Hydrol. Earth Syst. Sci. Discuss.,
https://doi.org/10.5194/hess-2018-37-RC2, 2018

Hydrology and Earth System Sciences
Discussions
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Interactive comment on "A major waterfall landscape maintained by fog drip water" *by* Lucheng Zhan et al.

Anonymous Referee #2

Received and published: 21 May 2018

This paper analyses isotopic data collected in the Chishui forest region in the southwest of China to characterise the underlying hydrological processes and quantify the contribution of fog water to a waterfall system. By using data collected in two campaigns, one in June 2011 and another, more detailed, in December 2014, the authors attempt to test the hypothesis that "the baseflow in the Chishui forest catchments was not just a mixture of rainwater from different rainfall events, but a mixture of both rainwater and a considerable amount of fog drip water". They conclude that fog in this region contributes between 8% and 31% of baseflow, which at the same time is considered the main component of waterfall discharge. Given the uncertainty in the results, the authors consider this estimate to be the lower bound of fog water contribution to baseflow.

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Discussion paper

The paper is interesting and the analysis is extensive however, however there are some factors in both format and content that would need to be addressed before the manuscript can be considered for publication in HESS. In terms of format, the structure of the document needs to be improved, for instance, with a clearer and more concise description of the methods both as generic procedures and specific activities for this study, and most importantly a division between results and discussion. In terms of format, although the isotopic analysis is very through, there are several assumptions that add uncertainty to the outcomes, or simply invalidate the results. These are the reasons to recommend major revisions to the document and potential rejection in its current form.

1. Improving the structure and description of the paper: Section 2.2: Consider improving the methods section. This does not mean extending the details and length of this section but being sharper and clearer. L 150-160: The description of the drought is suddenly mixed with the following presentation of methods. L 190-191: For instance here and elsewhere, divide the description of instruments and methods from the description of the monitoring campaigns. Section 3: Divide the section in two: Results, and Discussion separately. This will allow understanding the actual outcomes from the experiments and their implications for understanding the processes and contributions to the system.

2. Improving the content of the paper: L 365-367: Although it is mentioned that isotopes in rainwater changed significantly at the end of the year, without changes in the isotopic composition of stream water, there is a lack of data for the start of the year. To have a clearer picture, it would be necessary to know the stream isotopic composition then as well, to back up some of the assumptions and conclusions of the paper. L 386-388: Although it may seem a bit obvious to agree with the hypothesis that baseflow is a mixture of both rainwater and fog drip, I am afraid there is enough evidence to quantify these contributions. L 398-400: The fact that fog water samples were not collected all year round undermines some of the assumptions and conclusions of the paper. For

instance, what is the seasonality of the fog in the area? What is the isotopic composition of fog depending on such seasonality? Is it correct to assume a constant isotopic composition for the fog? Is it correct to assume a constant isotopic composition in the baseflow and rainwater for the mixing model? Justify these assumptions. L 413-419: The fact that rainfall data comes from monitoring of stations not located specifically in the study area at the local scale necessary to understand the contribution to processes, and especially that rainwater samples were collected at an elevation much lower than the two featured catchments increases substantially the uncertainty in the results. Given the lack of specific data, some of the assumptions, such as considering similar rainfall amounts and isotopic compositions, limit the correct quantification of fog contribution to baseflow. Although the explicit exposition of limitations is very welcome, more specific and detailed data is needed to back up some of the assumptions and conclusions in the study.

3. Minor comments:

L96-97: "It is unclear why frequent fog appears in this region and where the water through the large number of waterfalls in the dry period originates". This is a strong statement. Consider rephrasing and citing relevant sources to support this.

L101: "Using the methods of isotope hydrology" is too of a vague statement. Consider improving the terminology and description of the methods.

L 234: "main stream" should be used instead of "mainstream".

Although the paper is, in general, well written, there are some languages issues that need to be improved to provide a much better presentation of the paper and a clearer exposition of the results.

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