Hydrol. Earth Syst. Sci. Discuss.,
https://doi.org/10.5194/hess-2017-445-RC1, 2017

Hydrology and Earth System Sciences
Discussions

Interactive comment on "An improved Grassberger-Procaccia algorithm for analysis of climate system complexity" *by* Chongli Di et al.

Anonymous Referee #1

Received and published: 12 October 2017

1. The manuscript presents an improved Grassberger-Procaccia algorithm for analysis of climate system complexity, which is interesting. The subject addressed is within the scope of the journal. 2. However, the manuscript, in its present form, contains several weaknesses. Appropriate revisions to the following points should be undertaken in order to justify recommendation for publication. 3. For readers to quickly catch your contribution, it would be better to highlight major difficulties and challenges, and your original achievements to overcome them, in a clearer way in abstract and introduction. 4. It is shown in the reference list that the authors have several publications in this field. This raises some concerns regarding the potential overlap with their previous works. The authors should explicitly state the novel contribution of this work, the similarities and the differences of this work with their previous publications. 5. It is mentioned in p.1

that an improved Grassberger-Procaccia algorithm is adopted for analysis of climate system complexity. What are the other feasible alternatives? What are the advantages of adopting this particular algorithm over others in this case? How will this affect the results? More details should be furnished. 6. It is mentioned in p.2 that Lorenz and Henon chaotic systems are adopted to test the effectiveness of the proposed algorithm for estimating correlation dimensions. What are the other feasible alternatives? What are the advantages of adopting these particular systems over others in this case? How will this affect the results? More details should be furnished. 7. It is mentioned in p.2 that the Haihe River Basin is adopted as the case study. What are other feasible alternatives? What are the advantages of adopting this particular case study over others in this case? How will this affect the results? The authors should provide more details on this. 8. It is mentioned in p.3 that the normal-based K-means clustering technique is adopted to partition all normals of the scatter points into K clusters with high similarity. What are other feasible alternatives? What are the advantages of adopting this particular technique over others in this case? How will this affect the results? The authors should provide more details on this. 9. It is mentioned in p.4 that the Random Sample Consensus algorithm is adopted to fit a straight line through the log-transformed points. What are other feasible alternatives? What are the advantages of adopting this particular technique over others in this case? How will this affect the results? The authors should provide more details on this. 10. It is mentioned in p.6 that the intuitive judgment method and the point-based K-means clustering method are adopted to compare the results obtained by the proposed method. What are the other feasible alternatives? What are the advantages of adopting these particular methods over others in this case? How will this affect the results? More details should be furnished. 11. It is mentioned in p.6 that the normal-based K-means clustering technique is adopted to determine the scaling regions of the curves in Fig. 3a. What are other feasible alternatives? What are the advantages of adopting this particular technique over others in this case? How will this affect the results? The authors should provide more details on this. 12. Some key parameters are not mentioned. The rationale on the choice

of the particular set of parameters should be explained with more details. Have the authors experimented with other sets of values? What are the sensitivities of these parameters on the results? 13. Some assumptions are stated in various sections. Justifications should be provided on these assumptions. Evaluation on how they will affect the results should be made. 14. The discussion section in the present form is relatively weak and should be strengthened with more details and justifications. 15. Moreover, the manuscript could be substantially improved by relying and citing more on recent literatures about real-life case studies of contemporary soft computing techniques in hydrological engineering such as the followings: ïĄň Gholami, V., et al., “Modeling of groundwater level fluctuations using dendrochronology in alluvial aquifers”, Journal of Hydrology 529 (3): 1060-1069 2015. ïĄň Taormina, R., et al., ““Neural network river forecasting through baseflow separation and binary-coded swarm optimization”, Journal of Hydrology 529 (3): 1788-1797 2015. ïĄň Wu, C.L., et al., “Prediction of rainfall time series using modular artificial neural networks coupled with data-preprocessing techniques”, Journal of Hydrology 389 (1-2): 146-167 2010. ïĄň Wang, W.C., et al., “Improving forecasting accuracy of annual runoff time series using ARIMA based on EEMD decomposition,” Water Resources Management 29 (8): 2655-2675 2015. ïĄň Chen, X.Y., et al., “A comparative study of population-based optimization algorithms for downstream river flow forecasting by a hybrid neural network model,” Engineering Applications of Artificial Intelligence 46 (A): 258-268 2015. ïĄň Chau, K.W., et al., “A Hybrid Model Coupled with Singular Spectrum Analysis for Daily Rainfall Prediction,” Journal of Hydroinformatics 12 (4): 458-473 2010. 16. In the conclusion section, the limitations of this study, suggested improvements of this work and future directions should be highlighted.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2017-445, 2017.