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Microfacies and depositional analysis of Mauddud Formation in selected wells at three oilfields - Southern Iraq

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Abstract. Mauddud Formation (late Albian–Early Cenomanian) is one of Iraq's most important carbonate hydrocarbon reservoirs. Fifty-four core samples and one hundred fifty thin sections were made from several wells of Mauddud Formation in Ratawi, south Rumaila, and west Qurna oilfields, southern Iraq. The mineralogy of this formation is limestone and dolomite. The microfacies analysis results in five main microfacies associated with Mauddud Formation, including mudstone, wackestone, packstone, grainstone, and dolostone. In addition to ten submicrofacies including planktonic mudstone, benthic wackestone, bioclastic wackestone, algal wackestone, peloidal wackestone, bioclastic packstone, benthic packstone, benthic grainstone, bioclastic grainstone, and peloidal grainstone. These facies are indicated to be shallow restricted, lagoon, shoal, open marine, and mid-ramp environments. It was deposited on a shallow carbonate platform with a ramp setting. Several digenetic processes are affected in this formation; micritization, neomorphism, dissolution, cementation, dolomitization, and compaction are the main diagenetic processes. Dolomitization and dissolution processes improved the porosity and permeability with higher reservoir quality; while cementation re-duced the reservoir quality.

Keywords: Mauddud, Ratawi, Rumaila, West Qurna, Iraq

1 Introduction

Mauddud Formation (late Albian- early Cenomanian) is one of the essential formations deposited during the lower Cretaceous. It became important due to its petrophysical properties, which made it an oil reservoir in central and southern Iraq. The Mauddud Formation was initially described by Henson of the Qatar Petroleum Company's subsurface section. The study area is located within the stable shelf in the Mesopotamian zone within the Zubair subzone (Buday, 1980). The average thick-ness of the formation in southern Iraq ranges between 110 and 148 m, while in northern Iraq, the thickness is up to 250 m (Jassim and Goff, 2006). The upper Qam-chuqa Formation is equivalent to the Mauddud Formation in Iraq (Aqrawi, *et al*, 2010). Several authors, such as (Sadooni and Alsharhan, 2003), (Al-Awadi *et al*, 2017), and (Manhi and Alsultani, 2021) have written a lot about the petrophysical properties and lithology of the Mauddud Formation in the three oil fields. . The aim of this study is recognize and define the paleoenvironment and lithological facies of Mauddud Formation, southern Iraq.