

Sedimentological and diagenetic processes on Miocene carbonates, a comparison of proximal EX-buildup vs. distal JX mega-platform, Central Luconia Province, offshore Sarawak

SYED HAROON ALI*, MICHAEL C. POPPELREITER, MARKUS SCHLAICH, SAW BING BING, MUKHRIZ MUBIN & REDWAN ROSLI

South East Asia Carbonate Research Laboratory (SEACARL), Department of Geosciences, Faculty of Geosciences and Petroleum Engineering, Universiti Teknologi PETRONAS, 31750 Tronoh, Perak, Malaysia

*Corresponding author email address: ali_g03677@utp.edu.my

Introduction

It is well-known that there are significant differences in isolated carbonate buildups under meteoric/mixed marine and early marine/mixed marine diagenesis (Timms *et al.*, 2015; Wilson & Evans, 2002). Isolated carbonate buildups (Figure 1) are a major gas contributor to Malaysia's hydrocarbon production but remained unstudied. Quantitative studies of these buildups are vital for understanding the highly altered pore and fabric structures. These EX and JX buildups were deposited during the middle Miocene times and represent Cycle IV and V deposition (Epting, 1980; Vahrenkamp *et al.*, 2004).

The objective of this paper is to describe the buildups quantitatively with preliminary diagenetic, petrophysical rock types. EX and JX buildups are made up of similar constituents, faunal assemblages and comparable dimensions. The post depositional histories of both buildups located some 100 kilometers away, have similarities and differences. The majority of the secondary porosity (99%) in southern buildup EX created by early and late leaching, aided with dolomitization. However, in the northern buildup JX the reservoir properties mainly controlled by meteoric leaching and neomorphism (chalkification). There is a marked contrast in rock types in both buildups, e.g. the EX is characterized by argillaceous limestones (10%), limestones (55%), dolomitic limestones (20%), sucrosic and tight dolomite (15%). While in JX apart from argillaceous (10%) and mouldic limestones (40%), 3 additional limestone rock types are present namely, vuggy (20%), chalky (20%) and brecciated (10%). Argillaceous limestones are tight zones in both (EX and JX) and are result of extensive blocky/

equant cementation, during early marine diagenesis. Significant intercrystalline (20%) and vuggy porosity (15%) has been seen in sucrosic dolomites in EX, and may have been resulted from mixed marine diagenesis. Diagenetic overprint in JX resulted in mouldic (21%) and vuggy (17%) porosities as a combination of meteoric and mixed marine diagenesis.

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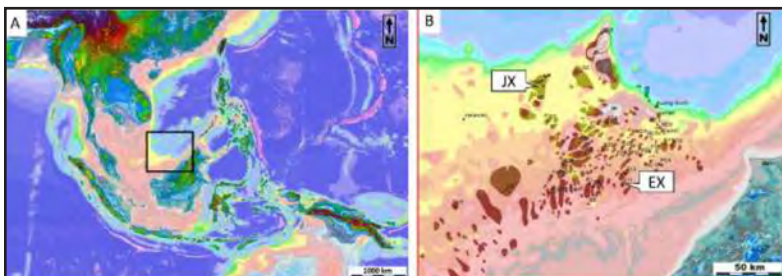


Figure 1: (A) Inset in the upper left shows regional position of the map on right side, (B) Shelf depths and distribution of carbonate buildups in Central Luconia, offshore Sarawak Basin and location of studied platforms, EX and JX.