

Geolsotope Service Identifies Reservoir Oil Fluid during Exploration Campaign



GEOIsotopes

Client

Major E&P Company
Deep Water, Offshore West Africa

Challenge

To understand the lateral connectivity of reservoir channel sands between wells in a continuous exploration drilling campaign.

Solution

Perform detailed mud gas comparisons, including detailed compositional analyses and continuous isotopic measurements using a heated, temperature stabilized, constant volume gas extraction system in combination with a highly accurate FID chromatograph for gas composition and an Isotopic analyzer capable of measuring $\delta^{13}\text{C}$ of C1, C2, C3 and CO₂. These data sets were integrated and interpreted in real-time.

Results

High quality gas data, unaffected by typical cold mud issues from deep water drilling was captured, analyzed and interpreted along with the isotopic data to provide a complete vertical analysis. This was then correlated across wells to interpret the similarity of gas responses.

Value

The information obtained from the Geolsotopes service allowed the data to be analyzed and interpreted immediately without waiting for lab results. This allowed the update of the reservoir model as subsequent wells were drilled, and confirmed that adjacent wells were laterally connected with similar fluids from a similar source.

Services used

GEOIsotopes



Deep Water Exploration campaign drilled to understand fluid typing

The target siliciclastic formations were highlighted to be part of a weakly confined channel system. Understanding changes in fluids would be helpful to understand the reservoir properties and identify the lateral variation with the channels. Real-time continuous data was requested by the client, rather than spot sampling and waiting for results.

Continuous Real-Time Data allows for clear differentiation of fluid types

The Geolsotope service allows for Isotopic analysis of C1, C2, C3 and CO₂. Results from this analysis were used to further enhance the results from the mud gas data by identifying the origin of the gases using Whiticar & Schoell and Chung interpretation charts and determining the fluid type (Schoell charts). The target sandstone reservoir was identified to be a combination of mixed thermogenic oil and biogenic gas. Non reservoir sands were identified to contain biogenic gas.

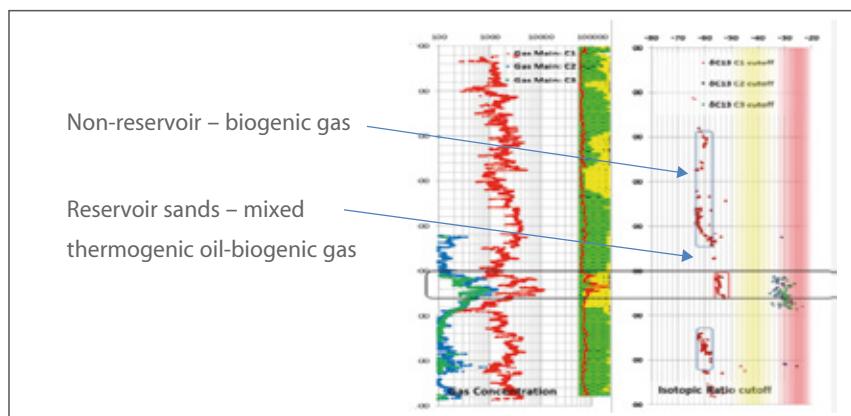


Figure 1. Chung Chart shows ethane and propane ratio trend confirming presence of mixed carbon origin.

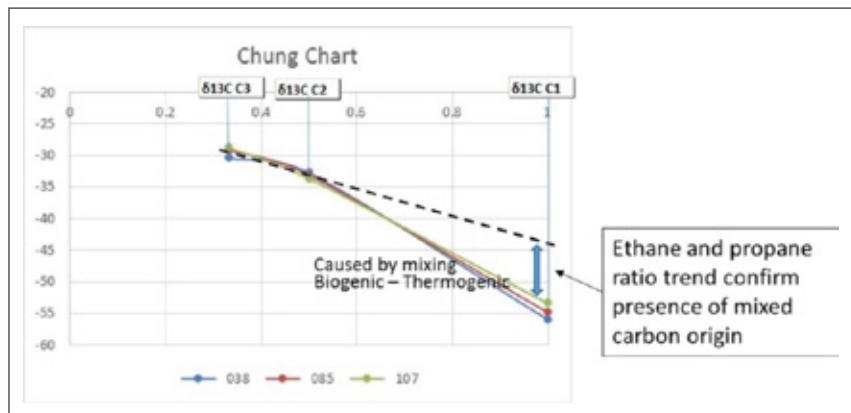


Figure 2. Isotopic analysis shows target formation is a mixed thermogenic oil and biogenic gas.