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The Jandaq Complex in Central Iran: new insights on a Middle Jurassic orogenic event

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Central Iran consists of several tectonic units of still largely debated paleogeographic affinity, age and tectonic evolution. In the NW of Central Iran three metamorphic complexes containing dismembered ophiolites, the Anarak, Jandaq and Posht-e-Badam complexes, occur. Among these, the Anarak complex, consisting of three tectonometamorphic units, is the best known. It is currently interpreted as a fragment of the late Palaeozoic orogenic wedge which reached peak metamorphic conditions before 290 Ma, the age of undeformed trondhjemite dikes intruding the whole complex.
The Posht-e-Badam and the Jandaq complexes have since now be considered of Precambrian to Paleozoic age. This interpretation derives from the age of Norian granites and granodiorites that intruded the Jandaq metamorphic units and the same interpretation has been extended also to the Posht-e- Badam complex due to its structural and petrographic similarities with the Jandaq one.
The Jandaq complex is divided in two subunits: the Arusan Ophiolitic Mélange (AOM) and the Jandaq High-Grade Metamorphic unit (HGM). To the north it is in contact with the Airekan basement, which mainly consists of undeformed granites of early Cambrian age (520-525 Ma). The AOM consists of serpentintes, prasinites and metagabbros with minor slices of quartzites. All rocks that compose this unit display structures related to at least two deformation phases accompanied by metamorphism which reached the upper greenschist or the epidote-amphibolite facies. The HGM is instead made by metapelites with minor amphibolites. Equilibrium mineralogical assemblages containing garnet + kyanite + staurolite in mica schists, and garnet + amphibole in metabasites suggest peak metamorphic conditions well within the garnet amphibolite facies.
Field structural analyses allowed to define the tectonic nature of the contact between the HGM and the AOM. 40Ar/39Ar dating of white mica, biotite and amphibole constrains the age of the metamorphic peak in the HGM unit between the end of the Early Jurassic and the Middle Jurassic. The age of metamorphism in the Arusan ophiolites is somewhat less defined due to complex Ar-release patterns. A preliminary interpretation points to a Carnian to very early Norian age, with a subsequent re-equilibration in the Middle Jurassic.
Structural petrographic and geochronological data indicate that the HGM and the AOM units experienced different tectonometamorphic evolution and that the HGM reached peak metamorphic conditions during the Toarcian/Pleinsbachian. The HGM and the AOM where stacked together and assembled to the Airekan terrane likely during retrogression and exhumation.
These new data indicate the occurrence of a Middle Jurassic orogenic event that was previously unknown in Central Iran and which significance still need to be underdstood.