



# Supplementary Materials for

## Exploring the Sensitivity of Subtropical Stand Aboveground Productivity to Local and Regional Climate Signals in South China

**Tables S1.** Spearman correlation coefficients between monthly climate variables and monthly productivity variables during the study period 1981–2015 (420 months). The monthly average climate variables included multivariate ENSO index (MEI), minimum temperature (Tmin), maximum temperature (Tmax), precipitation (PRE), streamflow (FLO) and number of dry days (DD). The monthly mean productivity variables included aboveground net primary productivity (ANPP), wood/stem productivity (WP) and canopy productivity (CP) at the primary (Pri), secondary (Sec), mixed (Mix) and single-species (Sin) forest located in subtropical China.

Variables		MEI	Tmin	Tmax	PRE	FLO	DD
ANPP.Pri	Coef.	0.113*	0.832**	0.769**	0.435**	0.460**	-0.206**
	Sig.	0.021	0.000	0.000	0.000	0.000	0.000
WP.Pri	Coef.	0.111*	0.826**	0.764**	0.437**	0.462**	-0.205**
	Sig.	0.023	0.000	0.000	0.000	0.000	0.000
CP.Pri	Coef.	0.111*	0.804**	0.771**	0.440**	0.463**	-0.207**
	Sig.	0.023	0.000	0.000	0.000	0.000	0.000
ANPP.Sec	Coef.	0.012	0.834**	0.446**	0.331**	0.339**	-0.113*
	Sig.	0.810	0.000	0.000	0.000	0.000	0.020
WP.Sec	Coef.	-0.015	0.808**	0.372**	0.310**	0.304**	-0.120*
	Sig.	0.759	0.000	0.000	0.000	0.000	0.014
CP.Sec	Coef.	-0.051	0.609**	0.177**	0.261**	0.241**	-0.179**
	Sig.	0.293	0.000	0.000	0.000	0.000	0.000
ANPP.Mix	Coef.	0.134**	0.853**	0.782**	0.449**	0.485**	-0.218**
	Sig.	0.006	0.000	0.000	0.000	0.000	0.000
WP.Mix	Coef.	0.134**	0.837**	0.775**	0.433**	0.469**	-0.199**
	Sig.	0.006	0.000	0.000	0.000	0.000	0.000
CP.Mix	Coef.	0.132**	0.847**	0.771**	0.446**	0.479**	-0.214**
	Sig.	0.007	0.000	0.000	0.000	0.000	0.000
ANPP.Sin	Coef.	-0.045	0.797**	0.450**	0.332**	0.366**	-0.098
	Sig.	0.446	0.000	0.000	0.000	0.000	0.099
WP.Sin	Coef.	-0.059	0.798**	0.428**	0.323**	0.354**	-0.098
	Sig.	0.315	0.000	0.000	0.000	0.000	0.096
CP.Sin	Coef.	-0.072	0.786**	0.408**	0.314**	0.343**	-0.090
	Sig.	0.223	0.000	0.000	0.000	0.000	0.126
MEI	Coef.		0.080	0.187**	0.175**	0.193**	-0.133**
	Sig.		0.101	0.000	0.000	0.000	0.006

Note: \*\*,  $p < 0.01$  and \*,  $p < 0.05$ .

**Table S2.** Results of one-way analysis of variance (ANOVA) on seasonal detrended interannual variations in climate variables: multivariate ENSO index (MEI), minimum temperature (Tmin), maximum temperature (Tmax), precipitation (PRE), streamflow (FLO) and number of dry days (DD); as well as productivity variables: canopy production (CP), wood production (WP) and aboveground net primary production (ANPP) recorded during the period 1982015 at primary (Pri), secondary (Sec), mixed (Mix) and single-species (Sin) forest located in subtropical China.

<b>Variables</b>	<b>df</b>	<b>F values</b>	<b>p Value</b>
ANPP.Pri	34	0.590	0.969
WP.Pri	34	0.854	0.705
CP.Pri	34	1.331	0.107
ANPP.Sec	34	4.737	0.000
WP.Sec	34	5.862	0.000
CP.Sec	34	6.126	0.000
ANPP.Mix	34	1.186	0.224
WP.Mix	34	1.765	0.006
CP.Mix	34	1.523	0.034
ANPP.Sin	23	5.523	0.000
WP.Sin	23	5.556	0.000
CP.Sin	23	5.661	0.000
MEI	34	13.166	0.000
Tmin	34	1.124	0.295
Tmax	34	4.796	0.000
PRE	34	0.609	0.961
FLO	34	0.686	0.910
DD	34	0.360	1.000

**Table S3.** Results of one-way analysis of variance (ANOVA) on interannual detrended seasonal variations in climate variables: multivariate ENSO index (MEI), minimum temperature (Tmin), maximum temperature (Tmax), precipitation (PRE), streamflow (FLO) and number of dry days (DD); as well as productivity variables: canopy production (CP), wood production (WP) and aboveground net primary production (ANPP) recorded during the period 1981–2015 at primary (Pri), secondary (Sec), mixed (Mix) and single-species (Sin) forest located in subtropical China.

<b>Variables</b>	<b>df</b>	<b>F values</b>	<b>p Values</b>
ANPP.Pri	11	540.8	0.000
WP.Pri	11	371.2	0.000
CP.Pri	11	235.0	0.000
ANPP.Sec	11	59.9	0.000
WP.Sec	11	46.8	0.000
CP.Sec	11	44.4	0.000
ANPP.Mix	11	239.2	0.000
WP.Mix	11	157.2	0.000
CP.Mix	11	183.9	0.000
ANPP.Sin	11	24.3	0.000
WP.Sin	11	24.1	0.000
CP.Sin	11	23.4	0.000
MEI	11	1.0	0.470
Tmin	11	222.1	0.000
Tmax	11	58.2	0.000
PRE	11	33.0	0.000
FLO	11	30.4	0.000
DD	11	11.6	0.000

**Table S4.** Results of linear mixed effects models on seasonally detrended time series investigating significant trends in climate variables: multivariate ENSO index (MEI), minimum temperature (Tmin), maximum temperature (Tmax), precipitation (PRE), streamflow (FLO) and number of dry days (DD); as well as productivity variables: canopy production (CP), wood production (WP) and aboveground net primary production (ANPP) recorded during the period 1981–2015 at primary (Pri), secondary (Sec), mixed (Mix) and single-species (Sin) forest located in subtropical China.

Variable	Model	Df	logLik	AIC	BIC	T	p-Value	Significance
MEI	trend	33	-77.2	-71.2	-66.7	-1.5	0.151	
	random	34	-81.5	-75.4	-71			
FLO	trend	33	290.5	294.5	297.5	-6.4	0.000	***
	random	34	316.4	322.4	327			
DD	trend	33	63.1	67.1	70.1	-5.2	0.000	***
	random	34	75.3	81.3	85.8			
PRE	trend	33	297	301	304	-3.4	0.002	**
	random	34	303.7	309.8	314.4			
Tmin	trend	33	204.2	208.1	211.2	-12.9	0.000	***
	random	34	253.9	259.9	264.5			
Tmax	trend	33	-14.9	-10.9	-7.9	-3.8	0.000	***
	random	34	-9.8	-3.8	0.7			
ANPP.Pri	trend	33	-334	-330	-327	278.1	0.000	***
	random	34	-79.6	-73.6	-69			
WP.Pri	trend	33	-357.7	-353.7	-350.7	282.1	0.000	***
	random	34	-102.4	-96.4	-91.8			
CP.Pri	trend	33	-415.8	-411.8	-408.8	308.9	0.000	***
	random	34	-154.5	-148.5	-143.9			
ANPP.Sec	trend	33	-324.7	-320.7	-317.7	445.8	0.000	***
	random	34	-48.3	-42.3	-37.7			
WP.Sec	trend	33	-342.2	-338.2	-335.2	443.6	0.000	***
	random	34	-56.2	-50.2	-45.6			
CP.Sec	trend	33	-372.5	-368.5	-365.5	163.3	0.000	***
	random	34	-164.2	-158.2	-153.6			
ANPP.Mix	trend	33	-338.2	-334.2	-331.2	406.5	0.000	***
	random	34	-61.3	-55.3	-50.7			
WP.Mix	trend	33	-326.3	-322.3	-319.3	236.4	0.000	***
	random	34	-88	-82	-77.4			
CP.Mix	trend	33	-453.3	-449.3	-446.3	383.8	0.000	***
	random	34	-176.1	-170.1	-165.5			
ANPP.Sin	trend	33	-92.4	-88.4	-86.2	83.4	0.000	***
	random	34	29.3	35.3	38.7			
WP.Sin	trend	33	-163.4	-159.4	-157.2	287	0.000	***
	random	34	11.5	17.5	21			
CP.Sin	trend	33	-225.3	-221.3	-219.1	302.4	0.000	***
	random	34	-43.3	-37.3	-33.8			

**Table S5.** Results of lagged cross-correlations between seasonal detrended climate and productivity variables indicating maximum correlation coefficients at different time lags (0–36 month) for correlations between climate variables: multivariate ENSO index (MEI), minimum temperature (Tmin), maximum temperature (Tmax), precipitation (PRE), streamflow (FLO) and number of dry days (DD); as well as productivity variables: canopy production (CP), wood production (WP) and aboveground net primary production (ANPP) recorded during the period 1981–2015 at primary, secondary, mixed and single-species forest located in subtropical China.

Aboveground net primary productivity (ANPP)												
Variables	Primary Forest			Secondary Forest			Mixed Forest			Single-Species Forest		
	Coef.	Lag	Sign.	Coef.	Lag	Sign.	Coef.	Lag	Sign.	Coef.	Lag	Sign.
MEI	-0.284	19	**	0.176	3		0.292	30	**	-0.377	18	***
Tmin	0.135	4		0.254	7	*	0.219	16	*	0.149	11	
Tmax	0.251	25	*	-0.255	18	*	-0.234	18	*	-0.108	5	
PRE	-0.145	25		0.085	14		-0.108	0		-0.108	18	
FLO	0.169	13		-0.085	36		-0.149	0		-0.131	18	
DD	-0.099	32		-0.087	14		-0.160	35		0.174	19	
Wood productivity(WP)												
Variables	Primary Forest			Secondary Forest			Mixed Forest			Single-Species Forest		
	Coef.	Lag	Sign.	Coef.	Lag	Sign.	Coef.	Lag	Sign.	Coef.	Lag	Sign.
MEI	-0.280	19	**	0.175	3		0.292	30	**	-0.387	18	***
Tmin	0.143	4		0.254	7	*	0.230	16	*	0.147	11	
Tmax	0.251	25	*	-0.256	18	*	-0.239	18	*	-0.104	5	
PRE	-0.144	25		0.085	14		-0.117	0		-0.111	18	
FLO	-0.158	25		-0.085	36		-0.156	0		-0.132	18	
DD	-0.108	32		-0.087	14		-0.167	35		0.174	19	
Canopy Productivity(CP)												
Variables	Primary Forest			Secondary Forest			Mixed Forest			Single-species forest		
	Coef.	Lag	Sign.	Coef.	Lag	Sign.	Coef.	Lag	Sign.	Coef.	Lag	Sign.
MEI	-0.260	19	**	0.177	3		0.297	30	**	-0.357	18	**
Tmin	0.145	4		0.253	7	*	0.214	15	*	0.156	18	
Tmax	-0.277	12	**	-0.254	18	*	-0.233	18	*	-0.115	5	
PRE	0.167	13		0.086	14		-0.095	0		-0.104	18	
FLO	0.211	13	*	-0.084	36		-0.133	0		-0.129	18	
DD	-0.076	34		-0.086	14		-0.153	35		0.173	19	