Go with the flow in flood prediction

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Floods have once again wreaked havoc across the country and climate scientists and meteorologists suggest that the problem is only going to get worse with wetter winters and rivers bursting their banks becoming the norm. A team based at Newcastle University and their colleagues in China have developed a computer model that can work out how the flood flow will develop and where flooding will be worst based on an understanding of fluid dynamics and the underlying topology of a region.

Writing in the journal *Progress in* Computational Fluid Dynamics, Newcastle civil engineer Qiuhua Liang and colleagues and Chi Zhang of Dalian University of Technology and Junxian Yin China Institute of Water Resources and Hydropower Research in Beijing explain how they have developed an adaptive computer model that could provide accurate and efficient predictions about the flow of water as a flood occurs. Such a model might provide environmental agencies and authorities with a more precise early-warning system for residents and businesses in a region at risk of flood. It could also be used by insurance companies to determine the relative risk of different areas within a given region and so make their underwriting of the risk economically viable.

The model is based on a numerical solution to the hydrodynamic equations of fluid flow . This allows the researchers to plot the likely movement of water during a dam break or flash flood over different kinds of terrain and around obstacles even when flood waves are spreading rapidly. The researchers have successfully tested their model on real-world flood data.

The team points out that flood disasters have become a major threat to human lives and assets. "Flood management is therefore an important task for different levels of governments and authorities in many countries", the researchers explain. "The availability of accurate and efficient flood modelling tools is vital to assist engineers and managers charged with flood risk assessment, prevention and alleviation."

More information: A first-order adaptive solution to rapidly spreading flood waves, *Progress in Computational Fluid Dynamics*, 2013, 13, 1-10.

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