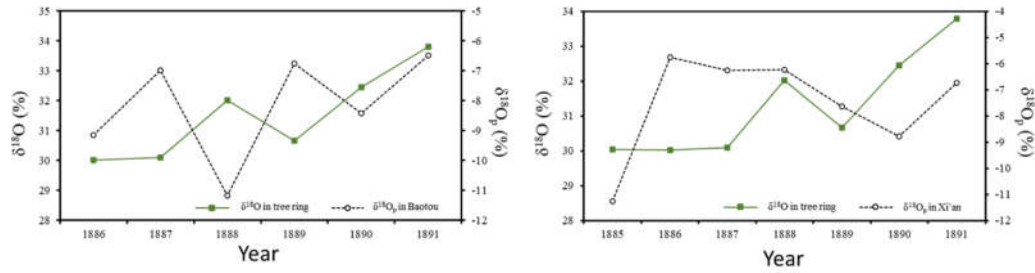


**Figure S1.** (a) Four measured individual series and the master series of  $\delta^{18}\text{O}$  produced by the numerical mixing method.(b) Mean interseries correlation (Rbar), the running expressed population signal calculated using 30-year windows and a lag time of 15 years.



**Figure S2.** Comparison between tree ring  $\delta^{18}\text{O}$  and Global Network of Isotopes in Precipitation (GNIP)  $\delta^{18}\text{O}_P$  from June to August in Baotou and Xi'an.

**Table S1.** Statistical Features of Four Individual Series and the Master Series

Series	Length(years)	Mean(‰)	Maximum(‰)	Minimum(‰)	Standard deviation(‰)	Skewness	Kurtosis
ERDS1	203	32.67	36.23	28.20	1.48	-0.23	0.02
ERDS2	139	32.15	35.03	28.77	1.39	-0.22	-0.63
ERDS3	197	31.54	35.43	27.31	1.51	-0.07	-0.25
ERDS4	184	33.08	36.18	29.63	1.42	-0.16	-0.40
Master	205	32.38	35.47	29.28	1.24	-0.11	-0.32

**Table S2.** Correlation Coefficients Between Each of the Four Individual  $\delta^{18}\text{O}$  Series

<b>Series</b>	<b>ERDS2</b>	<b>ERDS3</b>	<b>ERDS4</b>
ERDS1	0.564	0.527	0.547
ERDS2		0.619	0.663
ERDS3			0.707

Note. All  $p < 0.001$ .