Journal of International Scientific Publications: Ecology and Safety

Volume 8, ISSN 1314-7234 (Online), Published at: http://www.scientific-publications.net

ANALYSIS OF PRECIPITATION CHANGES IN DANUBIAN LOWLAND

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Abstract

The aim of this article is to point precipitation occurrence in the Nitra town area in years 1961 – 2010. The precipitations were considered in 3 categories within decades - always during spring, summer, autumn and winter months: number of days with precipitation of 0,1 mm and more, days with precipitation of 1 mm and more, days with precipitation of 10 mm and more. In the conclusion, we can assume a higher number of cases with precipitation increase over 10 mm were recorded and it considerably influences the amount of water in soil. This increase was recorded mainly in spring and autumn.

Key words: *precipitation, climatic change, agricultural.*

1. INTRODUCTION

The aim of this paper is to evaluate precipitation changes in Danubian lowland for period 1961-2000. Average precipitations were evaluated in 3 categories after decades, always for spring, summer, autumn and winter months: number of days with precipitation 0.1 mm and more, number of days with precipitation 1mm and more and number of days with precipitation 10 mm and more. In conclusion it can be say that there was recorded increasing of precipitation causes over 10 mm and more, which significantly influence supply of water in the soil. This increase was recorded especially in spring and autumn months.

2. MATERIAL AND METHODS

To processing of this problematic were used climatic data from agroclimatic station (γ=48°19´, λ=18°07´, 172.6 m.a.s.l) of Department of Biometeorology and Hydrology, Horticulture and Landscape Engineering Faculty, Slovak Agriculture University in Nitra, which were published in anniversary volumes (Šiška et. al, 2001, Repa et. al, 2000) and in specialized publications (Špánik et. al, 2002).

Precipitations were evaluated in three categories always for annual and always for spring, summer, autumn and winter months:

- Number of days with precipitation 0.1mm and more
- Number of days with precipitation 1mm and more
- Number of days with precipitation 10mm and more

3. RESULTS AND DISCUSSION

On the figures 1 and 2 is evident process of precipitation events with precipitation 0.1mm and more for spring and summer months on monitored area for 1961 to 2010 for annual periods. Trend curve has decreasing tendency. In winter moths has trend curve moderate decreasing tendency, but very low demonstrativeness (figure 4). In total, this examined period (figure no.5) is not very significant by changes of precipitation, what is obvious, by course of trend line with very low demonstrativeness and low determination coefficient.

Figures 6 and 7 describe the course of precipitation periods with precipitation 1 mm and more for spring and summer months on examined area for period 1961 – 2010 by annual. Trends lines have decreasing tendency. Figure 6 shows course of precipitation events with very high demonstrativeness and high determination coefficient R^2=0.973, and it means that there is strong linear dependency. Figures 8 and 9 describe course of precipitation events, where determination coefficient is low and also the demonstrativeness is low. Total is this

examined period (figure 10) typical for evident decreasing of precipitation by course of linear trend line and determination coefficient R^2=0.7323.

3.1 Precipitation events 0.1mm and more

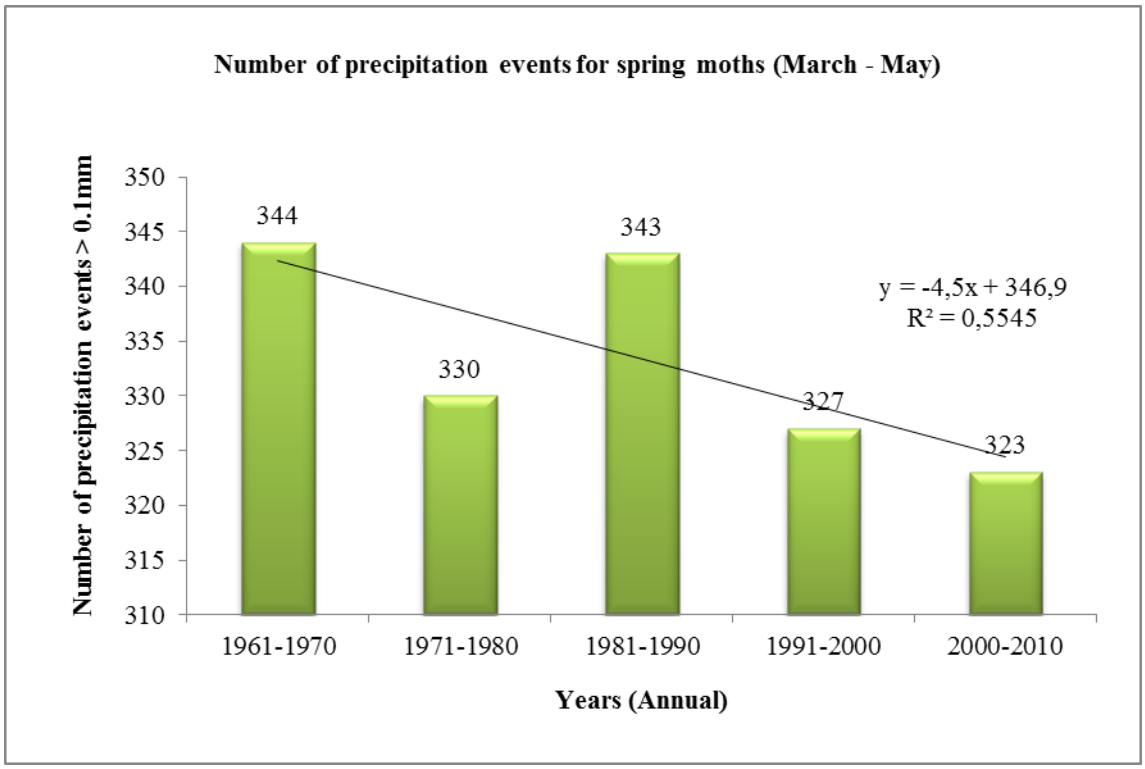


Fig. 1 Number of precipitation events with rainfall 0.1 mm and more for the spring season in years 1961-70, 1971-80, 1981-90, 1991-00, 2001-2010

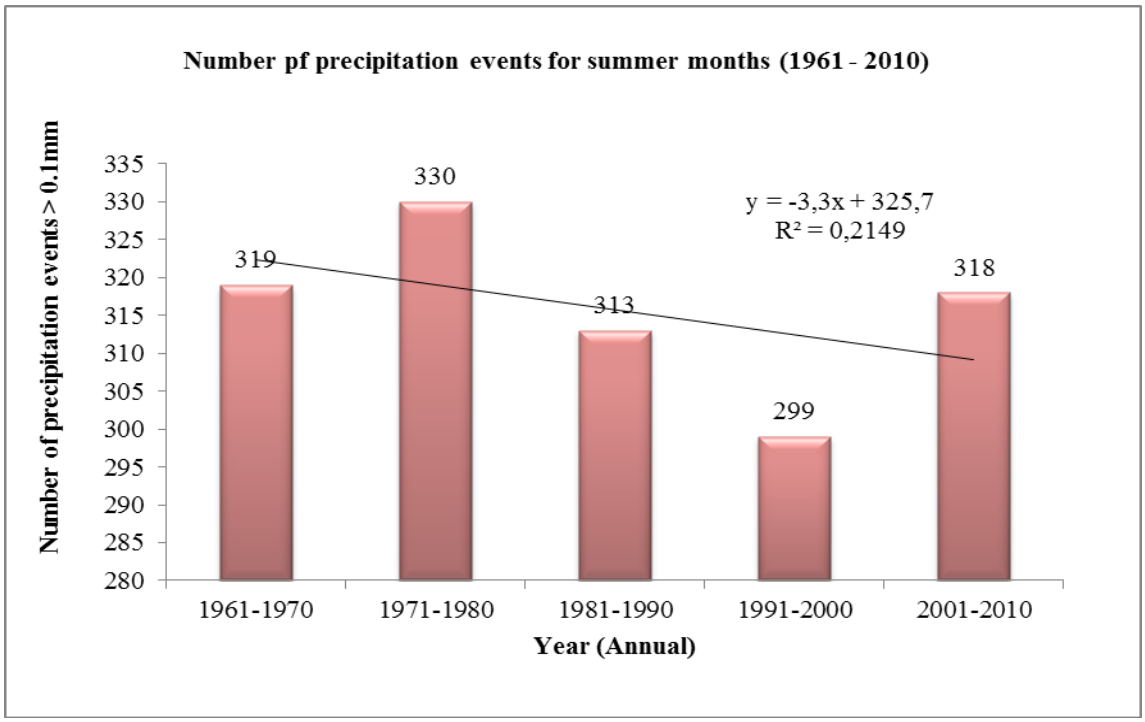


Fig. 2 Number of precipitation events with rainfall 0.1 mm and more for the summer season in years 1961-70, 1971-80, 1981-90, 1991-00, 2001-2010

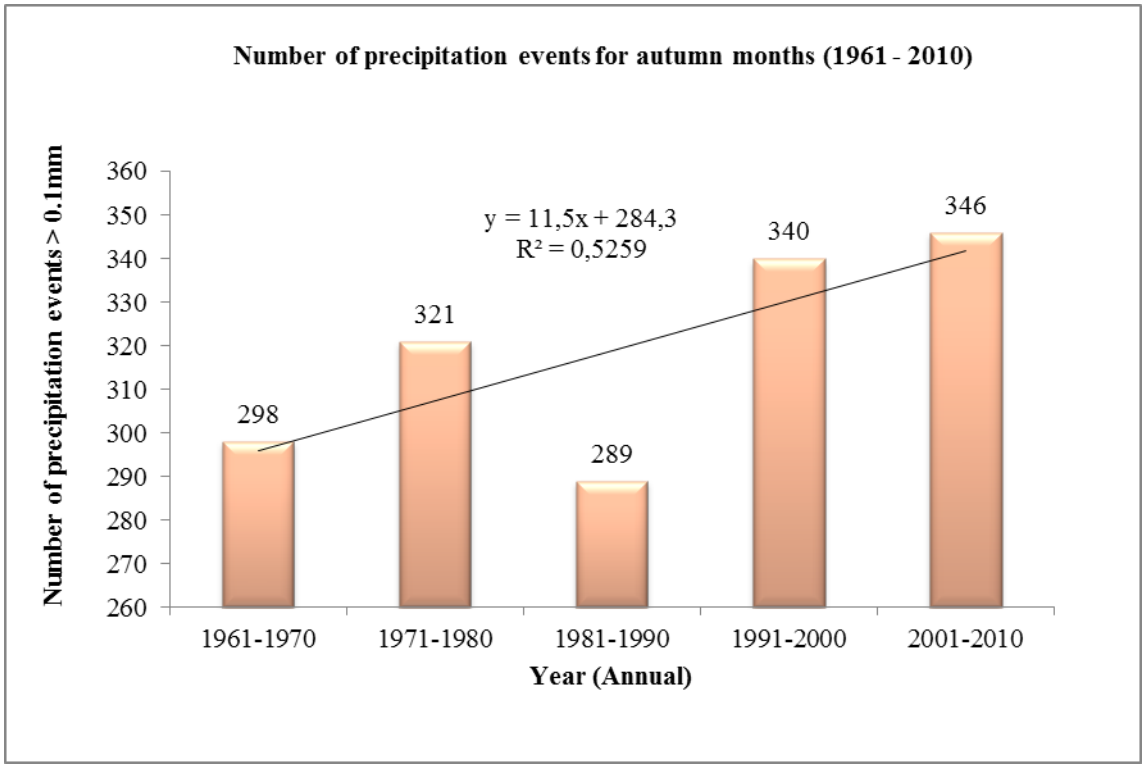


Fig. 3 Number of precipitation events with rainfall 0.1 mm and more for the autumn season in years 1961-70, 1971-80, 1981-90, 1991-00, 2001-2010

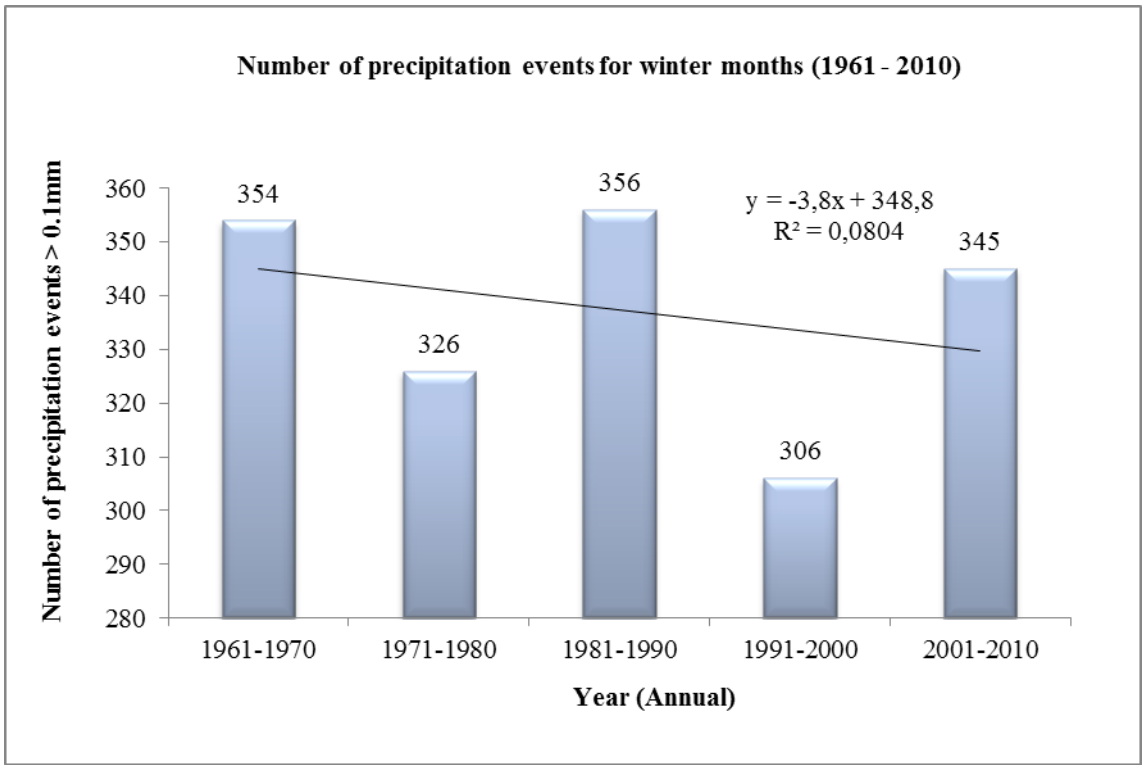


Fig. 4 Number of precipitation events with rainfall 0.1 mm and more for the winter season in years 1961-70, 1971-80, 1981-90, 1991-00, 2001-2010

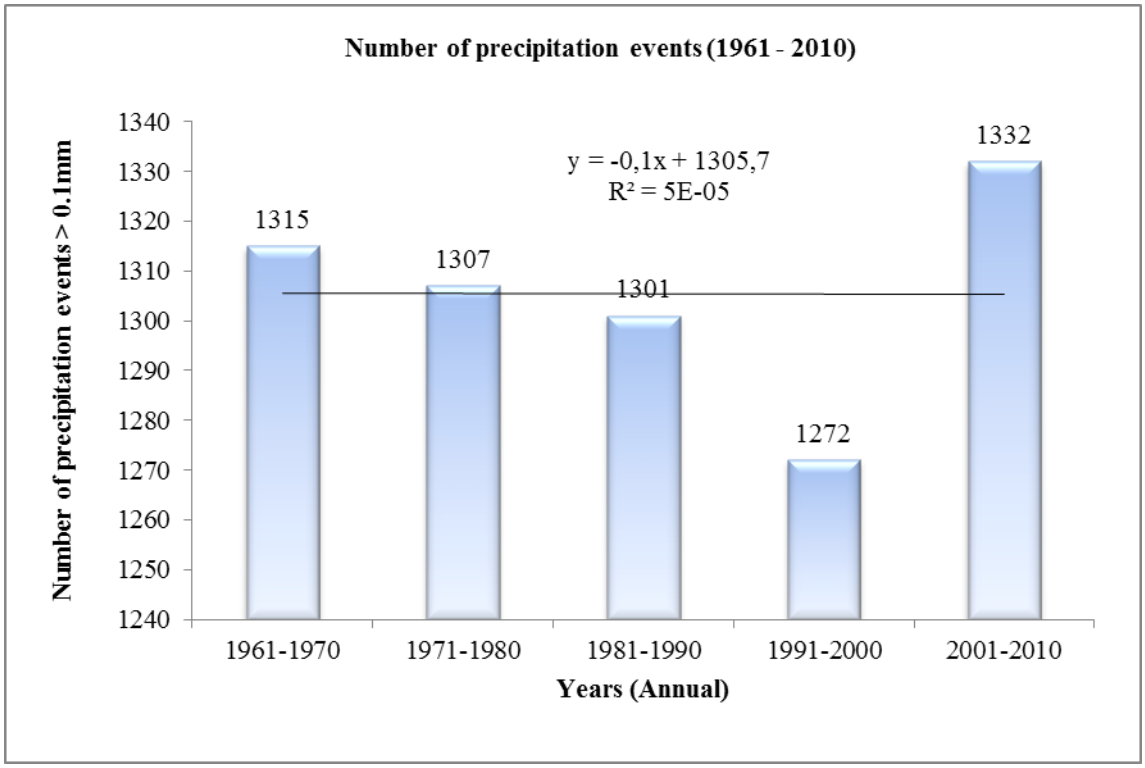


Fig. 5 Number of precipitation events with rainfall 0.1 mm and more for the period in years 1961-70, 1971-80, 1981-90, 1991-00, 2001-2010

3.1 Precipitations events 1mm and more

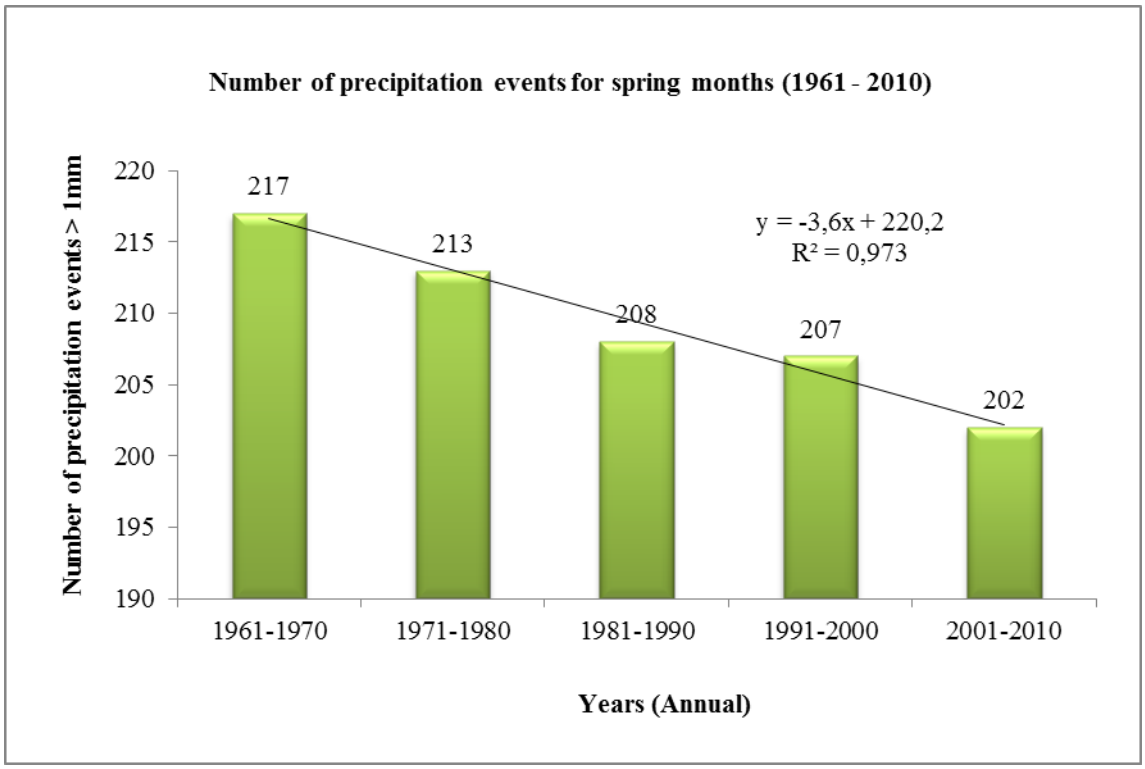


Fig. 6 Number of precipitation events with rainfall 1 mm and more for the period in years 1961-70, 1971-80, 1981-90, 1991-00, 2001-2010

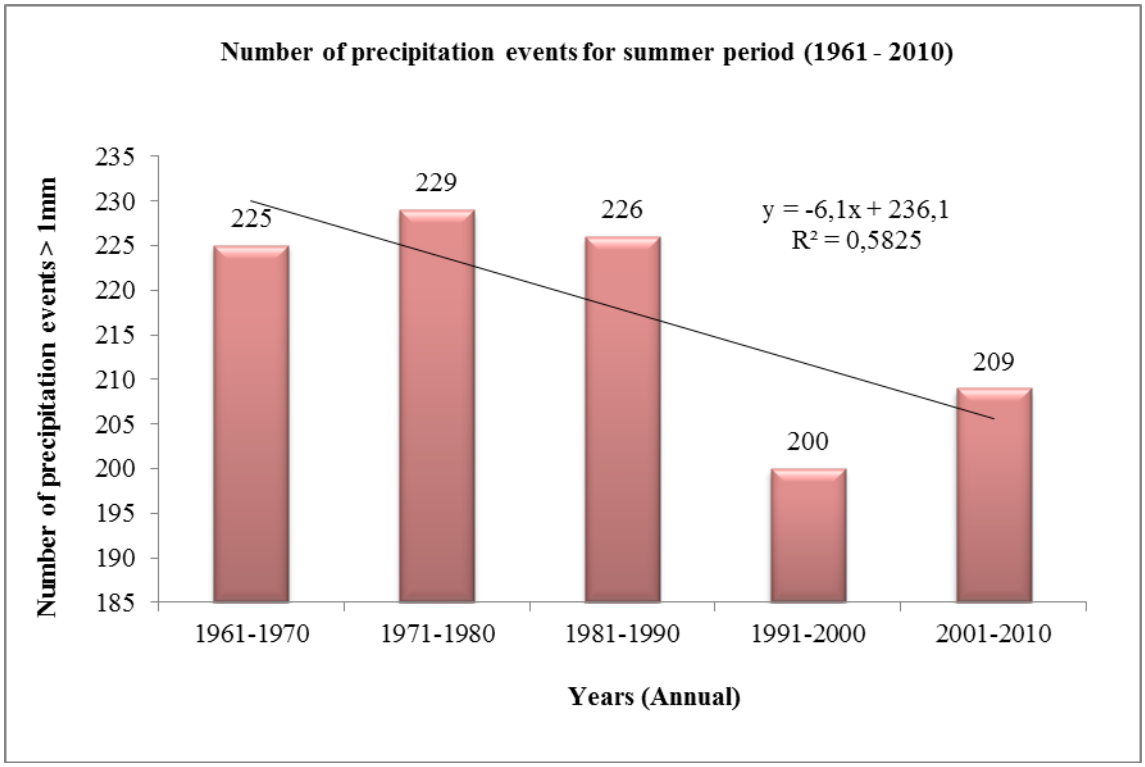


Fig. 7 Number of precipitation events with rainfall 1 mm and more for the summer season in years 1961-70, 1971-80, 1981-90, 1991-00, 2001-2010

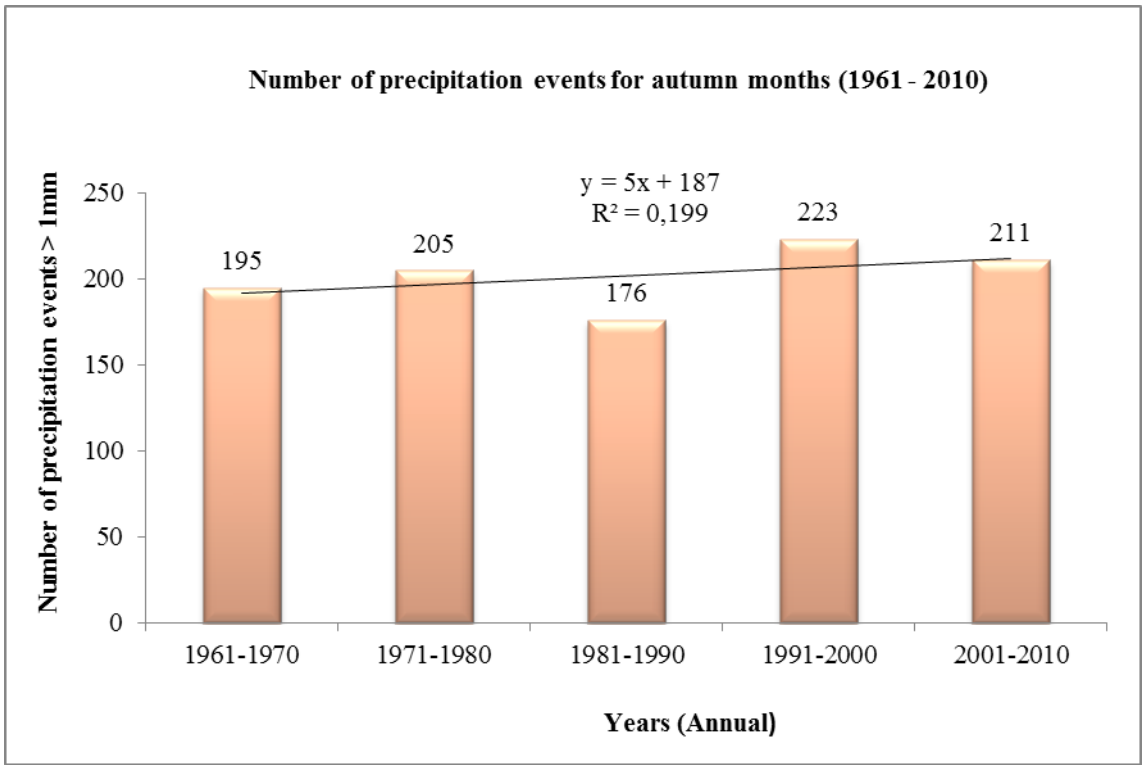


Fig. 8 Number of precipitation events with rainfall 1 mm and more for the autumn season in years 1961-70, 1971-80, 1981-90, 1991-00, 2001-2010

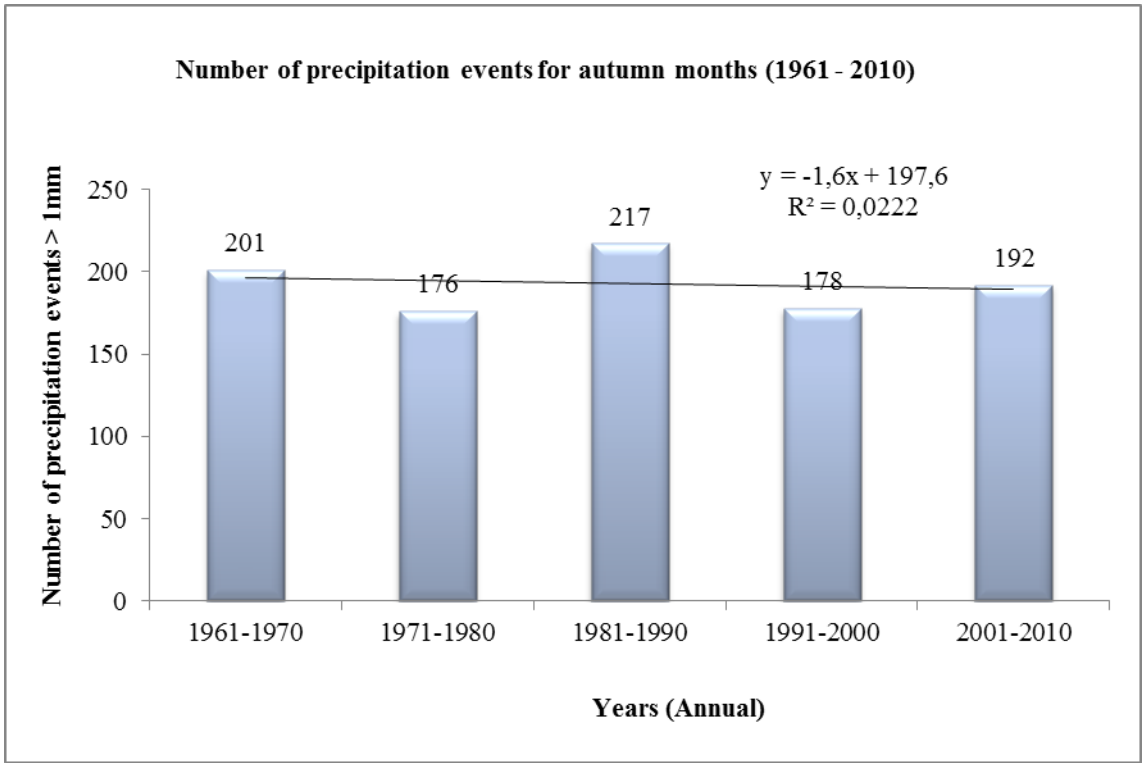


Fig. 9 Number of precipitation events with rainfall 1 mm and more for the winter season in years 1961-70, 1971-80, 1981-90, 1991-00, 2001-2010

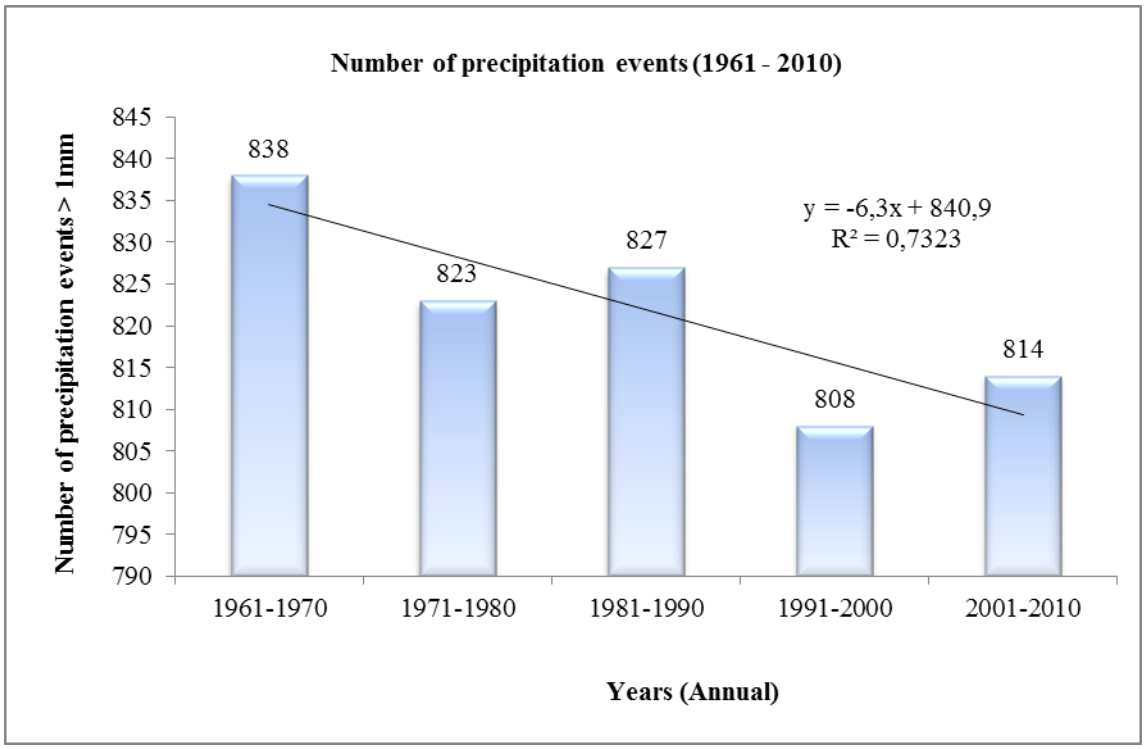


Fig. 10 Number of precipitation events with rainfall 1 mm and more for the period in years 1961-70, 1971-80, 1981-90, 1991-00, 2001-2010

3.3 Precipitation events > 10mm

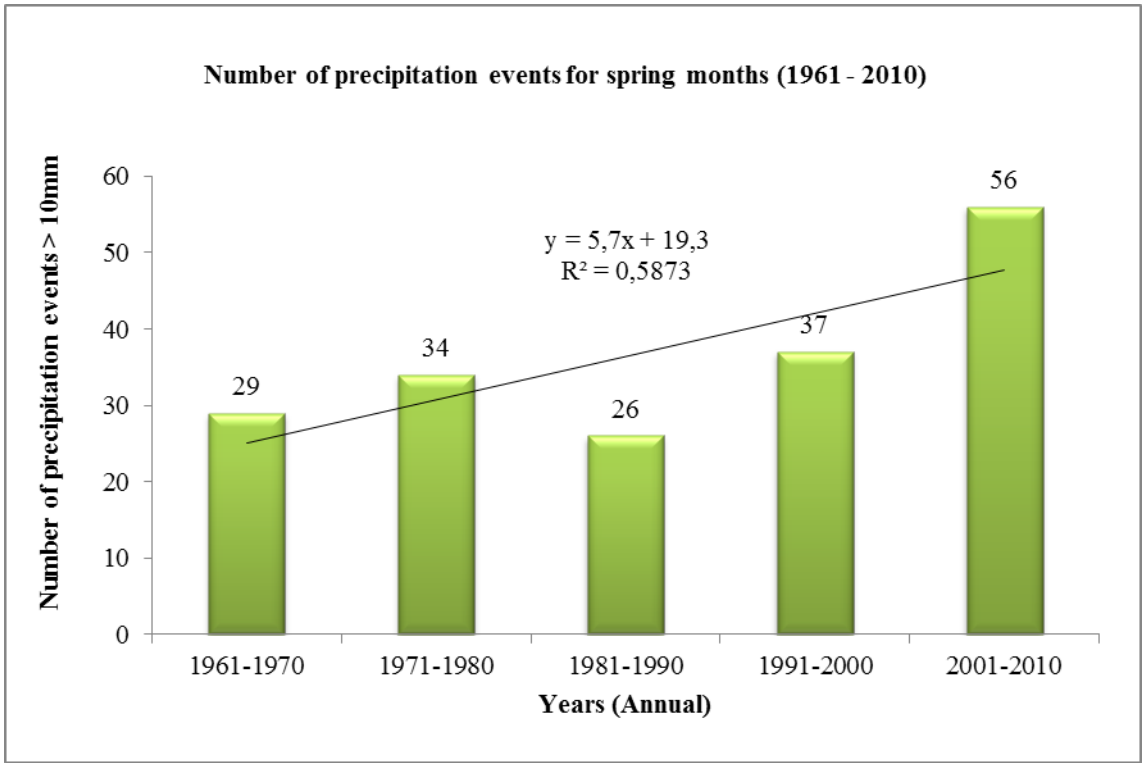


Fig. 10 Number of precipitation events with rainfall 10 mm and more for the spring season in years 1961-70, 1971-80, 1981-90, 1991-00, 2001-2010

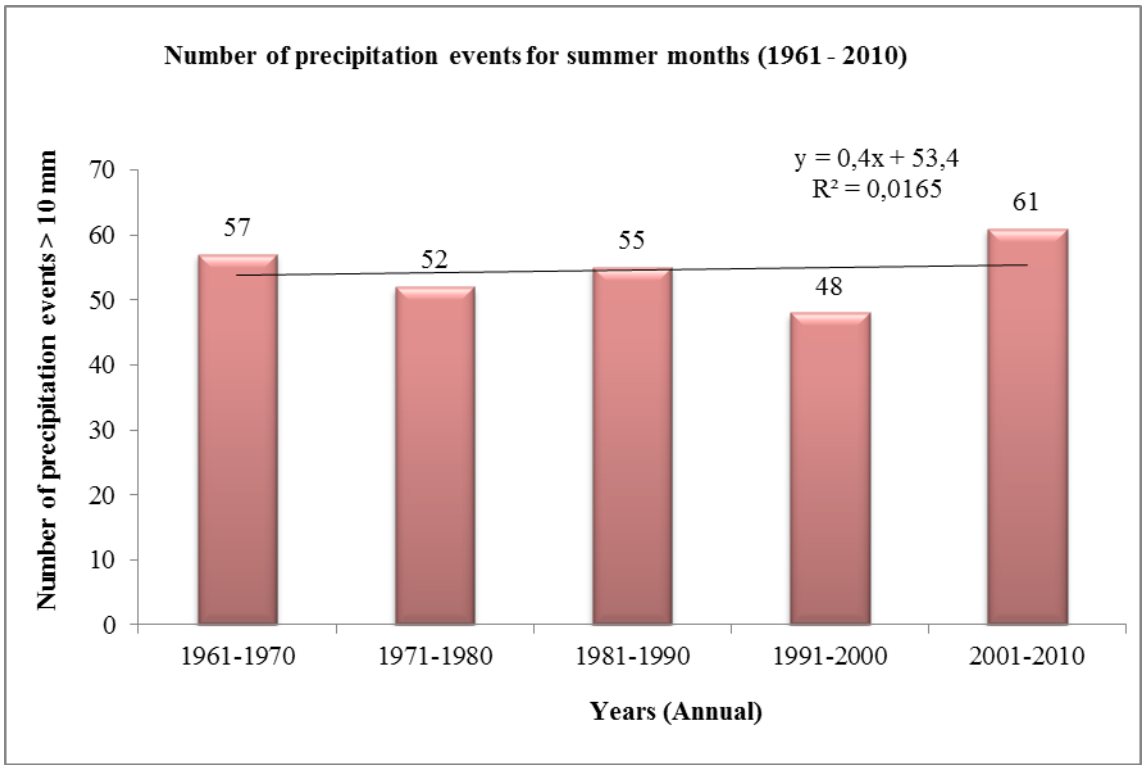


Fig. 11 Number of precipitation events with rainfall 10 mm and more for the summer season in years 1961-70, 1971-80, 1981-90, 1991-00, 2001-2010

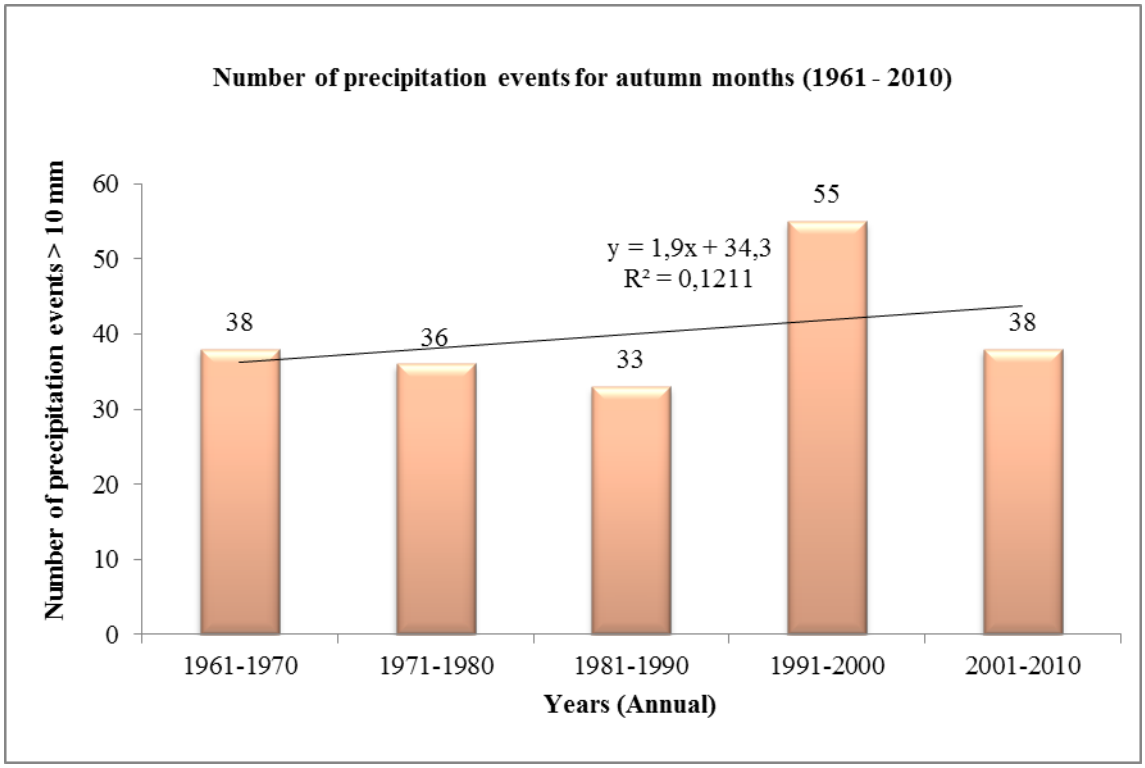


Fig. 12 Number of precipitation events with rainfall 10 mm and more for the autumn season in years 1961-70, 1971-80, 1981-90, 1991-00, 2001-2010

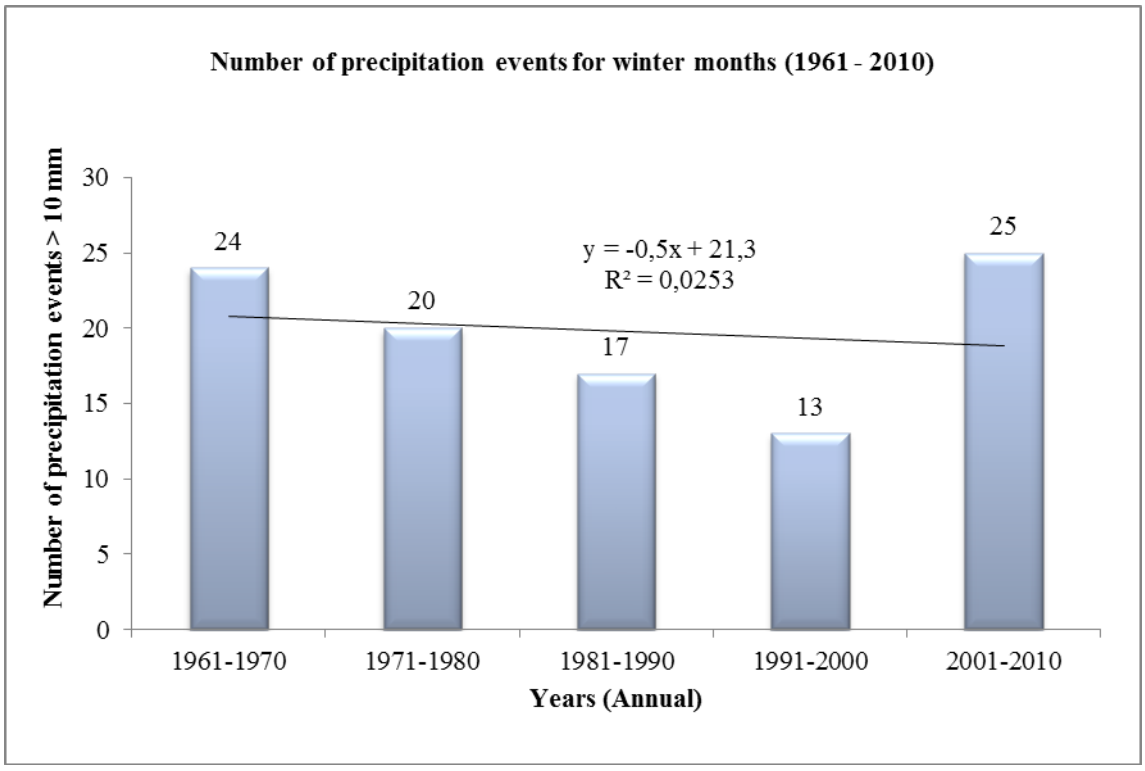


Fig. 13 Number of precipitation events with rainfall 10 mm and more for the winter season in years 1961-70, 1971-80, 1981-90, 1991-00, 2001-2010

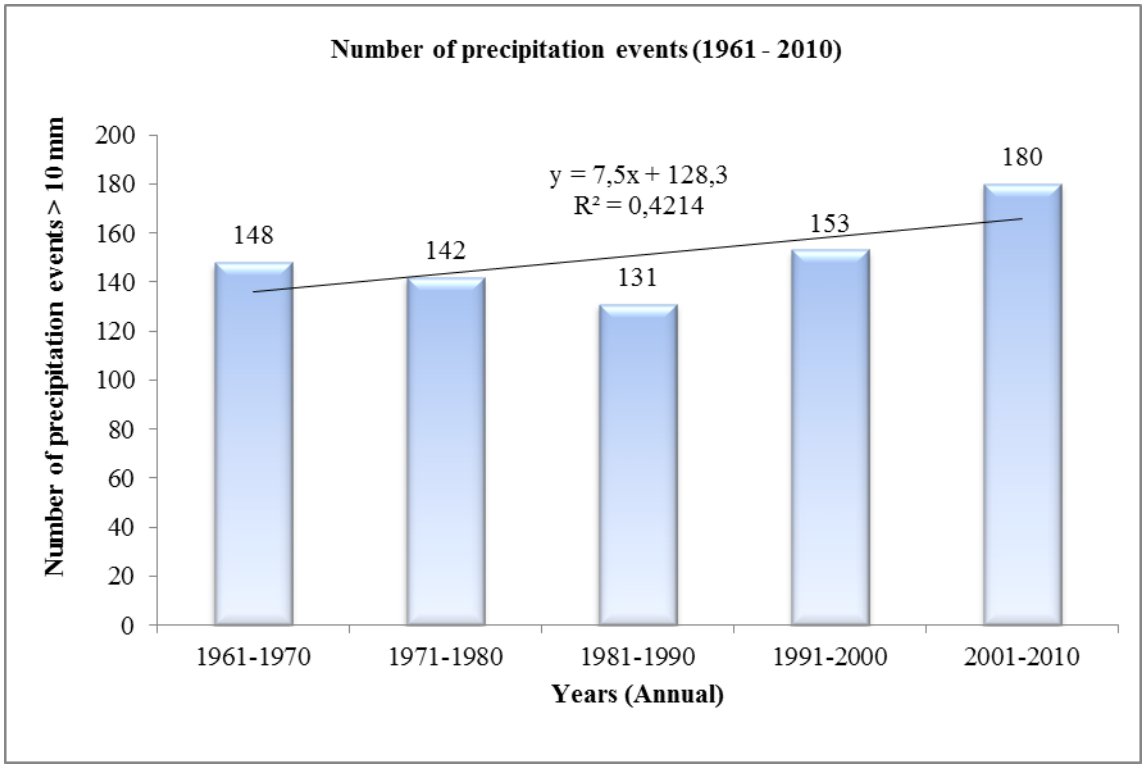


Fig. 14 Number of precipitation events with rainfall 10 mm and more for the period in years 1961-70, 1971-80, 1981-90, 1991-00, 2001-2010

Figure 11 shows increasing trend of precipitation events 10mm and more for spring months on examined area for period 1961 – 2010 which is obvious by determination coefficient R^2=0.5873. Others analysed months had very low demonstrativeness (figures 12, 13, 14). In total view on analysed 50-years time period with precipitation events 10mm and more (figure 15) it can be state that course of precipitation events is increasing which is obvious also by the course of trend line and determination coefficient R^2=0.4214.

4. CONCLUSION

At the end we can say that there was recorded the decreasing of precipitation events 0.1mm and 1mm and more, but in precipitation events 10mm and more, which significantly affect the supply of water in soil was recorded significant increasing, especially in spring months (fig. 11), but also in autumn months (fig. 13). This increasing of precipitation events with combination of snow meltdown depending on increasing of average temperature many times caused floods on the most part of Slovak republic in recent years.

ACKNOWLEDGEMENTS

This paper was support by grant projects VEGA 1/0573/11, VEGA 1/0744/13 and KEGA 003SPU-4/2012

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