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High resolution paleomagnetic study in the Central High Atlas (Morocco). New insights into the widespread Cretaceous remagnetization.

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In this work we present the preliminary paleomagnetic results in the framework of an ambitious research project that is being carried out in the Central High Atlas (CHA). The Atlas is an intracontinental chain generated by the inversion of extensional Mesozoic basins due to the convergence between Africa and Europe during the Cenozoic. The deposits involved in the CHA are dominated mainly by Lower and Middle Jurassic carbonates and Middle Jurassic red-beds.

The project is based on the hypothesis of the existence of a widespread and pervasive regional remagnetization well documented in different points of a large area (more than 10000 km2) of the CHA. This widespread remagnetization could be dated to ca. 100 Ma by comparison with the Global Apparent Polar Wander Path of the African plate. The overprint is bracketed between two tectonic events (i.e. interfolding remagnetization) and allows separating i) the pre-remagnetization deformation linked to the early structuring of the sedimentary basins (including Jurassic extension, diapirism, magmatism, etc.) and ii) post-remagnetization deformation related to the Cenozoic compression resulting in the uplift of the cordillera.

The small circle methods allow to determine the paleo-dip of beds at the remagnetization acquisition time from interfolding remagnetizations. Thus, the Atlas remagnetization provides the opportunity to reconstruct the geometry of the bedding at ca. 100 Ma. In previous works, our group has developed several geologic cross-section restorations to the remagnetization time (100 Ma) allowing to solve particular structural problems in the High Atlas.

The final objective of this new project is to obtain a paleodip map and a 3D reconstruction of a relatively wide region in order to obtain a palinspastic image of an area of the High Atlas at 100 Ma. To achieve this goal we need to provide a dense network of 100 Ma paleodip data. This will be obtained from a detailed paleomagnetic sampling along 20 serial cross-sections cutting across an area of 100 km x 60 km. These cross sections must be covered with about 600 paleomagnetic sites (about 4800 samples). 260 of them have been already sampled, analyzed and interpreted to obtain the corresponding paleodips in previous works developed by our group in this area.

In this work we present the paleomagnetic results of 270 new paleomagnetic sites in the region achieving most part of our objectives. We describe differences between areas both in magnetic properties as well as the directions of remagnetization, providing new clues on the processes of generation and propagation of the remagnetization event.