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Petrology & Geochemistry Of Source Rocks In Western Papua: Correlations With Oil Seeps And Reservoir Hydrocarbons

This study aims at identifying potential oil accumulations in the western and central Papuan Basin, a complex, "frontier" basin. One of the major problems as seen presently in the Papuan Basin is the lack of correlation between oils, both in seeps and in reservoirs and source rocks. The other most important aspect of the project is the characterisation of the organic matter with the aim of establishing types, depositional environments and their hydrocarbon potential. Qualifying and quantifying the source organic matter will be by petrological, geochemical, electron microscopical and microanalytical methods. The results from organic petrology and extensive geochemistry (using GC, GC-MS and stable isotopes) are being integrated with seismic, structural, sedimentological and sequence stratigraphic data.

This integrated approach to petroleum exploration aims at establishing the depositional environments responsible for the qualitative and quantitative results obtained for specific organic matter in the source rocks. Petrology and geochemistry identified predominance of terrestrial source organic matter with a significant input from perhydrous vitrinite and liptinite. In some oils a terrestrial biomarker has been identified. C- isotope data also support predominance of terrestrial organic matter.

Maturation profiles (Ro) of organic matter in carbonaceous sediments derived from drillholes show interesting consistent profiles with a geothermal gradient of 23 deg.C per Km to a specific depth within the oil window. A pronounced inflection point, with a high thermal gradient is evident in all boreholes across the basin, consistent with the end of the oil window.