



## **Evaluation of uncertain inundation models using uncertain SAR observations of floods**

Giuliano Di Baldassarre (1), Guy Schumann (2), and Paul Bates (2)

(1) UNESCO-IHE Delft, The Netherlands, (2) School of Geographical Sciences, University of Bristol, UK

A methodology to evaluate hydraulic models using uncertain flood extent maps derived from satellite imagery is described. The study was performed on a river reach of the Lower Dee, UK, where a coarse resolution image (ENVISAT ASAR) and high resolution satellite image (ERS-2 SAR) were acquired at the same time during the December 2006 flood event. Ten different flood extent maps were derived from the two flood images by using five different procedures to process these data. These flood extent maps were used to perform a sensitivity analysis of a simple raster-based inundation model (LISFLOOD-FP). The sensitivity analysis enabled us to investigate the capability of the two different resolution images to calibrate the friction parameters of the flood inundation model. The analysis shows that the optimal parameters of the model depend on the type of satellite image used to evaluate the model as well as on the particular procedure used to derive the flood extent map. Finally, the study developed a novel methodology to calibrate flood inundation models by comparing the model results to a probability of inundation map obtained by combining the ten different flood extent maps.