MICROPALAEONTOLOGICAL ANALYSIS

JUDITH-1, GIPPSLAND BASIN

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C O N T E N T S

I. SUMMARY

Judith-1 was drilled in offshore petroleum permit Vic P/11, Gippsland Basin to a depth of 2958mKB. Sidewall cores from 838m to 1563.5m 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

839m-890m	:	Indeterminate	
922m-1097m	:	Zone D1	Middle Miocene
1172m-1244m	:	Zones D1/D2	Middle Miocene
1320m	:	Zone E1	basal Middle Miocene
1391m-1436m	:	Zone G	upper Early Miocene
1449m-1451m	:	Zone H1	lower Early Miocene
1454m-1503.5m	:	Indeterminate	

Calcareous Nannoplankton Subdivision

839m-1172m	:	Zone NN6	mid Middle Miocene
1244m-1320m	:	Zone NN5	lower Middle Miocene
1391m-1436m	:	Zone NN3	upper Early Miocene
1449m	:	Zones NN2/NN1	lower Early Miocene
1451m	:	Zone NP25	latest Late Oligocene
1454m-1503.5m	:	Indeterminate	

Environment of Deposition

839m	:	middle neritic
Samples 890m-1172m incl.	:	middle-outer neritic
Samples 1244m-1449m incl.	:	outer neritic
1451m	:	middle-outer neritic
Samples 1454m-1503.5m incl.	:	undifferentiated marine

II. INTRODUCTION

A total of 18 sidewall cores have been scrutinized for foraminifera and calcareous nannoplankton from the interval 839m to 1503.5m in Judith-1. Fossil assemblages identified in the well section, interpreted zonation and depositional environment subdivision have been plotted on the distribution chart (Enclosure No. 1).

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) Benthonic Foraminiferal Subdivision

1. 839m-890m : Indeterminate

   The impoverished planktonic foraminiferal faunas in the interval lack age-diagnostic taxa.

2. 922m-1097m : Zone Dl (Middle Miocene)

   The sidewall core samples in the interval are assigned to Zone Dl on the basis of the association of Globorotalia miozea miozea and Globorotalia miozea conoidea, and the lack of diverse Globigerinoides, together with Praeorbulina and Orbulina suturalis.

3. 1172m-1244m : Zones Dl/D2 (Middle Miocene)

   The sidewall core samples at 1172m and 1244m contain moderate to high yielding planktonic foraminiferal faunas. The occurrence of Orbulina universa in both samples, together with Orbulina suturalis at 1172m and Globorotalia praemenardii at 1244m, indicates that the interval is possibly Zone D2 in age. The lack of Globorotalia miozea conoidea is also consistent with a Zone D2 assignment. However the lack of Praeorbulina and Globigerinoides sicanus, which normally are well represented in Zone D2, puts doubt on a definitive Zone D2 assignment. For that reason the interval is assigned to Zones Dl and D2 undifferentiated.

4. 1320m : Zone El (basal Middle Miocene)

   The sample at 1320m contains a rich planktonic foraminiferal assemblage including Praeorbulina glomerosa and Orbulina suturalis without Orbulina universa. These taxa indicate a Zone El assignment.

5. 1391m-1436m : Zone G (upper Early Miocene)

   The interval is assigned to Zone G on the basis of the occurrence of Globigerinoides trilobus and the lack of Globigerinoides sicanus. The occurrence of Globorotalia miozea miozea is consistent with an age no older than Zone G.

6. 1449m-1451m : Zone Hl (lower Early Miocene)

   The occurrence of Globigerina woodi connecta without Globigerinoides trilobus indicates that the sidewall core samples at 1449m and 1451m are Zone Hl in age.

7. 1454m-1503.5m : Indeterminate

   The samples in the interval are barren of planktonic foraminifera.

(B) Calcareous Nannoplankton Subdivision

1. 839m-1172m : Zone NN6 (mid Middle Miocene)

   The interval is assigned to Zone NN6 on the basis of the occurrence of Cyclicargolithus floridanus without Sphenolithus heteromorphous.

2. 1244m-1320m : Zone NN5 (lower Middle Miocene)

   The occurrence of Sphenolithus heteromorphous without Helicosphaera ampliaperta is consistent with a Zone NN5 assignment.

3. 1391m-1436m : Zone NN3 (upper Early Miocene)

   The sidewall core samples at 1391m and 1436m include Sphenolithus belemnos and on this basis are assigned to Zone NN3.

4. 1449m : Zones NN2 & NN1 (lower Early Miocene)

   The sample at 1449m is assigned to Zones NN2 and NN1 on the basis of the lack of Sphenolithus belemnos (base Zone NN3 index species) and Zygrhablithus bijugatus (top Zone NP25 index species).

5. 1451m : Zone NP25 (latest Late Oligocene)

   The association of Zygrhablithus bijugatus and Dictyococcites aff. bisectus, and the lack of pre-Zone NP25 taxa, indicates that the sample at 1451m is assignable to Zone NP25.

6. 1454m-1503.5m : Indeterminate

   The samples in the interval are barren of calcareous nannoplankton.

IV. ENVIRONMENT OF DEPOSITION

1. 839m : Middle neritic

The sample at 839m contains a moderately diverse foraminiferal fauna with benthonics predominant. The diverse benthonic fauna includes Globocassidulina subglobosa (frequent), Sphaeroidina bulloides (few), Brizalina (frequent) and Cassidulina laevigata. Deposition in a middle neritic environment is envisaged.

2. Samples 890m-1172m inclusive : Middle-outer neritic

The calcilutites in the interval are interpreted to have been deposited in a middle to outer neritic environment. The rich foraminiferal assemblages in the interval comprise the following diverse benthonic fauna: Brizalina (frequent-abundant), Globocassidulina subglobosa (rare-few), Euuvigerina miozea (rare-few), Trifarina bradyi (frequent-abundant from 890m to 1033m), Cassidulina laevigata (rare-abundant), Siphouvigerina proboscidea (rare-common) and Sphaeroidina bulloides (rare-common).

3. Samples 1244m-1449m inclusive : Outer neritic

The samples in the interval contain high yielding foraminiferal faunas with planktonics representing a dominant element (planktonic percentage ranging from 70 to 95). The benthonic assemblages in the interval include the following bathymetrically significant taxa: Brizalina (rare-frequent), Cassidulina laevigata (rare-few), Globocassidulina subglobosa (few), Siphouvigerina proboscidea (rare-few), Trifarina bradyi (few-frequent) and Sphaeroidina bulloides (few-frequent). Deposition in an outer neritic environment is envisaged.

4. 1451m : Middle-outer neritic

The glauconitic marl at 1451 is interpreted to have been deposited in a middle to outer neritic environment on the basis of containing a benthonic foraminiferal assemblage including Trifarina bradyi (frequent), Brizalina (few), Globocassidulina subglobosa (rare), Sphaeroidina bulloides (few) and Gyroidina subzelandica.

5. Samples 1454m-1503.5m inclusive : Undifferentiated marine

The interval is barren of foraminifera with the exception of the sample at 1454m which contains rare Haplophragmoides. The occurrence of pelletal glauconite throughout the interval indicates that the siliciclastics were deposited in a marine environment.

V. REFERENCES

MARTINI, E., 1971. Standard Tertiary and Quaternary calcareous nannoplankton zonation. In: FARINACCI, A., (Ed). Proc. Second Planktonic Conf., Roma. : 739-785.

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