Wallachian Area (Environment), consolided dry ground, drained by the Wallachian River Network (straight and terraced water courses); 3-Cândeşti Subgroup, characterized by the Cândeşti Area (alluvial fan-Environment); 4-Danube Delta Subgroup, characterized by the Danube Delta Area (delta environment). The Dacian Subgroup can be divided into two formations: Danube-Siret Formation, Wallachian-Lower Pleistocene in the west of the Romanian Plain (Bălăciţa – Olt Member: detritic dominance) and the Wallachian – Lower Holocene in the east of the Romanian Plain (Titu – Măicăneşti Member: pelitic dominance.). The Wallachian Subgroup can be divided into four formations: 1-Drincea-Olt Formation (red ferruginous clays, weathering crust), at the limit between the Lower Pleistocene and Middle Pleistocene; 2-Craiova-Galaţi Formation (predominant aeolian loess deposits), Middle Pleistocene-Upper Pleistocene); 3-Romanian Plain Formation (Complex), terrace and floodplain deposits of the Wallachian River Network valleys, Middle Pleistocene-Holocene; 4-Calafat Formation, Holocene, aeolian sandy dunes. The evolution of the Danube itself marked two periods: 1-Paleofluvial Period (Lower Pleistocene, presumably beginning in the Upper Pontian), when the Dacian Danube did already exist (a modest river, flowing in the Dacian River Network at its entrance into the Romanian Plain) and the Pannonian Danube (Danubes) also a rather modest rivers which flowed into the Dacian River Network at its entrance into the Pannonian Plain; 2-Neofluvial Period, Middle Pleistocene-Actual, when the Pannonian-Dacian (Actual) Danube already exist and was part of the Wallachian River Network formed in the lower part of the Middle Pleistocene, right after being caught in the Defile which had facilitated the formation of very important lively river. The Danube reached Galaţi (and the Black Sea) after the Siret and the Prut River dit it, during the upper part of the Upper Pleistocene. The Danube Channel, the Danube Canyon, yhe Danube Deep-Sea Fan, the Paleo-Danube presumably represent the Siret (including the Prut) Channel, the Siret Canyon.

Geochronological, geochemical and metamorphic framework of the Moslavačka Gora Massif (Croatia)

Starijaš B.[1], Gerdes A.[2], Balen D.[3], Tibljaš D.[3], Mayer A.[1] and Finger F.[1]

[1]*Department of Materials Science and Physics, University of Salzburg, Hellbrunnerstrasse 34, A-5020 Salzburg, Austria, biljana.starijas2@sbg.ac.at*
[2]*Institute of Geoscience, Goethe University, Altenhöferallee 1, D-60438, Frankfurt am Main, Germany*
[3]*Institute of Mineralogy and Petrology, University of Zagreb, Horvatovac 95, HR-10000 Zagreb, Croatia*

The Moslavačka Gora Massif (MGM) in Croatia, located about 50 km east-south-east of Zagreb, is a major exposure of crystalline basement within the Tertiary sediments of the Pannonian Basin. The central part of the massif is built up of a finegrained, two-mica S-type granite. The peripheral parts are formed by a metamorphic complex which includes mainly felsic anatexites and orthogneisses of granitic composition, some metapelites (paragneisses and micaschists) and rare amphibolites.

In terms of the Alpine plate tectonic framework, the MGM has been considered as a part of the Tisia block. Recently, the MGM has been related to the so-called “Sava Zone”, which is believed to host the suture between Tisia and the Dinarides. Reliable information concerning the geological evolution of the massif was as yet hardly available, so that any correlation with neighboring basement units remained largely speculative.

For a long time it was a common belief that the MGM represents Variscan crystalline basement. However, our new geochronological data indicate that this massif is a Cretaceous high-temperature/low-pressure metamorphic dome that was intruded in its center by a Cretaceous granite pluton. The age of the LP/HT metamorphism is estimated at ca. 90–100 Ma using the method of electron microprobe based Th-U-Pb dating on monazites. U-Pb dating of zircons by means of LA-SF-ICP-MS method for the Central Granite gave a concordant age of 82 ± 1 Ma. Zircons from three different samples of metagranites were dated at 486 ± 6 Ma, 483 ± 6 Ma and 491 ± 1 Ma, suggesting that most of the metamorphic complex of the MGM represents an Early Ordovician granitic series.

In order to better characterize the different metagranites of the MGM, a geochemical study was carried out. The volumetrically dominant Jelen grad type defines a coarse grained, K-feldspar phyric, S-type granite suite. Fine grained metagranites (Garić-grad type) show the characteristics of A-type magma.

The metamorphic evolution of the MGM was studied on metapelites. From the observed peak paragenesis (Crd-Grt-Kfs) and electron microprobe data it can be concluded that the Cretaceous metamorphism was of the low-pressure type reaching granulite facies conditions of ca. 750 °C and 3–4 kbar. A retrograde metamorphic event, mainly caused by heat and fluid input from the Central Granite, occurred at lower amphibolites facies conditions (500–600 °C, 1–2 kbar).

As yet there are no clear evidences for a Variscan tectonothermal event in the MGM. However, Permian magmatism or anatexis in the lower crust is indicated by inherited Permian zircons in the Central Granite. Relics of Permian monazite found in one sample of metapelite document a Permian phase of metamorphism in the metamorphic series of the MGM.

The high heat flow regime of Cretaceous age is unique in the basement of the Pannonian Basin and may be a local feature triggered by a mafic intrusion in the lower crust.

Petrographic, geochemical and physical methods used for determination of provenance of Czech marbles

Šťastná A. and Přikryl R.

Institute of Geochemistry, Mineralogy and Mineral Resources, Faculty of Science, Charles University in Prague, 12843, Prague, Czech Republic, astastna@gmail.com, prikryl@natur.cuni.cz

A large number of provenance studies have been published since the 1980s dealing with marbles of the Mediterranean area, in which the methodologies and characteristics were examined in detail. However, available data and comparative studies from other areas are still absent. The major aim of this extensive study, which has been started in late 1990s, consisted of distinguishing the different marble types of the Czech Republic by means of petrographic, geochemical and physical criteria. It includes quantitative approaches, comparing the data from the studied quarries with the properties of artefacts, and evaluating the examined methodology for the study of marble provenance. The work is part of an interdisciplinary research project entitled ‘Lithotheque of Czech historical dimension stones’.

The geological situation of the Bohemian Massif (Czech Republic) is very complicated in terms of the various tectonometamorphic and magmatic events that have affected these rocks. The various sedimentary limestones were metamorphosed to form crystalline limestone lenses within metasedimentary rocks, at ages ranging from the Proterozoic to the Lower Palaeozoic. These metamorphosed carbonates were, and still are, of special interest in the production of milled, crushed, and dimension stones worked in the Czech Republic, as well as in some bordering countries.

As the result of the continuing research, the new data were gathered from the southern and western part of the Bohemian Massif. The studied marbles were distinguished with the aid of combinations of following petrographic, geochemical, and physical techniques: optical microscopy, petrographic image analysis, cathodoluminescence, stable isotopic analysis and magnetic susceptibility. Data interpretation has allowed to characterize the marble types on the basis of the mineral assemblage, fabric parameters (carbonate grain size and carbonate grain shapes, index of grain size homogeneity, shape preferred orientation), the fabric of cathodomicrofacies, values of C and O isotope ratios ($\delta^{13}C$, $\delta^{18}O$) and values of the mass specific magnetic susceptibility. This approach has been found to be useful for fingerprinting calcitic, dolomitic and impure marbles, including rocks involved with various degrees of deformation.