An Analog Model for Shallow Marine Rift Climax Reservoirs, El Qaa Fault Block Dipslope, Suez Rift, Egypt

Muravchik, Martin [1]; Rarity, Frank [1]; Wilson, Paul [1]; Hodgetts, David [1]; Gawthorpe, Robert [1] (1) Basin Studies and Petroleum Geoscience, The University of Manchester, Manchester, United Kingdom.

Exceptionally well exposed shallow marine rift-climax deposits from the Upper Rudeis Formation (Miocene) in El Qaa Fault Block, Suez Rift, Egypt, provide an excellent analog for syn-rift reservoirs in dipslope settings. In order to get a better understanding of the spatial arrangement of sedimentary bodies and 3D geometry of stratal surfaces, digital outcrop techniques (DGPS and LIDAR mapping) have been combined with traditional field techniques.

The El Qaa Fault Block has a half-graben geometry, limited by NNW-SSE - striking normal faults: the Baba - Sidri and Feiran - Hadahid fault system to the east and the Nezzazat - Gebel Ekma - Abu Durba fault system to the west. The present analysis focuses on the different response of each sedimentary system in accordance to the hanging-wall dipslope evolution, on the western limit of the rift depocentre. The syn-rift succession in that setting consists of highly bioturbated shoreface sandy deposits, tidally-influenced dune fields and conglomeratic units of deltaic/fan-deltaic origin.

The dipslope has a ramp-like geometry, relatively uniform along strike in which sedimentary bodies can be traced along-strike for more than 15 km. Initial dipslope syn-rift shoreface sandstones and limestones onlap and thin along strike and are thought to relate to fault segments boundaries along the Nezzazat - Gebel Ekma - Abu Durba fault system. Younger shoreface sandbodies tend to be more uniform along strike, but subtle differences in thickness and facies are related to fault segments boundaries as drainage catchment variability. In that same manner, a conglomeratic body up to 2 km wide occupies the boundary between the Nezzazat and Gebel Ekma fault segments. These allogenic controls strongly influence the along strike variability of the dipslope depositional systems, particularly the location and geometry of tidal and deltaic/fan-deltaic facies.

The differences in facies development, grain size patterns, erosive levels and paleocurrent directions addressed by this analog model would potentially be a major cause for variations in fluid flow within dipslope reservoirs.