

ABSTRACT

Until Upper Albian times, Australia and Antarctica were fused along the southern margins of the Australian plate. A system of troughs caused by crustal fractures along this zone permitted sediments of Otway Group age to be deposited within the Otway, Bass, and Gippsland Basins. The sediments within the Bass Basin were broken into an array of half-grabens and grabens when Australia and Antarctica were sundered by extensional tectonism of the Otway period of rifting.

The half-grabens of Boobyalla, Durroon, and Bark, underlie T/15P. The infilling of these sub-basins during the Upper Cretaceous was influenced by the effects of Otway drifting and the subsequent period of Tasman rifting and drifting. The latter was caused by separation of the southeastern corner of Australia from the Lord Howe Rise.

Sedimentation within these sub-basins is non-marine and the phases of relative changes in sea level that occurred during this period had a strong influence on the facies of the Cenomanian and Turonian beds. These sediments accumulated within depocentres formed by the rotational movements of blocks along major listric faults. The exception to this general statement is the central and southern portions of the Boobyalla Sub-Basin, where subsidence occurred between bounding listric faults.

The period of Tasman rifting created a system of post-depositional, detached, roll-over structures along both listric margins of the central and southern margins of the Boobyalla Sub-Basin. It also formed updip culminations to tilted blocks within the graben. The effect of this extensional tectonism on the other sub-basins was to induce more rotational movement of Cenomanian and Turonian beds along the bounding faults.

Sedimentation after the period of Tasman rifting was influenced by both Otway and Tasman drift. Its effect was to cause subsidence to move to the central areas of the Bass Basin. Coniacian to Maastrichtian sedimentation thickened towards this depocentre from the margins of the basin. Tertiary sedimentation continued this pattern.

The model of rifting derived from these sub-basins can be applied to other rifted basins, in particular that of the Sudan, where both rollover structures and updip culminations to fault blocks produce oil.

The acquisition of more seismic data will be necessary to map these, and further, prospects. Tertiary structures west of Chat-1 should also be investigated.