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The modal mantle metasomatism in the NE part of the Cenozoic Central European Volcanic Province: the example of the Wołek basanite (SW Poland)

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The Cenozoic lava occurrences in SW Poland belong to the Central European Volcanic Province (CEVP). In some of them (ca.10) mantle xenoliths were recognized. Most of xenoliths show no signs of modal metasomatism (Blusztajn and Shimizu 1994, Matusiak-Małek et al. 2010, Puziewicz et al. 2011). One of the rare exposures with amphibole-bearing peridotite xenoliths in SW Poland is the Wołek Hill basanite. It is located about 100 km south-west of Wrocław (Nowak et al. 2010) in the Złotoryja volcanic field (Matusiak-Małek et al. 2010).

Peridotite xenoliths from Wołek (<1 to ca. 25 cm in diameter) are mostly spinel harzburgites (30 over 35 studied xenoliths), the others are: 2 dunites, 1 dunite with clinopyroxenite veins, 1 cpx-rich dunite, and 1 ol-rich wehrlite.

Amphibole was recognized in five xenoliths, and its amount is lower than 5 % vol (Nowak et al. 2010). It also occurs as 1-6 cm megacrysts (Nowak et al. 2010). In three xenoliths some rare phlogopites were observed (in particular close to clinopyroxenite vein).

Coexisting amphibole and clinopyroxene display enriched REE patterns, similar to other Polish localities (Blusztajn and Shimizu 1994), whereas clinopyroxene from xenoliths without amphibole shows spoon-like REE patterns and is enriched in Ba.

The $^{87}Sr/^{86}Sr$ (0.703154-0.703256) and $^{143}Nd/^{144}Nd$ (0.512898-0.512930) isotopic ratios from Cpx separates and Amph megacrysts are similar to those of the Cenozoic lavas from the Złotoryja volcanic field. The isotopic ratios from Amph separate are enriched in strontium at the expense of neodymium ($^{87}Sr/^{86}Sr$=0.703413 and $^{143}Nd/^{144}Nd$= 0.512897), and correspond to data from host-rock basanite.

The metasomatism in the Polish part of the CEVP lithosphere is mainly related to the circulation of dry alkaline melts (Puziewicz et al. 2011). Modal metasomatism occurring in the Wołek Hill xenoliths evidences that some of the magmas/fluids involved in the metasomatism had to be carbonatitic or CO_2-rich. Until now, similar Cpx MREE compositions, in Polish part of CEVP, were observed only in the Lądek-Lutynia area (Blusztajn and Shimizu 1994, Matusiak-Małek et al. 2010).

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