

Second-Order Cretaceous Sequences of the Circum-Arctic Region and their Petroleum Geology Significance

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Summary

Large-scale changes in lithofacies and stratigraphic architecture resulting from relative sea-level changes have been a focus for substantial academic and industry study over the last few decades. Within industry the prediction of hydrocarbon play elements using sequence stratigraphic techniques is now well established.

Biostratigraphically constrained sections of Cretaceous strata across the Circum-Arctic region provide an important chronostratigraphic framework within which sequence stratigraphic concepts can be applied. In this highly prospective area, the Cretaceous brackets key events for consideration in petroleum exploration, not least the development of rifted continental margins during the opening of the Canada/Amerasia basin.

Proven and potential source rock intervals occur throughout the Cretaceous and include the HRZ on the Alaska North Slope, Hi-TOC mudrocks on the Alpha Ridge, shales at the base of the Kanguk Formation in the Banks and Sverdrup Basins and organic rich facies of the upper Hekingen and Bazhenov units in West Eurasia. Significant reservoir units are also widely distributed throughout Cretaceous strata, with some substantial resources most famously under exploitation in the Alaska North Slope.

Here, major second order sea level fluctuations are identified which exerted an important depositional control on the development of organic-rich facies and architecture of reservoir units across the Arctic region.