2. REGIONAL OVERVIEW, TASMANIA BASIN

2.1 Exploration Drilling History

No petroleum wells have been drilled in the permit area. To date, only stratigraphic tests and mineral holes have been drilled in the Tasmania Basin. Between 1997 and 2002, GSLM drilled five stratigraphic tests, all with hard rock diamond core rigs. None of these wells were drilled on a defined structure. The results of these wells are summarised in Table 5.

Borehole	Operator	Type	Spud Year	Total Depth (mKB)	Purpose	Hydrocarbon Indications (gas % corrected for air, nitrogen and CO_2 contamination)[2]	Formation at TD	Age
Shittim-1	GSLM	Diamond core	1997	1751	Stratigraphic Test	Methane max. 31%, ethane max. 2.12% traces C3-C6. Helium up to 4.8 %	Phyllite and quartzite	Proterozoic
Jericho-1[1]	GSLM	Diamond core	1997	640	Stratigraphic Test	Methane max. 10%, ethane max 1.26% traces C3-C6. Helium detected	Bundella Fm	Permian
Lonnavale-1	GSLM	Diamond core	1997	557	Stratigraphic Test	Methane max. 1.8% ethane max. 0.35 % traces C3-C6	Ferntree Fm	Permian
Pelham-1	GSLM	Diamond core	1997	503	Stratigraphic Test	Methane max. 1%	Bundella Fm	Permian
Hunterston-1[3]	GSLM	Diamond core	2002	1324	Stratigraphic Test	Methane and ethane and traces C3-C6	Dolomitic siltstone	Precambrian

Table 5 – GSLM stratigraphic boreholes

1 Isotopic analysis of the methane at Jericho-1 showed it to be thermagenic in origin.

2 All gas measurements are air, nitrogen and CO_2 corrected. The estimation of CO_2 content may result in error. Samples were collected in various ways and sent to a laboratory for gas chromatograph analysis. The amounts above are subject to error and should be treated as qualitative.

3 No mud log is available for any well except Hunterston-1. It is, therefore, difficult to assess the exact depth origin of the maximum gas values. Operations such as reaming and tripping all result in anomalously high gas readings. Repeated swabbing was noted on the Hunterston-1 mud log.

2.2 Seismic Data

GSLM acquired 659 line kilometres of seismic reflection data across the Central Highlands and in the Northern Midlands areas of Tasmania (Figure 1). The data was acquired in March, 2001, by Trace Terracorp using Vibroseis. The grid is somewhat random as it was acquired mainly along roads (Stacey, 2003). Processing was done by Robertson Research.

The random grid was acquired in order to maximize regional coverage within a limited budget. However, because of poor data resolution and sparse coverage, interpretation of the regional structural elements was not achieved, although a very limited number of leads were recognized.

The presence of extensive Jurassic dolerite has a major impact on the seismic data resolution. At or near the surface, dolerite is generally highly diffusive resulting in poor resolution of underlying events. At depth, the dolerite is characterized by a strong positive event at its top and base and by weak and scattered events in between. Seismic events beneath the dolerite at depth are in general, better resolved.

The quality of the seismic data set is highly variable and coherent events across sections are rare. Previous interpretation efforts were focused on lines where there was well control and there are clear coherent events to correlate wells to seismic. Recent work has concentrated on the Tasmania Basin sequences, especially in areas of better data quality where there is no dolerite.

In 2006, GSLM recorded 152 kilometres of 2d seismic data and in 2007, 270.5 kilometres of 2d seismic data was completed, interpreted and integrated into the seismic database.

A seismic exploration progress report provided by GSLM in June, 2007, states that the 2001, 2006 and 2007 seismic program identified several major and many minor structures. Further seismic work is planned for November, 2007, to February, 2008. An extensive drilling program is planned by GSLM for late 2007.

2.3 Structural Setting

The island of Tasmania is situated off the southeast coast of the Australian continent. The Tasmania Basin is an erosional remnant of an epicratonic basin (Bacon *et al,* 2000) that covers most of central and eastern Tasmania. Regional seismic lines through the northern and central part of the Tasmania Basin are shown in Figure 2 and Figure 3.

The oldest basement consists of Proterozoic rocks which are exposed on the western half of Tasmania. Later basement rocks of Cambrian to Early Devonian age are known as the Wurawina Supergroup. All of these rocks were deformed by the mid Devonian tectonic event called the Tabberabberan Orogeny, a major pan Australian event.

Following a long hiatus, a succession of predominantly flat lying sedimentary rocks of Carboniferous to Late Triassic age was deposited (Bacon *et al*, 2000). In the Jurassic, dolerite intruded this succession as thick sheets, resulting in bodies with thicknesses of up to 600 metres. The total known maximum thickness of the Carboniferous to Late Triassic succession (excluding the dolerite) is 1.7 kilometres (Bacon *et al*, 2000). No well has drilled a section this thick. It is assumed that this estimate is based on the integration of drilling and outcrop data. The present boundaries of the basin are erosional and the original basin extent was probably much greater (Bacon *et al*, 2000).

This basin is an epicratonic skin of sediment and there is no strongly defined depocentre in the rocks preserved onshore today. The basin was uplifted at the end of the Cretaceous, probably associated with the Australian-Antarctic plate margin break-up. Erosion of approximately two kilometres of sediment is interpreted to have occurred. No further sediment was deposited until the Tertiary. Tertiary deposits are only a few hundred metres thick.

The Tasmania Basin can be divided into three major structural elements (Figure 4). The Longford Sub-basin (onshore extension of the Bass Basin) effectively divides the rest of the basin into a large western half called the Central Lakes-Huon Block, and an eastern half called the Douglas River Block (block names modified after Wakefield, 2000). All of these areas are underlain by folded Palaeozoic rocks of Cambrian to Devonian age.

Over much of the basin, the Earlier Palaeozoic is covered by generally flat-lying Permian to Triassic sediments and Jurassic Dolerite. The Longford Sub-basin is evident at the surface as a region called the "Lowlands". It formed due to extension in the Latest Cretaceous to Early Tertiary (Stacey and Berry, 2004) but contains only a few hundred metres of Tertiary sediments. A densely faulted zone, which may be a wrench zone, lies between the Longford Sub-basin and the Highlands (Blackburn, 2004). The Tiers Fault, an obvious cliff at the present day, delineates the western edge of this zone (Figure 4).

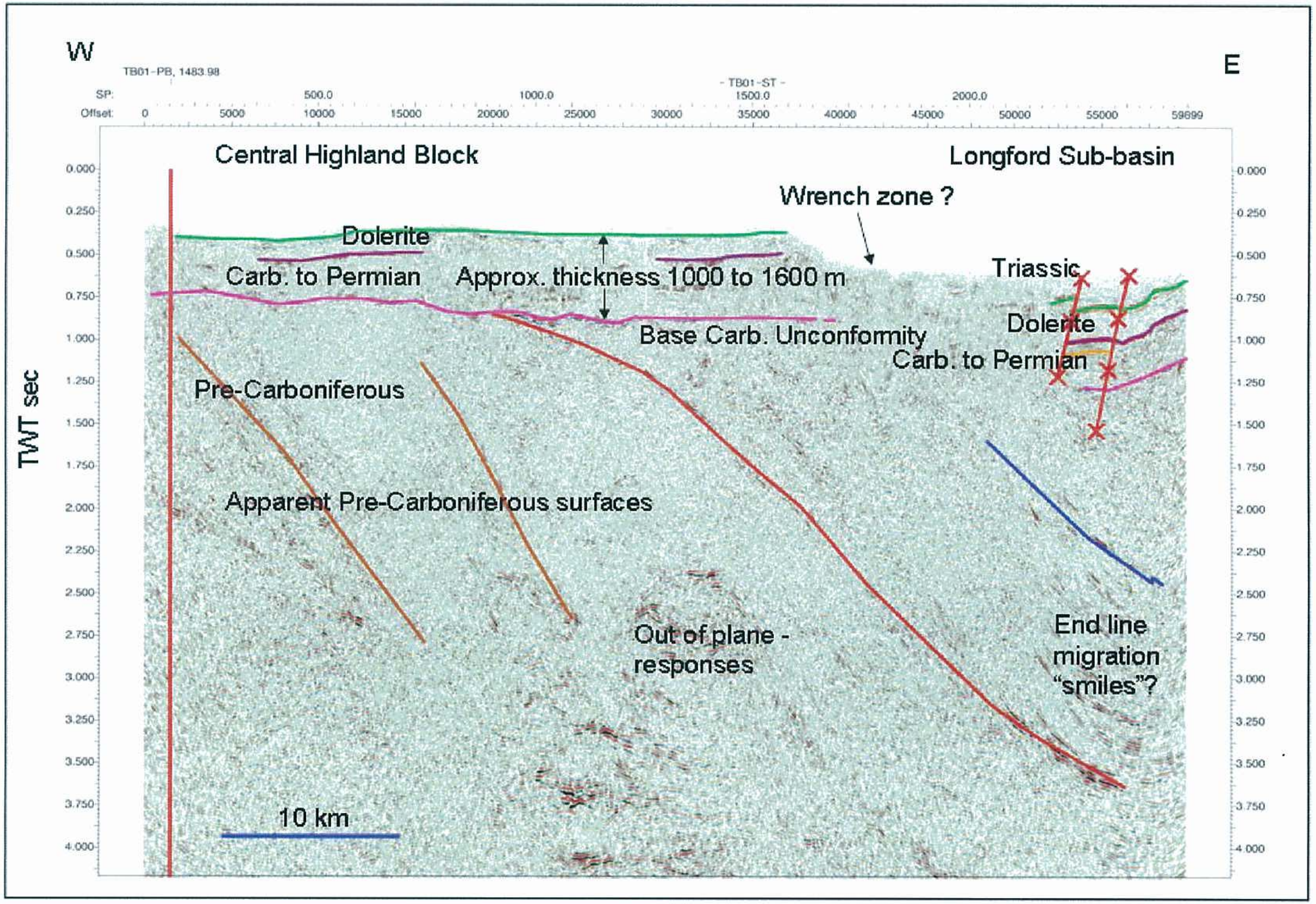

Figure 2 – Regional seismic line RTB01-ST through the central part of the Tasmania Basin. For line location, see Figure 1

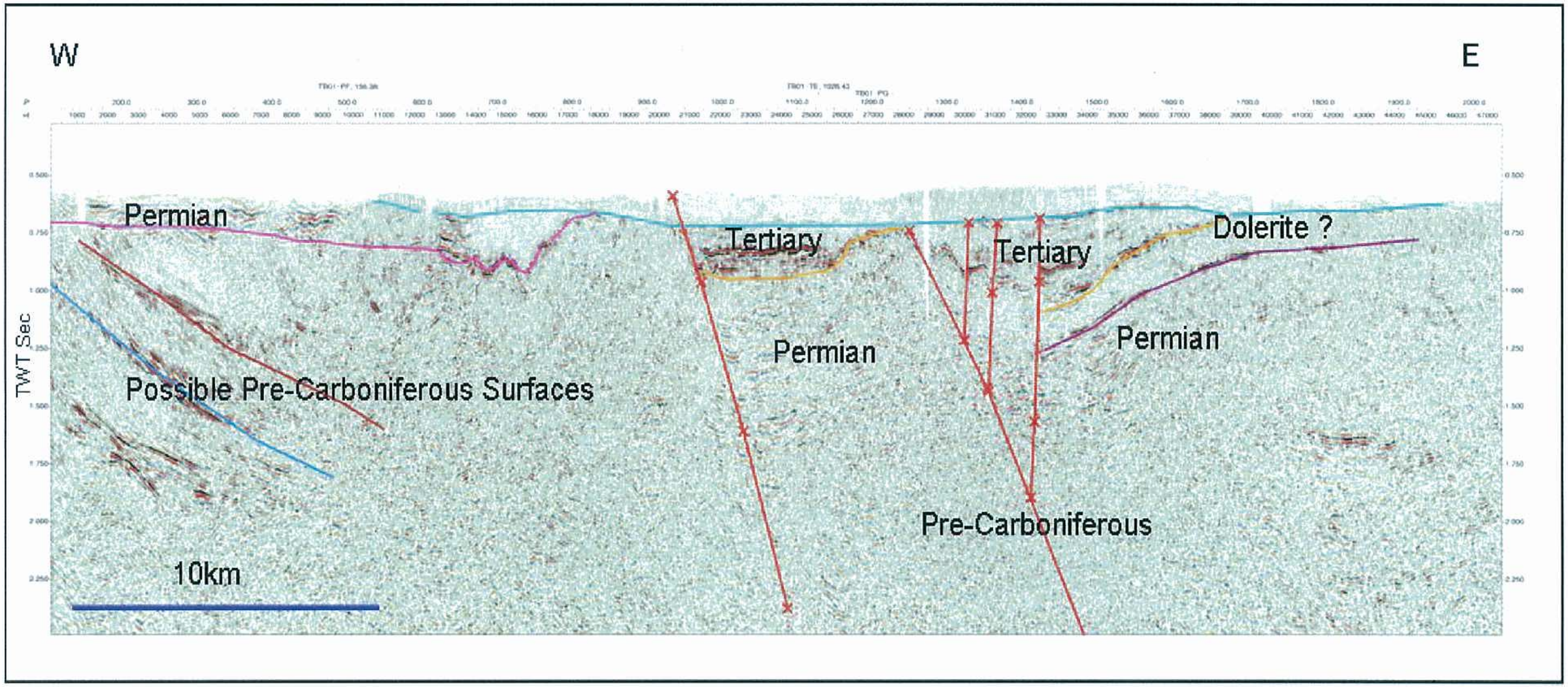

Figure 3 – Regional seismic line RTB01-PG through the northern part of the Tasmania Basin. For line location, see Figure 1

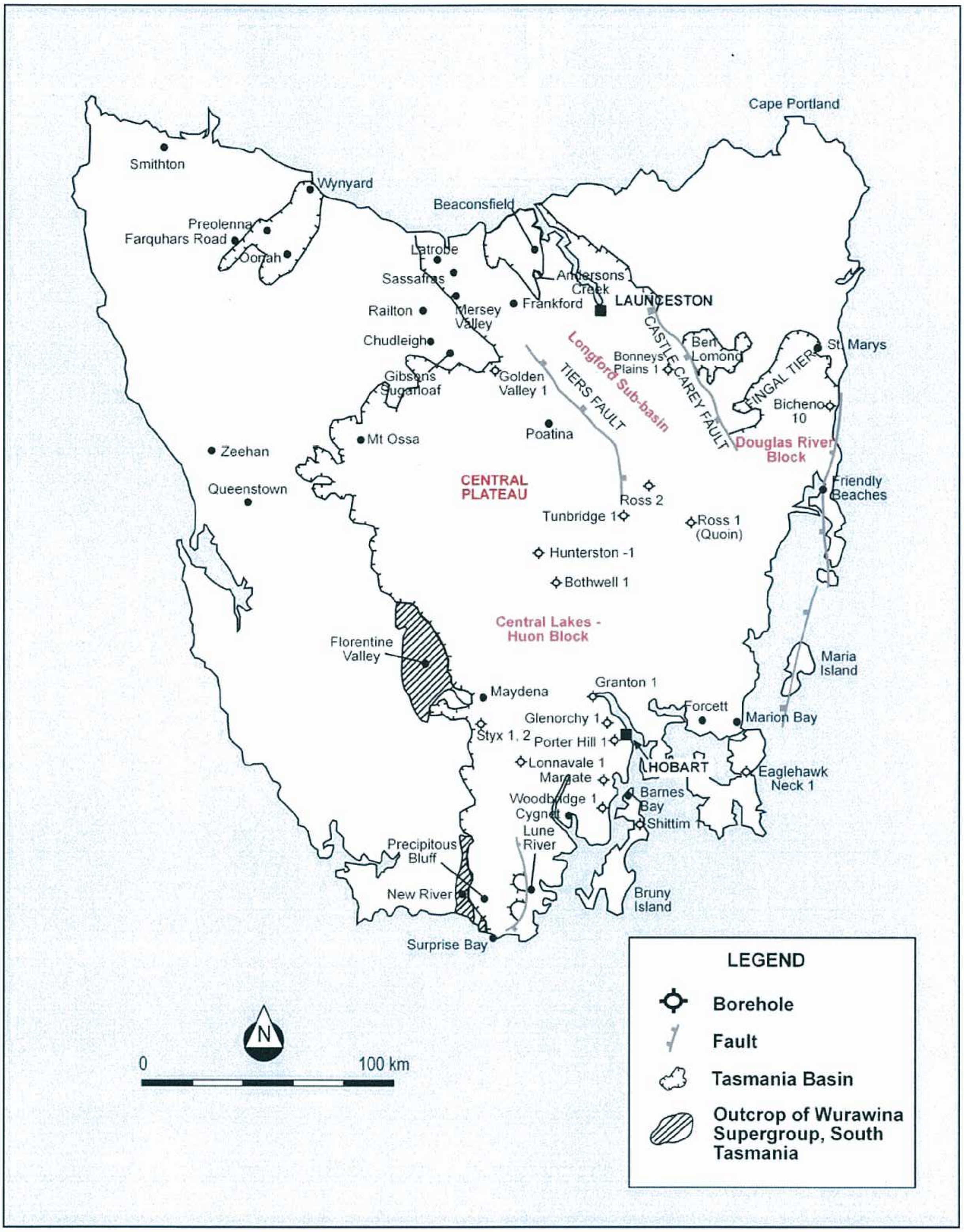

Figure 4 – Tasmania Basin major structural elements (modified from Seymour and Calver 1995a, and Wakefield, 2000)

2.4 Stratigraphy

The generalised stratigraphy of the Tasmania Basin is summarised in Figure 5. The stratigraphy of the basin is known mainly from outcrop and the stratigraphic diamond bore holes (Table 5). The following stratigraphic summary is based on Bacon *et al*, (2000). A more detailed discussion can be found in Clarke and Forsyth (1989).

The sediments are separated into two supergroups; the Wurawina Supergroup of Early Palaeozoic age and the Parmeener Supergroup of Late Palaeozoic to Early Mesozoic age. These are separated by a major angular unconformity, associated with the Tabberabberan Orogeny. Each of the supergroups are sub-divided into a number of lower rank lithostratigraphic units (Figure 5).

The Wurawina Supergroup is a Late Cambrian to Early Devonian shelf carbonate and clastic succession (Bacon *et al,* 2000). The supergroup consists of Late Cambrian to Early Ordovician, shallow marine to fluvial siliciclastic rocks (Denison Group) overlain by 1.5 kilometres of predominantly micritic, shallow marine, warm water Ordovician limestone (Gordon Group), then up to 5 kilometres of shallow marine Silurian to Early Devonian siliciclastic rocks (Eldon Group) (Bacon *et al*, 2000).

Results from a regional conodont alteration index (CAI) study on the Gordon Group carbonates, performed by Burrett, (1992), indicate that these rocks are mature for hydrocarbon generation in southern Tasmania, showing a CAI typically between 1.5 and 4 (Bacon *et al*, 2000). The results of this work are summarised in Figure 6.

A major orogenic event occurred in the Devonian. This resulted in considerable folding of the Early Palaeozoic strata and was followed by a long hiatus, lasting approximately 80 million years (Figure 5).

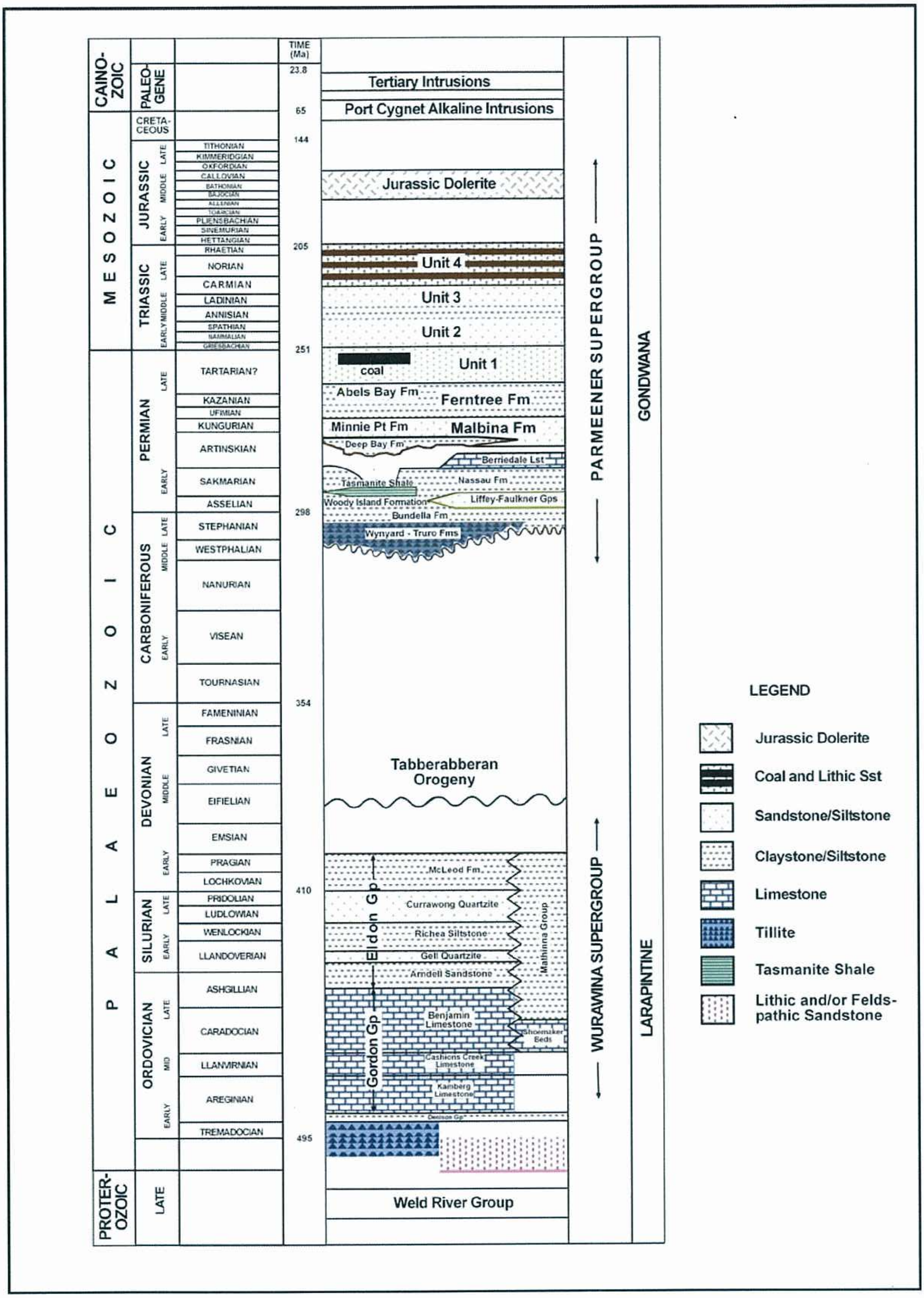

Figure 5 – Stratigraphy detail of the Tasmania Basin (modified from Seymour and Calver 1995b)

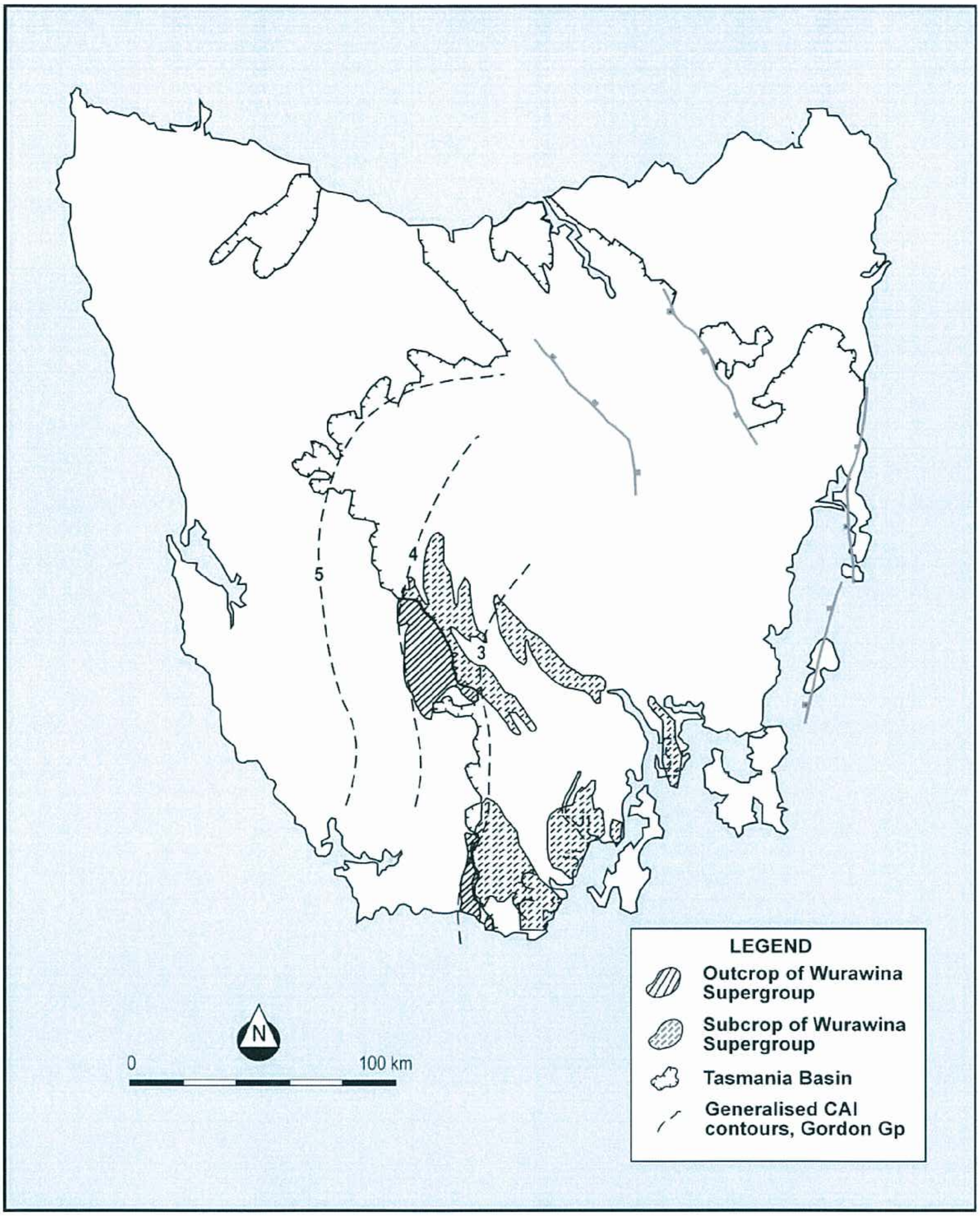

Figure 6 - Generalised CAI contours (modified from Burrett, 1992) with outcrop and inferred subsurface extent of Ordovician - Devonian basement rocks that may be mature for oil and gas generation (Leaman, 1996b)

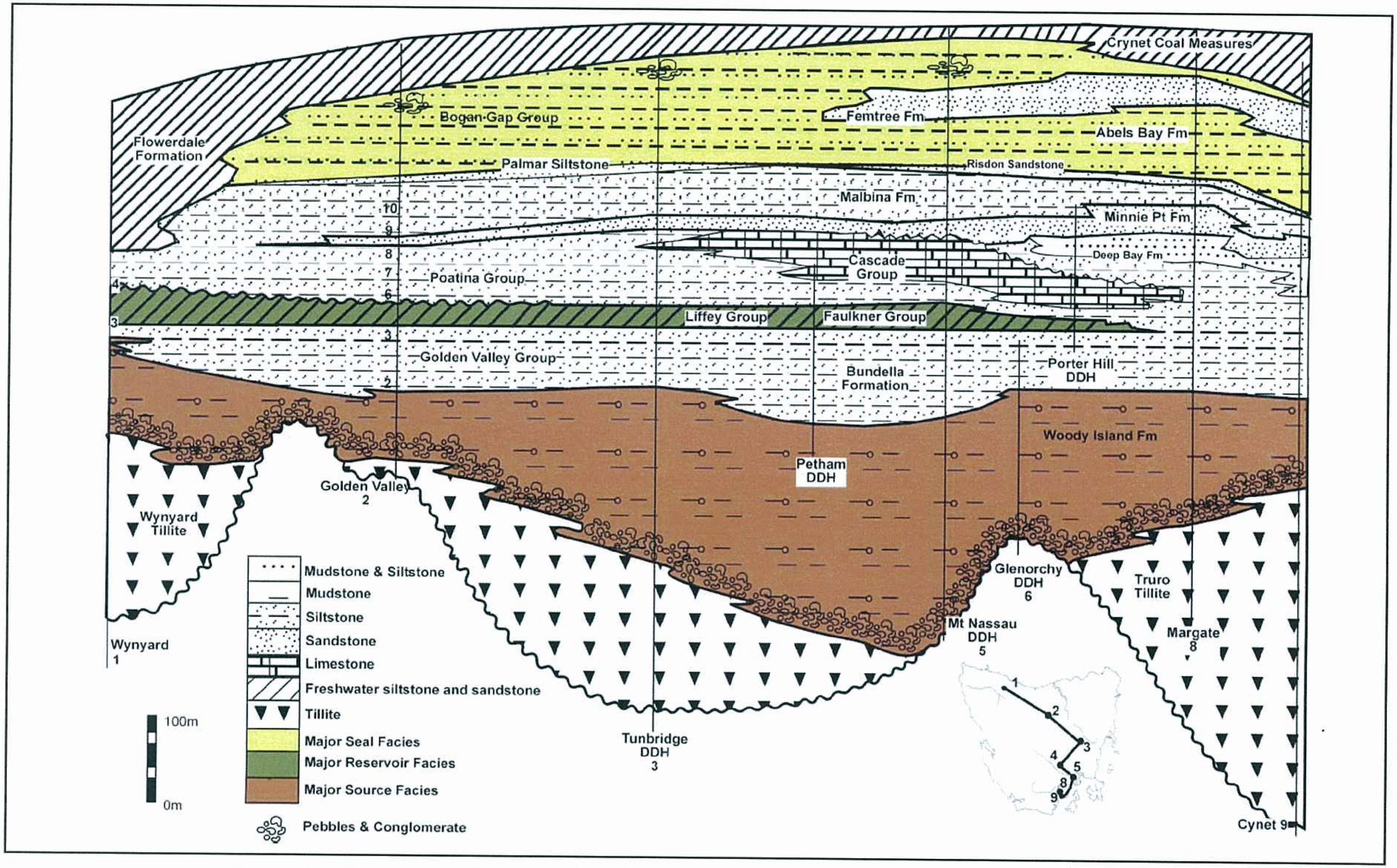

Figure 7 – Time-space diagram of the Lower Parmeener Supergroup (modified from Reid, 2004)

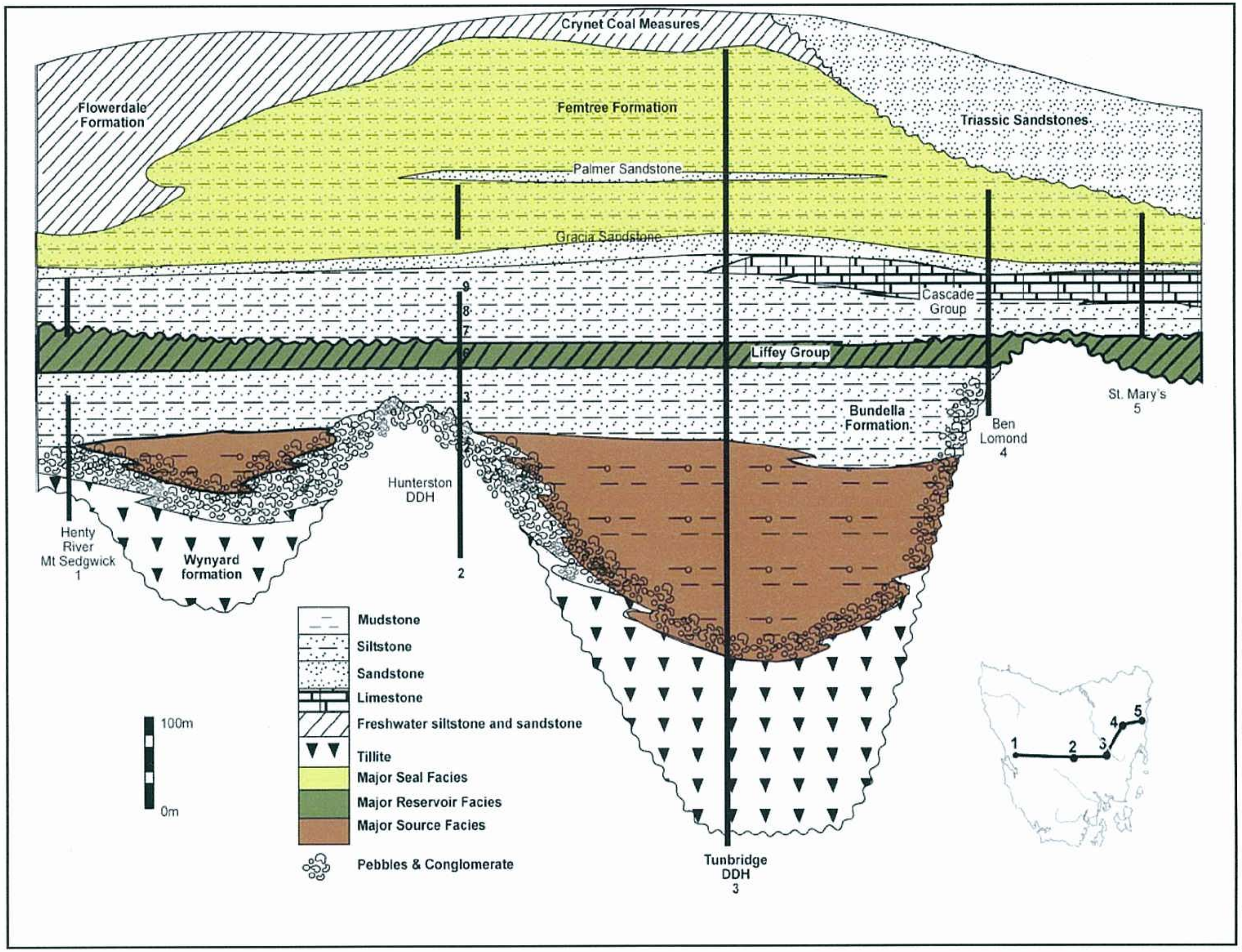

Figure 8 – Time-space diagram of the Lower Parmeener Supergroup (modified from Reid, 2004)