

3.3 THE OTWAY DRIFT PHASE (PART 1)

Cande and Mutter (1982) date the timing of ocean floor initiation between Antarctica and Australia as 100 Ma. The drift of Antarctica away from Australia caused separation at the present southern margins of the Australian continent, and this drift continues to the present day.

The effects of this separation of the continents on the region of the Bass Basin was to sunder the sediments of the Otway Group into a complicated array of grabens and half-grabens.

Three sub-basins underlie T/15P. These are (Fig 2):

- (1) The Boobyalla Sub-Basin (A)
- (2) The Durroon Sub-Basin (B)
- (3) The Bark Sub-Basin (C)

Moore et al (1984) identified an onshore extension of the Boobyalla Sub-Basin in northeastern Tasmania. Its offshore extension forms the largest and deepest of the three offshore sub-basins. It is 170 km long and 30 km wide and elongated in a northwest to southeast direction, paralleling its bounding fault, which is the major structural fault within the permit (Enclosure 12).

Weged between sub-parallelizing listric faults, one of which is the bounding fault to the Boobyalla Sub-Basin, is the Durroon half-graben. The basin measures 60 km x 10 km, though it is possible the limits of the original depositional basin have been altered by periods of subsequent erosion (Enclosure 12).

To the west of both the Boobyalla and the Durroon Sub-Basins, is Bark Sub-Basin. A plan view illustrates that the bounding fault shows a dog-leg pattern, one common to many of the world's great rift systems (Enclosures 12). That part of the dog-leg that trends approximately east to west may reflect a reactivation of pre-existing joint patterns in underlying Palaeozoic rocks. The outlines of these sub-basins reflect the dominant direction of Otway rifting, which is predominantly northwest to southeast.

A major peneplain on the surface of the Otway Group concluded the period of the initial sundering, tilting, and collapse of the beds. The humid, fluvial, geomorphic cycle at the end of the Upper Albian produced a nearly featureless surface that extended across the area of the Bass Basin. The seismic expression of this peneplain shows an angular unconformity (BMR 88-306) everywhere but the central and southern portions of the Boobyalla Sub-Basin. This would suggest that the beds of the Otway Group were faulted and tilted in attitudes of half-grabens everywhere but in the areas where collapse of the beds was controlled by faults on the east and west margins of the Boobyalla sub-basin, and by structural hingelines where faults are absent.

The physical geography created by the first paroxysm of Otway rifting was, contrary to most opinions, modest. The measure of the first tilt, and therefore of the topography created by it, can be estimated by projecting the dip of the beds under the Upper Albian peneplain to the updip faulted culmination of the tilted block, and measuring the thickness of strata that was removed by Upper Albian peneplanation.

However, the updip culminations of tilted faulted blocks were peneplaned during frequent periods of relative lowstands of sea level during Cenomanian to Maastrichtian times. Seismic data can identify successive surfaces of