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Supplementary material

The role of habitat diversity in generating the small-island effect

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Supplementary material

Appendix 1 Data sources used in this study.

Appendix 2

Table A1 Properties of the datasets used.

Table A2 The correlation matrix of the system characteristics.

Table A3 The threshold areas and correlations between habitat diversity and area.

Table A4 Full multinomial logistic regression models.

Appendix 1 Data sources used in this study.

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Table A1 Properties of the datasets used. Abbreviations: No. of sites, number of sites; Area_{max}, maximum site area; Area_{min}, minimum site area; Area range, the range between minimum and maximum site area; Habitat_{max}, maximum habitat diversity; Habitat_{min}, minimum habitat diversity; Habitat range, the range between minimum and maximum habitat diversity; Species range, the range between minimum and maximum number of species; SIE-P, small-island effect detected by path analysis; SIE-B, small-island effect detected by breakpoint regressions.

Taxon group	Site type	No. of sites	Area _{max} (ha)	Area _{min} (ha)	Area range (ha)	Habitat _{max}	Habitat _{mi} n	Habitat range	Species range	SIE-P	SIE-B
1	3	32	82	0.1	81.9	7	1	6	195	1	1
6	1	31	48	2	46	12	3	9	11	1	1
2	1	60	7	0.032	6.968	4	1	3	12	1	0
6	1	31	397824	3367	394457	18	2	16	52	1	0
6	2	42	1289.23	0.3	1288.93	7	2	5	58	1	0
4	2	42	1289.23	0.3	1288.93	7	2	5	5	1	1
1	3	86	50	0.05	49.95	4	1	3	108	1	0
2	3	18	16200	24	16176	19	2	17	18	1	1
2	3	32	826000	380	825620	54	2	52	68	1	1
1	3	47	99.58	0.031	99.549	13	1	12	71	1	1
2	3	24	7000	0.5	6999.5	4	1	3	18	1	0
1	2	30	8.3669	0.0851	8.2818	14	2	12	163	1	1
2	2	13	38	0.2	37.8	6	1	5	11	1	0
2	2	17	74.3	0.6	73.7	7	2	5	24	1	0
1	3	20	163600	100	163500	169	2	167	1267	1	1

4	4	22	38	0.05	37.95	5	1	4	10	1	1
6	3	73	10692.2	0.8	10691.4	26	3	23	78	1	0
2	3	90	8261.183	0.0023	8261.1807	16	1	15	33	1	1
3	1	16	178	8	170	5	1	4	4	1	0
1	1	51	11.472	0.03	11.442	8	1	7	83	1	0
2	1	21	19952.6231	100	19852.6231	6	1	5	696	1	0
1	1	44	28	0.1	27.9	1.83	1	0.83	13	1	0
1	1	41	4.7	0.1	4.6	1.89	1	0.89	11	1	0
3	2	23	1289.23	0.59	1288.64	7	2	5	8	1	1
4	2	48	1289.23	0.02	1289.21	7	2	5	12	1	0
2	2	31	1289.23	0.57	1288.66	7	2	5	61	1	1
6	1	20	92.16	0.52	91.64	12	3	9	40	1	0
1	4	24	205800	1500	204300	9	1	8	316	1	0
6	1	21	290	0.6	289.4	10	2	8	34	1	1
3	1	12	935	11	924	5	0	5	13	1	0
2	2	30	8.3669	0.0851	8.2818	14	2	12	23	1	1
2	4	25	24600	0.21	24599.79	7	1	6	44	1	1
6	4	17	151000	1300	149700	5	1	4	11	0	0
1	2	37	2.517	0.005	2.512	5	1	4	110	0	0
5	3	9	2197	29	2168	9	2	7	5	0	0
1	3	42	22984980	50	22984930	16	1	15	1604	0	1
5	1	23	5119	34	5085	7	2	5	11	0	0
6	1	22	5119	34	5085	7	2	5	50	0	0

5	1	18	89.8	2.4	87.4	3	1	2	11	0	0
6	3	43	4356	2	4354	6	1	5	65	0	0
2	1	12	3.8997	0.1097	3.79	11	4	7	44	0	0
2	1	12	2.8085	0.06	2.7485	11	4	7	46	0	0
6	1	13	594.53	0.67	593.86	4	1	3	23	0	0
5	2	14	1289.23	0.97	1288.26	7	3	4	7	0	0
6	3	20	59600	7.6	59592.4	3.6	1.08	2.52	14	0	0
2	3	10	160	0.5	159.5	7	3	4	23	0	0
1	3	34	92.14	0.005	92.135	21	1	20	222	0	1
6	3	44	582	0.5	581.5	10	1	9	59	0	0
5	1	24	2073600	8300	2065300	10	3	7	29	0	0
2	3	12	160	0.4	159.6	6	1	5	11	0	0
2	3	16	8.7	0.03	8.67	4	1	3	10	0	0
2	2	17	74.3	0.6	73.7	7	2	5	18	0	0
2	3	12	20800	0.2	20799.8	7	1	6	38	0	1
1	3	20	55.2968	0.2065	55.0903	5	2	3	156	0	1
1	3	82	68.3	0.05	68.25	9	3	6	235	0	1
4	1	22	5119	34	5085	7	2	5	21	0	0
1	1	42	25.7	0.1	25.6	1.65	1	0.65	4	0	0
1	1	22	8764.8	2.2	8762.6	3.4	0.02	3.38	27	0	0
1	3	17	73400	120	73280	14	1	13	1343	0	1
1	3	78	14.314	0.004	14.31	7	1	6	203	0	1
1	4	14	122300	20	122289	14	1	13	335	0	1

Table A2 The correlation matrix of the system characteristics. The values in the upper right diagonal line represent the Pearson r , whilst the values in the lower left diagonal line represent the p values.

	Taxon group	Site type	No. of sites	Area _{max}	Area _{min}	Area range	Species range	Habitat _{max}	Habitat _{min}	Habitat range
Taxon group		-0.219	-0.130	0.230	0.335	0.229	-0.384	-0.015	0.113	-0.020
Site type	0.090		0.062	0.306	-0.015	0.307	0.327	0.276	0.109	0.318
No. of sites	0.319	0.636		-0.091	-0.370	-0.090	0.236	0.028	0.124	0.029
Area _{max}	0.075	0.016	0.485		0.776	1.000	0.305	0.402	-0.040	0.433
Area _{min}	0.008	0.908	0.003	< 0.001		0.775	0.134	0.278	-0.051	0.283
Area range	0.075	0.016	0.489	< 0.001	< 0.001		0.306	0.402	-0.04	0.433
Species range	0.002	0.010	0.067	0.017	0.305	0.017		0.520	0.074	0.544
Habitat _{max}	0.911	0.031	0.828	0.001	0.030	0.001	< 0.001		0.219	0.985
Habitat _{min}	0.387	0.403	0.341	0.757	0.695	0.757	0.569	0.090		0.127
Habitat range	0.881	0.013	0.824	< 0.001	0.027	< 0.001	< 0.001	< 0.001	0.330	

Table A3 The threshold areas detected by difference processes or methods, and the relationship between habitat diversity with island area for cases when an SIE was detected, above and below the threshold. Abbreviations: L1, the upper limit of SIE based on forward (excluding islands from largest to smallest) path analysis; L2, the upper limit of SIE based on backward (adding islands from smallest to largest) path analysis; a and a' , Pearson correlation between habitat and area; T , the upper limit of SIE according to Lomolino and Weiser (2001) for 17 cases.

$L1$ (km ²)	$L2$ (km ²)	a	p	a' above $L1$	p	a' below $L1$	p	T (km ²)
1.2	0.2	0.768	0.001	0.639	0.014	0.591	0.033	1.181
14	5	0.164	0.379	0.26	0.219	0.248	0.254	3.111
0.1	0.073	0.285	0.028	0.544	0.084	0.521	0.122	
372960	372960	0.694	0.001	0.694	0.001	0.674	0.001	
1.2	0.73	0.924	0.001	0.377	0.084	0.391	0.08	0.982
1.15	0.8	0.924	0.001	0.422	0.072	0.441	0.067	0.959
0.6	0.6	0.636	0.001	-0.418	0.35	-0.913	0.011	
1000	800	0.86	0.001	0.695	0.038	0.674	0.067	
20900	12110	0.566	0.002	0.099	0.696	-0.054	0.837	137.14
0.145	0.129	0.915	0.001	-0.139	0.65	-0.334	0.288	0.605
57.1	6.2	0.58	0.003	0.672	0.001	0.776	0.001	
0.107	0.107	0.85	0.001	0.501	0.169	0.377	0.358	1.018
5	2	0.863	0.001	0.753	0.007	0.713	0.021	
4.3	2.6	0.187	0.471	0.479	0.193	0.333	0.42	
1580	1580	0.849	0.001	0.682	0.021	0.649	0.042	38.552

0.44	0.2	0.545	0.009	0.389	0.212	0.452	0.163	0.783
331.4	2.4	0.82	0.001	0.808	0.001	0.832	0.001	16.962
1.912	0.15	0.915	0.001	0.742	0.001	0.739	0.001	1.728
59	42	0.602	0.014	0.43	0.187	0.421	0.225	
0.595	0.166	0.522	0.001	0.405	0.151	0.56	0.047	0.626
3162.277	1995.2623	0.314	0.166	0.472	0.088	0.624	0.023	
0.9	0.7	0.326	0.031	0.08	0.692	0.048	0.814	
0.2	0.2	0.542	0.001	0.477	0.232	0.728	0.063	
143.19	1.01	0.972	0.001	0.972	0.001	0.955	0.001	5.244
0.83	0.59	0.905	0.001	0.576	0.02	0.568	0.027	0.814
1.2	0.83	0.882	0.001	0.03	0.913	0.045	0.874	
3.84	2.88	0.815	0.001	0.607	0.063	0.592	0.093	
72900	27800	0.458	0.024	0.585	0.014	0.555	0.026	
3.7	3.4	0.528	0.014	0.429	0.188	0.682	0.03	9.984
484	49	0.769	0.003	0.769	0.003	0.707	0.015	
0.2132	0.1932	0.85	0.001	0.336	0.262	0.466	0.127	0.809
334	334	0.827	0.001	0.523	0.121	0.69	0.04	36.782

Table A4 Full logistic regression models to determine which combination of island characteristics was important in determining the role of habitat diversity in generating SIEs. For variable abbreviations, see Table S1.

	df	AICc	delta AICc	Akaike weight
No. of sites + Habitat range + Species range	5	85.985	0	0.1622
No. of sites + Habitat range + Species range + Taxon group	6	86.203	0.218	0.1455
No. of sites + Habitat range + Species range + Site type + Taxon group	7	87.186	1.201	0.0890
No. of sites + Habitat range + Species range + Site type	6	87.492	1.506	0.0764
No. of sites + Habitat range + Species range + Area range	6	87.834	1.849	0.0644
No. of sites	3	88.61	2.625	0.0437
No. of sites + Habitat range + Species range + Taxon group + Area range	7	88.673	2.688	0.0423
No. of sites + Habitat range	4	88.715	2.730	0.0414
No. of sites + Habitat range + Site type	5	89.295	3.310	0.0310
No. of sites + Habitat range + Species range + Site type + Area range	7	89.669	3.684	0.0257
No. of sites + Habitat range + Species range + Site type + Taxon group + Area range	8	89.841	3.856	0.0236
No. of sites + Species range	4	89.891	3.906	0.0230
No. of sites + Habitat range + Area range	5	90.024	4.039	0.0215
No. of sites + Site type	4	90.299	4.314	0.0188
No. of sites + Taxon group	4	90.779	4.794	0.0148
No. of sites + Area range	4	90.831	4.846	0.0144
No. of sites + Habitat range + Taxon group	5	90.979	4.994	0.0134
No. of sites + Habitat range + Site type + Area range	6	91.145	5.160	0.0123

No. of sites + Habitat range + Site type + Taxon group	6	91.333	5.347	0.0112
No. of sites + Species range + Taxon group	5	91.656	5.671	0.0095
No. of sites + Species range + Site type	5	92.035	6.050	0.0079
No. of sites + Species range + Area range	5	92.262	6.277	0.0070
No. of sites + Site type + Taxon group	5	92.392	6.406	0.0066
No. of sites + Habitat range + Taxon group + Area range	6	92.483	6.498	0.0063
-	2	92.606	6.621	0.0059
Habitat range	3	92.640	6.655	0.0058
No. of sites + Site type + Area range	5	92.675	6.690	0.0057
Habitat range + Species range	4	92.967	6.982	0.0049
No. of sites + Taxon group + Area range	5	93.117	7.132	0.0046
Habitat range + Species range + Taxon group	5	93.301	7.315	0.0042
Habitat range + Area range	4	93.354	7.369	0.0041
No. of sites + Habitat range + Site type + Taxon group + Area range	7	93.516	7.531	0.0038
Habitat range + Site type	4	93.647	7.662	0.0035
No. of sites + Species range + Site type + Taxon group	6	93.792	7.807	0.0033
No. of sites + Species range + Taxon group + Area range	6	93.945	7.960	0.0030
Habitat range + Species range + Area range	5	94.024	8.039	0.0029
Taxon group	3	94.400	8.414	0.0024
Habitat range + Species range + Site type + Taxon group	6	94.440	8.454	0.0024
No. of sites + Species range + Site type + Area range	6	94.463	8.478	0.0023
Site type	3	94.476	8.491	0.0023
Habitat range + Taxon group	4	94.535	8.550	0.0023

Habitat range + Species range + Site type	5	94.548	8.563	0.0022
Area range	3	94.596	8.611	0.0022
Species range	3	94.696	8.711	0.0021
No. of sites + Site type + Taxon group + Area range	6	94.834	8.849	0.0019
Habitat range + Site type + Area range	5	94.897	8.912	0.0019
Habitat range + Site type + Taxon group	5	95.180	9.195	0.0016
Habitat range + Species range + Taxon group + Area range	6	95.258	9.273	0.0016
Habitat range + Taxon group + Area range	5	95.631	9.646	0.0013
No. of sites + Species range + Site type + Taxon group + Area range	7	95.964	9.979	0.0011
Habitat range + Species range + Site type + Area range	6	96.001	10.016	0.0011
Site type + Taxon group	4	96.131	10.146	0.0010
Species range + Taxon group	4	96.266	10.281	0.0009
Taxon group + Area range	4	96.581	10.596	0.0008
Site type + Area range	4	96.674	10.689	0.0008
Species range + Site type	4	96.741	10.756	0.0007
Habitat range + Species range + Site type + Taxon group + Area range	7	96.807	10.822	0.0007
Species range + Area range	4	96.842	10.857	0.0007
Habitat range + Site type + Taxon group + Area range	6	96.986	11.001	0.0007
Species range + Site type + Taxon group	5	98.286	12.301	0.0003
Site type + Taxon group + Area range	5	98.504	12.519	0.0003
Species range + Taxon group + Area range	5	98.64	12.655	0.0003
Species range + Site type + Area range	5	99.041	13.055	0.0002
Species range + Site type + Taxon group + Area range	6	100.734	14.749	0.0001

