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Petrology and geochronology of Vran Kamak paleovolcano, Central Srednogorie, Bulgaria

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Vran Kamak paleovolcano is formed during the Upper Cretaceous igneous activity along the Panagyurishte strip of Central Srednogorie Zone, Bulgaria, part of the magmatic-metallogenic arc belt Apuseni-Banat-Timok-Srednogorie. It represents a comparatively well-preserved, eroded stratovolcano built of epiclastics, pyroclastics and lava flow (with typical hyaloclastite and peperite formation) succession surrounded by marine environment, as only a part from the volcanic cone was over the sea level. The central (conduit) parts of the paleovolcano are intruded by a volcanic neck in the area of Vran Kamak summit. The volcanic activity was accompanied by sedimentary gravity flows and volcanoclastic debris is dispersed in the Late Cretaceous basin. The present study provides new petrological and geochronological data for Vran Kamak paleovolcano.

The analyzed samples from the lava flows show basaltic andesite to andesite composition with SiO₂ contents ranging from 51 to 55.5 wt %, while the volcanic neck of the Vran Kamak summit is trachydacite (SiO₂ of 61.54 wt %). The rocks are medium- to high-K calc-alkaline. On a primitive-mantle normalized diagram, the rocks show peaks in LILE (U, Th, Pb) and troughs in Nb, Ta, Ti and P. Weak negative Eu anomaly (0.83–0.94) and La_N/Yb_N (10 to 13) are observed. Fractionation of mafic minerals (amphibole and pyroxene) and plagioclase is visible on the harker diagrams. The ⁸⁷Sr/⁸⁶Sr_(t) ratio of 0.705141 from the volcanic neck shows small degree of crustal assimilation.

The basaltic andesite to andesite lava flows are built of plagioclase (with normal oscillatory zoning, bytownite-labrador, An₈₈₋₅₆), amphibole (tschermakite to magnesiohastingsite) and pyroxenes (mostly augite and rare small enstatite crystals embedded in them). Some of the clinopyroxenes form corona texture around the amphibole, showing processes of dewatering. The trachydacite neck is built of porphyries of plagioclase, sanidine, biotite, amphibole (magnesiohornblende to thermakite), magmatically corroded quartz and accessories of zircon, apatite and magnetite set in a fine-grained groundmass. The calculated depths of crystallization and temperatures of the hornblende from the lava flows are 17–22 km and 930–970 °C and that from the neck are 5.9–7 km and 800–830 °C, that give evidence for a complex volcano-plutonic system.

An attempt for LA-ICPMS U-Pb zircon dating of one the lava flows is made, but it contains only xenocrysts which fall in several age intervals: 306–314 Ma, 440–450 Ma, 520–530 Ma, 560–614 Ma,

810–830 Ma which represent inherited and recycled component from the local basement. This lava flow has a peperitic contact with sediments faunistically dated at the Turonian/Coniacian boundary (*Cremnoceramus deformis erectus*, Vangelov et al., 2019). The zircon population of the trachydacite neck is presented mostly by own magmatic grown crystals giving a Concordia age of 91.12 ± 0.43 Ma.

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References:

Vangelov, D., Gerdjikov, I., Dochev, D., Dotseva, Z., Velez, S., Dinev, Y., Trayanova, D., Dancheva, J. 2019. Upper Cretaceous lithostratigraphy of the Panagyurishte strip (Central Bulgaria) – part of the Late Cretaceous Apuseni-Banat-Timok-Srednogorie magmatic belt. – *Geol Balc.*, 48, 3, 11–33.