

Paleomagnetic and AMS study of the Taguelft inverted basin. Evidences of early compressional events in the High Atlas belt (North Africa)

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Abstract: In this work we present the results of paleomagnetic and AMS studies of an inverted basin (Taguelft) from the northern boundary of the Moroccan Central High Atlasic belt. This chain is an intra-plate inverted strike slip basin (Mattauer et al., 1977). The studied series comprise mostly Jurassic marly limestones and red beds. 41 sites were sampled with more than 10 standard samples per site. The AMS analysis of these rocks reveal three main directions of magnetic lineation. The Jurassic marly limestones display two perpendicular directions, NW-SE and NE-SW, consistent with the extension direction of the Jurassic Central High Atlasic basin evidenced by structural studies (Laville 1985). At the top of the Bajocian multicolored marls, the red claystones display a change in the magnetic lineation direction, which becomes E-W up to the Upper Jurassic red sandstones and mudstones. This E-W direction is consistent with N-S shortening indicating the first stage of basin inversion debated in the Central High Atlas (Moussaid et al., 2013).

Thermal demagnetization reveals a stable and systematic component with unblocking temperatures ranging between 300 and 600°C in the red beds specimens and 250 to 450°C in the marly limestones. This characteristic component displays normal polarities in all studied sites, suggesting a remagnetization. Rock magnetism experiments and AF demagnetization reveals the dominance of hematite as carrier of the magnetization in the red beds. The marly limestones display a mixture of low and high coercivity minerals, with dominance of magnetite. Fold tests at the basin scale using all paleomagnetic site means and also individual specimens directions on metric scale folds were performed. The results indicate in both cases a syn-folding remagnetization. The paleomagnetic direction at the remagnetization acquisition time have been calculated by the small circle intersection method (Waldhör and Appel, 2006). In order to define the age of this remagnetization event, the calculated mean direction ($D= 338.5$, $I= 37.4$, $K=34.2$, $\alpha_{95}= 4.1$) was compared with the expected

declinations and inclinations for the African plate using the Global Apparent Polar Wander Path (GAPWP) in African coordinates (Torsvik et al., 2012). This comparison indicates that the remagnetization event occurred around 100 Ma. The method proposed by Villalaín et al. (2003) has been used in order to determine the tilting of beds at the remagnetization acquisition time. The results support the occurrence of a folding event in the Atlasic belt prior to the Cenozoic inversion, related to the presence of progressive unconformities in the Jurassic series near the anticline ridges.

Keywords: AMS, Paleomagnetism, Remagnetizations, inverted basin, Moroccan High Atlas.

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