

THE MULTIANNUAL DISCHARGE FLUCTUATION OF THE CRIȘUL NEGRU RIVER AT THE TINCA HYDROLOGICAL STATION

Köteles Nandor*, Pereș Ana Cornelia*

*University of Oradea, Faculty of Environmental Protection, 26 Gen. Magheru St., 410048 Oradea, Romania, e-mail: kotelesnandor@yahoo.com

Abstract

The goal of this paper is to present the multiannual discharge fluctuation of the Crișul Negru river recorded at the Tinca hydrological station in the 2006-2010 period.

The multiannual average discharge is 27.6 m³/s. The highest discharge value was recorded in 2006, 440 m³/s, and the lowest one in 2009, 1.40 m³/s.

From the recordings it can be seen that the average of the highest daily discharge values is 318 m³/s, with the highest value recorded on 31.03.2006, that is, 440 m³/s.

The average of the lowest daily discharge values is 2.57 m³/s, with the lowest value recorded on 14.09.2009, that is, 1.40 m³/s.

Key words: discharge evolution, highest discharge, lowest discharge, river.

INTRODUCTION

The discharge of a river can change continuously, as it is influenced by climatic factors. The strongest influence is that of precipitation, which results in higher water levels. It is obvious that this influence on discharge depends on how big the river is. The discharge of bigger rivers, when compared to that of smaller ones, increases and decreases more slowly, as the rainfalls occurring hundreds of kilometers upstream need time to get downstream.

Discharge is also influenced by air temperature, as higher temperatures mean higher evaporation, which results in decrease of discharge.

MATERIAL AND METHOD

The analysis of discharge evolution of Crișul Negru river at the Tinca hydrological station was performed using data provided by The „Romanian Waters“ National Administration, Crișuri Water Branch. The data covered a period of five years, from 2006 to 2010.

The water discharge data were processed using statistical and mathematical methods. The results were graphed so that the fluctuation in time could be better followed.

RESULTS AND DISCUSSIONS

The multiannual average discharge of the Crișul Negru river at the Tinca hydrological station is $27.6 \text{ m}^3/\text{s}$. The highest annual average discharge in the period included in the study was recorded in 2006, the value of $41.2 \text{ m}^3/\text{s}$. A close value was recorded in 2010 as well, $38.1 \text{ m}^3/\text{s}$.

The lowest annual average discharge was $18.9 \text{ m}^3/\text{s}$, recorded in 2008 (see Figure 1). Values close to this one were recorded in 2009 and 2007 as well, $19.2 \text{ m}^3/\text{s}$ and $20.7 \text{ m}^3/\text{s}$ respectively.

The above data show that at the Tinca hydrological station the water discharge fluctuates rather much, with values of $41.2 \text{ m}^3/\text{s}$ and $38.1 \text{ m}^3/\text{s}$ in 2006 and 2010 respectively, while in 2007, 2008 and 2009 the values were close to each other.

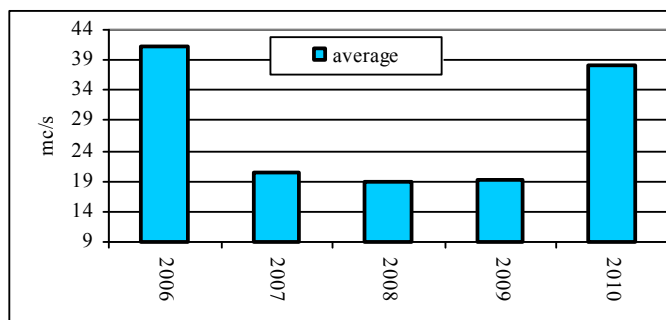


Figure 1. Evolution of annual average discharges at the Tinca hydrological station (2006-2010)

Table 1

Fluctuation of the highest annual discharges at Tinca in the 2006-2010 period

Highest discharge m^3/s	440	261	214	294	380
Date	31.03.2006	04.12.2007	09.03.2008	31.12.2009	02.01.2010

Source of data: Crișuri Water Branch

The fluctuation of the annual highest discharges shows that the highest value was recorded on 31.03.2006, $440 \text{ m}^3/\text{s}$, followed by $380 \text{ m}^3/\text{s}$ on 02.01.2010. The highest values drop to $294 \text{ m}^3/\text{s}$ on 31.12.2009, to $261 \text{ m}^3/\text{s}$ on 04.12.2007, and as low as $214 \text{ m}^3/\text{s}$ on 09.03.2008 (see Figure 2, Table1).

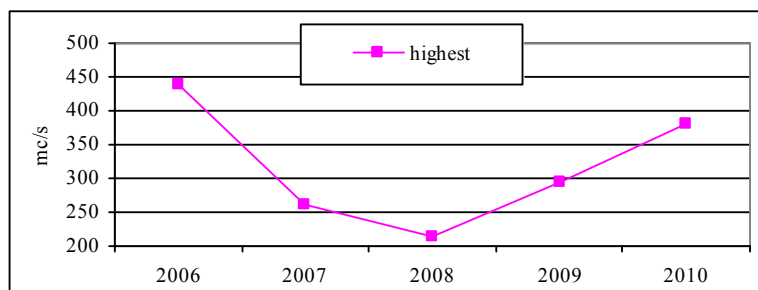


Figure 2. Evolution of highest annual discharges at the Tinca hydrological station (2006-2010)

Table 2

Fluctuation of the lowest annual discharges at Tinca in the 2006-2010 period

Lowest discharge m³/s	3.10	1.46	2.20	1.40	4.70
Date	25.29.10.2006	03.08.2007	07.09.2008	14.09.2009	28.07.2010

Source of data: Crișuri Water Branch

The lowest annual discharge was recorded on 14.09.2009, 1.40 m³/s. A value close to this one, 1.46 m³/s, occurred on 03.08.2007. The highest value of lowest discharge, 4.7 m³/s, was recorded on 28.07.2010 (see Figure 3, Table 2).

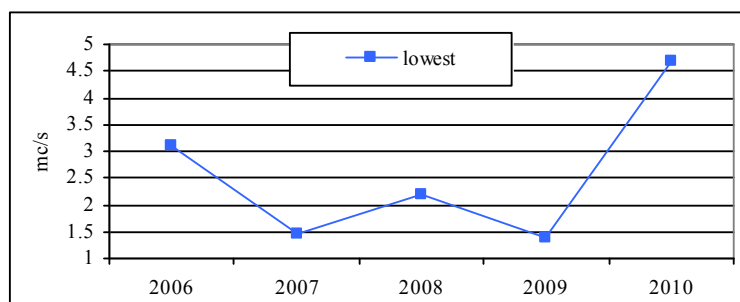


Figure 3. Evolution of lowest annual discharges at the Tinca hydrological station (2006-2010)

CONCLUSIONS

The multiannual average discharge is 27.6 m³/s. The highest value was 41.2 m³/s, recorded in 2006, while the lowest one was 18.9 m³/s, recorded in 2008.

The highest water discharge was 440 m³/s, recorded on 31.03. 2006.

The lowest water discharge was 1.40 m³/s, recorded on 14.09.2009.

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