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Hydrology and Earth System Sciences Discussions

Interactive comment on "The benefit of high-resolution operational weather forecasts for flash flood warning" *by* J. Younis et al.

J. Younis et al.

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Corrections for S. Drobot (Referee) drobot@colorado.edu Received and published: 19 March 2008

–> The authors thank the referee for his generally very positive feedback.

Specific Comments: 346:11 – I believe that the term "ground truth" is a misnomer, as we can be neither sure that the in situ data is accurate nor precise. A better term would be "surface validation".

–> The term ground truth is in fact a controversial expression and therefore the truth was already put in quotes, however, the same applies to “surface validation” since you can only validate if you are sure of your data. So we replace it simply with “ground measurement” as suggested by another referee.

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347:11 – Numerous studies have already looked at the potential change in flood occurrence under climate change [Milly et al., 2002; Palmer and Räisänen, 2002]. I suggest the authors use either these or some more up-to-date references to back up this statement.

Milly, P.C.D., Wetherald, R. T., Dunne, K. A., and Delworth, T. L., 2002. Increasing risk of great floods in a changing climate. Nature 415, 514–517. Palmer,T. N., and Räisänen, J., 2002. Quantifying the risk of extreme seasonal precipitation events in a changing climate. Nature 415, 512–514.

–> Palmer reference added as this refers to flash-floods. Milly et al refers to larger scale floods and has therefore not been listed here. Other references have been found instead.

347:24 – The danger in a flash flood is also strongly related to the human element. Depending on how many people live in an area, land-use patterns, and issues surrounding vulnerability, resiliency, and the availability/status of warning systems, flash flood impacts can range from minimal to disastrous.

–> The authors fully agree with this statement. However, a study of vulnerability would be beyond the scope of this paper and has therefore not been addressed here. There is, in fact, a paper submitted on this topic and for this case study to the Journal of Hydrology (Ruin et al., Human exposure to flash-floods – relation between flood parameters and human vulnerability during a storm of September 2002 in Southern France; submitted to Journal of Hydrology (2008)

348:1 – The Austin (1987) reference is fine but slightly out of date. A more recent and thorough report on weather radars and flash flood forecasting is “Flash Flood Forecasting over Complex Terrain: With an Assessment of the Sulphur Mountain NEXRAD in Southern California” by the US National Research Council

–> Agreed, we add the suggested reference:Board on Atmospheric Sciences

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and Climate, FLASH FLOOD FORECASTING OVER COMPLEX TERRAIN, THE NATIONAL ACADEMIES PRESS, http://www.nap.edu/catalog.php?record_id=11128, 2005 

354:3 – The authors note that they are using thresholds based on a previously tested approach. Can the authors provide more details on how the various thresholds relate to flash flood impacts? The idea is that if we are developing a new flash flood warning system and using thresholds such as "severe", "high", etc., it would be good to assess how the various threshold levels relate to the impacts in terms of property damage and loss of life.

–> For this publication, the relationship between thresholds and impact cannot be given because we have no detailed data on land-use, urban areas, etc for the region, which would be important data to estimate the risk and thus the impact. It is envisaged, however, to continue this study in the framework of another research project where these aspects would be looked at.

355:17 – I think the comparison of the number threshold exceedances between simulations and observations is important. This should also be quantified in terms of a correlation coefficient or coefficient of determination.

–> Please see the comments given to referee 5 on the same subject.

Figure 5 – I have some concerns with the scatterplots, particularly for discharges above 50 m3/s (which admittedly are rare, but are also the ones that are most likely to have the biggest impact). It seems to me that if I simply plot the simulated versus observed discharges for the values 50 and higher, the coefficient of determination will be greatly diminished, and possibly non-existent in the case of Virdourle. I suggest the authors perform this analysis and see if this turns out to be true. If so, this is a potential problem that would need to be addressed.

–> With the scatterplots we demonstrate that with the given input data the model has

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a tendency to underestimate the discharges. The higher the observed discharges the more apparent the underestimation from the simulations. This is exactly one of the reasons why we proposed the threshold exceedance approach instead of quantitative discharge simulations for the detection of flash-floods. In the case of the Virdourle, however, figure 6 shows that even the threshold approach is not producing optimum results.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 5, 345, 2008.