Nat. Hazards Earth Syst. Sci. Discuss.,
doi:10.5194/nhess-2016-338-RC2, 2017

Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Benchmarking an operational procedure for rapid risk assessment in Europe" *by* Francesco Dottori et al.

Anonymous Referee #2

Received and published: 24 January 2017

The authors present a first attempt to develop a flood impact forecasting procedure that is fully integrated in a continental scale flood early warning system. They demonstrate this system by benchmarking various components against a flood events in May 2014 in Bosnia-Herzegovina, Croatia and Serbia. The paper builds on two directions of several previous works of the various authors: (1) the EFAS system that has previously been used for forecasting peak flows; and (2) the impact assessment module that has been used in several past risk studies for current and future conditions. In my opinion, this is a laudable effort – the need for such studies has been clearly vocalized in many past papers, and in many scientific and policy-related fora. I greatly appreciate the effort undertaken not simply to present the framework, but to try to benchmark it for an actual event. Of course, 1 event remains a limited benchmarking, but I believe that the benchmarking has been carried out in a way much more thorough to past studies

in large scale risk modelling. The novelty here is not in the models themselves, which have been developed in pervious papers, but bringing them together for impact forecasting. The paper is well written and clear, and provides enough level of detail on the already developed models, without too much repetition. I believe that the paper therefore is an important first step forward in this direction, and therefore merits publication in NHESS, subject to the authors being able to address the following issues:

Main comments 1. L119-121: "In case thresholds are exceeded persistently over several forecasts, flood warnings for the affected locations are issued to the members of the EFAS consortium." Please explain this statement better: which thresholds? And what is meant by "over several forecasts"? 2. L161-162: "We first identify the maximum discharge predicted over the full forecasting period, calculated using the median discharge from ensemble forecasts at each river grid cell". It is not clear to me from this sentence how this works. Do you take the maximum discharge across the entire ensemble for each lead time? (e.g. for lead time 1 day take the max discharge of all the ensemble members at 1 day lead) Or is something else meant here? Please clarify. 3. It is stated that the flood protection standards of Jongman et al. (2014) are used, and integrated with information from literature review and local authorities where available. In terms of transparency and reproducibility, I recommend a list (e.g Supplementary Information or in Appendix) showing the regions in which the values from Jongman et al were replaced, and which values were used. 4. In the validation of the inundation maps, the authors have chosen only to report the hit rates. I find this problematic, as a (theoretical) model that greatly overestimates flood extent would tend to have very high hit rates. Therefore, in itself it only tells half the story. I believe that it would be more prudent to also report the false alarm ratios. This is especially important, since in Table 3 it is shown that the simulations show a much larger flooded area than the observed datasets, which could be leading to the high hit rates. 5. With regards the validation of the flood risk (I think it would be better called "flood impacts"), expressed as affected population, on lines 414-415 it is stated that: ". . .results from the reference simulation match well figures reported for all the flooded counties of Croatia except for

the Vukovar-Srijem County." This is a very subjective statement: how is "match well" defined? For example, in the Osjek-Baranja Country, the observed dataset reports 200 people, whilst the simulated dataset suggests 1300 – i.e. a difference of 550%. I realise that the definitions used in the simulated/observed datasets are different, and so the direct comparison is difficult, but it would be more transparent to report the differences openly than disguise relatively large differences with ambiguous language. 6. One of the reasons given for the large difference in simulated damage between the reported and simulated dataset is that the damage curves applied have not yet been calibrated for Bosnia-Herzegovina, Croatia and Serbia. If this is the case, is it even useful to include this information in the warning? 7. In the conclusion, it is stated that the "Comparison of reported and simulated flooded areas suggests that the methodology enables to identify areas at risk well in advance. . ." Whilst the results do indeed show some encouraging skill, I think the phrase "well in advance" seems like oversell. The 12th May forecast for the 14th May flood showed little sign of flooding. The impacts were rather clear on the 13th May, giving a good confidence warning 1 day in advance. It is of course subjective whether 1 day is "well in advance" – it depends on the actions that planners need to take. Minor comments L60: the authors refer to a paper by Ward et al., 2016 to support the claim that "flood impact forecasts are increasingly being requested by end users of early warning systems". This facet is already discussed in Ward et al (2015), which would seem a more prudent paper to cite. L131: "we decided create" to "we decided to create" L179: Batista e Silva et al. (2012) → Batista and Silva et al. (2012)

L222: wide spread to widespread L368: "time o image" to "time of image"

References Ward, P.J., Jongman, B., Salamon, P., Simpson, A., Bates, P., De Groeve, T., Muis, S., Coughlan de Perez, E., Rudari, R., Trigg, M.A., Winsemius, H.C., 2015. Usefulness and limitations of global flood risk models. Nature Climate Change, 5, 712-715, doi:10.1038/nclimate2742.

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