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ABSTRACTS

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Institute of Nuclear Research, Hungarian Academy of Sciences, involved 27 sites within 17 separate intrusive bodies. The dating was carried out on whole rock, groundmass, and monomineral (amphibole, feldspar) fractions. Most of the K-Ar ages ranged between c. 13.5 and c. 11 Ma, indicating that the intrusive activity took place during the Sarmatian (Late Miocene). The first- and the second-phase intrusions did not differ much in their radiometric ages.

Petrographical, mineralogical and geochemical studies were performed at the Department of Earth Sciences, University of Parma. The studied rocks have been classified using combined chemical (Total Alkalis and K_2O vs. Silica diagrams) and mineralogical criteria as most of these rocks show clear signs of having suffered variable degrees of alteration. They consist of basaltic andesites and andesites belonging to the calc-alkaline series. On the basis of K_2O vs. Silica diagram, they are best termed high-K basaltic andesites (HKBA) and medium-K andesites (MKA). The MKA rocks could have been generated by fractionation of *pl. amph* and *bt*,

starting from a magma compositionally similar to the rocks of the 1st phase HKBA intrusions. Due to the lack of a relatively primitive composition among the most primitive HKBA rocks investigated, it is difficult to characterize the geochemistry of the mantle source of the Pieniny magmas. All the studied rocks show major and trace elements characteristics within the range of subduction- to collision-related magmas and display multi-element patterns with positive LILE (e.g., K, Rb, Ba) anomalies in respect to the HFSE (Nb, Ta) characteristics of subduction-related magmas. The LILE enrichment could reflect either a contemporaneous contribution from a subducted slab or it could be a specific feature of the mantle wedge acquired during previous enrichment events. Furthermore, strong Pb positive anomaly observed in the HKBA rocks from the Pieniny Mts, suggests that a continental crust-derived component had been involved in their petrogenesis.

POSTER

Tertiary volcanic activity in the Inner Dinarides (Republic of Macedonia)

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During the Tertiary, from the Eocene to the Pliocene, granodiorite masses intruded and extruded on the surface along some tectonic zones. The evolution of this magmatism was reported first by ILIĆ (1962), and later presented in detail by KARAMATA (1962), KARAMATA and DJORDJEVIĆ (1980). ANTONOVIĆ and FILIPOVIĆ (1977) reported the major geochemical features of this magmatism. Individual area were shown in detail by BOEV (1988).

The Tertiary magmatism in the Dinarides, the Vardar zone and the Serbo-Macedonian mass took place after closure of the Mesozoic ocean basin. This closure is a result of the exposure of the Dinaride microslab and the Carpatho-Balkanide block with the Serbo-Macedonian mass and collision between these continental segments (DIMITRIJEVIĆ, 1974; KARAMATA, 1975, 1981). The subduction process during the Middle and Upper Jurassic was followed by calc-alkaline magmatism during the Middle and Upper Cretaceous. Further continental collision resulted in thickening of the continental crust and intrusion into the upper envelope as well as isostatic uplifting. Discontinued compression resulted in temporal melting of basal parts of the

continental crust with variable admixtures of material from the upper envelope. These pulsations and tectonomagmatic activities took place many times during the Oligocene, the Miocene and the Pliocene. Magmatites are distributed into separate areas, most common in the middle parts of the arch-dome structures and generally built volcano-plutonic belts. These granodiorite to quartzmonzonite magmas built intrusive rocks of various size and very large to small size volcanic complexes. Rock types found on the surface are result of upliftings of individual tectonic blocks as well as the intensity of erosion. Nevertheless, all complexes can be considered as volcano plutonic in which erosion either revealed deep intrusive parts or preserved volcanic complex in some places. Generally, these rocks occur in two belts which join at their middle parts (in the area of Mt. Kopaonik) and separate towards north and north-west and south-south-east. It should be mentioned that the two belts are not related to one geologic unit; they are located on both sides of the ophiolite belt and that they cut the geotectonic units of the Balkan peninsula - the Dinarides, the Vardar zone and the Serbo-Macedonian mass with a slight slope.

Description of individual occurrences of the Tertiary age are determined in the following sites:

- in the vicinity of Maglaj (in Bosnia) there is an occurrence of small subvolcanic bodies represented by andesites and dacites which comprise the western-most parts of this magnetic activity;

- in the district of Boranje and Srebrenica there is an occurrence of intrusive rocks with granodiorite feature which comprise the so called Boranje granodiorite massive with an occurrence of volcanic rocks round it represented by andesites, dacites and quartzlatites in the northern and south-eastern parts as well as dacites, andesites and quartzlatites in the vicinity of Srebrenica;

- in the district of Golija there is an occurrence of intrusive rocks with granodioritic and quartzmonzonitic as well as an occurrence of volcanic and subvolcanic dacitic and quartzlatitic bodies;

- in the vicinity of Belgrade, on Mt. Avala, there is an occurrence of vein rocks represented by granodioritic porphyry and quartzmonzonite porphyry;

- in the district of Kosmaj the magmatic activity is represented by intrusive bodies of quartzmonzonitic nature as well as small occurrences of dacitic and rhyolitic subvolcanic-volcanic rocks;

- in the area of Rudnik and Šumadija the Tertiary magmatic activity is represented by subvolcanic and volcanic occurrences of dacites, andesites and quartzlatites and in some places there are occurrences of vein rocks found as granodiorite porphyry;

- in the Kotlenik district this magmatic activity is represented by as volcanic rocks of andesitic, dacitic and quartzlatitic composition as well as large amounts of volcanoclastic rocks;

- there is an occurrence of intrusive rocks of granodioritic feature in the area of Zeljin. In the Polumir site, west of Zeljin there is an occurrence of a granodiorite body which, based on available knowledge, is a youngest intrusive rock in this zone of the Tertiary magmatic activity;

- there are occurrences of intrusive rocks of granodioritic feature in the vicinity of granodioritic features in the vicinity of Drenska Klisura close to Jošanička Banja;

- the areas of Mt. Kopaonik and the Ibarska Dolina is a large volcano-intrusive complex in which intrusive facies are represented by granodiorites, whereas volcanic and subvolcanic facies by andesites and dacites, quartzlatites and latites. In some places there are occurrences of vein facies found as granodiorite porphyry;

- magmatic activity in the Rogozna area is represented by volcanic facies built of latites, dacites, quartzlatites and ignimbrites. The northern part of the volcanic complex was cut across by vein rocks represented by granodiorite porphyry;

- the Lece and Radan districts is a large stratovolcano built mainly of andesites and volcanoclasts with occasional

occurrences of dacites in some places;

- in the Surdulica-Besna Kobila area there is an occurrence of granodiorite rocks which comprise a large massive in the northern rim of which dacitic volcanic rocks can be found;

- there is a 100 km long occurrence of subvolcanic-volcanic rocks present as dacites, quartzlatites and rhyolites in the Sasa and Osogovo areas;

- the Kratovo-Zletovo area is a large volcanic area built of thick packages of volcanic lavas, ignimbrites and pyroclasts of intermediary features (latitic-dacitic-andesitic). In individual parts of the complex there are occurrences of intrusive rocks present as quartzmonzonites and monzonites (the Pantelej site in the southern parts of the area);

- the Tertiary magmatic activity in the Bucin- Borov Dol area is represented by subvolcanic- volcanic facies present as trachyandesites, latites, trachy-rhyolites and quartzites in some places. There are occurrences of vein rocks present as granodiorite porphyry in individual parts;

- in the are of Strumica, Dojran and further on in Greece to Chalkidiki there are numerous occurrences of volcanic subvolcanic rocks present as dacites, latites and trachyrhyolites as well as occurrences of intrusive rocks in some sites (the Pontokerasia site). There is an occurrence of large masses of intrusive rocks present as granodiorites granodiorites and quartzmonzonites in the Chalkidiki (Sitonia) district;

- the Kožuf area is a large volcanic complex basically built of latites, quartzlatites, trachytes and trachyrhyolites as well as large volcanoclastic masses.

It should be mentioned that in individual sites there are occurrences of basic rocks of the Tertiary age. There are occurrences of leucite-trachyte rocks in the Gnjilane area, along the western rim of the Kratovo-Zletovo area, west of Bučim, in the Demir Kapija district and some other places.

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Application of satellite geodesy in the determination of recent tectonic movements in the Dinarides

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On the basis of highly accurate GPS-measurements in the geodynamic network CRODYN, by applying deformation theory, the geodetic model of recent tectonic movements has been established. This model was then compared with geological model of tectonic movements in which the movement of the Adriatic microplate in the direction north-northwest and the resistance of the Dinaric Alps to these movements play an important role.

The input data for the establishment of the geodetic model were the differences of ellipsoidal coordinates adjustment of 19 mutual points observed in two GPS campaigns; CRODYN 94 and CRODYN 96. The model

encompasses GPS points in Croatia and Slovenia placed in the area between 42.4 and 46.4 degrees of the northern latitude and 13.6 to 17.6 of the eastern longitude.

The results of analytical surface deformation analysis indicate the zones of various deformations in the test area. The zones of extension and of compression have been discovered. The geological findings about the tectonic movements of the Adriatic microplate confirm completely the existence of these zones in this area. Compression zones can be recognised by reverse movements and explicit tectonic activity, i.e. the epicentres of the strongest earthquakes are located in this areas.

POSTER

Albian-Cenomanian arenites overlying Dinaric platform carbonates contain detritus derived from continental and ophiolitic rocks

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Albian-Cenomanian sediments of the inner marginal portion of carbonate Dinarides in northwestern Croatia are represented by turbidites and pelagites (BABIĆ, 1974). These sediments are the oldest clastics associated with carbonates of the NE platform margin. We have studied heavy-mineral associations and non-carbonate particle composition from Albian-Cenomanian arenites in order to obtain data on relevant source rocks.

The heavy mineral associations are highly dominated by the ultrastable mineral group, i.e. zircon, tourmaline and rutile. However, there is an important proportion of chromspinel mineral grains making 6 to 24%. Non-carbonate particles studied in thin-sections included dominant lithoclasts of low-grade metamorphics, and subordinate lithoclasts of sediments, volcanics, mafic/ultramafic rocks.

The combination of heavy mineral association,