# Controls on Mesozoic rift-related uplift and syn-extensional sedimentation in the Exmouth Plateau

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## SUMMARY

The Exmouth Plateau, part of the Northern Carnarvon Basin, has experienced a multi-phase extensional history, which is associated with regional-scale uplift, as well the uplift and erosion of individual footwall blocks. Detailed interpretation of 3D seismic surveys over the area shows that fault activity began in in the latest Triassic, mainly on NNE-SSW and NE-SW trending faults.

Rotation of Triassic fault blocks initiated in the Upper Triassic and continued during the Jurassic. Erosion of pre-rift Triassic sediment occurred during the latest Triassic and the Jurassic. In the latest Jurassic deposition infilled half-grabens and deposition onto highs was limited in the west as the area was starved of sediment. A significant change in sediment supply in the early Cretaceous associated with progradation of the Barrow Delta resulted in the infilling of previously starved half-grabens. Fault activity had decreased by the mid-Cretaceous, with limited activity confined to major faults. Later Cretaceous sediment distribution in the study area was largely controlled by remnant topography.

High-quality 3D seismic data allows a detailed examination of the way in which rift-related fault activity affects sediment distribution. In addition to creating fault block traps in pre-rift Triassic sediments, understanding syn-extensional sediment patterns and fault reactivation has implications for syn-rift plays and seal integrity.

**Keywords:** Extension, North West Shelf, Exmouth Plateau, Triassic, Jurassic.

## INTRODUCTION

The complex multi-phase rifting history of the North West Shelf (NWS) has resulted in uplift across the Northern Carnarvon Basin, including the broad outboard Exmouth Plateau, Figure 1.

Details of the timing of Mesozoic rifting have been little studied and pose questions relevant to the exploration of petroleum systems. This study aims to uncover the detailed timing of fault activity and the fill history of the Mesozoic fault blocks on the Exmouth Plateau in order to provide a more detailed history of the region. This study also aims to provide an extension to pre-existing NWS knowledge through the development of a seismically derived tectono-stratigraphic meg-sequence model to delineate the timing of rift-related movement and the subsequent fill history.

Early studies in the Exmouth Plateau were undertaken by Exon et al (1982), Exon and Buffler (1992), Exon et al (1992) and Haq et al (1992) to uncover the tectonic and stratigraphic nature of the plateau. These studies relied on vintage 2D seismic data and/or limited well information. The biostratigraphic work of Jablonski (1997) covered the main depositional areas of the Northern Carnarvon Basin, and the easternmost margin of the Exmouth Plateau. As the plateau is a broad basin feature, further work is needed across the expansive area.

Longley et al (2002) developed a regional understanding of the NWS with a focus on linking biostratigraphic work to tectonic events impacting upon the entire NWS. Recently, Marshall and Lang (2013) took a different approach to earlier work using sequence stratigraphy to develop a series of stratigraphic markers to delineate a biostratigraphically controlled sequence stratigraphic framework, cross-referencing the previous work of Jablonski (1997) and Longley et al (2002). Others have developed stratigraphic patterns for individual sub-basins (Miller and Smith, 1996; Auld et al, 2002; Smith et al, 2002) and for the other NWS basins (Tucker, 2009).

Advances in seismic acquisition and processing have naturally taken place since the earlier work on the Exmouth Plateau, and high-quality 3D seismic data is available over large portions of the plateau. Detailed seismic interpretation of 3D surveys in this study have reconstructed the extensional history of the region. A series of widely identifiable horizons were interpreted over the region in order to develop a mega-sequence framework to aid in identifying phases of basin evolution.

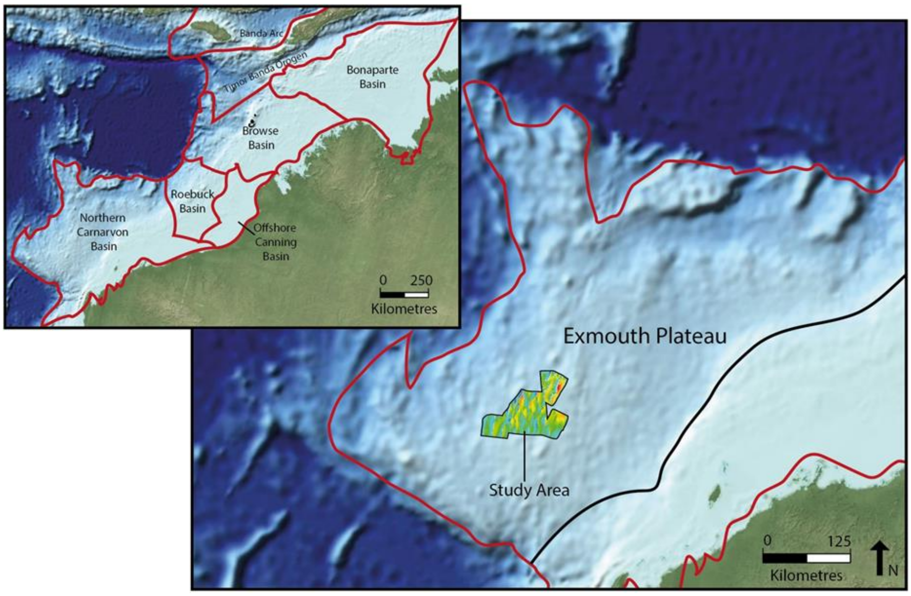


**Figure 1 Location of the study area within the Exmouth Plateau, Northern Carnarvon Basin. The NWS is inset in the top left.**

## GEOLOGIC BACKGROUND

The Northern Carnarvon Basin forms the southernmost section of the greater NWS (Gartrell, 2000) and the northernmost half of the greater Carnarvon Basin (Figure 1). The NWS developed through a multi-extension history associated with the breakup of the supercontinent, Gondwana (Veevers, 1988, Gartrell, 2000). The complete sedimentary infill of the Northern Carnarvon Basin is estimated to be between 12 and 15 km (Stagg and Colwell, 1994), spanning from the Mesozoic to the Cainozoic (Hocking, 1990). The area is a highly productive Australian hydrocarbon province (Gartrell, 2000). The Exmouth Plateau is a broad subsided continental platform outboard of the main depocentres of the Northern Carnarvon Basin (Falvey and mutter, 1981; Purcell and Purcell, 1988; Wulff and Barber, 1995). The two dominant structural trends, orientated north and the northeast, vary across the plateau reflecting the interaction of basement contacts and oblique extension (Stagg et al, 2004).

The plateau is first thought to have formed as a basin during the Pemo-Carboniferous early rifting event that separated (Haq et al, 1992), thinned and stretched the crust (Exon et al, 1992). Subsidence followed and large volumes of sediment accumulated during the Triassic (Haq et al, 1992; Exon and Buffler, 1992; Stagg and Colwell, 1994). A second phase of rifting formed fault blocks which rotated landwards during the early Jurassic (Haq et al, 1992). Thin sequences were deposited over the plateau, with Exon et al (1982) and Haq et al (1992) attributing this to erosion, but it could also be due to limited sediment supply. The final separation of India from the Australian-Antarctic plate occurred during the early Cretaceous (Haq et al, 1992; Exon and Buffler, 1992; Exon et al, 1992). At this time, a new supply of sediment was derived from the south following uplift (Exon and Buffler, 1992).

## DATA AND METHOD

The Thebe, Bonaventure and Scarborough 3D seismic surveys cover a large area of the central plateau and were used for this study. The Thebe survey forms the northeastern extent of the study, covering an area of 1197.987 km$^2$, with a line spacing of 25 m for inlines and 12.5 m for crosslines and a record length of 4600 ms. The Bonaventure survey is the largest of the three at 4131.5 km$^2$ with a record length of 7200 ms and line spacing's of 18.75 m for inlines and 12.5 m for crosslines, and forms the central, northwest, southwestern and southern extents of the study area. The Scarborough survey sits in the southeast of the study covering an area of 900 km$^2$, with a record length of 6000 ms and a line spacing of 18.75 m for inlines and 12.5 m for crosslines.

Key horizons were interpreted based on seismically visible tectono-stratigraphic relationships. The wells Thebe-1, Thebe-2, Bredoerode-1 and Eendracht-1 had accessible time-to-depth curves and stratigraphic tops so were tied to the seismic data to provide age constraints to the mega-sequences. These mega-sequences were then used to describe the phases of evolution over the Exmouth Plateau in relation to the rift-related activity. Fault activity was analysed through thickness changes surrounding faults and sedimentary fill was investigated using observed differences between thickness maps.

To investigate the distribution of rift-related topography and the extent to which it has been modified by later events, eroded fault block crests were mapped to determine the paleo sea-level or wave-base, and the extent to which the rift related-topography has been modified by later events.

## STRUCTURAL FRAMEWORK

The study area is largely dominated by a series of rotated fault blocks, containing Triassic sediments, Figure 2. These fault blocks occur along faults that form on NNE-SSW and NE-SW trend, dipping eastward. There is also some movement on NW-SE and NNW-SSE orientated faults. Most of these faults overlap to form larger fault assemblages. In the southeastern area, a limited number of faults formed on an E-W orientation. The largest displacement occurs in the north and centre of the study area, while the southeastern area exhibits much less deformation.

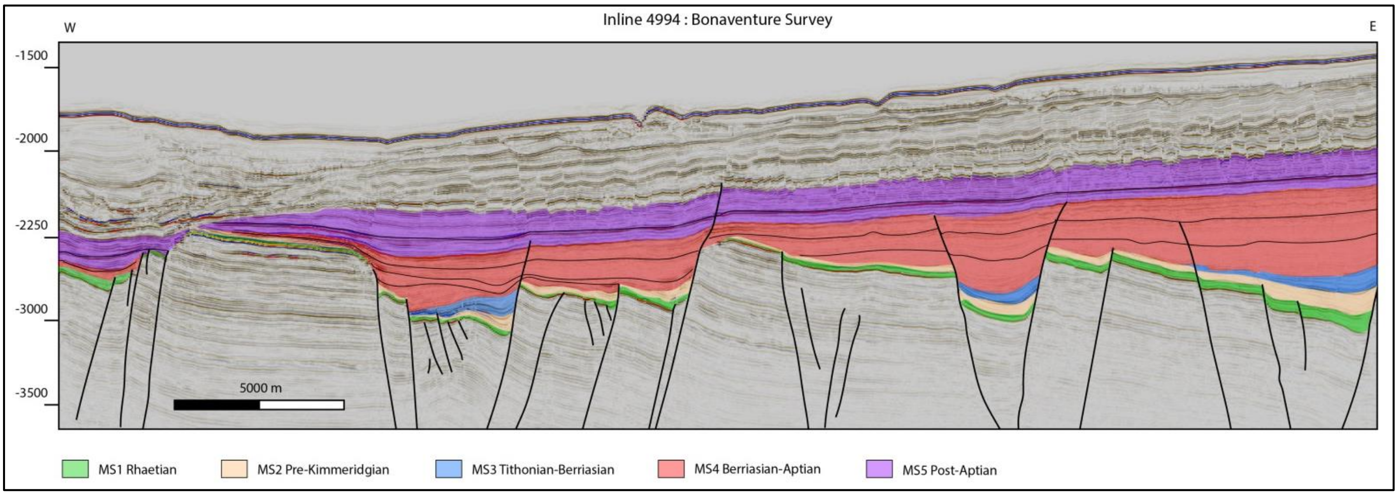


**Figure 2 Example of mega-sequence framework on a seismic line from the northern central region of the study area.**

## MEGA-SEQUENCE FRAMEWORK

A total of six mega-sequences were identified across the study area. These mega-sequences are described below, along with a description of internal sub-divisions where appropriate. The five mega-sequences that occur after the initial Triassic movement are shown with reference to stratigraphy (Figure 3) and seismic stratigraphy in Figures 2 and 3.

### Pre-kinematic

A thick mega-sequence composed of the Mungaroo Formation forms a series of parallel reflectors of medium amplitude and uniform thickness. The base of this sequence is not observed in the data used for this study and it is interpreted as post-rift in relation to the Permian rift, and pre-rift relative to the younger Mesozoic events described below.

### MS1 Rhaetian

The oldest mega-sequence to be mapped across the study area is a broad package of Rhaetian age encompassing the Brigadier Formation. Seismically the package is identified as a series of flat-lying reflectors, with some chaotic patterns in areas of substantial thickness changes; bright reflectors often represent the very base of the package. The chaotic seismic facies commonly occur in the northeast of the study area in the upper sequence, adjacent to eroded fault block crests. These slumps are interpreted as the localised re-deposition of sediment from the adjacent fault block crest. The sequence increases in thickness into major faults and thins and pinches-out over uplifted or tilted fault blocks over most of the area. However, in some locations within the central area, no thinning over highs or growth into faults is recognised. In these areas, the mega-sequence consists of a series of flat-lying reflectors.

### MS2 Pre-Kimmeridgian

The second oldest mega-sequence spans most of the Jurassic aged deposition of the plateau. The mega-sequence contains the Athol Formation and Murat Siltstone, extending into the Oxfordian and Kimmeridgian strata. This mega-sequence is thus described as a Jurassic mega-sequence with an unconformable top. On seismic data, the mega-sequence is characterised by as a series of low and medium concordant reflectors, with minor chaotic reflectors occurring in the deepest downthrown half-grabens. The base of the MS2 Pre-Kimmeridgian mega-sequence displays some gentle onlap onto the top of the underlying MS1 Rhaetian mega-sequence, and some rare truncation against the overlying MS3 Tithonian-Berriasian units. The sequence is topped by a reflector of high amplitude. This sequence covers the study area and thins over the uplifted fault blocks and thickens into major faults, with the exception of some fault blocks in the southwestern-most area of the study and one other fault block in the central area, where limited thickening into faults or thinning over highs occur. Chaotic seismic facies adjacent to eroded fault block crests interpreted as slumps only occur in the northwest and central areas of the study.

### MS3 Tithonian-Berriasian

Deposition of the MS3 Tithonian-Berriasian began in the latest Jurassic and continued into the earliest Cretaceous. It is identified on seismic data as a series of parallel reflectors that onlap the underlying MS2 Pre-Kimmeridgian sequence. The sequence occurs largely as, but not limited to, the filling of half-grabens as wedge-like features, Figure 2. Deposition declines towards the central, west and southwest of the study area, where deposition of the MS3 Tithonian-Berriasian sequence does not stretch over the highs. In the southwest of the study area, a chaotic slump feature occurs infrequently, adjacent to eroded crests. Deposition is thickest to the northeast of the study.

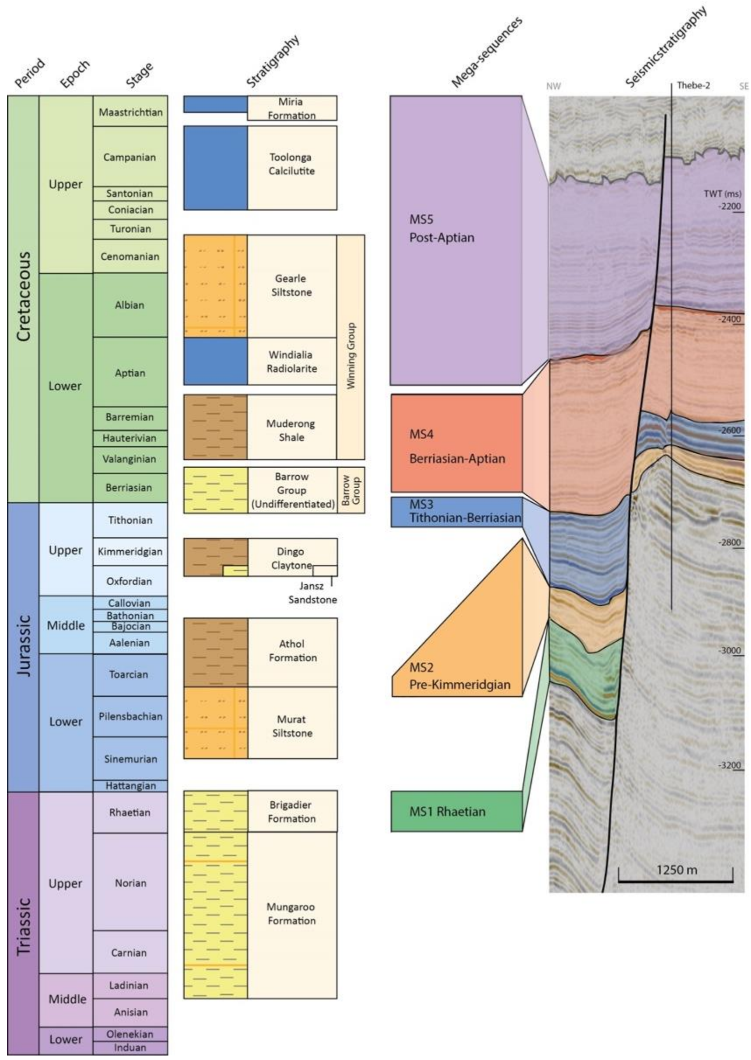


**Figure 3 Generalised stratigraphic column for the Exmouth Plateau, with the authors mega-sequence framwork constrained to a seismic inline from the Thebe 3D survey.**

**MS4 Berriasian -Aptian**

The thick MS4 Berriasian-Aptian mega-sequence is composed of the Barrow Group and the Muderong Shale, covering the study area. The seismic character is that of a series of faint reflectors, with intermittent chaotic patterns in the upper part of the sequence. The sequence onlaps and downlaps the underlying sequences to fill the deep half grabens and is visibly truncated in places at the top. There are three internal sub-divisions to this mega-sequence. The first is a localised set of delta forsets mapped within the northern central area. Also occurring within the central region is the division within the Barrow Delta stratigraphy that represents the bulk of the half-graben filling, where thickening into faults is significantly greater than the later sequences. The study-wide division separating the Barrow Delta from the overlying Muderong Shale marks the decrease of syn-rift growth wedge formation. This mega-sequence also displays a change in sedimentary influx, where supply arrives from the south. This supply continues during the deposition of the later deposition of the Muderong Shale.

**MS5 Post-Aptian**

The MS5 Post-Aptian mega-sequence encompasses the Windalia and Miria formations, Gearle Siltstone, and Toolonga Calcilutite, spanning from the Aptian to the end of the Cretaceous. The mega-sequence is seen on seismic data as a series of parallel reflectors, a substantial volume of which are cut by a network of polygonal faults. There is some onlap onto the lower MS4 Berriasian-Aptian mega-sequence. The MS5 Post-Aptian was sub-divided, to distinguish between the sediments affected by polygonal faulting and those which are not. The sub-division is mapped along the top of the Lower Gearle Formation. With limited thickness changes on either side of major faults, the mega-sequence is largely post-rift, with very late stage syn-rift deposition occurring along a few faults. The polygonal faulting makes the identification of mega-sequence packages difficult.

## STRUCTURAL HISTORY

The pre-kinematic Munagroo Formation sequences of Norian age are uniform in thickness, showing no indication that deposition occurred during fault activity. Fault-block rotation and uplift began during the latest Triassic across the whole plateau and continued throughout the Rhaetian. Pinch-out of sequences onto the crests of fault blocks is most prominent in the northeast and central regions, Figure 4. The rotation was more prominent in the northeast of the study area, with rotation continuing into the eastern central region. Limited fault block rotation occurred in the southeastern and southwestern areas.

During the Jurassic fault block uplift was most dominant in the northeast and lessened into the central area. Activity increased in both the southeastern and southwestern regions. In the latest Jurassic to earliest Cretaceous, the area was starved of sediment though fault activity was ongoing. Sediment onlapped the underlying MS2 mega-sequence and deposition was restricted to half-grabens in the south, central and western region. This may reflect a renewal of fault activity, cutting off supply from the northeast, where displacement is greater. Non-deposition across much of the highs in the central and southwestern area, the trend of Jurassic movement appears to have been more focused on the NNE-SSW orientated faults. The southeastern region was once again experiencing a relatively low level of displacement.

Fault activity declined during the early Cretaceous, and by the deposition of the upper Barrow Delta and Muderong Shale was restricted to small displacement over a few larger faults. The pattern of deposition at this time was largely impacted by remnant topography, as only fault blocks with the greatest relief impacted upon deposition. Following the Aptian, fault activity was dominated by the large network of polygonal faults that cover most of the study area, though the intensity of the faulting lessens to the west. Some movement on major faults in the northeast and southwest occurred at this time.

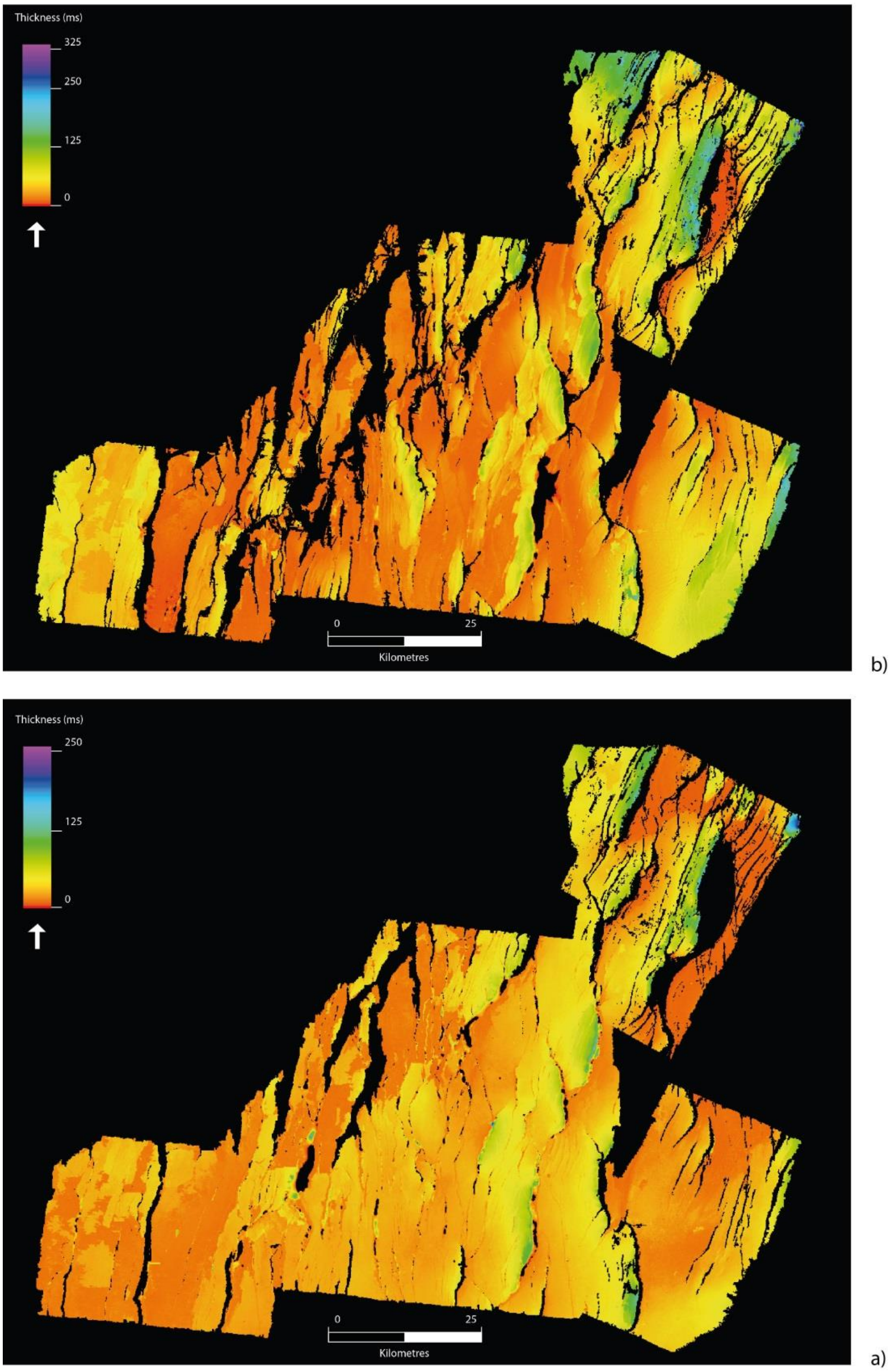


**Figure 4 Thickness maps of (a) MS1 Rhaetian and (b) MS2 Pre-Kimmeridgian in the central Exmouth Plateau.**

## CRESTAL EROSION

Crestal erosion takes place on the tilted fault blocks, occurring only on those that are formed on the NE-SW or NNE-SSW trend, Figure 5. The strata that have been eroded are the pre-kinematic mega-sequence and commonly strata from MS1 and occasionally MS2.

Where slump feature deposition (see mega-sequence framework) occurred adjacent to crestal erosion a time-line can be applied to the erosion of fault block crests. This first area to experience erosion in this study area was the northeastern region, during the Rhaetian.

During the latest Triassic and in the Jurassic crestal erosion was taking place in the central areas. The southwestern and central west area fault block crests were eroded in the latest Jurassic to earliest Cretaceous. No slump features were identified in the southeast of the study. Fault-block crests were therefore exposed to an erosive environment first in the northeast or east which then migrated to the south or southwest.

Burial of these eroded crest features is also variable. In a limited number of cases, MS1 buries the eroded fault block crest, but deposition of MS1 is thin in these occurrences. Commonly MS2 Pre-Kimmeridgian buries the underlying crestal erosion. However, MS2 may also have been eroded, or commonly pinches-out over highs and so does not cap the crests. This commonly occurs in the northeast, northwest and central areas. In the northeast incidents of MS2 failing to bury crest are rare, but when they occur the MS3 Tithonian-Berriasian sequences buries the eroded crests. In the northwest and central region, MS3 fills only the half-grabens and does not commonly extend over the crests. In these cases MS4 Berriasian-Aptian buries the crests. With the exception of a topographically high fault block to the northwest, the eroded crest of this fault block is onlapped by the deposition of MS4 and MS5, full burial is achieved by post-Cretaceous sequences.

The manner in which burial of these eroded crests occurs is also important to stratigraphic relationships. In most cases the overlying unit only partly buried the eroded crest, terminating on the footwall block where the erosional scarp becomes too steep for sediment to accumulate and only becomes buried when younger sediments of MS4 could onlap the hanging wall. In some locations, the overlying mega-sequences formed a drape over the crest.

Crestal erosion is widespread (Figure 5), but decreases to the southeast and southwest, relative to the middle Aptian, the eroded crests became shallower from the southeast, through the centre and into the northwest and southwest of the study area. This is opposite to the trend of erosion timing based on the occurrence of slump deposits.

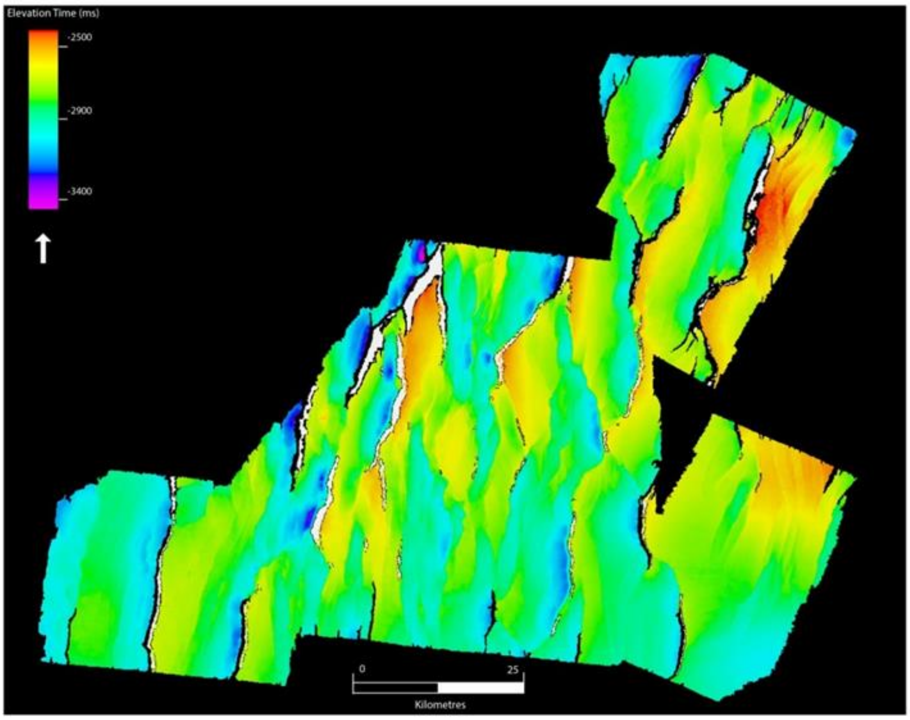


**Figure 5 Rift-related architecture of the study area, shown on the top Norian-Mungaroo Formation surface. Eroded fault block crests are displayed in white.**

## TECTONO-STRATIGRAPHIC HISTORY

The mega-sequences display the rotation history of the fault blocks. The MS1 Rhaetian sequences occurred after the initiation of fault block rotation, but syn-rift growth wedges indicate deposition occurred during fault movement. The MS2 Pre-Kimmeridgian mega-sequence is also considered to be a syn-rift package, forming more pronounced growth wedges. The renewal of uplift and rotation occurred on some fault blocks where the MS2 syn-rift fill onlaps crestal erosion of the MS1 syn-rift mega-sequence. There are few examples of faults that initiated after the deposition of MS2. In the southwestern region and in a single fault block within the northern central study area, rotation of fault blocks occurred after the deposition of the MS2 Pre-Kimmeridgian sequences.

From the latest Jurassic into the earliest Cretaceous fault activity occurred during the deposition of the MS3 sequence. The basin was starved of sediment during this time and many half-grabens were only partially filled. The arrival of large volumes of sediment in the Berriasian, derived from a new southern supply ended the starvation. Deposition of this new influx initially occurred as thick syn-rift packages of the lower MS4 mega-sequence. As deposition continued movement decreased, and ceased along many faults by the close of the upper MS4 mega-sequence. During the deposition of lower MS5, the fault activity was very limited. Polygonal faults obscure the movement history of the later Cretaceous sequences.

Rotated fault blocks highlight the widespread distribution of late Triassic rifting across the central Exmouth Plateau, Figure 4. Fault blocks were exposed to erosion from between the Rhaetian and earliest Cretaceous, at the latest. Mapping of a later Aptian horizon indicates that these eroded crests (and non-eroded crests) may have been exposed to later tilting, resulting in the current position of these fault blocks being shallower in the northwest and deeper in the southeast. However, this is difficult to determine as the fault blocks did not undergo a uniform phase of erosion.

The presence of onlap onto underlying sequences indicates a hiatus in depositional activity, while movement continues. Onlap is common among the identified mega-sequences. The MS2 Pre-Kimmeridgian sediments onlap the underlying MS1 units, the MS3 Tithonian-Berriasian sediments onlap the MS2 sequence, the MS4 strata onlap and downlap the MS2 and MS3 mega-sequences. This defines three depositional hiatuses, one following the deposition of the Brigadier Formation in the Rhaetian, one following the pre-Kimmeridgian sequences of MS2, and one following the deposition of the MS3 Tithonian-Berriasian, prior to the deposition of the Barrow Delta. The top of MS4 is partially truncated by the deposition of the overlying MS5. These truncations occur on the upthrown side of faults active at that time the time and are considered to represent erosion of highs.

## SIGNIFICANCE

**Stress Regime**

Previous sections have discussed the uplift and fault activity of the study area. A significant amount of uplift and deposition occurred during the early rifting resulting in the early relief of the rifted fault blocks. Following the initiation of rifting in the Triassic, movement occurred episodically into the Cretaceous. No significant change in stress occurred between the Jurassic and Cretaceous when plate reorganisation was occurring.

The volume of uplift was greater towards the margin, decreasing landward into the depocentres, indicating that the rotation of fault blocks was controlled by the plate boundary processes not the formation of the inboard sub-basins.

**Hydrocarbon Traps**

The hydrocarbon potential of the central Exmouth Plateau is likely to have been impacted by the tectonic history. Continuous fault activity in the central Exmouth Plateau from the late Triassic into the Cretaceous could have resulted in the episodic charge of reservoirs and also to seal breach.

The absence of a suitable seal occurs in two ways in the study area. The first is the erosion of fault block crests and the overlying burial facies. In this area, crests are buried by a number of different mega-sequences (see Crestal Erosion) due to the pinch-out over highs and limited supply. A large number of these sites rely on the burial, even partially, by the MS4 Barrow Delta strata, due to nondeposition or erosion of sealing facies. Based on the facies of the delta it is likely that it would provide a pathway for hydrocarbons to migrate through to a suitable trap and/or seal. This could result in remnant hydrocarbons shows within the uplifted fault block crests. The second cause of seal absence is the high topographic relief fault blocks, resulting in only partial cover by the regional seal. As seen in the northwest, fault blocks can sit at a high elevation where the Muderong Shale only onlaps the block and can offer no sealing potential. In this case, the potential of a hydrocarbon reservoir within tilted Triassic fault blocks is diminished. With the sealing Muderong Shale absent migration into the overlying strata would have occurred.

Stratigraphic traps become a viable option in this region. As mentioned previously (Mega-sequence Framework and Tectono-stratigraphic History) many of the described mega-sequences onlap the earlier deposition. The stratigraphic architecture in the area could result in the formation of onlap traps in the latest Triassic, Jurassic and earliest Cretaceous deposition. The Barrow Delta onlaps and buries most of the fault blocks, resulting in the potential for further traps similar to those in the Briseis-1 gas discovery.

## CONCLUSIONS

This study has uncovered the timing of tectonic activity and depositional fill in the central Exmouth Plateau.

1. Rift activity initiated in the latest Triassic after the deposition of the Mungaroo Formation.
2. Activity occurred along two dominant structural trends.
3. Movement in the area continued episodically, decreasing during the Cretaceous.
4. The erosion of fault block crests began during the Rhaetian in the northeast, and by the earliest Cretaceous had moved to the southwest.
5. The area was starved of sediment during the latest Triassic to earliest Cretaceous.
6. No change in stress regime during Jurassic and Cretaceous plate reorganisation.
7. Rotated fault blocks have a low chance of occurring with suitable sealing facies.

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## REFERENCES


Auld, K., Thomas, B., Goodall, J., Elliott, L., and Benson, J., 2002, John Brookes Gas: the voyage to discovery *In*: M. Keep and S. Moss, (Eds), The Sedimentary Basins of Western Australia, Proceedings Western Australian Basins Symposium 3, Perth, 491-509.

Exon, N.F., and Buffler, R.T., 1992, Mesozoic seismic stratigraphy and tectonic evolution of the western Exmouth Plateau *In:* Proceedings of the Ocean Drilling Program, Scientific Results, 122, 61-81.

Exon, N.F., Haq, B.U., and Von Rad, U., 1992, Exmouth Plateau revisited: scientific drilling and geological framework *In*: Proceedings of the Ocean Drilling Program, Scientific Results, 122, 3-20.

Exon, N.F., Von Rad, U., and Von Stackelberg, U., 1982, The geological development of the passive margins of the Exmouth Plateau off northwest Australia: Marine Geology, 47(1-2), 131-152.

Falvey, D.A., and Mutter, J.C., 1981, Regional plate tectonics and the evolution of Australia's passive continental margins: BMR Journal of Australian Geology and Geophysics, 6, 1-29.

Gartrell, A.P., 2000, Rheological controls on extensional styles and the structural evolution of the Northern Carnarvon Basin, North West Shelf, Australia: Australian Journal of Earth Sciences, 47(2), 231-244.

Haq, B.U., Boyd, R.L., Exon, N.F., and von Rad, U., 1992, Evolution of the central Exmouth Plateau: a post-drilling perspective: Proceedings of the Ocean Drilling Program, Scientific Results, 122, 801-816.

Hocking, R.M., 1990, Carnarvon Basin. *In*: Geology and Mineral Resources of Western Australia. Western Australia Geological Survey, Memoir 3, 457–495.

Jablonski, D., 1997, Recent advances in the sequence stratigraphy of the Triassic to Lower Cretaceous succession in the Northern Carnarvon Basin, Australia: The APPEA Journal, 37(1), 429–454.

Longley, I.M., Buessenschuett, C., Clydsdale, L., Cubitt, C.J., Davis, R.C., Johnson, M.K., Marshall, N.M., Murray, A.P., Somerville, R., Spry, T.B. and Thompson, N.B., 2002, The North West Shelf of Australia - a Woodside Perspective. *In*: M. Keep and S. Moss, (Eds), The Sedimentary Basins of Western Australia, Proceedings Western Australian Basins Symposium 3, Perth, 28-88.

Marshall, N.G., and Lang, S.C., 2013, A new sequence stratigraphic framework for the North West Shelf, Australia. *In*: The Sedimentary Basins of Western Australia 4: Proceedings PESA Symposium. Perth, 1-32.

Miller, L.R., and S.A. Smith, 1996, The development and regional significance of rift-related depositional systems in the Dampier Sub-basin, The APPEA Journal, 36(1), 369-384.

Purcell, P.G., and Purcell, R.R., 1988, The North West Shelf, Australia – An Introduction. In: Purcell P.G., and Purcell R.R., (Eds), The North West Shelf Australia, Proceedings of Petroleum Exploration Society Australia Symposium, Perth, 3-15.

Smith, N., Dempsey, C., Jackson, M., and Preston, J., 2003, Overcoming historical bias: an integrated geological and engineering assessment of the Coniston prospect, Exmouth Sub-basin, The APPEA Journal, 43(1), 363-383.

Stagg, H.M.J., Alcock, M.B., Bernardel, G., Moore, A.M.G., Symonds, P.A., and Exon, N.F., 2004, Geological framework of the Outer Exmouth Plateau and adjacent ocean basins: Geoscience Australia.

Stagg, H.M.J., and Colwell, J.B., 1994, The structural foundations of the Northern Carnarvon Basin. In The sedimentary basins of Western Australia: Proceedings of Petroleum Exploration Society of Australia Symposium, Perth, 349-365.

Tucker, S., 2009, Post-rift marine transgression of the southern Browse Basin margin: controls on hydrocarbon reservoir development and exploration potential, The APPEA Journal, 49(1), 43-64.

Veevers, J.J., 1988, Morphotectonics of Australia's northwestem margin - a review. In: Purcell P.G., and Purcell R.R., (Eds), The North West Shelf Australia, Proceedings of Petroleum Exploration Society Australia Symposium, Perth, 19-27.

Wulff, K., and Barber, P., 1995, Tectonic controls on the sequence stratigraphy of Late Jurassic fan systems in the Barrow-Dampier Basin, North West Shelf, Australia, PESA Journal, 23, 77-89.