Köse N, Türkes M, Celik H, Akkemik U (2025). **Is growth affected by climate change in the Western Anatolia?**
iForest – Biogeosciences and Forestry – doi: 10.3832/ifor4641-018

# Supplementary Material

**Fig. S1 -** *Pinus pinea* forest in the Kozak Plateau.

**Fig. S2 -** Tree-ring width chronologies of HAC (upper) and DEM (lower) sites.

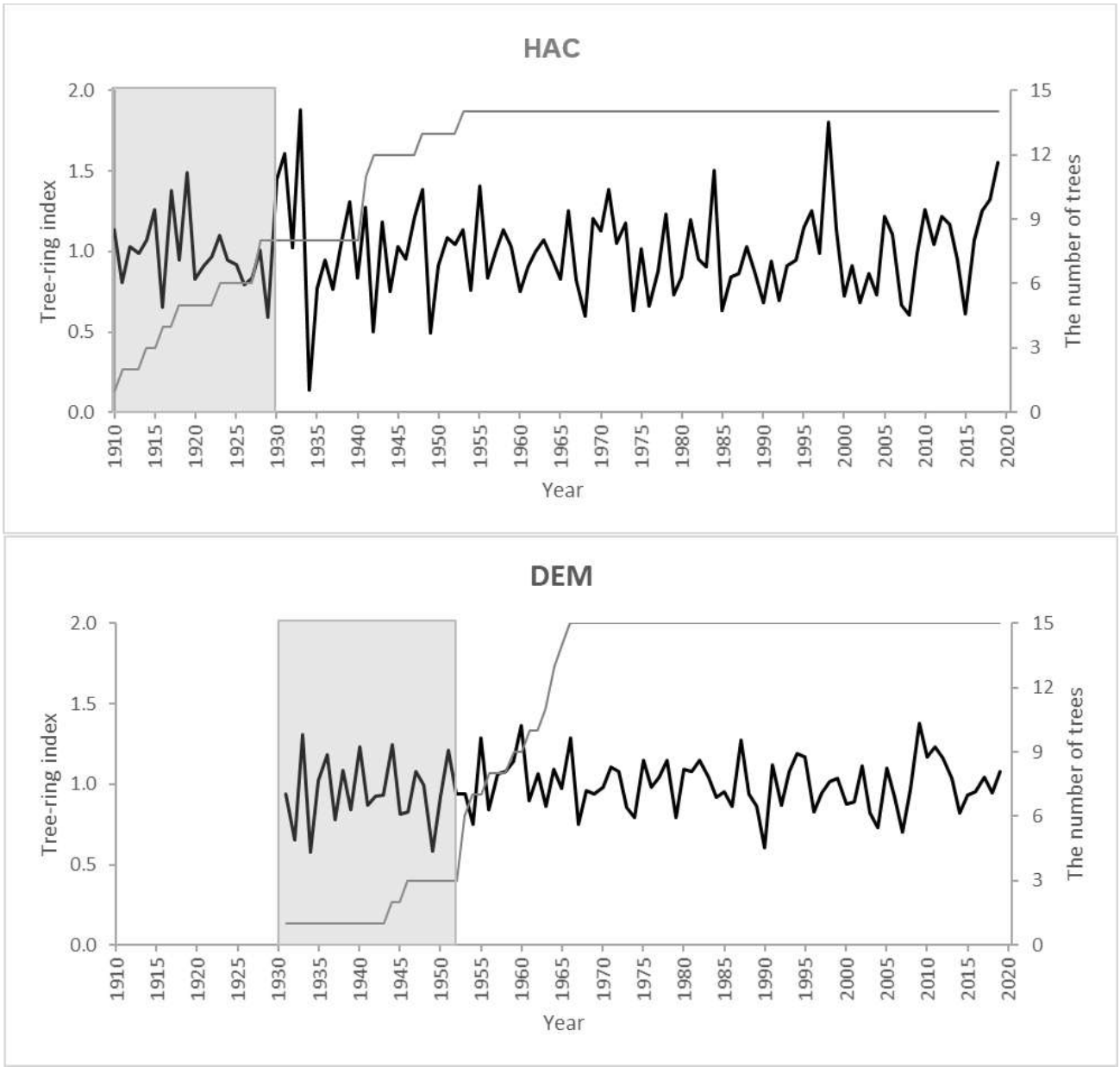


**Fig. S3 -** Inter-annual and long-period variations, and long-term linear trends in winter (DJF) (a) maximum and (b) minimum air temperature series for the Kozak district. (—) shows 9-point low-pass gaussian filter, and (—), long-term average; (- - -) depicts the line of linear regression fit to the seasonal air temperature series.

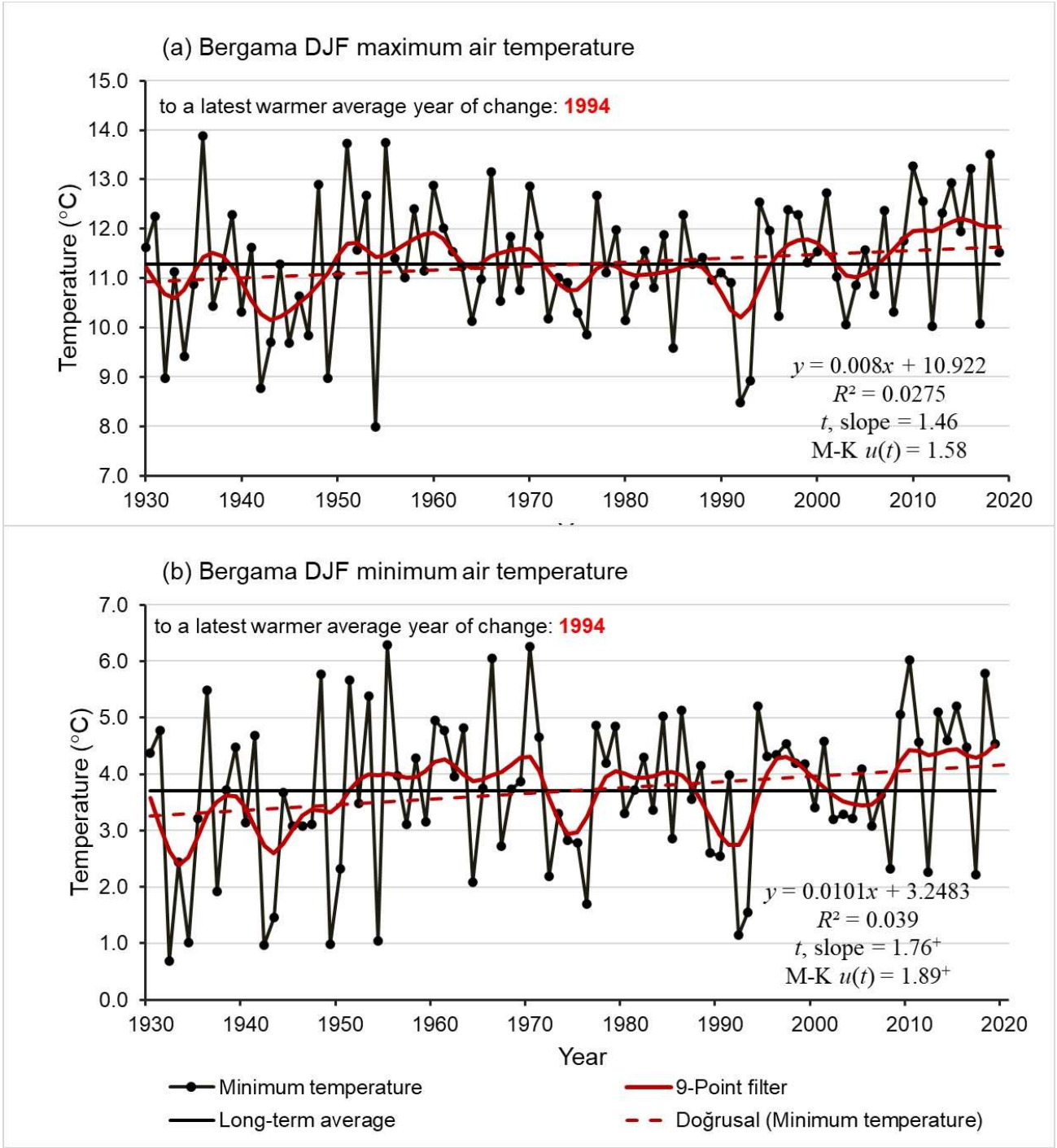


**Fig. S4 -** Pearson's correlation coefficients calculated between radial growth (RW, EW and LW) and drought indices $SPEI_1$, $SPEI_3$, $SPEI_6$ and, SPEI12. The analyzes were performed on the time spans between 1930 and 2019 for HAC and between 1952 and 2019 for DEM chronologies. (*): indicates significant correlation coefficients ($p < 0.05$).

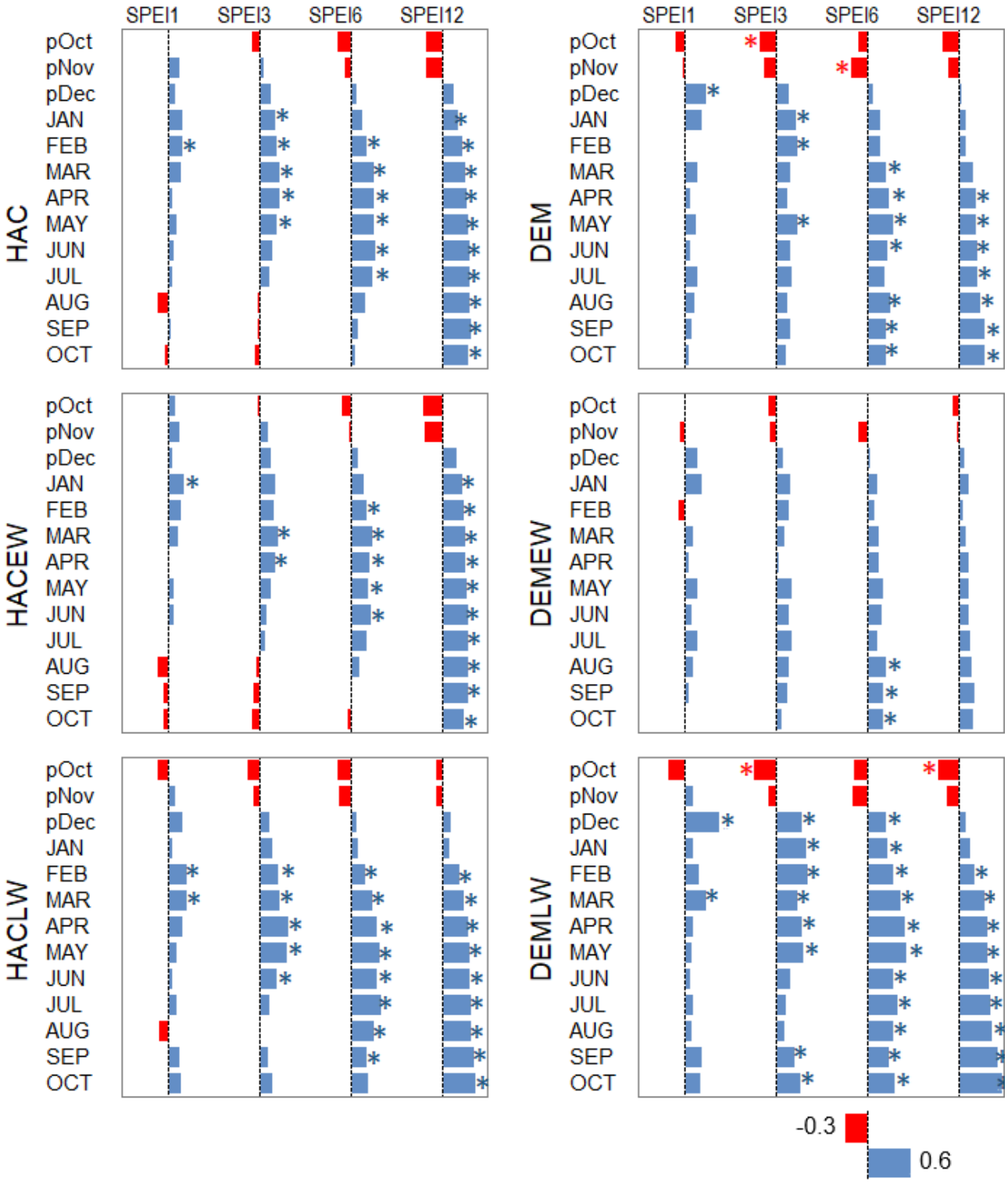


**Fig. S5 -** Moving window of Pearson's correlation coefficients between radial growth (RW, EW and LW) and monthly $SPEI_{12}$ from March to October. The analyzes were performed on the time spans between 1930 and 2019 for HAC and between 1952 and 2019 for DEM chronologies in a 30-year window with 5-year offset. (*): indicates statistically significant correlation coefficients ($p < 0.05$).

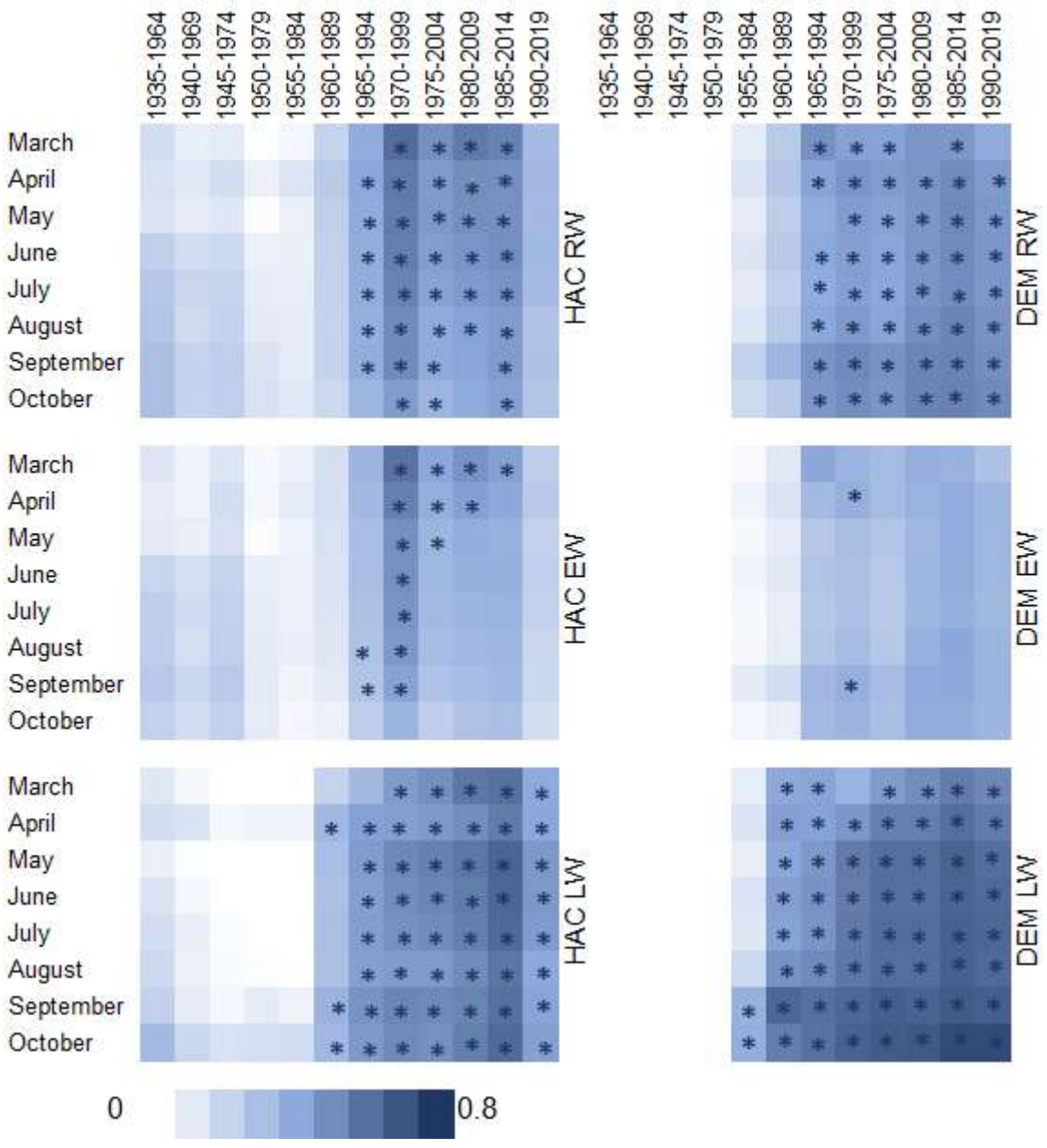
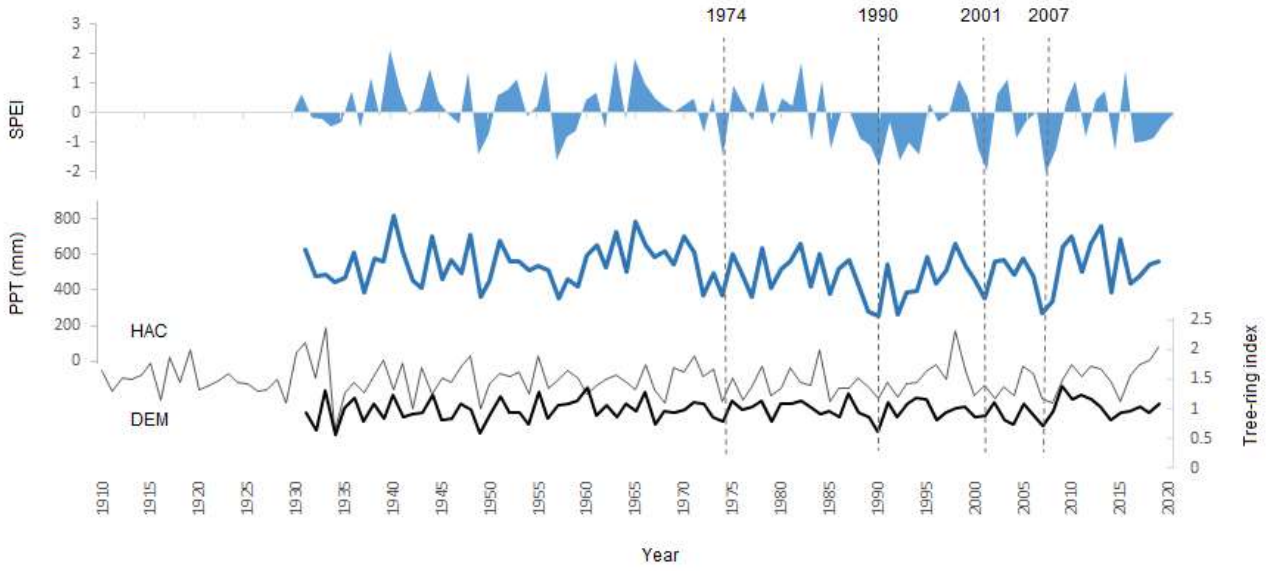


**Fig. S6 -** Severe dry years 1974, 1990, 2001 and 2007 that cause narrow ring formation. Blue area and blue line chars represent $SPEI_{March\text{-}Oct}$ and $PPT_{pDec\text{-}July,}$ respectively. Grey and black lines represent RW site chronologies of HAC and DEM sites, respectively.



**Tab. S1** - Resultant test statistics and trend rates calculated for the Kozak's 90-year long annual and seasonal mean (Tmean), average maximum (Tmax) and average minimum (Tmin) time-series according to Mann-Kendal rank correlation test and Student t test for significance of β coefficient (slope) of the Least Square Linear Regression (LSLR) model, and the Sen's slope estimation Q (°/time), respectively.

| | | ***Mann-Kendall test*** | | | ***Sen's slope estimation (°/time)*** | | |
|---|---|---|---|---|---|---|---|
| **Time-series** | ***n*** | **M-K *u(t)*** | **Student t test for the *β* coefficient** | **Signi.** | **Q (°C/Year)** | **Q (°C/decade)** | **Q (°C/100 year)** |
| Mean temperature | | | | | | | |
| Tmean_Ann | 90 | 4.25 | 5.42 | *** | 0.012 | 0.117 | 1.173 |
| Tmean_DJF | 90 | 1.79 | 1.79 | + | 0.010 | 0.095 | 0.952 |
| Tmean_ Sip | 90 | 3.66 | 4.01 | *** | 0.017 | 0.167 | 1.667 |
| Tmean_Sum | 90 | 4.37 | 5.33 | *** | 0.016 | 0.156 | 1.562 |
| Tmean_Aut | 90 | 1.99 | 2.22 | * | 0.007 | 0.075 | 0.747 |
| Maximum temperature | | | | | | | |
| Tmax_Ann | 90 | 2.96 | 3.69 | **(***) | 0.009 | 0.094 | 0.942 |
| Tmax_DJF | 90 | 1.46 | 1.58 | | 0.009 | 0.086 | 0.859 |
| Tmax_Sip | 90 | 2.76 | 2.86 | ** | 0.015 | 0.152 | 1.525 |
| Tmax_Sum | 90 | 2.70 | 3.14 | ** | 0.010 | 0.102 | 1.023 |
| Tmax_Aut | 90 | 0.96 | 1.22 | | 0.005 | 0.046 | 0.457 |
| Minimum temperature | | | | | | | |
| Tmin_Ann | 90 | 5.54 | 6.90 | *** | 0.015 | 0.145 | 1.452 |
| Tmin_DJF | 90 | 1.76 | 1.89 | + | 0.010 | 0.099 | 0.988 |
| Tmin_ Sip | 90 | 4.86 | 5.36 | *** | 0.018 | 0.181 | 1.809 |
| Tmin_Sum | 90 | 5.95 | 7.61 | *** | 0.021 | 0.210 | 2.098 |
| Tmin_Aut | 90 | 3.04 | 3.16 | ** | 0.011 | 0.113 | 1.134 |

+) Statistically significant at the 0.10 level of significance, *) Statistically significant at the 0.05 level of significance, **) Statistically significant at the 0.01 level of significance, ***) Statistically significant at the 0.001 level of significance

**Tab. S2 -** Resultant test statistics calculated for the Kozak's 90-year long 12-month SPEI for the period of March to October, according to Mann-Kendal rank correlation test, and Student t test for significance of β coefficient (slope) of the LSLR model, respectively.

| Drought indices | n | M-K u(t) | Student t test for the β coefficient | Significance |
|---|---|---|---|---|
| $SPEI_{12}$_Mar-Oct (8 Months) | 90 | -2.20 | -2.57 | * |

**Tab. S3** - Mean resistance, recovery and resilience indices with the percentage of high-resistant, high-recovered trees and trees reaching pre-drought growth in HAC and DEM sites.

| | | | Drought years | | | |
|---|---|---|---|---|---|---|
| | | | **1974** | **1990** | **2001** | **2007** |
| HAC | Resistance | Mean | 0.63 | 0.70 | 0.61 | 0.89 |
| | | % of high-resistant trees | 36 | 36 | 29 | 64 |
| | Recovery | Mean | 1.08 | 1.32 | 0.85 | 1.19 |
| | | % of high-recovered trees | 21 | 50 | 7 | 29 |
| | Resilience | Mean | 0.64 | 0.89 | 0.49 | 1.03 |
| | | % of trees reaching pre-drought growth | 7 | 36 | 0 | 43 |
| DEM | Resistance | Mean | 0.78 | 0.53 | 0.82 | 0.75 |
| | | % of high-resistant trees | 27 | 7 | 60 | 40 |
| | Recovery | Mean | 1.28 | 1.76 | 0.97 | 1.91 |
| | | % of high-recovered trees | 67 | 73 | 0 | 93 |
| | Resilience | Mean | 0.95 | 0.88 | 0.80 | 1.39 |
| | | % of trees reaching pre-drought growth | 7 | 7 | 7 | 73 |