ABSTRAK

KARAKTERISTIK DAN PERINGKAT BATUBARA DAERAH TABANG – KEMBANG JANGGUT, KUTAI KARTANEGARA, KALIMANTAN TIMUR

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Formasi Formasi Balikpapan di Cekungan Kutai merupakan salah satu formasi pembawa batubara utama di Indonesia, namun karakteristik litologi, kualitas, dan lingkungan pembentukan batubara di daerah Tabang–Kembang Janggut, Kutai Kartanegara, Kalimantan Timur, masih belum banyak dikaji secara terintegrasi. Penelitian ini bertujuan untuk mengidentifikasi karakteristik litologi dan pengaruhnya terhadap kualitas batubara, menentukan peringkat batubara, menganalisis hubungan parameter *proximate* terhadap nilai kalori, serta menginterpretasikan lingkungan rawa gambut pembentuk batubara.

Penelitian menggunakan pendekatan kualitatif dan kuantitatif dengan 24 data *proximate*, lima sampel petrografi organik, serta data pemboran dan log *gamma ray* dari enam titik bor. Interpretasi litologi dilakukan berdasarkan pola log *gamma ray* dan data *cutting*. Korelasi lapisan batubara menggunakan log *gamma ray*, hubungan parameter *proximate* terhadap nilai kalori dianalisis menggunakan korelasi Spearman, sedangkan lingkungan pembentukan gambut diinterpretasikan berdasarkan indeks maseral GI–TPI dan GWI–VI.

Hasil penelitian menunjukkan bahwa litologi daerah penelitian didominasi oleh batulempung dan batulanau dengan sisipan coaly shale dan batupasir halus yang mencerminkan lingkungan transitional *lower delta plain*. Batubara memiliki total moisture rata-rata 44,87–44,92% (ar), ash content 4,92–5,41%, volatile matter 39,07–39,23%, fixed carbon 34,34–34,42% (adb), total sulfur 0,17%, dan nilai kalori rata-rata 4.935–4.950 kcal/kg (adb). *Fixed carbon* dan *volatile matter* menunjukkan korelasi positif kuat terhadap nilai kalori, sedangkan *inherent moisture* dan *total moisture* menunjukkan korelasi negatif kuat. Berdasarkan klasifikasi ASTM D388 dan nilai reflektan vitrinit 0,195–0,235%, batubara tergolong peringkat *Subbituminus* B dan didominasi oleh kelompok maseral *huminite* (77,04–88,40%), terutama *attrinite* dan *textinite*. Nilai indeks maseral mengindikasikan bahwa gambut terbentuk pada rawa *ombrotrofik* bertipe *dry forest swamp* yang didominasi vegetasi berkayu dan dipengaruhi terutama oleh suplai air hujan.

Kata kunci: batubara, *proximate*, indeks maseral, reflektan *vitrinite*, *paleomire*.

ABSTRACT

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The The Balikpapan Formation within the Kutai Basin is one of the major coal-bearing formations in Indonesia. However, the lithological characteristics, coal quality, and coal-forming environments in the Tabang–Kembang Janggut area, Kutai Kartanegara, East Kalimantan, have not been comprehensively investigated in an integrated manner. This study aims to characterize the lithology and its influence on coal quality, determine coal rank, evaluate the relationship between proximate parameters and calorific value, and reconstruct the peat-forming environment of the coal.

This study employed both qualitative and quantitative approaches using 24 proximate data, five organic petrographic samples, and borehole and gamma-ray log data from six boreholes. Lithological interpretation was conducted based on gamma-ray log patterns and cutting data. Coal seam correlation was performed using gamma-ray logs, while the relationships between proximate parameters and calorific value were evaluated using Spearman correlation analysis. The peat-forming environment was interpreted using the Gelification Index–Tissue Preservation Index (GI–TPI) and Ground Water Index–Vegetation Index (GWI–VI) plots.

The results indicate that the study area is dominated by claystone and siltstone interbedded with coaly shale and fine-grained sandstone, reflecting a transitional lower delta plain depositional environment. The coal is characterized by average total moisture values of 44.87–44.92% (ar), ash contents of 4.92–5.41%, volatile matter contents of 39.07–39.23%, fixed carbon contents of 34.34–34.42% (adb), total sulfur contents of 0.17%, and average calorific values of 4,935–4,950 kcal/kg (adb). Fixed carbon and volatile matter exhibit strong positive correlations with calorific value, whereas inherent moisture and total moisture show strong negative correlations. Based on ASTM D388 classification and vitrinite reflectance values of 0.195–0.235%, the coals are classified as Lignite A and are dominated by the huminite maceral group (77.04–88.40%), particularly attrinite and textinite. The maceral indices indicate that the peat accumulated in an ombrotrophic dry forest swamp, dominated by woody vegetation and primarily supplied by meteoric (rain) water.

keywords*: coal, proximate analysis, maceral index, vitrinite reflectance, paleomire*