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Finite strain in the Tata – Tan-Tan region: evidences for the variscan dextral kinematics in the Anti-Atlas domain, Morocco

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In the Anti-Atlas Chain Mountain, it is possible to observe evidences for the presence of dextral shear zones associated to the Late Variscan collision, that give rise to the Pangaea supercontinent. In the Tata - Tan-Tan region this deformation led to a set of major deflections of the main geological/geomorphological units (like the Ordovician quartzitic crest of Jbel Bani and the Devonian carbonated units of Jbel Rich) that suffer rotation from the regional NE-SW direction to near an ENE-WSW trend. The shallow structural level of the deformation usually precludes the development of secondary mesoscopic structures like penetrative cleavage, which difficult the geodynamic interpretation of the region. Finite strain quantification studies using quartz grains of Ordovician quartzites help to constrain the possible structural solutions.

Both in Tata and Tan-Tan the orientation of the strain ellipsoids in the E-W to ENE-WSW sectors are not the result of a simple rigid rotation of the previous NE-SW trend, but a plastic deformation of the quartz grains have also occurred. The obtained pattern could be explained by the superposition of the regional dextral shearing along the E-W direction on deformation induced by flexural bending related to the coeval Variscan folds.

Moreover, the existence of different orientations of finite strain ellipsoids obtained in adjacent layers of Tata, emphasize the importance of strain partition mechanisms related to the regional dextral Variscan deformation.

These data, combined with the structural data for the region, strengthen the interpretation of the influence of a dominant non-coaxial tectonic dextral shear regime, associated to detachment basal plans cause that impose a strong decoupling of deformation observed in the region of the Anti-Atlas, active during Late Variscan tectonic.

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