A report for data analysis by different methods

To ensure the correct results, we analyze the data by different methods:

(1) For Fig.1 and table 1, we analysis and redrawn the figure, and got the same result as the submitted paper.

(2) For the table 2, We checked the data in four methods in SAM, including ① all data were transformed by log and community-weighted means were based on abundance of species in each plot (Table 2-A), ② all data not transformed and community-weighted means based on abundance of species in each plot (Table 2-B), ③ only environment factors were transformed by log and community-weighted means were based on abundance of species in each plot (Table 2-C), ④ all data were transformed by log and community-weighted means were based on basal area of species in each plot . We got the similar the study results. Restored time, followed by soil nutrients, were the most important limits to functional traits, species and functional diversity.

(3) For Fig.2 and Fig.3, we used three different methods to ensure the results: ① based on abundance, and all the functional traits were log-transformed to computer functional traits and functional diversity (Fig.3-A, Fig.4-A), ② based on abundance, and functional traits were not log-transformed to computer functional traits and functional diversity (Fig.3-B, Fig.4-B), ③base on species basal area, and all the functional traits were log-transformed to computer functional traits (Fig.3-C, Fig.4-C). We all also got the following similar results in three different methods.

(4) For Fig.5, We reanalysis the environment data, and supplied information in detail.

Table 1 Number of stems, species, species showing a significant preference for different tree sizes

Tree sizes	Number of stems				Number of species				No. species showing preference			
	40_y	60_y	Old	Total	40_y	60_y	Old	Total	40_y	60_y	Old	Total
Saplings	235	482	308	1025	29	47	61	97	4	11	9	24
Treelets	312	427	251	990	34	48	61	101	6	9	8	23
Adult trees	275	296	270	841	23	34	68	94	**3**	**2**	**12**	**17**
Total	822	1205	829	2856	44	65	102	135	8	15	24	47

Notes: Preference for forest recovery stage is analyzed using an indicator species value (Dufrene and Legendre 1997). Significant associations with each of the restored forest are tested using the probabilities of obtaining as great an indicator value as great an indicator value as observed over 1000 iterations.

Table 2-A The selected models with delta AIC, the importance of each environment parameters, the correlation direction and residual spatial autocorrelation(RSA)(Moran's values, p<0.05 was in bold). All the data (including environmental factors, functional traits, species and functional diversity) were transformed by log in this table. Eight functional traits using community-weighted means based on abundance of species in each plot.

	Log_Decidu	Log_SLA	Log_LDMC	Log_LNC	Log_LPC	Log_LKC	Log_LCC	Log_WD	Log_Smass	Log_S	Log_H	Log_J	Log_FRic	Log_FEve	Log_FDiv
Model	#195	#129	#187	#457	#107	#129	#389	#191	#66	#131	#1	#384	#226	#481	#290
R_adj	0.463	0.196	0.601	0.61	0.651	0.754	0.48	0.389	0.184	0.59	0.274	-0.227	0.453	0.511	-0.257
F_radio	10.884	-3.277	-10.681	-4.216	32.327	-15.432	-2.751	2.264	17.413	-18.964	12.114	1.53	2.493	3.346	1.802
log_Rtime	**-0.984**	**+0.746**	**-0.836**	**+0.666**	**+0.933**	**+0.985**	-0.369	**+0.906**	**-0.996**	**+0.993**	**+0.93**	+0.22	**+0.992**	+0.213	-0.213
log_pH	+0.244	**-0.64**	+0.214	**-0.691**	**-0.844**	-0.464	+0.35	+0.231	**-0.978**	+0.213	-0.219	-0.421	+0.205	-0.241	**-0.534**
log_SOM	**-0.466**	-0.283	**+0.814**	+0.323	**+0.502**	-0.318	**-0.517**	**+0.581**	+0.351	**+0.634**	+0.245	-0.253	+0.227	-0.202	**+0.695**
log_TN	**-0.517**	+0.254	+0.292	**+0.536**	-0.448	-0.257	**+0.855**	+0.365	+0.267	**-0.566**	+0.208	+0.232	-0.199	-0.201	-0.861
log_TP	**+0.863**	+0.291	-0.355	**+0.66**	**+0.698**	+0.289	**-0.667**	+0.348	-0.331	-0.342	+0.243	+0.265	**-0.529**	**+0.97**	+0.363
log_TK	+0.268	+0.275	+0.254	**-0.587**	**-0.756**	-0.3	**+0.593**	-0.228	+0.2	-0.235	+0.331	**+0.616**	-0.212	-0.221	+0.462
log_AN	-0.198	+0.371	**-0.873**	**-0.533**	+0.335	+0.198	**-0.965**	+0.208	+0.176	+0.258	+0.21	+0.209	+0.197	-0.221	-0.293
log_AP	-0.292	+0.285	-0.277	**+0.809**	**+0.592**	+0.386	**+0.541**	**-0.642**	+0.314	+0.271	+0.29	+0.238	+0.463	+0.248	+0.396
log_AK	+0.252	**+0.617**	-0.239	**+0.903**	**+0.973**	**+0.637**	-0.351	-0.255	**+0.973**	-0.224	+0.245	**+0.496**	+0.217	+0.221	**+0.519**
Distance	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I
0.199	0.162	-0.1	-0.161	-0.177	-0.188	-0.151	-0.106	-0.143	-0.068	-0.047	-0.082	-0.063	-0.096	-0.185	**0.28**
0.601	**-0.458**	**-0.225**	-0.042	-0.093	-0.04	-0.117	0.054	-0.138	0.012	-0.167	**-0.207**	**-0.248**	-0.146	-0.005	**0.277**
1.132	0.121	0.041	-0.005	0.09	0.097	0.102	-0.001	0.068	0.04	0.13	0.134	0.086	0.117	-0.046	0.058
1.6	<.001	0.128	0.042	0.168	0.075	0.072	-0.013	0.021	-0.109	-0.023	-0.008	0.031	-0.026	0.036	-0.076
1.873	-0.15	-0.042	<.001	-0.062	0.033	0.052	-0.117	-0.018	-0.061	-0.168	-0.139	-0.096	-0.126	-0.094	-0.024
2.106	0.045	-0.026	-0.092	-0.138	-0.183	-0.135	-0.088	-0.018	-0.068	0.054	0.152	0.064	0.109	-0.013	**-0.234**
2.396	-0.188	0.003	0.013	0.087	0.007	-0.06	0.002	-0.02	0.048	-0.204	-0.181	0.013	**-0.22**	0.107	**-0.344**
2.793	0.141	-0.063	-0.027	-0.129	-0.076	-0.031	0.037	-0.067	-0.091	0.135	0.056	-0.047	0.101	-0.031	**-0.216**

Table 2-B The selected models with delta AIC, the importance of each environment parameters, the correlation direction and residual spatial autocorrelation(RSA)(Moran's values, p<0.05 was in bold). All the data were not transformed, and eight functional traits and functional diversity using community-weighted means based on abundance of species in each plot.

	Deciduous	SLA	LDMC	LNC	LPC	LKC	LCC	WD	Smass	S	H	J	FRic	FEve	FDiv
Model	#163	#250	#187	#128	#82	#256	#389	#191	#126	#131	#130	#497	#1	#481	#290
R_adj	0.603	0.097	0.357	0.814	0.267	0.78	0.45	0.384	0.377	0.554	0.374	-0.284	0.429	0.503	0.099
F-radio	-8.543	-2.606	-2.613	-2.609	-2.771	-2.865	-2.56	-2.563	-3.648	-2.978	-2.697	-2.597	-6.431	-2.626	-2.618
Rtime	**-0.981**	**+0.73**	**+0.639**	**+0.718**	**+0.987**	**+0.994**	-0.352	+0.841	**-0.989**	**+0.996**	**+0.951**	+0.223	**+0.988**	+0.216	+0.223
pH	-0.275	-0.417	-0.283	**-0.823**	**-0.979**	**-0.482**	+0.257	+0.263	**-0.994**	+0.214	+0.251	-0.408	+0.232	-0.261	**-0.669**
SOM	**-0.52**	-0.257	**+0.546**	+0.344	-0.298	-0.23	-0.46	+0.534	0.223	**+0.803**	+0.348	+0.241	+0.226	+0.201	**+0.699**
TN	-0.381	+0.264	+0.414	+0.343	-0.465	-0.209	**+0.908**	+0.339	0.26	**-0.735**	+0.229	+0.244	+0.217	+0.201	-0.861
TP	**+0.889**	+0.367	-0.516	**+0.623**	**-0.632**	-0.248	+0.443	+0.405	-0.264	-0.375	-0.258	+0.278	+0.297	**+0.936**	-0.301
TK	+0.329	+0.287	+0.269	-0.392	**-0.681**	-0.301	+0.399	+0.263	-0.196	-0.397	+0.293	**+0.597**	+0.392	-0.212	+0.449
AN	+0.203	**+0.587**	**+0.942**	-0.366	-0.171	+0.198	**-0.971**	+0.22	0.371	+0.258	+0.212	+0.22	+0.295	+0.215	+0.258
AP	-0.316	+0.355	+0.283	**-0.668**	**-0.793**	+0.245	**+0.776**	-0.455	-0.222	-0.274	+0.267	+0.237	+0.254	-0.246	+0.263
AK	+0.248	+0.43	+0.35	**+0.912**	**+0.994**	**+0.892**	+0.249	+0.284	**0.992**	-0.226	+0.295	**+0.516**	+0.279	+0.237	**+0.625**
Distance	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I
0.199	0.17	-0.092	-0.169	-0.179	-0.179	-0.167	-0.108	-0.145	-0.105	-0.057	-0.072	-0.057		-0.173	**0.277**
0.601	**-0.451**	**-0.234**	-0.051	-0.091	-0.033	-0.101	0.053	-0.136	0.015	**-0.179**	**-0.22**	**-0.255**		-0.013	**0.293**
1.132	0.149	0.044	-0.001	0.09	0.092	0.108	-0.002	0.068	0.007	0.111	**0.154**	0.091		-0.042	0.058
1.6	0.019	0.133	0.05	**0.163**	0.064	0.076	-0.01	0.018	-0.071	0.019	0.007	0.036		0.044	-0.066
1.873	-0.174	-0.052	-0.009	-0.058	0.048	0.076	-0.12	-0.02	-0.07	-0.169	-0.164	-0.114		-0.108	-0.026
2.106	0.033	-0.029	-0.081	-0.141	-0.196	-0.165	-0.084	-0.013	-0.067	0.005	0.132	0.072		-0.023	**-0.237**
2.396	-0.188	0.008	0.013	0.084	0.005	-0.027	0.001	-0.016	0.068	-0.156	-0.173	0.014		0.115	**-0.354**
2.793	0.121	-0.064	-0.026	-0.124	-0.071	-0.074	0.038	-0.071	-0.062	**0.142**	0.062	-0.048		-0.034	**-0.226**

Table 2-C The selected models with delta AIC, the importance of each environment parameters, the correlation direction and residual spatial autocorrelation(RSA)(Moran's values, p<0.05 was in bold). Environmental factors were transformed by log in this table. Eight functional traits and functional diversity using community-weighted means based on abundance of species in each plot.

	Deciduous	SLA	LDMC	LNC	LPC	LKC	LCC	WD	Smass	S	H	J	FRic	FEve	FDiv
Model	#163	#129	#187	#125	#107	#122	#389	#191	#114	#131	#1	#384	#256	#481	#290
R_adj	0.71	0.266	0.58	0.583	0.588	0.809	0.477	0.392	0.315	0.644	0.415	-0.197	0.499	0.542	-0.179
F_radio	9.934	-12.798	2.24	-9.675	-22.561	-63.008	-15.211	-6.084	4.568	30.04	18.822	12.693	5.754	69.694	5.388
log_Rtime	**-0.998**	**+0.807**	**-0.796**	**+0.676**	**+0.927**	**+0.987**	-0.363	**+0.906**	**-0.997**	**+0.991**	**+0.971**	+0.219	**+0.991**	+0.226	-0.218
log_pH	-0.218	**-0.631**	+0.223	**-0.682**	-0.873	**-0.623**	+0.351	+0.23	**-0.991**	+0.275	+0.216	-0.458	+0.303	-0.243	-0.481
log_SOM	**-0.551**	-0.296	**+0.793**	+0.358	+0.454	-0.35	**-0.522**	**+0.593**	+0.308	**+0.609**	+0.237	-0.259	+0.206	-0.202	**+0.657**
log_TN	-0.397	+0.263	+0.299	**+0.581**	-0.453	-0.272	**+0.849**	+0.358	+0.294	**-0.525**	+0.205	+0.236	+0.203	+0.203	**-0.815**
log_TP	**+0.941**	+0.283	-0.388	**+0.653**	**+0.772**	+0.226	**-0.672**	+0.35	-0.366	+0.265	+0.218	+0.274	+0.213	**+0.967**	+0.375
log_TK	+0.239	-0.278	+0.269	**-0.613**	**-0.809**	-0.375	**+0.595**	-0.227	-0.199	-0.297	+0.289	**+0.581**	+0.353	-0.222	+0.473
log_AN	+0.193	+0.335	**-0.878**	**-0.606**	+0.338	-0.208	**-0.964**	+0.207	+0.188	+0.254	+0.197	+0.204	+0.26	-0.233	-0.345
log_AP	+0.257	+0.275	-0.277	**+0.829**	**+0.609**	+0.23	**+0.537**	**-0.643**	+0.266	+0.251	+0.245	-0.243	+0.216	+0.264	+0.414
log_AK	+0.232	**+0.606**	-0.254	**+0.898**	**+0.984**	**+0.82**	-0.351	-0.257	**+0.991**	-0.335	+0.24	**+0.541**	+0.347	+0.234	+0.469
Distance	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I	Moran's I
0.199	0.17	-0.092	-0.169	-0.179	-0.179	-0.167	-0.108	-0.145	-0.105	-0.057	-0.072	-0.057		-0.173	**0.277**
0.601	**-0.451**	**-0.234**	-0.051	-0.091	-0.033	-0.101	0.053	-0.136	0.015	**-0.179**	**-0.22**	**-0.255**		-0.013	**0.293**
1.132	0.149	0.044	-0.001	0.09	0.092	0.108	-0.002	0.068	0.007	0.111	**0.154**	0.091		-0.042	0.058
1.6	0.019	0.133	0.05	**0.163**	0.064	0.076	-0.01	0.018	-0.071	0.019	0.007	0.036		0.044	-0.066
1.873	-0.174	-0.052	-0.009	-0.058	0.048	0.076	-0.12	-0.02	-0.07	-0.169	-0.164	-0.114		-0.108	-0.026
2.106	0.033	-0.029	-0.081	-0.141	-0.196	-0.165	-0.084	-0.013	-0.067	0.005	0.132	0.072		-0.023	**-0.237**
2.396	-0.188	0.008	0.013	0.084	0.005	-0.027	0.001	-0.016	0.068	-0.156	-0.173	0.014		0.115	**-0.354**
2.793	0.121	-0.064	-0.026	-0.124	-0.071	-0.074	0.038	-0.071	-0.062	**0.142**	0.062	-0.048		-0.034	**-0.226**

Table 2-D The selected models with delta AIC, the importance of each environment parameters, the correlation direction and residual spatial autocorrelation(RSA)(Moran's values, p<0.05 was in bold). The data, including environmental factors, functional richness, were transformed by log in this table. Eight functional traits and functional diversity using community-weighted means based on tree basal area of species in each plot.

	Deciduou	SLA	LDMC	LNC	LPC	LKC	LCC	WD	Smass	S	H	J	Log_FRi	FEve	FDiv
Model	#219	#484	#493	#457	#107	#363	#484	#255	#194	#131	#1	#384	#226	#481	#380
r_adj	0.799	0.777	0.611	0.806	0.824	0.317	0.672	0.105	-0.292	0.644	0.415	-0.197	0.384	-0.324	0.429
Rtime	**-0.976**	**+0.664**	-0.442	**+0.695**	**+0.863**	+0.293	-0.314	**+0.67**	**-0.982**	**+0.991**	**+0.971**	+0.219	**+0.987**	-0.38	-0.217
Log_pH	+0.382	**-0.577**	**+0.492**	**-0.544**	**-0.917**	**-0.6**	+0.329	+0.444	-0.317	+0.275	+0.216	-0.458	-0.217	-0.239	**-0.531**
Log_SOM	+0.214	-0.338	+0.292	-0.308	-0.274	-0.44	+0.352	-0.277	+0.261	**+0.609**	+0.237	-0.259	+0.229	+0.344	+0.39
Log_TN	**-0.959**	+0.267	+0.289	**+0.514**	+0.422	-0.319	+0.482	+0.399	+0.324	**-0.525**	+0.205	+0.236	-0.283	-0.26	-0.377
Log_TP	-0.247	**+0.94**	**-0.887**	**+0.783**	**+0.706**	**+0.751**	**-0.924**	+0.425	+0.238	+0.265	+0.218	+0.274	**-0.569**	-0.486	+0.428
Log_TK	+0.224	-0.415	+0.296	**-0.572**	**-0.659**	**+0.467**	**+0.519**	-0.262	+0.433	-0.297	+0.289	**+0.581**	-0.256	-0.249	**-0.469**
Log_AN	**+0.966**	+0.434	**-0.777**	-0.418	-0.307	**+0.522**	**-0.921**	-0.262	+0.226	+0.254	+0.197	+0.204	+0.214	-0.388	**-0.797**
Log_AP	-0.212	**+0.51**	-0.32	**+0.667**	**-0.55**	+0.388	-0.393	-0.396	+0.261	+0.251	+0.245	-0.243	**+0.532**	+0.437	**+0.802**
Log_AK	+0.335	+0.386	**+0.565**	**+0.785**	**+0.978**	**-0.465**	+0.374	**+0.492**	+0.27	-0.335	+0.24	**+0.541**	+0.227	-0.252	**+0.68**
DistCnt	Moran's	Moran's	Moran's	Moran's	Moran's	Moran's	Moran's	Moran's	Moran's	Moran's	Moran's	Moran's	Moran's	Moran's	Moran's I
0.199	0.023	-0.187	-0.156	-0.169	-0.189	-0.105	-0.207	0.036	-0.048	-0.057	-0.072	-0.057	-0.075	-0.046	0.187
0.601	-0.165	-0.113	-0.031	-0.117	-0.077	-0.138	0.033	-0.069	-0.083	-0.179	-0.22	-0.255	-0.131	-0.128	0.229
1.132	**0.163**	-0.043	-0.089	0.025	-0.012	-0.022	-0.074	**0.238**	-0.005	0.111	0.154	0.091	0.094	0.033	0.042
1.6	0.005	**0.259**	0.112	**0.235**	**0.18**	0.148	0.069	-0.046	0.058	0.019	0.007	0.036	-0.074	-0.154	-0.115
1.873	**-0.274**	-0.113	-0.015	-0.133	-0.026	-0.122	0.098	**-0.28**	0.207	-0.169	-0.164	-0.114	-0.14	0.05	-0.194
2.106	-0.054	-0.145	-0.114	-0.15	-0.161	-0.098	-0.188	-0.025	-0.21	0.005	0.132	0.072	0.139	0.031	-0.196
2.396	-0.122	**0.176**	0.064	0.121	0.099	**0.146**	0.078	-0.022	-0.073	-0.156	-0.173	0.014	-0.24	-0.025	-0.244
2.793	0.139	-0.1	0.007	-0.096	-0.069	-0.089	-0.026	-0.099	-0.059	0.142	0.062	-0.048	0.148	0.052	0.057

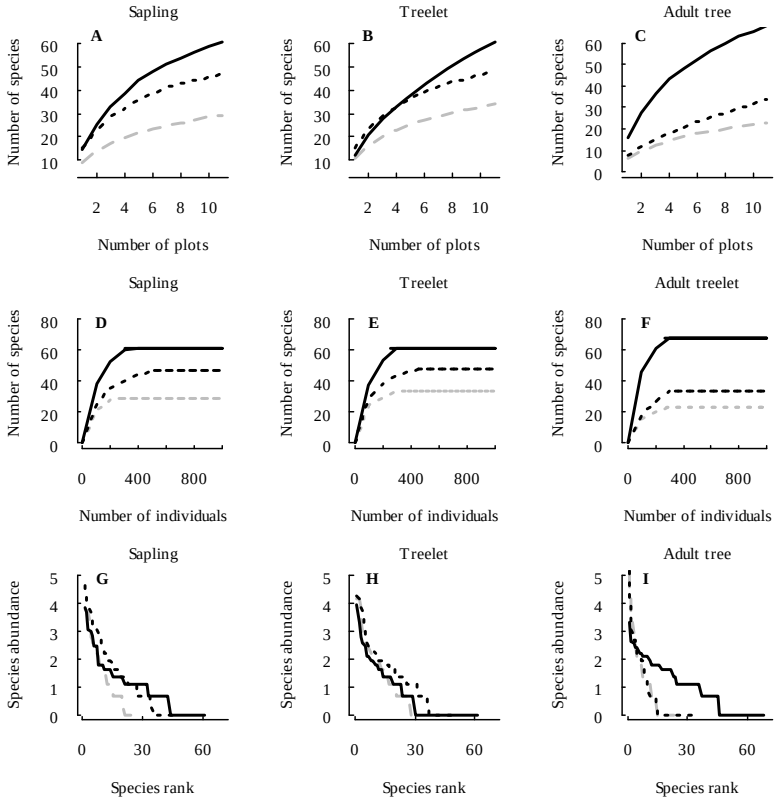

Fig.1 The species-area accumulation curves, species-individual accumulation cuvres, and species rank-abundance diagrams of tropical monsoon forest tree species with different recovery ages(gray dashed linesrepresent 40-year forests, blackdotted linesrepresent 60-year forests, and black solid lines represent old-growth forests; tree size class: saplings(1 cm≤dbh< 5 cm), treelets (5 cm≤dbh< 10 cm), and adult trees(dbh≥10 cm))

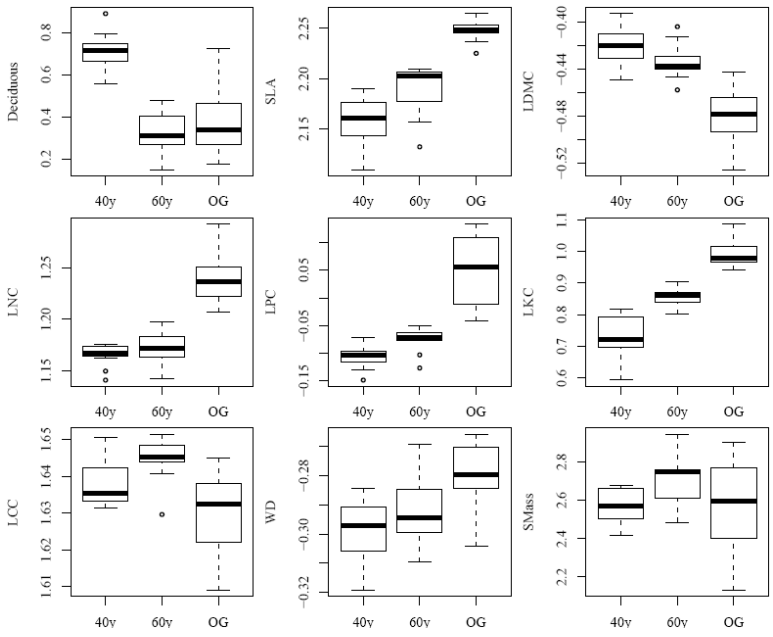

Fig.3-A The changes of functional traits with the secondary succession of monsoon forests (Eight

functional traits using community-weighted means based on log-transformed traits and tree abundance of species in each plot)

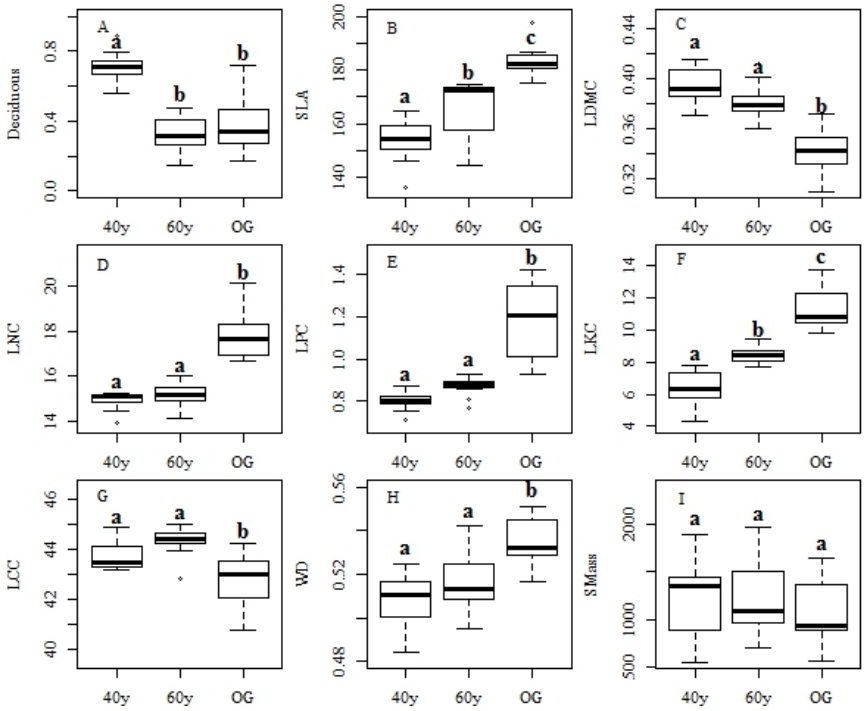

Fig.3-B The changes of functional traits with the secondary succession of monsoon forests (Eight functional traits using community-weighted means based on not log-transformed traits and tree abundance of species in each plot)

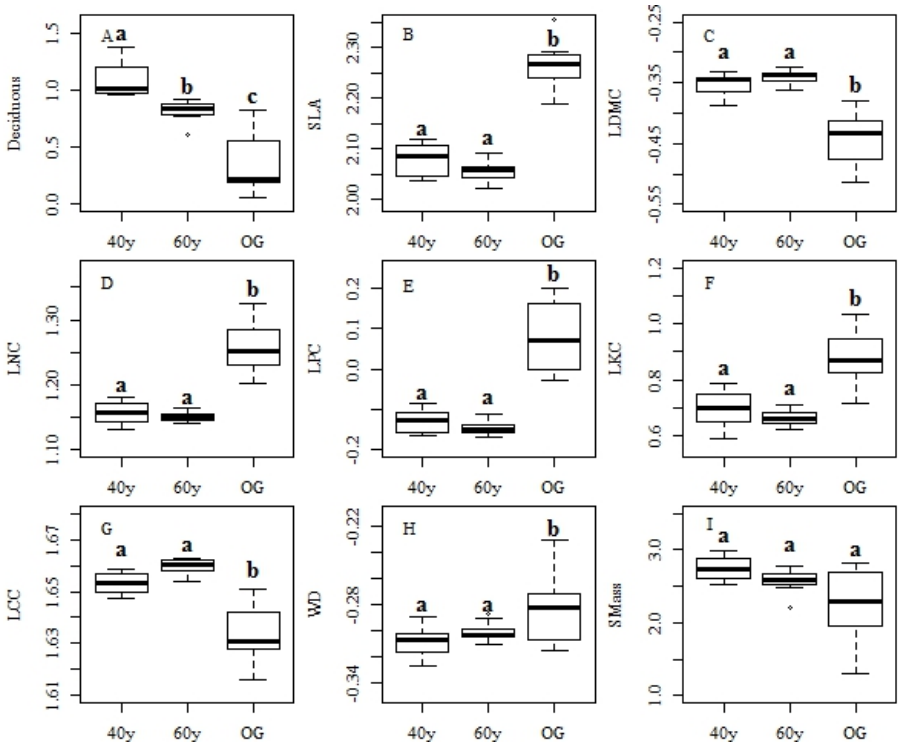

Fig.3-C The changes of functional traits with the secondary succession of monsoon forests (Eight functional traits using community-weighted means based on log-transformed traits and tree basal area of species in each plot)

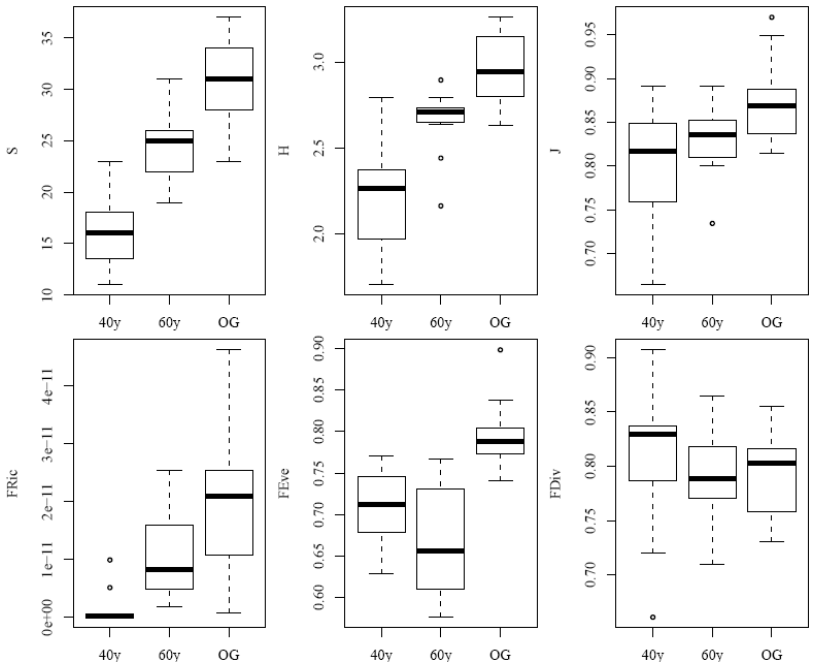

Fig.4-A The changes of species and functional diversity with secondary succession of monsoon forests ((Functional diversity based on tree abundance in every plot, and functional traits log-transformed)

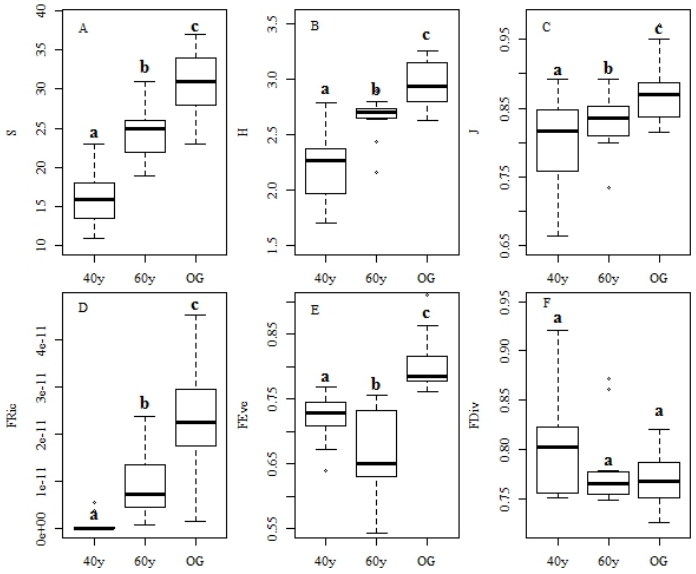

Fig.4-B The changes of species and functional diversity with secondary succession of monsoon forests (Functional diversity were defined basing on tree abundance in every plot, and functional traits not log-transformed)

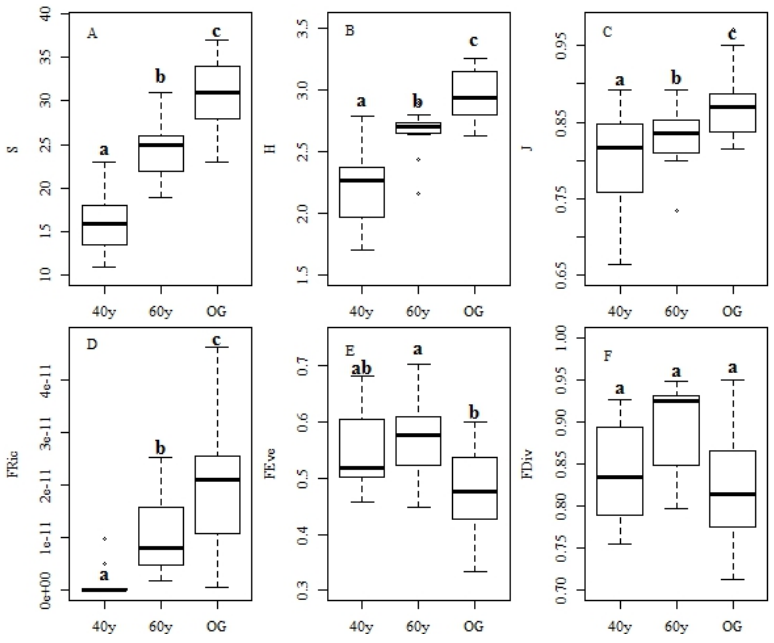

Fig.4-C The changes of species and functional diversity with secondary succession of monsoon forests (Functional diversity were defined basing on tree basal area in every plot, and functional traits log-transformed)

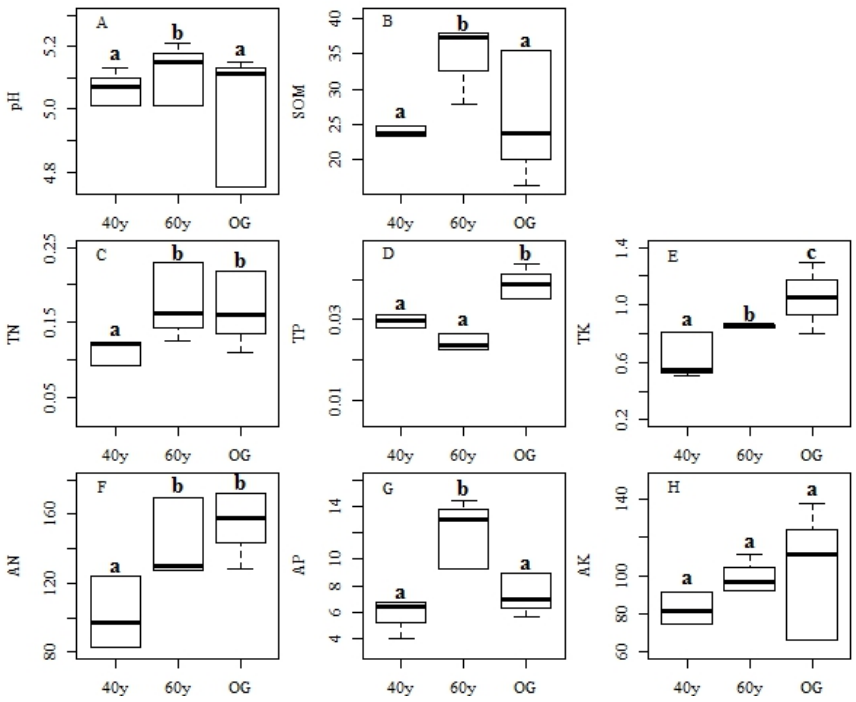

Fig.5 The changes of soil nutrient factors during succession in tropical monsoon forests

Information in detail for figures in paper