Supporting Information 1. Additional information on origin and properties of the analysed nested-plot series.

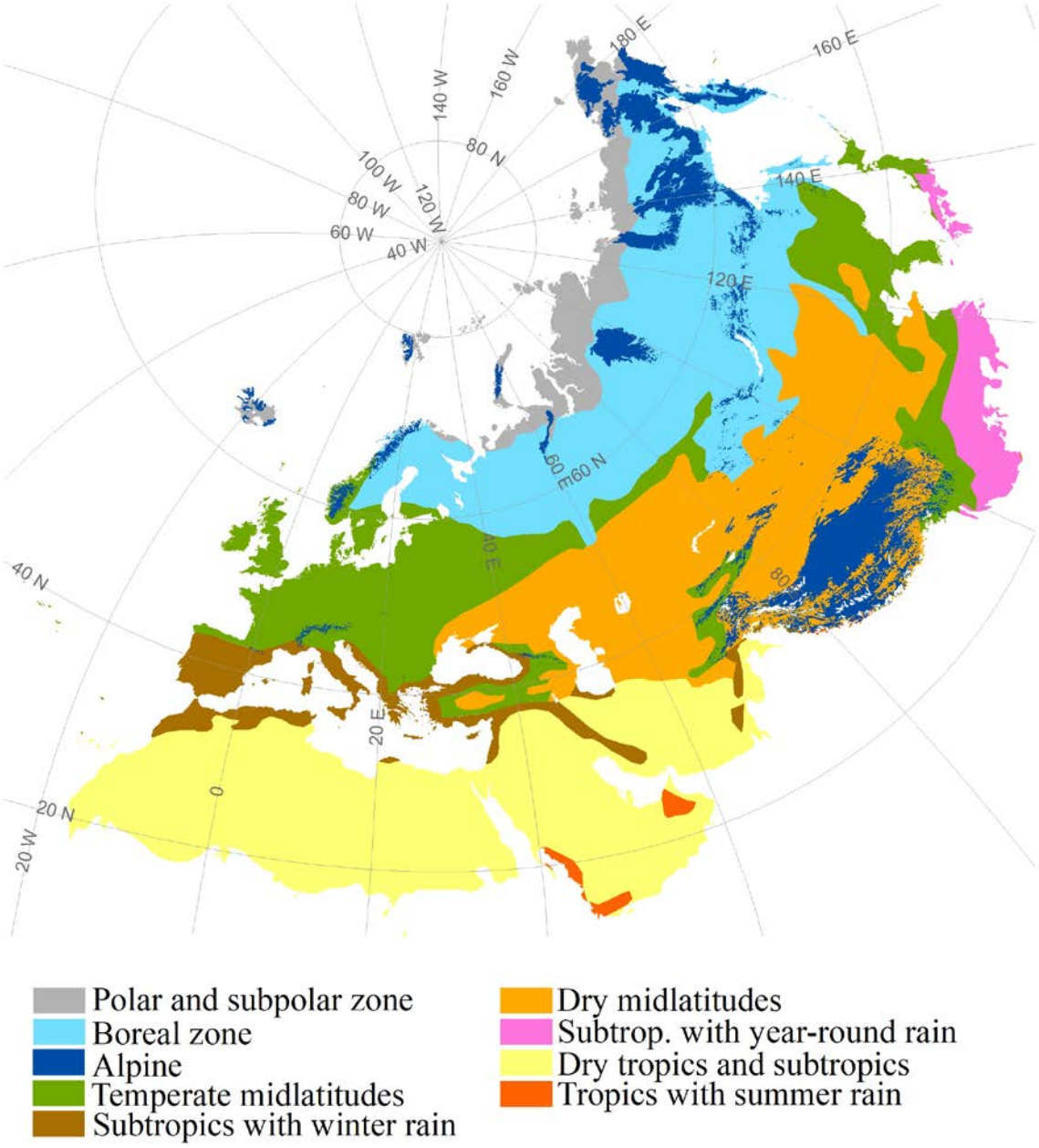

Figure S1.1. Map that shows the delimitation of the Palaearctic biogeographic realm (Olson et al., 2001) and the distribution of the nine biomes within it (only the 10th biome, the Tropics with year-round rain, is not present in the realm). We have modified the biome classification provided in Bruelheide et al. (2019), which is based on the nine ecozones of Schultz (2005) plus an additional alpine biome based on Körner et al. (2017). Note that the biomes "Polar and subpolar zone", "Subtropics with year-round rain" and "Tropics with

summer rain" are not represented in the study as GrassPlot currently does not contain nested-plot series from these meeting our requirements.

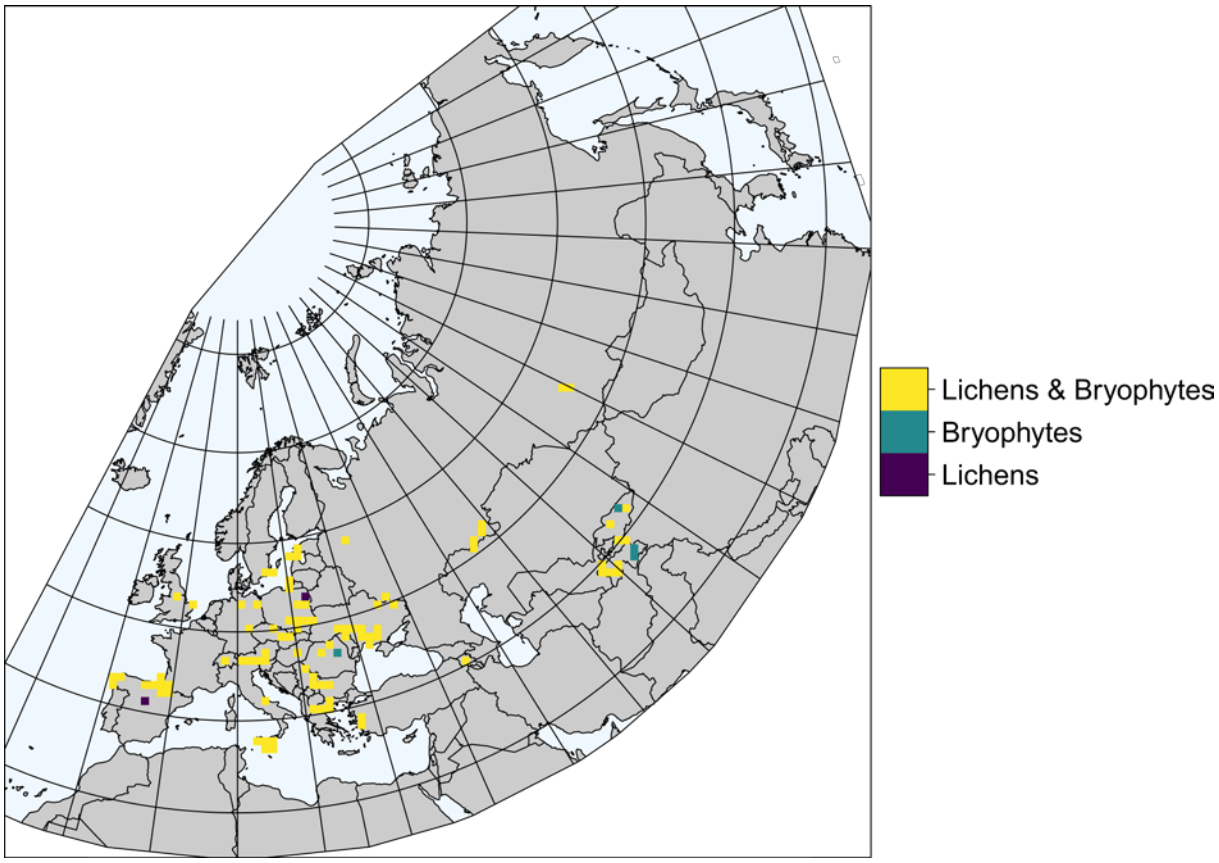

Figure S1.2. Spatial distribution of 10,000-km² grid cells that contain nested-plot series with information on bryophyte and lichen richness. Bryophyte and lichen richness was available for 757 and 780 nested-plot series, respectively. The map uses the Europe Lambert Conformal Conic projection.

Table S1.1. Proportion of the nested-plot series regarding taxonomic groups, methodological variables, and number of grain sizes.

Taxonomic group				
	Vascular plants	Bryophytes	Lichens	All terricolous taxa
Frequency	2057	757	780	733

Methodological settings			
	Shoot	Rooted	NA
Frequency	1827	177	53
	Averaged	Non-averaged	
Frequency	1890	169	
	Perfect nesting	Non-perfect nesting	
Frequency	916	1141	

Number of grain sizes							
	7	8	9	10	11	13	16
Frequency	1280	595	28	33	31	26	64

Table S1.2. Origin of the nested-plot series with regard to biome and vegetation type.

Ecological parameters			
Biome	Frequency	**Vegetation type**	Frequency
Alpine	97	Alpine grassland	508
Boreal zone	61	Dune	166
Dry midlalitudes	48	Garrigue	2
Dry tropics and subtropics	91	Heathland	28
Subtropics with winter rain	294	Mediterranean grassland	22
Temperate midlatitudes	1466	Mesic grassland	143
		Mesic-xeric grassland	644
		Rock and scree	1
		Rocky grassland	113
		Ruderal community	26
		Saline community	73
		Sandy dry grassland	78
		Semi-desert	13
		Tall-forb community	11
		Thorn cushion community	17
		Wet grassland	19
		Wetland	31
		Xeric grassland	138
		NA	24

Table S1.3. Description of the vegetation types used in GrassPlot.

Vegetation type	Definition (modified from Mucina et al., 2016)	Phytosociological classes (those from Europe according to Mucina et al., 2016)
Alpine grassland	Vegetation belt below the snow line and above the tree-line of temperate and mediterranean mountain ranges; it is characterised by natural grasslands and low scrub vegetation	*Carici rupestris-Kobresietea bellardii; Cleistogenetea squarrosae p.p.; Elyno-Seslerietea p.p.; Festucetea indigestae p.p.; Juncetea trifidi p.p.; Salicetea herbaceae*
Dune	Coastal sandy aerohaline communities; subject to sea-salt spray brought by winds	*Ammophiletea; Helichryso-Crucianelletea maritimae*
Garrigue	Mediterranean scrub formation (tomillar, romeral, garrigue, phrygana, batha) dominated by drought-tolerant shrubs of the genera *Cistus, Coridothymus, Rosmarinus*, etc. For this proposal we restric it to thermo-supramediterranean areas	*Festuco hystricis-Ononidetea striatae p.p.; Ononido-Rosmarinetea*
Heathland	Plant formation dominated by dwarf or low shrubs with fine evergreen sclerophyllous leaves, mainly belonging to the family *Ericaceae*	*Calluno-Ulicetea; Loiseleurio procumbentis-Vaccinietea; Rhododendro hirsuti-Ericetea carneae*
Mediterranean grassland	Typical grassland of the Mediterranean Region, rich in therophytes	*Helianthemetea guttati; Lygeo sparti-Stipetea tenacissimae; Poetea bulbosae; Stipo giganteae-Agrostietea castellanae; Stipo-Trachynietea distachyae*
Mesic grassland	Grasslands dominated by mesic plants, hence plants preferring habitats around the middle of environmental moisture gradient	*Calamagrostietea langsdorfii p.p.; Elyno-Seslerietea p.p.; Juncetea trifidi p.p.; Molinio-Arrhenatheretea p.p.; Nardetea strictae p.p.*
Meso-xeric grassland	Grasslands dominated by mesic and xerophilous plants, hence plants preferring habitats around the middle or at the dry end of environmental moisture gradient	*Cleistogenetea squarrosae p.p.; Festuco-Brometea p.p.*
Rock and scree	Scree communities and chasmophytic vegetation growing in rocky crevices of cliffs and rock faces	*Adiantetea; Asplenietea trichomanis; Didymophyso aucheri-Dracocephaletea aucheri; Polypodietea; Thlaspietea rotundifolii*
Rocky grassland	Tomillar and stony grasslands developed on lithosols (normally limestone), substrate characterised by very shallow and skeletal humus-rich horizon with parent bedrock often	*Elyno-Seslerietea p.p.; Festuco hystricis-Ononidetea striatae p.p.; Festuco-Brometea p.p.; Helianthemo-Thymetea; Sedo-Scleranthetea*

Vegetation type	**Definition (modified from Mucina et al., 2016)**	**Phytosociological classes (those from Europe according to Mucina et al., 2016)**
	protruding to the surface	
Ruderal community	Grasslands and low scrubs in heavily disturbed habitats	*Artemisietea vulgaris; Bidentetea; Chenopodietea; Digitario sanguinalis-Eragrostietea minoris; Epilobietea angustifolii; Papaveretea rhoeadis; Polygono-Poetea annuae; Sisymbrietea*
Saline community	Communities developed on soils or water having high content of soluble salts (e.g. NaCl, MgSO4), making the environment toxic for the majority of common (hence ecologically not specialized) species; these habitats support facultative or obligate halophytes	*Cakiletea maritimae; Crithmo-Staticetea; Festuco-Puccinellietea; Juncetea maritimi; Saginetea maritimae; Salicornietea fruticosae; Spartinetea maritimae; Therosalicornietea*
Sandy dry grassland	Tomillar and grasslands developed on siliceous lithosols, substrate characterised by very shallow and skeletal humus-rich horizon with parent bedrock often originating a sandy soil	*Festucetea indigestae p.p.; Koelerio-Corynephoretea canescentis*
Semi-desert	Open grasslands and scrubs in very dry climates	*Ajanio-Cleistogenetea songoricae; Artemisietea lerchianae; Kleinio-Euphorbietea canariensis*
Tall forb community	Communities dominated by tall herbs growing on naturally productive areas in mountains and stream banks	*Molinio-Arrhenatheretea p.p.; Mulgedio-Aconitetea; Trifolio-Geranietea sanguinei*
Thorn cushion community	Dwarf shrubs and thorn-cushion communities in mountains from Mediterranean and sub-Mediterranean areas, adapted to winter low temperatures	*Astragalo microcephali-Brometea tomentelli; Festuco hystricis-Ononidetea striatae p.p.; Onobrychidetea cornutae; Prangetea ulopterae p.p.; Rumici-Astragaletea siculi*
Wet grassland	Grasslands dominated by hygrophilous plants, hence plants preferring habitats around the wet part of environmental moisture gradient	*Calamagrostietea langsdorfii p.p.; Molinio-Arrhenatheretea p.p.; Nardetea strictae p.p.*
Wetland	Grasslands and helophytic formations on permanently waterlogged and temporarily flooded areas; mires included	*Isoëto-Nanojuncetea; Littorelletea uniflorae; Montio-Cardaminetea; Oxycocco-Sphagnetea; Phragmito-Magnocaricetea; Scheuchzerio palustris-Caricetea fuscae*

Vegetation type	**Definition (modified from Mucina et al., 2016)**	**Phytosociological classes (those from Europe according to Mucina et al., 2016)**
Xeric grassland	Grassland dominated by xerophilous plants, hence preferring habitats on the dry end of the environmental water gradient	*Cleistogenetea squarrosae p.p; Festuco-Brometea p.p.*

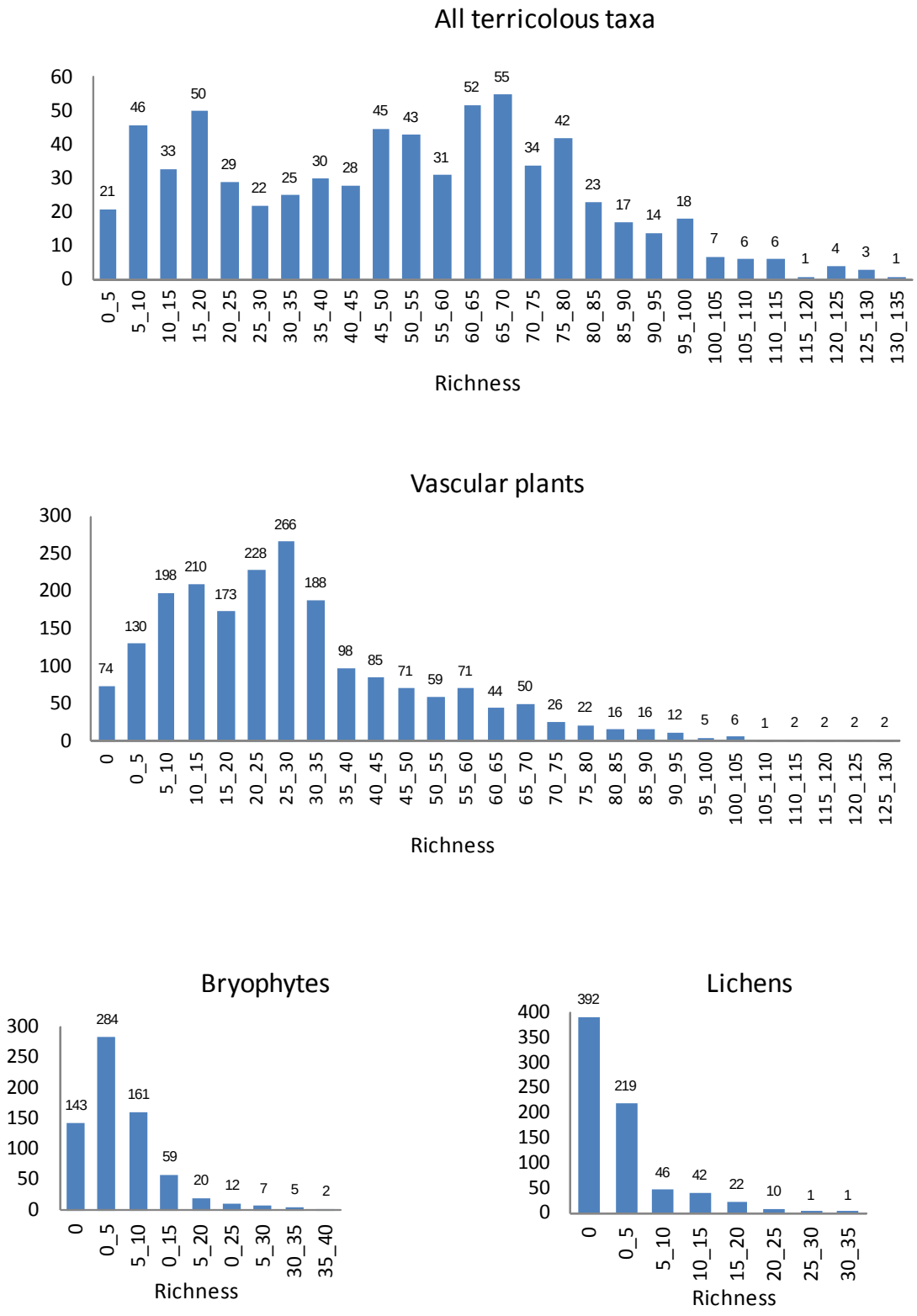

Figure S1.3. Histograms of the richness values found in the biggest plot of a nested-plot series.

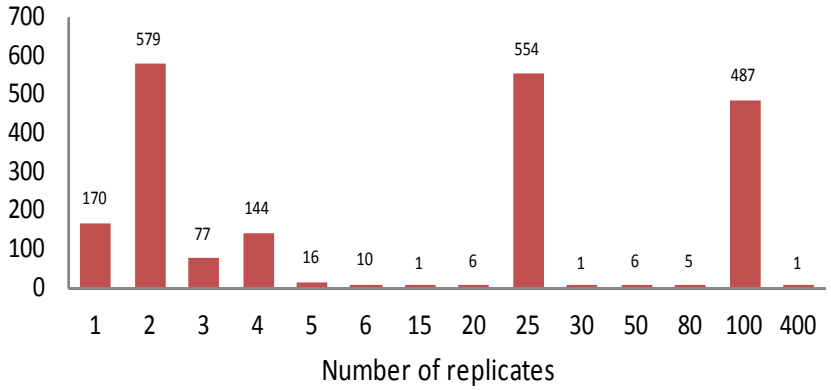

Figure S1.4. Histogram of the number of replicates averaged in the smallest subplots of a nested-plot series.

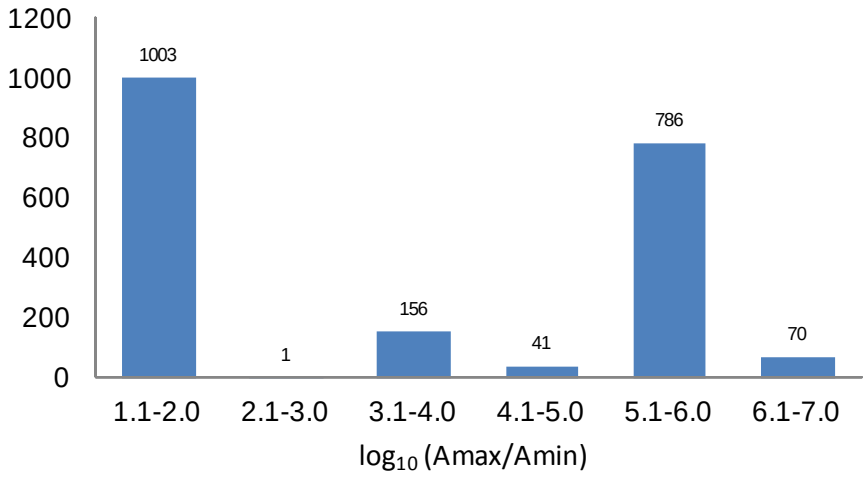

Figure S1.5. Histogram of the grain-size range of the nested-plot series.

Table S1.4. Overview of the 69 datasets retrieved from GrassPlot.

Dataset ID	Short dataset name	Country	Custodian	Nº nested series	Nº plots	Nº grain sizes	Reference(s)
Perfect nesting without replication							
CZ_A	Dengler White Carpathians	Czech Republic	Jürgen Dengler	1	7	7	
HU_D	Török nested series	Hungary	Orsolya Valkó	30	300	10	Godó et al. (2017)
NO_C	Grytnes North Norway	Norway	John-Arvid Grytnes	33	231	7	
NO_D	Grytnes South Norway	Norway	John-Arvid Grytnes	10	70	7	
RU_G	Dolnik Curonian Spit	Russia	Christian Dolnik	64	832	8 or 16	Dolnik (2003, 2006)
RU_M	Dolezal Kamchatka	Russia	Jiri Dolezal	10	80	8	
SE_A	Löbel Öland	Sweden	Swantje Löbel	31	341	11	Löbel (2002); Löbel et al. (2006); Löbel & Dengler (2008)
Perfect nesting with replication at smaller grain sizes							
AM_A	Dembicz Armenia	Armenia	Iwona Dembicz	1	13	7	
AS_A	Arek_Kyrgyzstan & Tajikistan	Tajikistan and Kyrgyzstan	Arkadiusz Nowak	12	156	7	
AT_E	EDGG Austria	Austria	EDGG	15	195	7	
CH_C	Dengler Wädenswil	Switzerland	Jürgen Dengler	17	221	7	Dengler & Widmer (2018)
CH_D	Dengler_Ausserberg	Switzerland	Jürgen Dengler	3	39	7	Dengler et al. (2018)

Dataset ID	Short dataset name	Country	Custodian	Nº nested series	Nº plots	Nº grain sizes	Reference(s)
CH_E	Dengler Alp Glivers	Switzerland	Jürgen Dengler	3	39	7	Hepenstrick et al. (2018)
DE_A	Dengler Upper Franconia	Germany	Jürgen Dengler	1	13	7	Hopp & Dengler (2015)
DE_F	Dengler Bayreuth	Germany	Jürgen Dengler	18	234	7	Dengler (2016)
DE_H	Langer Bayreuth	Germany	Nancy Langer	22	286	7	Langer (2016); Went (2016)
DE_K	Allers Lüneburg	Germany	Marc-André Allers	2	50	7	Dengler & Allers (2006); Allers (2007)
DE_L	Dengler Uckermark	Germany	Jürgen Dengler	23	299	7	Langer et al. (2017)
EE_A	Boch Saaremaa	Estonia	Steffen Boch	16	576	8	Boch (2005); Boch & Dengler (2006); Dengler & Boch (2008)
ES_A	EDGG Navarre	Spain	EDGG	35	455	7	Biurrun et al. (2014)
EU_F	Torca Bay of Biscay dunes	France, Spain	Marta Torca	139	3197	7	Torca et al. (2019a, 2019b)
EU_J	Janišová Carpathians	Romania, Slovakia	Monika Janišová	17	204	7	
GR_A	EDGG Greece	Greece	EDGG	14	182	7	Dengler & Demina (2012)
HU_B	Bartha Hungary sandy grasslands	Hungary	Sándor Bartha	5	1180	7	Bartha (2016)
IR_A	Naqinezhad Central Alborz	Iran	Alireza Naqinezhad	27	459	9	Talebi (2017)
IT_A	EDGG Sicily	Italy	EDGG	21	273	7	Guarino et al. (2012)
IT_C	Baumann Gran Paradiso	Italy	Esther Baumann	14	182	7	Baumann et al. (2016)
IT_D	Dengler Aosta	Italy	Jürgen Dengler	2	26	7	Wiesner et al. (2015)

Dataset ID	Short dataset name	Country	Custodian	Nº nested series	Nº plots	Nº grain sizes	Reference(s)
IT_H	Chiarucci Parco della Chiusa	Italy	Alessandro Chiarucci	6	78	7	Suanno (2017)
IT_I	Chiarucci Radicondoli	Italy	Alessandro Chiarucci	3	111	10	Chiarucci et al. (2006)
IT_L	EDGG Apennines	Italy	EDGG	20	260	7	
IT_Q	EGC Sulmona	Italy	Giampiero Ciaschetti	1	13	7	Dengler (2018)
PL_A	EDGG Poland	Poland	EDGG	31	403	7	
PL_D	Pielech nested	Poland	Remigiusz Pielech	10	130	7	
PL_E	Kozub Biebrza	Poland	Łukasz Kozub	15	195	7	
RO_A	EDGG Transylvania	Romania	EDGG	20	260	7	Dengler et al. (2009, 2012); Turtureanu et al. (2014)
RO_B	Mardari Moldavian Plateau	Romania	Constantin Mardari	45	585	7	Mardari & Tănase (2016)
RS_A	EDGG Serbia	Serbia	EDGG	32	416	7	Krstivojević Ćuk et al. (2015); Aćić et al. (2017)
RU_A	EDGG Khakassia	Russia	EDGG	39	507	7	Janišová et al. (2013); Polyakova et al. (2016)
RU_I	Belonovskaya Novgorodskaya	Russia	Elena Belonovskaya	4	46	7	Belonovksaya & Tsarevskaya (2017)
RU_K	Mirin Belogorie	Russia	Denis Mirin	2	26	7	
RU_L	Dolnik South Ural	Russia	Christian Dolnik	7	91	7	

Dataset ID	Short dataset name	Country	Custodian	Nº nested series	Nº plots	Nº grain sizes	Reference(s)
TJ_A	Arek_Tajikistan	Tajikistan	Arkadiusz Nowak	15	195	7	
TR_B	Güler Buca İzmir	Turkey	Behlül Güler	3	39	7	
UA_A	EDGG Podolia	Ukraine	EDGG	21	273	7	Kuzemko et al. (2014, 2016)
UA_D	Janišová Chywchyny Mts.	Ukraine	Monika Janišová	5	65	7	Janišová et al. (2016)
UA_H	Kuzemko Byzky Gard	Ukraine	Anna Kuzemko	2	26	7	
UA_I	Kuzemko Kreida	Ukraine	Anna Kuzemko	8	104	7	
UA_J	Vynokurov Southern Ukraine	Ukraine	Denys Vynokurov	11	143	7	
UA_K	Savchenko Kharkiv & Donetsk	Ukraine	Galina Savchenko	11	143	7	
UA_L	Dembicz nested Ukraine	Ukraine	Iwona Dembicz	12	156	7	
UK_A	Archibold Great Britain	United Kingdom	Idoia Biurrun	6	48	8	Archibald (1949)
Non-perfect nesting							
BG_A	EDGG Bulgaria	Bulgaria	EDGG	15	209	8	Pedashenko et al. (2013)
AT_C	GLORIA Hochswab	Austria	Harald Pauli	59	11505	8	Gottfried et al. (2012); Pauli et al. (2012); Winkler et al. (2016)
CN_C	Zhang Tibet	China	Hui Zhang	1	798	9	Zhang (2013)
DE_B	Dengler BR Schorfheide-Chorin	Germany	Jürgen Dengler	10	750	8	Dengler et al. (2004)

Dataset ID	Short dataset name	Country	Custodian	Nº nested series	Nº plots	Nº grain sizes	Reference(s)
DE_G	Kiehl Hamburger Hallig salt marshes	Germany	Kathrin Kiehl	47	376	8	Wanner et al. (2014)
ES_J	GLORIA Ordesa	Spain	José Luis Benito	64	12480	8	Gottfried et al. (2012); Pauli et al. (2012); Winkler et al. (2016)
ES_M	GLORIA Sistema Central	Spain	Rosario Gavilán	32	6240	8	Gottfried et al. (2012); Pauli et al. (2012); Winkler et al. (2016)
ES_N	GLORIA Sierra Nevada East	Spain	María Rosa Fernández	64	12480	8	Gottfried et al. (2012); Pauli et al. (2012); Winkler et al. (2016)
ES_O	GLORIA Sierra Nevada North	Spain	María Rosa Fernández	64	12480	8	Gottfried et al. (2012); Pauli et al. (2012); Winkler et al. (2016)
ES_P	Alfaro Picos de Europa	Spain	Borja Jiménez-Alfaro	16	3120	8	Jímenez-Alfaro et al. (2010)
EU_C	Hajek spring fen nested series	Czech Republic, Poland, Slovakia	Eva Hettenbergerová	30	390	7	Hájková & Hájek (2003); Náhlíková (2009)
IR_C	GLORIA Alborz	Iran	Jalil Noroozi	64	12480	8	Gottfried et al. (2012); Pauli et al. (2012); Winkler et al. (2016)
IT_O	GLORIA Dolomites	Italy	Brigitta Erschbamer	60	11700	8	Erschbamer et al. (2011); Gottfried et al. (2012); Pauli et al. (2012); Winkler et al. (2016)
NO_B	GLORIA Norway	Norway	Pieter De Frenne	64	12480	8	Gottfried et al. (2012); Pauli et al. (2012); Winkler et al. (2016); Vanneste et al. (2017)

Dataset ID	Short dataset name	Country	Custodian	Nº nested series	Nº plots	Nº grain sizes	Reference(s)
SE_C	Peet Öland	Sweden	Robert K. Peet	6	768	7	Sykes et al. (1994); Wilson et al. (1995)
SE_D	Reitalu Öland	Sweden	Triin Reitalu	516	23736	7	Reitalu et al. (2008, 2009, 2010, 2012)
UK_B	Pakeman Outer Hebrides	United Kingdom	Robin Pakeman	30	2820	13	White et al. (2018)
Total				2057	139265		

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