of a Variscan collision (or series of collisions) between Sudetic terranes, it seems reasonable to conclude that development of the earliest structures observed in rocks of the Stronie formation at in part of the OSD gneisses took place before Variscan orogeny.

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Thrusts and Folds in the Neyriz Ophiolite and Associated Rocks, Iran

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As the youngest collisional orogenic belt, the Zagros orogenic belt, has caused widespread folding and thrusting relative to crust thickening and uplifting, and was recognized generally by the international geoscientific community (e.g., Ricou; Alavi 1980, 1994; Pamic, et al.). The southeastern part of Zagros orogenic belt is located in around of Neyriz region and comprises a number of NW-striking thrust faults, ductile-brittle shear zones, folds, ophiolite, ophiolite mélange and tectonic slices. Ophiolites are major features of an orogenic belt and they are dominantly oceanic crust and mantle emplaced by collision of mantle-rooted thrust fault with a continental margin or island arc. Ophiolite nappes thus represent remnants of lithospheric plates; their basal thrusts are remnants of subduction zones. The Neyriz ophiolite is part of the upper mantle and Tethyan oceanic crust that stretched along the Zagros suture. The ophiolite consists of several small and large thrust sheets each having its own internal layering. Rocks in this complex are include compositionally layered, serpentinized peridotites (mainly harzburgites, lherzolites, dunites and pyroxenites), both massive and layered gabbros, sheeted dikes, pillow lavas, and thinly and uniformly bedded Jurassic to Upper Cretaceous radiolarian cherts interbedded with red lutites and thin beds of pelagic limestones (Nadimi 1999, 2002). Compositionally layered amphibolites and metamorphosed sedimentary rocks as schists have observed locally. In the central part of the Neyriz area, the ophiolite thrust sheets transported over the Upper Cretaceous shallow-water shelf/platform carbonates and overlain unconformably by the uppermost Cretaceous limestones (Tarbour Formation). The initial emplacement as slivers of Neo-Tethyan oceanic crust over the Afro-Arabian continental shelf must have been a Cenomanian-Maastrichtian event (Alavi 1980, 1994). Sheets of recrystallized limestones that strongly sheared and/or brecciated at their contacts are also presents.

In cross section, major thrust sheets show an imbricate pattern. Within each thrust sheet, rocks intensely folded and sheared. Folds are of angular parallel type and disharmonic; shear zones are brittle with discrete, anastomosing shear planes and associated cataclasites. Structurally, the northeastern high mountains, the ophiolite, and southwestern units are characterized by NW-SE trending folds and thrusts, which exhibit shortening in a NE-SW direction and show evident southwestward thrusting in general. The northeastern limit of the ophiolite thrust sheets distinguished by a system of breaching thrusts, which has resulted in transportation of the Mesozoic continental shelf sedimentary rocks over the ophiolites and severe crushing, and intermingling of various rock units. And also the southwestern limit of the ophiolite thrust sheets distinguished by a system of nappes and interesting folds in beds of pelagic limestone and radiolarites, which has resulted in obduction of the ophiolite and associated sedimentary rocks over the Mesozoic continental shelf sedimentary rocks of the Arabian platform. The radiolarites and pelagic limestones have shortened about 35–40 % during folding.

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Contrasting Metamorphic Evolution of HP Rocks in the Gföhl Unit of the Kutná Hora Crystalline Complex and the Moldanubian Zone in Austria

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The uppermost part (Běstvina and Malín formations) of the Kutná Hora Crystalline Complex is due to presence of HP/HT granulites, garnet peridotites and eclogites are generally correlated with the Gföhl complex in the Moldanubian zone. We have studied felsic granulites, kyanite-bearing migmatites and migmatitic gneisses of the Gföhl-relted unit in the Kutná Hora Crystalline Complex and in the Moldanubian zone of Waldviertel in Austria. In order to analyse PT evolution of individual lithologies we have constructed pseudosections in the NCKFMASH system using the THERMOCALC software (Powell et al. 1998). The calculated isopleths in the pseudosections were compared with composition of garnet, plagioclase and K-feldspar in different stages of the rock evolution. The overall PT trajectory was further improved by calculation of "Average pT" method (Powell et al. 1998).

Granulites and migmatites occuring in the uppermost parts of the Kutná Hora Crystalline Complex, are characterized by the presence of kyanite, garnet and feldspars and gneisses contain also white mica. The migmatite contains clusters of muscovite and biotite with small grains of garnet and kyanite. Textural relations indicate that biotite was formed during the late stage of metamorphism. It replaces or rims muscovite being in textural equilibrium with garnet and kyanite. Garnet in both migmatite and in gneiss is homogeneous and only weak retrograde zoning was observed in the rims of garnet from granulite. Garnet in migmatitic gneiss is rich in Fe (Alm_{77-83}, Py_{10-13},Grs_{2-6}). Relatively high-Mg garnet is present in granulite (Alm_{56-60}, Py_{28-32},Grs_{5-11}). Analysed muscovite has relatively high phengite component with Si = 3.2 a.p.f.u. Plagioclase is usually rich in Na and the anorthite content ranges between 6–11 mol% in migmatitic gneiss. Granulite has nearly pure albite with $An_{0.07-0.09}$.

The HP/HT metamorphic conditions of 875 ± 95 °C and 15.6 ± 1.4 kbar were calculated, using the average PT (Powell et al. 1998) for the assemblage Ky-Grt-Plg-Kfs-Ms-Qtz ($X_{H2O\ in\ melt}$ = 0.5) in the Malín and Běstvina migmatitic gneisses. The Běstvina granulite gave temperature and pressure of 831 ± 53 °C and 16.5 ± 1.8 kbar ($X_{H2O\ in\ melt}$ = 0.6) for kyanite, garnet core, perthitic feldspars and biotite in garnet. Metamorphic PT conditions for the MP/LT stage were calculated from the matrix biotite, garnet rims and the recrystallized grains of plagioclase, K-feldspar and quartz. The results yielded PT conditions of 712 ± 39 °C and 10.6 ± 1.8 kbar for migmatites and 705 ± 97 °C and 14.4 ± 2.1 kbar for granulites. The calculated PT conditions, consistent with the lack of sillimanite, suggest that the retrogression occurred still at high pressure in the kyanite stability field.

PT conditions obtained for the HP/HT metamorphic stage in felsic granulites from the Moldanubian zone in Austria correspond to 912 °C ± 54 °C and 13,7 kbar ± 1,5 kbar. Their exhumation to the middle custal levels was accompanied by formation of LP/HT mineral assemblages that yield pressure and temperature of 890 °C ± 72 °C and 8,5 kbar ± 2,0 kbar. The Gföhl migmatitic gneisses contain relics of kyanite armoured within feldspars indicating the earlier HP metamorphic stage. The dominant assemblage within the late foliation is Sill-Grt-Plg-Kfs-Bt determining conditions of the metamorphic overprint at 877 °C ± 69 °C and 6,7 kbar ± 1,7 kbar. The development of spinel in the ky-kfs granulites indicates, that the metamorphism continued to shallow depths at still high temperature.