

Interactive comment on “Proof in climatology for circulation effect of stalagmite $\delta^{18}\text{O}$ in East Asia: analysis on the ratios among water vapor transport passageway intensities in East Asia” by S. Nan et al.

Anonymous Referee #1

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General comments

This study describes temporal changes in water vapour transport pathways into the East Asian monsoon region over the last ~50 years. Using NCEP-NCAR reanalysis data, the study provides climatological information about vapour transport changes into the region in the second half of the 20th Century, which has implications for stalagmite oxygen isotopic composition in the region.

The study provides useful information on regional circulation changes that impact vapour transport pathways, which are, in turn, important for archives of past climate
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change. The analysis of these pathways is comprehensive and convincing and is potentially useful for interpreting palaeoclimatic signals.

However, the findings of the study, stemming from the paper title, are largely overstated. While circulation and sea surface temperature changes are explicitly considered, the study does not look at isotopic changes in any comprehensive way. There are various omissions from the study (detailed below) that need to be considered.

Specific comments

1. The title of the manuscript needs to be reconsidered. Does “Proof in climatology...” make sense? The word “proof” does not seem entirely appropriate. Particularly, can the authors guarantee that the pathways described herein are stable under past boundary conditions? The paper does not seem to really delve into stalagmite isotopic variability but rather only summarises the ratio of water vapour transports passageways. Given the emphasis in the title and introduction on stalagmite isotopic variability, this needs to be addressed in more depth in the paper.

2. The isotopic variability from speleothems is not really discussed in the text. The study begins describing speleothem records but these are not discussed in any real detail and only a superficial discussion of isotopic variability and implications is provided. Similarly, any implications for understanding past isotopic variability are not considered, but should be.

3. In general, the manuscript is poorly written, it is confusingly structured in the early sections and contains many sentences that are difficult to understand. In particular, the Introduction begins with information on stalagmite records that are not discussed in further detail, the circulation effect is not defined adequately and it is not clear where this study fits into the existing literature. It would be clearer to begin describing the existing literature and then the motivation for the study. Further details of poor sentence structure and grammar are provided in the technical comments below – overall it may be useful for another colleague with proficient English skills to proof read any further

drafts of this manuscript.

4. The manuscript does not adequately describe how this study differs from previous work and indeed many relevant previous studies are entirely absent from the references. These include papers such as Wang, 2013 in PNAS and Zhou, 2009 in Journal of Climate.

5. The text contains too many acronyms for the reader to keep track of, so the notation needs rethinking. In particular it is very difficult to keep track of the acronyms that represent the ratios of other acronyms.

6. The study does not address any potential biases in NCEP-NCAR reanalysis or look at any other reanalysis products as a complementary lines of investigation. Possible issues with data quality need to be addressed explicitly.

7. Similarly, there is only superficial description of amount effect and connection to water vapour transport. These concepts need to be integrated more clearly. How doe changes in WVT impacts isotopic composition in vapour/precipitation and how does this impact isotopic variability in speleothem calcite?

8. The abstract is very technical and descriptive and should instead provide a more concise summary of the results of the study and the implications of these for the wider community.

Technical corrections

- Title: The title needs to be reworded as no “proof” was provided of circulation impacts on isotopic variability.

- 42654, line 14: This sentence needs changing, specifically (“have supplied chronologic benchmark”)

- 4265, line 21: Should be 1950s not 1950’s

- 4265, line 22 ff: These sites are described here but largely ignored in the rest of the

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text. What is their purpose? They should be integrated into the analysis better.

- 4265, line 27: What does “obviously” mean? Can the data be provided so the reader can see this?

- 4265, line 27: Reword this sentence (“Precipitation in China, as we have known. . .”) as it is not clear who we is.

- 4266, line 2: Reword “Therefore, amount effect. . .” as this is poorly worded.

- 4266, line 5: The amount effect should be introduced earlier and defined clearly.

- 4266, line 28: Reword the last sentence and please provide a reference for this statement.

- 4267, line 1: It is not clear what “from climatologists” means, reword this.

- 4267, line 15: This paragraph assumes a lot of local knowledge by the reader, can these locations be shown on a map?

- Section 2 Data and Calculation – What is the calculation of? Also, the potential biases in the reanalysis dataset need to be address. Data quality issues have not been discussed at all.

- 4268, line 11: “The surface pressure is used to treat the impact of topography” needs rephrasing.

- Section 3 “ratios” not “rations”. Also, I’m not sure about an acronym to describe the ratio of various other ratios, can this not be expressed more simply as “ratio of intensities of WVT passageways”? This is wordier, but easier to understand.

- 4269, line 5 ff. What exactly do you mean by “branch” and how do these correspond to the pathways described in the introduction?

- 4269, line 13. Reword this “Because of the guide of . . .” and can the WPSH be shown on a map in the early part of the manuscript?

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- 3.2 Are these decadal shifts statistically significant?
 - 4270, line 1. What do you mean by "In climatology...?"
 - 4270, line 14. What does "normal" mean here?
 - 4270, line 20 ff. The circulation effect has not been adequately connected to WVT passageways in this study. This needs to be discussed in more detail, possibly when the "circulation effect" is first described.
 - 4271, line 5. Can these years be put in a table instead? This would make this section easier to read.
 - 4271, line 16 ff. But are these difference described statistically significant? They don't seem to be from the colours in Fig 4a.
 - 4272, line 28. Does this mean that the position of the WPSH is diagnosed from the position of the 5870 gpm contour? Can this be made more explicit?
 - 4273, line 4. There are multiple influences on stalagmite isotopic variability that have not been acknowledged and should be.
 - Section 5. The first paragraph needs to be reworded, the writing is hard to follow and poorly written.
 - 4273, line 18. What does "previous" mean here?
 - 4275, line 7 "In light of the conception of circulation effect..." needs rewording.
 - 4276, line 11 "In light of circulation effect..." The isotopic variability in vapour and stalagmite calcite needs to be discussed more thoroughly in this study, as the WVT and isotopic connection has not been made clearly enough.
 - Figure 1. The word "ranges" in the caption seems ambiguous – why does this mean? Also the regions are hard to see above the wind vectors.
 - Figures 8 and 9. The contours are very difficult to pick out and read, these need to
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be changed so they can be seen.

Interactive comment on Clim. Past Discuss., 9, 4263, 2013.