Coastal flooding

A large and increasing fraction of the world’s population lives along coastlines and significant numbers are already vulnerable to coastal flooding in both the developed and developing world.

This exposure is likely to increase as sea level rises with climate change. In some locations future changes in tropical storms and storm surges may further add to the risk of flooding. Projections of future change, particularly if they include quantified risk assessment, give governments the opportunity to plan sea defences and other infrastructure developments.

They also enable them to understand their vulnerability and to articulate what they need from a future post-2012 framework.

BANGLADESH

Coastal flooding is a particular problem for Bangladesh, with a large population living within 1 or 2 metres of the high-water mark and few coastal defences. The Met Office Hadley Centre worked with the Proudman Oceanographic Laboratory in the DFID-funded CLASIC project to combine climate predictions with coastal and storm surge models. This has enabled an assessment of coastal flood risk for selected regions. This system could be adapted to work with weather forecasts to provide an improved storm-surge early warning system, as used in the UK. It could also be extended to improve estimates of the uncertainty in future climate predictions.
“We commissioned the Met Office Hadley Centre, working with POL and CEH, to develop the latest innovative science to produce an excellent set of state of the art predictions for sea level rise, surge and river flows. We think it is an outstanding example of linking developing science to a very real task, helping us plan the future of flood risk management for London and the Thames Estuary for the next century.”

Tim Reeder
Regional Climate Change Programme Manager
Environment Agency Thames Region

THE UK ENVIRONMENT AGENCY is taking steps to develop coastal and river defences that will protect London from flooding until the end of this century. The Met Office Hadley Centre worked with POL\(^1\) to supply assessments of coastal flood risk in the future, and with CEH\(^2\) to supply consistent estimates of peak river flows. The results enable a more accurate assessment of the future flooding threats to London, and thus inform cost-effective decisions on upgrading the Thames Barrier.

THE KEY FINDINGS FROM THIS NEW RESEARCH ARE AS FOLLOWS:

- Water levels in the Thames Estuary are likely to rise by between 20 cm and 90 cm over the next century due to thermal expansion of the oceans, melting glaciers and polar ice. There remains much uncertainty over the contribution of polar ice melt to increasing sea-level rise. At the extreme, sea level may rise by a total of up to 2 metres by 2100.

- Climate change is less likely to increase storm surge height and frequency in the North Sea than previously thought.

- Future peak freshwater flows for the Thames, at Kingston for instance, could increase by around 40% by 2080.

CRUCIALLY, IN TERMS OF THE THAMES ESTUARY, THIS RESEARCH MEANS THAT:

- We have greater confidence that current Government predictions for sea-level rise in the Thames Estuary are realistic.

- The Environment Agency’s Thames Estuary 2100 project is using the best available climate-change science to plan for future flood risk management and coastal erosion in the Thames Estuary.

- The previous worst-case scenario of increases in maximum water levels can be revised down from 4.2 metres to 2.7 metres. Such a reduction in worst-case scenario for this century means that a costly tide-excluding estuary barrage is much less likely to be necessary to manage flood risk this century.

\(^1\) Proudman Oceanographic Laboratory

\(^2\) Centre for Ecology & Hydrology

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