The High Atlas : a Reactivated Obliquely Opening Ancient Rift

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The Atlas forms an intracontinental belt from Morocco to Tunisia. Our works is focalised on the Moroccan High Atlas, in the transition zone between the Eastern High Atlas and Saharan Atlas. Our study has used satellite imagery and field structural analysis. Our reconstruction of the Jurassic trough in this portion of the High Atlas belt takes into account the observed later compressive deformation. The present day structures are inherited from tilted blocks and basins formed during the Jurassic extension. Identification of the individual blocks which have either relatively uplifted or downthrown when crossing a particular normal fault is based on the observed thicknesses and sedimentary facies of the Liassic stratas which vary from thick, commonly dolomitic breccias, to thin units which consist mainly of fine-grained limestones. There is a variety of tilted blocks and basins (depocenters) which have developed on a number of scales. The deepest of these basins seems to have developed to the northwest of the town of Rich because the Jurassic sediments are the thickest in this area. The trough was therefore asymmetric, with the thickest portion being located along the northern margin of the structure. Data such as tension joints, stylolites, striations, microfolds, have be collected along fossilized paleofaults, in order to determine the paleodisplacements and paleostress orientations, specially for Liassic and middle Jurassic times. Local paleostress solutions provide information on the successive orientations of major patterns during the Mesozoic and Cenozoic time. In the early Jurassic an initial rift stage is characterized by normal-oblique faults bounding tilted blocks, associated to tensional paleostress patterns which minimum component trends WNW-ESE. Faults parallel to this direction are interpreted as paleotransfer faults. We assume that the divergent motion responsible for the opening of the rift system in the early Jurassic was trending WNW-ESE, subparalleling the paleotransfer faults and the trend of the minimum component ($\sigma 3$) of the paleostress field. The E-W trending Jurassic central-eastern High Atlas rift opened obliquely, and not in a pure strike-slip regime along E-W striking faults as previously proposed. A leter stage of rifting (middle Jurassic) is characterized large normal faults and is suppoded to accompagny local movements that be due to gravity. This pattern of oblique opening in the Jurassic has developped throughout the Atlas Mountains of northern Africa because the WNW-ESE to NW-SE trending faults are also found in the Saharan and Tunisian Atlas.