

# **Local-scale Partitioning of Functional and Phylogenetic Beta Diversity in a Tropical Tree Assemblage**

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## Figure legends

**Figure S1 Geographical location and the spatial distribution of the three habitat types in 20-ha Xishuangbanna forest dynamics plot.** Colors represent different habitat types at the spatial scale of  $20 \times 20$  m. The map was generated using DIVA-GIS 7.5.

**Figure S2 The phylogenetic tree constructed from DNA barcodes of the 428 species in the 20-ha Xishuangbanna forest dynamics plot.**

**Figure S3 The distribution of standard effective size for non-abundance-weighted mean pairwise phylogenetic distance (*S.E.S. D<sub>pw</sub>*) and standard effective size for non-abundance-weighted mean nearest taxon phylogenetic distance (*S.E.S. D<sub>nn</sub>*) across scales.** Bars to the left of the red zero line indicates phylogenetic turnover is faster than expected. The proportions of S.E.S values below zero were as follows: (a) 65.16%, (b) 77.35%, (c) 51.28%, (d) 81.76%, (e) 47.80%, (f) 85.81%, (g) 69.75%, (h) 94.56%.

**Figure S4 The distribution of standard effective size for non-abundance-weighted mean pairwise functional distance (*S.E.S. D<sub>pw</sub>*) and standard effective size for non-abundance-weighted mean nearest taxon functional distance (*S.E.S. D<sub>nn</sub>*) across scales.** Bars to the left of the red zero line indicates functional turnover is faster than expected. The proportions of S.E.S values below zero were as follows: (a) 56.35%, (b) 71.26%, (c) 95.6%, (d)

95.48%, (e) 98.02%, (f) 95.91%, (g) 99.6%, (h) 90.25%.

**Table S1 The loadings of eight continuous functional traits on the first three principal components for 428 tree species in the 20-ha Xishuangbanna forest dynamics plot.**

Functional traits	PCA1	PCA2	PCA3
LDMC	-0.534	-0.008	-0.376
Leaf area	0.302	0.499	0.278
Leaf chlorophyll content	-0.165	0.362	0.005
Leaf thickness	0.091	0.696	-0.113
Maximum height	-0.273	0.112	0.553
Seed mass	-0.336	0.014	0.544
SLA	0.522	-0.325	0.303
Stem specific resistance	-0.358	-0.130	0.274
% explained	49.961	12.264	10.514

SLA, specific leaf area; LDMC, leaf dry mass content.

**Table S2 Classification criteria for the three topographical habitat types for all 20 × 20 m quadrats in the 20-ha Xishuangbanna forest dynamics plot.**

Habitats	Valley	Slope	Ridge
Elevation (m)	< 779.8	all	all
Slope (degree)	all	≥ 27.14	< 27.14
Convexity (degree)	< 0	≥ 0	all

27.14 and 779.8 are median slope and median elevation respectively for all 20 × 20 m quadrats within the plot.

**Table S3 The variation of phylogenetic dissimilarity explained by geographic and environmental distances across scales using multiple regressions on distance matrices based on non-abundance-weighted metrics.**

Scale (m <sup>2</sup> )	Response distance matrix	Explanatory distance matrices		
		Combination of geographic and environmental distance	Geographic distance	Environmental distance
10 × 10	<i>D<sub>pw</sub></i>	0.096***	0.002***	0.096***
	<i>D<sub>nn</sub></i>	0.089*	0.010	0.087
20 × 20	<i>D<sub>pw</sub></i>	0.004***	0.004	0.000***
	<i>D<sub>nn</sub></i>	0.207***	0.027***	0.197***
50 × 50	<i>D<sub>pw</sub></i>	0.174***	0.007	0.173***
	<i>D<sub>nn</sub></i>	0.144***	0.064***	0.114***
100 × 100	<i>D<sub>pw</sub></i>	0.196***	0.018	0.235***
	<i>D<sub>nn</sub></i>	0.325***	0.150***	0.300***

\*\*\* P < 0.001, \*\* P < 0.01, \* P < 0.05

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Scale (m <sup>2</sup> )	Response distance matrix	Explanatory distance matrices		
		Combination of geographic and environmental distance	Geographic distance	Environmental distance
10 × 10	$D_{pw}$	0.004	0.000	0.004
	$D_{nn}$	0.036*	0.008	0.033
20 × 20	$D_{pw}$	0.016***	0.008***	0.007***
	$D_{nn}$	0.020***	0.019***	0.000***
50 × 50	$D_{pw}$	0.058***	0.007***	0.058***
	$D_{nn}$	0.142***	0.068***	0.108***
100 × 100	$D_{pw}$	0.000***	0.000***	0.000***
	$D_{nn}$	0.242***	0.080***	0.236***

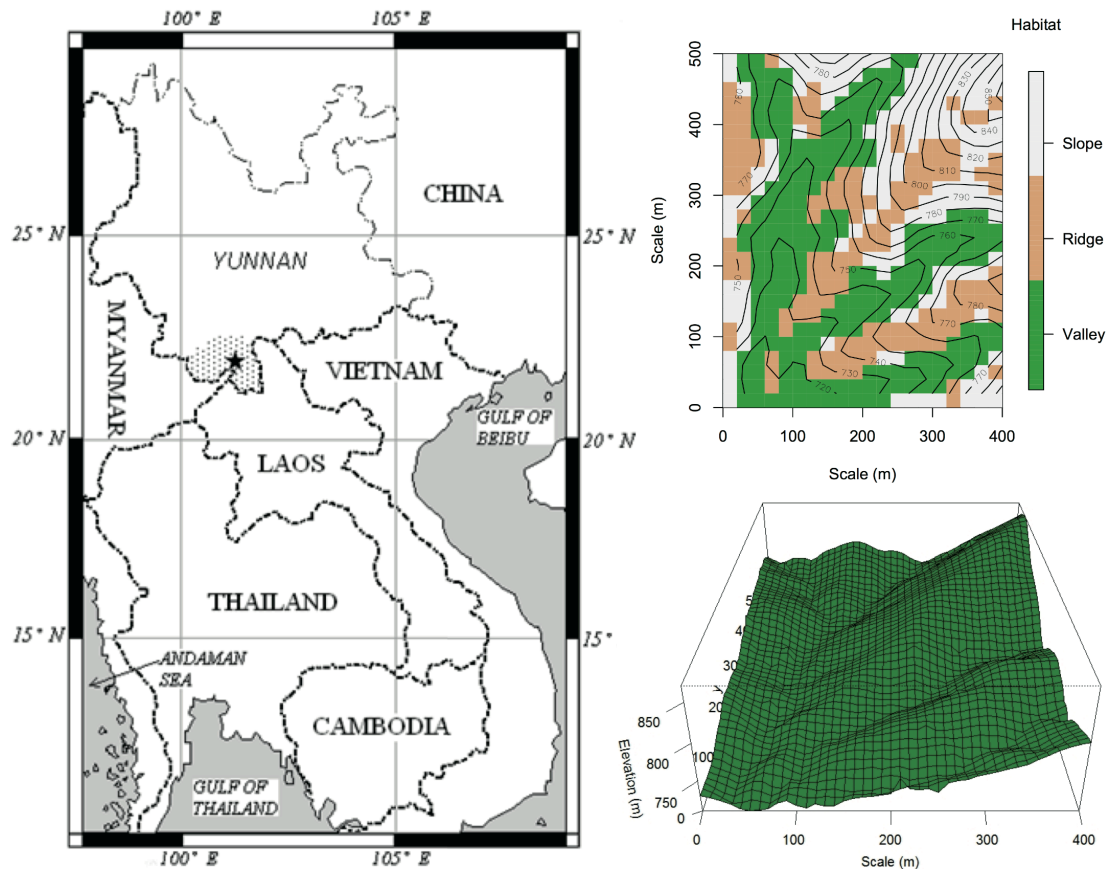
\*\*\* P < 0.001, \*\* P < 0.01, \* P < 0.05

**Table S5 One-tailed student's t test for whether the mean phylogenetic and functional dissimilarity within habitats was lower than that across habitats.**

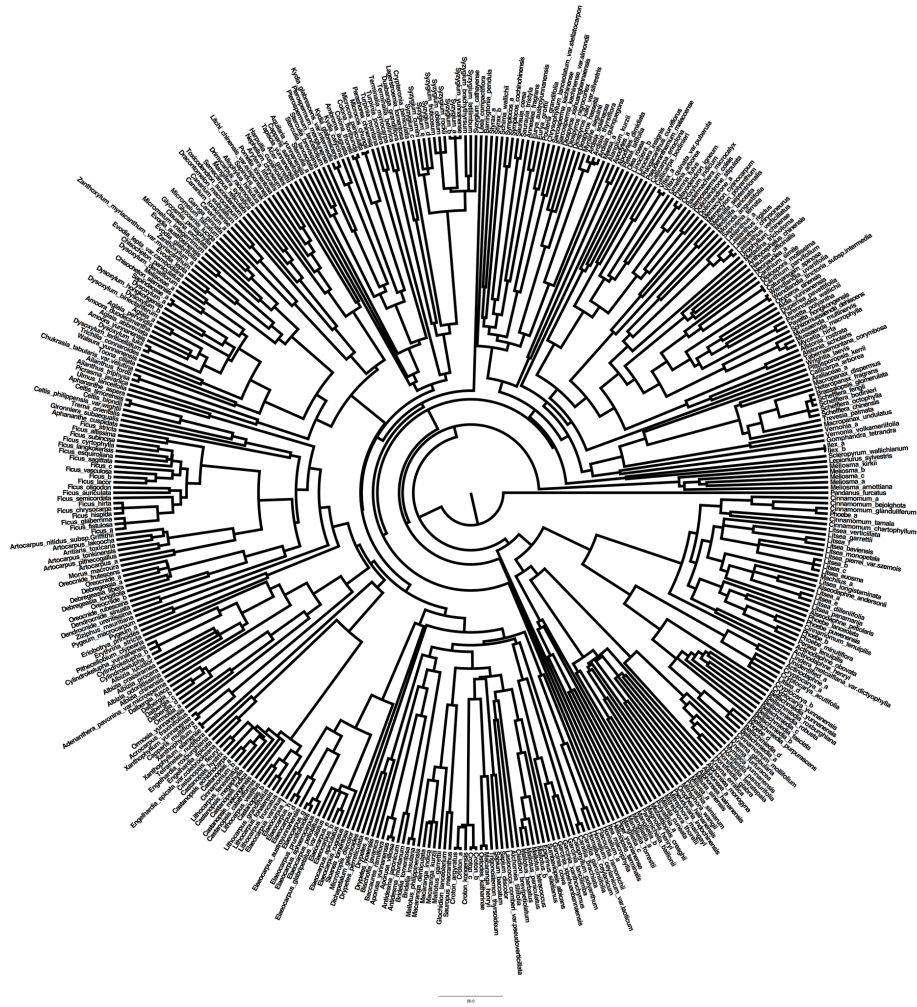
Habitats	Phylogenetic	Phylogenetic	Functional	Functional
	<i>S.E.S D<sub>pw</sub></i>	<i>S.E.S D<sub>nn</sub></i>	<i>S.E.S D<sub>pw</sub></i>	<i>S.E.S D<sub>nn</sub></i>
	<i>P</i> value	<i>P</i> value	<i>P</i> value	<i>P</i> value
VV-VS	0.530	<b>0.000</b>	<b>0.023</b>	<b>0.001</b>
VV-VR	<b>0.001</b>	<b>0.001</b>	<b>0.001</b>	<b>0.001</b>
VV-SR	<b>0.001</b>	<b>0.000</b>	<b>0.001</b>	<b>0.001</b>
SS-VS	<b>0.005</b>	<b>0.000</b>	<b>0.001</b>	<b>0.001</b>
SS-VR	<b>0.001</b>	<b>0.000</b>	<b>0.001</b>	<b>0.001</b>
SS-SR	<b>0.001</b>	<b>0.000</b>	<b>0.001</b>	<b>0.001</b>
RR-VS	<b>0.001</b>	<b>0.001</b>	<b>0.001</b>	<b>0.001</b>
RR-VR	<b>0.001</b>	<b>0.001</b>	<b>0.001</b>	<b>0.001</b>
RR-SR	0.236	0.068	0.673	0.041

V: Valley; S: Slope; R: Ridge. The same letters represent phylogenetic and functional dissimilarity within habitats (i.e. VV, SS, RR) and the different letters represent that across habitats (i.e. VS, VR, SR).  $P < 0.025$  is shown in bold.

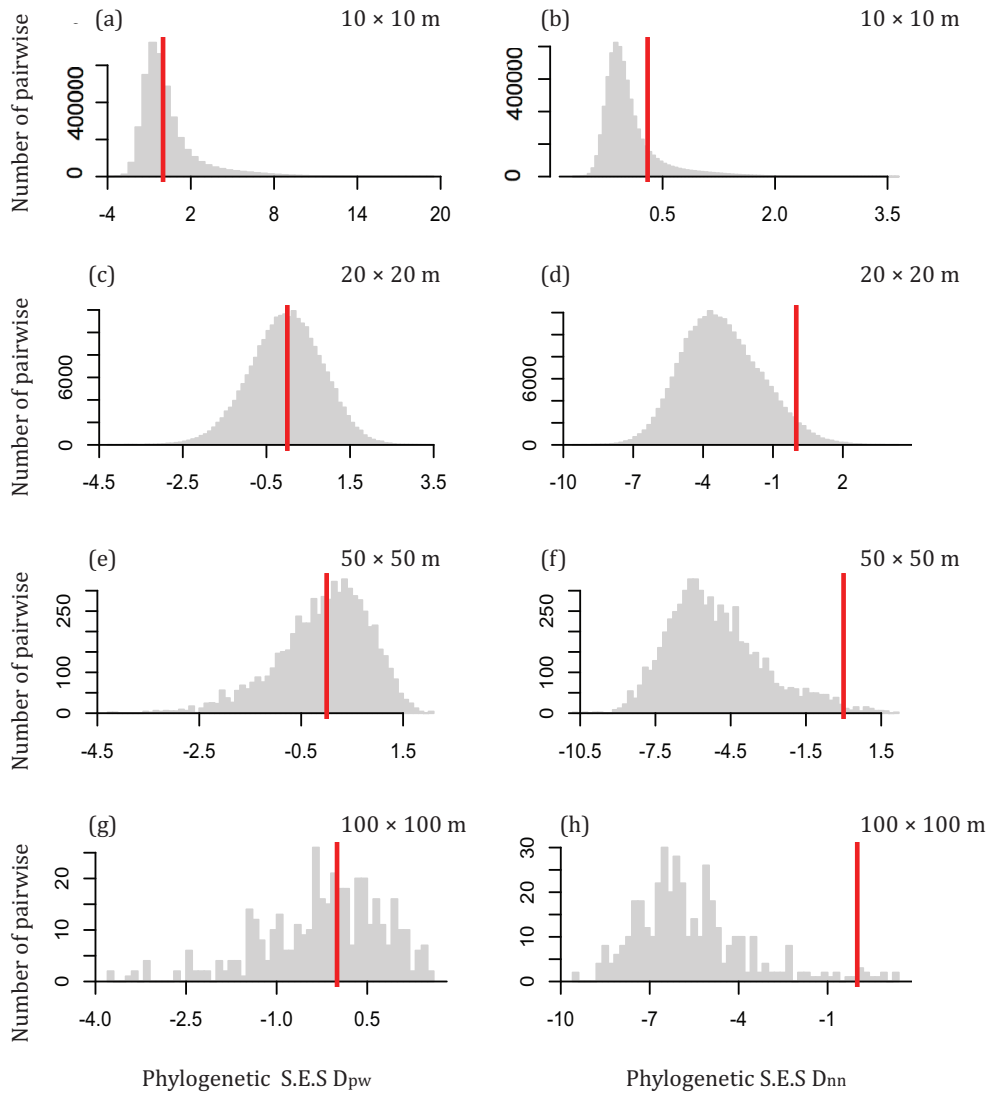




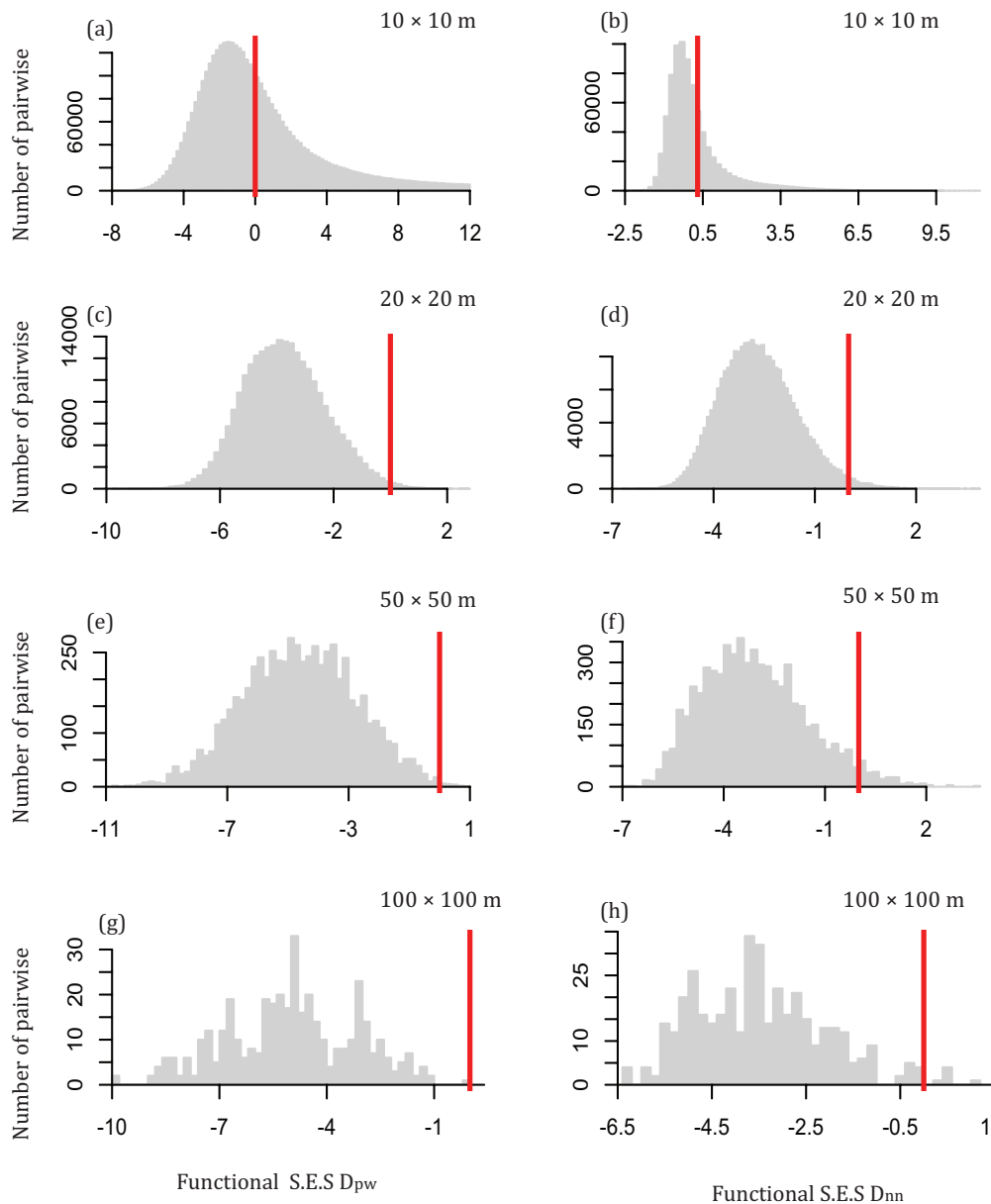
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