Extreme temperature indices over Serbia

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In this work, the extreme climate indices based on the daily maximum and minimum temperatures during the period 1949–2009 at fifteen stations distributed across Serbia were analyzed. The following temperature indices were considered: cold nights (Tn10), cold days (Tx10), warm nights (Tn90), warm days (Tx90) and frost days (FD). The results showed seasonal changes in the minimum and maximum temperature extremes. The most significant trends of temperature indices were revealed for the summer season. According to the seasonal analysis of five temperature extreme indices, it was found that a warming tendency was dominant. Tendencies significant at the 5 % level were obtained during the spring (Tx10) and summer (Tn10, Tn90 and Tx90). The largest warming tendencies of greater than 1 day per decade were found for Tx90 and Tn90 in the summer. A cooling tendency was revealed only during the autumn for Tx10 and FD, suggesting a rise in the number of cold and frost days.

An analysis of the extreme temperature indices suggested that the Serbian climate generally tended to become warmer in the last 61 years.

To describe the link of the extreme temperature indices with the large-scale atmospheric circulations, indexes of teleconnection patterns, such as the North Atlantic Oscillation (NAO), East Atlantic (EA) and East Atlantic/West Russia (EA–WR) were investigated. It was found that the Tn90 and Tx90 values were highly positively correlated with the EA index during the winter, spring and summer, while Tx10 and Tn10 values were negatively correlated. The Tn10 value probably decreased because of the trend to more positive phases of the EA. Opposite correlations with the EA–WR were found for the Tn10 and Tn90 values in the autumn.