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By

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INTRODUCTION and BACKGROUND

Near-future climate change (decades to century scale) must be viewed in the context of past climate change. Baselines, rates of change and natural variability are all important aspects of climate change and must be taken into account when making land/resource use and natural hazards decisions.

Marine sediments record past paleoclimate and paleoceanographic changes. We have focused on the Gulf of Mexico because these sediments preserve a record of North American climate change. Periods of intense freshwater runoff following the last ice age are preserved in Gulf of Mexico sediments (Kennett and Shackleton, 1975; Flower and Kennett, 1990). Likewise, extended episodes of flooding and drought are recorded in river flow data during the last century (Poore et al., in prep) and similar events throughout the Holocene should be recorded in high accumulation rate sequences in the Gulf of Mexico (Poore and Wright, 1999). An annual summer monsoon is responsible for wet conditions in parts of the south from New Mexico to Florida. Variability in monsoon strength should be recorded in the planktic foraminiferal assemblages from the western Gulf of Mexico.

Many techniques exist to extract paleoclimate information from marine sediments. All faunal based reconstructions rely on a temporally well-constrained calibration data set representing modern or "near" modern conditions. We present faunal census data generated from analysis of surface sediment samples taken in the northwestern Gulf of Mexico on cruise 94H of the Texas A&M University research vessel R/V Gyre (Figure 1). This work is one component of the USGS effort to develop a robust and well-dated planktic foraminifer calibration data set (see Dowsett and Poore, 1999).

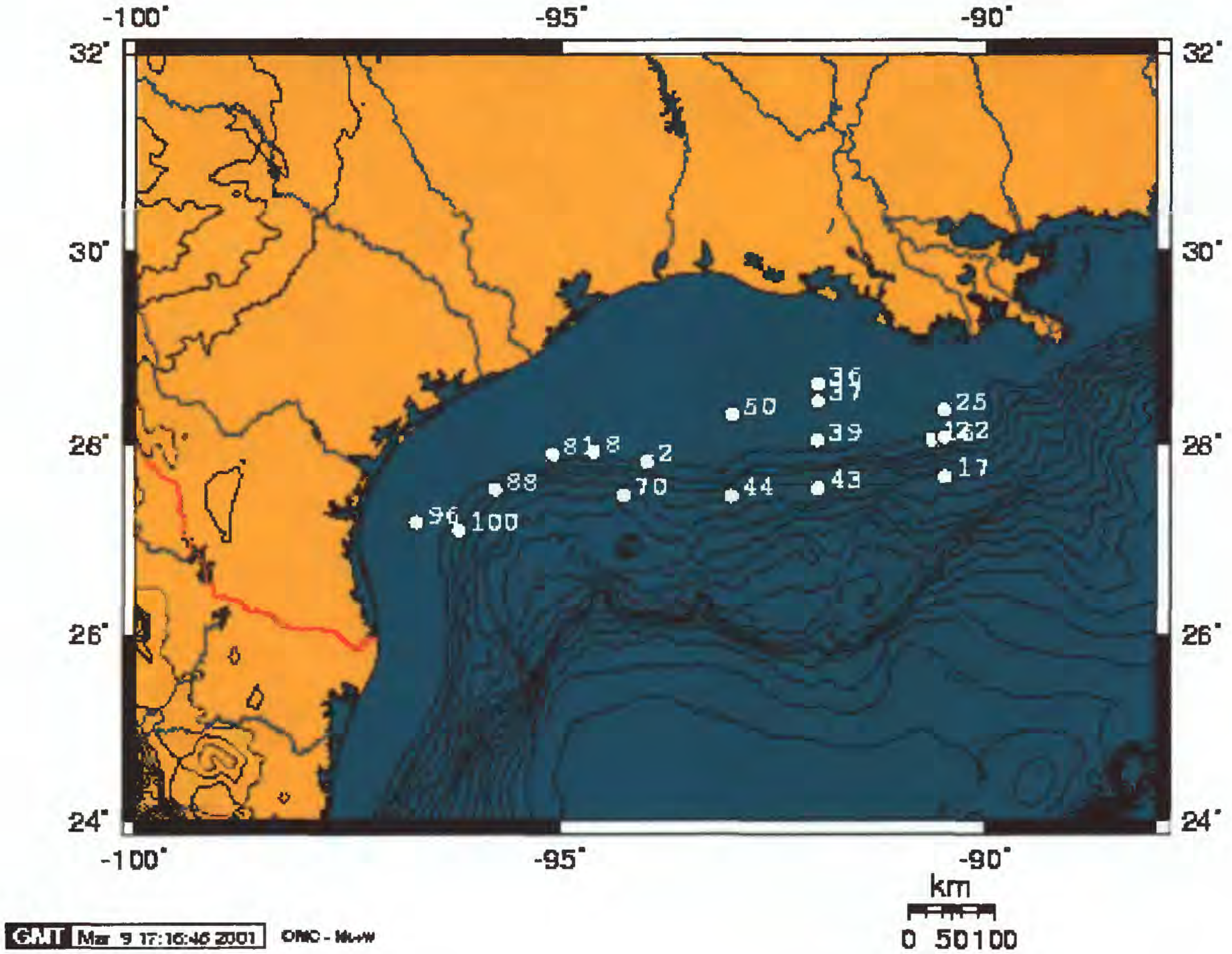

Figure 1. Location of LATX sites discussed in text.

METHODOLOGY

Sample Processing and Selection

Samples were taken using a short gravity corer with 180-cm long, 3-inch outer diameter, polycarbonate liners. Upon retrieval, cores were capped and sealed. After cores were split, samples were taken from 1-3cm at each core site and processed using low temperature (isotopic) techniques. Samples were dried in an oven at ≤50°C. The dried bulk sample was disaggregated in a beaker filled with deionized water and a small amount of dilute Calgon solution (5 g Calgon to 1 liter water). Samples were washed through a 63 µm sieve using a fine spray and oven dried at ≤50°C. After drying, samples were sieved to isolate the <63µm, 63-149µm and ≥149µm size fractions. A split of 300-350 planktic foraminifer specimens was obtained from the ≥149 μm size fraction using a Carpco sample splitter. In many cases, due to a high ratio of benthic to planktic specimens, benthics were removed from the sample.

In many cases the number of planktic specimens in the sample was so low as to preclude further analysis. After deleting barren (for planktics) samples and samples with low numbers of planktics the original data set was reduced to 43 samples. Further examination of these 43 samples identified 26 samples with clear indications of down slope transport or intense dissolution (Fig. 2). These samples were removed from the data set. The remaining 17 samples (Fig. 1) exhibit the best-preserved faunas and have the highest potential to be near modern in age. Specimens were identified, sorted, and glued to a standard 60-square micropaleontological slide.

Figure 2. LATX Core 94H-50. Location of "core top" sample can be seen at left (top) of core. Pebbles throughout the core suggest downslope transport.

Counting Categories

In general, our taxonomic concepts follow Parker (1962; 1967) and Blow (1969); exceptions to their practices are noted below. A list of taxa identified is given below.

Candeina nitida d'Orbigny
Globigerina bulloides (d'Orbigny)
Globigerina digitata (Brady)
Globigerina falconensis Blow
Globigerina rubescens Hofker
Globigerinella aequilateralis (Brady)
Globigerinella calida (Parker)
Globigerinita glutinata (Egger)
Globigerinoides conglobatus (Brady)
Globigerinoides ruber (d'Orbigny) White and pink varieties of *Gs. ruber* were tabulated separately in Table 1.
Globigerinoides sacculifer (Brady)
Globigerinoides tenellus Parker
Globorotalia crassaformis (Galloway and Wissler).
Globorotalia hirsuta (d'Orbigny)
Globorotalia inflata (d'Orbigny)
Globorotalia menardii (Parker, Jones, and Brady) Total number of specimens identified as *Gl. menardii, Gl. tumida* and *Gl. ungulata* were combined in *the Globorotalia menardii* complex (Total) category in Table 1.
Globorotalia scitula (Brady)
Globorotalia truncatulinoides (d'Orbigny) Dextral and sinistral coiling varieties were tabulated separately in Table 1.
Globorotalia tumida (Brady)
Globorotalia ungulata Bermudez
Globorotaloides hexagona (Natland)
Hastigerina pelagica d'Orbigny
Neogloboquadrina dutertrei (d'Orbigny)
Neogloboquadrina pachyderma (Ehrenberg) Specimens of dextral coiling *N. pachyderma* with greater than 4 chambers in the final whorl are considered transitional between *N. pachyderma* and *N. dutertrei* and are tabulated in the P-D intergrade category in Table 1. No sinistral coiled specimens were encountered during this study.
Orbulina universa d'Orbigny
Pulleniatina obliquiloculata (Parker and Jones)
Sphaeroidinella dehiscens (Parker and Jones)
Turborotalita quinqueloba (Natland)

SUMMARY

The data presented here will be dated using AMS ^{14}C techniques prior to being incorporated in the USGS Gulf of Mexico core-top database. These data will then be used to reconstruct regional Holocene paleoceanographic and paleoclimatic conditions.

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Table 1. Planktic foraminifer census data.

Core	Interval (cm)	Lat	Lon	Length (cm)	water depth (m)	*Candeina nitida*	*Globigerina bulloides*	*Globigerina digitata*	*Globigerina falconensis*	*Globigerina rubescens*	*Globigerinella aequilateralis*	*Globigerinella calida*	*Globigerinita glutinata*	*Globigerinoides conglobatus*	*Globigerinoides ruber* (pink)	*Globigerinoides ruber* (white)	*Globigerinoides ruber* (total)	*Globigerinoides sacculifer*	*Globigerinoides tenellus*	*Globorotalia crassaformis*	*Globorotalia hirsuta*	*Globorotalia inflata*	*Globorotalia menardii*	*Globorotalia menardii* complex (total)	*Globorotalia scitula*	*Globorotalia truncatulinoides* (left)	*Globorotalia truncatulinoides* (right)	*Globorotalia tumida*	*Globorotalia ungulata*	*Hastigerina pelagica*	*Neogloboquadrina dutertrei*	*Neogloboquadrina pachyderma* (right)	P - D intergrade	*Orbulina universa*	*Pulleniatina obliquiloculata*	*Sphaeroidinella dehiscens*	*Turborotalita quinqueloba*	Other	Total
LATX94H-02	1-3	27.815	94.006	105	210	0	28	0	8	1	9	15	21	3	50	73	123	2	3	3	0	0	4	10	0	1	53	4	2	0	27	0	0	5	34	0	0	4	350
LATX94H-08	1-3	27.920	94.625	78.5	195	0	34	2	18	1	22	16	23	4	50	79	129	8	6	4	0	0	6	7	0	0	36	0	1	1	42	0	0	8	50	0	0	3	414
LATX94H-16	1-3	28.049	90.646	90	165	0	18	1	5	0	38	11	4	8	52	70	122	11	0	7	0	0	3	8	0	2	40	3	2	0	35	1	0	5	32	0	1	2	351
LATX94H-17	1-3	27.660	90.496	91	906	0	10	2	2	0	26	11	11	6	48	97	145	42	0	12	0	0	32	49	0	0	53	13	4	0	44	0	0	20	63	0	0	1	497
LATX94H-22	1-3	28.077	90.503	27/30	144	0	1	0	0	0	15	4	0	2	29	42	71	42	0	3	0	0	31	44	0	0	31	12	1	0	68	0	0	4	36	1	0	0	322
LATX94H-25	1-3	28.356	90.508	71.5	48	0	21	0	18	0	6	6	12	1	61	116	177	14	11	0	0	0	0	4	1	0	9	0	4	0	28	0	0	1	6	0	0	4	319
LATX94H-36	1-3	28.633	92.003	71.5	36	0	15	0	13	0	1	10	6	0	72	87	159	7	2	0	0	0	0	0	0	0	0	0	0	0	4	0	0	1	0	0	0	2	220
LATX94H-37	1-3	28.450	92.002	60	53	0	30	0	21	5	8	8	11	0	67	134	201	5	6	0	0	0	1	4	0	0	9	0	3	0	21	0	0	3	9	0	0	0	341
LATX94H-39	1-3	28.045	91.999	28.5	103	1	18	0	7	4	24	3	24	4	50	179	229	20	5	1	0	0	14	20	0	0	43	3	3	0	47	0	0	1	73	0	0	2	526
LATX94H-43	1-3	27.544	91.994	61	720	0	13	1	1	0	5	14	8	7	34	84	118	23	0	2	0	2	23	31	3	1	49	5	3	0	28	0	0	10	37	1	0	4	358
LATX94H-44	1-3	27.458	93.009	40	926	0	7	2	0	0	5	23	4	12	44	80	124	6	0	7	0	0	15	24	0	0	57	9	0	0	41	0	1	2	65	0	0	5	385
LATX94H-50	1-3	28.313	92.998	28.5	53	0	17	0	1	3	17	10	8	0	85	127	212	7	5	0	0	0	1	2	1	0	4	0	1	0	18	0	0	5	7	0	0	1	318
LATX94H-70	1-3	27.470	94.271	60	974	0	6	0	2	0	17	16	7	4	53	75	128	18	0	2	0	0	24	32	2	0	62	6	2	0	25	0	0	10	73	0	0	2	406
LATX94H-81	1-3	27.901	95.105	24	105	0	18	0	7	0	5	12	11	5	59	100	159	9	1	0	1	0	5	9	0	4	26	0	4	0	23	1	0	5	36	0	0	1	333
LATX94H-88	1-3	27.528	95.789	82	503	0	18	0	2	0	0	10	7	0	48	86	132	1	0	5	0	0	1	1	0	0	51	0	0	0	33	0	0	0	40	0	0	0	300
LATX94H-96	1-3	27.186	96.715	81.5	70	0	21	0	12	11	3	7	27	2	38	112	140	4	12	0	0	0	1	2	0	0	10	0	1	0	21	0	0	4	13	0	0	2	301
LATX94H-100	1-3	27.101	96.213	79	428	0	18	0	3	0	0	5	7	2	36	84	120	2	1	1	0	0	3	5	0	0	40	2	0	0	23	0	0	2	42	0	0	1	272