The Jandaq Complex and theJandaq ophiolites (Central Iran) and their structural setting

Benciolini L.[1], Zanchi A.[2*], Zanchetta S.[2], Martin S.[3] & Javadi H.R.[4]

1. Dipartimento di Fisica, Chimica e Ambiente, Università degli Studi di Udine; 2. Department of Earth and Environmental Sciences, Milano-Bicocca University, Milan; 3. Dipartimento di Geoscienze, Università degli Studi di Padova; 4. Geological Survey of Iran, Azadi Square, Meraj Avenue, 13185-1494 Tehran, Iran.

Corresponding email: andrea.zanchi@unimib.it

Keywords: Central Iran, accretionary wedge, Great Kavir Fault, ophiolites

Several different terranes derived by the dismembered Eurasian margin occur to the south of the Great Kavir-Doruneh Fault in Central Iran, which mainly consists of Gondwana-derived units. This work presents field observations and PT estimates on some units in the Jandaq area in order to discuss their tectonic significance. Two units are described: a) an ultramafic to mafic unit reported in the literature as "Arusan ophiolitic mélange" or Jandaq ophiolite (JO); b) the so-called Jandaq metamorphic belt (JMB).

a) The JO consists of highly serpentinized ultrabasic, metabasites, metacherts and marbles. Serpentinites locally show poorly preserved mineral relics of mantle peridotites (Opx, Cpx, Ol) and include some metagabbro pods. Metabasites often include mm- to cm- thick carbonatic layers and discontinuous epidote-rich layers. This complex show a greenschist-facies foliation defined by poikilitic Ab, Chl, Tr, Cal and Ep. Amphibolite facies relics consisting of yellowish to green Hbl, Pl and Ep are rarely preserved within undeformed pods. Metacherts and thick marble layers cover this assemblage. A thick horizon of actinolite schists separate metabasites and serpentinites. We suggest that Ep- and Cal- rich metabasites could represent metamorphosed lavas associated to relatively fresh peridotites. Subsequent serpentinization gave rise to metasomatic actinolite schist. Locally, serpentinites are covered by ophicalcites followed by graded serpentinitic breccias and marbles, suggesting the exposure of mantle rocks at the seafloor.

b) The JMB consists of metapelites and minor amphibolites, which show contrasting radiometric ages (Carboniferous/Jurassic). Metapelites show an amphibolite-facies paragenesis consisting of Gt, Bt, Mu, Ky, Pl and St mineral assemblages, whilst amphibolites contain Hbl and Pl. Hbl and Pl equilibria within amphibolites, as well as Gt Bt equilibria within metapelites, suggest that the JML experienced conditions of T = 600° +/- 30° C e P = 8 Kb +/- 1,5 Kb.

The JO and JMB are crosscut by Late Jurassic granitoids non-conformably covered by the Upper Jurassic-Lower Cretaceous Chah Palang Conglomerate. All the described units are now part of a thrust stack, which formed in a right-lateral transpression active along ENE-WSW trending dextral strike-slip faults.

Finally, the JMB and JO reveal peculiar and independent structural setting and evolutions. We suggest that the the structural setting of the Jandaq ophiolite could be usefully compared with oceanic and ophiolitic analogues.