

ECLOGITE FACIES RELICS IN THE METABASITES OF THE WESTERN CARPATHIANS

JANÁK, M.¹, LUPTÁK, B.¹ & MÉRES, Š.²

¹Geological Institute, Slovak Academy of Sciences, Dúbravská 9, P.O. Box 106, 840 05 Bratislava 45, Slovakia

²Department of Geochemistry, Comenius University, Mlynská dolina G, 84215 Bratislava, Slovakia
e-mail: geolmjan@savbask

High-pressure, true eclogite facies rocks have previously been unknown in the Western Carpathians. However, microtextures indicating former eclogite facies stage (symplectites, kelyphites and coronas due to a breakdown of primary omphacite) have been observed in the amphibolite facies metabasites. The recent finding of omphacite (JANÁK et al., 2003) has definitely confirmed the existence of eclogite facies metamorphism in the Western Carpathians.

These rocks occur in the eastern part of the Nízke Tatry Mountains, in the Koleso valley, ca. 8 - 9 km northwards of Hel'pa. Relicts of eclogites form lenses and boudins in amphibolites and metagabbros. Other country rocks of eclogites are kyanite-bearing gneisses yielding an Ordovician (~ 470 Ma) age of the protolith, and Variscan (~ 340 Ma) age of recrystallization. All these rocks belong to the pre-Mesozoic basement complexes of the Veporic unit in the Central Western Carpathians.

High-pressure, eclogite facies assemblage in the metabasites is omphacite + garnet + phengite + rutile + quartz + zoisite ± amphibole. Omphacite occurs as inclusions in garnet, attaining the size of less than 10 µm. Omphacite composition depends on bulk rock chemistry. In Fe-rich samples omphacite contains up to 40 mole% of jadeite. Garnet is poikiloblastic with inclusions of quartz, zoisite, clinopyroxene, amphibole and rutile as primary assemblage of the eclogite facies. Phengite contains up to 3.4 Si p.f.u. Secondary phases occur in the coronas, symplectites and fractures. The most typical is clinopyroxene (diopside) with 10 - 20 % of jadeite content, forming the symplectites with plagioclase and amphibole after primary clinopyroxene (omphacite). Biotite, often as symplectite with plagioclase, occurs after primary phengite. These minerals formed at lower pressure, due to retrogression under amphibolite facies conditions. Results obtained from geothermometry and geobarometry on eclogite facies assemblage (garnet + omphacite + phengite) suggest a pressure of 2.3 - 2.7 GPa at temperatures ranging from 650 - 730 °C, well within the stability field of eclogite facies.

Eclogite facies metamorphism in the Western Carpathians is deduced to be Variscan, resulting from northwards migration and initial collision of continental blocks drifted from the northern margin of Gondwana with Laurussia. Eclogites in the Western Carpathians may therefore trace remnants of Variscan subduction zone in the lateral prolongation of the Intra-Alpine basement areas of the Alps (mainly Austroalpine units), further east of the Bohemian Massif and other Armorican terranes.

Reference

JANÁK, M., MÉRES, Š. & IVAN, P. (2003): Journal of the Czech Geological Society, 48, 69-70.