European Mineralogical Conference
Vol. 1, EMC2012-123, 2012
European Mineralogical Conference 2012

P-T pseudosections from Tisia Mega-Unit metamorphic rocks exposed along the Kutjevačka Rijeka transect (Mt. Papuk, Croatia)

D. Balen (1) and P. Horváth (2)

(1) University of Zagreb, Institute of Mineralogy and Petrology, Department of Geology, Zagreb, Croatia (drbalen@geol.pmf.hr, +38514605998), (2) MOL Plc Exploration & Production Division, Reservoir & Technology Engineering, Hungary

The metamorphic rocks of the Slavonian Mountains (Mts. Psunj, Papuk and Krndija in Croatia) outcropping in the SW edge of Pannonian Basin (PB) belong to the Tisia Mega-Unit. This large tectonic unit represents the south-eastern part of PB basement with complex internal structure which encompasses three huge southward dipping Alpine nappe systems; each comprising crystalline basement rocks and post-Variscan overstep sequences. This study is focused on the metamorphic complexes of the central nappe system (i.e. Bihor) outcropping along the Kutjevačka Rijeka transect. The transect, 5.5 km long, trending NNW–SSE, is one of the most prominent geological sections in the Mt. Papuk area exposing (1) Ordovician to Silurian greenschist to medium-grade Psunj (Kutjevo) Complex (PsC), (2) (very) low-grade Hercynian Semimetamorphic Complex (HSC) and (3) the clastic-carbonate succession of Upper Permian and Triassic age.

The chloritoid schists, representing a very rare and peculiar lithology in the area, were set through various interpretations as (a) upper level of PsC which continuously grade into greenschist and amphibolite facies rocks, (b) part of separate narrow zone presumably of Upper Devonian age and (c) the basal part of HSC in unconformable contact with the older Paleozoic rocks. The aim of this preliminary communication is to clarify the position of the chloritoid schists in respect to other rock types from the transect using pseudosection modelling (THERMOCALC v. 3.33 software) and extraction of P-T data.

The simple peak metamorphic mineral assemblages allow the use of KFMASH model system for the chloritoid-bearing schists containing white mica + chlorite + chloritoid (10-15 vol. %) + quartz and PsC chlorite schists (chlorite + plagioclase + muscovite + quartz). Peak metamorphic conditions for chloritoid-bearing schists reached 3.5-4 kbar and 340-380 ºC, based on conventional thermobarometry and intersection of mineral isopleths in the quantitative phase diagrams, while P-T data for chlorite schists are not well constrained (<480 °C; <8 kbar).

Amphibolites (amphibole + plagioclase + garnet + quartz), paragneisses (biotite + plagioclase + garnet + amphibole + quartz) and garnet-bearing micaschists (biotite + muscovite + plagioclase + garnet + quartz) of PsC are modelled in the NCFMASH, NCKFMASH and NCKMnFMASH systems, respectively. Quantitative phase diagrams reveal that the peak assemblage of micaschists formed at conditions of 600–660 °C and 11–12 kbar - calculated using garnet isopleths and mineral thermobarometry. The paragneisses and amphibolites provide similar P–T information for the peak event (ca. 650 °C, 10–12 kbar).

The P-T data presented here show that chloritoid schists resemble more to the HSC lithologies. Additionally, differences in obtained pressures and temperatures for greenschist and amphibolite facies parts of PsC question the continuous transition from one to the other, implying 1) a tectonic contact between them, 2) lack of certain part of the transect or 3) a distinct tectono-metamorphic evolution for those two parts.