



# GEOGULF2021

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## Potential for REEs in Large Evaporitic Bodies: Examples from North American Phanerozoic Salt Bodies

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### ABSTRACT

With increased demand for rare earth elements (REEs) that coincide with our increased technological advances, we are looking towards new sources. While REEs are typically found in alkaline igneous rocks, new potential sources lie in extensive evaporitic bodies. Even at low concentrations (e.g., 7 ppm of lithium), these elements could have commercial value, could also be useful indicators of palaeoceanographic conditions, and lead to insights in deposition, diagenesis and halokinesis of salt bodies. Here, we present and attempt to interpret trace and bulk geochemistry of several large evaporitic bodies: Salina Group, Louann Salt, Hutchison Salt, Salado Salt, and modern-day Searles Lake deposits. Modern seawater shows to have an enrichment of REEs, and preliminary work on the Salina Salt from the Appalachian Basin, the Salado Salt from Texas, Hutchison Salt from Kansas, and modern salt precipitates from Searles Lake, California indicate that the trace element geochemistry of salts are highly variable, including REEs. The bulk geochemistry shows that these bodies are primarily halite, with some containing anhydrite, shale laminations, and carbonates. There are also trace amounts of various other elements, including relatively high amounts of Sr (0–1663 ppm), Fe (0–462 ppm), Mn (0–208 ppm), Nd (0–1237 ppm), Pr (0–817 ppm), Ce (0–468 ppm), La (0–471 ppm), amongst others. The REE enrichment in various samples can be argued to be indicators of authigenic materials compared to diagenetically altered or weathered evaporite minerals. To further determine correlations amongst the data, factor analysis can help to identify original sources of trace elements; however, because of tectonically driven fluid flow/movement during subsequent orogenic events and/or diagenesis, these should be taken with a grain of salt. Overall, if found with high enough concentrations, these salt bodies, which are often brined for caverns, could prove to be economically valuable.

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## NOTES

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