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Mantle peridotite and cumulate xenoliths from Steinberg (Upper Lusatia, SE Germany): preliminary data

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The Steinberg quarry is located about 2 km to the west of Ostritz village, ca 15 km to the south of Görlitz in Lusatian part of Saxony (Germany). The basanite occurring in the quarry contains locally numerous peridotite xenoliths of size not exceeding 8 cm.

Two kinds of peridotite occur in xenoliths from Steinberg. The peridotite I has a protogranular texture. It consists of olivine (88.9 – 91.4 % Fo), orthopyroxene (mg# 0.89 – 0.92) , clinopyroxene (mg# 0.92 – 0.94) and spinel (cr# 0.41 – 0.43 in primary grains). Peridotite I occurs in two textural varieties. The first one has protogranular texture and exhibits no evidence of melt metasomatism preceding thevolcanism. The temperatures of its equilibration (after the exsolution of spinel from clinopyroxene) are ca. 850 – 880 ºC (Brey & Köhler 1990 opx-cpx thermometer).The second textural variety is characterized by intense fissuring of grains. The temperatures of equilibration of grains of ortho- and clinopyroxene in this peridotite are vary between 1080 – 1115 ºC, whereas the exsolution of clinopyroxene from orthopyroxene happened at temperatures 980 – 990 ºC. The mineral assemblage and major element composition of peridotites I correspond to the harzburgites occurring in other sites in Lower Silesia and considered to be a common rock in lithospheric mantle beneath NE part of the Bohemian Massif.

Peridotite II locally exhibits the cumulate texture. It is consist of olivine (72.7 – 90.9 %Fo), orthopyroxene (mg# 0.76 – 0.77), clinopyroxene (mg # 0.77 – 0.85), spinel and feldspar (Or1-59Ab24-69An2-75). The forsterite and nickel content in olivine occurring in peridotite II are typical for lower crustal cumulates. The cumulative origin of those kinds of peridotites is also supported by remnants of cumulate texture.

References:
Brey, G. P. & Köhler, T. (1990): Geothermobarometry in four-phase lherzolites. II. New thermobarometers, and practical assessment of existing thermobarometers. – Journal of Petrology 31: 1353-1378.