

Case Study:

Volcanic Event Identification in Clastic Turbidity Play

GEOLOG

Chemostratigraphical Evaluation of Volcanic Event in the Lower Miocene

GEOROX

Client

Petronas Carigali Mexico (PCCMO). Shallow Water Well - Offshore, Exploratory. Salina Basin, (Block#6), Mexico.

Challenges

The Miocene Period in the GoM consists of clastic turbidities plays which are characterized by the mineralogical complexity that comprises inside some volcanic events that are not obviously identified by conventional geophysical downhole log methods.

Solution

Geolog proposed to perform in real-time a Chemostratigraphical Evaluation based on the XRD and XRF analyses of the cuttings rock samples to identify the main minerals linked to the volcanic input.

Results

An integrated approach of using real-time XRD and XRF data allowed the client to identify the pass through the Upper to the Lower Miocene where a volcanic event was identified something that was not possible to achieve with the downhole logging tools (GR, Neutron and Density).

Value

No need to wait for belated lab tests, weeks or months after the well is drilled. Cost Efficient and Risk Reduction – No downhole tools (NO LIH or fishing risk).

The high values of the GR together with the diminishing trend of the Density log which is an evidence of the volcanic ash apparition, while between 3525 to 3680m, are represented by a shaly interval which is opposite to the previous appreciation.

Using the GeoROX Service, the client was able to identify in near real-time, the formation change between Upper and Lower Miocene without the support of the LWD tool.

Services used

GEOROX

Elemental (XRF) and Mineralogical (XRD) Analysis.

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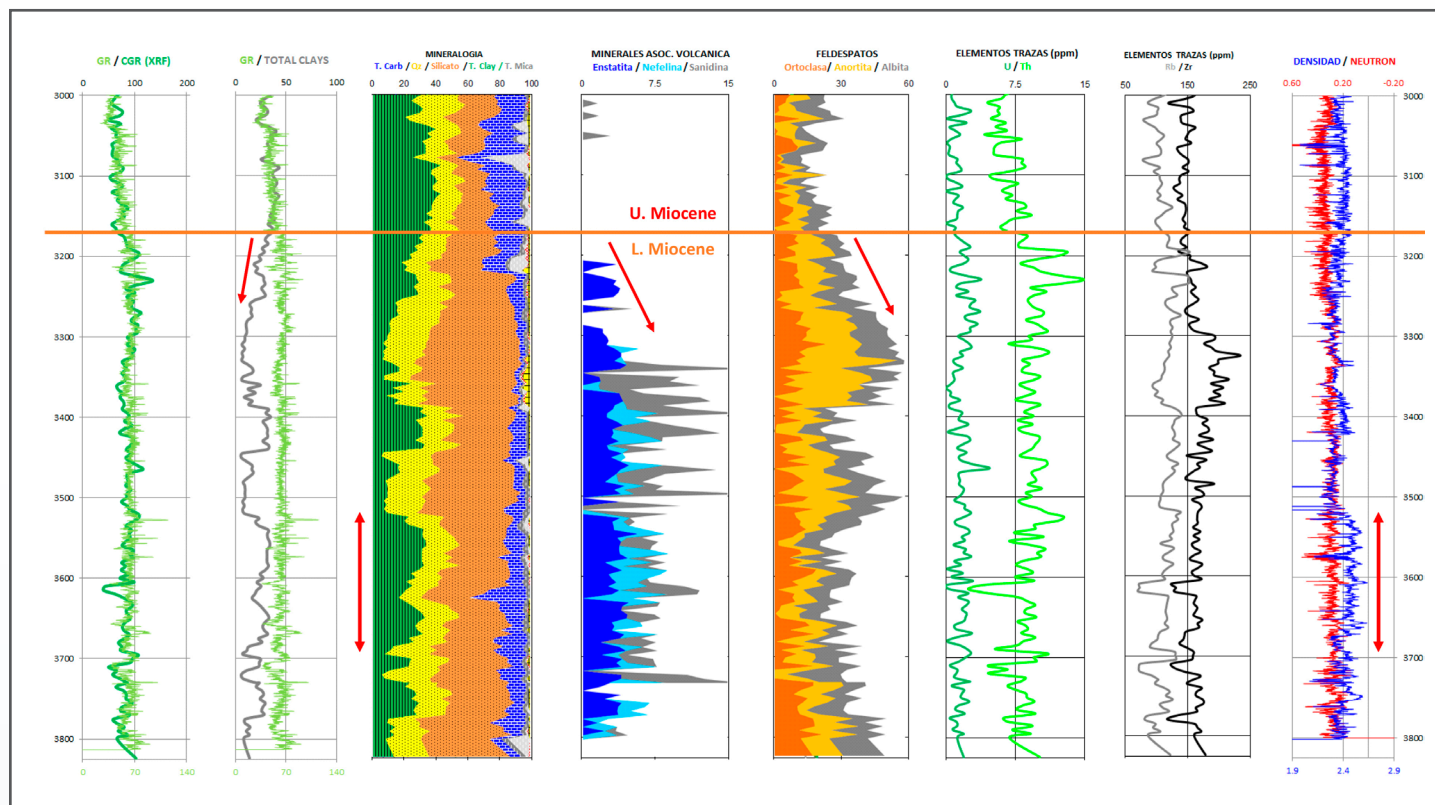
ROX

Fig.1, Composite Log (XRD/XRF and WL Logs)

During the drilling of the 12 1/4" section, before a 3170m MD depth, the Total Clays values perfectly follow the GR from the LWD tool confirming the high accuracy of the XRD results. After that depth, the linearity is lost, and our Total Clays started to decrease which creates our first QC alert.

There is an increase in the radioactivity on the GR-LWD which is followed by the CGR, and an immediate appearance of Enstatite, Sanidine, Nepheline, and Feldspars related to volcanic rocks, which justify the anomalous GR reading and their contribution instead of the Total Clays values.

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