Oikos

OIK-03688

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Appendix 1–5

Appendix 1. Studies and data included in the meta-analysis

Figure A1. Localities of sites included in this study. Size of symbols is proportional to the number of included independent experiments, and colors indicate ecosystem type: Freshwater (blue), Marine (red), and Terrestrial (green).

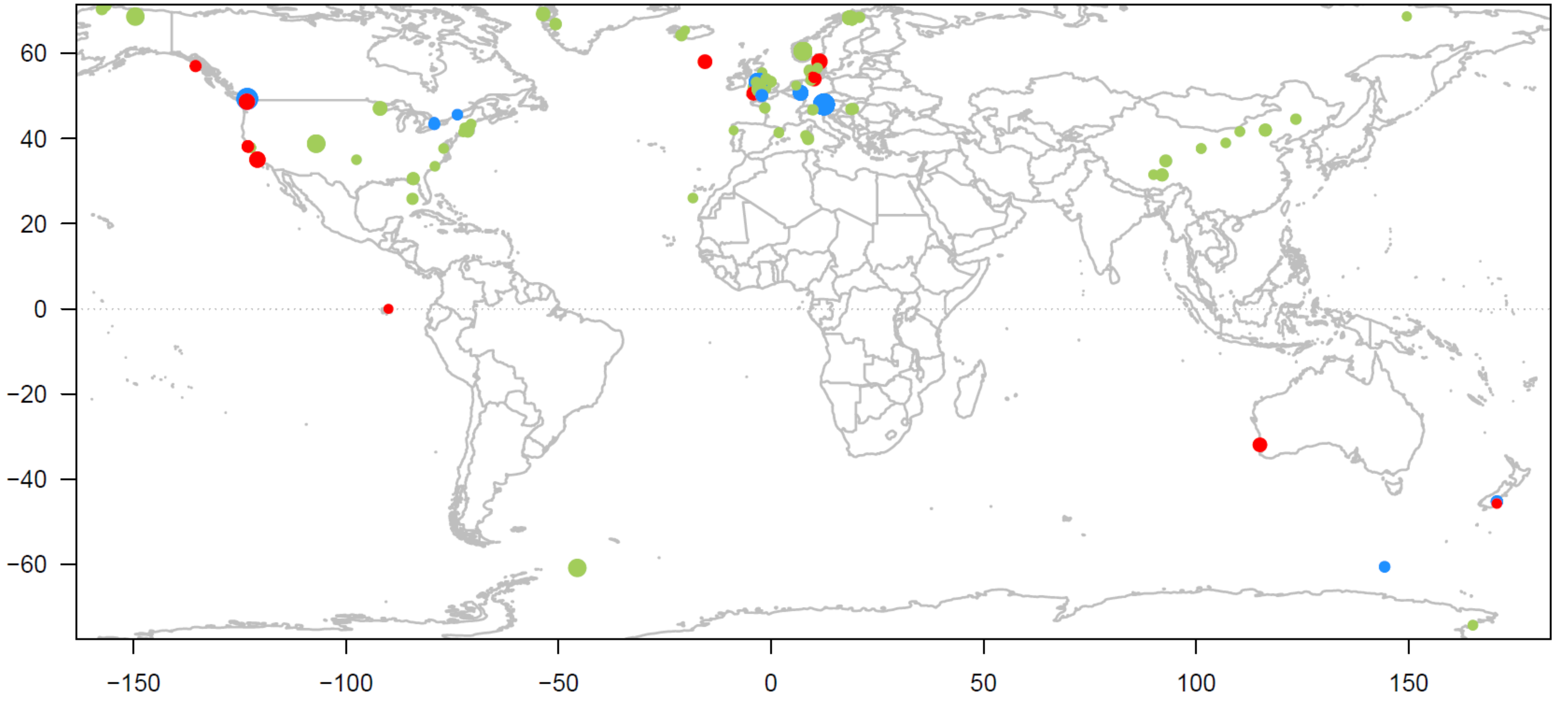

Table A1. Supplementary data

The table comprises the complete data set, with descriptions of field names (underlined) and factor levels where applicable (italics). The source publication is given by author and year, which are listed in full bibliography below. "NA" indicates the study did not provide data and values could not be determined from other sources.

citation: Unique number corresponds to literature citations listed below the table.

study site ID: Unique number for each geographic study location, as mapped globally in Fig. S1.

ecosystem type: Study system classified as *terrestrial*, *freshwater*, or *marine*.

habitat: within ecosystem types, coarsely classified as *pelagic*, *benthic*, or *running* waters in aquatic systems, and *shrubland*, *herbaceous*, *tundra*, or *soil* habitats in terrestrial systems.

biotic type: dominant organismal category characterizing community: *algae* (phytoplankton, periphyton or macroalgae), *aquatic fauna* (primarily invertebrates), *plants*, *cryptogams* (lichens, mosses, fungi), *arthropods*, or *soil fauna*.

study venue: experiments in *field* or *laboratory* settings.

type of manipulation: temperature manipulations were classified in these categories: direct *heating*, *open top chambers*, *greenhouse*, *climate chambers*, or *reflective* covers.

trophic type: classified as primarily *producers* (e.g. plants, algae) or *consumers* (e.g. sessile invertebrates, insects).

openness of experiment: indicator that experiments were *open* or *closed* to immigration or emigration of individuals or propagules.

experimental temperature change (ΔT) or differential from controls (°C): mean temperature difference between controls and experimental treated units.

mean environmental ambient T (temperature) during the experiment (°C): ambient environmental temperature was the mean water temperature observed during aquatic experiments, and mean air or soil temperature for the terrestrial experiments.

absolute value of latitude: in decimal degrees, WGS-84.

study relative duration: duration of each study in days, natural log-transformed.

experimental replicate unit area: units of area (m^2), natural log-transformed.

evenness effect size (Ê): Mean natural log response ratio of temperature manipulations on species evenness, $\ln(E_1/E_0)$.

richness effect size (Ŝ): Mean natural log response ratio of temperature manipulations on species richness, $\ln(S_1/S_0)$.

Table A1. Data included in the meta-analysis

citation	site	system	habitat	biotic type	venue	manipulation	trophic	openness	ΔT	ambient T	latitude	duration	area	Ê	Ŝ
1	79	terrestrial	soil	arthropods	lab	heating	consumer	closed	3	15	51.7	4.61	-2.41	0.1244	NA
1	79	terrestrial	soil	arthropods	lab	heating	consumer	closed	3	15	51.7	4.61	-2.41	0.0684	NA
1	79	terrestrial	soil	arthropods	lab	heating	consumer	closed	3	15	51.7	4.61	-2.41	-0.3488	NA
1	79	terrestrial	soil	arthropods	lab	heating	consumer	closed	3	15	51.7	4.61	-2.41	-0.1244	NA
1	79	terrestrial	soil	arthropods	lab	heating	consumer	closed	3	15	51.7	4.61	-2.41	-0.2191	NA
1	79	terrestrial	soil	arthropods	lab	heating	consumer	closed	3	15	51.7	4.61	-2.41	0.1549	NA
1	79	terrestrial	soil	arthropods	lab	heating	consumer	closed	3	15	51.7	4.61	-2.41	0.0589	NA
1	79	terrestrial	soil	arthropods	lab	heating	consumer	closed	3	15	51.7	4.61	-2.41	-0.0562	NA
1	79	terrestrial	soil	arthropods	lab	heating	consumer	closed	3	15	51.7	4.61	-2.41	0.0941	NA
2	38	terrestrial	herbac.	plants	field	ot chambers	producer	open	2.25	-2.25	68.35	7.69	0	0.0996	-0.2854
2	38	terrestrial	herbac.	plants	field	ot chambers	producer	open	2.25	-2.25	68.35	7.69	0	-0.2049	-0.1818
3	39	terrestrial	herbac.	plants	lab	heating	producer	closed	2.8	18.1	53.7	4.94	-2.21	NA	-0.2184
3	40	terrestrial	herbac.	plants	lab	heating	producer	closed	2.8	18.1	47.2	4.94	-2.21	NA	-0.1967
3	41	terrestrial	herbac.	plants	lab	heating	producer	closed	2.8	18.1	41.9	4.94	-2.21	NA	0.05
3	42	terrestrial	herbac.	plants	lab	heating	producer	closed	2.8	18.1	41.4	4.94	-2.21	NA	-0.3405
3	43	terrestrial	herbac.	plants	lab	heating	producer	closed	2.8	18.1	37.6	4.94	-2.21	NA	-0.1523
3	44	terrestrial	herbac.	plants	lab	heating	producer	closed	2.8	18.1	33.5	4.94	-2.21	NA	-0.1054
4	24	freshwater	running	cryptogam	field	heating	consumer	open	5.2	9.5	43.75	6.11	1.1	NA	-0.2963
5	6	terrestrial	herbac.	cryptogam	field	heating	producer	open	3	8	53.33	7.91	2.2	0.1048	-0.1054

5	6	terrestrial	herbac.	cryptogam	field	heating	producer	open	3	8	53.33	7.91	2.2	0.0017	-0.0883
5	6	terrestrial	herbac.	cryptogam	field	heating	producer	open	3	8	53.33	7.91	2.2	-0.3336	-0.107
6	45	terrestrial	herbac.	arthropods	field	heating	consumer	open	1.4	15.4	53.82	4.79	1.39	-0.0953	-0.1013
6	45	terrestrial	herbac.	arthropods	field	heating	consumer	open	1.4	15.4	53.82	4.79	1.39	-0.1951	0.0597
7	17	terrestrial	soil	soil fauna	field	heating	consumer	closed	4.76	9.74	69.25	2.08	-1.61	0.2719	0.0694
8	11	freshwater	pelagic	algae	lab	clim chamber	producer	closed	2	19	50.91	4.14	-5.29	-0.3514	-0.1083
9	77	terrestrial	soil	soil fauna	lab	heating	consumer	closed	3.5	9.9	55.5	6.59	-2.07	0.2719	NA
9	77	terrestrial	soil	soil fauna	lab	heating	consumer	closed	3.5	9.9	55.5	6.59	-2.07	-0.1542	NA
10	11	freshwater	pelagic	algae	lab	clim chamber	producer	closed	3	12	50.91	6.21	-5.29	-0.1178	-0.0922
10	11	freshwater	pelagic	algae	lab	clim chamber	producer	closed	3	12	50.91	6.21	-5.29	-0.4238	-0.261
10	11	freshwater	pelagic	algae	lab	clim chamber	producer	closed	3	12	50.91	6.21	-5.29	0.1719	0.1785
10	11	freshwater	pelagic	algae	lab	clim chamber	producer	closed	3	12	50.91	6.21	-5.29	0.0548	0.1227
11	29	terrestrial	tundra	plants	field	greenhouse	producer	open	3.5	11.2	68.63	8.1	4.61	-0.7589	-0.6931
11	29	terrestrial	tundra	plants	field	greenhouse	producer	open	3.5	11.2	68.63	8.1	4.61	-0.1593	-0.3102
12	46	terrestrial	shrubland	cryptogam	field	heating	producer	open	0.9	10.5	46.77	6.59	0.1	NA	-0.4648
13	26	terrestrial	herbac.	plants	field	heating	producer	open	3	11.9	38.88	7.51	3.4	-0.04	0
13	26	terrestrial	herbac.	plants	field	heating	producer	open	3	11	38.88	7.69	3.4	-0.0395	0
14	29	terrestrial	soil	cryptogam	field	greenhouse	consumer	open	2.09	10.5	68.63	8.84	2.53	NA	0.3903
15	47	freshwater	benthic	aquatic fauna	lab	heating	consumer	closed	4.8	17.5	50.18	5.97	0.69	-0.0157	-0.0183
16	34	marine	benthic	aquatic fauna	lab	heating	consumer	closed	3.4	18.7	58.23	3.53	-2.2	0.1591	0.1694
16	34	marine	benthic	aquatic fauna	lab	heating	consumer	closed	3.4	18.7	58.23	3.53	-2.2	0.1793	0.0634
16	34	marine	benthic	aquatic fauna	lab	heating	consumer	closed	3.4	18.7	58.23	3.53	-2.2	-0.0531	0.3036
17	23	terrestrial	herbac.	plants	field	ot chambers	producer	closed	2.6	15.9	25.9	7	1.84	NA	-0.1103
18	30	terrestrial	shrubland	plants	field	heating	producer	open	5	8.5	42.5	6.59	3.22	NA	-0.1957
19	14	freshwater	benthic	plants	field	heating	producer	open	4	12.5	53.27	6.03	1.14	0.1542	-0.0572
20	71	terrestrial	herbac.	plants	field	ot chambers	producer	open	1.5	22.6	41.63	6.75	-1.39	-0.4495	-0.1487
20	72	terrestrial	herbac.	plants	field	ot chambers	producer	open	1.9	19.1	43.34	6.75	-1.39	-0.891	-0.3956

20	73	terrestrial	herbac.	plants	field	ot chambers	producer	open	0.6	19.8	43.33	4.81	-1.39	-0.0408	-0.1678
21	48	terrestrial	herbac.	plants	field	ot chambers	producer	open	2.5	20	30.65	5.9	1.39	NA	0.1278
21	48	terrestrial	herbac.	plants	field	ot chambers	producer	open	2.5	20	30.65	5.9	1.39	NA	-0.11
22	18	terrestrial	tundra	plants	field	ot chambers	producer	open	4	8.9	68.63	7	5.7	0.036	0
22	18	terrestrial	tundra	plants	field	ot chambers	producer	open	4	8.9	68.63	7	5.7	-0.2127	0
23	33	marine	benthic	aquatic fauna	lab	heating	consumer	closed	4.26	11.78	50.5	4.09	-3.43	-0.1744	0.2829
24	37	marine	benthic	aquatic fauna	field	heating	consumer	open	1.45	25	0	4.32	-6.44	0.179	-0.1701
24	37	marine	benthic	aquatic fauna	field	heating	consumer	open	1.45	25	0	4.32	-6.44	-0.1252	-0.5614
25	26	terrestrial	soil	soil fauna	field	heating	consumer	closed	1.4	13.7	38.88	6.59	-4.85	-0.0007	-0.087
25	26	terrestrial	soil	soil fauna	field	heating	consumer	closed	1.4	13.7	38.88	6.59	-4.85	0.0764	0
25	26	terrestrial	soil	soil fauna	field	heating	consumer	open	0	12.8	38.88	6.59	2.3	-0.1042	0.1542
25	26	terrestrial	soil	soil fauna	field	heating	consumer	open	1.4	13.7	38.88	6.59	2.3	-0.0733	-0.5108
26	10	marine	benthic	algae	lab	clim chamber	producer	closed	5	14	54.2	3.33	-5.99	-0.0015	-0.4925
26	10	marine	benthic	algae	lab	clim chamber	producer	closed	5	14	54.2	3.33	-5.99	0.1228	-0.0488
26	10	marine	benthic	algae	lab	clim chamber	producer	closed	5	14	54.2	3.33	-5.99	-0.2067	-0.3483
27	49	terrestrial	herbac.	plants	field	heating	producer	open	4	22	42.38	6.63	1.39	-0.1059	-0.027
27	49	terrestrial	herbac.	plants	field	heating	producer	open	4	22	42.38	6.63	1.39	-0.2569	-0.6939
27	49	terrestrial	herbac.	plants	field	heating	producer	open	4	22	42.38	6.63	1.39	0.2758	0.0637
28	24	freshwater	running	arthropods	field	heating	consumer	open	2.2	10.8	43.75	6.59	1.61	NA	0.0072
29	2	terrestrial	tundra	plants	field	ot chambers	producer	open	1.4	4.2	70.48	7.69	-0.47	-0.0124	0.0351
29	2	terrestrial	tundra	plants	field	ot chambers	producer	open	1.4	4.2	70.48	7.69	-0.47	0.0634	0.1054
29	3	terrestrial	tundra	plants	field	ot chambers	producer	open	1.4	4.2	71.3	7.69	-0.47	0.0402	-0.1178
29	3	terrestrial	tundra	plants	field	ot chambers	producer	open	1.4	4.2	71.3	7.69	-0.47	-0.0084	0.1506
30	50	terrestrial	herbac.	plants	field	heating	producer	open	2.84	21.4	41.63	6.59	1.39	0.0184	-0.0354
30	50	terrestrial	herbac.	plants	field	heating	producer	open	2.84	21.4	41.63	6.59	1.39	-0.0136	-0.0422
30	50	terrestrial	herbac.	plants	field	heating	producer	open	2.84	21.4	41.63	6.59	1.39	-0.0139	-0.0353
31	31	terrestrial	tundra	cryptogam	field	ot chambers	producer	open	2.25	-2.24	68.35	7.29	0	NA	0.2077
31	31	terrestrial	tundra	cryptogam	field	ot chambers	producer	open	2.25	-2.24	68.35	7.29	0	NA	-0.1653

31	31	terrestrial	tundra	cryptogam	field	ot chambers	producer	open	2.25	-2.24	68.35	7.29	0	NA	-0.0634
32	4	terrestrial	tundra	plants	field	ot chambers	producer	open	1.5	3.7	64.28	7.08	0.41	0.0541	-0.1503
32	5	terrestrial	tundra	plants	field	ot chambers	producer	open	1.5	0.3	65.27	7.08	0.41	0.08	0.0572
33	28	terrestrial	herbac.	cryptogam	field	greenhouse	producer	open	0.57	-2.05	60.72	7.29	-1.77	-0.7474	0.5705
34	8	terrestrial	herbac.	plants	field	ot chambers	producer	open	1.5	9.8	60	7.03	0	0.0285	-0.0542
34	8	terrestrial	herbac.	plants	field	ot chambers	producer	open	1.5	9.8	60	7.03	0	-0.0512	-0.4326
35	7	terrestrial	tundra	plants	field	ot chambers	producer	open	1.3	-1.6	37.62	6.59	0.41	NA	-0.3003
35	7	terrestrial	tundra	plants	field	ot chambers	producer	open	1.3	-1.6	37.62	6.59	0.41	NA	-0.0182
36	35	marine	benthic	aquatic fauna	field	heating	consumer	open	1.5	18	48.75	5.9	-5.3	NA	0.2533
36	35	marine	benthic	aquatic fauna	field	heating	consumer	open	2.9	26.4	48.75	5.9	-5.3	NA	-0.7651
36	35	marine	benthic	aquatic fauna	field	heating	consumer	open	2	21.7	48.75	5.9	-5.3	NA	-0.9441
37	51	freshwater	pelagic	algae	lab	heating	producer	closed	5	25	45.48	4.03	-5.52	-0.0577	-0.0794
37	51	freshwater	pelagic	algae	lab	heating	producer	closed	5	20	45.48	4.03	-5.52	0.2488	-0.1017
37	51	freshwater	pelagic	algae	lab	heating	producer	closed	5	20	45.48	4.03	-5.52	0.4055	-0.116
37	51	freshwater	pelagic	algae	lab	heating	producer	closed	5	25	45.48	4.03	-5.52	-0.0423	-0.0794
38	19	terrestrial	shrubland	plants	field	ot chambers	producer	open	0.77	15.3	41.3	7.29	3	0.07	-0.2616
39	22	terrestrial	soil	arthropods	field	ot chambers	consumer	open	0.3	4	68.35	8.67	1.35	0.0138	-0.1436
40	76	freshwater	pelagic	aquatic fauna	field	heating	consumer	open	3.1	11.1	53.41	6.59	1.14	-0.2231	NA
41	26	terrestrial	soil	arthropods	field	heating	consumer	open	1.4	13.7	38.88	8.9	3.4	NA	-0.1249
42	27	freshwater	pelagic	algae	field	heating	producer	closed	3.1	11.1	53.27	6.58	1.13	NA	-0.0908
42	27	freshwater	pelagic	algae	field	heating	producer	closed	1.6	11.1	53.27	6.58	1.13	NA	-0.007
42	27	freshwater	pelagic	algae	field	heating	producer	closed	1.6	11.1	53.27	6.58	1.13	NA	0.2353
42	27	freshwater	pelagic	algae	field	heating	producer	closed	3.1	11.1	53.27	6.58	1.13	NA	0.1934
42	27	freshwater	pelagic	algae	field	heating	producer	closed	3.1	11.1	53.27	6.58	1.13	NA	-0.0138
42	27	freshwater	pelagic	algae	field	heating	producer	closed	1.6	11.1	53.27	6.58	1.13	NA	-0.0462
42	27	freshwater	pelagic	algae	field	heating	producer	closed	1.6	11.1	53.27	6.58	1.13	NA	-0.0564
42	27	freshwater	pelagic	algae	field	heating	producer	closed	3.1	11.1	53.27	6.58	1.13	NA	0.1001

43	25	freshwater	pelagic	aquatic fauna	lab	heating	consumer	closed	4	4	60.7	2.35	-4.61	-0.5918	0
43	25	freshwater	pelagic	aquatic fauna	lab	heating	consumer	closed	4	4	60.7	2.35	-4.61	-0.3042	0.2007
43	25	freshwater	pelagic	aquatic fauna	lab	heating	consumer	closed	4	4	60.7	2.35	-4.61	-0.3039	0.1335
44	11	freshwater	running	aquatic fauna	lab	heating	consumer	open	3	11.1	50.91	5.14	-7.16	0.0811	0.0984
44	11	freshwater	running	aquatic fauna	lab	heating	consumer	open	3	6.7	50.91	3.91	-7.16	0.176	0.023
45	52	terrestrial	tundra	plants	field	ot chambers	producer	open	1.5	6.3	60.6	7.85	-1.02	NA	-0.3199
45	52	terrestrial	tundra	plants	field	ot chambers	producer	open	1.5	6.3	60.6	7.85	-1.02	NA	-0.245
45	52	terrestrial	tundra	plants	field	ot chambers	producer	open	1.5	6.3	60.6	7.85	-1.02	NA	0.0234
45	52	terrestrial	tundra	plants	field	ot chambers	producer	open	1.5	6.3	60.6	7.85	-1.02	NA	-0.126
45	52	terrestrial	tundra	cryptogam	field	ot chambers	producer	open	1.5	6.3	60.6	7.85	-1.02	NA	-0.2567
45	52	terrestrial	tundra	cryptogam	field	ot chambers	producer	open	1.5	6.3	60.6	7.85	-1.02	NA	-1.2182
45	52	terrestrial	tundra	cryptogam	field	ot chambers	producer	open	1.5	6.3	60.6	7.85	-1.02	NA	-0.2326
45	52	terrestrial	tundra	cryptogam	field	ot chambers	producer	open	1.5	6.3	60.6	7.85	-1.02	NA	0.056
45	52	terrestrial	tundra	cryptogam	field	ot chambers	producer	open	1.5	6.3	60.6	7.85	-1.02	NA	-1.3063
45	52	terrestrial	tundra	cryptogam	field	ot chambers	producer	open	1.5	6.3	60.6	7.85	-1.02	NA	-0.1387
45	52	terrestrial	tundra	cryptogam	field	ot chambers	producer	open	1.5	6.3	60.6	7.85	-1.02	NA	-0.2412
46	53	terrestrial	shrubland	arthropods	field	reflective	consumer	open	1.1	12.3	56.38	7.4	3	NA	0.1344
46	54	terrestrial	shrubland	arthropods	field	reflective	consumer	open	1.3	9.5	53.05	7.4	3	NA	-0.0033
46	55	terrestrial	shrubland	arthropods	field	reflective	consumer	open	0.8	10.9	52.4	7.4	3	NA	0
46	56	terrestrial	shrubland	arthropods	field	reflective	consumer	open	0.8	17.8	46.88	6.31	3	NA	-0.6669
46	57	terrestrial	shrubland	arthropods	field	reflective	consumer	open	0.8	19.1	41.3	7.4	3	NA	-0.1903
46	58	terrestrial	shrubland	arthropods	field	reflective	consumer	open	0.9	19.4	40.6	6.31	3	NA	0.1903
47	59	freshwater	running	aquatic fauna	field	heating	consumer	open	6	16.1	45.13	3.04	-3	0.2336	-0.0161
47	59	freshwater	running	aquatic fauna	field	heating	consumer	open	6	16.1	45.13	3.04	-3	0.3028	-0.0541
47	59	freshwater	running	aquatic fauna	field	heating	consumer	open	6	16.1	45.13	3.04	-3	-0.0371	0.1095

47	59	freshwater	running	aquatic fauna	field	heating	consumer	open	6	16.1	45.13	3.04	-3	0.2519	-0.0782
48	15	terrestrial	tundra	plants	field	ot chambers	producer	open	4	11.8	68.35	7.31	0	-0.0575	-0.0274
49	1	terrestrial	herbac.	plants	field	heating	producer	open	1.2	13.4	38.95	7.29	3.4	NA	-0.0388
50	78	terrestrial	shrubland	plants	field	ot chambers	producer	open	2.73	11	68	8.1	0.81	-0.4414	NA
50	78	terrestrial	shrubland	plants	field	ot chambers	producer	open	2.73	11	68	8.1	0.81	0.0029	NA
50	78	terrestrial	shrubland	arthropods	field	ot chambers	consumer	open	2.73	11	68	8.1	0.81	0.0044	NA
50	78	terrestrial	shrubland	arthropods	field	ot chambers	consumer	open	2.73	11	68	8.1	0.81	0.0914	NA
51	13	marine	pelagic	aquatic fauna	field	heating	consumer	closed	4	12	57.96	2.64	-6.32	0.4126	-0.47
51	13	marine	pelagic	aquatic fauna	field	heating	consumer	closed	4	12	57.96	2.64	-6.32	0.47	-0.3365
52	20	terrestrial	soil	soil fauna	field	ot chambers	consumer	open	1.45	7.7	68.33	7.98	0.36	-0.011	0.1157
52	20	terrestrial	soil	soil fauna	field	ot chambers	consumer	open	1.45	7.7	68.33	7.98	0.36	-0.0669	-0.0972
52	20	terrestrial	soil	soil fauna	field	ot chambers	consumer	open	1.55	6.3	68.33	7.98	0.36	0.0072	-0.1411
52	20	terrestrial	soil	soil fauna	field	ot chambers	consumer	open	1.55	6.3	68.33	7.98	0.36	-0.053	-0.0339
53	36	marine	benthic	algae	field	heating	producer	open	3.5	12.25	35.2	8.2	0	0.1355	0.0645
53	36	marine	benthic	algae	field	heating	producer	open	3.5	12.25	35.2	8.2	0	-0.0572	-0.0541
53	36	marine	benthic	aquatic fauna	field	heating	consumer	open	3.5	12.25	35.2	8.2	0	0.1232	0.0465
53	36	marine	benthic	aquatic fauna	field	heating	consumer	open	3.5	12.25	35.2	8.2	0	0.2538	0
54	29	terrestrial	tundra	cryptogam	field	ot chambers	consumer	open	1.5	10.5	68.63	8.79	0	NA	-0.0429
54	29	terrestrial	tundra	cryptogam	field	ot chambers	consumer	open	1.5	10.5	68.63	8.79	0	NA	0.0358
55	60	terrestrial	herbac.	plants	field	heating	producer	open	1.75	16.3	34.98	8.54	1.39	0.0247	-0.0205
56	22	terrestrial	shrubland	arthropods	field	ot chambers	consumer	open	1.8	7.7	68.35	8.3	0.36	0.2061	-0.4925
56	22	terrestrial	shrubland	arthropods	field	ot chambers	consumer	open	1.8	7.7	68.35	8.3	0.36	-0.0213	0.08
57	32	marine	benthic	aquatic fauna	field	heating	consumer	open	2.2	25.5	32	3.09	-3.22	NA	-0.1245
57	32	marine	benthic	aquatic fauna	field	heating	consumer	open	1.8	17	32	3.47	-3.22	NA	0.153
58	74	marine	pelagic	algae	lab	clim chamber	producer	closed	6	2.5	54.33	4.14	0.43	0.1405	0.0455

59	74	marine	pelagic	algae	lab	clim chamber	producer	closed	6	2.5	54.33	4.41	0.43	0.6303	0.069
60	74	marine	pelagic	algae	lab	clim chamber	producer	closed	6	2.5	54.33	4.22	0.43	-0.0275	-0.0225
60	74	marine	pelagic	algae	lab	clim chamber	producer	closed	6	2.5	54.33	4.22	0.43	0.5383	-0.0153
61	68	marine	benthic	aquatic fauna	field	heating	consumer	open	0.33	15.75	57.06	3.04	-1.35	-0.07	-0.0741
61	68	marine	benthic	algae	field	heating	producer	open	0.33	15.75	57.06	3.04	-1.35	-0.1919	-0.3399
62	21	terrestrial	herbac.	plants	field	heating	producer	open	3	7	51.65	5.19	2.2	NA	-0.1097
63	61	marine	pelagic	algae	lab	heating	producer	closed	5	14	45.75	2.64	-0.24	-0.9627	-0.1823
64	12	freshwater	pelagic	aquatic fauna	field	heating	consumer	open	2.5	21.2	49.23	4.43	0	0.1654	0.1542
64	12	freshwater	pelagic	aquatic fauna	field	heating	consumer	open	2.5	21.2	49.23	4.43	0	0.3874	0.2103
64	12	freshwater	pelagic	aquatic fauna	field	heating	consumer	closed	2.5	21.2	49.23	4.43	0	0.0319	0.0211
64	12	freshwater	pelagic	aquatic fauna	field	heating	consumer	closed	2.5	21.2	49.23	4.43	0	0.457	0.1313
65	70	freshwater	running	aquatic fauna	field	heating	consumer	open	4.59	9.05	43.45	5.97	-8.17	NA	-0.3212
66	75	terrestrial	soil	cryptogam	field	greenhouse	consumer	open	5.5	8.5	74.33	7	-1.8	-0.9985	NA
66	75	terrestrial	soil	cryptogam	field	greenhouse	consumer	open	5.5	8.5	74.33	7	-1.8	-0.6779	NA
67	62	terrestrial	tundra	aquatic fauna	field	heating	consumer	open	2.5	8.5	78.47	4.09	-1.61	0	-0.1719
67	62	terrestrial	tundra	aquatic fauna	field	heating	consumer	open	2.5	8.5	78.47	4.09	-1.61	0	0.364
68	69	terrestrial	herbac.	arthropods	field	ot chambers	consumer	open	2.6	15.9	25.9	6.31	1.84	-0.1369	-0.1468
69	16	terrestrial	herbac.	plants	lab	heating	producer	closed	2.4	10.9	47	5.9	0.74	0.0301	0.1054
69	16	terrestrial	herbac.	plants	lab	heating	producer	closed	3.3	12.2	47	5.9	0.74	0.013	0
70	74	marine	pelagic	algae	lab	clim chamber	producer	closed	6	2.5	54.33	3.64	0.43	-0.1915	-0.0206
71	63	terrestrial	herbac.	arthropods	field	ot chambers	consumer	open	0.93	5.5	44.55	6.82	0.53	0.0299	0.091
71	63	terrestrial	herbac.	plants	field	ot chambers	producer	open	0.93	5.5	44.55	6.82	0.53	0.4372	0.0816
72	64	terrestrial	herbac.	plants	field	heating	producer	open	1.1	14.6	42.03	7.4	2.48	-0.0495	-0.1632
72	64	terrestrial	herbac.	plants	field	heating	producer	open	0.9	14.4	42.03	7.4	2.48	0.2048	-0.0842
73	65	terrestrial	herbac.	plants	field	ot chambers	producer	open	4.83	2.04	34.72	7.33	-1.39	-0.2104	-0.1664

74	9	terrestrial	herbac.	plants	field	heating	producer	open	1	11.1	37.78	6.75	-0.22	NA	0.0356
74	9	terrestrial	herbac.	plants	field	heating	producer	open	1	11.1	37.78	6.75	-0.22	NA	-0.0386
74	9	terrestrial	herbac.	plants	field	heating	producer	open	1	11.1	37.78	6.75	-0.22	NA	0.04
74	9	terrestrial	herbac.	plants	field	heating	producer	open	1	11.1	37.78	6.75	-0.22	NA	0.1146
74	9	terrestrial	herbac.	plants	field	heating	producer	open	1	11.1	37.78	6.75	-0.22	NA	-0.0038
74	9	terrestrial	herbac.	plants	field	heating	producer	open	1	11.1	37.78	6.75	-0.22	NA	0.1288
74	9	terrestrial	herbac.	plants	field	heating	producer	open	1	11.1	37.78	6.75	-0.22	NA	0.0502
74	9	terrestrial	herbac.	plants	field	heating	producer	open	1	11.1	37.78	6.75	-0.22	NA	0.1111
75	66	terrestrial	herbac.	plants	field	ot chambers	producer	open	1.73	0	31.43	7	-1.39	NA	-0.3979
75	66	terrestrial	herbac.	plants	field	ot chambers	producer	open	1.73	0	31.43	7	-1.39	NA	-0.4331
75	67	terrestrial	herbac.	plants	field	ot chambers	producer	open	1.73	0	31.38	7	-1.39	NA	-0.3218

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Appendix 2. Linear mixed effects models testing the dependence of richness and evenness log response ratios on intensity, duration, and unit size of temperature change manipulations across major ecosystem types (freshwater, marine, terrestrial).

Table A2. Analysis of deviance tables (type II Wald chi-square tests) showing the fixed effects of temperature (ΔT, degrees centigrade), natural log of experimental duration (days), and natural log of experimental unit area (m^2) in linear mixed models with ecosystem type and the two-way interaction for richness LRR (Ŝ; N = 169, sites = 74) and evenness LRR (Ê; N = 121; sites = 50). All models contained the random grouping factor for site. The marginal coefficient of determination estimates variance explained by fixed effects in a given model (m-R^2), and the conditional R^2 is a measure of variance explained by both fixed and random effects (c-R^2)

		Richness LRR (Ŝ)				Evenness LRR (Ê)			
	DF	χ^2	p	m-R^2	c-R^2	χ^2	p	m-R^2	c-R^2
ΔT	1	0.227	0.634	0.049	0.148	0.231	0.631	0.053	0.513
system	2	4.206	0.122			2.062	0.357		
ΔT × system	2	2.275	0.321			1.712	0.425		
logduration	1	0.193	0.661	0.035	0.137	0.000	0.995	0.068	0.545
system	2	3.604	0.165			1.108	0.575		
logdur × system	2	0.579	0.749			2.391	0.303		
logarea	1	3.568	0.059	0.098	0.162	0.098	0.754	0.043	0.529
system	2	6.989	0.030			1.066	0.587		
logarea × system	2	7.299	0.026			1.080	0.583		

Appendix 3. Graphical relationships of diversity effects (log response ratios for richness, Ŝ and evenness, Ê) with environmental and methodological covariates

Figure A2. Bivariate relationships of the intensity of ambient temperature (degrees centrigrade) with log-response ratios of richness (Ŝ) and evenness (Ê). Each point represents the log-response ratio from one independent experiment (terrestrial, black circles; freshwater, dark grey squares; marine, light grey triangles).

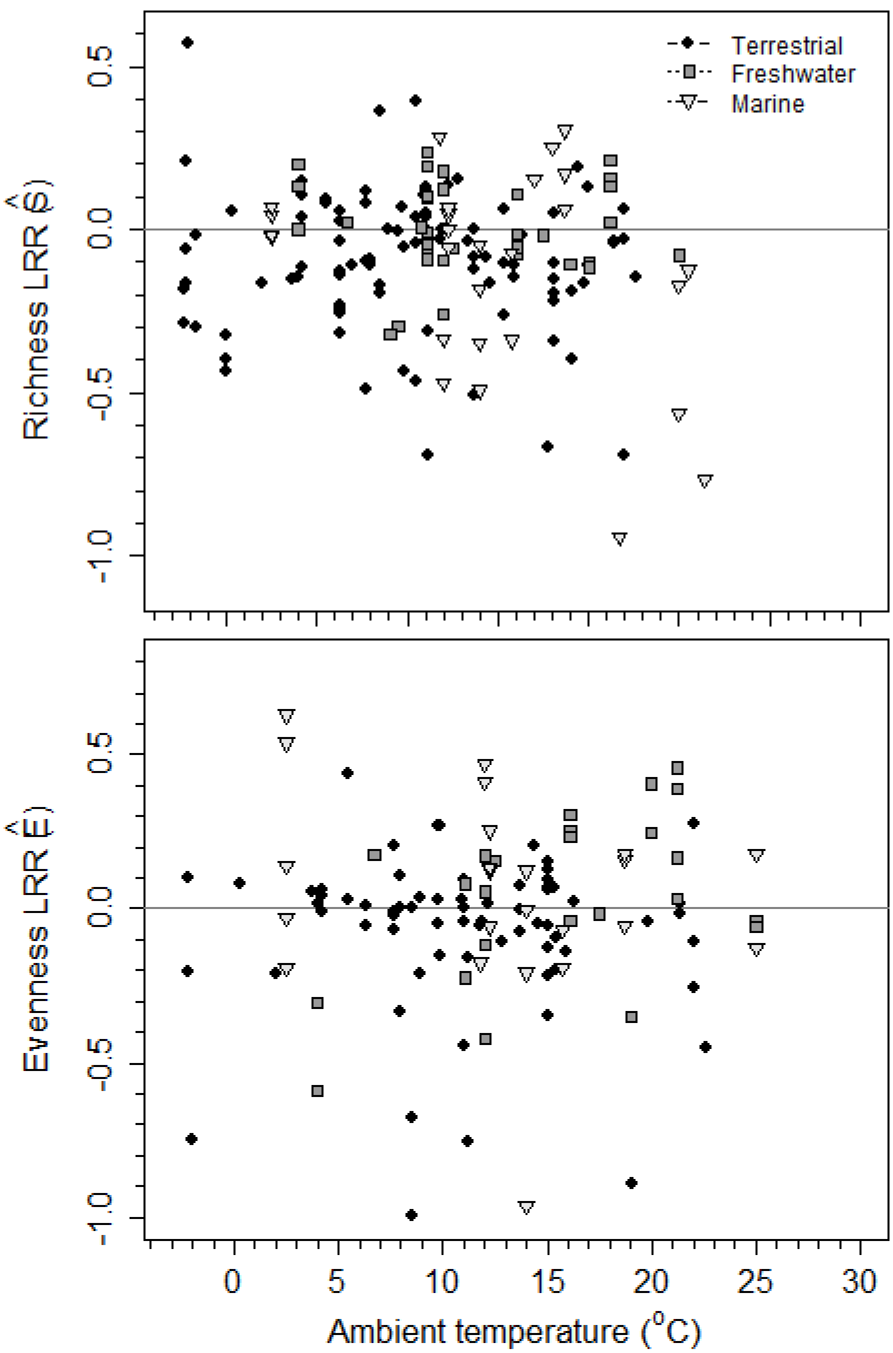


Figure A3. Bivariate relationships of the intensity of latitude (absolute value) with log-response ratios of richness (Ŝ) and evenness (Ê). Each point represents the log-response ratio from one independent experiment. Symbols as in Fig. A2.

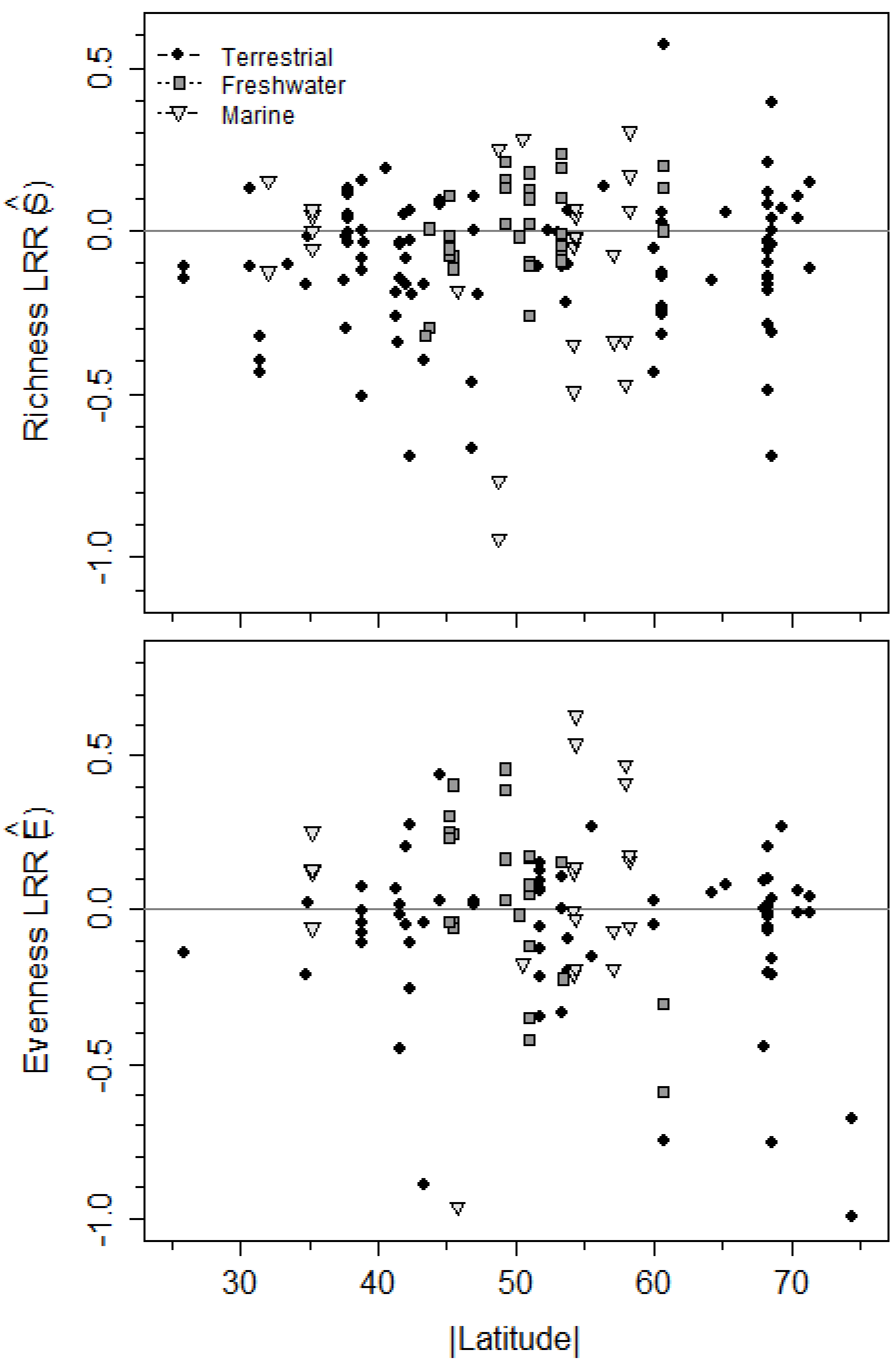


Figure A4. Mean log-response ratios ± 95% bootstrapped confidence intervals for species richness (Ŝ, closed symbols) and evenness (Ê, open symbols) by biotic categories: (A) community type; (B) habitat; (C) dominant community taxa. See methods and Supplementary material Appendix 1 for explanations of variables.

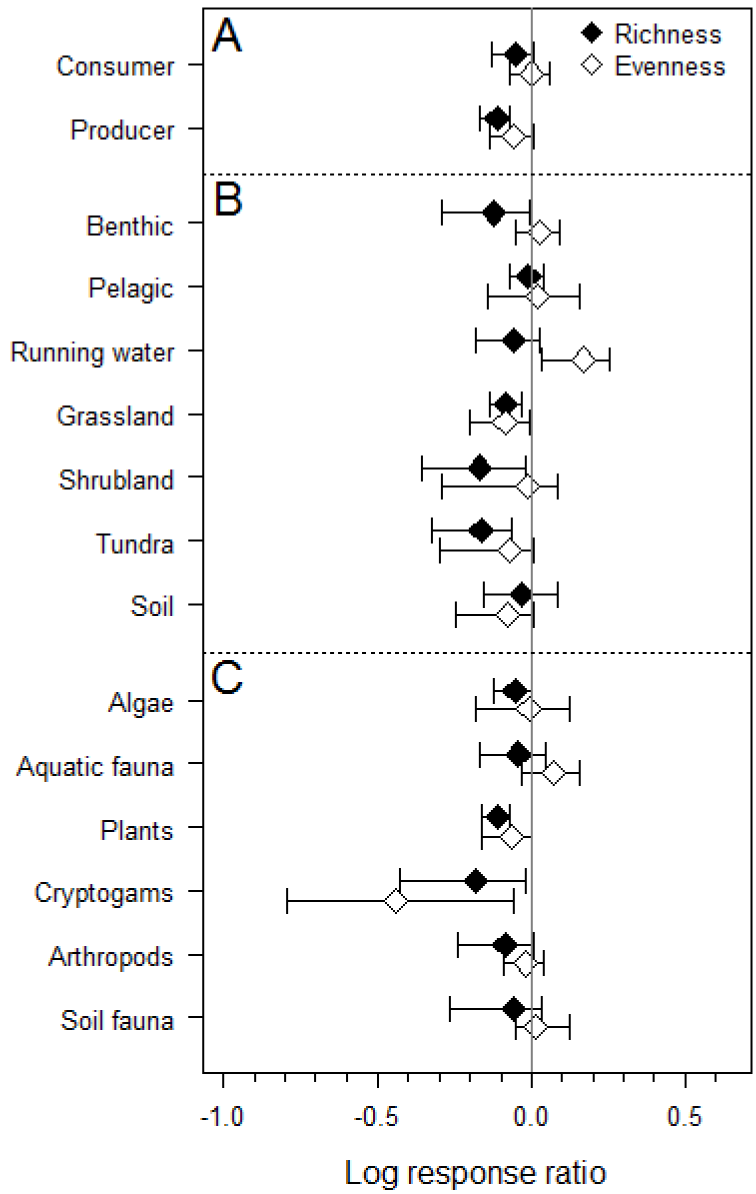
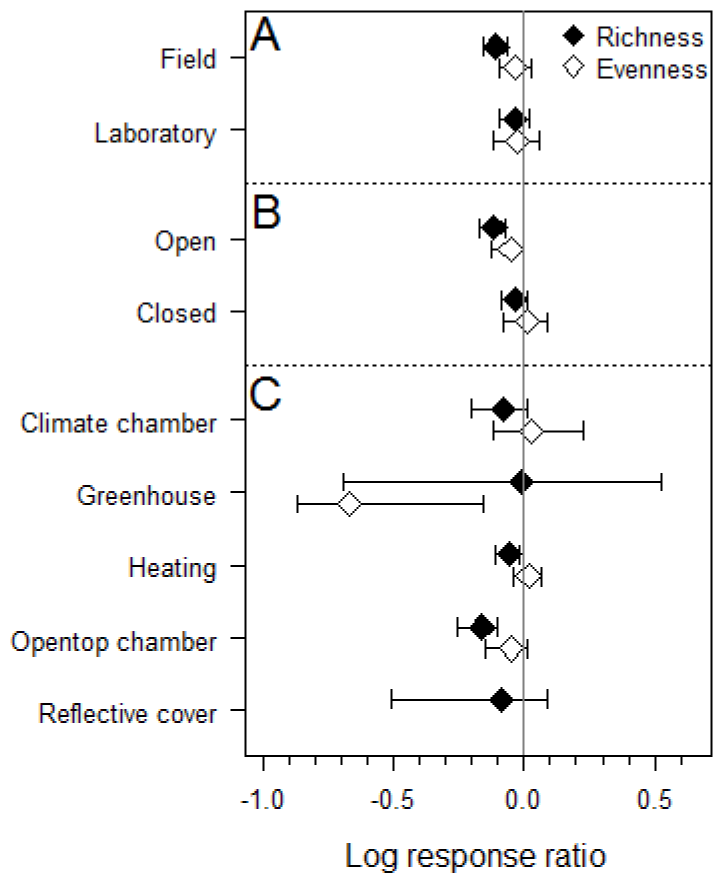


Figure A5. Mean log-response ratios ± 95% bootstrapped confidence intervals for species richness (Ŝ, closed symbols) and evenness (Ê, open symbols) by procedural categories of studies: (A) venue; (B) openness; (C) manipulation type. See methods and Supplementary material Appendix 1 for explanations of variables.



Appendix 4. Model averaged AICc weights tables, including all models within 4 AICc units of the top model for Ŝ and Ê.

Table A3. Summary of top models for richness LRR (Ŝ), with number of parameters (k), small sample size corrected AIC (AICc), difference in AICc from top model, the AICc weight for a given model (w_i), and the cumulative weights (cum. w_i). Abbreviated variable names in models correspond to Table A6.

no	model	k	AICc	ΔAICc	w_i	cum. w_i
1	*trop ven ambT area*	7	9.106	0.000	0.046	0.046
2	*trop ven sys ambT area*	9	9.141	0.035	0.045	0.091
3	*open trop ambT area*	7	9.560	0.454	0.037	0.128
4	*trop ven area*	6	9.658	0.552	0.035	0.163
5	*trop ven sys area*	8	9.797	0.691	0.033	0.195
6	*trop ven sys ambT ΔT area*	10	10.084	0.978	0.028	0.223
7	*open trop ven ambT area*	8	10.256	1.151	0.026	0.249
8	*open trop area*	6	10.373	1.267	0.024	0.274
9	*open trop sys ambT area*	9	10.649	1.543	0.021	0.295
10	*trop ven area lat*	7	10.721	1.616	0.021	0.315
11	*trop ven ambT area dur*	8	10.775	1.669	0.020	0.335
12	*trop ven sys ambT area dur*	10	10.890	1.785	0.019	0.354
13	*trop ven sys ΔT area*	9	10.914	1.809	0.019	0.373
14	*open trop ven sys ambT area*	10	10.994	1.888	0.018	0.391
15	*open trop ven area*	7	11.045	1.939	0.017	0.408
16	*trop ven ambT ΔT area*	8	11.072	1.966	0.017	0.425
17	*open trop ambT area dur*	8	11.136	2.030	0.017	0.442
18	*trop ven ambT area lat*	8	11.212	2.106	0.016	0.458
19	*trop ven sys ambT ΔT area dur*	11	11.243	2.137	0.016	0.474
20	*trop ven sys area lat*	9	11.316	2.211	0.015	0.489
21	*trop ven sys ambT area lat*	10	11.399	2.293	0.015	0.504
22	*open trop area lat*	7	11.459	2.353	0.014	0.518
23	*open trop sys area*	8	11.509	2.404	0.014	0.532
24	*trop ven ΔT area*	7	11.586	2.480	0.013	0.545
25	*open trop ambT ΔT area*	8	11.683	2.577	0.013	0.558
26	*open trop ambT area lat*	8	11.706	2.600	0.013	0.570
27	*trop ven area dur*	7	11.724	2.618	0.012	0.583
28	*open trop ven sys area*	9	11.747	2.641	0.012	0.595
29	*trop ven ambT*	6	11.752	2.647	0.012	0.607
30	*open trop ambT*	6	11.768	2.662	0.012	0.619
31	*ven sys area*	7	11.821	2.715	0.012	0.631
32	*trop ven sys area dur*	9	11.895	2.790	0.011	0.643
33	*open trop ven sys ambT ΔT area*	11	11.957	2.852	0.011	0.654
34	*open trop ven ambT ΔT area*	9	12.119	3.013	0.010	0.664
35	*ven sys ambT area*	8	12.149	3.043	0.010	0.674

36	*open trop ven ambT area dur*	9	12.170	3.065	0.010	0.684
37	*open trop sys ambT area dur*	10	12.175	3.069	0.010	0.694
38	*open trop ven area lat*	8	12.267	3.161	0.009	0.703
39	*trop ven sys ΔT area lat*	10	12.310	3.204	0.009	0.712
40	*trop ven sys ambT ΔT area lat*	11	12.357	3.251	0.009	0.721
41	*ven sys ΔT area*	8	12.361	3.256	0.009	0.731
42	*open trop sys ambT ΔT area*	10	12.363	3.257	0.009	0.740
43	*trop sys ambT area*	8	12.387	3.281	0.009	0.748
44	*trop ven ambT ΔT area dur*	9	12.391	3.285	0.009	0.757
45	*open trop area dur*	7	12.392	3.286	0.009	0.766
46	*ven sys ambT ΔT area*	9	12.419	3.314	0.009	0.775
47	*open trop ven ambT area lat*	9	12.455	3.349	0.009	0.784
48	*trop ambT*	5	12.457	3.351	0.009	0.792
49	*ven area*	5	12.460	3.355	0.009	0.801
50	*open trop ΔT area*	7	12.469	3.363	0.009	0.809
51	*ven sys ambT ΔT area dur*	10	12.521	3.415	0.008	0.818
52	*trop sys ambT area dur*	9	12.522	3.416	0.008	0.826
53	*trop ven ΔT area lat*	8	12.623	3.517	0.008	0.834
54	*sys area*	6	12.735	3.629	0.007	0.841
55	*trop ven sys ΔT area dur*	10	12.737	3.631	0.007	0.849
56	*open area*	5	12.758	3.652	0.007	0.856
57	*trop ven area lat dur*	8	12.760	3.655	0.007	0.864
58	*sys ambT area dur*	8	12.763	3.657	0.007	0.871
59	*trop sys area*	7	12.770	3.665	0.007	0.878
60	*trop ambT area dur*	7	12.845	3.740	0.007	0.886
61	*trop lat*	5	12.873	3.767	0.007	0.893
62	*ven sys area lat*	8	12.874	3.769	0.007	0.900
63	*open trop ven ΔT area*	8	12.879	3.773	0.007	0.907
64	*open trop ven sys ambT area dur*	11	12.888	3.782	0.007	0.913
65	*open trop ven sys ΔT area*	10	12.895	3.789	0.007	0.920
66	*open trop sys area lat*	9	12.899	3.793	0.007	0.927
67	*open trop sys ambT area lat*	10	12.901	3.795	0.007	0.934
68	*trop*	4	12.905	3.800	0.007	0.941
69	(intercept)	3	12.926	3.821	0.007	0.948
70	*trop ven ambT area lat dur*	9	12.929	3.823	0.007	0.955
71	*open trop ambT ΔT area dur*	9	12.991	3.885	0.007	0.961
72	*open sys area*	7	12.998	3.892	0.007	0.968
73	*sys ambT area*	7	13.004	3.899	0.007	0.974
74	*trop ven*	5	13.009	3.903	0.007	0.981
75	*trop ven sys ambT*	8	13.010	3.904	0.007	0.987
76	*trop ven lat*	6	13.077	3.971	0.006	0.994
77	*ven area lat*	6	13.094	3.988	0.006	1.000

Table A4. Variable importances for richness LRR ($\hat{S}$) final model set, as the proportion of the models (n = 77) containing each term.

variable	varweight	n containing
area	0.93	68
trophic	0.89	63
venue	0.68	48
ambientT	0.57	40
system	0.46	37
openness	0.38	30
ΔT	0.23	21
duration	0.20	19
latitude	0.19	19

Table A5. Summary of top models for evenness LRR (Ê), with number of parameters (k), small sample size corrected AIC (AICc), difference in AICc from top model, the AICc weight for a given model (w_i), and the cumulative weights (cum. w_i). Abbreviated variable names in models correspond to Table A8.

no	model	k	AICc	ΔAICc	w_i	cum. w_i
1	*trop*	4	21.954	0.000	0.133	0.133
2	(intercept)	3	22.642	0.688	0.094	0.226
3	*trop lat*	5	23.668	1.714	0.056	0.283
4	*trop area*	5	24.011	2.057	0.047	0.330
5	*open trop*	5	24.046	2.093	0.047	0.377
6	*trop ambT*	5	24.050	2.096	0.046	0.423
7	*trop ven*	5	24.071	2.117	0.046	0.469
8	*trop DT*	5	24.091	2.137	0.046	0.515
9	*trop dur*	5	24.093	2.139	0.045	0.560
10	*area*	3	24.176	2.223	0.044	0.604
11	*dur*	3	24.506	2.552	0.037	0.641
12	*open*	4	24.608	2.655	0.035	0.676
13	*lat*	3	24.765	2.812	0.032	0.708
14	*ven*	4	24.766	2.812	0.032	0.741
15	*DT*	3	25.168	3.214	0.027	0.767
16	*ambT*	3	25.246	3.292	0.026	0.793
17	*trop ambT lat*	6	25.249	3.295	0.026	0.818
18	*sys*	5	25.279	3.325	0.025	0.843
19	*trop sys*	6	25.369	3.415	0.024	0.867
20	*open trop lat*	6	25.791	3.837	0.019	0.887
21	*trop ven lat*	6	25.812	3.858	0.019	0.906
22	*trop area lat*	6	25.825	3.871	0.019	0.925
23	*trop DT lat*	6	25.831	3.877	0.019	0.944
24	*trop lat dur*	6	25.866	3.912	0.019	0.963
25	*open trop ven*	6	25.876	3.922	0.019	0.982
26	*ven area*	5	25.923	3.969	0.018	1.000

Table A6. Variable importances for evenness LRR (Ê) final model set, as the proportion of the models (n = 26) containing each term.

variable	varweight	n containing
trophic	0.63	16
latitude	0.21	8
venue	0.13	5
area	0.13	4
openness	0.12	4
duration	0.1	3
ambientT	0.1	3
ΔT	0.09	3
system	0.05	2

Appendix 5. Graphical relationships of diversity effects (log response ratios for richness, $\hat{S}$ and evenness, $\hat{E}$) as a function of total species pool size.

Figure A6. Bivariate relationships of total species pool (number of species recorded in a study overall, or directly reported by authors for a site) with log-response ratios of richness (Ŝ) and evenness (Ê). Each point represents the log-response ratio from one independent experiment (terrestrial, black circles; freshwater, dark grey squares; marine, light grey triangles). No relationship was detected for richness (t = 1.18, DF = 126, p = 0.24) or evenness (t = 0.11, DF = 86, p = 0.91). Results did not vary by ecosystem type. Total species pool was natural log-transformed prior to analysis.