ASSESSING THE SCALE OF A THERMAL ANOMALY SURROUNDING THE GYPSUM VALLEY SALT DIAPIR, PARADOX BASIN, CO, USING PAIRED (U-TH)/HE AND VITRINITE ANALYSES

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Abstract

Salt is two to three times more thermally conductive than surrounding sediments, and as a result, thermal anomalies are associated with salt in sedimentary basins. The size and magnitude of anomalies surrounding salt have been calculated by numerical modeling. However, despite numerous studies there is little consensus in the literature about the expected scale and impact the thermal anomalies have on surrounding sediments. The size and magnitude of these anomalies have important implications for the maturation of hydrocarbons in salt basins and for thermally driven diagenetic processes (e.g., quartz cementation) that may affect reservoir quality. This study will document the scale and thermal impact of the Gypsum Valley salt diapir (GVD), located in southwestern Colorado, on the surrounding sediments of the Paradox Basin using vitrinite reflectance analysis (R_o) and low-temperature apatite and zircon (U-Th)/He thermochronology. Paired mudstone and sandstone samples were collected in a transect perpendicular to the edge of salt. Analysis of these data are expected to show a decrease in R_o values with increasing distance from salt based on numerical models that predict an elevation in temperatures near salt, when sediments are in a suprasalt position. Zircon and apatite (U-Th)/He cooling ages are expected to be younger relative to regional cooling ages adjacent to salt, and similar to regional ages far from salt due to the elevated temperatures. The trends of these data will quantify the spatial extent, and relative magnitude of the thermal anomaly, and have important implications for petroleum systems in sediments adjacent to salt bodies.

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