

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

**C. Reszler (Referee)**

christian.reszler@joanneum.at

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In this paper the benefit of high resolution meteorological forecasts for flash flood forecasting is analysed by the threshold exceedance approach that allows an application particularly in ungauged catchments. The methodology is described clearly. The runoff thresholds are determined by a 12 year model simulation based on synoptic daily data. The approach is tested at regional scale in a detailed case study of the September 2002 event and in a long term simulation over a 6 month period. The authors illustrate that the high resolution weather forecasts indicate the occurrence of a flash flood up to 24 hours in advance. I find the proposed approach very interesting for flash flood forecasting in small, ungauged catchments and very well suited for publication in HESS.

Specific comments

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p.348/line 21 The authors propose that the temporal and spatial resolved scales of the meteorological and the hydrological model should be linked. Flash floods are dominated by small temporal and spatial scale processes. p.351/line 1 The authors note that the LISFLOOD model has been developed particularly for large catchments. A report is cited, that it has been applied in small catchments: I would be interested about the experiences from this application. What is the value of the 1km grid compared to the spatial resolution of the meteorological data and the weather forecasts? (Are the significant hydrological processes represented at this scale? How are the parameters set for each grid element?) p.353/line 4 How is the hourly temporal resolution of the weather forecasts derived within the meteorological forecast model? Is the radar information used to estimate the short term development?

p.350/line 8 I suggest not to write "confirmed" (see p.356/line 21).

p.355/lines 9-13 The threshold exceedance approach does not necessarily require a calibrated model, which makes this method very useful for ungauged catchments. Thresholds relative to the simulated discharges are determined so that systematic errors are compensated for. In this study, during the 12 year simulation for threshold determination some peaks are over- and some peaks are underestimated. Even in the September 2002 case study based on high resolution data the peak is underestimated (Fig. 8). Despite the lack of knowing the parameters, can the model performance be evaluated in terms of representing the main flood generation processes? Did you perform any sensitivity analyses?

p.355/lines 15-17 You have done the comparison of the statistical properties between simulations and observations. I think this is very important to show in order to evaluate the model performance and to illustrate the threshold selection.

p.354/lines 5-6 The comparison of the return periods may be misunderstood. Is this the estimated return period of the simulated thresholds?

p.355/line 24 It would be interesting if you describe more in detail how the results of

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the contingency tables change with different threshold values.

p.356/line 16 Could you insert a sentence about the initial conditions used: Is the model updated during the 12 hours between two forecasts using the high resolution data (incl. radar)? p.358/line 24 What initial conditions are used at each forecast point during the long term analyses?

p.359/lines 4-5 In the long term evaluation, it would be interesting, if there are any significant differences in the synoptic meteorological conditions between the analysed events. Does this shift in the weather forecasts in winter occur systematically? Have you got any information about the performance of the meteorological model in different synoptic conditions? In general, the testing period should be extended to include more events.

Technical comments

The legend in Fig. 1 contains "stream gauges" twice; I think one circle should denote "synoptic meteorological stations".

There are a couple of typing errors. Please go through the paper again very carefully and check.

p.347/line 7 flash floods are

p.347/line 14 a full stop is missing

p.350/line 4 remove ")"

p.350/line 7 the citation should be Delrieu et al. (2005)

p.356/line 28 remove "is"

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