

Multi-proxy analyses of subatlantic peat bog sediments from the Western Tatra Mts. (Poland)

Kłapyta P.¹ and Kołaczek P.²

¹*Institute of Geography and Spatial Management, Jagiellonian University, Gronostajowa 7, 30-387 Kraków, Poland, woytastry@gmail.com*

²*Department of Palaeobotany Institute of Botany, Jagiellonian University, Lubicz 46, 31-512 Kraków, Poland, piotrkolaczek@op.pl*

The main aim of our study was to analyse local slope processes, vegetation changes and human impact during the last millennium in the Pyszniańska Valley (Western Tatra Mts.) on the basis of palynological and lithological analyses combined with radiocarbon datings from a small peat bog in the Pyszniańska Valley. These data were supplemented by a lithological analysis of cirque bottom-slope deposits from a depression within the Pyszniański cirque. Sedimentation at the site probably began in the 14th-15th century, which is suggested by pollen analysis. The sediments are dominated by fine grain material (sands and silts) transported by surface and linear slope washing with the interbedding of distinctive layers of coarse clastic material, which are indicators of high-energy geomorphic processes. The first phases of vegetation development (TZNP-1,2 zones) are characterized by visible deforestation caused by fire clearances and/or development of mining and metallurgical centers. The high number of hazel (*Corylus avellana*) pollen grains is probably the effect of the redeposition of sediments originating in the Boreal or Atlantic period from the higher elevation of the valley. In the TZNP-3 zone the Pyszniańska Valley was affected by a most catastrophic high-energy geomorphic event, recorded as a continuous layer of coarse material. The upper phase (TZNP-4a subzone) signifies pasture development based on animal husbandry. Regular determination of *Ambrosia artemisifolia* type pollen combined with radiocarbon data points to the 19th-20th century. The TZNP-4b subzone reflects the succession of *Carex rostrata* on the peat bog and reforestation in the vicinity of the site caused by the establishment of the Tatra National Park in 1954. The cirque floor sediments consist of massive, 1.65 m thick, very coarse layers of gravels and boulders, which represent dynamic sedimentation caused by the activity of high magnitude slope processes (debris flows).

Decision support system for landslide hazard mitigation on rock slopes

Klimeš J.¹, Stembekr J. and Dufka D.²

¹*Institute of Rock Structure and Mechanics CAS, v.v.i., V Holešovičkách 41, Praha 18209, Czech Republic, jklimes@centrum.cz*

²*Strix Chomutov, a.s. 28. října 1081, Chomutov 430 01, Czech Republic, dufka@strixchomutov.cz*

Slope movements on the rock slopes (e.g. rock falls or rock slides) belong among the most dangerous slope processes since even small volume events (involving single boulders) may have largely damaging effects on infrastructure or may cause serious injuries. This phenomenon is very often also highly localized problem, which demands for local solutions by local governments which rarely include experienced personnel. Rather high costs of almost any structural mitigation measure possibly applied on rock slopes makes mitigation process subject to many political and economic interests which not always result in the best and most effective slope stability solution. The project NEMETON aims to provide easy to use and free web based tool for local authorities and also for project companies to provide basic information about degree of hazard, possible mitigation measures and their basic technical and economic characteristics. The system includes interactive interface for intuitive description of rock slope stability problem allowing even inexperienced user to provide sufficient information to be advice for future steps leading to cost effective solution of the problem. At the same time, the basic information will help the project and technical companies to get a basic idea about probable cause of the problems, possible slope stability solutions and the technical conditions of the solution. In the second step, more detailed

geotechnical information are inserted to provide detail information for geotechnical professionals to assess the slope stability conditions and to select the best suited mitigation solution using the best suited technology. The success of the decision support system is ensured by involvement of wide spectrum of professionals for its design and the result verification. System is designed to accommodate any technical solution provided by otherwise competing companies to find the best mitigation option for defined problem. The presentation will introduce you into the rock slope stability problems in the Czech Republic, their typical technical solutions, basic database structure of the NEMETON system, results of its implementation and further research steps leading to the full operation of the NEMETON program welcoming broader European cooperation.

Geology and minerals of Kosovo* – Perspectives for national development

Knobloch A.¹, Legler C.¹, Barth A.¹ and Rexhaj A.²

¹*Beak Consultants GmbH, Am St. Niclas Schacht 13, 09599 Freiberg, Germany, www.beak.de, info@beak.de*

²*Independent Commission for Mines and Minerals, Rr. Armend Daci Nr. 1, 10000 Pristina, Kosovo*, www.kosovo-mining.org, icmm@kosovo-mining.org*

In 2002, the UN Kosovo administration has identified the key economic potential of the mineral industry for the further sustainable development of Kosovo. Consequently, between 2003 and 2009, under supervision of the Directorate of Mines and Minerals (DMM) (now Independent Commission for Mines and Minerals of Kosovo (ICMM)), Pristina/Kosovo, a comprehensive review of the geology and mineral potential of Kosovo was carried out. The results have been stored in the GEO-Database Kosovo (GDK) – a customised geo-scientific information management system, powered by ESRI ArcGIS 9.2 and Microsoft SQL 2005. The GDK comprises of a system of primary and derived geo-scientific and geo-economic data, such as mineral concessions, drill holes, geochemistry, field observation data, reports and documents, and a wide variety of thematic maps at scale 1:50,000 – 1:200,000. The database, reports and maps are currently used as the key working tools for the management of the mining sector of Kosovo and its further development.

In 2003, the activities have been launched by digitalisation of the existing geo-scientific maps, followed by the implementation of a unified national geological legend and the creation of a reviewed seamless national geological map at scale 1:100,000 (finalised in 2008). Extensive field work was executed in order to investigate thematic geological issues and to evaluate the mineral potential of the country.

An atlas of new thematic maps at scale 1:200,000 covers the most important geo-scientific and geo-economic issues: Metallogenic / Minerogenic Map, Map of Minerals, Geological Map, Hydrogeological Map, Tectonic Map, Quarry Map, Map of Construction Raw Materials, Map of Mineral and Thermal Waters, Morpho-Orographical Map, Soil Map, Satellite Imagery Map, Maps of Mineral Prospectivity for Au, Pb/Zn and Cr.

Detailed maps have been created in order to investigate special issues of key economic importance: Map of Construction Raw Materials and related maps of land use conflicts (Kosovo Quarry Plan) 1:50.000, the Kosovo Mineral Resources Management Plan 1:50.000, the Geohazards Map of Planned Kosovo Highway 1:25.000, the Geochemical Survey Maps of gold prospective areas 1:50.000.

Between 2007 and 2008, as part of the field mapping and sampling campaign, a stream sediment sampling survey was executed with main focus on precious metals (Au, Ag), base metals (Zn, Pb, Cu) and rare metals. As result, high-grade Au-anomalies (up to 11 g/t in stream sediments) were found at different locations, proven by findings of native gold in heavy concentrates and Au recorded in hard rock samples. In 2009, the existing knowledge and data was used for the creation of national mineral prospectivity maps for Pb/Zn, Au and Cr. These maps have been produced by support of the newly developed– advangeo® - software, which uses neural networks technology based on artificial intelligence. The

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