

PALYNOLOGY OF TASMANIAN MINES DEPARTMENT SUB-BASALT

DRILLING PROGRAMME HOLE-5

BY

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INTRODUCTION

Five core samples were submitted by Peter Baillie for palynological analysis. All were from sediment horizons interbedded with basalts. Four yielded rich and diverse assemblages, but one was very lean of palynomorphs. Thermal maturity was very variable. The zonation used is summarised on Figure 1 and is basically that of Stover and Evans (1973) and Stover and Partridge (1973) as modified by Partridge (1976). Raw data is given in an Appendix.

PALYNOSTRATIGRAPHY

30.7m (CORE)-241.6m (CORE) : lower P. tuberculatus Zone : early Oligocene : non-marine : maturity variable from immature to fully mature.

These samples are all dominated by Nothofagidites spp. in moderate diversity assemblages. The co-occurrence of Beaupreadites verrucosus and Cyatheacidites annulatus indicates assignment to the lower Proteacidites tuberculatus Zone of early Oligocene age. The presence of Periporopollenites vesicus and absence of younger indicators confirm the assignment. The sample at 96.8m (CORE) is very lean, but still contains zonal indicators.

Non-marine environments are indicated by the absence of marine

MM YEARS	EPOCH	SERIES	PLANKTONIC FORAMINIFERAL ZONATIONS			PALYNOLOGICAL ZONATIONS				
			CENOZOIC AFTER STAINFORTH et.al. 1975		BLOW, 1969 BERGGREN, 1971	BASS STRAIT TAYLOR 1966	DINOFLAGELLATE ASSEMBLAGE ZONES	SPORE - POLLEN ASSEMBLAGE ZONES		
			CRETACEOUS AFTER VAN HINTE 1972							
35	OLIGOCENE	EARLY	<i>Cassigerinella chipolensis</i>	P.19	J.1	<i>Operculodinium</i> spp.	PROTEACIDITES TUBERCULATUS			
			<i>Pseudohastigerina mica</i>	P.18				J.2		
40	Eocene	LATE	<i>Globorotalia cerroazulensis</i> (sensu lato)	P.17	K	<i>Phthanoperidinium coreoides</i>	UPPER NOTHOFAGIDITES ASPERUS			
			<i>Globigerinatheka semiinvoluta</i>	P.16				NOTHOFAGIDITES GONTATUS	MIDDLE NOTHOFAGIDITES ASPERUS	
45			MIDDLE	<i>Truncorotaloides rohi</i>						P.14
				<i>Orbulinoides beckmanni</i>				P.13	(Wetzeliella echinosuturata)	
		<i>Globorotalia lehneri</i>		P.12	PROTEACIDITES ASPEROPOLUS					
		<i>Globigerinatheka subconglobata</i>	P.11	<i>Wetzeliella edwardsii</i>		UPPER MALVACIPOLLIS DIVERSUS				
		<i>Hantkenina aragonensis</i>	P.10	<i>Wetzeliella thompsonae</i>						
50		EARLY	<i>Globorotalia pentacamerata</i>	P.9	<i>Wetzeliella ornata</i>	Middle M. Diversus				
			<i>Globorotalia aragonensis</i>	P.8	<i>Wetzeliella waipawaensis</i>					
			<i>Globorotalia formosa formosa</i>	P.7	<i>Wetzeliella hyperacantha</i>	Lower Malvacipollis Diversus				
		<i>Globorotalia subbotinae</i>	b.		UPPER LYGISTEPOLLENITES BALMEI					
55	LATE	<i>Globorotalia velascoensis</i>	P.6 a.	<i>Wetzeliella homomorpha</i>						
		<i>Globorotalia pseudomenardii</i>	P.5	<i>Eisenackia crassitabulata</i>	LOWER LYGISTEPOLLENITES BALMEI					
		<i>Globorotalia pusilla pusilla</i>	P.3							
60	MIDDLE	<i>Globorotalia angulata</i>	P.2	<i>Trithyrodinium evittii</i>	TRICOLPITES LONGUS					
		<i>Globorotalia uncinata</i>	P.2							
65	EARLY	<i>Globorotalia trinidadensis</i>	P.1	<i>Deflandrea druggii</i>	TRICOLPORITES LILLIEI					
		<i>Globorotalia pseudobulloides</i>				a.				
	LATE CRETACEOUS	MAASTRICHTIAN LATE	<i>Globigerina cugubina</i>		BASE OF DINOFLAGELLATE SEQUENCE	TRICOLPORITES LILLIEI				
			<i>Globotruncanella mayaroensis</i>							
			<i>Globotruncana contusa</i>							
			<i>Globotruncana stuarti</i>							
			<i>Globotruncana gansseri</i>							
	EARLY	<i>Globotruncana scutilla</i>		Section without diagnostic dinoflagellates	TRICOLPORITES LILLIEI					
70		<i>Globotruncana calcarata</i>								
		<i>Globotruncana subspinosa</i>								
	EARLY	<i>Globotruncana stuartiformis</i>								

Figure 1 Zonation Framework (from Partridge 1976)

indicators and the presence of the freshwater alga Botryococcus.

Spore colours are light yellow at 30.7m, 73.9m and 125.4m, indicating immaturity for hydrocarbon generation. The sample at 96.8m is very lean possibly due to very high temperatures during or after deposition. The sample at 241.6m is light to mid brown, showing early maturity for oil, but immaturity for gas/condensate.

CONCLUSIONS

The studied section is of Oligocene (lower P. tuberculatus Zone) age, entirely non-marine and generally mature, with some anomolous high maturities caused by local heating from the interbedded basalts. Radiometric dating would provide calibration from the subzone.

REFERENCES

- Partridge, A.D. (1976) The geological expression of eustasy in the early Tertiary of the Gippsland Basin Aust. Pet. Explor. Assoc. J., 16 : 73-79
- Stover, L.E. and Evans, P.R. (1973) Upper Cretaceous-Eocene spore-pollen zonation, offshore Gippsland Basin, Australia. Spec. Publ. geol. Soc. Austr. 4 : 55-72
- Stover, L.E. and Partridge, A.D. (1973) Tertiary and Late Cretaceous spores and pollen from the Gippsland Basin, South-eastern Australia Proc. R. Soc. Vict., 86 : 237-286

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TASDM SBDP #5

DESCRIPTION:

ALL SAMPLE DEPTHS ARE IN METRES

CHECKLIST OF GRAPHIC ABUNDANCE BY LOWEST APPEARANCE

-  = Abundant
-  = Common
-  = Few
-  = Rare
-  = Very Rare
- ? = Questionably Present
- . = Not Present

Depth (m)	Species	Abundance
030.7 CORE	CYATHEACIDITES ANNULATUS	
073.0 CORE	CYATHIDITES SPP.	
096.8 CORE	DACRYCARPITES AUSTRALIENSIS	
125.4 CORE	DICTYOPHYLLIDITES SPP.	
241.6 CORE	DILWYNITES GRANULATUS	
	FOVEOTRILETES PALAEQUETRUS	
	GLEICHENIIDITES CIRCINIDITES	
	HALORAGACIDITES HARRISII	
	HERKOSPORITES ELLIOTTII	
	LAEVIGATOSPORITES	
	LYGISTEPOLLENITES FLORINII	
	MATONISPORITES ORNAMENTALIS	
	MICROFOVEOSPORITES	
	NOTHOFAGUS ASPERUS	
	NOTHOFAGUS BRACHYSPINULOSUS	
	NOTHOFAGUS EMARCIOSUS/HETERUS	
	NOTHOFAGUS FALCATUS	
	NOTHOFAGUS FLEMINGII	
	PEROMONOLITES VELLOSUM	
	PHYLLOCLADIDITES MAWSONII	
	PROTEACIDITES SPP.	
	RETITRILETES AUSTRACLAVATIDITES	
	STEREISPORITES ANTIQUISPORITES	
	VERRUCATOSPORITES SP.	
	VERRUCOSISPORITES CF. CRISTATUS	
	VERRUCOSISPORITES KOPUKUENSIS	
	VERRUCOSISPORITES SPP.	
	CUPANIEIDITES ORTHOTEICHUS	
	DILWYNITES TUBERCULATUS	
	ERICIPIITES SCABRATUS	
	ISCHYOSPORITES GREMIUS	
	NOTHOFAGUS VANSTEENISII	

SPECIES LOCATION INDEX

Index numbers are the columns in which species appear.

INDEX NUMBER	SPECIES
40	*BOTRYOCOCCUS*
41	BEAUPREADITES VERRUCOSUS
42	BEAUPREIDITES TRIGONALIS
28	CUFANIEIDITES ORTHOTEICHUS
1	CYATHEACIDITES ANNULATUS
2	CYATHIDITES SPP.
3	DACRYCARPITES AUSTRALIENSIS
4	DICTYOPHYLLIDITES SPP.
5	DILWYNITES GRANULATUS
29	DILWYNITES TUBERCULATUS
30	ERICIPITES SCABRATUS
36	FALCISPORITES SIMILIS
6	FOVEOTRILETES PALAEQUETRUS
7	GLEICHENIIDITES CIRCINIDITES
8	HALORAGACIDITES HARRISII
44	HELCIPORITES ASTRUS
9	HERKOSPORITES ELLIOTTII
31	ISCHYOSPORITES GREMIUS
10	LAEVIGATOSPORITES
11	LYGISTEPOLLENITES FLORINII
43	MALVACIPOLLIS SUBTILIS
12	MATONISPORITES ORNAMENTALIS
13	MICROFOVEDOSPORITES
45	MILFORDIA HOMEOPUNCTATUS
14	NOTHOFAGUS ASPERUS
15	NOTHOFAGUS BRACHYSPINULOSUS
37	NOTHOFAGUS DEMINUTUS
16	NOTHOFAGUS EMARCIDUS/HETERUS
17	NOTHOFAGUS FALCATUS
18	NOTHOFAGUS FLEMINGII
32	NOTHOFAGUS VANSTEENISII
38	PERIPOROPOLLENITES VESICUS
39	PEROMONOLITES DENSUS
19	PEROMONOLITES VELLOUSUS
20	PHYLLOCLADIDITES MAWSONII
46	PODOSPORITES MICROSACCATUS
21	PROTEACIDITES SPP.
22	RETITRILETES AUSTRACLAVATIDITES
23	STEREISPORITES ANTIQUISPORITES
33	TRIPOROPOLLENITES AMBIGUUS
34	TRIPOROPOLLENITES CHNOSUS
24	VERRUCATOSPORITES SP.
35	VERRUCOSISPORITES "BUBBLY"
25	VERRUCOSISPORITES CF. CRISTATUS
26	VERRUCOSISPORITES KOPUKUENSIS
27	VERRUCOSISPORITES SPP.