

Exploration in the North African Triassic Plays

Jennifer Gyongyver Fischer¹, Souraya Nassif¹, Cyril Ruchonnet¹, and Eric Schmid¹

¹IHS Markit, Perly-Certoux, Switzerland

Abstract

Triassic plays in Saharan Africa generally extend from Morocco to Libya and hold almost 10 % of the continent's recoverable reserves. These plays have been the focus of exploration since the second half of the 1950s. They comprise hydrocarbon accumulations mostly in Upper Triassic fluvial sandstones, which were deposited as river valley in fills in stratigraphic-structural or structural traps, and which were sourced mainly by the Silurian hot shales. These clastic reservoirs have good qualities with average porosities of 17 % and permeabilities of 300 mD. From an exploration history perspective, the bulk of activity to date has happened in Algeria, and can be summarized in five periods: **The Pioneers: 1956-1969**. The biggest exploration success in the Trias was achieved right at the beginning of exploration, with the 100 Tcf Hassi R'Mel discovery in 1956 on the Tilrhemt Uplift. A string of large discoveries was also made on the Hassi Messaoud-El Biod High in the wake of the Hassi Messaoud discovery (itself not in the Trias). There, a number of north-south trending large triassic anticlines were identified to the south-east of the Hassi Messaoud field. The Ghadames Basin also appears with the 730 MMbo El Borma triassic discovery on the Algeria-Tunisia border. **Follow-up period: 1970-1989**. The most activity during this period occurred in the Tilrhemt Uplift / Oued Mya Basin, where 30 triassic reservoir discoveries yielded around 2 Tcf of gas and 200 MMb of oil. **The rise of the Berkine: 1990-2000**. In this period, triassic exploration focused almost entirely on the Berkine area of the Ghadames Basin. Advances in seismic, successfully applied by Anadarko, enabled good imaging under the thick sand cover present in the Berkine area. 30 triassic reservoirs were discovered, yielding 3.9Bb of oil. **Berkine follow-up: 2001-2010**. This decade was again dominated by the Berkine area where most of the triassic reservoirs were discovered. Of note the average discovery size, compared to the previous period (1990 – 2000) declined. **Revival of the Hassi Messaoud-El Biod High**. This last period saw some revival in the Hassi Messaoud-El Biod High, due mainly to activity of PTT-CNOOC on the Hassi Bir Rekaiz project. Exploration in the Berkine area is still active, but the region is more mature and operators such as Eni and Sonatrach focus on near-field exploration. This translates into a further drop in the average discovery size. In a forward-looking part of our study, we consider the facies distribution of the triassic reservoir units, the discoveries made to date in the region and the extent of the Silurian source rock. Combining these datasets suggests that new discoveries could be made, especially in the eastern part of the Ghadames Basin, possibly in the north-eastern part of the Illizi Basin and in the northern part of the Murzuq Basin. Recent exploration success in Eastern Morocco also indicate triassic potential there.