IAG Webinar 2023

6 March 2023 at 12:00–16:10 CET

Coordinators: Anita Bernatek-Jakiel*, Mihai Micu**
*Jagiellonian University (Kraków), **Romanian Academy (Bucharest)

INTERNATIONAL GEOMORPHOLOGY WEEK 2023

12:10–12:30

Impact of marls fracturing on the landslides processes in the Middle Dnieper area, Ukraine

Anzhelika Drozdova, Taras Shevchenko National University of Kyiv, Ukraine

Landslides are some of the main geological hazards in the Middle Dnieper area of Ukraine. Prediction of future landslide hazards at the local level requires an analysis of conditions and processes controlling landslides in the Middle Dnieper area. These conditions are mainly hydrogeological regime, precipitation, slope steepness, lithology of the deposits and tectonic movements. Specific combinations of these factors are associated with differing degrees of landslide hazards. One of the most important factors is the presence of the weak zones, joints, fracturing, etc. An indication of this factor is usually obtained by real field observation and remote sensing data.

12:30–12:50

Thermo-hydro-mechanical coupling in slope stability: advanced experiments and multiscale modeling

Marco Loche, Czech Academy of Sciences, Czechia

The complexity of the physico-mechanical processes in expansive clays is such that coupled models are needed to explain their behaviour under hydraulic, mechanic, and thermal conditions. Very limited research in this field has shown that some landslides might be activated by thermal excursions, demonstrating that the thermal effects can be significant. These effects can occur due to seasonal thermal variations in the clay rich soil layers along mountain slopes. In the proposed study, shear experiments have been conducted under controlled temperature conditions, and the role of thermal variations have been assessed in slope stability problems through numerical and statistical modelling.

12:50–13:10

Rock glaciers formation in the Southern Carpathians assessed by TCN-derived surface exposure ages and relative dating

Mirela Vasile, Research Institute of the University of Bucharest, Romania

Rock glaciers are valuable proxy indicators of landscape dynamics during and following deglaciation phases, especially in terms of debris production magnitude as response to debuttressing and to rockwall permafrost degradation. TCN dating has been extensively used in deglaciation chronology and only recently applied on periglacial landforms. We here use ^{10}Be surface exposure ages and apply Schmidt hammer relative dating to document multiple evolution phases of rock glaciers from the Southern Carpathians, highlighting differences imposed by altitude and lithology. The results confirm most rock glaciers initiated their formation during Younger Dryas and underwent intensive debris accumulation in Early Holocene (11.6-9 ka).

13:10–13:30

Correlation of lake sediments of the southeastern periphery of the last glaciation in the Late Glacial and Holocene

Novik Alexey Alexandrovich, Belarusian State University, Belarus

Analysis of paleogeographical and geomorphological data of lakes and their catchments in the southeastern sector of the last Scandinavian (Poozerye) glaciation allowed us to restore the dynamics of lake levels as an indicator of the evolution of the natural environment of the region. The general patterns of lake sedimentation and fluctuations in levels are primarily related to the global trend of climate warming at the beginning of the post-glacial epoch and the disappearance of permafrost. Further changes were determined by the Holocene climatic cycles and the degree of change in continentality.

13:30–13:50

Quantitative reconstruction of the glacial lake-outburst flood based on megadunes morphometry, NE Poland

Mateusz Suwiński, Nicolaus Copernicus University in Toruń, Poland

The surrounding of Augustów town (NE Poland) is represented by an outwash plain shaped by the proglacial meltwater activity during the last glaciation and consists of unique megadune fields. Such features developed as a result of multiple glacial lake-outburst floods due to the aggradation of superimposed bedforms associated with the sudden reduction of floodwater flow energy in unconfined or semi-confined settings. A mosaic pattern of megadune ridges is observed, and morphometric parameters like length (L), height (H), width (W) and crest orientation (A) constitute the database. These parameters were measured using 1×1 m DEM, enabling us to assess/quantify floodwater outflow.

13:50–14:10

Svalbard lagoon-barrier systems response to accelerated cryosphere degradation

Zofia Owczarek, University of Wrocław, Poland

The Arctic barrier-lagoon complexes are unique environments to study coastal response to warmer climate due to their high sensitivity. Here, I present the results of a multi-decadal (1936-2021) remote sensing data analysis focusing on the development of Svalbard lagoons. In my talk I'll concentrate on morphological changes detected along barrier-lagoon coasts. Stability of these environments is mainly controlled by sediment supply, storm impacts, resistance to sea level rise and sea ice protection. However, our work suggests that Svalbard lagoons may also be shaped by extreme processes, such as glacial lake outburst flood and rapid retreat of marine-terminating glaciers.

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Use of aerial and satellite images for dynamic analysis of vegetation in river landscapes

Hamid Afzali, Milos Rusnak, Slovak Academy of Sciences, Slovakia

Riparian vegetation is closely connected with river system, morphology changes, sediment deposition, water flow or biodiversity and is a crucial part of ecosystem for river management. This study assesses different classification approaches to classify vegetation by combining satellite and LIDAR data to identify vegetation response to succession and human impact in the riparian zone. The method is focused on temporal vegetation dynamics for different time horizons, identification the effects of different environmental parameters and revitalisation on vegetation spectral response, identifying vegetation indices before and after revitalisation and finally explaining the effect of environmental parameters on vegetation dynamics.

14:50–15:10

Hydro-morphological characterization of small rivers through drone-based sensors. The example of Sajó River, Hungary

László Bertalan, University of Debrecen, Hungary

The Sajó River in Hungary is a sand-bed river along which intensive meander development and bank erosion processes frequently occur. Datasets with high spatio-temporal resolution are necessary to identify the characteristics of channel morphodynamics. However, so far data density at this river is sparse and gauging stations are distributed poorly. I would like to introduce novel methods from multi-temporal field campaigns along selected sub-reaches where we applied Uncrewed Aerial Vehicles (UAV) and Unmanned Water Vehicles (UWV) to survey channel morphology and flow conditions. UAV-based bathymetric reconstruction was also utilized to assess post-flood morphological changes.

15:10–15:30

Late Quaternary fluvial records in the NW extreme of the Pannonian Basin

Ioana Perșoiu, Ștefan cel Mare University, Romania

Large fluvial fans are the dominant morphological features along the western rim of the Pannonian Basin. They were formed by the left-side tributaries of the Tisa River - in turn, a tributary of the Danube River - following its regional scale avulsion, more than 30.000 yrs ago. This presentation will focus on the spatial and temporal dynamics of the fluvial system that constructed the Someș Fluvial Fan, the northernmost fluvial fan related with this avulsive event.

15:30–15:50

Geomorphic recovery of the Bela River after river training

Akhtar Zeb Khan, Anna Kidova, Slovak Academy of Sciences, Slovakia

The research is based on a braidplain of the Bela River, which belongs to the system of protected areas Natura 2000. After river training in 2018, the fluvial geomorphological processes have been changed. The aims of this study focus on identify the natural recovery of the braidplain, detecting the succession of vegetation on the disturbed reaches. Furthermore, highlight the morphological response of multi-thread rivers to the hydro-morphological lateral continuity of different types of disturbances via remote sensing and field investigation. However, the expected results would be an illustration for many conservation projects in future river management.

15:50–16:10

Stress field changes in Central Europe since Late Miocene to date as determined from volcanic rocks and extensometric measurements in the Bohemian Massif, Central Europe

Jakub Stemberk, Czech Academy of Sciences, Czechia

The landscape evolution is often affected by tectonic activity, which is driven by the stress field acting and also by its changes over time. Very little is known about stress field behaviour during Cenozoic. The contribution presents the results of stress field reconstruction within the NE Bohemian Massif (Central Europe) since Late Miocene to date and its implication to the fault kinematics, dynamics and potential activity within the region. The classical methods of paleostress were used and applied on stria on slickensides datasets measured in the dated volcanic rocks and on present-day observed 3D fault movement dataset measured by extensometers.