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Insights in dynamics of high-pressure cells based on high-resolution outcrop panoramas: A geometry database for calcite vein networks in the Oman Mountains.

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The Oman Mountains offer soccer-field sized world-class outcrops of calcite vein networks in limestone of the Cretaceous Shuaiba and Natih formation, which are major oil and gas reservoirs in the Middle East.
The creation of high-resolution outcrop panoramas is a feasible method to capture the geometry of vein networks. We captured four polished outcrops comprising calcite vein networks in the Cretaceous limestones of the Jabal Akhdar high-pressure cell. The imagery acquisition was carried out using various techniques, resolution and spatial coverage, according to the desired detail level and the given terrain.
The GIS-based outcrop panoramas serve the FRACs Research Consortium to integrate field and laboratory measurements. Overprinting relationships and time sequences allow the understanding of vein network kinematics. Supported by microstructural and geochemical studies these datasets can provide insights into a dynamically evolving RTM-system. Such investigations will deliver constraints on boundary conditions to model these complex systems. Furthermore network geometries are used to model fluid flow while vein-opening increments are deduced from microstructural observations. The fracture or host-rock vein interface morphology respectively affects the coupled system of fluid flow and crystal growth in an open fracture.