Supplementary Materials

Table S1. Change rates of the $\delta^{13}C_{cor}$, $\delta^{18}O$ and intrinsic water-use efficiency (*iWUE*) series in the drought strengthened period (D_s+, 1986–1999) or in the drought weakened period (D_s-, 2000–2017) calculated using simple piecewise regression based on the data of *Pinus tabuliformis* and *Sophora viciifolia*.

	Period	$\delta^{13}C_{cor}$ (‰ yr^{-1})	$\delta^{18}O$ (‰ yr^{-1})	*iWUE* (μmol mol^{-1} yr^{-1})
P. tabuliformis	D_s+	0.373***	-0.002	4.57***
	D_s-	-0.064	-0.042	0.47
S. viciifolia	D_s+	0.367	0.460	4.64
	D_s-	0.004	-0.117*	1.28***

Significance levels are presented by $*$ and $***$: $*p < 0.05$; $***p < 0.005$.

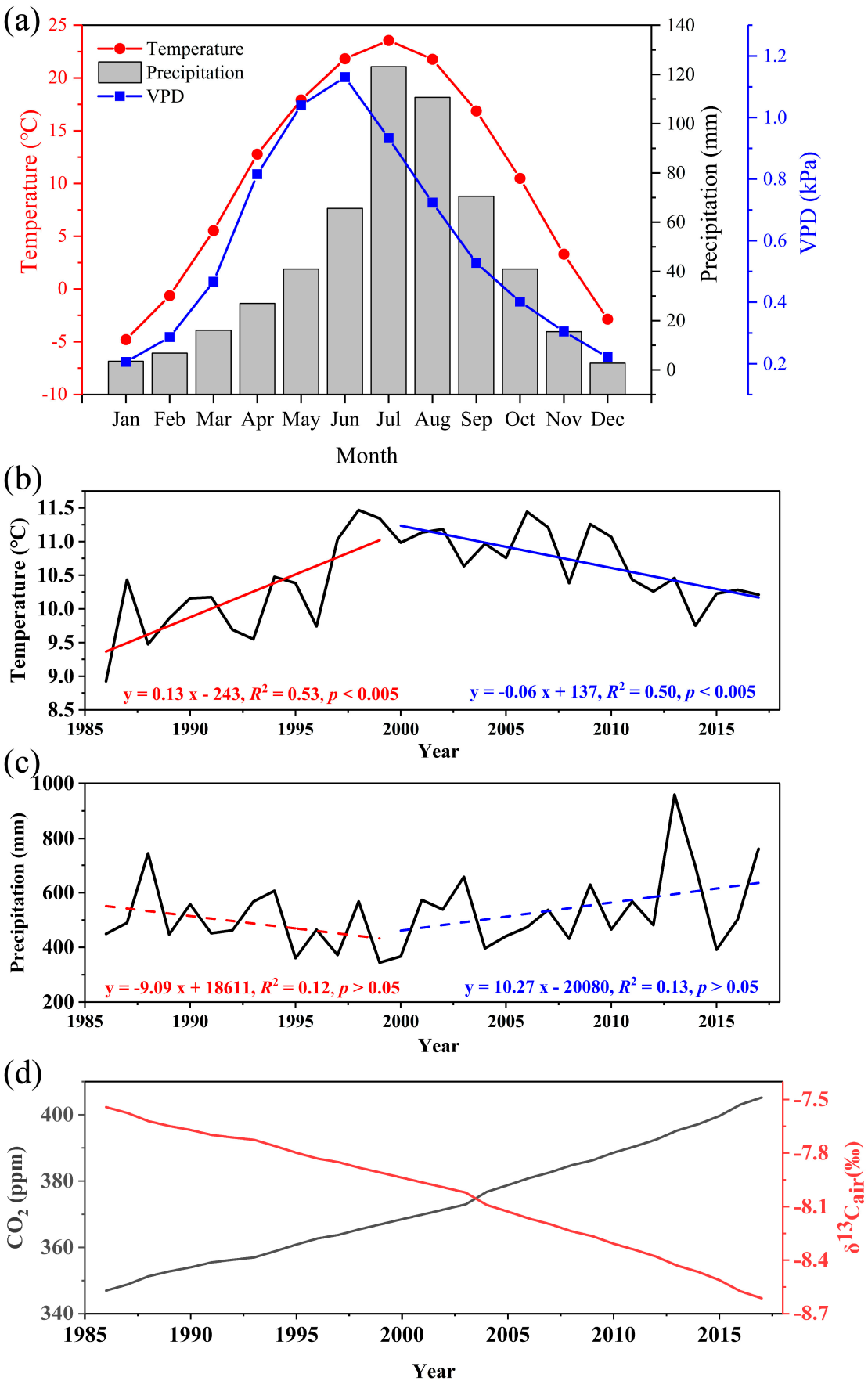

Figure S1. (a) The monthly mean temperature, precipitation and vapor-

pressure deficit (*VPD*) at the Yan'an meteorological station. Temporal variations of the annual (b) mean annual temperature, (c) total precipitation and (d) atmospheric carbon dioxide concentration (CO_2, grey line) and atmospheric stable carbon isotope ratio ($\delta^{13}C_{air}$, red line) from 1986 to 2017. We divide the entire period into two sub-periods based on the change in drought trends that occurred in 2000. The trends and linear regression models for mean annual temperature and total precipitation in the two sub-periods are also provided. The solid and dashed lines represent significant and nonsignificant trends, respectively.

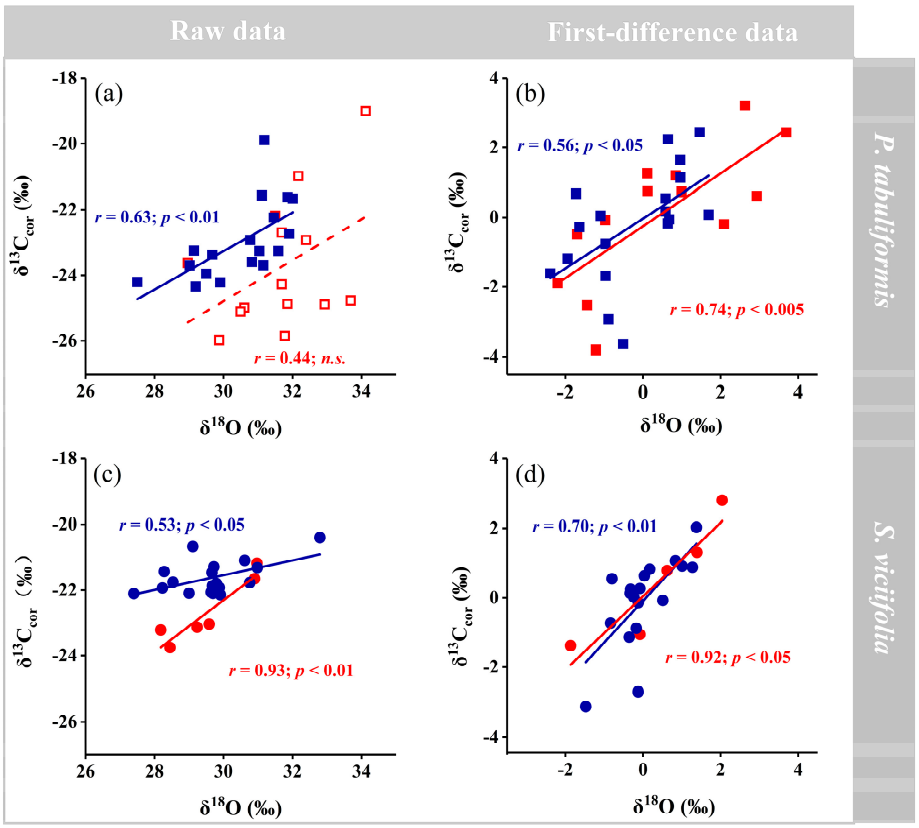

Figure S2. Scatter plots for the relationships between the tree-ring $\delta^{13}C_{cor}$ and $\delta^{18}O$ series during the period when drought stress strengthened (light red) and the period when drought stress weakened (dark bule) for (a, b) *Pinus tabuliformis* and (c, d) *Sophora viciifolia*: (a, c) raw data, (b, d) the first-difference data. The Pearson correlation coefficients (*r*) for the two subperiods is provided. The solid and dashed lines represent significant and nonsignificant trends, respectively. *n.s.*: non-significant ($p > 0.05$).

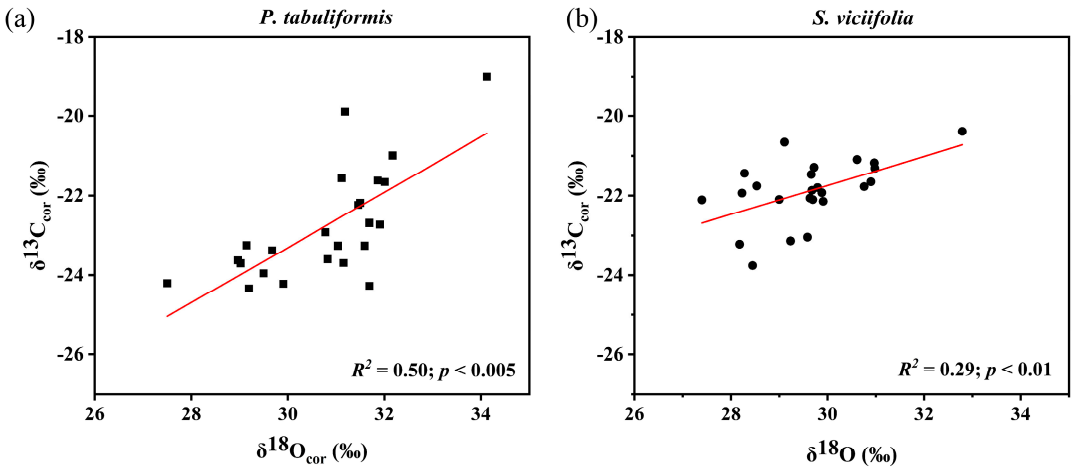

Figure S3. Scatter plots for the relationships between the tree-ring $\delta^{13}C_{cor}$ and $\delta^{18}O$ series during the common period from 1994 to 2017 for (a) *Pinus tabuliformis* and (b) *Sophora viciifolia* in the raw data. The coefficient of determination (R^2) is provided.

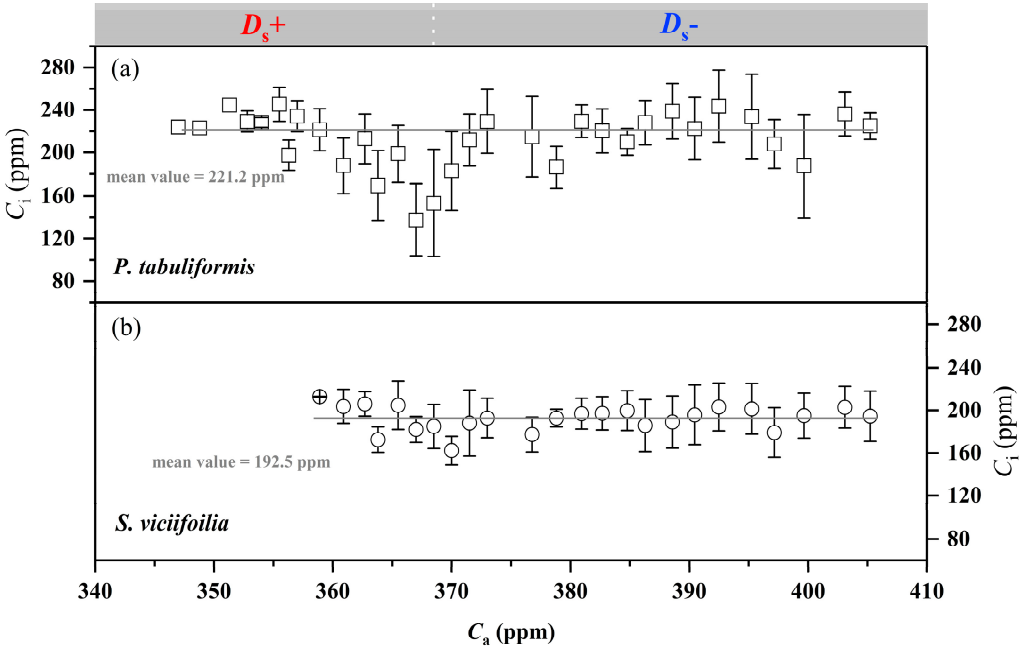

Figure S4. The trends of intercellular CO_2 concentration (C_i) based on tree-ring $\delta^{13}C_{plant}$ of *Pinus tabuliformis* (a) and *Sophora viciifolia* (b) as atmospheric CO_2 concentration (C_a) rises. The grey straight lines indicate the mean value of intercellular CO_2 concentration (C_i). Error bars are 1 standard deviation (SD). D_s+ = the period when drought stress strengthened; D_s- = the period when drought stress weakened.