

METHOD TO IDENTIFY THE FACIES ASSOCIATION ARCHITECHTURE BASED ON CORE ANALYSIS

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Abstract

Rock is a very important in knowing the geological processes that developed in the past and present. The geological processes recorded in the core rock or often known as the core. Core is a rock of subsurface drilling. From the rock core can be known the characteristics of rocks ranging from megascopic and microscopic characteristics. The results of megascopic and microscopic analysis will be known facies, deposit environments, facies associations and architecture.

The data contained 3 rocks that have been in the description, after the analysis there are 3 facies including the foraminifera limestone, sandstone foraminifera and claystone foraminifera. The foraminifera limestone is deposited on the Patch Reef Interior Platform environment, the foraminifera sandstones are deposited on the Restricted Interior's platform environment and the foraminifera claystone is deposited on the Open Marine Interior Platform environment. All three facies are integrated into the facies association Restricted - Open Marine Platform.

Keywords : Core, Facies, Facies Association

INTRODUCTION

Rock is a very important tool to investigate the earth's history. One of the processes is the sediment deposition. The depositional environment can be observed by rock analysis, while the core is very important tools. The aim of this study is to provide a simulation of defining the architecture of facies association.

PREVIOUS WORKS

Facies, Depositional Environment, Facies Association and Architechture

Facies is a sedimenatry fiture that observed by its geometry, lithology, sedimentary structure, paleocurrent, and fossil (Selley, 1970). Environment is a part of earth relief which is characterized by its specific physical, chemical, and biological features (Selley, 1985). Facies association shows the combination of the natural processes in term of depositional environment.

The relationship of time and space in depositional facies on sedimentary rock records has been introduced by Walther (1894). In geological term, architechture is a geometry of facies analysis, facies

association and depositional environment.

Facies Zone

Basic processes of carbonate sedimentation and lateral facies development has been widely known as the "standard facies" (Wilson, 1975). The facies belt concept showing the possibilities of understanding the carbonate facies. This model known as carbonate platform (Figure 1), which in this study investigated in rimmed carbonate platform.

METHODS

This study data gathered from limestone, sandstone, and claystone description. This study aim to show the simplified model, where the model being as result of this study which is 3D architechture model.

RESULTS

Megascopic and Microscopic Analysis

Megascopic feature on hand specimen such color, texture, and structure was observed as well as petrographic analysis was performed to

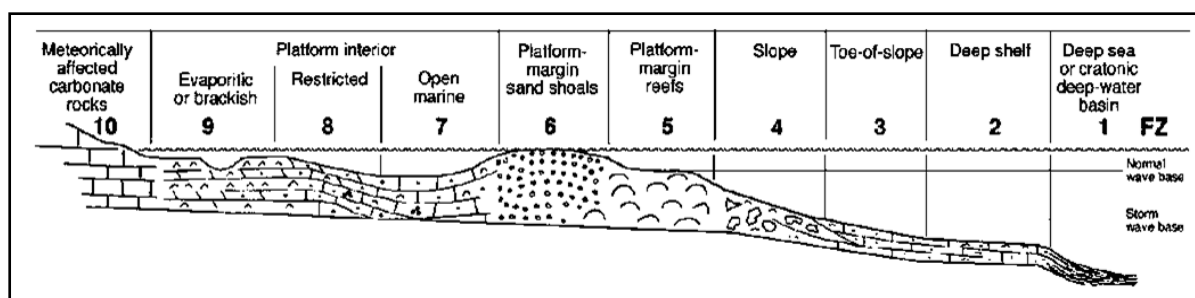


Figure 1 Facies zone from shallow to deep marine (Wilson, 1970)

determine grain type, matrix, mineral, fossil, and porosity. For example in Table 1, showing the carbonate named as packstone (Dunham, 1962) means that by petrographic analysis this rock dominated by shell grain, and the mud-matrix smaller than its shell grain.

Depositional Facies Analysis

Rock divided by its lithology, texture, structure, and fossils. The *foraminifera* packstone facies has grain dominated by shell and variety of fossils founded indicated this facies deposited in Platform Interior Patch Reef (Figure 2).

The platform interior patch reef characterized as massive structure, huge amount of biota with fine-coarse grain size.

The *foraminifera* sandstone facies came with massive structure, medium grain size, and has small variety of foraminifera. This facies determined as Platform Interior Restricted where good amount of sedimentary material made the carbonate cannot developed.

The *foraminifera* claystone facies deposited in Platform Interior Open Marine. The deposit in this environment is foram-rich fine grained sediment.

Facies Association Architecture

Facies association is a step before interpreting the depositional architecture. From this study, identified three facies, *foraminifera* packstone, *foraminifera* sandstone, and *foraminifera* claystone. It has correlated depositional

environment with platform interior, which Wilson (1970) dividing the platform interior as restricted, open marine, and patch reef. Patch reef usually developed in environment that has enough amount of sunlight, warm temperature, and low energy wave. Patch reef usually associated with the platform interior open marine (Figure 3).

CONCLUSION

To understand the facies association architecture, must follow the three steps; megascopic and microscopic core description, depositional environment analysis and facies determination, and Facies association architecture analysis.

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Table 1. Core description of claystone, packstone, and sandstone

No	Lithology	Description	Fossils	Facies	Facies Zone
1	Claystone	Dark grey, massive, clay, fine sorted, has carbonate content	Foraminifera	<i>Foraminifera Claystone</i>	Platform Interior Normal Marine (Open Marine)
2	Packstone	Grey, massive, fine-medium grain size, poor sorted	Foraminifera, lepidocyclina, coral, alga and mollusca	<i>Foraminifera Packstone</i>	Platform Interior Patch Reef
3	Sandstone	Dark grey, massive, fine sand grain, fine sorted	Foraminifera	<i>Foraminifera Sandstone</i>	Platform Interior Restricted

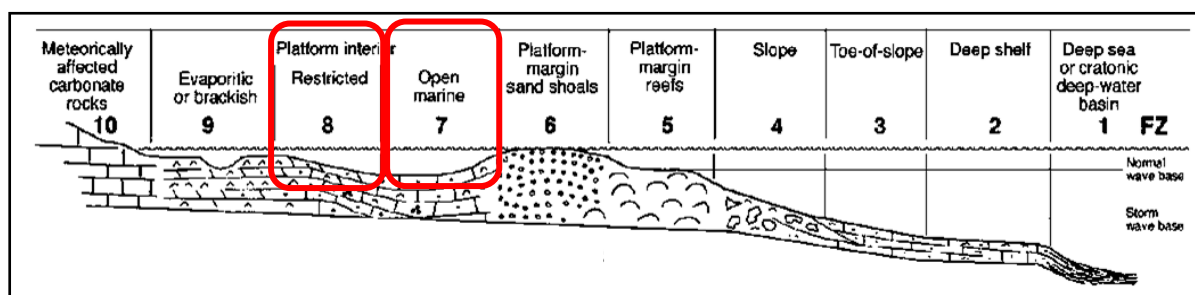


Figure 2 Restricted and open marine platform interior marked by red boxes

Platform Interior

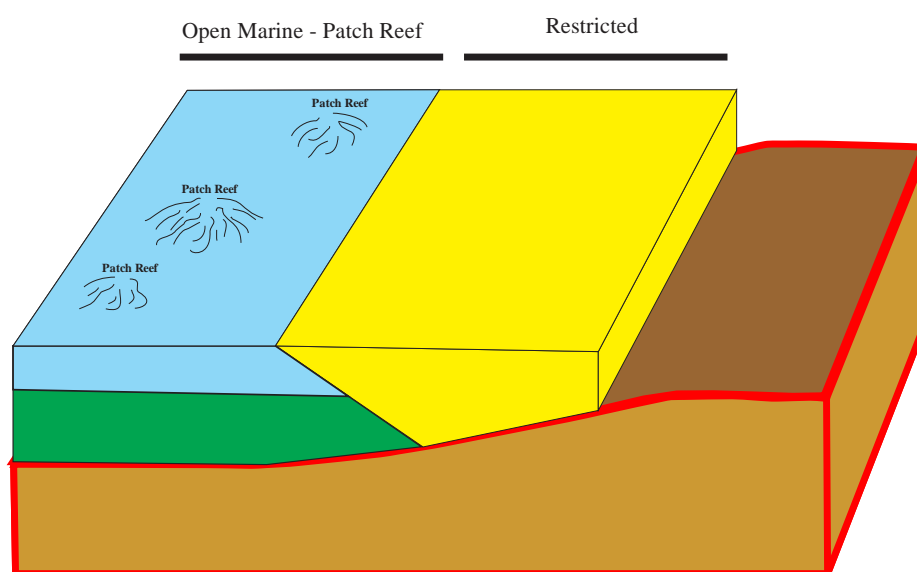


Figure 3 Facies association architecture in platform interior showing *foraminifera packstone* facies (blue); *foraminifera claystone* (green); *foraminifera sandstone* (yellow).