MICROPALAEONTOLOGICAL ANALYSIS, GUMMY-1, GIPPSLAND BASIN

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C O N T E N T S

1. SUMMARY

Gummy-1 was drilled in offshore petroleum permit Vic P/19, Gippsland Basin to a depth of 3563mKB. Sidewall cores from 1215m to 2078m have been examined for foraminifera and calcareous nannoplankton. A summary of the biostratigraphic breakdown of the respective microfossil groups and environmental sub-division is given below:-

Planktonic Foraminiferal Subdivision

1215m & 1387m	:	Zone B2	mid-lower Late Miocene
1519m	:	Zones B2 & C	mid Late-upper Middle Miocene
1642m	:	Zones C & D1	upper-mid Middle Miocene
1749m & 1788m	:	Zone D1	mid Middle Miocene
1852m	:	Zone D2	lower Middle Miocene
1956m	:	Zone F	upper Early Miocene
2065m	:	Zone H1	basal Early Miocene
2078m	:	Zone H2	latest Late Oligocene

Calcareous Nannoplankton Subdivision

1215m	:	Zones NN14 to NN10	Early Pliocene-Late Miocene
1387m	:	Indeterminate	
1519m & 1642m	:	Zones NN9 to NN7	upper Middle Miocene
1749m-1852m	:	Zone NN6	mid Middle Miocene
1956m	:	Zones NN5 & NN4	lower Middle-upper Early Miocene
2065m & 2078m	:	Zones NN1 & NP25	lower Early Miocene-latest Late Oligocene

Environment of Deposition

Samples 1215m-1642m inclusive	:	outer neritic
Samples 1749m-2078m inclusive	:	outer neritic-upper bathyal

II. INTRODUCTION

A total of 10 sidewall cores have been scrutinized for foraminifera and calcareous nannoplankton from the interval 1215m to 2078m in Gummy-1. Fossil assemblages identified in the well section are provided in Appendix No. 2.

III. BIOSTRATIGRAPHIC ANALYSIS

The planktonic foraminiferal letter zonal scheme of Taylor (in prep.) and the NN/NP calcareous nannoplankton zonal scheme of Martini (1971) are used for biostratigraphic subdivision.

(A) Planktonic Foraminiferal Subdivision

1. 1215m & 1387m : Zone B2 (mid-lower Late Miocene)

   Assignment to Zone B2 is based on the association of Globorotalia acostaensis and Globorotalia miotumida.

2. 1519m : Zones B2 & C (mid Late-upper Middle Miocene)

   The occurrence of Globorotalia miotumida miotumida (few) indicates assignment to Zones B2 and C. The single recorded occurrence of Globorotalia acostaensis in the sample at 1519m indicates a possible Zone B2 age however an undifferentiated B2/C assignment is given a higher degree of confidence.

3. 1642m : Zones C & D1 (upper-mid Middle Miocene)

   The low yielding and very poorly preserved planktonic foraminiferal fauna at 1642m includes single specimens of Globorotalia praescitula/G. scitula and Globorotalia aff. miotumida. These taxa suggest assignment to Zones C and D1.

4. 1749m & 1788m : Zone D1 (mid Middle Miocene)

   Assignment to Zone D1 is based on the association of Globorotalia praescitula and Globorotalia miozea miozea.

5. 1852m : Zone D2 (lower Middle Miocene)

   The sample at 1852m is assigned to Zone D2 on the basis of the association of Orbulina universa, Orbulina suturalis and Globigerinoides sicanus.

6. 1956m : Zone F (upper Early Miocene)

   The occurrence of Globigerinoides sicanus (single specimen) and lack of the Orbulina/Praeorbulina group indicates assignment to Zone F.

7. 2065m : Zone H1 (basal Early Miocene)

   The occurrence of Globigerina woodi connecta and lack of Globigerinoides trilobus indicates that the sample at 2065m is Zone H1 in age.

8. 2078m : Zone H2 (latest Late Oligocene)

   Assignment to Zone H2 is based on the occurrence of Globigerina woodi woodi without Globigerina woodi connecta.

(B) Calcareous Nannoplankton Sub-division

1. 1215m : Zones NN14 to NN10 inclusive (Early Pliocene-Late Miocene)

The high yielding nannoplankton asemblage at 1215m contains frequent Sphenolithus abies and lacks Sphenolithus moriformis, and on this basis is assigned to Zones NN14 to NN10 inclusive.

2. 1387m : Indeterminate

The impoverished and very poorly preserved calcareous nannoplankton assemblage at 1387m lacks age-diagnostic taxa and no zonal assignment is possible.

3. 1519m & 1642m : Zones NN9 to NN7 inclusive (upper Middle Miocene)

The samples at 1519m and 1642m are assigned to Zones NN9 to NN7 inclusive on the basis of the occurrence of Sphenolithus moriformis and lack of Cyclicargolithus floridanus.

4. 1749m-1852m : Zone NN6 (mid Middle Miocene)

The high yielding and moderately diverse nannoplankton assemblages in the interval contain frequent to abundant Cyclicargolithus floridanus, and lack Sphenolithus heteromorphous, and on this basis are indicative of Zone NN6.

5. 1956m : Zones NN5 & NN4 (lower Middle-upper Early Miocene)

The diverse nannoplankton assemblage at 1956m is assigned to Zones NN5 and NN4 on the basis of the occurrence of rare Sphenolithus heteromorphous.

6. 2065m & 2078m : Zones NN1 & NP25 (lower Early Miocene-latest Late Oligocene)

Assignment to Zones NN1 and NP25 is based on the association of Zygrhablithus bijugatus (rare at 2065m), Dictyococcites aff. bisectus (frequent at 2065m and rare at 2078m), Cyclicargolithus abisectus (frequent at 2078m) and Sphenolithus cf. capricornatus (rare at 2078m).

IV. ENVIRONMENT OF DEPOSITION

1. Samples 1215m-1642m inclusive : Outer neritic

The micritic limestones in the interval are interpreted to have been deposited in an outer neritic environment on the basis of containing the following bathymetrically-diagnostic taxa: Cassidulina delicata/laevigata (rare-frequent), Bulimina aff. aculeata (rare-few), Sphaeroidina bulloides (few-frequent) and Siphouvigerina proboscidea (rare-few). The foraminiferal faunas in the samples in the interval contain generally even numbers of planktonics and benthonics.

2. Samples 1749m-2078m inclusive : Outer neritic-upper bathyal

The rich foraminiferal faunas in the interval comprise 80-95% planktonics and the benthonic assemblages include : Pleurostomella (rare at 1749m), ?Osangularia (rare at 1788m and 2078m), Hyperammina (frequent at 1956m) and Cyclammina (few at 2065m). Deposition in an outer neritic to upper bathyal environment is envisaged.

V. REFERENCES

MARTINI, E., 1971. Standard Tertiary and Quaternary calcareous nannoplankton zonation. In: A. Farinacci (ed.). Proc. II Plank. Conf., Roma, 1970, 2: 739-785.

TAYLOR, D.J., (in prep.). Observed Gippsland biostratigraphic sequences of planktonic foraminiferal assemblages.

APPENDIX NO. 1 : SUMMARY OF MICROPALAEONTOLOGICAL DATA, GUMMY-1

SAMPLE (mKB)	FORAM YIELD	FORAM PRESERV.	FORAM DIVERSITY	NANNO YIELD	NANNO PRESERV.	NANNO DIVERSITY
SWC, 1215	high	poor	high	high	poor	mod/low
SWC, 1387	high	poor	mod/high	v. low	v. poor	low
SWC, 1519	mod/high	v. poor	mod/high	moderate	poor	low
SWC, 1642	low	v. poor	mod/low	moderate	poor	low
SWC, 1749	high	poor	moderate	high	poor	moderate
SWC, 1788	high	mod/poor	moderate	high	poor	moderate
SWC, 1852	high	mod/poor	moderate	high	mod/poor	mod/high
SWC, 1956	mod/low	poor	moderate	high	moderate	high
SWC, 2065	high	mod/poor	mod/high	high	moderate	mod/high
SWC, 2078	high	mod/poor	moderate	high	moderate	mod/high