PETROGRAPHY AND GEOCHEMISTRY OF ECLOGITE PEBBLES FROM PLEISTOCENE CONGLOMERATES AT DUNAVARSÁNY, HUNGARY

HORVÁTH, P [1], JÓZSA, S.[2] & SZAKMÁNY, G.[2]

[1]Institute for Geochemical Research, Hungarian Academy of Sciences, Budaörsi út 45, 1112 Budapest, Hungary
[2]Department of Petrology & Geochemistry, Eötvös University, Pázmány P sétány 1/C, 1117 Budapest, Hungary
e-mail: phorvath@geochem.hu

Eclogite pebbles have been found in the Upper Pleistocene gravel load of the Palaeo Danube at Délegyháza, 15 km south of Budapest (Hungary). The gravel load contains a wide variety of pebbles of igneous, sedimentary, and metamorphic origin. Provenance of most rock types is unclear (i.e. limestones, tourmaline- and garnet-bearing granitoids, amphibolites, granulites and eclogites). The gravel is very polymict; the roundness of the pebbles ranges from well-rounded to angular types, and their size is between 20 mm to 200 mm.

Eclogite gravels are usually elongated and well rounded. Reddish brown garnets (1 - 4 mm in size) with dark rims give 20 - 30 volume % of the whole rock. Groundmass is slightly schistose and consists of fine-grained acicular amphiboles and plagioclases with colour ranging from white to dark green. Subhedral, porphyroblastic garnets have cores full of inclusions such as quartz, rutile, zoisite and rare omphacite with a jadeite content of 44 – 48 %. Garnets have homogenous composition, but show variations between the analyzed samples. They exhibit multiple replacement textures: 1. (sometimes resorbed) kelyphytic rims made of hornblende; 2. Si-poor hornblende (SiO_2 less than 40 wt.%), plagioclase (An 46 – 47 %) and magnetite. This assemblage show radial textures growing from the rims into the interior of garnet grains. These zones contain spinel-anorthite inclusion assemblages possibly formed after kyanite. Similar assemblages were found in the matrix. Kyanites are also replaced by spinel-corundum-anorthite-zoisite assemblage. Where kyanite was found as a stable phase, margarite and zoisite formed concentric rims on them with margarite forming the inner rim. Plagioclase broke down to zoisite and paragonite-margarite, while plagioclase and kyanite - when found together broke down to margarite and zoisite. The matrix consists of hornblende-plagioclase symplectites, in rare occasions relic diopsidic clinopyroxenes were also found. Clinopyroxene coronas developed around matrix quartz grains. Large actinolites overgrow the matrix.

Garnet-omphacite pairs yield 660 - 750 °C near garnet rims and 560 - 590 °C for the inner parts of garnet, minimum pressure is estimated around 15 - 17 kbar. P-T pseudosection calculations were performed for elucidating the P-T peak conditions of the studied eclogites. The peak assemblage (Grt – Omp – Ky - Qtz ± Zo) formed at 660 - 800 °C and over 17 kbar; we obtained the same P-T conditions for the peak assemblage Grt – Omp Qtz in Ky-free samples.

Although eclogites and other metamorphics (i.e. granulites) found in the locality are known in the Bohemian Massif 300 - 400 km upstream, their low resistance to attrition excludes or questions the possibility that the pebbles originated from there. We suggest that they were reworked from Lower Miocene conglomerates, synchronous with the birth of the Pannonian Basin.