

## ***Interactive comment on “Forecasters priorities for improving probabilistic flood forecasts” by F. Wetterhall et al.***

**EM Stephens**

stephens@atm.ox.ac.uk

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This is an interesting article that provides a valuable end-user viewpoint on how the EFAS system would like to see it improved. I have a few general comments that I think are required to help make the paper easier to understand and place in context.

Firstly, I think the definitions of terms used such as 'forecaster', 'forecast', 'decision-maker' need to be explained, since they could be misinterpreted. Here (I think) forecaster is used to described the professional forecasters who are the end-users of EFAS. Some readers of this article might think that the forecaster refers to the scientists working at ECMWF or JRC. You also make reference to 'communication to decision-makers' (e.g. p2221, Line 1). Are these decision-makers the forecasters? This is confusing.

Secondly, I would also like to see a bit more background on these forecasters / decision-makers. How do they use the forecast? Is it emailed to them? Do they access it online? Is it integrated into their own systems? What do they use it for? Do they issue early-warnings from it? Do they use it for management of flood defences or dams? How much contact do they have with those responsible for EFAS? Is it just the annual workshop? A bit more detail on this will set the context a bit better.

Thirdly, I think some further explanation of EFAS is also required, since you refer to multi-model systems and so on later on in the article. It might be important to consider the intended audience of this paper, it appears that technical terms have been largely avoided, which may be fine, but some basic-level description of the science would be useful, e.g. for those outside of EFAS developing hydrological forecast systems for end-user applications.

#### Specific Comments and Technical Changes

Title: This should either be “Forecaster priorities”, “Forecaster’s priorities” or “Forecasters’ priorities”.

I would go with the first, although I don’t know whether for a scientific journal it would be better to say ‘End-user priorities’, otherwise it sounds like this paper is about technical ECMWF or JRC opinions for forecast improvements. Equally, I think this paper deals with the improvement to the Early Warnings and not the forecasts themselves – e.g. it discusses better dissemination, decision-making tools. While the authors might think that the forecast is the entire product, dissemination included, readers of HESS might think that the forecast is just the raw output of the model. This needs defining in the article.

#### P2220 Section 2.3

I think this section would benefit, given the discussion later in the paper, by having more information about the flow of information in EFAS. E.g. Are both the NWP and

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hydrological models ensemble-based? How many ensemble members in each? Are these multi-model or initial condition ensembles? (this is important due to the discussion about including a multi-model system). Who runs the forecasts operationally? How is this information passed on to the end-users / professional forecasters? Can you describe how the forecast information is currently used for decision-making?

P2221 Line 7 Should be 'to start off' not 'to start of'

P2226 Section 4.2.

You say that the category for improving existing decision-making tools was unpopular, and that this could imply that the tools available today are sufficient. Are the tools you refer to the ones available as part of the EFAS forecast, or those internal to the forecasters that EFAS is disseminated to?

I think this point needs further discussion. Perhaps they could be unpopular because these tools are decision-maker specific, or the end-users of the EFAS forecasts think that these decision-making tools are their responsibility? Maybe they wouldn't want to admit that their decision-making tools are inadequate?

P2226 Line 21 It is not clear that the sentences from 'Priorities of a more technical nature' onwards belong in this section.

P2227 Line 11 change 'it virtually' to 'it is virtually'

P2227 Line 22. You state previously in the paper that the most important priority being the inclusion of more models "could be governed by the wish to include the forecaster's hydrological model of choice, and not necessarily the idea of a full uncertainty system."

So do you think this outcome is as a result of a forecaster wanting their 'model of choice' or a desire for a better quantification of uncertainty? If the latter, does this not contradict the conclusions of Pappenberger et al. 2013. 'Visualising probabilistic flood forecast information'? Do you think that the EFAS users have changed their minds in the course of a year, and what may have influenced this?

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P2228 'It is a more important priority for the forecaster to improve the forecast in the medium range' Was this a result found in this study? Perhaps needs rephrasing to clarify.

P2229 Line 8. "Although, the priority to standardise hydrological data format was selected as least popular out of the five topics pitched, one should not forget that it was actually a top five contender (thus seen as more important than other topics)"

I'm not sure that it is strictly true to say that it was in the top 5 – other groups might have had a second favourite idea that they didn't go with. I think "one should not forget it was actually a top five contender (thus seen as more important than other topics)" should be changed to "one should not forget it was chosen as a topic to be pitched in the first place". Or something like that.

Figure 2: I can't read the text in this figure

P2229 Line 9 Change "this point to" to "this points to"

P2229 Line 13. Is this for political reasons?

P2229 Line 20. What do you mean by generally improved forecast skill? Do you mean a general improvement in the forecast skill, or an improvement to the general forecast skill? I think the two are subtly different. How is forecast skill currently calculated? How is skill currently communicated? Does this need to change?

P2229 Line 24. Is there much difference in the time taken for these priorities to be implemented too?

P2230 Line 15. Is it worth including links to the training activities of EFAS and HEPEX?

P2230 Line 15. Change to 'these training and collaboration efforts need to be'

P2250 Line 19 Change "Could be on way" to "Could be one way"

P2230 Section 5.2. Would forecast verification scores be understood by the EFAS end-

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users? Does there need to be work addressing what scores they are most interested in, or training them in forecast evaluation? Is there data for assessing long-term performance at specific points, particularly for flood events which are rare. Would this cause a discrepancy between what the end-users want to know about forecast performance and what information can actually be provided to them?

“Research activities are already initiated to address this issue” - Can you provide more detail on this?

P2230 Line 6 should be NWP's not NWP's

P2230 Line 17. “A number of projects.” Can you give examples? Are these in Europe?

P2231 Line 21 Since you refer to forecast dissemination, I think it would be important to state somewhere in the article how the forecast is currently disseminated.

P2231 Line 22 “decisions” not “decision”

P2232 Line 2 Change “are directed” to “should be directed”

P2232 Line 5 Change “are concerning either to improve the physical representations in the used models and improve the forecast...” to “concern whether to improve the physical representations in the adopted models or to improve the forecast on lead times >3 days”

Is there any indication of which processes should be better represented physically?

P2232 Line 6 Is there any indication of what lead times would be useful to the decision-makers? E.g would it be helpful for them to have have skillful forecasts at 5 days or 15 days?

P2232 Line 11 change “both to the hydrological and meteorological” to “both to the hydrological and the meteorological”

P2232 Change “It was developed from the opinions of a large group of professional flood forecasters in which we consider the best way to improve existing operational

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flood warning systems” to “It was developed from the opinions of a large group of professional flood forecasters on the best ways to improve existing operational flood warning systems” or similar.

P2232 Line 20 I think the sentence beginning ‘Other areas...’ could be expanded to provide a better explanation of what is meant by past performance and uncertainty assessments (e.g. are these not the same thing in a way?) and what you mean by multi-model approaches, especially in relation to EFAS. (e.g. will you be including more NWP models or more hydrological models or more ensemble members?)

P2232 Line 25 Should this be changed to “and will be dealt with accordingly”

P2232 Line 8 I’m not sure what first point, second point, etc. refers to, not the numbered list at least?

P2232 Line 11. Could you expand on ‘include more NWPs’. Do you mean include models from different NWP agencies, or do you mean include more ensemble members?

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