Monthly analysis of indices based on daily minimum temperatures in Serbia

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The following climate indices were analyzed: frost days (FD), cold nights (TN10p), warm nights (TN90p), minimum value of daily minimum temperature (TNn), and tropical nights (TR). Monthly analysis was performed for indices based on the daily minimum temperature at eight stations in Serbia during the period 1950-2009.

The non-parametric Mann–Kendall test was used to determine whether the trends were statistically significant. It was found that the trends of FD and TN10p were negative for all the months except for November and December. The significant negative trend of TN10p during the period 1950-2009 was recorded in March, May, August, September and October. There was a positive trend of TN90p, TR for all months and TNn except for October, November and December. The significant positive trend of TN90p was observed in March, May, during the summer months and October, while for TR in July and August, i.e. in the two hottest months.

The negative minimum temperature anomaly of about –5.7 ^{0}C in February 1956 was obtained for the negative values of the East Atlantic index (EAI) and North Atlantic Oscillation index (NAOI). The positive temperature anomaly of about 3.0 ^{0}C in November 2009 was recorded for the positive value of the EAI and small negative value of the NAOI. Hence, the negative/positive anomalies prevailed for the negative/positive values of the EAI.

In order to investigate the impact of the low-frequency large-scale variability pattern on the minimum temperature, EAI was compared through a correlation analysis with the time series of the climate indices. It was found that the monthly coefficient of correlation between the EAI and climate indices was negative for FD and TN10p, and positive one for TN90p and TR. The highest monthly correlation was found for FD and TN90p in February and for TN10p and TR in August. Since the highest correlation in value of about 0.7 is obtained in February, it could be concluded that the EA can explain about 50% of the total variability of the minimum temperature.