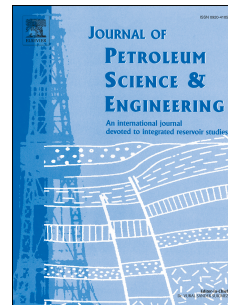


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Geochemical characteristics, depositional environment and hydrocarbon generation modeling of the upper cretaceous Pakawau group in Taranaki Basin, New Zealand

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1 **Geochemical Characteristics, Depositional Environment and Hydrocarbon**
2 **Generation Modelling of the Upper Cretaceous Pakawau Group in Taranaki**
3 **Basin, New Zealand**

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11
12 **Abstract:**

13 The oil, gas and condensate province of the Upper Cretaceous to Cenozoic Taranaki Basin is
14 very important as it has become the sole commercially-producing sedimentary basin in New
15 Zealand. An understanding of burial/thermal geo-histories of Taranaki Basin is essential for
16 modeling hydrocarbon generation. In the present study, data from subsurface samples from
17 selected wells have been analyzed and interpreted for characterizing source rock of the Pakawau
18 Group along with thermal geohistory of the basin. The Upper Cretaceous Pakawau Group, made
19 up of Rakopi (87-75 Ma) and North Cape (75-65 Ma) formations, is the eldest and most prolific
20 organic rich hydrocarbon source rock in the basin. Their lithologies vary between carbonaceous
21 mudstone and coal from alluvial to coastal plain depositional environments with marginal marine
22 influence. Most samples that are interpreted contain kerogen Types II and II-III, with few
23 samples of Type-III kerogen. This is validated by the biomarkers results, where the assessed data
24 shows that the organic source ranges from terrestrial to marine origin. The Pakawau Group
25 source is immature to mature, as reflected by the distribution of vitrinite reflectance (%Ro),
26 pyrolysis T_{max} from pyrolysis data and biomarkers data. Vitrinite reflectance distribution shows
27 that the Rakopi Formation is mostly within the mature oil window for hydrocarbon generation
28 with values ranging generally between 0.5% to 0.95% Ro. Using two selected wells, the models
29 have been interpreted to generate hydrocarbons from the Pakawau Group between Upper
30 Paleocene and Middle Eocene. Interpretations of the burial models confirm that hydrocarbons of
31 Pakawau Group has not yet attained peak generation and is still being expelled from the source
32 rock to-date.

33 *Keywords: Pakawau Group, Rakopi Formation, North Cape Formation, Taranaki Basin, source*
34 *rock evaluation, burial history*

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