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DATA DESCRIPTOR

Southern Islands Vascular Flora (SIVFLORA) dataset: A global plant database from Southern Ocean islands

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The Southern Islands Vascular Flora (SIVFLORA) dataset is a globally significant, open-access resource that compiles essential biodiversity data on vascular plants from islands across the Southern Ocean. The SIVFLORA dataset was generated through five steps: study area delimitation, compiling the dataset, validating and harmonizing taxonomy, structuring dataset attributes, and establishing file format and open access. Covering major taxonomic divisions, SIVFLORA offers a comprehensive overview of plant occurrences, comprising 14,589 records representing 886 species, 95 families, and 42 orders. This dataset documents that 58.62% of the taxa are native, 9.61% are endemic, and 31.77% are alien species. The Falkland/Malvinas Archipelago, the most species-rich, contrast sharply with less diverse islands like the South Orkney Archipelago. SIVFLORA serves as a taxonomically harmonized, interoperable resource for investigating plant diversity patterns, ecosystem responses to climate change in extreme environments, island biogeography, endemism, and the effects of anthropogenic pressures on Southern Ocean flora.

Background & Summary

The southern islands vascular flora dataset (SIVFLORA). The Southern Islands Vascular Flora dataset (SIVFLORA)¹ compiles essential biodiversity data on vascular plants from islands across the Southern Ocean. While numerous botanical expeditions since the mid-19th century have explored these islands, producing a wealth of botanical treatises and scientific publications^{2,3}, a comprehensive global dataset on their vascular flora diversity has remained absent. This gap is notable given the islands' significance as natural laboratories for studying evolutionary and biogeographic processes⁴. In contrast, Arctic flora has been more systematically studied and cataloged^{5,6}, highlighting the need for a similarly detailed and unified dataset for the Southern Ocean islands.

SIVFLORA¹ is an open-access resource designed to address the lack of unified and interoperable biodiversity data for the islands of the Southern Ocean. This repository compiles comprehensive pan-floristic data on species presence and plant diversity, drawing from diverse sources, including historical exploration literature, taxonomic monographs, ecological research, checklists, and specimen databases. The dataset provides an up-to-date catalog of vascular plant diversity, emphasizing native, endemic, and exotic species.

The sub-Antarctic region has been defined in several ways⁷, but a “core” region of sub-Antarctic islands and archipelagos includes South Georgia Island, Marion Island, Prince Edward Island, the Crozet Archipelago, the Kerguelen Archipelago, Heard Island, McDonald Island, and Macquarie Island (Fig. 1). These islands are characterized by an absence of woody plants and terrestrial vertebrates, and they experience cool, oceanic climates with reduced seasonality compared to Antarctica⁷. Other islands, such as Snares Archipelago and Campbell Island, as well as Tierra del Fuego Archipelago and the islands south of the Beagle Channel, are also described as sub-Antarctic, due to some of these islands experiencing colder conditions throughout the year⁷. Additionally,

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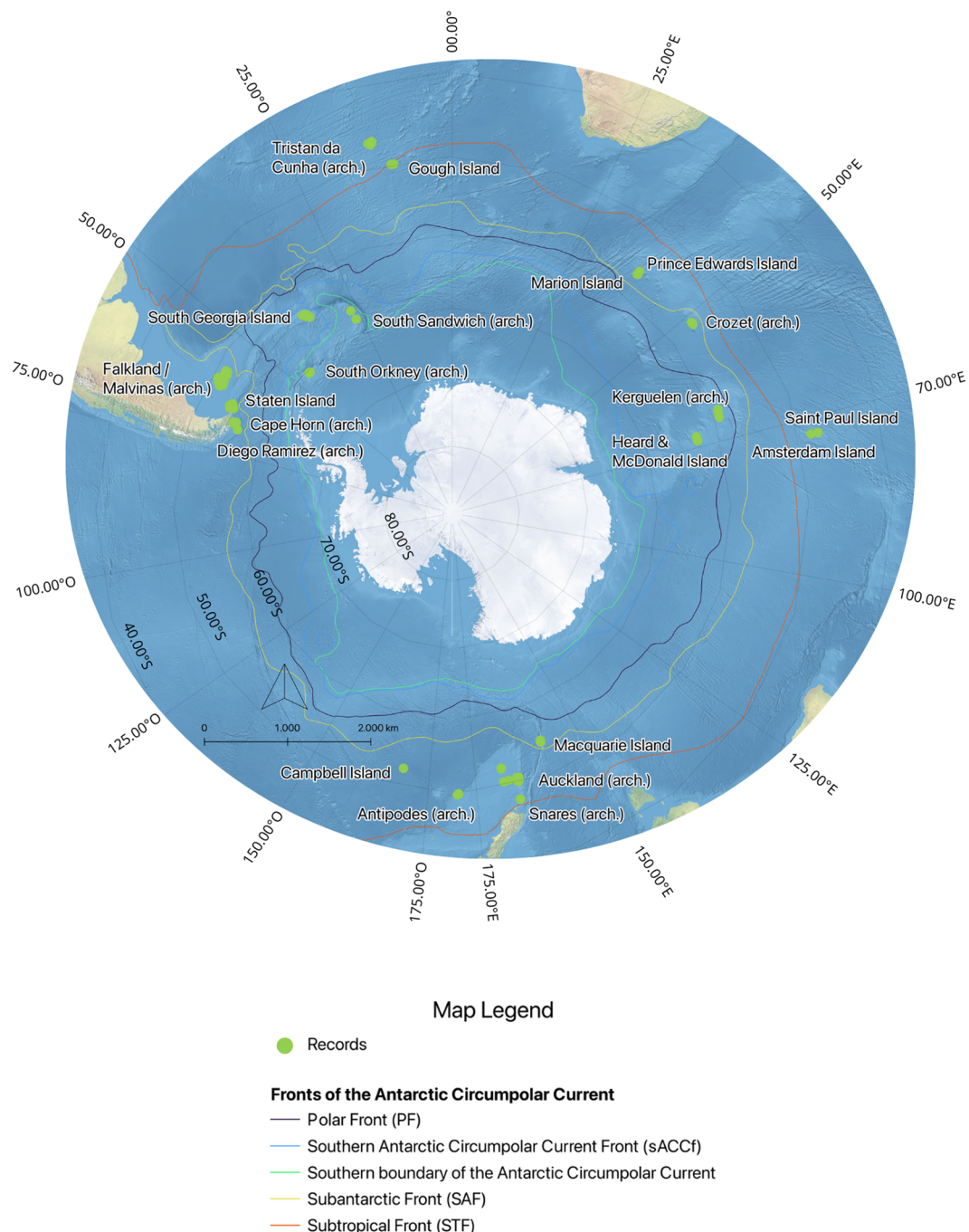


Fig. 1 Spatial distribution of Southern Ocean islands included in SIVFLORA. Map generated in QGIS v.3.2.8 (<https://www.qgis.org>) with a raster base map from Natural Earth (<https://www.naturalearthdata.com/>).

there is biological connectivity, especially in marine life, with islands like the Falklands/Malvinas Archipelago, Gough Island, Amsterdam Island, Saint Paul Island, and the subtropical Tristan da Cunha Archipelago, which have many terrestrial species absent from the core region. The Southern Ocean islands, some of the most isolated on the planet, provide a unique system to study native flora and natural dispersal processes in environments characterized by extreme climatic conditions. However, historical land use, including grazing, whaling settlements, and the introduction of exotic species, has significantly altered plant communities, as evidenced by the presence of numerous invasive species that have formed distinct vegetation assemblages⁸. This degradation highlights the need for a comprehensive floristic approach to understand species dynamics within a historical context and in relation to current human activities.

In response to these challenges, significant efforts have been made to compile exhaustive and up-to-date floristic catalogs^{4,9–13}. SIVFLORA¹, with its extensive geographical and botanical scope, is a valuable tool for conducting meta-analyses of plant diversity patterns and for understanding the processes driving the southward

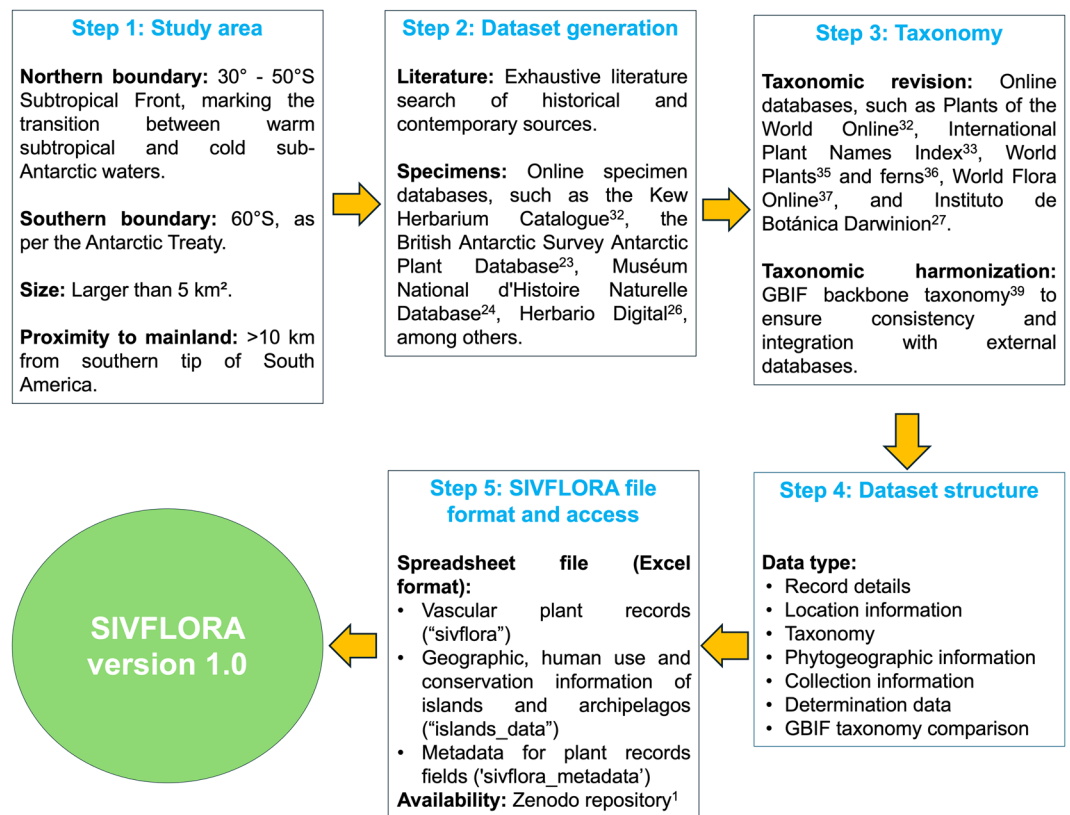


Fig. 2 Overview of the workflow for compiling, validating, and generating the Southern Islands Vascular Flora database (SIVFLORA). The process includes: (1) delimitation of the study area, (2) dataset generation, (3) taxonomic validation, (4) dataset structuring, and (5) defining the SIVFLORA file format and ensuring access.

expansion of angiosperms as growing conditions become increasingly favorable^{14–16}. This dataset complements other major initiatives and integrates seamlessly with related datasets, including alien species of Antarctica and some Southern Ocean islands¹⁷, the global floras and traits⁹, and the checklist of Antarctic terrestrial and freshwater biodiversity¹⁸. Together, these resources help identify research gaps and guide future botanical surveys and environmental monitoring efforts.

This study aimed to compile comprehensive and accurate data on the flora of islands located between the northern limit of the Subtropical Front and 60°S, the boundary established by the Antarctic Treaty. The dataset includes georeferenced species records, taxonomic revisions with accompanying comments, phytogeographic classifications, and biological collection details. These data were taxonomically validated, harmonized, and integrated into a standardized and interoperable format using a global taxonomic standard. Capturing the diversity of plant species across 22 islands and archipelagos, this dataset was developed through a workflow encompassing study area delineation, data compilation, taxonomic verification, attribute structuring, and the creation of an open-access spreadsheet file. This ensures the dataset's usability and reproducibility for diverse research applications.

Methods

The process of SIVFLORA¹ dataset generation involved five major steps (Fig. 2), which included: delimitation of the study area (Step 1), dataset generation (Step 2), taxonomic validation and harmonization (Step 3), dataset field information structuring (Step 4), and creation of the SIVFLORA¹ open access file format (Step 5).

The northern boundary includes islands located south of the Subtropical Front^{7,19}. Tristan da Cunha Archipelago, Amsterdam Island (37°S), and Saint Paul Island (38°S) were included as they are frequently classified as sub-Antarctic^{7,19}. To ensure the presence of vascular plants, islands larger than 5 km² were prioritized, with exceptions made for Diego Ramírez Archipelago, McDonald Island, and Snares Archipelago, which have areas under 3 km². Islands near the southern tip of South America were required to be at least 10 km from the mainland to minimize the influence of the fjord system, which includes hundreds of unexplored islands.

The study's southern limit at 60°S aligns with the Antarctic Treaty, which defines this boundary for the Antarctic region. Signed in 1959, the treaty governs activities south of this latitude. The Antarctic native vascular flora south of 60°S comprises only two species, *Colobanthus quitensis* (Caryophyllaceae) and *Deschampsia antarctica* (Poaceae), both widely distributed across sub-Antarctic islands²⁰. Additionally, *Poa annua*, while geographically restricted, is recorded as an invasive species in this Antarctic region²¹. Given that the distribution of native and invasive vascular plants on islands south of 60°S is well-documented¹⁷, their inclusion in

Island-Archipelago	Latitude	Longitude	Surface (km ²)	Human settlement	Protected areas designations	Climate
Amsterdam	37°49'S	77°31'E	58	No (scientists and conservationists non-permanent personnel only)	Antarctic French National Park (1938); Terrestrial Nature Reserve; Marine Nature Reserve; French Southern Territories National Nature Reserve (RNN) 2006; UNESCO World Heritage Site (2019) entered as "French Austral Lands and Seas"	Sub-Antarctic
Antipodas	49°40'S	178°45'58"E	22	No	UNESCO World Heritage Site (1998) entered as "New Zealand Sub-Antarctic Islands"; Reserve for Protection of Flora & Fauna (1961); Antipodes Islands Nature Reserve (1977)	Sub-Antarctic
Bollons	49°38'S	178°49'04"E	2			
Cabo Hornos (arch.)	55°58'S	67°17'21"W	630.93	Yes	Cape Horn National Park (1945); UNESCO Man and the Biosphere Programme (MAB) Cape Horn Biosphere Reserve (2005)	Magellanic Sub-Antarctic
Bandurrias (BAN)	55°37'S	67°30'W	—			
Bayly (BAY)	55°37'S	67°37'W	—			
Grevy (GRE)	55°33'S	67°38'51.42"W	—			
Hermite (HER)	55°50'S	67°25'00"W	143.6			
Hornos (HOR)	55°58'S	67°14'W	28.3			
Hoste (HOS)	55°15'S	69°00'W	—			
Herschel (HSL)	55°50'S	67°12'W	65.5			
Ottaries (OTT)	55°36'S	67°32'25"W	—			
Wollaston (WOL)	55°44'S	67°19'W	—			
Diego Ramirez (arch.)	56°29'S	68°44'W	—	No (meteorological station and lighthouse)	Cape Horn National Park (1945); National Protected Property (Bien Nacional Protegido BNP year 2008); Diego Ramirez Islands-Paso Drake Marine Park (2019)	Magellanic Sub-Antarctic
Bartolomé	56°32'S	68°43'W	1.2			
Gonzalo	56°31'S	68°41'00"W	0.44			
Auckland (arch.)	50°42'S	166°06'E	570	No	Auckland Islands Nature Reserve (1977); Auckland Islands-Motu Maha Marine Reserve; UNESCO World Heritage Site (1998) entered as "New Zealand Sub-Antarctic Islands"	Sub-Antarctic
Adams	50°53'S	166°3'36"E	96.95			
Davis	—	—	0.001			
Enderby	50°29'S	166°17'44"E	6.95			
Ewing	50°31'S	166°18'E	0.58			
Rose	—	—	0.8			
Campbell	52°32'S	169°8'E	115	No (scientists and conservationist non-permanent personnel)	Moutere Ihupuku-Campbell Island Marine Reserve; Campbell Islands Nature Reserve (1977); UNESCO World Heritage Site (1998) entered as "New Zealand Sub-Antarctic Islands"	Sub-Antarctic
Crozet (arch.)	46°23'S	51°40'E	352	No (scientists and conservationist non-permanent personnel)	Antarctic French National Park (1924, except Possesion and L'Est islands); L'Est, aux Cochons, des Pingouins and des Apotres islands are designated as Specially Protected Areas; National Nature Reserve (2006); UNESCO World Heritage Site (2019) entered as "French Austral Lands and Seas"	Sub-Antarctic
Aux cochons	46°06'S	50°14'E	67			
des Apotres	45°58'S	50°27'E	2			
des Pingouins	46°27'S	50°23'E	3			
L'est	46°26'S	52°18'E	130			
Possesion	46°24'S	51°46'E	150	No (military, scientific and specific tourism non-permanent personnel)	"Isla de Los Estados y Archipiélago Año Nuevo" Wild Natural Reserve (2016)	Magellanic Sub-Antarctic
De los Estados	54°47'S	64°15'W	534			
Observatory	54°39'S	64°08'W	4			
Falkland/Malvinas (arch.)	51°48'S	59°31'W	12			
Carcass	51°16'S	60°33'W	19	Yes	There are 19 National Nature Reserves in the Falkland/ Malvinas Islands (eight owned by the government, two owned by environmental or conservation groups and nine owned privately); Sea Lion Island and Bertha's Beach (East Falkland), are Ramsar Wetlands; There are Wildlife Sanctuaries (since 1964)	Magellanic Sub-Antarctic
Gran Malvina (west Falkland)	51°47'S	60°07'W	4,377.00			
Sea lion	52°26'S	59°05'W	9			
Soledad (east Falkland)	51°48'S	58°47'W	6,353.00			
Trinidad (Saunders)	51°20'S	60°10'W	132			
Gough	40°19'S	9°32'W	57	No (scientific non-permanent personnel)	UNESCO World Heritage Site (1995) entered as "Gough and Inaccessible Islands"; Gough Island Wildlife Reserve (1976); Wetlands of International Importance (Ramsar)	Subtropical
Heard	53°05'S	73°31'E	368	No	UNESCO World Heritage Site (1997) entered as "Heard and McDonald Islands"; The Heard and McDonald Islands are Ramsar Wetlands	Sub-Antarctic
Kerguelen (arch.)	49°15'S	69°10'E	7,215	No (scientific non-permanent personnel)	Antarctic French National Park (1938); Terrestrial Nature Reserve; Marine Nature Reserve; French Southern Territories National Nature Reserve (RNN) 2006; most islands are designated as a Specially Protected Areas; UNESCO World Heritage Site (2019) entered as "French Austral Lands and Seas"	Sub-Antarctic
Australia	49°27'S	69°50'E	37			
Aux moules	49°24'S	69°56'E	4			
Chateau	49°29'S	69°55'E	—			
Croy	48°38'S	68°37'E	16			
Grande Terre	49°15'S	69°10'E	6,675			
Haute	49°22'S	69°54'E	12			
Howe	48°52'S	69°27'E	54			
Longue	49°32'S	69°54'E	35			
Verte	49°30'S	70°02'E	1.5			
Continued						

Island-Archipelago	Latitude	Longitude	Surface (km ²)	Human settlement	Protected areas designations	Climate
Macquarie	54°37'S	158°51'W	128	No (scientific non-permanent personnel)	UNESCO World Heritage Site (1997) entered as “Macquarie Island”; Nature Sanctuary (1933); Macquarie Island Nature Reserve (1970, 1978); Biosphere Reserve (1977) under “the Man and the Biosphere Program from 1977 until its withdrawal from the program in 2011”	Sub-Antarctic
Marion	46°54'S	37°44'E	290	No (scientific non-permanent personnel)	Marion Island Nature Reserve (1995); Marine Protected Area (2013)	Sub-Antarctic
McDonald	53°03'S	72°36'E	2.6	No	UNESCO World Heritage Site (1997) entered as “Heard and McDonald Islands”; The Heard and McDonald Islands are Ramsar Wetlands; Convention for the Conservation of Antarctic Marine Living Resources	Sub-Antarctic
Prince Edward	46°52'S	37°45'E	45	No (scientific non-permanent personnel)	Prince Edward Island Nature Reserve (1995); Marine Protected Area (2013)	Sub-Antarctic
Saint Paul	38°43'S	77°31'E	8	No	Antarctic French National Park (1938) and are designated as a Specially Protected Areas; Terrestrial Nature Reserve; Marine Nature Reserve; French Southern Territories National Nature Reserve (RNN) 2006; UNESCO World Heritage Site (2019) entered as “French Austral Lands and Seas”	Sub-Antarctic
Snares	48°01'S	166°36'E	3.4	No (biological station with few scientific non-permanent personnel)	Nature Reserve (1977); National Reserve (1983); UNESCO World Heritage Site (1998) entered as “New Zealand Sub-Antarctic Islands”	Sub-Antarctic
South Georgia	54°26'S	36°33'W	3,756	No (very small scientific non-permanent personnel)	Site of Special Scientific Interest - Bird and Annenkov islands (1975); Specially Protected Area-Cooper Island (1975); Special Tourist Interest Areas (Cape Buller and Cape Wilson); Marine Protected Area (2012-2013)	Sub-Antarctic
South Orkney (arch.)	60°40'S	45°11'W	620	No (biological station with few scientific non-permanent personnel in Signy and Laurie Research Station)	Entire islands are protected without specific designation (1964); Specially Protected Areas - Moe, Lynch, Southern Powell, Grey, Michelsen islands among others (1966)	Maritime Antarctic
Coronation	60°37'S	45°35'W	457			
Laurie	60°40'S	45°11'W	86			
Signy	60°43'S	45°36'W	19			
South Sandwich	58°25'S	26°23'W	320	No (scientific non-permanent personnel)	The island is protected without specific designation (1975)	Maritime Antarctic
Tristan da Cunha	37°07'S	12°17'W	98	Yes	The islands are protected as Sanctuaries without specific designation (1976); UNESCO World Heritage Site (1995) entered as “Gough and Inaccessible Islands”; Marine Protection Zone; Whale Sanctuary (2001) by Tristan Island Council	Subtropical

Table 1. Overview of islands and archipelagos included in the SIVFLORA database. The table details 22 islands/archipelagos and 62 localities across the Southern Ocean. Attributes include island/archipelago name, geographic coordinates (latitude and longitude), surface area (km²), human settlement status, protected area designations, and climate zone. Protected area designations highlight conservation frameworks such as national parks, marine reserves, and UNESCO World Heritage Sites, where applicable. Climate zones are classified into Sub-Antarctic, Magellanic Sub-Antarctic, Maritime Antarctic, or Subtropical based on geographic and bioclimatic characteristics.

SIVFLORA¹ was unnecessary. These criteria ensure the selected islands represent distinct geographic zones across the Southern Ocean.

SIVFLORA¹ was compiled through an exhaustive, systematic review of specialized sources (February 2022–April 2024). This methodology combined broad bibliographic exploration of both contemporary and historical works with targeted keyword queries and cross-referencing. Island-specific searches were conducted using standardized search strings incorporating the name of each island or archipelago (e.g., “Campbell Island,” “South Orkney Archipelago”) across specialized academic databases (e.g., JSTOR; <https://www.jstor.org/>). When initial results exceeded 200 references, queries were refined iteratively by adding terms such as “vascular plants.” For instance, an initial search for “Campbell Island” on JSTOR returned 876 results, which were narrowed to 92 upon including “vascular plants.” This approach ensured references were both comprehensive and specifically focused on vascular plant literature for each island. To further expand coverage, all relevant literature was examined for botanical citations, floras, specimen records, and monographs. Reference trails were followed meticulously to locate historical literature not readily captured by standard database queries. Information on the phytogeographic origin or “establishment_means” of species on islands was obtained from the reviewed literature. Among the resources detailed below used to document island flora, the Global Biodiversity Information Facility (GBIF; <https://www.gbif.org>) records were not utilized for this purpose, as they provide species-specific geographic context but do not indicate whether a species is alien, endemic, or native.

Digitized specimen records available online serve as invaluable resources for biodiversity research. We used online databases such as *The Herbarium Catalogue Data Portal of the Royal Botanic Gardens, Kew*²², the *British Antarctic Survey Antarctic Plant Database*²³, the Vascular Plants Database hosted by the *Muséum National d'Histoire Naturelle*²⁴, the *Atlas of Living Australia*²⁵, the *Chilean Digital Herbarium*²⁶ (Herbario Digital), and the *Instituto de Botánica Darwinion*²⁷. Additionally, we incorporated species lists and checklists from the *New Zealand Plant Conservation Network*²⁸, the *Australian Antarctic Program*²⁹, and the *Flora of Staten Island*³⁰. Together, these platforms provide access to high-quality, digitized records.

Data Type	Attribute	Description
Record	id_entry	Unique identifier of each taxonomic record corresponding to the dataset
	reference	A related resource that is referenced, cited, or otherwise pointed to by the described resource
	publication_type	Type of publication from which the record was obtained
	id_publication_type	Numeric identifier for the type of publication:
		1 Paper
		2 Book
		3 Website
		4 Metadata Database
		5 Digital Collection
		6 Online Database
		7 Technical Report
		8 Monograph
		9 Thesis (Undergraduate/Master's/Doctoral)
		10 Herbarium Material
		11 Fascicle
Location	bibliographic_citation	Full bibliographic reference for the resource
	short_citation	Bibliographic citation in short format
	gbif_id	Registration number associated with GBIF
	gbif_download_doi	GBIF download DOI
	island	Full name of the island associated with the record
	acronym_island	Acronym for the island associated with the record
	locality	Specific description of the place where the record was found
	decimal_latitude	Geographic latitude in decimal degrees
	decimal_longitude	Geographic longitude in decimal degrees
	country	Name of the country or major administrative unit
	state_province	Name of the next smaller administrative region than country (state, province, canton, department, region, etc.)
	county	Name of the next smaller administrative region than state or province (county, shire, department, etc.)
	municipality	Name of the next smaller administrative region than county (city, municipality, etc.)
	regional_climate	Climatic region based on Greene & Walton (1975), Convey (2020), and Hassler (2023). Includes:
		Sub-antarctic
		Maritime Antarctic
		Magellanic Sub-antarctic
	sup_km2	Subtropical
		Total area (measured in square kilometers)
	verbatim_latitude	Original latitude as reported in the source
	verbatim_longitude	Original longitude as reported in the source
	verbatim_elevation	Original description of the elevation (altitude, usually above sea level) as reported in the source
Taxonomy	family	Full scientific name of the family for the record
	genus	Full scientific name of the genus for the record
	scientific_name	Full name of the taxon in the record after taxonomic revision
	varietas	Variety (varietas) in the botanical nomenclature hierarchy
	author_varietas	Author of the variety (varietas)
	subspecies	Subspecies in the botanical nomenclature hierarchy
	author_subspecies	Author of the subspecies
	forma	Form (forma) in the botanical nomenclature hierarchy
	author_forma	Author of the form (forma)
	identification_qualifier	Term (e.g., cf., aff.) to express the taxonomic status of the species
	verbatim_identification	Taxonomic identification as it appeared in the original record
	authorship_according_bibliography	Author of the species as it appeared in the original record
	name_publish_in	Reference where the species in the record was originally published
	name_publish_in_year	Year of original publication for the species in the record
	reviewed_name	Scientific name determined according to a reference (POWO, WFO, Hassler, IPNI) and taxonomist (Patricio Medina)
	reviewed_authorship_name	Author or authorities accepted as valid according to reference and taxonomist (Patricio Medina)
	reviewed_infraspecies_authorship	Author or authorities for infraspecies accepted as valid according to reference and taxonomist (Patricio Medina)
	reviewed_name_reference	Reference for the valid species name
	synonym	Synonym of the scientific name according to the original publication
	taxon_remarks	Comments or notes about the taxon or name in the original reference
Continued		

Data Type	Attribute	Description
Phytogeographic Information	life_form	Life form of the species, based on Raunkiaer's terminology
	plant_habit	General appearance or architecture of the plant species
	establishment_means	Indicates whether a species has been introduced to a specific location at a given time due to direct or indirect human activity. In this dataset, the values can be: Native: Species native to the indicated island but not endemic; Endemic: Species endemic to the indicated island; Introduced: Species introduced to the indicated island; Cosmopolitan: Species with a global distribution, uncertain whether it is native to the island; Alien*: Species potentially introduced to the island with a cosmopolitan distribution; Alien**: Species potentially introduced to the island with a restricted distribution; missing values occur when no data is available, such as in cases where the information is derived solely from GBIF records.
	degree_establishment	The degree to which the species survives, reproduces, and spreads at the locality
	historical_use	Historical human use of the species in its recorded territory
Collection Information	recorded_by	Name of the person who collected the specimen or material cited
	recorded_by_id	Unique identifier for the person who collected the specimen
	event_date	Date of specimen collection or indicated in herbarium material
	herbarium_material	Indicates if herbarium material is linked to the record
	institution_code	Acronym for the institution holding the specimen
	catalog_number	Identifying number assigned at the time of entering the specimen in the herbarium
	occurrence_remarks	Comments or observations made by the dataset authors
	type_status	Nomenclatural type corresponding to the specimen cited
Determination Information	associated_media	Associated media (e.g., images) of the species record
	identify_by	Name of the person who determined the specimen
	date_identified	Date when the specimen or material was identified
	additional_study	Additional studies carried out with the specimen
	author_additional_study	Author of additional studies
GBIF Taxonomy Comparison	date_additional_study	Date of additional studies
	gbif_name	Scientific name obtained from GBIF
	gbif_usageKey	Numeric identifier from GBIF taxonomic backbone
	gbif_rank	Taxonomic rank of the GBIF name
	gbif_matchType	Match level between the scientific name and GBIF taxonomic backbone
	gbif_confidence	Confidence level of the taxonomic match
	gbif_status	Taxonomic status of the name according to GBIF
	gbif_kingdom	Kingdom classification from GBIF
	gbif_phylum	Phylum classification from GBIF
	gbif_class	Class classification from GBIF
	gbif_order	Order classification from GBIF
	gbif_synonym	Indicates if the name is a synonym according to GBIF taxonomic backbone

Table 2. Dataset fields included in SIVFLORA, grouped across seven categories: Record, Location, Taxonomy, Phytogeographic Information, Collection Information, Determination information, and GBIF Taxonomy Comparison. The fields include unique record identifiers, geographic coordinates, climatic and administrative data, taxonomic classifications (verbatim and reviewed), species establishment status, specimen collection details, and GBIF taxonomic harmonization.

The taxonomic revision for validating records adheres to a structured hierarchical approach. Primary reliance is placed on authoritative taxonomic platforms, including *Plants of the World Online*^{31,32}, the *International Plant Names Index*³³, the *Instituto de Botánica Darwinion*²⁷, the *Catalogue of Life Checklist*³⁴, *World Plants*³⁵, *World Ferns*³⁶ and the *World Flora Online*³⁷. This multi-source approach enables robust validation of nomenclature and taxonomy, ensuring accuracy and consistency across datasets. The dataset supports comparative analysis across various taxonomic levels. Records with incomplete taxonomic identification (sp., spp., aff., or cf. rank), doubtful identifications, and horticultural crop species were excluded from this checklist. To determine the accepted binomial names, the criteria outlined in the *International Code of Nomenclature for algae, fungi, and plants* (Shenzhen Code)³⁸ are followed.

For broader interoperability, the GBIF backbone taxonomy³⁹ is adopted for taxonomic data harmonization⁴⁰, facilitating consistent searches, browsing, and reporting across occurrence datasets, species pages, and external resources such as *GenBank*⁴¹, and *IUCN Red List of Threatened Species* (<https://www.iucnredlist.org/>). The GBIF taxonomic backbone is regularly updated and uses sources such as with the *Catalogue of Life Checklist*³⁴ and further enriched by merging data from other authoritative sources. It also incorporates identifiers for Operational Taxonomic Units (OTUs) derived from barcoding initiatives, such as the *International Barcode of Life* (<https://ibol.org/>), supporting the integration of molecular data with traditional taxonomy.

Independent taxonomic revisions, such as those conducted in this dataset construction, may occasionally reveal discrepancies with global catalogues like the GBIF Backbone Taxonomy⁴². While most species names in the SIVFLORA¹ dataset, listed in the “reviewed_name” column, match the GBIF checklist as indicated by matchType = “EXACT” in the “gbif_matchType” column, occasional mismatches occur between the

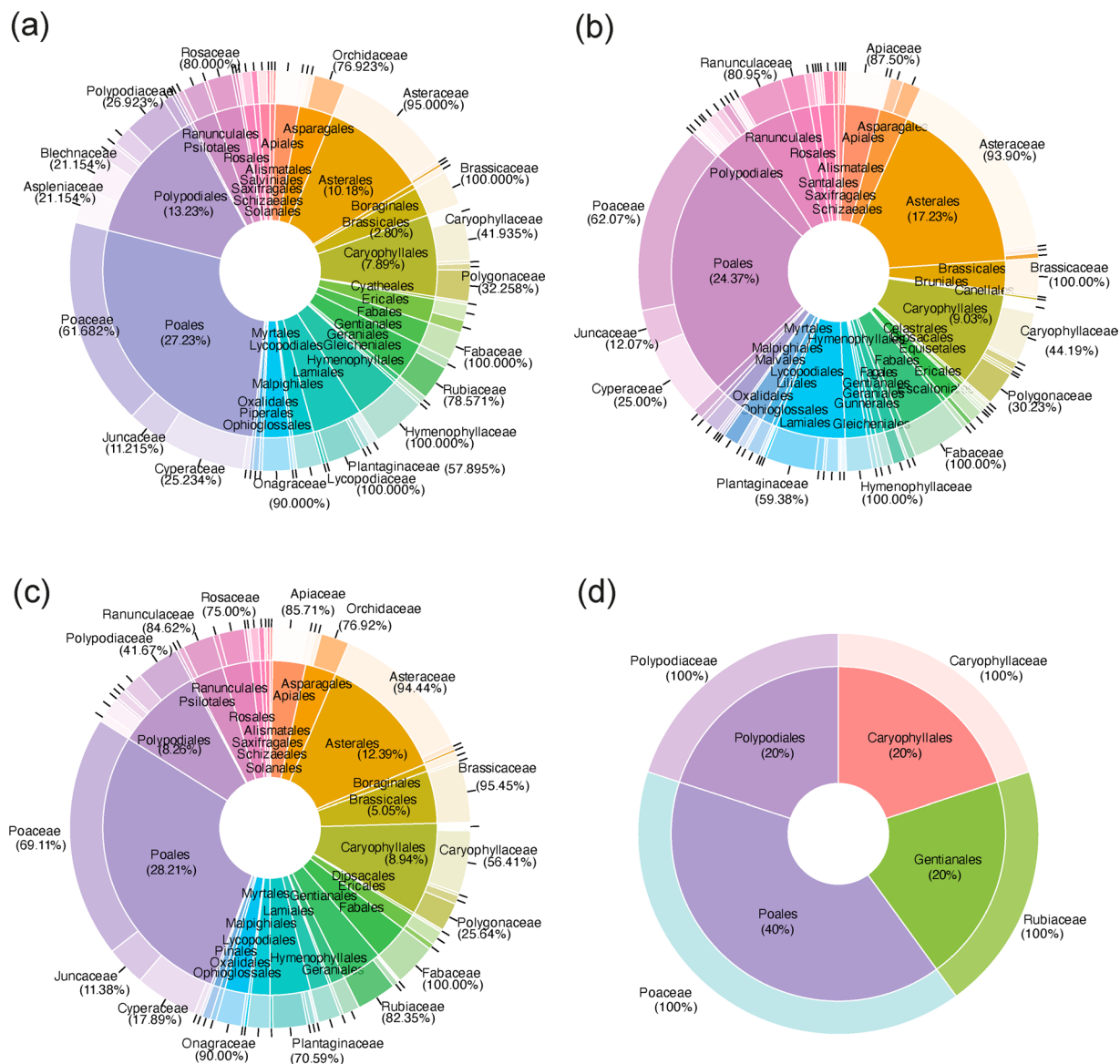


Fig. 3 Plant diversity across regions: The pie-donut charts show plant diversity across different regions, with plant orders represented in the inner pie and families in the outer donut, labeled with species counts. Percentages indicate the relative contribution of orders and families, with small or overlapping values omitted for clarity. **(a)** Subtropical Islands Flora. **(b)** Magellanic sub-Antarctic Islands Flora. **(c)** Sub-Antarctic Islands Flora. **(d)** Maritime Antarctic Islands Flora.

“reviewed_name” and “gbif_name” columns. These discrepancies likely arise from unresolved taxonomic issues within the GBIF taxonomic backbone. For instance, in the case of *Grammitis poeppigiana*, the GBIF Backbone Taxonomy returned “*Notogrammitis parisi*” as the “gbif_name,” providing only the genus name and author due to a “basonym relation derived” issue. This occurs when GBIF infers a relationship to an original name (basonym) through name and authorship comparison, even though this relationship is not explicitly present in the source data. In contrast, our taxonomic revision provides more robust and transparent results by citing all sources used. We encourage users to report any potential errors or concerns to the corresponding author to further improve the dataset.

Data Records

SIVFLORA¹ is provided in a user-friendly spreadsheet format, available for download as a flat spreadsheet file from the Zenodo repository. It is openly accessible, and adheres to the FAIR principles⁴³, ensuring it is findable, accessible, interoperable, and reusable. The dataset is also open for revision by interested parties, promoting collaborative updates and improvements.

The dataset encompasses 22 islands and 62 localities across diverse geographic and climatic zones (Table 1). Dataset fields are organized into seven categories—Record, Location, Taxonomy, Phytogeographic Information,

All Families

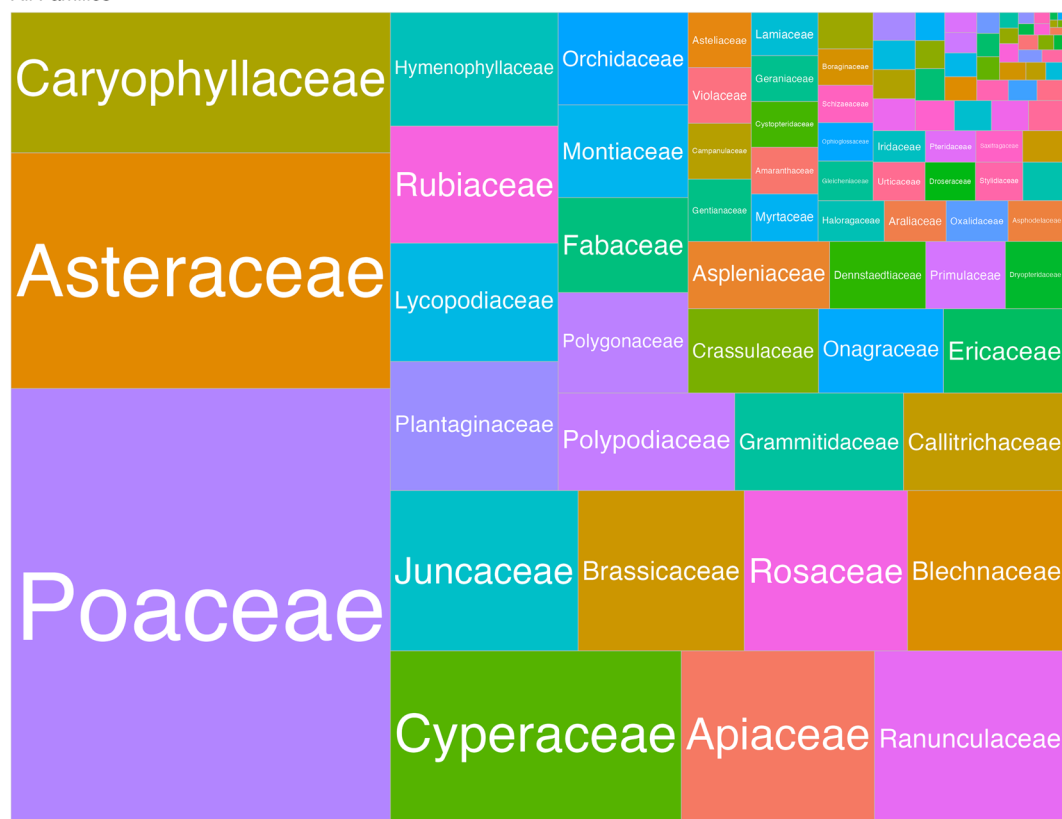


Fig. 4 Treemap of the proportion of plant families, with each rectangle's size proportional to the number of species relative to the total species inhabiting Southern Ocean islands.

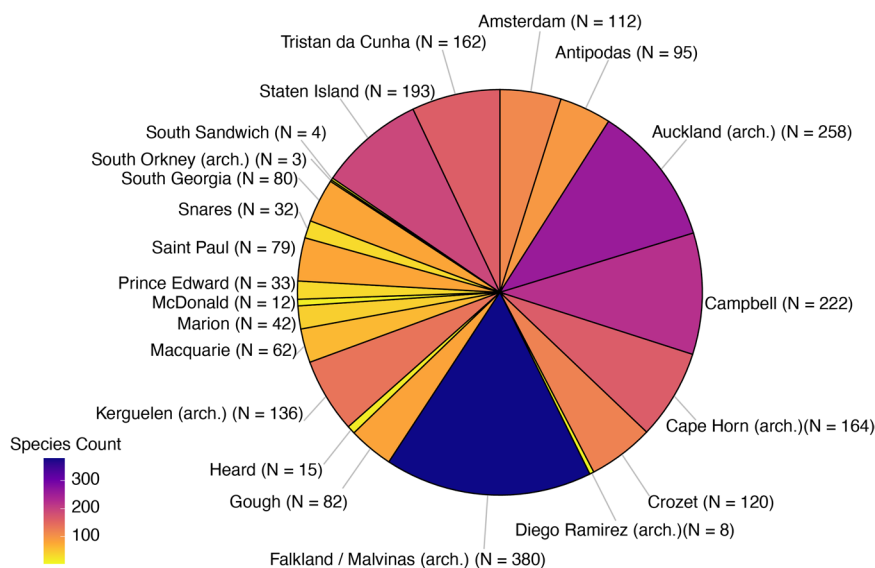


Fig. 5 Taxonomic richness across different Southern Ocean islands. Each slice represents the number of unique species inhabiting each island, with the size of the slice proportional to the species count. The color gradient indicates species richness, with darker shades representing higher species counts.

Collection Information, Determination Information, and GBIF Taxonomy Comparison—ensuring comprehensive data coverage for ecological, taxonomic, and biogeographic analyses (Table 2). Some islands are notable for their small size, such as Diego Ramírez Archipelago, McDonald Island, and Snares Archipelago, all of which are under 3 km². In contrast, large archipelagos like Kerguelen Archipelago (7,215 km²) and the Falkland/Malvinas

Archipelago (more than 12,000 km²) as whole, represent substantial landmasses. Amsterdam Island, Campbell Island, and Crozet Archipelago, are uninhabited, with only non-permanent scientific and conservation personnel allowed. These islands fall under extensive conservation frameworks, such as Antarctic French National Parks or UNESCO World Heritage designations. Also, the Auckland Archipelago and Macquarie Island are part of the New Zealand and Australian sub-Antarctic World Heritage Sites, respectively, and are protected for their rich biodiversity. In contrast, islands like those in the Falklands/Malvinas and Tristan da Cunha Archipelago have small permanent settlements alongside established conservation efforts, including National Nature Reserves and Marine Protected Areas.

SIVFLORA¹ incorporates data from over 300 references, resulting in an initial compilation of 15,393 records. Of these, 795 were discarded due to incomplete taxonomic identification or dubious citations, leaving 14,598 valid records distributed across 42 orders, 95 families, 323 genera, and 886 species and infrageneric ranks. The species composition of the islands reveals a different phylogeographic origin of plant diversity. Native species dominate, comprising 58.62% of the total flora (537 species), highlighting the islands' natural biodiversity. Alien species make up 31.77% (291 species), reflecting the significant impact of introduced species on these ecosystems. Endemic species, unique to specific islands, represent 9.61% (88 species), underscoring the islands' role as centers of endemism.

The most diverse families in SIVFLORA¹ are Poaceae (138 taxa, 15.49%; Fig. 3, Fig. 4), Asteraceae (117 taxa, 13.13%), and Cyperaceae (60 taxa, 6.73%), followed by Caryophyllaceae, Brassicaceae (31 taxa each, 3.48%), and Fabaceae (29 taxa, 3.25%). Other rich families include Plantaginaceae (27 taxa, 3.03%), Juncaceae and Hymenophyllaceae (26 taxa each, 2.92%) and Apiaceae, Ranunculaceae with 24 taxa each 2.69%). A notable record in SIVFLORA¹ is the diversity of orchids (22 taxa), particularly in the Auckland Archipelago, which hosts nine distinct species. The genus *Corybas* is the most represented in the dataset, with six species across islands such as the Antipodes Archipelago, Auckland Archipelago, Campbell Island, and Macquarie Island. The genus *Gavilea* also shows significant diversity, with five species present in the Falkland/Malvinas Archipelago and Staten Island. Additionally, *Codonorchis lessonii* has a broad distribution, occurring on Staten Island, the Cape Horn Archipelago and the Falkland/Malvinas Archipelago. In terms of distribution breadth, *Callitriche antarctica* and *Poa annua* are the most widely distributed, each found on 18 islands (81.82% of the islands included in the dataset), *Austroblechnum penna-marina* and *Stellaria media* occur on 17 islands, while *Crassula moschata* and *Ranunculus biternatus* are found on 14 islands, demonstrating their prevalence in sub-Antarctic environments. Additionally, *Acaena magellanica*, *Montia fontana*, and *Poa pratensis* each occupy 13 islands, illustrating their persistence across multiple island ecosystems.

SIVFLORA¹ documents the highest taxonomic richness in the Falkland/Malvinas Archipelago, which includes 380 species spanning 67 families (Fig. 5). The Auckland Archipelago follows, with 258 species and 51 families, while Campbell Island features slightly fewer taxa, with 222 species across 48 families. Staten Island and the Cape Horn Archipelago exhibit comparable family diversity (54 and 49 families, respectively) but differ in species richness, with Staten Island hosting 193 species and the Cape Horn Archipelago containing 164 species. Islands such as Tristan da Cunha Archipelago, the Kerguelen Archipelago, and the Crozet Archipelago, display moderate levels of diversity, with species counts ranging from 162 to 120 and family numbers from 40 to 31. In contrast, Amsterdam Island and the Antipodes Archipelago, the most geographically isolated islands, are characterized by lower diversity, with 112 and 95 species, respectively, and smaller family representation (31 and 29 families). The dataset also highlights the islands with the lowest taxonomic richness. The South Sandwich Archipelago are represented by only 4 species distributed across 3 families (Poaceae, Polypodiaceae, and Rubiaceae), while the South Orkney Archipelago is documented with just 3 species from 2 families (Poaceae and Caryophyllaceae).

Technical Validation

SIVFLORA¹ was developed through rigorous validation to ensure scientific accuracy and comprehensive coverage of Southern Ocean island floras. Each record is sourced from peer-reviewed literature, specialized taxonomic references, and curated botanical collections. Data harmonization processes were applied to standardize nomenclature, taxonomy, correct errors, consolidate synonyms, and remove duplicate records. Accepted and verbatim names are included to support ongoing validation and integration.

Usage Notes

SIVFLORA¹ is organized to ensure its usability and integration into diverse research efforts, with data fields structured to provide comprehensive and accessible information. The dataset includes multiple data types grouped into key categories to enhance its functionality and support a wide range of applications. The "Record" category includes unique identifiers for each taxonomic record, detailed bibliographic citations, publication types, and references to related resources, enabling traceability and compatibility with other datasets. It also includes GBIF-specific information, such as download DOIs and identifiers, to facilitate integration with global biodiversity databases. "Location information" captures geographic and administrative details, including latitude, longitude, country, and regional climate zones, which are essential for spatial and environmental analyses. Attributes such as island names, surface areas, and verbatim geographic data are included to ensure precise location references. The "Taxonomy" category provides detailed classifications at multiple hierarchical levels, from family to subspecies, including authorship and synonyms. This section incorporates reviewed names and references, ensuring taxonomic accuracy and consistency across the dataset. "Phytogeography information" category documents the life forms, plant habits, and establishment means for species, distinguishing between native, endemic, introduced, and cosmopolitan species. Additional fields capture the degree of establishment and historical use, providing context for species' ecological and cultural significance. "Collection information" category encompasses details about collection events, including collectors' names, collection dates, herbarium

material references, and institutional codes. It also includes type statuses and associated media, offering valuable insights for specimen-based studies. “Determination information” category records expert identifications and annotations, along with details of additional studies conducted on specimens. Lastly, the “GBIF taxonomy comparison” comparison provides a harmonization layer by matching dataset records with the GBIF Backbone Taxonomy. It includes taxonomic ranks, match confidence, synonyms, and classifications across multiple hierarchical levels, promoting interoperability and validation.

All species occurrence data were sourced from refs. ^{1,2,18,22,23,26–342}.

Code availability

The data presented in this manuscript was generated without custom code.

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Author contributions

P.C.G. and P.M. designed the study. P.C.G., P.M. compiled the data. P.C.G., P.M., and C.M. conducted the analyses. P.C.G., P.M., T.C., A.D., J.O., C.E. and C.M. reviewed the data. P.C.G. wrote the manuscript, with all authors contributing to its review.

Competing interests

The authors declare no competing interests.

Additional information

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