

# HP/UHP Rocks in the Kutná Hora Complex and Adjacent Monotonous Unit

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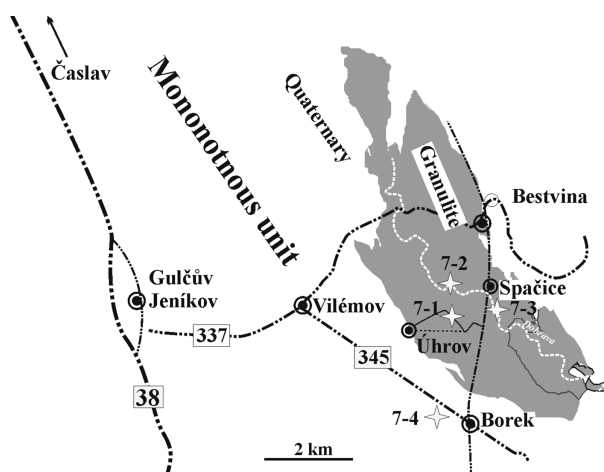
During the final day of the field trip we will visit garnet peridotite, garnet pyroxenite, eclogite and surrounding granulite in the Kutná Hora complex (stops 7.1–7.3, Fig. 1) and one eclogite occurrence in serpentinized spinel peridotite in the Monotonous unit (stop 7.4). The field trip localities can be reached by Highway 38 to Časlav and taking Highways 337 and 345 to Vilémov and Borek, respectively.

High-grade metamorphic rocks of the Kutná Hora Complex are exposed in an ~50-km-long NW-SE-oriented belt near the town of Kutná Hora, where the high-grade metamorphic rocks structurally overlie a medium-grade, paragneiss sequence of the Monotonous unit (Fig. 2). Based on its lithology and high-grade metamorphism, the Kutná Hora Complex has been correlated with the Gföhl unit in the eastern part of the Moldanubian zone (Synek and Oliveriová, 1993). The complex consists of two superposed tectonic units: at the top are granulites, granulite

gneisses and migmatites with amphibolized and serpentinized mafic and ultramafic rocks and skarns, below which are micaschists with lenses of amphibolites. The largest granulite body (the Běstvina granulite) consists mainly of retrogressed felsic granulites, biotite gneisses, migmatites, and several small, isolated bodies of peridotite and eclogite (Pouba et al., 1987; Synek and Oliveriová, 1993; Vrána et al., 2006). Three stages of deformation can be recognized in the high-grade rocks of the Kutná Hora Complex (Synek and Oliveriová, 1993). D1, the oldest event, is contemporaneous with eclogite-facies metamorphism of metabasic protoliths, metamorphic crystallization of HP/HT granulites, and (re)crystallization of garnet lherzolites. An earlier S1 fabric in granulite occurs within low-strain domains surrounded by a regionally developed penetrative S2 fabric formed during the D2 stage of deformation, (Machek et al., 2009). S1 foliation in felsic granulites dips steeply to the SE or NW and is usually preserved in the vicinity of peridotite and eclogite bodies. S2 foliation dips generally to the ENE at medium to high angles. Occasionally, S1 foliation is transposed into the S2 foliation by symmetrical S2 folds, in which folds, axial planes, and S2 foliation are parallel. D2 deformation was accompanied by extensive partial melting and migmatization that generated kyanite-bearing granitic leucosomes. D3 is a late stage of reactivation, which generated low-temperature mylonites that locally overprint earlier structural patterns and migmatitic features.

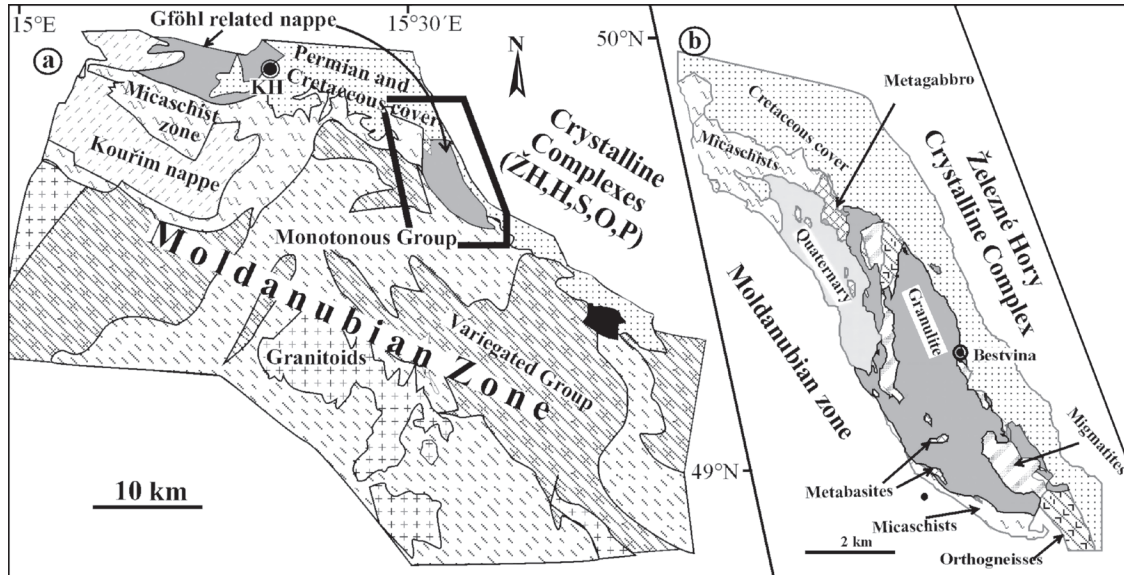
The ultramafic rocks show a deformational fabric concordant with relic S1 granulite fabric. It is the youngest fabric in the mantle rocks because it cross-cuts or reworks other observed fabrics. The peridotite fabric is recorded by the LPO of olivine, which displays an (010)[001] slip system (Machek et al., 2009). The LPO in olivine defines an E-W trending and steeply dipping foliation, which is discordant to the S1 foliation in granulites with clinopyroxenites, and which might be interpreted as the original mantle fabric S0. The LPOs of clinopyroxene and quartz measured in clinopyroxenites and coarse-grained granulites, respectively define a subvertical foliation S1 and stretching lineation L1. In peridotite from stop 7.1, LPO data show an olivine fabric closely concordant to S0 in the peridotite at stop 7.2, as well as a NE-SW striking, sub-vertical fabric that corresponds to the S1 foliation. The [001] slip direction of all minerals defines a steeply plunging stretching lineation in the S0 foliation plane, while S1 is a strongly planar fabric with weak, variable lineation. This indicates a reworking of the S0 fabric, producing(?) a sub-vertical stretching lineation in response to an oblate strain pattern during development of the S1 fabric.

The Monotonous unit beneath the Kutná Hora Complex is represented by partly migmatized kyanite/sillimanite+biotite±muscovite±cordierite paragneiss. At the contact with the micaschist zone of the Kutná Hora complex, the Monotonous unit paragneiss encloses several bodies of serpentinized peridotites, eclogites and garnet amphibolites (Synek and



■ **Fig. 1.** Localities of field trip stops 7-1 to 7-3 in garnet peridotites and eclogites in the Kutná Hora complex and stop 7-4 in eclogite in the Monotonous unit (area C in Fig. 1 of the Introduction to post-conference excursion).

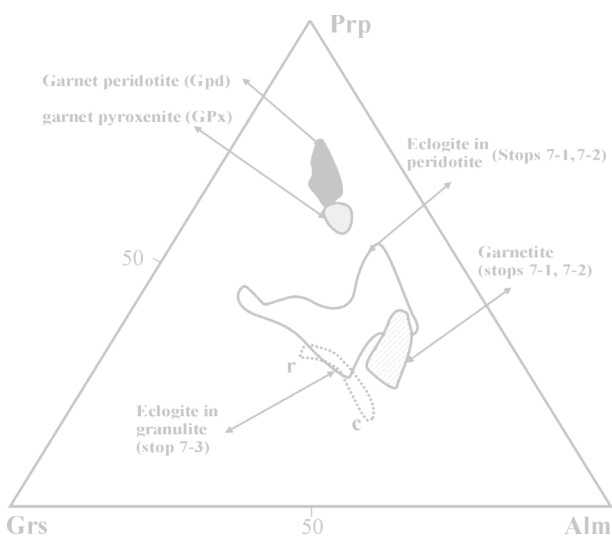
Oliveriová, 1993). The surrounding paragneiss exhibits a penetrative deformational fabric defined by a medium grade foliation dipping at moderate angles towards the NE. This foliation is concordant to the S2 fabric observed in the Běstvina formation (Machek et al., 2009) and the contact between the Monotonous unit and Běstvina formation. The structural relation of this fabric to the peridotite body is unclear. The mafic and ultramafic bodies in the Monotonous unit may have been extruded along the shear zone between the Monotonous and Běstvina units.



■ **Fig. 2.** (a) Simplified geological map of the north-eastern part of the Moldanubian zone and locations of the Gföhl-related units in the Kutná Hora Complex (after Synek and Oliveriová, 1973); Abbreviations: KH, the town of Kutná Hora; ZH, Zelezne Hory complex; H, Hlinsko zone; S, Svatka crystalline complex; O, Oheb crystalline complex; and P, Podohorany crystalline complex. (b) The Bestvina granulite body with associated garnet peridotites and eclogites to be visited on the excursion.

### Stop 7-1 (Day 7). Garnet Peridotite and Eclogite, Úhrov, ca. 1 km East from the Village of Úhrov

Coordinates: N49°48'39.5" E15°33'32.5"



Stop 7-1 can be reached by an asphalt road from Borek to Spačice, but before Spačice turn left on the dirt road to Úhrov, and after 300 m turn northwest (Fig. 1). It is a small outcrop of garnet peridotite with boulders of eclogite in an overgrown, abandoned quarry in serpentinized garnet peridotite.

The garnet peridotite is strongly serpentinized, but contains garnet crystals (up to 5 mm in size) that are mostly rimmed by a thick kelyphitic corona of clinopyroxene ± orthopyroxene + amphibole + spinel (Faryad, 2009). Garnet is rich in Mg (Prp<sub>66-78</sub>, Fig. 3), with relatively low Fe and Ca contents (Alm<sub>16-23</sub>, Grs<sub>12-17</sub>), and the spessartine component is below

■ **Fig. 3.** Compositions of garnet from garnet peridotite, garnet clinopyroxenite, garnetite, and eclogite from the Kutná Hora complex. Dotted field shows the range of prograde compositional zoning in garnet (c, core; r, rim) from eclogite within granulite (stop 7-3).