λ=1.54056 Å), at an operating voltage of 40 kV and a beam current of 40 mA. Baltic ambers exhibit the same XRD pattern comprising of a broad peak centered at $2\theta=15^0$. They are in the amorphous state. The records seem to indicate for Romanite and Lithuanian amber some internal crystallization tendency, confirmed also by microscopically studies. These have been marked up using a PANPHOT microscope transmitted light. On the Romanite thin sections a weak anisotropy with grey-yellowish to light-blue colors was observed, although in literature is mentioned that amber does not present crystallization tendencies. Baltic amber studied with this occasion revealed no anisotropy.

Preliminary results on xenoliths in basaltic andesite subvolcanic body in the vicinity of Kroumovgrad, eastern Rhodopes, Bulgaria

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The studied basaltic andesite subvolcanic body belongs to the Paleogene post-collisional volcanism of the Eastern Rhodopes Momchilgrad-Arda volcanic region. It intrudes acid and intermediate pyroclastic, epiclastic rocks as well as concomitant sedimentary rocks. The subvolcanic rocks are with dense porphyritic texture and glassy (hyalinic) ground mass. Phenocrysts are represented by clinopyroxene, orthopyroxene and plagioclase. The rocks are medium-K to high-K, Q-normative and with Mg# = 65-72. Their geochemical peculiarities are similar to those from subduction related magmas, with negative anomalies for Ta, Nb, Ti, P in primordial mantle normalized spidergrams, but are probably influenced by lower crust material. Three different types of deep xenoliths of granulites, plagioclasites and cumulate clinopyroxenites are established. Granulites are metabasites with MgO = 7.15 wt. %. Basic granulites (pyriclasites) are composed by clinopyroxene and plagioclase where titanomagnetite is an accessory phase. Plagioclasites are composed exclusively of oligoclase with a small amount of chlorite. And finally clinopyroxenites are monomineral but with a transitional peripheral zone, where plagioclase (anortite) appears as a reaction product. Pressure estimations for granulites and clinopyroxenites are 8-14 kbars corresponding approximately to the crust – mantle boundary. Both xenolith types show petrographic evidences for rock transformations and initial melting. They were probably the result of an interaction with the ascending–basaltic to basaltic andesite mantle-derived and lower crust modified magma.

Volcanic glass textures, shape characteristics and compositions from phreatomagmatic rock units of the western Hungarian monogenetic volcanic fields and their implication to magma fragmentation

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Mio-Pliocene (~8 – 2.3 My) monogenetic volcanic fields in western Hungary (Bakony-Balaton Highland and Little Hungarian Plain Volcanic Fields) consist of eroded maar, tuff ring and scoria cones. Erosion advanced in many cases, and today the crater and volcanic conduit filling pyroclastic assemblages are preserved. The majority of the volcanoes had at least in their initial eruptive phase phreatomagmatic eruptions that produced pyroclastic beds deposited mainly from base surges and subordinate pyrolcastic falls. These phreatomagmatic rock units are rich in well-preserved volcanic glass shards. Electron microprobe studies on fresh volcanic glass reviled that they are primarily tephritic in composition. Textural analysis of the shape parameters of the glass shards were carried out with an aim to determine the magma fragmentation style was responsible for their formation. The shape analysis indicated that the majority of the magma was fragmented in a brittle fashion. Not only the fine ash 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.