Supplementary Tables and Figures:

Table S1. The results of independent-samples *t*-test for temperature dependency

	Positive role (i.e., positive correlation)				**Negative role (i.e., negative correlation)**			
	Pregrowing season		**Growing season**		**Pregrowing season**		**Growing season**	
	PC vs. NC	PM vs. NM	PC vs. NC	PM vs. NM	PC vs. NC	PM vs. NM	PC vs. NC	PM vs. NM
N	35 vs. 38	31 vs. 33	29 vs. 32	23 vs. 29	35 vs. 38	31 vs. 33	29 vs. 32	23 vs. 29
F	2.474	0.828	1.398	0.004	0.601	1.295	0.028	4.579
p	0.318	0.578	0.250	0.238	0.742	0.529	0.427	0.115
p (bootstrap)	0.337	0.564	0.264	0.259	0.735	0.508	0.467	0.105

Note: the PC, PM, NC, and NM represent planted coniferous, planted mixed, natural coniferous, and natural mixed forests, respectively. "N" represents the number of data samples. "*F*" and "*p*" represents the *F* value and significance of the independent-samples *t*-test, respectively. "*" indicate difference significant at $p < 0.05$. The "*p (bootstrap)*" represent the *p*-value of the independent-samples *t*-test with a bootstrapped sampling method (1000 samples).

Table S2. The results of independent-samples *t*-test for water balance dependency

	Positive role (i.e., positive correlation)		**Negative role (i.e., negative correlation)**	
	Pregrowing season	**Growing season**	**Pregrowing season**	**Growing season**

	PC vs. NC	PM vs. NM	PC vs. NC	PM vs. NM	PC vs. NC	PM vs. NM	PC vs. NC	PM vs. NM
N	44 vs. 45	42 vs. 46	108 vs. 131	86 vs. 113	44 vs. 45	42 vs. 46	108 vs. 131	86 vs. 113
F	0.322	0.097	2.106	2.845	0.00006	1.110	2.097	0.930
p	0.816	0.756	0.434	0.427	0.873	0.481	0.106	0.660
p (bootstrap)	0.824	/	0.424	0.415	0.864	/	0.094	0.689

Note: the PC, PM, NC, and NM represent planted coniferous, planted mixed, natural coniferous, and natural mixed forests, respectively. "N" represents the number of data samples. "*F*" and "*p*" represents the *F* value and significance of the independent-samples *t*-test, respectively. "*" indicate difference significant at $p < 0.05$. The "*p (bootstrap)*" represent the *p*-value of the independent-samples *t*-test with a bootstrapped sampling method (1000 samples).

Table S3. The environmental climatic thresholds and their ranges for various time scales

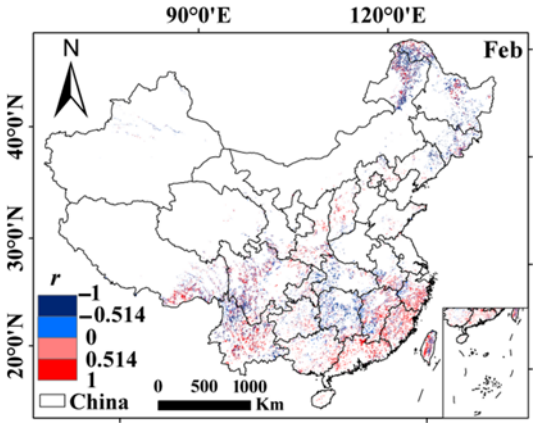
Time scale	**Temperature thresholds ($T_{threshold}$)** (℃)				**Water balance thresholds ($WB_{threshold}$)** (mm/month)			
(months)	PC	NC	PM	NM	PC	NC	PM	NM
1-12	5.2 (3.7~7.0)	3.3 (3.0~7.1)	6.3 (4.5~6.7)	5.5 (3.3~6.9)	168.7 (169.6~168.7)	209.5 (214.0 ~209.5)	149.3 (149.9~149.3)	108.5 (108.6 -108.5)
1-24	3.3 (3.2~3.7)	2.8 (2.4~2.9)	5.1 (4.5~6.7)	4.4 (3.3~6.9)	212.5 (223.2~212.5)	186.0 (189.5~ 186.0)	129.1 (129.7~129.1)	150.5 (164.1~150.5)
1-36	2.3 (−0.8~2.6)	2.8 (2.4~2.9)	5.3 (4.5~ 6.7)	3.6 (3.3~6.9)	238.8 (241.4~238.8)	229.6 (238.0~229.6)	149.3 (149.9~149.3)	186.3 (186.5~186.3)

Note: the PC, PM, NC, and NM represent planted coniferous, planted mixed, natural coniferous, and natural mixed forests, respectively. The ranges of threshold indicate the actual value around each threshold.

Table S4. The environmental climatic thresholds and their ranges for a 0.1 statistically significant level

Temperature thresholds ($T_{threshold}$) (℃)				**Water balance thresholds ($WB_{threshold}$)** (mm/month)			
PC	NC	PM	NM	PC	NC	PM	NM
1.4 (−0.85~2.60)	2.1 (−1.09~2.33)	4.9 (4.55~6.65)	3.6 (3.30~6.90)	258.0 (263.4~258.0)	228.3 (229.6~228.3)	141.5 (149.3~141.5)	186.3 (186.5~186.3)

Note: the PC, PM, NC, and NM represent planted coniferous, planted mixed, natural coniferous, and natural mixed forests, respectively. The ranges of threshold indicate the actual value around each threshold. The results considered 1–48 month time scales of water availability.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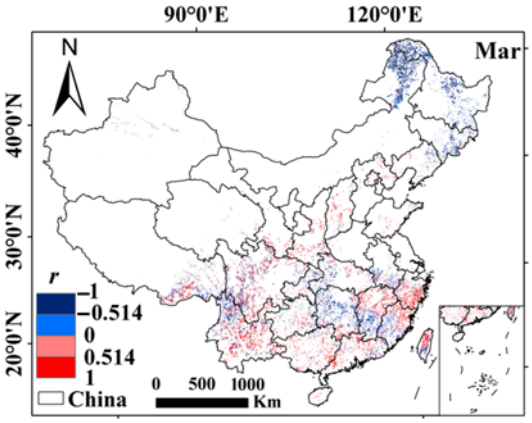
(a)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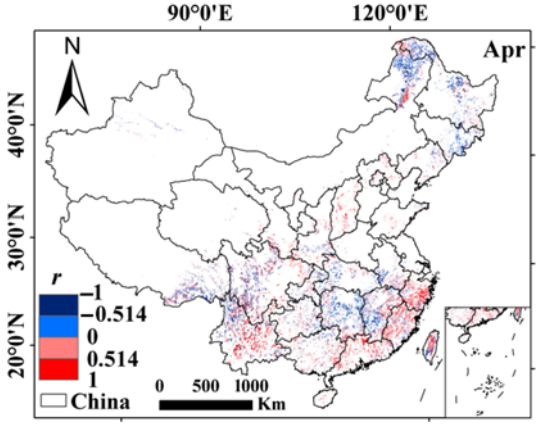
(b)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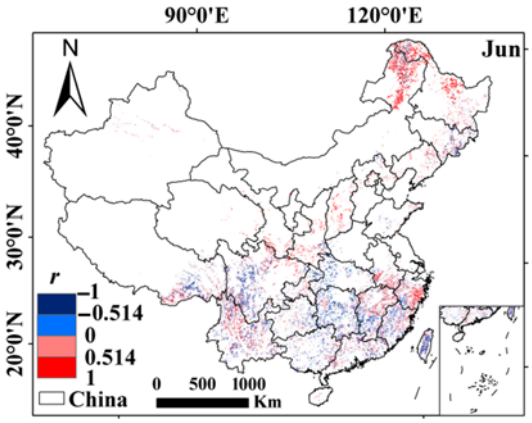
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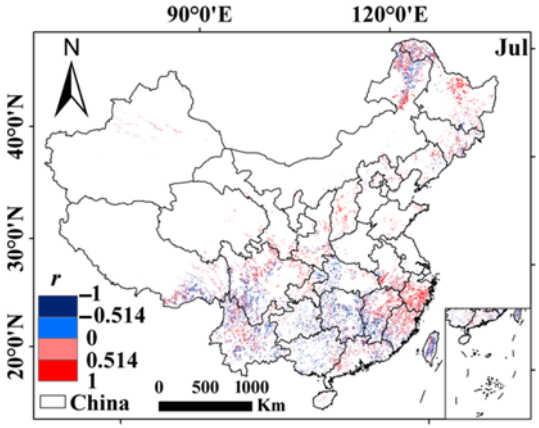
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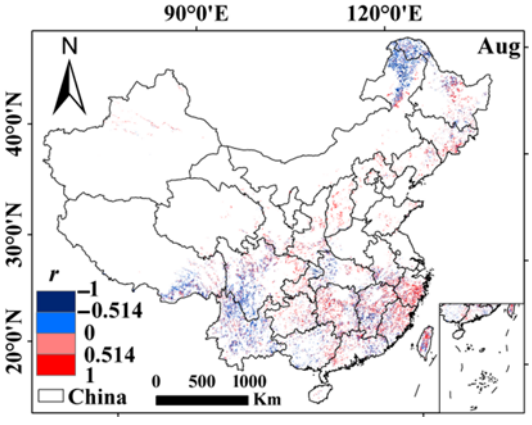
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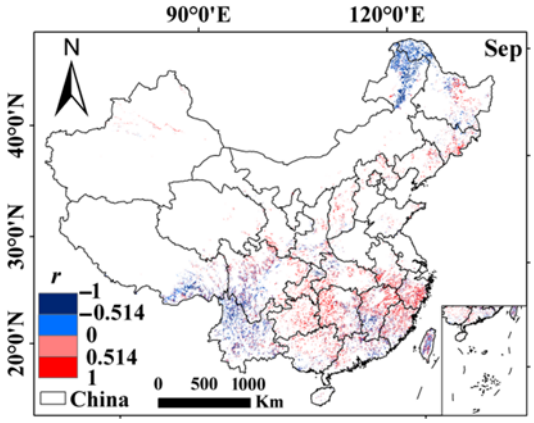

(g)

Figure S1. Spatial distribution of the strongest correlations (the r corresponds to $|r|_{max}$) of forest vigor with water availability in China: **(a)** February, **(b)** March, **(c)** April, **(d)** June, **(e)** July, **(f)** August, **(g)** September, respectively. The correlation significant at $p < 0.05$ is equivalent to $|r| > 0.514$ [1]. White areas indicate non-forest areas in China.

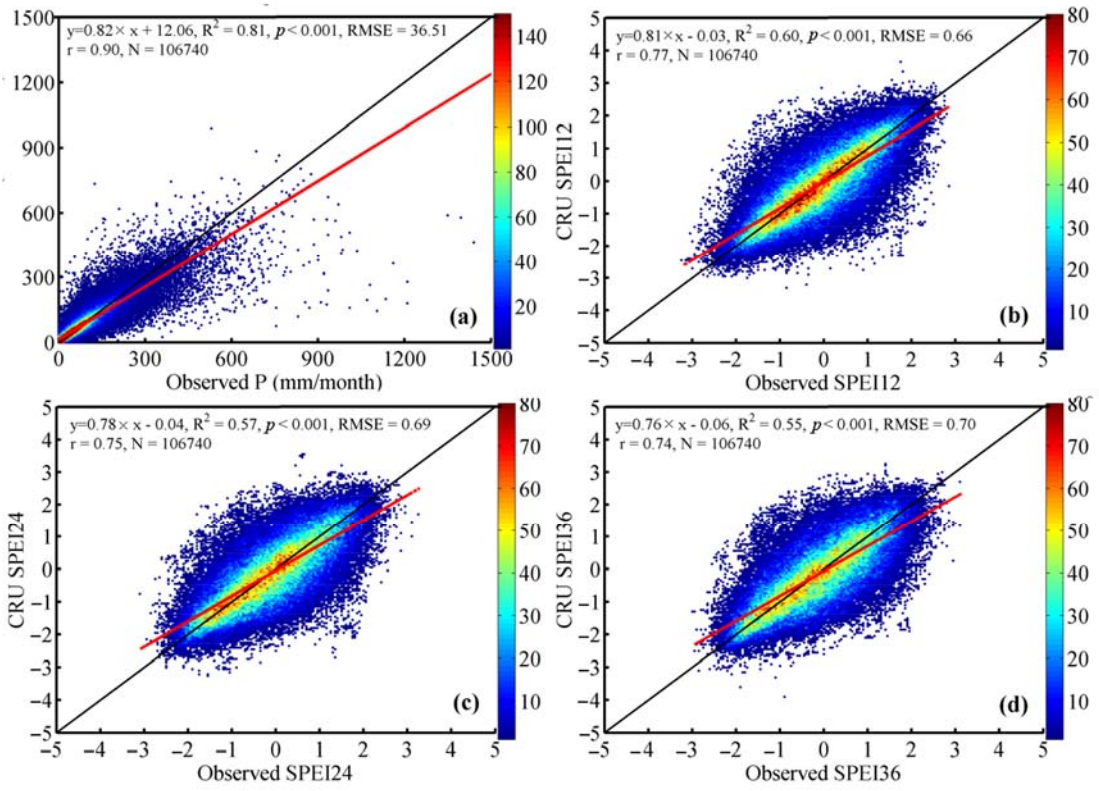

Figure S2. Comparisons between CRU data and the counterparts derived from meteorological stations. **(a)** The precipitation, **(b)** the *SPEI* at time scale of 12 months , **(c)** the *SPEI* at time scale of 24 months and **(d)** the *SPEI* at time scale of 36 months. The potential evapotranspiration (*PET*) was estimated using the FAO-56 Penman–Monteith method based on six primary variables (i.e., vapor pressure, relative humidity, sun hours, wind speed, and maximum and minimum temperatures) during 1960–2015. The *SPEI* calculated using the "spei" package in R software (Version 3.6.1). The

colors of figures (i.e., b, c, and d) represent the number of data samples, and the red and black line represent the fitting line and 1:1 line, respectively.

References

1. Ho, R. Handbook of Univariate and Multivariate Data Analysis with IBM SPSS, second ed. Chapman and Hall, London, UK, **2015**, 219-232.