



PE990480

APPENDIX 3

Micropalaeontology

Foraminiferal Biostratigraphy
and Environmental Analysis
of Kingfish #6

by David Taylor

Paleontology Report 1975/2

February 3, 1975.

FORAMINIFERAL BIOSTRATIGRAPHY AND ENVIRONMENTAL ANALYSIS OF KINGFISH #6

By : David Taylor

February 3, 1975.

Forty samples of side wall cores were examined from the Kingfish #6 sequence between 7607' and 2857'*. The "greensand" half of SWC 7607' (this SWC was split as it contained 2 distinct lithologies with "greensand" and calc. shale) was barren of foraminifera, as was the sample at 4571'. The calc. shale at 7607' and the SWC at 7603' contained indeterminate faunas, apparently due to solution, either syngenetic or diagenetic. Two sheets of distribution charts accompany this report; one showing planktonic distribution and biostratigraphy (Sheet 1), whilst the other shows distribution of key benthonic forms and other features which delineate the environmental sequence.

OLIGOCENE to EARLY MIOCENE - 7599' to 6516'

The oldest identifiable fauna was at 7599' containing Globigerina angiporoides which suggests Zone J, but the nondescript associated fauna does not permit further subdivision. The two samples below this, at 7603' and 7607' have poorly preserved planktonic faunas, commented on above.

The fauna at 7595' is distinctively Zone J-1, as it includes Globorotaloides testarugosa. The highest J-1 fauna at 7589' is a poor one, while the base of I-1 at 7581' is very clear though more representative of the top of I-1 because of the presence of Globoquadrina dehiscens (S.L.). There may well be a missing time interval between 7589' and 7581'; certainly Zone I-2 is missing as in most deepwater Gippsland sequences. If this break in deposition is real, then it occurred in all the Kingfish sequences I have examined. The sample at 7571' contains an excellent specimen suite of the complex, Globoquadrina dehiscens (S.L.), possibly including G. praedehiscens.

The top of I-1 and the base of H-2 (at 7419'), are distinctive and characteristic but the higher H-2 faunas are typically poor. The appearance of Globigerina connecta, Globorotalia zealandica, G. praescitula, and G. kugléri dramatically mark the base of H-1 with an increase in specific diversity. Zones G and F are present although there may be some abbreviation. It should be noted that Zones G and F are probably or possibly absent in Kingfish #1, #2, and #5, whilst they are present in Kingfish #3, #A-1, #B-1, and in this sequence.

(Note : * All depths used in this report are corrected sidewall core depths).

LATE MIOCENE (= mid Miocene) - 6416' to 2857'

The base of the late Miocene is taken at the base of Zone E with the appearance of Praeorbulina curva. Both samples at 6416' and 6316' contain this species. However, Orbulina suturalis was not recognised in the sequence although it was probably present in the unsampled interval between 6316' and the appearance of O. universa at 6216'. The interval between 6416' and 6316' obviously represents the basal part of Zone E; i.e., E-2. Zone D-2 has a high specific diversity which decreases at the base of D-1 at 5514'. A problem has arisen regarding the definition of the D-1/C boundary which could be placed at 3258' due to the sudden and abundant appearance of Globorotalia conomiozea. If this is the correct position, then it is lower than that picked in any of the other Kingfish sequences. This whole question must be left in abeyance until the thoroughly sampled Flounder #5 sequence has been analysed. For the present the side wall core at 3496' is definitely D-1, whilst the sample at 2857' is definitely C.

ENVIRONMENTAL SEQUENCE

The environmental trend in Kingfish #6 is broadly similar to that in the other Kingfish sequences I have examined. This trend is from the abrupt transition from a "greensand" to a deepwater carbonate sequence, with up-sequence progradation of the continental slope with heavy scouring and slumping during Zone D times, and finally the ultimate establishment of the continental shelf and stable conditions at the top of D-1 and/or C. The other feature which is obvious in all of the Kingfish sequences is that the earliest calcareous faunas (i.e., Zone J) are heavily corroded and most of the specimens may well have been dissolved as the faunas are dominated by arenaceous foraminifera. This dissolution could be due to the fact that deposition took place at or below the C.C.D. (= Calcium Carbonate Dissolution death). However, what calcareous faunas there are, are usually encrusted and distorted which implies diagenesis and compaction, thus the significance of these deplete faunas is impossible to interpret for it is difficult to distinguish between the syngenetic and diagenetic cause and effect.

However, there are subtle environmental differences between Kingfish #6 and other Kingfish wells. This applies especially to those wells which have a gap in the sequence with Zones G, F, and E missing; such as Kingfish #1, #2, and #5. For example, in Kingfish #5, there is an outstanding discordance between the benthonic faunas of the continental rise and those of the outer shelf or upper slope, without any evidence of the intervening normal slope environment. Also in Kingfish #5, a continental rise environment is apparent up to the base of Zone G, whilst in Kingfish #6 the continental rise deposits are confined to Zones J and I. This may imply that the progradation of the slope was faster in Kingfish #6 than in #5, and that the slope may have developed as a series of protruding fans. Also the biostratigraphic and environmental discordance in Kingfish #5 could have been due to the fact that the slope was too steep and thus unstable to support a benthonic community or retain any planktonic foraminifera which fell onto it. On the other hand, the discordance could have been due to subsequent slumping and/or canyon cutting. If either surmise is correct, then the continental slope in Kingfish #6 was more gentle and stable, for it certainly sustained a diverse benthonic fauna and retained planktonic assemblages.

Benthonic diversity decreases in Zone D, with size and shape sorting of both planktonic and benthonic specimens. These features are also associated with orange stained, reworked planktonic foraminifera and quartz. The interval between 6216' and 4005' in Kingfish #6 has all the indications of slope instability with slumping of sediment from the shelf edge and strong down slope current action. Whether this interval can be described as "canyon fill" is disputable.

Core-1 at 5657' to 5690' within this interval is to be examined in greater detail from an environmental aspect and will be presented as a separate report. This work will not have any effect on the age dating of the section.

BASIN GIPPSLANDBY DAVID TAYLORWELL NAME KINGFISH #6DATE Feb. 28, 1975 ELEV. K.B. +30'Foram Zonules

		Highest Data	Quality	2 Way Time	Lowest Data	Quality	2 Way Time
MIOCENE	A	Alternate					
	B	Alternate					
	C	2857	1		2857	1	
		Alternate					
	D	*3058	2		5514	0	
	D1	Alternate	3609	0			
			5764	0	6115	0	
	D2	Alternate					
	E	**6215	0		6215	0	
		Alternate					
	F	6316	0		6416	0	
		Alternate					
	G	6516	1		6611	1	
	Alternate						
H	6767	2		7118	0		
H1	Alternate	6917	1				
		7218	2	7419	1		
H2	Alternate						
OLIGOCENE	I	7519	0		7571	0	
	I1	Alternate					
	I2	Alternate					
	J	7581	1		7603	2	
	J1	Alternate	7589	0	7595	0	
J2	Alternate						
EOC.	K	Alternate					
	Pre K						

*The boundary between zones C & D is in process of revision due to

Flounder 5. **Zone E is represented by only one sample and this belongs to E2 the lower subdivision. SWC at 7603' is indeterminant while SWC at 7599' contains only J fauna, but both put in J1 on spore-pollen.

COMMENTS: SWC at 7607' contained two lithologies; a green-sand with NNF and a calcareous shale with indeterminant fauna.

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 _____

side wall cores in feet

2857 3058 3258 3496 3609 4005 4361 4571 4837 5012 5313 5514 5764 5915 5990 6005 6115 6216 6316 6416 6516 6591 6611 6767 6917 7018 7118 7218 7318 7419 7519 7557 7571 7581 7589 7595 7599 7603 7607 7607

BENTHONICS															
42. <i>Euvigerina miozea</i>	I	I	I												
43. <i>Cibicides lobatulus</i>															
44. <i>Sphaeroidina bulloides</i>															
45. <i>Gyroidinoides subzelandica</i>															
46. "Textularia"															
47. <i>Globocassidulina cuneata</i>															
48. <i>Lenticulina spp.</i>															
49. <i>Cassidulina laevigata</i>															
50. <i>Quinqueloculina spp.</i>															
51. <i>Euvigerina maynei</i>															
52. <i>Cibicides pseudoungerianus</i>															
53. <i>Anomalinoidea procolligera</i>															
54. <i>Pullenia spp.</i>															
55. <i>Globobulimina sp.</i>															
56. <i>Gyroidinoides zelandica</i>															
57. <i>Cibicides thiara</i>															
58. <i>Siphonina australis</i>															
59. <i>Alabama sp.</i>															
60. <i>Haplophragmoides</i>															
61. <i>Textularia sp.</i>															
62. <i>Alveophragmium sp.</i>															
63. <i>Martinotiella communis</i>															
64. <i>Ammodiscus (clear)</i>															
65. <i>Cibicides cf. lobatulus</i>															
66. <i>Astrononion</i>															
67. <i>Vulvulina granulosa</i>															
68. <i>Trifarina bradyi</i>															
69. <i>Karreriella bradyi</i>															
70. <i>K. sp?</i>															
71. <i>Ammosphaeroidina</i>															
72. <i>Discamina sp.</i>															
% PLANKTONIC FORAMINIFERA	90					50	70	80	85	90	60	80	70	90	<10
SIZE & SHAPE SORTING	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
REWORKED FAUNA and/or QUARTZ						X	X								X
GLAUCONITE															X
SOLUTION of CaCO ₃															X X X
ENVIRONMENT	SHELF	UNSTABLE SLOPE WITH SLUMPING					BASE of SLOPE				RISE ? ?				