POSIBILITIES OF RECREATION IN HNILEC RIVER BASIN FROM CLIMATOLOGICAL POINT OF VIEW

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Abstract
Climate change affects the hydrological regime of the Palcmanská Maša water reservoir and the use of the water surface for recreational purposes. Within the contribution, climatological variables were analyzed, namely precipitation, temperatures and flows in the sub-basin above Stratená station in the Hnilec river basin. The results document the possibilities of recreational use of the given area.

Key words: Hnilec, climate parameters, recreation

Introduction

Climate change is already happening. I observe increased daily average temperatures, lack of water. The assessment of low flows is necessary from the point of view of water management (Junáková et al., 2020). The lack of water affects the use of the territory for recreational purposes. First, you need to define what low flow is. Low flow is between Quantile Q70 – Q90 (Smakhtin, V. U., 2001). In this study, we evaluated very low flows that did not exceed the Q20 value. Which is a very small value that we characterize as dry periods. In the recent period, the occurrence of dry periods is becoming more frequent, which affects agriculture, forestry, water management, but also nature protection and recreation (Zeleňáková, et al., 2018).

Materials and methods

Study area and data

The studied territory is located in eastern Slovakia. The Hnilca basin belongs to the Hornád basin. The Hornád River belongs to the Danube River basin. The greater part of the studied territory is located in the Slovak Paradise, which is used for recreational purposes. The Palcmanská Maša reservoir was built on the upper course of the Hnilec river. The purpose of the reservoir is to accumulate water to ensure the supply to the hydroelectric power plant in Dobšina, to balance the flows of the Hnilec and for recreational use (Mazúr, E., Lukniš, M., 2002)

In the given basin, flows were evaluated in two water measuring stations: Jaklovce and Stratená for the period 1961-2020. Sub-basins were created according to the hydrological stations, and to the given basins are area air temperatures and area precipitation. Data provided by SHMU.

Methods

The Q20 quantile for daily flows was calculated using the R programming language in the R studio program using the Stats package. The fifth type of quantile calculation was used. Based on the calculated quantile, all daily flows whose value was less than Q20 were separated. Based on these values, the days of the year that did not exceed this value were calculated. Next, a linear trend was used, with which we found out whether the given days are increasing or decreasing. (Hyndman, R. J., Fan, Y., 1996).

Results

The evaluation of the flows showed us that the daily flows, which do not exceed the value of Q20, increase in number of days. The most days where flows did not exceed the given value were in the period from 1985 to 2008 Figure 2.

On Figure 3, daily precipitation for the period 1961-2020 is evaluated, a slight increase in precipitation is observed.

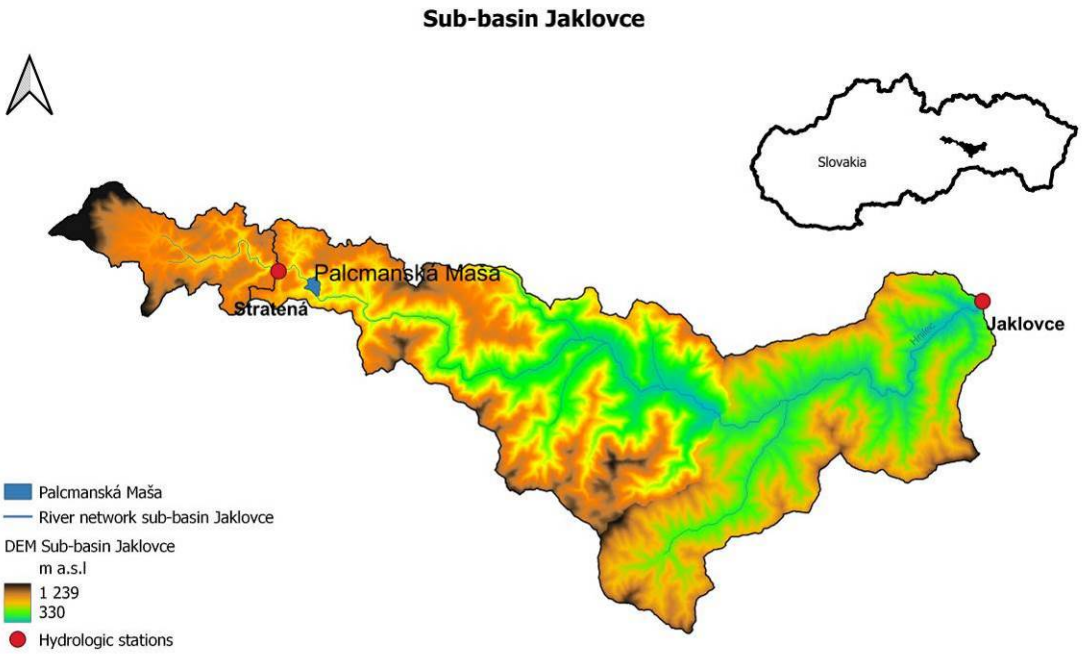
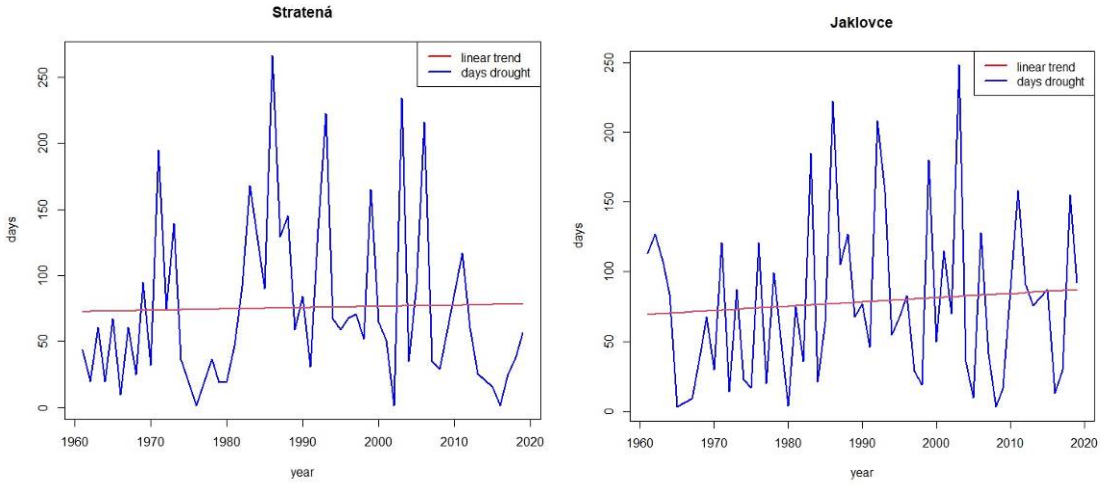
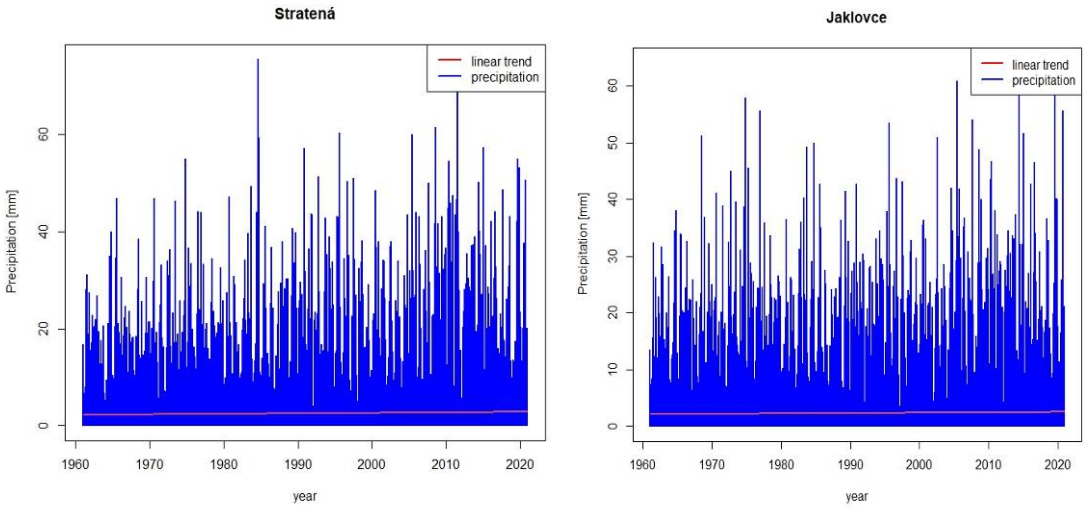


Fig.1: Basin Hnilec



a, b,

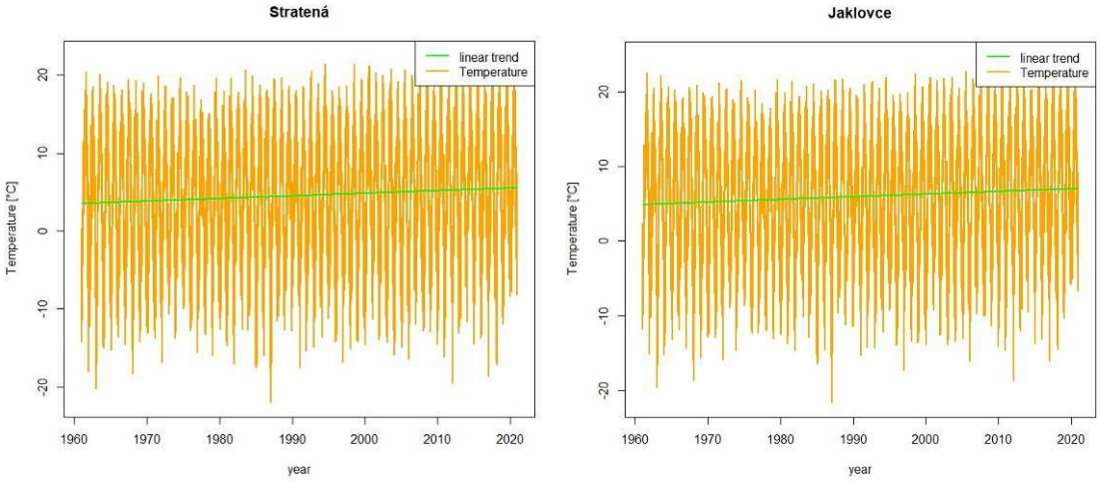
Fig. 2: a, station Stratena b,station Jaklovce dayly dry period



a, b,

Fig. 3: Daily precipitation a, station Stratená b, station Jaklovce

Daily average air temperatures have increased over the observation period 1961-2020.



a, b,

Fig. 4: Daily precipitation a, station Stratená b, station Jaklovce

The results show that there are more days in the year where the daily flows do not exceed the Q20 value. In some years, the number of days where daily flows did not exceed this value was more than 200 days. our precipitation has slightly increased, but the daily average temperature has increased, which results in higher evaporation from the given area.

Discussion

Climate change has an impact on water inflows to the Palcmanská Maša water reservoir, which is also used for recreational purposes. The decrease in flows affects the volume of water in the reservoirs and the lack of water by limiting the use of the reservoir for recreational purposes such as fishing, swimming and boating. This study can be used to adjust the operating procedure of the water tank.

Conclusion

Climate change impact on recreational use of Palcmanská Maša. It is necessary to propose adaptation measures for better retention of water in the reservoir as well as in the surroundings. An increase in the daily average temperature results in greater interest in outdoor recreation. The Hnilec basin area has great potential for recreational use of the area, from hiking in the Slovak paradise, fishing in the reservoir or evening walks by the lake.

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Souhrn
Vliv změny klimatu na rekreační využití Palcmanské Maši. Je nutné navrhnout adaptační opatření pro lepší zadržování vody v nádrži i v okolí. Nárůst průměrné denní teploty má za následek větší zájem o venkovní rekreaci. Oblast povodí Hnilce má velký potenciál pro rekreační využití oblasti, od turistiky ve Slovenském Ráji, rybaření v přehradě nebo večerních procházek u jezera.

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