



Analysis of tropical days in Serbia

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Extreme meteorological events, such as long duration of high temperature, have effects on human and animal's lives, agriculture, energy demand, etc. Impacts of extreme events are more serious when extreme weather conditions prevail over extended periods. The aim of this study is to analyze consecutive tropical days with maximum temperatures of at least 30C (spells) in Serbia. The daily maximum temperature during July and August are analyzed to determine probability of spells. The analysis covered the period 1949-2005 (Novi Sad), 1943-2006 (Belgrade), and 1948-2006 (Nis) at three meteorological stations that are representative for a plain and mountain region of Serbia, respectively. An attempt to quantitatively describe the frequency of extreme temperature event is made by employing stochastic time series modeling, specifically the first order autoregressive, AR(1), model.

The longest period of 20 successive tropical days is observed in Novi Sad from July 23 to August 11 in 1994. In the same year, the period of 21 successive tropical days is recorded in Belgrade between July 24 and August 14. The second longest period of tropical days lasted 18 days (1946). Towards the southeast (Nis), the duration of the spells was longer. It reached 29 days in 2003, 23 days in 1952, and 22 days in 1994. A longer duration of spells was recorded in Nis suggesting an effect of the continental climate.

It is shown that the AR(1) model is able to reproduce the distribution of lengths of spells in Serbia. The AR(1) model gives return periods in good agreement with observations for spells lasting up to 20 days for Belgrade and Novi Sad, and up to 10 days for Nis.

The frequency of occurrence of spells revealed an increasing tendency until 1955 and after 1975. The minimum is observed from 1965 to 1985 for all three meteorological stations.

Obtained results for Serbia agree with results obtained for Central and Eastern regions of Europe.