

Interactive comment on “Comment on “Origin of water in the Badain Jaran Desert, China: new insight from isotopes” by Wu et al. (2017)” by L. Zhan et al.

Anonymous Referee #1

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The manuscript on “Comment on – “Origin of water in the Badain Jaran Desert, China: new insight from isotopes” by Wu et al. (2017)” - by Lucheng Zhan, et al. provides evidence, that groundwater in the Badain desert is not locally recharged as recommended by Wu et al., (2017) but originating from the Qilian Mountains. This argument is based mainly on a recalculation / corrected values of “an amount weighed stable isotope value of precipitation”, which differs significantly from the former value proposed by Wu et al., and additionally on new groundwater observations collected in the area and provided in the paper.

The comment by Zhan et al. is correct and justified. It is arguing against results from

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Wu et al. in a sense full and scientifically correct form. The comment is well written and logically sound. In my opinion this is a very nice example how 'stimulating discussions' potentially might push science and knowledge in a right direction. It also highlights pros and cons of isotope based research in a productive way and will eventually lead to a better understanding of the Badain Jaran Desert system for all interested readers.

I recommend to allow and accept the comments for publication in HESS after only minor revisions.

General comments

- A key role in both papers is the data set from the WMO/IAEA on stable isotopes in precipitation – station Zhangye (1986 – 2003, n=86). I recommend, that more information on GNIP station Zhangye and in addition to the mean monthly isotope data set (Fig. 1a) the long-term isotope set is implemented in the work to clarify seasonality and trends of the 17 years data set. - Wu et al. were describing their data point as annual average from 'monthly weighted average' values. Therefore I would recommend that the authors include their weighing formula into the text. Were mean monthly values weighed or monthly values to yearly precipitation? - The authors do not comment on earlier an earlier hypotheses, that groundwater might contribute fossil water (Line 30), which potentially was recharged during cooler periods and therefore with more depleted d2H, d18O values. If this would be the case, elevations would not need to be as high as 3914 m a.s.l. (Line 88).

Minor comments - Line 82: (Figure 2b, c) instead of (Figure 2b&c) - Line 105: Wu et al. 2017 instead of 2016 - Line 144: ...isotope data of the Zhangye station to determine... - Line 217: ...monthly precipitation of the GNIP station Zhanye (a). ... - Line 220: delete: Further details are provided in the text. - Line 222: dD vs. d18O ... - Line 223: ... (b, c) ... instead of (b & c)

Please also note the supplement to this comment:

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<https://www.hydrol-earth-syst-sci-discuss.net/hess-2018-229/hess-2018-229-RC1-supplement.pdf>

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