

Interactive comment on “Improved estimation of flood parameters by combining space based SAR data with very high resolution digital elevation data” by H. Zwenzner and S. Voigt

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Received and published: 6 November 2008

This is a nice flood application of a very new SAR instrument. It is generally well written and presents a good structure. However, some parts, particularly the second case study, could largely be improved.

Suggestions to improve:

Introduction:

*More references should be put in for the verification of models with SAR extent. Al-

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though the reference of Bates et al., 2006 is very appropriate here, the authors may want to have a look at: Pappenberger, F., K. Frodsham, K. Beven, R. Romanowicz, and P. Matgen (2007), Fuzzy set approach to calibrating distributed flood inundation models using remote sensing observations, *Hydrology and Earth System Sciences*, 11, 739–752. Also, there is a very nice paper on merging LiDAR with image processing on SAR: Mason, D. C., M. S. Horritt, J. T. Dall’Amico, T. R. Scott, and P. D. Bates (2007), Improving river flood extent delineation from Synthetic Aperture Radar using airborne laser altimetry, *IEEE Transactions on Geoscience and Remote Sensing*, 45, 3932–3943.

*The authors say that image shifting to correct for positional inaccuracies for local level extraction is one of their aims. A near identical procedure has been proposed in other studies: G. Schumann, A. Black, M. Cutler, J. B. Henry, L. Hoffmann, P. Matgen, and L. Pfister, Hydraulic and event knowledge to reduce the positional uncertainty in SAR flood images for improved flood model calibration and development, in *Proc. 7th Int. Symp. Spat. Accuracy Assessment Natural Resources and Environ. Sci.*, Lisbon, Portugal, Jul. 5–7, 2006, pp. 633–642. Some reference to this work is also given in the paper on line 21 on page 2965. Despite the similarities to this paper, the authors do not give any reference to the studies in their method section!

Elbe part:

*There is not enough information on the Radarsat image used. Is it VV or HH? *I think the very large disagreement in Figure 3 between the SAR and IKONOS only within 3 hours could be an indication that there is too much distortions from the proximity of the urban areas and thus would indicate that for such a situation traditionally available SAR images do not work well and that there is thus a need for much more appropriate radiometric as well as higher spatial resolutions, such as provided by TerraSAR-X in such situations. This or a similar conclusion could be put at the end of the Elbe case study, as it highlights the need for TerraSAR-X.

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Severn part:

*The cross sections on Fig. 5 are plotted on two rivers showing a confluence (River Avon in NE and Severn). Which one is plotted in Fig 6. and 7.? Need to be clear, as I would expect to see a divergence in the water surface on the graph at some point along the river if the two rivers were plotted!

*Fig. 7 seems to indicate that the reach length is far too short for this topographic gradient (for the River Severn for instance it is only around 60 cm over 7 km. Probably around 20 km would have accounted for some irregularities and as a result you would be very likely to have more of a downward trend too.

*The authors claim that the variations in Fig. 7 are due to some classification errors (which ones?) and vegetation height instead of bare ground elevations. Are the authors not using a bare ground DEM from the Env. Agency? If so, why not? If the authors mean remaining very short vegetation (which the LiDAR erosion algorithm did not remove) they should clearly state this. I do not believe that remaining very short vegetation in some local areas could have that much of an effect.

*The authors state that possible explanations for the difference within 15 hrs observed in Fig. 6 could be: - the flood situation was recorded between two flood waves or there was a breach. These two possibilities need to be checked in detail - a tidal influence. I think it is quite unlikely that a tidal influence would reach as far as the Tewkesbury location

*Generally the part on the River Severn needs to be re-visited by the authors. I believe much can be improved here, which may well show that TerraSAR-X has the potential to support flood management close to or even inside urban areas

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 5, 2951, 2008.

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