



Javakhishvili Tbilisi State University (TSU) - Geographical Society of Georgia  
 International Geographical Union Commission on Landscape Analysis and Landscape Planning  
 Mountain Partnership - Georgian Cartographers Association

# BOOK OF ABSTRACTS

II International Scientific Conference  
**Landscape Dimensions of Sustainable Development**  
**Science – CartoGis - Planning – Governance**

Dedicated to the 75th Anniversary  
 of Professor Nikoloz (Niko) Beruchashvili



12-16 SEPTEMBER

2022 TBILISI, GEORGIA

Ivane Javakhishvili Tbilisi State University  
Alexandre Javakhishvili Geographical Society of Georgia  
International Geographical Union (IGU)  
Commission Landscape Analysis and Landscape Planning  
Georgian Cartographers Association  
Mountain Partnership

## II INTERNATIONAL SCIENTIFIC CONFERENCE

LANDSCAPE DIMENSIONS OF SUSTAINABLE DEVELOPMENT:  
SCIENCE – CARTOGIS - PLANNING – GOVERNANCE

# Book of Abstracts

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**On behalf of the Ivane Javakhishvili Tbilisi State University  
Thank you for participating in the International Conference**

**LANDSCAPE DIMENSIONS OF SUSTAINABLE DEVELOPMENT  
SCIENCE – CARTOGIS - PLANNING – GOVERNANCE**

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## ASSESSMENT OF THE CURRENT STATE OF WATER RESOURCES IN TRANSCARPATHIA

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### Abstract

Observations of water runoff in the studied area are carried out for a long time, which, firstly, allows establishing a fairly objective trend of change; secondly, it allows us to judge the trend of changes in water flow during the period of global warming.

This study examines the Tisza sub-basin. On the territory of Ukraine there is an upper, mostly right-bank part of the Tisza basin, which situated on the southwestern slopes of the Ukrainian Carpathians and the Transcarpathian lowlands. The peculiarity of the study area is that the Carpathian Mountains protect the territory from the intrusion of cold air masses from the northeast and east. The rivers in question are characterized by a flood regime caused by melting snow and heavy rainfall in the spring (from February-March to June-July), as well as heavy rain and snow-rainfall during the rest of the year.

Recently, a large number of studies have been devoted to assessing the impact of climate change on river runoff (Blöschl et al, 2017 & 2019), in particular, possible changes in the structure of intra-annual runoff distribution Tisza sub-basin are of scientific and practical interest.

The analysis of the intra-annual distribution of river runoff was carried out for catchments with an area range from 189 to 2870 km<sup>2</sup>. The water gauge stations (WGS) on Transcarpathian Rivers have an observation period from 56 to 103 years, up to 2015 inclusive.

The calculation is performed for 3 time intervals: for the entire observation period (60-70 years); the period of the climatic norm (1961-1991) and period of climatic changes (1989-2015). At the first stage, the

residual mass curves were calculated and constructed to analyze the cyclicity in fluctuations in the time runoff series (Fig. 1).

Analysis of Fig. 1 shows that for the entire period and the period of the climatic norm, full cycles of water availability can be distinguished, which include both low-water and highwater phases; on the another hand, the period of climatic changes is characterized by a stable decreasing trend against the background of insignificant increases in certain years.

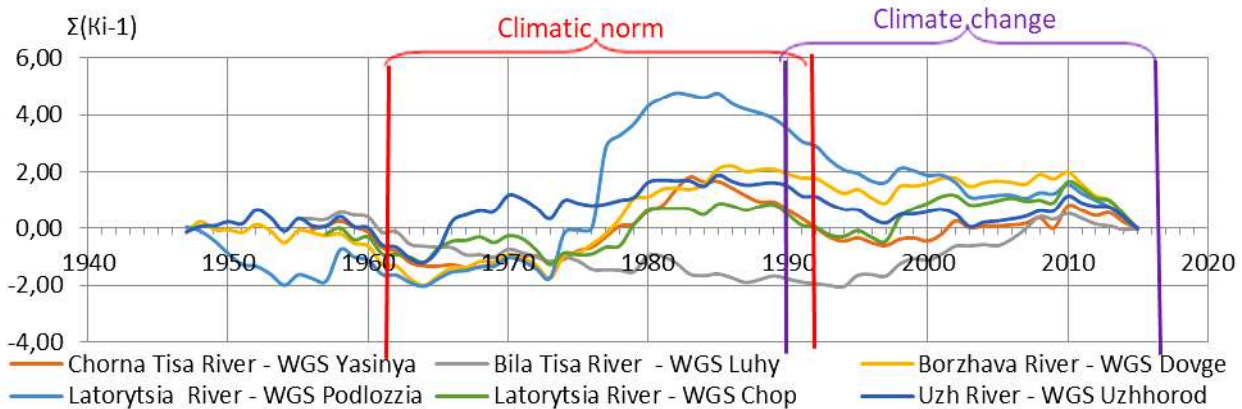


Fig. 1 - Residual mass curves of water discharge at the rivers of Tisza subbasin

The intra-annual runoff regime of the region under study is characterized by floods from March to August, and in some years to November-December. Analyzing the entire available series of observations for the considered catchments, it can be noted that the runoff in the spring season is 36-41% of the annual runoff, summer 15-27%, autumn 15-19% and winter 14-29%. On the rivers in the eastern part of Transcarpathia, the largest runoff occurs in April, less often in May, and on the rivers in the western part of the region it is March. The average monthly runoff of the wet month is from 14% to 17% of the annual runoff.

At the moment, no significant influence of climate change on the runoff of rivers in the Tisza sub-basin and its intra-annual distribution has been revealed, which is due to the peculiar conditions of the formation of river flow in the study area.

**Keywords:** intra-annual runoff, Transcarpathian, climate change.

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