Linking Source Rock Maturation to Hydrocarbon Accumulation in the Taranaki Basin, New Zealand: An Integrated Study of the Stable Platform and Eastern Mobile Platform

Mahdi Ali Lathbl[1,*], Mohammed Hail Hakimi[2,3], Akm Eahsanul Haque[1]

[1.] *Department of Geoscience, Universiti Teknologi PETRONAS, Seri Iskandar 32610, Perak, Malaysia*

[2.] *Department of Geology, Faculty of Science, University of Malaya, 50603 Kuala Lumpur, Malaysia*

[3.] *Institute of Geology and Petroleum Technologies Kazan Federal University, Kazan 420008, Russia*

Corresponding author:

** Mahdi Ali Lathbl; E-mail address: mahdibaras2000@gmail.com*

Abstract

This study explores the hydrocarbon potential of Late Cretaceous coals and coaly source rocks within the Taranaki Basin, New Zealand, addressing the gap in understanding these formations despite the absence of confirmed discoveries. The research employs both non-biomarker and biomarker analyses of source rock samples, alongside 1D maturity modeling from the Late Cretaceous to Late Pliocene, to assess the oil generation dynamics of the Rakopi and Farewell source rock systems. Emphasis is placed on their migration through fault pathways into Eastern mobile reservoir rocks, examining the geological and geochemical factors that influence hydrocarbon generation and expulsion. The study's findings highlight specific geological formations and fault pathways with the highest potential for hydrocarbon accumulation, providing a robust framework for guiding future exploration strategies. By integrating advanced geochemical analysis and modeling techniques, this research contributes to bridging the gap between theoretical hydrocarbon potential and practical exploration outcomes, aiming to improve exploration success rates and unlock new hydrocarbon resources in the Taranaki Basin.

Keywords: Hydrocarbon Potential; Late Cretaceous; Oil Generation Dynamic; Petroleum Systems Modeling; Source Rock Maturation; Taranaki Basin.