In the Bohemian Massif, garnet peridotites occur as isolated lenses mostly within the Gföhl unit (felsic granulite, orthogneiss, migmatite) of the Moldanubian domain. According to previous classification, the most common types I and III of peridotite (Medaris et al. 2005) were investigated by mean of lattice preferred orientation (LPO), petrology and geochemistry. The strongly depleted Type I peridotites with ortho- and clinopyroxene, olivine, spinel and garnet are devoid of garnet clinopyroxenite layers and tectonic bodies of eclogite. Two LPO patterns have been measured, yielding foliation orientations discordant to each other. The former shows a higher temperature [100](0kl) pattern and, occurs in the spinel-bearing part of the body (peak P=2.2GPa and T=1100°C), and its origin is attributed to the Devonian back-arc spreading. The latter, a lower temperature axial [010] pattern, occurs in mylonitic microstructure, but is restricted to HT garnetiferous peridotites (P≥2.2-2.7GPa and T=1200-1300°C) along the margin of the body. It is suggested that garnet growth is strain-induced within a shear zone that originated below thickened orogenic root (360-340Ma), and then reactivated during orogenic extrusion transporting the sliver of hot mantle peridotite to much cooler (P≥1.5GPa and T=850°C) granulitized orogenic root.

In the type III garnet peridotites with layers of garnet clinopyroxenites and eclogites, olivine LPO shows either [100](010) or [001](010) pattern. Foliation in the peridotites has a variable orientation, but is always steeply dipping. Enclosed eclogites are either metamorphosed pre-existing MORB basalts or HP melts, and their foliation is coherent to the peridotites. Both peridotites and eclogites show peak PT conditions of 3.5GPa and 900°C reached in a HP-LT gradient. Clinopyroxenites corresponds geochemically to a product of reaction/crystal accumulations of the transient basaltic melt with the peridotites. They form vertically oriented and closely-spaced layers discordant to the peridotites, but parallel to the surrounding
coarse-grained granulites. The type III peridotites are supposed to be relics of mantle wedge hydrated to a various extents above the Saxothuringian Ocean subduction zone (380-360Ma) that triggered mantle wedge flow. During orogenic thickening (360~340Ma) hydrated mantle deformed and the basaltic melt flow from the subduction zone became strain-controlled. It is very likely that exhumation of the Type III peridotites occurred along rheological boundary between hydrated and non-hydrated mantle during vertical mantle wedge flow towards orogenic root in the hanging-wall.

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Session classification : The deep structure and evolution of the Variscan Lithosphere

Track classification : The deep structure and evolution of the Variscan Lithosphere

Type : Talk