

Interactive comment on “Hydrological characterization of cave drip waters in a porous limestone: Golgotha Cave, Western Australia” by Kashif Mahmud et al.

Anonymous Referee #2

Received and published: 10 July 2017

7/7/2017

Review of: Hydrological characterization of cave drip waters in a porous limestone: Golgotha Cave, Western Australia, by Mahmud et al.

Summary and Recommendation

This manuscript is a follow up on drip monitoring data that were published in previous works including a 2016 paper in HESS. Whereas classification of flow regimes in the previous paper(s) was based also on morphological characteristics of the stalactites, here a similar clustering is based solely on a cluster analysis of the drip data. Beside the cluster analysis, there are new histograms and analysis of autocorrelation, which

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may add some qualitative understandings of the karst flow regime in these stalactites (seasonality, annual precipitation variability). I am not sure the “delta” from the previous works on this data that is presented in the current manuscript is worth a new HESS paper. I am sure that in the present way it is written it is not. Therefore, I recommend on a major revision in which: 1) the description of previous methods and results will be decreased to minimum; 2) Elaboration on the new statistical methods and results that are used here, 3) the presentation and discussion concerning the histograms and autocorrelation analysis will be upgraded significantly; and 4) the “delta” from our understanding of the system we had before this analysis will be declared more explicitly.

Major Comments

- 1) Even though it is declared in the manuscript and figure captions, it's inappropriate that more than half of the paper including 3 figures and 2 tables are repetition of methods and results of a previous work. It doesn't look good, especially the almost identical figures, avoid.
- 2) Lines 83-212, old stories, to be reduced to a 1/3 of current.
- 3) Lines 213-228 these are the new methods: Elaborate in explaining them, equations, figures that illustrate, etc., MDS, K-means, these are not general statistics (this section (4) has to be as long as sections 2+3 at least).
- 4) What does the MDS analysis add to the correlation matrices analyzed in Mahmud et al. 2016. ?

Specific Comments

- 1) L 22 –Abstract should not include references.
- 2) L 27 Capital C
- 3) L 37 for development of karst in relation to fractures, beds, bedding plains see also Kurtzman et al., 2009, Geosphere, v. 5; no. 2; p. 126–139;

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- 4) Line 91 “high matrix porosity” – give numbers 0.1? 0.2? 0.3?
- 5) Lines 215-221: define cross-correlation function; is O an R calculated to all $n(n-1)/2$ pairs of drip data, elaborate, explain the method. End of lines 216 and 218 – redundancy. What are the dimensions of the distance matrix – d ?
- 6) Lines 223 – 228, what is MDS? Is it of the family of the classic principle-component-analysis (PCA)? In the current application how many dimensions? Equations, figures, tell us the method? What is the K-means algorithm – elaborate on top of citing?
- 7) Figure 4. Put all vertical axis the same - 10000 or 1×10^{-4} , do not mix; Color choice not good – try blue for wet seasons and red for dry, or rainy 2013 in contrast with other play with it and choose the better, print and see if it is good on printing as well.
- 8) L 245. These histograms are not skewed. Maybe add a sub figure to figure 4 with the most characteristic normal, skewed, bi-modal histograms, including a continuous line of the pdf to illustrate.
- 9) Figure 5 and relevant text. – The most contrasting ACF are usually at time lag of 150-200 (1 season in the 2-seasons Mediterranean climate), I would plot these ACF until lags of 365 days to enhance the seasonal understanding, that may be gained.
- 10) Figure 6 and 7, choose more contrasting colors and increase symbol size.
- 11) L 292 and 296 typo mistake of new line.
- 12) L313-314 “inconsistency” - unclear
- 13) L339 the beginning of line is unclear

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2017-127>, 2017.