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Tardi-Variscan Deformation in Ibero-Moroccan Sector; Implications on Pangeia Assemblage

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The tardi-Variscan structures in the Ibero-Moroccan domain show a brittle-ductile behaviour, overlapping the earlier main ductile stages, developed in the same orogenic process. The interaction between tectonic thickening, erosion and isostasy during the progressive colisional stages of the Variscan Wilson cycle was responsible by this rheological evolution. The tardi-Variscan deformation can not be understood without recognize the role of the first-order anisotropies. These anisotropies could be either the result of main Variscan events or inherited from previous tectonic cycles. Previous works (e.g. Arthaud & Matte, 1977) emphasize the crucial role of major E-W lithospheric anisotropies in the development of the tardi-Variscan fracture pattern.

Recent structural detail mapping in Portugal (in SW sector of Iberian Chain) and Morocco (in Anti-Atlas and Western High Atlas) shows kinematic and geometric similarities between tardi-Variscan structures in both sectors. Indeed, this deformation event is characterized by left-lateral NNE-SSW to NE-SW brittle-ductile shear zones; these shears can be observed from orogenic scale (e.g. Vilariça or Messejana Faults in Iberia and Snaâla-Oulmés one in Morocco) to regional scale. At the regional scale, the shears are expressed by decametic-hectometric faults with metric to decametric offsets.

The absence of a right-lateral conjugate family and the common presence of orogenic dextral E-W shear zones, support a dominoes genetical model to the sinistral NNE-SSW shears (Ribeiro, 2002). These dominoes were driven by the major E-W lithospheric anisotropies. Indeed, although the left-lateral shears are pervasive at minor scales the E-W dextral shears (e.g. Azores-Gibraltar Fault on transition between Iberian and Morocco segments or in Morocco region Tizi'n Test and Tantan shears) could only be seen at the scale of the Ibero-Moroccan domain.

This model extrapolates to whole Ibero-Moroccan domain a previous proposal to the Iberian segment (Ribeiro, 2002). This is a variant of the classic model suggested for tardi-Variscan faulting (e.g. Arthaud & Matte, 1977). Such model considers a major dextral simple shear between Gondwana and Laurussia, which induce a conjugate system of strike-slip faults. However, this hypothesis is not consistent with field observations, because the sinistral shear family clearly predominates and its dextral conjugate is absent. Moreover, in last stages of Pangeia collision, it could be emphasized a dextral transcorrent system between Laurussia and Gondwana (e.g. Nance et al, 2012). This is in agreement with recent paleogeographic models proposed to the last stages of Variscan Orogeny.

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