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Ministry of Higher Education & Scientific Research  
Salahaddin University- Erbil**



# **Sedimentology and Stratigraphy of Bekhme Formation (Upper Cretaceous) in Selected Sections in Kurdistan Region-Iraq**

A Thesis

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## **Abstract**

This thesis incorporates a study of stratigraphy and sedimentology of the Bekhme Formation in selected areas of the Iraqi Kurdistan region. The Bekhme Formation belongs to the Late Campanian-Early Masstrichtian cycle. At least eight sections were visited in the area extending from  $36^{\circ}15'00''$ ; long.  $44^{\circ}30'00''$  to lat.  $37^{\circ}00'00''$ ; long.  $42^{\circ}45'00''$  but two sections were described and sampled. The first section is taken at the northern edge of the Bekhma Gorge, at the western bank of the Great Zab River and 160 samples were collected from this section. The second is Khanzad section, which is 6.5 km southeast of Harir Town and 45 samples were collected from this section. A total of 175 thin sections prepared and stained with Alizarin Red S.

In this study the Bekhme Formation was divided, in the field, into four units depending on lithology, bedding and fossils. These units are: Basal Conglomerate Unit ( $B_1$ ), Dolomitic Calcarenite Unit ( $B_2$ ), Bedded Dolomitic Limestone Unit ( $B_3$ ) and Massive Dolomitic Limestone ( $B_4$ ). Petrographic studies revealed the presence of six microfacies: lime mudstone facies, wackestone facies, packstone facies, grainstone facies, rudstone facies and framestone facies. Combined field observation, fossil content, microfacies and diagenetic changes aided in establishing four facies associations. These facies associations are: Basal conglomerate (palimpsest), Forereef, Reef and Backreef. Accordingly it is suggested that deposition of the Bekhme Formation took place in isolated platform, in many respects similar to that of the Bahama Bank.

The formation was affected by intensive diagenetic processes such as compaction, dissolution, cementation, neomorphism, micritization, dolomitization, silicification and stylolitization. In cementation diagnostic types of cement blocky cement, granular cement, drusy cement, syntaxial (rim) cement and Dog tooth cement and in dolomitization diagnostic fabrics of dolomite which were sieve mosaic, suture mosaic, fogged mosaic and saddle textures and build the model of dolomitization which was mixing zone model.

Field and laboratory investigations revealed that the Bekhme Formation differs from the Aqra Formation, especially their fossil content for example *Globotruncana* gr. *Stuarti* and *Rugoglobigerinidae* genera are presence in Bekhme Formation but absence in Aqra Formation and *Loftusia* and *Actionella* are presence in Aqra Formation but absence in Bekhme Formation.

In addition to in places when Shiranish Formation appear above massive limestone then this massive limestone is Bekhme Formation not Aqra Formation. It is therefore recommended here to separate both formations from each other and not combine them as some authors have suggested.

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# Chapter One

## Introduction