

40Ar/39Ar Dating of White Micas in the Tamsamani Units (External Rif): New Constraints on the Tectono-metamorphic Evolution of the Rif.

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Located at an intermediate position in the External Rif nappe pile, the Tamsamani units present an abnormally intense metamorphism and a penetrative ductile deformation. Some of the Tamsamani units, which could have an internal origin, underwent medium-pressure low-temperature (MP-LT) conditions (7-9 kbar; 330-430°C). These conditions are similar to the ones recorded in the lower grade Internal Rif units (Alboran Domain). Whereas several geochronological studies have been carried out to constrain the Alboran Domain metamorphic evolution, data are lacking in the External Rif. We have undertaken 40Ar/39Ar dating, together with microtextural and chemical analysis of the dated white micas in order to assess the tectono-metamorphic evolution of the MP-LT Tamsamani units. We show that three groups of ages can be pointed out: (1) 33-23 Ma corresponding to Si-rich relic micas, (2) 15-12 Ma corresponding to the micas defining the foliation and (3) 10-6 Ma corresponding to late micas and alteration. We propose that the MP-LT metamorphism in the Tamsamani, probably Oligocene in age, could be related with the subduction of the Subbetic units and the HP-LT event in the Alboran Domain. However our data show that the exhumation of the Tamsamani took place during the Middle Miocene when the Alboran Domain units were already exhumed. The timing of the tectonic and metamorphic evolution of the Tamsamani is set back within the External Rif tectonic time frame and compared with the Alboran Domain units of the internal Rif. We finally compare our results with the available geochronological data in the whole Betic-Rif orogen and discuss the implications for regional geodynamics.

Keywords: 40Ar/39Ar, Alboran domain, metamorphism, Rif, Tamsamani