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On the Qarat Kibrit Salt Dome Faulting System South of Adam, Oman: In Search of Uranium Anomalies

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Abstract : Development of salt domes, often a rising from depths of some 10 km or more, causes an intense faulting of the surrounding host rocks (salt tectonics). The fractured rocks then present ideal space for oil that can migrate and get trapped. If such moving of hydrocarbons passes uranium-carrying rock units (e.g., shales), uranium is collected and enriched by organic carbon compounds. Brines from the salt body are also ideal carriers for oxidized uranium species and will further dislocate uranium when in contact with uranium-enriched oils. Uranium then has the potential to mineralize in the vicinity of the dome (blue halite is evidence for radiation having affected salt deposits elsewhere in the world). Based on this knowledge, the Qarat Kibrit salt dome was investigated by a well-established geophysical method like very low frequency electromagnetic (VLF-EM) along five traverses approximately 250 m in length (10 m intervals) in order to identify subsurface fault systems. In-phase and quadrature components of the VLF-EM signal were recorded at two different transmitter frequencies (24.0 and 24.9 kHz). The images of Fraser filtered response of the in-phase components indicate a conductive zone (fault) in the southeast and southwest of the study area. The Karous-Hjelt current density pseudo section delineates subsurface faults at depths between 10 and 40 m. The stacked profiles of the Fraser filtered responses brought out two plausible trends/directions of faults. However, there seems to be no evidence for uranium enrichment has been recorded in this area.

Keywords : salt dome, uranium, fault, in-phase component, quadrature component, Fraser filter, Karous-Hjelt current density
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