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Book of abstracts

6th PannEx Workshop

Organised by the

**Babes-Bolyai University, Faculty of Geography,
Research Centre for Sustainable Development**

in partnership with the

**University of Agriculture Sciences and Veterinary Medicine
in Cluj-Napoca,**

INDECO Soft

and the

PannEx consortium network



**Cluj-Napoca,
20-21 June, 2022**

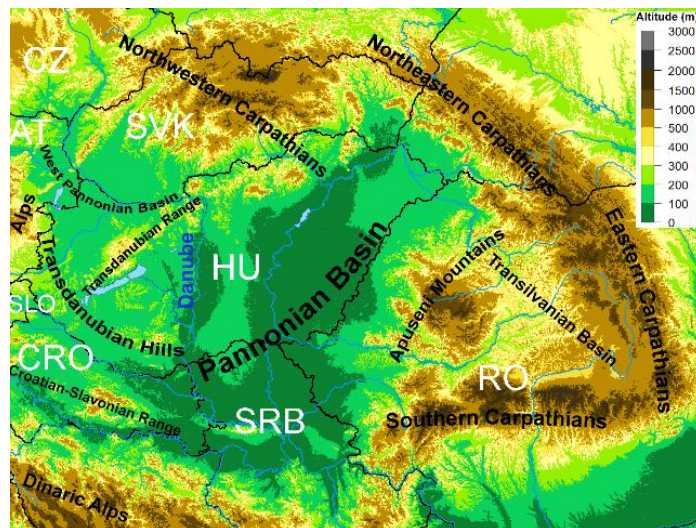


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Regional environmental challenges in the Pannonian basin

Workshop Climate Services for a Sustainable Agriculture



Edited by
Adina-Eliza Croitoru,
Csaba Horváth, Bela Kobulniczky

Cluj-Napoca,
20-21 June, 2022



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The workshop was organized under the framework of the research project **Redefining agro-climatic suitability zones for maize and winter wheat crops towards a smart climate change-oriented agriculture in Romania (AGROCLIMRO)** financed by the Executive Unit for the Financing of Higher Education, Research, Development and Innovation (UEFISCDI) in Romania.

Background

PannEx (Pannonian Basin Experiment) is a Regional Hydroclimate Network of the Global Energy and Water Exchanges project (GEWEX) which aims to achieve a better understanding of the Earth system components and their interactions in the Pannonian Basin. The international efforts involve the international research community in an integrated approach towards identifying and increasing adaptation capacity in the face of climate change in the Pannonian Basin.

Objectives

The 6th workshop is dedicated to introduce the ongoing and planned research on climate change in extreme weather events and adaptation, and to discuss the cooperation possibilities for research projects. The workshop is intended to strengthen & organize the work of the PannEx Task Teams and develop a new iteration of the Science and Implementation Plan. More details are available in the *White Book* at: <https://www.wcrp-climate.org/WCRP-publications/2019/WCRP-Report-No3-2019-PannEx-WB.pdf>

The workshop is organized as a side meeting of the workshop *Climate Service for a Sustainable Agriculture* organized within the framework of the research project AGROCLIMRO (www.agroclim.ro).

Topics of the 6th workshop follow the structure of the PannEx Task Teams and include

- Agroclimatological and Agrobiological Systems;
- Energy Production;
- Special Observations and Data Analysis;
- Ecosystem Services;
- Urban Climate and Air Quality; Outreach and Education; Micrometeorology and Agronomical Process Modelling;
- Water Balance at Basin Scale;
- Modelling from Climate to Flash Floods.



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Analysis of the impact of weather conditions in 2010-2019 on the formation of flash floods in the north-western Black Sea region

Valeriya Ovcharuk, Galina Borovskaya, Natalia Kichuk



"Modern climate change is accompanied by increasing recurrence of dangerous hydrometeorological phenomena, including heavy rainfall. During the warm period in the study area there are heterogeneous weather conditions, which are due to the alternation of hot air masses and atmospheric fronts, resulting in high temperature contrasts in the area. Almost every year on the territory of the north-western Black Sea coast, heavy rains can be observed, which sometimes become catastrophic and lead to flash floods. This is how the downpour rain on September 12, 2013 in the Kohylnyk River basin can be characterized, where the maximum daily precipitation was 196.9 mm at the Tarutino weather station and caused significant damage throughout the basin.

Similar weather conditions developed in the first decade of August 2019, which led to significant rainfall in the study area. According to the UkrHMS in the first decade of August 2019 in Ukraine there was unstable weather with large fluctuations in air temperature. During the first decade of August, several active atmospheric fronts and cyclones moved through the territory of Ukraine, accompanied by heavy rains, squalls and hail. The greatest amount of precipitation was observed on August 3-4 in the southern and eastern regions during the movement of the active cyclone from southwest to east. On August 4, 2019, in the city of Belgorod-Dniester, as a result of the disaster, traffic was disrupted, agricultural and basement buildings were flooded, certain areas were flooded, sewer manholes were destroyed, and trees were felled.

In some areas of these regions there were heavy rains, when the amount of precipitation reached 130-220% of the monthly norm, in Khorly (Kherson region) - 105 mm, Zaporozhye (according to AMWS) - 121 mm, Belgorod-Dniester (Odesa region) - 126 mm, which was about three monthly norms and met the criterion of a spontaneous meteorological phenomenon III (red) level of danger.

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In normative documents, the formation of rain floods is associated with the daily values of precipitation Hm. The observed values of Hm in recent years range from a fairly wide range - from 52 mm (Korotne) to 196.9 mm (AMWS Tarutino), but, as the analysis shows, belong to different years. Generalized data on the frequency of maximum daily precipitation showed that most often daily maxima were observed in the range of 80 - 100 mm (56.7%). In the last ten years, significant daily precipitation occurred in only 12.7% of their total.

The analysis of the presented data also shows that for the last 5 years no significant amount of precipitation was observed in any of the watersheds where stationary hydrological observations are conducted, which caused significant floods."



PannEx is in its way to become a Regional Hydroclimate Project (RHP) of the World Climate Research Programme ([WCRP](#)) Global Energy and Water Exchanges Project ([GEWEX](#)). The GEWEX aims to observe, understand and model the hydrological cycle and energy fluxes in the Earth's atmosphere and at the surface. It proceeds by means of an integrated program of research, observations and science activities that focuses on the atmospheric, terrestrial, radiative, hydrological, coupled processes and interactions that determine the global and regional hydrological cycle, radiation and energy transitions, and their involvement in climate change. The almost closed structure of the Pannonian basin makes it a very good natural laboratory for the study of the water and energy cycles, focusing on the physical processes of relevance.



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