

Interactive comment on “A large sample analysis of seasonal river flow correlation and its physical drivers” by Theano Iliopoulou et al.

Anonymous Referee #1

Received and published: 27 April 2018

SUMMARY:

This paper looks at the lagged seasonal correlations between the average river flow in antecedent months and, on one side, peak flow for the High Flow Season (HFS), and on the other hand, average flow for the Low Flow Season (LFS). It also looks at what are the possible physical drivers that could explain these correlations. The study is carried out using a large sample of European rivers. It also shows a real-case application of the findings to flood frequency estimation.

GENERAL COMMENTS:

The paper is well-written, clear, interesting and attempts more systematically than previous study to attribute the observed correlations to physical drivers. The methods

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used are adequate and robust, assumptions are being verified. Overall, it contributes to the advance of science in the field, and my recommendation would therefore be for publication.

However, I have a couple of comments for suggested improvement: 1) My major comment is that, although the whole manuscript looks at both high flows and low flows, and analyses both in detail, the practical example at the end is only for high flows. I think a similar case study for low flows is missing there. If there is a really good reason for only giving an application example for high flows, the motivation for this should be clearly explained.

2) Section 2.2 is too long. It would help readability to have a few sub-sections in here. Suggestion of subsections below (could be different, this is just a suggestion): 2.2.1. Correlation analysis 2.2.2. Analysis of physical drivers a) Drivers (catchment descriptors, geological descriptors, climatic descriptors) b) Principal Component Analysis

MINOR COMMENTS:

Abstract:

line 43: change “in real-world cases” to “in two real-world cases”: otherwise it is misleading and it sounds like you’ve done this to all the 224 catchments.

1. Introduction:

Line 63-66: Note that the persistence method described by Svensson (2016) that you cite here, has been used operationally in the production of the UK Hydrological Outlooks since 2013 (see Prudhomme et al., 2017)

Reference: Christel Prudhomme, Jamie Hannaford, Shaun Harrigan, David Boorman, Jeff Knight, Victoria Bell, Christopher Jackson, Cecilia Svensson, Simon Parry, Nuria Bachiller-Jareno, Helen Davies, Richard Davis, Jonathan Mackay, Andrew McKenzie, Alison Rudd, Katie Smith, John Bloomfield, Rob Ward & Alan Jenkins (2017) Hydrological Outlook UK: an operational streamflow and groundwater level forecasting system

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at monthly to seasonal time scales, *Hydrological Sciences Journal*, 62:16, 2753-2768, DOI: 10.1080/02626667.2017.1395032

2. Methodology

Section 2.2: see comment earlier in general comments regarding splitting this section

Line 127: change “in terms of catchment, climatic and geological descriptors” to “in terms of catchment, geological and climatic descriptors”, because that is the order in which you list them later in the text.

Line 128-130: add altitude to the list of catchment descriptors (as you present it after percentages of lakes and glaciers).

Line 139: replace “baseflow index” with “BI”

5. Physical interpretation of correlation

Line 365: typo: replace “20-cathcment” with “20-catchment”

8. Discussion and Conclusions

Line 456: typo: replace “There” with “Their” or “These”

Interactive comment on *Hydrol. Earth Syst. Sci. Discuss.*, <https://doi.org/10.5194/hess-2018-134>, 2018.