SOCIETY OF INDEPENDENT PROFESSIONAL EARTH SCIENTISTS

DALLAS CHAPTER
P.O. Box 793721
Dallas, TX 75379

JANUARY LUNCHEON MEETING

Date: **Tuesday, January 16, 2024**
Place: **Prestonwood Country Club – 15909 Preston Road, Dallas, TX 75248**
Time: **11:30 A.M. (dining at 11:45 A.M.)**

Topic: **The Origin and Enrichment of Lithium-Rich Oil Field Brines: A Case Study from the Devonian Leduc Formation, Alberta Basin, Canada**

The direct extraction of critical minerals from low temperature brines and oil field produced water is emerging as a potentially economical and environmentally improved extraction methodology. Resource characterization and field-tested lithium production via direct lithium extraction technologies of Smackover Fm. (Arkansas, USA) and Leduc Fm. (Alberta, Canada) brines indicate a promising domestic supply of lithium from oil field brines. Elevated lithium concentrations (>50 mg/L) are known in oil fields across North America (e.g., Paradox, Appalachian, Williston Basins) but the origin of these brines, source of the lithium, and mechanisms for lithium enrichment are largely debated or unknown. Using the Devonian Leduc Fm. resource, we document the complexity of unraveling brine generation and evolution and lithium source and enrichment in oil field brine resources. The presence of high lithium concentrations (50-140 mg/L) have been documented in the Alberta Basin since the 1960s. The lithium resource within the Leduc reservoir brines have been estimated at 16.0 Mt lithium carbonate equivalent with an average lithium concentration of 75 mg/L. Competing hypotheses exist regarding Leduc Fm. brine origin (evapoconcentration of seawater, dissolution of evaporites, magmatic/hydrothermal fluids) and post-formational brine modification (migration – connate vs. exotic brine, dilution with meteoric water, mineralization – e.g., dolomitization, dewatering of clay minerals/gypsum). Additionally, lithium source (clay minerals in reservoir, subaerial/subsurface rock-water interactions, exotic lithium-rich fluids) and lithium brine enrichment mechanisms confound understanding of resource homogeneity and longevity. In this presentation we summarize the Leduc brine geochemical characterization and potential lithium sources. We also discuss a path forward for interrogating the origin of oil field brine resources using multiple isotopic systems (7Li, 87Sr/86Sr, Δ'17O) applied to both the brine and reservoir host rock.

Speaker: **Dr. Kristina Butler, Assistant Professor - University of Texas at Dallas**

Dr. Kristina Butler is an Assistant Professor at the University of Texas at Dallas in the Department of Geosciences. She is a sedimentologist and low-temperature geochemist who researches sediment- and brine-hosted critical mineral deposits. Dr. Butler earned her BS in geosciences at the University of Alaska Anchorage, her PhD at the University of Texas at Austin, and recently finished a postdoc at Brown University.

Please RSVP by 12:00 Noon on Thursday, January 11, 2024 to
Carole Popa, SIPES-Dallas Chapter Secretary, at carolerkp@yahoo.com or by phone 972-985-7830.
Guests are welcome. Their lunch expense is $40.
Dallas Chapter invites potential new members by paying for their meal.
COMING UP: Next Luncheon on February 20, 2024