

Middle Ordovician (Llanvirnian) Relative Sea-Level Fluctuations

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Abstract : The Canning Basin is located between the Kimberley and Pilbara Precambrian cratonic blocks. It is a large but relatively poorly explored Paleozoic basin in remote Western Australia. During the early Ordovician period, the Australian continent was located near the equator. Middle Ordovician age Nita and Goldwyer Formations in Canning Basin are therefore warm water carbonates. The Nita Formation carbonates are a regressive sequence which conformably overlies the Goldwyer Formation. It contains numerous progradational cycles of limestone, vuggy dolomitized carbonate beds and shale deposited in subtidal to supratidal environments. The Goldwyer Formation contains transgressive shale sequences and regressive carbonates deposited in shallow subtidal conditions. The shales contain oil-prone *Gloeocapsomorpha prisca*-bearing source rocks. Llanvirnian relative sea-level fluctuations were reconstructed by using Fischer plots methodology for three key wells (wells McLarty 1, Looma 1 and Robert 1) in Broome Platform and compared with INPEFA data. The Goldwyer lower shale (interval Or1000P) shows increasing relative sea-level and this matches with a transgressive systems tract. Goldwyer middle carbonate (interval Or2000) shows relative sea-level drop and this matches with a regressive systems tract. Goldwyer upper shale (interval Or2000P) shows relative sea-level drop and this matches with a transgressive systems tract. Nita Formation Leo Member (interval Or3000) shows a relative sea level drop and this matches with a regressive systems tract. The Nita Formation Cudalgarra Member (intervals Or3000P and Or4000) with transgressive systems tract then this is followed by a regressive systems tract. This pattern matches with the relative sea-level curves in wells McLarty 1 and Robert 1. The correlation is weak for parts of well Looma 1. This is probably influenced by the fact that the thickness of this section is quite small. As a conclusion, Fischer plots for the Llanvirnian Goldwyer and Nita Formations show good agreement with the third order global sea level cycles of Haq and others. Fischer plots are generally correlated well with trend and cyclicity determined by INPEFA curves and as a method of cross-checking INPEFA data and sea-level change.

Keywords : canning basin, Fischer plots, Llanvirnian, middle Ordovician, sea-level fluctuations, stratigraphy

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