

Interactive comment on “Complex networks for streamflow dynamics” by B. Sivakumar and F. M. Woldemeskel

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General comments

The paper considers a network-based approach to study the streamflow dynamics by using monthly data from about 600 US stations over a period of 52 years. The manuscript is clear in its objectives, it is also very well organized and contextualized within the state of the art and the current knowledge gaps. Results are deeply analyzed and their possible impact in addressing open problems in hydrology and water resources is evaluated as well. The paper definitely deserves attention for a possible publication in HESS.

Specific comments

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Interactive Discussion

Discussion Paper



- I understand that the main focus is on the local clustering coefficient and I also understand this work reports preliminary results, but it would be very useful evaluating the streamflow connections also by means of the degree centrality (i.e. (number of first neighbors of node i)/(total number of possible neighbors)), which is probably the most intuitive network parameter. I think the results can be improved through the analysis of the degree centrality with the same thresholds used for the local clustering. Comparison of the spatial connections highlighted by these two parameters is able to give a more complete network perspective.

- Are the monthly streamflow data expressed in terms of monthly anomalies? Please specify this aspect in Section 3.

- Data exhibit huge variations in their characteristics, one of these is the basin drainage area. In this regard, are the data used for the analysis area-normalized? If not, please elaborate whether the different areas can induce substantial bias and spurious correlation.

- In the correlation analysis (4.1), are the neighbors selection based on the geographical distance from the reference node? Is it possible to have some statistical information on the distance (in terms of PDF, if significant, or just in terms of mean and standard deviation) for the three values (5, 15, 30 neighbors)? For each station, compute the average distance from the neighbors, and then evaluate the distance distribution for all the stations for the three values (5, 15, 30).

Technical corrections

- Page 7268, line 9: “and” should be removed;
- Page 7269, line 1: Fig. 6b should be Fig. 6c;
- Page 7270, line 6: “and” should be remove.

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