$$CPI\ (1) = \frac{(C_{23} + C_{25} + C_{27} + C_{29})\ wt\% + (C_{25} + C_{27} + C_{29} + C_{31})\ wt\%}{2 \times (C_{25} + C_{26} + C_{28} + C_{30})\ wt\%}$$

$$CPI\ (2) = \frac{(C_{23} + C_{25} + C_{27})\ wt\% + (C_{25} + C_{27} + C_{29})\ wt\%}{2 \times (C_{24} + C_{26} + C_{28})\ wt\%}$$

- carbon preference indices are approximately 1 for marine samples, regardless of maturity
- decrease from 20 --> 1 for terrestrial samples as maturity increases

The $C_{21} + C_{22}/C_{28} + C_{29}$ ratio is generally >1.5 for aquatic source material and <1.2 for terrestrial organic matter, however, the values increase with maturity.

Pristane/phytane (Pr/Ph) ratios can indicate depositional environments:

. <3.0 - relatively reducing depositional environments;
. 3.0-4.5 - mixed (reducing/oxidising) environments;
. >4.5 - relatively oxidising depositional environments.

2.3.3.2 C_1 - C_{31} Whole Oil Gas Chromatography

This analytical method is applied to oil and condensate samples. It provides a picture of the whole oil up to n-C_{31} and allows quantitation of components with more than 4 carbons atoms. Several parameters are measured which illustrate changes in the degree of biodegradation and water washing in the reservoir. Because these measurements are performed on very volatile components in the oil, care should be taken during sampling, transportation and storage of the fluid to minimise evaporation.

Whole oil analytical conditions are listed below:

Instrument:	Shimadzu GC-9A
Column:	25m x 0.2mm ID BP-1
Injector/Detector Temperature:	290°C
Column Temperature:	-20°C to 280°C at 4°/min
Carrier Gas:	hydrogen

2.3.4 Carbon Isotope Analysis

This measurement is normally carried out on one or more of the following mixtures: topped oil, saturate fraction, aromatic fraction, NSO fraction. The organic matter is combusted in oxygen to produce carbon dioxide which is purified and transferred to an isotope mass spectrometer. The carbon isotope ratio ($\delta C_{13}/\delta C_{12}$) is measured and compared to an international standard (the Peedee Belemnite Limestone - PDB).