WELL COMPLETION REPORT

FLOUNDER-6

APPENDIX 5

FORAMINIFERAL SEQUENCE - FLOUNDER-6

by

David Taylor

FORAMINIFERAL SEQUENCE

FLOUNDER # 6

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SUMMARY

By comparison with other Flounder wells, Flounder # 6 is anomalous in that no Oligocene sediment was present, but that the complete early Miocene sequence was developed. This haphazard preservation of sediment at various times in the six Flounder wells was a function of fluctuations in mechanisms effecting stability of the continental slope.

A continuous late Neogene planktonic foraminiferal sequence was developed in Flounder # 6, but was 1600 feet thinner than in Flounder # 5. This was probably due to variation in the height of the canyon at the depositional site.

At least one sidewall core (i.e. at 6356 feet) at the base of the marine carbonate sequence was incorrectly labelled regarding depth.

INTRODUCTION.

Forty six sidewall core samples were submitted for examination from FLOUNDER # 6. Nine samples between 7091 and 6410 were barren of fauna or devoid of planktonic foraminifera. The rich planktonic foraminiferal carbonate at 6356 is obviously out of sequence so that there has been an error in sampling or labelling of this sidewall core.

It is important to note that data in this report and accompanying data sheets is related to the depths (in feet) labelled on samples as submitted. No attempt at obvious adjustments has been made.

The following sheets of factual observed data accompany this report.

Distribution Chart Sheet 1	- showing distribution of planktonic foraminifera and basis of biostratigraphic breakdown.
Distribution Chart Sheet 2	- giving distribution of benthonic foraminifera and environmental interpretation.
Two Sample Data Sheets	- listing all samples, giving quality of zonal entity and summarising residue grain character.
Biostratigraphic Data Sheet	

BIOSTRATIGRAPHY and ENVIRONMENT

The sequence will be discussed in three sections which are each discrete in age and each are regarding samples from separate sidewall core guns. Comparison with the other Flounder sequences will be made at the end of this biostratigraphic discussion.

1) PALEOGENE - Sidewall core gun 3 and 4.

Sidewall cores between 7091 and 6410 were barren of foraminifera, apart from 6625 and 6536 which contained a wholly arenaceous fauna of *Bathysiphon angleseaensis* and *Haplophragmoides rotundata*. As planktonic were absent, no age determination can be given, but this arenaceous fauna is characteristic for the Flounder Formation.

2) EARLY NEOGENE - Sidewall core gun 2.

The fauna at 6356 is a diverse Zone H-1 fauna which can be regarded as of high quality, with *Globigerina woodi connecta*, *Globoquadrina dehiscens* (both early and ultimate morphotypes), *Globorotalia bella* and *G. praescitula*. Thus the earliest marine carbonate sample in the sequence was younger than Oligocene, as it represented the basal part of the early Miocene. The bases of the other five Flounder marine carbonate sequences contained Oligocene planktonic foraminifera.

At 6354 (2 feet above the Zone H-1 sample) the grains were entirely quartz sand and sandstone without any foraminifera, suggesting the Flounder Formation and not the Lakes Entrance Formation carbonate of 6356. As the lithological sequence is reversed either or both of those samples were mislabelled or mishot.

Zone H-1 faunas were present at 6340, 6335 and 6330, with the latter fauna being of very high quality with a similar fauna to 6356, but also containing *Globorotalia kugleri*.

Fauna at 6320 represents Zone G whilst the next sample at 6270, has a Zone E-2 fauna. The Zone F to E-2 sequence appears to be abbreviated when compared with other Flounder sequences.

The base of the mid Miocene is between 6270 and 6200 with *Praeorbulina glomerosa curva* being present in the former and *Orbulina universa* in the latter. Once again abbreviation of section is evident. The samples at 6200 and 6139 represent Zone D-2.

As no samples were submitted between 6139 and 2925 no Zone D-1 or C faunas were seen.

3) LATE NEOGENE - Sidewall core gun 1.

Faunas between 2925 and 2700 were biostratigraphically indeterminant. The presence of *Globorotalia acostaensis*, *G. miotumida miotumida* and a morphotype close to *G. miotumida conomiozea* indicates that 2625 represented the late Miocene in Zone B-2.

G. miotumida conomiozea is abundant at 2400 which places the fauna within Zone B-1 and probably within the basal Pliocene. The Pliocene aspect of the fauna increases at and above 2332 with the appearance of *G. puncticulata sphericomiozea.*

The distinct *G. puncticulata puncticulata* and *G. crassaformis* at 2180 marks the lowest A-4 sample, but probably the base of A-4 is between 2180 and 2332 as *G. puncticulata puncticulata* evolved rapidly from *G. puncticulata sphericomiozea.* The sample at 2180 was definitely deposited in the basal Pliocene.

The initial appearance of *G. inflata* and *Globoquadrina humerosa* was at 1762 indicating the first definite Zone A-3 fauna though the base was probably below this level on evolutionary rates.

The base of Zone A-2 was picked on the earliest occurrence of *G. dutertrei.*

4) BIOSTRATIGRAPHIC COMPARISON WITH OTHER FLOUNDER SEQUENCES.

Comparison was made by re-examination of samples and analysis of distribution charts compiled by myself for Flounder # 1, # 2, # 3, # 4 and # 5. These comparisons are tabulated on page 4 and discussed on page 5.

EPOCH	ZONE		FLOUNDER SEQUENCES # 1	# 6	# 2	# 5	# 3	# 4	AGE M.Y.
MID MIOCENE	D-1	top	2983 (1)	NO DATA	3150 (3)		NO DATA	3258 (1)	
		base	5500 (3)					5100 (1)	
	D-2	top	5555 (1)	?	?	6714 (0)	?	?	
		base	5865 (1)	6200 (1)	6289 (1)	6021 (0)	6100 (3)	5774 (1)	
	E-1	top	?	?	6391-6416 (1)	?	6200 (3)	6150 (1)	16
EARLY MIOCENE	E-2	base	6021 (1)	6270 (1)	?	6117 (0)	6450 (3)	6200 (1)	
	F	top		?		6187 (0)		6230 (0)	
		base		?				6335 (1)	16.5
	G	top		?					
		base		6320 (0)					
	H-1	top		6330 (0)					
		base		6356 (0)					24
LATE OLIGO-CENE	H-2	top							
		base							
	I-1	top				6268 (0)			
		base							
	I-2	top							
		base							30
EARLY OLIGO-CENE	J-1	top	6250 (3)		6492 (4)		6478 (1)	6345 (1)	
		base	6289 (1)				6528 (1)		
		top							
		base							37.5

CORRELATION of FLOUNDER SEQUENCES

Late Neogene omitted as reliable data available only for # 5 & # 6

It is clear from the tabulation (page 4) that Flounder # 6 sequence was anomalous when compared with the other five Flounder sequences; in that:-

1) Two disjoint time intervals were not represented by sediment in the first five Flounder wells; these intervals being separated by a veneer of sediment within the Oligocene. These two non-depositional periods coalesced in Flounder # 6 where there is no evidence of Oligocene sedimentation.

2) The 8 m.y. span of the early Miocene was represented by continuous sedimentation in Flounder # 6, whilst only the top of the early Miocene, less than 1 m.y., was represented by sediment in the other Flounder sequences.

3) No Zone D-1 (mid Miocene) sediment was present in Flounder # 5. The presence or absence of D-1 in Flounder # 6 cannot be confirmed because of lack of samples at the appropriate interval.

The fact, that at least one sidewall core had been given an incorrect depth (i.e. at 6356), does not explain these inconsistencies. Sample spacing is such that Oligocene fauna would have been seen if present.

Late Neogene planktonic foraminiferal sequences were only well developed in Flounder # 5 and # 6. Even so the sequences (from base of Zone B-2 to modern sea floor) was some 1600 feet thicker in Flounder # 5 than in Flounder # 6.

5) MARINE CARBONATE ENVIRONMENTS ON FLOUNDER STRUCTURE.

The basal sediment of the marine carbonate sequence was deposited in the proximity of the base of the slope in all Flounder wells; no matter what was the biostratigraphic level of this initial deposit. The base of the slope, today, is unstable; sediment may not be deposited or retained because of high velocity subsurface currents and continual slumping and scouring may remove any accumulation of sediment. Thus variation of age of initial sediment in the Flounder wells (page 4) was no doubt due to one or both of these mechanisms which would have fluctuated in intensity from site to site.

All the Flounder sequences exhibit features of submarine canyon filling at differing times (e.g. during Zone D in Flounder # 1, but from Zone C into Zone A in Flounder # 5). Also thicknesses of the fill differ, as

is evident in Flounder # 6, where the late Neogene fill is some 2000 feet thinner than that in Flounder # 5. This difference was probably a function of the height of the canyon at the depositional site. Flounder # 5 may have been in a medial canyon position whilst Flounder # 6 was more towards the edge of a canyon.

6) CONCLUSION.

The preservation and thickness of particular time/rock units was dependent on the vagaries of scouring and filling mechanisms of anastomosing and superimposed submarine canyon systems which dissected the continental shelf and slope above the Flounder structure during the Neogene.

Form R 193 3/71

BASIN GIPPSLAND BY

WELL NAME FLOUNDER # 1 DATE ELEV. + 99'

Foram Zonules

		Highest Data	Quality	2 Way Time	Lowest Data	Quality	2 Way Time
MIOCENE	A						
	Alternate						
	B				1800	3	
	Alternate						
	C	1900	3		2900	3	
	Alternate						
	D_1	2983	1		5500	3	
	Alternate						
	D_2	5555	1		5865	0	
	Alternate						
	E				6021	1	
	Alternate						
	F						
	Alternate						
	G						
	Alternate						
	H_1						
	Alternate						
	H_2						
	Alternate						
OLIGOCENE	I_1						
	Alternate						
	I_2						
	Alternate						
	J_1	6250	3		6289	1	
	Alternate						
	J_2						
	Alternate						
EOC.	K						
	Alternate						
	Pre K						

COMMENTS:

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 31.1.78

By David Taylor

Form R 193 3/71

BASIN GIPPSLAND BY DAVID TAYLOR

WELL NAME FLOUNDER-6 DATE 1/2/78 ELEV. +83'

Foram Zonules

		Highest Data	Quality	2 Way Time	Lowest Data	Quality	2 Way Time
PLEIST.	A_1						
	Alternate						
	A_2	1191	1		1256	1	
	Alternate						
PLIOCENE	A_3	1536	?		1762	1	
	Alternate	1631	1				
	A_4	1902	1		2180	1	
	Alternate						
	B_1	2332	0		2400	0	
	Alternate						
MIOCENE	B_2	2625	0		2625	0	
	Alternate						
	C						
	Alternate						
	D_1						
	Alternate						
	D_2	6139*	1		6200	1	
	Alternate						
	E	6270	1		6270	1	
	Alternate						
	F						
	Alternate						
	G	6320	0		6320	0	
	Alternate						
	H_1	6330	0		6340*	1	
	Alternate						
	H_2						
	Alternate						
OLIGOCENE	I_1						
	Alternate						
	I_2						
	Alternate						
	J_1						
	Alternate						
	J_2						
	Alternate						

COMMENTS: SWC at 6356 feet contains good H1 faunas; but is below top of Flounder Formation.

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 _____

MICROPALEONTOLOGICAL MATERIAL

WELL NAME AND NO: FLOUNDER # 6 *DATE:* 1.2.78

PREPARED BY: DAVID TAYLOR *SHEET NO:* 1 of 2

DRAW:

DEPTH	*SAMPLE TYPE*	*SLIDES*	*ADDITIONAL INFORMATION*
7091	SWC 62	N.F.F. Dom c-m ang-subrd qtz	
7029	SWC 63	N.F.F. 60-40 f ang qtz sdst & m subrd qtz, lim staining	
6750	SWC 68	N.F.F. 50-50 f ang silty qtz sdst & m-f ang qtz	
6625	SWC 70	*Bathysiphon angleseaensis, Haplophragmoides* sp?; 60-40 m-f ang qtz & f ang qtz silty sdst	
6546	SWC 71	N.F.F. 60-40 f ang qtz & f ang qtz silty sdst.	
6537	SWC 65	*Haplophragmoides rotundata;*m gy mdst & f ang qtz	
6475	SWC 72	N.F.F. 50-50 wh f ang qtz silty sdst & f ang qtz	
6410	SWC 103	N.F.F. m gy mdst & f ang qtz	
6356	SWC 31	H-1(0) Dom plank r. glauc. r c ang qtz	
6354	SWC 32	N.F.F. ?INCORRECT DEPTH f-m qtz sand & sdst.	
6340	SWC 34	H-1(1) Poor Pres. 60-40 Planks and mic. r glauc moulds	
6335	SWC 35	H-1(2) Pres. poor. Dom mic	
6330	SWC 36	H-1(0) 70-30 planks & mic	
6320	SWC 37	G(0) 60-40 mic & planks	
6270	SWC 38	E-2(1) Poor Pres. Dom calc sh	
6200	SWC 39	D-2(1) Poor Pres. Dom calc sh	
6139	SWC 40	D-2(1) Poor Pres. Dom calc sh	
2925	SWC 1	? Dom mic r. spic	
2860	SWC 2	? Dom mic r. c ang qtz	
2800	SWC 3	? Dom mic	
2769	SWC 4	? Dom mic	
2700	SWC 5	? Dom mic, r c ang qtz, r spic	
2625	SWC 6	B-2(0) 60-40 planks & benth r mic	
2550	SWC 7	B(2) Dom mic,r spic	
2475	SWC 8	B(2) Dom mic	

MICROPALEONTOLOGICAL MATERIAL

WELL NAME AND NO: FLOUNDER # 6 *DATE:* 1.2.78

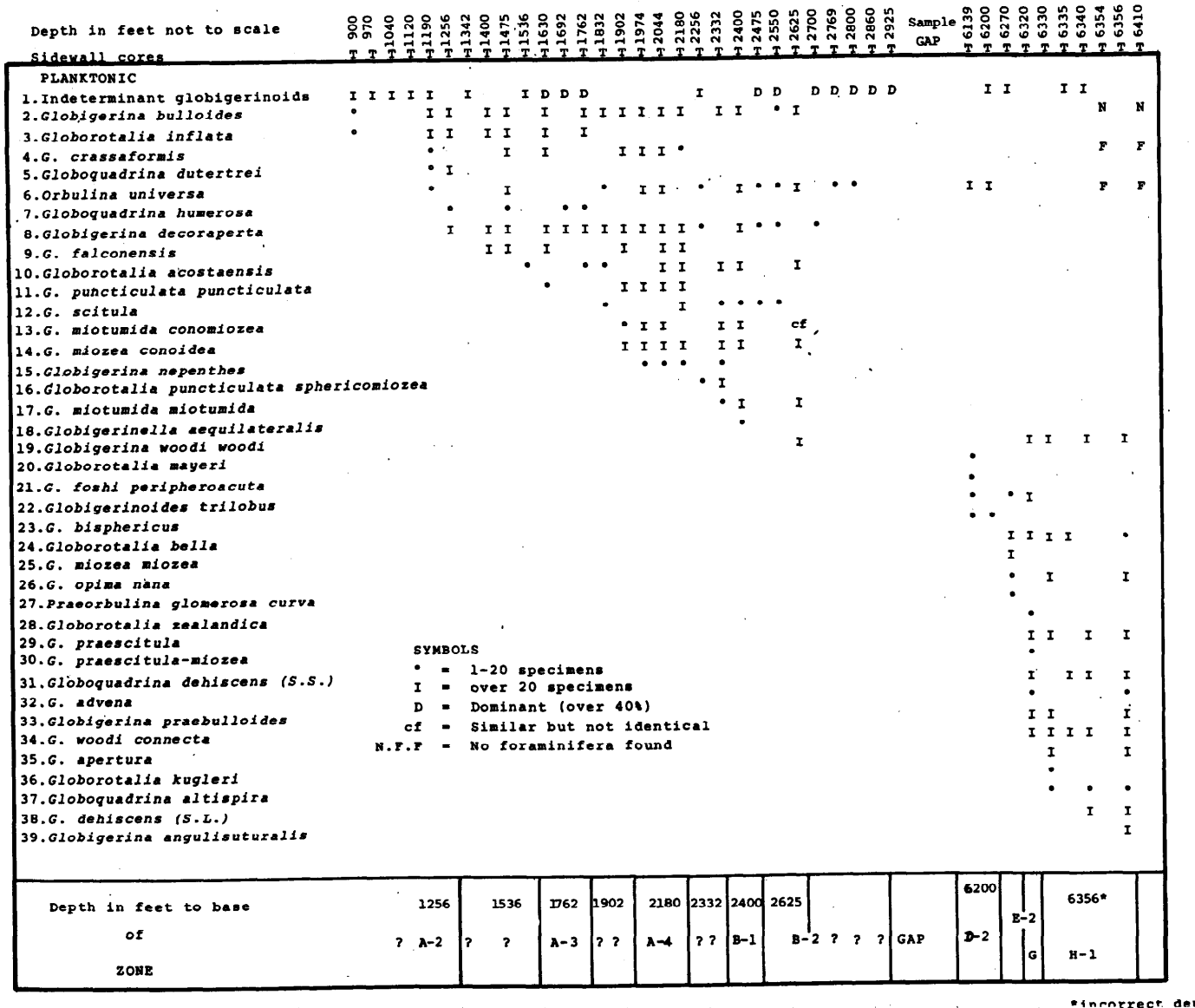
PREPARED BY: DAVID TAYLOR *SHEET NO:* 2 of 2

DRAW:

DEPTH	*SAMPLE TYPE*	*SLIDES*	*ADDITIONAL INFORMATION*
2400	SWC 9	B-1(0) 70-30 plank & mic	
2332	SWC 10	B-1(0) 50-50 planks & mic	
2256	SWC 11	Dom mic	
2180	SWC 12	A-4(1) 50-50 planks & mic	
2044	SWC 14	A-4(1) 60-40 mic & planks	
1974	SWC 15	A-4(1) Dom mic	
1902	SWC 16	A-4(1) 60-40 planks & benth	
1832	SWC 17	A-4/3(2) Dom mic	
1762	SWC 18	A-3(1) Dom mic	
1692	SWC 19	A-3(2) Dom mic	
1630	SWC 20	A-3(1) Dom mic r glauc	
1536	SWC 21	A-3(2) Dom calcar	
1475	SWC 22	A-3/2(1) Dom calcar	
1400	SWC 23	A(1) Dom calcar + bry	
1342	SWC 24	A(2) Dom calcar	
1256	SWC 25	A-2(1) Dom calcar + bry	
1190	SWC 26	A-2(1) Dom calcar + bry	
1120	SWC 27	A(2) bry calcar	
1040	SWC 28	A(2) c ang qtz + bry calcar + moll	
970	SWC 29	A(2) bry calcar + moll	
900	SWC 30	A(2) bry + moll calcar + c ang qtz + och	

FLOUNDER # 6

(Sample gap between 6139 & 2925)

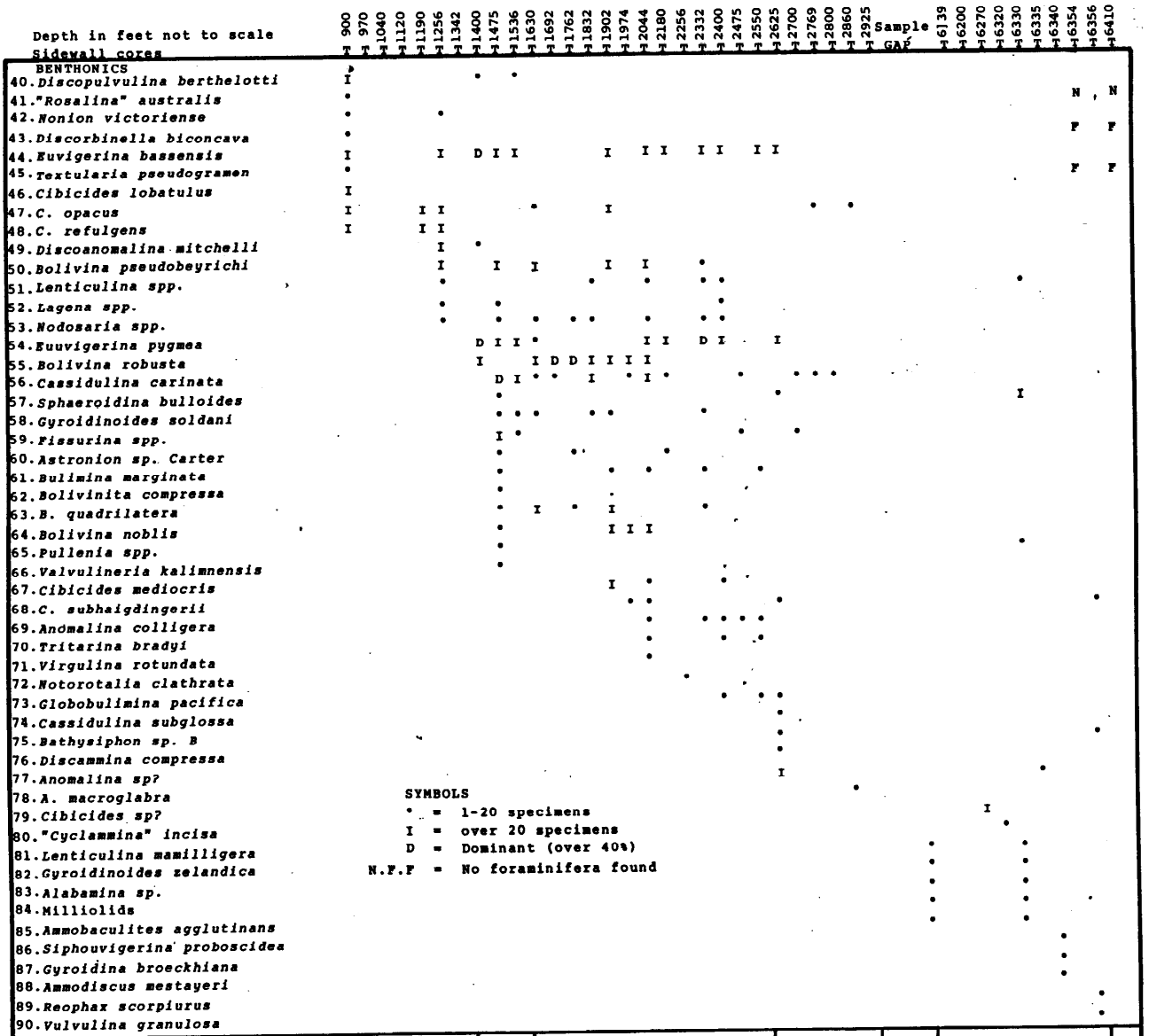


Depth in feet to base of ZONE	1256	1536	1762	1902	2180	2332	2400	2625			GAP	6200		6356*	
	? A-2	? ?	A-3	? ?	A-4	? ?	B-1	B-2	?	? ?		D-2	E-2 G	H-1	

*incorrect depth

FLOUNDER # 6

Depth in feet not to scale
Sidewall cores



ENVIRONMENTAL INTERPRETATION	High energy mid to outer CONTINENTAL SHELF & CANYON HEAD	SHELF/ SLOPE BREAK CANYON	UPPER SLOPE CANYON ENERGY FLUCTUATING	LOWER SLOPE CANYON	Sample GAP	BASE of SLOPE
Depth in feet to base of ZONE	1256 ? A-2	1536 ? ?	1762 A-3	1902 ? ?	2180 A-4	2332 ? ? 2400 2625 B-2 ? ?	6200 D-2	E-2 G 6356* H-1

*incorrect depth