

Interactive comment on “The response of Iberian rivers to the North Atlantic Oscillation” by J. Lorenzo-Lacruz et al.

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Title : The response of Iberian rivers to the North Atlantic Oscillation

General Comments This paper analyzes the influence of the NAO on streamflows over the IP. The association is obtained by means of correlation analysis. The correlation is computed for different time realizations or moving window to characterize the changes in the NAO streamflow relationships. The results indicated significant association in winter and autumn, which is consistent with previous studies about NAO precipitation relationships. However, the authors provide new findings about persistent relationships and explain spatial distribution and non-stationarity of the NAO-streamflow relationships. Therefore, the objective of this study has great interest for planning water

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management. I recommend the paper be accepted for publication in HESS. Some comments and suggestions can be considered to improve the clarity of the paper.

Specific Comments

In the introduction section the purpose of the paper is well defined and organized. The data used in this study are explained carefully.

With respect to the methods, more details are needed to describe PCA in section 3.3.3. For instance, which procedure is used to perform PCA, S or T? It is also advisable to indicate the time resolution of the streamflow time series. The PCA results are not discussed and I think that this part is not required to understand the paper. However, the use of PCA for the lagged correlation coefficients is justified in the paper.

With respect to the results

-Figure 3 shows the one-month lagged Pearson's correlations between the SSI for a particular month and the NAO index for the previous month. Can the authors explain why the NAO drives streamflow in winter and not in spring? (line 289 - and following)? Table 1 shows the percentage of gauging stations that registered significant differences between the average SSI anomalies generated during positive and negative NAO phases. The authors said that “It is noteworthy the high percentages (> 70%) of gauges in the large Atlantic basins (Duero, Tajo, Guadiana and Guadalquivir) with significant differences during winter and early spring..”. However, the table shows that the differences are much lower in December than in January and February. Is there any explanation for that?

-More interpretations are needed for the results of PCA in line 352. Figures 6 show the three PCs for positive and negative phases of the NAO - I wonder if this analysis is performed independently for the positive and negative phases. In this case, is the explained variance equal for the positive and negative phases? I am sorry for not understanding the objective of this part of this study.

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-March is a month that shows a very significant decreasing trend for precipitation, and I wonder whether the authors have found this trend in the SSI time series and if it was removed before performing the analysis (page 372).

-PCA is applied to the correlation coefficient derived from different time series realizations between NAO and SSI. One can see in Figure 7 strong changes in the correlation coefficients with time. Is there an explanation for this? Are the correlation coefficients significant? I think it could be interesting to obtain correlation coefficients by using other NAO indices to demonstrate the significance of the non-stationarity of the NAO and SSI relationships.

-The authors present interesting results about the NAO SSI relationships for different months. However, the results of the PCA study when applied to streamflow anomalies need more interpretation or should be removed from the paper because they do not provide additional information for this work.

Technical corrections

In Line 212 1992 for NAO+ appears twice

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 4459, 2011.