



Pre-Permian extensional deformation and uplift in the central High Zagros (Iran): What is the geodynamic significance of the so-called "Hercynian unconformity" in the Arabian plate?

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Central High Zagros (CHZ), which is bounded by the High Zagros Fault (HZF) to the south-west and the Main Zagros Thrust (MZT) to the north-east, includes exposures of Lower Paleozoic strata in the core of several thrust anticlines developed during the Zagros orogeny. However, structural style and tectonic evolution during the Paleozoic remain poorly studied due to scarce and discontinuous outcrops, the complexity of Cenozoic deformation and the absence of deep sub-surface data. We present the preliminary results of field trip focusing on the geology of Paleozoic in this area. We confirm the existence of an angular unconformity below the Upper Carboniferous (?) - Lower Permian Faraghun formation. In the geological literature this unconformity is generally reported as the "Hercynian Unconformity" suggesting a relationship with the Hercynian (Variscan) orogeny, which affected Western Europe and westernmost Africa during the Carboniferous. Amazingly the unique observable structures sealed by this unconformity are N-S trending normal faults and tilted blocks without any evidence of compressional deformation. These faults and tilted blocks can be shown not only at outcrop scale but also evidenced by geological mapping. This pre-Permian extensional deformation, which is general at the scale of the CHZ (300km x 50km), asks about the significance of the "Hercynian unconformity" in the study area and, more generally, in the Arabian plate. A hiatus of Silurian to Carboniferous rocks in CHZ prevents any direct estimation of the age of neither this extensional deformation nor the associated uplift (and coeval erosion). However, in the light of these new observations, a reassessment of the geology of some key areas (like Ghawar area in Saudi Arabia) as well as existing ZrFT and Zr(U-Th)/He thermochronologic data allows us to propose that a major thermo-tectonic event should be responsible for uplift and associated normal faulting during the Late Devonian-Early Carboniferous in the Arabian plate. The subsequent cooling of the lithosphere should be responsible for thermal subsidence and deposition of a huge carbonate platform during the Permian and later. This strongly modifies the "classical" interpretation of the pre-Permian unconformity as a far effect of the Variscan orogeny.