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STRUCTURAL EVOLUTION OF AHNET BASIN, ALGERIA

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The Ahnet basin, located in the western part of the Saharan platform exhibits several features witnessing very important and complex structural history. Actually, various trends of large scale folds can be seen in outcrops and subsurface. This makes the area very attractive for hydrocarbon exploration. Indeed, the first well that penetrates the stratigraphic column of the basin was realized in the 1950's.

Since exploration was focused on Ahnet basin, several commercial gas accumulations were discovered in various reservoir formations of several ages, like the Ordovician, lower Devonian and Tournaisian-Strunian. There is good reason to believe that significant gas remains undiscovered in non conventional traps. Exploration should be reoriented towards subtle, stratigraphic, and structural complex trapping systems.

Geochemical analysis and modeling reveals that Silurian and Frasnian shales are widespread in the area and represent the main source rocks in the entire basin. Modeling of the thermal history shows that the complexity and the variability of hydrocarbon generation process and degree of filling of the traps needs to be understood.

Well testing results and reserve estimates show evidence of gas potential in the Ordovician and Siegenian tight (low permeability) reservoirs. Production is usually related to the presence of fracture networks.

Structural Phases

Previous studies on the structural evolution of the basin highlighted severe structural complexity. Integration of outcrops, seismic and well data suggest the overprint of three structural phases as listed below:

Panafrican phase:

This phase results from the collision between the West and East African cratons. This compression led to important folding trends which obviously were followed by an erosional period.

Sagging phase:

During the Paleozoic, there was no evidence of tectonic activity has been. Sea level changes and subsidence rates mainly controlled the depositional framework of the Paleozoic sediments. Encountered unconformities are attributed to transgressive cycles. Basement faulting did not extend into this phase.

Hercynian uplift:

It is believed the Hercynian uplift was probably a single tectonic phase. Several authors believe that the early Visean stress oriented at N040 degrees and late Stephano –Autunien N120 degrees were the main components of this phase.