

## **Role of Climate and Rifting in Sedimentation and Hydrocarbon Potential of the Onshore Lake Edward-George Basin, Albertine Graben, Uganda**

**Wilson Tumushabe<sup>1</sup>**

<sup>1</sup>Ministry of Energy and Mineral Development

### **Abstract**

The study area is the onshore Ugandan Lake Edward-George basin, Albertine rift, Uganda that is located in the northernmost part of the western arm of East African Rift System (EARS). Dominion Petroleum Ltd carried out petroleum exploration in the Lake Edward basin i.e., field geological mapping, seismic data acquisition and interpretation, etc. This resulted in the drilling of the Ngaji-1 well, the only deep well in the entire area. The major aspect of the research was to determine how climate and tectonism have influenced sedimentation style, with the major emphasis on further understanding its petroleum potential. XRF and XRD analyses proved to be of less significance in the paleoclimatic interpretations of sediments, only ICP-MS/OES data was used in the project. From field geology and ICP-MS/OES data, it was confirmed that climate and tectonism played a significant role during sedimentation in this basin. It has been found that all scenarios that had been raised in the predictive coupled climatic-tectonic model are present within Lake Edward-George basin. Results from this research however have also show that rift-fill sediments in the south and eastern Lake Edward-George basin (close to the rift shoulders) are majorly dominated by fluvial and alluvial distributary fan complexes and within these fan complexes, could be recognised during the detailed stratigraphic logging to describe the different lacustrine packages were encountered within the basin fill sediments close to the present day Lake Edward. Sediments within the study area were classified into four members: (1) Kabagwe, (2) Rushaya, (3) Kiruruma, and (4) Kisenyi members. However, the main challenge was to locate the definite chronostratigraphic markers for these members. It has been further confirmed that sediments in the Lake Edward-George basin represent a petroleum play for hydrocarbon generation and accumulation, in which the necessary elements of a valid petroleum system were identified i.e., good potential for reservoirs and top seals as well as circumstantial evidence of regionally source rocks, possible seals, traps and hydrocarbon-migration pathways.