Hornblende and phlogopite-bearing ultramafic cumulates: Evidence for subduction-related ultramafic magmatism in the Eastern Pontides, Amasya Area, NE Turkey,

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Northern part of the Eastern Pontide Orogenic Belt is charecterized by the Upper Cretaceous TH-CA magmatic arc volcanics and granitic rocks. Hercynian basement of eastern Pontides (Pulur, Agvanis and Tokat massifes), phlogopite and hornblende-bearing mafic-ultramafic intrusions and Upper Cretaceous shoshonitic volcanics are exposed in the southern part. Further south (back-arc basin), mantle peridotites and olistostromal ophiolitic melange of the Middle and Upper Cretaceous are widespread. This study focuses on the petrology, geotectonic setting and time of emplacement of the phlogopite and hornblende-bearing ultramafic intrusions in the Tokat massif. Similar intrusions are also found in the Pulur and Agvanis massifes.

Smaller and roughly elliptical ultramafic intrusions were intruded into Paleozoic Amasya metamorphic assemblage of the Tokat massif or into Triassic (?) metagabbros. Contact metamorphism and forcefull injection traces in the wall rocks are observed. All of intrusions consist of lherzolites with cumulus texture. Essential cumulus mineral is serpentinized olivine. Intercumulus minerals consist of clinopyroxene (Wo_{45-52}, En_{40-48}, Fe_{5-12}) hornblende, phologopite and extremely rare plagioclase. This crystallization sequence in the ultramafic intrusions in the southern part of eastern Pontides suggest that they are derived from a high-Al hydrous basaltic parental magma. Lherzolites are slightly enriched in LREE and HFSE with respect to primitive mantle and show positive Eu and negative Nb anomalies. Geological, geochemical and petrological characteristics suggest that these rocks which previously thought to be a part of oceanic lithosphere are actually ultramafic cumulates of root zone of Eastern Pontide Magmatic Arc.

Isotopic investigations on the magmatism in Eastern Srednogorie

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Most of the major porphyry-copper deposits in SE Europe are concentrated in the Carpathian-Balkan region. They are genetically related to a narrow 1000 km long belt of Upper Cretaceous calc-alkaline magmatic rocks. This belt extends from southern Romania through eastern Serbia and across Bulgaria and is known as Apuseni-Banat-Timok-Srednogorie (ABTS) magmatic and metallogenic belt. Its tectonic evolution is related to the subduction of the former Tethys ocean beneath the European continental margin during the Upper Cretaceous, but the complex regional geodynamic evolution is not well reconstructed. Detailed research is being done for the Central Srednogorie part of the ABTS belt. Results obtained for all major magmatic centers show an across-arc north to south migration of magmatism with an increasing contribution of mantle-derived material in the same direction, interpreted to be a consequence of southward retreat of a north-dipping oblique subduction zone (von Quadt et al., in press). The overall time span of the magmatism is about 14 Ma (92.1-78.54).

The Eastern Srednogorie Zone (ESZ) occupies the easternmost part of the ABTS belt and possesses specific features in terms of tectonics, magmatism and metallogeny. We present preliminary U-Pb single zircon ages for the Izgrev and Granitovo intrusions in the southern part of the ESZ. Concordant ages range from ca. 81 to 78 Ma. U-Pb zircon data reveal some old lead components of 460 Ma. The initial $^{87}Sr/^{86}Sr$ whole-rock ratios range from 0.7043461 to 0.7086206 and reveal a mixed crust and mantle source for the magmatic rocks. The initial εHf values for some of the dated single zircon grains vary from + 6.33 to + 7.11. The εHf values of the zircons with old lead component ranges from +0.71 to –0.67. These data together with additional age, isotopic and geochemical data will increase our understanding of the geodynamic evolution along as well as across the ABTS belt in the context of alpine orogeny.

Reference

von Quadt A., Moritz R., Peytcheva I., Heinrich, Ch., (2005). *Ore Geology Reviews* (in press).