

FORAMINIFERAL BIOSTRATIGRAPHY - MARLIN-4

By David Taylor

Twenty eight sidewall cores between 3050' and 7855' and samples from a conventional core between 6130' and 6146' were examined for foraminifera. No fauna was found at 6030', 6070', 6124', 6170', 6208' and 7855'.

BIOSTRATIGRAPHY

The planktonic foraminiferal biostratigraphic scheme used for Marlin-4 is that which has been applied to other Esso Gippsland Basin wells.

The oldest fauna is at 6190' which contained Globigerina linaperta which is considered to have been confined to the Eocene. A conventional core sample at 6146' had this species together with Globorotalia centralis which indicates a late Eocene age below Zone K. Zone K (late Eocene) is probably present at 6050' and definitely present at 5990' and 5970' where there was an association of Globigerina linaperta, G. angiporoides and G. ampliapertura.

The Oligocene interval is greatly abbreviated and it is probable that there was a hiatus during most of the Oligocene as Zone J was not recognised and only 20' separates the Late Eocene at 5970' and the upper part of Zone I (Late Oligocene) at 5950'. Another 20' up hole zone I was present at 5930', but at 5900 the base of Zone H (Oligocene/Miocene boundary) was marked by the appearance of Globigerina woodi. Zone J was not recognised in all other Marlin wells examined, although only rotary cuttings were available from these wells.

The presence of such species as Globorotalia kugleri and G. praescitula indicates definite basal Miocene corresponding to the upper part of Zone H at 5800', with the top of Zone H being placed at 5650'. The initial appearance of Globigerinoides trilobus and Globoquadrina dehiscens at 5580' gives a Zone G determination. Zone F was represented at 5300' by the association of Globigerinoides bisphericus, G. trilobus and Globorotalia praemenardii. The top of the early Miocene (top of Zone F) was at or above 5200'.

Zone E, at the base of the late Miocene was not present in the samples, but there was a sample gap between 5200' and 4800'. The sidewall core at 4800', contained a lower Zone D fauna with Orbulina universa. Zone E is no doubt present within this 400' sample gap. Zone D continued upwards to at least 3550'. The preservation of fauna 3050' was so poor that determination was impossible.

ENVIRONMENT

The Eocene faunas between 6190' and 5970' are sparse with few planktonic forms, no doubt washed in by strong tidal currents. The earlier benthonic faunas consist of the euryhaline forms, Haplogragnoides spp. and Ammonia sp. cf. beccarii, which indicate either low salinities or strongly fluctuating polyhaline conditions.

Towards the top of the Eocene the calcareous benthonic fauna became more specifically diverse, though not numerically abundant. This suggests increase in salinity and probable stabilization of salinity level. However, the salinity did not attain that of normal sea water. The interpretation of the environment is that it was a high energy (i.e. hydrodynamic) estuary, reminiscent of the modern estuary of the Fly River, Papua (Taylor, 1973). The estuary migrated during the Eocene and the Marlin-4 site assumed gradually a more seaward position with time. It is noted that estuarine faunas (e.g. Ammonia sp. cf. beccarii) were reported in Marlin-1 at 5280', 5314', 7240' and 7250' (sidewall and conventional cores).

Foraminiferal Biostratigraphy - Marlin-4 cont'd

The late Oligocene and early Miocene sediments were globigerinid oozes and the presence of such benthonic species as Epistominell sp. cf. E. exigua, "Planulina" wullerstorfi and Cibicides sp. cf. C. mundulus suggest a deep water origin. Fluctuations specific diversity and numerical abundance suggest fluctuations in environmental stability. Water depth decreased gradually and deposition on the continental shelf occurred at and above 4350', as is evident from the presence of shallow water Cibicides spp. and Notorotalia spp. and from the decrease in the percentage of the planktonic element in the total fauna.

The progression of environmental events in Marlin-4 are identical to those in Marlin-1.

REFERENCES

- TAYLOR, David J., 1973 - A preliminary report on the marine geology of the Fly River estuary, Papua. University Sydney., Dept. of Geology and Geophysics. Unpubl. reps. 1973/1.

BASIN GIPPSLANDBY David TaylorWELL NAME MARLIN - 4DATE 10-1-74

ELEV. _____

Foram Zonules

		Highest Data	Quality	2 Way Time	Lowest Data	Quality	2 Way Time
MIOCENE	A	Alternate					
	B	Alternate					
	C	Alternate					
	D	3550	1		4350	1	
	D ₁	Alternate					
	D ₂	4800	1		4800	1	
	E	Alternate					
	F	5200	2		5300	0	
	F	Alternate					
	G	5500	2		5580	0	
	G	Alternate					
	H	5650	0		5800	0	
H ₁	Alternate						
H ₂	5850	2		5900	1		
H ₂	Alternate						
OLIGOCENE	I ₁	5930	1		5950 *	0	
	I ₁	Alternate					
	I ₂	Alternate					
	J ₁	Alternate					
J ₂	Alternate						
EOC.	K	*5970	1		6050	2	
	K	Alternate					
	Pre K	@6146	1		6190	2	

* Probable hiatus between 5950' & 5970'

@ Conventional core no.1 has sparse late Eocene Brown's Cl. fauna.

COMMENTS: No fauna was found in side wall cores at 6030', 6070', 6124', 6170', 6208' & 7855'. Faunas were too sparse or too poorly preserved for determination at 6100' & 3050'.

Note: If highest or lowest data is a 3 or 4, then an alternate 0, 1, 2 highest or lowest data will be filled in if control is available.

If a sample cannot be interpreted to be one zonule, as apart from the other, no entry should be made.

- 0 SWC or Core - Complete assemblage (very high confidence).
- 1 SWC or Core - Almost complete assemblage (high confidence).
- 2 SWC or Core - Close to zonule change but able to interpret (low confidence).
- 3 Cuttings - Complete assemblage (low confidence).
- 4 Cuttings - Incomplete assemblage, next to uninterpretable or SWC with depth suspicion (very low confidence).

Date Revised _____