

Sedimentology of the Alberta Salts: a world without compare

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The Elk Point Group (EPG) is a sedimentary package that extends from the Canadian Northwest Territories to North Dakota, USA. The Elk Point Basin, a Western Canadian Sedimentary Basin sub-basin, contains the EPG strata, including the Givetian-aged Prairie Evaporite Formation that spans most of the basin and the Emsian-aged Lotsberg Formation, spatially restricted to the depositional center of the Elk Point Basin. During the Devonian, the Elk Point Basin underwent extreme shifts in depositional facies due to intermittent access to the open ocean.

We have undertaken high resolution study of the Lotsberg and Prairie Evaporite formations of the EPG in Southern Alberta. To characterize the depositional model, formation ages, and facies for the Prairie Evaporite and the Lotsberg formations in this area we have examined six drill cores and 220 well logs of rock salt deposits. We present our preliminary interpretations of core sample analysis, formation thicknesses, anhydrite interbed correlations, and core log-well log comparisons.

Core samples of the Prairie Evaporite contain primary depositional features such as chevron crystals that grew up from the Devonian inland sea floor, and dissolution truncation surfaces marking flooding events. These features record changes in evaporation with respect to cycles of increasing salinity as the inland sea is cut off from the open ocean. The Lotsberg Formation is comprised of coarse, nearly pure halite with trace anhydrite impurities and at least one significant (~1 m) interbed of anhydrite. The lack of primary depositional fabrics in the formation is hypothesized to result from recrystallization of the halite during burial.

We will expand our descriptions and interpretations in the future via transmitted-light microscopy of thin sections, and bulk geochemical analysis using ICP-OES and XRD.