

TERTIARY FORAMINIFERAL SEQUENCE

INTERSTATE'S PURRUMBETE-1



PE990141

OTWAY BASIN - VICTORIA

by

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Summary:

	300'- 480'	middle Miocene
Gellibrand Clay	480'- 660'	lower Miocene
	660'- 780'	basal lower Miocene
Clifton Formation	780'-1060	upper Oligocene
Narrawaturk Marl*	1060'-1300'	upper Eocene
Mepunga Formation	1300'- ?	Eocene

* base doubtful

Introduction

Rotary cuttings were examined from 300' to 1700'. Down hole contamination was normal, not completely masking new faunas at depth and permitting use of Taylor's down hole biostratigraphic scheme. 5 sidewall cores were examined from 1100', 1200', 1300', 1355' and 1500'. The last three samples were barren of fauna.

The foraminiferal sequence extended from the upper Eocene Zonule L to middle Miocene. The lower Zonules of the upper Eocene, Zonules M and N, were not recognised.

MIDDLE MIOCENE 300' - 480'

The cutting sample at 300' contained Orbulina suturalis, Globigerinoides glomerosa and Globoquadrina dehiscens which is the association of planktonic species in Zonule E of the middle Miocene. The presence of the benthonic species Cibicides victoriensis supports this determination. The fauna has a rich arenaceous element including:- Ammosphaeroidia sphaeroidiformis, Clavulinoides victoriensis, Gaudyrina convexa, G. heywoodensis and Pseudoclavulinoides rudis. This element indicates inner continental shelf conditions, exposed to open oceanic currents.

LOWER MIOCENE 480' - 780'

The highest appearance of Globigerinoides bisphericus, G. rubrus, G. trilobus trilobus and especially G. trilobus altiapertura designates the top of Zonule F and the top of the lower Miocene. Cibicides opacus is replaced by C. perforatus and Operculina victoriensis is present. The arenaceous and milliolid elements are still rich and identical specifically with that in the middle Miocene.

The next notes faunal change is at 660' where number of Globigeroides decrease with an increase in Globigerina woodi and the highest appearance of G. woodi connecta. This planktonic change, though partially obscured by down hole contamination, marks the top of Zonule H which designates the base of lower Miocene. Sample quality does not permit the differentiation of Zonule G which is no doubt present.

The benthonic fauna from 300' to 780' is consistent despite changes within specific lineages. It is concluded that an inner shelf environment was present throughout the lower Miocene and the number of planktonic specimens show open oceanic conditions.

UPPER OLIGOCENE 780' - 1060'

The sediment from 300' to 780' is a grey byzoal marl typical of the Gellibrand Clay. Cutting sample at 780' shows an abrupt change with sandstone cemented by brown iron oxide and some calcareous sandstone with oxidized glauconite. Below this level the faunas are dominated by an arenaceous element similar to that listed at 300' but the specimens are larger and the tests have agglutinated orange stained quartz grains. Stained specimens of Cibicides perforatus are common. Planktonic foraminifera are rare but Globigerina eupertura is present at 780'. Cassigerinella chipoloensis occurs at and below 840'. These 2 planktonic species do not appear above Zonule I which is equated with the upper Oligocene.

UPPER EOCENE 1060' - 1300'

The sample at 1060' contain a grey richly fossiliferous grey marl with the planktonic species Globigerina ampliapertura, G. angioporoides and G. linaperta, placing the fauna within Zonule K at the top of the Eocene. Zonule J is missing so obviously there is a disconformity between the Clifton Formation above the Narrawaturk Marl at 1060'. This disconformity is in all sections in the northern part of the Port Campbell Embayment and on the Warrnambool high.

The side wall cores at 1100' and 1200' demonstrate that sandy silt lens are present within the marl section. Environmental fluctuations are evident as both sidewall cores completely lack a planktonic fauna. The benthonic species in sidewall core at 1200' are typical of the whole interval from 1060' - 1300'. Species include:- Amosphaeroidina sphaeroidiniformis, Haplophragmoides spp., Siphotextularia sp., Alabama cf. westraliensis, Cibicides perforatus, C. brevoralis, Gyroidinoides zealandica, Karreria cf. pseudoconvexa, Trifarina spp. and Pullenia spp. Bryozoal and mollusca fragments are common. Very shallow water conditions are indicated.

Cutting samples below 1260' contain poorly developed specimens of Globigerapsis index which marks the top of Zonule L (mid-upper Eocene) However no fauna was found in sidewall core at 1300', 1355' and 1500' and well developed examples of G. index or other Zonule L or pre-Zonule L planktonic species were not isolated in cutting samples.

Conclusions

It is concluded that the marine sequence commenced in mid-upper Eocene times. The Victorian Mines Department Carpendeit-1 water bore commenced at the base of upper Eocene yet Purrumbete-1 has a thicker Tertiary marine section and is only 2 miles away from Carpendeit-1.

			Purrumbete-1	Carpenteit-1	
<u>MIOCENE</u>	<u>H</u>	6 (s)	660'- 780'	650'- 700'	
<u>OLIGOCENE</u>	<u>I</u>	c	780'-1060'	700'- 780'	Clifton Formation
		<u>J</u>	disconformity		
<u>UPPER</u>	<u>K</u>	3	1060'-1260'	780'- 847'	
<u>EOCENE</u>	<u>L</u>	2	1260'-1300'	847'-1006'	
		<u>M</u>	N.P.	1006'-1060'	
<u>MIDDLE</u>	<u>N</u>		N.P.	?	
<u>EOCENE</u>	<u>O</u>		N.P.	N.P.	

N.P. = not present

The above tabulation would suggest differential warping at the base of upper Eocene times with further readjustment in late Eocene times. Equilibrium in depths was reached in the lower Miocene.

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