

A Re-evaluation of Middle Miocene Wadi Waqb Outcrops in Umluj Basin, Saudi Arabia

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Abstract

The Miocene post-rift sediments represent some of the thickest deposits in the Red Sea Basin. Miocene sediments, historically grouped into the Raghama Formation, are exposed in the Umluj Basin, located in the northern part of the eastern coast of the Red Sea. Pellaton et al. (1982) described a wide distribution of Miocene Raghama sediments that were subdivided into two units, a conglomerate/sandstone layer overlain by a bioclastic limestone layer. Subsequent stratigraphic studies of other Red Sea basins subdivided the Miocene sediments into six formations, starting with the lower Miocene Musayr Formation and ending with the upper Miocene Ghawwas Formation. However, the Miocene outcrops in Umluj Basin have not been included in these recent studies and have remained assigned to the Raghama Formation. This study investigates the lithofacies and age assignment of a several outcrops starting with a tilted block of carbonates, located approximately 500 meters northeast of the Bir ibn Ghuhayn water well (Pellaton et al., 1982). The block is around 50 meters high and 500 meters wide and consists of massive coral and red algal deposits separated by intervals of mudstone. Hand specimens and thin-section analysis of rock samples revealed the presence of *Borelis melo*, a Middle Miocene benthic foraminifer typically associated with the Wadi Waqb Member of Jabal Kibrit Formation. This suggests that many carbonate outcrops of the Umluj Basin, previously named Raghama Formation, can potentially be correlative to Wadi Waqb carbonates. Analyzing ASTER satellite imagery of the area confirmed the presence of many carbonate outcrops in the area. The present findings confirm that Wadi Waqb outcrops are present outside Midyan in the Umluj Basin, which is over 350 km south of most reported Wadi Waqb outcrops in the Ifal Basin. It is now possible to correlate lithostratigraphic and biostratigraphic units from outcrop to subsurface in the Umluj Basin. Surface geology maps have been addressed in this study of the Umluj Basin and re-evaluated with additional fieldwork paying particular attention to the extent of Wadi Waqb deposits.