

Eocene Oil-Prone Source Rock Potential of Central Indonesia

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Extensive deposits of Tertiary petroleum source rocks have been documented throughout southeast Asia, ranging from marine carbonate sources in Philippines to lacustrine clastic sources in Vietnam to widespread terrigenous clastic sources in Indonesia. Eocene oil-prone source rock potential of central Indonesia has been recognized for several years, although few data have been published. We have examined a suite of Eocene outcrop samples from eastern Borneo and western Sulawesi, and characterized their oil-prone source potential in terms of conventional source parameters (TOC, Rock-Eval, VR) and molecular and isotopic characteristics. TOC content in these immature and marginally mature shales and coals (VR = 0.24-0.80%) ranges up to 76%, and hydrogen indices are 224-627mg/g. Molecular and isotopic characteristics of the extractable organic matter are similarly wide-ranging: pristane/phytane ratios are 1.5-13.4, and carbon isotope ratios of the aliphatic hydrocarbons are -29.6‰ to -25.5‰. Detailed molecular parameters confirm that our Eocene sample set includes a wide range of terrigenous depositional settings (as shown by sterane and hopane distributions), and previous studies have established the presence of lacustrine-sourced oil in the Eocene.

Our data, when combined with previous industry and consortium studies, confirm the occurrence of oil-prone, terrigenous Eocene source potential in extensive areas of eastern Borneo and western Sulawesi, and oil-prone, lacustrine Eocene potential in the southern portion of Makassar Strait. Our sample dating suggests that this potential appears to extend throughout the Eocene. Commercial, Eocene-sourced oil accumulations are known in the Barito Basin (Tanjung Field), but the extent of other Eocene-sourced accumulations (e.g., Tengawang oil of East Kalimantan, surface seeps in southwest Sulawesi, and Pangkat oil tests in the southern Makassar Strait) has not been determined.