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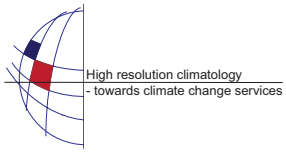

The temperature variability and heat waves in Serbia

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Temperature extremes are an important aspect of any climate change because ecosystems and societal responses are most sensitive to them. During July and August 2007 record values of temperatures were observed in south-eastern Europe. Serbia, Bulgaria and Greece were the European countries most affected by the heat wave. Record values of the maximum temperatures were observed over almost the whole territory of Serbia and in Smederevska Palanka, a temperature of 44.9 °C in July was registered, which was the absolute maximum value ever recorded. The highest increase over the previous absolute maximum temperature, dating back to 1888, of 3.1 °C was registered in Belgrade.

In Serbia, the mean summer temperature of 2007 exceeded the 1961 – 1990 mean by 3 °C, corresponding to an excess of up to 4 standard deviations. Also, the mean July temperature in 2007 exceeded the 1961 – 1990 mean by 3.3 °C, corresponding to an excess of up to 3 standard deviations.

The Warm Spell Duration Indicator (WSDI), from which the duration and severity of the heat waves are estimated, was applied to the series of the daily maximum temperatures in Smederevska Palanka (SP). An extraordinary heat wave occurred in Serbia from July 14 to July 24 in 2007. An analysis of the daily maximum temperatures and heat waves during the summer of 2007 revealed significant changes in the trends of anomalies and extreme (90 %) quantiles. 1987, 2007 and 1998 were the three years with the longest heat waves from the beginning of measurements, having a duration of 13, 11 and 10 days, respectively. The longest heat wave observed in 1987 did not reach the severity of the heat wave in July 2007.

The atmospheric circulation at 500-hPa resulted in the horizontal advection of warm air masses from northern Africa across central and eastern Mediterranean towards the Balkans. The 500-hPa geopotential anomalies (according to the reference period 1961 – 1990) of the summer and July 2007 exceeded 35 and 40 gpm over Serbia, respectively. The warm advection was manifested in temperature anomalies over Serbia, reaching up to 3.5 and 4.0 °C for the summer and July 2007, respectively.