

For data description manuscript [essd-2026-180]

2st round author's response to the reviewer #1 and #2

Reviewer #1 comment: The authors have addressed most of my previous concerns, and I appreciate the effort to revise the validation analysis. However, I still have one question regarding the revision of Figure 11. The authors state that the original single-point comparison has been replaced by a 135-station network-mean diagnostic. However, the revised Figure 11 appears to show nearly identical temporal variations in the Reference series (blue curves) compared with the original single-point version. Moreover, the reported linear trends remain exactly the same (e.g., $+c$ °C/10a for temperature and $+0.0208$ g/kg/10a for specific humidity).

Authors' response: We sincerely thank the reviewer for recognizing our efforts to revise the manuscript and for the valuable comments that have substantially improved its academic quality.

Figure 11 presents a multi-year monthly time series and therefore exhibits a pronounced annual cycle. After averaging the observations across multiple stations in the revised Figure 11, averaged max/min monthly values changed from 10.46/-10.69 °C to 13.43/-7.35 °C for temperature, and from 9.19/0.99 g kg⁻¹ to 10.02/1.50 g kg⁻¹ for specific humidity. By these changes, the differences between multi-station averages and single-station time series are shown.

We would also like to clarify that the linear trends mentioned by the reviewer ($+0.0729$ °C decade⁻¹ for temperature, and $+0.0208$ g kg⁻¹ decade⁻¹ for specific humidity) are shown in **Figure 10**. The data and calculations underlying these trends remain unchanged between the previous and round 1 revised version, they have consistently been based on the annual mean TPHH product over the Tibetan Plateau.

Reviewer #2 comment: I appreciate the authors' careful and substantial revision. The revised manuscript addresses the main concerns raised in the previous round, particularly those regarding the interpretation of the FourCastNet framework, and the release of the open access reproduction documentation. The added performance metrics, DEM-sensitivity experiments, trend diagnostics, and proxy-window analyses considerably improve the transparency and reproducibility of the work. Therefore, the revised manuscript is suitable for publication in Earth System Science Data, here I recommend acceptance after this one correction below:

Please ensure that the terminology is fully consistent in the remaining figure captions and cross-references. In particular, expressions such as “validation” and “historical validation period” in the captions of Figures 7 and 11 should be replaced with “station-based consistency evaluation”, “pre-1979 station-based consistency period”, or “station-network-mean consistency diagnostic” as appropriate. This would align the captions with the revised methodological interpretation and avoid implying that the CMA network is independent of TPMFD.

Authors' response: We sincerely thank the reviewer for helping our manuscript with all these constructive and helpful comments. The relevant statements in the captions of **Figure 7** and **11** have been revised according to the suggestion.

Reference style revision note: We have reformatted all references to conform to the ESSD reference style.