(*Bacinella* and *Lithocodium*) and slope (bioclastic). The carbonate platform deposits are covered by the clayey limestones and marls of the Salash Formation of Valanginian to Early Hauterivian age.

The Callovian to Valanginian peri-platform pelagic carbonates were deposited on the northern Tethyan continental margin. In the Western Balkan Unit (Bulgaria) the pelagic record consists of the sediments of the Yavorets, Gintsi and Glozhene formations. Their correlatives in the Stara Planina-Poreć Zone (Serbia) are Kamenica, Pokrovenik and Rosomać formations. These are micritic and clayey nodular pelagic limestones formed in relatively deep basin conditions under quite low rates of sedimentations. Starting from the Late Berriasian, the basinal carbonate accumulation was quickly replaced by hemipelagic alternation of clayey limestones and marls which continued up to the Hauterivian (Salash Formation in western Bulgaria and Ržana Formation in eastern Serbia). Diverse ammonites and planktonic microfossils such as calcareous dinocysts, calcareous nannofossils and calpionellids were applied for detail zonations, stage and substage subdivisions. For the Oxfordian–Valanginian interval twelve calcareous dinocyst zones, five calcareous nannofossil zones and seven calpionellid zones are recorded. In the basin facies six microfacies within the pelagic carbonates are superposed: filamentous, *Globuligerina*-Radiolarian, *Saccocoma*, *Globochaete* and calpionellid and spicule microfacies. Stable sedimentary environment persisted during the whole Late Jurassic. Since the Late Berriasian a clear bathymetrical tendency occurred in the pelagic carbonates from west to east – platform slope, basin and a periphery of flysch trough.

The carbonate platform sedimentation started with the formation of a homoclinal ramp in the Callovian and passed through a rim platform during the early Kimmeridgian. The platform evolution includes three main stages – stepwise progradation, aggradation and retrogradation during the late Kimmeridgian to Valanginian. The phase of platform drowning started in distal portions of the platform. The drowning phases are documented by erosional surfaces, hiatuses and condensed glauconitic beds. The drowning of the platform shows westward youngering from the earliest to Late Valanginian.

Fossilized microorganisms preserved as fluid inclusions in epithermal veins, Vani Mn-Ba deposit, Milos Island, Greece

Ivarsson M.[1], Kilias S.[2], Broman C.[3], Naden J.[4] and Detsi K.[2]

[1]*Department of Paleozoology, Swedish Museum of Natural History, Svante Arrheniusväg 9 Box 5000, 105 05 Stockholm, Sweden, magnus.ivarsson@nrm.se*

[2]*Department of Economic Geology and Geochemistry, Faculty of Geology and Geoenvironment, Panepistimiopolis, Zographou, 15784, Athens, Greece, kilias@geol.uoa.gr*

[3]*Department of Geology and Geochemistry, Stockholm University, Geoscience Building, Svante Arrhenius väg 8C, 106 91 Stockholm, Sweden*

[4]*British Geol Survey, Keyworth NG12 5GG, Notts,U.K.*

Fossilized microorganisms preserved as fluid inclusions are found in barite–silica-Mn oxide veins in the marine rift basin-related Quaternary Mn-Ba deposit of Vani, Milos. Basin fill consists of 35-50 m thick sequence of glauconitic sediments sandwiched between volcaniclastic sandy tuffs, and bedding-parallel barite–Mn oxide(–silica) horizons, pebble horizons, and massive gravel. Exhalative barite-rich deposits characteristic of sea-floor venting, such as white smoker (sulphate) structures in glauconitic sediments, feeder veins, bedding-conformable horizons, and extensive microbial mat- related structures in sandy tuffs, were recognized. The feeder veins host the microfossils and consist chiefly of banded barite and minor colloform quartz, Fe-oxyhydroxides, and hollandite-group minerals and MnO_2 phases, and display epithermal textures characteristic of open-space precipitation. Curvi-linear, branched filamentous microfossils with distinct segmentation of septa and a turgid appearance of knob-like outgrowths occur associated with spheroidal spore-like microfossils and small twisted microstructures. Both filamentous and spheroidal microstructures are filled with aqueous (liquid ± vapour) and/or hydrocarbon phases. Oil and solid hydrocarbons in the fluid inclusions may represent decomposed biological material. Chitin was detected by the pigment Wheat Germ Agglutinin conjugated with Fluorescein Isothiocyanate (WGA-FITC) in

some of the microfossils, indicating that they are fossilized fungi; a fungal interpretation is further supported by microfossil morphology. Smaller, often twisted filamentous microfossils with a simpler morphology in which chitin was not detected probably represent fossilized prokaryotes and, if so, prokaryotes and eukaryotes co-existed in the geothermal system of Vani. Fluid inclusion microthermometry shows that microfossils were trapped at temperatures of ~100°C in boiling water, probably evolved seawater. Preservation of microfossils occurred at shallow sub-marine conditions of <10 m depth. Our results show that fluid inclusions may contain valuable palaeobiological information and can be used both for establishing biogenicity but also for the reconstruction of the palaeoenvironment of fossilized microorganisms.

Structural and geochronological evidence for Palaeogene shearing in the Rhodope Mountains (SW Bulgaria)

Jahn-Awe S.[1], Froitzheim N.[1], Nagel T.J.[1], Frei D.[2], Pleuger J.[3] and Georgiev N.[4]

[1]*Steinmann-Institut, Universität Bonn, Poppelsdorfer Schloss, 53115 Bonn, German, sjahn_awe@yahoo.de*
[2]*GEUS, Øster Voldgade 10, 1350 Copenhagen K, Denmark*
[3]*Geologisches Institut, ETH Zürich, Sonneggstrasse 5, 8092 Zürich, Switzerland*
[4]*Department of Geology and Paleontology, University St. Kliment Ohridski, 15 Tzar Osvoboditel Blv., 1000, Sofia, Bulgaria*

The basement rocks of the Rhodope Metamorphic Province (RMP) in SW Bulgaria and NE Greece belong to a synmetamorphic, eastern Mediterranean nappe stack with layers of continental crust and ophiolites. It has been assembled during a complex history in an Alpine active continental margin realm along the southwestern border of Moesia. During late and post-collisional stages, deeper levels of the nappe stack have been exhumed as metamorphic core complexes along low-angle detachment faults. The late stages of extension were associated with rift basin formation, volcanism, erosion and sedimentation.

On the basis of lithotectonic and palaeogeographic considerations the present-day structure of the RMP can be generally subdivided into a lower, middle and an upper tectonic level. Lower and middle levels are jointed along the top-to-the-SW Nestos shear zone, middle and upper levels probably along the top-to-the-NNW Borovica Shear Zone.

We combine structural, metamorphic and U-Pb zircon geochronological datasets in order to unravel the complex history of the RMP. U-Pb zircon geochronology by LA-SF-ICP-MS was carried out on samples from pegmatite veins and granitoid intrusions from the Rhodope Mountains in Bulgaria.

One study area is a broad profile in the Western Rhodopes. The section cuts the eastern part of the Neogene Struma Graben, the Palaeogene Mesta Graben, the basement of the southern Pirin and western Rhodope Mountains, intrusions therein and extension-related structures (e.g. Strymon Valley Detachment, Ribnovo Low-angle Normal Fault). In the basement, lower (Pangaion-Pirin Complex) and middle (Sidironero-Mesta Unit) levels of the nappe stack are exposed. The main shearing event within the two levels is top-to-the-SW and related to the activity of the Nestos Shear Zone. U-Pb zircon geochronology by LA-SF-ICP-MS was carried out on samples from three granitoid intrusions.

The undeformed and therefore post-tectonic Teshovo (South Pirin) Pluton intruded into the lower level and gives zircon crystallization ages of 32 ± 0.2 Ma. Both the Dolno Dryanovo and Spanchevo plutons intruded into the middle level and are syn-tectonic to the main foliation. Their single-phased magmatic zircons and magmatic rims yield ages of ca. 56 to 55 Ma, whereas inherited cores display ages of ca. 143 to 145 Ma. Variscan zircons, which are typical for basement rocks from the Pangaion-Pirin Complex, are not present in samples from the Spanchevo and Dolno Dryanovo plutons. These results indicate that at ca. 56 to 55 Ma the Sidironero-Mesta Unit was not yet placed upon the Pangaion-Pirin Complex. Therefore, the southwest directed thrusting of the middle level over the lower level took place between ca. 56 to 55 Ma and ca. 32 Ma.

The second study area is situated in the eastern part of the Central Rhodopes in Bulgaria. Rocks from the lower tectonic level (Arda Unit) are overlain by rocks from the