

The Timing and Characteristics of Source Rock Intervals in the Late Cretaceous Kanguk Formation, Sverdrup Basin, Canadian Arctic Islands

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ABSTRACT

The Kanguk Formation is part of a regionally extensive Late Cretaceous marine, organic-rich mudstone unit that contains oil-prone intervals and is found across more than 1,200,000 km² from the Canadian Arctic Islands to the Beaufort Sea, North Alaska and potentially even beyond. Its existence is also used as evidence for the presence of oil-prone source rocks, not only in the Amerasia Basin but also in Baffin Bay, where a late Turonian-Coniacian source rock was hinted at by the Scott Inlet oil seep offshore Baffin Island. Despite its importance for hydrocarbon exploration, the Kanguk Formation has not been studied in great detail. Only recently new studies on biostratigraphy have been published but many questions remain unanswered. Current unknowns are the organic matter composition, the continuity of source rock intervals and the timing of source rock deposition. Recent publications identified the Oceanic Anoxic Event 2 (OAE-2) in the Sverdrup Basin, which suggests that there may be a regional source rock related to the OAE-2. Based on sedimentological, organic geochemical and petrographic analyses of samples from a Kanguk Formation section on Ellesmere Island, we provide new data on the organic matter composition and source potential of the Kanguk Formation. We provide new data on the timing and regional continuity of source interval deposition from biostratigraphic analyses and U-Pb zircon dating of bentonites from the same section. We will also show evidence for potential hydrocarbon source intervals not related to the global OAE-2. Finally, we discuss why correlation to surrounding hydrocarbon basins such as Baffin Bay or the Amerasia Basin and to global OAEs should be treated with caution.