DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

Pliocene planktic foraminifer census data from Deep Sea Drilling Project Hole 607 and Ocean Drilling Program Hole 661A

Harry J. Dowsett and Stephanie M. West

U.S. Geological Survey, Reston, Va. 22092

Open-File Report 92-413

Pliocene planktic foraminifer census data from Deep Sea Drilling Project Hole 607 and Ocean Drilling Program Hole 661A

Harry J. Dowsett and Stephanie M. West
U. S. Geological Survey, Reston, Va. 22092

INTRODUCTION

The U.S. Geological Survey is conducting a long-term study of the climatic and oceanographic conditions of the Pliocene. One of the major elements of the study involves the use of quantitative composition of planktic foraminifer assemblages in conjunction with stable isotope analysis of planktic and benthic foraminifers to estimate sea-surface temperatures and identify major oceanographic boundaries and water masses within the North Atlantic Basin. We anticipate analyzing many samples during the project which will result in a large volume of raw census data. In addition, it is likely that all or some of the census data from individual cores will be incorporated into analyses for more than one report over the course of the project. Therefore we have decided to make the raw census data available in a series of open-file reports that will provide basic data for future work. In this report we present counting categories and raw census data for planktic foraminifer assemblages in 65 samples from DSDP Hole 607 and ODP Hole 661A (Fig. 1).

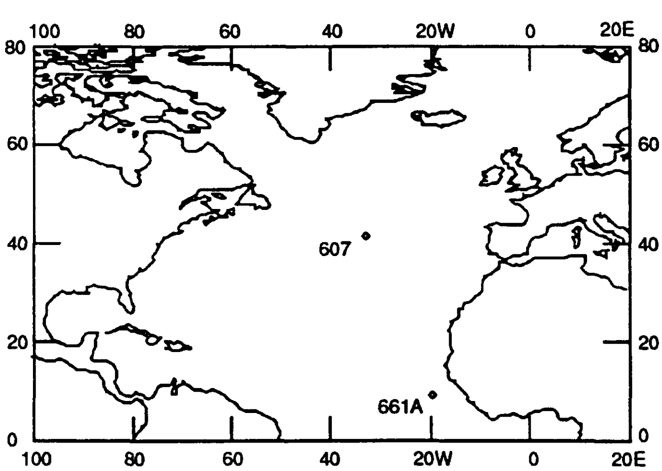

Figure 1 - Location of DSDP and ODP Holes covered in this report.

A variety of statistical techniques are being developed to transform census data of foraminifers in Pliocene deep-sea cores into quantitative estimates of Pliocene sea-surface temperatures. Details of statistical techniques, taxonomic groupings, and oceanographic interpretations are presented in more formal publications (Dowsett and Poore, 1990, 1991; Dowsett, 1991).

Latitude, longitude, and water depth for each DSDP and ODP locality are in Table 1. Counts of variables tabulated in each sample are given in Tables 2 and 3.

METHODS

The samples used in this study were washed using low temperature (isotope) procedures. Sediment samples were dried in an oven at ≤50° C. The dried bulk sample was disaggregated in a beaker with warm tap water and about 2 ml of dilute calgon solution (5 gm calgon to 1 liter water). The beaker was agitated on a shaker/hot plate without heating. Samples were then washed through a 63 µm sieve using a fine spray hose and dried in an oven at ≤50° C. Many samples required an additional treatment with about 10 ml of 10% H_2O_2 added to the wash in order to obtain clean specimens.

Table 1 - Latitude, longitude, and water depth (in corrected meters) for DSDP and ODP Holes shown in Figure 1.

Hole	Latitude	Longitude	Water Depth
607	41°00'N	32°96'W	3426.1
661A	09°45'N	19°39'W	4005.8

A split of 300-350 planktic foraminifer specimens was obtained from the ≥149 µm size fraction using a Carpco sample splitter. Specimens were identified, sorted, and glued to a standard 60 square micropaleontological slide.

COUNTING CATEGORIES

Taxa included in counting categories and codes used for headings of Tables 2 and 3 are summarized below. In general, our taxonomic concepts follow Parker (1962; 1967), and Blow (1969). Exceptions to their practices are noted below.

DSDP and ODP sample designations are abbreviated in Tables 2 and 3 as core-section, depth within section in centimeters (eg. 10-5, 34 = core 10, section 5, 34 cm below top of section 5). The depth column lists depth of sample below sea floor in meters.

Code	Taxon (taxa) comments
bulls	*Globigerina bulloides* (d'Orbigny) and *G. praebulloides* Blow
falco	*Globigerina falconensis* Blow
incis	*Globigerina incisa* (Bronnimann and Resig)
praed	*Globigerina praedigitata* Parker
woodi	*Globigerina woodi* Jenkins and *G. apertura* Cushman
decor	*Globigerina decoraperta* Takayanagi and Saito
aequi	*Globigerinella aequilateralis* (Brady)
gluti	*Globigerinita glutinata* (Egger) s.l.
congl	*Globigerinoides conglobatus* (Brady)
obliq	*Globigerinoides obliquus* Bolli and *G. extremus* Bolli and Bermudez
ruber	*Globigerinoides ruber* (d'Orbigny)
saccu	*Globigerinoides sacculifer* (Brady), *G. quadrilobatus* (d'Orbigny) and *G. trilobus* (Reuss)
altis	*Globoquadrina altispira* (Cushman and Jarvis)
crass	*Globorotalia crassaformis* (Galloway and Wissler). This category includes *G. ronda* Blow and *G. oceanica* Cushman and Bermudez .
hirsu	*Globorotalia hirsuta* (d'Orbigny)
plata	*Globorotalia inflata* (d'Orbigny) and *G. puncticulata* (Deshayes)
marga	*Globorotalia margaritae* Bolli and Bermudez
menar	*Globorotalia menardii* (Parker, Jones, and Brady) s.l. This category includes various members of the *G. menardii* lineage such as *G. limbata* (Fornasini) and *G. miocenica* Palmer.
pumil	This category includes small forms with 5-7 chambers in the ultimate whorl that are similar to *Globorotalia pumilio* Parker, *G. praepumilio* (Parker) and *G. pseudopumilio* Bronnimann and Resig.
scitu	*Globorotalia scitula* (Brady) s.l. This category includes various members of the *G. scitula* group, for example *G. subscitula* Conato.
tocat	*Globorotalia tosaensis* Takayanagi and Saito and *G. truncatulinoides* (d'Orbigny)
tumid	*Globorotalia tumida* (Brady) s.l. This category includes *G. plesiotumida* Blow and Banner.
acost	*Neogloboquadrina acostaensis* (Blow) and *N. continuosa* (Blow)
humer	*Neogloboquadrina humerosa* (Takayanagi and Saito)
spach	*Neogloboquadrina pachyderma* (Ehrenberg) left-coiling. Relatively small, compact *Neogloboquadrina* with 4-5 chambers in the ultimate whorl, kummerform ultimate chamber, and a

slightly to distinct oval equatorial outline are included here. Separating small left-coiling *N. atlantica* from large left-coiling *N. pachyderma* is arbitrary in many North Atlantic high-latitude sites.

dpach *Neogloboquadrina pachyderma* (Ehrenberg) right-coiling. This category is restricted to specimens with 4 chambers in the ultimate whorl. Right-coiling specimens close to *N. pachyderma* that have more than 4 chambers in the ultimate whorl are tabulated as "dupac".

dupac This category is used for specimens of right-coiling *Neogloboquadrina* with more than four chambers in the ultimate whorl that are transitional between *N. pachyderma* and *N. acostaensis* or *N. atlantica.*

Neogl This category includes *Neogloboquadrina* that were not identified to specific level but generally does not include representatives of *N. atlantica.*

Orbul *Orbulina universa* d'Orbigny

Sphae *Sphaeroidinella* and *Sphaeroidinellopsis*

quinq *Turborotalita quinqueloba* (Natland)

Gltal This catagory includes *Globorotalia* that were not identified to species level.

Pulle This catagory includes *Pulleniatina* that were not identified to specific level.

OTHER This category includes unidentified specimens and taxa that are rare within assemblages from the cores.

TOTAL Total number of planktic forams in the counting split.

frags fragments of planktic foraminifers

bform benthic foraminifers

ACKNOWLEDGEMENTS

We thank Keith Goggin and Gary Belair for assistance with sample preparation and Deb Willard and Scott Ishman for their review of this manuscript. We also thank DSDP and ODP for access to the samples.

REFERENCES

Blow, W. H., 1969, Late middle Eocene to Recent planktonic foraminiferal biostratigraphy. *In* Bronnimann, P. and Renz, H. H., (Eds), *Proceedings of First Planktonic Conference:* Leiden (E. J. Brill), p. 199-422.

Dowsett, H. J., 1991, The development of a long-range foraminifer transfer function and application to Late Pleistocene North Atlantic climatic extremes. *Paleoceanography* , v.6, p. 259-273.

Dowsett, H. J. and R. Z. Poore, 1990, A new planktic foraminifer transfer function for estimating Pliocene through Holocene Sea Surface temperatures. *Marine Micropaleontology* , v.16, p. 1-23.

Dowsett, H. J. and R. Z. Poore ,1991, Pliocene sea surface temperatures of the North Atlantic Ocean at 3.0 Ma.. *Quaternary Science Reviews* , v. 10, p. 189-204.

Parker, F. L., 1962, Planktonic foraminiferal species in Pacific sediments, *Micropaleontology,* v. 8, p. 219-254.

____________, 1967, Late Tertiary biostratigraphy (Planktonic Foraminifera) of tropical Indo-Pacific deep-sea cores: *Bulletins of American Paleontology,* v. 52, p. 115-208.

Table 2 - DSDP 607

SAMPLE	DEPTH	bulls	falco	incis	woodi	decor	aequi	gluti	congl	obliq	ruber	saccu	altis	crass	hirsu	plata	menar	scitu	tocat	tumid	humer	spach	dpach	dupac	Neogl	orbul	sphae	quinq	Gltal	other	total	frags	bform
11-5, 104	99.44	58	14	3	28	1	6	45	0	2	26	2	0	33	14	3	0	0	4	1	0	5	8	14	14	19	5	19	8	11	343	293	0
12-1, 19	102.19	50	5	6	47	2	3	42	0	4	28	1	0	8	8	4	0	20	3	2	0	3	15	6		0	3	24	10	12	306	77	5
14-3, 48	124.68	60	33	0	28	1	2	39	0	10	16	4	0	24	4	36	2	7	0	0	0	0	1	3	0	0	0	3	24	13	310	82	2
14-3, 88	125.08	52	18	5	33	1	6	60	0	7	15	6	1	35	11	32	1	8	2	0	0	0	3	15	0	1	0	10	13	14	349	213	0
14-4, 16	125.49	45	21	0	25	4	14	36	0	1	8	4	0	55	10	37	0	3	2	0	0	1	4	9	0	4	0	0	30	13	326	110	0
14-3, 129	125.86	47	24	1	21	3	10	23	0	6	18	14	0	18	3	55	0	6	3	0	0	3	5	12	0	4	0	0	23	12	311	41	2
14-4, 55	126.25	54	10	3	19	5	12	19	0	1	18	4	0	18	9	87	0	1	11	0	0	2	2	12	0	5	0	0	1	19	312	87	0
14-4, 94	126.64	41	10	0	20	3	9	24	0	2	13	2	0	16	3	111	0	2	0	1	0	1	0	7	5	3	0	0	17	18	308	90	1
14-4, 135	127.05	83	14	3	26	9	12	49	0	8	18	4	0	25	11	10	0	5	3	0	0	0	0	6	5	3	0	5	5	12	316	110	2
14-5, 73	127.43	59	3	8	22	7	9	53	0	3	10	3	0	22	7	38	0	5	2	0	0	1	0	12	29	4	0	0	16	10	323	89	2
14-5, 23	127.93	60	8	0	30	3	11	30	0	4	20	1	0	27	18	60	0	11	1	0	0	2	0	9	0	0	0	1	22	13	331	150	1
14-5, 126	128.46	62	13	2	45	8	22	38	0	6	14	4	0	29	13	42	0	4	0	0	0	1	3	12	12	1	2	0	13	17	363	163	2
14-6, 24	128.94	75	3	1	24	0	12	47	1	11	18	6	0	35	13	9	0	9	0	0	0	0	1	15	21	5	1	0	10	13	330	232	0
14-6, 84	129.54	46	3	5	26	5	15	34	0	5	16	12	0	43	14	10	0	2	0	0	0	0	0	42	46	9	0	0	9	6	348	170	2
14-6, 120	129.90	44	1	0	29	2	9	21	0	3	12	5	0	37	12	39	4	4	11	1	0	0	3	49	38	5	0	0	12	9	350	170	1
14-7, 9	130.29	63	4	0	32	5	7	17	0	1	9	1	0	37	4	31	0	4	9	2	0	0	2	39	28	0	0	0	15	17	327	143	2
15-1, 24	131.04	45	2	0	20	0	1	43	0	0	3	1	0	27	10	47	0	7	6	2	0	1	8	26	25	5	0	0	15	10	304	177	2
15-2, 19	132.49	69	6	3	27	3	5	41	1	6	13	4	1	34	5	41	1	7	10	1	0	0	0	17	14	3	0	0	9	17	338	204	3
15-3, 13	133.93	78	2	2	35	2	5	50	0	2	10	6	0	30	6	25	0	8	2	0	0	0	3	7	20	1	0	0	5	13	312	198	0
15-4, 24	135.54	85	8	3	18	1	5	33	0	1	15	2	15	13	0	90	0	4	2	1	0	0	4	24	27	2	1	0	5	10	369	157	0
15-5, 34	137.14	68	8	3	44	2	2	27	0	4	6	4	1	18	11	2	11	7	5	4	0	2	17	45	30	0	7	0	5	4	337	118	3
15-5, 43	138.73	91	0	4	27	2	3	32	0	7	7	2	19	3	6	7	0	3	1	2	0	0	10	32	38	0	0	0	9	16	321	110	2
15-7, 21	140.01	76	7	4	30	1	8	69	0	4	22	5	3	1	9	4	0	1	0	5	0	0	1	24	29	3	0	0	18	14	338	97	2
16-2, 12	142.02	103	9	2	66	0	3	30	0	7	18	3	0	0	2	5	0	4	0	0	0	0	1	26	34	2	1	0	8	17	341	111	5
16-3, 21	143.61	106	6	5	37	3	0	41	0	3	28	7	1	3	1	3	0	2	0	0	0	0	5	17	32	0	0	0	8	19	327	113	6
16-4, 23	145.13	90	4	3	44	4	0	48	0	7	26	2	0	1	5	4	2	7	0	3	0	0	6	26	34	1	0	0	11	15	343	171	4
16-4, 58	145.48	106	13	1	43	6	2	36	0	5	20	0	0	15	11	1	0	1	0	4	0	0	2	10	18	0	0	4	15	4	317	121	0
16-4, 100	145.90	71	5	4	39	3	4	61	0	10	14	1	0	19	2	1	0	0	0	3	1	0	2	25	24	0	0	0	16	15	320	109	2
16-4, 127	146.17	94	4	16	39	4	9	37	0	4	15	1	0	26	4	1	1	4	0	0	4	0	1	9	13	0	0	0	10	11	307	65	1
18-3, 115	163.75	62	0	0	38	11	5	29	0	3	14	3	0	0	12	89	2	2	0	0	0	14	16	0	23	2	0	0	23	7	355	140	4
18-5, 126	163.86	72	0	0	43	8	2	13	0	14	14	0	0	0	17	49	6	4	0	0	0	3	5	16	17	0	0	0	18	12	313	127	4

SAMPLE	DEPTH	bulls	falco	incis	praed	woodi	decor	aequi	gluti	congl	obliq	ruber	saccu	altis	crass	hirsu	plata	marga	menar	pumil	scitu	tumid	acost	humer	spach	dpach	dupac	Neogl	orbul	sphae	quinq	Gltal	Pulle	other	total	frags	bform
5H-6-67	38.27	39	0	14	0	1	1	16	6	1	6	49	146	1	9	0	0	0	0	0	4	0	3	15	0	0	10	6	51	5	0	0	0	17	400	1051	16
6H-2-80	41.91	37	0	0	0	0	6	3	6	2	21	70	60	0	7	0	15	0	48	0	0	0	0	41	0	2	12	0	8	5	0	0	0	3	346	183	3
6H-5-15	45.75	27	0	2	0	0	0	4	11	2	22	23	53	31	21	0	20	0	0	0	0	4	3	24	3	1	23	0	8	4	0	0	0	5	291	401	6
6H-5-34	45.94	21	0	0	0	5	0	6	12	0	37	20	37	22	14	0	35	0	31	0	0	8	5	48	0	0	4	5	7	0	0	0	0	1	318	288	0
6H-5-58	46.18	8	0	0	0	8	0	3	19	1	34	31	48	34	3	0	12	0	25	0	0	24	2	63	0	0	12	3	16	0	0	0	0	6	352	216	3
6H-5-80	46.4	23	15	0	0	9	0	5	16	0	38	24	12	19	8	0	18	0	21	0	0	11	11	43	0	0	4	7	6	0	0	0	0	6	296	229	1
6H-5-104	46.64	16	0	2	0	13	0	0	7	3	32	18	58	32	13	0	25	0	28	0	0	6	12	50	0	0	11	8	8	0	0	0	0	4	346	262	3
6H-5-128	46.88	26	0	0	0	1	2	3	8	0	24	28	69	20	15	0	28	0	30	0	0	14	9	46	0	0	4	10	5	0	0	3	0	7	352	420	2
6H-6-15	47.25	47	1	0	0	6	0	4	14	1	21	33	46	19	9	0	21	0	17	0	1	13	5	56	0	0	4	5	8	0	0	0	0	2	333	206	0
6H-6-30	47.4	25	0	1	0	3	2	0	7	0	24	24	66	28	4	0	16	0	29	0	1	9	5	50	0	0	5	3	7	0	0	0	0	4	313	352	1
6H-6-48	47.58	29	0	2	0	5	1	3	14	0	36	38	31	29	12	0	14	0	27	0	3	10	10	73	0	0	10	4	8	0	0	3	0	5	367	200	2
6H-6-70	47.8	30	0	1	0	2	0	1	12	0	42	31	62	3	7	0	14	0	29	0	1	9	5	38	0	1	8	1	10	0	0	0	0	1	308	209	2
6H-6-95	48.05	13	0	5	0	3	0	2	3	0	12	9	139	7	12	0	0	0	58	0	3	6	0	31	0	0	1	6	8	0	0	0	0	4	322	422	9
6H-6-119	48.29	20	0	1	0	0	0	5	8	0	32	27	71	16	10	0	2	0	42	0	1	18	4	53	0	0	6	4	1	1	0	1	0	1	324	195	1
6H-6-135	48.45	16	0	2	1	0	0	3	8	1	17	15	99	14	16	0	0	0	32	0	3	9	4	74	0	0	1	5	5	3	0	0	0	2	330	477	5
6H-7-10	48.7	17	0	2	1	17	0	2	3	1	20	14	55	13	13	1	0	0	29	0	2	0	14	73	0	0	1	6	5	18	8	3	0	6	324	330	8
7H-1-15	49.25	14	0	1	0	17	1	2	4	1	15	32	72	31	9	0	5	0	40	0	0	6	7	42	0	0	2	3	9	36	4	0	0	5	358	463	4
7H-1-36	49.46	9	0	0	0	4	0	0	4	0	9	8	90	24	8	0	0	0	24	0	2	1	12	39	0	0	1	11	5	47	0	1	0	5	304	900	29
7H-1-59	49.69	8	0	0	0	14	0	1	10	0	11	17	51	26	10	0	0	1	47	0	2	4	1	73	0	0	2	3	3	29	1	1	1	3	319	254	3
7H-1-83	49.93	7	0	1	0	7	0	5	10	0	11	23	52	25	7	0	0	0	34	1	0	3	6	62	0	0	1	7	3	43	0	0	0	1	309	239	2
7H-1-105	50.15	11	0	2	0	8	0	1	16	0	25	34	57	33	3	0	3	3	31	1	4	0	3	36	0	0	1	5	11	15	0	0	3	2	308	195	2
7H-1-130	50.4	10	0	4	0	11	1	0	6	3	15	6	43	41	14	1	5	0	16	1	0	1	2	67	0	0	2	5	7	31	1	1	0	1	295	379	9
7H-2-15	50.75	23	0	0	0	7	0	7	4	1	22	17	67	35	5	0	4	0	50	0	0	5	2	52	0	0	2	6	3	18	1	1	0	2	334	231	0
7H-2-30	50.9	12	0	1	0	10	0	4	6	0	16	14	33	32	2	0	4	0	26	0	3	5	4	51	0	0	0	1	8	21	0	2	0	2	257	371	2
7H-2-50	51.1	12	0	0	0	13	0	1	3	0	15	13	56	0	13	0	8	0	32	2	3	0	4	49	0	0	3	8	0	32	0	3	0	4	274	460	0
7H-2-73	51.33	9	0	0	0	27	0	6	7	1	31	29	61	32	6	0	15	4	6	1	3	0	11	39	0	0	0	4	4	24	9	0	4	2	331	156	0
7H-2-97	51.57	15	0	1	0	9	0	0	1	0	10	10	65	40	7	0	25	2	1	2	9	1	11	55	0	0	1	4	7	19	1	1	2	6	305	214	4
7H-2-120	51.8	8	0	0	0	18	0	1	6	0	24	19	55	22	9	0	16	2	24	0	8	0	5	42	0	0	1	9	4	19	0	0	2	4	298	192	3
7H-2-143	52.03	15	0	0	0	24	2	0	3	0	23	14	39	21	7	0	6	1	26	0	4	0	61	11	0	0	4	7	0	11	1	4	1	4	289	219	3
7H-3-17	52.27	10	0	1	0	8	0	0	0	1	8	9	56	19	4	0	2	1	19	0	7	0	1	76	0	0	0	3	2	57	0	2	1	8	295	711	49
7H-3-40	52.5	16	0	0	2	3	0	2	3	0	31	14	50	49	11	0	0	0	35	0	9	0	2	51	0	0	3	10	3	15	1	0	0	2	312	375	4
7H-3-64	53	16	0	0	2	18	0	0	3	0	42	22	44	0	4	0	1	1	31	0	6	0	11	53	0	0	1	5	2	22	0	0	1	5	290	102	2
7H-5-65	56	7	0	0	5	3	0	3	1	1	22	1	59	30	8	0	0	0	70	0	1	0	6	28	0	0	1	3	4	42	0	0	0	2	297	218	4
8H-1-15	59	19	0	0	0	23	0	4	3	0	55	2	30	21	9	0	6	0	50	3	2	0	4	35	0	0	6	8	7	17	0	3	0	7	314	172	0

Table 3 - ODP 661A