

## **Geochemistry of Western Australian Crude Oils: Use of Carbon Isotope Models to Delineate Active Petroleum Systems**

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Bulk carbon isotopic compositions of crude oils and their sub-fractions (saturate, aromatic and polar fractions) have long been used in conjunction with conventional biomarker data as an interpretive tool in the oil industry. Many geochemical models however, tend to be developed using data from specific regions such as the Gulf of Mexico or North Sea. Australian basins however, can boast a number of unusual factors that are difficult to compare with the more explored northern hemisphere basins, such as the relatively low TOC contents and high terrigenous affinity of many known source rocks. As a consequence, some of the better known interpretative tools often cannot be applied effectively to Australian oil accumulations.

For example, whilst Jurassic marine sediments remain the most widely attributed source rocks on the North West Shelf, numerous source horizons ranging from Permian to Cretaceous age, and containing varying degrees of terrigenous influence, are also known to contribute to commercial oil accumulations. This influence is generally more clearly reflected in the carbon isotopic compositions of respective sediments and crude oils.

Over the years, a large amount of carbon isotope data has been collected from most basins within Australia. Here we present data and interpretive models for a number of Western Australian basins to highlight the combined use of biomarker and bulk carbon isotope analyses to, for example, delineate marine and terrestrial influenced source horizons. Thus models may be successfully applied, in a regional context, to distinguish for example, active petroleum systems in Western Australia.