

CONTROLS ON MESOZOIC RIFT-RELATED UPLIFT SYN-EXTENSIONAL SEDIMENTATION IN THE EXMOUTH PLATEAU

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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 the latest Triassic, mainly on NE-SW trending faults. This created barriers to sediment transport, resulting in sediment starved half graben and onlap of sediments onto upthrown fault blocks. Further erosion of pre-rift Triassic sediment occurred during the Jurassic, though uplift had ceased and only the larger faults remained active. The Late Jurassic brought about a new phase of uplift in the south, possibly associated with the reactivation of north-south trending faults. By the earliest Cretaceous all major faults were once again active. 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 slowed by the end of the Cretaceous, with limited activity confined to major faults.

The high quality of the 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.