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EXPLORATION OPPORTUNITY IN THE BECHAR FORLAND BASIN AND ITS MARGINS IN THE WESTERN SAHARA, ALGERIA

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The Bechar basin is the least explored area in the northwestern Algerian Sahara. Most of this area is unexplored. The existing wells are concentrated in the highest zone of its eastern margin and none of them has shown any commercial hydrocarbon accumulation in spite of the presence of reservoirs, source rocks and top seals. This paper highlights the hydrocarbon potential and frontier exploration opportunity in this basin. This later is a foreland basin formed since the early Carboniferous. Huge blocks, submarine fans and turbidites are deposited during the Tournaisien and Visean near the thrustbelt in the north whereas siltstone and shale alternation are found towards the depocentre. Apart from the late Paleozoic erosion, there were a continuous and rapid deposition during the carboniferous where more than 6000 m of sediments are deposited. Rates of sedimentation are very high, and are of 24; 18 and 44 cm/1000yrs during the Tournaisian, Lower Visean and Upper Visean respectively.

This basin is bordered to the east by the NNE Meharez fault across which a narrow isolated carbonate plateform lies in the same direction with a width of 50 km and a length of 150km, where visean and namurian shallower facies occur such as carbonate buildups and carbonate sheets. Most of the wells are drilled in this area. Biostratigraphic analysis, well correlations and seismic interpretation show several unconformities mainly within the carboniferous section. The rates of deposition here are much lower than those three stages mentioned above and are 3; 3.8 and 5.7 cm/1000yrs respectively.

In both the deep basin and its margins, the Carboniferous section lies unconformably upon the Upper Devonian and older strata.

The chronostratigraphic diagram shows the hiatus due to non-deposition events in the basin margin, an erosion of the foreland plate caused by forebulge uplift, and offlap and onlap patterns of the lower carboniferous layers. The unconformities in the carbonate plateform pass basinwards into correlative conformities to the west in the deep basin.

The main reservoir rocks are the lower and upper Devonian sandstones, the Visean and Namurian sandstones and carbonates.All the anticline structures are formed by the end of the Devonian.This allows the fluids to be trapped during the main and later oil migration. In fact, 1013 10^9 of oil and 24819 TCF of gas are expulsed during the Carboniferous from Silurian, middle Devonian and upper devonian source rocks. The hydrocarbon accumulation and the abandence of shows in the Meharez High might be caused by the repetetive uplifts and erosions since the Late Devonian causing disrupting of traps, remigration and surface seepages. Within the deep carboniferous basin the continuous sedimentation during the carboniferous and the shally facies which makes a good and thick seal rock, preserve the trapped hydrocarbons from leakage to the surface.

Within the carbonate plateform the sediments form wedges faning out from the highest point to the deep basin in the west and to the Tamzaia saddle in the east and north-east where they deepen and carbonate and silico-clastic plays are preserved under upper Carboniferous and Mesozoic section.