

Note: The comments are in black, and our replies in blue.

This paper studies moisture sources and dynamics over southeastern Tibetan Plateau using water vapor isotopes, especially in non-monsoon season. The findings offer valuable insights into the mechanisms at seasonal scale for this region and could provide an explanation for hydrological information recorded in paleo proxy isotopes. However, there are still many problems preventing the publication in current version. The structure of the paper is not well-organized and lack of logic. Especially, the discussion and results section needs to be carefully revised and organized. The English expression is not good and needs improvement.

Re: We sincerely thank the referee for the overall comments and the comments/suggestions on how to improve our manuscript. In response to your comments and suggestions, we have made significant revisions to enhance the clarity, logical flow, and overall structure of the manuscript. The Introduction section has been streamlined and now maintains a sharper focus on vapor isotopes, aligning more closely with the study's objectives. In addition, we have thoroughly reorganized the discussion and results section to improve the structure and ensure a coherent presentation and discussion of our findings. We have also addressed the issues related to English expression, striving to improve the manuscript's readability. These revisions are informed by your comments as well as those from the other reviewer. Please find below a detailed response to your comments and corresponding changes.

Specific comments:

Abstract: lines 13-15: The study area in this paper is southeastern Tibetan Plateau, not the whole Tibetan Plateau. Please rewrite the abstract.

Re: Following your suggestion, the first part of the Abstract has been rewritten as follows:

“The southeastern Tibetan Plateau (SETP) has experienced a significant drying trend in recent decades, likely linked to changes in moisture sources. Water vapor isotopes are valuable tracers of the atmospheric water cycle, yet their interpretation is hindered by ambiguities in atmospheric controls.”

Introduction: This part is too long and distracted. It is hard to get why do you perform vapor isotopes analysis in southeastern Tibetan Plateau. There have been a lot of studies on moisture sources and dynamics in this region. What is your scientific question?

Re: We agree that the Introduction section was overly lengthy and lacked focus, which may have obscured the rationale behind our study. In response, we have thoroughly rewritten the first paragraph to clearly articulate the motivation for conducting vapor isotopes study over the southeastern Tibetan Plateau. In addition, we have streamlined the discussion on precipitation isotopes by consolidating related materials into a single, coherent paragraph. The last paragraph of the Introduction has also been revised to outline our scientific objectives and approaches employed.

Line 60: why do you emphasize non-monsoon season. In fact, I don't think it is a good idea to emphasize the non-monsoon season independently. I suggest the authors to emphasize the scientific

question, and to introduce the important role of the non-monsoon season on resolving the scientific question.

Re: Yes, we agree that isolating the non-monsoon season independently may detract from the study's overarching scientific objectives. Following your suggestion, we have restructured the relevant parts by integrating the discussion of the non-monsoon season and monsoon into a single paragraph. The restructured paragraph on the review of precipitation isotopes highlights the importance of both seasons in addressing the scientific question. The material has been significantly condensed.

Lines 318-325: this part should be results, not discussion.

Re: We agree that these parts are more appropriately situated within the Results section. It has been relocated to a new subsection within the Results section.

Section 4.2, 4.3, 4.4: Most of these sections are results, not discussion. I strongly suggest the authors to reorganize the results and discussion. It is difficult to obtain information in current version.

Re: We agree that the original structure made it difficult to distinguish clearly between results and their interpretation. Following your suggestions, we have reorganized the results and discussion. The Sections 4.1, 4.2, and 4.3 are now moved to the Results section. Currently, only one section was kept as discussion section. The current structure of the results and discussion is as follows: “

3 Results

3.1 General characteristics of vapor $\delta^{18}\text{O}$, d-excess, and local meteorological variables

3.2 Seasonal variability in moisture sources and transport pathways

3.3 Role of ocean surface evaporation conditions at seasonal and intraseasonal time scales

3.4 Role of dry and cold air intrusion during the non-monsoon season

3.5 Role of rain-vapor interaction during the summer monsoon season

4 Implications for interpreting TP ice core isotope data

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Figure Legends: Ensure consistent formatting (e.g., font size, symbols, color schemes) across all figures to improve clarity and visual coherence.

Re: We have checked all figure legends to ensure uniformity across all figures, and we have made changes when it is necessary.

Isotope Notation: Verify that “ $\delta^{18}\text{O}$ ” is consistently formatted with proper superscripts (e.g., replace “d18O” or “delta18O” with “ $\delta^{18}\text{O}$ ”).

Re: We have checked the isotope notation across the manuscript, figures, and supplementary information. To ensure consistency, we replaced all occurrences of “d18O” from those figures in the supporting information with the properly formatted “ $\delta^{18}\text{O}$ ”.