

Interactive comment on “Catchment classification based on characterisation of streamflow and precipitation time-series” by E. Toth

Anonymous Referee #1

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The topic of this manuscript is very interesting, which tries to realize catchment classification. First the streamflow signatures were used as inputs to an SOM neural network and thus provided an overall grouping of catchments. Then the catchment descriptors are utilized in the PCA and discrimination analysis for classification of ungauged catchments. Finally these two classification results are compared. Overall, this research makes significant contribution to hydrological fields. A minor revision is recommended for this manuscript in its present form. Further comments are shown below:

1. The authors used the SOM neural network for the classification of streamflow signatures? How about the K-Means or Fuzzy C-Means methods?
2. Figure 1 shows the closure sections of the catchments associated to the three clusters
C5036

ters obtained from the streamflow signatures. This figure is interesting and able to capture the meaningful input-output pattern; while the output layer of the SOM only consists of 3 nodes (one dimension only), which might not fully explore a meaningful topological map. If it is feasible, it would be interesting to learn the result if the number of nodes increase, such as 2x2, 2x3. This can be referred from Chang et al. (2010), where they stated that the spatial location of an output (evaporation) in the SOM would correspond to a particular feature of data drawn from the input space (meteorological variables) and thus gain ideas over the formulated map of input-output patterns.

Reference Chang, F.J., Chang, L.C., Kao, H.S., Wu, G.R., 2010. “Assessing the effort of meteorological variables for evaporation estimation by Self-Organizing Map Neural Network”, *Journal of Hydrology*, 384, 118-129

3. It would be easier to catch the idea if the component of classes in SOM could be presented in a figure not just in text.
4. It would be good to address the reason for calculating the error rate of the discriminant analysis through the result of SOM. If there is some expert knowledge, a supervised learning strategy, such as Learning Vector Quantization (LVQ), couple with the SOM might enhance the classification result of the SOM.
5. Adding more recent publications relevant to this research topic will enrich this manuscript, such as

Chang, F.J., Tsai, M.J., Tsai, W.P., Herricks, E.E., Assessing the Ecological Hydrology of Natural Flow Conditions in Taiwan, *Journal of Hydrology*, Vol. 354 pp.75-89, 2008.
Thomas B., Lischeid G., Steidl J., and Dannowski R., Regional catchment classification with respect to low flow risk in a Pleistocene landscape, *Journal of Hydrology*, 2012.

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