Referee #1

This manuscript presents the HDM-Plot dataset, a plot-based vegetation dataset across the Hengduan Mountains region, comprising 314 plots sampled between 2022–2024 and covering a wide elevational gradient (754–4,932 m), with detailed species, structural, and environmental information. Overall, the dataset is valuable, timely, and potentially highly useful for studies of mountain biodiversity, vegetation classification, and macroecological analyses. However, as a data paper, the manuscript still requires substantial revision to improve transparency in sampling design, clarify dataset scope, and strengthen technical validation and usability.

Response: Thanks for your positive comments and constructive suggestions for our manuscript. We have revised the manuscript accordingly, especially focusing on the sampling design, dataset scope, technical validation and usability, and others. The detailed corrections and explanations are listed below.

Comment 1 One critical issue concerns the geographic extent of the dataset. Based on Figure 1 and other maps throughout the manuscript, the spatial coverage—particularly in the southeastern part—clearly includes a substantial portion of the Yunnan–Guizhou (Yun–Gui) Plateau, rather than being restricted to the Hengduan Mountains sensu stricto. This has important implications for both the description and interpretation of the dataset. Relatedly, the manuscript describes HDM vegetation as being dominated by subtropical evergreen broadleaf forests (Lines 73–74; light blue region in Fig. 1) and reports a relatively high proportion of tropical areal-types (35.4%; Line 24). These statements appear inconsistent with the widely accepted view that the Hengduan Mountains flora is predominantly temperate in character, within the Sino-Himalayan floristic region. While the HDM is indeed a transitional zone between tropical Southeast Asia and temperate East Asia, its floristic identity is generally shaped by temperate elements at mid–high elevations, with tropical components being comparatively limited and largely confined to lower elevations. This discrepancy may arise from the inclusion of non-HDM areas (e.g., the Yun–Gui Plateau) in the dataset. I recommend that the authors explicitly clarify the sampling extent and adopt one of the following approaches: (1) restrict the dataset strictly to the Hengduan Mountains by removing sites apparently located on Yun-Gui Plateau & revise all corresponding maps and summaries, or (2) acknowledge that the dataset covers adjacent Plateau, revise the manuscript accordingly, and avoid presenting results as representative of the Hengduan Mountains alone. In addition, Figure 2 appears to include several plots in the northwestern corner that fall outside the defined study region. The authors seem to include these plots in downstream analyses (and maps), and if so, apply a consistent treatment to all peripheral plots (including those in the southeastern plateau).

Response: First, we acknowledge that the HDM-Plot dataset is not restricted to the Hengduan Mountains sensu stricto, but also includes adjacent regions, especially along the southeastern margin adjoining the Yun–Gui Plateau and the northwestern margin adjoining the Tibetan Plateau. Our surveys aimed to document vegetation composition and distribution along the major mountain–valley systems of the Hengduan Mountains. However, because of the continuity of regional topography, the gradual transition of vegetation belts, and the practical arrangement of survey routes, the actual survey extent included adjacent plots. These peripheral plots record important vegetation transitions from the Hengduan Mountains toward adjacent regions, so we retained them and treated them consistently in all analyses. We therefore adopted the reviewer's second suggested approach. To avoid ambiguity, we have revised the Title, Abstract, Introduction, Study area, figures, and corresponding captions to explicitly state that the dataset covers "the Hengduan Mountains and adjacent regions". Specifically, the manuscript title has been revised to "HDM-Plot: a plot dataset of plant communities across three-dimensional zonal vegetation in the Hengduan Mountains and adjacent regions, southwestern China". We have clarified in Section 2, Study area, that unless otherwise specified, the results in this manuscript describe patterns within the HDM-Plot study region and should not be interpreted as representing the Hengduan Mountains sensu stricto alone. To maintain consistency with the published dataset product, we retain the dataset name, "HDM-Plot".

Second, we have checked and revised the description of vegetation regionalization and mapped vegetation types in the Section Introduction. A newly added Table S1was used to summarize the relative area of **vegetation regionalization units** and **mapped vegetation types**, respectively, within the HDM-Plot study region. The results show that the subtropical evergreen broadleaf forest region occupies the largest proportion of the study region (86.7%), whereas the tropical monsoon rain forest and rain forest region (8.5%) and the Qinghai–Xizang Plateau alpine vegetation region (4.7%) occupy much smaller proportions. The main vegetation types in the study region include subtropical evergreen broadleaf forest (24.2%), subalpine shrubland (23.2%), subalpine needleleaf forest (16.0%), alpine meadow (13.3%), and dry-hot valley shrubby grassland (12.5%). To avoid ambiguity with the commonly accepted understanding of vegetation in the Hengduan Mountains sensu stricto, we have revised the relevant text in the manuscript and now present these patterns explicitly as spatial characteristics of vegetation in the HDM-Plot study region. Accordingly, the revised manuscript states that the HDM-Plot study region spans three vegetation regionalization units: the subtropical evergreen broadleaf forest region, the tropical monsoon rain forest and rain forest region, and the Qinghai–Xizang Plateau alpine vegetation region. Across the region, mapped vegetation types show a southeast–northwest transition from subtropical evergreen broadleaf forests and dry-hot valley shrubby grasslands to subalpine needleleaf forests, subalpine shrublands, and alpine meadows.

Third, we have checked and supplemented the analysis of floristic characteristics in Section 4.3. The original floristic statistics were calculated separately at the family and genus levels, with each family or genus assigned to one areal-type category. The newly added Table S2 further provides the number of species contained within each areal-type category. The results show that although tropical areal-types account for 35.4% of the recorded genera, these genera contain only 23.3% of the recorded species. In contrast, temperate genera contain 66.7% of the recorded species. In addition, we added a Figure S2 reflecting the spatial distributions of genus-level areal-type groups based on plot–genus occurrence records. The analysis indicates that temperate genera dominate plot-level occurrence records and are mainly associated with high elevations, whereas tropical genera are more closely associated with low elevations. Both temperate and tropical elements are broadly distributed within the study region, but the number of occurrence records of temperate genera is nearly four times than that of tropical genera. These additional results further clarify that the HDM-Plot dataset records transitional floristic features across the Hengduan Mountains and adjacent regions. However, when species representation and plot-level occurrence frequency are considered, temperate elements are clearly dominant, consistent with the widely accepted understanding of the regional flora. To avoid ambiguity, we have revised the Abstract and Section 4.3 to present these results as dataset level, and to clarify that at the genus level, temperate elements are dominant and tropical elements are secondary.

Table S1 Relative area of vegetation regionalization units and mapped vegetation types in the HDM-Plot study region

Vegetation unit	Area (km^2)	Relative area (%)
Vegetation regionalization		
I	632,189	**86.7**
II	62,040	8.5
III	34,248	4.7
Vegetation types		
TRF	6,469	0.9
DHVSG	91,381	**12.5**
SEBF	176,385	**24.2**
SMNBF	5,173	0.7
TDBFS	10,284	1.4
SANF	116,924	**16.0**
SAS	169,306	**23.2**
TM	14,654	2.0
AM	96,771	**13.3**
AV	41,378	5.7

Table S3 Floristic areal-types at family and genus levels in the HDM-Plot dataset.

Areal-types	Family level (percentage, %)		Genus level (percentage, %)	
	No. of families	No. of species	No. of genera	No. of species
1	30.8	48.6	6.6	8.6
2	24.8	12.1	11.6	9.6
3	8.5	4.3	2.9	3.1
4	2.6	0.4	5.3	2.5
5	1.7	0.3	2.9	1.6
6	/	/	2.6	1.2
7	1.7	1.2	10.0	5.3
8	18.8	29.4	23.2	47.2
9	5.1	2.5	7.1	5.1
10	0.9	0.1	6.3	3.8
11	/	/	1.8	1.8
12	/	/	0.8	0.4
13	/	/	0.8	0.4
14	5.1	1.2	14.0	7.9
15	/	/	4.0	1.3
Cosmopolitan	30.8	48.6	6.6	8.6
Tropical	39.3	18.3	35.4	**23.3**
Temperate	29.9	33.1	54.1	**66.7**
Endemic to China	/	/	4.0	1.3

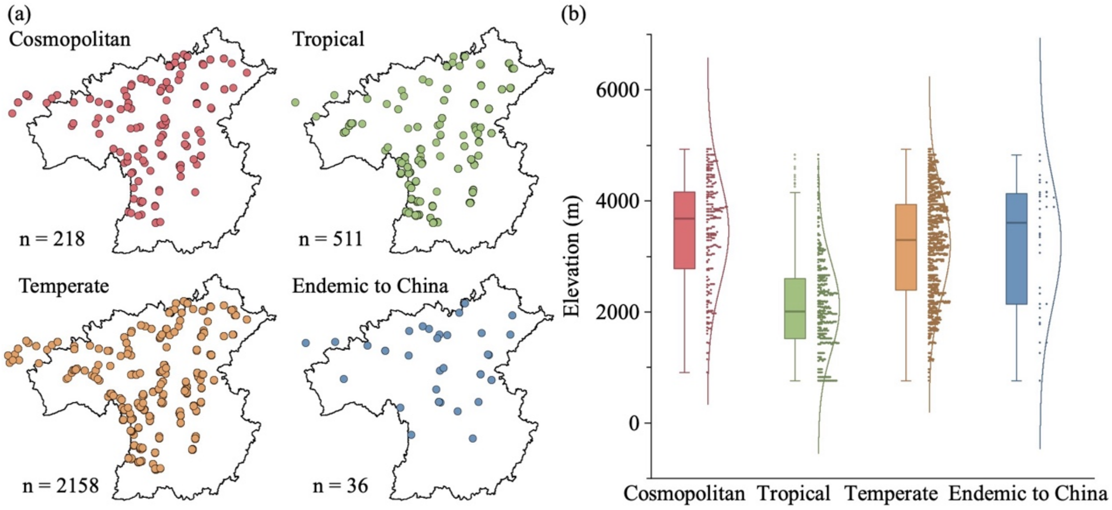

Figure S2 Spatial **(a)** and elevational **(b)** distributions of genus-level areal-type groups based on plot–genus occurrences. n denotes the total number of plot–genus occurrence.

Comment 2 The sampling design and representativeness. The manuscript states that plots were placed across representative mountains and valleys, while also considering logistics and accessibility. However, the sampling design remains insufficiently documented for a data paper -- there is no clear stratification scheme (by elevation / vegetation / region), potential accessibility bias is not quantified, and the overall sampling rationale remains unclear (representativeness, coverage of extremes, opportunistic survey). For transparency and future data reuse, the authors should clarify the sampling design rationale and goals. Additionally, the authors could provide a table or supplementary figures to show: (a) numbers of plots per vegetation types (ideally alongside the relative area of each vegetation type in the study region); (b) numbers of plots per elevational band (e.g., 500-m intervals). These would be helpful information to interpret the data.

Response: We agree that the sampling design and representativeness of the dataset needed to be described more clearly. The main goal was to capture the major vegetation belts and transition zones shaped by the mountain–valley system and climatic gradients across the Hengduan Mountains and adjacent regions. Therefore, plots were placed along various longitudinal, latitudinal, and elevational gradients, with emphasis on major mountain–valley systems, vegetation physiognomic types, and local transitions among forest, shrubland, and grassland communities. At the same time, plot placement was constrained by field logistics, road accessibility, and terrain conditions in complex mountain environments. We have clarified in Section 3.1, Vegetation survey, that the survey followed a coverage-oriented field sampling design. As suggested, we have expanded Figure 2 to summarize the realized sampling coverage. The revised Figure 2 shows the spatial distribution of plots (a), their climatic coverage in MAT–MAP space (b), and the plot proportion and relative area of each vegetation type (c) and each elevational belt (d). These plots cover the major geographical space, climatic space, vegetation types, and elevational belts of the study region (Figure 2). The corresponding figure caption and text have been revised accordingly.

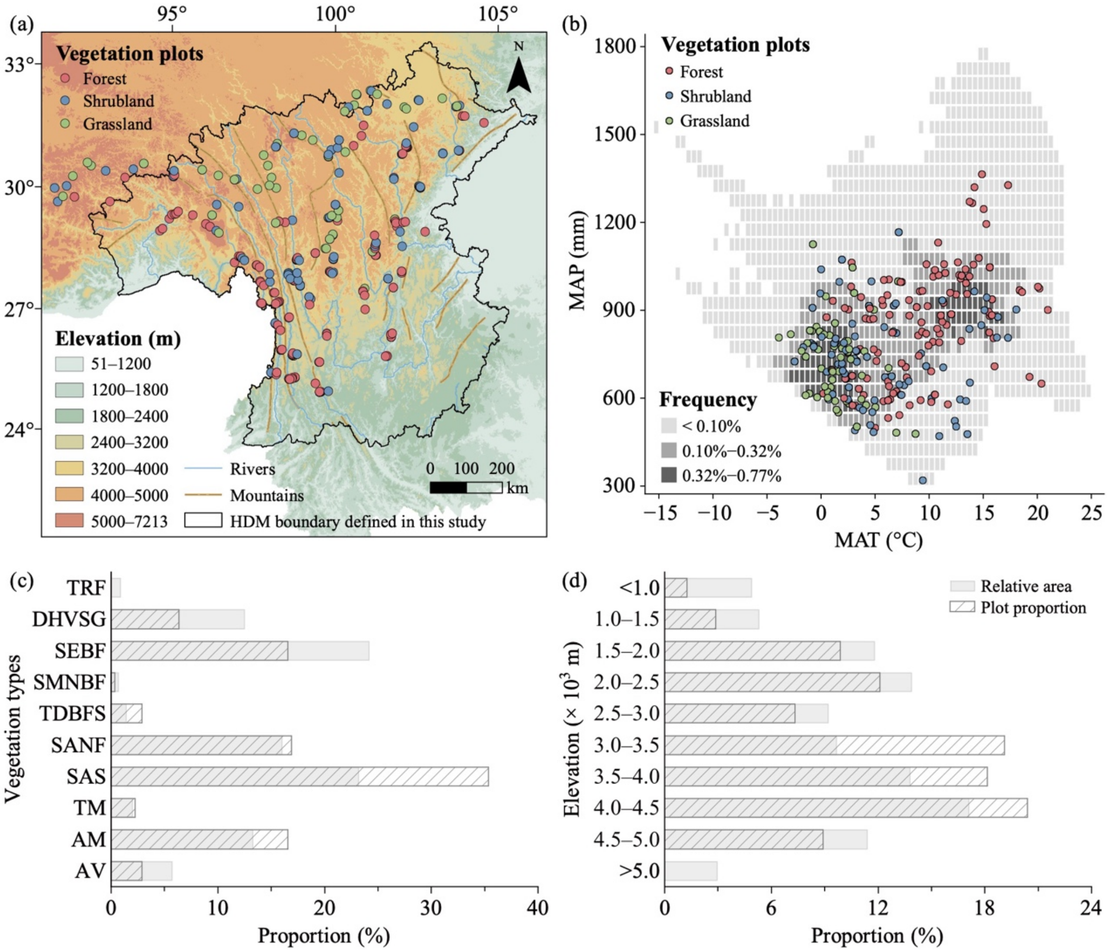

Figure 2. Spatial **(a)**, climatic **(b)**, vegetation-type **(c)**, and elevational **(d)** coverage of vegetation plots in the HDM-Plot dataset. Elevation data was derived from the SRTM 90 m dataset (Farr et al., 2007) and resampled into 1 km grid cells. Mountain and river data were obtained from the Digital Mountain Map of China Dataset (Nan et al., 2015) and Natural Earth (https://www.naturalearthdata.com, last access: 12 March 2026), respectively. Mean annual temperature (MAT, °C) and mean annual precipitation (MAP, mm) were derived from a 1 km

monthly climate dataset for China covering 1991–2020 (Hu et al., 2025). Grey squares in panel **(b)** indicate the frequence of MAT–MAP combinations among all 1 km grid cells within the study boundary, based on two-dimensional bins of 0.5 °C for MAT and 50 mm for MAP. In panels (c) and (d), grey bars indicate the relative area of each vegetation type and each elevational belt, and hatched bars indicate the plot proportion of surveyed plots within each group. Vegetation types were extracted from the 1:1,000,000 Vegetation Map of the People's Republic of China (Editorial Committee of Vegetation Map of China, the Chinese Academy of Sciences, 2007a). TRF, tropical rain forest; DHVSG, dry-hot valley shrubby grassland; SEBF, subtropical evergreen broadleaf forest; SMNBF, subtropical mountains mixed needleleaf and broadleaf forest; TDBFS, temperate deciduous broadleaf forest and shrubland; SANF, subalpine needleleaf forest; SAS, subalpine shrubland; TM, temperate meadow; AM, alpine meadow; and AV, alpine cushion and sparse vegetation, and bare land.

Comment 3 Interpretation of ecological patterns. The manuscript reports patterns such as: unimodal richness along elevation and growth-form shifts across gradients. Given the non-random sampling design and uneven spatial distribution of plots, these results should be presented more cautiously. They are best interpreted as descriptive summaries of the dataset, rather than as general ecological conclusions about the Hengduan Mountains region. I recommend explicitly reframing these results to avoid overinterpretation.

Response: We agree that these patterns should be interpreted cautiously. In the revised manuscript, we have reframed the elevational patterns of species richness, growth forms, and woody life forms in Figure 8 as descriptive summaries of the surveyed plots in the HDM-Plot dataset, rather than as general ecological conclusions for the entire region. Accordingly, we have revised the relevant descriptions in the Abstract, Section 4.2, and the caption of Figure 8. We have checked the full manuscript and removed of softened statements that may imply regional-scale inference, with explicit clarification that these results describe patterns within the HDM-Plot dataset.

Comment 4 Figure elements. Several figures could be substantially improved in terms of clarity and presentation. For example, multi-panel figures should include panel labels (e.g., a, b, c, d) to clearly separate different components. In Figure 1, the left panel could be (a) horizontal vegetation type distributions, and the right panel could be (b) elevational distribution. For Figure 3/4/5/6, there could be four panels, (a) for spatial patterns of Families, (b) for genera, (c) for elevational patterns of Families, and (d) for genera. Similar suggestion for Figure 11. And figure captions need to be revised correspondingly. For some figures, units are missing. Elevation units ("m") should be explicitly indicated in Figure 1/2/3/4/5/6. Also, units for MAT (°C) and MAP (mm) are missing in Figure 2 and should be added. For Scatterplots by groups, such as elevational patterns of plots in Figure 3/4/5/6/11, though jittering helps to separate points, but many are overlayed due to the large amount. I recommend that these figures could be modified to violin plots to show the density of plots along elevation, which would better represent distribution patterns. For Figure 7, since piecharts are not ideal (and largely redundant with numeric labels). Stacked barplots would provide clearer and more comparable information.

Response: We have systematically revised the relevant figures to improve clarity and readability. Specifically, we have first added panel labels to all multi-panel figures and revised the corresponding captions accordingly. We have also updated the main text so that figure citations refer to the specific subpanels where appropriate. Second, we have added the missing units to the relevant figures, including elevation (m) and, in Figure 2, MAT (°C) and MAP (mm). Third, we have replaced the jittered elevational scatterplots in Figures 3–6 and the original Figure 11 with violin plots with embedded boxplots, which more clearly summarize the elevational density and distribution range of different taxa. Fourth, we have replaced the pie charts in Figure 7 with stacked bar plots as suggested. In addition, to improve clarity and better link vegetation formations with their physiognomic appearance and spatial distributions, we merged the original Figures 10 and 11 into a single revised Figure 10. The corresponding figure numbering, captions, and citations in the main text have been revised accordingly. For brevity, we show the revised Figures 3 and 7 in the response as representative examples; however, all relevant figures have been revised consistently in the manuscript.

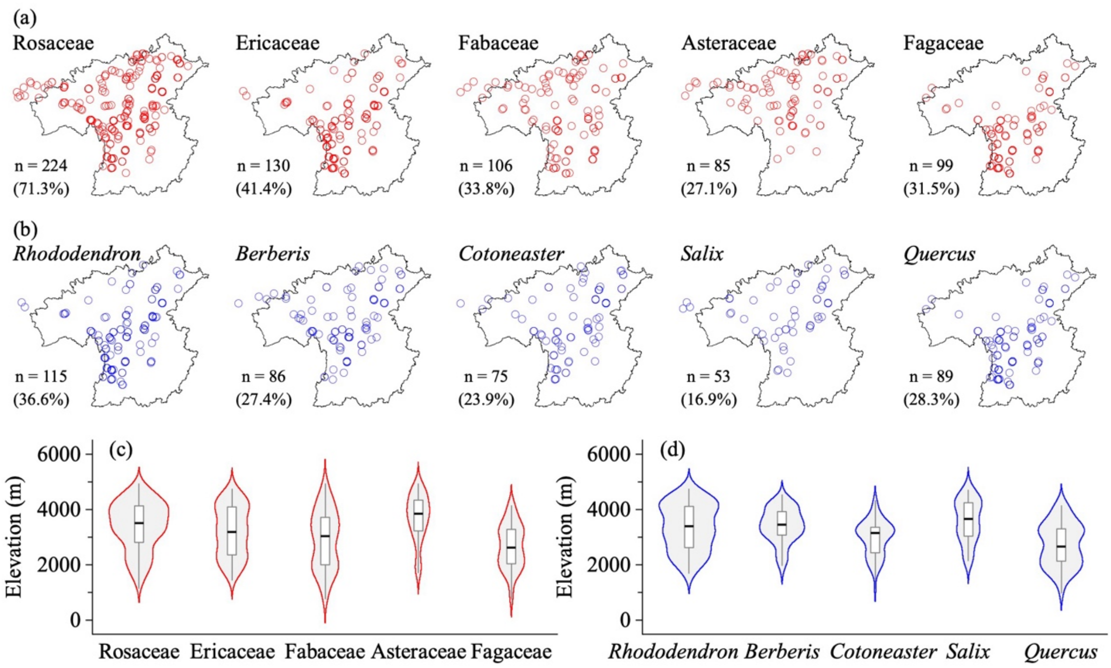

Figure 3. Horizontal **(a, b)** and elevational **(c, d)** patterns of dominant plant families **(a, c)** and genera **(b, d)** in all vegetation plots in the HDM-Plot dataset. n denotes the number of plots in which each dominant family or genus was recorded, and the values in parentheses indicate the proportion of the total survey plots.

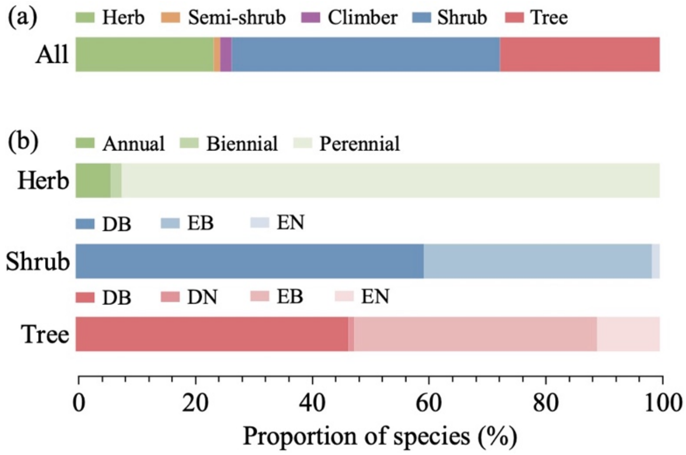

Figure 7. Growth-form composition of all species **(a)** and life-form composition within herbaceous, shrub, and tree species **(b)** surveyed in the HDM-Plot dataset. Bars show the proportion of species in each category. DB, deciduous broadleaf; DN, deciduous needleleaf; EB, evergreen broadleaf; and EN, evergreen needleleaf.

Comment 5 - Line 9: “investigations”: investigation.

Response: Corrected as suggested.

Comment 6 - Line 12: “in altitudes of 754–4,932 m”: of/spanning altitudes of 754–4,932 m.

Response: Revised to “spanning altitudes of 754–4,932 m”.

Comment 7 - Line 126: “The HDM cover...”: The HDM covers ..., or The Hengduan Mountains cover...

Response: Revised to “The HDM covers...”.

Comment 8 - Line 254: “Along the ranges of elevation”: Across the elevational gradient, or Along the elevational range surveyed...

Response: Revised to “Along the elevational range surveyed...”.

Comment 9 - Line 182: what is community height? How community height and total coverage are visually estimated in the field? Were standardized protocols used across observers to ensure consistency?

Response: In the HDM-Plot dataset, community height was defined as the maximum height of the dominant vegetation layer within a plot. Specifically, in forest plots, it referred to the visually estimated height of the tallest tree in the tree layer; in shrubland plots, it was measured or estimated as the height of the tallest shrub layer using a tape measure where possible; and in grassland plots, it was measured as the maximum height of the herbaceous leaf layer. Total plot coverage was visually estimated as the vertically projected percentage cover of all plant species within a plot. These measurements and estimates followed the same field criteria throughout all survey campaigns and were conducted by experienced vegetation investigators to ensure consistency. We have added these details to Section 3.1, Vegetation survey, and revised the corresponding description in the dataset summary table.

Comment 10 - “Abundance” is recorded (Line 13), but it is unclear whether this refers to: counts, coverage, or others, across forest, shrubland, and grassland plots? The authors need to clarify this in the main text to explain how data collected behind Table 4.

Response: Thank you for pointing out this ambiguity. In our dataset, “abundance” refers to count data, namely the number of individuals or clumps, rather than coverage. For plants occurring as discrete individuals, each individual was counted separately; for clumped plants, distinguishable clumps were used as the counting unit, and the number of individuals within clumps was additionally noted when identifiable. The recording unit differed among vegetation types. In forest and shrubland plots, woody plants were recorded by individual or clump, so the same species could have multiple records within a plot. In grassland plots, herbaceous plants were recorded by species, with each species represented by a single record containing its total number of individuals or clumps. Relative abundance used in the calculation of importance values was also based on the number of individuals or clumps. To avoid confusion, we have replaced "abundance" with "number of individuals or clumps" in the Abstract, Section 3.1, and the dataset summary table, and have also supplemented the recording units for different vegetation types in Section 3.1.

Comment 11 - Table 3 is very long (nearly four pages) and would be better placed in the Supplementary Material or provided as part of the dataset rather than in the main text.

Response: As suggested, we have moved the Table 3 to the Supplementary Material as Table S4. The corresponding citations in the main text have been updated accordingly.