same within error as the age of H*P* metamorphism determined for felsic granulites in southern Bohemia (Naemura et al., 2008, see the text above).

Naemura et al. (2009) described three equilibrium stages for the Plešovice peridotite. The temperature of Stage I was estimated to be 1020 ± 15 °C, using the Al-Cr orthopyroxene thermometer (Witt-Eickschen and Seck 1991) for orthopyroxene megacrysts. Stage II is defined by the spinel-garnet lherzolite assemblage in the matrix, and equilibrium conditions were estimated to be 23–35 kbar and 850–1030 °C, based on the application of two-pyroxene and Grt-Cpx thermometry, Grt-Opx and Grt-Cpx barometry, and an empirical Spl barometer for Spl-Grt lherzolite. Stage III is defined by the presence of aluminous ortho- and clinopyroxene, aluminious spinel, and amphibole and phlogopite in kelyphite. Temperature conditions for stage III were estimated to be 730–770 (±27) °C at 8–15 kbar. The mineral assemblage in the multiphase solid inclusions (MSI) in chromian spinel is composed of phlogopite, dolomite, apatite and calcite with minor amounts of chlorite and magnesiohornblende. Crystallization conditions of the MSI assemblage were at relatively low-P and low-T ($T < 750$ °C; $P < 16$ kbar). The timing of crystallization of MSI appears to predate the stage II, as most MSI are completely enclosed by the host chromian spinel, which formed during stage II. These relations suggest that the Plešovice peridotite experienced cooling after Stage I and was transformed to spinel-garnet peridotite by subsequent subduction processes (Naemura et al, 2009).

Recently, Naemura et al. (in press) reported the presence of carbon phases in garnet(?), including micro-diamond that suggests ultra-deep conditions (~6 GPa) for garnet in the precursor of the Stage I(?) garnet peridotite. Synchrotron X-ray fluorescence analysis indicated that this diamond contains Fe-Ni metal (taenite) and Cu-Zn-rich phases (possibly sulfide) as inclusions. In particular, the latter phase supports the natural origin of this diamond, although the aggregation state of nitrogen in the diamond is very similar to that in synthetic diamond. Raman spectroscopy shows that graphite crystals included in garnet show upward displacements of the G-band up to 1600 cm^{-1}. Such upward displacements are most likely due to internal pressure, supporting the high-pressure origin of graphites. Another line of evidence for ultra-deep conditions is revealed by pyroxene lamellae developed in coarse-grained chromian spinel grains. EBSD analysis indicates that the pyroxene lamellae could be formed by exsolution from a high-pressure polymorph of spinel (Ca-ferrite and/or Ca-titanite structure), which may be stable under very high pressures (>12.5 GPa). The diamond-bearing Plešovice peridotite is interpreted to represent a fragment of asthenosphere (>200 km) that was transported to relatively shallow levels by a diapiric plume and then incorporated into the Moldanubian orogenic root shortly before or during the Variscan continent-continent collision at ca. 340 Ma.

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Garnet-Rich Gneisses (Kinzigites) of the Lhenice Shear Zone

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The garnet-rich gneisses form a ~15 km long, north-south trending, discontinuous belt having up to 100 m in thickness, which forms part of the Lhenice shear zone (Rajlich et al., 1986). The Lhenice shear zone separates the Blanský les granulite massif to the east from the Prachatice and Křišťanov granulite massifs to the west. Rajlich et al. (1986) determined that

the Lhenice shear zone experienced amphibolite facies metamorphism similar to that in the Varied and Monotonous Units in Lower Austria, i.e. about 0.5 to 0.9 GPa and 700 to 840 °C (Petrakakis, 1986). Detailed gravity profiles of the Lhenice belt presented by Vrána (1979) and Vrána and Šrámek (1999) demonstrated that the Lhenice shear zone is a major N-S striking regional shear zone.

Fiala (1992) published an E-W profile of different lithological rock types across the Lhenice shear zone and assumed that the garnet-rich gneisses forms suite of the Lhenice shear zone metasediments.

Stop 4-2 (Day 4). Garnet-Rich Gneisses (Kinzigites), Ktiš Quarry, 1 km NNE of Ktiš Village

Coordinates: N48°55′25.33″ E14°8′24.15″

This locality (Fig. 1) was first described by Fiala (1992), who compared the compositions of iron- and aluminium-rich garnet-sillimanite-biotite and cordierite-bearing gneisses at Ktiš with other occurrences of kinzigites worldwide and applied the term kinzigite to the suite of Ktiš gneisses.

Ktiš kinzigites have a planar fabric (Fig. 2); they are granoblastic and have a coarse-grained to fine-grained matrix composed of cordierite, sillimanite, biotite, garnet, quartz, K-feldspar and plagioclase with accessory spinel, apatite and zircon. Biotite, sillimanite, plagioclase and kyanite occur as inclusions in garnet. Cordierite and spinel occur only in the matrix both as isolated grains and as reaction coronas around garnet.

The main foliation planes dip to the west at 35–60°, and fold axes of quartz-K-feldspar lenses trend 190° and plunge at 60°. Kinzigites were intruded by biotite-bearing granite dykes (up 1.5 m) in the eastern and central parts of the quarry.

Geological studies of the Ktiš locality

U-Pb dating of the Ktiš garnet-rich gneisses (Wendt, 1989) revealed two populations of detrital zircons. The rounded heterogeneous zircon population (ca. 1.6–2.0 Ga) indicated repeated sedimentary reworking during the Precambrian, and younger

■ **Fig. 1.** Free blocks of garnet-rich gneisses in abandoned Ktiš quarry (photo by M. Svojtka).