

## **Mesozoic Marine Connections across the High Arctic Reassessed - Inferences from a New Palaeogeography Study and Plate Tectonic Model**

Rkia Bouatmani <sup>1</sup>, Simon Campbell <sup>1</sup>, Stanislaw Mazur <sup>1</sup>, Lawrence Gill <sup>2</sup>, and Paul Markwick <sup>1</sup>

<sup>1</sup>GETECH, Leeds, United Kingdom.

<sup>2</sup>Exploration and New Business, Mærsk Olie og Gas AS, Copenhagen, Denmark.

Several palaeogeographic reconstructions for the high Arctic show the direct pre-Cretaceous continuity of the Sverdrup Basin into the Hanna Trough. Both the basins were supposed to adjoin one another before the opening of the Canada Basin due to 66° of counter clockwise rotation of Arctic Alaska and Chukotka away from the Canadian Arctic Islands. We have tested the justification of an early Mesozoic marine connection between the Sverdrup Basin and Hanna Trough using plate modelling, analysis of seismic data and examination of facies distribution. An investigation of alternative marine connections of the Mesozoic high Arctic seas to the global ocean was also carried out.

Available seismic data allowed the identification of areas of early Mesozoic uplift and erosion where the Ellesmerian sequence is missing and the Beaufortian and/or Brookian sequences directly overlie the Franklinian basement. These data show the lack of a possible connection between the Alaskan North Slope and the Sverdrup Basin for most of the time between Carnian and Aptian due to a belt of uplifts along the Barrow Arch and the South Chukchi Basin. This is supported by the presence of a distinct basement high offshore modern day Arctic Alaska observed on early Mesozoic reconstructions of the gravity anomaly map. Geochemically and lithologically, key Late Triassic source rocks of the Shublik Formation (Alaska) and the Schei Point Group (Sverdrup Basin) also seem to differ.

Our plate reconstruction for the Canada basin is a variation of the rotational model, but modified to avoid a large overlap between the Siberian Shelf and the Canada Arctic Islands. The plate model was used to reverse the plate movements and restore the original Mesozoic facies pattern. The facies distribution indicates that an open ocean connection to the Sverdrup Basin and other shallow seas located at the Chukchi Shelf existed across present-day eastern Siberia. The presence of a deep seaway in that area is suggested by the widespread occurrence of turbidites throughout the majority of the Chukchi Platform. Furthermore, after reversing the rotation experienced by the Chukchi microplate, these turbidites must have been originally deposited in the area located close to eastern Arctic Canada. Therefore, the open marine connection between the Sverdrup Basin and the Hanna Trough seems to be unlikely for the most of the Mesozoic and an East Siberia Seaway appears to be a more plausible solution.