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## The interplay between tectonics and karst in the formation of the canyons in the Al-Hajar Mountains (Sultanate of Oman)

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The Al-Hajar Mountains (Northern Sultanate of Oman) characterise the north-eastern part of the Arabian Plate and exhibit a complex tectonic history. They formed during the overthrusting of the Semail Ophiolite and the slope-basin sedimentary sequences over autochthonous sedimentary cover and metamorphic units. The post-orogenic history is characterised by extension and subsequent shortening, forming a series of regional-wide anticlines. The Jebel Akhdar dome, in the central Al-Hajar Mountains, is one of these anticlines; it consists of a pre-Permian basement and Permian to Late Cretaceous carbonate platforms. Along the southern flank of the anticline, the Jebel Akhdar Mesozoic shallow-water limestone is deeply cut into a network of narrow and sometimes meandering canyons. The combination of remote sensing, morphometry, field survey and structural analysis is the multidisciplinary approach used to explore the evolution of canyons and understand the processes that oversaw their deep incision. We identified a group of joint and fault sets, morphostructural lineaments and inactive karst features (both in the epikarst and in the hypokarst) at various scales and evidence for canyons overdeepening respect to the present-day watershed basins. Our reconstruction suggests the ancestral action of karst dissolution along the many structural weaknesses available along the phreatic zone. This led to the formation of a complex network of conduits, later exhumed and occasionally reworked by fluvial processes and linear erosion, whose dynamic was tuned by pre-Quaternary and Quaternary climatic changes.