Basin Modelling at the Songkhla Basin (Gulf of Thailand) or: how many source rocks do I have?

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Abstract

The Songkhla basin is located in the western Gulf of Thailand, 15 km offshore east of the town of Songkhla. It covers an area of some 2,500km^2 and contains several oil producing fields. Songkhla is one of the Tertiary rift basins formed in the Gulf of Thailand between 40-20 Ma. It is an asymmetric basin controlled by NNW-SSE faults which developed mainly in its western side, and it is filled by an assumed Eocene-Miocene continental sequence. The oil producing intervals are fluvial and alluvial sandstones of Eocene, Lower Oligocene and Lower Miocene age. Lower Oligocene lacustrine shales are the supposed source rocks of the basin, but the potential of the Lower Miocene is also considered in this work. The aim of this work was, using the in-house data currently available, to re-evaluate the presence, geochemistry and maturity of the known and potential source rock intervals of the Songkhla Basin.

The hypothesis of an effective Miocene source is not certain at present day, and we favor the existence of a single main source rock interval at Songkhla: the Lower Oligocene organic-rich lacustrine shales. This is supported by both geochemical data and basin models. The recommendations which arose from this work were; 1) more wells in the basin should be sampled in order to complete the geochemical data set, 2) additional scenarios in basin models should be created in order to improve the understanding of source rock distribution and maturation in the Songkhla Basin, and 3) an eye must be kept for %Ro values, and alternative ways should be found to evaluate thermal maturity.