Source rock evaluation is one of the important tools in petroleum exploration which determine how and where the organic matter in the sediment is converted into hydrocarbons (Gas and/or Oil). Many geochemical factors play important role in that transformation such as temperature, pressure, bacterial activity, catalytic action, time and existence of geochemical medium with certain PH and EH value.

This study deals with the geochemical criteria of Zeit Bay Field, Gulf of Suez and the nearby areas to determine its source rock potentiality. The field represents one of the complicated oil fields as it comprises several reservoirs in complete hydraulic communication, making it one of the unique reservoirs. Hydrocarbons are produced from all the porous and permeable intervals from Hammam Faraun member of Belayim Formation down to Pre-Cambrian Fracture Basement. The determination of its source rock had been done through the interpretation of the geochemical analysis that carried out by geochemical lab, further more, to discus the reservoir potential of the field

Organic carbon content (type and quality), free bitumen content, vitrinite reflectance which reflect the thermal maturation Index and the hydrocarbon Index had been used as geochemical parameters in this study.

A correlation between Zeit Bay Field crude oil analysis and different rock samples had been performed to relate the crude oil to its proper source rock.

The petroleum-producing Balingian Province is situated in northwest Borneo and is a sub basin of the greater Sarawak Basin, Malaysia. The province, straddling both onshore and offshore, consists of a thick clastic succession ranging in age from Oligocene to Plio-Pleistocene. Oil production is limited to the offshore areas but stratigraphic equivalents of the offshore producing sections are exposed onshore. The field observations and laboratory analyses of these onshore successions carried out in this study suggest an almost self contained petroleum system within these coal-bearing thick heterolithic clastic sections.

The onshore section is dominated by the Oligocene-Miocene Nyalau Formation. Within the Nyalau Formation fine-grained lithofacies occur in close association with heterolithic facies of interlayered muddy/sandy sediments within a tidally-influenced succession of delta plain deposits. Oil-prone coaly laminae and dispersed particles are common, particularly associated with carbonaceous shales or carbargillites. Terrigenous organic matter is observed to be not only restricted to the coaly and shaley sediments but is also widely distributed in coarser grained sediments including the sands and silts of the predominantly tidal-influenced heterolithic facies.

Petrographic and organic geochemical characteristics denote good petroleum source potential within these heterogenous facies association as suggested by reasonably high HI in the range of about 200-500mgHC/gTOC (in support of the predominance of type II & III kerogen), rich in extractable organic matter and Py-GC pyrograms that are dominated by n-alkene/alkane doublets.

Onshore field studies show these coaly heterolithic facies that developed within the lower coastal plain setting to be laterally extensive within the Sarawak Basin. Such sequences thicken up in the offshore where they provide an additional source bearing section in addition to the already proven thin (<1m) coal source rocks.

In terms of carrier and/or reservoir bed potential the extensive lateral extent of the heterolithic facies, characterised by close association of fine grained thin shaley intervals and coarser silty and sandy sections, provides an effective source-carrier-reservoir coupling with the necessary continuity preferred for hydrocarbon migration whilst thick shale beds act as the effective seal.

Tertiary coals of NW Borneo, and SE Asia in general, are known to be effective source rocks in the prolific gas- and oil-producing basins of the region. Based on geological and biomarker studies it has been established that much of the petroleum in the productive Balingian Province, was generated from organic matter of higher plant origin deposited within the paralic conditions of a lower delta plain to marine prodelta setting. Coal extracts of the Nyalau Formation, the onshore equivalents of offshore source rocks, are characterised by the presence of higher plant derived biomarkers such as oleanane and...
bichadinanes. Similar biomarker distributions are observed in the Balingian oils. These terrestrial markers have been widely associated with triterpenoids of angiosperm origin and resin-derived compounds. Sedimentary facies association and reported occurrence of a high abundance of mangrove pollen within intertidal successions are supportive evidence to a mangrove origin for these Sarawak Basin coals and their associated oils. In this study, the maceral suberinite and the associated macerals bituminite, lipodontinitre/fluorinite and phlobaphinite are shown to be the most oil-prone macerals of the Balingian province mangrove-derived coals and coaly sediments. The high abundance of these suberinitic constituents which are known to expel hydrocarbons within a narrow range of 0.45-0.75%Ro, consequently gives rise to a relatively lower onset of liquid petroleum generation compared to the commonly acceptable 0.6%Ro. These are considered important characteristics of mangrove-derived coals.

1345512 Fluid Detection in Carbonate Reservoirs Utilizing Gas Analysis-A Case Study
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Explorations have been continuously developing new technologies and techniques to achieve the goal of discovering Hydrocarbon. Gas detection while drilling and analysis of the data is very vital in evaluating the hydrocarbon potential of the formations. It is particularly significant in exploration of high pressure, tight, fractured carbonate reservoirs in Kuwait, which are drilled with Oil Base Mud (OBM) having high barite content causing severe formation damage.

This paper aims to present the procedure of interpreting gas data collected while drilling and their utility in formation evaluation, identification of productive intervals, fluid characterization and identification of gas/oil and oil/water contacts. Total gas and C1-C5 components readings, synchronized with depth and corresponding lithology, are acquired from the gas detector. The data is verified for any contamination, which may be due to mud containing oil, mud additive or pipe dope etc. The Gas Quality Ratio (GQR) is calculated to determine any contamination in the gas data. If the GQR is in the range of 0.8-1.2, the gas data is considered suitable to carry out gas analysis. As the reservoirs are drilled with OBM, the gas chromatograph gives abnormally high CS against some sections which is not considered for the analysis. The good quality data is used to calculate various ratios in sections showing significant gas readings. Recently in few exploratory wells this gas analysis was carried out for Najmah and Marrat reservoirs. It has been observed that the more useful ratios in these carbonate reservoirs of Kuwait are C1/C1+C2+C3+C4+C5, Pixler ratios (C1/C2, C1/C3 and C1/C4), Wetness (100*C2+C3+C4+C5/C1+C2+C3+C4+C5), Balance (C1+C2/C3+C4+C5) and Character (C4+C5/C3). C1/C1+C2+C3+C4+C5, Pixler ratios and Wetness, Balance and Character indicate dry gas in the Upper section of Najmah followed by gas-condensate. These ratios indicate liquid hydrocarbon in Marrat. The results of the gas analyses were integrated with log and core data and were found to be very useful in identification of production test intervals. The gas analyses results have been ratified by production test results. Proper gas analyses on uncontaminated gas data can help to identify test intervals even in wells where log data could not be acquired due to well condition. It is recommended to record good quality gas data and carry out gas analyses in all exploratory wells.

1345991 Focusing Stimulation Efforts on Sweet Spots in Shale Reservoirs for Enhanced Productivity

As the quest for shale oil and gas spreads to South America, Europe, Asia and Australia, inevitably the operating practices of North America tend to serve as the template for the new, frontier areas. With either a sparse evaluation from logs, cores and cuttings or none at all, the ubiquitous approach for selection of zones for hydraulic fracturing in the long laterals in North America is to place 20 to 30 frac stages, more or less evenly spaced along the lateral, often without regard to variations in the reservoir properties. In many cases, especially in early stage frontier regions, a more comprehensive alternative approach that includes geological data integration to selectively optimize completion and stimulation intervals could be advantageous. Specific field examples presented here show how each of the following can serve, in varying degrees, to delineate zones with better reservoir properties from those with poor reservoir characteristics (i) near real time measurements of XRF, XRD and pyrolysis on cuttings at the well site (ii) a superior approach to monitoring the real-time hydrocarbon (C1 - C8, benzene, toluene) and non-hydrocarbon gases (CO2, N2) dissolved in the drilling fluid in the mud stream (iii) LWD spectral gamma ray and density measurements (iv) LWD Shock wave acoustics and (v) suites of openhole well logs obtained in horizontal shale gas wells This enables the operator to concentrate frac dollars in zones that are more productive and at the same time, avoid intervals that are not likely to be good producers. A relatively small investment in such surveys to delineate sweet spots could yield major dividends in enhanced productivity and improved utilization of frac dollars.

1346951 Application of Bandlimited Attributes to Characterization of Fluvial /Deltaic Reservoirs
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The Middle Oligocene Frio sandstone reservoirs of the Texas Gulf Coast are dominated by amalgamated thin fluvial channel and crevasse-splay reservoirs as characterized by those found in Stratton Field, but analogous to reservoir systems that are found throughout Southeast Asia. At Stratton, the field is draped over a broad dome shaped structure in the Vicksburg Flexure Trend above the Vicksburg fault system. The channel sands are 3 to 10 m thick and