Metamorphism and Exhumation Processes of the Shotur Kuh Metamorphic Complex, Semnan Province (Central Iran Zone)

Mahmoud Rahmati ILKHCHI[1], Shah Wali FARYAD[2], Karel SCHULMANN[3] and Jan KOSLER[4]

[1] Geological Survey of Iran, Teheran, Iran
[2] Institute of Petrology and Structural Geology, Albertov 6, Charles University Prague, Czech Republic
[3] Centre de Geochimie de la Surface, Université Louis Pasteur,1rue Blesig,670 00 Strasbourg cedex, France
[4] Department of Earth Science, University Bergen, Allegaten 41, Bergen, N-5007, Norway

The Shotur Kuh Metamorphic Complex (SKMC) represents an E-W trending elliptical tectonic window (area 20 × 11 km), exposed within Jurassic–Eocen sedimentary sequences 260 km SE of Semnan city (Semnan province, Eastern Iran). The SKMC consists of banded sequence of orthogneisses (metagranite-metatonalite) and amphibolites. U-Pb data obtained by laser ablation ICP-MS analysis of zircon yielded a Cambrian age of ca. 520 Ma, which can be interpreted as corresponding to the protolith crystallization. The absolute age of pervasive amphibolite facies metamorphism is not established yet, but an indication of pre-Jurassic age of metamorphism is indicated by the presence of pebbles of gneisses and amphibolite in Jurassic basal conglomerates. The gneisses are formed mostly by plagioclase (An_{19-30}), biotite, (X_{Mg} = 0.47 or 0.67, regarding to the whole rock composition), in some cases also garnet ($Alm_{58–70}$, $Grs_{24–36}$, $Py_{2–7}$, $Sps_{1–5}$) and accessory amounts of allanite with epidote rim. Tonalitic varieties may additionally contain amphibole. Some quartz-rich mica schists have variable amounts of muscovite. Amphibolites are mostly formed by plagioclase ($An_{18–20}$) and ferropargasite (X_{Mg} = 0.34, Na^{M4} = 0.3), and locally also garnet ($Alm_{56–61}$,$Grs_{30–34}$,$Py_{3–5}$,$Sps_{1–5}$). PT conditions of 520–560 °C and 6–8 kbar have been estimated using Grt-Bt, Grt-Amph thermometry and Grt-Amph-Pl barometry, in combination with thermodynamic calculations using the PTGIBS software. The amphibolite facies metamorphism was accompanied by strong deformation (D1) that resulted in formation of isoclinal syn-schistose folding of compositional layering and strong mineral foliation bearing stretching and mineral lineation trending in the E-W direction. All rocks are affected by variable degree of retrogression, mylonitization and brittle-ductile reactivation of the early high grade fabric. This late event was synchronous with very low-grade metamorphism and deformation (D2) developed in the adjacent Jurassic meta-sediments. Kinematic indicators, mainly asymmetrical buckling and asymmetrical boudinage of cherts in weakly metamorphosed limestones and dolomites suggest a N-S compression and top to the north shearing. Foliation in the Jurassic rocks which is parallel to mylonitic shear zones affecting the gneiss and amphibolite complex dips 60° to the north along the northern margin of the SKMC. However, in the southern and central parts of the complex the greenschist facies fabrics dip under 20–40° to the south. Cretaceous age of this tectonometamorphic process is inferred from the presence of pebbles of Jurassic slates and weakly metamorphosed carbonate rocks in the Upper Cretaceous basal conglomerates. In addition, late thin skinned deformation (D3) and N-S verging folding in the Eocene sediments date the yougest tectonometamorphic process in this area. This analysis clearly demonstrate that the exhumation of the Shotur Kuh Metamorphic Complex resulted from active buckling of the basement during a N-S directed Cretaceous to Tertiary compression and de-coupled thin-skinned tectonics of the Mesozoic cover. However, the age of main metamorphic event affecting the SKMC remains yet not constrained.

Emplacement Mechanisms of the Thrust Sheets in the Barrandian (Bohemian Massif)

Jiří JANEČKA[1,2] and Rostislav MELICHAR[3]

[1] Institute of Geological Sciences, Faculty of Science, Masaryk University, Kotlářská 2, 611 37 Brno, Czech Republic
[2] Institute of Geology, Czech Academy of Sciences, Rozvojová 135, 165 02 Prague 6, Czech Republic
[3] Institute of Geological Sciences, Faculty of Science, Masaryk University, Kotlářská 2, 611 37 Brno, Czech Republic

The Prague Synform (Teplá–Barrandian region, Bohemian Massif), referred in old papers as a Prague Basin, represents remains of Ordovician to Middle Devonian sedimentary units folded into a large synclinorium. The term Prague Basin was a consequence of geological interpretations of the Prague Synform as a relatively small and isolated sag of synsedimentary origin. The issue of older models is broad and complicated, further details are discussed in Melichar (2004).

First of three major faults under our study was the Tachlovice Fault. This fault is at least forty kilometres in length, strikes