

Interactive comment on “The benefit of seamless forecasts for hydrological predictions over Europe” by Fredrik Wetterhall and Francesca Di Giuseppe

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The manuscript shows the development and the skill of a seamless hydrological forecasting system from sub-seasonal to seasonal scales. Meteorological forecasts from ENS extended (day 1 – 46) and SYS4 (47 to month 7) are merged by randomly selecting ensemble members of SYS4 after ENS extended ends. The skill analysis shows that most of the skill improvement by using SEAM is due to the more frequent model initializations and the more recent NWP model version of ENS extended. The paper is well written, the methodology and results are nicely presented and compared. The real value of this study is the application of products off the shelf (available opera-

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tional products). Hence the results can be directly incorporated in real-time operational streamflow forecasting practice. The paper should be foreseen for publication in HESS after minor revisions.

Comments: p 2, l 24: Typo, replace TSYS4 with SYS4

p 2, l 30: please add the forecast length published in the seasonal outlook of EFAS

p 2, l 119: please add possible drawbacks of selecting a random member of SYS4 (one point was raised p 6 l 192- p7 l 195). Another possible drawback could be that ensemble members are combined originating from complete different climatological conditions day 1 – day 46.

p 3, l 89: Are the 5kmx5km grid cells of Lisflood further subdivided in elevation zones?

p 4, l 124: Are bias/drift correction methods applied to correct the meteorological forecasts?

p 5, l 135: the description of the hindcast period used in this study is a little bit confusing due to the mixture of forecast dates (2015-05-14 – 2016-06-02) used to produce the hindcast dataset and the forecast dates of the retrospective forecasts. Please clarify! One possibility would be probably to add the range of forecast dates. Something like: "...the hindcast data set of SEAM covers the period 1995-05-14 to 2016-06-02..." "...the SYS4 re-forecasts used in this study are initialized each month over the period 1995-05-01 to 2016-06-01..."

p 5, l 160: replace SEAS with SYS4

p 6, l 161: Incomplete sentence, I assume: ".... as in SEAM to account for the difference in ensemble size...."

p 7, l 206: Another option of the poor performance of Lisflood in these regions could be the snow modelling component. In steep orography a 5km x 5km grid is relatively coarse to model snow adequately, are grid cells of Lisflood further subdivided in eleva-

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tion zones? Please add a comment/discussion of the snow modelling performance of Lisflood.

p 8, l 231: add Figure to the figure number "...Cologne (Figure 4)...".

p 8, l 233: I assume 3% of its climatological value is derived from the simulated climatology and not from the observed climatology? Please specify!

p 8, l 240: It should be mentioned that the second low flow event was hit by the SYS4 forecast initialized 2003-09-01. This signal towards a low flow event is missing in the SEAM forecasts published after 2003-09-01. In SEAM a signal towards an extreme low flow event first appears about 3 days before the begin of the event (forecast date 2015-09-14). I would add the real forecast dates to Figure 4 and not the forecast dates the hindcast data set is produced. This could be a little bit confusing for a reader not familiar to the hindcast procedure of ENS extended.

p 8 Conclusion: I miss a discussion of potential improvements of the presented seamless forecasting system. Are there any ideas how to reduce the higher spread of the CRPSS of SEAM compared to SYS 4 in figure 2 c, d? Probably an improvement of the methodology of the concatenation of the forecasts from the two systems? Please add this aspect to the conclusions. Another aspect I miss is the conclusion from Figure 2 b): The improved boundary condition of the first 46 days originating from the more recent model version with a higher resolution doesn't improve the predictability (forecast skill) after day 46.

Figure 3: Are all forecast dates used in this analysis? Please add to the caption to be consistent with the caption of Figure 2.

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