

Accepted Manuscript

Geometric and depositional responses of carbonate build-ups to Miocene sea level and regional tectonics offshore northwest Australia

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PII: S0264-8172(18)30080-1

DOI: [10.1016/j.marpetgeo.2018.02.034](https://doi.org/10.1016/j.marpetgeo.2018.02.034)

Reference: JMPG 3262

To appear in: *Marine and Petroleum Geology*

Received Date: 11 October 2017

Revised Date: 16 February 2018

Accepted Date: 24 February 2018

Please cite this article as: Van Tuyl, J., Alves, T.M., Cherns, L., Geometric and depositional responses of carbonate build-ups to Miocene sea level and regional tectonics offshore northwest Australia, *Marine and Petroleum Geology* (2018), doi: 10.1016/j.marpetgeo.2018.02.034.

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1 **Geometric and depositional responses of carbonate build-ups to Miocene sea level and**
2 **regional tectonics offshore northwest Australia**

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8
9 **Abstract**

10 The geometric and depositional responses of isolated carbonate build-ups to Miocene sea-level
11 change and regional tectonics was investigated using a combination of 3D seismic and borehole
12 data from the Browse Basin, North West Australia, and outcrop information from the Cariatiz Reef,
13 southeast Spain. The interpreted seismic volume documents five (5) Miocene sequence boundaries
14 and five (5) main seismic facies. Seismic attribute analyses proved a highly effective tool for
15 interpreting carbonate facies but, when compared with outcrop information from southeast Spain,
16 data are limited to large-scale features of scales beyond 16.4 m vertically and 18.75 m horizontally.
17 Hence, this work clearly shows that estimations of reservoir potential are significantly
18 underestimated if based on seismic data alone. As a corollary of the structural analysis in this work,
19 growth patterns suggest Messinian structural partitioning across the Browse Basin, with
20 deformation associated with plate collision focused in preferentially orientated faults - thus only
21 influencing carbonate build-up evolution at a local scale.

22
23 **Keywords:** North West Australia; Browse Basin; Miocene; carbonate reefs; carbonate facies;
24 seismic attributes; outcrop analogue; reservoirs.

25
26 **1. Introduction**

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