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Pliocene planktic foraminifer census data from Deep Sea Drilling Project Holes 541 and 546

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

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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 67 samples from DSDP Holes 541 and 546 (Fig. 1).

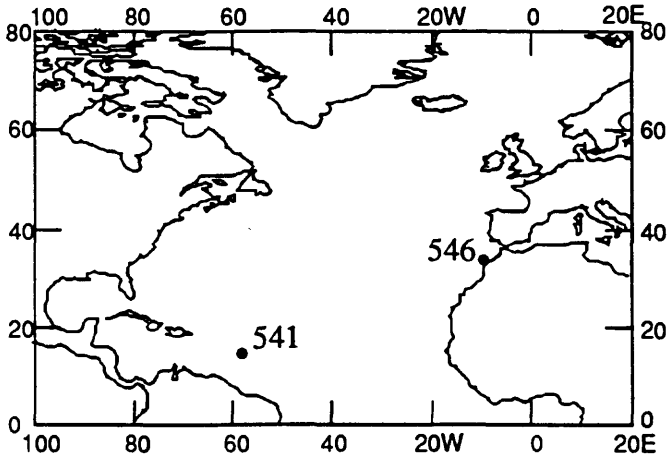

Figure 1 - Location of DSDP Holes covered in this report.

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 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.

A split of 300-350 planktic foraminifer speci-

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

Hole	Latitude	Longitude	Water Depth
541	15°31'N	58°43'W	4940.0
546	33°46'N	09°33'W	3958.0

mens 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 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
Cnglm	*Conglomerata*
bulls	*Globigerina bulloides* (d'Orbigny) and *G. praebulloides* Blow
falco	*Globigerina falconensis* Blow
pseud	*Globigerina pseudobesa* (Salvatorini)
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)
Gnoid	*Globigerinoides* spp. Representatives of *Globigerinoides* (usually small) that could not be confidently assigned to *G. ruber*, *G. obliquus* (s.l.) or *G. conglobatus*.
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.
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.
hexag	*Globorotaloides hexagona* (Natland)
acost	*Neogloboquadrina acostaensis* (Blow) and *N. continuosa* (Blow)
humer	*Neogloboquadrina humerosa* (Takayanagi and Saito)
spach	*Neogloboquadrina pachyderma* (Eh-

renberg) 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

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Table 2 - DSDP 541

sample	depth	conglm	bulla	falco	pseud	incis	praed	woodi	decor	aequi	gluti	congl	obliq	ruber	saccu	altis	crass	hirsu	plata	marga	menar	acitu	tocat	tumid	hexag	acost	humer	spach	dpach	dupac	orbul	pulle	sphae	quinq	Gital	other	total	bform	frags
13-6-27	113.27	1	17	4	0	9	0	16	0	0	6	26	36	114	8	0	11	0	6	0	0	1	0	0	0	2	1	2	6	3	7	2	36	0	1	9	324	17	866
14-2-36	116.86	1	5	3	0	1	0	30	2	0	12	3	23	83	27	39	7	0	0	0	2	11	0	12	0	32	0	3	4	4	2	0	10	1	0	12	329	3	111
14-4-93	120.43	0	2	3	0	0	0	17	3	0	18	2	31	90	20	49	4	0	0	0	0	4	0	13	0	18	1	2	8	11	1	1	24	1	1	8	332	0	119
14-4-121	120.71	2	1	2	0	0	0	10	1	0	21	3	21	77	26	85	8	0	0	0	1	3	0	12	0	19	6	2	2	12	2	2	25	2	0	14	359	1	204
14-5-19	121.19	0	1	2	0	0	0	13	0	0	8	2	31	66	17	69	8	0	0	0	2	2	0	5	0	23	16	1	0	11	2	1	55	1	3	10	349	1	174
14-5-57	121.57	1	3	3	0	0	0	6	0	1	9	8	41	75	12	55	9	2	0	0	0	6	0	9	0	24	6	2	1	15	3	0	60	0	5	12	368	0	80
14-5-85	121.85	0	2	0	0	0	0	1	0	0	12	6	45	64	33	31	11	1	0	0	8	2	0	4	0	12	9	1	1	5	2	0	71	0	5	5	331	2	173
14-5-114	122.14	0	8	5	0	1	0	6	0	0	18	5	34	29	8	41	11	1	7	0	2	1	0	12	0	14	13	5	5	9	1	0	104	0	8	10	358	3	209
14-5-142	122.42	0	1	1	0	1	0	4	0	0	3	6	43	39	24	34	12	1	0	0	6	2	0	9	0	10	14	0	0	8	2	0	88	0	10	11	329	3	238
14-6-23	122.73	0	3	0	0	0	0	4	0	1	10	5	53	44	26	26	15	0	1	1	15	3	0	6	0	17	14	0	4	6	1	0	100	0	4	10	369	3	205
14-6-50	123.00	0	1	0	0	0	0	2	0	2	3	10	39	25	41	31	8	1	1	0	10	2	0	4	0	17	13	1	1	4	9	1	84	1	4	9	324	3	283
14-6-76	123.26	0	4	0	0	0	0	7	0	0	3	25	45	30	30	33	14	0	0	1	11	6	0	1	0	12	5	0	2	6	9	0	87	0	5	7	343	10	188
14-6-106	123.56	0	0	0	0	0	0	7	0	0	17	22	54	45	40	44	16	3	1	0	9	1	1	1	0	13	15	0	4	5	9	0	14	0	2	8	331	1	166
14 6-135	123.85	0	0	0	0	0	0	1	0	1	16	25	54	46	34	49	12	2	1	0	8	7	1	0	0	12	20	0	2	5	12	1	3	0	3	8	323	9	177
14-7-13	124.13	0	1	4	0	0	0	13	0	6	23	31	25	58	52	35	12	6	0	0	14	1	2	2	1	26	27	2	3	6	0	0	0	0	10	9	369	5	332
14-7-41	124.41	0	2	3	0	0	0	11	0	0	19	33	28	52	26	44	24	0	0	0	9	1	1	0	0	26	26	3	1	8	4	0	14	0	1	24	360	0	255
15-1-18	124.68	1	1	0	0	0	0	12	0	0	11	26	37	52	35	33	4	5	0	0	17	0	1	0	0	36	22	1	3	9	9	0	17	0	2	13	347	3	237
15-1-64	125.14	0	1	0	0	0	0	4	0	0	7	41	47	56	53	4	11	2	0	0	8	1	0	0	0	31	31	0	1	4	7	0	15	0	9	14	347	4	159
15-1-108	125.58	0	0	0	0	9	2	5	0	0	4	44	17	19	85	12	1	1	0	0	7	1	0	0	0	9	2	4	1	2	34	10	48	0	7	20	344	74	376
15-2-25	126.25	0	2	0	0	0	0	12	0	0	8	30	31	45	72	29	0	4	0	0	6	0	0	0	0	26	23	2	0	4	0	1	19	0	24	16	354	2	241
15-2-49	126.49	0	0	0	0	2	0	3	0	0	5	32	29	44	55	37	0	2	0	0	9	9	0	0	0	30	23	0	0	1	5	0	38	0	3	14	341	6	439
15-2-90	126.90	0	1	0	0	1	0	7	0	0	10	26	22	35	64	6	0	2	1	0	15	7	0	1	0	24	24	1	0	9	3	3	33	2	19	11	327	6	225
15-2-133	127.33	0	1	0	0	0	0	2	0	0	6	21	19	28	78	17	0	4	0	0	17	7	0	2	0	36	25	1	2	3	2	1	15	0	15	20	322	8	303
15-3-27	127.77	0	1	1	0	2	0	1	0	0	3	40	22	29	83	24	3	0	1	0	5	5	0	0	0	27	1	3	4	3	18	2	26	0	8	13	325	42	1045
15-3-74	128.24	0	1	0	0	2	5	0	0	0	4	17	16	15	74	12	0	0	0	0	0	5	0	0	0	28	7	3	2	5	7	0	119	0	4	11	337	29	444
15-3-115	128.65	0	0	0	0	6	2	1	0	0	10	15	33	24	48	29	0	5	1	0	3	7	0	0	0	50	22	1	0	1	9	0	54	0	6	16	343	6	228
15-4-52	129.52	0	1	0	0	0	3	1	0	0	8	15	10	22	33	12	0	0	13	0	0	2	0	0	0	22	7	1	2	3	11	0	120	0	0	19	305	17	957
15-4-97	129.97	0	0	0	0	7	1	2	0	0	5	21	16	59	56	52	4	0	0	0	1	4	0	0	0	39	26	1	2	5	4	0	13	2	17	18	355	5	216
15-4-116	130.16	0	0	0	0	12	0	2	0	0	14	11	22	30	90	30	8	1	0	0	5	2	0	0	0	23	15	5	1	1	7	1	42	0	4	18	344	9	553
15-5-35	130.85	0	1	0	0	6	2	0	0	0	3	50	53	24	67	10	2	0	0	0	1	1	0	0	0	18	5	4	1	2	21	2	38	1	0	10	322	19	1110
15-5-81	131.31	0	0	0	0	19	2	1	0	0	20	24	33	41	81	32	7	3	0	0	0	3	0	0	0	26	13	2	0	1	3	0	25	0	12	8	356	3	193
16-2-127	138.27	0	0	0	7	1	0	2	0	1	12	14	55	16	66	25	2	0	0	0	7	2	0	0	0	42	17	0	1	2	6	1	60	1	22	13	375	4	303
16-6-75	142.25	0	1	0	0	10	0	7	0	0	8	11	81	5	40	58	0	0	0	0	0	14	0	0	0	19	15	0	0	0	2	0	39	0	4	17	331	4	341

sample	depth	bulla	falco	pseud	incis	praed	woodi	decor	aequi	gluti	congl	obliq	ruber	saccu	gnoid	altis	crass	hirsu	plata	marga	menar	acitu	tumid	acost	humer	dpach	dupac	neogl	orbul	pulle	sphae	Gital	other	total	frags	bform
7 3-91	53.41	53	38	2	2	1	1	0	5	9	0	1	37	0	0	0	0	0	65	1	0	0	0	48	4	0	14	0	11	0	0	0	3	295	60	1
7 4-91	54.91	23	20	1	2	0	2	0	10	39	0	2	27	0	0	0	25	0	0	0	0	4	0	82	21	5	35	0	12	0	1	3	0	314	125	6
7 5-111	56.61	33	15	0	2	0	21	0	16	39	0	9	54	0	0	0	3	0	1	0	0	1	0	73	1	5	17	0	20	5	0	0	10	325	155	2
7 6-91	57.91	27	15	2	2	0	36	0	9	34	3	1	31	0	0	0	20	0	4	0	0	2	0	76	6	5	16	0	19	2	0	1	18	329	93	3
8 1-31	59.31	45	18	1	3	2	17	0	6	55	1	5	64	1	5	0	12	0	0	0	0	2	0	34	5	1	7	0	12	0	1	0	28	325	97	2
8 1-91	59.91	42	3	0	3	0	17	0	5	52	0	3	67	0	0	0	8	0	0	0	0	1	0	57	4	12	19	8	20	0	0	1	29	351	106	4
8 2-33	60.88	94	25	1	7	1	15	0	3	39	0	1	25	0	0	0	41	0	0	0	0	1	0	24	4	2	8	7	30	0	0	0	16	344	63	4
8 2-91	61.41	46	9	0	12	0	11	1	1	61	0	0	26	0	0	0	35	0	2	0	0	0	0	46	3	7	28	4	10	0	0	5	10	317	105	6
8 3-31	62.31	58	19	0	17	1	14	4	1	44	0	1	56	0	0	0	24	0	0	2	0	2	0	38	9	3	16	6	11	1	0	10	24	361	110	5
8 3-93	62.93	53	8	0	8	1	39	7	1	37	0	0	60	0	0	0	1	1	0	0	0	2	0	42	7	2	28	9	12	0	0	0	37	355	108	2
8 4-33	63.85	66	10	2	8	1	21	7	6	61	1	5	46	0	0	0	10	0	0	0	0	4	0	21	6	8	28	12	21	4	0	7	10	365	110	5
8 4-91	64.41	55	15	1	5	0	23	1	10	44	1	0	24	0	0	0	53	0	9	0	0	6	0	17	1	6	33	10	16	0	0	5	11	346	61	2
8 5-26	65.26	56	8	1	21	0	9	1	3	24	2	0	25	0	0	0	38	2	7	0	0	4	0	33	4	3	36	9	14	1	0	0	14	315	81	2
8 6-33	66.85	54	5	0	0	0	33	0	1	24	0	3	25	9	0	0	12	0	24	0	0	1	1	39	1	3	42	5	14	0	6	3	16	321	80	4
8 6-91	67.41	33	4	0	4	0	29	0	9	22	0	6	35	15	0	0	13	0	29	0	0	0	0	34	8	0	43	8	20	1	0	2	7	322	100	2
8 7-26	68.26	63	6	0	9	0	25	0	3	30	0	8	36	17	0	0	23	1	9	0	0	1	0	14	1	2	24	2	8	2	0	4	10	298	110	1
9 1-31	68.81	51	9	0	2	1	23	2	1	27	1	4	23	40	0	0	28	1	12	0	0	6	0	27	3	5	33	4	6	0	0	5	5	319	93	0
9 1-91	69.41	48	7	0	3	0	23	1	1	21	1	11	33	34	0	0	32	0	3	0	0	3	0	24	7	2	35	3	7	1	0	5	9	314	72	3
9 2-36	70.36	37	3	0	7	0	30	1	4	56	0	3	30	25	0	0	53	0	21	0	0	2	0	30	9	1	1	0	3	2	0	4	11	333	77	1
9 2-101	71.01	47	7	0	2	0	22	0	3	39	0	4	40	5	0	0	46	2	56	0	0	2	0	10	0	0	19	2	21	0	0	1	9	337	84	1
9 3-31	71.81	44	7	0	5	0	24	0	9	40	0	11	27	12	0	0	42	0	59	0	0	7	0	8	0	3	19	2	13	0	0	2	7	341	81	2
9 3-93	72.43	62	5	0	1	0	13	0	3	36	0	5	44	13	0	0	37	0	50	0	0	2	0	3	0	5	29	2	6	0	0	0	12	328	93	2
9 4-33	73.33	33	9	0	4	0	12	0	2	44	0	3	31	26	0	1	30	0	49	0	0	0	0	10	3	7	19	5	11	0	1	1	10	311	180	3
9 4-91	73.91	44	9	0	4	0	23	0	1	24	0	11	29	28	0	0	49	0	38	0	0	1	0	18	2	1	11	0	19	3	0	3	6	324	108	4
9 5-31	74.81	33	5	0	4	0	19	1	1	38	0	6	12	20	0	0	57	0	50	0	1	1	0	12	0	0	28	3	9	0	0	0	13	313	113	7
9 5-91	75.41	49	11	0	8	0	26	1	4	54	0	13	30	13	0	0	27	0	42	0	0	1	0	14	2	2	27	2	2	1	0	0	8	337	100	0
9 6-33	76.33	76	7	0	2	0	26	0	10	70	0	4	17	8	0	2	28	0	13	0	16	2	1	18	0	3	35	3	8	1	6	4	11	371	68	0
9 6-91	76.91	14	3	0	3	1	8	0	5	37	1	5	21	5	0	0	48	0	85	0	0	3	0	13	1	4	26	3	12	5	1	0	12	316	120	23
10 1-36	78.36	26	6	0	3	0	31	1	0	13	0	11	37	3	0	1	44	0	58	0	0	1	0	6	1	3	27	1	9	0	21	0	14	317	110	3
10 1-91	78.91	56	9	0	7	0	34	0	0	11	0	12	19	4	0	0	41	1	60	0	1	2	0	10	1	2	24	1	3	4	8	1	5	316	101	2
10 2-81	80.31	30	9	0	0	0	25	0	0	13	0	13	36	23	0	11	38	0	45	0	0	6	0	3	3	1	24	4	1	1	15	4	8	313	137	3
10 3-76	81.76	42	3	0	2	0	29	0	0	22	0	24	32	32	0	9	46	0	42	0	0	2	0	17	1	3	18	5	3	2	10	1	10	355	130	1
10 4-76	83.26	38	4	0	1	0	15	0	2	19	0	16	22	12	0	1	55	0	56	0	0	10	0	12	0	6	25	3	3	7	5	1	3	316	100	13
10 5-76	84.76	28	1	0	4	0	13	0	2	16	0	8	16	18	0	0	43	0	52	0	5	3	0	30	0	7	52	4	1	1	5	2	7	318	103	6

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