



## **Evolution of structures, pressure and temperature in the footwall of large scale overthrusts – Oman’s passive continental margin during obduction orogeny**

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The Oman Mountains are world famous for their exceptionally well-exposed Cretaceous ophiolite sequence. During obduction the overridden sedimentary basin was forced to deep burial. Cenozoic doming associated with Eurasian-Arabian collision and incision of deep wadis resulted in spectacular outcrops cutting the allochthonous units associated with obduction, as well as the entire overridden passive margin sequence. This offers unique insights on how obduction manifests itself in the structural record of the autochthonous, and how it influenced the evolution of pressure and temperature.

In this contribution we focus on relative timing of obduction related shearing and burial related veins, timing of exhumation, as well as on the influences of obduction on hydrocarbon generation and tectonically driven migration. We focus on the Jebel Akhdar Dome, one of three tectonic windows in the Oman Mountains. We present combined results of meter-scale structural mapping with thermal reconstructions of peak burial (solid bitumen reflectance, Raman spectroscopy), exhumation (zircon (U-Th)/He thermochronology), pressure reconstruction (fluid inclusion thermometry) as well as 2D numerical basin modeling. Peak burial temperatures of 225-260 °C for Natih rocks reflect peak burial of about 8-10 km, prior to platform exhumation, which was active between 49-39 Ma. Moreover, we quantify related pressure evolution and show how ophiolite obduction initiated overpressure cells forcing tectonically expelled fluid migration. Combining our results with plate tectonic reconstructions of the Arabian Peninsula, we present a new comprehensive model of mountain building in Oman.