Climate Sensitivity and Tree Growth Patterns in Subalpine Spruce-Dominated Forests of the North-western Dinaric Alps

Marko Orešković [1], Domagoj Trlin [1], Igor Anić[1,2], Milan Oršanić[1], Luka Prša[1] and Stjepan Mikac[1]*.

[1] Department of Forest Ecology and Silviculture, Faculty of Forestry and Wood Technology, University of Zagreb, Svetošimunska cesta 23, 10000 Zagreb, Croatia
[2] Croatian Academy of Sciences and Arts, Zrinski trg 11, 10000, Zagreb, Croatia
Correspondence: smikac@sumfak.hr;

Supplementary Materials:



Figure S1. The succession of beech in pure spruce stands following spruce dieback.

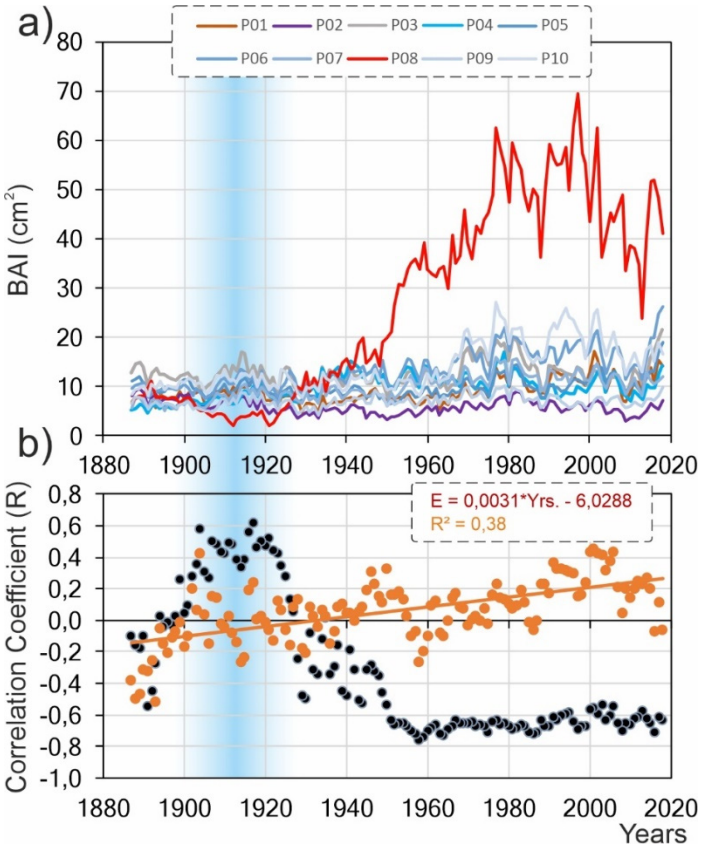

Figure S2. Long-term growth of basal area increment (BAI) across four sites. a) Time series of basal area increment (BAI) chronologies for the studied sites during the period from 1887 to 2020. b) Correlation coefficient (R) between elevation and basal area increment (BAI) values for each individual year during the period from 1887 to 2020. (black dots represent (R) values for all sites, while orange dots exclude site P08).

Table S1. Linear trend values of basal area increment (BAI) chronologies across sites and different time periods. Statistically significant trends for p<0.05 are indicated in bold. Slope – slope of the regression line, r – correlation coefficient.

Span	Plot	Slope	Error	Intercept	Error	r	p
1928-1976	P01	0.022	0.005	-42.95	9.09	0.56	**2.63E-05**
	P02	0.020	0.006	-40.07	11.47	0.45	**0.0012**
	P03	0.032	0.008	-63.47	15.77	0.50	**0.0002**
	P04	0.003	0.008	-5.03	14.74	0.06	0.7040
	P05	0.015	0.006	-29.50	11.03	0.36	**0.0118**
	P06	0.030	0.005	-57.86	9.66	0.66	**2.91E-07**
	P07	0.039	0.006	-76.86	10.86	0.72	**6.19E-09**
	P08	0.042	0.002	-81.28	3.71	0.95	**2.54E-26**
	P09	0.041	0.008	-80.30	16.30	0.58	**1.07E-05**
	P10	0.038	0.005	-74.84	10.48	0.72	**5.57E-09**

Span	Plot	Slope	Error	Intercept	Error	r	p
1977-2013	P01	-0.017	0.014	34.44	28.43	-0.20	0.2468
	P02	-0.077	0.010	153.35	19.79	-0.79	**4.29E-09**
	P03	-0.075	0.012	149.50	24.12	-0.72	**4.35E-07**
	P04	-0.043	0.012	85.93	24.47	-0.51	**0.0013**
	P05	-0.013	0.014	25.68	28.20	-0.15	0.3798
	P06	-0.037	0.009	74.95	17.53	-0.58	**0.0002**
	P07	-0.043	0.010	86.65	20.23	-0.58	**0.0002**
	P08	-0.026	0.007	52.38	13.04	-0.55	**0.0004**
	P09	-0.060	0.014	119.97	27.10	-0.60	**9.16E-05**
	P10	-0.033	0.012	67.66	23.46	-0.43	**0.0075**

Span	Plot	Slope	Error	Intercept	Error	r	p
1950-1976	P01	0.037	0.012	-72.87	23.77	0.52	**0.0054**
	P02	0.066	0.011	-129.39	22.42	0.75	**5.42E-06**
	P03	0.100	0.019	-196.97	37.19	0.73	**1.74E-05**
	P04	-0.017	0.015	33.55	29.13	-0.22	0.2683
	P05	0.054	0.013	-106.90	24.86	0.65	**0.0002**
	P06	0.049	0.014	-96.16	27.86	0.57	**0.0020**
	P07	0.049	0.016	-96.01	30.83	0.53	**0.0044**
	P08	0.037	0.005	-72.10	9.45	0.84	**4.92E-08**
	P09	0.060	0.019	-117.01	36.49	0.54	**0.0036**
	P10	0.096	0.011	-189.26	22.49	0.86	**9.31E-09**

Span	Plot	Slope	Error	Intercept	Error	r	p
1928-2018	P01	0.030	0.003	-59.27	6.11	0.72	**1.13E-15**
	P02	0.009	0.003	-17.69	6.75	0.26	**0.0116**
	P03	0.013	0.004	-26.23	8.43	0.31	**0.0025**
	P04	-0.007	0.003	15.10	6.38	-0.24	**0.0240**
	P05	0.027	0.003	-53.60	6.89	0.64	**1.17E-11**
	P06	0.022	0.003	-43.26	5.57	0.64	**9.15E-12**
	P07	0.017	0.003	-33.13	5.99	0.51	**2.38E-07**
	P08	0.024	0.002	-47.38	4.08	0.78	**9.65E-20**
	P09	0.007	0.004	-13.94	8.08	0.18	0.0846
	P10	0.026	0.003	-51.31	6.25	0.66	**1.29E-12**

Variable	Plot	Slope	Error	Intercept	Error	r	p
1942-1976	P01	0.017	0.008	-33.29	16.32	0.33	0.0522
	P02	0.037	0.010	-72.15	19.02	0.55	**0.0007**
	P03	0.057	0.013	-110.86	26.43	0.59	**0.0002**
	P04	-0.025	0.009	49.75	18.34	-0.42	**0.0115**
	P05	0.023	0.010	-45.26	19.13	0.38	**0.0256**
	P06	0.029	0.009	-57.48	18.10	0.48	**0.0032**
	P07	0.049	0.010	-95.79	18.87	0.66	**1.41E-05**
	P08	0.046	0.003	-89.40	6.73	0.92	**7.85E-15**
	P09	0.020	0.014	-39.56	27.29	0.25	0.1527
	P10	0.058	0.009	-113.92	18.13	0.74	**4.28E-07**

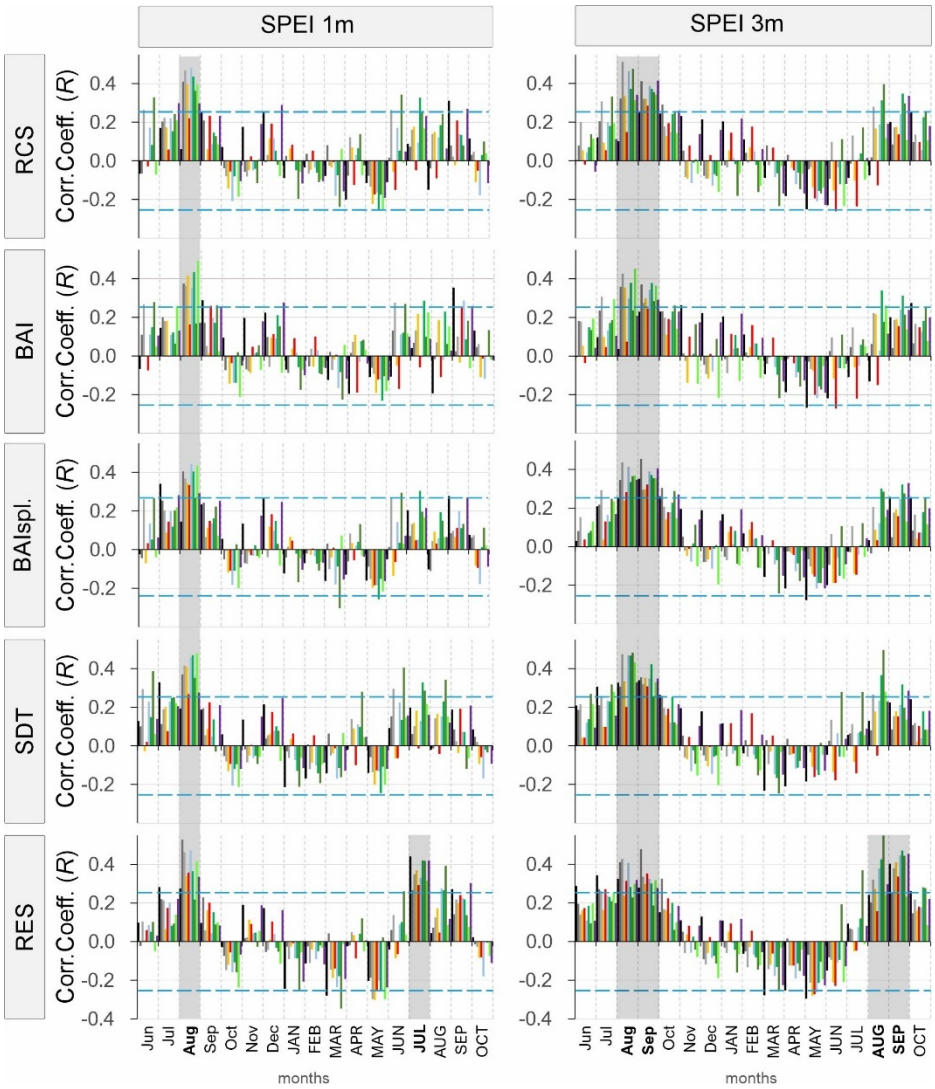

Figure S3. Values of the simple linear (Pearson) correlation coefficient (R) between Standardized Precipitation-Evapotranspiration Index (SPEI) according to the standardization method for each plot separately for the period from 1954 to 2018.

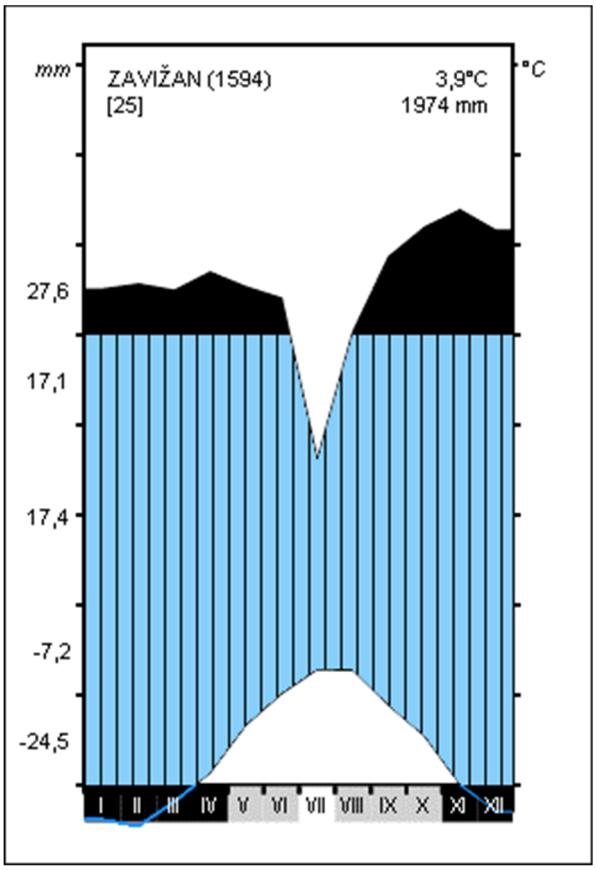

Figure S4. Walter-Lieth Climate diagram