Melut Basin is one of the extensional Sudanese interior rift basin located in the upper Nile State southeast of Sudan.

The basin is characterized by three rift phases started from early Cretaceous, late Cretaceous and mid Tertiary. The sedimentary infill of Melut basin was dominated by continental siliciclastic sediments deposited mainly in lacustrine and fluvial setting.

The structural architecture of Melut basin is characterized by a series of half grabens developed by several types of normal fault tectonics, these grabens create separated sub-basin namely: north Melut sub-basin, Central Melut sub-basin and south Melut sub-basin. The trap styles are fault dependent closures, in terms of faulted anticlines, fault nose, and fault steps.

The source rocks of the lacustrine shale deposition with patchy distribution and high TOC dominate Alrenk & Galhak formations of the upper Cretaceous sediments, marked by dark-gray shale. The main reservoir is Paleocene-Eocene sandstone of Yabus and Samma formations has been distributed overall the basin and pinched-out to the flank of the basin. Adar Formation is considered the main regional cap rock, with maximum thickness of about 900m in the depocentre and gradually decreases towards the basin flanks.

Hydrocarbon discoveries took place in the Melut Basin in the last 7 years constitute a considerable addition to the Sudanese oil reserves. More than 18 major oil fields have been discovered in the Tertiary sandstone reservoirs of Yabus-Samma formations. Most of these discovery is hosted by northern Melut sub-basin, compare with the central and southern parts of Melut basin where little success has been made.

In 2003 Exploration team in Melut basin made a remarkable achievement by the discovery Palouge-Fal giant oil fields which consider as the biggest oil field in Sudan. The reserve estimated to be about 4173 Million Barrel initial in-place. The net-pay thickness is more than 110m in the Tertiary Yabus-Samma formations. This discovery was followed by the discovery of Moleeta, Gumry, Nahal, Zarzor, Mishmish oil Fields.

In early exploration phases of Melut rift basin, 90% of the oil reserves have been discovered in the conventional traps, while the remaining un-conventional traps (stratigraphic and fractured basement) play significant discoveries in the current exploration phase as in Ruman area.