Dear reviewer,

We sincerely thank for your review on our manuscript. According to your suggestions, we have made some changes to our manuscript. The detailed corrections are listed below.

1 I recommend the authors to describe the study area with "Qinghai-Tibetan Plateau".

Thanks for the suggestion. We have noted that several words about the name of the plateau existed, for example, the Tibetan Plateau, Qinghai-Tibetan Plateau, Qingzang Plateau and even Xizang Plateau. The first word has often been used internationally, and the other three have usually been used by Chinese scientists. We looked through recent papers published from ESSD, the word "Tibetan Plateau" was more often used than the Qinghai-Tibetan Plateau. It is also called the "Tibetan Plateau" in the special issue "Extreme environment datasets for the three poles" which our manuscript submitted. In order to keep unanimous with the special issue, we still use the word "Tibetan Plateau" but explained in the Introduction that the TP is call "Qinghai-Tibetan Plateau" too and it includes two regions of Qinghai and Xizang in China.

2 I agree that some datasets have built in China, but it has no data on the QTP. However, some progresses about trait analysis have been achieved and the description of these work is necessary.

In the section ("Introduction") of our manuscript we have generally introduced some trait-based works carried out on the Tibetan Plateau but lacked detailed description. Thus, we have made some corresponding adjustments to this part. Details are as follows:

"Field-based, small regional studies of plant functional traits on the TP had made some interesting advances, such as Luo *et al.* (2005) linked the plant traits with ecosystem functions, He *et al.* (2006) explored the influence factors on plant traits, Geng *et al.* (2014) quantified the patterns of plant trait correlations between above- and below-ground components, Wang *et al.* (2020) compared their work with global dataset, and Xu *et al.* (2021) analyzed the mechanism of plant trait variation along the altitude pattern. Yet such works were also limited, where the sampling sites have been mostly along the main roads in East TP. Plant trait records from Central to West TP are very rare."

3 Line 102, please added the description of sampling size in your dataset.

We have supplemented the relevant description in line 104. "The dominant and common plant species in each site were determined by visual inspection, and leaf samples of these plants were picked up and the leaf traits were measured."

4 Line 172, please add the method reference of measuring LNC and LPC.

Determination of nitrogen and phosphorus in plants was conducted based on the agricultural industry standards of the People's Republic of China (NY/T 2017-2011, Fang *et al.*, 2011).

Fang JB, Pang RL, Guo LL, Xie HZ, Li J, Luo J, Yu H, Liu Y, Wu FK. 2011. Determination of

nitrogen, phosphorus and potassium in plants. NY/T 2017–2011.

5 The ecological significance of these traits should be added.

We have added this information in our manuscript (3.4 Data analysis). Details are as follows:

"The six fundamental leaf traits we selected for analyze the relationships due to their ecological significance in the face of high altitude and extremely cold environment: LT, affecting the water supply and storage of leaves and the exchange process of matter and energy in photosynthesis; LDMC, reflecting the ability of plants to acquire surrounding environmental resources; SLA, considered as the first choice index for studying plant physiological and ecological strategies under specific environmental conditions; LCC, the main structural material of plants; LNC, characterizing the ability of plants to absorb and utilize nutrient elements; and LPC, the second largest element affecting plant growth."

6 The potential applications and the limitations (if some uncertainties existed during measuring) should be discussed.

The previous version of our manuscript has briefly discussed the potential applications and limitations of the dataset in the "Summary" section, but some uncertainties existed during measuring have been absent. In the current version, we added more detailed descriptions of this part in the first paragraph of the "Summary" section. Details are as follows:

"The TiP-Leaf dataset was compiled from direct field measurements, covering a great proportion of plant species and vegetation types on the highest plateau in the world. The dataset provides important data foundation not only for quantitative analyses of modern alpine vegetation but also for prediction of future response of alpine ecosystem to climate change and improvement of next-generation vegetation models. It could also be used to promote the vegetation protection and restoration on the TP and contribute to the global plant trait database. However, the dataset also presents some unavoidable limitations. For example, the establishment of sampling sites and the judgment of dominant and common species are mostly subjective. The leaves of some plants are extremely small, resulting in incomplete recognition when scanning the leaf area. Due to the harsh field conditions, it is sometimes impossible to determine the plant traits in time. It is still impossible to prevent some leaves from losing too much water to withering although we have taken protective measures for the leaves. Inadequate collection of some leaf samples results in less data of plant chemical element content than that of morphological traits. In any case, it is not easy to carry out large-scale collection of plant traits on the Tibetan Plateau, which requires a lot of manpower and material resources as well as overcoming the adverse environment of high altitude and extreme variability."

Please do not to hesitate to contact us, if you have any further questions about the manuscript and the answers.

Sincerely yours,

Yilin Jin and Jian Ni

On behalf of all the co-authors