POSTER: session Geochemistry

Origin of hydrocarbon in the Western Prerif and Rharb basin

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The Western Prerif is located in north western Morocco and correspond to external most portions of the Rif folded and thrust belt. The Rharb basin is a foreland/foredeep developed at the South western part of the Prerif area. Oil and gas were discovered respectively in the NE edge and the central parts of the Rharb basin. Several small gas fields since sixties have been developed.

The isotope-ratio-mass spectrometer (IRMS) and gas chromatography (GC) were used to differentiate between biogenic gas and thermogenic gas in the Rharb basin. The diagram $\delta\ ^{13}C$ –methane versus the proportion of methane in gaseous hydrocarbons has shown that the gases produced in the KSR, BFD-1, DNO-1 and ZHA-1 fields are biogenic methane derived from bacterial fermentation during early diagenesis which is characterized by an important depletion ($\delta\ ^{13}C$ –methane < -60‰ PDB). These biogenic gases are probably sourced by Miocene shale. The same diagram shows that the gas encountered by RJB3 well is thermogenic and very dry, formed by thermal cracking of both kerogen and residual hydrocarbons. This thermogenic gas is characterized with an isotopic ratio ($\delta\ ^{13}C$ –methane) equal to -36.5 ‰ PDB.

In Ouezzane area, characterization by Biomarkers analyses, of Srafah's oil seeps organic matter has shown that the oil seeps is sourced from limy source rock.
The Kerogen of the source rock is oil prone (Type II).
The maturation expulsion of oil, calculated from Triterpanes and Phénantrènes biomarkers, has an Ro equivalent to 0.7%. Guntham's diagram showing geologic times versus steranes ratio [C28 α α α (R)/ C29 α α α (R)] have permitted to highlight that Srafah's oil seeps are sourced from a limy shale Cretaceous source rock.