

sPlot open - An environmentally-balanced, open-access, global dataset of vegetation plots

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Abstract

Assessing biodiversity status and trends in plant communities is critical for understanding, quantifying and predicting effects of global change on ecosystems. Vegetation plots record occurrence or abundance of all plant species present (community composition) in a delimited area of 0.01 to 40,000 m². Absences can be inferred, allowing analyses not possible with presence-only data. Recently the first global vegetation plot database was compiled ('sPlot'). However, this large dataset is environmentally and spatially unbalanced, and not open-access. We address both issues by (a) resampling the vegetation plots using a novel algorithm; (b) securing permission to openly release data from the holders of 104 specific datasets. We present the largest open-access vegetation plot dataset ever released: 91,205 plots globally, recording abundance of each vascular plant species (total 39,997 taxa). Plot-level data include location, date, size, biome, elevation, slope aspect, vegetation type and naturalness. Based on values for 18 traits per species from the 'TRY' database, community-weighted mean and variance of traits per plot are presented. The dataset can be used to explore plant community diversity patterns globally, as ground truth data in remote sensing applications or as baselines for biodiversity monitoring.

Background & Summary

Biodiversity is facing a global crisis. As many as 1 million species are currently threatened with extinction, the vast majority due to anthropogenic impacts such as land-use and climate change ([1](#), [2](#)). In addition, the rates of biodiversity homogenization and redistribution are accelerating ([3](#), [4](#); [5](#)). Biological assemblages are becoming progressively more similar to each other globally, as local and endemic species go extinct and are replaced by more widespread and competitive native or alien species ([1](#); [5](#)). Many terrestrial and marine species are also shifting their geographical distribution as a response to climate change ([4](#)), including animals hosting pathogens transmissible to humans ([6](#); [7](#)). This has profound potential impacts on human and ecosystem health ([8](#); [9](#)).

Plant communities are no exception to this biodiversity crisis ([10](#); [11](#); [5](#)). This is particularly worrying since terrestrial vegetation accounts for 80% (450 Gt C) of the living biomass on Earth ([12](#)). Given the central role of vegetation in ecosystem productivity, stability and functioning ([11](#)), assessing biodiversity status and trends in plant communities is paramount for other kingdoms of life and human societies alike.

Monitoring trends in plant biodiversity requires adequate data across a range of spatiotemporal scales ([13](#), [14](#)). Large independent collections of plant occurrence data do exist at the global or continental extent via the Botanical Information and Ecology Network (BIEN) ([15](#)), the Global Inventory of Floras and Traits (GIFT) ([16](#)) or the Global Biodiversity Information Facility (GBIF) (<https://www.gbif.org/>). However, these presence-only databases either neglect how individual plant species co-occur and interact locally to form plant communities, or are collected at spatial resolutions which are too coarse to assess biodiversity trends (e.g., one-degree grid cells) at the plant community scale ([17](#)).

Yet, there is a long tradition among botanists to record the cover or abundance of each plant species that occurs in a vegetation plot of a given size (i.e. surface area) at a given time (e.g. [18](#)). Compared to presence-only data, vegetation-plot data (termed 'presence-absence' here) present many advantages. First, they contain information on which plant species do, and do not, co-occur in the same locality at a given moment in time ([19](#)). This is important for testing hypotheses related to biotic interactions among plant species. Vegetation-plot data also provide crucial information on where and when a species was absent, therefore improving predictions from current species distribution models ([20](#)). Being spatially explicit, vegetation plots can be resurveyed through time to assess potential changes in plant species composition relative to a baseline ([21](#); [22](#), [5](#)). As they normally contain information on the relative cover or abundance of each species, vegetation plots are also more appropriate for detecting biodiversity changes than data representing only the occurrence of individual species ([23](#)).

Globally, however, vegetation-plot data are very fragmented, as they typically stem from a myriad of local research and survey projects ([24](#)). Consequently, these data often have either high fine-grain spatial resolutions but small spatial extents, or vice versa ([25](#)). Furthermore, with their disparate sampling protocols, standards and taxonomic resolutions, aggregating and harmonizing vegetation plot data proves extremely challenging ([26](#)). It is not surprising, therefore, that these data are rarely used in global-scale biodiversity research ([27](#); [28](#); [29](#)).

The sPlot initiative tries to close this data gap. It leverages numerous local-to-regional vegetation-plot datasets to create a harmonized and comprehensive global database of georeferenced terrestrial plant species assemblages ([24](#)). Established in 2013, sPlot (version 3) currently contains more than 1.9 million vegetation plots, and is fully integrated with the TRY database ([30](#)), from which it derives information on plant functional traits. The sPlot database is increasingly being used to study continental-to-global scale vegetation patterns, such as the relative contribution of regional vs. local factors on the global patterns of fern richness ([31](#)), the mechanisms underlying the spread and

abundance of native vs. invasive tree species ([32](#)), and worldwide trait–environment relationships in plant communities ([26](#)).

Here, we provide an open-access data set composed of 91,205 vegetation plots, that represent the entire environmental space covered by the sPlot database, to provide a standardized dataset for ecological research. The environmental stratification of the sampling of these plots maximises the benefits of this large dataset for a wide range of potential uses of the data. The selected vegetation plots stem from 104 databases and span 115 countries (Figure [1](#)). This resampled dataset (sPlot Open - hereafter) is composed of: (1) plot-level information, including metadata and basic vegetation structure descriptors; (2) the vascular plant species composition of each vegetation plot, including species cover or abundance information when available; and (3) community-level functional information derived from the TRY database ([30](#)).



Figure 1: Global map of sPlot Open ($n = 91,205$) and spatial distribution of vegetation plot density per hexagonal cell with a spatial resolution of approximately 70,000 km². Map projection is Eckert IV.

Methods

Vegetation plot data sources

We started from the sPlot database v2.1 (created October 2016), which contains 1,121,244 unique vegetation plots and 23,586,216 species records stemming from 110 different vegetation-plot datasets of regional, national or continental extent. Some of the 110 datasets stem from regional or continental initiatives (see [24](#) for more information). For instance: 48 vegetation-plot datasets derive from the European Vegetation Archive (EVA) ([19](#)); three major African datasets derive from the Tropical African Vegetation Archive (TAVA); and multiple vegetation datasets in the USA and Australia derive from the VegBank ([33](#); [34](#)) and TERN's AEKOS ([35](#)) archives, respectively. Data from other continents (South America, Asia) or countries were contributed as separate standalone datasets. The metadata of each individual vegetation-plot dataset stored in sPlot are managed through the Global Index of Vegetation-Plot Databases [GIVD](#) ([36](#)), using the GIVD code as the unique dataset identifier.

Resampling method

Data in the sPlot database are unevenly distributed across continents and biomes (see [26](#)). Mid-latitude regions in developed countries (mostly Europe, the USA and Australia) are overrepresented, while regions in the tropics and subtropics are underrepresented, which is a typical geographical bias in biodiversity data (e.g., [37](#); [4](#)). To reduce this imbalance as much as possible, we performed a stratified resampling approach, using several environmental variables available at global extent as sampling strata. We considered 30 climatic and soil variables. For climate, we complemented the 19 bioclimatic variables from CHELSA ([38](#)), as well as two variables reflecting growing-season warmth (growing degree days above 1 °C - GDD1 - and 5 °C - GDD5), which we calculated based on CHELSA bioclimatic variables. In addition, we considered an index of aridity (AR) and a model for Potential Evapotranspiration (PET - [39](#)). For soil, we extracted seven variables from the SOILGRIDS database ([40](#)), namely: soil organic carbon content in the fine earth fraction, cation exchange capacity, pH, as well as the fractions of coarse fragments, sand, silt and clay.

We stratified our sampling effort based on the following procedure. First, we ran a global principal component analysis (PCA) on a matrix of terrestrial grid cells by the 30 above-mentioned environmental variables. We considered the full environmental space of all terrestrial habitats on Earth at a spatial resolution of 2.5 arcmin, totaling 8,384,404 terrestrial grid cells, irrespective of whether a grid cell hosted vegetation plots from the sPlot database v2.1 or not. We then subdivided the PCA ordination space, represented by the first two principal components (PC1–PC2), which accounted for 47% and 23% of the total environmental variation in terrestrial grid cells, into a regular 100 × 100 grid. This PC1-PC2 two-dimensional space was subsequently used to balance our sampling effort across all PC1-PC2 grid cells for which vegetation plots were available. Before projecting vegetation plots from the sPlot database v2.1 onto this PC1-PC2 environmental space, we removed vegetation plots: a) from wetlands; b) from anthropogenic vegetation types; c) without geographical coordinates; and d) with a location uncertainty higher than 3 km for those having geographical coordinates. This resulted in a total of 799,400 out of the initial set of 1,121,244 vegetation plots. When projecting the 799,400 vegetation plots in the PC1-PC2 grid, we calculated how many vegetation plots occurred in each PC1-PC2 grid cell. For those grid cells with more than 50 vegetation plots ($n = 858$), we selected up to 50 vegetation plots using the heterogeneity-constrained random resampling algorithm from Lengyel et al. (2011) [[41](#)]. This approach optimizes the selection of a random subset of vegetation plots that encompasses the highest variability in species composition while avoiding peculiar and rare communities, which may represent outliers. We based the quantification of variability in plant species composition among the 50 randomly selected vegetation plots by computing the mean and the variance of the Jaccard's dissimilarity index ([42](#)) between all possible

pairs of these 50 vegetation plots ($n = 1225$). More precisely, for a given PC1-PC2 grid cell containing more than 50 vegetation plots, we generated 1,000 random selections of 50 vegetation plots and ranked them according to the mean (ascending order) and variance (descending order) value. Ranks from both sortings were summed for each random selection, and the selection with the lowest summed rank was considered to provide the most balanced/even representation of vegetation types within the focal grid cell. Where a grid cell contained less than 50 plots, we retained all of them. In this way, we reduced the imbalance towards over-sampled climate types while ensuring that the resampled dataset represents the entire environmental gradient covered by the sPlot database. We repeated the resampling procedure three times to get three different possibilities of a heterogeneity-constrained selection of 50 vegetation plots per PC1-PC2 grid cell with, initially, more than 50 vegetation plots. Vegetation plots selected during the first iteration were our first choice, while we considered the vegetation plots additionally selected in the second and third iteration as reserves when asking for permission to release the data as open access to each dataset's contributor(s).

Permission to release the data as open access

The resampling procedure resulted in a preliminary potential selection of 98,383 vegetation plots (first choice) and 51,634 vegetation plots flagged as reserves (second or third choice for the subset of PC1-PC2 grid cells with more than 50 vegetation plots available). Since the sPlot database is a consortium of independent datasets whose copyright belongs to the data contributor, we used this preliminary potential selection to ask each dataset's custodian (i.e., either the owner of a dataset or its authorized representative in case of a collective dataset) for permission to release the data of each selected vegetation plot as open access. For 8,070 vegetation plots, permission could not be granted because, for instance, the data are unpublished, confidential or sensitive. For these vegetation plots, we used the reserve pool to randomly select replacements, for which such permission could be granted. We imposed the constraint that each candidate vegetation plot in the reserve pool should belong to the same environmental stratum, i.e., the same PC1-PC2 grid cell, of the confidential vegetation plot. Note that 2,380 PC1-PC2 grid cells (11.7% of total) had one or more confidential vegetation plots (median = 1, mean = 3.4, max = 171) that could not be replaced from the reserve pool.

Trait information

For each vegetation plot for which open access has been granted, we computed the community weighted means for eighteen plant functional traits derived from the TRY database v3.0 ([30](#)). These traits were selected among those that describe the leaf, wood and seed economics spectra ([43](#); [44](#)), and are known to either affect different key ecosystem processes or respond to macroclimatic drivers, or both ([24](#)). The eighteen plant functional traits (all concentrations based on dry weight) were: (1) leaf area [mm^2]; (2) stem specific density [g cm^{-3}]; (3) specific leaf area [m^2kg^{-1}]; (4) leaf carbon concentration [mg g^{-1}]; (5) leaf nitrogen concentration [mg g^{-1}]; (6) leaf phosphorus concentration [mg g^{-1}]; (7) plant height [m]; (8) seed mass [mg]; (9) seed length [mm]; (10) leaf dry matter content [g g^{-1}]; (11) leaf nitrogen per area [g m^{-2}]; (12) leaf N:P ratio [g g^{-1}]; (13) leaf $\delta^{15}\text{N}$ [per million]; (14) seed number per reproductive unit; (15) leaf fresh mass [g]; (16) stem conduit density [mm^{-2}]; (17) dispersal unit length [mm]; and (18) conduit element length [μm].

Because missing values were particularly widespread in the species-trait matrix, we employed a gap-filling procedure based on hierarchical Bayesian modeling (R package 'BHPMF', [45](#); [46](#)). Gap-filling was performed at the level of individual observations. We then transformed to the natural logarithm all gap-filled trait values and averaged each trait by taxon (i.e., at species, or genus level). Additional information on the gap-filling procedure is available in [[24](#)].

Community-weighted means (CWM) and variances (CWV) were calculated for every plant functional trait j and every vegetation plot k as follows ([47](#)):

$$CWM_{j,k} = \sum_i^{n_k} p_{i,k} t_{i,j} \quad (1)$$

$$CWM_{j,k} = \sum_i^{n_k} p_{i,k} (t_{i,j} - CWM_{j,k})^2 \quad (2)$$

where n_k is the number of species with trait information in vegetation plot k , $p_{i,k}$ is the relative abundance of species i in vegetation plot k calculated as the species' fraction in cover or abundance of total cover or abundance, and $t_{i,j}$ is the mean value of species i for trait j .

Data Records

sPlot Open contains 91,205 vegetation plots (also called 'relevés') from 115 countries and all continents except Antarctica (Figure 1). This randomized selection comes from 105 constitutive datasets (Table 1). It only contains the species composition of vascular plants; information on the composition of bryophytes and lichens was discarded since it was only available for a minority of plots ($n = 4,963$ and $n = 3,045$, respectively). Information on the size (surface area) of the vegetation survey is available for 61,898 vegetation plots, and ranges between 0.01 and 40,000 m² (mean = 270 m²; median = 78.5 m²). Similarly, only for a minority of plots ($n = 17,757$) information on the exact group of plants sampled in the field is available (e.g., complete vegetation, only trees, only trees > 1 m height, and so on). However, as most data were collected using the phytosociological method, we deem safe to assume that, unless otherwise specified, plots contain information on all vascular plants. The average number of vascular plant species per vegetation plot ranges between 1 (i.e. monospecific stands) and 270 species (mean = 17.6; median = 13).

By capping the number of vegetation plots in overrepresented environmental conditions, the resampling procedure described above strongly reduced the bias in the distribution of vegetation plots within the environmental niche space. Yet, due to the lack or scarcity of data from some geographical regions, like the tropics, the spatial distribution of vegetation plots remains unbalanced across geographical regions (Figure 1). This is evident when comparing the number of plots across continents or biomes. Europe is by far the best represented continent, with 53,884 vegetation plots. In contrast, in Africa and South America the remaining plots after data edition and selection were 4,507 and 5,533 vegetation plots, respectively. The representation of biomes is also unbalanced (Figure 2). Despite these imbalances, all the Whittaker biomes are covered by sPlot Open, and our resampling algorithm has resulted in a much more balanced dataset than many other large global datasets that are available, such as GBIF.



Figure 2: Distribution of all the vegetation plots provided by sPlot Open ($n = 91,205$) in the two-dimensional climatic space represented by mean annual temperature and mean annual precipitation superimposed onto Whittaker biomes

Almost one third of vegetation plots in sPlot Open belong to forest ($n = 25,740$), two thirds to non-forest vegetation ($n = 58,145$) vegetation, with 8 % of plots remaining unassigned ($n = 7,320$). When not directly done by data providers, the assignment of plots to forests and non-forests was based on multiple lines of evidence, including the plot-level information on the cover of the tree layer, as well as traits of species composing a plot, such as growth form and height. In short, a plot record was considered as forest if the cover of the tree layer, or alternatively, the sum of the (relative) cover of all tree taxa (normalized to 100%), was greater than 25%. It was considered a non-forest record if the sum of relative cover of low-stature, non-tree and non-shrub taxa was greater than 90%. For an extensive explanation of this classification scheme, we refer the reader to Brulheide et al. (2019) [24]. Even if the proportion of forest vs. non-forest vegetation plots is relatively well-balanced, the geographical distribution of vegetation plots belonging to different vegetation types is likely not balanced in the geographical space, as it depends on the idiosyncrasies of the constitutive datasets composing the sPlot database. For instance, the data from New Zealand only include plots collected in non-forest ecosystems, while data from Chile only refer to forests. We urge potential users to carefully read the description of each individual dataset in [GIVD](#), or to contact the custodians of each dataset before using sPlot Open.

Database Organization

sPlot Open is organized into three main matrices, relationally linked through the key column *'PlotObservationID'*.

The **'header'** matrix contains plot-level information for the 91,205 vegetation plots provided in sPlot Open, including: metadata (e.g., plot ID, ownership, sampling date, geographical location, positional accuracy); sampling design information (e.g., the total surface area used during the vegetation survey); and a plot-level description of vegetation structure (e.g., vegetation type, percentage cover of each vegetation layer) and vegetation type. Plots in Europe are also classified according to the EUNIS habitat classification (column *'ESY'*), based on the habitat classification expert system described in Chytrý et al. (2020) ([49](#)). For each vegetation plot, we further provide information on the dataset it originates from, based on the IDs used in [GIVD](#). A brief description of all the 43 variables in the header matrix is provided in Table [2](#).

The **'DT'** matrix contains data on the species composition of each plot. It is structured in a long format and contains 1,608,610 records from 39,997 vascular plant taxa, mostly resolved at the species level. For each record, we report both the taxon name as originally contributed by the data custodian (column *'Original_species'*), and the taxon name after taxonomic standardization (column *'Species'*). For each record, we report the species cover/abundance values. These follow different standards across the datasets constituting the sPlot database. We, therefore, provide both the cover/abundance value as reported in the original data (column *'Original_abundance'*), together with the abundance scale that was originally used (column *'Abundance_scale'*). This can take seven values: *'CoverPerc'* = percentage cover, *'pa'* = presence-absence, *'x_BA'* = basal area (m²/ha, only for woody species), *'x_IC'* = individual count, i.e., number of individuals in plot, *'x_SC'* = stem count, i.e., number of stems in plot, *'x_IV'* = importance value index, *'x_PF'* = presence frequency. The great majority of entries, however, use the percentage cover scale (n= 1,397,109). Finally, for each entry, we calculated a *'Relative_cover'*, i.e., the cover/abundance of a given taxon divided by the total cover/abundance of all taxa in that vegetation plot.

The **'CWM_CWV'** matrix contains the community-weighted means and variances calculated for each of the 18 functional traits mentioned above. It also contains three additional columns. The column *'Species_richness'* returns the number of species recorded in each plot. The columns *'Trait_coverage_cover'* and *'Trait_coverage_pa'* return, respectively, the proportion of total cover and species in a plot for which functional trait information was available. Functional trait information was available for 20,932 species. The average proportion of species in each plot for which we have functional trait information is 0.88 (median = 1). For 47,177 plots, the coverage is complete, while for only one plot do we have no functional trait information for any of the species occurring in it. When considering relative cover, the average trait coverage is 0.89. As many as 68,234 and 74,388 plots have functional trait information for more than 80% of the species or 80% of relative cover, respectively.

sPlot Open contains two additional objects. The **'metadata'** matrix contains plot-level metadata, which provide information on the origin of each individual vegetation plot. This object contains 15 columns, with information on the dataset of origin (column *'GIVD_ID'* - [36](#)), author or surveyor names (columns *'Releve_author'* and *'Releve_coauthor'*), bibliographic references both at the dataset (column *'DB_BIBTEXKEY'*) and plot level (*'Plot_Biblioreference'* and *'BIBTEXKEY'*), when available. Similarly, the column *'Project_name'* provides information on the project in which a vegetation plot was collected. When available, we also provide information on the numbering of the plots in the publication where they originally appeared (columns *'Nr_table_in_publ'*, *'Nr_releve_in_table'*), or in the dataset where they were initially stored (*'Original_nr_in_database'*). In the case of nested plots (n = 1,786), we also provide the original plot and subplot IDs (columns: *'Original_plotID'*, *'Original_subplotID'*). The last two columns

report plot-level *'Remarks'*, and the unique identifier produced by Turboveg when the vegetation plot was first stored (*'GUID'*).

Finally, the object **'references'**, contains all the bibliographic references formatted according to a BibTex standard. Each reference is tagged with a key corresponding to the fields *'DB_BIBTEXKEY'* and *'BIBTEXKEY'* in the metadata. We further provide an R function (*'sPlotOpen_citation'*) to create reference lists, based on a selection of plots and/or datasets.

Except for the 'reference' file (format .bib), all objects/matrices are provided in tab-delimited .txt files. All objects, including the *'sPlotOpen_citation'* function, are also compiled inside an .RData object.

Technical Validation

The original sPlot database has a nested structure and consists of several individual datasets, each validated and maintained by its respective dataset custodian. In many cases, individual datasets are also collections whose vegetation plots were provided by their respective owners (the person who performed the actual vegetation survey) or by someone who digitized the original data from the scientific published or grey literature. We obviously have no direct control over the individual vegetation plots that we provide here in sPlot Open. Yet, all these vegetation plots stem from trained professional botanists, or published scientific work, and are accompanied by detailed information on the sampling protocols used, thus ensuring data quality and reliability.

Before integration into the sPlot database, each dataset was further checked for consistency and, if it was in a different format, we converted it to a Turboveg 2 database (50). During this conversion, we checked that all datasets contained the required metadata information, and cross-checked that each plot was located within the geographic scopes of its respective dataset. Finally, we harmonized all the taxonomic names from all datasets, based on the sPlot's taxonomic backbone (51). This backbone matched all the taxonomic names (without nomenclatural authors) from all datasets in sPlot 2.1 and TRY v3.0 (30) to their resolved version based on the Taxonomic Name Resolution Service web application (TNRS version 4.0; 52; iPlant Collaborative, 2015). This allowed us to (1) harmonize all datasets to a common nomenclature, and (2) link the sPlot database to the TRY database (30). All taxa originally denoted at taxonomic ranks lower than species were aggregated at species level. Additional detail on the taxonomic resolution is reported in Bruelheide et al. (2019) [24], while a description of the workflow, including R-code, is available in Purschke (2017) [51].

Usage Notes

The sPlot Open database can be downloaded from <https://www.idiv.de> (link to PlantHub). Users are urged to cite the original sources when using sPlot Open in addition to the present paper, particularly when using data contained in BioTIME (53). For two datasets (AF-00-009, AF-CD-001), the identification of taxa at species level is still in progress. As most of the constitutive datasets remain under continuous development, sPlot Open users are encouraged to get in touch with the custodian(s) of the data they are planning to use (custodian names are reported in <https://www.idiv.de/sPlot>).

The data included in the present paper represent the subset of sPlot for which we were able to secure permission for making these data open. The additional data in sPlot are available under sPlot's Governance and Data Property Rules (www.idiv.de/sPlot).

Code Availability

The R code used to produce sPlot Open from the sPlot 2.1 database is contained in the *sPlotOpen_code* GitHub repository: (https://github.com/fmsabatini/sPlotOpen_Code/). This manuscript was produced using the Manubot workflow (54). The code for reproducing this manuscript is stored in the *sPlotOpen_manuscript* GitHub repository: (https://github.com/fmsabatini/sPlotOpen_Manuscript).

Acknowledgements

We are grateful to thousands of vegetation scientists who sampled vegetation plots in the field or digitized them into regional, national or international databases. We also appreciate the support of

the German Research Foundation for funding sPlot as one of the iDiv (DFG FZT 118, 202548816) research platforms, and the organization of three workshops through the sDiv calls. We acknowledge this support with naming the database “sPlot”, where the “s” refers to the sDiv synthesis workshops.

The study has been supported by the TRY initiative on plant traits (<http://www.try-db.org>). The TRY initiative and database is hosted, developed and maintained by J. Kattge and G. Bönisch (Max Planck Institute for Biogeochemistry, Jena, Germany). TRY is currently supported by DIVERSITAS/Future Earth and the German Centre for Integrative Biodiversity Research (iDiv) Halle-Jena-Leipzig. Jens Kattge acknowledges support by the Max Planck Institute for Biogeochemistry (Jena, Germany), Future Earth, the German Centre for Integrative Biodiversity Research (iDiv) Halle-Jena-Leipzig and the EU H2020 project BACI, Grant No 640176.

Isabelle Aubin was funded through Natural Sciences and Engineering Research Council of Canada and Ontario Ministry of Natural Resources and Forestry. Yves Bergeron was funded through Natural Sciences and Engineering Research Council of Canada. Idoia Biurrun was funded by the Basque Government (IT936-16). Anne Bjorkman thank the Herschel Island-Qikiqtaruk Territorial Park management, Catherine Kennedy, Dorothy Cooley, Jill F. Johnstone, Cameron Eckert and Richard Gordon for establishing the ecological monitoring programme. Funding was provided by Herschel Island-Qikiqtaruk Territorial Park. Luis Cayuela was supported by project BIOCON08_044 funded by Fundación BBVA. Milan Chytrý, Flavia Landucci, Corrado Marcenò and Tomáš Peterka were supported by the Czech Science Foundation (project no. 19-28491X). Jiri Dolezal would like to acknowledge the financial support from MSMT-INTER-EXCELLENCE project (LTAUSA18007). Brian Enquist thanks the following individuals and institutions for contributing data to sPlot via the SALVIAS database: Mauricio Bonifacino, Saara DeWalt, Timothy Killeen, Susan Letcher, Nigel Pitman, Cam Webb, The Missouri Botanical Garden, RAINFOR and the Amazon Forest Inventory Network. Alvaro G. Gutiérrez was funded by Project FORECOFUN-SSA PIEF-GA-2010-274798 and FONDECYT 1200468 Mohamed Z. Hatim thanks Kamal Shaltout and Joop Schaminée for supervision of the MSc thesis, and Joop Schaminée for support and funding from the Prince Bernard Culture Fund Prize for Nature Conservation. Jürgen Homeier received funding from BMBF (Federal Ministry of Education and Science of Germany) and the German Research Foundation (DFG Ho3296-2, DFG Ho3296-4). Borja Jiménez-Alfaro was funded by the Spanish Research Agency through grant AEI/10.13039/501100011033 Dirk N. Karger received funding from: The WSL internal grant exCHELSA and ClimEx, the Joint Biodiversa COFUND project ‘FeedBaCks’ and ‘Futureweb’, the Swiss Data Science Projects: SPEEDMIND, and COMECO, and the Swiss National Science Foundation (20BD21_184131). Attila Lengyel was supported by the National Research, Development and Innovation Office, Hungary (PD-123997). Tatiana Lysenko was funded by Russian Foundation for Basic Research (grant No. 16-04-00747a). Jérôme Munzinger was supported by the French National Research Agency (ANR) with grants INC (ANR-07-BDIV-0008), BIONEOCAL (ANR-07-BDIV-0006) & ULTRABIO (ANR-07-BDIV-0010), by National Geographic Society (Grant 7579-04), and with fundings and authorizations of North and South Provinces of New Caledonia. Arkadiusz Nowak received support from the National Science Centre, Poland, grant no. 2017/25/B/NZ8/00572. Gerhard E. Overbeck acknowledges support from Brazil’s National Council of Scientific and Technological Development (CNPq, grant 310022/2015-0). Robert Peet acknowledges the support from the National Center for Ecological Analysis and Synthesis, the North Carolina Ecosystem Enhancement Program, the U.S. Forest Service, and the U.S. National Science Foundation (DBI-9905838, DBI-0213794). Josep Peñuelas would like to acknowledge the financial support from the European Research Council Synergy grant ERC-SyG-2013-610028 IMBALANCE-P Oliver Phillips was funded by an ERC Advanced Grant (291585, “T-FORCES”) and a Royal Society-Wolfson Research Merit Award. Valério D. Pillar has been supported by the Brazil’s National Council of Scientific and Technological Development (CNPq, grant 307689/2014-0). Solvita Rūsiņa was supported by the University of Latvia grant AAP2016/B041/Zd2016/AZ03 within the “Climate change and sustainable use of natural resources”. Franziska Schrodtt was supported by a University of Minnesota Institute on the Environment Discovery Grant, a German Centre for Integrative Biodiversity Research (iDiv) Halle-Jena-Leipzig grant (50170649_#7) and a University of Nottingham Anne McLaren Fellowship. Jens

Christian Svenning considers this work a contribution to his VILLUM Investigator project “Biodiversity Dynamics in a Changing World” funded by VILLUM FONDEN (grant 16549). Kim André Vanselow would like to thank W. Bernhard Dickoré for the help in the identification of plant species and acknowledge the financial support from the Volkswagen Foundation (AZ I/81 976) and the German Research Foundation (DFG VA 749/1-1, DFG VA 749/4-1). Evan Weiher was funded by NSF DEB-0415383, UWEC-ORSP, and UWEC-BCDT. Work by Karsten Wesche was supported by the German Research Foundation (DFG WE 2601/3-1,3-2, 4-1,4-2) and by the German Ministry for Science and Education (BMBF, CAME 03G0808A) Susan Wiser was funded by the NZ Ministry for Business, Innovation and Employment’s Strategic Science Investment Fund.

This paper is dedicated to the memory of Dr. Ching-Feng (Woody) Li.

Author contributions

FMS wrote the first draft of the manuscript, with considerable input from JL and HB. JL and TH wrote the resampling algorithm. FMS set up the GitHub projects, curated the database, and produced the graphs. He also coordinated the sPlot consortium. SMH wrote the Turboveg v3 software, which holds the sPlot database. JK provided the trait data from TRY and FS performed the trait data gap filling. HB secured the funding for sPlot as a strategic project of iDiv. All other authors contributed data and/or helped set up the database and/or helped develop the resampling algorithm. All authors contributed to revising the manuscript.

Competing interests

The authors declare no competing interests.

References

1. **Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services**
IPBES
IPBES secretariat (2019)
ISBN: [978-3-947851-13-3](#)
2. **Living planet report**
WWF
(2018)
ISBN: [9782940529902](#)
3. **Accelerating homogenization of the global plant-frugivore meta-network**
Evan C. Fricke, Jens-Christian Svenning
Nature (2020-09-02) <https://doi.org/ghgs3g>
DOI: [10.1038/s41586-020-2640-y](#) · PMID: [32879498](#)
4. **Species better track climate warming in the oceans than on land**
Jonathan Lenoir, Romain Bertrand, Lise Comte, Luana Bourgeaud, Tarek Hattab, Jérôme Murienné, Gaël Grenouillet
Nature Ecology & Evolution (2020-05-25) <https://doi.org/ggx3np>
DOI: [10.1038/s41559-020-1198-2](#) · PMID: [32451428](#)
5. **Replacements of small- by large-ranged species scale up to diversity loss in Europe's temperate forest biome**
Ingmar R. Staude, Donald M. Waller, Markus Bernhardt-Römermann, Anne D. Bjorkman, Jörg Brunet, Pieter De Frenne, Radim Hédli, Ute Jandt, Jonathan Lenoir, František Máliš, ... Lander Baeten
Nature Ecology & Evolution (2020-04-13) <https://doi.org/ggrs73>
DOI: [10.1038/s41559-020-1176-8](#) · PMID: [32284580](#)
6. **Global trends in emerging infectious diseases**
Kate E. Jones, Nikkita G. Patel, Marc A. Levy, Adam Storeygard, Deborah Balk, John L. Gittleman, Peter Daszak
Nature (2008-02) <https://doi.org/cbxh9h>
DOI: [10.1038/nature06536](#) · PMID: [18288193](#) · PMCID: [PMC5960580](#)
7. **Altitudinal Changes in Malaria Incidence in Highlands of Ethiopia and Colombia**
A. S. Siraj, M. Santos-Vega, M. J. Bouma, D. Yadeta, D. R. Carrascal, M. Pascual
Science (2014-03-06) <https://doi.org/f5vb47>
DOI: [10.1126/science.1244325](#) · PMID: [24604201](#)
8. **Biodiversity redistribution under climate change: Impacts on ecosystems and human well-being**
Gretta T. Pecl, Miguel B. Araújo, Johann D. Bell, Julia Blanchard, Timothy C. Bonebrake, I-Ching Chen, Timothy D. Clark, Robert K. Colwell, Finn Danielsen, Birgitta Evengård, ... Stephen E. Williams
Science (2017-03-31) <https://doi.org/f9xmpm>
DOI: [10.1126/science.aai9214](#) · PMID: [28360268](#)

9. **Managing consequences of climate-driven species redistribution requires integration of ecology, conservation and social science**
Timothy C. Bonebrake, Christopher J. Brown, Johann D. Bell, Julia L. Blanchard, Alienor Chauvenet, Curtis Champion, I-Ching Chen, Timothy D. Clark, Robert K. Colwell, Finn Danielsen, ... Gretta T. Pecl
Biological Reviews (2018-02) <https://doi.org/gc2dvc>
DOI: [10.1111/brv.12344](https://doi.org/10.1111/brv.12344) · PMID: [28568902](https://pubmed.ncbi.nlm.nih.gov/28568902/)
10. **A Significant Upward Shift in Plant Species Optimum Elevation During the 20th Century**
J. Lenoir, J. C. Gegout, P. A. Marquet, P. de Ruffray, H. Brisse
Science (2008-06-27) <https://doi.org/bnhhj8>
DOI: [10.1126/science.1156831](https://doi.org/10.1126/science.1156831) · PMID: [18583610](https://pubmed.ncbi.nlm.nih.gov/18583610/)
11. **The functional role of producer diversity in ecosystems**
Bradley J. Cardinale, Kristin L. Matulich, David U. Hooper, Jarrett E. Byrnes, Emmett Duffy, Lars Gamfeldt, Patricia Balvanera, Mary I. O'Connor, Andrew Gonzalez
American Journal of Botany (2011-03) <https://doi.org/fnh8qs>
DOI: [10.3732/ajb.1000364](https://doi.org/10.3732/ajb.1000364) · PMID: [21613148](https://pubmed.ncbi.nlm.nih.gov/21613148/)
12. **The biomass distribution on Earth**
Yinon M. Bar-On, Rob Phillips, Ron Milo
Proceedings of the National Academy of Sciences (2018-06-19) <https://doi.org/cp29>
DOI: [10.1073/pnas.1711842115](https://doi.org/10.1073/pnas.1711842115) · PMID: [29784790](https://pubmed.ncbi.nlm.nih.gov/29784790/) · PMCID: [PMC6016768](https://pubmed.ncbi.nlm.nih.gov/PMC6016768/)
13. **Effective Biodiversity Monitoring Needs a Culture of Integration**
Hjalmar S. Kühl, Diana E. Bowler, Lukas Bösch, Helge Bruelheide, Jens Dauber, David. Eichenberg, Nico Eisenhauer, Néstor Fernández, Carlos A. Guerra, Klaus Henle, ... Aletta Bonn
One Earth (2020-10) <https://doi.org/ghgk4w>
DOI: [10.1016/j.oneear.2020.09.010](https://doi.org/10.1016/j.oneear.2020.09.010)
14. **What we need to know to prevent a mass extinction of plant species**
Stuart L. Pimm
PLANTS, PEOPLE, PLANET (2020-10-28) <https://doi.org/ghhwnp>
DOI: [10.1002/ppp3.10160](https://doi.org/10.1002/ppp3.10160)
15. **Cyberinfrastructure for an integrated botanical information network to investigate the ecological impacts of global climate change on plant biodiversity**
Brian J Enquist, Rick Condit, Robert K Peet, Mark Schildhauer, Barbara M. Thiers
PeerJ (2018-01-13) <https://doi.org/ghfnxs>
DOI: [10.7287/peerj.preprints.2615v2](https://doi.org/10.7287/peerj.preprints.2615v2)
16. **GIFT – A Global Inventory of Floras and Traits for macroecology and biogeography**
Patrick Weigelt, Christian König, Holger Kreft
Journal of Biogeography (2019-06-09) <https://doi.org/gf38t6>
DOI: [10.1111/jbi.13623](https://doi.org/10.1111/jbi.13623)
17. **Distorted Views of Biodiversity: Spatial and Temporal Bias in Species Occurrence Data**
Elizabeth H. Boakes, Philip J. K. McGowan, Richard A. Fuller, Ding Chang-qing, Natalie E. Clark, Kim O'Connor, Georgina M. Mace
PLoS Biology (2010-06-01) <https://doi.org/brfdq6>
DOI: [10.1371/journal.pbio.1000385](https://doi.org/10.1371/journal.pbio.1000385) · PMID: [20532234](https://pubmed.ncbi.nlm.nih.gov/20532234/) · PMCID: [PMC2879389](https://pubmed.ncbi.nlm.nih.gov/PMC2879389/)
18. **Versuch einer Übersicht über die Wiesentypen der Schweiz**
F. G. Stebler, C. Schröter

19. **European Vegetation Archive (EVA): an integrated database of European vegetation plots**
Milan Chytrý, Stephan M. Hennekens, Borja Jiménez-Alfaro, Ilona Knollová, Jürgen Dengler, Florian Jansen, Flavia Landucci, Joop H. J. Schaminée, Svetlana Ačić, Emiliano Agrillo, ... Sergey Yamalov
Applied Vegetation Science (2016-01) <https://doi.org/bc7k>
DOI: [10.1111/avsc.12191](https://doi.org/10.1111/avsc.12191)
20. **Sample selection bias and presence-only distribution models: implications for background and pseudo-absence data**
Steven J. Phillips, Miroslav Dudík, Jane Elith, Catherine H. Graham, Anthony Lehmann, John Leathwick, Simon Ferrier
Ecological Applications (2009-01) <https://doi.org/dx4s78>
DOI: [10.1890/07-2153.1](https://doi.org/10.1890/07-2153.1) · PMID: [19323182](https://pubmed.ncbi.nlm.nih.gov/19323182/)
21. **Global environmental change effects on plant community composition trajectories depend upon management legacies**
Michael P. Perring, Markus Bernhardt-Römermann, Lander Baeten, Gabriele Midolo, Haben Blondeel, Leen Depauw, Dries Landuyt, Sybryn L. Maes, Emiel De Lombaerde, Maria Mercedes Carón, ... Kris Verheyen
Global Change Biology (2018-04) <https://doi.org/gc6mjp>
DOI: [10.1111/gcb.14030](https://doi.org/10.1111/gcb.14030) · PMID: [29271579](https://pubmed.ncbi.nlm.nih.gov/29271579/)
22. **Accelerated increase in plant species richness on mountain summits is linked to warming**
Manuel J. Steinbauer, John-Arvid Grytnes, Gerald Jurasinski, Aino Kulonen, Jonathan Lenoir, Harald Pauli, Christian Rixen, Manuela Winkler, Manfred Bardy-Durchhalter, Elena Barni, ... Sonja Wipf
Nature (2018-04-04) <https://doi.org/gdfwk3>
DOI: [10.1038/s41586-018-0005-6](https://doi.org/10.1038/s41586-018-0005-6) · PMID: [29618821](https://pubmed.ncbi.nlm.nih.gov/29618821/)
23. **Exploring large vegetation databases to detect temporal trends in species occurrences**
Ute Jandt, Henrik von Wehrden, Helge Bruelheide
Journal of Vegetation Science (2011-12) <https://doi.org/d8b4jv>
DOI: [10.1111/j.1654-1103.2011.01318.x](https://doi.org/10.1111/j.1654-1103.2011.01318.x)
24. **sPlot – A new tool for global vegetation analyses**
Helge Bruelheide, Jürgen Dengler, Borja Jiménez-Alfaro, Oliver Purschke, Stephan M. Hennekens, Milan Chytrý, Valério D. Pillar, Florian Jansen, Jens Kattge, Brody Sandel, ... Andrei Zverev
Journal of Vegetation Science (2019-04-08) <https://doi.org/gfvhkm>
DOI: [10.1111/jvs.12710](https://doi.org/10.1111/jvs.12710)
25. **Biodiversity data integration—the significance of data resolution and domain**
Christian König, Patrick Weigelt, Julian Schrader, Amanda Taylor, Jens Kattge, Holger Kreft
PLOS Biology (2019-03-18) <https://doi.org/c3xz>
DOI: [10.1371/journal.pbio.3000183](https://doi.org/10.1371/journal.pbio.3000183) · PMID: [30883539](https://pubmed.ncbi.nlm.nih.gov/30883539/) · PMCID: [PMC6445469](https://pubmed.ncbi.nlm.nih.gov/PMC6445469/)
26. **Global trait–environment relationships of plant communities**
Helge Bruelheide, Jürgen Dengler, Oliver Purschke, Jonathan Lenoir, Borja Jiménez-Alfaro, Stephan M. Hennekens, Zoltán Botta-Dukát, Milan Chytrý, Richard Field, Florian Jansen, ... Ute Jandt
Nature Ecology & Evolution (2018-11-19) <https://doi.org/gfj595>
DOI: [10.1038/s41559-018-0699-8](https://doi.org/10.1038/s41559-018-0699-8) · PMID: [30455437](https://pubmed.ncbi.nlm.nih.gov/30455437/)
27. **Big data for forecasting the impacts of global change on plant communities**
Janet Franklin, Josep M. Serra-Diaz, Alexandra D. Syphard, Helen M. Regan

Global Ecology and Biogeography (2017-01) <https://doi.org/f9hdp3>
DOI: [10.1111/geb.12501](https://doi.org/10.1111/geb.12501)

28. **Achievements and challenges in the integration, reuse and synthesis of vegetation plot data**
Susan K. Wiser
Journal of Vegetation Science (2016-09) <https://doi.org/ghfnr5>
DOI: [10.1111/jvs.12419](https://doi.org/10.1111/jvs.12419)
29. **Managing data locally to answer questions globally: The role of collaborative science in ecology**
Isabelle Aubin, Françoise Cardou, Laura Boisvert-Marsh, Eric Garnier, Manuella Strukelj, Alison D. Munson
Journal of Vegetation Science (2020-04-03) <https://doi.org/ggtgsm>
DOI: [10.1111/jvs.12864](https://doi.org/10.1111/jvs.12864)
30. **TRY plant trait database – enhanced coverage and open access**
Jens Kattge, Gerhard Bönsch, Sandra Díaz, Sandra Lavorel, Iain Colin Prentice, Paul Leadley, Susanne Tautenhahn, Gijsbert D. A. Werner, Tuomas Aakala, Mehdi Abedi, ... Christian Wirth
Global Change Biology (2020) <https://onlinelibrary.wiley.com/doi/abs/10.1111/gcb.14904>
DOI: <https://doi.org/10.1111/gcb.14904>
31. **Global fern and lycophyte richness explained: How regional and local factors shape plot richness**
Anna Weigand, Stefan Abrahamczyk, Isabelle Aubin, Claudia Bitá-Nicolae, Helge Bruehlheide, Cesar I. Carvajal-Hernández, Daniele Ciccuzza, Lucas Erickson Nascimento da Costa, János Csiky, Jürgen Dengler, ... Michael Kessler
Journal of Biogeography (2019-12-30) <https://doi.org/ggf4gr>
DOI: [10.1111/jbi.13782](https://doi.org/10.1111/jbi.13782)
32. **Similar factors underlie tree abundance in forests in native and alien ranges**
Masha T. Sande, Helge Bruehlheide, Wayne Dawson, Jürgen Dengler, Franz Essl, Richard Field, Sylvia Haider, Mark Kleunen, Holger Kreft, Joern Pagel, ... Tiffany M. Knight
Global Ecology and Biogeography (2019-12) <https://doi.org/ggftj7>
DOI: [10.1111/geb.13027](https://doi.org/10.1111/geb.13027) · PMID: [32063745](https://pubmed.ncbi.nlm.nih.gov/32063745/) · PMCID: [PMC7006795](https://pubmed.ncbi.nlm.nih.gov/PMC7006795/)
33. **Vegetation-plot database of the Carolina Vegetation Survey**
Robert K. Peet, Michael T. Lee, M. Forbes Boyle, Thomas R. Wentworth, Michael P. Schafale, Alan S. Weakley
Vegetation databases for the 21st century (2012) <https://doi.org/10.7809/b-e.00081>
34. **VegBank – a permanent, open-access archive for vegetation-plot data**
Robert K. Peet, M. T. Lee, M. D. Jennings, D. Faber-Langendoen
Vegetation databases for the 21st century (2012) <https://doi.org/10.7809/b-e.00080>
35. **Terrestrial ecosystem research infrastructures: challenges and opportunities**
Abad Chabbi, Henry W Loescher
(2017) <https://www.routledgehandbooks.com/doi/10.1201/9781315368252>
ISBN: [9781498751339](https://doi.org/9781498751339)
36. **The Global Index of Vegetation-Plot Databases (GIVD): a new resource for vegetation science**
Jürgen Dengler, Florian Jansen, Falko Glöckler, Robert K. Peet, Miquel De Cáceres, Milan Chytrý, Jörg Ewald, Jens Oldeland, Gabriela Lopez-Gonzalez, Manfred Finckh, ... Nick Spencer

Journal of Vegetation Science (2011-08) <https://doi.org/ctx2s7>
DOI: [10.1111/j.1654-1103.2011.01265.x](https://doi.org/10.1111/j.1654-1103.2011.01265.x)

37. Climate-related range shifts - a global multidimensional synthesis and new research directions

J. Lenoir, J.-C. Svenning
Ecography (2015-01) <https://doi.org/f6xz9h>
DOI: [10.1111/ecog.00967](https://doi.org/10.1111/ecog.00967)

38. Climatologies at high resolution for the earth's land surface areas

Dirk Nikolaus Karger, Olaf Conrad, Jürgen Böhrer, Tobias Kawohl, Holger Kreft, Rodrigo Wilber Soria-Auza, Niklaus E. Zimmermann, H. Peter Linder, Michael Kessler
Scientific Data (2017-09-05) <https://doi.org/gbvksk>
DOI: [10.1038/sdata.2017.122](https://doi.org/10.1038/sdata.2017.122) · PMID: [28872642](https://pubmed.ncbi.nlm.nih.gov/28872642/) · PMCID: [PMC5584396](https://pubmed.ncbi.nlm.nih.gov/PMC5584396/)

39. Global High-Resolution Soil-Water Balance

Antonio Trabucco, Robert J. Zomer
figshare (2019) https://figshare.com/articles/Global_High-Resolution_Soil-Water_Balance/7707605/3
DOI: [10.6084/m9.figshare.7707605.v3](https://doi.org/10.6084/m9.figshare.7707605.v3)

40. SoilGrids250m: Global gridded soil information based on machine learning

Tomislav Hengl, Jorge Mendes de Jesus, Gerard B. M. Heuvelink, Maria Ruiperez Gonzalez, Milan Kilibarda, Aleksandar Blagotić, Wei Shangguan, Marvin N. Wright, Xiaoyuan Geng, Bernhard Bauer-Marschallinger, ... Bas Kempen
PLOS ONE (2017-02-16) <https://doi.org/f9qc5p>
DOI: [10.1371/journal.pone.0169748](https://doi.org/10.1371/journal.pone.0169748) · PMID: [28207752](https://pubmed.ncbi.nlm.nih.gov/28207752/) · PMCID: [PMC5313206](https://pubmed.ncbi.nlm.nih.gov/PMC5313206/)

41. Heterogeneity-constrained random resampling of phytosociological databases

Attila Lengyel, Milan Chytrý, Lubomír Tichý
Journal of Vegetation Science (2011-02) <https://doi.org/dvjzbx>
DOI: [10.1111/j.1654-1103.2010.01225.x](https://doi.org/10.1111/j.1654-1103.2010.01225.x)

42. THE DISTRIBUTION OF THE FLORA IN THE ALPINE ZONE.1

Paul Jaccard
New Phytologist (1912-02) <https://doi.org/fvhsjd>
DOI: [10.1111/j.1469-8137.1912.tb05611.x](https://doi.org/10.1111/j.1469-8137.1912.tb05611.x)

43. A leaf-height-seed (LHS) plant ecology strategy scheme

Mark Westoby
Plant and Soil (1998-02-01) <https://doi.org/10.1023/A:1004327224729>
DOI: [10.1023/a:1004327224729](https://doi.org/10.1023/a:1004327224729)

44. The world-wide “fast-slow” plant economics spectrum: a traits manifesto

Peter B. Reich
Journal of Ecology (2014-03) <https://doi.org/gfc4z9>
DOI: [10.1111/1365-2745.12211](https://doi.org/10.1111/1365-2745.12211)

45. Uncertainty Quantified Matrix Completion Using Bayesian Hierarchical Matrix Factorization

Farideh Fazayeli, Arindam Banerjee, Jens Kattge, Franziska Schrod, Peter B. Reich
Institute of Electrical and Electronics Engineers (IEEE) (2014-12) <https://doi.org/ghfnw3>
DOI: [10.1109/icmla.2014.56](https://doi.org/10.1109/icmla.2014.56)

46. **BHPMF - a hierarchical Bayesian approach to gap-filling and trait prediction for macroecology and functional biogeography**
Franziska Schrodtt, Jens Kattge, Hanhuai Shan, Farideh Fazayeli, Julia Joswig, Arindam Banerjee, Markus Reichstein, Gerhard Bönisch, Sandra Díaz, John Dickie, ... Peter B. Reich
Global Ecology and Biogeography (2015-12) <https://doi.org/f76qw8>
DOI: [10.1111/geb.12335](https://doi.org/10.1111/geb.12335)
47. **Scaling from Traits to Ecosystems**
Brian J. Enquist, Jon Norberg, Stephen P. Bonser, Cyrille Violle, Colleen T. Webb, Amanda Henderson, Lindsey L. Sloat, Van M. Savage
Advances in Ecological Research (2015) <https://doi.org/ghfnsw>
DOI: [10.1016/bs.aecr.2015.02.001](https://doi.org/10.1016/bs.aecr.2015.02.001)
48. **Communities and Ecosystems**
R. H. Whittaker
Macmillan Publishing Co. Inc. (1975)
49. **EUNIS Habitat Classification: Expert system, characteristic species combinations and distribution maps of European habitats**
Milan Chytrý, Lubomír Tichý, Stephan M. Hennekens, Ilona Knollová, John A. M. Janssen, John S. Rodwell, Tomáš Peterka, Corrado Marcenò, Flavia Landucci, Jiří Danihelka, ... Joop H. J. Schaminée
Applied Vegetation Science (2020-08-16) <https://doi.org/ghf4dn>
DOI: [10.1111/avsc.12519](https://doi.org/10.1111/avsc.12519)
50. **TURBOVEG, a comprehensive data base management system for vegetation data**
Stephan M. Hennekens, Joop H. J. Schaminée
Journal of Vegetation Science (2001-02-24) <https://doi.org/cgmn6m>
DOI: [10.2307/3237010](https://doi.org/10.2307/3237010)
51. **Oliverpurschke/Taxonomic_Backbone: First Release Of The Workflow To Generate The Taxonomic Backbone For Splot V.2.1 And Try V.3.0**
Oliver Purschke
Zenodo (2017-08-18) <https://doi.org/ghf4ph>
DOI: [10.5281/zenodo.845445](https://doi.org/10.5281/zenodo.845445)
52. **The taxonomic name resolution service: an online tool for automated standardization of plant names**
Brad Boyle, Nicole Hopkins, Zhenyuan Lu, Juan Antonio Raygoza Garay, Dmitry Mozzherin, Tony Rees, Naim Matasci, Martha L Narro, William H Piel, Sheldon J Mckay, ... Brian J Enquist
BMC Bioinformatics (2013-01-16) <https://doi.org/gb8vxz>
DOI: [10.1186/1471-2105-14-16](https://doi.org/10.1186/1471-2105-14-16) · PMID: [23324024](https://pubmed.ncbi.nlm.nih.gov/23324024/) · PMCID: [PMC3554605](https://pubmed.ncbi.nlm.nih.gov/PMC3554605/)
53. **BioTIME: A database of biodiversity time series for the Anthropocene**
Maria Dornelas, Laura H. Antão, Faye Moyes, Amanda E. Bates, Anne E. Magurran, Dušan Adam, Asem A. Akhmetzhanova, Ward Appeltans, José Manuel Arcos, Haley Arnold, ... Michael L. Zettler
Global Ecology and Biogeography (2018)
<https://onlinelibrary.wiley.com/doi/abs/10.1111/geb.12729>
DOI: <https://doi.org/10.1111/geb.12729>
54. **Open collaborative writing with Manubot**
Daniel S. Himmelstein, Vincent Rubinetti, David R. Slochower, Dongbo Hu, Venkat S. Malladi, Casey S. Greene, Anthony Gitter

55. ForestPlots.net: a web application and research tool to manage and analyse tropical forest plot data

Gabriela Lopez-Gonzalez, Simon L. Lewis, Mark Burkitt, Oliver L. Phillips

Journal of Vegetation Science (2011-08) <https://doi.org/dz6zb3>

DOI: [10.1111/j.1654-1103.2011.01312.x](https://doi.org/10.1111/j.1654-1103.2011.01312.x)

56. Plot-scale evidence of tundra vegetation change and links to recent summer warming

Sarah C. Elmendorf, Gregory H. R. Henry, Robert D. Hollister, Robert G. Björk, Noémie Boulanger-Lapointe, Elisabeth J. Cooper, Johannes H. C. Cornelissen, Thomas A. Day, Ellen Dorrepaal, Tatiana G. Elumeeva, ... Sonja Wipf

Nature Climate Change (2012-04-08) <https://doi.org/f223nb>

DOI: [10.1038/nclimate1465](https://doi.org/10.1038/nclimate1465)

57. Database of Masaryk University's Vegetation Research in Siberia

Milan Chytrý

Biodiversity & Ecology (2012-09-10) <https://doi.org/ghgvcp>

DOI: [10.7809/b-e.00088](https://doi.org/10.7809/b-e.00088)

58. The West African Vegetation Database

Marco Schmidt, Thomas Janßen, Stefan Dressler, Karen Hahn, Mipro Hien, Souleymane Konaté, Anne Mette Lykke, Ali Mahamane, Bienvenu Sambou, Brice Sinsin, ... Georg Zizka

Biodiversity & Ecology (2012-09-10) <https://doi.org/ghgvcf>

DOI: [10.7809/b-e.00065](https://doi.org/10.7809/b-e.00065)

59. BIOTA Southern Africa Biodiversity Observatories Vegetation Database

Gerhard Muche, Ute Schmiedel, Norbert Jürgens

Biodiversity & Ecology (2012-09-10) <https://doi.org/ghgvcg>

DOI: [10.7809/b-e.00066](https://doi.org/10.7809/b-e.00066)

60. Vegetation Database of the Okavango Basin

Rasmus Revermann, Amândio Luis Gomes, Francisco Maiato Gonçalves, Johannes Wallenfang, Torsten Hoche, Norbert Jürgens, Manfred Finckh

Phytocoenologia (2016-06-01) <https://doi.org/ghgt82>

DOI: [10.1127/phyto/2016/0103](https://doi.org/10.1127/phyto/2016/0103)

61. Zur Vegetationsökologie der Savannenlandschaften im Sahel Burkina Fasos

J. Müller

FB Biologie und Informatik, J.W. Goethe-Universität Frankfurt a.M (2003)

62. Conventional tree height-diameter relationships significantly overestimate aboveground carbon stocks in the Central Congo Basin

Elizabeth Kearsley, Thales de Haulleville, Koen Hufkens, Alidé Kidimbu, Benjamin Toirambe, Geert Baert, Dries Huygens, Yodit Kebede, Pierre Defourny, Jan Bogaert, ... Hans Verbeeck

Nature Communications (2013-08-05) <https://doi.org/ghgt8w>

DOI: [10.1038/ncomms3269](https://doi.org/10.1038/ncomms3269) · PMID: [23912554](https://pubmed.ncbi.nlm.nih.gov/23912554/)

63. Vegetation Database of Southern Morocco

Manfred Finckh

Biodiversity & Ecology (2012-09-10) <https://doi.org/ghgvcc>

DOI: [10.7809/b-e.00094](https://doi.org/10.7809/b-e.00094)

64. **{Das Weidepotential im Gutu-Distrikt (Zimbabwe) – Möglichkeiten und Grenzen der Modellierung unter Verwendung von Landsat TM-5}**
C. Samimi
Karlsruher Schriften zur Geographie und Geoökologie (2003)
65. **Classification of Korean forests: patterns along geographic and environmental gradients**
Tomáš Černý, Martin Kopecký, Petr Petřík, Jong-Suk Song, Miroslav Šrůtek, Milan Valachovič, Jan Altman, Jiří Doležal
Applied Vegetation Science (2015-01) <https://doi.org/ghgt8z>
DOI: [10.1111/avsc.12124](https://doi.org/10.1111/avsc.12124)
66. **Vegetation of Middle Asia – the project state of art after ten years of survey and future perspectives**
Arkadiusz Nowak, Marcin Nobis, Sylwia Nowak, Agnieszka Nobis, Grzegorz Swacha, Zygmunt Kącki
Phytocoenologia (2017-12-01) <https://doi.org/gctffg>
DOI: [10.1127/phyto/2017/0208](https://doi.org/10.1127/phyto/2017/0208)
67. **Vegetation of the woodland-steppe transition at the southeastern edge of the Inner Mongolian Plateau**
Hongyan Liu, Haiting Cui, Richard Pott, Martin Speier
Journal of Vegetation Science (2000-08) <https://doi.org/cxr92b>
DOI: [10.2307/3246582](https://doi.org/10.2307/3246582)
68. **Combined effects of livestock grazing and abiotic environment on vegetation and soils of grasslands across Tibet**
Yun Wang, Gwendolyn Heberling, Eugen Görzen, Georg Miehe, Elke Seeber, Karsten Wesche
Applied Vegetation Science (2017-07) <https://doi.org/gbkd6v>
DOI: [10.1111/avsc.12312](https://doi.org/10.1111/avsc.12312)
69. **Community assembly during secondary forest succession in a Chinese subtropical forest**
Helge Bruelheide, Martin Böhnke, Sabine Both, Teng Fang, Thorsten Assmann, Martin Baruffol, Jürgen Bauhus, François Buscot, Xiao-Yong Chen, Bing-Yang Ding, ... Bernhard Schmid
Ecological Monographs (2011-02) <https://doi.org/dmwpsm>
DOI: [10.1890/09-2172.1](https://doi.org/10.1890/09-2172.1)
70. **Vegetation Database of Sinai in Egypt**
Mohamed Hatim
Biodiversity & Ecology (2012-09-10) <https://doi.org/ghgvcr>
DOI: [10.7809/b-e.00099](https://doi.org/10.7809/b-e.00099)
71. **Eurosiberian meadows at their southern edge: patterns and phytogeography in the NW Tien Shan**
Viktoria Wagner
Journal of Vegetation Science (2009-03-25) <https://doi.org/ftq2r6>
DOI: [10.1111/j.1654-1103.2009.01032.x](https://doi.org/10.1111/j.1654-1103.2009.01032.x)
72. **Plant communities of the southern Mongolian Gobi**
Henrik von Wehrden, Karsten Wesche, Georg Miehe
Phytocoenologia (2009-10-21) <https://doi.org/ddvj9h>
DOI: [10.1127/0340-269x/2009/0039-0331](https://doi.org/10.1127/0340-269x/2009/0039-0331)
73. **Wetland Vegetation Database of Baikal Siberia (WETBS)**
Victor Chepinoga

Biodiversity & Ecology (2012-09-10) <https://doi.org/ghgvcs>
DOI: [10.7809/b-e.00107](https://doi.org/10.7809/b-e.00107)

74. Database of Siberian Vegetation (DSV)

Andrei Zverev, Andrey Korolyuk

Biodiversity & Ecology (2012-09-10) <https://doi.org/ghmxn2>

DOI: [10.7809/b-e.00108](https://doi.org/10.7809/b-e.00108)

75. SaudiVeg ecoinformatics: Aims, current status and perspectives

Mohamed A. El-Sheikh, Jacob Thomas, Ahmed H. Alfarhan, Abdulrahman A. Alatar, Sivadasan Mayandy, Stephan M. Hennekens, Joop H. J. Schaminée, Ladislav Mucina, Abdulla M. Alansari
Saudi Journal of Biological Sciences (2017-02) <https://doi.org/ghmwh5>

DOI: [10.1016/j.sjbs.2016.02.012](https://doi.org/10.1016/j.sjbs.2016.02.012) · PMID: [28149178](https://pubmed.ncbi.nlm.nih.gov/28149178/) · PMCID: [PMC5272952](https://pubmed.ncbi.nlm.nih.gov/PMC5272952/)

76. Eastern Pamirs – A vegetation-plot database for the high mountain pastures of the Pamir Plateau (Tajikistan)

Kim André Vanselow

Phytocoenologia (2016-06-01) <https://doi.org/f952sp>

DOI: [10.1127/phyto/2016/0122](https://doi.org/10.1127/phyto/2016/0122)

77. Socotra Vegetation Database

Michele De Sanctis, Fabio Attorre

Biodiversity & Ecology (2012-09-10) <https://doi.org/ghgvct>

DOI: [10.7809/b-e.00111](https://doi.org/10.7809/b-e.00111)

78. Structural and floristic diversity of mixed tropical rain forest in New Caledonia: new data from the New Caledonian Plant Inventory and Permanent Plot Network (NC-PIPPN)

Thomas Ibanez, Jérôme Munzinger, Gilles Dagostini, Vanessa Hequet, Frédéric Rigault, Tanguy Jaffré, Philippe Birnbaum

Applied Vegetation Science (2014-07) <https://doi.org/f57bfw>

DOI: [10.1111/avsc.12070](https://doi.org/10.1111/avsc.12070)

79. Managing biodiversity information: development of New Zealand's National Vegetation Survey databank

S. K. Wiser, P. J. Bellingham, L. E. Burrows

New Zealand Journal of Ecology (2001) <https://www.jstor.org/stable/24055293>

80. Species Richness, Forest Structure, and Functional Diversity During Succession in the New Guinea Lowlands

Timothy J. S. Whitfeld, Jesse R. Lasky, Kipiro Damas, Gibson Sosanika, Kenneth Molem, Rebecca A. Montgomery

Biotropica (2014-09) <https://doi.org/f6hf36>

DOI: [10.1111/btp.12136](https://doi.org/10.1111/btp.12136)

81. Database Dry Grasslands in the Nordic and Baltic Region

Jürgen Dengler, Solvita Rūsiņa

Biodiversity & Ecology (2012-09-10) <https://doi.org/ghgvcv>

DOI: [10.7809/b-e.00114](https://doi.org/10.7809/b-e.00114)

82. Vegetation-Plot Database of the University of the Basque Country (BIOVEG)

Idoia Biurrun, Itziar García-Mijangos, Juan Campos, Mercedes Herrera, Javier Loidi

Biodiversity & Ecology (2012-09-10) <https://doi.org/ghgt9d>

DOI: [10.7809/b-e.00121](https://doi.org/10.7809/b-e.00121)

83. Balkan Dry Grasslands Database

Kiril Vassilev, Zora Dajić, Renata Cušterevska, Erwin Bergmeier, Iva Apostolova
Biodiversity & Ecology (2012-09-10) <https://doi.org/ghgvcw>
DOI: [10.7809/b-e.00123](https://doi.org/10.7809/b-e.00123)

84. The Mediterranean *Ammophiletea* Database: a comprehensive dataset of coastal dune vegetation

Corrado Marcenò, Borja Jiménez-Alfaro
Phytocoenologia (2016) <https://doi.org/ghgt83>
DOI: [10.1127/phyto/2016/0133](https://doi.org/10.1127/phyto/2016/0133)

85. Local temperatures inferred from plant communities suggest strong spatial buffering of climate warming across Northern Europe

Jonathan Lenoir, Bente Jessen Graae, Per Arild Aarrestad, Inger Greve Alsos, W. Scott Armbruster, Gunnar Austrheim, Claes Bergendorff, H. John B. Birks, Kari Anne Bråthen, Jörg Brunet, ... Jens-Christian Svenning
Global Change Biology (2013-05) <https://doi.org/f24bdd>
DOI: [10.1111/gcb.12129](https://doi.org/10.1111/gcb.12129) · PMID: [23504984](https://pubmed.ncbi.nlm.nih.gov/23504984/)

86. Balkan Vegetation Database: historical background, current status and future perspectives

Kiril Vassilev, Hristo Pedashenko, Alexandra Alexandrova, Alexandar Tashev, Anna Ganeva, Anna Gavrilova, Asya Gradevska, Assen Assenov, Antonina Vitkova, Borislav Grigorov, ... Vladimir Vulchev
Phytocoenologia (2016-06-01) <https://doi.org/f8sjft>
DOI: [10.1127/phyto/2016/0109](https://doi.org/10.1127/phyto/2016/0109)

87. WetVegEurope: a database of aquatic and wetland vegetation of Europe

Flavia Landucci, Marcela Řezníčková, Kateřina Šumberová, Milan Chytrý, Liene Aunina, Claudia Biță-Nicolae, Alexander Bobrov, Lyubov Borsukevych, Henry Brisse, Andraž Čarni, ... Wolfgang Willner
Phytocoenologia (2015-07-01) <https://doi.org/bdmw>
DOI: [10.1127/phyto/2015/0050](https://doi.org/10.1127/phyto/2015/0050)

88. European Mire Vegetation Database: a gap-oriented database for European fens and bogs

Tomáš Peterka, Martin Jiroušek, Michal Hájek, Borja Jiménez-Alfaro
Phytocoenologia (2015-11-01) <https://doi.org/f724p4>
DOI: [10.1127/phyto/2015/0054](https://doi.org/10.1127/phyto/2015/0054)

89. Vegetation Database of Albania

Michele De Sanctis, Giuliano Fanelli, Alfred Mullaj, Fabio Attorre
Phytocoenologia (2017-01-01) <https://doi.org/ghgt85>
DOI: [10.1127/phyto/2017/0178](https://doi.org/10.1127/phyto/2017/0178)

90. Austrian Vegetation Database

Wolfgang Willner, Christian Berg, Paul Heiselmayer
Biodiversity & Ecology (2012-09-10) <https://doi.org/ghgvcx>
DOI: [10.7809/b-e.00125](https://doi.org/10.7809/b-e.00125)

91. Bulgarian Vegetation Database: historic background, current status and future prospects

Iva Apostolova, Desislava Sopotlieva, Hristo Pedashenko, Nikolay Velez, Kiril Vasilev
Biodiversity & Ecology (2012-09-10) <https://doi.org/ghgvch>
DOI: [10.7809/b-e.00069](https://doi.org/10.7809/b-e.00069)

92. Swiss Forest Vegetation Database

Thomas Wohlgemuth

Biodiversity & Ecology (2012-09-10) <https://doi.org/ghgvcz>
DOI: [10.7809/b-e.00131](https://doi.org/10.7809/b-e.00131)

93. Czech National Phytosociological Database: basic statistics of the available vegetation-plot data

M. Chytrý, M. Rafajová
Preslia (2003)

94. VegMV – the vegetation database of Mecklenburg-Vorpommern

Florian Jansen, Jürgen Dengler, Christian Berg
Biodiversity & Ecology (2012-09-10) <https://doi.org/gftw54>
DOI: [10.7809/b-e.00070](https://doi.org/10.7809/b-e.00070)

95. VegetWeb – the national online-repository of vegetation plots from Germany

Jörg Ewald, Rudolf May, Martin Kleikamp
Biodiversity & Ecology (2012-09-10) <https://doi.org/ghgvcj>
DOI: [10.7809/b-e.00073](https://doi.org/10.7809/b-e.00073)

96. German Vegetation Reference Database (GVRD)

Ute Jandt, Helge Bruehlheide
Biodiversity & Ecology (2012-09-10) <https://doi.org/ghgvc2>
DOI: [10.7809/b-e.00146](https://doi.org/10.7809/b-e.00146)

97. The phytosociological database SOPHY as the basis of plant socio-ecology and phytoclimatology in France

Emmanuel Garbolino, Patrice De Ruffray, Henry Brisse, Gilles Grandjouan
Biodiversity & Ecology (2012-09-10) <https://doi.org/ghhn9q>
DOI: [10.7809/b-e.00074](https://doi.org/10.7809/b-e.00074)

98. Hellenic Natura 2000 Vegetation Database (HelNatVeg)

Panayotis Dimopoulos, Ioannis Tsiripidis
Biodiversity & Ecology (2012-09-10) <https://doi.org/ghgvc3>
DOI: [10.7809/b-e.00177](https://doi.org/10.7809/b-e.00177)

99. Hellenic Woodland Database

Georgios Fotiadis, Ioannis Tsiripidis, Erwin Bergmeier, Panayotis Dimopolous
Biodiversity & Ecology (2012-09-10) <https://doi.org/ghgvc4>
DOI: [10.7809/b-e.00178](https://doi.org/10.7809/b-e.00178)

100. Phytosociological Database of Non-Forest Vegetation in Croatia

Zvezdana Stancic
Biodiversity & Ecology (2012-09-10) <https://doi.org/ghgt9f>
DOI: [10.7809/b-e.00180](https://doi.org/10.7809/b-e.00180)

101. Hungarian Phytosociological database (COENODATREF): sampling methodology, nomenclature and its actual stage

K Lájér, Z. Botta-Dukát, J. Csiky, F. Horváth, F. Szmorad, I. Bagi, T. Rédei
Annali di Botanica, Nuova Serie (2008)

102. VegItaly: The Italian collaborative project for a national vegetation database

F. Landucci, A. T. R. Acosta, E. Agrillo, F. Attorre, E. Biondi, V. E. Cambria, A. Chiarucci, E. Del Vico, M. De Sanctis, L. Facioni, ... R. Venanzoni
Plant Biosystems - An International Journal Dealing with all Aspects of Plant Biology (2012-12)

<https://doi.org/ghgt8x>

DOI: [10.1080/11263504.2012.740093](https://doi.org/10.1080/11263504.2012.740093)

103. Nationwide Vegetation Plot Database – Sapienza University of Rome: state of the art, basic figures and future perspectives

Emiliano Agrillo*, Nicola Alessi, Marco Massimi, Francesco Spada, Michele De Sanctis

Phytocoenologia (2017-07-20) <https://doi.org/gbsxm9>

DOI: [10.1127/phyto/2017/0139](https://doi.org/10.1127/phyto/2017/0139)

104. Semi-natural Grassland Vegetation Database of Latvia

Solvita Rūsiņa

Biodiversity & Ecology (2012-09-10) <https://doi.org/ghgt9g>

DOI: [10.7809/b-e.00197](https://doi.org/10.7809/b-e.00197)

105. Schatten voor de natuur. Achtergronden, inventaris en toepassingen van de Landelijke Vegetatie Databank

J. H. J. Schaminée, J. A. M. Janssen, R. Haveman, S. M. Hennekens, G. B. M. Heuvelink, H. P. J.

Huiskes, E. J. Weeda

KNNV Uitgeverij (2006)

106. The Polish Vegetation Database: structure, resources and development

Zygmunt Kącki, Michał Śliwiński

Acta Societatis Botanicorum Poloniae (2012) <https://doi.org/f34f3k>

DOI: [10.5586/asbp.2012.014](https://doi.org/10.5586/asbp.2012.014)

107. Romanian Forest Database: a phytosociological archive of woody vegetation

Adrian Indreica, Pavel Dan Turtureanu, Anna Szabó, Irina Irimia

Phytocoenologia (2017-12-01) <https://doi.org/ghgt86>

DOI: [10.1127/phyto/2017/0201](https://doi.org/10.1127/phyto/2017/0201)

108. The Romanian Grassland Database (RGD): historical background, current status and future perspectives

Kiril Vassilev, Eszter Ruprecht, Valeriu Alexiu, Thomas Becker, Monica Beldean, Claudia Biță-

Nicolae, Anna Mária Csergő, Iliana Dzhovanova, Eva Filipova, József Pál Frink, ... Jürgen Dengler

Phytocoenologia (2018-03-01) <https://doi.org/gc79hp>

DOI: [10.1127/phyto/2017/0229](https://doi.org/10.1127/phyto/2017/0229)

109. Vegetation Database Grassland Vegetation of Serbia

Svetlana Aćić, Milicia Petrović, Urban Šilc, Zora Dajić Stevanović

Biodiversity & Ecology (2012-09-10) <https://doi.org/ghgt9h>

DOI: [10.7809/b-e.00206](https://doi.org/10.7809/b-e.00206)

110. Lower Volga Valley Phytosociological Database

Alexey Sorokin, Valentin Golub, Kseniya Starichkova, Lyudmila Nikolaychuk, Viktoria Bondareva, Tatyana Ivakhnova

Biodiversity & Ecology (2012-09-10) <https://doi.org/ghgt9j>

DOI: [10.7809/b-e.00207](https://doi.org/10.7809/b-e.00207)

111. Vegetation Database of the Volga and the Ural Rivers Basins

Tatiana Lysenko, Olga Kalmykova, Anna Mitroshenkova

Biodiversity & Ecology (2012-09-10) <https://doi.org/ghgvc7>

DOI: [10.7809/b-e.00208](https://doi.org/10.7809/b-e.00208)

112. Vegetation Database of Tatarstan

Vadim Prokhorov, Tatiana Rogova, Maria Kozhevnikova
Phytocoenologia (2017-09-27) <https://doi.org/ghgt84>
DOI: [10.1127/phyto/2017/0172](https://doi.org/10.1127/phyto/2017/0172)

113. Vegetation Database of Slovenia

Urban Šilc
Biodiversity & Ecology (2012-09-10) <https://doi.org/ghgt9k>
DOI: [10.7809/b-e.00215](https://doi.org/10.7809/b-e.00215)

114. Slovak Vegetation Database

Jozef Šibík
Biodiversity & Ecology (2012-09-10) <https://doi.org/ghgt9m>
DOI: [10.7809/b-e.00216](https://doi.org/10.7809/b-e.00216)

115. Ukrainian Grasslands Database

Anna Kuzemko
Biodiversity & Ecology (2012-09-10) <https://doi.org/ghk7f3>
DOI: [10.7809/b-e.00217](https://doi.org/10.7809/b-e.00217)

116. The Tree Biodiversity Network (BIOTREE-NET): prospects for biodiversity research and conservation in the Neotropics

Luis Cayuela, Lucía Gálvez-Bravo, Ramón Pérez Pérez, Fábio de Albuquerque, Duncan Golicher, Rakan Zahawi, Neptalí Ramírez-Marcial, Cristina Garibaldi, Richard Field, José Rey Benayas, ... Regino Zamora
Biodiversity & Ecology (2012-09-10) <https://doi.org/ghgvck>
DOI: [10.7809/b-e.00078](https://doi.org/10.7809/b-e.00078)

117. Timberline meadows along a 1000-km transect in NW North America: species diversity and community patterns

Viktoria Wagner, Toby Spribille, Stefan Abrahamczyk, Erwin Bergmeier
Applied Vegetation Science (2014-01) <https://doi.org/f5mpvm>
DOI: [10.1111/avsc.12045](https://doi.org/10.1111/avsc.12045)

118. How resilient are northern hardwood forests to human disturbance? An evaluation using a plant functional group approach

I. Aubin, S. Gachet, C. Messier, A. Bouchard
Ecoscience (2007)

119. Vegetation and altitudinal zonation in continental West Greenland

B. Sieg, B. Drees, F. J. A. Daniëls
Meddelelser om Grønland Bioscience (2006)

120. VegBank – a permanent, open-access archive for vegetation-plot data

Robert Peet, Michael Lee, Michael Jennings, Don Faber-Langendoen
Biodiversity & Ecology (2012-09-10) <https://doi.org/ghgvcm>
DOI: [10.7809/b-e.00080](https://doi.org/10.7809/b-e.00080)

121. Vegetation-plot database of the Carolina Vegetation Survey

Robert Peet, Michael Lee, Forbes Boyle, Thomas Wentworth, Michael Schafale, Alan Weakley
Biodiversity & Ecology (2012-09-10) <https://doi.org/ghgvcn>
DOI: [10.7809/b-e.00081](https://doi.org/10.7809/b-e.00081)

122. The Alaska Arctic Vegetation Archive (AVA-AK)

Donald A. Walker, Amy L. Breen, Lisa A. Druckenmiller, Lisa W. Wirth, Will Fisher, Martha K. Reynolds, Jozef Šibík, Marilyn D. Walker, Stephan Hennekens, Keith Boggs, ... Donatella Zona
Phytocoenologia (2016-09-01) <https://doi.org/f877ht>
DOI: [10.1127/phyto/2016/0128](https://doi.org/10.1127/phyto/2016/0128)

123. VegPáramo, a flora and vegetation database for the Andean páramo

Gwendolyn Peyre, Henrik Balslev, David Martí, Petr Sklenář, Paul Ramsay, Pablo Lozano, Nidia Cuello, Rainer Bussmann, Omar Cabrera, Xavier Font
Phytocoenologia (2015-07-01) <https://doi.org/f7m9cj>
DOI: [10.1127/phyto/2015/0045](https://doi.org/10.1127/phyto/2015/0045)

124. The Floristic and Forest Inventory of Santa Catarina State (IFFSC): methodological and operational aspects

A. C. Vibrans, L. Sevgnani, D. V. Lingner, A. L. Gasper, S. Sabbagh
Pesquisa Florestal Brasileira (2010)

125. Plant Invasions in Protected Areas

Springer Science and Business Media LLC
(2013) <https://doi.org/ghgt8v>
DOI: [10.1007/978-94-007-7750-7](https://doi.org/10.1007/978-94-007-7750-7)

126. The Ecozones of the World

Jürgen Schultz
Springer Science and Business Media LLC (2005) <https://doi.org/ft52nn>
DOI: [10.1007/3-540-28527-x](https://doi.org/10.1007/3-540-28527-x)

127. A global inventory of mountains for bio-geographical applications

Christian Körner, Walter Jetz, Jens Paulsen, Davnah Payne, Katrin Rudmann-Maurer, Eva M. Spehn
Alpine Botany (2016-12-19) <https://doi.org/f93fmr>
DOI: [10.1007/s00035-016-0182-6](https://doi.org/10.1007/s00035-016-0182-6)

Supplementary Material

Table 1: List of databases contributing to the open access dataset extracted from the sPlot database. Databases are ordered based on their ID in the Global Index of Vegetation Databases (GVID ID).

| GVID ID | Dataset name | Custodian | Deputy custodian | Nr. OA plots | Ref |
|-----------|--|--------------------------|------------------|--------------|--------------------|
| 00-00-001 | ForestPlots.net | Oliver L. Phillips | Aurora Levesley | 108 | 55 |
| 00-00-003 | SALVIAS | Brian Enquist | Brad Boyle | 2860 | |
| 00-00-004 | Vegetation Database of Eurasian Tundra | Risto Virtanen | | 600 | |
| 00-00-005 | Tundra Vegetation Plots (TundraPlot) | Anne D. Bjorkman | Sarah Elmendorf | 227 | 56 |
| 00-RU-001 | Vegetation Database Forest of Southern Ural | Vasiliy Martynenko | Pavel Shirokikh | 25 | |
| 00-RU-002 | Database of Masaryk University`s Vegetation Research in Siberia | Milan Chytrý | | 128 | 57 |
| 00-RU-003 | Database Meadows and Steppes of Southern Ural | Sergey Yamalov | Mariya Lebedeva | 99 | |
| 00-TR-001 | Forest Vegetation Database of Turkey - FVDT | Ali Kavgacı | | 15 | |
| AF-00-001 | West African Vegetation Database | Marco Schmidt | Georg Zizka | 184 | 58 |
| AF-00-003 | BIOTA Southern Africa Biodiversity Observatories Vegetation Database | Norbert Jürgens | Ute Schmiedel | 562 | 59 |
| AF-00-006 | SWEA-Dataveg | Miguel Alvarez | Michael Curran | 1211 | |
| AF-00-008 | PANAF Vegetation Database | Hjalmar Kühl | TeneKwetché Sop | 942 | |
| AF-00-009 | Vegetation Database of the Okavango Basin | Rasmus Revermann | Manfred Finckh | 202 | 60 |
| AF-BF-001 | Sahel Vegetation Database | Jonas V. Müller | Marco Schmidt | 279 | 61 |
| AF-CD-001 | Forest Database of Central Congo Basin | Kim Sarah Jacobsen | Hans Verbeeck | 97 | 62 |
| AF-ET-001 | Vegetation Database of Ethiopia | Desalegn Wana | Anke Jentsch | 59 | [??? |
| AF-MA-001 | Vegetation Database of Southern Morocco | Manfred Finckh | | 266 | 63 |
| AF-ZW-001 | Vegetation Database of Zimbabwe | Cyrus Samimi | | 17 | 64 |
| AS-00-001 | Korean Forest Database | Tomáš Černý | Jiri Dolezal | 766 | 65 |
| AS-00-003 | Vegetation of Middle Asia | Arkadiusz Nowak | Marcin Nobis | 128 | 66 |
| AS-00-004 | Rice Field Vegetation Database | Arkadiusz Nowak | | 31 | |
| AS-BD-001 | Tropical Forest Dataset of Bangladesh | Mohammed A.S. Arfin Khan | Fahmida Sultana | 82 | |
| AS-CN-001 | China Forest-Steppe Ecotone Database | Hongyan Liu | Fengjun Zhao | 97 | 67 |
| AS-CN-002 | Tibet-PaDeMoS Grazing Transect | Karsten Wesche | | 27 | 68 |
| AS-CN-003 | Vegetation Database of the BEF China Project | Helge Brühlheide | | 18 | 69 |
| AS-CN-004 | Vegetation Database of the Northern Mountains in China | Zhiyao Tang | | 70 | |

| GIVD ID | Dataset name | Custodian | Deputy custodian | Nr. OA plots | Ref |
|----------------|---|-------------------------------------|-------------------------|---------------------|--------------------|
| AS-EG-001 | Vegetation Database of Sinai in Egypt | Mohamed Z. Hatim | | 98 | 70 |
| AS-ID-001 | Sulawesi Vegetation Database | Michael Kessler | | 24 | |
| AS-IR-001 | Vegetation Database of Iran | Jalil Noroozi | Parastoo Mahdavi | 105 | |
| AS-KZ-001 | Database of Meadow Vegetation in the NW Tien Shan Mountains | Viktoria Wagner | | 3 | 71 |
| AS-MN-001 | Southern Gobi Protected Areas Database | Henrik von Wehrden | Karsten Wesche | 688 | 72 |
| AS-RU-001 | Wetland Vegetation Database of Baikal Siberia (WETBS) | Victor Chepinoga | | 6 | 73 |
| AS-RU-002 | Database of Siberian Vegetation (DSV) | Andrey Korolyuk | Andrei Zverev | 2150 | 74 |
| AS-RU-004 | Database of the University of Münster - Biodiversity and Ecosystem Research Group's Vegetation Research in Western Siberia and Kazakhstan | Norbert Hölzel | Wanja Mathar | 85 | |
| AS-SA-001 | Vegetation Database of Saudi Arabia | Mohamed Abd El-Rouf Mousa El-Sheikh | | 607 | 75 |
| AS-TJ-001 | Eastern Pamirs | Kim André Vanselow | | 174 | 76 |
| AS-TW-001 | National Vegetation Database of Taiwan | Ching-Feng Li | Chang-Fu Hsieh | 897 | |
| AS-YE-001 | Socotra Vegetation Database | Michele De Sanctis | Fabio Attorre | 190 | 77 |
| AU-AU-002 | AEKOS | Ben Sparrow | | 7443 | 35 |
| AU-NC-001 | New Caledonian Plant Inventory and Permanent Plot Network (NC-PIPPN) | Jérôme Munzinger | Philippe Birnbaum | 98 | 78 |
| AU-NZ-001 | New Zealand National Vegetation Databank | Susan K. Wiser | | 983 | 79 |
| AU-PG-001 | Forest Plots from Papua New Guinea | Timothy Whitfeld | George D. Weiblen | 53 | 80 |
| EU-00-002 | Nordic-Baltic Grassland Vegetation Database (NBGVD) | Jürgen Dengler | Łukasz Kozub | 931 | 81 |
| EU-00-011 | Vegetation-Plot Database of the University of the Basque Country (BIOVEG) | Idoia Biurrun | Itziar García-Mijangos | 1694 | 82 |
| EU-00-013 | Balkan Dry Grasslands Database | Kiril Vassilev | Armin Macanović | 224 | 83 |
| EU-00-016 | Mediterranean Ammophiletea Database | Corrado Marcenò | Borja Jiménez-Alfaro | 3713 | 84 |
| EU-00-017 | European Coastal Vegetation Database | John Janssen | | 1369 | |
| EU-00-018 | The Nordic Vegetation Database | Jonathan Lenoir | Jens-Christian Svenning | 1755 | 85 |
| EU-00-019 | Balkan Vegetation Database | Kiril Vassilev | Hristo Pedashenko | 211 | 86 |
| EU-00-020 | WetVegEurope | Flavia Landucci | | 61 | 87 |
| EU-00-022 | European Mire Vegetation Database | Tomáš Peterka | Martin Jiroušek | 1843 | 88 |
| EU-AL-001 | Vegetation Database of Albania | Michele De Sanctis | Giuliano Fanelli | 99 | 89 |

| GIVD ID | Dataset name | Custodian | Deputy custodian | Nr. OA plots | Ref |
|----------------|---|----------------------------|-------------------------|---------------------|---------------------|
| EU-AT-001 | Austrian Vegetation Database | Wolfgang Willner | Christian Berg | 950 | 90 |
| EU-BE-002 | INBOVEG | Els De Bie | | 48 | |
| EU-BG-001 | Bulgarian Vegetation Database | Iva Apostolova | Desislava Sopotlieva | 74 | 91 |
| EU-CH-005 | Swiss Forest Vegetation Database | Thomas Wohlgemuth | | 1409 | 92 |
| EU-CZ-001 | Czech National Phytosociological Database | Milan Chytrý | Ilona Knollová | 579 | 93 |
| EU-DE-001 | VegMV | Florian Jansen | Christian Berg | 5 | 94 |
| EU-DE-013 | VegetWeb Germany | Florian Jansen | Jörg Ewald | 199 | 95 |
| EU-DE-014 | German Vegetation Reference Database (GVRD) | Ute Jandt | Helge Bruelheide | 286 | 96 |
| EU-DK-002 | National Vegetation Database of Denmark | Jesper Erenskjold Moeslund | Rasmus Ejrnæs | 1181 | |
| EU-ES-001 | Iberian and Macaronesian Vegetation Information System (SIVIM) - Wetlands | Aaron Pérez-Haase | Xavier Font | 292 | |
| EU-FR-003 | SOPHY | Emmanuel Garbolino | Patrice De Ruffray | 13322 | 97 |
| EU-GB-001 | UK National Vegetation Classification Database | John S. Rodwell | | 5457 | |
| EU-GR-001 | KRITI | Erwin Bergmeier | | 43 | |
| EU-GR-005 | Hellenic Natura 2000 Vegetation Database (HelNatVeg) | Panayotis Dimopoulos | Ioannis Tsiripidis | 777 | 98 |
| EU-GR-006 | Hellenic Woodland Database | Ioannis Tsiripidis | Georgios Fotiadis | 4 | 99 |
| EU-HR-001 | Phytosociological Database of Non-Forest Vegetation in Croatia | Zvezdana Stančić | | 213 | 100 |
| EU-HR-002 | Croatian Vegetation Database | Željko Škvorc | Daniel Krstonošić | 688 | |
| EU-HU-003 | CoenoDat Hungarian Phytosociological Database | János Csiky | Zoltán Botta-Dukát | 17 | 101 |
| EU-IT-001 | VegItaly | Roberto Venanzoni | Flavia Landucci | 2712 | 102 |
| EU-IT-010 | Vegetation database of Habitats in the Italian Alps – HabItAlp | Laura Casella | Pierangela Angelini | 155 | [??? |
| EU-IT-011 | Vegetation-Plot Database Sapienza University of Rome (VPD-Sapienza) | Emiliano Agrillo | Fabio Attorre | 1003 | 103 |
| EU-LT-001 | Lithuanian Vegetation Database | Valerijus Rašomavičius | Domas Uogintas | 119 | |
| EU-LV-001 | Semi-natural Grassland Vegetation Database of Latvia | Solvita Rūsiņa | | 306 | 104 |
| EU-MK-001 | Vegetation Database of the Republic of Macedonia | Renata Ćušterevska | | 10 | |
| EU-NL-001 | Dutch National Vegetation Database | Stephan M. Hennekens | Joop H.J. Schaminée | 10223 | 105 |
| EU-PL-001 | Polish Vegetation Database | Zygmunt Kącki | Grzegorz Swacha | 464 | 106 |

| GIVD ID | Dataset name | Custodian | Deputy custodian | Nr. OA plots | Ref |
|----------------|---|-----------------------------|-------------------------|---------------------|---------------------|
| EU-RO-007 | Romanian Forest Database | Adrian Indreica | Pavel Dan Turtureanu | 60 | 107 |
| EU-RO-008 | Romanian Grassland Database | Eszter Ruprecht | Kiril Vassilev | 44 | 108 |
| EU-RS-002 | Vegetation Database Grassland Vegetation of Serbia | Svetlana Aćić | Zora Dajić Stevanović | 57 | 109 |
| EU-RU-002 | Lower Volga Valley Phytosociological Database | Valentin Golub | Andrey Chuvashov | 149 | 110 |
| EU-RU-003 | Vegetation Database of the Volga and the Ural Rivers Basins | Tatiana Lysenko | | 96 | 111 |
| EU-RU-011 | Vegetation Database of Tatarstan | Vadim Prokhorov | Maria Kozhevnikova | 94 | 112 |
| EU-SI-001 | Vegetation Database of Slovenia | Urban Šilc | Filip Küzmič | 435 | 113 |
| EU-SK-001 | Slovak Vegetation Database | Milan Valachovič | Jozef Šibík | 893 | 114 |
| EU-UA-001 | Ukrainian Grasslands Database | Anna Kuzemko | Yulia Vashenyak | 149 | 115 |
| EU-UA-006 | Vegetation Database of Ukraine and Adjacent Parts of Russia | Viktor Onyshchenko | Vitaliy Kolomiychuk | 479 | |
| NA-00-002 | Tree Biodiversity Network (BIOTREE-NET) | Luis Cayuela | | 208 | 116 |
| NA-CA-003 | Database of Timberline Vegetation in NW North America | Viktoria Wagner | Toby Spribille | 38 | 117 |
| NA-CA-004 | Understory of Sugar Maple Dominated Stands in Quebec and Ontario (Canada) | Isabelle Aubin | | 9 | 118 |
| NA-CA-005 | Boreal Forest of Canada | Yves Bergeron | Louis De Grandpré | 44 | |
| NA-GL-001 | Vegetation Database of Greenland | Birgit Jedrzejek | Fred J.A. Daniëls | 340 | 119 |
| NA-US-002 | VegBank | Robert K. Peet | Michael T. Lee | 6456 | 120 |
| NA-US-006 | Carolina Vegetation Survey Database | Robert K. Peet | Michael T. Lee | 2317 | 121 |
| NA-US-014 | Alaska-Arctic Vegetation Archive | Donald A. Walker | Amy Breen | 467 | 122 |
| SA-00-002 | VegPáramo | Gwendolyn Peyre | Xavier Font | 1591 | 123 |
| SA-AR-002 | Vegetation Database of Central Argentina | Melisa Giorgis | Alicia T.R. Acosta | 42 | |
| SA-BO-003 | Bolivia Forest Plots | Michael Kessler | Sebastian Herzog | 18 | |
| SA-BR-002 | Forest Inventory, State of Santa Catarina, Brazil (IFFSC Project) | Alexander Christian Vibrans | André Luís de Gasper | 1345 | 124 |
| SA-BR-003 | Grasslands of Rio Grande do Sul, Brazil | Eduardo Vélez-Martin | Valério De Patta Pillar | 271 | |
| SA-BR-004 | Grassland Database of Campos Sulinos | Gerhard E. Overbeck | Valério De Patta Pillar | 111 | |
| SA-CL-002 | SSAForests_Plots_db | Alvaro G. Gutierrez | | 163 | |
| SA-CL-003 | Chilean Park Transects - Fondecyt 1040528 | Aníbal Pauchard | Alicia Marticorena | 33 | 125 |
| SA-EC-001 | Ecuador Forest Plot Database | Jürgen Homeier | | 156 | |

Table 2: Description of the variables contained in the ‘header’ matrix, together with their range (if numeric) or possible levels (if nominal or binary), and the number of non-empty (i.e., non NA) records. Variable types can be n - nominal (i.e.,

qualitative variable), o - ordinal, q - quantitative, or b - binary (i.e., boolean), or d - date. . Additional details on the variables is in Bruelheide et al. (2019) [24]. GIVD codes derive from Dengler et al. (2011) [36]. Biomes refer to Schultz 2005 [126], modified to include also the world mountain regions by Körner et al. (2017)[127]. The column ESY refers to the EUNIS Habitat Classification Expert system described in Chytrý et al. (2020) [49].

| Variable | Range/Levels | Unit of Measurement | Nr. non-NA Records | Type |
|----------------------|---|---------------------|--------------------|------|
| GIVD_ID | | | 91205 | n |
| Dataset | | | 91205 | n |
| Continent | Africa, Asia, Europe, North America, Oceania, South America | | 91205 | n |
| Country | | | 91205 | n |
| Biome | Alpine, Boreal zone, Dry midlatitudes, Dry tropics and subtropics, Polar and subpolar zone, Subtrop. with year-round rain, Subtropics with winter rain, Temperate midlatitudes, Tropics with summer rain, Tropics with year-round rain | | 91205 | n |
| Date_of_recording | 1888-07-05 - 2015-02-03 | dd-mm-yyyy | 75971 | d |
| Latitude | -54.73863 - 80.149116 | ° (WGS84) | 91205 | q |
| Longitude | -162.741433 - 179.590053 | ° (WGS84) | 91205 | q |
| Location_uncertainty | 1 - 2500 | m | 91176 | q |
| Releve_area | 0.01 - 40000 | m ² | 62063 | q |
| Plant_recorded | All vascular plants, All trees & dominant understory, Dominant trees, Only dominant species, Dominant woody plants >= 2.5 cm dbh, All woody plants, Woody plants >= 1 cm dbh, Woody plants >= 2.5 cm dbh, Woody plants >= 5 cm dbh, Woody plants >= 10 cm dbh, Woody plants >= 20 cm dbh, Woody plants >= 1 m height, Not specified | | 91205 | n |
| Elevation | -25 - 4819 | m a.s.l. | 52277 | q |
| Aspect | 0 - 360 | ° | 30842 | q |
| Slope | 0 - 90 | ° | 37817 | q |
| is_forest | FALSE = 58145; TRUE = 25740 | | 83885 | b |
| ESY | | | 55631 | n |
| Forest | FALSE = 50071; TRUE = 23979 | | 74050 | b |
| Shrubland | FALSE = 62967; TRUE = 11083 | | 74050 | b |
| Grassland | FALSE = 26974; TRUE = 47076 | | 74050 | b |
| Wetland | FALSE = 55970; TRUE = 18080 | | 74050 | b |
| Sparse_vegetation | FALSE = 62728; TRUE = 11322 | | 74050 | b |
| Cover_total | 1 - 313 | % | 24850 | q |
| Cover_tree_layer | 0.5 - 150 | % | 7270 | q |
| Cover_shrub_layer | 0.5 - 145 | % | 10209 | q |
| Cover_herb_layer | 0.2 - 180 | % | 26846 | q |
| Cover_moss_layer | 1 - 100 | % | 9685 | q |

| Variable | Range/Levels | Unit of Measurement | Nr. non-NA Records | Type |
|-----------------------|-------------------------------|---------------------|--------------------|------|
| Cover_lichen_layer | 1 - 95 | % | 739 | q |
| Cover_algae_layer | 1 - 100 | % | 221 | q |
| Cover_litter_layer | 1 - 100 | % | 4510 | q |
| Cover_bare_rocks | 1 - 100 | % | 1904 | q |
| Cover_cryptogams | 1 - 95 | % | 593 | q |
| Cover_bare_soil | 0.1 - 99 | % | 1414 | q |
| Height_trees_highest | 1 - 99 | m | 6140 | q |
| Height_trees_lowest | 1 - 90 | m | 246 | q |
| Height_shrubs_highest | 0.1 - 9.9 | m | 2902 | q |
| Height_shrubs_lowest | 0.1 - 9 | m | 350 | q |
| Height_herbs_average | 0.1 - 440 | cm | 10161 | q |
| Height_herbs_lowest | 1 - 250 | cm | 2809 | q |
| Height_herbs_highest | 1 - 600 | cm | 1744 | q |
| Naturalness | 1 = Natural, 2 = Semi-natural | | 68179 | o |