fraction but the coarse ash fraction of the phreatomagmatic pyroclastic rocks suggested brittle fragmentation style of the magma due to thermohydraulic magma and external water interaction triggered eruptions. The glass shards are primarily blocky in shape, low in vesicularity and have low to moderate microlite content. The glass shape analysis was supplemented by fractal dimensions calculation of the glassy pyroclasts. The fractal dimensions of the glass shards range from 1.06802 to 1.50088 with an average value of 1.237072876 and a mean value of 1.24521 based on fractal dimension test on 157 individual glass shards. The average and mean fractal dimension values are similar to the theoretical Koch-flake (snowflake) value of 1.262 suggesting complex boundaries but bulky shape of the majority of the glass shards inferred to be typical for pyrolasts formed by the brittle fragmentation of hot melt through explosive magma and water interaction. Light microscopy and backscattered electron microscopy images show well the bulky, fractured and complex particle outline of the individual glass shards. Abundant and complex micro-fractures, low vesicularity and the complex, moss-like particle boundary of the studied glass shards are characteristic features of both laboratory generated and natural glass shards as a result of hot melt and external water interaction. The similar textural features identified in fine and coarse ash particles, suggest that the particles were formed by processes that triggered brittle fragmentation of the melt in the hot melt and water interface (active particles) as well as in the vicinity of the interaction interface (non-interactive particles). Such scenario can be envisioned where hot melt rapidly penetrate abundant water-rich zones such as a) water-saturated soft-substrate, b) surface water body, or c) quickly recharging fracture-filled ground-water and the melt quickly cooled down to a temperature where it has been fragmented in brittle fashion and dispersed quickly from the explosion locus by the kinetic energy released in the magma – water interface. The variety of moss-like, blocky, bulky and heavily fractured complex glass particles all attest the phreatomagmatic fragmentation formed the pyroclastic deposits from where the studied volcanic glass particles were collected.

Interconnection of the regional-tectonic geological research and the applied technological research: The case study from the Gemeric zone, the Inner Western Carpathians

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The recent economic relations and the request of the European Union for the close interconnection of the scientific research with the practical applicability of obtained results initiate the changes in the methodical approach also in the geological activities. New regional geological projects should be supplemented with the technological and environmental researches much extensively than before. The presentation demonstrates some examples of such interdisciplinary geological, technological and environmental approach in Slovakia.

The Western Carpathians were formed in two orogenic cycles – Paleozoic Variscan cycle and Mesozoic-Cenozoic Alpine cycle. The recent tectonic setting (the course of lithological units, the character of the ore veins, etc.) is strongly affected by the Alpine overprint and segmenting the former Variscan setting. Despite, the role of Variscan evolution is of the high importance for the metallogenic processes by the late Variscan-early Alpine post-collision thermal processes.

The Variscan exhumation and the south-vergent obduction of the former Lower Paleozoic oceanic crust (incomplete ophiolite suite) on the marginal sedimentary flyschoid and volcanosedimentary sequences is well demonstrated in the Gemeric Unit of the Inner Western Carpathians (deformation phase VD; pre-Stephanian age; the Rakovec suture zone). It consists of the south-vergent compression-collision phase VD_1 (323-275 Ma) with the pressure metamorphic peak at 275 Ma and the pressure release at 275-262 Ma. The main extension and unroofing phase VD_2 (262-216 Ma), located in the South-Gemeric zone led to the origin of the Meliata-Hallstatt oceanic domain.

During the Alpine tectonometamorphism the kinematic regime has changed from the transpression to the north-vergent compression-overthrust kinematics AD_1 (141-114 Ma) related to the closure of the Meliata-Hallstatt domain to post-collision unroofing kinematics in the phase AD_2 (107-82 Ma) and, finally, to the origin of conjugated shear zones trending NE-SW and NW-SE in AD_3 (75 Ma-recent).

During both orogenic processes the high pressure rocks and ultramafics were exhumed, recently occurring along the Rakovec and Meliata suture zones. A newly developed technology for the use of ultramafics in CO_2 liquidation has confirmed the effectivity 3 : 1 of the process, i.e. 3 tons of ultramafics liquidate 1 ton of CO_2. Revealed methodology of mineral sequestration (carbonatization) produces carbonates nesquehonite and hydromagnesite, being stable and safe for the environment. Technological research recommends to use studied ultramafics is for obtaining of Co, Ni, SiO_2 (optical fibres), Fe concentrate, $Mg(OH)_2$ fillings, basic heat-resistant building materials, and those for shielding of radioactivity.

The genesis of the magnesite and talc is a reflection of the complex, above described, Variscan and Alpine geodynamic processes. The magnesite has originated during Permoscythian post-collision (post-VD) and pre-AD_1 evolution. The talc is a product of Alpine tectonic overprint (shearing) and the fluid migration through the magnesite bodies in AD_1 and AD_2. The majority of occurrences of the magnesite and talc are located in the wider surrounding of the contact zone of Gemeric Unit with northern and underlying Veporic Unit. This magnesite is relatively rich in Fe_2O_3 (8-4 %), and the magnesite products (87.5-89 %) can reach the higher quality by the nitrate treatment (up to 99.5 % MgO). The main products of such treatment are $Mg(OH)_2$ and MgO. Technological research recommends using magnesite for the production of Mg and its compounds (brucite, periclase and $MgCl_2$). Another use of magnesite is in agriculture (the nitrogen fertilizer) and environmental protection (ecological sorbent). The industrial use of talc can benefit from improved methodology of flotation and milling. The flotation concentrates with the high fineness (50 % beneath 0.5 and 100 % beneath 3 micrometres) and brightness (above 90 %) are predestined as a high-quality filling into plastics, rubber, paper, paints and ceramics. The selectively exploited high-quality talc interbeds are used in cosmetics and pharmacy without necessity of flotation elaboration.

On the relationship between the Paleogene Magura Basin and Pieniny Klippen Belt sedimentary area –the Leluchów sections, a new approaches (Polish Outer Carpathians)

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The relationships between the Central Carpathian Paleogene Basin, Pieniny Klippen Belt and the Magura Nappe are still one of the most important questions, which should be answered.

It is essential for better understanding of the Paleogene paleogeography and evolution of basin located along collision zone of the Central and Outer Carpathian domains.

Our studies were focused on the contact zone between the Magura Nappe and Pieniny Klippen Belt, close to the Polish-Slovakian border. Between the Udol village in the west and Ruska Vola in the east, the Late Eocene-Oligocene, deposits overlap both the Pieniny Klippen Belt as well as the Magura Nappe. These deposits are known as the Ujak facies. According to traditional opinion the Ujak facies overlapped the Pieniny Klippen Belt, and are overthrust by the Magura Nappe. The best recognized Leluchów section of the Ujak facies are situated on the left bank of the Poprad River, in the contact zone of the Krynica Subunit of the Magura Nappe and the Pieniny Klippen Belt. Unfortunately in this section contact of the Magura