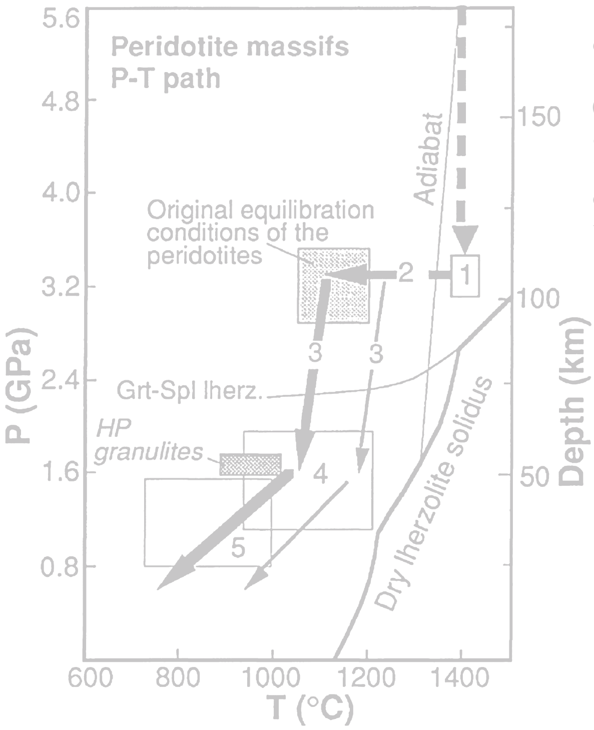


■ **Fig. 6.** P-T diagram showing the P-T paths of peridotite massifs from lower Austria (Becker, 1997). Stage 1, formation of pyroxenites and pyroxene megacrysts as high-pressure igneous cumulates; Stage 2, isobaric cooling; Stage 3, near-isothermal decompression; Stage 4, exsolution of spinel in pyroxenes and growth of coarse-grained symplectites; and Stage 5, formation of kelyphites. The dashed arrow represents isothermal interpolation to the intersection with an upper-mantle adiabat and implies fast ascent of superheated magma in the sublithospheric mantle. Thick and thin arrows indicate different paths for peridotites that followed somewhat different cooling histories. Equilibration conditions of high-pressure granulites are also shown (Carswell and O'Brien, 1993).

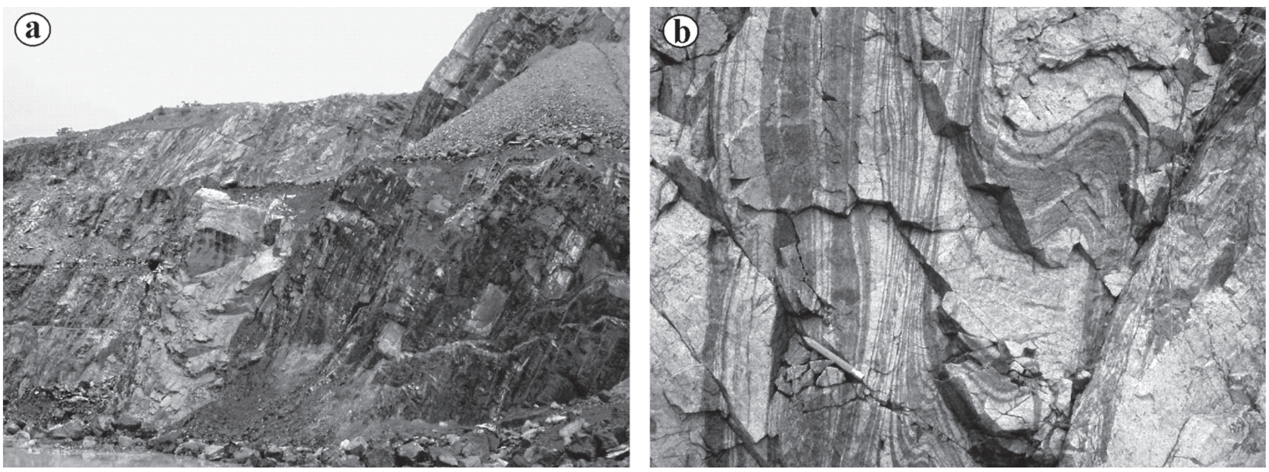
Sm/Nd garnet-clinopyroxene-whole rock isochron ages of 344 ± 10 Ma and 370 ± 15 Ma for two garnet pyroxenite samples within Dunkelsteinerwald peridotite bodies (Carswell and Jamtveit, 1990) indicate an early Variscan age for the formation of the Pmax (Stage II) assemblages. Similar U-Pb zircon ages (347 ± 9 and 367 ± 18 Ma) were obtained by Kroner et al. (1988) from granulite massifs in the southern and eastern parts of the Moldanubian Zone.

Stop 5-2 (Day 5). Garnet Peridotite and Garnet Pyroxenite, Granulite Quarry in Meidling-im-Tal, 6 km South from Krems am der Donau

Coordinates: N48°20′40.0″ E15°37′32.3″

The high-pressure granulite with elongated boudins of garnet peridotite exhibits a highly sheared fabric, which is homogeneously developed across the quarry and originated during the early stages of exhumation of the rocks. Felsic granulites are dominant in the quarry, consisting of feldspar, quartz, garnet, kyanite ± sillimanite, rutile, and variable amounts of biotite. Ternary feldspar (+ mesoperthite) is well preserved in garnet and occurs locally in the matrix. Some mafic varieties of granulite may contain clinopyroxene and orthopyroxene. Garnet contains oriented needles of rutile.

A large body of strongly serpentinized garnet peridotite, including lherzolite, harzburgite, and rare dunite, is exposed in the



■ **Fig. 7.** Meidling-im-Tal granulites and peridotites. (a) large deformed body of peridotite within strongly foliated HP granulite; Meidling quarry. (b) relicts of early compositional layering transposed to a dominant Grt-Ky bearing granulitic fabric; Meidling quarry central part of the quarry (Fig. 7a, b) (Becker, 1997). Relict minerals in the peridotites are pyroxenes, olivine, and garnet with kelyphitic rims or kelyphite pseudomorphs after garnet. Garnet is rich in MgO (19–20 wt%) and Cr_2O_3 (3.6–7.6 wt%), and orthopyroxene has relatively high Al_2O_3 = 1.9–3.5 wt% (Table 1). Garnet pyroxenites form thin layers (millimetres to several decimetres) within garnet peridotites. They show a weak foliation, defined by alignment of pyroxenes, which together with garnet, formed by recrystallization of primary, coarse-grained Al-rich clino- or orthopyroxene, as illustrated in Fig. 4 and described by Carswell (1991). Clinopyroxene neoblasts in pyroxenite are rich in Na_2O (up to 4.16 wt%, Table 1). More details about mineral compositions and PT evolution of the ultramafic rocks are given above.

Rock	Lh	Hz	CMe	GCp	GCp	Lh	OMe	CMe	Lh	OMe	CMe	GCp	Hz	Lh	Lh
Mineral	Garnet					Orthopyroxene				Clinopyroxene			Spinel		
position	lamellae					Incl.	lamellae	kelyph	incl		lamellae	incl	matrix	in amph	in amph
SiO_2	41.76	41.28	41.24	40.82	41.74	55.71	56.14	55.75	53.47	51.98	52.32	53.27	0	0	0
TiO_2	0.28	0.13	0.15	0.2	0.1	0.09	0.06	0.06	0.2	0.19	0.25	0.38	0.07	0.05	0.03
Cr_2O_3	3.5	7.62	1.91	0.06	0.54	0.65	0.42	0.46	1.43	1.33	1.44	0.13	33.69	40.72	32.05
Al_2O_3	21.06	18.04	21.69	22.92	23.16	1.95	2.58	2.45	3.56	4.12	4.56	10.33	34.99	28.93	36.42
FeO	6.72	6.97	10.6	9.63	10.76	5.25	5.92	5.97	2.61	2.18	1.79	2.91	15.94	17.2	15.28
MnO	0.38	0.2	0.68	0.17	0.43	0.09	0.16	0.13	0.13	0.08	0.05	0.07	0.08	0.06	0.06
MgO	20.48	19.87	18.6	12.76	18.59	34.53	33.17	34.66	16.63	15.35	15.77	11.2	15.72	12.45	14.63
CaO	5.68	6.62	5.35	13.16	4.95	0.94	0.55	0.44	20.05	23.34	22.41	16.94	0.01	0.04	0.08
Na_2O	0.01	0.03	0.03	0.02	0	0.09	0.04	0.04	1.55	1	1.33	4.16			
Total	99.85	100.77	100.26	99.75	100.26	99.29	99.04	99.95	99.63	99.56	99.95	99.38	100.48	99.445	100.44

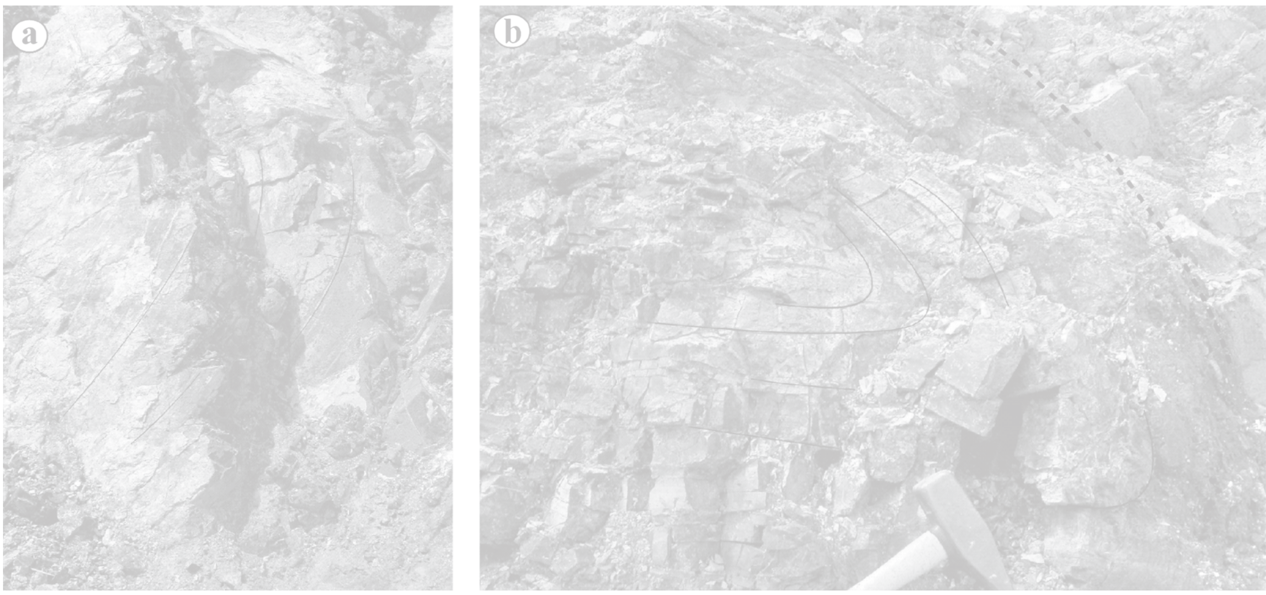
Gnt garnet, Lh lherzolite, Hz harzburgite, CMe clinopyroxene megacryst, OMe orthopyroxene megacryst, Gnt garnetite, GCp garnet clinopyroxenite)

■ **Tab. 1.** Selected mineral analyses from peridotites, megacrysts and pyroxenites (taken from Becker, 1997).

Stop 5-3 (Day 5). Garnet Peridotites, Granulite Quarry Close to Karlstetten, 9 km Northwest from St. Pölten

Coordinates: N48°16′12.9″ E15°33′12.0″

This quarry is a typical example of strongly retrogressed granulites containing boudins and rootless folds of garnet peridotite bodies (Fig. 8a,b). Structures developed in this quarry show vertical shortening affecting the granulite under middle crustal con-



■ **Fig. 8.** Structures in granulites with serpentinized garnet peridotites. (a) isoclinal fold of serpentinized peridotite within retrograded granulite; Karlstetten quarry. (b) large open buckle fold of serpentinized garnet peridotite; Karlstetten quarry.