

## Response to Reviewers' comments

**Journal:** Atmospheric Chemistry and Physics

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**Title:** “Measurement report: Impact of domestic heating on dust deposition sources in hyper-arid Qaidam Basin, northern Qinghai-Xizang Plateau”

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\*In the revised manuscript, revisions are marked in Purple.

Specific comments:

Lines 24-26: I would be a little more specific with these highlights – considering that the study focused on atmospheric dust deposition.

➤ **Response:**

Thank you for your suggestion. We have added emphasis on atmospheric dust deposition in the Highlights section, and the revised text is provided below (Lines 24–27).

“1. The spatiotemporal distribution of carbonaceous aerosols in the basin's atmospheric dust deposition was analyzed using various carbon indicators.  
2. Domestic heating significantly increased associated pollutants in rural atmospheric dust deposition.”

Lines 27-28: I'm not sure the findings from this study support this statement. As far as I can tell, the analysis presented in the MS does not attempt to quantify the influence of regional emissions/deposition over QXP glaciers. I would suggest re-phrasing: “...emissions and deposition may impact regional glaciers”... or something along that line.

➤ **Response:**

Thank you for your comment. Indeed, our study does not explicitly demonstrate the influence of regional emissions/deposition on QXP glaciers. Accordingly, we have revised the text (Lines 28–30) as follows:

“3. The basin's unique energy structure suggests its emissions and deposition could affect regional glaciers on the Qinghai-Xizang Plateau.”

Lines 62: The sentence “It is a key component of particulate matter” is somewhat abrupt and out of place. I would suggest integrating this information into the previous sentence – which itself could be reworked.

➤ **Response:**

Thank you for your insightful suggestions. We have integrated this sentence with the preceding one, and the revised text is provided below (Lines 62–64):

“Atmospheric dust, a key component of particulate matter (PM), comprises solid particles, typically

ranging in size from below 1  $\mu\text{m}$  to 100  $\mu\text{m}$ , which may become airborne depending on their origin, physical characteristics and ambient conditions (Xu, 2014).”

Line 186: It is established that the QXP is named the Treasure Basin in the introduction section, so there is no need to repeat here.

➤ **Response:**

We apologize for the misunderstanding here. We have removed the redundant description referring to the Qaidam Basin as “treasure basin” and conducted a thorough check throughout the manuscript.

Line 336: I think there should be a comma here instead of a period.

➤ **Response:**

Thank you for pointing this out. We have changed the comma to a period, and the revised sentence is provided below (**Lines 337–340**):

“After siphoning the supernatant water, 10 mL of 0.05 N sodium hexametaphosphat  $[(\text{NaPO}_3)_6]$  were added, and the residue was dispersed for 5 min in an ultrasonic bath before measurement (Lu and An, 1997), the results are expressed as volume percentages.”

Line 1057: I would recommend moving Figure 8 and 9 to the supporting information section. The MS is rather large as it stands.

➤ **Response:**

We greatly appreciate your feedback. We have relocated Figure 8 and Figure 9 to the Supporting Information as Figures S25 and S26, respectively, and have updated the corresponding references throughout the manuscript.