

Oligocene/Miocene volcanic episode. This episode is characterised by basin-wide expulsion of igneous material either as extrusives and forming complex overlapping volcanic cones and flows, or as doleritic intrusives that penetrate horizontally through the stratigraphy. The extrusives occur mainly on the eastern flanks of the Cormorant and Yolla Troughs, while the intrusives occur dominantly in the western parts of T/18P and T/25P.

This period is coincident with the basin inversion of the Cormorant Trough.

The structural mechanism for this episode has previously been explained as a late stage tertiary compressional event. There is no doubt that there are some minor wrench-related features of this age scattered throughout the basin, for example the north-south trending fault system in the Yolla area that only became apparent on the 3D seismic data, and which is thought to be responsible for sourcing most of the extrusives in the area (Waldron, 1995). However, there is a significant lack of major reversals or thrusts, whilst crestal collapse structures are more common. Even in a divergent wrench system there should be more signs of lateral offsets of earlier faults or structural features. The strain ellipsoid also suggests that such a system will produce folds with a strike perpendicular to the major normal faults, but this is not the case. Indeed folds with a parallel strike are common.

For these reasons, and because of the coincident basin inversion in the Cormorant Trough and large amounts of igneous material being injected into the stratigraphic record, it is suggested that the mechanism for this episode is thermal doming due to a massive rising magma chamber that during its pre-expulsion phase simply uplifted the trough.

Gunn et al., 1997 present evidence for the presence of major magma chambers at depths of approximately 15 kilometres beneath the basin depocentres and their relevance to the basin's formation. A late stage reactivation of one of these magma chambers would provide the mechanism for the Oligocene/Miocene tectonic episode.

2.2 Stratigraphy

A generalised stratigraphic column for the Bass Basin is shown in Figure 4. A detailed Stratigraphy discussion was presented by Knowles et al, 1994, and is paraphrased below:

The stratigraphy of the central Bass Basin is only known from well control, however this together with the available regional seismic data allows correlation with subcropping rocks and well bores from the generically similar Otway and Gippsland Basins.

Basement in the Bass Basin is slightly metamorphosed, and the oldest dated sediments are 589 my old (Cambrian). Bass 2 drilled through low-angled, altered tuffaceous mudstone radiometrically dated as Early Palaeozoic or Cambrian. Bass 3 reached TD in 40 degree dipping, silicified blackshale and quartzite sandstone and siltstone, believed to be Early Palaeozoic in age.

A 1200 m lower Cretaceous section similar to the Otway Group of the Otway Basin and the Strzelecki Group of the Gippsland Basin was drilled at Durroon 1 (Brown, 1976) the only Bass Basin well to intersect this Early Cretaceous stratigraphy. The north west extension of the Tertiary Bass Basin overlaps the Otway Basin in the