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Hydrocarbon generation and migration induced by ophiolite obduction: The carbonate platform under the Semail Ophiolite, Jebel Akhdar, Oman.

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Oman's Semail Ophiolite, as largest ophiolite on earth, fascinated geologists for more than hundred years. It spans over 350 km in a NW-SE orientation and is dominating the northern landscape of Oman. After overthrusting of this oceanic crust onto the passive continental margin of Arabia, updoming of the area during Alpine orogeny exposed the margin sediments which are now easily accessible at the surface. Within the Oman Mountains different canyons provide access to 1,400 m of lithology accumulated through the last 300 My, containing hydrocarbon source and reservoir rocks. These sedimentary rocks offer unique possibilities to analyze the temperature and pressure evolution of sedimentary basins influenced by large scale overthrusts.

Understanding the evolution of the overthrusted sedimentary basin is the key to entrapped reservoirs. Hence, it is essential to understand the thermal and tectonic history of the Oman Mountains to elaborate the interplay of overthrusting and ophiolite induced burial of the overridden sedimentary basin. Therefore, we linked structural modelling of the northern Oman Mountains with petrographic analysis and basin modelling. Thermal history was reconstructed using various maturity parameters (e.g. vitrinite and solid bitumen reflectance, Raman spectroscopy of carbonaceous material, fluid inclusion measurements), while reconstruction of the structural history was based on field mapping and stress field restorations. Presented results were summarized and integrated in a numerical basin model of the area.