

The Evolution of Deformation in the Southern-Central Tunisian Atlas: Parameters and Modelling

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Abstract : The southern-central Tunisian Atlas presents a typical example of external zone. It occupies a particular position in the North African chains: firstly, it is the eastern limit of atlassic structures; secondly, it is the edges between the belts structures to the north and the stable Saharan platform in the south. The evolution of deformation study is based on several methods such as classical or numerical methods. The principal parameters controlling the genesis of folds in the southern central Tunisian Atlas are; the reactivation of pre-existing faults during later compressive phase, the evolution of decollement level, and the relation between thin and thick-skinned. One of the more principal characters of the southern-central Tunisian Atlas is the variation of belts structures directions determined by: NE-SW direction named the atlassic direction in Tunisia, the NW-SE direction carried along the Gafsa fault (the oriental limit of southern atlassic accident), and the E-W direction defined in the southern Tunisian Atlas. This variation of direction is the result of an important variation of deformation during different tectonics phases. A classical modeling of the Jebel ElKebar anticline, based on faults throw of the pre-existing faults and its reactivation during compressive phases, shows the importance of extensional deformation, particular during Aptian-Albian period, comparing with that of later compression (Alpine phases). A numerical modeling, based on the software Rampe E.M. 1.5.0, applied on the anticline of Jebel Orbata confirms the interpretation of "fault related fold" with decollement level within the Triassic successions. The other important parameter of evolution of deformation is the vertical migration of decollement level; indeed, more than the decollement level is in the recent series, most that the deformation is accentuated. The evolution of deformation is marked the development of duplex structure in Jebel AtTaghli (eastern limit of Jebel Orbata). Consequently, the evolution of deformation is proportional to the depth of the decollement level, the most important deformation is in the higher successions; thus is associated to the thin-skinned deformation; the decollement level permit the passive transfer of deformation in the cover.

Keywords : evolution of deformation, pre-existing faults, decollement level, thin-skinned

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