Hydrol. Earth Syst. Sci. Discuss., 5, S482–S485, 2008
www.hydrol-earth-syst-sci-discuss.net/5/S482/2008/

Hydrology and Earth System Sciences Discussions

Interactive comment on "The European Flood Alert System – Part 1: Concept and development" *by* J. Thielen et al.

Anonymous Referee #1

Received and published: 9 June 2008

The paper presents the scientific development of the EFAS. The system provides flood warnings for large river basins across Europe with lead times from 3-10 days based on the deterministic and probabilistic forecasts provided by the ECMWF (along with medium range deterministic forecasts provided by the DWD). Part 1 of a series of 2 papers deals with the scientific approach adopted in the development of the system.

General comments:

Although there cannot be any doubt about the relevancy of the presented approach for computing and issuing flood warnings in an operational context, the scientific merit of the paper remains rather obscure. In fact, as a stand-alone contribution (i.e. without taking into account Part 2 of Bartholmes et al.), I would rather see this paper published

in a practitioner's journal that is dedicated to issues that are of interest for stakeholders in flood management. The basic elements of EFAS have already been presented in more detail in a series of papers. The contribution of this work is to bring it all together and to present EFAS as a pan-european flood forecasting tool for large trans-national river systems. Frankly speaking, I found it hard to review this paper, which in some parts reads more as a technical report than a scientific paper (e.g. p. 272 "a workshop on the use of ensemble prediction system (...) was organized on November 2005"). Moreover in Part 1 there is no material to assess the actual performance of the presented system. A quantitative assessment of EFAS is given by Bartholmes et al. in Part 2, which is, in my opinion, the far more interesting paper. Also, the authors claim that Part 1 deals with the scientific approach adopted in the development of EFAS whereas especially the last part (from 3.5 onward) deals with administrative issues like the communication of results and the collection of users' feedback which are of limited interest for the scientific community.

The apparent advantages of EFAS that the authors list in comparison to local forecasting systems are not very convincing (paragraph 3.1.). The authors argue that EFAS could provide added value with respect to extended lead times of prediction and interpretation of probabilistic weather and flood information. However, one could argue that using the 51 EPS runs, the same kind of forecasting products could be provided with any regional model that, on the other hand, may be more carefully calibrated to local characteristics (e.g. with better knowledge of site specific warning thresholds and with the availability of better data sets for calibration and evaluation). Therefore I see the main interest of this paper in the presentation of an integrated flood warning approach based on medium range probabilistic forecasts of rainfall. This approach may (at least partially) be applied to any regional flood forecasting system provided the required data sets are available. The authors could therefore highlight the potential of their approach as a standard methodology for flood warning in Europe rather than mentioning apparent benefits of EFAS over other (regional) systems. This would further increase the scientific interest of this paper. I believe that the main interest of EFAS is twofold: - to

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provide a very valuable integrated approach for assessing flood probabilities that could potentially be considered as a standard approach for regional flood warning - to provide flood warnings in regions where there is no regional operational flood forecasting system

The system under its present form has many weaknesses: - real-time hydrological data is not available - local topographical data is not available (determines critical water level thresholds) - observed meteorological data become available with a delay of 1-2 days - operating schemes for dams are most of the time unknown - no real time assimilation of water levels to ensure improved model performances - many hydrological models perform very poorly (Fig. 2) - the uncertainties that are associated to hydrological modelling are not accounted for

Since these weaknesses are rather unavoidable in such large scale forecasting systems, it is still not very clear to me what is the point in having EFAS unless there is no regional system available. Hence, I believe that EFAS is not complementary to regional systems but "only" represents an alternative in data poor regions across the world. Why having EFAS if there is a site-specific forecasting tool that can make use of ECMWF's data sets? By insisting less on the "added-value"; of their system with respect to local systems and by focussing more on the fact that the EFAS approach could serve as a general blueprint for operational flood warning, the authors would increase the scientific relevancy of their work. Moreover, the publication in a scientific journal such as HESS would be easier to justify. Finally, I recommend to skip some parts that are not relevant for the scientific community (e.g. 3.1, 3.5, 3.7)

Overall, I found this an interesting paper to read. However, regarding the points listed above, I propose: - to generalize the methodology part to render this paper more interesting for a broader scientific public (with less focus put on EFAS as a pan-european forecasting system) and to insist on the applicability of the methodology in regional forecasting systems - or to publish Part 1 in a more appropriate practitioner's journal (e.g. Journal of River Basin Management) - or to merge Part1 and Part2 into one con-

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cise paper (and to skip the paragraphs that are dedicated respectively to the feasibility study and the communication of results)

Specific comments:

p. 263 l.7: EPS ensembles could be used by any regional forecasting system as well thereby eventually increasing the lead-times of these systems. EFAS is not the only system that can make use of the EPS ensembles. Hence, the added value may come from EPS (i.e. ECMWF) rather than EFAS.

p. 263 l. 17: delete "in Europe";

p. 265 l. 1: what is the difference between the ECMWF data and the DWD data sets? Is the DWD also providing ensembles of rainfall forecasts?

p. 266 l. 20 are these NS performance criteria achieved for daily forecasts with observed daily rainfall data as input? If so, I think the model performances are rather poor

p. 270 Did you use one parameter set for the hydrological modelling?

p. 270 l. 13 specify that only the uncertainty related to the rainfall forecasts is intuitively; represented. Did you try to assess the predictive uncertainty of the system by the means of statistical modelling of errors?

p. 272 is it really relevant for the scientific community to know who is receiving the forecasts and who is providing feedback? I think not and paragraphs like this one render this paper not appropriate for a scientific journal (in my opinion)

Fig. 4 increase size of Fig. 4a

Table 1: What is the meaning of E?

Finally, I present my apologies to the authors for the delayed review this paper!

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 5, 257, 2008.

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Interactive Comment