Appendix S1: Path Analysis Results

To ensure that our results did not arise because of confounding effects of differences in the range of temperature (or topographic heterogeneity) values or the spatial configuration (summarized by mean Euclidean distance) of quadrats within 5% quantiles, we first evaluated whether these factors were correlated with the species richness of both assemblages. Since various statistically significant correlations were detected, we used path analysis to evaluate whether the correlation between widespread and range-restricted species richness remained significant across temperature quantiles and non-significant across topographic heterogeneity quantiles. Both of these conditions were met (Fig. S3), indicating that the correlation (or lack thereof) between assemblage richnesses was not a byproduct of differing ranges of values or the spatial configuration of quadrats within 5% quantiles, regardless of whether they were based on minimum temperature or topographic heterogeneity.

Table S1. Ordinary least squares (OLS) and conditional autoregressions (CARs) of widespread and range-restricted mammal species richness on environmental variables in the continental Americas. Bolded entries indicate the models with the highest R^2 and lowest AIC values. For CARs, total R^2 and the proportion of variation unique to predictors (i.e. not shared with space) is shown. OLS and CAR results were consistent.

	Widespread species richness							Range-restricted species richness						
	Ordinary Least Squares			Conditional Autoregression				Ordinary Least Squares			Conditional Autoregression			
Predictor variables	p-value of coefficient	R^2	AIC	p-value of coefficient	Total R^2	AIC	R^2 uniqe to predictors	p-value of coefficient	R^2	AIC	p-value of coefficient	Total R^2	AIC	R^2 unique to predictors
MAT	<0.001	0.61	36789	<0.001	0.90	31522	0.04	<0.001	0.05	12168	<0.001	0.31	10929	0.02
MINT	<0.001	0.64	36495	<0.001	0.91	31398	0.04	<0.001	0.06	12109	<0.001	0.32	10899	0.03
TRANGE	<0.001	0.66	36327	<0.001	0.91	31385	0.04	<0.001	0.07	12048	<0.001	0.33	10846	0.04
MAP	<0.001	0.50	37703	<0.001	0.89	31890	0.04	<0.001	0.02	12252	<0.001	0.31	10950	0.02
NPP	<0.001	0.49	37817	<0.001	0.89	31890	0.03	<0.001	0.08	12023	<0.001	0.34	10779	0.05
VGT	<0.001	0.01	40323	<0.001	0.86	32951	0.00	<0.001	0.02	12277	<0.001	0.30	11109	0.01
ERANGE	<0.001	0.02	40271	<0.001	0.86	32951	0.00	<0.001	0.08	12042	<0.001	0.32	10892	0.03
MAT	<0.001	0.73	35478	<0.001	0.91	31129	0.05	<0.001	0.05	12153	<0.001	0.32	10881	0.03
MAT^2	<0.001			<0.001				<0.001			<0.001			
MINT	**<0.001**	**0.78**	**34611**	**<0.001**	**0.93**	**30387**	**0.06**	<0.001	0.06	12100	0.038	0.32	10879	0.03
$MINT^2$	**<0.001**			**<0.001**				0.001			0.115			
TRANGE	<0.001	0.74	35299	<0.001	0.92	30814	0.06	0.334	0.08	12043	<0.001	0.33	10844	0.04
$TRANGE^2$	<0.001			<0.001				0.008			0.067			
MAP	<0.001	0.58	37035	0.367	0.90	31765	0.04	0.009	0.03	12239	0.466	0.31	10946	0.02
MAP^2	<0.001			<0.001				<0.001			0.011			
NPP	<0.001	0.51	37656	0.097	0.90	31835	0.04	<0.001	0.09	11984	0.235	0.34	10789	0.05
NPP^2	<0.001			<0.001				<0.001			0.107			
VGT	<0.001	0.02	40285	0.002	0.86	32938	0.00	0.005	0.02	12261	0.824	0.30	11018	0.01
VGT^2	<0.001			0.015				<0.001			0.125			
ERANGE	<0.001	0.02	40260	0.032	0.86	32950	0.00	**<0.001**	**0.15**	**11743**	**<0.001**	**0.35**	**10729**	**0.06**
$ERANGE^2$	<0.001			0.090				**<0.001**			**<0.001**			

notes: MINT is minimum temperature, MAT is mean annual temperature, TRANGE is annual temperature range, MAP is mean annual precipitation, NPP is net primary productivity, VGT is the number of vegetation classes and ERANGE is elevation range. To improve normality, TRANGE was square-root transformed, MAP and ERANGE were log transformed, and NPP was cube root transformed.

Table S2: Lower and upper bounds for 5% quantiles based on minimum temperature and topographic heterogeneity in the continental Americas.

	Minimum Temperature (°C)		Topographic heterogeneity (m)	
Quantile (%)	Lower bound	Upper bound	Lower bound	Upper bound
5	-40.0	-32.4	6	70
10	-32.4	-29.0	71	110
15	-29.0	-26.2	110	145
20	-26.2	-21.1	145	180
25	-21.1	-16.6	180	222
30	-16.5	-12.3	222	262
35	-12.3	-8.9	262	306
40	-8.9	-5.6	306	349
45	-5.6	-2.3	349	406
50	-2.2	0.6	406	484
55	0.7	3.6	484	574
60	3.6	7.1	574	710
65	7.1	10.5	711	879
70	10.5	13.4	879	1109
75	13.4	15.5	1110	1398
80	15.5	17.2	1398	1658
85	17.2	18.6	1658	1981
90	18.6	20.3	1983	2358
95	20.3	21.2	2361	3310
100	21.2	23.1	3335	5876

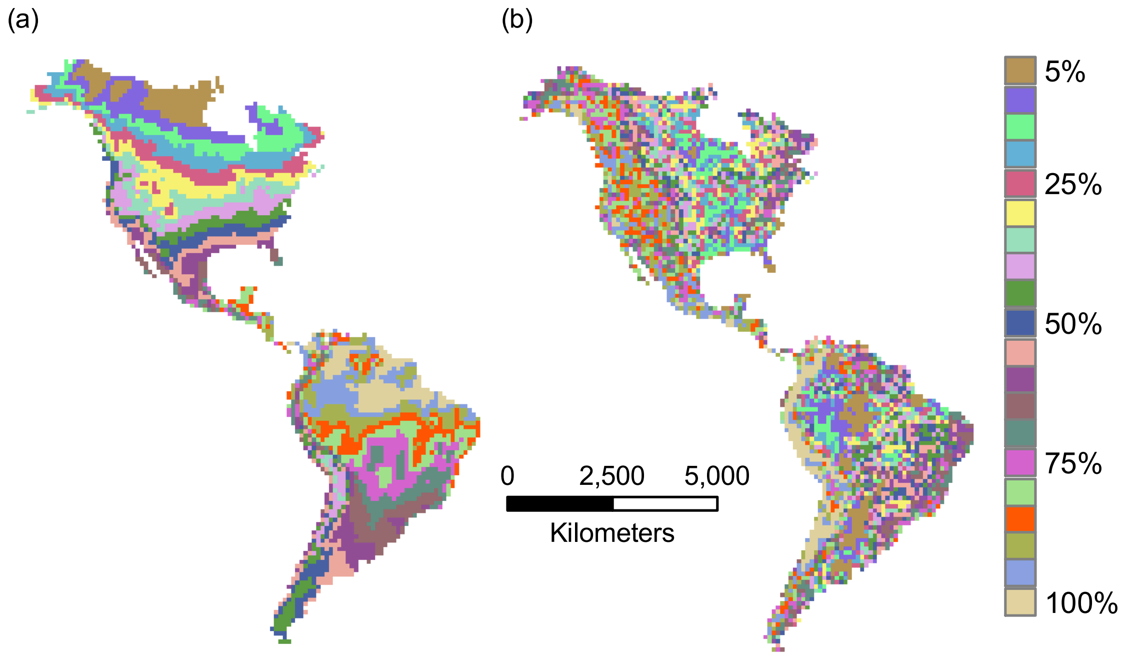

Fig. S1. 5% quantiles based on minimum temperature (a) and topographic heterogeneity (b) in the continental Americas. Legend gives upper quantile limits. Maps use a Lambert azimuthal projection.

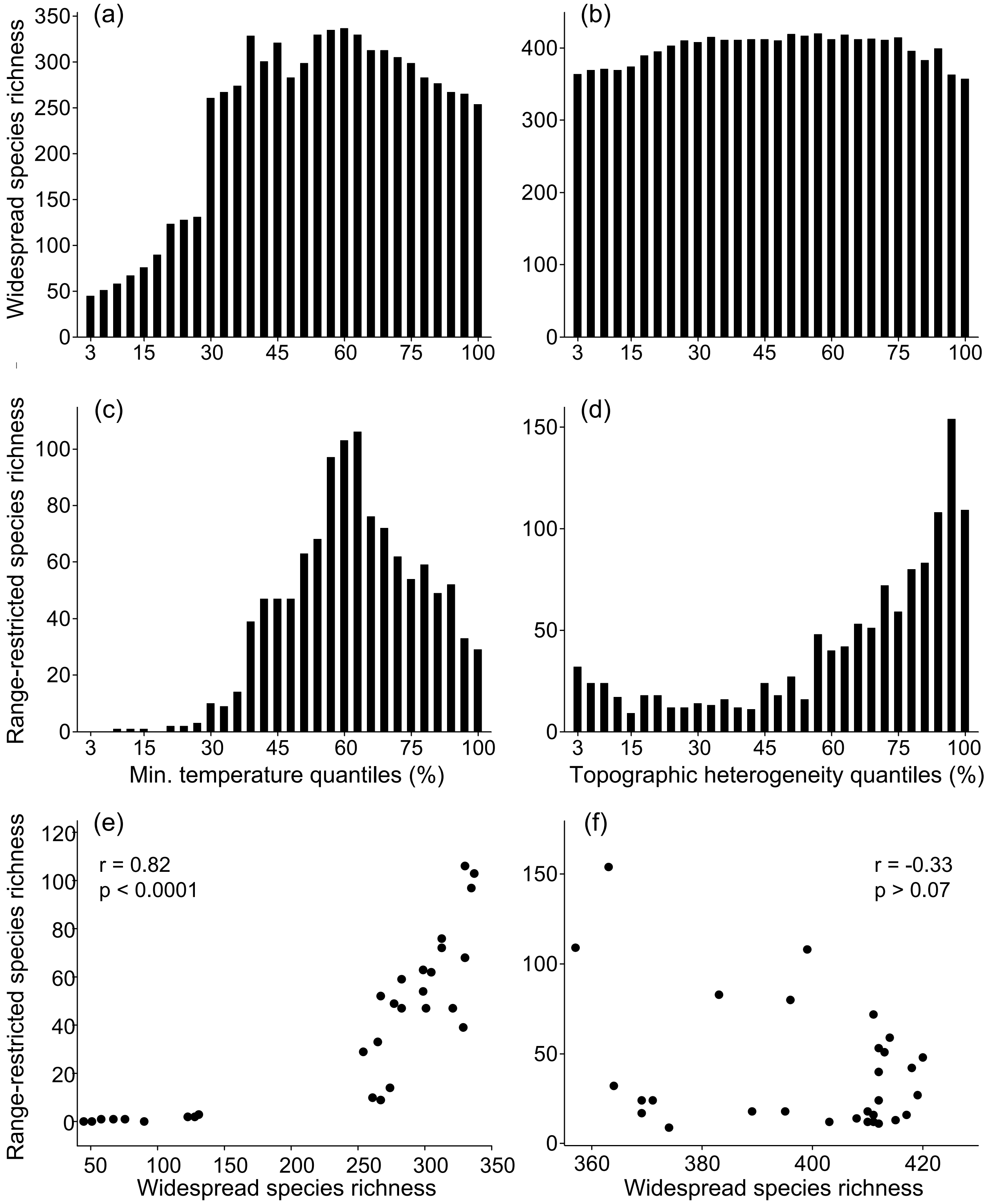

Fig. S2. Widespread and range-restricted species richness in thirty equal area divisions based on minimum annual temperature (a, c, e) and topographic heterogeneity (measured as elevation range; b, d, f). (a) and (b) are for widespread species, (c) and (d) are for range-restricted species, and (e) and (f) show the correlation between widespread and range-restricted species richness.

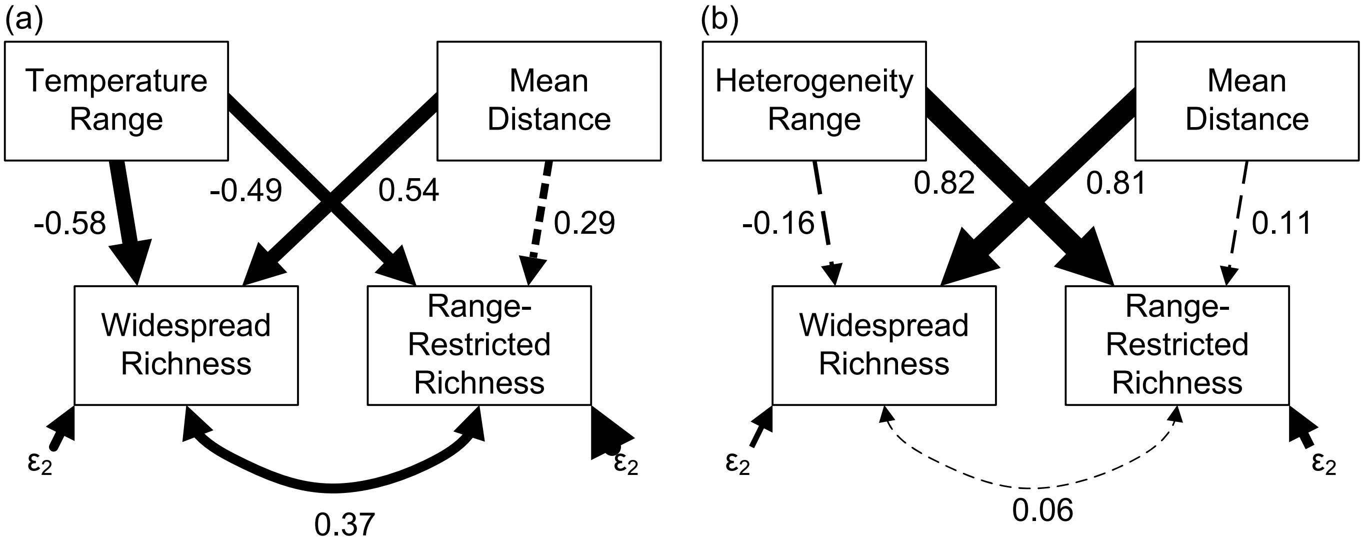

Fig. S3. Path diagrams examining the effect of value range (heterogeneity or temperature) and spatial configuration of quadrats (mean Euclidean distance) within quantiles on the correlations between widespread and range-restricted species richness. Values shown are standardized path coefficients, line widths are proportional to coefficient magnitude and dashed lines denote relationships with $P > 0.05$. For temperature based divisions (a), the correlation between range-restricted and widespread species richness remained significant ($P < 0.01$) despite other effects, while for topographic heterogeneity divisions (b) remained non-significant ($P > 0.07$).