

ROLE OF FIELDWORK IN GEOMORPHOLOGY

ABSTRACTS

Annual conference of the Czech Association of Geomorphologists

March 10–13, 2015 Plzeň, CZ

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Vydala: Západočeská univerzita v Plzni 2015
ISBN 978-80-261-0496-4

WELCOME TO PLZEŇ – THE HEART OF THE WESTERN BOHEMIA

Welcome to the 15. Czech Association of Geomorphologist's annual international conference. The meeting will focus on the role of fieldwork in geomorphology. We would like to stress importance and irreplaceability of fieldwork now in the time of extensive use of sophisticated data sources, tools and devices. Traditionally, a broad range of geomorphologic topics is covered by the conference agenda. However, the following key themes underpin the meeting:

I am become death, destroyer of the worlds. – Man as a creator and victim of landscape changes.

Once upon a time, there was an ice age. – Glacial and periglacial processes and landforms.

Water, water, every where! – Fluvial geomorphosystems on the roof of Europe.

We need to go deeper! – Tectonic and structural geomorphology.

Yes, how many years can a mountain exist, before it is washed to the sea? – Slope processes and slope-channel coupling.

Quo vadis? – Section opened for the geomorphology students and graduates.

We hope that you are stimulated by excellent talks and interesting posters and you enjoy the meeting.

Pavel Mentlík and Václav Stacke,
Markéta Pluháčková, Klára Vočadlova, Pavel Rak
and Michal Mergl (excursion guide)

CONTENTS

<i>WELCOME TO PLZEŇ – THE HEART OF THE WESTERN BOHEMIA</i>	<i>3</i>
<i>THE SUSCEPTIBILITY OF THE WIELKI ROGOZNIK RIVERBANKS (PODHALE REGION) ON THE FROST PROCESSES.....</i>	<i>10</i>
Augustowski Karol, Kukulak Józef	10
<i>DELINEATION OF BASIC MORPHOMETRIC – MORPHOSTRUCTURAL INDIVIDUALS OF THE WESTERN CARPATHIANS USING OBJECT-BASED IMAGE ANALYSIS</i>	<i>12</i>
Peter Bandura, Lucian Drăgut, Tatiana Harciníková	12
<i>APPLICATION OF LOW-COST UAV IN GEOMORPHOLOGICAL STUDIES IN THE ARCTIC</i>	<i>14</i>
Jan Blahůt, Filip Hartvich, Jan Balek, Jan Kavan	14
<i>RE-ASSESSMENT OF PERMANENT SNOW-AVALANCHE PATHS IN THE KRKONOŠE MTS. BASED ON NUMERICAL RUN-OUT MODELLING</i>	<i>15</i>
Jan Blahůt, Jan Klimeš, Jan Balek, Petr Tábořík	15
<i>ORE MTS AND HUMAN IMPACT.....</i>	<i>16</i>
Eva Břízová, Leona Bohdálková, Oldřich Myška, Petr Bohdál, Vladimír Šrein	16
<i>THE AIZM FLOOD MODEL - ACCURACY AND PERSPECTIVE IN THE GEOMORPHOLOGICAL RESEARCH</i>	<i>18</i>
Caletka M., Koli M., Šulc Michalková M.	18
<i>DEBRIS FLOWS MODELLING IN THE KRKONOŠE MTS.....</i>	<i>19</i>
Zuzana Drábová.....	19
<i>PLEISTOCENE THERMOKARST PROCESSES AND LANDFORMS IN CZECHIA.....</i>	<i>20</i>
Jaromír Demek.....	20
<i>POTENTIAL CHANGES IN THE LANDSCAPE DUE TO OX-BOW REVITALIZATION (CASE STUDY FROM DRAVA-BASIN, HUNGARY).....</i>	<i>22</i>
József Dezső, Amadé Halász, Gabriella Tóth Jakub Miřijovský, Dénes Lóczy	22
<i>GOOGLE-EARTH 3D AND CAVES – USEFUL TOOLS IN GLOBAL PLEISTOCENE LGM GLACIAL GEOMORPHOLOGY RECONSTRUCTIONS.....</i>	<i>24</i>
Cajus G. Diedrich.....	24
<i>RECENT EVOLUTION OF (PRO)GLACIAL LAKES IN THE TYROL (AUSTRIA) AND LONG-TERM BEHAVIORAL PATTERNS</i>	<i>26</i>
Adam Emmer, Sarah Merkl, Martin Mergili	26
<i>RECENT EVOLUTION AND DEGRADATION OF THE BENT JATUNRAJU GLACIER (CORDILLERA BLANCA, PERU).....</i>	<i>27</i>
Adam Emmera, Edwin Loarteb, Jan Klimeš, Vít Vilímek	27
<i>CIRQUES, ROCK AVALANCHES AND THE BUZZSAW HYPOTHESIS FOR MOUNTAIN GLACIATION.</i>	<i>28</i>
Ian S. Evans	28

<i>DESIGN CRITERIA FOR RESTORATIONS OF MOUNTAIN STREAMS - EXAMPLES FROM THE MORAVSKOSLEZSKÉ BESKYDY MTS.....</i>	30
Tomáš Galia, Václav Škarpich, Zdeněk Příbyla, Jan Hradecký.....	30
<i>SEDIMENTATION IN THE CUTOFF CHANNELS, CASE STUDY IN THE STRÁŽNICKÝ MEANDER, RIVER MORAVA</i>	31
Petr Holík, Monika Šulc Michalková.....	31
<i>GEOMORPHIC RESPONSE TO RIVER REGULATION OF THE VISTULA CHANNEL IN THE FORELAND OF THE CARPATHIAN MOUNTAINS IN THE LAST 200 YEARS.....</i>	32
Jadwiga Gorajska	32
<i>GEOPHYSICAL SURVEYING IN CONDITIONS OF HIGH ARCTIC: EXAMPLES FROM SVALBARD.....</i>	34
Filip Hartvich, Jan Blahůt and Josef Stemberk	34
<i>LONG-TERM MONITORING OF A SLOW SLOPE DEFORMATION - CASE STUDY OF OBŘÍ HRAD</i>	35
Filip Hartvich	35
<i>LONGITUDINAL PROFILES OF THE TATRA VALLEYS AS A MIRROR OF MORPHOTECTONIC DEVELOPMENT.....</i>	36
Michal Havaš, Jozef Minár.....	36
<i>'I AM BECOME DEATH, DESTROYER OF WORLDS' – MAN AS A CREATOR AND VICTIM OF LANDSCAPE CHANGE: CAN WE IDENTIFY AND EXPLOIT ANTHROPOGENIC SIGNALS?</i>	38
Simon M. Hutchinson.....	38
<i>THE PLEISTOCENE LOAMY DEPOSITS IN THE ORAVA BASIN (WESTERN CARPATHIANS) BASED ON GRAIN-SIZE ANALYSIS.....</i>	40
Dorota Chmielowska	40
<i>WEATHERING ORIGIN OF THE LOAMY DEPOSITS IN THE ORAVA BASIN (WESTERN CARPATHIANS).....</i>	42
Dorota Chmielowska, Józef Kukulak, Karol Augustowski.....	42
<i>GEOTOURISM ON LANDSLIDES AS A NEW WAY OF EDUCATION ABOUT MASS PROCESSES.....</i>	44
Anna Chrobak.....	44
<i>FLOODPLAIN DELINEATION ON SMALL STREAMS ACCORDING TO TRADITIONAL APPROACHES AND THEIR APPLICATION IN PRACTICAL TASKS.....</i>	46
Jiří Jakubínský	46
<i>VECTOR ANALYSIS OF VALLEY AXES IN A RELATION TO GEOLOGICAL STRUCTURES ON THE KUNĚTICKÁ HORA HILL NEAR PARDUBICE.....</i>	48
Jan Juráček	48

<i>SOURCES OF ALLUVIA DELIVERY TO A FORE-MOUNTAIN RIVER IN THE TEMPERATE CLIMATIC ZONE. ZLATY POTOK/CREAK, NORTHERN SUDETES FORELAND, SOUTHERN POLAND.</i>	50
Kazimierz Klimek, Dariusz Ciszewski, Beata Woskowicz-Ślęzak	50
<i>GEOMORPHOLOGICAL CONDITIONS OF ROHAČKA KARST AREA</i>	52
Martin Kovalík.....	52
<i>MICROMORPHOLOGY OF SAND GRAINS OF GLOF'S SEDIMENTS FROM PERU</i>	53
Klára Krbcová.....	53
<i>PATTERN OF STREAM CHANNEL MORPHOLOGY ONE THE NORTHERN SLOPE OF BABIA GÓRA MASSIF, WESTERN CARPATHIAN MOUNTAINS.</i>	54
Robert Kowalski	54
<i>DATED DEPOSITS ON THE TERRACES OF THE WIELKI ROGOZNIK STREAM (PODHALE REGION) IN THE ORAVA FAULT ZONE</i>	56
Józef Kukulak Janusz Olszak, Anna Świerczewska,	56
<i>BEAVER (CASTOR FIBER) ACTIVITY AND ITS EFFECT ON THE STREAM CONNECTIVITY IN THE CHANGING WATERSHED OF THE KATEŘINSKÝ BROOK</i>	58
Petr Kunc, Petr Plecháč, Monika Cihelková, Amálie Bártová, Václav Stacke.....	58
<i>THE CYRILKA CAVE: LONGEST CREVICE-TYPE CAVE IN CZECH REPUBLIC.</i>	59
Jan Lenart.....	59
<i>METHODS OF FRACTAL GEOMETRY USED IN THE MORPHOMETRIC ANALYSIS OF ETHIOPIAN HIGHLANDS.</i>	60
Michal Kusák	60
<i>THE NEW FEATURES OF LANDSLIDE RELIEF DISCOVERED USING LIDAR. CASE STUDY FROM THE BABIA GÓRA RIDGE, WESTERN CARPATHIAN MOUNTAINS</i>	62
Adam Łajczak, Barbara Czajka, Ryszard J. Kaczka.....	62
<i>ROLE OF LAND RELIEF AND STRUCTURE IN THE FORMATION OF PEAT BOGS IN MOUNTAIN AREAS, AS EXEMPLIFIED BY THE POLISH CARPATHIANS</i>	64
Adam Łajczak	64
<i>TRANSPORT OF SUSPENDED SEDIMENT BY THE VISTULA RIVER BASINUPSTREAM OF KRAKÓW, SOUTHERN POLAND, AND THE HUMAN IMPACT DURING THE SECOND HALF OF THE 20TH CENTURY.</i>	66
Adam Łajczak	66
<i>THE IMPACT OF EARTHQUAKES ON LANDSLIDE ACTIVITY IN THE WESTERN CARPATHIANS DETERMINED BY THE MEANS OF DENDROCHRONOLOGY</i>	68
Ireneusz Malik, Małgorzata Wistuba, Marta Polowy, Agnieszka Barnaś, Monika Franek	68
<i>THE INFLUENCE OF MINING ACTIVITY ON LANDFORM FEATURES</i>	69
Kinga Mazurek.....	69
<i>NEW, BEAUTIFUL BYTOM</i>	70

Kinga Mazurek, Łukasz Marchewka.....	70
<i>ON THE GENESIS AND AGE OF LOESS IN SOUTH-EAST PART OF THE DANUBE BASIN. THE PRESENT STATE OF RESEARCH.</i>	71
Alžbeta Medved'ová, József Szeberényi, Pavel Roštínsky, Juraj Holec	71
<i>MORPHOTECTONIC HISTORY OF THE WESTERN CARPATHIANS (STORY OF RECOGNITION).</i>	72
Jozef Minár, Peter Bandura, Pavol Bella, Miroslav Bielik, Juraj Holec, Jozef Hók, Michal Kováč, Silvia Králiková, Alžbeta Medved'ová, Peter Orvoš, Roberta Prokešová, Ján Soták, Miloš Stankoviansky, Veronika Staškovanová, Michal Šujan, Michal Veselský, Rastislav Vojtko	72
<i>ADVANCING PLEISTOCENE AND HOLOCENE CLIMATE CHANGE RESEARCH IN THE ROMANIAN CARPATHIANS USING GLACIAL DEPOSITS AND LAKE SEDIMENTS CHRONOLOGY</i>	74
Marcel Mindrescu.....	74
<i>DISTRIBUTION AND MORPHOLOGY OF ROCK GLACIERS IN THE TATRA MOUNTAINS</i>	76
Peter Mida, Tomáš Uxa.....	76
<i>IS SACKUNG DIAGNOSTIC FEATURE FOR (DE)GLACIATED MOUNTAINS?</i>	77
Tomáš Pánek, Pavel Mentlík	77
<i>FLUVIAL GEOMORPHOLOGICAL MAPPING AND CLASSIFICATION OF THE ČERNÁ OPAVA RIVER</i>	78
Lenka Ondráčková	78
<i>MORPHOSTRUCTURES OF THE WESTERN CARPATHIANS</i>	80
Peter Orvoš.....	80
<i>HYDROLOGICAL NETWORK CHANGES CAUSED BY HUMAN ACTIVITY. CASE STUDY – NECHRANICE DAM</i>	82
Jan Pacina, Ján Sládek	82
<i>EXTREMELY STRONG WINDS IN THE TATRA MOUNTAINS IN 1968 AND 2013 – METEOROLOGICAL CONDITIONS AND SCALE OF DEVASTATION</i>	84
Bartłomiej PIETRAS, Anna CHROBAK.....	84
<i>GEOMORPHOLOGICAL MAPPING AND RELATIVE DATING OF GLACIAL LANDFORMS IN ROHÁČSKÁ VALLEY IN THE WESTERN TATRA MTS.</i>	85
Markéta Pluháčková, Pavel Mentlík.....	85
<i>ATLAS OF LANDFORMS OF WEST BOHEMIA</i>	86
Pavel Rak.....	86
<i>RECONSTRUCTION OF THE 1770 LANDSLIDE EVENT AT THE KOZÍ VRCH HILL (N CZECHIA) AND POST-LANDSLIDE LANDSCAPE DEVELOPMENT</i>	87
Pavel Raška, Vilém Zábranský, Jana Lamková	87
<i>EFFECTS OF STRESS FIELD ON WEATHERING OF SANDSTONE FORMS AND MONUMENTS IN PETRA ARCHAEOLOGICAL SITE, JORDAN</i>	88

Jaroslav Řihošek, Jiří Bruthans.....	88
<i>IMPACTS OF AGE-DEPENDENT TREE SENSITIVITY AND DATING APPROACHES ON DENDROGEOMORPHIC TIME SERIES OF LANDSLIDES.....</i>	<i>89</i>
Karel Šilhán, Markus Stoffel	89
<i>LANDSLIDE ACTIVITY BY THE KOZÁROVCE VILLAGE (LEVICE DISTRICT, SLOVAKIA).....</i>	<i>90</i>
Ivan Ružek, Karel Šilhán, Libor Burian, René Putiška.....	90
<i>MULTI-HILLSHADE HIERARCHIC CLUSTERING – A NEW ARTEFACT RESISTANT METHOD FOR AUTOMATIC LINEAMENT EXTRACTION</i>	<i>91</i>
Jakub Šilhavý, Jozef Minár, Pavel Mentlík, Ján Sládek	91
<i>CHANGING RIVERS AND PLANT HABITAT OF THE FLOODPLAIN AREAS – CASE FROM THE MORÁVKA RIVER.....</i>	<i>92</i>
Václav Škarpich, Matěj Horáček, Vladimír Šala, Tomáš Galia	92
<i>LARGE-SCALE UAV MAPPING OF SLOPE DEFORMATION IN SVĚTÝ ANTON-CENTRAL SLOVAKIA.</i>	<i>93</i>
Ján Sládek, Miloš Rusnák, Jaroslav Buša, Vladimír Greif.....	93
<i>LANDFORM EVOLUTION IN THE REGION OF THE JIZERA AND LABE CONFLUENCE</i>	<i>94</i>
Tereza Steklá.....	94
<i>EFFECTS OF LICHEN COVERAGE ON SANDSTONE SURFACES: QUANTITATIVE STUDY OF HYDRAULIC AND MECHANICAL PROPERTIES.....</i>	<i>95</i>
Martin Slavík, Jiří Bruthans.....	95
<i>SHIFTING THE ACTIVITY OF GULLIES AND DEBRIS FLOW TRACKS IN CULMINATION PARTS OF MID-MOUNTAIN RANGE (A CASE STUDY FROM THE HRUBÝ JESENÍK MTS.).....</i>	<i>97</i>
Radek Tichavský.....	97
<i>RECENT SEDIMENTATION IN LANDSLIDE-DAMMED LAKES IN OUTER WESTERN CARPATHIANS.....</i>	<i>98</i>
Veronika Smolková	98
<i>VALLEY EVOLUTION OF THE BIALA ŁAŹECKA RIVER.....</i>	<i>100</i>
Jakub ŠTEMBERK, Petra ŠTĚPANČÍKOVÁ , Petr TÁBOŘÍK	100
<i>ACCELERATED LATE PLEISTOCENE ACTIVITY OF THE SUDETIC MARGINAL FAULT AS A SIGNAL OF ICE LOADING?</i>	<i>102</i>
Petra Štěpančíková, Thomas Rockwell, Daniel Nývlt, Filip Hartvich, Jakub Štemberk, Maria Ortuño, Madeline Myers, Karen Luttrell, Dylan H. Rood, Petr Tábořík, Neta Wechsler, Jozef Hók.....	102
<i>TIME-LAPSE RESISTIVITY MEASUREMENTS IN LANDSLIDE MONITORING – BENEFITS, DIFFICULTIES AND WHAT WE HAVE LEARNED SO FAR.....</i>	<i>104</i>
Petr Tábořík, Filip Hartvich, Tomáš Belov, Lukáš Vlček, Jan Blahůt, Václav Stacked, Roberta Prokešová.....	104
<i>LANDSCAPE DEVELOPMENT IN THE SURROUNDINGS OF JAVOŘÍ PILA (THE ŠUMAVA MTS., CZECH REPUBLIC).....</i>	<i>106</i>

Lenka Tlapáková	106
<i>COUPLING BETWEEN LANDSLIDE ACTIVITY AND FLUVIAL EROSION RECORDED IN TREE RINGS AND RELIEF (WESTERN CARPATHIANS AND EASTERN SUDETES)</i>	107
Małgorzata Wistuba, Ireneusz Malik	1077
<i>DETERIORATING OF WATER QUALITY IN PROTECTED OXBOWS DUE THE ORGANIC MATTER ACCUMULATION AND SEDIMENTATION</i>	108
Gabriella Tóth, József Dezső, Amadé Halász, Jakub Miřijovský, Dénes Lóczy	108
<i>PERIGLACIAL COLLUVIAL BLOCKY DEPOSITS FROM KAMIENNA RIVER VALLEY, KARKONOSZE MTS. (SW POLAND): NEW TECHNIQUES AND CONVENTIONAL APPROACH</i>	110
Andrzej Traczyk.....	110
<i>LANDSLIDE HAZARD ASSESSMENT AND PREDICTION OF LANDSLIDE CATASTROPHES WITH THE USE OF DENDROCHRONOLOGY</i>	112
Małgorzata Wistuba, Ireneusz Malik, Dominika Baldys	112
<i>SPONSORS</i>	113

TIME-LAPSE RESISTIVITY MEASUREMENTS IN LANDSLIDE MONITORING – BENEFITS, DIFFICULTIES AND WHAT WE HAVE LEARNED SO FAR

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Keywords: *active landslides, landslide monitoring, electrical resistivity tomography, time-lapse resistivity measurements, pore-water pressure, precipitations*

Presented contribution is aimed at present progress in application of time-lapse resistivity measurements in monitoring of active landslides. Besides the methods of geotechnical monitoring such as inclinometry, extensometry, monitoring of ground-water regimes or measurements of pore-water pressures, repeated geophysical measurements bring a useful tool to observe changes of specific physical properties of landslide accumulation. Supposing the mechanical properties of the landslide body material as invariable in time (in terms of lithology, particle size and porosity), resistivity, as a geoelectrical quantity, represents changes in water saturation. Together with measurements of pore-water pressure, resistivity provides very valuable information on water saturation or moisture content in pores. Time-lapse electrical resistivity tomography (TL-ERT) thus brings the information on moisture changes in time. As study sites we chose two active landslides, both in volcanic landscape: i) Ľubietová landslide (Poľana stratovolcano, Slovenské stredohorie middle-mountains, Inner Western Carpathians) belonging to the Central Slovakia Neogene Volcanic Field); and ii) Čeranišťa landslide (České stredohoří middle-mountains, Czech massif), Czech Tertiary Neovolcanites. Both observed landslides are active, however, in case of Ľubietová, landslide is directly endangering the Ľubietová village. Therefore it is very important to monitor the landslide behaviour. Permanent monitoring of the landslide has been going on for nearly forty years since 1977. The application of the repeated ERT measurements was performed from March 2007 to April 2011. The ERT results showed some changes in the subsurface resistivity distribution, however, the period of several months among individual measurements turned out as too long. Observed resistivity hike thus could have not been described in its development. Despite of this, ERT showed as a useful tool for observations of resistivity changes within the landslide body (Tábořík et al. 2012, Prokešová et al. 2013, Prokešová et al 2014). The survey at the other studied site, Čeranišťa landslide, has been carried out since August 2013. The locality is not situated directly nearby buildings or engineering constructions. Nevertheless, the locality is used as a testing site for the TL-ERT monitoring. The main objective of the research is to identify relations between

triggering factors and landslide activity. Thus, the variations in resistivity distribution are measured in order to acquire information on subsurface water saturation and its changes and, also, it could help, together with hydroclimatic observations, to reveal relations within the system „precipitation – subsurface saturation – mass movement activation“. Furthermore, using the monitoring of movement velocity based on repeated geodetic measurements we shall be able to determine the causal connection between precipitations, soil saturation and (re)activation of mass movements. Main goals of the long term research are i) to describe dynamics of the complex slope deformation, and ii) to reveal a connection among predispositions (tectonics, lithology), triggering factors (extreme precipitations, soil humidity changes, long-term climatic oscillations) and landslide activity. For description of a long-term landslide activity the measurements of displacements have been performed by means of i) 3-D spatial dilatometers, ii) extensometric measurements, iii) geodetic measurements and repeated laser scanning. Last but not least, the studied locality serves also as a testing site for the repeated resistivity measurements in terms of a) measuring parameters optimization, b) different electrode configurations testing, and c) data processing optimization (Tábořík et al. 2013, Tábořík et al. 2014). Research was supported by grant projects: VEGA project 1/0157/10, SGS6/PřF/2011, CzechGeo LM2010008 and GAUK 862213.

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