

## ***Interactive comment on “The influence of decadal-scale variability on trends in long European streamflow records” by J. Hannaford et al.***

### **Anonymous Referee #1**

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I think this is an excellent paper. The use of the "multi-temporal" approach is excellent and really points out that much of the streamflow variations seen over the past century are the result of multi-decadal quasi-periodic oscillations. I also think that it is very valuable that the authors looked at high flow, average flow, and low flow conditions. At several points in the paper they comment on the coherence among these three kinds of flow indicators.

I would encourage the authors to put even more emphasis on the relationship between AMIN7, AMAX7 and annual means. There is a great deal of discussion in the quasi-scientific literature about global climate change that suggests that hydrologic variability

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either has been increasing or will be increasing as a result of enhanced greenhouse forcing. I am not aware of any rigorous studies that actually address this in terms of historical data from the past 50 to 100 years. A little bit more analysis of the results already produced by the authors could shed considerable light on this issue. Of course the "conventional thinking" is that floods are getting bigger and low flows are getting lower. I think their findings (and other less-rigorous analysis I've been doing in the US) suggests that high flow, average flow and low flow variables tend to move in tandem rather than diverge from each other.

I also applaud their decision NOT to focus on statistical significance testing (lines 6-14, page 1870). Their argument is excellent and they made the right choice. The issue is what is the general tendency of changes across broad regions, and it is not about the attainment of some arbitrary thresholds of "significance" that are based on a very arbitrary and unrealistic set of statistical assumptions. I sincerely hope that HESS will not do what so many other journals do, forcing authors to use hypothesis tests as a "ticket" to publish their findings.

I did have one question about the forming of "regions" (lines 13-15 page 1868). They mention using "homogeneous hydrological behavior on an interdecadal timescale using a cluster analysis." But then the discussion uses very geographically based names for these regions and the map indicates that the catchments in a "region" were close together geographically. What was the role of geographic proximity in the definition of the "regions." My guess is that it was an important influence that was used along with the cluster analysis, but I didn't get a clear understanding of that from the text. Clarification would help.

Other than my suggestion about more emphasis on the relationships among the trends in AMIN7, AMAX7, and annual mean flows I think this paper is an outstanding contribution to the understanding of hydrologic variability and change.