**Response to Reviewer #1**

After reviewing the revised manuscript and considering the comments from the previous reviewers, I find that the authors have addressed the concerns thoroughly, and the manuscript is now significantly improved. The study presents a valuable, large-scale dataset and high-resolution maps of soil micronutrients across the Tibetan Plateau, which will be a significant resource for the community.

I fully concur with the perspective raised by Reviewer #1 regarding data accuracy: while the spatial patterns derived from XRF and ICP-MS may be similar, the exact numerical concentrations are of paramount importance for a dataset intended for quantitative use and model benchmarking.

The authors have transparently discussed the limitations of XRF in the "Uncertainty" section (Section 5), noting the systematic underestimation of Zn by XRF compared to ICP-MS and their subsequent calibration. This is commendable. However, to ensure the dataset is used appropriately and to highlight a critical methodological caveat, I recommend the authors strengthen this warning within the main text, particularly in the Abstract and/or the Data Availability section.

Specifically, it should be explicitly stated that while XRF is robust for major elements like Fe, its accuracy diminishes for trace-level elements such as Zn. Users should be cautioned that the provided concentrations for these more trace elements, despite calibration, carry greater inherent methodological uncertainty compared to values that would be obtained via ICP-MS. This prominent disclaimer will guide future users in applying the dataset correctly, especially for studies focusing on absolute bioavailability thresholds, detailed mass balance calculations, or comparisons requiring high-precision concentration values.

**[Response]** Thank you very much for your time and careful evaluation of our manuscript. Following your suggestion, we have implemented the following targeted revisions:

First, we added an explicit clarification in the Abstract regarding the analytical methods

and prediction uncertainty: *"Four micronutrients (Fe, Mn, Zn, and V) were measured by laboratory X-ray fluorescence (XRF) for all samples and calibrated and validated against inductively coupled plasma mass spectrometry (ICP-MS) for a subset of samples."* (Lines 10-12 on Page 1).

We further clarified model performance and uncertainty: *"Predictions for major elements are robust, whereas trace-level elements, particularly Zn, exhibit comparatively higher methodological uncertainty despite calibration. Accordingly, users should interpret absolute Zn contents with caution and refer to the accompanying uncertainty diagnostics when applications require high-precision estimates."* (Lines 22-25 on Page 1).

In addition, we revised the Data Availability section to clearly define the intended use scope and appropriate cautionary scenarios. The following statement has been added: *"Users should note that laboratory XRF provides robust estimates for major elements (e.g., Fe), whereas trace-level elements (particularly Zn) carry higher uncertainty even after ICP-MS calibration. The dataset is intended primarily for plateau-scale analyses and cross-ecosystem spatial comparisons, caution is advised when using absolute Zn contents for applications requiring high analytical precision (e.g., bioavailability thresholds, detailed mass-balance calculations, or benchmarking requiring near-reference values), and users should consult the accompanying calibration statistics and uncertainty diagnostics."* (Lines 391-396 on Page 18).

We believe these revisions address the concern clearly and transparently.

**Response to Reviewer #2**

I am glad to see that the authors have made substantive changes to the manuscript and the manuscript has been improved a lot, and I think it can be accepted after a minor revision. Since the XRF analysis is questioned, I strongly suggest the authors show measurement techniques in the Abstract clearly.

**[Response]** Thank you very much for the positive evaluation and suggestions. We have added an explicit clarification in the Abstract regarding the measurement techniques: *"Four micronutrients (Fe, Mn, Zn, and V) were measured by laboratory X-ray fluorescence (XRF) for all samples and calibrated and validated against inductively coupled plasma mass spectrometry (ICP-MS) for a subset of samples."* (Lines 10-12 on Page 1).