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Stop 4-1 (Day 4). Garnet Peridotites and Pyroxenites, Quarry Pod Libínem

Coordinates: N48°59′59.4″ E14°01′21.0″

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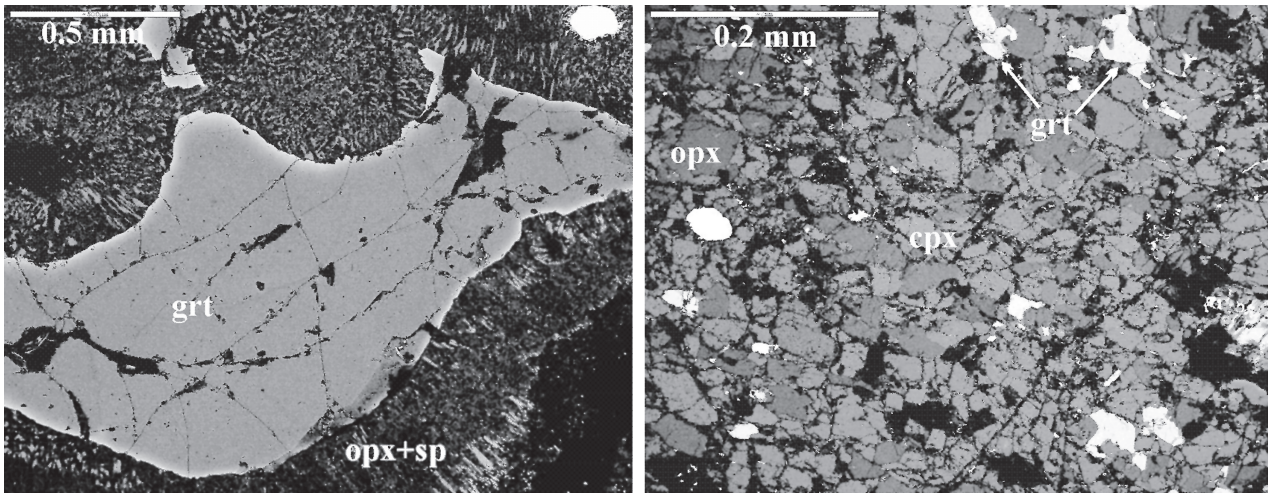
The large active quarry Pod Libínem is located directly at the SW margin of the Prachatice Granulite Massif (Fig. 1). The felsic granulites exhibit penetrative steep fabric and contain bodies of partially serpentinized Grt peridotites and pyroxenites, which form up to 10-m-large boudins. Granulite consists of feldspars, quartz, garnet, biotite, and kyanite (sillimanite), cordierite and accessory, spinel, rutile, zircon, graphite and apatite. Quartz forms mostly platy grains that define foliation of the rocks. Grain boundaries of quartz grains are followed by fine-grained perthitic K-feldspar, plagioclase and locally by biotite and relics of kyanite. Garnet is replaced by biotite or by cordierite, and kyanite is rimmed by spinel or totally replaced by sillimanite. Cordierite occurs along thin veins but mostly forms corona around garnet and finally replaced the whole garnet. Plagioclase forming symplectite with sapphirine is also present. Granulite is locally penetrated by granitic veins.

Garnet peridotites are strongly serpentinized. Pyroxene-rich varieties may contain up to 5- to 7-cm-large garnet porphyroblasts that are mostly replaced by symplectites of pyroxene + amphibole + spinel. They contain inclusions of clinopyroxene. In addition to isolated red-brown spinel, symplectites of spinel + orthopyroxene (former garnet), overgrown by amphibole, are also present. Garnet in peridotite forms relic grains, which have homogeneous composition with Mg and Cr con-



■ **Fig. 1.** BSE images from garnet peridotite and garnet pyroxenite within garnulites (stop 3-1). (a) garnet with corona of opx+sp symplectite from garnet peridotite. (b) microtexture of garnet pyroxenite.

tent (Prp_{70} Alm_{15} Grs_6 Uv_7). Orthopyroxene, clinopyroxene, and olivine show weak zoning. Core-to-rim grains of ? orthopyroxene show an increase in Al and Mg and a decrease of Cr, and clinopyroxene exhibits a decrease in Na from (Jd_8) to (Jd_5). Olivine has forsterite content 0.89. Spinel has X_{Al}=Al/(Cr+Al+Fe^{3+}) ratio 0.37. PT conditions, calculated based on garnet-olivine (O'Neill & Wood, 1980; O'Neill, 1981), two-pyroxene (Brey and Kohler, 1990; Taylor, 1998) thermometry, and Grt-Opx (Brey and Kohler, 1990), Cr-in Cpx (Nimis and Taylor, 2000) are in the range 1080–1115 °C at 2.9–3.0 GPa.

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Stop 5-1 (Day 5). Granulite and Garnet Peridotite, Plešovice Quarry, 5 km NNE of Český Krumlov

Coordinates: N48°55′25.20″, E14°20′28.10″

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The main rock types in the Plešovice quarry are felsic granulites and granulitic gneisses, similar to those at stop 4-1, but minor amounts of garnetiferous perpotassic granulites and veins of aplites and pegmatites also occur. Garnet peridotite occurs as an isolated boudins in the granulites. The highly potassic granulites (with K_2O content up to 13 wt.%) occur in foliated layers up to 2 m thick, which are concordant with the predominant felsic calc-alkaline granulites (Vrána, 1989; Janoušek et al., 2007; for description of the predominant felsic granulites – see the Post-Conference Excursion Guide, Day 1). Perpotassic granulites consist of K-feldspar (up to 93%), quartz and pyrope-rich (~30 molar %) garnet with accesory zircon (up to 1 000 ppm Zr), apatite and monazite. Characteristic are high concentrations of Cs, Rb, Ba and U and variable enrichments in Zr and Hf (Vrána, 1989; Janoušek et al., 2007). The perpotassic granulites are interpreted as the product of non-eutectic melt (Vrána, 1989; Janoušek et al., 2007), possibly derived from the protolith of the adjacent felsic granulites in the BLGM (Janoušek et al., 2007).

The spinel-garnet peridotite (Fig. 1), which has been studied in detail, occurs as an elongated lens (20 m × 5 m), which is exposed in the western part of the present-day fifth level of the quarry. The peridotite has an inequigranular texture, in which large spheroidal garnet grains (extensively kelyphitized) are set in a fine-grained matrix of olivine (Ol), orthopyroxene (Opx), minor clinopyroxene (Cpx), and Cr-rich spinel (Spl). The large spheroidal garnet grains locally enclose Ba- and Sr-rich phlogopite and apatite (Ap) inclusions (Naemura et al., 2008). Thorianite (ThO_2) occurs as a member of multiphase solid inclusions, consisting of phlogopite + carbonates + apatite + graphite + rutile + monazite + thorianite, in chromian spinel. The CHIME U-Th-Pb dating of the thorianite yielded a weighted mean age of 333.8 ±4.5 Ma (2 sigma, Table 1), which is the

analyses no.	UO_2 [wt%]	ThO_2 [wt%]	PbO [wt%]	ThO_2* [wt%]	Age ± 2σ [Ma]
1	17.628	77.210	1.889	134.714	331.3 ± 6.6
2	18.094	76.910	1.918	135.942	333.3 ± 6.6
3	17.758	77.240	1.927	135.193	336.7 ± 6.7
4	18.836	75.730	1.938	137.183	333.8 ± 6.6
weighted average					333.7 ± 5.5

■ **Tab. 1**. Results of electron microprobe dating of thorianite from the Plešovice peridotite. From Naemura et al., 2008.