

Oils and Oil-Prone Coals of the Kutei Basin, Indonesia

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Previous studies have determined that Miocene and Eocene coals of the Kutei Basin of Indonesia have oil-prone source rock potential. Here we compare nine Miocene and Eocene coals (15Ma to 36Ma) on the island of Borneo with numerous oils recovered from the same basin. Oil-prone source rock potentials of these coals were determined; levels of maturity were assessed; molecular and isotopic characteristics of the solvent extracts from the coals were evaluated; and these characteristics were compared to those of a selected set of Kutei oils. Our data indicate that several of the coals qualify as oil-prone potential source rocks using conventional interpretive criteria. All are thermally immature or marginally mature, with vitrinite reflectance (VR) values ranging from 0.24% to 0.59%. N-alkane distributions and other molecular characteristics are typical of immature, Tertiary terrigenous organic matter.

Comparison of these Miocene/Eocene coal extracts with the Kutei Basin oils reveals several molecular and isotopic correlations, including the presence of specific molecular markers (e.g., oleananes and oleanenes), distributions (e.g., sterane carbon numbers) and isotopic relationships (e.g., n-alkanes and acyclic isoprenoids). Nevertheless, no single coal is correlatable with any single oil using all of the techniques of this study, indicating that no bona fide and defensible oil-source rock correlation can be made using these coals. Several explanations are available for this observation, including (a) these coals are not sources for any of these oils; (b) the oils arise from multiple sources (including coaly shales); (c) the low maturity levels of these coals preclude a proper correlation; and (d) the molecular content of the Kutei oils is composed of additional material besides that contributed by conventional source rocks (coaly or otherwise). This paper will explore these possibilities in light of our dataset.