

1 **Supplementary information**

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Reconstruction code	Standardization procedure		Aggregation method for regional chronology	Reconstruction method
	dentrending	variance stablitzation		
RCS_chrono_R	RCS	-	<i>chrono</i>	regression
RCSPT_chrono_R	RCS	PT	<i>chrono</i>	regression
300sp_chrono_R	300years spline	-	<i>chrono</i>	regression
300spPT_chrono_R	300years spline	PT	<i>chrono</i>	regression
RCS_mean_R	RCS	-	<i>mean</i>	regression
RCSPT_mean_R	RCS	PT	<i>mean</i>	regression
300sp_mean_R	300years spline	-	<i>mean</i>	regression
300spPT_mean_R	300years spline	PT	<i>mean</i>	regression
PCs_RCS_R	RCS	-	Nested PCs	regression
PCs_RCSPT_R	RCS	PT	Nested PCs	regression
PCs_300sp_R	300years spline	-	Nested PCs	regression
PCs_300spPT_R	300years spline	PT	Nested PCs	regression
RCS_chrono_S	RCS	-	<i>chrono</i>	scaling
RCSPT_chrono_S	RCS	PT	<i>chrono</i>	scaling
300sp_chrono_S	300years spline	-	<i>chrono</i>	scaling
300spPT_chrono_S	300years spline	PT	<i>chrono</i>	scaling
RCS_mean_S	RCS	-	<i>mean</i>	scaling
RCSPT_mean_S	RCS	PT	<i>mean</i>	scaling
300sp_mean_S	300years spline	-	<i>mean</i>	scaling
300spPT_mean_S	300years spline	PT	<i>mean</i>	scaling
PCs_RCS_S	RCS	-	Nested PCs	scaling
PCs_RCSPT_s	RCS	PT	Nested PCs	scaling
PCs_300sp_S	300years spline	-	Nested PCs	scaling
PCs_300spPT_S	300years spline	PT	Nested PCs	scaling

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5 Supplementary table 1. Summary of the 24 regional reconstructions developed. RCS:

6 Regional Curve Standardization; PT power transformation.

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	Variable	Period 1265-1990			Period 1265-1900		
		Minimum	Maximum	Range	Minimum	Maximum	Range
Model simulations	Erik1	-1.6019	0.5822	-2.1841	-1.6019	-0.0999	-1.502
	Erik2	-1.2859	0.7436	-2.0295	-1.28586	-0.16666	-1.1192
	MM5-Erik1	-1.6944	0.3631	-2.0575	-1.6944	0.1965	-1.8909
	MM5-Erik2	-1.7958	0.511	-2.3068	-1.7958	-0.2114	-1.5844
Tree-ring based reconstructions	RCS_chrono_R	-0.7875	0.20075	-0.98825	-0.7875	0.149	-0.9365
	RCSPT_chrono_R	-0.84664	0.19919	-1.04583	-0.84664	0.15859	-1.00523
	300sp_chrono_R	-0.40696	0.334	-0.74096	-0.28816	0.334	-0.62216
	300spPT_chrono_R	-0.40459	0.33013	-0.73472	-0.3264	0.33013	-0.65653
	RCS_mean_R	-0.66937	0.42625	-1.09562	-0.66937	0.42625	-1.09562
	RCSPT_mean_R	-0.74256	0.43952	-1.18208	-0.74256	0.43952	-1.18208
	300sp_mean_R	-0.39035	0.42711	-0.81746	-0.34445	0.42711	-0.77156
	300spPT_mean_R	-0.45361	0.42282	-0.87643	-0.45361	0.42282	-0.87643
	PCs_RCS_R	-0.60225	0.34825	-0.9505	-0.60225	0.1895	-0.79175
	PCs_RCSPT_R	-0.6595	0.347	-1.0065	-0.6595	0.1035	-0.763
	PCs_300sp_R	-0.316	0.38675	-0.70275	-0.316	0.31175	-0.62775
	PCs_300spPT_R	-0.34275	0.38025	-0.723	-0.34275	0.278	-0.62075
	RCS_chrono_S	-1.745	0.4518	-2.1968	-1.745	0.3367	-2.0817
	RCSPT_chrono_S	-2.4853	0.5909	-3.0762	-2.4853	0.4715	-2.9568
	300sp_chrono_S	-0.72885	0.5813	-1.31015	-0.51879	0.5813	-1.10009
	300spPT_chrono_S	-0.69034	0.5743	-1.26464	-0.55575	0.5743	-1.13005
	RCS_mean_S	-1.056	0.6488	-1.7048	-1.056	0.6488	-1.7048
	RCSPT_mean_S	-1.1309	0.6653	-1.7962	-1.1309	0.6653	-1.7962
	300sp_mean_S	-0.6952	0.7635	-1.4587	-0.6133	0.7635	-1.3768
	300spPT_mean_S	-0.73419	0.6944	-1.42859	-0.7342	0.6944	-1.4286
	PCs_RCS_S	-0.9664	0.2814	-1.2478	-0.9664	0.2814	-1.2478
	PCs_RCSPT_s	-1.0035	0.373	-1.3765	-1.0035	0.373	-1.3765
	PCs_300sp_S	-0.66065	0.38374	-1.04439	-0.66065	0.38374	-1.04439
	PCs_300spPT_S	-0.8098	0.4006	-1.2104	-0.8098	0.4006	-1.2104
	mPYR	-1.5271	0.2219	-1.749	-1.5271	-0.1398	-1.3873

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3 Supplementary table 2. Amplitudes of the inter-decadal variation of tree-ring based
4 temperature reconstructions and model simulations for the total (1265-1990AD) and pre-
5 industrial period (1260-1900AD) in differences from the mean. Bold numbers indicate the
6 largest amplitudes.

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