

A Standardized Approach to Optical Thermal Maturity Assessment with Application to the Beaufort-Mackenzie Basin, Arctic Canada

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Abstract

New and legacy percent vitrinite reflectance (%Ro) data were compiled by the Geological Survey of Canada (GSC) for approximately 80 wells in the Beaufort-Mackenzie Basin. We have attempted to standardize the data obtained from different sources based on what we have learned about organic recycling and other factors that affect the quality of the measurements. The data were quality-checked by comparison with complementary thermal maturity indicators such as Rock-Eval Tmax, liptinite reflectance, and the degree of apatite fission track annealing, and were quality-ranked on a scale of “A” to “C”, depending on the amount of information available for each set of analyses (e.g. petrographic descriptions, raw measurements, etc.). Where possible, raw legacy measurements were reinterpreted based on the analysis or reanalysis of samples in the same wells or in the same stratigraphic successions of nearby wells. The “cleaned-up” %Ro data have been used to map regional maturity trends across the basin. Preliminary analysis shows that thermal maturity for a given depth decreases northward from onshore exhumed areas along the southern basin margin to offshore, rapidly-deposited Cenozoic successions beneath the Beaufort Sea. These data are valuable for ongoing petroleum assessment studies and for constraining basin thermal modelling.