

Response Letter

Dear Editor,

We thank you for the careful reading and helpful suggestions. We have addressed the two minor issues and the additional request regarding the Author contributions section as follows.

1. L. 485: “cooling” → “cooling autumns”?

We agree that the original wording “cooling” could be ambiguous. We have clarified it as “autumn cooling” to explicitly indicate that the cooling refers to autumn. The revised phrase now reads:

“... declining autumn lags—particularly in the Tianshan—may indicate accelerated snowpack establishment under autumn cooling, while declining winter lags in the North Tianshan may reflect snowpack thermal degradation under warming winters.”

2. L. 486–487: Attribution of seasonal temperature changes

We agree that seasonal temperature changes are not presented in our study and should be clearly attributed to Chen et al. (2015). Following your suggestion, we have rephrased the sentence as:

“This asymmetric interpretation is supported by concurrent regional trends presented by Chen et al. (2015): autumn cooling rates have accelerated over the study period, while winter warming trends have been documented in the same region.”

The revised paragraph now reads:

“The lag patterns presented in Section 4.3 add a temporal dimension to this diagnostic framework. In the Altay Mountains, long and stable winter lags are consistent with a deep, cold snowpack possessing high thermal inertia. In contrast, shorter lags in the Tianshan low-elevation zones suggest reduced thermal buffering capacity. The long-term trends also exhibit seasonal asymmetry: declining autumn lags—particularly in the Tianshan—may indicate accelerated snowpack establishment under autumn cooling, while declining winter lags in the North Tianshan may reflect snowpack thermal degradation under warming winters. This asymmetric interpretation is supported by concurrent regional trends presented by Chen et al. (2015): autumn cooling rates have accelerated over the study period, while winter warming trends have been documented in the same region. These interpretations are inferential—lag time is a statistical metric, whereas thermal inertia and cold content are physical properties we did not directly measure. Direct attribution would require complementary in situ measurements or process-based modeling.”

We have also revised the “Author contributions” section to use the authors’ initials rather than their full names. The revised section now reads:

“H.L. conceived the main innovative ideas and led the experiments. X.B., S.L., Y.C., and J.L. participated in the experiments and manuscript writing. M.X. and X.L. contributed to the data processing.”*

We hope these revisions address your concerns.

Sincerely,

Haixing Li and coauthors