

The wedge of sediments in this basin points to the influence of the bounding zone of faults along which subsidence continued throughout the Turonian.

3.6.3 Cenomanian-Turonian deposition within the Boobyalla Sub-Basin

The Boobyalla Sub-Basin is of two parts: a northern half-graben, and a central and southern graben, fault bounded on its eastern and western margins, and collapsing across well-defined structural hinge zones elsewhere.

Seismic data across the half-graben is widely spaced and of poor quality. The isopach of the sediments may be estimated, but until better seismic data are made available, the seismic stratigraphy cannot be the subject for conjecture.

The central and southern trough contain the thickest deposits of Turonian sediments, though this statement requires a qualification since the base of Turonian cannot be established within this sub-basin. There is, however, a thickness of seismic data that exhibits a depositional continuity that is thicker than the Turonian isopachs in the other sub-basins.

Sediments are sourced from the surrounding areas of Tasmania and the islands of the Flinders group. Silicates will be brought into the basin during the rise and subsequent fall, of sea level, from areas of granite and granodiorite outcrops in both the main source areas. Lesser erosion during the period of highstand will encourage the accumulation of the mudstone which are sourced from Palaeozoic siltstones and mudstones and Jurassic lavas.

The seismic stratigraphy can be divided into two parts: a lower, more discontinuous, succession of reflections, and the familiar high amplitude, correlatable, series of reflections associated with mudstone deposition. The sequence above the mudstones is missing, though the evidence is that this is by erosion of the Turonian Unconformity, rather than by non-deposition. The erosional limits of the mudstone can be estimated (Enclosure 16), as can the depositional limits (Enclosure 17). The thickest erosional isopachs of the mudstone are found adjacent to the bounding listric fault to the basin and measure approximately 1,500 m.

3.7 THE TASMAN RIFT PHASE

Shaw (1978) estimated the age of new ocean floor between Australia and Lord Howe Rise at 80 Ma. Rifting in this area preceded breakup by 10 Ma, and was marked by a fall of relative sea level of 140 m at the end of the Turonian.

The effect of this rifting was to subject the sediments within the three sub-basins of T/15P to extensional forces, the severity of which was most marked within the Boobyalla Sub-Basin. Sediments within this sub-basin were faulted and tilted along pre-existing listric faults and a new Tasman direction of faulting overprinted onto these structures. Post-depositional, detached, roll-over structures formed on the downthrown sides of listric faults on either side of the central and southern portions of the sub-basin. The axial direction of these roll-over structures is at right angles to the direction of extension of these beds.

The effect of the Tasman rift on the two other sub-basins within the permit was to cause further subsidence along their bounding listric fault systems.

The period concluded with the erosion and peneplanation of the beds of Turonian age in the sub-basins. The resulting Turonian Unconformity forms one of the most recognisable seismic sequence boundaries in the permit area.