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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Investigation of hydrological time series using copulas for detecting catchment characteristics and anthropogenic impacts" *by* T. Sugimoto et al.

Anonymous Referee #2

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The manuscript provides an interesting set of tools based on copula function for investigating discharge time series dynamic.

The topic is particularly interesting since it is in line with the recent and innovative use of copula. Up today copula was applied mainly to perform multivariate frequency analysis while it is potentially useful for detecting and interpreting observed data. This paper is a clear example. The manuscript is easy and pleasant to read, however it includes many analyses and methods that, maybe, it could be worth to split it in two papers.

In the following minor and major concerns are listed.

1) In the abstract API acronym should be defined.

2) In the Introduction line 20-22. If the aim is to investigate on the catchment status and the anthropogenic impact, I do not think it is obvious that the solution is to analyze the discharge time series, the reader could expect to see the analysis of the cross-correlation between rainfall and runoff time series.

3) Section 3. I would give more practical explanation about Copula asymmetry. It is not fully clear.

4) Section 3.1 line 15. "and instead of "und" 5) Section 3.1 line 25. related "to" temporal distribution

6) Section 3.1 page 9165-9166. The de-seasonalization approach is well known (Grimaldi, S. Linear parametric models applied to daily hydrological series (2004) Journal of Hydrologic Engineering, 9 (5), pp. 383-391), maybe you can remove the equations in order to make easier the text.

7) Section 3.1 pag 9166. I am not surprised to have a residual periodicity since you have removed the annual one. Maybe a weekly periodicity could be still detected.

8) Section 4.1.In general this section is very interesting. I would suggest to better explain if the distance D is based on empirical copula and why this is important; and the uncertainty of the estimated distance. Maybe these notions are already included in the text but it should be better clarified.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 9157, 2015.