



## INTERDISCIPLINARITY IN GEOSCIENCE IN THE CARPATHIAN BASIN



**Executive Unit of Financing Education Higher, a Research Development  
and Innovation (UEFISCDI)**



Universitatea  
Ștefan cel Mare  
Suceava

Faculty of History and Geography

**Department of Geography**

**Department of Geography, University of Suceava, ROMANIA**

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**On behalf of the Workshop Organizing Committee, we would like to welcome you to the 1<sup>st</sup>  
Workshop on**

## INTERDISCIPLINARITY IN GEOSCIENCE IN THE CARPATHIAN BASIN (IGCB)

in SUCEAVA, Romania, 18-21 October 2012

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**The purpose of this Workshop** is to bring together an international group of scientists and the local researchers focusing on the Carpathian Basin, in order to share the results of their research and discuss and promote opportunities for collaboration on topics such as geography, environment, botany, geology, biology and ecology in the Carpathian basin, one of the least studied and promoted areas in Europe as yet. Furthermore, this workshop aims at an educational role by providing scientific training for young researchers and students by facilitating the contact with the latest developments in geosciences in the Carpathian region.

**The Workshop** is centered on presentations, open debates and exchanges of ideas concerning a wide range of topics related to the progress in geosciences in the Carpathian Basin. The proceedings feature keynote presentations, working group sessions, discussions and poster presentations.

The papers submitted before September 15<sup>th</sup> 2012 and accepted for participation in the Workshop will be published in a special volume of GEOREVIEW. Scientific Annals of "Ștefan cel Mare" University. Geography series (<http://atlas.usv.ro/georeview/>).

## **Workshop Organizing Committee:**

### **Chairman:**

Dr. Marcel MÎNDRESCU, Department of Geography, University of Suceava, Romania;  
[marcel.mindrescu@gmail.com](mailto:marcel.mindrescu@gmail.com)

### **Deputy Chairmen:**

Dr. Joanna ZAWIEJSKA, Pedagogical University of Cracow, Institute of Geography, Poland;  
[jzawiejska@gmail.com](mailto:jzawiejska@gmail.com)

Dr. Ionuț-Alexandru CRISTEA, Department of Geography, University of Suceava, Romania;  
[icristea@atlas.usv.ro](mailto:icristea@atlas.usv.ro)

### **Scientific Secretaries:**

PhD Candidate Ionela GRĂDINARU, Faculty of Geography, University of Iași, Romania;  
[ionela.gradinaru@gmail.com](mailto:ionela.gradinaru@gmail.com)

PhD Candidate Andrei Emil BRICIU, Department of Geography, University of Suceava, Romania;  
[andreibriciu@atlas.usv.ro](mailto:andreibriciu@atlas.usv.ro)

### **Scientific Committee Members:**

Dr. Ian EVANS, Durham University, United Kingdom & University of Suceava, Romania;  
[i.s.evans@durham.ac.uk](mailto:i.s.evans@durham.ac.uk)

Dr. Simon M. HUTCHINSON, [School of Environment & Life Sciences](#), Salford University, United Kingdom; [S.M.Hutchinson@salford.ac.uk](mailto:S.M.Hutchinson@salford.ac.uk)

Dr. Maria RĂDOANE, Department of Geography, University of Suceava, Romania;  
[radoane@usv.ro](mailto:radoane@usv.ro)

Dr. Maria HÖHN, [Corvinus University of Budapest, Hungary](#); [maria.hohn@uni-corvinus.hu](mailto:maria.hohn@uni-corvinus.hu)

Dr. Angelica FEURDEAN, 3Senckenberg Research Institute and Natural History Museum & LOEWE Biodiversity and Climate Research Centre (BiK-F), Frankfurt am Main, Germany and "Emil Racoviță" Institute of Speleology, Romanian Academy of Science, Cluj Napoca, Romania; [angelica.feurdean@gmail.com](mailto:angelica.feurdean@gmail.com)

Dr. Sorina FĂRCAȘ, Institute of Biological Research in Cluj-Napoca, Romania;  
[soryna001@yahoo.com](mailto:soryna001@yahoo.com)

Dr. Daniel VEREȘ, "Emil Racoviță" Institute of Speleology-Romanian Academy/Babeș-Bolyai University, Cluj, Romania; [dsveres@googlemail.com](mailto:dsveres@googlemail.com)

- Dr. Ioan TANTĂU, Geology Department, University Babeş-Bolyai of Cluj Napoca, Romania;  
[ioan.tantau@ubbcluj.ro](mailto:ioan.tantau@ubbcluj.ro)
- Dr. Irina BUSHUEVA, Institute of Geography, Russian Academy of Sciences, Moscow, Russia;  
[irinasbushueva@gmail.com](mailto:irinasbushueva@gmail.com)
- Dr. Astrid BJORNSEN GURUNG, Mountain Research Initiative Europe (MRI), Programme Manager, Innsbruck, Austria, [astrid.bjoernsen@uibk.ac.at](mailto:astrid.bjoernsen@uibk.ac.at)
- Dr. Aurel PERŞOIU, Department of Geography, University of Suceava, Romania;  
[aurel.persoiu@gmail.com](mailto:aurel.persoiu@gmail.com)
- Dr. Lucien von GUNTEN, University of Bern, Institute of Geography and Oeschger Center for Climate Change Research, Switzerland, [lucien.vongunten@pages.unibe.ch](mailto:lucien.vongunten@pages.unibe.ch)
- Dr. Lucian DRĂGUŢ, Department of Geography, West University of Timisoara, Romania;  
[lucian\\_dragut@cbg.uvt.ro](mailto:lucian_dragut@cbg.uvt.ro)
- Dr. Pavel MENTLIK, Department of Geography, Faculty of Education, University of Bohemia in Plzeň, Czech Republic; [pment@kge.zcu.cz](mailto:pment@kge.zcu.cz)
- Dr. Liviu POPESCU, Department of Geography, University of Suceava;  
[mihaila\\_dum@yahoo.com](mailto:mihaila_dum@yahoo.com)
- Dr. Dumitru MIHĂILĂ, Department of Geography, University of Suceava;  
[mihaila\\_dum@yahoo.com](mailto:mihaila_dum@yahoo.com)

#### **Organizing Committee Members:**

- PhD Student Gabriela FLORESCU, University of Suceava, [amirabilix@yahoo.com](mailto:amirabilix@yahoo.com)
- PhD Student Aritina HALIUC, University of Suceava, [aritina\\_h@yahoo.com](mailto:aritina_h@yahoo.com)
- PhD Student Andrei ZAMOSTEANU, University of Suceava, [andreynorty@yahoo.com](mailto:andreynorty@yahoo.com)

#### **Keynote speakers:**

- Dr. Simon M. HUTCHINSON, [School of Environment & Life Sciences](#), Salford University, United Kingdom; [S.M.Hutchinson@salford.ac.uk](mailto:S.M.Hutchinson@salford.ac.uk)
- Dr. Maria HÖHN, [Corvinus University of Budapest, Hungary](#); [maria.hohn@uni-corvinus.hu](mailto:maria.hohn@uni-corvinus.hu)
- Dr. Pavel MENTLIK, Department of Geography, Faculty of Education, University of Bohemia in Plzeň, Czech Republic; [pment@kge.zcu.cz](mailto:pment@kge.zcu.cz)
- Dr. Ian EVANS, Durham University, United Kingdom & University of Suceava, Romania;  
[i.s.evans@durham.ac.uk](mailto:i.s.evans@durham.ac.uk)
- Dr. Bartłomiej WYŻGA, Instytut Ochrony Przyrody PAN, Poland; [wyzga@iop.krakow.pl](mailto:wyzga@iop.krakow.pl)
- Dr. Iuliana ARMAŞ, University of Bucharest, Department of Geography, Romania;  
[iuliaarmas@yahoo.com](mailto:iuliaarmas@yahoo.com)

**WORKSHOP PROGRAMME:**

<b>Day 1 - October 19, 2012. Location: Building E, Conference Hall, University of Suceava</b>		
<b>Registration Desk</b> 8:00-9:00		
<b>Open Ceremony</b> 9:00-10:00		
<b>Keynote Speakers, 10:00-13:00</b>		
<b>No</b>	<b>Time</b>	<b>Author/Authors and Title</b>
1	10:00-10:25	<b>Simon M. HUTCHINSON, Marcel MÎNDRESCU</b> - University of Salford, UK  Reconstructing recent environmental change in the Carpathian Basin; advocating an interdisciplinary approach for 2020 environmental science <i>Past Global Changes (PAGES): Coordinated paleoscience greater than the sum of its parts</i>
2	10:25-10:50	<b>Maria HÖHN, Péter BODOR, Márta BÉNYEI-HIMMER, Júlia FERENCZI, György Dénes BISZTRAY</b> - Corvinus University of Budapest, HU  Competitive replacement of the native <i>Vitis</i> and <i>Hedera</i> taxa by invasive aliens: morphological, cytological and molecular evidences
3	10:50-11:15	<b>Pavel MENTLÍK</b> - University of West Bohemia, Plzeň, CZ  Morphometrical analysis of glacial landforms in the northern part of the High Tatra Mountains, Slovakia
<b>Coffee Break, 11:15-11:45</b>		
4	11:45-12:10	<b>Ian S. EVANS, Marcel MÎNDRESCU</b> - University of Durham, UK & University of Suceava, RO  Cirque development and the glaciation of the Carpathians
5	12:10-12:35	<b>Bartłomiej WYŻGA, Joanna ZAWIEJSKA</b> - Polish Academy of Sciences, PL  Hydromorphological quality as a key element of the ecological status of Polish Carpathian rivers
6	12:35-13:00	<b>Iuliana ARMAŞ, Daniela NISTORAN, Livioara BRAȘOVEANU</b> - University of Bucharest, RO  Linking morphological settings and hydrodynamic river behavior. Prahova River-Romania

<b>Lunch, Restaurant USV, 13:00-14:30</b>		
<b>Presentations/Part 1, 14:30-16:30</b>		
<b>Moderators: Petru URDEA &amp; Bartłomiej WYŻGA</b>		
7	14:30-14:50	<b>Petre GĂȘTESCU</b> - <i>University Hyperion, Bucharest, RO</i> Water resources in the Romanian Carpathians and their management
8	14:50-15:10	<b>Zita IZAKOVIČOVÁ</b> - <i>Slovak Academy of Sciences, SK</i> Evaluation of the changes of landscape types of Slovakia
9	15:10-15:30	<b>Petru URDEA</b> - <i>West University of Timișoara, RO</i> Using thermal imagings in the study of periglacial forms and process
10	15:30-15:50	<b>Artur RADECKI-PAWLIK, Leszek KSIAZEK</b> - <i>Agricultural University of Krakow, PL</i> The morphology and morphodynamics of sand-gravel subaquatic dunes: the Raba river estuary, Poland
11	15:50-16:10	<b>Virgil SURDEANU, Monica MOLDOVAN</b> - <i>Babeș-Bolyai University Cluj-Napoca, RO</i> A possible triggering and evolution mechanism of glimee-type landslides
12	16:10-16:30	<b>Ionuț A. CRISTEA</b> - <i>University of Suceava, RO</i> Tectonic and lithological controls on the South-Eastern Carpathians drainage network
<b>Coffee break, 16:30 – 17:00</b>		
<b>Presentations/Part 2, 17:00-19:00</b>		
<b>Moderators: Zita IZAKOVIČOVÁ &amp; Simon HUTCHINSON</b>		
13	17:00-17:20	<b>Veronika SMOLKOVA, Tomáš PÁNEK, Jan HRADECKÝ</b> - <i>University of Ostrava, CZ</i> Landslide depressions – important witnesses of the landscape evolution in the Outer Western Carpathians
14	17:20-17:40	<b>Aritina HALIUC</b> - <i>University of Suceava, RO</i> Assessing of lacustrine sediments of Red Lake (Romania) for environmental changes
15	17:40-18:00	<b>Delia M. GHEORGHIU, Derek FABEL, Jim HANSOM, Sheng XU</b> - <i>SUERC, University of Glasgow, UK</i> Glaciers and climate in the Late Devensian/Würm – from west to east

16	18:00- 18:20	<b>Mihai NICULIȚĂ</b> - University of Iași, RO SRTM3 downsampling to SRTM1 using cokriging
17	18:20- 18:40	<b>Andrei-Marian PANAIT, Ioan TANȚĂU, Sorina FĂRCAȘ</b> - Babeș-Bolyai University, RO Late Glacial and Holocene vegetation history in Apuseni Mountains (Romania)
18	18:40- 19:00	<b>Loredana Ioana PUI</b> - University of Oradea, RO The Igriș-Gutâi mountain tourist planning in terms of a territorial system in Maramureș
<b>Dinner, Restaurant USV, 19:00</b>		
<b>Day 2 - October 20, 2012. Location: Building E, Conference Hall, University of Suceava</b>		
i	09:00- 10:30	<b>Honoris Causa Degree Ceremony - Professor Ian S. EVANS</b> from University of Durham (UK) and University of Suceava (RO)
<b>Coffee break, 10:30- 11:00</b>		
<b>Presentations/Part 3, 11:00-13:00</b>		
<b>Moderators: Joanna ZAWIEJSKA &amp; Ionuț A. CRISTEA</b>		
19	11:00- 11:20	<b>Gheorghe ROMANESCU, Cristina DINU, Adina RADU, Cristian STOLERIU, Gabriela ROMANESCU, Ana Maria ROMANESCU</b> - University of Iași, RO Physico-chemical properties of lacustrine waters from South-Western Dobrogea
20	11:20- 11:40	<b>Július OSZLÁNYI, Zita IZAKOVIČOVÁ</b> - Institute of Landscape Ecology, Slovak Academy of Sciences, SK Integrated landscape management of the Ipel river basin
21	11:40- 12:00	<b>Basarab DRIGA, Constantin ZAHARIA</b> - Romanian Academy, Institute of Geography, RO Natural hazards in the town of Baia Mare
22	12:00- 12:20	<b>Petr TÁBOŘIK, Tomáš PÁNEK, Pavel MENTLIK, Veronika SMOLKOVÁ</b> - Charles University in Prague, CZ Goelectrical surveying in geomorphology: case studies from the Western Carpathians
23	12:20- 12.40	<b>Andrei ZAMOSTEANU, Marcel MÎNDRESCU</b> - University of Suceava, RO Geomorphometry of the glacial lakes in the Romanian Carpathians

24	12:40-13:00	<b>Hanna HAJDUKIEWICZ, Bartłomiej WYŻGA, Antoni AMIROWICZ, Paweł OGLECKI, Artur RADECKI-PAWLIK, Joanna ZAWIEJSKA, Paweł MIKUŚ - Polish Academy of Sciences, PL</b>  The influence of local channel regulation on fish and benthic invertebrate communities in a mountain river
<b>Lunch, Restaurant USV, 13:00-14:30</b>		
<b>Presentations/Part 3, 14:30-16:30</b>		
<b>Moderators: Petr TÁBORĚK &amp; Delia GHEORGHIU</b>		
25	14:30-14:50	<b>Anca GEANTĂ, Ioan TANŢĂU, Tudor TĂMAŞ - Babeş-Bolyai University, RO</b>  Late Glacial and Holocene vegetation history from a high altitude site in Rodnei Mountains, Northern Romania
26	14:50-15:10	<b>Endre TÓTH, Levente HUFNAGEL, Maria HÖHN - Corvinus University of Budapest, HU</b>  Chloroplast microsatellite study reveal lower variability in <i>Pinus sylvestris</i> L. populations inhabiting sunny, dry habitats
27	15:10-15:30	<b>Cristian Valeriu PATRICHE, Bogdan ROŞCA, Radu Gabriel PÎRNĂU, Dan LaurenŢiu STOICA - Academy, Department of Iaşi, Geography Group, RO</b>  Spatial prediction of soil qualitative variables using logistic regression and fuzzy techniques. Study region: DobrovăŢ Basin (Central Moldavian Plateau)
28	15:30-15:50	<b>Alin MIHU-PINTILIE, Gheorghe ROMANESCU, Cristian STOLERIU, IonuŢ Cristi NICU, Andrei ENEA - University of Iaşi, RO</b>  Morphometric and morpho-bathymetric methods in the study of lake basins using GIS techniques. Case study: natural dam lakes from Eastern Carpathians
29	15:50-16:10	<b>Andrei Emil BRICIU - University of Suceava, RO</b>  Comparative thermal analysis of water and air in Suceava city area
30	16:10-16:30	<b>Joanna ZAWIEJSKA - Pedagogical University Krakow, PL</b>  Are we really comfortable with letting the rivers run wild again?
<b>Posters Session: during coffee breaks</b>		
31		<b>Veronika Kupkova, Pavel Mentlík - University of Ostrava, CZ</b>  Morphometrical Analysis of Glacial Landforms in the Northern Part of the High Tatra Mountains, Slovakia
32		<b>Anca Geantă, Andreea Auer, Simon Hutchinson, Marcel Mîndrescu, Angelica Feurdean - Babeş-Bolyai University, Cluj Napoca, RO</b>



	Macrocharcoal analysis of a 4200 year old lake sediment profile from Northern Romania - fire regimes and climate implications
33	<i>Bogdan Ridush - Chernivtsi "Yurii Fed'kovych" National University, UA</i> Paleogeographical records in karst caves of the Ukrainian Carpathians
34	<i>Laurențiu Dan Stoica, Cristian Valeriu Patriche - University of Alexandru Ioan Cuza Iași, RO</i> Geostatistical approach on the estimation of Ponto-Sarmatic habitats' preservation in NE Romania
35	<i>Ovidiu Murărescu, Murătoreanu George, Mădălina Frînculeasa - Valahia University of Târgoviște, Department of Geography</i> Extreme climate phenomena and their impact in shaping the current relief in the Bucegi - Leaota mountain complex
36	<i>Natalia German - Chernivtsi "Yurii Fed'kovych" National University, UA</i> Correlation of dendrochronological data from the southern slope of the Khotyn Upland with meteorological data for the recent 100 years
37	<i>Florin Vartolomei - Spiru Haret University, Bucharest, RO</i> Wetland and floodplain habitats management and solutions in lower meadow of Prut Natural Park
38	<i>Iuliia Kalush, Bogdan Ridush - Chernivtsi "Yurii Fed'kovych" National University, UA</i> Holocene seismic dislocations near Komariv (Chernivtsi Region, Ukraine)
39	<i>George Murătoreanu, Mădălina Frînculeasa, Ovidiu Murărescu - Valahia University of Târgoviște, Department of Geography</i> Glacial and periglacial geomorphosites in the upper basin of Ialomița river
40	<i>Karol Plesiński, Artur Radecki-Pawlik - Department of Hydraulic Engineering and Geotechnics, Krakow, PL</i> Hydrodynamic parameters diversification in the watercourse with the rapid hydraulic structures (examples from the Porębianka River, Polish Carpathians)
41	<i>Andrei Enea, Cristian Stoleriu, Gheorghe Romanescu, Alin Miha-Pintilie - University of Alexandru Ioan Cuza Iași, RO</i> Monitoring the deforestation phenomena from the Red Lake hydrographic basin, using geomatic techniques and satellite imagery
42	<i>Gabriela Florescu - University of Suceava, RO</i>

	Physical and geochemical indicators in lake sediment study. Significance and interpretations. Case study: Iezerul Feredeului Lake, 1-120 cm
Closing of Workshop: 16:30- 17:30	
<b>Festive Dinner, 18:00, Apropos Café Restaurant</b>	
<b>Day 3, October 21: Field trip</b>	
<b><i>Coordinators: Marcel Mindrescu &amp; Aritina Haliuc &amp; Gabriela Florescu &amp; Andrei Zamosteanu</i></b>	
<b>Field Excursion</b> to the Northern Romanian Carpathians (Obcinele Bucovinei and Rarau Mts). Also is planned to visit some UNESCO monuments. Sunday night- accommodation in the Rarau Mts.	

## ABSTRACTS:

### 1. Hutchinson Simon M.<sup>1\*</sup>, Mindrescu Marcel

<sup>1</sup>School of Environment and Life Science, University of Salford, UK

\*Corresponding author: Simon Hutchinson. Email: [s.m.hutchinson@salford.ac.uk](mailto:s.m.hutchinson@salford.ac.uk)

### **Reconstructing recent environmental change in the Carpathian Basin; advocating an interdisciplinary approach for 2020 environmental science**

#### **Introduction and rationale**

An interdisciplinary approach to environmental science is particularly important in the field of palaeoenvironmental research. Indeed, while the majority of such studies employ a range of proxies in their investigation, the more innovative studies tend to truly cross discipline boundaries. The investigation of depositional environments (e.g., lake sediments and mires) as archives of environmental history has a long tradition in the Carpathian region. However, glacial lakes across the region have also been described as under-investigated despite their potential for palaeolimnological study (Buczko *et al.* 2009). Studies have also largely focused on relatively early (Late Glacial and Early Holocene) environmental change. Nevertheless, there is an increasing interest in the reconstruction of more human-driven impacts on the environment and events in the very recent past on a century to decade timescale e.g., post Industrial Revolution and following political change from the mid 1940s and in the late 1980s. Furthermore, efforts have also been made to inform the debate about future climate and environmental changes linking palaeoenvironmental records to predictive computer modelling.

#### **Palaeolimnological records of recent environmental change; overview and prospects**

To date our investigations (based on a research collaboration between the Universities of Salford (UK) and Suceava (Romania) and also with the Senckenberg Research Institute and Natural History Museum, Frankfurt (Germany)) of recent lake sediment deposits have covered a range of depositional environments across the Carpathian Basin, but have tended to focus on the more recent past and primarily the post Industrial Revolution period.

Short gravity cores taken in glacial lakes in the Rodna / Maramures and Fagaras Mountains in Romania have indicated the prevalence of probably trans-boundary atmospheric inputs at low levels of environmental contaminants such as Pb (Akinyemi *et al.* in press). At key sites such as Lacul Capra (Fagaras Mountain in the Southern Carpathians) radiometric dating has provided a chronology of these inputs recorded in the sediment geochemistry and mineral magnetic properties. Further collaboration with the Environmental Change Research Centre at University College, London (UK) has also allowed us to extend the map of spheroidal carbonaceous particles (SCPs) from a single site in Romania (Rose *et al.* 2009) across the region.

Mountain lakes are known to be sensitive environmental monitors, but are not exempt from direct human impacts. At Lacul Stiol (Rodna Mountains in the Eastern Carpathians) an illegal modification in the lake's hydrology hugely extended its surface area and depth. The impacts of this event were readily detected in the sediment column as both a change in stratigraphy and the rate of sedimentation (Mindrescu *et al.* 2010). Elsewhere catchment-derived inputs to the water body can provide an informative chronometer. Sediment cores taken from Lacul Iezer-Feredeui in the Obcina Feredeului Mountains (Eastern Carpathians) revealed over 4 m of laminated sediments spanning

around 1000 years based on radiocarbon dating at the base of the core. A cluster of lakes in this area, apparently formed by land sliding, have the potential to provide a unique and valuable insight into the environmental history of the last millennium (Mindrescu *et al.* in press).

More recent research has extended beyond the uplands of the Carpathian Basin and into Transylvania. Lacul Stiucii (Bont Valley, Cluj) provides not only a detailed, whole Post Glacial scale environmental record, but also, via short gravity Pb-210 dated cores, facilitates a detailed insight into the impacts of the rise of industrialised agriculture from the late 1940s and the consequences of its decline from the late 1980s following economic and political change. This study provides an excellent example of international interdisciplinary research that has led to important research findings and the development of an unexpected, additional dimension to the project.

It is apparent that environmental research in the Carpathian Basin is dynamic, that active researchers often link with organisations beyond the region, and that an interdisciplinary approach is imperative in addressing its environmental challenges. Our research has highlighted a number of areas where a palaeoenvironmental perspective will facilitate the investigation of a range of applied research questions. Therefore, on-going and future research will, for example, work with remote sensors, modellers and try to identify under-exploited depositional archives that may provide other environmental records. Remote sensing can act as a useful and impartial observer of land cover change. This approach covers more and more terrain in the Carpathian Basin with a particular focus on its forest (e.g., Kummerle *et al.* 2010). Whereas the technique can overcome some of the issues associated with the accuracy of forest management records, carefully linked to lake sediment-based records, the opportunity exists to quantify the effects and impacts of forest clearance and regeneration, and to put recent (post 1990s) environmental damage into a longer term perspective.

Effectively moving downstream from mountain lakes to below the tree line also suggests that the potential of artificial water bodies as retrospective monitors of human impact and environmental change merits further investigation. Romania has a large number of such lakes (see Radoane & Radoane 2005). On the one hand they can be difficult environments in which to try to exploit the sedimentary record, on the other they have been usefully employed elsewhere when carefully selected and successfully sampled (e.g., Shotbolt *et al.* 2005). In addition to investigating the consequences of human activities in the uplands, enhancing our understanding of the impacts of landscape change in the lowlands of the Carpathian Basin, where there has been a significant change in agricultural practices, is also a priority and one that may also benefit from a palaeoenvironmental perspective. A longer term time perspective can make a useful contribution to environmental management decision making and future land use planning.

### **Conclusions and prognosis**

A palaeoenvironmental perspective on environmental issues is widely recognised as beneficial especially when making informed predictions of future environment conditions (e.g. Schmidt & Moyer 2008). Furthermore, it is particularly relevant to the Carpathian Basin. Interdisciplinary science is seen as essential especially when bidding for research funding e.g., via the EU. However, at least in the short term, it can be bad for your (career) health! Initially there can be a steep learning curve to working outside your discipline in that it can take time to learn the language (or jargon), become familiar with the modes of working and build up trust and respect in another area's field. Therefore the initial outputs of interdisciplinary collaboration can be tardy in their arrival.

What about the future? To develop the field of palaeoenvironmental research in the region and thereby to usefully contribute to significant environmental issues it will be important to take young researchers forward. Thus, the need to develop graduate, interdisciplinary research centres of excellence, particularly in applied palaeoenvironmental requires serious consideration. This will provide one route to developing the critical mass required to effectively engage environmental decision makers and thereby inform environmental policy. In this respect making our findings clear and accessible to a non specialist audience is an additional challenge.

**Post scriptum**

Whereas the research activity mentioned above reflects the work of a number of individuals working together, the wider views expressed in this article are those of the author alone.

**Bibliography**

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## **2. Höhn Maria<sup>1\*</sup>, Bodor Péter, Bényei-Himmer Márta, Ferenczi Júlia, Bisztray György Dénes**

<sup>1</sup>Corvinus University of Budapest, Faculty of Horticultural Science, Department of Botany, Hungary

\*Corresponding author: Maria Höhn. Email: [maria.hohn@uni-corvinus.hu](mailto:maria.hohn@uni-corvinus.hu)

### **Competitive replacement of the native *Vitis* and *Hedera* taxa by invasive aliens: morphological, cytological and molecular evidences**

We describe here case studies of two woody climber species native to the broadleaf forests of the Carpathian basin. Wild grape (*Vitis sylvestris* C.C.Gmel.), considered to be one of the ancestors of the domesticated grapevine (*Vitis vinifera* L.) became a highly threatened species since the introduction of the American grape species as rootstocks for grapevine. Among these, especially, Riparian grape (*Vitis riparia* Minchx.) escaped from the wine yards and by invading the natural habitats replaced the autochthonous wild grape. In consequence of the competitive exclusion *Vitis sylvestris* suffered a strong withdrawal along its native habitats. 20 morphological traits, including leaf shape and trichome structure were studied to tackle evidence of the introgressive hybridization among the alien and native taxa. Most of the studied Hungarian habitats were already dominated by hybrid specimens of *Vitis* taxa. Molecular analysis based on 8 nuclear microsatellites markers supported the morphological results.

Based on former references among the native and cultivated ivy species there are diploids and tetraploid specimens. The native *Hedera helix* L. it is considered to be diploid (2n=48), while the cultivated ivy known as Irish ivy, *H. hibernica* (G.Kirchn.) Bean, from Western Europe was considered to be a tetraploid (2n=96) species. Based on our morphological study, among wild spreading specimens of *H. hibernica*, found to invade seminatural habitats of the Carpathian basin there are morphologically distinctive forms that are apart from both *H. helix* and *H. hibernica cult.* By a

cytological study among these morphotypes, we could detect diploids, tetraploids and also triploids. Our results suggest that the native, diploid *Hedera helix* is strongly competed by the invasive tetraploid *H. hibernica*. Moreover, in the studied material there are also morphologically distinctive specimens of different cytotypes.

### 3. Mentlík Pavel

Centre of Biology, Geoscience and Environmental education, Faculty of Education, University of West Bohemia, Plzeň, Czech Republic

Email: [pavelmentlik@gmail.com](mailto:pavelmentlik@gmail.com)

#### What can the surface of the Earth tell us about environmental changes?

Geomorphology is a science dealing with the landforms of the Earth. Origin and development of the landforms are influenced by many factors which are dependent on climate and strongly influenced by its change. Therefore, analysis of the surface of the Earth provides relevant information about climate and environmental changes in the past.

The presentation has four main parts:

i) opening part when basic geomorphological terms are explained and defined in context of environmental change. Geomorphological mapping of elementary form is introduced as an integrating method of geomorphological research and useful tool of multidisciplinary investigation of landscape;

ii) the meaning of environmental change is defined and discussed in context of time-scale and spatial-scale variability in the second part. The mind map of the environmental changes during the Quaternary (from present to ~2.5 Myr ago) is presented,

iii) the following part introduces sedimentological, biological and geomorphological proxy data (which are connected with surface of the Earth) as well as modern methods (numerical dating, modelling in GIS and geophysical sounding) which are used in the Quaternary research. The main attention is focused on the data connected with glaciers and glaciation. Examples mainly from the High Tatras (Carpathian) and the Bohemian Forest (Bohemian Massif) are presented;

and iv) the presented outcomes are summarized and objectives for the following research are presented in the last part of the presentation.

### 4. Evans Ian S.

University of Durham, UK & “Stefan cel Mare” University of Suceava

Email: [i.s.evans@durham.ac.uk](mailto:i.s.evans@durham.ac.uk)

#### Cirque development and the glaciation of the Carpathians

The moderate altitudes of the Carpathian Mountains limited glaciation to cirque and short valley glaciers, but these were widespread: well-developed cirques are found in Romania, Ukraine, Slovakia and Poland. The ‘marginal’ nature of glaciation means that glaciers formed first on the most favourable (shadiest and leeward) mountain slopes, giving valuable indications of former wind directions (from west-northwest in Romania). Some cirques are completely isolated from others, but several mountain ranges rose sufficiently high above snowline that glaciers and cirques developed on all slopes, as in the Retezat, Făgăraș, and especially the High Tatra. However, differences in snowline (palaeo-ELA) are found between different slopes there also. The Low Tatra, by contrast, are strongly asymmetric, with many north-facing cirques.

Cirque development is measured both subjectively (5 grades) and objectively: the relation between these measures is shown by an  $R^2$  of 62% (for Romania) when grade is predicted from maximum gradient, minimum gradient, and plan closure. Cirques larger in horizontal dimensions have better grades. Cirque enlargement in plan is faster than vertical enlargement, as shape changes with size (allometry).

Despite being in an active orogenic belt, Romanian cirques are more similar to those in Britain than to those in British Columbia, where relief and thus vertical dimensions are greater. 'Cirque-in-cirque' forms are common in the higher ranges of Romania: Retezat, Godeanu and Făgăraş. Isolated cirques are relatively simple. Lakes are most frequent on granite, as in the Retezat and High Tatra. Geology affects especially vertical dimensions and gradients. Cirque form relates firstly to glaciological (climatic) factors and secondly to geologic (lithological and structural) factors.

Uplift of the Carpathians is recent and ongoing, so that traces are found only of recent glaciations, and glacial transformation is immature or incomplete. Mountain ranges can be ranked in terms of glacial modification, from the High Tatra and Retezat to the Suhard, Ciucaş and Bihor Mountains. This correlates with the degree of local asymmetry (of cirque aspect).

### **5. Wyzga Bartłomiej\*<sup>1</sup>, Zawiejska Joanna**

<sup>1</sup>Institute of Nature Conservation, Polish Academy of Sciences, Poland

Corresponding author: Bartłomiej Wyzga. Email: [wyzga@iop.krakow.pl](mailto:wyzga@iop.krakow.pl)

### **Hydromorphological quality as a key element of the ecological status of Polish Carpathian rivers**

After a few decades of efforts to detect, quantify and counteract the effects of water pollution on river biota, recent years have brought an increasing understanding of significance of hydromorphological quality of rivers for their ecological status, and research on Polish Carpathian rivers has contributed to the progress in this field. Our team developed a method of hydromorphological assessment of rivers, which is based on the European Standard EN-14614 and compromises between the needs for practical application and the environmental significance of results. Application of the method in rivers with varied channel pattern confirmed its usefulness and showed a significant impact of channelization and channel incision on the hydromorphological quality of Carpathian rivers. Both disturbances simplified flow pattern and homogenised physical habitat conditions in rivers, and the changes are now clearly reflected in the reduced abundance and diversity of fish fauna as well as the reduced taxonomic diversity of benthic invertebrate communities. Significant relationships between these biotic characteristics of Polish Carpathian rivers, and the variation of physical habitat conditions and hydromorphological quality of the rivers indicate that recovery of the degraded communities will require restoration measures increasing morphological complexity of the watercourses. Environmental changes that took place in Carpathian catchments during the twentieth century have changed water and sediment fluxes in the rivers and thus invalidate the historical state of the watercourses as reference for their restoration. Therefore, reference conditions should be defined as those which exist or would exist under present environmental conditions in the catchment but with the lacking human influence on the channel, riparian zone and floodplain of the river which is to be restored. An erodible corridor seems to be a restoration measure enabling the most effective adjustment of a degraded river to its contemporary regime as well as re-establishment of geomorphic dynamic equilibrium conditions and improvement of hydromorphological conditions for river biota.

## 6. Armaş Iuliana\*<sup>1</sup>, Nistoran Daniela, Braşoveanu Livioara

<sup>1</sup>University of Bucharest, Department of Geography, Romania

\*Corresponding author: Iuliana Armaş. Email: [juliaarmas@yahoo.com](mailto:juliaarmas@yahoo.com)

### Linking morphological settings and hydrodynamic river behaviour. Prahova River, Romania

The purpose of this study is to analyze, using GIS, the relationship between hydrodynamic characteristics during high intensity flood periods and geomorphological controls on channel and valley morphology of the Carpathian and Subcarpathian Prahova River.

In order to acquire Prahova River's topographic information, on its channel and valley from Predeal (upstream) to Campina (downstream), in August 2006 a GIS ground-based survey was used. The survey consisted of 192 topo-bathymetrical cross-section profiles over 55 Km distance (river length) covering the Carpathian and Subcarpathian reaches.

In the summer of 2012, the Subcarpathian bathymetry was remeasured on the 57 cross-section profiles with the assistance of GNSS technology. We used the RTK-Cinematic method in Real Time and differential real time corrections provided by the specialized ROMPOS service. The RTK-POMPOS determinations were realised using two approaches, one through MAC (Master-Auxiliary Concept) and the other through VRS (Virtual Reference Station), both approaches provide corrections from more than one reference station in the same time. The surveys were achieved using Topcon GR-3 state of the art equipment. The Topcon Tools vers.8.2. application was used to process the survey's data.

The geometry of the hydraulic model (cross-section profiles and longitudinal profile) was extracted from topo-bathymetric surveyed data (TIN) under GIS environment by using HEC-GeoRAS utility. Steady flow simulations under mixed subcritical and supercritical conditions (transitions specific to this high slope river reach) were performed with the help of the hydraulic modeling software HEC-RAS for 5 flow values ranging from annual to 100-year flood. The 10-year flood was found to be very close to bankfull flow for this artificialized channel. Stage-discharge curves were used at the gauging stations of Busteni and Campina to calibrate the model.

Mean velocity, shear stress and stream power values were computed in each cross-section. These values were correlated with observed erosion/deposition sites and existing geology and conclusion were drawn regarding the morphodynamic behavior of the river.

Five main areas with high values of computed shear stresses and velocities and corresponding low values of width to depth ratio (W/D) were identified (two in the Carpathian sector and three in the subcarpathic sector). These areas were found to match the observed erosion areas, where the river has incised into bedrock and eroded its banks.

This erosional areas are tectonic-structurally determined and sustained by the uplift of the Bend Carpathian area in relation to Quaternary river evolution.

**Key words:** GIS, hydraulic modeling, river behaviour, structural and geomorphological controls

## 7. Gâstescu Petre

Hyperion University, Bucharest, Romania

Email: [gastescu\\_petre@yahoo.com](mailto:gastescu_petre@yahoo.com)

### Water resources in the Romanian Carpathians and their management

The Carpathians, covering of length of 1,000 km on Romanian's territory and surface 66,303 kms, 27.9% respectively. The Carpathians, their positions towards the air mass circulation from the West especially, are in fact an orographical dam differentiating the specific runoff of the streams. Thus, the values of hydrological parameter are higher on the mountain sides to the West than the ones on the opposite mountain sides of the same altitude. On an average, the runoff gradient is estimated as



5-6 l/s.kms up to 100 m with variations imposed by hydrographic basin exposure towards the continental and oceanic air mass circulation. Due to the Carpathian`display on few degrees of latitude and their position circulation directions, the vertical zonality law has a more important role in the physico-geographical differentiation than the latitudinal one. Besides the climatic factors, the forest and the alpine meadows covering the Carpathian space play an important part in forming and dimensioning the process of liquid runoff. The forest covers about 40-45% of the mountain surface reaching to 60-70% in some Eastern Carpathians massives. In the meantime, worth mentioning are the alpine and sub-alpine meadows which extend over the upper limit of the forest(14,000 kms, it means 21%) playing an important part in soil protection against erosion and in moderating the liquid runoff process under a continental-temperate climate condition. The Carpathians represent the origin place for almost all the rivers in Romania. Due this typical situation, the discharge, at the exterior limit of mountains space, are rather reduced through the specific runoff is great enough (between 7 to 50 l/s.kms). All these, due to their palaeogeographical evolution, some rivers (the Olt, Mureş and Someş) being obliged to cross downstream the mountain chain, are forming gorges. Within traverse valley sectors, the medium discharge of the above-mentioned rivers is about 100 mc/s. The other Carpathian rivers around the area have a medium discharge of tens oder mc. Though the geological, geomorphological and hydrological conditions are favourable for complex function accumulation lake building, hydroenergetical especially, due to their reduced discharge, a lot of captures from the lateral rivers are necessary to rise the discharges.Worth mentioning to the same effect is - Vidra reservoir, placed on the Lotru river, for which besides the 4.5 mc/s from the main river,other 11.2 mc/s are brought from the neighbouring rivers through 132 kms of galleries; while in Vidraru reservoir, on the Argeş river, 12.2 mc/s from other rivers through 29 kms galleries are added to its 7.5 mc/s. The examples may continue, gura Apelor reservoir, Râul Mare in Retezat, the Fântânele reservoir on the Someşul Mare in the Apuseni Mountains, a.s.o. The evaluation of the water volume came from the river runoff was undertaken following the medium annual runoff map on a scale of 1:500,000 from 1990, drawn out by Institute of Hydrology on the relief units it has been calculated my-self, the water volume flowed on each unit which summing up resulted in the total water volume for Romanian Carpathians space. This water volume is reckoned at 27.4 thousand million mc/year i.e. 68.6% from the whole volume flown on the entire hydrographic network in Romania (40.6 thousand million mc/year), save for the Danube. The through quantitative-qualitative and temporary-spatial know- ledge of the water resource from the various Carpathians units of different orders gives the possibility of establishing the water potential, the economic profiles andf their management in bildingmacro-and micro hydropower-stations, drinking water, industrial and irrigation catchments and limiting protection areas. Though man has humanized the Carpathian space since ancient times, the population density is obviously reduced. The estimations have brought into light that 3.2 million persons live here in numerous villages and more than 60 towns (50 inhabitants/kms). The large majority dwell in depressions and at the foot of the mountain. Taking into consideration the important water volume which is annually regenerating, its high qualities and regime during the year time, the Carpathians should constitute a very special objective for the geographicalspace planning in Romania. Some protection perimeters (hydroreserves) with different restriction degrees should be set up in the mountain massifs with a high specific runoff, in fact supply basins for the main rivers in Romania. The implementation of different size reservoirs (volume, surface and depth) on the yearly runoff variation (diminution during autumn and winter time) as they assure a constant discharge for the consumers. The reservoirs should form part of the hydroreserves or protected even outside their perimeter. Given the Carpathian central position on Romania`s territory and the height difference between reservoirs and the consumers in the peri-Carpathian regions, there ought to be achieved gravitational water supplies by buried pipes with reduced energy consumption.

**8. Izakovičová Zita**

Institute of Landscape Ecology, Slovak Academy of Sciences, Slovakia

Email: [Zita.Izakovicova@savba.sk](mailto:Zita.Izakovicova@savba.sk)

**Evaluation of the changes of landscape types of Slovakia**

In the last period landscape protection, its representative types more and more comes to the limelight. In October 2000 the European Landscape Convention - also known as the Florence Convention was adopted. The aims of this Convention are to promote landscape protection, management and planning, and to organise European co-operation on landscape issues. Contracting states ought to analyse the landscape types on the whole area of their countries, to analyse their features, record their changes, specify motive power and pressure forming them and assess selected types with respect to special values attributed by engaged participants and inhabitants. Knowledge and identification of single landscape types enable the intensification of care of diversity of single landscape types and landscape biodiversity. It is an unavoidable condition in the strategic planning process and effective protection of regionally special landscape.

Slovakia signed ELC in 2005 and became an active participant in its implementation. The Institute of the Landscape Ecology of Slovak Academy of Sciences elaborated methodology for specification and evaluation of the representative landscape types of Slovakia (RLTS).

RLTS are defined as homogeneous units considering the landscape character, functions and current land-use. GIS (Geographical Information Systems) tool was used to create RLTS, in particular by overlaying of abiotic landscape structure (type of relief, quaternary deposits, climatic regions, and soil types) and land-cover map (CORINE Land Cover 2006 - CLC) at national scale. This process yielded to a patched map of homogeneous areas, which were further interpreted, generalized, and regionalized to a final map of RLTS.

Landscape types of Slovakia were defined by the synthesis of the mentioned maps. Totally there were identified 126 basic landscape types. Each landscape type represents unique combination of land-use in different abiotic conditions and gives the unique environment for nature development in the second stage typing rare and unique landscape types of Slovakia have been marked

Following, all RLTS were evaluated from the point of view nature protection and recent degradation and threats. In the meantime main changes of RLES were identified, taken into account also key driving forces of landscape changes and consequent pressures on the landscape. The final step included preparation of management proposal with aim to maintain all representative landscape types and to secure their sustainable development and protection.

**9. Urdea Petru**

West University of Timișoara, Department of Geography, Romania

Email: [urdea@cbg.uvt.ro](mailto:urdea@cbg.uvt.ro)

**Using thermal imagings in the study of periglacial forms and processes**

Periglacial morphogenetic domain is marked by the presence of landforms whose genesis and evolution is closely related to thermal conditions. It goes without saying therefore of interest to know the thermal characteristics of these periglacial landforms. To achieve this objective, the use of classical thermometers is also expensive and laborious process, but in our opinion, the most expeditious way is to use a infrared termocamera. Tacking into account that radiant temperature of the Earth surface is a function of their internal temperature or kinetic temperature, and their ability to emit radiation, strongly dependent on the thermal properties of the material - with physical and compositional differences -, we consider that a thermal image can also reveal just some of the differences in the morphological structures. Energy flux that occurs at topographic surface interactions with the

atmosphere cause individualization of microclimates, with implications for the appearance and development of the periglacial morphogenetic processes like creep, fros heaving, solifluction, thermal sorting and weathering. A way of understanding of these processes and highlighting small-scale differentiation knowing as much detail as possible, is knowing the thermal image, thermal imprint of each microform. .

Using a Fluke Ti20 thermal infrared camera, our interest was focused to several periglacial forms including, solifluxion lobe, earth hummocks, nivation niche and weathering rock face from Făgăraș Mountains and Muntele Mic. Thermal imagers allow both highlighting each periglacial microforms in contrast with neighboring areas and also the presence of „heat islands” and „cold island”. Revealing in this respect is the image of an earth hummock frozen core. In the same manner the thermal image shape clear „the cold island” of the snow patch presented in the nivation niche. The thermal image of the weathering wall facilitates identification both of the cracks network and lithological and mineralogical differentiation, knowing that each mineral has a thermal emissivity signature. Using a specific software can statistically analyze thermal value classes, graphically represented then by histograms.

### **10. Radecki-Pawlik Artur\*<sup>1</sup>, Ksiazek Leszek**

<sup>1</sup>Department of Hydraulic Engineering and Geotechnics, University of Agriculture in Krakow, Poland

\*Corresponding author: Artur Radecki-Pawlik. Email: [rmradeck@cyf-kr.edu.pl](mailto:rmradeck@cyf-kr.edu.pl)

### **The morphology and morphodynamics of sand-gravel subaquatic dunes: the Raba river estuary, Poland**

In the outlet of the Raba River to the Vistula, the biggest river in Poland, the morphology and morphodynamics of sand and fine-gravel subaquatic dunes were investigated. The site is situated in highland region just about the entrance to Polish Carpathians. The dunes formed on the Raba River bed estuary are composed of sand and fine gravel ( $d_{50}$  up to 11 mm). Systematic observation (within the 2000-2005) were made of geometry, sediment composition and hydraulic climate under which the dunes grew and decomposed. The investigation focuses here mostly on the geometrical parameters of these bed forms such as height, length, as well as granulometric characteristics of the sediment. Based on in-site measurements different hydraulic parameters were calculated such as shear stresses, resistant coefficient, Froude and Reynolds numbers and roughness coefficient. It was found that the relation between height (H) and length (L) of the Raba estuary dunes describes the formula:  $H = 0.05L^{0.35}$ . Also these dunes are steeper and flatter then classical H/L index is:  $H/L = 0.0518L^{0.622}$ . During the field campaign, when the foot access to the estuary was possible and dunes were spotted on the river bed the range of measured water velocity was from  $v = 0.39 \text{ m}\cdot\text{s}^{-1}$  to  $v = 0.81 \text{ m}\cdot\text{s}^{-1}$  with the highest velocity over the dune crest. At the same time the measured range of shear stresses within the dune field formation were from  $\tau = 0.115 \text{ N}\cdot\text{m}^{-2}$  to  $\tau = 1.59 \text{ N}\cdot\text{m}^{-2}$ . On the field investigations the CCHE2D - two-dimensional unsteady flow and sediment transport model for non-equilibrium transport of non-uniform sediment mixtures - was applied. The model was used to simulate the morphodynamic changes along the outlet of the Raba River basing on field observations of the 2005 summer flood as well as calculate hydraulics parameters. It was also used to test and confirm the range of morphodynamic changes, which take place along the research reach where the dunes are being developed. The maximum water flow velocity for and the shear stresses for the summer flood caused the hydrodynamic conditions when water velocity as well as shear stresses values reached respectively up to  $v = 1,93 \text{ m}\cdot\text{s}^{-1}$ , and  $\tau = 19.74 \text{ N}\cdot\text{m}^{-2}$  which shows that critical conditions of bed load movement were exceeded for the Raba estuary.

**Key words:** sand-gravel dunes, estuary zone, morphodynamics, the Raba River

**11. Surdeanu Virgil\*1, Moldovan Monica**

<sup>1</sup>'Babes-Bolyai' University, Cluj Napoca, Romania

\*Corresponding author: Virgil Surdeanu. Email: [surdeanu\\_v@yahoo.com](mailto:surdeanu_v@yahoo.com)

**A possible triggering and evolution mechanism of glimee-type landslides**

Glimee-type landslides are considered the landforms providing a distinct personality feature to Transilvanian morphologic landscape, both by means of their frequency of apparition and by the grandeur of their morphometric attributes.

Although in the scientific literature of the first part of the 20th century, one may find a large number of information concerning glimee-type landslides, we opinate that certain aspects connected with their genesis still stand for discussion.

Concerning this issue, we allow ourselves to consider them a derivated construction, in which the sliding process is present, but not determinative. Its role is evident when we refer to those covering large areas of slopes, whereas for those who evolve as terminal parts of secondary interfluves, the mechanisms seem different that what is presently known.

In what concerns the age of the glimee-type landslides, it has been asserted that they are old, thousands and tens of thousands of years old. Recent encounters come to infirm these opinions.

**12. Cristea A. Ionuț**

"Ștefan cel Mare" University of Suceava, Department of Geography, Romania

Email: [icristea@atlas.usv.ro](mailto:icristea@atlas.usv.ro)

**Tectonic and lithological controls on the South-Eastern Carpathians drainage network**

A large number of studies, especially in the last three decades, have emphasized the major influence of the tectonics on the evolution and landscape characteristics of certain regions around the Globe. In a fortunate manner, the same period overlapped a time when the development of quantitative research methods (graphical analysis, statistics etc.) of landform morphometry generically integrated in Geographic Information Systems (GIS) has been substantial.

Vrancea Region overlaps the south-eastern part of the Romanian Carpathians and Subcarpathians and is generally known as one of the most intensely seismic areas in Europe. According to Merten (2011), this area conserves the youngest topography in the Romanian Carpathians, which is a result of the building (deformational) processes that started during the late Pliocene – Pleistocene. Moreover, the tectonic activity continues to the present (Holocene), as confirmed by high accuracy geodetic measurements and the high frequency of earthquakes. Thus, there is sufficient evidence to bring us to the conclusion that landforms in this region are largely generated by the recent tectonic evolution.

Our study focuses on Putna's River catchment, one of the largest in the area. The main objective of the presentation is to draw preliminary conclusions about tectonic or lithologic influences on the longitudinal profiles of rivers in region (using standardized method of channel steepness analysis based on a reference concavity proposed by Whipple et al., 2007) or other possible effects on river channels planform and landscape morphometry.

**13. Smolková Veronika \*1, Pánek Tomáš, Hradecký Jan**

<sup>1</sup>Department of Physical Geography and Geoecology, Faculty of Science, University of Ostrava, Czech Republic

\*Corresponding author: Veronika Smolková. Email: [Veronika.Smolkova@osu.cz](mailto:Veronika.Smolkova@osu.cz)

**Landslide depressions - important witnesses of the landscape evolution in the Outer Western Carpathians**

Environmental changes are reflected in sedimentary archives and can be traced through geochronological, sedimentary and pollen evidence. In the Czech and Slovak part of the Outer Western Carpathians, local geomorphologists are for the last ten years interested in the quaternary geochronology of the slope deformations. Due to the lack of the organic material incorporated in the landslide bodies, new sources of chronological information were found – relatively small and shallow depressions (tens to hundreds m<sup>2</sup> in area, several m in depth), related with the presence of landslide (landslide-dammed floodplain impoundments, intercolluvial and near-scarp depressions and double ridges). Such undrained depressions are often filled with several meters thick sediments of various geneses (organic, lacustrine, fluvial, colluvial, etc.) and in regions with otherwise poor Holocene record (and discontinuous alluvial deposits) might provide excellent palaeoenvironmental records imprinted in their deposits. Detailed sedimentological analyses of the sedimentary archive within a landslide-controlled impounded floodplain (Smrdutá site, Hostýnské vrchy Mts) allowed us to (i) constrain the chronology of the origin and later stages of activity of the causal slope deformation in the context of late-Holocene climatic changes, (ii) characterize the sedimentary regime of a mountainous floodplain affected by long-term activity of recurrent landslide, (iii) trace the environmental changes triggered either with climatic (e.g. Little Ice Age) or with anthropogenic (e.g. Wallachian colonization, industry pollution) factors and (iv) infer the sedimentation and denudation rates in the study area in the different periods of the late Holocene. Presentation explains the methodological strategy, discusses the results with other case studies from the study area and evaluates possible limitations of sedimentary archives stored within dynamic settings of landslide-dammed impoundments.

**14. Haliuc Aritina**

“Ștefan cel Mare” University of Suceava, Department of Geography, Romania

Email: [aritinah@yahoo.com](mailto:aritinah@yahoo.com)

**Assessing lacustrine sediment for environmental changes, Red Lake (Romania)**

Located in the north east of Romania Red Lake is a unique valley lake formed by a landslide in (Pisota & Nastase 1957). It is the largest natural barrage lake of Romanian Carpathians situated at an elevation of 986m (Begy, 2010). The landslide occurred in the Hașmaș Massif in the Central Group of Eastern Carpathians blocking the Bicz Brook at its confluence with the Suhard Brook (Bojoi, 1968, Pisota & Nastase, 1957, Grasu & Turculeț, 1980). Red Lake is included in the Hasmaș-Cheile Biczului National Park being a protected area and one of the most visited attractions of the Hașmaș Mountains (Romanescu et. al., 2010). Red Lake is a significant and interesting natural barrage lake because of its origins and its multiple uses and consequently needs to be subjected to efficient environmental management.

The lake has an elongated form in a southern-northern direction, but has two limbs: Oii, heading 960m north-south and Suhard heading 380m SW-NE (Pisota & Nastase, 1957). The lake has a surface area of 11.6ha, a water volume of 606.500m<sup>3</sup> and a maximum depth of 9.6m (average depth 5.41m) (Begy 2010, Begy et al. 2009). The aim of this study is to examine the proprieties of the recently taken lacustrine sediments in order to achieve some perspective on the environmental changes.

The sediments were taken in the summer of 2011 using an inflatable boat, a hand GPS and a gravity corer. Each core was sectioned at 2 cm intervals, dried at 37°C. The elemental composition of the samples was determined using a pXRF analysis (Niton XL3t 900). To analyse the magnetic characteristics of the samples two instruments were used; a Bartington Instruments Ltd MS2 and C sensor able to detect very fine ferrimagnetic minerals, Molspin Ltd Pulse Magnetiser and Minispin Fluxgate Magnetometer. The samples were burnt at 550°C and respectively at 850°C to estimate the organic and carbonate content of the sediments via loss on ignition (LOI). The particle size measurements were undertaken using Horiba Partica LA-950V2.

The geochemical, mineral magnetic, organic and particle size characteristics of the samples reflect changes in the surrounding environment due to anthropogenic actions and natural events. The surface, basal sediments as well as cores taken near the main limbs have different characteristics. This indicates the different sources of the sediments as well as differential deposition. The important shifts in the sediments properties correspond to changes in the catchment (floods, deforestations, weir construction, land-use changes and intensive tourism). The longest core appears to cover a considerable part of the history of the lake confirming the high rate of infilling (previously as documented by Begy et al., 2009) as well as other important environmental episodes. Even though, this well-known water body is declared a protected area this study provides an insight for the necessity of environmental management for its longevity and sustainability.

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### 15. Gheorghiu Delia M. <sup>1\*</sup>, Fabel Derek, Hansom Jim, Sheng Xu

<sup>1</sup> School of Geographical and Earth Sciences, University of Glasgow, Glasgow, United Kingdom

\*Corresponding author: Delia Gheorghiu. Email: [dgheorghiu@ges.gla.ac.uk](mailto:dgheorghiu@ges.gla.ac.uk)

### Glaciers and climate in the Late Devensian/Würm – from west to east

Identifying the glacial extent and dynamic behaviour of past glaciers is a key factor in understanding climate change and its influence over a wide area. This study explores the intricate nature of landforms created by the last ice masses in two different areas of Europe. In the Monadhliath Mountains (Scotland),  $^{10}\text{Be}$  exposure ages indicate deglaciation of the Last Devensian ice sheet at ca. 15 ka ( $^{10}\text{Be}$ ), whilst the glaciers in the Rodna Mountains (Romania) retreated from their maximum extent at ca. 37 ka ( $^{10}\text{Be}$ ). However, a more synchronous Younger Dryas glaciation seems to have occurred in both study areas between 10-12 ka ( $^{10}\text{Be}$ ).

These new chronologies are compared to other climate archives in Europe and the climatic oscillations recorded in the North Atlantic region. The results clarify both the spatial and temporal

reconstruction of mountain glaciers and help to increase our knowledge of ice mass behaviour under general climate forcing mechanisms and local environmental conditions.

### **16. Niculiță Mihai**

'Alexandru Ioan Cuza' University of Iasi, Romania

Email: [mihai.niculita@uaic.ro](mailto:mihai.niculita@uaic.ro)

#### **SRTM3 downsampling to SRTM1 using cokriging**

SRTM data represent the most precise temporal Earth surface altitude snapshot. The characteristics and availability of SRTM data, make it valuable for all land surface studies, ranging from geology, to geomorphology, hydrology and land use. While conterminous US is covered by the original resolution, the rest of the World data was released at a coarser resolution. We present a methodology for obtaining a digital elevation model from SRTM data, by downsampling the SRTM3 data to a SRTM1 equivalent. This methodology is based on the use in cokriging, of SRTM1 DLR and ASTER GDEM data, as covariates. We show on several US sites, that this method is superior to other methods, both for standard deviation of the differences, but also for the resolution of the data.

### **17. Panait Andrei-Marian<sup>1\*</sup>, Tanțău Ioan , Fărcaș Sorina**

<sup>1</sup> Babeș-Bolyai University, Department of Geology, Cluj Napoca, Romania

\*Corresponding author: Andrei-Marian Panait. Email: [pnt\\_andrei@yahoo.com](mailto:pnt_andrei@yahoo.com)

#### **Late Glacial and Holocene vegetation history in Apuseni Mountains (Romania)**

Pollen analysis supported by nine AMS 14C dates from Ic Ponor peat sequence (1050 m altitude) in the Apuseni National Park (W Romania) were used to reconstruct the Late Glacial and Holocene vegetation history in this mountain region. The vegetation record starts during the Younger Dryas period, with the occurrence of rather closed woodlands composed of Pinus, Betula, Picea, and Salix. Picea was the dominant tree species for the entire Holocene period. Temperate tree taxa (Ulmus, Quercus, Fraxinus, Tilia, Corylus) were also common. Corylus expanded during the Boreal period and reached maximum abundance after 8000 yr BP. Pollen of Carpinus and Fagus were already recorded around 7500 yr BP, earlier than in other regions of Romania. The indications of human activities appear around 8300 yr BP with the first occurrences of cereals pollen. A hiatus is present in the upper part of the sequence at about 5000 yr BP. Comparison with other sequences from Romania reveals both similarity but also differences related to the location of glacial refugia, climate change and human impact.

### **18. Pui Loredana Ioana**

Department of Geography, University of Oradea, Romania

Email: [dana\\_mm2001@yahoo.com](mailto:dana_mm2001@yahoo.com)

#### **The Igniș-Gutâi mountain tourist planning in terms of a territorial system in Maramureș**

The tourism planning of Igriş - Gutai mountain area is a relevant subject in the tourist thanks the gap between the natural and anthropic tourism potential and tourism infrastructure well represented almost nonexistent. The unique landscape, diversity and variety of natural and anthropogenic sightseeing, key indicators of tourist traffic signals a weak tourism phenomenon, even if they are individualized in small and medium-sized mountains with the natural exception. Being part of the small and medium mountains category, the tourism planning of Igriş - Gutai Mountains must consider that they are component of a Territorial system. The novelty of this theme is emphasized by the way of tourist planning methodological tools which offer a different perspective to analyze the Igriş - Gutai area. Thus, the scientific approach of this area will take into account the principles, the scientific norms and tourism planning methods and also the methods of Regional Geography and territorial systems. The starting point is the researcher 's vision on the study area. He has seen the Igriş - Gutai Mountains as an area subject to tourist planning, a region which provides the useful direction of research or the territorial system components cut in functional complexes. The original character is supported by the need for a territory interdisciplinary approach due to its complex structure, which can be found on the personal touch.

**19. Romanescu Gheorghe\*<sup>1</sup>, Dinu Cristina, Radu Adina, Stoleriu Cristian, Romanescu Gabriela, Romanescu Ana Maria**

<sup>1</sup>“Alexandru Ioan Cuza” University of Iasi, Faculty of Geography and Geology, Department of Geography, Romania

\*Corresponding author: Gheorghe Romanescu. Email: [romanescugheorghe@gmail.com](mailto:romanescugheorghe@gmail.com)

**Physico-chemical properties of lacustrine waters from south-western Dobrogea**

The fluviatile limans in the south-west of Dobrogea are the most characteristic forms of this type, with an exclusive development on the territory of Romania. In time, they were interpreted as fluvio-maritime limans or even as fluvio-lacustrine limans. As a result of the fact that they are situated close to the Danube, bordering one of the driest regions of Romania, they have had diverse usage since ancient times. Because the fluviatile limans in Dobrogea are mostly used in pisciculture, the water qualitative parameters have to be monitored permanently. They also have a role in attenuating floods, acting as a tampon against flash floods. Consequently, they have a special local importance even today, feeding as much of the population as possible (directly or indirectly). From a geomorphological point of view the fluviatile limans in Dobrogea were formed as a result of the withdrawal of the Romanian (Levantine). The decrease in depth may cause the flood waves to pass over the dams. In this case, the periodical drainage of lake cuvettes is required. The physical parameters of water (depth, transparency and temperature) as well as the chemical parameters (pH, dissolved oxygen, nitrates, nitrites, phosphates and the Ca/Mg ratio) have been analyzed. From an ecological viewpoint, the fluviatile limans in the south-west of Dobrogea are suitable for fish breeding and for developing an adequate lacustrine life.

**Keywords:** fishing, fluviatile limans, geomorphological parameters, qualitative parameters, Romania.

**20. Oszlányi Július\*<sup>1</sup>, Izakovičová Zita**

<sup>1</sup>Institute of Landscape Ecology, Slovak Academy of Sciences, Slovakia

\*Corresponding author: Julius Oszlanyi. Email: [julius.oszlanyi@savba.sk](mailto:julius.oszlanyi@savba.sk)

**Integrated landscape management of the Ipel river basin**



This paper presents an evaluation of the Ipel river basin, examining its sustainable development. It devises methodology for integrated landscape management as a basic tool for the implementation of its sustainable development in actual practice. The main objective of this case study is to define the socio-economic and environmental problems, to design measures to eliminate these problems and/or to prevent new problems arising. The ultimate goal is to achieve management practices which are in harmony with this area's potential, to the greatest possible extent. Thus, basic principles are applied to landscape-ecological optimization of landscape organisation, including nature protection, biodiversity, landscape stability and the protection of its natural resources. These involve its water and soil and the air/atmosphere in its forests. The protection of its cultural-historical resources is extremely important, including, inter alia, the protection of cultural monuments, protection of historical landscape structures and protection of the entire environment.

### **21. Driga Basarab\*<sup>1</sup>, Zaharia Constantin**

<sup>1</sup> Romanian Academy, Institute of Geography, Bucharest, Romania

\*Corresponding author: Basarab Driga. Email: [driga\\_basarab@yahoo.com](mailto:driga_basarab@yahoo.com)

#### **Natural hazards in the town of Baia Mare**

The current paper aims at understanding the evolutive trends of the natural geographic system of Baia Mare city, manifested by processes of various intensities, which induce a specific hazard to areas with destructive potential, because of the intensity and frequency of natural hazards. By using GIS techniques, we performed an analysis of geomorphic, hydric and climatic hazards within the geographic space of the city. The prepared study offers certain data and information to the local administrative authorities and urbanism specialists, which are necessary for the identification of some areas that can be affected by a particular type of hazard, capable of deteriorating civil and industrial engineering.

### **22. Tábořík Petr\*<sup>1</sup>, Pánek Tomáš, Mentlík Pavel, Smolková Veronika**

<sup>1</sup>Institute of Hydrogeology, Engineering Geology and Applied Geophysics, Faculty of Science, Charles University in Prague, Czech Republic

\*Corresponding author: Petr Tábořík. Email: [petr.taborik@post.cz](mailto:petr.taborik@post.cz)

#### **Geoelectrical surveying in geomorphology: case studies from the Western Carpathians**

A complex approach in studies of the landform dynamics and evolution has become an integral part of the geomorphological research in the last decades. Interdisciplinary studies in geomorphology can be build upon information from various fields of research, ranging from palaeobotanics to geotechnical methods. Utilization of the methods of applied geophysics in geomorphology is, nowadays, one of the basic means of obtaining the information on the subsurface structures. Together with the geological information about lithology, structures or tectonics, geophysical methods can contribute to the modelling of the relief-shaping processes, such as weathering, slope development, or erosion.

Among the Direct Current methods (DC methods), the Electrical Resistivity Tomography (ERT) represents a modern, fast method of the resistivity survey. Presently, the ERT measurements are mostly performed by means of automatic PC-controlled systems and multi-electrode cable sections

according to the chosen electrode array. The method has a wide spectrum of possible uses and can be applied in all parts of the mountain relief ranging from ridges to valley bottoms or mountain forefields. However, there are some limitations, e.g. accessibility of the studied site, conductivity of the surface layer, or demands on power supply.

In this contribution, we present the ERT surveying applied within the geomorphological research of the Carpathian region on following case studies: I) alpine relief of High Tatras Mts.; II) marginal slope of the Pol'ana stratovolcano; and III) flysch Outer Western Carpathian Nappes. The ERT has been utilized in order to i) determine the thickness of valley-fill (fluvial, glaciofluvial and colluvial sediments); ii) distinguish particular phases of the glaciation; iii) confirm disintegration of mountain ridges and contiguous slopes; iv) determine the depth and distribution of eluvial and colluvial sediments; v) determine the interaction between slope sediments and fluvial system (dammed valleys, sedimentary infill on river beds), etc.

**Keywords:** geoelectrical survey, electrical resistivity tomography (ERT), landforms, Western Carpathians

### **23. Zamosteanu Andrei\*<sup>1</sup>, Mîndrescu Marcel**

<sup>1</sup>"Ștefan cel Mare" University of Suceava, Department of Geography, Romania

\*Corresponding author: Andrei Zamosteanu. Email: [andreynorty@yahoo.com](mailto:andreynorty@yahoo.com)

#### **Geomorphometry of the glacial lakes in the Romanian Carpathians**

The aim of this study is to make an inventory and a database comprising of all glacial lakes in the Romanian Carpathians based on information provided by Gâștescu (1960), Pișota (1968, 1971), Decei (1981), Mindrescu (2006), and the data obtained in the field and laboratory by employing GIS techniques (ArcView, Global Mapper, Map Maker, Google Earth).

In order to identify all the glacial lakes within the mountainous area several datasets were used. These sources included maps of glacial cirques published by Pișota (1971), maps of each glacial cirque by Mindrescu (2006), a map of the glaciated areas in Rodna Mts by Sawicki (1911), individual studies on glacial lakes (Vespremeanu-Stroe et al., 2008), a study on the glacial and periglacial landscape in Romania (Vuia, 2005), as well as the topographic (1:25,000, 1986) and geological (1:200,000, 1968) maps and orthophotos (2005). By applying GIS techniques, each glacial lake was digitized, resulting in a geomorphometric dataset assigned to each glacial lake (coordinates, elevation, area and perimeter (1984 and 2005), aspect, etc.).

Subsequent to the data analysis, several maps were generated comprising all the glacial lakes in the Romanian Carpathians, but also for each mountain massif in part, displaying the altitudinal distribution of lakes, their catchments, geology and land cover.

The highest frequency of glacial lakes occurs between altitudes of 1800 m and 2000 m, which leads to the conclusion that this elevation range was the most intensely glaciated within the Romanian Carpathians. Regarding the depth of lakes, it is noteworthy that the majority of them are below 5 m in depth. By analyzing the data regarding the area of glacial lake catchments, it was determined that Retezat Mts host the largest catchments (e.g., Lia - 441 ha, Bucura - 201 ha, etc.). The analysis of geological data indicated that granitic substrates favored the formation of the highest number of lakes, which has also been documented in the Pyrenees (Garcia-Ruiz, et. Al., 2000).

To conclude, a total of 227 glacial lakes were inventorized in the Romanian Carpathians, of which 220 are cirque lakes (whereby 59 are silted) and 7 are valley lakes (Pojoarnei in Fagaraș, Latoriței, Zănoaga Stâni in Parâng, Tăul dintre Brazi, Lia, Ana and Soarbele in Godeanu). For comparison, Mindrescu (2006) counted 631 glacial cirques, which indicates that less than one third of all the cirques has a glacial lake.

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**24. Hajdukiewicz Hanna, Wyżga Bartłomiej\*<sup>1</sup>, Amirowicz Antoni, Ogłęcki Paweł, Radecki-Pawlik Artur, Zawiejska Joanna, Mikuś Paweł**

<sup>1</sup>Institute of Nature Conservation, Polish Academy of Sciences, Poland

\*Corresponding author: Bartłomiej Wyżga. Email: [wyzga@iop.krakow.pl](mailto:wyzga@iop.krakow.pl)

**The influence of local channel regulation on fish and benthic invertebrate communities in a mountain river**

To restore the gravel-bed Biała River, Polish Carpathians, establishing erodible corridor was proposed in two reaches located in its mountain and foothill course. In these reaches, relatively long, unmanaged channel sections alternate with short, channelized sections located in the vicinity of bridges. This study investigates the effect of the alternating morphologies on physical habitat conditions, fish and benthic macroinvertebrate communities and the ecological quality of the river in 10 pairs of unmanaged and channelized cross-sections located between significant tributaries. Unmanaged cross-sections with an average of two low-flow channels exhibited significantly greater variation in depth-averaged and near-bed flow velocity and bed material size than single-thread, channelized cross-sections. Summer, autumn and winter surveys of invertebrates indicated that unmanaged cross-sections typically hosted three times more taxa than channelized cross-sections, and this was reflected in distinct appraisal of both types of cross-sections using the invertebrate-based BMWP-PL index. Single electrofishings indicated no statistically significant difference in the number of fish species between both types of cross-sections, and this resulted in similar scores of the European Fish Index allowing to associate both channel types with the same class of ecological river quality. This study indicated that short channelized river sections do not disrupt continuity of fish populations although they provide worse habitats for fish, reflected in the lower numbers of individuals, especially juveniles. It also highlighted the need to investigate various groups of river biota while determining the response of river biocoenosis to environmental stressors and evaluating the ecological state of the river.

**25. Geantă Anca<sup>1\*</sup>, Tanțău Ioan, Tamaș Tudor**<sup>1</sup>Department of Geology, Babes-Bolyai University, Cluj-Napoca, Romania\*Corresponding author: Anca Geanta. Email: [anca.geanta@ubbcluj.ro](mailto:anca.geanta@ubbcluj.ro)**Late Glacial and Holocene vegetation history from a high altitude site in Rodnei Mountains, Northern Romania**

Pollen analysis from a peat sequence 1.85 m long taken from Gargalau, an oligotrophic peat bog located at 1810 m altitude in Rodnei Mountains (Northern Romania), is used to reconstruct the postglacial vegetation history and specific paleoclimate in the region. This study was aimed towards a better understanding of Holocene environmental events in Rodnei Mts. region. Typical palynological methods were employed. Seven radiocarbon dates were used to constrain the pollen record for the Gargalau site. The vegetation record starts in the colder Younger Dryas period and covers the entire Holocene. The vegetation dynamics are mainly consistent with other palynological data from Romania, with slight differences due to the higher altitude and to the geographic position.

**26. Tóth Endre<sup>1</sup>, Hufnagel Levente, Höhn Maria\***<sup>1</sup>Corvinus University of Budapest, Faculty of Horticultural Science, Department of Botany, and Botanic Garden of Soroksár, Hungary\*Corresponding author: Maria Höhn. Email: [maria.hohn@uni-corvinus.hu](mailto:maria.hohn@uni-corvinus.hu)**Chloroplast microsatellite study reveal lower variability in *Pinus sylvestris* L. populations inhabiting sunny, dry habitats**

Native populations of *Pinus sylvestris* in East Central Europe are small, inhabiting sites that exhibit substantial variation in ecological characteristics. Along the Carpathians natural stands of Scots pine can be found in peat bogs, on rocky surface while in the Carpathian basin on sandy substrate. We use microsatellite markers (cpSSR) to investigate the genetic structure of 7 remnant populations from these extreme habitat types by comparing them with 2 others from the major distribution area of the species' range, from Northern Europe. We presumed that the standing genetic variation is a consequence of the postglacial vegetation history shifted by selection and adaptive behaviour of species.

Based on the results we can conclude that there is no correlation between the geographic and genetic distance of the populations, but the haplotype distribution revealed a clustering by the habitat type, with a lower variation in populations of the dry habitats. Although our findings are based on neutral markers the environmental differences that involve local adaptation probably produced a selection pressure at population level detectable in non-coding sites.

**27. Patriche Cristian Valeriu<sup>1\*</sup>, Roșca Bogdan, Pîrnău Radu Gabriel, Stoica Dan Laurențiu**<sup>1</sup>'Alexandru Ioan Cuza University' of Iasi, Faculty of Geography and Geology, Romania & Romanian Academy, Department of Iași, Geography Group\*Corresponding author: Cristian Valeriu Patriche. Email: [pvcristi@yahoo.com](mailto:pvcristi@yahoo.com)**Spatial prediction of soil qualitative variables using logistic regression and fuzzy techniques. Study region: Dobrovăț Basin (Central Moldavian Plateau)**[www.georeview.ro](http://www.georeview.ro)

The present study tests several statistical tools, namely the regression trees, the logistic regression and the fuzzy techniques, for spatial prediction of soil qualitative variables in Dobrovăț basin. Compared to the classical approach in soil survey, the statistical approach has the advantage of taking into account and rendering the spatial continuity of soil cover and its properties, allowing the estimation of soil parameters, with a certain degree of accuracy, both inside (interpolation) and outside (extrapolation) the area of interest. The methods taken into consideration in our study were used to derive spatial occurrence probabilities for the main soil types in the basin. In addition, the logistic regression was also employed to estimate the occurrence probability of some soil diagnostic horizons. The fuzzy techniques have the advantage of allowing the integration of the researchers' experience into the mapping procedures. The results show that all methods were able to successfully predict the occurrence of Aluvisols, Chernozems and Luvisols, while the rate of success was lower for the other soil types. The spatial occurrence probability of A mollic horizon was estimated fairly using the logistic regression.

**28. MiHu-Pintilie Alin<sup>1\*</sup>, Romanescu Gheorghe, Stoleriu Cristian, Cristi Nicu Ionuț, Enea Andrei**

<sup>1</sup>"Al. I. Cuza" University of Iasi, Faculty of Geography and Geology, Romania

\*Corresponding author: Alin MiHu-Pintilie. Email: [allin\\_86@yahoo.com](mailto:allin_86@yahoo.com)

**Morphometric and morpho-bathymetric methods in the study of lake basins using GIS techniques. Case study: natural dam lakes from Eastern Carpathians**

Investigations of lake basins using GIS techniques has become in recent years a favorite area for our research team from the Faculty of Geography and Geology („Al.I.Cuza" University of Iasi). This is due to the fact of having a well equipped and modern laboratory (sonar, total station, GPS, GPR, autonomously diving equipment, etc.) who allowed us to implement modern models for morpho-bathymetric mapping of the underwater relief. In addition to this, using dedicated softwares (ArcGIS 9.3, TNTMips 7.0, AutoCAD2008) made possible to integrate classical principles of topo-bathymetric survey in a GIS.

First model is using topographic maps and plans at different scales (1:25000, 1:5000, 1:2000), satellite imagery, orthophotoplans in order to capture the evolution of lake basins. Making detailed DEM by means of specialized softwares and compared analysis of the lake surfaces could be an important tool in revealing lacustrine dynamics of the hydrological regimes from the basin, as well as forecasting the future dynamics through statistical analysis of morphometric changes. An application of this method was performed on lake basins in cascade from Valea Oii (Bahlu), where the surface and perimeter of 9 lakes was mapped, being observed a high mobility and changes along a period of 111 years (the oldest map used was from 1894, scale 1:50000). This model, on the other side, has an inconvenience due to dependence of the cartographic background which, in some areas, is missing from the national database.

In order to avoid the dependence of this incomplete cartographic background, we decide to make our own cartographic surveys, using high precision technical instruments, for example how it was made the bathymetric survey for natural dam lakes: Lacul Iezer (Iezer lake) from Sadova stream (Ferede Mts.), Lacul Roșu (Red lake) from Bicaz stream (Hăghimaș Mts.), Lacul Crucii (Cross lake) from Cuiejdol stream (Stânișoarei Mts.). These surveys were made using Leica System 1200 (Leica TCR1201 total station and GPS1200), Midas Valeport Surveyor Ecosounder (Bathy-500DF Dual Frequency Hydrographic Echo Sounder) sonar, along with satellite imagery. In the case of Iezer lake, due to a small surface, it has been used the direct survey with total station on the dam of the lake where from the survey was made. Scavenging the surface of the lake was made using a small boat with a topographic prism and a prospecting well in order to determine the depths which were transmitted

to the total station to make the necessary depth corrections. Also, for this lake were made GPR profiles, from which we could determine the depth and the sediments extent.

The morpho-bathymetric survey of Roșu and Crucii lakes was made with the sonar and a GPS (to map the lake basin surface and perimeter). Mapping the bottom of the lake was necessary to scavenge the entire surface of the lake, the equidistance between profiles of 25 cm. After finishing the surveys, has result approximately over 130000 reading points (>80000 for Red lake, >45000 for Cross lake), after the corrections were made, finally we could use approximately 95000. Statistical processing and modeling in a dedicated software made possible the realization of a detailed DEM of the lake bottoms with a high resolution that can be up to  $\pm 1$  cm. From all the methods used, we conclude that this survey method as being the best for mapping the lake bottom, the detailed DEM being used as a cartographic background in complex studies like: geomorphology, limnology, limno-ecology, biology, botanics, etc.

### **29. Briciu Andrei-Emil**

'Alexandru Ioan Cuza' University of Iasi & 'Stefan cel Mare' University of Suceava, Romania

Email: [andreibriciu@atlas.usv.ro](mailto:andreibriciu@atlas.usv.ro)

#### **Comparative thermal analysis of water and air in Suceava city area**

Using data from field measurements and from the national measuring network, a thermal analysis of air and water in rural and urban areas was conducted. Field measurements were made in pairs (air/water) for points located alongside rivers in the study area. Different thermal behaviours were observed not only for air versus water in the same points or for water versus water in places with different land use, but also in the correlation between air and water depending on location. These differences lead to a possible way to discover presumptive causes of the evolution of thermal regimes. The main cause for the differences of the measurements is the anthropic factor.

### **30. Zawiejska Joanna**

Department of Geography, Pedagogical University of Krakow, Poland

Email: [jzawiejska@gmail.com](mailto:jzawiejska@gmail.com)

#### **Are we really comfortable with letting the rivers run wild again?**

River restoration projects are undertaken across Europe, with social consultation on environmentally sensitive schemes and programmes intended to raise awareness and support for restoration. However, gaining public support and participation is often difficult while its lack may threaten restoration projects. This paper addresses some underappreciated aspects of public perception and education about rivers.

From a geomorphological perspective, bringing the rivers back to their natural state means reinstating the dynamics of geomorphic processes, which drive natural river morphology and ecosystem function. This inherently entails the occurrence of floods, channel mobility or bank erosion, usually associated with danger and degradation of riverscape values. Such deeply ingrained association stems from a history of man-river interaction, which, with technological progress erased the realistic image of natural rivers. With the majority of rivers in Europe modified, even in areas commonly thought of as pristine, several Europeans may have never seen a fully natural river channel and their only direct, and thus powerful, experience of natural river function is that of a natural

disaster (e.g. floods). This negative view is strengthened by media and education which advocate sustainability but equally commend engineering solutions such as flood protection schemes or hydropower development despite their often detrimental effect on river integrity. Finally, the public may be positive about increasing scenic beauty of the rivers but their concept of naturalness, deemed attractive, mostly likely differs from that held by river scientists.

Caring for the environment, as taught from an early age, is based on some form of activity such as cleaning campaigns organized by schools to develop proactive environmental attitudes. Paradoxically, in case of rivers, 'care' may be associated with a lack of intervention as the improvement in river health is expected to occur if river dynamics is uninhibited. This lack of coherence as to what 'care' means is apparent in relation to large woody debris in rivers, which, though environmentally significant, is seen as litter and removed.

Despite a general agreement on the necessity to protect (somewhat abstract) nature, reflected in environmental awareness surveys, the knowledge about the value of the natural environment (natural river) may not result in actions supporting its conservation or restoration at a local scale. In particular socio-economic and geographic context, consequences of restoration measures (e.g. a dam removal) become tangible and may not be supported, if not opposed.

Boosting education about natural river system function and value are the basis for shaping modern attitudes to rivers. Investigation of the social perception of rivers and formation of such perceptions seems vital if long-term support for restoration of rivers to their natural, self-sustaining state is to be gained from the general public.

### **31. Kupková Veronika<sup>1\*</sup>, Mentlík Pavel**

<sup>1</sup>Department of Geography, Faculty of Education, University of West Bohemia, Plzeň, Czech Republic

\*Corresponding author: Veronika Kupková. Email: [kupkovav@students.zcu.cz](mailto:kupkovav@students.zcu.cz)

### **Morphometrical analysis of glacial landforms in the northern part of the High Tatra Mountains, Slovakia**

The High Tatra Mountains were glaciated during the European Last Glacial Maximum (LGM), dating back to 20 000 BP. Several studies (e.g. Midriak, 1983; Lindner et al., 2003) showed that all the main valleys, both on Slovakian and Polish sides, were glaciated. Resulting from this, we can identify glacial landforms typical for high mountain environment: glacial cirques, complex cirques, troughs, and depositional zones. These segments form a cascade system where the ice had been accumulated in the upper parts (cirques) and flowed downwards. Former glaciers' size (during the LGM) was reconstructed through the morphometric characteristics (e.g. width, length, average altitude, azimuth) which were measured in GIS; the basis for these measurements provided Geomorphological map (Lukniš, 1973).

**Key words:** Last Glacial Maximum, glacial cirque, complex cirque, trough, depositional zone, cirque morphometry, cirque distribution, cirque classification, GIS, High Tatras

### **32. Geantă Anca<sup>1\*</sup>, Auer Andreea, Feurdean Angelica, Hutchinson Simon, Mindrescu Marcel**

<sup>1</sup>Department of Geology, Babeş-Bolyai University, Cluj-Napoca, Romania

\*Corresponding author: Anca Geantă. Email: [ancageanta@yahoo.com](mailto:ancageanta@yahoo.com)

### **Macrocharcoal analysis of a 4200 year old lake sediment profile from Northern Romania - fire regimes and climate implications**

Macroscopic charcoal particles, magnetic susceptibility and AMS C14 dates were performed on a sediment sequence from a small subalpine lake (Buhaescu Mare), Rodnei Mts. in order to reconstruct fire regimes in the area. Specifically we aim to distinguish between natural fire activity and human driven fires. Buhaescu Mare lake, also known as Rebra lake (0.4 ha; 1920 m a.s.l.), is today surrounded by mire vegetation, Ericaceae, *Carex* and *Pinus mugo* patches further away, being situated just above the current tree line. The sedimentary profile, with a total length of 98 cm is composed of clayey silt (98-80 cm) and gyttja (80-0 cm). Magnetic susceptibility was used to support the charcoal results, this parameter being expected to rise during episodes of intense fire and subsequent erosive events.

The results from the charcoal record indicate periods of high charcoal activity at about 4200 cal. BP, 3000 cal. BP, 2700 cal BP, 2000 cal BP and 1350 cal BP. and point to a succession of warm/dry and cold/wet periods. The increase in charcoal particles over the last 2000 years was probably related to human impact, but this remains to be documented through the analysis of pollen and coprophilous fungi record.

#### **33. Ridush Bogdan**

<sup>1</sup>Department of Physical Geography and Natural Management, Chernivtsi “Yurii Fed'kovych” National University & Ukrainian Institute of Speleology and Karstology of Ukrainian National Academy of Science and Ministry of Education and Science of Ukraine

Corresponding author: Bogdan Ridush. Email: [ridush@yahoo.com](mailto:ridush@yahoo.com)

#### **Paleogeographical records in karst caves of the Ukrainian Carpathians**

The only real forms of carbonate karst within limits of Ukrainian Carpathians were developed in few isolated limestone blocks, separated from the bottom layers and spread along the south-west macroslope. Quite often these blocks are penetrated with underground cavities which contain Quaternary deposits. The last are represented with speleothems and uncemented clastic deposits. The morphological analysis of karst forms testifies that they have ancient (Early Quaternary) age of initial karstification, related with hypogenic karst. The analysis of deposits of some caves and palaeofaunistic reconstructions showed considerable speed (tens and hundreds of meters) of limestone massifs denudation during the Late Pleistocene. The conclusion, that during Pliocene – Early Pleistocene these blocks were the parts of few larger karst massifs with the extensive karst aquiferous network, was done. Later these massifs were fragmented, both due to karst denudation and other erosion processes. The fragments of caves, which were preserved, were modified by weathering, condensation corrosion, and processed by modern infiltration streams. Due to their unicity in the region of East Carpathians, the caves of Uglja area became the collectors of important palaeogeographical and palaeoclimatic records.

#### **34. Stoica Dan Laurențiu<sup>1\*</sup>, Patriche Cristian Valeriu**

<sup>1</sup>‘Alexandru Ioan Cuza’ University of Iasi, Faculty of Geography and Geology, Romania

\*Corresponding author: Dan Laurențiu Stoica. Email: [dan\\_sezu@yahoo.com](mailto:dan_sezu@yahoo.com)

#### **Geostatistical approach on the estimation of Ponto-Sarmatic habitats' preservation in NE Romania**



The specific pastures and bogs habitats designated at the level of Natura 2000 ecological network in NE Romania pertain to primary European interest habitats (1530) and foster endemic and critically endangered fauna and flora elements. Previous scientific work on primary interest plants (*Polygala sibirica*, *Iris pumila*, *Rumex tuberosus*) endemic fauna (*Vipera ursinii moldavica*) led to detailed phytosociological and zoological information, yet spatially accurate assessments and habitats' metrics to enhance proper, overall evaluations prove insufficient. The target area incorporates three important Natura 2000 sites (RO SCI 0265, RO SCI 0058, RO SCI 0171), designated in 2007 and reshaped in 2011 by the Romanian Environmental Ministry. The area suffers important urban sprawl negative impact since 1990.

The evaluation manner is based on Landsat TM and ETM imagery, ortho-plans, fragmentation indices and locally adapted ecological parameters incorporation in order to quantify habitat's conservation status and change and ecologically proper *Vipera ursinii moldavica* patches on the basis of GIS automatic classifications. The classifications are statistically tested for significance via the dedicated methodology.

**Key words:** remote sensing, Natura 2000, automatic classification, management

### **35. Murărescu Ovidiu<sup>1\*</sup>, Murătoreanu George, Frânculeasa Mădălina**

<sup>1</sup>Valahia University of Târgoviște, Department of Geography, Romania

\*Corresponding author: Ovidiu Murărescu. Email: [ovidiu\\_murarescu@yahoo.com](mailto:ovidiu_murarescu@yahoo.com)

#### **Extreme climate phenomena and their impact in shaping the current relief in the Bucegi - Leaota mountain complex**

The current modeling of the relief in the Bucegi Leaota mountain complex manifests tiered steps. The presence of cryo-modelling nival system at altitudes over 1800 m, the system imposes a typical relief, characterized by the presence of accumulations of scree, nival depressions and changes of soil particles under the effect of freeze-thaw. Here acting modeling cryo-nival processes, of which the most important are the degradation of the rocks and soil particles under the influence of variations of temperature, mass movements, often combined with the heavy erosion. Between 1600-1800 m there is a transition in the floor that combines the action of freeze-thaw and snow with river-heavy modeling. Tomcat forest floor is located below the altitude of 1600 m, in its development of the forest of conifers and blend. Fluvial erosion and heavy prevails in the actual underlying gravitational processes.

Within these floors morpho-dynamic phenomena of extreme climate have particular significance in that they require drastic changes in environmental conditions and climatic parameters. The most important phenomena with extreme climatic implications in relief modeling are avalanches of snow, plantations early and the late, storms and heavy rains by character of showers, strong winds. They produce often visible changes in the landscape, such as the phenomena of weathering of rocks because of frost and thaw phenomena, collections of masses of detritus, felling of trees.

### **36. German Natalia**

Faculty of Geography, "Yurii Fed'kovych" National University, Chernivtsi, Ukraine

Email: [german.0891@mail.ru](mailto:german.0891@mail.ru)

#### **Correlation of dendrochronological data from the southern slope of the Khotyn Upland with meteorological data for the recent 100 years**

The research we conducted for the first time for the Khotyn Upland. For research on oak (*Quercus robur*) we took three samples with the maximum duration of series up to 100 years. In the result we got the scale of annual forest growth. As the duration of the life of the tree was known, it was necessary to determine the correlation of dendrochronological and meteorological data. To identify the relationship between them the data of temperature and precipitation for the last hundred years after meteorological station of the Chernivtsi University were taken. The study of dendrochronological results of the oak reflects changes of climatic characteristics in the area.

After the survey it can be said that the best correlation is observed on the highest and lowest values of temperature and precipitation. The highest rates are observed during 1954 - 1955 respectively and the lowest during 1942 – 1943 years. On these periods we can say that here is best observed correlation of all components. In general, differences in the thickness of the rings is increment in oak stands are very similar to the climatic indicators in the area for 100 years, indicating that the sharp fluctuations in temperature and precipitation. The best observed ratio of dendrochronological data at optimum temperature, because temperature is a limiting factor.

### 37. Vartolomei Florin

Faculty of Geography, "Spiru Haret" University, Bucharest, Romania

Email: [fvartolomei@yahoo.com](mailto:fvartolomei@yahoo.com)

### **Wetland and floodplain habitats management and solutions in lower meadow of Prut Natural Park**

Declaring the Lower Meadow of the Inferior Prut River Natural Park in the southern part of Prut hydrographical basin is the result of the interaction between human activities and nature over time.

This protected area was created as a distinct area with a significant landscape value and with a great biological diversity where, through the maintenance of a harmonious interaction of man with nature and through the protection of the diversity of habitats and landscape, the traditional use of lands and some activities by the local population are encouraged.

In addition, the public is offered recreational activities and tourism and may unfold scientific, educational and cultural activities in the area.

The Lower Meadow of Inferior Prut River Natural Park includes all the flood meadow of Prut river on the administrative territory of Galați county. The Lower Meadow of Inferior Prut River Natural Park has the endorsement of CMN 19/Cj/18.02.2003. The planning maps of UPV Prut Meadow were drawn up by SILVAPROIECT, in 1995.

It has to be mentioned that several wetlands which in present are in natural stage are included or will be included in the List of Protected Areas under the legislation preservation. In this regard the planning of wetlands and floodplains rehabilitation is underdevelopment and will depend by the finalization of the land restitution action.

For all the types of existing habitats housing a large variety of fauna (especially avifauna), sedentary as well as migrating or passing fauna, the Mața – Rădeanu humid area, with a surface of 386 ha, is similar to the special preservation areas from the Danube Delta.

Among the protected areas within lower Prut basin, according to the criteria of habitat identification, three of them (*Ostrovul Prut*, *Lower Prut river meadow* and *Vlascuta swamp*) have been indicated to include some wetlands as well.

The human pressure has been led to the changes of structure and functionality of the wetlands floodplains and of the Prut river, characterized through the apparition of a strongly anthropized environment.

We propose the following potential demonstration sites for wetland management and restoration projects in the Lower Prut basin:

- Prut flood plain, downstream of Sovarca swamp, up to the mouth point in the Danube;

- Brates Lake located NE from Galați city, connected with the Prut river by the valley of Ghimia brook;

- Horincea hydrographical basin.

Rivers crossing the plain area as is it is the case of Prut river are not adequate for the partitioning of the river bed of their basins, because of the hydrologic regime with large flow variations. They may however be used as power sources for the system units created as a result of improvement works on the former marshes or for natural marshes as well as for economic and social utilities. Water use in these two cases requires the installation of pumping stations in the Giurgiulesti Oancea-area location, water and wastewater treatment. Their location will be dictated by the population exodus from town to village and the development of small rural industries.

Based on the analysis of the premises and conclusions that have emerged can be extracted a series of proposals to solve the problem. The most important aspects are the technical (technical works for effective exploitation of water resources and the role improvement works combined with fish farming biotechnology) and organizational ones (decision-makers involved and the specific tasks).

The spirit of Environment protection Law and Water Law seen as interior documents for each enterprise aimed to order their own knowledge about the flows of waste (losses, sewage, discharges and package materials). The general outside task of this study becomes the universal primary source of information for further accounts to Environmental and Water Management Structures, Emergency Planning, Labour Safety, Sanitary and Municipal Services, Statistics Office etc.

### **38. Iuliia Kalush<sup>1\*</sup>, Bogdan Ridush**

<sup>1</sup>Scientific Library, "Yurii Fed'kovych" National University, Chernivtsi, Ukraine

\*Corresponding author: Iuliia Kalush. Email: [ikalush@yahoo.com](mailto:ikalush@yahoo.com)

#### **Holocene seismic dislocations near Komariv (Chernivtsi Region, Ukraine)**

The investigated site is situated on the right side of the Dnister River canyon, near Komariv Village, in the North Bessarabia (Chernivtsi Region, Ukraine). The Holocene seismic dislocations were identified and investigated in rock cliff, in the upper part of the canyon slope. The paleoseismogeological study of Komariv site was realized. The Holocene landslide-gravitational seismic dislocation of Kelmenetsky part of the Dnister was formed due to strong platform tremor intensity more than 7 points, which took place in between 1000-700 yrs BC and 1600-1800 yrs AD. They are presented as the fragments of different size of the Sarmatian (Miocene) limestone onkoyid. The collapses of limestone cliffs which were founded there, show a high seismic danger of the area. The results of seismic dislocation's measurements, mechanism and causes of their formation should be considered in seismicity estimation of the territory to protect the environment and population from serious consequences of future earthquakes.

Theoretical basis for the determination of palaeoseismic dislocations, their manifestations in relief, were analyzed and systematized. Special attention is paid to identify correlation between seismicity and tectonic-geomorphologic structure of the area. The methods of research of seismogenic braking of relief on platforms were developed.

### **39. Murătoreanu George<sup>1\*</sup>, Frînculeasa Mădălina, Murărescu Ovidiu**

<sup>1</sup>Valahia University of Târgoviște, Department of Geography, Romania

\*Corresponding author: George Murătoreanu. Email: [muratoreanug@yahoo.com](mailto:muratoreanug@yahoo.com)

#### **Glacial and periglacial geomorphosites in the upper basin of Ialomița river**

The upper basin of the Ialomița Valley developed in the Bucegi Natural Park offers a special framework whose morphological peculiarities, by diversity and harmony, is an attractive source of tourism. Custom lithology is dominated by Jurassic and Cretaceous sedimentary rocks, of which notes: complex conglomerates of Bucegi wide variety of facies, from looking at the layered solid, breccias and conglomerates Raciú type, layers of rock Sinaia predominantly limestone in rhythmic alternations of grezocalcare, sandstone, marl, calcareous sandstones, shales and clays, marls, calcareous sandstones framed canvas type Teleajen suites with flysch sandstone and sandstone-conglomerate.

Lithology can highlight the possibilities of developing multiple geomorfosituri. Addressed in this study are some of the most representative geomorfosituri with glacial and periglacial genesis (Omu Pike, Babele, Sfinx, erratic block of Ialomița Valley, glacial cirque of Ialomița, Mecetul Turcesc, Bucura-Dumbravă Pike, Strunga), components of this landscape. Taking as a basis the classical methodology, selected geomorphosites were evaluated synergistic relationship with tourism impact it generates, emphasizing their morphological and scientific attributes. Highlighting the two attributes was necessary because, for the analyzed space, geomorphological and scientific value, although well quantified, are often ignored in the perception of tourists predominantly channeled to the aesthetic and cultural component strongly boosted tourism indicators and exploitation potential such as infrastructure facilities, socio-economic conditions of the region, the promotion etc.

#### **40. Plesiński Karol<sup>1\*</sup>, Radecki-Pawlik Artur**

<sup>1</sup>Agriculture University of Krakow, Department of Hydraulic Engineering and Geotechnics, Poland

\*Corresponding author: Karol Plesiński. Email: [kplesinski@ar.krakow.pl](mailto:kplesinski@ar.krakow.pl)

#### **Hydrodynamic parameters diversification in the watercourse with the rapid hydraulic structures (examples from the Porębianka River, Polish Carpathians)**

At the present, in modern river training practices and philosophy one can notice coming more into use ecological friendly hydraulic structures. Those, which are especially needed for river training works, as far as expectation of Water Framework Directive is concerned, are rapid hydraulic structures (RHS). What is important, RHS in general do not stop fish and invertebrates against migrating upstream, provide natural and esthetical effects within the river channel, still working as hydraulic engineering structures. Along this paper we described and measured some hydraulic parameters within the reach of chosen rapid hydraulic structures, which we found in the field.

The main aim of the research was to describe changes of values of those parameters upstream and downstream of the RHS's and to find out their influence on hydrodynamics of the stream. The study was undertaken on the Porębianka river in the Gorce Mountains, Polish Carpathians.

Observed hydrodynamic parameters within the reach of the RHS's depend on the location of measuring point and the influence of individual part of the structure. At the same time maximum velocity does not always create the bigger shear force, because it is also depend on the velocity distribution along the hydrological profile.

#### **41. Enea Andrei<sup>1\*</sup>, Stoleriu Cristian, Romanescu Gheorghe, Miha-Pintilie Alin**

<sup>1</sup> "Al. I. Cuza" University of Iasi, Faculty of Geography and Geology, Romania

\*Corresponding author: Andrei Enea. Email: [andr.enea@yahoo.com](mailto:andr.enea@yahoo.com)

## **Monitoring the deforestation phenomena from the Red Lake hydrographic basin, using geomatic techniques and satellite imagery**

The Red Lake is one of the most important lacustrine, touristic objectives in Romania. At its origins, it is a natural barrage lake, and the local morphometric and pedological factors determine geomorphological processes that occur at large depths (the landslide that has led to the appearance of the lake), but also surface processes (surface erosion, especially in the areas with little, or no vegetation, to protect the soil). Out of all these processes, the surface erosion has one of the most negative impact upon the lifespan of the lake, because it contributes to the silting of the lacustrine basin. The main, anthropic cause, which leads to the acceleration of the surface erosion, is represented by the deforestation actions that take place in the basin, which also have an illegal character (mostly proven by the placement of the hydrographic basin inside the Cheile Bicazului - Hășmaș National Park). Therefore, a permanent and precise monitoring of the deforestation phenomena is necessary, in order to determine its influence upon the silting process, to which the Red Lake is subjected.

In the making of this study, several GIS materials and techniques have been used. First of all, the hydrographic basin has been determined, and according to its placement inside the country, satellite images have been downloaded (ETM+ and TM, provided by the Landsat satellites). These images were downloaded for free, from the Global Land Cover Facility website (<http://glcf.umiacs.umd.edu/>), having a spatial resolution of 1 pixel = 30x30 metri<sup>2</sup>. We have downloaded five sets of satellite images, compiling a chronologic interval of 18 years (between 18 august 1989 and 27 july 2007). During this 18 year interval, we were able to calculate the total surface affected by deforestation. Therefore, despite the fact that the data sets could not be obtained at regular time intervals between them, we also calculated the average deforestation rate, inside each studied period. In order to have a greater accuracy and precision, the satellite images have been downloaded for the periods of the year, during which the foliage of trees is the most developed (the months of july and august, corresponding to each year of the satellite image data). Therefore, each of these digital layers have been imported into GIS environment, under the form of RGB colour composites. For each of the three corresponding RGB bands, different layers have been chosen, in order to also use a near infrared colour band, with which we could more precisely identify, the areas covered with coniferous forest vegetation, and especially the deforested areas, inside the watershed of the Red Lake hydrographic basin.

For a better understanding of the distribution of deforestation, we have generated a map of the evolution of this process, for the 4 temporal intervals, for which we could calculate the different deforestation rates. Several graphs have also been generated, to illustrate the evolution of deforestation rates and deforested areas.

In conclusion, it is easy to see the importance of monitoring deforestation phenomena in the Red Lake hydrographic basin, because it is the biggest risk factor (associated with other connected processes, such as silting, eutrophication, pollution etc), that could lead to the disappearance of the lake.

### **42. Florescu Gabriela**

'Stefan cel Mare' University of Suceava, Romania

Email: [amirabilix@yahoo.com](mailto:amirabilix@yahoo.com)

## **Physical and geochemical indicators in lake sediment study. Significance and interpretations. Case study: Iezerul Feredeului Lake, 1-120 cm**

In order to infer past environmental events of local impact, one core (408 cm. long, in sections of 60 cm. each) was taken from of Iezerul Feredeului Lake and subjected to various measurements.

The first 120 cm. of sediments were analyzed, at 1 cm resolution, for the following parameters: magnetic susceptibility (MS), saturation isothermal remnant magnetism (SIRM), loss on ignition (LOI 550° C, 950°C), particle size, as well as the content of certain chemical elements, such as Fe, Mn, Pb, Zn, Sr, Cs, Cu, Ti or Cr. By correlating the results, several observations were made, concerning variations in the sedimentation regime, as well as in the accumulation rates, the amount of allochthonous inorganic material inwashed during some events, or the level of contamination.

The varved-type structure of the sediments shows a correlation pattern with the measurements results for the physical and geochemical indicators above mentioned.