



Paleaostress/strain study and its implications for the geodynamic history of the Jabal Akhdar Dome (Oman)

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Field observations, including oolite-, stylonite, fracture analyses combined with laboratory measurements using calcite twin analysis show a ductile-to-brittle multiple-phase deformation history of the Arabian carbonate platform, ranging from Late Cretaceous to Neogene times. The Arabian carbonate platform, belonging to a passive continental margin since the Late Permian, was the site of the obduction of Tethyan oceanic lithosphere (Semail Ophiolite) during the Late Cretaceous, caused by the northward drift of Africa (Hanna, 1995). After or during the obduction, large parts of the entire nape pile composed of the Arabian platform and the Hawasina/Semail nappes, were folded and exhumed. This led to the exhumation of the Jabal Akhdar Dome. Our oolite samples from the Jabal Akhdar Dome and from below the ophiolite thrust reveal the strain ellipsoid related to the obduction. This strain ellipsoid shows components of pure and simple shear. In the latter case the longest axes of the strain ellipsoid are parallelly oriented to the direction of obduction (NE to SW), which is in good agreement with the direction of obduction as depicted by Hacker et al. (1996) for the study area. The pure-shear component (flattening) is interpreted to be a result of the overburden of the up to 7 km thick oceanic lithosphere. The oolites that are located approximately 200 m below the ophiolite thrust contact provide evidence for ductile deformation during the Late Cretaceous. These results are compared with strain and stress tensors obtained from stylonites, calcite twins and fracture analyses, derived from the uppermost part of the Arabian platform of the Jabal Akhdar Dome. Our results show a complex and detailed structural deformation of the post-obduction history of the Jabal Akhdar Dome, including its folding and exhumation.

Hanna, S. (1995) Field guide to the Geology of Oman. Ruwi (Historical Association of Oman. 178 pp.
Hacker, B.R., Mosenfelder, J.L. & Gnos, E. (1996) Rapid emplacement of the Oman ophiolite: Thermal and geochronological constraints. *Tectonics*, 15(6), 1230-1247.