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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "The extreme runoff index for flood early warning in Europe" *by* L. Alfieri et al.

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General remarks:

The authors presents an operationally feasible solution for early flood warning at the European scale. Since detailed distributed modelling approaches based on hydrometeorological (ensemble) prediction chains have large computational cost, such an approach devoted to have first estimates of flood risk have potentially a high appeal for several users groups.

As the authors point out in the introduction, several approached have emerged

that try to give early estimates of (flash-)floods. The majority of the approaches only considers precipitation as an input. In my experience such approaches generate a large number of false alarms, since the antecedent hydrological conditions are disregarded. Here the authors dare to use a so far disregarded variable of numerical weather prediction models (NWP).

Another key here is the use of retrospective forecasts with the same model version used for the forecast. This approach is increasingly gaining popularity. By comparing current model outcomes with the model climatology the forecasts is somewhat disconnected from the impossible task of reproducing reality at any cost and can focus on practical applications. There is here of course the assumption that NWPS climatology is representative.
As I can see from Figure 6, the problems of the false alarms is not solved here.

The manuscript is very well written and in the scope of NHESS. The methods and analyses are very clear to me and point to many interesting features of predictability of extreme floods at the European scale. The verification has unfortunately no real link to actual peak events. The case study is very illustrative and demonstrates possible real-time use of ERI.

I recommend to accept this paper after the (very minor) issues listed here below are addressed.

Best regards

Massimiliano Zappa

Issues to be addressed (Page(s) – Line(s)):

P 7524-7525 : You compare an index (ERI) with a model output (EFAS-WB). I see of course the advantage of this, nevertheless I would like to see for some rivers also the use of observed discharge. Is it possible to introduce this in the revised manuscript? (Yes, I saw your disclaimer at page 7529-7530)

P 7528 Figure 4: Do you have any explanation for the spatial pattern of the optimal time shift presented in Figure 4, right panel? The quality of the predictions seems to be correlated with the time shift: negative shift = low BSS, positive shift = better BSS.

P 7528: I generally expect that if you have many false alarms, than your probability of detection should be rather high. If you generate too many alerts, then you might very often generate an alert, when an event occurs. This seem not to be the case (and sorry if I misinterpret the plot). It seems to me that you have both many missed events and many false alarms, and both features are unfavourable to address users of such a tool.

Minor comments:

P 7520, L 17 : There is a recent paper of Blöschl et al. on the 2013 flood. Please cite it. There is also a NHESSD paper by Grams et al. on these event available since January 2014, please consider if it might fit as citation.

P 7522 : Can you provide a small explanation for 1.2Tc limit?

P 7527 : Concerning the topic of matching peaks you might find also some good ideas in the “Series distance” method by Ehret and Zehe (2011)

P 7540 : Very minor: In the figure you call the optimal time shift (opt.LT), would not be consistent to have opt.ts? LT stays for your for lag-time but could be also interpreted as lead-time.

P 7546 : Just a personal note: Figure 9 is to me the most interesting outcome of the paper.

P 7548: The legend to the right panel of Figure 11 might be more clear.

References:

Blöschl, G., Nester, T., Komma, J., Parajka, J., and Perdigão, R. A. P.: The June 2013 flood in the Upper Danube Basin, and comparisons with the 2002, 1954 and 1899 floods, Hydrol. Earth Syst. Sci., 17, 5197-5212, doi:10.5194/hess-17-5197-2013, 2013.
Ehret, U. and Zehe, E.: Series distance – an intuitive metric to quantify hydrograph similarity in terms of occurrence, amplitude and timing of hydrological events, Hydrol. Earth Syst. Sci., 15, 877-896, doi:10.5194/hess-15-877-2011, 2011.
Grams, C. M., Binder, H., Pfahl, S., Piaget, N., and Wernli, H.: Atmospheric processes triggering the Central European floods in June 2013, Nat. Hazards Earth Syst. Sci. Discuss., 2, 427-458, doi:10.5194/nhessd-2-427-2014, 2014.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 1, 7517, 2013.