tholeiitic magmas were generated at two different times in the complex: *eclogite* and its retrograde equivalents at 540 Ma (Homolka eclogite, 539 ±2 Ma; Mechov granulite, 545–535 Ma; Louka amphibolite, 540 ±9 Ma) and *metagabbro* at ~500 Ma (Výškovice, 495 ± 1 Ma; near Výškovice, 503 ±4 Ma; Ovčí Dvůr, *c.* 496 Ma).

Eclogite facies metamorphism probably occurred at *c.* 370–375 Ma, based on Sm-Nd garnet-omphacite ages (Louka eclogite, 377 ±7 Ma; Mnichov eclogite, 367 ±4 Ma), U-Pb lower intercept ages for zircon (Homolka eclogite, 377 ±27 Ma; Louka amphibolite, 373 ±10 Ma), and one U-Pb concordant zircon age (Homolka eclogite, 382 ±3 Ma). Note, however, that garnet in the Mnichov eclogite is zoned, and the core of garnet and whole rock yield a Sm-Nd age of 420 ±8 Ma. Lu-Hf analyses of garnet and omphacite in the Mnichov and Louka eclogites are underway to examine in more detail the metamorphic evolution of MLC eclogites.

$^{40}Ar/^{39}Ar$ and K-Ar ages for amphibole in seven samples of amphibolite, one of metagabbro (Bečov), and one of pegmatite (Tisová roadcut) yield a mean cooling age of 377 ±5 Ma, which is within error of the Sm-Nd and U-Pb metamorphic ages. Biotite from the Tisová pegmatite has a $^{40}Ar/^{39}Ar$ plateau age of 374 ±1 Ma, and muscovite from paragneiss, 366 ±1 Ma.

The largely overlapping results from Sm-Nd, U-Pb, $^{40}Ar/^{39}Ar$, and K-Ar geochronological methods implies that metamorphism in the MLC was the result of a short-lived episode of subduction and exhumation during Late Devonian (Frasnian-Famennian) time. Preservation of compositional zoning in garnet also requires that the duration of metamorphism must have been relatively brief.

Tectonometamorphic Scenario

The Mariánské Lázně Complex is regarded as a fragment of oceanic lithosphere from an Early Paleozoic Saxothuringian ocean (Matte et al., 1990; Franke, 2000). Birth of the Saxothuringian ocean was in Early Cambrian time, as indicted by 540 Ma protolith ages for MORB-like eclogite and its retrograded equivalents in the MLC. The Early Cambrian genesis of this oceanic crust was contemporaneous with, and may have been related to, rifting along the margin of Gondwana, which is recorded in Bohemia by a change in geotectonic regime from convergence to transtension at the Precambrian-Cambrian boundary (Drost et al., 2004; Zulauf et al., 1997).

Further growth of the Saxothuringian ocean and Late Cambrian development of additional oceanic crust is marked by *c.* 500 Ma metagabbro in the MLC. Late Cambrian production of basic magma was a widespread event in western Europe and North America, where *c.* 500 Ma basic rocks of similar chemical characteristics are found in the Sudetes (Gory-Sowie, Dobromierz, Izera), Münchberg Massif, Zone of Erbendorf-Vohenstraus, Norway (Leka, Karmøy), Scotland (Aberdeenshire), Ireland (Connemara), Newfoundland, Nova Scotia, Maryland, and Alabama (Bowes and Aftalion, 1991; Crowley et al., 2002).

Late Devonian (Frasnian to Famennian) closure of the Saxothuringian ocean occurred by southeastward subduction of oceanic lithosphere beneath Bohemia and eventual collision of Saxothuringia with Bohemia by about 365 Ma, as indicated by eclogite facies metamorphism and subsequent retrogression in the MLC and the geochronological data summarized above. In Bohemia, initial stages of convergence are indicated by Givetian deposition of continental siliciclastic flysch in the Barrandian basin (Patočka and Štorch, 2004), and evidence for Frasnian metamorphism is found in the Teplá Crystalline Unit, where monazite from paragneiss yields ID-TIMS ages of 387–382 Ma and EMP ages of 382–373 Ma (Timmermann et al., 2006). As noted previously, the largely overlapping Sm-Nd, U-Pb, $^{40}Ar/^{39}Ar$, and K-Ar metamorphic and cooling ages for various rock types in the MLC requires that duration of the subduction/exhumation cycle was relatively brief. An important implication of this interpretation is that the Saxothuringian ocean basin must have been relatively small in size, in order for closure of the ocean and collision of Saxothuringia with Bohemia to have occurred in such a relatively short time span.

Stop 3-1 (Day 3). Serpentinite, Small Abandoned Quarry, 1km NW Sítiny

Coordinates: N50°01′58.0″ E12°45′15.9″

Peridotite at this locality is almost completely serpentinized, although relict textures viewed under the microscope reveal the original mineralogy (Fig. 12). Prior to serpentinization, the peridotite contained medium-grained olivine, idioblastic amphibole, and spinel (now chlorite). Chlorite has preserved the anhedral, "holly leaf" shape of the original spinel, which was probably $MgAl_2O_4$-rich, because this is the characteristic texture of this compositional type of spinel in peridotite, in contrast to the subhedral to euhedral shape of $FeCr_2O_4$-rich spinel. The original amphibole was likely to have been tremolite, because in metamorphosed peridotite, tremolite is stable with chlorite, while Al-amphibole is stable with spinel. The inferred mineral assemblage of olivine + tremolite + chlorite indicates middle-grade recrystallization at ≤700 °C.

Other MLC peridotite localities show similar features, suggesting that much of the peridotite body has been recrystallized at moderate temperatures. However, there is no evidence that peridotite was metamorphosed at eclogite facies pressure, because no garnet has been reported so far in MLC peridotite.