

Real-time flood monitoring

An intelligent flood monitoring system that could give advance warning of the type of local floods that have been engulfing parts of the UK this summer is under test in the Yorkshire Dales. Unlike most current systems which issue general flood warnings over large areas, the new system promises rapid, low-cost warnings specific to particular flood-prone sites. Funded by the North-West Development Agency, it is based on a network of intelligent sensors which communicate with each other to form a computing grid using software developed under the Open Overlays e-Science project.

The sensors are placed in different locations across a flood plain to record water depth. A digital camera, placed on the river bank, monitors flow rate from the speed of flotsam between two points. Each sensor incorporates a powerful computer, no bigger than a packet of gum, which communicates wirelessly with other sensors in the network to form a computing grid. "As soon as the sensors detect water coming down the valley, the network gears up," says Danny Hughes, a member of the team developing the system at Lancaster University.

In order to provide flood warnings, the system makes use of flood forecasting models which can be run on the sensor computing grid and adjusted so that their predictions stay in line with what the sensors are recording. "An interesting possibility is to use such a local warning system to give advanced warning, even in catchments where the response to rainfall is very fast, making flood forecasting very difficult," suggests Professor Keith Beven of Lancaster who is also involved in the project.

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A depth monitoring sensor before and during a flood