a: the spatial patterns of autocorrelation in the occurrence of local species assemblages that are significantly structured with respect to MDiv - The spatial correlogram for the occurrence of non-random assemblages of species more similar than expected by chance showed that the spatial autocorrelation increases up to 0.56 only at the shortest distant classes (395 km); lower levels of spatial autocorrelation occurred for the other distant classes (between -0.18-0.24) (solid circles on Fig. S4A).

The spatial correlogram for the occurrence of non-random assemblages of species more dissimilar than expected by chance showed low levels of spatial autocorrelation at all distance classes (-0.04-0.15) (solid circles on Fig. S4C).

b: evaluation of the effect of spatial autocorrelation on the performance of environmental models fitted to MDiv and SR - We used spatial generalised linear mixed model in R (GLMM) [Dormann et al. (2007) for review] to address the spatial autocorrelation in models with binomial distribution of errors (Table II, main text). We used glmmPQL of the MASS package in R [according to the script provided in Dormann et al. (2007)], with a Gaussian correlation structure in the residuals to estimate the coefficients of the environmental variables that were preserved in the final models shown on Table II (main text).

GLM and GLMM models resulted in rather similar results, although GLMM tends to reduce the magnitude of the regression coefficients (compare Table II, main text, and Table S2 below). The spatial autocorrelation that remained in the residuals after the fit of GLM and GLMM models was low (i.e. Moran's I equal or less than 0.29 at the shortest distance classes) (Fig. S4B, D).

TABLE SII

Spatial generalised linear mixed model to account for the presence of structure in the organisation of local species assemblages with respect to morphological diversity (MDiv)

	MDiv lower than expected by chance		MDiv greater than expected by chance	
Environmental variables	*b*	*p*	*b*	*p*
Constant	-3.217	0.000	-5.397	0.000
Potential evapotranspiration	-0.346	0.000	-	-
Mean annual temperature	0.175	0.345	4.839	0.001
Mean altitude	-	-	-	-
Mean precipitation	-3.336	0.000	-	-
Actual evapotranspiration	-	-	-	-
Colwell's precipitation predictability index	-2.882	0.000	-	-
Mean standard deviation altitude	0.603	0.000	-	-
Coefficient of variation in temperature	-	-	-	-
Coefficient of variation in precipitation	-3.531	0.000	-	-
Number of ecoregions	-	-	-	-
Distance of each cell in the grid map to major rivers	-	-	-2.698	0.012

b: coefficients that indicates the magnitude of the association; *p*: the probability level.

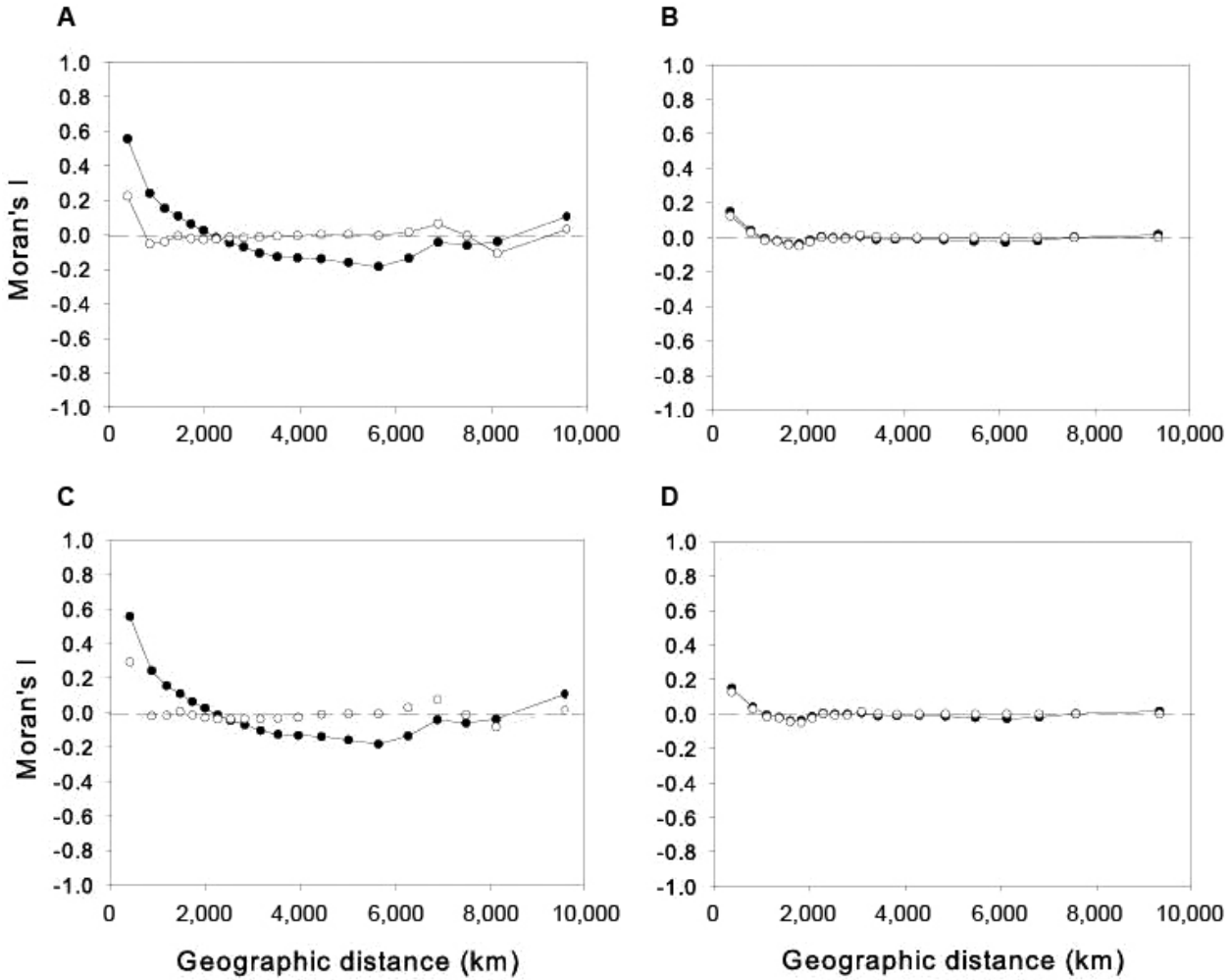

Fig. S4: spatial correlograms for the binomial variable that represents the presence of random/non-random assemblages with respect to morphological diversity (MDiv) (solid circles). A, B: non-random assemblages are more similar than expected by chance; C, D: non-random assemblages are more dissimilar than expected by chance. Residuals after the fit of environmental models (open circles) are given for non-spatial GLM (A, C) and spatially explicit GLMM (B, D) models (see Materials and Methods).