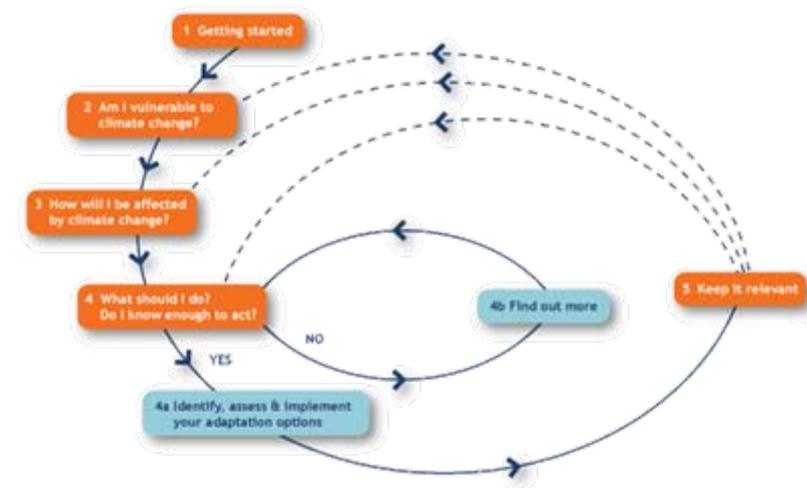


# UKCIP Tools portfolio



# The Adaptation Wizard

- the Adaptation Wizard is a tool to help you adapt to climate change
- it is a **5-step process** that will help you to:
  - o assess your vulnerability to current climate and future climate change
  - o identify options to address your key climate risks, and
  - o help you to develop a climate change adaptation strategy
- high level, simplified version of UKCIP's risk framework
- iterative, **question-driven** approach
- **answer all questions** using **resources**
- record answer in **notepad**
- refer to **checklist**, then move to next step



# Components of UKCIP08

## **Historical climate information**

Information on present UK climate and recent trends, based on observations

## **Probabilistic climate projections**

Information on modelled future climate change, provided in probabilistic terms

## **Marine projections**

Information on modelled future changes above and below the surface of sea areas around the UK

# SO...

UKCIP has developed a 'bottom-up' approach

Now UK central government has adopted a major role

What will be the emerging relationship? 'Top-down' vs 'Bottom-up'

We look forward to UKCIP08 probabilistic CC scenarios

But there are limitations. "What do we do next?"

Stakeholders need to understand overall decision-making methodology

UKCIP needs to build further on 'Adaptation Wizard'

# Thank-you for listening

[www.ukcip.org.uk](http://www.ukcip.org.uk)



# Semantics minefield

arrangements to mitigate the impacts of climate change

we can adapt existing buildings, but what about new ones?

immediate action to mitigate the effects of flood damage

need to adapt our buildings to be more energy efficient

will adapt our community to a low-carbon economy

we will create a well-adapted local authority

technical solutions to climate-proof our housing

install flood-proof defences

