tectonics, from the Oligocene post-collision, which dominated in the Dinarides, to the Miocene extension, occurring predominantly within the Pannonian/Intra-Carpathian area, may be reconciled.

In this context, granitoid rocks of Mt. Bukulja show characteristics that should be linked to specific geodynamics: (1) it is situated at the very southern margin of the Pannonian Basin, (2) it is characterized by Neogene peraluminous granitic rocks, and (3) it shows Nb-Ta-Sn metalogenetic features. Therewith, they differ from the widespread plutono-volcano-plutonic provinces in Serbia, which are dominated by Late Oligocene, mostly calc-alkaline igneous rocks related to Pb/Zn±Ag±Sb metallogeny.

The granitic mass of Mt. Bukulja crops out about 60 km southern of Belgrade as an E-W laccolite-shaped igneous body covering an area of about 40 km^2. It is concordantly intruded into low-grade metamorphosed Devonian/Carboniferous schists in the West and into Cretaceous sandy marbles, clay sandstones and limestones in the East.

The bulk of the granitoid mass is represented by medium-grained to slightly porphyritic, slightly peraluminous two-mica granite (TMG). Metaluminous hornblende-biotite and biotite-bearing (H-BG) granite and rare aplitic granite are subordinate, and the former occur as patches or enclaves of various dimensions (from several decimeters to several tens of meters) or as isolated outcrops within deep creeks. The available radiometric age suggests that TMG was emplaced around 20 Ma whereas the age of H-BG is inadequately constrained. A lamprophyre dyke (BLD) similar in composition and age to other Serbian primitive minettes with a K/Ar age of 26 Ma has been found in the vicinity of Mt. Bukulja. TMG and H-BG show similar petrographic characteristics but the evidence of magma interaction processes are found only in H-BG. In comparison to H-BG, TMG are less enriched in most trace elements including REE and have a more fractionated REE-pattern and higher Eu-anomaly. TMG display a wider range of initial Sr-Nd isotope ratios normalized on 20 Ma ($^{87}Sr/^{86}Sr_i$=0.70652-0.71368 and $^{143}Nd/^{144}Nd_i$=0.51223-0.51283) than do H-BG ($^{87}Sr/^{86}Sr_i$=0.70768-0.70781 and $^{143}Nd/^{144}Nd_i$=0.51242-0.51256). Geochemical modelling suggests that H-BG could have derived from a BLD-like melt by mixing plus fractionation processes assuming a batch of TMG-like magma as the acid end-member. On the other hand, the geochemical variability of TMG is reproduced by an AFC model with assimilation/fractionation ratio r=0.5 and with high amount of crustal component (~20-50 %) starting from the least evolved TMG rocks. In the modelling, the average composition of the least evolved TMG samples were used to represent parental magma composition whereas the composition of adjacent metamorphic rocks was adopted as possible contaminant. The composition of the least evolved TMG implies that TMG parental magma likely originated by melting of a mafic lithology such as earlier basalts underplating in the lower crust. The high proportions of assimilation along with other geochemical and geological evidence suggest that the Mt. Bukulja TMG originated within the same geotectonic setting as acid volcanics of the north Pannonian Basin. The results of this study support the hypothesis that the Mt. Bukulja pluton is related to tectonomagmatic events controlled by the early extensional phases in the opening of the Pannonian basin.

Hydrothermal methane fluxes from the soil at Sousaki (Greece)

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Methane soil flux measurements have been made in 38 sites at the geothermal system of Sousaki (Greece) with the closed chamber method. Fluxes range from –47.6 to 29,150 mg m-2 d-1 and the diffuse CH_4 output of the system has been estimated in 19 t/a. Contemporaneous CO_2 flux measurements showed a fair positive correlation between CO_2 and CH_4 fluxes but the flux ratio evidenced methanotrophic activity within the soil. Laboratory CH_4 consumption experiments confirmed the presence of methanotrophic microorganisms in soil samples collected at Sousaki. These results further confirm recent studies on other geothermal systems that revealed the existence of thermophilic and acidophilic bacteria exerting methanotrophic activity also in hot and acid soils thereby reducing methane emissions to the atmosphere.

A multi-source provenance for Eocene-Oligocene turbidites in the southern Thrace Basin

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The Thrace Basin (Turkey and Greece) is located between the Rhodope-Strandja Massif to the northwest, the Marmara Sea and Biga Peninsula to the south and the Black Sea to the east. It consists of a complex system of depocenters and uplifts with very articulate paleotopography indicated by abrupt lateral facies variations. Most of the basin fill ranges from the Eocene to the Late Oligocene and consists mainly of turbiditic deposits with a significant volcaniclastic component, evolving upwards to shelf and continental deposits.

Sediment source areas and paleodispersal pattern of the southern Thrace Basin were determined by studying framework and heavy-mineral compositions of arenite samples (78 samples for framework composition and 40 samples for heavy minerals). Samples were collected at six localities, which are from west to east: Gökçeada, Gallipoli and South-Ganos (south of Ganos Fault), Alexandroupolis, Korudağ and North-Ganos (north of Ganos Fault). The Thrace Basin fill is made mainly of lithic arkoses and arkosic litharenites with variable amount of low-grade metamorphic lithics (also ophiolitic), neovolcanic lithics, and carbonate grains (mainly extrabasinal). Picotite is the most widespread heavy mineral in all petrofacies.

The average values and distribution of several petrographic parameters discriminate six petrofacies. These parameters are: Q+F/NCE+CE (occurrence of granitic rocks in source area), OF/L (total of ophiolitic rock fragments), F+S/L (amount of metamorphic lithics), CE/L (quantity of carbonate extrabasinal grains), NEOV/NCE (presence of neovolcanic component, both single grains and lithics), CI/L (total carbonate intrabasinal grains), and the amount of the four principal heavy minerals (picotite, sphene, glaucophane and epidote groups).

Integration of the petrographic dataset (gross and heavy mineral composition) with stratigraphic analyses and paleocurrent measurements points to a complex sediment dispersal pattern in the southern Thrace Basin during Eocene-Oligocene times. The main sediment source area was located to the south, including the region of the İzmir-Ankara suture and another poorly dated suture located in the Biga Peninsula. Detrital input from this source area is characterized by the abundance of picotite and ophiolites with low-grade metamorphic rock fragments and extrabasinal carbonate grains. A possible secondary source area is represented by the Rhodope Massif to the west. Detritus possibly derived from this area is characterized by picotite with plutonic and metamorphic rocks. Such Rhodopian provenance, although quantitatively subordinate in the study area, seems to have played a significant role in providing detritus to the central and northern sectors of the basin. An important penecontemporaneous volcanic component is widespread in late Eocene-Oligocene times, indicating widespread post-collisional (collapse?) volcanism following the closure of the Vardar-Izmir-Ankara ocean.

In summary, the most important source area for the sediment of Thrace Basin in the study area was represented by the exhumed subduction-accretion complex along the southern margin of the basin (Biga Peninsula and western-central Marmara Sea region). Most measured paleocurrent indicators show an eastward paleoflow but this is most likely the result of gravity flow deflection. This is possible considering the strong control of the east-west-trending synsedimentary transcurrent faults which cut the Thrace Basin, generating a series of depocenters and uplifts, which deeply influenced sediment dispersal and the areal distribution of paleoenvironments.