

FAULT VOID FILLS - PERVASIVE AND PERSISTENT FLUID FLOW PATHWAYS IN FRACTURED CRYSTALLINE AND CARBONATE RESERVOIRS

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ABSTRACT

The overall project aim is to understand how void structures associated with faults, and their associated fills, form at a range of different depths. It will help to better understand the relationship between seismogenic faulting and fluid flow and how this may influence the development of petroleum resources. These little studied “fault void fills” are widely recognised in both surface exposures and subsurface cores, and are thought to represent significant potential pathways for the migration of hydrocarbons in otherwise low permeability crystalline basement and carbonate reservoirs. The Institut Français du Pétrole Grant from the AAPG Foundation is being used to fund fieldwork studying fractured Devonian-Carboniferous limestones of South-Devon and Pembroke. Karst-like fault void fills here formed in the near surface and include complex zoned carbonate mineralization and Permo-Triassic sedimentary materials. In addition to collecting measurements and specimens for lab analyses, aerial drone imagery will be used to acquire high resolution aerial photographs for mapping and to build 3D photogrammetric virtual outcrop models. The findings here will be compared and contrasted to equivalent datasets collected from other fracture networks and fills formed across a broad range of palaeodepths, ranging from near surface (Rona Ridge), to deeper crustal settings (Adamello, Italy; West Salton Detachment, USA). The results from this study will lead to a better understanding of the relationship between fluid flow and fracture networks, which could have significant implications for fluid migration models, and exploration and production of unconventional crystalline basement/carbonate reservoirs.

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