

Supplementary Materials

Patterns and drivers of avian taxonomic and phylogenetic beta diversity in China vary across geographical backgrounds and dispersal abilities

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Supplementary Figure S1 Patterns of taxonomic beta diversity, phylogenetic beta diversity ($\beta_{tax.sor}$ and $\beta_{phy.sor}$), and their respective turnover ($\beta_{tax.sim}$ and $\beta_{phy.sim}$) and nestedness ($\beta_{tax.sne}$ and $\beta_{phy.sne}$) components for breeding birds in mainland China, with 25×25 km, 50×50 km, 100×100 km, and 200×200 km spatial resolution, respectively



Supplementary Figure S2 Phylogenetic tree for 1 146 breeding birds considered in this study



Supplementary Figure S3 Geographical patterns of environmental variables in mainland China

MAT: mean annual temperature; MAP: mean annual precipitation; PET: potential evapotranspiration; TS: temperature seasonality; PS: precipitation seasonality; MATR: mean annual temperature range; HD: habitat diversity; ER: elevational range; NDVI: normalized difference vegetation index; AALC: area of anthropogenic land cover.



Supplementary Figure S4 Schematic of moving window approach, showing focal grid and grids sampled by the window and used in beta diversity calculation of focal grid



Supplementary Figure S5 Patterns of taxonomic beta diversity, phylogenetic beta diversity ($\beta_{tax.sor}$ and $\beta_{phy.sor}$), and their respective turnover ($\beta_{tax.sim}$ and $\beta_{phy.sim}$) and nestedness ($\beta_{tax.sne}$ and $\beta_{phy.sne}$) components for breeding birds with strong, medium, and weak dispersal ability in mainland China



Supplementary Figure S6 Proportion of grids dominated by turnover and nestedness components in eastern and western regions of mainland China (MLC) divided by Hu Line

TBD: taxonomic beta diversity; PBD: phylogenetic beta diversity.



Supplementary Figure S7 Variance partitioning analysis of spatial (Spa), climate (Clim), habitat heterogeneity (HH), and habitat quality (HQ) distances of taxonomic beta diversity and phylogenetic beta diversity of breeding birds ($\beta_{tax.sor}$ and $\beta_{phy.sor}$) and their respective turnover ($\beta_{tax.sim}$ and $\beta_{phy.sim}$) and nestedness ($\beta_{tax.sne}$ and $\beta_{phy.sne}$) components across mainland China

Venn diagrams show average R² value of independent and shared effects of four explanatory variables.



Supplementary Figure S8 Proportion of species with strong, medium, and weak dispersal ability on either side of Hu Line

Supplementary Table S1 Correlations between taxonomic beta diversity, phylogenetic beta diversity ($\beta_{tax.sor}$ and $\beta_{phy.sor}$), and their respective turnover ($\beta_{tax.sim}$ and $\beta_{phy.sim}$) and nestedness ($\beta_{tax.sne}$ and $\beta_{phy.sne}$) components of all species and species with strong, medium, and weak dispersal ability

Weak dispersal ability		
Р		
<0.00		
1		
< 0.00		
1		
< 0.00		
1		
< 0.00		
1		
<0.00		
1		
< 0.00		
1		
s - 1 1 1 2 2 C		

Coef and *SE* refer to standardized coefficients and standard error, respectively, in simultaneous autoregressive models.