EMS7/ECAM8 Abstracts,
Vol. 4, EMS2007-A-00316, 2007
7th EMS Annual Meeting / 8th ECAM

Climate change and variability of extreme climate events in Belgrade

S.Djordjevic

Republic Hydrometeorological Service of Serbia, Belgrade, Serbia
(s.djordjevic@hidmet.sr.gov.yu / Fax: + 381 11 30 50 847/ Phone: + 381 11 30 50 923)

Climate change, a significant and truly global problem of mankind, represents a considerable risk factor for our environment and health. Climate has become one of the most topical issues over the last two to three decades. Extreme weather events are undisputed proof of climate change. Belgrade (132 m, $\varphi 44^o 48'$N, $\lambda 20^o 28'$E) with two million inhabitants is the capital of Serbia. Climate is moderate-continental. Meteorological observations have started 118 years ago on the Main meteorological station Belgrade-Observatory. In the long series of observation, changes in temperature and precipitation regime have been noticed. Daily values of air temperature and precipitation were statistically processed. Microsoft Office standard applications were used.

This paper gives analysis results: deviations from the average and linear trends of mean, minimum and maximum seasonal and annual air temperatures, seasonal and annual precipitation sums and number of days with precipitation. Besides that, the assessment of potential climate changes was made also by calculating the following indicators of extreme climate events: TnGE20, TnLE0, TxGE30, TxLE0, HWDI, Tn90, Tn10, Tx90, Tx10. Indicators are recommended by WMO, i.e., Working Group on Climate Change Detection (Peterson, 2001).

The tendency of increase of sesonal and annual air temperatures was observed. Three years out of the fifteen last years (1994, 2000 è 2002) are the warmest since the measuring exists in Belgrade (since 1888). For the period of 118 years the most significant is the increase of minimum annual temperatures whose trend is +2.13 (^{o}C/100 years). The greatest change in the last 50 years is also with minimum temperatures, but in summer season, with the coefficient of +3.79. Also considerable increase of maxi-

mum temperatures in spring was noted, +2.84 ^{o}C for the last 50 years.

Long-term increase of annual precipitation sums was noticed. The increase in winter period is significant. In the past 50 years there are changes in trend, i.e., in winter period precipitations decrease, and in summer period precipitations increase. The number of days with precipitation is also greater in summer period, and smaller in winter period.

In the past 50 years great changes appeared in extreme temperatures. Cold days, and especially cold nights are becoming less frequent and warm days and warm nights more frequent.

Srtatistically significant changes were noticed with heat waves which became more frequent and lasted longer (Djordjevic, 2006). January 2007 was the warmest ever since the measuring exists in Belgrade with the heat wave lasting 20 days which was more than previous maximum in the very warm year of 1998.

Observed trends in time series are suggestive of change in the climatology of extreme events in Belgrade. Since it is considerably urban environment, temperature increase, especially in summer, can be very detrimental for people, especially young, old and those who are sick or overweight are more likely to become victims of extreme heat.

References

1. Djordjevic Smilja, Jovanovic Gordana, 2006: Trends and frequency of heat waves and tropical days in Serbia, International Conference on the Problems of Hydrometeorological Security, Moscow, Russia.

2. Peterson T., Folland C., Gruza G., Hogg W., Mokssit A., Plummer N., 2001: Report on the activities of tha working group on climate change detection and related rapporteurs, WCDMP-No.47, WMO-TD No. 1071.

3. Tank et all, 2003: Trends in Indices of Daily Temperature and Precipitation Extremes in Europe, 1946-99, AMS.