

Transfer Zones and Hydrocarbon Trapping: A Case of the Albertine Graben, East African Rift System, Uganda

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Abstract

The Albertine Graben forms the northernmost termination of the western arm of the East African Rift System. Rifting was initiated during the Miocene and thick sediments have accumulated in asymmetric basins along strike of the rift system. The rift is highly segmented and bordered by en-echelon linked border faults typically ten to twenty kilometers long. These faults are separated by transfer zones, which exhibit both hard and soft linkages. The Graben is comprised of a number of basins, lying in a general northeasterly trend separated by accommodation zones. These basins are shouldered to the east and west by Precambrian rocks, which are mainly Gneisses and Granites. The rift system is linked by a number of transfer zones that include both relay ramps and accommodation zones. The accommodation zones have been classified into two types namely; (i) the High Relief Extension Parallel and (ii) the Low Relief Oblique. Accommodation Zone 1; the High Relief Extension Parallel occurs in the Semliki basin where the sharply upstanding mass of the Rwenzori Mountains lies centrally along the rift. Extension in this part of the Albertine Graben is almost orthogonal leading to creation of long, linear and parallel fault systems. Accommodation Zone 2 referred to as the Low Relief Oblique occurs at the northern tip of Lake Albert separating Pakwach and Rhino Camp basins which exhibit a change in fault polarity. Mapping undertaken in this part of the Graben has pointed to oblique extension due to a change in stress overtime. On the other hand, several relay ramps have been interpreted in the Graben. These are common structures formed during fault growth. Two synthetic fault segments are separated by gap (in the past referred to as a fault bridge e.g. Ramsay and Huber, 1987) before they link up. This gap may be faulted by transverse faults leading to breaching (hard linked) or may remain un-faulted (soft linked). The hydrocarbon discoveries so far made in the Albertine Graben are in transfer zones. This paper will discuss the role of accommodation zones, relay ramps and fault linkages to Petroleum migration and accumulation in rift Systems with reference to the Albertine Graben.