



Basin Geohistory Analysis of the Mishrif Formation in Southern Iraq

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Abstract

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The Mishrif Formation of age (Late Cenomanian - Early Turonian) is considered one of the most important geological formations containing oil in southern Iraq. Where it was analyzed the basin geohistory through the Backstripping method, which enabled us to know the geological events that occurred during and after the deposition. Nine wells were chosen from several oil fields to cover the study area (Zb-114, R-270, WQ-17, Rt-5, Lu-2, Ns-5, Ri-1, No-2, and Hf-5), located between the eastern lines (582400-749080) and the northern lines (3534600-3357197). The mathematical models is used to predict sedimentation rates and original thicknesses of Mishrif Formation and the formations above it. It was estimated that the sedimentation rates and erosional thicknesses of the regional unconformity surfaces are located in the stratigraphic column in the study area. Mishrif Formation has characterized a moderate sedimentation rates that ranged between (2-6 cm/1000y), where increase in the northeast of the study area in the wells (Ri-1, No-2, and Hf-5), these rates an indicator to the center of the sedimentary basin. The geological burial curves show three levels of subsidence rates (fast, moderate, and low). The burial history of the Mishrif Formation. and the other formations indicated that the sedimentation rates are in a direct relationship with the total subsidence of the basin. Three regional unconformity surfaces were found which the effectiveness of the tectonic movements, it's had strong effective to the sedimentary basin of the Mishrif Formation that exposed it to during the Cretaceous period. These movements had a major impact on shaping the sedimentary character through its influence on the process of advancement and retreat of the sea level, which formed successive depositional cycles. As the top of the Mishrif Formation was exposure to uplifting and erosion processes especially in the northeast area of study in Tigris tectonic subzone, formed the first regional unconformity surface about (89-90 Ma) ago.

Keywords: Geohistory analysis; Mishrif Formation; Backstripping method; Sedimentary rates; Burial history; Total subsidence; Unconformity surfaces.

1. Introduction

The Mishrif Formation (Late Cenomanian - Early Turonian) is one of the most important geological formations containing oil in southern Iraq (Al-Mimar et al., 2018). The basin geohistory was analyzed through the Backstripping method, which enabled us to know the geological events that affected it and occurred during and after the deposition. Stratigraphic techniques have been utilized in creating geological burial curves, which use mathematical models developed by Harami et al. (1992); Allen and Allen (1993); Springer (1993); Jin (1994) Makhous et al. (1997) Milner (1998); Beicip-Franlab (2002). Mishrif Formation was described for the first time by Rabanet (1952) and Owen and Nasser (1958) from