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Editorial

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In recent years there has been a growing concern about the evidence of climate change and, in particular, the important factors associated with increasing flood risk, particularly through the impacts of rising sea levels and stormier weather. A recent Foresight Future Flooding[1] report highlighted other important factors, including land use, increased urban development, and increased wealth, with all of these factors potentially contributing to increased flood risk to domestic and industrial properties. Figures for annual damage from flooding could rise from the present level of £1 billion to about £25 billion in the worst case scenario and the number of people at high risk from flooding could rise from 1·5 million to 3·5 million. Although more effective land management is recognised as being a means of helping to reduce the flood risk for many cases, in the worst-case scenario land management may be of little benefit and greater use of flood defences will be required. Around 5 million people, in 2 million properties, live in flood risk areas in England and Wales. In addressing these challenges engineers and scientists involved in flood risk management are increasingly using more accurate digital terrain data and more sophisticated and accurate computational models (or hydroinformatics tools) for predicting peak flood elevations, flood inundation extent and flood propagation velocities. These hydroinformatics tools are not only being used by members of our Institution to address the challenges of flood risk management within the UK, but they are also being used to address some of the major challenges in overseas developing countries, where the consequences of floods can be devastating, both in terms of loss of property and, in particular, loss of life. In many of these countries floods can also lead to a considerable increase in water-borne disease and engineers and scientists are extending their models to include epidemiological models and health risk assessment. According to figures published by the World Health Organisation and UNICEF over half of the hospital beds in the world today are occupied by people with water-borne diseases and the prevalence of some of these diseases is exacerbated by flooding.[2]

In line with these challenges of managing flood risk, my colleagues and I on the Editorial Panel are very pleased to bring you this special issue on flooding, primarily focused on the formation of the Flood Risk Management Research Consortium and, in particular, the research underway within the Whole Systems Modelling priority area, led by Professor Garry Pender of Heriot Watt University. The Flood Risk Management Consortium is funded and supported primarily by: the Engineering and Physical Sciences Research Council, the Environment Agency, the Department for Environment, Food and Rural Affairs, the Natural Environment Research Council, the Scottish Executive, the Rivers Agency Northern Ireland and UK Water Industry Research.

In this special issue there are eight papers, with the first paper reporting on the formation of the Flood Risk Management Consortium and the research underway in the whole systems modelling priority area. This is followed by three papers on the development and application of computer models; the second paper (University of Bristol) involves solving the continuity and Manning's equations using a storage cell structure for predicting inundation extent on the floodplain. The third paper (Cardiff University and Halcrow) involves the dynamic linking of a one- and two-dimensional deterministic model for predicting flood elevation and inundation extent over the floodplain; likewise the fourth paper (University of Nottingham) involves linking a one- and two-dimensional model, but based on a Riemann solver approach, with comparisons being made with a storage cell model. The next two papers are related to data management, with the fifth paper (Neelz *et al.*) evaluating the benefits of using remotely sensed data to support flood modelling, and the sixth paper (Hammond and Han) investigates the impact of digital elevation maps on the accuracy of computer model predictions. The seventh paper (Evans *et al.*) discusses the Foresight Future Flooding project and its impact on the new Government strategy for flood risk management and Making Space for Water. Finally, the last paper (Li *et al.*) describes the development of a three-dimensional deterministic numerical model and an interesting application of this model to a site redevelopment aimed at minimising flood protection measures to address the risks of both fluvial and tidal flooding.

In the meantime our Panel very much hope that you will welcome this special issue and we are currently planning further special issues on Groundwater, Hydroinformatics Tools for the Water Industry, and Flooding from an International Perspective, to mention but a few. If you have any views on areas where we might consider planning other special issues, then the Editorial Panel would welcome your comments.

REFERENCES

1. www.foresight.gov.uk/Previous_Projects/Flood_and_Coastal_Defence/index.html
2. World Health Organisation/UNICEF. *Global Water Supply and Sanitation Assessment.* WHO/UNICEF, Geneva, 2000.