Ecography

E6781
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Supplementary material

Appendix 1

Table A1 Richness of species, genera and families per grid, and the mean values of major environmental variables in the seven biogeographical regions defined according to China's physical geography and phytogeography (Editorial Board for Physical Geography of China, 1985) (see figure 1*A*). 1, Southeast China; 2, eastern Himalayas; 3, Tibetan Plateau; 4, North China; 5, Mongolian Plateau, 6, Northeast China; 7, Northwest China.

	Region1	Region2	Region3	Region4	Region5	Region6	Region7
Area (10^3km^2)	1889.6	923.3	1668.9	959.6	876.0	862.0	2233.0
Species/grid	845 ± 424	984 ± 593	70 ± 86	256 ± 194	138 ± 63	102 ± 53	110 ± 43
Genus/grid	297 ± 109	312 ± 178	29 ± 27	104 ± 52	58 ± 19	45 ± 19	44 ± 13
Family/grid	97 ± 20	93 ± 35	18 ± 12	50 ± 17	31 ± 8	24 ± 8	24 ± 6
Environmental energy							
MAT (^oC)	16.6 ± 3.4	10.4 ± 7	-3.5 ± 2.8	10.9 ± 3.1	3.7 ± 3.1	1.2 ± 3.4	5.7 ± 5.2
MTWQ (^oC)	25.6 ± 3	16.4 ± 5.9	6.4 ± 2	23.5 ± 2.9	19.1 ± 2	18.8 ± 2.4	19.5 ± 6
MTCQ (^oC)	6.8 ± 4.1	3.3 ± 7.8	-13.6 ± 3.8	-2.9 ± 4	-13.3 ± 5.3	-18.8 ± 4.7	-9.9 ± 4.4
WI (^oC)	142.3 ± 35	85.1 ± 60	5.8 ± 6	97.9 ± 22.3	60.5 ± 12.7	56.2 ± 13.9	70.3 ± 35
PET (mm)	901 ± 143.9	644.4 ± 202.9	326.4 ± 39.6	731.9 ± 102.8	566.8 ± 53.4	553.6 ± 65.1	617.9 ± 158
Water availability							
MAP (mm)	1344.3 ± 305.5	998.1 ± 404.2	281.1 ± 170.6	625.3 ± 133.5	338.5 ± 93.5	562.5 ± 116.1	116.6 ± 100.3
PWQ (mm)	617.5 ± 141.5	576.8 ± 221.5	178.2 ± 94.1	382.3 ± 72.6	226.1 ± 62.4	361 ± 65	66.4 ± 56.6
PDQ (mm)	110.2 ± 49.6	31.4 ± 18.7	9.2 ± 10.6	25.8 ± 18.5	8 ± 2.8	16.5 ± 7	5.9 ± 7.9
MI	50 ± 29.5	54.6 ± 33.9	-17 ± 44.9	-13.8 ± 18.7	-39.4 ± 19	2.3 ± 21.5	-76.3 ± 26.5
WD (mm)	7.6 ± 23.2	8.3 ± 20.5	89.9 ± 82.7	125.3 ± 102	229.3 ± 115.7	42.4 ± 72.4	502.8 ± 230.3
AET (mm)	893.3 ± 142.5	636.1 ± 197.1	236.6 ± 104.7	606.6 ± 109.5	337.4 ± 92.1	511.2 ± 61.9	115.1 ± 96.2
Climate seasonality							
MDR (^oC)	8.2 ± 1.1	11.8 ± 1.8	14.1 ± 0.9	11 ± 1.4	13 ± 0.7	12.8 ± 1.4	13.9 ± 1.6
ART (^oC)	28.9 ± 3.6	26.4 ± 3.8	36.2 ± 3.1	39.2 ± 3.7	47.8 ± 5.1	53.4 ± 3.9	45.9 ± 3.7
TSN	730.3 ± 113.1	516.3 ± 92.9	783.6 ± 101.5	1019.2 ± 106.1	1252.6 ± 187.2	1458.5 ± 114.2	1141 ± 135.6

PSN	61.1 ± 11.2	89.9 ± 8.1	104.8 ± 18.2	97.1 ± 17.3	106.3 ± 8.9	101.8 ± 9.5	84.7 ± 21.9
Habitat heterogeneity							
Elev	1062.3 ± 628.5	2333.3 ± 959.4	1401.3 ± 660.7	737.6 ± 610.3	579.3 ± 390.7	493.9 ± 315.4	1229.3 ± 1109.4
Vege-N	10.3 ± 4.5	11.8 ± 5	6.9 ± 3.5	9.1 ± 5.1	9.9 ± 3.6	7.9 ± 2.7	9.3 ± 5.1
Vege-*H'*	1.5 ± 0.5	1.8 ± 0.4	1.2 ± 0.4	1.1 ± 0.7	1.5 ± 0.4	1.3 ± 0.4	1.4 ± 0.7
RMAT (^{o}C)	5.6 ± 3.3	13 ± 5	8 ± 3.7	4.2 ± 3.3	3.2 ± 2.2	2.9 ± 1.7	6.6 ± 6.1
RMAP (mm)	284.3 ± 146.1	450.2 ± 566.4	92.7 ± 143.6	122.4 ± 72.3	74.7 ± 41.6	87 ± 46.4	75.1 ± 80.7
Human activity							
HPD (km^{-1})	322.3 ± 256.0	53.1 ± 55.7	6.2 ± 18.0	377.2 ± 277.5	60.4 ± 41.4	88.6 ± 78.5	38.3 ± 59.3
GDP ($\times 10^{9}$ CNY)	29.4 ± 69.6	1.4 ± 2.2	0.1 ± 0.5	21.3 ± 20.1	2.5 ± 1.8	5.3 ± 6.8	1.3 ± 1.4
CROP (km^{2})	971.5 ± 687.9	337.9 ± 348.8	8.1 ± 39.6	1698.3 ± 662.8	504.4 ± 616.8	722.3 ± 754	88.1 ± 229.6

Table A2 The cumulative proportion of variance explained by the first seven PC axes extracted from the PCA for all environmental (climate, habitat heterogeneity and human activities) variables, climatic variables and variables of habitat heterogeneity + human activities.

PC axes	1	2	3	4	5	6	7
PCA for contemporary environment	0.459	0.662	0.745	0.801	0.851	0.888	0.924
PCA for contemporary climate	0.651	0.829	0.904	0.957	0.976	0.990	0.995
PCA for habitat heterogeneity + human activities	0.435	0.670	0.804	0.888	0.954	0.983	0.998

Table A3 The variance inflation factors (VIF) of the best models selected by forward-selection method.

Models	VIF
Environmental model	
PC axis 1	1.064
PC axis 2	1.066
PC axis 7	1.066
Climatic model	
PC axis 1	1.049
PC axis 2	1.117
PC axis 6	1.168
Model of habitat heterogeneity + human activities	
PC axis 2	1.400
PC axis 1	1.239
PC axis 4	1.295
PC axis 3	1.921
PC axis 7	1.184
PC axis 5	1.573

Figure A1 Poisson-ness plot drawn with vcd package in R. X-axis represents the observed species richness (i.e. number of occurrence), and y-axis represents the metameter of the Poisson distribution.

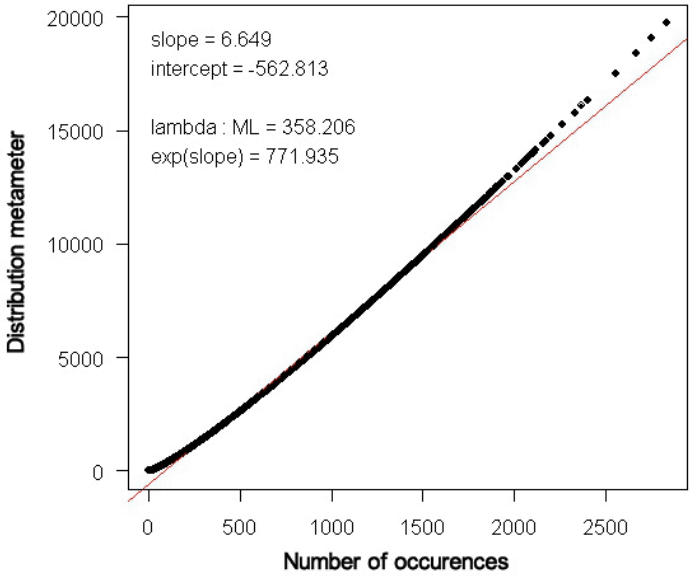


Figure A2 Relationship between the residuals of the best model and the principal components of all environmental variables that have been involved in the best model. A, B and C, PC axes 1, 2, and 7 respectively.

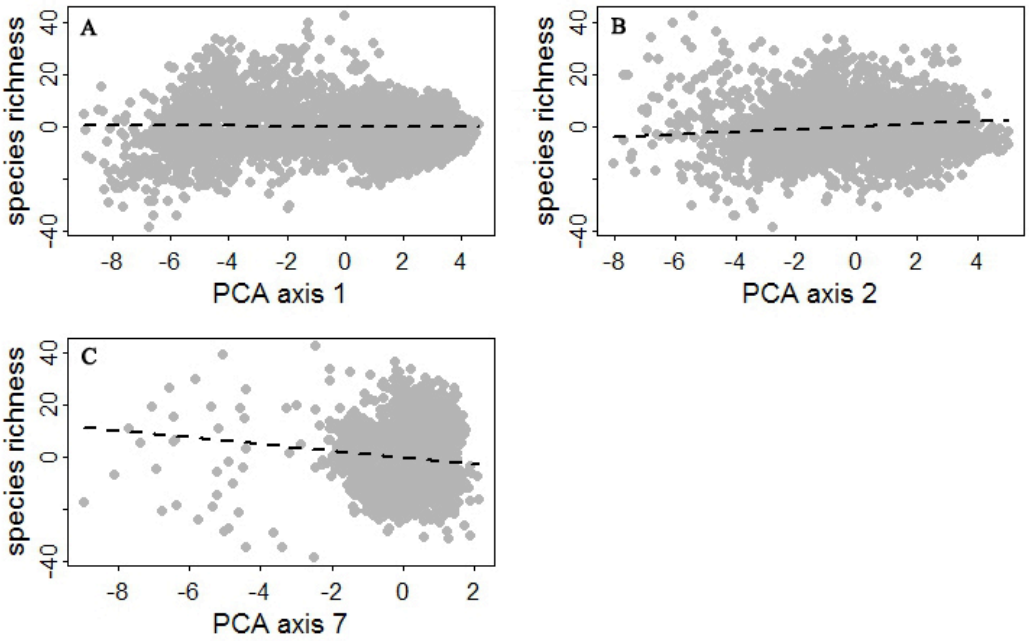


Figure A3 Moran's I of the geographical patterns in species richness and the model residuals. solid dots, the original data of species richness; circles, the residuals of the climatic model; filled triangles, the residuals of the environmental model; empty triangles, the residuals of the model with environment and biogeographical regions as predictors.

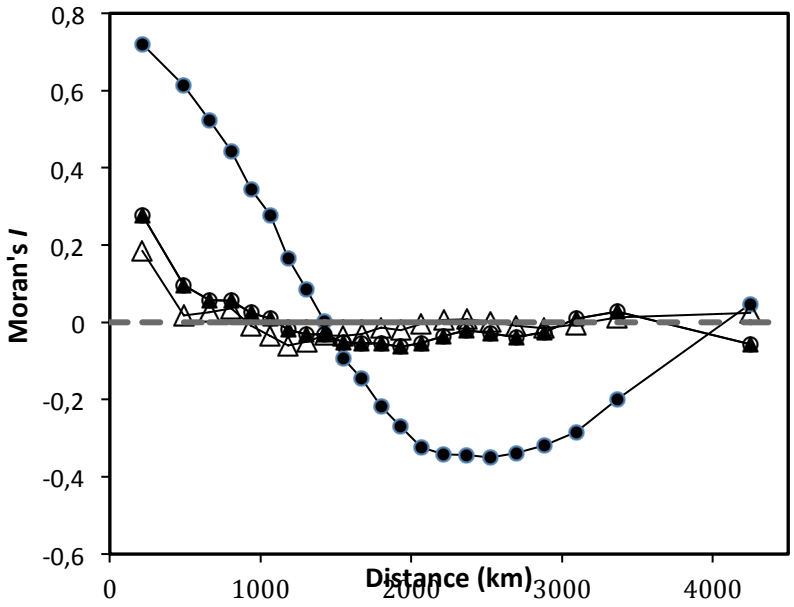


Figure A4 The partitioning of deviance in genus diversity using partial regression methods for the comparisons between (A) contemporary environment *vs*. regional effects, (B) contemporary climate *vs*. regional effects, and (C) contemporary climate *vs*. habitat heterogeneity + human activities. In the figure, a, and c are the independent components attributed to two groups of factors, respectively; b is the covarying component of the groups; and d is residual deviance. For the details of the partial regression method, see Legendre and Legendre (1998).

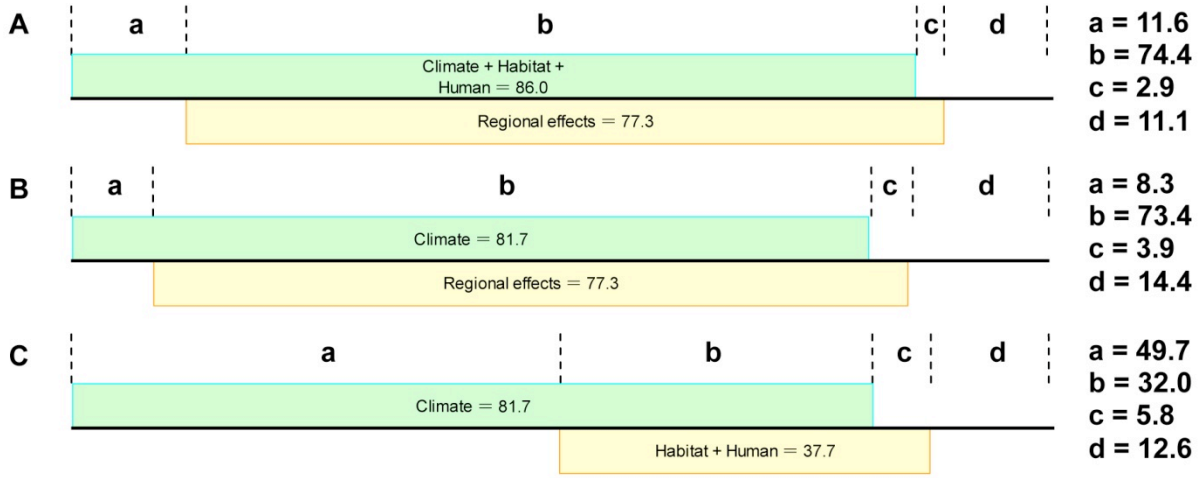


Figure A5 The partitioning of deviance in family diversity using partial regression methods for the comparisons between (A) contemporary environment *vs*. regional effects, (B) contemporary climate *vs*. regional effects, and (C) contemporary climate *vs*. habitat heterogeneity + human activities. In the figure, a, and c are the independent components attributed to two groups of factors, respectively; b is the covarying component of the groups; and d is residual deviance. For the details of the partial regression method, see Legendre and Legendre (1998).

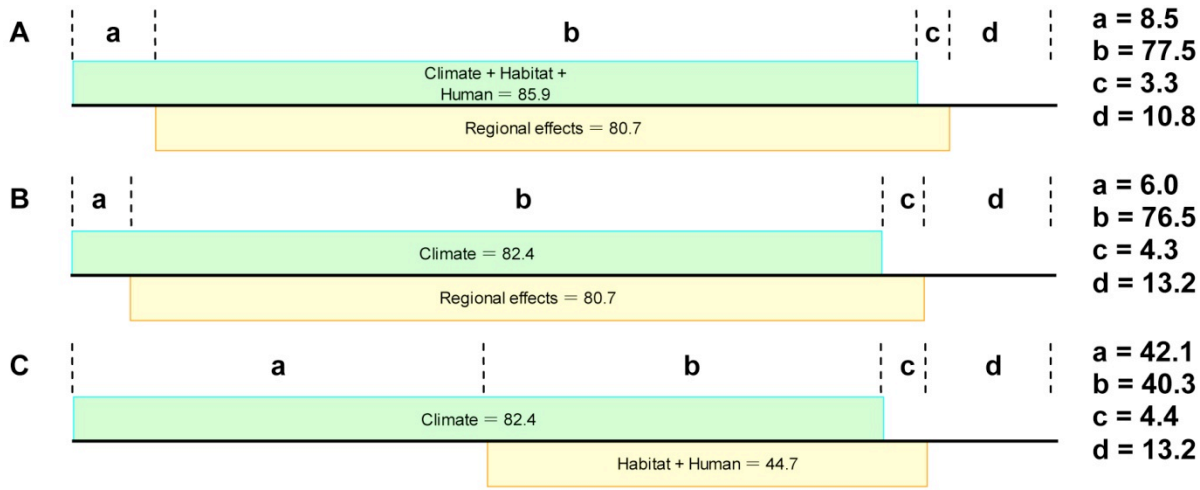
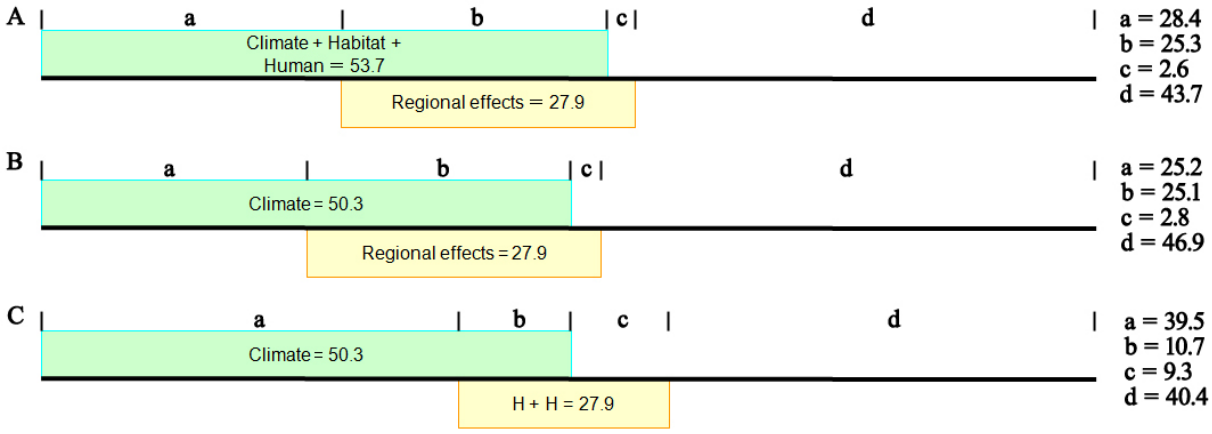


Figure A6 The partitioning of deviance in the richness of narrow-range species using partial regression methods for the comparisons between (A) contemporary environment *vs*. regional effects, (B) contemporary climate *vs*. regional effects, and (C) contemporary climate *vs*. habitat heterogeneity + human activities. The narrow-range species were defined as the first quartile of species (2851 species) when all species were sorted into the order of increasing range size. In the figure, a, and c are the independent components attributed to two groups of factors, respectively; b is the covarying component of the groups; and d is residual deviance. For the details of the partial regression method, see Legendre and Legendre (1998).



SUPPLEMENTAL LITERATURE CITED

Editorial Board for Physical Geography of China. 1985. China's Physical Geography: phytogeography. - Science Press, Beijing.

Legendre, P. and Legendre, L. 1998. Numerical ecology. - Elsevier Science BV, Amsterdam.