HESS Review – Bonnet et al

Thank you for your corrections to the paper "Influence of multidecadal variability on high and low flows: the case of the Seine Basin". The paper is much improved and now reads with a lot more clarity than before. Section 3 reads much better, Section 4 is also well written, and the conclusion is good. I suggest the paper be accepted subject to minor revisions:

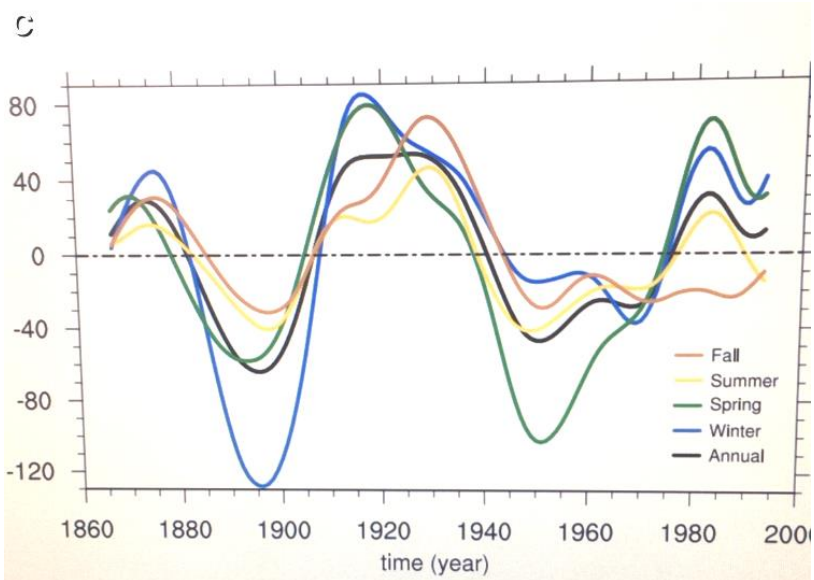
General comments:

1. I'm not sure enough focus is given to the analysis of the extremes, given that is the main novelty of the approach and paper over Bonnet et al 2017.
2. I'd be tempted to end the abstract on a more positive note
3. You mention that summer and fall flows are lower, but the variations are also important. Perhaps Figure 7 would be better plotted as percentage anomalies to show this?
4. Section 5.2 – how are groundwater-river exchanges quantified?
5. Section 6 – first sentence – "they are mainly linked to variations in precipitation" – I'm not sure this is the message you portray in the previous section. You state that "in summer, unlike in spring, no significant differences in precipitation between positive and negative multidecadal phases are noted" and "in winter… slight differences in precipitation……are not significant" etc. You also conclude that "Large and significant multidecadal variations in summer and 20 winter river flows exist, which cannot be explained by concomitant variations in precipitation". So you should clarify this statement somehow (as you do in the conclusion, page 17 lines 22-23), are you only referring to spring? Otherwise, it doesn't add up!

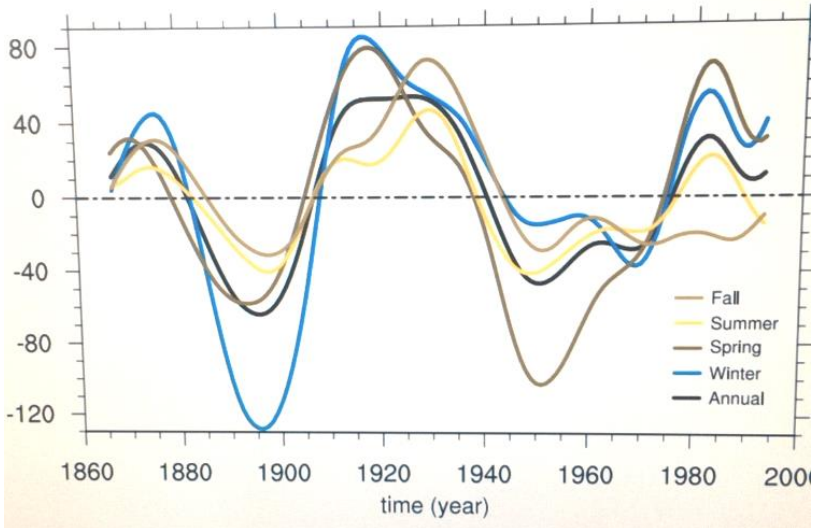
Figure corrections

1. Figure 1 – could you choose better colouring? the red and magenta are very similar
2. Figure 3 – please relabel the x axes "1", "2", "3" instead with "reference", "20CRpt" and "Seine" for readability. Please also label the Y axis. The dots appear black, not blue, but their colour doesn't matter. The caption is missing an "s" on the penultimate line from "values"
3. Figures 6 and 7 – I would relabel the y axes to say they're anomalies
4. Figures 7 and 9 – this is not a colour-blind friendly palette – the Fall and Spring are not differentiable. Making the green paler and the red brighter and darker would help (see image below)
5. Figure 8 – please label the columns and rows on the graphic itself with the variables along the top and the seasons along the right hand side to aid interpretation. I would also be tempted to reorder the rows to read spring at the top, then summer, autumn, and winter, in the order you discuss them
6. Figure 12 – I don't think I understand this graph and its implications. The caption is VERY long. Should some of this description be in the body of the paper?
7. Figure 13 – Is it sensible to reverse the scale from figs a and b? maybe use colours that don't signify "wet" and "dry"
8. Figure 14 – caption should read mm/d not mm/j
9. Figure 14 – please add the crosses to the legend as 1910-1930 and 1940-1960.

10.



ass filtered interannual anomalies of the Seine river flows at the Poses station. Black: annual, blue: winter, and brown: autumn. The annual mean over the whole period is 446m3/s.



ass filtered interannual anomalies of the Seine river flows at the Poses station. Black: annual, blue: winter, and brown: autumn. The annual mean over the whole period is 446m3/s.

Grammar corrections:

- Throughout – should multidecadal be hyphenated: multi-decadal?
- Page 2 line 1 – “correctly reproduce”, not “reproduce correctly”
- Page 2 line 4, line 19 – “river flow variability”, not “flows”
- Page 2 line 11 – “for several decades”, not “on”
- Page 2 line 33 – “for the second half”, not “on”
- Page 4 line 1 – “this allows to study” isn’t correct, I suggest “this allows studies into whether”

- Page 4 line 3 – “this study therefore has” not “has therefore”
- Page 4 line 16, Page 9 line 15 – “flow” not “flows”
- Page 5 line 1, line 9 – “platform” not “plateform”
- Page 5 line 2 – what does ISBA stand for?
- Page 5 line 12 – “based on thousands of observation stations”
- Page 5 line 32 – im not familiar with what “weights” means
- Page 6 line 26 – “searched for”
- Page 7 – make sure your use of commas in numbers in consistent. There is 5000 and 5,000 on the same page. Find out the HESS standard
- Page 7 line 24 – recommend rewording to “this approach additionally takes local observations into account in the downscaling process…”
- Page 8 line 31 – “degrades”
- Page 8 line 32 – “developed on the Seine basin”, suggest changing on to “over” or “for”
- Page 9 line 15 – “even almost as well reproduced” doesn’t read well, I suggest something like “river flow variability is reproduced almost as effectively as the reference simulation”
- Page 9 – I don’t think you need to keep re-referencing Fig 3 as often.
- Page 9 line 28 – suggest replacing “even if” with “although”
- Page 10 line 25 – “by a factor of 2”
- Page 10 line 27 – I think HESS prefer not to quote personal communication, as you say “might be linked”, I think it’s fair to leave the reference out of this sentence.
- Page 11 line 18 – do you mean to reference Figure 8?
- Page 13 – please write NAO, AMV and SST in full, the abbreviations were last seen on page 2, a long way away!
- Page 13 line 19 – “circulation anomalies on a few decades” should possibly be “circulation anomalies for a few decades” but I don’t fully understand the statement
- Page 14 line 13 – would we call this “paleoclimate”? It seems too modern to be considered paleo but I might be wrong
- Page 17 line 27 – “longer” not “longest”
- Page 18 line 18 – “progress” not “progresses”
- Page 18 line 23 – suggest “climate models may have difficulties capturing some properties”