

## R&D Technical Summary W5B-029/TS

# Climate change scenarios UKCIP02: Implementation for flood and coastal defence

### Background to R&D project

The potential impacts of future climate change are a consideration in most flood risk calculations, but until recently climate change information and guidance on its usage were limited. The United Kingdom Climate Impacts programme released new climate scenarios in April 2002. These provide information at a higher spatial and temporal resolution than had been available in the UKCIP98 report. Project W5B-029 addressed the appropriate and consistent use of the new information within the flood and coastal defence community of England and Wales.

Prior to release of UKCIP02, appropriate precautionary allowances had been established for future changes in sea level and river flow, chosen towards the upper end of the range of expectations. These allowances were reviewed, together with user requirements and climate change information available.

### Results of R&D project

The Project Record describes climate change user needs, a review of information available in UKCIP02 and recommendations for further research needed to facilitate take-up. The widely used ‘appropriate precautionary allowances’ recommended by Defra were reviewed and recommendations for appropriate and consistent application of climate change information are given in the Technical Report. The advantages of maintaining continuity with current allowances were thought to outweigh the value of major changes to the allowances. However, a new allowance for wave conditions is recommended, and it is noted that ongoing research may soon permit refinement of the rainfall and river flow allowances.

Parameter	Current practice	Recommendation and Comment
Mean sea level	For EA Regions – 6mm/yr for Anglian, Thames, Southern and North East (South of Flamborough Head) – 5mm/yr for South West and Wales – 4mm/yr for North West and North East (North of Flamborough Head)	No change  As previously – with a rider that use for extreme levels should be reviewed if higher extreme values, especially around the Thames Estuary are supported by future modelling
Extreme sea level	Usually assumed to be as for mean sea level	No change, but review if higher values for Thames and Anglian are supported by other models
High and extreme rainfall and river flow	Test sensitivity to additional 20% in peak flow or volume over 50 years	No change to sensitivity allowance, but ongoing research may lead to refinements
High and extreme wind speeds and offshore wave conditions	None	Add 10% sensitivity allowance to offshore wind speeds and wave heights by 2080s (and 5% to wave periods). New recommendation – needs to be considered in relation to depth limited conditions inshore

Different types of calculation or decision require different levels of climate change assessment. Where practical, it is noted which input data to use for each type of task, whether full modelling is needed or whether a sensitivity test would be adequate. Papers presented to two conferences of river and coastal engineers helped to raise awareness of this work.

### **R&D Outputs and their Use**

The principal output is the R&D Technical Report: Guidance for Users. This provides information on how to apply UKCIP02 climate change information in an appropriate and consistent manner across a range of flood and coastal defence tasks. The target audience is technically competent persons within organisations such as Defra, the Environment Agency, local authorities, consultants, developers etc. for use in day-to-day activities. It is not intended for use by specialist climate change modellers or in major national climate impacts studies, where more sophisticated approaches may be appropriate.

A Project Record with the information about climate change related user needs, a review of information available in UKCIP02 and recommendations for further research needed to facilitate take-up has also been produced.

Following completion of this R&D project, advice was provided to operating authorities on the use of the new scenarios for flood and coastal management. This supplementary guidance may be found at: <http://www.defra.gov.uk/enviro/fcd/pubs/pagn/Climatechangeupdate.pdf>

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This R&D Technical Summary relates to R&D Project W5B-029 and the following outputs:

- UK Climate Impacts Programme 2002 climate change scenarios: Implementation for flood and coastal defence: User needs, scenario components and recommendations. R&D Project Record W5B-029/PR, dated April 2003.
- UK Climate Impacts Programme 2002 climate change scenarios: Implementation for flood and coastal defence: Guidance for users. R&D Technical Report W5B-029/TR, dated April 2003.
- UK Climate Impacts Programme 2002 climate change scenarios: Implementation for flood and coastal defence. Defra Conference of River and Coastal Engineers, Keele, September 2002.
- Use of UKCIP02 climate change scenarios in flood and coastal defence. CIWEM Rivers and Coastal Group Winter Meeting, January 2003.
- Supplementary Note on Climate Change Considerations for Flood and Coastal Management. Defra Flood Management Division / Environment Agency, April 2003.

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The above outputs are available on the Environment Agency website ([www.environment-agency.gov.uk/floodresearch](http://www.environment-agency.gov.uk/floodresearch)). Copies are held by all EA Regional Information Centres and can be purchased from the Environment Agency's R&D Dissemination Centre, c/o WRC, Frankland Road, Blagrove, Swindon, Wiltshire SN5 8YF (Tel: (+44) 1793 865012; Fax: (+44) 1793 514562; email: [publications@wreplc.co.uk](mailto:publications@wreplc.co.uk)).

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