

Correlations between the temperature variability index And the temperature extremes

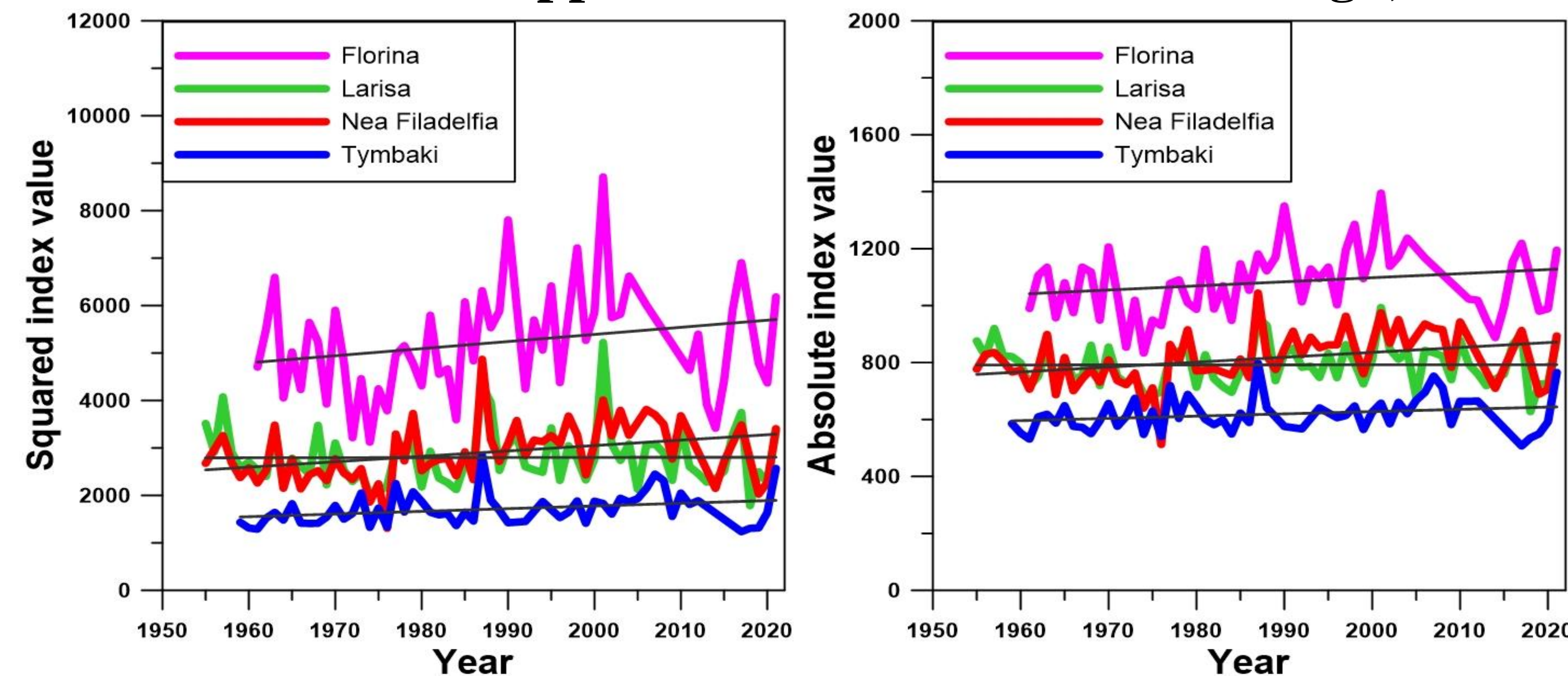


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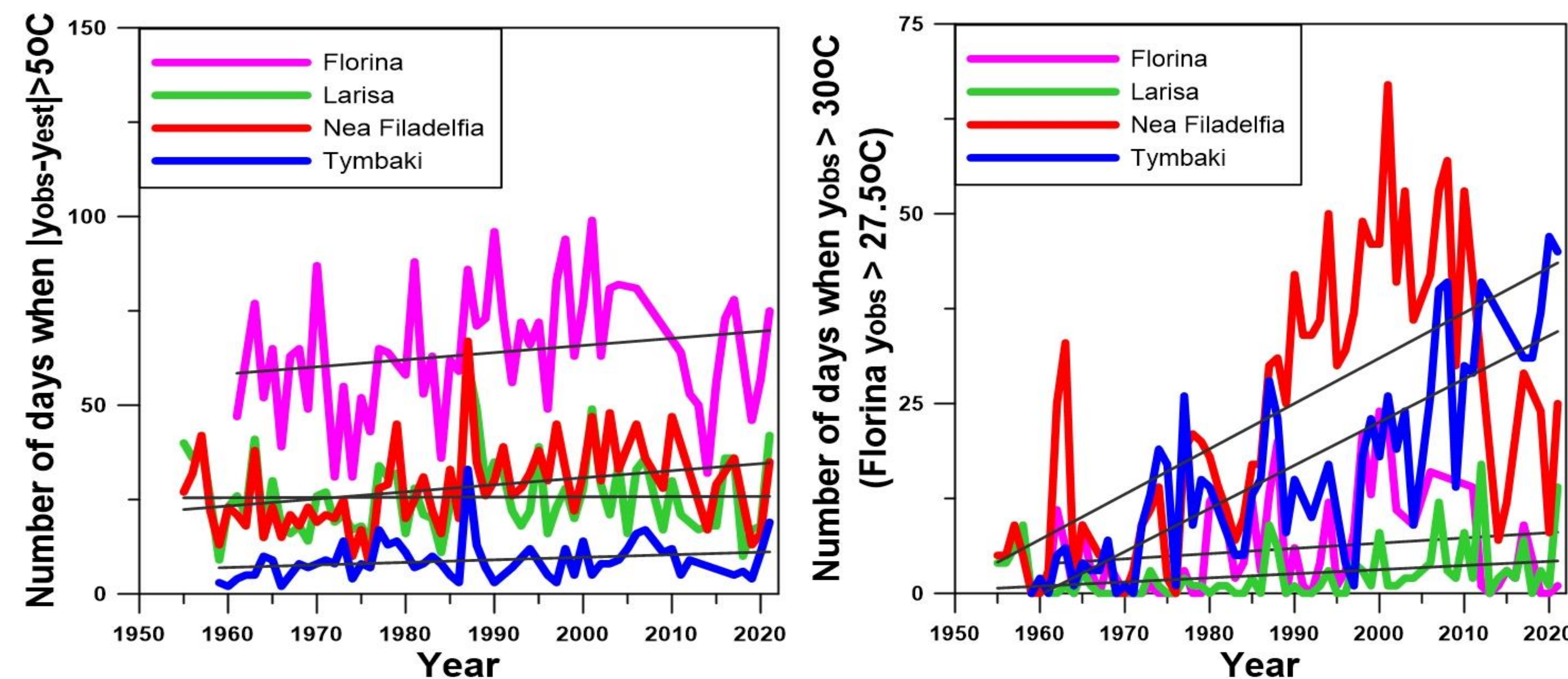
Introduction. The weather extreme events contribute to climate variability. Temperature variability can be studied through the use of Fourier harmonic analysis. We propose a new index for quantifying temperature variability, which is relied on Fourier harmonic analysis [1-5]. The trends of the new proposed index regarding temperature extremes, are investigated in the present work.

Methods. Time-series data of 4 meteorological stations of the Hellenic National Meteorological Service (HNMS) network are used, Florina, Larisa, Nea Filadelfia and Tymbaki. Two index variations are calculated and used in the present study: The sum of the squares of the differences and the sum of the absolute differences, of the observed and the estimated through Fourier harmonic analysis temperatures. The context of temperature extremes is set and the correlations of all temperature extreme metrics with the index values, are finally determined.

Results. The r-squared values in Table 1 indicate that the correlation between index trends and temperature extremes is moderate for Florina (r-squared values from 0.28 to 0.31),



Figures 1,2. Evolution of Squared and Absolute Indices for the 4 meteorological stations.



Figures 3,4. Number of days when absolute difference of observed and estimated temperature is greater than 5 °C and Number of days when average daily temperature is greater than 30 °C (greater than 27.5 °C in the case of Florina).

	Coefficient of Determination - R squared		
	Correlation: Number of days when absolute difference between temperatures is greater then 5°C vs. Temperature extremes	Correlation: Squared Index values vs. Temperature extremes	Correlation: Absolute Index values vs. Temperature extremes
Florina	0.31	0.28	0.31
Larisa	0.16	0.12	0.16
N. Filadelfia	0.39	0.47	0.49
Tymbaki	0.18	0.26	0.21

Table 1. Correlation between Index values and warm temperature extremes for the 4 stations.

weak for Larisa (0.12 to 0.16) weak to moderate for Tymbaki (0.18 to 0.26) and moderate to strong for Nea Filadelfia (0.39 to 0.49).

Conclusions. The results indicate possible correlations between the new proposed index and the climate extremes, at least for Florina and Nea Filadelfia stations. Data from more meteorological stations should be also analyzed.

References.

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