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**Depositional environments of the Upper Ordovician
Mamuniyat Formation, NW Murzuq Basin, Libya**

Nuri M. Fello ^{a,*}, Abdulmageed M. Litha ^b

^{a, b} *Repsol Oil Operations, Exploration Department,
P.O.Box: 91987, Tripoli, Libya*

Abstract

The Murzuq Basin, SW Libya, is one of a series of Palaeozoic intracratonic sag basins on the North African Saharan Platform. The structural fabric of the basin was developed during the Late Proterozoic Pan-African orogenic event, which has strongly influenced the stratigraphy and depositional patterns within the predominantly Palaeozoic clastic basin-fill.

The Upper Ordovician (Ashgillian) Mamuniyat Formation is the primary reservoir target in four oilfields A, B, H and M within Repsol Oil Operations Concession area NC115, on the NW flank of the Murzuq Basin. A major problem with the Mamuniyat is the location of the sediment provenance, due to the lack of adequate subsurface and outcrop data, and the relationship and controls on sediment flux, and the depositional systems. Petrographic data derived from sandstone samples from cored intervals through the Mamuniyat Formation show that they are mainly sublitharenites, with some quartz arenites and litharenites. Compositional data for the four oilfields indicates that they were derived from a similar parent rock, but with differences in modal composition, textural attributes and porosity of the lower, middle and upper parts of the Mamuniyat attributed to temporal variations in source area uplift, base level change, sediment flux and accommodation space. These same tectonic events influenced facies patterns, sediment deposition and interaction between a variety of shallow water marine and fluvial depositional environments across a NW-SE oriented storm-influenced coastline.

Petrography and regional facies patterns suggest that the Mamuniyat sandstones were derived from a nearby, tectonically active, granitic basement source terrain, which was most probably the uplifted Ghat/Tikiमित Arch to the SW of NC 115 Concession area. Periodic uplift of the basin margin in the SW, and associated base level changes led to the basinward progradation of braided fluvial systems followed by marine transgressive events emanating from Palaeotethys in the northeast (**Figure 1**). Both the braided fluvial and shallow water marine sandstones of the Mamuniyat Formation are primary hydrocarbon reservoir targets, with the main source and seal being the eustatically controlled Lower Silurian Tanezzuff Shale.

Keywords: Braided fluvial plain; Shallow marine sandstones; Upper Ordovician; Libya

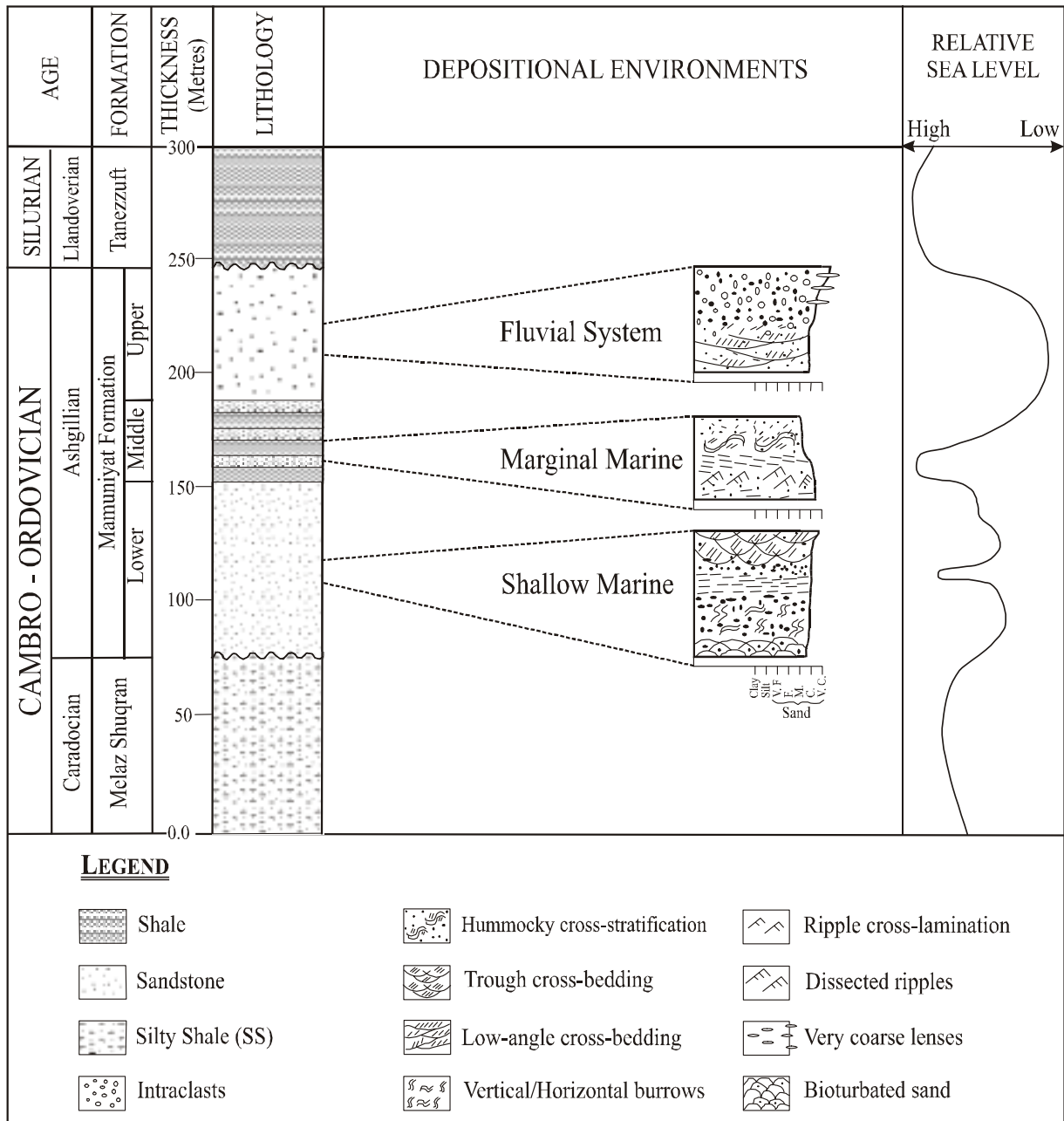


Fig. 1 Generalised lithological section of the Cambro-Ordovician and Silurian succession in NC115 Concession, illustrating internal depositional patterns of Mamuniyat Formation, and associated relative sea level changes..

*Corresponding author: Dr. Nuri M. Fello.
 Tel.: +218-21-4802630; Fax: +218-21-4802640
 E-mail address: nfello@roilop.com (N.M. Fello).