Supporting Information

Past millennium hydroclimate variability from Corsican pine tree-ring chronologies

Jan Esper, Claudia Hartl, Oliver Konter, Fredrik Reinig, Philipp Römer, Frederic Huneau,
Sebastien Lebre, Sonja Szymczak, Achim Bräuning, Ulf Büntgen

Table S1. Verification statistics of the sp30 – sp1000 CHEPI chronologies regressed against JAS_P&JJ precipitation (top) and Sep_P PDSI (bottom) over the full, late and early calibration periods.

JAS_P&JJ prec.	1962-2016		1989-2016			1962-1988		
Chronology	r	DW	r	RE	CE	r	RE	CE
sp1000	0.59	1.69	0.66	0.27	0.20	0.48	0.44	0.39
sp500	0.58	1.68	0.65	0.25	0.17	0.48	0.43	0.38
sp100	0.56	1.67	0.65	0.16	0.08	0.45	0.37	0.32
sp30	0.59	1.71	0.68	0.25	0.17	0.46	0.45	0.40

Sep_P PDSI	1947-2016		1982-2016			1947-1981		
Chronology	r	DW	r	RE	CE	r	RE	CE
sp1000	0.53	1.60	0.36	0.27	0.27	0.67	-0.32	-0.33
sp500	0.52	1.60	0.36	0.27	0.26	0.67	-0.31	-0.32
sp100	0.50	1.57	0.35	0.25	0.24	0.63	-0.18	-0.19
sp30	0.45	1.51	0.32	0.19	0.19	0.57	-0.20	-0.21

Table S2. Reconstructed JAS_P&JJ precipitation and Sep_P PDSI derived from scaled 30sp – 1000sp CHEPI chronologies. Top (bottom) panel shows three wettest (driest) 30-year periods of each reconstruction.

Moist	1000sp			500sp			100sp			30sp		
Rank	Period	Prec.	PDSI	Period	Prec.	PDSI	Period	Prec.	PDSI	Period	Prec.	PDSI
1	1051-1080	305	1.5	1051-1080	319	1.9	1572-1601	315	1.7	1570-1599	290	0.7
2	1372-1401	300	1.4	1519-1548	313	1.7	1371-1400	308	1.5	1518-1547	289	0.7
3	1518-1547	300	1.4	1372-1401	313	1.7	1519-1548	308	1.5	1746-1775	287	0.6
Mean		**302**	**1.4**		**315**	**1.8**		**311**	**1.5**		**289**	**0.7**

Dry	1000sp			500sp			100sp			30sp		
Rank	Period	Prec.	PDSI	Period	Prec.	PDSI	Period	Prec.	PDSI	Period	Prec.	PDSI
	1296-1325	152	-3.0	1296-1325	184	-2.2	1295-1324	216	-1.4	1557-1586	256	-0.4
	1711-1740	168	-2.5	1934-1963	200	-1.7	1555-1584	217	-1.4	1295-1324	257	-0.3
	1013-1042	179	-2.2	1102-1131	203	-1.6	1013-1042	223	-1.2	1452-1481	260	-0.2
Mean		**167**	**-2.6**		**196**	**-1.8**		**219**	**-1.4**		**258**	**-0.3**

Table S3. Reconstructed JAS$_P$&JJ precipitation and Sep$_P$ PDSI derived from scaled 30sp – 1000sp CHEPI chronologies. Top (bottom) panel shows ten wettest (driest) seasons of each reconstruction.

Moist	1000sp			500sp			100sp			30sp		
Rank	Year	Prec.	PDSI	Year	Prec.	PDSI	Year	Prec.	PDSI	Year	Prec.	PDSI
1	1997	458	6.0	1997	456	6.1	995	453	6.0	995	465	6.5
2	995	433	5.3	995	438	5.5	1997	449	5.9	1997	453	6.1
3	1389	398	4.3	1389	410	4.7	1584	416	4.9	1691	431	5.4
4	1584	397	4.2	1584	408	4.6	1759	405	4.5	1457	424	5.2
5	1191	394	4.1	1073	403	4.5	1073	405	4.5	1781	415	4.9
6	1073	393	4.1	1534	394	4.2	1389	404	4.5	1885	410	4.7
7	1534	387	3.9	1191	392	4.1	1191	401	4.4	1092	406	4.6
8	1386	384	3.8	1386	390	4.1	1677	399	4.3	1677	405	4.5
9	1885	379	3.7	1885	390	4.1	1691	397	4.3	1073	405	4.5
10	1996	379	3.7	1759	389	4.0	1066	393	4.1	1884	402	4.4
Mean		**400**	**4.3**		**407**	**4.6**		**412**	**4.7**		**422**	**5.1**

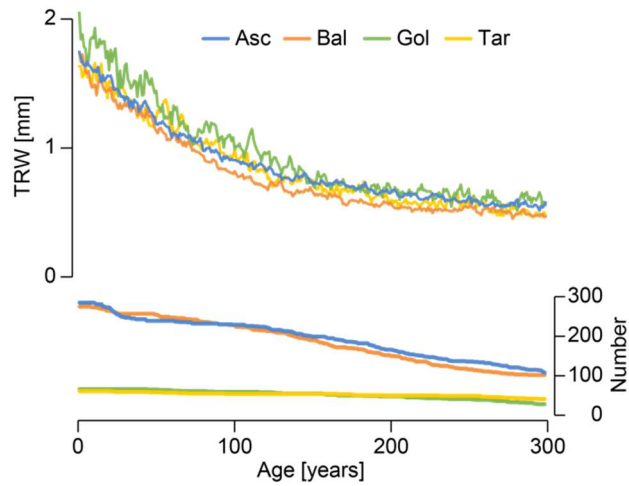| Dry	1000sp			500sp			100sp			30sp		
Rank	Year	Prec.	PDSI	Year	Prec.	PDSI	Year	Prec.	PDSI	Year	Prec.	PDSI
1	1879	33	-6.5	1879	68	-5.7	1879	54	-6.6	1879	72	-6.4
2	1725	40	-6.3	1725	80	-5.3	1098	88	-5.5	1204	93	-5.7
3	1098	56	-5.9	1098	86	-5.1	1204	93	-5.3	1098	112	-5.1
4	1116	58	-5.8	1116	87	-5.1	1099	104	-5.0	1160	122	-4.8
5	1771	58	-5.8	1950	93	-4.9	1116	107	-4.9	1498	127	-4.6
6	1099	75	-5.3	1771	101	-4.7	1725	110	-4.8	1116	128	-4.6
7	1204	75	-5.3	1099	102	-4.7	1571	116	-4.6	1099	129	-4.6
8	1824	75	-5.3	1204	105	-4.6	1950	118	-4.5	1824	130	-4.5
9	1305	77	-5.2	1305	111	-4.4	1771	120	-4.5	1771	131	-4.5
10	1306	79	-5.2	1571	112	-4.3	1824	122	-4.4	1537	133	-4.4
Mean		**63**	**-5.7**		**94**	**-4.9**		**103**	**-5.0**		**118**	**-4.9**

Fig. S1. Age-aligned tree-ring data. **a**, Arithmetic mean curves of the age-aligned TRW series from Asco, Ballone, Golo and Tartagine shown together with **b**, site replication curves.
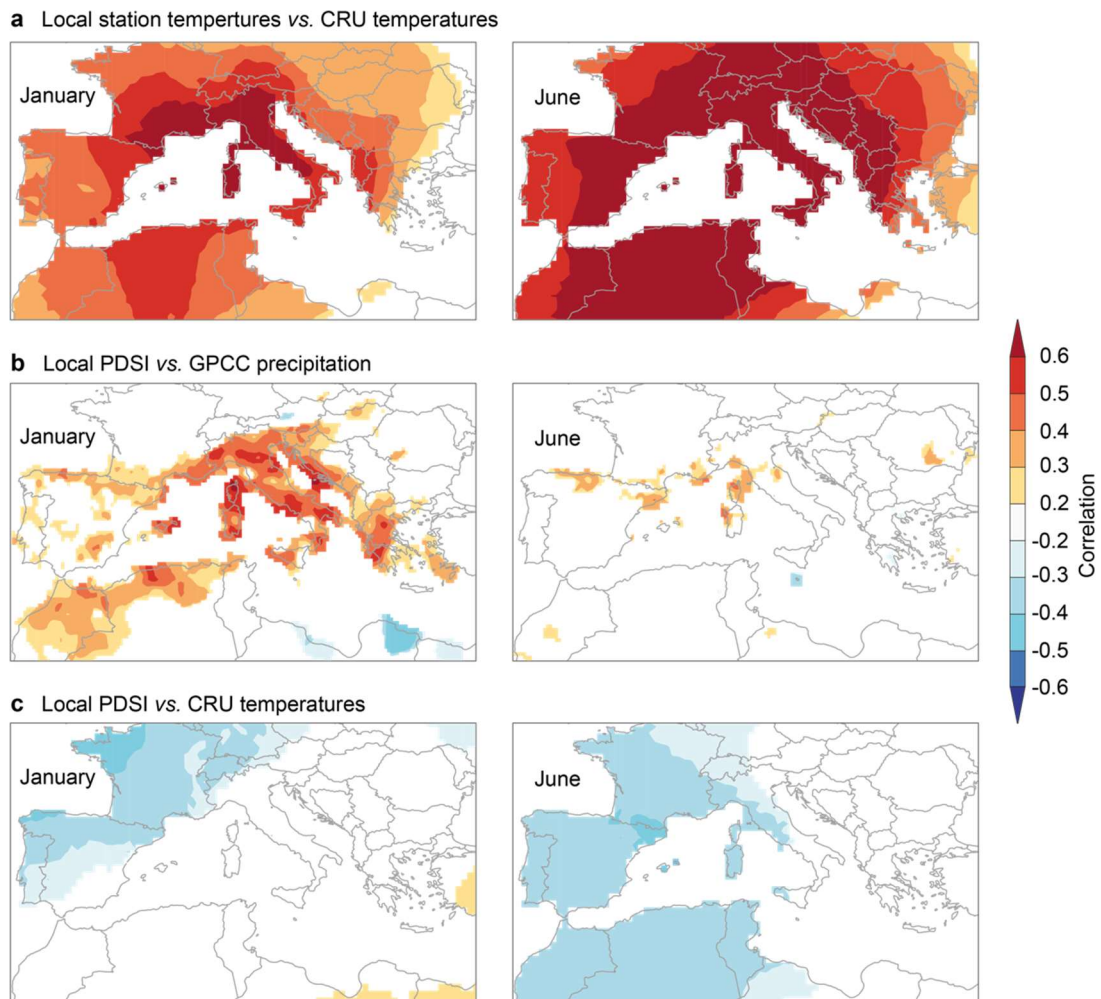

Fig. S2. Climate data correlation fields. **a**, Correlation of the ABC_T station mean combining temperatures from Ajaccio, Bastia and Calacuccia with CRU 4.04 January (left panel) and July temperatures (right panel) from 1962-2016. **b**, Same as in **a**, but for local PDSI data (grid point at 9.25E and 42.25N) and GPCC precipitation. **c**, Same as in **b**, but for local PDSI versus CRU temperatures.

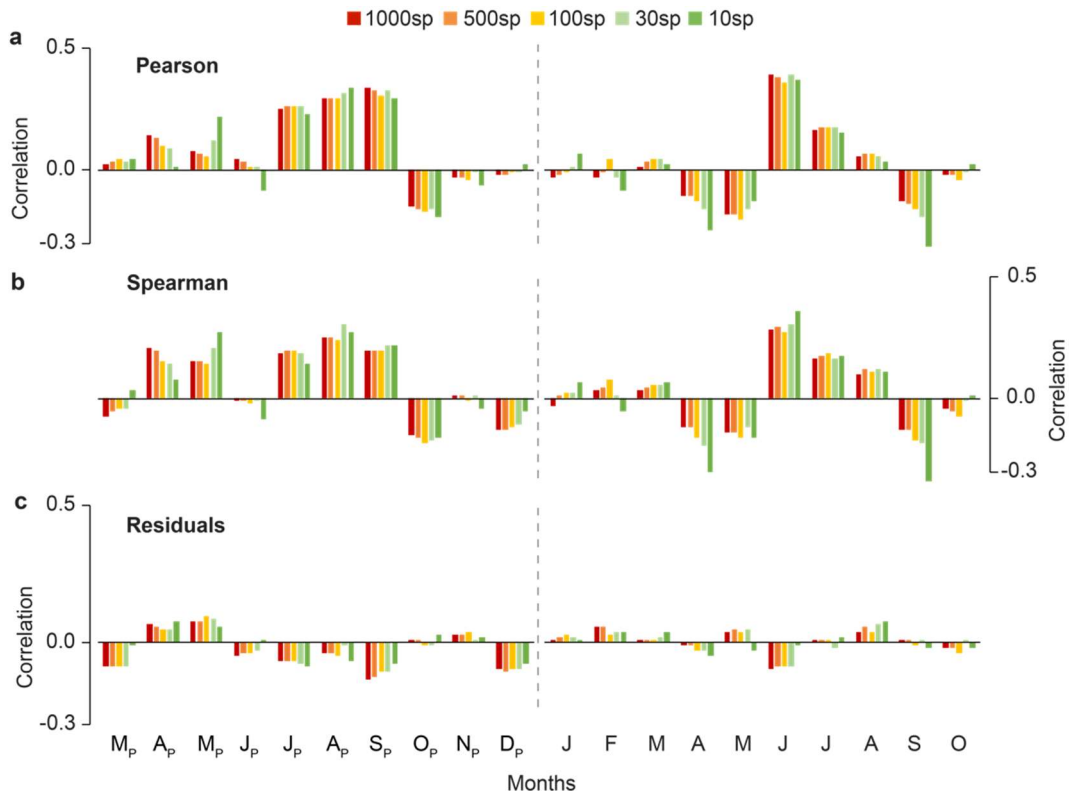*Fig. S3.* Power spectra of the 10sp, 30sp, 100sp, 500sp and 1000sp detrended CHEPI chronologies.

Fig. S4. Pearson versus Spearman correlations. **a**, Pearson correlations of the differently detrended CHEPI chronologies (colours) with monthly mean precipitation totals of the Ajaccio, Bastia and Calacuccia stations (ABC$_P$) from 1962-2016. Results from previous-year March (M$_P$) to current-year October (O) are shown. **b**, Same as in **a**, but using Spearman rank correlations. **c**, Monthly residuals from calculating Spearman minus Pearson correlations.
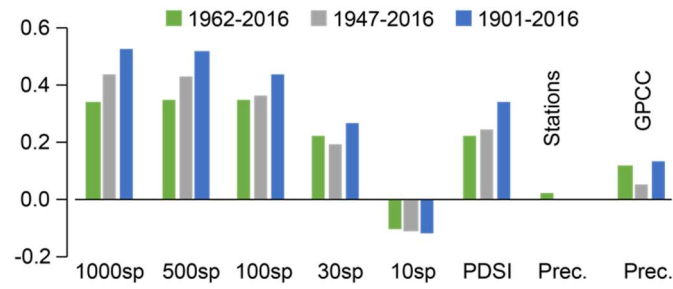
Fig. S5. Lag-1 autocorrelations of the spline detrended CHEPI chronologies (10sp – 1000sp), September PDSI (9.25E/42.25N), JAS$_P$&JJ station and GPCC precipitation records (9.125E/42.125N) from 1962-2016 (green), 1947-2016 (grey) and 1901-2016 (blue). Note that the station precipitation record extends back to only 1962.
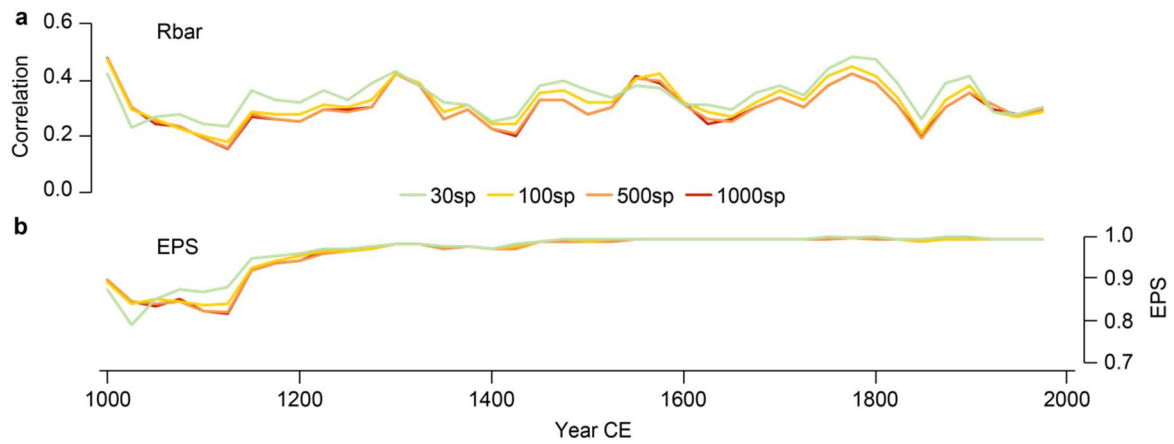

Fig. S6. Rbar (**a**) and EPS (**b**) statistics of differently detrended CHEPI chronologies (30sp – 1000sp) calculated over 50-year periods shifted in 25-year steps along the past millennium.