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IODP Proposal Cover Sheet

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Title:	Shallow-Water Drilling of the New Jersey Continental Shelf: Determining the Links Between Sediment Architecture and Sea-Level Change
Proponent(s):	Gregory S. Mountain, Kenneth G. Miller, Nicholas Christie-Blick, Peter J. Sugarman, Craig S. Fulthorpe
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Permission to post abstract on IODP-MI Web site: ■ Yes ☐ No

Abstract: (*400 words or less)*

We propose to drill sites MAT 1-3 on the inner continental shelf of New Jersey to: 1) estimate amplitudes, rates and mechanisms of global sea-level (eustatic) change; and 2) evaluate the response of passive continental margin sedimentation to eustatic changes. The NJ Coastal Plain and continental shelf/slope comprise a "natural laboratory" for unraveling eustasy and margin sedimentation by exploiting the chance to drill a series of linked boreholes as part of the 'NJ/Mid-Atlantic Transect' (NJ/MAT). Consequently, this margin has been the focus of previous drilling both onshore and offshore (ODP Legs 150X, 174AX, 150 and 174A, respectively). Each of these efforts has successfully dated sequence boundaries and tied them to the $\delta^{18}O$ proxy of glacioeustasy, but all have fallen short of the ultimate objectives for either of two reasons: 1) the region most sensitive to sea-level change, the inner shelf, has not been sampled; and 2) drilling technology aboard the ODP drilling platform, JOIDES *Resolution*, is not well suited for recovering sand-prone continental shelf sediments. Consequently, a critical gap remains in the NJ/MAT and our knowledge of global sea-level change. The drilling we propose is designed to obtain deep sub-seafloor samples and downhole logging measurements in this crucial inner shelf region using a mission-specific platform. MAT 1-3 represent the most sensitive and accessible locations for bringing the NJ Transect to a successful conclusion.

Scientific Objectives: (*250 words or less*)

The inner to middle shelf offshore New Jersey is an ideal location to investigate the history of sea-level change and its relationship to sequence stratigraphy for several reasons: rapid depositional rates, tectonic stability, and well-preserved, cosmopolitan fossils suitable for age control characterize the sediments of this margin throughout the time interval of interest. Coring and logging along a depth transect at 3 sites embedded within a regional seismic grid and correlated to previously drilled holes both offshore and onshore will allow us to:

1) date major "Icehouse" (Oligocene-Recent) sequences, a time of known glacioeustatic change, and compare ages of the unconformable surfaces bracketing these sequences with ages of sea-level lowerings predicted by the $\delta^{18}O$ glacioeustatic proxy;
2) estimate the amplitudes, rates, and mechanisms of sea-level change; and
3) evaluate sequence stratigraphic facies models that predict depositional environments, sediment compositions, and stratal geometries in response to sea-level changes.

Please describe below any non-standard measurements technology needed to achieve the proposed scientific objectives.

Mission-Specific Platform

Proposed Sites:

Site Name	Position	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
						determine the age, facies, and paleobathymetry of surfaces correlated with the following sequence boundaries:
MAT-1A*	39.634091 -73.621646	32	752	0	752	?m5 (early Miocene) to o1 (mid Oligocene) and as old as ?Paleocene
MAT-1B	39.635066 -73.620800	32	752	0	752	
MAT-1C	39.639419 -73.616619	32	752	0	752	
MAT-2D*	39.565720 -73.497266	35	752	0	752	?m4 (mid Miocene) to o1 (mid Oligocene) and as old as late Eocene
MAT-2E	39.567083 -73.496050	35	752	0	752	
MAT-2F	39.571200 -73.492317	34	752	0	752	
MAT-3A*	39.519533 -73.413238	34	752	0	752	?m1 (mid Miocene) to m5.7 (early Miocene)
MAT-3B	39.514094 -73.418144	34	752	0	752	
MAT-3C	39.525037 -73.408025	34	752	0	752	
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Shallow-Water Drilling of the New Jersey Continental Shelf:
Determining the Links Between Sediment Architecture and Sea-Level Change

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ABSTRACT

We propose to drill sites MAT 1-3 on the inner continental shelf of New Jersey to: 1) estimate amplitudes, rates and mechanisms of global sea-level (eustatic) change; and 2) evaluate the response of passive continental margin sedimentation to eustatic changes. The NJ Coastal Plain and continental shelf/slope comprise a "natural laboratory" for unraveling eustasy and margin sedimentation by exploiting the chance to drill a series of linked boreholes as part of the 'NJ/Mid-Atlantic Transect' (NJ/MAT). Consequently, this margin has been the focus of previous drilling both onshore and offshore (ODP Legs 150X, 174AX, 150 and 174A, respectively). Each of these efforts has successfully dated sequence boundaries and tied them to the $\delta^{18}O$ proxy of glacioeustasy, but all have fallen short of the ultimate objectives for either of two reasons: 1) the region most sensitive to sea-level change, the inner shelf, has not been sampled; and 2) drilling technology aboard the ODP drilling platform, JOIDES *Resolution*, is not well suited for recovering sand-prone continental shelf sediments. Consequently, a critical gap remains in the NJ/MAT and our knowledge of global sea-level change. The drilling we propose is designed to obtain deep sub-seafloor samples and downhole logging measurements in this crucial inner shelf region using a mission-specific platform. MAT 1-3 represent the most sensitive and accessible locations for bringing the New Jersey Transect to a successful conclusion.

INTRODUCTION

Eustasy as a global phenomenon. Understanding the history and impact of sea-level fluctuations is one of the most societally-relevant objectives of marine geology and geophysics. While global sea level is currently rising at rates of ~20 cm/century (in part due to anthropogenic influences; Barnett, 1990), in many coastal regions the rate is much higher because of the additional effect of local subsidence (**Fig. 1**). The geologic record shows that global sea level has changed by 100's of meters (summaries in Donovan and Jones, 1979) at rates as high as meters per century (Fairbanks, 1989). However, the importance of understanding eustasy in the geologic record goes beyond preparing for a sea-level rise of 0.5 m over the next century. Indeed, the project that we outline does not address the centennial time scale; for that, strategies such as synthesizing tide gauge and Recent marsh records are required. Instead, this study leads towards a broader understanding of the long-term behavior and wide-ranging effects of one of the planet's most fundamental divides - the line between land and ocean. Throughout Earth's history, the transfer of energy and material across this boundary has profoundly influenced the interactions among the lithosphere, biosphere (e.g., Katz et al., 2005), and atmosphere, and continues to affect the balance of these systems today. Weathering rates, sediment distribution, stratal architecture, carbon burial, and glaciation are just a few of the myriad processes that are complexly intertwined with eustatic change.

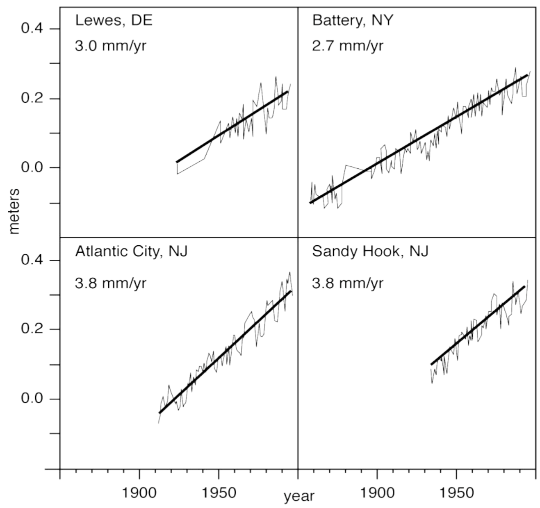

Fig. 1 – Yearly average sea level based on tide gauge data. After Psuty and Collins (1996).

Despite its importance, knowledge of the basic amplitudes and rates of sea level variations on time scales of 10^4 to 10^6 yrs is surprisingly limited. Our goal is to address this deficiency in the way endorsed by numerous study groups (e.g., Imbrie et al., 1987; Sea Level Working Group, 1992): by sampling key facies across the prograding deposits of a passive continental margin.

Unraveling eustasy from the effects of subsidence and sediment supply requires a fundamental understanding of passive margin sedimentation. Sediments deposited adjacent to the shoreline are replete with stratal discontinuities on all spatial scales, including sequence boundaries: regional unconformities associated with evidence for baselevel lowering. Sequence boundaries provides a means to objectively subdivide the stratigraphic record (Christie-Blick et al., 1990; Christie-Blick, 1991). These surfaces and the intervening sediments (sequences) provide the basis for evaluating controls on sedimentary architecture and for predicting sedimentary facies and societally-important resource distributions (e.g., hydrocarbons and potable water; Vail et al., 1977; Sugarman et al., in press). Remarkably similar sequence architecture occurs on margins of widely contrasting tectonic and sedimentary histories (e.g., Bartek et al., 1991), emphasizing that eustasy is a fundamental, worldwide control on the stratigraphic record. Nevertheless, it is clear that tectonics and changes in sediment supply also have molded the stratigraphic record (e.g., Reynolds et al., 1991); the challenge is to isolate the imprint of each of these effects.

Although sequence stratigraphy is a powerful tool for deciphering margin records, many fundamental assumptions have not been tested. For example, although the facies models of Exxon Production Research Company (EPR; e.g., Posamentier et al., 1988) are widely applied, the nature of facies associated with prograding clinoforms have not been publicly documented (although Ocean Drilling Program [ODP] Legs 166 and 174A made good contributions). Furthermore, the timing and phase relationships of facies distributions with respect to sea-level change have not been evaluated (e.g., Reynolds et al., 1991). More importantly, the sequence stratigraphic record has been used to extract a eustatic history (e.g., Haq et al., 1987), despite the fact that critical assumptions (e.g., the water depth at the lowest point of onlap; Greenlee and Moore, 1988; see discussion below) have not been tested.

Eustatic Unknowns: amplitude, response, and mechanism. Measuring the amplitude of eustatic change is a difficult task. Although deep-sea $\delta^{18}O$ records provide precise timing of glacioeustatic changes (Miller et al., 1991, 1996b, 2005a), the eustatic amplitudes can be estimated using $\delta^{18}O$ to no better than ±20 % for the past few million years and ±50% prior to that because of assumptions about paleo-temperature and application of the Pleistocene sea-level/δ_W calibration of Fairbanks and Matthews (1978) to the older record (Miller et al., 2005a).

Carbonate atolls have been sampled as fossil “dip sticks” (e.g., ODP Legs 143, 144), and while this approach has been successful for the Pleistocene (Fairbanks, 1989) recovery and age control for records older than the late Pleistocene have posed very large challenges. As noted above, continental margin sediments have long been regarded as a viable source for extracting eustasy (e.g., Vail, 1977; Watts and Steckler, 1979; Haq et al., 1987; Greenlee and Moore, 1988), provided the effects of tectonic subsidence and changes in sediment supply could be removed. It is for this reason that we have pursued drilling into the New Jersey margin. It was known that drilling on the New Jersey continental slope by Leg 150 (Mountain, Miller, Blum, et al., 1994) would yield virtually no information on amplitudes. By contrast, it was expected that the coastal plain drilling by Leg 150X (Miller et al., 1994, 1996a) and later by 174AX (Miller et al., 1998b, 1998a, 2003, 2004) would provide valuable constraints on eustatic amplitudes. While onshore analyses have borne this out (**Fig. 2**), they’ve been based on incomplete Miocene and younger sections dating from times when the shoreline was frequently seaward of its current position (Kominz et al., 1998). By contrast, the Late Cretaceous to Oligocene shoreline was often landward of the coastal plain wells and, as a result, eustatic amplitudes from these sections have been shown to be as large or larger than those of the Miocene (**Fig. 2**; Miller et al., 2005a). Analyses of ODP Leg 194 on the Marion Plateau (John et al., 2004) clearly shows that the NJ onshore sites do not capture the full amplitude of Miocene sea-level change.

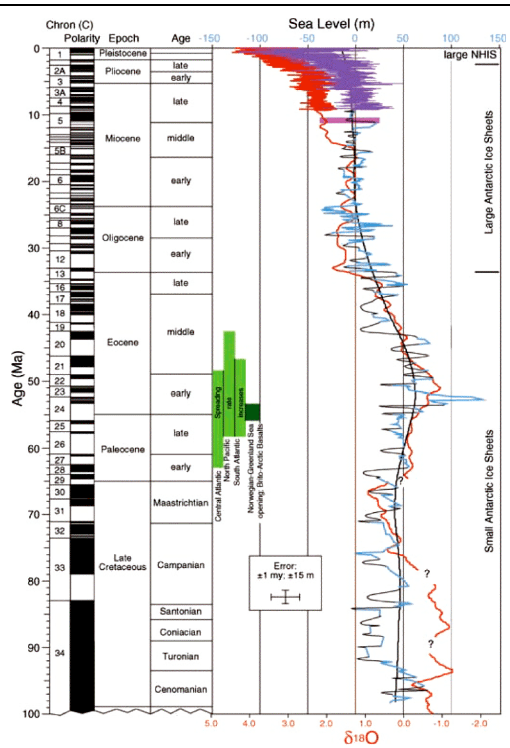

Fig. 2 - Global sea level (light blue; scale on top axis in m) for the interval 7-100 Ma derived by backstripping data from onshore boreholes along the New Jersey coastal plain. Global sea level (purple) for the interval 0-7 Ma is derived from $\delta^{18}O$. A benthic foraminiferal $\delta^{18}O$ synthesis from 0-100 Ma (red curve; scale on bottom axis in ‰ [(reported to *Cibicidoides* values [0.64 ‰ lower than equilibrium]) is shown for comparison. The pink box at ca. 11 Ma is the sea-level estimate derived from the Marion Plateau (see text). The heavy black line is the long-term fit to the backstripped curve. Light green boxes indicate times of spreading rate increases on various ocean ridges. Dark green box indicates the opening of the Norwegian-Greenland Sea and concomitant extrusion of the Brito-Arctic basalts. After Miller et al. (2005a).

The New Jersey continental shelf, particularly the inner to middle shelf where we propose to drill, is much better suited for estimating late Oligocene-Miocene eustatic amplitudes because sediments in this setting are stratigraphically more complete, record the full range of water depth variations, and provide the facies needed to estimate amplitudes.

The response of passive margin sedimentation to large, rapid sea-level changes is poorly known. Various facies models have been proposed for shelf sedimentation in response to eustatic changes (e.g., Posamentier et al., 1988; Galloway, 1989). However, there has been little direct sampling of well-imaged seismic sequences in the regions most affected by sea-level change. For example, our understanding of the amplitude of sea-level change and sedimentation response requires that we know the depositional setting of the strata that onlap sequence boundaries. However, without samples it is not known whether this onlap is coastal, marginal marine, or deep marine (?100 m suggested by Greenlee and Moore, 1988). Furthermore, the depositional significance (e.g., shoreface vs. mid-shelf) of the clinoform inflection point, a critical constraint in facies interpretation, has been inferred mostly through forward models, although a tantalizing bit of evidence recovered at ODP Leg 174A Hole 1071F suggests a marginal marine setting ~3.5 km landward of one late middle Miocene clinoform inflection point (Austin, Christie-Blick, Malone et al., 1998). Testing and refining depositional models have global implications, because they potentially provide not only predictions about petroleum (e.g., Vail and Mitchum, 1977) and water resources (e.g., Sugarman and Miller, 1997; Sugarman et al., in press), but also information about the response of sedimentation to large, rapid sea-level variations. Continued analysis of Leg 174A sequences will shed new light on shelf facies models and their predictions from seismic data; however, Leg 174A was limited by low core recovery and penetration of only upper middle Miocene and younger strata, hampering efforts to establish reliable facies models. Drilling at proposed Sites MAT 1-3 will provide the information needed to evaluate depositional facies models properly.

Glacioeustasy (Donovan and Jones, 1979) is the only known mechanism for producing the large, rapid eustatic changes that have been reported for the past 200 m.y. (Miller et al., 2005). Our studies have shown that changes in ice volume are the dominant mechanism causing eustatic changes during the past 42 m.y. (Miller et al., 1996b, 1998a). While most studies have assumed that the Earth was ice-free during the Cretaceous-Eocene, Stoll and Schrag (1996) and Miller et al. (1999; 2004, 2005a, b) have argued that there were ice sheets during the Cretaceous to early Eocene. Site MAT 1 should recover a Paleocene-Eocene record that will address this fundamental issue.

The importance of eustasy vs. tectonism to the formation and preservation of sequences is a long-standing debate that our proposed drilling will address. Tectonism in this context includes phenomena that operate across a large range of scales in both time and space, i.e., from rapid, narrowly focused 'active' processes such as faulting and salt intrusion, to the slower and more laterally extensive 'passive' process of flexural loading. We have backstripped 7 onshore coreholes (Kominz et al., 1998; Van Sickle et al., 2004; see summary in Miller et al., 2005) and have shown that active tectonics has played a minimal role in Cenozoic onshore deposition. Flexural loading, by contrast, explains ~30 m of excess subsidence that backstripping found in Delaware vs. onshore New Jersey wells beginning at ca. 21-12 Ma. This enhanced subsidence is attributed to a local flexural response to the load of thick sequences prograding offshore of Delaware (Browning et al., in press). Based on this, we hypothesize that: 1) eustatic change is a first-order control on accommodation that provides a simultaneous imprint on all continental margins; 2) tectonic change due to movement of the crust can overprint the record and result in large gaps, though this effect is not apparent in NJ Miocene sequences; and 3) second-order differences in sequences can be attributed to local flexural loading effects, particularly in regions experiencing large-scale progradation. Sites MAT 1-3 (**Fig. 3**) provide the crucial link in the onshore-offshore transect (**Fig. 4**) required to evaluate eustasy vs. local lithospheric flexure on the development of prograding late Oligocene-Miocene sequences.

SITE SELECTION

The NJ margin: Its Suitability, Results, and Promise. The New Jersey margin in general is an ideal location to investigate the history of sea-level change and its relationship to sequence stratigraphy for several reasons: rapid depositional rates, tectonic stability, and well-preserved, cosmopolitan fossils suitable for age control characterize the sediments of this margin throughout the time interval of interest (see summary in Miller and Mountain, 1994). In addition, there exists a large set of seismic, well log, and borehole data with which to frame the general Jersey

Coastal Plain across the shelf to the slope and rise (Miller and Mountain, 1994; **Figs. 3, 4**) with the following goals to:

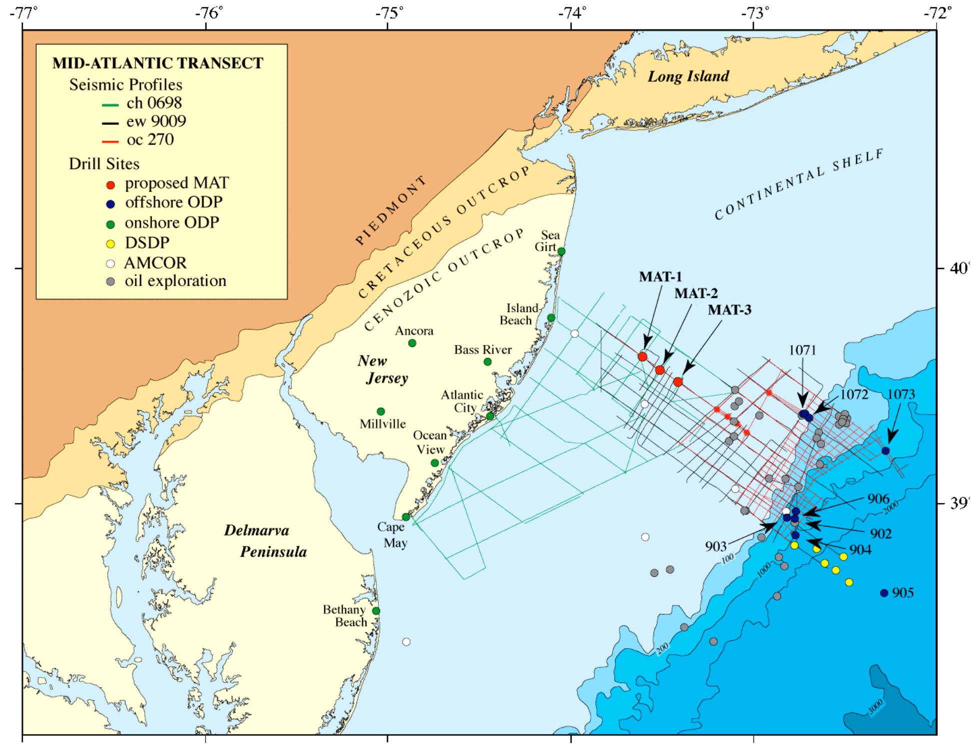

Fig. 3 – Location of the NJ/Mid-Atlantic Transect, exploiting knowledge of stratal geometry observed in high resolution MCS profiles and the age, facies and depositional history of sediments in coreholes from various sources. We propose to drill and log inner shelf sediments from a mission-specific platform at Sites MAT 1, 2 and 3.

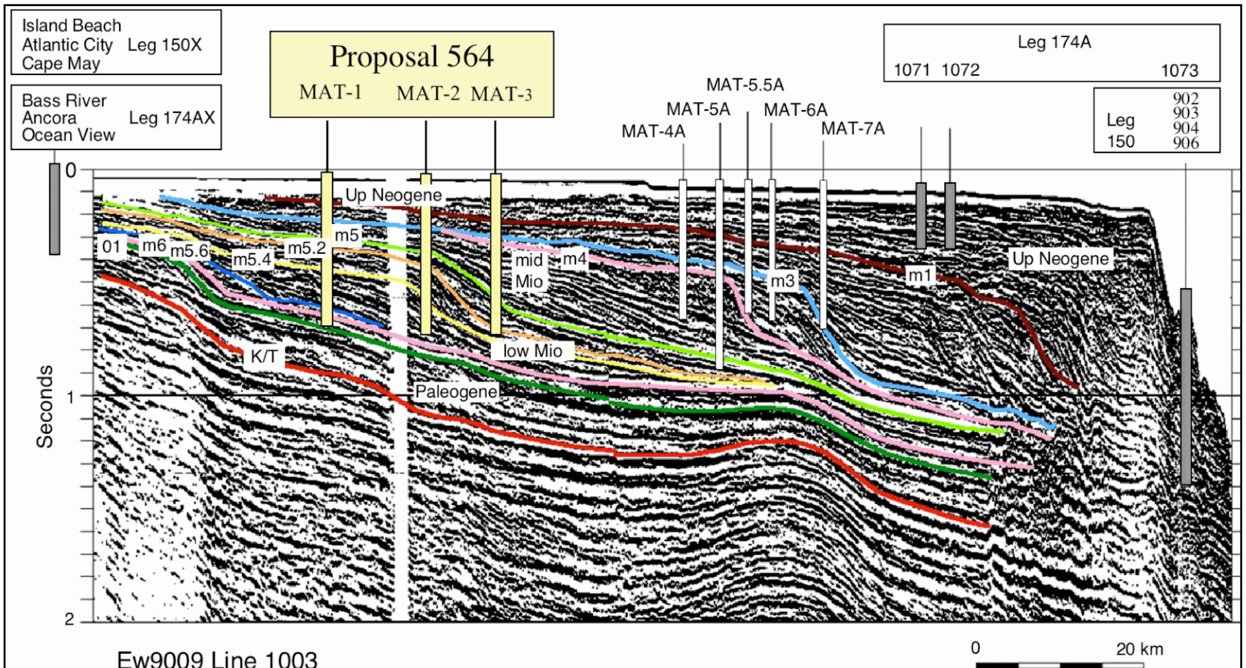

Fig. 4 – Ew9009 Line 1003 through proposed sites MAT 1, 2 and 3 (yellow sub-seafloor columns; see Fig. 2 for location). Generalized locations of ODP boreholes onshore and offshore (gray columns) and previously proposed but undrilled MAT sites 4A-7A (white columns) are also shown. Several key surfaces (colored lines; K/T ~65 Ma, o1 ~33.5 Ma, m5 ~16.5 Ma, m4 ~14 Ma, m3 ~13.5 Ma, and m1 ~11.5 Ma) have been traced from the inner shelf to the slope. The clinoform shape of sediments bracketed by these unconformities is thought to be the result of large sea-level fluctuations (Vail and Mitchum, 1977).

1) date major "Icehouse" (Oligocene-Recent) sequences, a time of known glacioeustatic change (Miller et al., 1991), and compare ages of the unconformable surfaces bracketing these sequences with ages of sea-level lowerings predicted by the $\delta^{18}O$ glacioeustatic proxy;
2) estimate the amplitudes, rates, and mechanisms of sea-level change; and
3) evaluate sequence stratigraphic facies models (e.g., systems tracts; Posamentier et al., 1988) that predict depositional environments, sediment compositions, and stratal geometries in response to sea-level changes.

Drilling into the New Jersey Slope (ODP Sites 902-904, 1073) and the Coastal Plain (Island Beach, Atlantic City, Cape May, Bass River, Ancora, Oceanview, Bethany Beach, Millvile, Fort Mott, Sea Girt and Cape May Zoo) has provided a chronology for sea-level changes over the past 100 m.y. (Miller et al., 1996b, 1998a, 2005a). Sequence boundaries from 10-42 m.y. have been shown to correlate (within ±0.5 m.y.): 1) both regionally (onshore-offshore) and interregionally (New Jersey-Alabama-Bahamas); and 2) with glacioeustatic lowerings inferred from the $\delta^{18}O$ record (**Fig. 5**). These correlations establish a firm link between late middle Eocene to middle

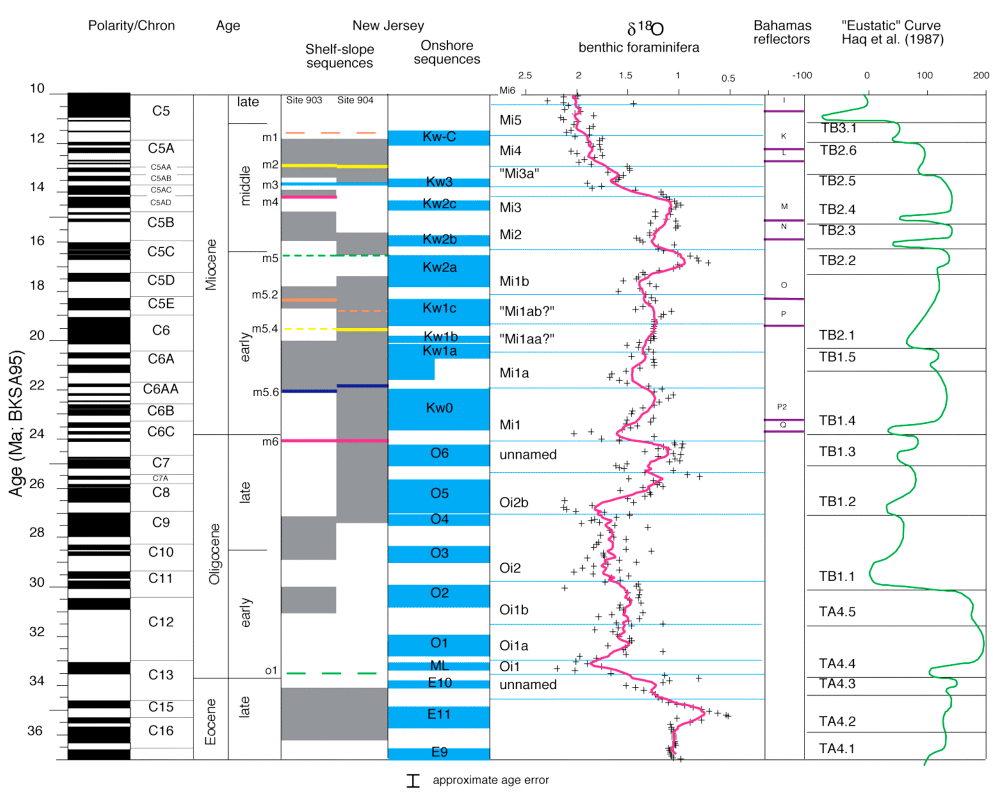

Fig. 5 - Comparison of Oligocene-Miocene slope sequences, onshore sequences, oxygen isotopes, Bahamian reflections (Eberli, Swart, Malone, et al., 1997), and the inferred eustatic record of Haq et al. (1987). After Miller et al. (1998a).

Miocene glacioeustatic change and margin erosion on the m.y. scale. Oxygen isotopic studies of slope Site 904 provide *prima facie* evidence for a causal connection between Miocene $\delta^{18}O$ increases (inferred glacioeustatic falls) and sequence boundaries (Miller et al., 1998a). Results from the New Jersey Transect findings are consistent with the general number and timing of Late Cretaceous to middle Miocene sequences initially published by Exxon (Vail and Mitchum, 1977), although the Exxon group's sea-level amplitudes are substantially higher than indicated in New Jersey studies (Miller et al., 1996b, 1998a; 2005a; Van Sickle et al., 2004).

Aided by easier access to older strata than is found downdip/offshore, New Jersey Coastal Plain drilling (Miller et al., 1994, 1996; Miller, Sugarman, Browning, et al., 1998, in prep.) has addressed an additional goal: to evaluate "Greenhouse" (Cretaceous to Eocene) sequences and their relationships to global sea-level changes. One surprising result has been to extend the history of ice sheets back to a time previously considered to be ice-free (Late Cretaceous middle Eocene, Browning et al., 1996; mid-Maastrichtian, Miller, et al., 1999b). Late Cretaceous to middle Eocene comparisons of onshore hiatuses/sequence boundaries and $\delta^{18}O$ indicate that growth and decay of small ice sheets (<30 m sea-level equivalent) also occurred in this supposedly ice-free world (Browning et al., 1996; Miller et al., 1998a, 2003, 2005a,b).

ODP drilling in the Bahamas (ODP Leg 166 and supplementary platform drilling; Eberli, Swart, Malone, et al., 1997) complements the results from New Jersey by providing a chronology of baselevel lowerings (**Fig. 5**) and an evaluation of carbonate prograding sequences. Integration of results from the NJ and Bahamas margins suggests that the approaches outlined by COSODII (Imbrie et al., 1987) and the JOIDES Sea Level Working group (1992) are valid because it:

1) proved the age of sequence boundaries on margins can be determined to better than ±0.5 m.y.;
2) validated the "transect" approach of drilling passive continental margins (arrays of holes - onshore, shelf, slope);
3) showed that the siliciclastic New Jersey and carbonate Bahamas margins yield correlatable records of base-level change, as deduced from definitions of the chronostratigraphy of seismically-observed stratal discontinuities; and
4) achieved orbital-scale stratigraphic resolution on continental slopes and carbonate platforms.

Despite these advances in dating sequences and linking them to glacioeustasy, there are major gaps in our understanding of the amplitudes, of the response of sedimentation, and of the mechanisms that drive eustatic change. Only by drilling the region most sensitive to sea-level change, the paleo-nearshore zone to inner shelf region, can these gaps be filled.

The Optimal Locations of MAT1, 2 and 3. The region between the paleo-shoreline and the paleo-inner to middle shelf is the most sensitive region for studying past sea-level variations, and <u>must</u> be sampled to obtain estimates of eustatic amplitudes. Reliability of these estimates depends on the precision of paleowater depths determined by lithologic and benthic foraminiferal criteria. Both of these are optimal indicators in nearshore to middle neritic facies, but become less precise in facies deeper than middle neritic (>100 m) paleodepths (see examples in Miller and Snyder, 1997). Sections deposited in nearshore to inner neritic environments (< 30 m) are difficult to date, even though the facies associations may be clearer and the paleodepth resolution is best. Work onshore New Jersey has shown that the best results can be obtained by targeting sequences deposited between 0 and 60 m paleodepth (Kominz and Pekar, 2001). Following these guidelines as well as concepts developed by the JOIDES Sea Level Working Group (1992), the ideal drilling locations are outlined in **Fig. 6**.

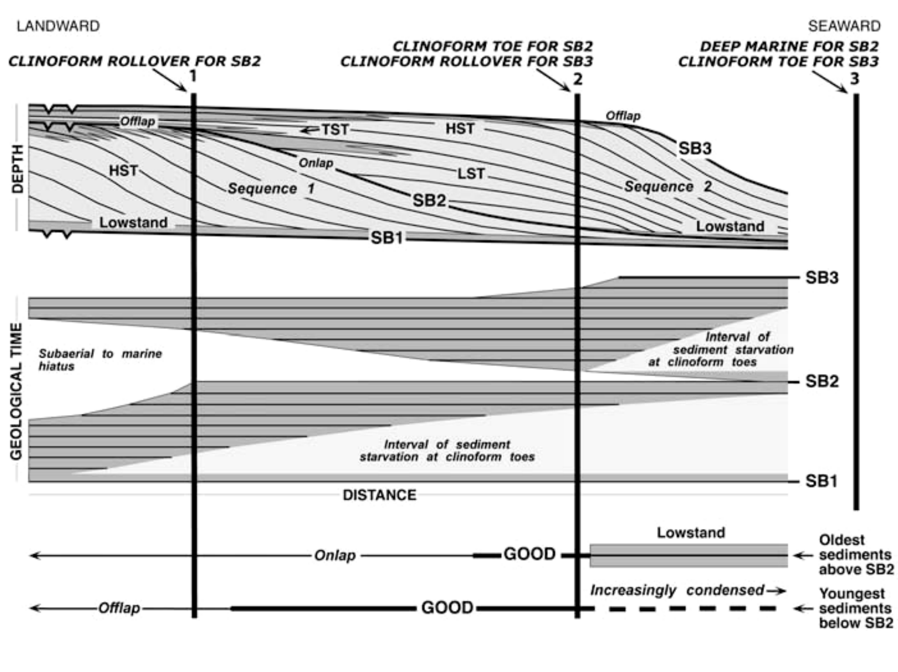

Fig. 6 – Idealized locations of a 3-hole transect to determine the time and magnitude of the baselevel fall associated with sequence boundary 'SB2'. This transect will sample: the youngest sediments below SB2 (site 1); the oldest sediments above SB2 (site 2); and more distal sediments above SB2 to ensure dateable material and provide additional backstripping information (site 3). Bio- and lithofacies will evaluate predicted models of clinoform evolution. Due to the stacked arrangement of sequences offshore NJ, several clinoforms can be sampled at one location.

Sites MAT1-3 target upper Oligocene to Middle Miocene seismically imaged prograding clinoforms that were deposited in inner-middle neritic paleodepths (based on coeval onshore strata deposited in nearshore/prodelta settings). We have obtained excellent seismic images of these clinoforms (**Fig. 7**) across the regions that record the full amplitude of sea-level change: immediately landward of and near the toes of the clinoforms (i.e., across the clinoform inflection point). Modern water depths at MAT1-3 are ~34 m (**Fig. 8**; **Table 1**), a fortunate "crossover" depth between getting too far landward for detailed control on sequence geometry (i.e., thorough seismic control on land is not possible), and too far seaward for affordable commercial drill rigs (the cost of a jack-up increases dramatically beyond 40 m of water). Leg 174A shelf drilling (Austin, Christie-Blick, Malone, et al., 1998) targeted similar upper Miocene-Pliocene clinoforms beneath the modern outer shelf, demonstrated that the multiple-site transect strategy is valid, and recovered lagoonal facies ~3 km landward of a late Miocene clinoform edge. Further success by Leg 174A was limited by unstable hole conditions that led to moderate to poor recovery and the inability to reach shelf samples older than ~12 Ma. Proposed shelf Sites MAT 1-3 are ideally located to sample numerous sequence boundaries across their respective clinoform inflection points and to test the amplitudes of, and facies models for, late Oligocene to middle Miocene sea-level changes (i.e., sequence--bounding lower Miocene reflections m6 (24. 0 Ma, m5.6 (22.0 Ma), m5.4 (19.5 Ma), m5.2 (18.3 Ma), and m5.0 (16.6 Ma) and at least 2 unnamed upper Oligocene reflections; Monteverde et al., 2000).

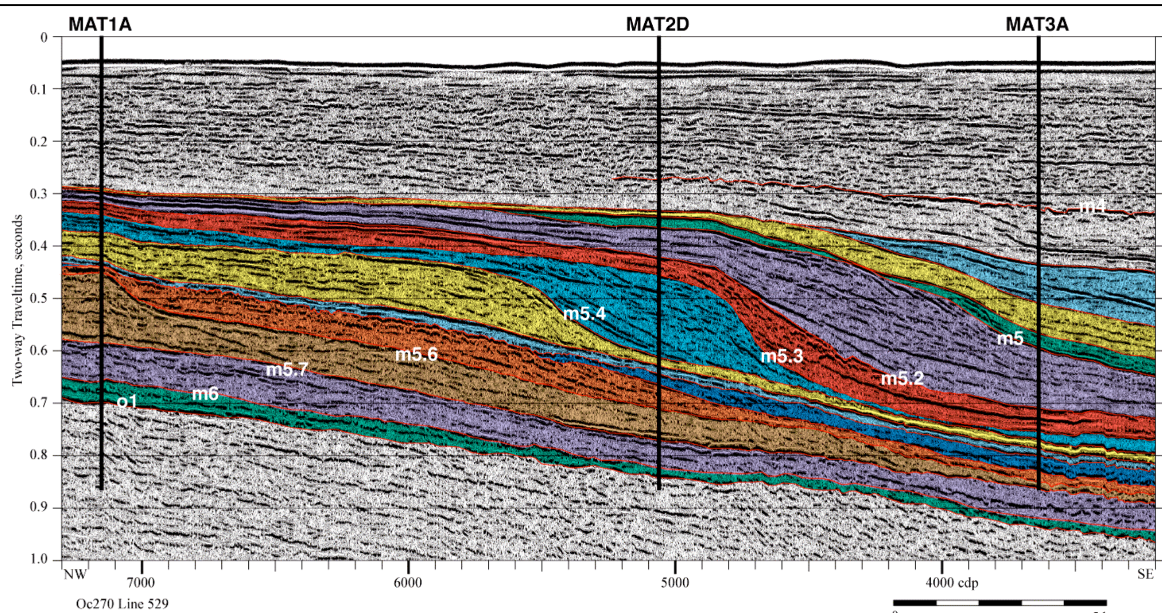

Fig. 7 – Oc270 dip line 529 passes through primary sites MAT-1A, -2D and -3A and reveals several mid- to lower Miocene clinoforms (color) and sequence boundaries (white labels). Drilling will evalauate these predictions, determine the relationship of clinoform evolution to facies distribution, and establish links between depositional geometry, sediment character, and changes in eustatic sea level.

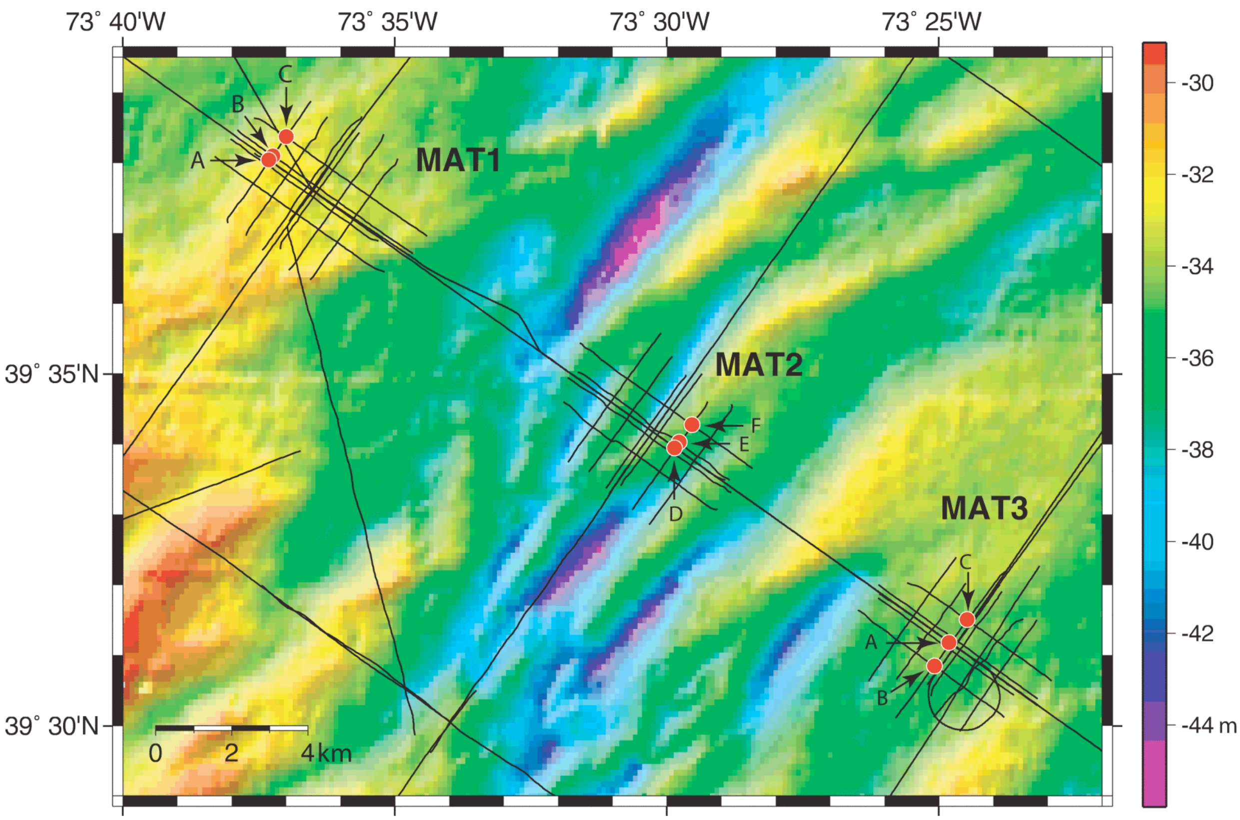

Fig. 8 - Bathymetry and MCS profiles in the vicinity of proposed Sites MAT-1, 2 and 3. Colors correspond to water depths as indicated in m-scale at right. Primary sites MAT-1A, MAT-2D and MAT-3A lie on Oc270 dip line 529 (Fig, 7) as well as on the center line of each detailed seismic grid from cruise CH0698. Alternate sites are at crossings of CH0698 profiles in each grid.

Site	Dip Profile Cruise - Line	CDP	Strike Profile Cruise - Line	CDP	Latitude °N	Long °W	WD, m
MAT-1A	**CH0698 - 107**	**11165**	**CH0698 - 102**	**5704**	**39.634091**	**-73.621646**	**32**
MAT-1B	CH0698 - 109	9002	CH0698 - 102	5724	39.635066	-73.620800	32
MAT-1C	CH0698 - 113	6983	CH0698 - 102	5820	39.639419	-73.616619	32
MAT-2D	**CH0698 - 207**	**11390**	**CH0698 - 218**	**4274**	**39.565720**	**-73.497266**	**35**
MAT-2E	CH0698 - 209	8618	CH0698 - 218	4244	39.567083	-73.496050	35
MAT-2F	CH0698 - 213	10640	CH0698 - 218	4148	39.571200	-73.492317	34
MAT-3A	**CH0698 - 307**	**10997**	**CH0698 - 310**	**4613**	**39.519533**	**-73.413238**	**34**
MAT-3B	CH0698 - 301	10032	CH0698 - 310	4736	39.514094	-73.418144	34
MAT-3C	CH0698 - 313	6944	CH0698 - 310	4490	39.525037	-73.408025	34

Table 1 – Primary (bold) and alternate sites are located at intersecting profiles noted by line number and common depth point (CDP). Latitude, longitude and water depth are listed.

Provide a testable record of eustatic variations. Backstripping is a proven method for extracting amplitudes of global sea level from passive margin records (e.g., Watts and Steckler, 1979). One-dimensional backstripping is a technique that progressively removes the effects of sediment loading (including the effects of compaction) and paleowater depth from basin subsidence. By modeling thermal subsidence on a passive margin, the tectonic portion of subsidence can be assessed and a eustatic estimate obtained (Kominz et al., 1998). Backstripping requires knowing relatively precise ages, paleodepths, and porosities of sediments, and each of these criteria are best obtained from borehole transects; such transects also allow application of two-dimensional backstripping techniques that account for lithospheric flexural effects, increasing the precision of the eustatic estimates (Steckler et al., 1999; Kominz and Pekar, 2001). The eustatic component obtained from backstripping needs to be verified by comparing sea-level records with other margins and those derived from δ^{18}O estimates.

Drilling at MAT1-3 will allow us to make precise late Oligocene to early middle Miocene eustatic estimates using one and two-dimensional backstripping as described above. One- (Kominz et al., 1998; Van Sickle et al., 2004) and two-dimensional (Kominz and Pekar, 2001) backstripping of onshore New Jersey sites has provided preliminary amplitude estimates of 10-60 m for m.y.-scale variations, but the estimates are incomplete, particularly for the Miocene, because most lowstand deposits are generally not represented (Miller et al., 1998a; Miller et al., 2005a; **Fig. 2**). Amplitude estimates derived from δ^{18}O studies require assumptions about temperature and the sea-level/δ_W calibration; although these assumptions are large, initial eustatic estimates based on δ^{18}O records are consistent with backstripping results (**Fig. 2**). Sites MAT1-3 are precisely located to recover as nearly a complete set of late Oligocene-middle Miocene sequences as possible and, through backstripping, provide a much more direct measure of the full range of amplitudes for this time interval.

Once we have obtained precise eustatic estimates from late Oligocene to early middle Miocene records at MAT1-3, we will be able to extend our results to the older and younger records. Middle Miocene through Recent sediments record similar clinoform geometries on the New Jersey shelf; by applying calibrations of seismic profiles and facies developed as part of this work, we should be able to derive eustatic estimates for the interval 16-0 Ma. In particular, deriving a firm, independent eustatic estimate from margin sediments will: 1) allow us to test temperature assumptions needed to make a glacioeustatic estimate from $\delta^{18}O$ records (**Fig. 2**); and 2) provide an estimate of the Tertiary sea-level/δ_W calibration and evaluate the Pekar (1999) and Pekar, et al., 2002 calibration of 0.09 ‰/10 m (vs. 0.11‰/10 m for the late Pleistocene) that was based on backstripping an incomplete coastal plain record. Whereas both backstripping and $\delta^{18}O$ methods have inherently large assumptions, the convergence of the two methods (**Fig. 2**) suggests that we will be able to produce a testable eustatic model for the past 42 m.y., and perhaps for the older record as well.

Test models of sedimentation on siliciclastic shelves. Shallow-water records contain unconformities observed in outcrop or in the subsurface at all spatial scales, whether they divide beds or basins. Unconformably bounded sequences are the fundamental building blocks of the shallow-water record (Sloss, 1963; Van Wagoner et al., 1990; Christie-Blick, 1991). Researchers at EPR (Vail et al., 1977, Haq et al., 1987, Van Wagoner et al., 1988; Posamentier et al., 1988) claimed that similarities in the ages of stratal unconformities pointed to global sea-level (eustasy) as the overriding control. The resulting "eustatic curve" has remained controversial (e.g., Miall, 1991; Christie-Blick et al., 1990) largely because of basic assumptions about the stratigraphic response to eustatic change, and because the work relies in part on unpublished data. In response to this controversy, Christie-Blick and Driscoll (1995), among others, pointed out that the fundamental enterprise of interpreting the origin of layered rocks does not really require any assumptions about eustasy. They emphasized that sequence boundaries attest to changes in depositional baselevel. The timing of many of the EPR sequence boundaries have been validated onshore NJ and correlated to the $\delta^{18}O$ proxy of eustatic change (Miller et al., 1998, 2005a), though other sequence boundaries on this and other margins be tectonically derived. Whether or not sequence boundaries are caused by changes in eustasy, local tectonism, or sediment supply (Reynolds et al., 1991), disconformable surfaces irrefutably divide the shallow water record into sequences. Whatever their cause, these stratal breaks are real and they provide an objective means of analyzing the rock record.

Facies between sequence boundaries vary in a coherent fashion and various facies models have been proposed for shelf sedimentation (e.g., Posamentier et al., 1988; Galloway, 1989). Much work has been done by the exploration and academic communities in testing and applying these models, and much has been learned. For example, flooding surfaces (particularly maximum flooding surfaces) can be used to unravel stratigraphic stacking patterns (e.g., Van Wagoner, 1987; Galloway, 1989), while highstand deposits are generally regressive and are often reservoirs for oil or water resources (e.g., Posamentier et al., 1988; Greenlee et al., 1992; Sugarman and Miller, 1997; Sugarman et al., in press). Nonetheless, predictions of facies models have not been widely successful because they are the products of many unevaluated processes (Reynolds et al., 1991).

One major reason that models are still poorly constrained is that there has been no publicly available study of continuous cores across a prograding clinoform deposit that constitutes the central element of many facies models. As a result, the water depths in which clinoforms form and the distribution of lithofacies they contain are poorly known. It is widely debated whether or not clinoform tops ever become subaerially exposed during sea-level lowstands, and whether or not the shoreline ever retreats to (or even moves seaward of) the clinoform rollover (Fulthorpe and Austin, 1998; Austin, Christie-Blick, and Malone, et al., 1998; Steckler, et al., 1999; Fulthorpe et al., 1999). Settling these controversies will have significant implications on our understanding of how sequence boundaries develop and how much of the facies distribution within clinoforms can be attributed to eustasy. Some workers assume that the shoreline is always located at the clinoform rollover (e.g., Posamentier et al., 1988; Van Wagoner, 1990; Lawrence et al., 1990). Others have presented models of basin evolution that suggest the shoreline and the clinoform rollover can move independent of each other (e.g., Steckler et al., 1993; Steckler et al., 1999). The sea-level estimates of Greenlee and Moore (1988) argue that sea-level falls expose an entire continental shelf and that strata onlapping clinoform fronts are coastal plain sediments deposited during the beginning of the subsequent sea-level rise. Many researchers (e.g., Steckler et al., 1993) stress that if strata onlapping clinoform fronts were deposited at or near sea level, then the clinoform heights dictate that sea level occasionally fell hundreds of meters in less than a million years; such magnitudes and rates are beyond the reasonable scales of any known mechanism for eustatic change. Extracting the amplitude of sea-level fluctuations from sequence architecture is critically dependent on whether the lowest point of onlap onto sequence boundaries is truly coastal or is deeper marine. Determining water depths at the clinoform edge is essential to sequence stratigraphic models and understanding of this basic element of the dynamic land-sea interface. It can only be established by sampling, such as proposed here.

OPERATIONS

We propose to use a mission-specific, industry-standard "small" jack-up rig that is well suited to coring and logging the New Jersey inner shelf. Jack-up rigs are barges (self-propelled or otherwise) with 3 or 4 legs that are hydraulically lowered to the ocean floor. Small jack-up rigs typically have a 200,000 lb live deckload capability, work around-the-clock, have a maximum working depth of 40 m, and can house 30 persons including a 5-person crew and 8-person drilling team. They are relatively insensitive to sea conditions when raised ten or more feet above the sea surface; sea-states off New Jersey in the May-October weather window are generally excellent for setting the rig. Advantages of small jack-up rigs, in addition to the stability of this fixed platform, include relatively low costs (vs. semi-submersibles, dynamically-positioned drillships, or large jack-up rigs), ability to set casing to total depth (vs. the JOIDES *Resolution*), and ready availability (vs. semi-submersibles, which are currently in high demand). Target depths at MAT 1, 2, and 3 are 2500 ft (~750 m), which should reach into the Paleogene (MAT 1), the upper Eocene (MAT 2), and the base of the Miocene (MAT 3). Experience onshore suggests that a 2500 ft borehole could be drilled in 25 days, although this is only an estimate.

Experience at onshore wells has shown that excellent recovery (>96% at Ancora; Miller, Sugarman, Browning, et al., 1999) can be obtained in these sediments. One can expect challenges of loose, coarse-grained intervals such as the "Atlantic City 800-foot sand" that were consistently encountered onshore. Drilling at Leg 150X and Leg 174AX sites showed that the key to a stable hole is to case off the surficial sands (typically to ca. 20 m depth) and to follow this with casing of the "Atlantic City 800-foot sand" (expected at roughly 305, 320 and 335 m at MAT 1, MAT 2, and MAT 3, respectively). Core length should be determined by hole conditions; shorter core barrels in intervals of critical contacts are desirable.

We expect that unstable hole conditions will make it very time-consuming, if not impossible, to lower wireline logging tools to the bottom of each hole. Consequently, we strongly advocate Logging-While-Drilling (LWD) in its place. While this latter suite of tools may not provide the range of imaging or the quality of sonic data that can be acquired by wireline techniques under ideal conditions, it will still be very valuable. The large advantage of LWD is that as long as a hole can be drilled, *in situ* grain size, porosity, density, clay type, fabric and bedding can be measured. This has two significant benefits: one that is operational, the other scientific First, LWD provides useful information to the driller before coring is attempted, and as a result, to optimize recovery we suggest LWD operations should precede all coring. This will give the driller as much information as possible concerning the location and character of intervals that could benefit from special coring techniques. Second, the depth, character, and stratal position of surfaces and formation features these log data reveal will provide correlation to the recovered cores and core-log data obtained from the multi-sensor track (MST; magnetic susceptibility (MS) and Natural Gamma Ray (NGR)). Furthermore, the porosity data will be an extremely important component of backstripping calculations that will be used to calculate eustasy. Core/core-log/downhole-log integration should help to establish the sedimentary response to sea-level changes. Synthetic seismograms will be computed to provide for the correlation of features seen in seismic profiles to surfaces found in cores and/or logs. Finally, downhole log data will provide information from intervals where core recovery is limited. As was done on Leg 174A, we propose to use a single-component geophone clamped to the borehole wall at multiple depth intervals to record air gun signals from the sea surface. These "check-shot" data will provide a sure way of establishing the critical time-to-depth link between seismic and borehole observations.

Site Assessment. Setting a ~2 million-lb rig down on the seafloor requires seabed assessment to establish sediment type, local topography, and proximity to any seafloor artifacts or natural sub-seafloor anomalies. Data relevant to each of these have been collected; additional information may be acquired by the operator prior to drilling. Three MCS surveys have crossed directly over all 3 primary MAT sites (**Figs. 3, 7,** and **8**). A reconnaissance grid using a 120-channel, 6-airgun system aboard the *R/V Ewing* in 1990 was the first demonstration that Oligocene-Miocene clinoforms were well developed at this location (**Fig. 4**); the *R/V Oceanus* returned with 48-

channel, GI-gun, HiRes equipment in 1995 and collected remarkably improved images of these same features along line 529 (**Fig. 7**). The *R/V Cape Hatteras* used identical HiRes gear in 1998 to concentrate on three grids of 150-600 m line spacing designed to provide detailed control on clinoform geometries as well as to meet the Guidelines established by the JOIDES Safety and Pollution Prevention Panel (JOIDES, 1994). These data can locate subsurface features that may pose a hazard to drilling (amplitude anomalies suggesting trapped gas; faults that could serve as conduits for deep-seated hydrocarbons, or indicators of unstable settings for a jack-up rig). A Simrad EM1000 swath-bathymetry/acoustic backscatter survey passed over the proposed drillsites during an ONR-supported STRATAFORM study in 1996 (**Fig. 8**); JOI/USSAC supported the collection of additional Simrad EM3000 data over MAT1-3 in June 1999 (J. Goff, N. Driscoll, pers. comm.). Grab samples within a few hundred m of all 3 primary sites were collected during this same cruise (J. Goff, pers. comm.). These site-assessment data have been processed, mapped, interpreted, and provided to the IODP Safety panel (EPSP) for its comment and input, and an evaluation of hazards posed by sub-surface gas has been completed an independent contractor. All primary and alternate sites (**Table 1**) have been approved by both.

SIGNIFICANCE

Advancing knowledge of the history and impact of eustatic change is a formidable but tractable task. Prior work at the New Jersey margin has proven that transects of continuously cored and logged boreholes, carefully positioned within shallow-water facies of a passive continental margin, are an effective strategy. These efforts have fallen short of their goals because of a lack of a shallow-water drilling platform. We have selected three sites that build on this earlier work, and with management by the Mission-Specific Platforms Operator of the IODP, the appropriate platform and drilling tools can be located and employed. Coring and logging Sites MAT1-3 will provide estimates of eustatic amplitudes, generate a testable record of eustatic variations, and evaluate models that predict the nature and distribution of facies in passive margin strata. It is time that these goals, developed during the era of the ODP, and incorporated in the Science Plan of the IODP, have a chance to be realized.

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1983	Chief Scientist - *CONRAD 2405*, multichannel seismic profiling, Morocco continental margin
1983	Sedimentologist - *GLOMAR CHALLENGER Leg 95*, stratigraphy, eustatic record of the NJ continental margin
1984	Co-Chief Scientist - *CONRAD 2502*, single channel seismic profiling, SEABEAM bathymetry, Hudson Canyon and Hudson Fan
1984	Chief Scientist - *CONRAD 2512*, piston coring, single channel seismic profiling, Bermuda Rise
1986	Co-Chief Scientist - *CONRAD 2704*, piston coring, single channel seismic profiling and SEABEAM bathymetry, Indus Fan and Oman continental margin
1989	Participant - *ATLANTIS II 120-02*, piston coring, *ALVIN* diving, NJ slope

1990 Chief Scientist - *EWING 9009,* single and multichannel seismic profiling, Hydrosweep bathymetry, NJ continental margin
1992 Co-Chief Scientist - *EWING 9209*, single channel seismic profiling, Hydrosweep bathymetry, piston coring, Ceara Rise
1993 Co-Chief Scientist - *JOIDES Resolution* ODP Leg 150, stratigraphic record of sea-level change, NJ continental margin
1995 Co-Chief Scientist - *OCEANUS 270*, HiRes multichannel seismic profiling, NJ continental margin
1996 Chief Scientist - *WECOMA 9605,* HiRes multichannel seismic profiling, northern California continental margin
1997 Logging Scientist - *JOIDES Resolution* ODP Leg 174A, stratigraphic record of sea-level change, NJ continental margin
1998 Chief Scientist - *CAPE HATTERAS 0698*, HiRes multichannel seismic profiling, NJ inner shelf
1998 Participant - *Marion Dufresne II 99-2*, long piston coring, NJ shelf
1998 Participant - *Le Suroit*, HiRes multichannel seismic profiling, Side-Scan, vibracoring Rhone margin
2001 Chief Scientist - *Knorr 165*, testing shallow-water drilling, New England shelf
2002 Chief Scientist - *Endeavor 370*, HiRes multichannel seismic plus towed Chirp sonar profiling, vibracoring, New Jersey continental margin
2002 Chief Scientist - *Knorr 166*, HiRes multichannel seismic profiling, Seabeam bathymetry and backscatter, jumbo piston coring, Gardar and Eirik Drifts

Other Professional Activities:

1984 Member, DSDP Sedimentary Petrology and Physical Properties Panel
1988 Lecturer, Rutgers Univ., up.-level undergraduate course entitled "*Stratigraphy*"
1988 Co-convener (with J. Watkins, Texas A&M Univ.) JOI/USSAC wkshp on "The Role of ODP Drilling in the Investigation of Global Changes in Sea Level", El Paso, TX
1988-89 Chairman, JOIDES Site Survey Panel
1991-92 Member, JOIDES Sea Level Working Group
1991 Editor, "*Advisory Panel Report on Earth System History*" (NSF)
1991 Invited Speaker, "Sea Level Before the Greenhouse: establishing the eustatic baseline", 1st Tues. Lecture Series, JOI, Inc., Washington, DC
1992-95 Member, JOIDES Site Survey Panel
1993 Manager (Temporary), JOIDES Site Survey Data Bank
1995 Member, NSF/MG&G Proposal Review Panel
1995 Member, JOI/USSAC Advisory Panel
1995-97 Member, JOIDES Planning Committee
1995-98 Member, Lamont-Doherty Executive Committee
1996 Invited Speaker, "OD21: Riser Drilling into Continental Margins", Intn'tl Conf. on Ocean Drilling in the 21st Century, JAMSTEC, Hayama, Japan
1997 Convener, JOI/USSAC wkshp on "Marine Coring at Margins", Palisades, NY
1997 Invited Speaker, "Seismic Stratigraphy: Sound Bytes of the Solid Earth", U.S.-Korea Conf. on Ocean Science and Technology, The Inst. of Public Policy, Arlington VA
1997-99 Alternate, JOIDES Science Committee
1998-00 Co-Chair, JOIDES Shallow-Water Drilling Program Planning Group
2001 Member, Steering Committee, "JEODI Workshop on Alternate Platform Drilling", Lisbon, Portugal
2002 JOI/USSAC Distinguished Lecturer, "The Ups and Downs of Determining Ancient Sea-Level Change"
2003 Co-convener (with J. Gee, Scripps) JOI/USSAC wkshp on "Ocean Drilling and Site Survey Introduction", San Francisco, CA
2003 - Member, JOI/USSAC Advisory Committee
2004 - Member, DOSSEC Drilling Safety Review Panel

Collaborators

J. Austin, C. Fulthorpe (both UTIG), K. Miller, R. Sheridan, J. Wright, J. Browning (all Rutgers), J. Damuth (UT), P. Flemings (PSU), M. Kominz (W. Michigan U.), C. McHugh (CCNY), P. Sugarman (NJ Geol. Surv.)

Graduate and Post Doctoral Advisors

B. Tucholke (WHOI), C. Wylie Poag and J. Schlee (both USGS)

Thesis Advisor and Postgraduate-Scholar Sponsor

advisor to: D. Monteverde, R. Earley, J. Uptegrove,(all Rutgers)
thesis committee mbr. to: S. Pekar, H. Li, X. Comas, S. Henderson, A. Kulpecz (all Rutgers)

Biographical Sketch

Kenneth G. Miller
Stratigrapher/Micropaleontologist
Department of Geological Sciences, Wright Lab Room 246, 610 Taylor Road,
Rutgers, The State University of New Jersey, Piscataway, NJ 08854
Phone: (732) 445-3622 FAX: (732) 445-3374 e-mail: kgm@rci.rutgers.edu
Birthdate: June 28, 1956 Family Status: Married to Karen Clark Miller

Education:

1982, Ph.D., Massachusetts Institute of Technology/Woods Hole Oceanographic Institution Joint Program in Oceanography, Marine Geology and Geophysics.
1978, A.B., Rutgers College, Geological Sciences.

Appointments

2000-2006 Chair, Department of Geological Sciences, Graduate Director, Director of the Geology Museum, and Co-Director Rutgers Core Repository, Rutgers University, New Brunswick.
2000-present, Professor II, Rutgers University, New Brunswick.
2000 Acting Chair, Department of Geological Sciences, Rutgers University, New Brunswick.
1993-2000, Professor I, Rutgers University, New Brunswick.
1993-2001, Adjunct Senior Research Scientist, Lamont-Doherty Earth Observatory.
1996-2002. Vice Chair, Department of Geological Sciences.
1998 Cruise, Co-chief scientist R/V *Cape Hatteras,* multi- and single channel seismics.
1993-2003 Chief scientist, Coastal Plain Drilling Project, ODP Legs 150X & 174AX: Is. Beach (1993), Atlantic City (1993), Cape May (1994), Bass River (1996), Ancora (1998), Ocean View (1999), Bethany Beach (2000), Fort Mott (2001), Millville (2002), Sea Girt (2003), Cape May Zoo (2004).
1993 Co-chief scientist, Ocean Drilling Program Leg 150, New Jersey Sea-level Transect.
1988-1993 Adjunct Research Scientist, Lamont-Doherty Earth Observatory.
1988-1993 Associate Professor, Rutgers University, New Brunswick.
1990 Cruise, Co-chief scientist R/V *Maurice Ewing*, multi- and single channel seismics.
1989 Cruises, Co-chief scientist R/V *Atlantis II* 120 and 124, Alvin diving and piston coring.
1983-1988 Associate Research Scientist, Lamont-Doherty Geological Observatory.
1984 Cruise, Co-chief scientist R/V *Conrad*, single channel water-gun seismics & piston coring.
1984-1986 Visiting Lecturer, Rutgers University, Newark College of Arts and Sciences.
1982-1983 Post-doctoral fellow, Lamont-Doherty Geological Observatory.
1983 Cruise, Paleontologist, DSDV *Glomar Challenger*, Leg 95, The New Jersey Transect.
1978-1982 Graduate research assistant, Woods Hole Oceanographic Institution.

Academic Awards: 2003. Rosenstiel Award, University of Miami; 1995. JOI/USSAC Distinguished Lecturer; 1983. ARCO scholar, Lamont-Doherty Geological Observatory; 1982-1983. Lamont-Doherty Geological Observatory post-doctoral fellowship; 1980. Phillips Petroleum Graduate Fellowship; 1978. Graduated from Rutgers College highest honors (third in a class of 1500).

Research Interests: Foraminiferal stable isotope stratigraphy and paleoceanography; Foraminiferal biostratigraphy, paleoecology, and paleobiogeography; Seismic and sequence stratigraphy of passive margins and the deep sea.; Cenozoic sea-level and paleoceanographic changes: integration of isotopic, bio-, magneto-, and seismic stratigraphic evidence.

Professional Societies: Member American Geophysical Union; Fellow Geological Society of America; Member AAAS; Patron Cushman Foundation Member NAMS.

Editorial Boards 1995-present. Associate Editor, *Journal Sedimentary Research;* 1989-present. Associate Editor, *Palaios*. 1986-1991, 1996-present. Associate Editor, *Paleoceanography*; 1992-1995. Editor, *Paleoceanography*; 1990-1992. Associate Editor, *Geological Society of America Bulletin*. 1988-1992. Associate Editor, *Marine Micropaleontology*.

Ten Significant Publications

Miller, K.G. and Fairbanks, R.G., Oligocene to Miocene global carbon isotope cycles and abyssal circulation changes, In: Sundquist, E.T., and W.S. Broecker, eds., *Am. Geophys. Un., Geophys. Monograph 32,* 469-486, 1985.

Miller, K.G., Fairbanks, R.G., and Mountain, G.S., Tertiary oxygen isotope synthesis, sea-level history, and continental margin erosion, *Paleoceanography, 2,* 1-19, 1987.
Miller, K.G., Wright, J.D., and Fairbanks, R.G., Unlocking the Ice House: Oligocene-Miocene oxygen isotopes, eustasy, and margin erosion, *J. Geophy. Res., 96,* 6829-6848, 1991.
Miller, K.G., Mountain, G.S., the Leg 150 Shipboard Party, and Members of the New Jersey Coastal Plain Drilling Project, Drilling and dating New Jersey Oligocene-Miocene sequences: ice volume, global sea level, and Exxon records, *Science*, *271,* 1092-1094, 1996.
Miller, K. G., Sugarman, P. J., Browning, J. V., Kominz, M. A., Hernandez, J. C., Olsson, R. K., Wright, J.D., Feigenson, M.D., and Van Sickel, W., A chronology of Late Cretaceous sequences and sea-level history: Glacioeustasy during the Greenhouse World. *Geology*, *31*, 585-588, 2003.
Miller, K. G., Kominz, M. A., Browning, J. V., Wright, J.D., Mountain, G.S., Katz, M.E., Sugarman, P. J., Cramer, B.S., Christie-Blick, N., Pekar, S.F., The Phanerozoic record of global sea-level change, submitted to Science 6/20/2005.
Miller, K.G., Browning, J.V., Sugarman, P.J., et al., 2002. 174AS leg summary: sequences, sea level, tectonics, and aquifer resources: coastal plain drilling. *In* Miller, K.G., Sugarman, P.J., Browning, J.V., et al., *Proc. ODP, Init. Repts*., 174AX (Suppl.): 1–40.
Miller, K.G., The role of ODP in understanding the causes and effects of global Sea-Level change, Accomplishments and Opportunities of the ODP, *JOIDES Journal,* 28(1), 23-28, 2002.
Miller, K. G., Sugarman, P. J., Browning, J. V., Kominz, M. A., Olsson, R. K., Feigenson, M.D., Hernandez, J. C., Upper Cretaceous Sequences and Sea-level History, New Jersey Coastal Plain, *GSA Bulletin*, v. 116, 3/4; 368–393, 2004.
Browning, J.V. Miller, K.G, McLaughlin, P.P., Kominz, M.A., Sugarman, P.J., Monteverde, D., Feigenson, M.D., and Hernandez, J.C., Quantification of the effects of eustasy, subsidence, and sediment supply on Miocene sequences, U.S. Mid-Atlantic Margin, GSA Bull., in press.

Collaborators: M.-P. Aubry, T. Bralower, M.E. Katz, G. Mountain, D. Kent, R. Fairbanks, M. Kominz, D. McNeil, R. Olsson, R. Sheridan, L. Burckle, M. Feigenson, D. Bukry

Graduate advisors: B. Tucholke, W, Berggren; **Graduate advisees**. J. Browning, B. Christensen, B. Cramer, M. Katz, D. Pak, S. Pekar, P. Sugarman, J. Wright

Synergistic Activities

Related Service to Scientific Community: 2003-2008 Vice Chair, DOSECC; 2005 Member, Scientific Ocean Drilling Vessel Oversight Committee; 2003-2005 Member, Science Planning Committee, IODP; 2003-2004 Co-Chair, Publications Subcommittee, Science Planning Committee, IODP; 2003-2005 Co-chair, Science Planning Committee, DOSECC; 2002-2008 Member, Board of Directors, DOSECC. 2000 Chair, SCICOM Subcommittee on the Legacy of ODP; 1993-present, Collaborator with the New Jersey Geological Survey, Department of Environmental Protection.

Related Public Service: 1988-present Served as guide for numerous primary school and civic organizations to the Rutgers Geology Museum and geological field localities in the state; 2000-present Directed Geology Museum Open House with 10,000+ visitors; 2003 Rutgers TV outreach: the Death of the Dinosaurs; 2000-2001-Board Member, Elm Ridge Area Neighborhood Association (ERANA), Provided geological evaluation of water-resource issues.

Related curriculum development: involved numerous graduate and undergraduates in coastal plain drilling; incorporated coastal plain and Newark Basin cores into various major classes; gave 2-6 guest lectures per semester in large non-major lectures on K/T boundary and other topics.

IODP Site Summary Forms:

564-Full2

Form 1 - General Site Information

Please fill out information in all gray boxes
Revised 7 March 2002

New ☐ **Revised** ■

Section A: Proposal Information

Title of Proposal:	Global Sea Level and the Architecture of Passive Margin Sediments: Shallow-Water Drilling of the New Jersey Continental Shelf
Date Form Submitted:	1/27/2006
Site Specific Objectives with Priority (Must include general objectives in proposal)	Determine age, facies, and paleobathymetry of surfaces correlated with sequence boundaries m1, m4, m5, m5.2, m5.4, m5.6, m6 and o1 and evaluate facies and age of Paleogene sediments
List Previous Drilling in Area:	offshore: AMCOR 6011 (Hathaway et al., 1976; 32 km WNW), ODP 1071, 1072 (79 and 82 km ESE) onshore: Island Beach (ODP Leg 150X; 46 km WNW) and other Leg 150X and 174X Sites

Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	MAT-1A	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	NJ inner shelf
Latitude:	Deg: 39	Min: 38.045460 N	Jurisdiction:	USA
Longitude:	Deg: 73	Min: 37.298760 W	Distance to Land:	44 km (24 nmi)
Coordinates System:	WGS 84			
Priority of Site:	Primary: **YES**	Alt:	Water Depth:	32 m

Section C: Operational Information

	Sediments	Basement
Proposed Penetration: (m)	752 m What is the total sed. thickness? ~ 10 km	no
		Total Penetration: 752 m
General Lithologies:	medium to coarse sand, ± pebbles and shell fragments, sandy mudstone, mudstone, marly chalk, limestone	
Coring Plan: *(Specify or check)*	push-core and rotary core from Mission-Specific jack-up drill rig 1-2-3-APC ☐ VPC* ☐ XCB ☐ MDCB* ☐ PCS ☐ RCB ☐ Re-entry ☐ HRGB ☐ ** Systems Currently Under Development*	

Wireline Logging Plan:

Standard Tools		Special Tools				LWD	
Neutron-Porosity	☐	Borehole Televiewer	☐	Formation Fluid Sampling	☐	Density-Neutron	■
Litho-Density	☐	Nuclear Magnetic Resonance	☐	Borehole Temperature & Pressure	☐	Resistivity-Gamma Ray	■
Gamma Ray	☐	Geochemical	☐	Borehole Seismic	☐	Acoustic	■
Resistivity	☐	Side-Wall Core Sampling	☐				
Acoustic	☐						
Formation Image	☐			Others ( )		Others (check-shot)	

Max.Borehole Temp. : *Expected value (For Riser Drilling)* ____________°C

Mud Logging: *(Riser Holes Only)*

Cuttings Sampling Intervals

from ________ m to ________ m, __________ m intervals

from ________ m to ________ m, __________ m intervals

Basic Sampling Intervals: 5m

Estimated days:

Drilling/Coring: 24d	Logging: 1 d	Total On-Site:25 days

Future Plan: *Longterm Borehole Observation Plan/Re-entry Plan* - *none*

Hazards/ Weather:

Please check following List of Potential Hazards

Shallow Gas	■	Complicated Seabed Condition	☐	Hydrothermal Activity	☐
Hydrocarbon	☐	Soft Seabed	■	Landslide and Turbidity Current	☐
Shallow Water Flow	☐	Currents	☐	Methane Hydrate	☐
Abnormal Pressure	☐	Fractured Zone	☐	Diapir and Mud Volcano	☐
Man-made Objects	☐	Fault	☐	High Temperature	☐
H_2S	☐	High Dip Angle	☐	Ice Conditions	☐
CO_2	☐	have completed HiRes MCS grid survey in accordance with JOIDES Guidelines and AT&T marine cable locations			

What is your Weather window? (Preferable period with the reasons)

June-August is best, can be extended to April-October (though Sept./Oct. is hurricance season)

IODP Site Summary Forms:

Form 2 - Site Survey Detail

Please fill out information in all gray boxes

New ☐ *Revised* ■

Proposal #: 564	Site #: MAT-1A	Date Form Submitted: 1/27/2006

	Data Type	SSP Requir-ements	Exists In DB	Details of available data and data that are still to be collected
1	High resolution seismic reflection			Primary Line(s) CH0698 107 cdp 11165 :Location of Site on line (SP or Time only) Crossing Lines(s): CH0698 102 cdp 5704
2	Deep Penetration seismic reflection			Primary Line(s): Ew9009 1003 cdp 10425 Location of Site on line (SP or Time only) Crossing Lines(s):
3	Seismic Velocity†			stacking velocities, Oc270 line 529
4	Seismic Grid			CH0698
5a	Refraction (surface)			
5b	Refraction (near bottom)			
6	3.5 kHz			concurrent with all Oc270 and CH0698 data Location of Site on line (Time)
7	Swath bathymetry			available from Creed and Onrust cruises, but not in Data Bank
8a	Side-looking sonar (surface)			available from Creed and Onrust cruises, but not in Data Bank
8b	Side-looking sonar (bottom)			
9	Photography or Video			
10	Heat Flow			
11a	Magnetics			published total mag field contours prepared by USGS available if requested
11b	Gravity			published gravity field contours prepared by the USGS available if requested
12	Sediment cores			Grain size analysis from Onrust submitted with written Safety report
13	Rock sampling			
14a	Water current data			
14b	Ice Conditions			
15	OBS microseismicity			
16	Navigation			all Oc270 and CH0698 MCS and all Creed and Onrust swath topo and backscatter data collected with DGPS navigation
17	Other			

SSP Classification of Site:	SSP Watchdog:	Date of Last Review:
SSP Comments:		

X=required; X*=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

IODP Site Summary Forms:

Form 3 - Detailed Logging Plan

New ☐ *Revised* ■

Proposal #: 564	Site #: MAT-1A	Date Form Submitted: 1/27/06
Water Depth (m): 32	Sed. Penetration (m): 762	Basement Penetration (m): 0

Do you need to use the conical side-entry sub (CSES) at this site? Yes ☐ No ■

Are high temperatures expected at this site? Yes ☐ No ■

Are there any other special requirements for logging at this site? Yes ☐ No ■

If "Yes" Please describe requirements:____

What do you estimate the total logging time for this site to be: 1 day

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity		
Litho-Density		
Natural Gamma Ray		
Resistivity-Induction		
Acoustic		
FMS		
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)	Density-neutron LWD will provide driller with formation characteristics	1
Resitivity-Gamma Ray (LWD)	Resitivity-Gamma LWD will provide driller with formation characteristics	1
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	VSP – check shot survey	1

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group at: borehole@ldeo.columbia.edu http://www.ldeo.columbia.edu/BRG/brg_home.html Phone/Fax: (914) 365-8674 / (914) 365-3182	Note: Sites with greater than 400 m of penetration or significant basement penetration require deployment of standard toolstrings.

Form 4 – Pollution & Safety Hazard Summary

IODP Site Summary Forms:

Please fill out information in all gray boxes

New ☐ *Revised* ■

Proposal #: 564	Site #: MAT-1A	Date Form Submitted: 1/27/06

1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	push/rotary core to TD from jack-up in one hole, cased as needed; logging in second dedicated hole (preferred) or in cored hole if possible
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	ODP Leg 174A drilling at Sites 1071 and 1072 on the outer shelf, 80 km ESE; hydrocarbons were monitored continously and found to be at background levels (5-10 ppmv) down to the bottom of Hole 1071F at 369-405 mbsf. Headspace methane contents in this interval were 448-1268 ppmv, and C1/C2 raios were 1302-2440. Above-background levels of methane were modest (289-1056 ppmv) within only athe 17-36 mbsf interval. Like other slope sites, drilling at ODP Leg 174A Site 1073 encountered considerable methane (as high as 29,000 ppmv) at shallow depths (uupper few 10's mbsf) with high C1/C2 ratios above 100,000. Deeper in the hole where methane fell to background levels the C1/C2 ratio also dropped, to values less than 100. DSDP Site 612 and ODP Sites 902, 903, 904, and 906 drilled to a maximum depth of 1150 m on the NJ slope (100 km to the SE) with no significant occurrences. The GLOMAR *Conception* drilled several AMCOR holes to ~300 mbsf beneath the continental shelf with open circulation; no significiant hydrocarbons were encountered at inner shelf site 6011 (22 m water depth, 260 m penetration to Eocene), inner shelf site 6020 (39 m water depth, 44 m penetration to the upper Pleistocene), middle shelf Site 6009 (58 m water depth, 300 m penetration to Miocene), or middle shelf Site 6010 (76 m water depth, 311 m penetration to Miocene sediments.) Upper slope site 6021 (301 m water depth, 305 m penetration to Pleistocene) reported high values (300,000 ppm) of light hydrocarbons (mostly methane).
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	Nearby Exxon 500-1 recorded C1 values from 1880-3200 ft bkb (573-976 m) that were typically less than 10,000 ppm; peak value was 40,000 ppm. No significant hydrocarbons were reported below this interval. Total depth of well: 12,250 ft (3735 m).
4	Are there any indications of gas hydrates at this location?	no
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.	no
6	What "special" precautions will be taken during drilling?	Probably will be done from jack-up with BOP, diverter, casing, closed circulation, and mud
7	What abandonment procedures do you plan to follow:	industry-standard procedures
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	
9	Summary: What do you consider the major risks in drilling at this site?	platform stability during jack-up and jack-down operations

IODP Site Summary Forms:

Form 5 – Lithologic Summary

New ☐ *Revised* ■

Proposal #: 564	Site #: MAT-1A	Date Form Submitted: 1/27/06

Sub-bottom depth (m)	*Key reflectors, Unconformities, faults, etc*	*Age*	*Assumed velocity (km/sec)*	*Lithology*	*Paleo-environment*	*Avg. rate of sed. accum. (m/My)*	*Comments*
0	seafloor						43 msecs
		late Pleist-early Middle Miocene	1.80	thick (5+ m) med to cse sand with occasional pebbles and shell frags	fluvial/estuarine/ nearshore	25	
229 mbsf	m5						295 msecs
		Middle to Early Miocene	1.85	sandy mudstone, with intervals of thick (~5 m) sand, occasionally glauconitic and cemented	mid- to outer shelf	15	
381 mbsf	downlap surface						455 msecs
		Early Miocene	1.90	mudstone with occasional sandy mudstone	pro-delta; slope	25	
600 mbsf	o1						685 msecs
		Late Eocene to Paleocene	1.95	marly chalk, limestone	carbonate ramp at several 100 m water depth	15	
752 mbsf	TD						845 msecs

564-Full2

IODP Site Summary Forms:

Form 1 - General Site Information

Please fill out information in all gray boxes
Revised 7 March 2002

New ☐ Revised ■

Section A: Proposal Information

Title of Proposal:	Global Sea Level and the Architecture of Passive Margin Sediments: Shallow-Water Drilling of the New Jersey Continental Shelf
Date Form Submitted:	1/27/2006
Site Specific Objectives with Priority (Must include general objectives in proposal)	Determine age, facies, and paleobathymetry of surfaces correlated with sequence boundaries m1, m4, m5, m5.2, m5.4, m5.6, m6 and o1 and evaluate facies and age of Paleogene sediments
List Previous Drilling in Area:	offshore: AMCOR 6011 (Hathaway et al., 1976; 32 km WNW), ODP 1071, 1072 (79 and 82 km ESE) onshore: Island Beach (ODP Leg 150X; 46 km WNW) and other Leg 150X and 174X Sites

Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	MAT-1B	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	NJ inner shelf
Latitude:	Deg: 39	Min: 38.103960 N	Jurisdiction:	USA
Longitude:	Deg: 73	Min: 37.248000 W	Distance to Land:	44 km (24 nmi)
Coordinates System:	WGS 84			
Priority of Site:	Primary:	Alt: **YES**	Water Depth:	32 m

Section C: Operational Information

	Sediments	Basement
Proposed Penetration: (m)	752 m What is the total sed. thickness? ~ 10 km	no
		Total Penetration: 752 m

General Lithologies: medium to coarse sand, ± pebbles and shell fragments, sandy mudstone, mudstone, marly chalk, limestone

Coring Plan: *(Specify or check)*
push-core and rotary core from Mission-Specific jack-up drill rig

1-2-3-APC ☐ VPC* ☐ XCB ☐ MDCB* ☐ PCS ☐ RCB ☐ Re-entry ☐ HRGB ☐

** Systems Currently Under Development*

Wireline Logging Plan:

Standard Tools		Special Tools				LWD	
Neutron-Porosity	☐	Borehole Televiewer	☐	Formation Fluid Sampling	☐	Density-Neutron	■
Litho-Density	☐	Nuclear Magnetic Resonance	☐	Borehole Temperature & Pressure	☐	Resistivity-Gamma Ray	■
Gamma Ray	☐	Geochemical	☐	Borehole Seismic	☐	Acoustic	■
Resistivity	☐	Side-Wall Core Sampling	☐				
Acoustic	☐						
Formation Image	☐			Others ( )		Others (check-shot)	

Max.Borehole Temp. : *Expected value (For Riser Drilling)* ____________°C

Mud Logging: *(Riser Holes Only)*
Cuttings Sampling Intervals
from ________ m to ________ m, ________ m intervals
from ________ m to ________ m, ________ m intervals
Basic Sampling Intervals: 5m

Estimated days: Drilling/Coring: 24d | Logging: 1 d | Total On-Site:25 days

Future Plan: *Longterm Borehole Observation Plan/Re-entry Plan - none*

Hazards/ Weather:

Please check following List of Potential Hazards

Shallow Gas	■	Complicated Seabed Condition	☐	Hydrothermal Activity	☐
Hydrocarbon	☐	Soft Seabed	■	Landslide and Turbidity Current	☐
Shallow Water Flow	☐	Currents	☐	Methane Hydrate	☐
Abnormal Pressure	☐	Fractured Zone	☐	Diapir and Mud Volcano	☐
Man-made Objects	☐	Fault	☐	High Temperature	☐
H_2S	☐	High Dip Angle	☐	Ice Conditions	☐
CO_2	☐	have completed HiRes MCS grid survey in accordance with JOIDES Guidelines and AT&T marine cable locations			

What is your Weather window? (Preferable period with the reasons)
June-August is best, can be extended to April-October (though Sept./Oct. is hurricance season)

Form 2 - Site Survey Detail

IODP Site Summary Forms:

Please fill out information in all gray boxes

New ☐ *Revised* ■

Proposal #: 564	Site #: MAT-1B	Date Form Submitted: 1/27/2006

	Data Type	SSP Requir-ements	Exists In DB	Details of available data and data that are still to be collected
1	High resolution seismic reflection			Primary Line(s) CH0698 109 cdp 9002 :Location of Site on line (SP or Time only) Crossing Lines(s): CH0698 102 cdp 5724
2	Deep Penetration seismic reflection			Primary Line(s): Ew9009 1003 cdp 10425 Location of Site on line (SP or Time only) Crossing Lines(s):
3	Seismic Velocity†			stacking velocities, Oc270 line 529
4	Seismic Grid			CH0698
5a	Refraction (surface)			
5b	Refraction (near bottom)			
6	3.5 kHz			concurrent with all Oc270 and CH0698 data Location of Site on line (Time)
7	Swath bathymetry			available from Creed and Onrust cruises, but not in Data Bank
8a	Side-looking sonar (surface)			available from Creed and Onrust cruises, but not in Data Bank
8b	Side-looking sonar (bottom)			
9	Photography or Video			
10	Heat Flow			
11a	Magnetics			published total mag field contours prepared by USGS available if requested
11b	Gravity			published gravity field contours prepared by the USGS available if requested
12	Sediment cores			Grain size analysis from Onrust submitted with written Safety report
13	Rock sampling			
14a	Water current data			
14b	Ice Conditions			
15	OBS microseismicity			
16	Navigation			all Oc270 and CH0698 MCS and all Creed and Onrust swath topo and backscatter data collected with DGPS navigation
17	Other			

SSP Classification of Site:	SSP Watchdog:	Date of Last Review:
SSP Comments:		

X=required; X*=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

IODP Site Summary Forms:

Form 3 - Detailed Logging Plan

New ☐ *Revised* ■

Proposal #: 564	Site #: MAT-1B	Date Form Submitted: 1/27/2006
Water Depth (m): 32	Sed. Penetration (m): 762	Basement Penetration (m): 0

Do you need to use the conical side-entry sub (CSES) at this site? Yes ☐ No ■

Are high temperatures expected at this site? Yes ☐ No ■

Are there any other special requirements for logging at this site? Yes ☐ No ■

If "Yes" Please describe requirements:____________________________

What do you estimate the total logging time for this site to be: 1 day

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity		
Litho-Density		
Natural Gamma Ray		
Resistivity-Induction		
Acoustic		
FMS		
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)	Density-neutron LWD will provide driller with formation characteristics	
Resitivity-Gamma Ray (LWD)	Resitivity-Gamma LWD will provide driller with formation characteristics	
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	VSP – check shot	

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group at: borehole@ldeo.columbia.edu http://www.ldeo.columbia.edu/BRG/brg_home.html Phone/Fax: (914) 365-8674 / (914) 365-3182	Note: Sites with greater than 400 m of penetration or significant basement penetration require deployment of standard toolstrings.

Form 4 – Pollution & Safety Hazard Summary

IODP Site Summary Forms:

Please fill out information in all gray boxes

New ☐ *Revised* ■

Proposal #: 564	Site #: MAT-1B	Date Form Submitted: 1/27/06

1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	push/rotary core to TD from jack-up in one hole, cased as needed; logging in second dedicated hole (preferred) or in cored hole if possible
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	ODP Leg 174A drilling at Sites 1071 and 1072 on the outer shelf, 80 km ESE; hydrocarbons were monitored continously and found to be at background levels (5-10 ppmv) down to the bottom of Hole 1071F at 369-405 mbsf. Headspace methane contents in this interval were 448-1268 ppmv, and C1/C2 raios were 1302-2440. Above-background levels of methane were modest (289-1056 ppmv) within only athe 17-36 mbsf interval. Like other slope sites, drilling at ODP Leg 174A Site 1073 encountered considerable methane (as high as 29,000 ppmv) at shallow depths (uupper few 10's mbsf) with high C1/C2 ratios above 100,000. Deeper in the hole where methane fell to background levels the C1/C2 ratio also dropped, to values less than 100. DSDP Site 612 and ODP Sites 902, 903, 904, and 906 drilled to a maximum depth of 1150 m on the NJ slope (100 km to the SE) with no significant occurrences. The GLOMAR *Conception* drilled several AMCOR holes to ~300 mbsf beneath the continental shelf with open circulation; no significiant hydrocarbons were encountered at inner shelf site 6011 (22 m water depth, 260 m penetration to Eocene), inner shelf site 6020 (39 m water depth, 44 m penetration to the upper Pleistocene), middle shelf Site 6009 (58 m water depth, 300 m penetration to Miocene), or middle shelf Site 6010 (76 m water depth, 311 m penetration to Miocene sediments.) Upper slope site 6021 (301 m water depth, 305 m penetration to Pleistocene) reported high values (300,000 ppm) of light hydrocarbons (mostly methane).
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	Nearby Exxon 500-1 recorded C1 values from 1880-3200 ft bkb (573-976 m) that were typically less than 10,000 ppm; peak value was 40,000 ppm. No significant hydrocarbons were reported below this interval. Total depth of well: 12,250 ft (3735 m).
4	Are there any indications of gas hydrates at this location?	no
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.	no
6	What "special" precautions will be taken during drilling?	Probably will be done from jack-up with BOP, diverter, casing, closed circulation, and mud
7	What abandonment procedures do you plan to follow:	industry-standard procedures
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	
9	Summary: What do you consider the major risks in drilling at this site?	platform stability during jack-up and jack-down operations

IODP Site Summary Forms:

Form 5 – Lithologic Summary

New ☐ *Revised* ■

Proposal #: 564	Site #: MAT-1B	Date Form Submitted: 1/27/2006

Sub-bottom depth (m)	*Key reflectors, Unconformities, faults, etc*	*Age*	*Assumed velocity (km/sec)*	*Lithology*	*Paleo-environment*	*Avg. rate of sed. accum. (m/My)*	*Comments*
0	seafloor						43 msecs
		late Pleist-early Middle Miocene	1.80	thick (5+ m) med to cse sand with occasional pebbles and shell frags	fluvial/estuarine/ nearshore	25	
229 mbsf	m5						295 msecs
		Middle to Early Miocene	1.85	sandy mudstone, with intervals of thick (~5 m) sand, occasionally glauconitic and cemented	mid- to outer shelf	15	
381 mbsf	downlap surface						455 msecs
		Early Miocene	1.90	mudstone with occasional sandy mudstone	pro-delta; slope	25	
600 mbsf	o1						685 msecs
		Late Eocene to Paleocene	1.95	marly chalk, limestone	carbonate ramp at several 100 m water depth	15	
752 mbsf	TD						845 msecs

564-Full2

IODP Site Summary Forms:

Form 1 - General Site Information

Please fill out information in all gray boxes
Revised 7 March 2002

New ☐ Revised ■

Section A: Proposal Information

Title of Proposal:	Global Sea Level and the Architecture of Passive Margin Sediments: Shallow-Water Drilling of the New Jersey Continental Shelf
Date Form Submitted:	1/27/2006
Site Specific Objectives with Priority (Must include general objectives in proposal)	Determine age, facies, and paleobathymetry of surfaces correlated with sequence boundaries m1, m4, m5, m5.2, m5.4, m5.6, m6 and o1 and evaluate facies and age of Paleogene sediments
List Previous Drilling in Area:	offshore: AMCOR 6011 (Hathaway et al., 1976; 32 km WNW), ODP 1071, 1072 (79 and 82 km ESE) onshore: Island Beach (ODP Leg 150X; 46 km WNW) and other Leg 150X and 174X Sites

Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	MAT-1C	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	NJ inner shelf
Latitude:	Deg: 39	Min: 38.365140 N	Jurisdiction:	USA
Longitude:	Deg: 73	Min: 36.997140 W	Distance to Land:	44 km (24 nmi)
Coordinates System:	WGS 84			
Priority of Site:	Primary:	Alt: **YES**	Water Depth:	32 m

Section C: Operational Information

	Sediments	Basement
Proposed Penetration: (m)	752 m What is the total sed. thickness? ~ 10 km	no
		Total Penetration: 752 m
General Lithologies:	medium to coarse sand, ± pebbles and shell fragments, sandy mudstone, mudstone, marly chalk, limestone	
Coring Plan: *(Specify or check)*	push-core and rotary core from Mission-Specific jack-up drill rig 1-2-3-APC ☐ VPC* ☐ XCB ☐ MDCB* ☐ PCS ☐ RCB ☐ Re-entry ☐ HRGB ☐ ** Systems Currently Under Development*	

Wireline Logging Plan:

Standard Tools		Special Tools				LWD	
Neutron-Porosity	☐	Borehole Televiewer	☐	Formation Fluid Sampling	☐	Density-Neutron	■
Litho-Density	☐	Nuclear Magnetic Resonance	☐	Borehole Temperature & Pressure	☐	Resistivity-Gamma Ray	■
Gamma Ray	☐	Geochemical	☐	Borehole Seismic	☐	Acoustic	■
Resistivity	☐	Side-Wall Core Sampling	☐				
Acoustic	☐						
Formation Image	☐			Others ( )		Others (check-shot)	

Max.Borehole Temp. :	*Expected value (For Riser Drilling)* ____________°C				
Mud Logging: *(Riser Holes Only)*	Cuttings Sampling Intervals				
	from ______ m	to ______ m,	______ m intervals		
	from ______ m	to ______ m,	______ m intervals		
	Basic Sampling Intervals: 5m				
Estimated days:	Drilling/Coring: 24d	Logging: 1 d	Total On-Site:25 days		
Future Plan:	*Longterm Borehole Observation Plan/Re-entry Plan - none*				

Hazards/ Weather:

Please check following List of Potential Hazards						*What is your Weather window? (Preferable period with the reasons)*
Shallow Gas	■	Complicated Seabed Condition	☐	Hydrothermal Activity	☐	June-August is best, can be extended to April-October (though Sept./Oct. is hurricance season)
Hydrocarbon	☐	Soft Seabed	■	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Methane Hydrate	☐	
Abnormal Pressure	☐	Fractured Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☐	
CO_2	☐	have completed HiRes MCS grid survey in accordance with JOIDES Guidelines and AT&T marine cable locations				

Form 2 - Site Survey Detail

IODP Site Summary Forms:

Please fill out information in all gray boxes

New ☐ *Revised* ■

Proposal #: 564	Site #: MAT-1C	Date Form Submitted: 1/27/2006

	Data Type	SSP Requir-ements	Exists In DB	Details of available data and data that are still to be collected
1	High resolution seismic reflection			Primary Line(s) CH0698 113 cdp 6983 :Location of Site on line (SP or Time only) Crossing Lines(s): CH0698 102 cdp 5820
2	Deep Penetration seismic reflection			Primary Line(s): Ew9009 1003 cdp 10425 Location of Site on line (SP or Time only) Crossing Lines(s):
3	Seismic Velocity†			stacking velocities, Oc270 line 529
4	Seismic Grid			CH0698
5a	Refraction (surface)			
5b	Refraction (near bottom)			
6	3.5 kHz			concurrent with all Oc270 and CH0698 data Location of Site on line (Time)
7	Swath bathymetry			available from Creed and Onrust cruises, but not in Data Bank
8a	Side-looking sonar (surface)			available from Creed and Onrust cruises, but not in Data Bank
8b	Side-looking sonar (bottom)			
9	Photography or Video			
10	Heat Flow			
11a	Magnetics			published total mag field contours prepared by USGS available if requested
11b	Gravity			published gravity field contours prepared by the USGS available if requested
12	Sediment cores			Grain size analysis from Onrust submitted with written Safety report
13	Rock sampling			
14a	Water current data			
14b	Ice Conditions			
15	OBS microseismicity			
16	Navigation			all Oc270 and CH0698 MCS and all Creed and Onrust swath topo and backscatter data collected with DGPS navigation
17	Other			

SSP Classification of Site:	SSP Watchdog:	Date of Last Review:
SSP Comments:		

X=required; X*=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

IODP Site Summary Forms:

Form 3 - Detailed Logging Plan

New ☐ *Revised* ■

Proposal #: 564	Site #: MAT-1C	Date Form Submitted: 1/27/2006
Water Depth (m): 32	Sed. Penetration (m): 762	Basement Penetration (m): 0

Do you need to use the conical side-entry sub (CSES) at this site? Yes ☐ No ■

Are high temperatures expected at this site? Yes ☐ No ■

Are there any other special requirements for logging at this site? Yes ☐ No ■

If "Yes" Please describe requirements:______________________________

What do you estimate the total logging time for this site to be: 1 day

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity		
Litho-Density		
Natural Gamma Ray		
Resistivity-Induction		
Acoustic		
FMS		
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)	Density-neutron LWD will provide driller with formation characteristics	
Resitivity-Gamma Ray (LWD)	Resitivity-Gamma LWD will provide driller with formation characteristics	
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	VSP – check shot	

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group at: borehole@ldeo.columbia.edu http://www.ldeo.columbia.edu/BRG/brg_home.html Phone/Fax: (914) 365-8674 / (914) 365-3182	Note: Sites with greater than 400 m of penetration or significant basement penetration require deployment of standard toolstrings.

Form 4 – Pollution & Safety Hazard Summary

IODP Site Summary Forms:

Please fill out information in all gray boxes

New *Revised*

Proposal #: 564	Site #: MAT-1C	Date Form Submitted: 1/27/2006

1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	push/rotary core to TD from jack-up in one hole, cased as needed; logging in second dedicated hole (preferred) or in cored hole if possible
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	ODP Leg 174A drilling at Sites 1071 and 1072 on the outer shelf, 80 km ESE; hydrocarbons were monitored continously and found to be at background levels (5-10 ppmv) down to the bottom of Hole 1071F at 369-405 mbsf. Headspace methane contents in this interval were 448-1268 ppmv, and C1/C2 raios were 1302-2440. Above-background levels of methane were modest (289-1056 ppmv) within only athe 17-36 mbsf interval. Like other slope sites, drilling at ODP Leg 174A Site 1073 encountered considerable methane (as high as 29,000 ppmv) at shallow depths (uupper few 10's mbsf) with high C1/C2 ratios above 100,000. Deeper in the hole where methane fell to background levels the C1/C2 ratio also dropped, to values less than 100. DSDP Site 612 and ODP Sites 902, 903, 904, and 906 drilled to a maximum depth of 1150 m on the NJ slope (100 km to the SE) with no significant occurrences. The GLOMAR *Conception* drilled several AMCOR holes to ~300 mbsf beneath the continental shelf with open circulation; no significiant hydrocarbons were encountered at inner shelf site 6011 (22 m water depth, 260 m penetration to Eocene), inner shelf site 6020 (39 m water depth, 44 m penetration to the upper Pleistocene), middle shelf Site 6009 (58 m water depth, 300 m penetration to Miocene), or middle shelf Site 6010 (76 m water depth, 311 m penetration to Miocene sediments.) Upper slope site 6021 (301 m water depth, 305 m penetration to Pleistocene) reported high values (300,000 ppm) of light hydrocarbons (mostly methane).
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	Nearby Exxon 500-1 recorded C1 values from 1880-3200 ft bkb (573-976 m) that were typically less than 10,000 ppm; peak value was 40,000 ppm. No significant hydrocarbons were reported below this interval. Total depth of well: 12,250 ft (3735 m).
4	Are there any indications of gas hydrates at this location?	no
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.	no
6	What "special" precautions will be taken during drilling?	Probably will be done from jack-up with BOP, diverter, casing, closed circulation, and mud
7	What abandonment procedures do you plan to follow:	industry-standard procedures
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	
9	Summary: What do you consider the major risks in drilling at this site?	platform stability during jack-up and jack-down operations

IODP Site Summary Forms:

Form 5 – Lithologic Summary

New ☐ *Revised* ■

Proposal #: 564	Site #: MAT-1C	Date Form Submitted: 1/27/2006

Sub-bottom depth (m)	*Key reflectors, Unconformities, faults, etc*	*Age*	*Assumed velocity (km/sec)*	*Lithology*	*Paleo-environment*	*Avg. rate of sed. accum. (m/My)*	*Comments*
0	seafloor						43 msecs
		late Pleist-early Middle Miocene	1.80	thick (5+ m) med to cse sand with occasional pebbles and shell frags	fluvial/estuarine/ nearshore	25	
229 mbsf	m5						295 msecs
		Middle to Early Miocene	1.85	sandy mudstone, with intervals of thick (~5 m) sand, occasionally glauconitic and cemented	mid- to outer shelf	15	
381 mbsf	downlap surface						455 msecs
		Early Miocene	1.90	mudstone with occasional sandy mudstone	pro-delta; slope	25	
600 mbsf	o1						685 msecs
		Late Eocene to Paleocene	1.95	marly chalk, limestone	carbonate ramp at several 100 m water depth	15	
752 mbsf	TD						845 msecs

564-Full2

IODP Site Summary Forms:

Form 1 - General Site Information

Please fill out information in all gray boxes
Revised 7 March 2002

New [ ] Revised [x]

Section A: Proposal Information

Title of Proposal:	Global Sea Level and the Architecture of Passive Margin Sediments: Shallow-Water Drilling of the New Jersey Continental Shelf
Date Form Submitted:	1/27/2006
Site Specific Objectives with Priority (Must include general objectives in proposal)	Determine age, facies, and paleobathymetry of surfaces correlated with sequence boundaries m1, m4, m5, m5.2, m5.4, m5.6, m6 and o1 plus facies and age of upper Eocene sediments
List Previous Drilling in Area:	offshore: AMCOR 6011 (Hathaway et al., 1976; 44 km WNW), ODP 1071, 1072 (67 and 70 km ESE) onshore: Island Beach (ODP Leg 150X; 58 km WNW) and other Leg 150X and 174X Sites

Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	MAT-2D	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	NJ inner shelf
Latitude:	Deg: 39	Min: 33.94320	Jurisdiction:	USA
Longitude:	Deg: 73	Min: 29.83596	Distance to Land:	56 km (30 nmi)
Coordinates System:	WGS 84			
Priority of Site:	Primary: **YES**	Alt:	Water Depth:	35 m

Section C: Operational Information

	Sediments	Basement
Proposed Penetration: (m)	752 m What is the total sed. thickness? ~ 10 km	no
		Total Penetration: 752 m
General Lithologies:	medium to coarse sand, ± pebbles and shell fragments, sandy mudstone, mudstone, marly chalk, limestone	
Coring Plan: *(Specify or check)*	push-core and rotary core from Mission-Specific jack-up drill rig 1-2-3-APC ☐ VPC* ☐ XCB ☐ MDCB* ☐ PCS ☐ RCB ☐ Re-entry ☐ HRGB ☐ ** Systems Currently Under Development*	

Wireline Logging Plan:

Standard Tools		Special Tools				LWD	
Neutron-Porosity	☐	Borehole Televiewer	☐	Formation Fluid Sampling	☐	Density-Neutron	■
Litho-Density	☐	Nuclear Magnetic Resonance	☐	Borehole Temperature & Pressure	☐	Resistivity-Gamma Ray	■
Gamma Ray	☐	Geochemical	☐	Borehole Seismic	☐	Acoustic	■
Resistivity	☐	Side-Wall Core Sampling	☐				
Acoustic	☐						
Formation Image	☐			Others ( )		Others (check-shot)	

Max.Borehole Temp. : *Expected value (For Riser Drilling)* ____________°C

Mud Logging: *(Riser Holes Only)*

Cuttings Sampling Intervals

from ________ m to ________ m, ________ m intervals

from ________ m to ________ m, ________ m intervals

Basic Sampling Intervals: 5m

Estimated days:

Drilling/Coring: 24d	Logging: 1 d	Total On-Site:25 days

Future Plan: *Longterm Borehole Observation Plan/Re-entry Plan - none*

Hazards/ Weather:

Please check following List of Potential Hazards

Shallow Gas	■	Complicated Seabed Condition	☐	Hydrothermal Activity	☐
Hydrocarbon	☐	Soft Seabed	■	Landslide and Turbidity Current	☐
Shallow Water Flow	☐	Currents	☐	Methane Hydrate	☐
Abnormal Pressure	☐	Fractured Zone	☐	Diapir and Mud Volcano	☐
Man-made Objects	☐	Fault	☐	High Temperature	☐
H_2S	☐	High Dip Angle	☐	Ice Conditions	☐
CO_2	☐	have completed HiRes MCS grid survey in accordance with JOIDES Guidelines and AT&T marine cable locations			

What is your Weather window? (Preferable period with the reasons)

June-August is best, can be extended to April-October (though Sept./Oct. is hurricance season)

Form 2 - Site Survey Detail

IODP Site Summary Forms:

Please fill out information in all gray boxes

New ☐ *Revised* ■

Proposal #: 564	Site #: MAT-2D	Date Form Submitted: 1/27/2006

	Data Type	SSP Requir-ements	Exists In DB	Details of available data and data that are still to be collected
1	High resolution seismic reflection			Primary Line(s) CH0698 207 cdp 11390 :Location of Site on line (SP or Time only) Crossing Lines(s): CH0698 218 cdp 4274
2	Deep Penetration seismic reflection			Primary Line(s): Ew9009 1003 cdp 9390 Location of Site on line (SP or Time only) Crossing Lines(s):
3	Seismic Velocity†			stacking velocities, Oc270 line 529
4	Seismic Grid			CH0698
5a	Refraction (surface)			
5b	Refraction (near bottom)			
6	3.5 kHz			concurrent with all Oc270 and CH0698 data Location of Site on line (Time)
7	Swath bathymetry			available from Creed and Onrust cruises, but not in Data Bank
8a	Side-looking sonar (surface)			available from Creed and Onrust cruises, but not in Data Bank
8b	Side-looking sonar (bottom)			
9	Photography or Video			
10	Heat Flow			
11a	Magnetics			published total mag field contours prepared by USGS available if requested
11b	Gravity			published gravity field contours prepared by the USGS available if requested
12	Sediment cores			Grain size analysis from Onrust submitted with written Safety report
13	Rock sampling			
14a	Water current data			
14b	Ice Conditions			
15	OBS microseismicity			
16	Navigation			all Oc270 and CH0698 MCS and all Creed and Onrust swath topo and backscatter data collected with DGPS navigation
17	Other			

SSP Classification of Site:	SSP Watchdog:	Date of Last Review:
SSP Comments:		

X=required; X*=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

IODP Site Summary Forms:

Form 3 - Detailed Logging Plan

New ☐ *Revised* ■

Proposal #: 564	Site #: MAT-2D	Date Form Submitted: 1/27/2006
Water Depth (m): 35	Sed. Penetration (m): 762	Basement Penetration (m): 0

Do you need to use the conical side-entry sub (CSES) at this site? Yes ☐ No ■

Are high temperatures expected at this site? Yes ☐ No ■

Are there any other special requirements for logging at this site? Yes ☐ No ■

If "Yes" Please describe requirements:____

What do you estimate the total logging time for this site to be: 1 day

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity		
Litho-Density		
Natural Gamma Ray		
Resistivity-Induction		
Acoustic		
FMS		
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)	Density-neutron LWD will provide driller with formation characteristics	
Resitivity-Gamma Ray (LWD)	Resitivity-Gamma LWD will provide driller with formation characteristics	
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	VSP – check shot	

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group at: borehole@ldeo.columbia.edu http://www.ldeo.columbia.edu/BRG/brg_home.html Phone/Fax: (914) 365-8674 / (914) 365-3182	Note: Sites with greater than 400 m of penetration or significant basement penetration require deployment of standard toolstrings.

Form 4 – Pollution & Safety Hazard Summary

IODP Site Summary Forms:

Please fill out information in all gray boxes

New *Revised*

Proposal #: 564	Site #: MAT-2D	Date Form Submitted: 1/27/2006

1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	push/rotary core to TD from jack-up in one hole, cased as needed; logging in second dedicated hole (preferred) or in cored hole if possible
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	ODP Leg 174A drilling at Sites 1071 and 1072 on the outer shelf, 68 km ESE; hydrocarbons were monitored continously and found to be at background levels (5-10 ppmv) down to the bottom of Hole 1071F at 369-405 mbsf. Headspace methane contents in this interval were 448-1268 ppmv, and C1/C2 ratios were 1302-2440. Above-background levels of methane were modest (289-1056 ppmv) within only the 17-36 mbsf interval. Like other slope sites, drilling at ODP Leg 174A Site 1073 encountered considerable methane (as high as 29,000 ppmv) at shallow depths (upper few 10's mbsf) with high C1/C2 ratios above 100,000. Deeper in the hole where methane fell to background levels the C1/C2 ratio also dropped, to values less than 100. DSDP Site 612 and ODP Sites 902, 903, 904, and 906 drilled to a maximum depth of 1150 m on the NJ slope (88 km to the SE) with no significant occurrences. The GLOMAR *Conception* drilled several AMCOR holes to ~300 mbsf beneath the continental shelf with open circulation; no significiant hydrocarbons were encountered at inner shelf site 6011 (22 m water depth, 260 m penetration to Eocene), inner shelf site 6020 (39 m water depth, 44 m penetration to the upper Pleistocene), middle shelf Site 6009 (58 m water depth, 300 m penetration to Miocene), or middle shelf Site 6010 (76 m water depth, 311 m penetration to Miocene sediments.) Upper slope site 6021 (301 m water depth, 305 m penetration to Pleistocene) reported high values (300,000 ppm) of light hydrocarbons (mostly methane).
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	Nearby Exxon 500-1 recorded C1 values from 1880-3200 ft bkb (573-976 m) that were typically less than 10,000 ppm; peak value was 40,000 ppm. No significant hydrocarbons were reported below this interval. Total depth of well: 12,250 ft (3735 m).
4	Are there any indications of gas hydrates at this location?	no
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.	no
6	What “special” precautions will be taken during drilling?	Probably will be done from jack-up with BOP, diverter, casing, closed circulation, and mud
7	What abandonment procedures do you plan to follow:	industry-standard procedures
8	Please list other natural or manmade hazards which may effect ship’s operations: (e.g. ice, currents, cables)	
9	Summary: What do you consider the major risks in drilling at this site?	platform stability during jack-up and jack-down operations

IODP Site Summary Forms:

Form 5 – Lithologic Summary

New ☐ *Revised* ■

Proposal #: 564	Site #: MAT-2D	Date Form Submitted: 1/27/2006

Sub-bottom depth (m)	*Key reflectors, Unconformities, faults, etc*	*Age*	*Assumed velocity (km/sec)*	*Lithology*	*Paleo-environment*	*Avg. rate of sed. accum. (m/My)*	*Comments*
0	seafloor						47 msecs
		late Pleist-early Middle Miocene	1.80	thick (5+ m) med to cse sand with occasional pebbles and shell frags	fluvial/estuarine/ nearshore	25	
258 mbsf	m5						325 msecs
		Middle to Early Miocene	1.85	sandy mudstone, with intervals of thick (~5 m) sand, occasionally glauconitic and cemented	mid- to outer shelf	35	
353 mbsf	m5.2						425 msecs
		Early Miocene	1.90	mudstone with occasional sandy mudstone	pro-delta; slope	70	
728 mbsf	o1						820 msecs
		Late Eocene to Paleocene	1.95	marly chalk, limestone	carbonate ramp at several 100 m water depth	15	
752 mbsf	TD						845 msecs

564-Full2

IODP Site Summary Forms:

Form 1 - General Site Information

Please fill out information in all gray boxes
Revised 7 March 2002

New ☐ Revised ■

Section A: Proposal Information

Title of Proposal:	Global Sea Level and the Architecture of Passive Margin Sediments: Shallow-Water Drilling of the New Jersey Continental Shelf
Date Form Submitted:	1/27/2006
Site Specific Objectives with Priority (Must include general objectives in proposal)	Determine age, facies, and paleobathymetry of surfaces correlated with sequence boundaries m1, m4, m5, m5.2, m5.4, m5.6, m6 and o1 plus facies and age of upper Eocene sediments
List Previous Drilling in Area:	offshore: AMCOR 6011 (Hathaway et al., 1976; 44 km WNW), ODP 1071, 1072 (67 and 70 km ESE) onshore: Island Beach (ODP Leg 150X; 58 km WNW) and other Leg 150X and 174X Sites

Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	MAT-2E	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	NJ inner shelf
Latitude:	Deg: 39	Min: 34.02498	Jurisdiction:	USA
Longitude:	Deg: 73	Min: 29.76300	Distance to Land:	56 km (30 nmi)
Coordinates System:	WGS 84			
Priority of Site:	Primary:	Alt: **YES**	Water Depth:	35 m

Section C: Operational Information

	Sediments	Basement
Proposed Penetration: (m)	752 m What is the total sed. thickness? ~ 10 km	no
		Total Penetration: 752 m
General Lithologies:	medium to coarse sand, ± pebbles and shell fragments, sandy mudstone, mudstone, marly chalk, limestone	
Coring Plan: *(Specify or check)*	push-core and rotary core from Mission-Specific jack-up drill rig 1-2-3-APC ☐ VPC* ☐ XCB ☐ MDCB* ☐ PCS ☐ RCB ☐ Re-entry ☐ HRGB ☐ ** Systems Currently Under Development*	

Wireline Logging Plan:

Standard Tools		Special Tools				LWD	
Neutron-Porosity	☐	Borehole Televiewer	☐	Formation Fluid Sampling	☐	Density-Neutron	■
Litho-Density	☐	Nuclear Magnetic Resonance	☐	Borehole Temperature & Pressure	☐	Resistivity-Gamma Ray	■
Gamma Ray	☐	Geochemical	☐	Borehole Seismic	☐	Acoustic	■
Resistivity	☐	Side-Wall Core Sampling	☐				
Acoustic	☐						
Formation Image	☐			Others ( )		Others ( )	

Max.Borehole Temp. : *Expected value (For Riser Drilling)* ____________°C

Mud Logging: *(Riser Holes Only)*

Cuttings Sampling Intervals

from ________ m to ________ m, __________ m intervals

from ________ m to ________ m, __________ m intervals

Basic Sampling Intervals: 5m

Estimated days:	Drilling/Coring: 21d	Logging: 4 d	Total On-Site:25 days

Future Plan: *Longterm Borehole Observation Plan/Re-entry Plan - none*

Hazards/ Weather:

Please check following List of Potential Hazards

Shallow Gas	■	Complicated Seabed Condition	☐	Hydrothermal Activity	☐
Hydrocarbon	☐	Soft Seabed	■	Landslide and Turbidity Current	☐
Shallow Water Flow	☐	Currents	☐	Methane Hydrate	☐
Abnormal Pressure	☐	Fractured Zone	☐	Diapir and Mud Volcano	☐
Man-made Objects	☐	Fault	☐	High Temperature	☐
H_2S	☐	High Dip Angle	☐	Ice Conditions	☐
CO_2	☐	have completed HiRes MCS grid survey in accordance with JOIDES Guidelines and AT&T marine cable locations			

What is your Weather window? (Preferable period with the reasons)

June-August is best, can be extended to April-October (though Sept./Oct. is hurricance season)

IODP Site Summary Forms:

Form 2 - Site Survey Detail

Please fill out information in all gray boxes

New *Revised*

Proposal #: 564	Site #: MAT-2E	Date Form Submitted: 1/27/2006

	Data Type	SSP Requir-ements	Exists In DB	Details of available data and data that are still to be collected
1	High resolution seismic reflection			Primary Line(s) CH0698 209 cdp 8618 :Location of Site on line (SP or Time only) Crossing Lines(s): CH0698 218 cdp 4244
2	Deep Penetration seismic reflection			Primary Line(s): Ew9009 1003 9390 Location of Site on line (SP or Time only) Crossing Lines(s):
3	Seismic Velocity†			stacking velocities, Oc270 line 529
4	Seismic Grid			CH0698
5a	Refraction (surface)			
5b	Refraction (near bottom)			
6	3.5 kHz			concurrent with all Oc270 and CH0698 data Location of Site on line (Time)
7	Swath bathymetry			available from Creed and Onrust cruises, but not in Data Bank
8a	Side-looking sonar (surface)			available from Creed and Onrust cruises, but not in Data Bank
8b	Side-looking sonar (bottom)			
9	Photography or Video			
10	Heat Flow			
11a	Magnetics			published total mag field contours prepared by USGS available if requested
11b	Gravity			published gravity field contours prepared by the USGS available if requested
12	Sediment cores			Grain size analysis from Onrust submitted with written Safety report
13	Rock sampling			
14a	Water current data			
14b	Ice Conditions			
15	OBS microseismicity			
16	Navigation			all Oc270 and CH0698 MCS and all Creed and Onrust swath topo and backscatter data collected with DGPS navigation
17	Other			

SSP Classification of Site:	SSP Watchdog:	Date of Last Review:
SSP Comments:		

X=required; X*=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

IODP Site Summary Forms:

Form 3 - Detailed Logging Plan

New ☐ *Revised* ■

Proposal #: 564	Site #: MAT-2E	Date Form Submitted: 1/27/2006
Water Depth (m): 35	Sed. Penetration (m): 762	Basement Penetration (m): 0

Do you need to use the conical side-entry sub (CSES) at this site? Yes ☐ No ■

Are high temperatures expected at this site? Yes ☐ No ■

Are there any other special requirements for logging at this site? Yes ☐ No ■

If "Yes" Please describe requirements:______________________________

What do you estimate the total logging time for this site to be: 1 day

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity		
Litho-Density		
Natural Gamma Ray		
Resistivity-Induction		
Acoustic		
FMS		
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)	Density-neutron LWD will provide driller with formation characteristics	
Resitivity-Gamma Ray (LWD)	Resitivity-Gamma LWD will provide driller with formation characteristics	
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	VSP – check shot	

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group at: borehole@ldeo.columbia.edu http://www.ldeo.columbia.edu/BRG/brg_home.html Phone/Fax: (914) 365-8674 / (914) 365-3182	Note: Sites with greater than 400 m of penetration or significant basement penetration require deployment of standard toolstrings.

IODP Site Summary Forms:

Form 4 – Pollution & Safety Hazard Summary

Please fill out information in all gray boxes

New ☐ *Revised* ■

Proposal #: 564	Site #: MAT-2E	Date Form Submitted: 1/27/2006

1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	push/rotary core to TD from jack-up in one hole, cased as needed; logging in second dedicated hole (preferred) or in cored hole if possible
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	ODP Leg 174A drilling at Sites 1071 and 1072 on the outer shelf, 68 km ESE; hydrocarbons were monitored continously and found to be at background levels (5-10 ppmv) down to the bottom of Hole 1071F at 369-405 mbsf. Headspace methane contents in this interval were 448-1268 ppmv, and C1/C2 ratios were 1302-2440. Above-background levels of methane were modest (289-1056 ppmv) within only the 17-36 mbsf interval. Like other slope sites, drilling at ODP Leg 174A Site 1073 encountered considerable methane (as high as 29,000 ppmv) at shallow depths (upper few 10's mbsf) with high C1/C2 ratios above 100,000. Deeper in the hole where methane fell to background levels the C1/C2 ratio also dropped, to values less than 100. DSDP Site 612 and ODP Sites 902, 903, 904, and 906 drilled to a maximum depth of 1150 m on the NJ slope (88 km to the SE) with no significant occurrences. The GLOMAR *Conception* drilled several AMCOR holes to ~300 mbsf beneath the continental shelf with open circulation; no significiant hydrocarbons were encountered at inner shelf site 6011 (22 m water depth, 260 m penetration to Eocene), inner shelf site 6020 (39 m water depth, 44 m penetration to the upper Pleistocene), middle shelf Site 6009 (58 m water depth, 300 m penetration to Miocene), or middle shelf Site 6010 (76 m water depth, 311 m penetration to Miocene sediments.) Upper slope site 6021 (301 m water depth, 305 m penetration to Pleistocene) reported high values (300,000 ppm) of light hydrocarbons (mostly methane).
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	Nearby Exxon 500-1 recorded C1 values from 1880-3200 ft bkb (573-976 m) that were typically less than 10,000 ppm; peak value was 40,000 ppm. No significant hydrocarbons were reported below this interval. Total depth of well: 12,250 ft (3735 m).
4	Are there any indications of gas hydrates at this location?	no
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.	no
6	What "special" precautions will be taken during drilling?	Probably will be done from jack-up with BOP, diverter, casing, closed circulation, and mud
7	What abandonment procedures do you plan to follow:	industry-standard procedures
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	
9	Summary: What do you consider the major risks in drilling at this site?	platform stability during jack-up and jack-down operations

IODP Site Summary Forms:

Form 5 – Lithologic Summary

New ☐ *Revised* ■

Proposal #: 564	Site #: MAT-2E	Date Form Submitted: 1/27/2006

Sub-bottom depth (m)	*Key reflectors, Unconformities, faults, etc*	*Age*	*Assumed velocity (km/sec)*	*Lithology*	*Paleo-environment*	*Avg. rate of sed. accum. (m/My)*	*Comments*
0	seafloor						47 msecs
		late Pleist-early Middle Miocene	1.80	thick (5+ m) med to cse sand with occasional pebbles and shell frags	fluvial/estuarine/ nearshore	25	
258 mbsf	m5						325 msecs
		Middle to Early Miocene	1.85	sandy mudstone, with intervals of thick (~5 m) sand, occasionally glauconitic and cemented	mid- to outer shelf	35	
353 mbsf	m5.2						425 msecs
		Early Miocene	1.90	mudstone with occasional sandy mudstone	pro-delta; slope	70	
728 mbsf	o1						820 msecs
		Late Eocene to Paleocene	1.95	marly chalk, limestone	carbonate ramp at several 100 m water depth	15	
752 mbsf	TD						845 msecs

564-Full2

IODP Site Summary Forms:

Form 1 - General Site Information

Please fill out information in all gray boxes
Revised 7 March 2002

New ☐ Revised ■

Section A: Proposal Information

Title of Proposal:	Global Sea Level and the Architecture of Passive Margin Sediments: Shallow-Water Drilling of the New Jersey Continental Shelf
Date Form Submitted:	1/27/2006
Site Specific Objectives with Priority (Must include general objectives in proposal)	Determine age, facies, and paleobathymetry of surfaces correlated with sequence boundaries m1, m4, m5, m5.2, m5.4, m5.6, m6 and o1 plus age and facies of upper Eocene sediments
List Previous Drilling in Area:	offshore: AMCOR 6011 (Hathaway et al., 1976; 44 km WNW), ODP 1071, 1072 (67 and 70 km ESE) onshore: Island Beach (ODP Leg 150X; 58 km WNW) and other Leg 150X and 174X Sites

Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	MAT-2F	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	NJ inner shelf
Latitude:	Deg: 39	Min: 34.27200	Jurisdiction:	USA
Longitude:	Deg: 73	Min: 29.53902	Distance to Land:	56 km (30 nmi)
Coordinates System:	WGS 84			
Priority of Site:	Primary:	Alt: **YES**	Water Depth:	34 m

Section C: Operational Information

	Sediments	Basement
Proposed Penetration: (m)	752 m What is the total sed. thickness? ~ 10 km	no
		Total Penetration: 752 m

General Lithologies: medium to coarse sand, ± pebbles and shell fragments, sandy mudstone, mudstone, marly chalk, limestone

Coring Plan: *(Specify or check)*

push-core and rotary core from Mission-Specific jack-up drill rig

1-2-3-APC ☐ VPC* ☐ XCB ☐ MDCB* ☐ PCS ☐ RCB ☐ Re-entry ☐ HRGB ☐

** Systems Currently Under Development*

Wireline Logging Plan:

Standard Tools		Special Tools				LWD	
Neutron-Porosity	☐	Borehole Televiewer	☐	Formation Fluid Sampling	☐	Density-Neutron	■
Litho-Density	☐	Nuclear Magnetic Resonance	☐	Borehole Temperature & Pressure	☐	Resistivity-Gamma Ray	■
Gamma Ray	☐	Geochemical	☐	Borehole Seismic	☐	Acoustic	■
Resistivity	☐	Side-Wall Core Sampling	☐				
Acoustic	☐						
Formation Image	☐			Others ( )		Others (check-shot)	

Max.Borehole Temp. : *Expected value (For Riser Drilling)* ____________°C

Mud Logging: *(Riser Holes Only)*

Cuttings Sampling Intervals

from ________ m to ________ m, ________ m intervals

from ________ m to ________ m, ________ m intervals

Basic Sampling Intervals: 5m

Estimated days:

Drilling/Coring: 24d	Logging: 1 d	Total On-Site:25 days

Future Plan: *Longterm Borehole Observation Plan/Re-entry Plan - none*

Hazards/ Weather:

Please check following List of Potential Hazards

Shallow Gas	■	Complicated Seabed Condition	☐	Hydrothermal Activity	☐
Hydrocarbon	☐	Soft Seabed	■	Landslide and Turbidity Current	☐
Shallow Water Flow	☐	Currents	☐	Methane Hydrate	☐
Abnormal Pressure	☐	Fractured Zone	☐	Diapir and Mud Volcano	☐
Man-made Objects	☐	Fault	☐	High Temperature	☐
H_2S	☐	High Dip Angle	☐	Ice Conditions	☐
CO_2	☐	have completed HiRes MCS grid survey in accordance with JOIDES Guidelines and AT&T marine cable locations			

What is your Weather window? (Preferable period with the reasons)

June-August is best, can be extended to April-October (though Sept./Oct. is hurricance season)

IODP Site Summary Forms:

Form 2 - Site Survey Detail

Please fill out information in all gray boxes

New ☐ *Revised* ■

Proposal #: 564	Site #: MAT-2F	Date Form Submitted: 1/27/2006

	Data Type	SSP Requir-ements	Exists In DB	Details of available data and data that are still to be collected
1	High resolution seismic reflection			Primary Line(s) CH0698 213 cdp 10640 :Location of Site on line (SP or Time only) Crossing Lines(s): CH0698 218 cdp 4148
2	Deep Penetration seismic reflection			Primary Line(s): Ew9009 1003 9390 Location of Site on line (SP or Time only) Crossing Lines(s):
3	Seismic Velocity†			stacking velocities, Oc270 line 529
4	Seismic Grid			CH0698
5a	Refraction (surface)			
5b	Refraction (near bottom)			
6	3.5 kHz			concurrent with all Oc270 and CH0698 data Location of Site on line (Time)
7	Swath bathymetry			available from Creed and Onrust cruises, but not in Data Bank
8a	Side-looking sonar (surface)			available from Creed and Onrust cruises, but not in Data Bank
8b	Side-looking sonar (bottom)			
9	Photography or Video			
10	Heat Flow			
11a	Magnetics			published total mag field contours prepared by USGS available if requested
11b	Gravity			published gravity field contours prepared by the USGS available if requested
12	Sediment cores			Grain size analysis from Onrust submitted with written Safety report
13	Rock sampling			
14a	Water current data			
14b	Ice Conditions			
15	OBS microseismicity			
16	Navigation			all Oc270 and CH0698 MCS and all Creed and Onrust swath topo and backscatter data collected with DGPS navigation
17	Other			

SSP Classification of Site:	SSP Watchdog:	Date of Last Review:
SSP Comments:		

X=required; X*=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

IODP Site Summary Forms:

Form 3 - Detailed Logging Plan

New ☐ *Revised* ■

Proposal #: 564	Site #: MAT-2F	Date Form Submitted: 1/27/2006
Water Depth (m): 34	Sed. Penetration (m): 762	Basement Penetration (m): 0

Do you need to use the conical side-entry sub (CSES) at this site? Yes ☐ No ■

Are high temperatures expected at this site? Yes ☐ No ■

Are there any other special requirements for logging at this site? Yes ☐ No ■

If "Yes" Please describe requirements:____

What do you estimate the total logging time for this site to be: 1 day

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity		
Litho-Density		
Natural Gamma Ray		
Resistivity-Induction		
Acoustic		
FMS		
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)	Density-neutron LWD will provide driller with formation characteristics	
Resitivity-Gamma Ray (LWD)	Resitivity-Gamma LWD will provide driller with formation characteristics	
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	VSP – check shot	

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group at: borehole@ldeo.columbia.edu http://www.ldeo.columbia.edu/BRG/brg_home.html Phone/Fax: (914) 365-8674 / (914) 365-3182	Note: Sites with greater than 400 m of penetration or significant basement penetration require deployment of standard toolstrings.

Form 4 – Pollution & Safety Hazard Summary

IODP Site Summary Forms:

Please fill out information in all gray boxes

New ☐ *Revised* ■

Proposal #: 564	Site #: MAT-2F	Date Form Submitted: 1/27/2006

1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	push/rotary core to TD from jack-up in one hole, cased as needed; logging in second dedicated hole (preferred) or in cored hole if possible
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	ODP Leg 174A drilling at Sites 1071 and 1072 on the outer shelf, 68 km ESE; hydrocarbons were monitored continously and found to be at background levels (5-10 ppmv) down to the bottom of Hole 1071F at 369-405 mbsf. Headspace methane contents in this interval were 448-1268 ppmv, and C1/C2 ratios were 1302-2440. Above-background levels of methane were modest (289-1056 ppmv) within only the 17-36 mbsf interval. Like other slope sites, drilling at ODP Leg 174A Site 1073 encountered considerable methane (as high as 29,000 ppmv) at shallow depths (upper few 10's mbsf) with high C1/C2 ratios above 100,000. Deeper in the hole where methane fell to background levels the C1/C2 ratio also dropped, to values less than 100. DSDP Site 612 and ODP Sites 902, 903, 904, and 906 drilled to a maximum depth of 1150 m on the NJ slope (88 km to the SE) with no significant occurrences. The GLOMAR *Conception* drilled several AMCOR holes to ~300 mbsf beneath the continental shelf with open circulation; no significiant hydrocarbons were encountered at inner shelf site 6011 (22 m water depth, 260 m penetration to Eocene), inner shelf site 6020 (39 m water depth, 44 m penetration to the upper Pleistocene), middle shelf Site 6009 (58 m water depth, 300 m penetration to Miocene), or middle shelf Site 6010 (76 m water depth, 311 m penetration to Miocene sediments.) Upper slope site 6021 (301 m water depth, 305 m penetration to Pleistocene) reported high values (300,000 ppm) of light hydrocarbons (mostly methane).
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	Nearby Exxon 500-1 recorded C1 values from 1880-3200 ft bkb (573-976 m) that were typically less than 10,000 ppm; peak value was 40,000 ppm. No significant hydrocarbons were reported below this interval. Total depth of well: 12,250 ft (3735 m).
4	Are there any indications of gas hydrates at this location?	no
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.	no
6	What "special" precautions will be taken during drilling?	Probably will be done from jack-up with BOP, diverter, casing, closed circulation, and mud
7	What abandonment procedures do you plan to follow:	industry-standard procedures
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	
9	Summary: What do you consider the major risks in drilling at this site?	platform stability during jack-up and jack-down operations

IODP Site Summary Forms:

Form 5 – Lithologic Summary

New *Revised*

Proposal #: 564	Site #: MAT-2F	Date Form Submitted: 1/27/2006

Sub-bottom depth (m)	*Key reflectors, Unconformities, faults, etc*	*Age*	*Assumed velocity (km/sec)*	*Lithology*	*Paleo-environment*	*Avg. rate of sed. accum. (m/My)*	*Comments*
0	seafloor						45 msecs
		late Pleist- early Middle Miocene	1.80	thick (5+ m) med to cse sand with occasional pebbles and shell frags	fluvial/estuarine/ nearshore	25	
258 mbsf	m5						325 msecs
		Middle to Early Miocene	1.85	sandy mudstone, with intervals of thick (~5 m) sand, occasionally glauconitic and cemented	mid- to outer shelf	35	
353 mbsf	m5.2						425 msecs
		Early Miocene	1.90	mudstone with occasional sandy mudstone	pro-delta; slope	70	
728 mbsf	o1						820 msecs
		Late Eocene to Paleocene	1.95	marly chalk, limestone	carbonate ramp at several 100 m water depth	15	
752 mbsf	TD						845 msecs

IODP Site Summary Forms:

564-Full2

Form 1 - General Site Information

Please fill out information in all gray boxes
Revised 7 March 2002

New ☐ **Revised** ■

Section A: Proposal Information

Title of Proposal:	Global Sea Level and the Architecture of Passive Margin Sediments: Shallow-Water Drilling of the New Jersey Continental Shelf
Date Form Submitted:	1/27/2006
Site Specific Objectives with Priority (Must include general objectives in proposal)	Determine age, facies, and paleobathymetry of surfaces correlated with sequence boundaries m1, m4, m5, m5.2, m5.4, and m5.6
List Previous Drilling in Area:	offshore: AMCOR 6011 (Hathaway et al., 1976; 44 km WNW), ODP 1071, 1072 (59 and 62 km ESE) onshore: Island Beach (ODP Leg 150X; 66 km WNW) and other Leg 150X and 174X Sites

Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	MAT-3A	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	NJ inner shelf
Latitude:	Deg: 39	Min: 31.171980	Jurisdiction:	USA
Longitude:	Deg: 73	Min: 24.794280	Distance to Land:	64 km (36 nmi)
Coordinates System:	WGS 84			
Priority of Site:	Primary: **YES**	Alt:	Water Depth:	34 m

Section C: Operational Information

Proposed Penetration: (m)

	Sediments	Basement
Proposed Penetration: (m)	752 m What is the total sed. thickness? ~ 10 km	no
		Total Penetration: 752 m

General Lithologies: medium to coarse sand, ± pebbles and shell fragments, sandy mudstone, mudstone, marly chalk, limestone

Coring Plan: *(Specify or check)*

push-core and rotary core from Mission-Specific jack-up drill rig

1-2-3-APC ☐ VPC* ☐ XCB ☐ MDCB* ☐ PCS ☐ RCB ☐ Re-entry ☐ HRGB ☐

** Systems Currently Under Development*

Wireline Logging Plan:

Standard Tools		Special Tools				LWD	
Neutron-Porosity	☐	Borehole Televiewer	☐	Formation Fluid Sampling	☐	Density-Neutron	■
Litho-Density	☐	Nuclear Magnetic Resonance	☐	Borehole Temperature & Pressure	☐	Resistivity-Gamma Ray	■
Gamma Ray	☐	Geochemical	☐	Borehole Seismic	☐	Acoustic	■
Resistivity	☐	Side-Wall Core Sampling	☐				
Acoustic	☐						
Formation Image	☐			Others ( )		Others (check-shot)	

Max.Borehole Temp. : *Expected value (For Riser Drilling)* ____________°C

Mud Logging: *(Riser Holes Only)*

Cuttings Sampling Intervals

from ________ m to ________ m, ________ m intervals

from ________ m to ________ m, ________ m intervals

Basic Sampling Intervals: 5m

Estimated days:

Drilling/Coring: 24d	Logging: 1 d	Total On-Site:25 days

Future Plan: *Longterm Borehole Observation Plan/Re-entry Plan - none*

Hazards/ Weather:

Please check following List of Potential Hazards

Shallow Gas	■	Complicated Seabed Condition	☐	Hydrothermal Activity	☐
Hydrocarbon	☐	Soft Seabed	■	Landslide and Turbidity Current	☐
Shallow Water Flow	☐	Currents	☐	Methane Hydrate	☐
Abnormal Pressure	☐	Fractured Zone	☐	Diapir and Mud Volcano	☐
Man-made Objects	☐	Fault	☐	High Temperature	☐
H_2S	☐	High Dip Angle	☐	Ice Conditions	☐
CO_2	☐	have completed HiRes MCS grid survey in accordance with JOIDES Guidelines and AT&T marine cable locations			

What is your Weather window? (Preferable period with the reasons)

June-August is best, can be extended to April-October (though Sept./Oct. is hurricance season)

IODP Site Summary Forms:

Form 2 - Site Survey Detail

Please fill out information in all gray boxes

New ☐ *Revised* ☒

Proposal #: 564	Site #: MAT-3A	Date Form Submitted: 1/27/2006

	Data Type	SSP Requir-ements	Exists In DB	Details of available data and data that are still to be collected
1	High resolution seismic reflection			Primary Line(s) CH0698 307 cdp 10997 :Location of Site on line (SP or Time only) Crossing Lines(s): CH0698 310 cdp 4613
2	Deep Penetration seismic reflection			Primary Line(s): Ew9009 1003 cdp 8690 Location of Site on line (SP or Time only) Crossing Lines(s):
3	Seismic Velocity†			stacking velocities, Oc270 line 529
4	Seismic Grid			CH0698
5a	Refraction (surface)			
5b	Refraction (near bottom)			
6	3.5 kHz			concurrent with all Oc270 and CH0698 data Location of Site on line (Time)
7	Swath bathymetry			available from Creed and Onrust cruises, but not in Data Bank
8a	Side-looking sonar (surface)			available from Creed and Onrust cruises, but not in Data Bank
8b	Side-looking sonar (bottom)			
9	Photography or Video			
10	Heat Flow			
11a	Magnetics			published total mag field contours prepared by USGS available if requested
11b	Gravity			published gravity field contours prepared by the USGS available if requested
12	Sediment cores			Grain size analysis from Onrust submitted with written Safety report
13	Rock sampling			
14a	Water current data			
14b	Ice Conditions			
15	OBS microseismicity			
16	Navigation			all Oc270 and CH0698 MCS and all Creed and Onrust swath topo and backscatter data collected with DGPS navigation
17	Other			

SSP Classification of Site:	SSP Watchdog:	Date of Last Review:
SSP Comments:		

X=required; X*=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

Form 3 - Detailed Logging Plan

IODP Site Summary Forms:

New ☐ *Revised* ■

Proposal #: 564	Site #: MAT-3A	Date Form Submitted: 1/27/2006
Water Depth (m): 34	Sed. Penetration (m): 762	Basement Penetration (m): 0

Do you need to use the conical side-entry sub (CSES) at this site? Yes ☐ No ■

Are high temperatures expected at this site? Yes ☐ No ■

Are there any other special requirements for logging at this site? Yes ☐ No ■

If "Yes" Please describe requirements:____

What do you estimate the total logging time for this site to be: 1 day

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity		
Litho-Density		
Natural Gamma Ray		
Resistivity-Induction		
Acoustic		
FMS		
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)	Density-neutron LWD will provide driller with formation characteristics	
Resitivity-Gamma Ray (LWD)	Resitivity-Gamma LWD will provide driller with formation characteristics	
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	VSP – check shot	

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group at: borehole@ldeo.columbia.edu http://www.ldeo.columbia.edu/BRG/brg_home.html Phone/Fax: (914) 365-8674 / (914) 365-3182	Note: Sites with greater than 400 m of penetration or significant basement penetration require deployment of standard toolstrings.

Form 4 – Pollution & Safety Hazard Summary

IODP Site Summary Forms:

Please fill out information in all gray boxes

New ☐ *Revised* ■

Proposal #: 564	Site #: MAT-3A	Date Form Submitted: 1/27/2006

1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	push/rotary core to TD from jack-up in one hole, cased as needed; logging in second dedicated hole (preferred) or in cored hole if possible
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	ODP Leg 174A drilling at Sites 1071 and 1072 on the outer shelf, 60 km ESE; hydrocarbons were monitored continously and found to be at background levels (5-10 ppmv) down to the bottom of Hole 1071F at 369-405 mbsf. Headspace methane contents in this interval were 448-1268 ppmv, and C1/C2 raios were 1302-2440. Above-background levels of methane were modest (289-1056 ppmv) within only athe 17-36 mbsf interval. Like other slope sites, drilling at ODP Leg 174A Site 1073 encountered considerable methane (as high as 29,000 ppmv) at shallow depths (uupper few 10's mbsf) with high C1/C2 ratios above 100,000. Deeper in the hole where methane fell to background levels the C1/C2 ratio also dropped, to values less than 100. DSDP Site 612 and ODP Sites 902, 903, 904, and 906 drilled to a maximum depth of 1150 m on the NJ slope (80 km to the SE) with no significant occurrences. The GLOMAR *Conception* drilled several AMCOR holes to ~300 mbsf beneath the continental shelf with open circulation; no significiant hydrocarbons were encountered at inner shelf site 6011 (22 m water depth, 260 m penetration to Eocene), inner shelf site 6020 (39 m water depth, 44 m penetration to the upper Pleistocene), middle shelf Site 6009 (58 m water depth, 300 m penetration to Miocene), or middle shelf Site 6010 (76 m water depth, 311 m penetration to Miocene sediments.) Upper slope site 6021 (301 m water depth, 305 m penetration to Pleistocene) reported high values (300,000 ppm) of light hydrocarbons (mostly methane).
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	Nearby Exxon 500-1 recorded C1 values from 1880-3200 ft bkb (573-976 m) that were typically less than 10,000 ppm; peak value was 40,000 ppm. No significant hydrocarbons were reported below this interval. Total depth of well: 12,250 ft (3735 m).
4	Are there any indications of gas hydrates at this location?	no
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.	no
6	What "special" precautions will be taken during drilling?	Probably will be done from jack-up with BOP, diverter, casing, closed circulation, and mud
7	What abandonment procedures do you plan to follow:	industry-standard procedures
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	
9	Summary: What do you consider the major risks in drilling at this site?	platform stability during jack-up and jack-down operations

IODP Site Summary Forms:

Form 5 – Lithologic Summary

New [ ] *Revised* [X]

Proposal #: 564	Site #: MAT-3A	Date Form Submitted: 1/27/2006

Sub-bottom depth (m)	*Key reflectors, Unconformities, faults, etc*	*Age*	*Assumed velocity (km/sec)*	*Lithology*	*Paleo-environment*	*Avg. rate of sed. accum. (m/My)*	*Comments*
0	seafloor						45 msecs
		late Pleist-early Middle Miocene	1.85	thick (5+ m) med to cse sand with occasional pebbles and shell frags	fluvial/estuarine/ nearshore	25	
248 mbsf	m4						315 msecs
		Middle to Early Miocene	1.90	mudstone with occasional sandy mudstone	pro-delta; slope	55	
752 mbsf	TD						845 msecs

IODP Site Summary Forms:

564-Full2

Form 1 - General Site Information

Please fill out information in all gray boxes
Revised 7 March 2002

New ☐ **Revised** ■

Section A: Proposal Information

Title of Proposal:	Global Sea Level and the Architecture of Passive Margin Sediments: Shallow-Water Drilling of the New Jersey Continental Shelf
Date Form Submitted:	1/27/2006
Site Specific Objectives with Priority (Must include general objectives in proposal)	Determine age, facies, and paleobathymetry of surfaces correlated with sequence boundaries m1, m4, m5, m5.2, m5.4, and m5.6
List Previous Drilling in Area:	offshore: AMCOR 6011 (Hathaway et al., 1976; 44 km WNW), ODP 1071, 1072 (59 and 62 km ESE) onshore: Island Beach (ODP Leg 150X; 66 km WNW) and other Leg 150X and 174X Sites

Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	MAT-3B	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	NJ inner shelf
Latitude:	Deg: 39	Min: 30.845640	Jurisdiction:	USA
Longitude:	Deg: 73	Min: 25.088640	Distance to Land:	64 km (36 nmi)
Coordinates System:	WGS 84			
Priority of Site:	Primary:	Alt: **YES**	Water Depth:	34 m

Section C: Operational Information

	Sediments	Basement
Proposed Penetration: (m)	752 m What is the total sed. thickness? ~ 10 km	no
		Total Penetration: 752 m

General Lithologies: medium to coarse sand, ± pebbles and shell fragments, sandy mudstone, mudstone, marly chalk, limestone

Coring Plan: *(Specify or check)*
push-core and rotary core from Mission-Specific jack-up drill rig

1-2-3-APC ☐ VPC* ☐ XCB ☐ MDCB* ☐ PCS ☐ RCB ☐ Re-entry ☐ HRGB ☐

** Systems Currently Under Development*

Wireline Logging Plan:

Standard Tools		Special Tools				LWD	
Neutron-Porosity	☐	Borehole Televiewer	☐	Formation Fluid Sampling	☐	Density-Neutron	■
Litho-Density	☐	Nuclear Magnetic Resonance	☐	Borehole Temperature & Pressure	☐	Resistivity-Gamma Ray	■
Gamma Ray	☐	Geochemical	☐	Borehole Seismic	☐	Acoustic	■
Resistivity	☐	Side-Wall Core Sampling	☐				
Acoustic	☐						
Formation Image	☐			Others ( )		Others (check-shot)	

Max.Borehole Temp. : *Expected value (For Riser Drilling)* ____________°C

Mud Logging: *(Riser Holes Only)*

Cuttings Sampling Intervals

from ________ m to ________ m, ________ m intervals

from ________ m to ________ m, ________ m intervals

Basic Sampling Intervals: 5m

Estimated days:

Drilling/Coring: 24d	Logging: 1 d	Total On-Site:25 days

Future Plan: *Longterm Borehole Observation Plan/Re-entry Plan - none*

Hazards/ Weather:

Please check following List of Potential Hazards

Shallow Gas	■	Complicated Seabed Condition	☐	Hydrothermal Activity	☐
Hydrocarbon	☐	Soft Seabed	■	Landslide and Turbidity Current	☐
Shallow Water Flow	☐	Currents	☐	Methane Hydrate	☐
Abnormal Pressure	☐	Fractured Zone	☐	Diapir and Mud Volcano	☐
Man-made Objects	☐	Fault	☐	High Temperature	☐
H_2S	☐	High Dip Angle	☐	Ice Conditions	☐
CO_2	☐	have completed HiRes MCS grid survey in accordance with JOIDES Guidelines and AT&T marine cable locations			

What is your Weather window? (Preferable period with the reasons)

June-August is best, can be extended to April-October (though Sept./Oct. is hurricance season)

Form 2 - Site Survey Detail

IODP Site Summary Forms:

Please fill out information in all gray boxes

New [ ] *Revised* [X]

Proposal #: 564	Site #: MAT-3B	Date Form Submitted: 1/27/2006

	Data Type	SSP Requir-ements	Exists In DB	Details of available data and data that are still to be collected
1	High resolution seismic reflection			Primary Line(s) CH0698 301 cdp 10032 :Location of Site on line (SP or Time only) Crossing Lines(s): CH0698 310 cdp 4736
2	Deep Penetration seismic reflection			Primary Line(s): Ew9009 1003 cdp 8690 Location of Site on line (SP or Time only) Crossing Lines(s):
3	Seismic Velocity†			stacking velocities, Oc270 line 529
4	Seismic Grid			CH0698
5a	Refraction (surface)			
5b	Refraction (near bottom)			
6	3.5 kHz			concurrent with all Oc270 and CH0698 data Location of Site on line (Time)
7	Swath bathymetry			available from Creed and Onrust cruises, but not in Data Bank
8a	Side-looking sonar (surface)			available from Creed and Onrust cruises, but not in Data Bank
8b	Side-looking sonar (bottom)			
9	Photography or Video			
10	Heat Flow			
11a	Magnetics			published total mag field contours prepared by USGS available if requested
11b	Gravity			published gravity field contours prepared by the USGS available if requested
12	Sediment cores			Grain size analysis from Onrust submitted with written Safety report
13	Rock sampling			
14a	Water current data			
14b	Ice Conditions			
15	OBS microseismicity			
16	Navigation			all Oc270 and CH0698 MCS and all Creed and Onrust swath topo and backscatter data collected with DGPS navigation
17	Other			

SSP Classification of Site:	SSP Watchdog:	Date of Last Review:
SSP Comments:		

X=required; X*=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

IODP Site Summary Forms:

Form 3 - Detailed Logging Plan

New ☐ *Revised* ■

Proposal #: 564	Site #: MAT-3B	Date Form Submitted: 1/27/2006
Water Depth (m): 34	Sed. Penetration (m): 762	Basement Penetration (m): 0

Do you need to use the conical side-entry sub (CSES) at this site? Yes ☐ No ■

Are high temperatures expected at this site? Yes ☐ No ■

Are there any other special requirements for logging at this site? Yes ☐ No ■

If "Yes" Please describe requirements:______________________________

____

What do you estimate the total logging time for this site to be: 1 day

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity		
Litho-Density		
Natural Gamma Ray		
Resistivity-Induction		
Acoustic		
FMS		
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)	Density-neutron LWD will provide driller with formation characteristics	
Resitivity-Gamma Ray (LWD)	Resitivity-Gamma LWD will provide driller with formation characteristics	
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	VSP – check shot	

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group at: borehole@ldeo.columbia.edu http://www.ldeo.columbia.edu/BRG/brg_home.html Phone/Fax: (914) 365-8674 / (914) 365-3182	Note: Sites with greater than 400 m of penetration or significant basement penetration require deployment of standard toolstrings.

Form 4 – Pollution & Safety Hazard Summary

IODP Site Summary Forms:

Please fill out information in all gray boxes

New ☐ *Revised* ■

Proposal #: 564	Site #: MAT-3B	Date Form Submitted: 1/27/2006

1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	push/rotary core to TD from jack-up in one hole, cased as needed; logging in second dedicated hole (preferred) or in cored hole if possible
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	ODP Leg 174A drilling at Sites 1071 and 1072 on the outer shelf, 60 km ESE; hydrocarbons were monitored continously and found to be at background levels (5-10 ppmv) down to the bottom of Hole 1071F at 369-405 mbsf. Headspace methane contents in this interval were 448-1268 ppmv, and C1/C2 raios were 1302-2440. Above-background levels of methane were modest (289-1056 ppmv) within only athe 17-36 mbsf interval. Like other slope sites, drilling at ODP Leg 174A Site 1073 encountered considerable methane (as high as 29,000 ppmv) at shallow depths (uupper few 10's mbsf) with high C1/C2 ratios above 100,000. Deeper in the hole where methane fell to background levels the C1/C2 ratio also dropped, to values less than 100. DSDP Site 612 and ODP Sites 902, 903, 904, and 906 drilled to a maximum depth of 1150 m on the NJ slope (80 km to the SE) with no significant occurrences. The GLOMAR *Conception* drilled several AMCOR holes to ~300 mbsf beneath the continental shelf with open circulation; no significiant hydrocarbons were encountered at inner shelf site 6011 (22 m water depth, 260 m penetration to Eocene), inner shelf site 6020 (39 m water depth, 44 m penetration to the upper Pleistocene), middle shelf Site 6009 (58 m water depth, 300 m penetration to Miocene), or middle shelf Site 6010 (76 m water depth, 311 m penetration to Miocene sediments.) Upper slope site 6021 (301 m water depth, 305 m penetration to Pleistocene) reported high values (300,000 ppm) of light hydrocarbons (mostly methane).
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	Nearby Exxon 500-1 recorded C1 values from 1880-3200 ft bkb (573-976 m) that were typically less than 10,000 ppm; peak value was 40,000 ppm. No significant hydrocarbons were reported below this interval. Total depth of well: 12,250 ft (3735 m).
4	Are there any indications of gas hydrates at this location?	no
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.	no
6	What "special" precautions will be taken during drilling?	Probably will be done from jack-up with BOP, diverter, casing, closed circulation, and mud
7	What abandonment procedures do you plan to follow:	industry-standard procedures
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	
9	Summary: What do you consider the major risks in drilling at this site?	platform stability during jack-up and jack-down operations

IODP Site Summary Forms:

Form 5 – Lithologic Summary

New ☐ *Revised* ☒

Proposal #: 564	Site #: MAT-3B	Date Form Submitted: 1/27/2006

Sub-bottom depth (m)	*Key reflectors, Unconformities, faults, etc*	*Age*	*Assumed velocity (km/sec)*	*Lithology*	*Paleo-environment*	*Avg. rate of sed. accum. (m/My)*	*Comments*
0	seafloor						45 msecs
		late Pleist- early Middle Miocene	1.85	thick (5+ m) med to cse sand with occasional pebbles and shell frags	fluvial/estuarine/ nearshore	25	
248 mbsf	m4						315 msecs
		Middle to Early Miocene	1.90	mudstone with occasional sandy mudstone	pro-delta; slope	55	
752 mbsf	TD						845 msecs

564-Full2

IODP Site Summary Forms:

Form 1 - General Site Information

Please fill out information in all gray boxes
Revised 7 March 2002

New ☐ Revised ■

Section A: Proposal Information

Title of Proposal:	Global Sea Level and the Architecture of Passive Margin Sediments: Shallow-Water Drilling of the New Jersey Continental Shelf
Date Form Submitted:	1/27/2006
Site Specific Objectives with Priority (Must include general objectives in proposal)	Determine age, facies, and paleobathymetry of surfaces correlated with sequence boundaries m1, m4, m5, m5.2, m5.4, and m5.6
List Previous Drilling in Area:	offshore: AMCOR 6011 (Hathaway et al., 1976; 44 km WNW), ODP 1071, 1072 (59 and 62 km ESE) onshore: Island Beach (ODP Leg 150X; 66 km WNW) and other Leg 150X and 174X Sites

Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	MAT-3C	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	NJ inner shelf
Latitude:	Deg: 39	Min: 31.502220	Jurisdiction:	USA
Longitude:	Deg: 73	Min: 24.481500	Distance to Land:	64 km (36 nmi)
Coordinates System:	WGS 84			
Priority of Site:	Primary:	Alt: **YES**	Water Depth:	34 m

Section C: Operational Information

	Sediments	Basement
Proposed Penetration: (m)	752 m What is the total sed. thickness? ~ 10 km	no
		Total Penetration: 752 m

General Lithologies:	medium to coarse sand, ± pebbles and shell fragments, sandy mudstone, mudstone, marly chalk, limestone	
Coring Plan: *(Specify or check)*	push-core and rotary core from Mission-Specific jack-up drill rig 1-2-3-APC ☐ VPC* ☐ XCB ☐ MDCB* ☐ PCS ☐ RCB ☐ Re-entry ☐ HRGB ☐ ** Systems Currently Under Development*	

Wireline Logging Plan:

Standard Tools		Special Tools				LWD	
Neutron-Porosity	☐	Borehole Televiewer	☐	Formation Fluid Sampling	☐	Density-Neutron	■
Litho-Density	☐	Nuclear Magnetic Resonance	☐	Borehole Temperature & Pressure	☐	Resistivity-Gamma Ray	■
Gamma Ray	☐	Geochemical	☐	Borehole Seismic	☐	Acoustic	■
Resistivity	☐	Side-Wall Core Sampling	☐				
Acoustic	☐						
Formation Image	☐			Others ( )		Others ( )	

Max.Borehole Temp. :	*Expected value (For Riser Drilling)* ____________°C
Mud Logging: *(Riser Holes Only)*	Cuttings Sampling Intervals from ________ m to ________ m, ________ m intervals from ________ m to ________ m, ________ m intervals *Basic Sampling Intervals: 5m*

Estimated days:	Drilling/Coring: 24d	Logging: 1 d	Total On-Site:25 days
Future Plan:	*Longterm Borehole Observation Plan/Re-entry Plan - none*		

Hazards/ Weather:

Please check following List of Potential Hazards						*What is your Weather window? (Preferable period with the reasons)*
Shallow Gas	■	Complicated Seabed Condition	☐	Hydrothermal Activity	☐	June-August is best, can be extended to April-October (though Sept./Oct. is hurricance season)
Hydrocarbon	☐	Soft Seabed	■	Landslide and Turbidity Current	☐	
Shallow Water Flow	☐	Currents	☐	Methane Hydrate	☐	
Abnormal Pressure	☐	Fractured Zone	☐	Diapir and Mud Volcano	☐	
Man-made Objects	☐	Fault	☐	High Temperature	☐	
H_2S	☐	High Dip Angle	☐	Ice Conditions	☐	
CO_2	☐	have completed HiRes MCS grid survey in accordance with JOIDES Guidelines and AT&T marine cable locations				

IODP Site Summary Forms:

Form 2 - Site Survey Detail

Please fill out information in all gray boxes

New ☐ *Revised* ■

Proposal #: 564	Site #: MAT-3C	Date Form Submitted: 1/27/2006

	Data Type	SSP Requir-ements	Exists In DB	Details of available data and data that are still to be collected
1	High resolution seismic reflection			Primary Line(s) CH0698 313 cdp 6944 :Location of Site on line (SP or Time only) Crossing Lines(s): CH0698 310 cdp 4490
2	Deep Penetration seismic reflection			Primary Line(s): Ew9009 1003 cdp 8690 Location of Site on line (SP or Time only) Crossing Lines(s):
3	Seismic Velocity†			stacking velocities, Oc270 line 529
4	Seismic Grid			CH0698
5a	Refraction (surface)			
5b	Refraction (near bottom)			
6	3.5 kHz			concurrent with all Oc270 and CH0698 data Location of Site on line (Time)
7	Swath bathymetry			available from Creed and Onrust cruises, but not in Data Bank
8a	Side-looking sonar (surface)			available from Creed and Onrust cruises, but not in Data Bank
8b	Side-looking sonar (bottom)			
9	Photography or Video			
10	Heat Flow			
11a	Magnetics			published total mag field contours prepared by USGS available if requested
11b	Gravity			published gravity field contours prepared by the USGS available if requested
12	Sediment cores			Grain size analysis from Onrust submitted with written Safety report
13	Rock sampling			
14a	Water current data			
14b	Ice Conditions			
15	OBS microseismicity			
16	Navigation			all Oc270 and CH0698 MCS and all Creed and Onrust swath topo and backscatter data collected with DGPS navigation
17	Other			

SSP Classification of Site:	SSP Watchdog:	Date of Last Review:
SSP Comments:		

X=required; X*=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

Form 3 - Detailed Logging Plan

IODP Site Summary Forms:

New ☐ *Revised* ■

Proposal #: 564	Site #: MAT-3C	Date Form Submitted: 1/27/2006
Water Depth (m): 34	Sed. Penetration (m): 762	Basement Penetration (m): 0

Do you need to use the conical side-entry sub (CSES) at this site? Yes ☐ No ■

Are high temperatures expected at this site? Yes ☐ No ■

Are there any other special requirements for logging at this site? Yes ☐ No ■

If "Yes" Please describe requirements:______________________________

____

What do you estimate the total logging time for this site to be: 1 day

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity		
Litho-Density		
Natural Gamma Ray		
Resistivity-Induction		
Acoustic		
FMS		
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)	Density-neutron LWD will provide driller with formation characteristics	
Resitivity-Gamma Ray (LWD)	Resitivity-Gamma LWD will provide driller with formation characteristics	
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	VSP – check shot	

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group at: borehole@ldeo.columbia.edu http://www.ldeo.columbia.edu/BRG/brg_home.html Phone/Fax: (914) 365-8674 / (914) 365-3182	Note: Sites with greater than 400 m of penetration or significant basement penetration require deployment of standard toolstrings.

Form 4 – Pollution & Safety Hazard Summary

IODP Site Summary Forms:

Please fill out information in all gray boxes

New ☐ *Revised* ■

Proposal #: 564	Site #: MAT-3C	Date Form Submitted: 1/27/2006

1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	push/rotary core to TD from jack-up in one hole, cased as needed; logging in second dedicated hole (preferred) or in cored hole if possible
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	ODP Leg 174A drilling at Sites 1071 and 1072 on the outer shelf, 60 km ESE; hydrocarbons were monitored continously and found to be at background levels (5-10 ppmv) down to the bottom of Hole 1071F at 369-405 mbsf. Headspace methane contents in this interval were 448-1268 ppmv, and C1/C2 raios were 1302-2440. Above-background levels of methane were modest (289-1056 ppmv) within only athe 17-36 mbsf interval. Like other slope sites, drilling at ODP Leg 174A Site 1073 encountered considerable methane (as high as 29,000 ppmv) at shallow depths (uupper few 10's mbsf) with high C1/C2 ratios above 100,000. Deeper in the hole where methane fell to background levels the C1/C2 ratio also dropped, to values less than 100. DSDP Site 612 and ODP Sites 902, 903, 904, and 906 drilled to a maximum depth of 1150 m on the NJ slope (80 km to the SE) with no significant occurrences. The GLOMAR *Conception* drilled several AMCOR holes to ~300 mbsf beneath the continental shelf with open circulation; no significiant hydrocarbons were encountered at inner shelf site 6011 (22 m water depth, 260 m penetration to Eocene), inner shelf site 6020 (39 m water depth, 44 m penetration to the upper Pleistocene), middle shelf Site 6009 (58 m water depth, 300 m penetration to Miocene), or middle shelf Site 6010 (76 m water depth, 311 m penetration to Miocene sediments.) Upper slope site 6021 (301 m water depth, 305 m penetration to Pleistocene) reported high values (300,000 ppm) of light hydrocarbons (mostly methane).
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	Nearby Exxon 500-1 recorded C1 values from 1880-3200 ft bkb (573-976 m) that were typically less than 10,000 ppm; peak value was 40,000 ppm. No significant hydrocarbons were reported below this interval. Total depth of well: 12,250 ft (3735 m).
4	Are there any indications of gas hydrates at this location?	no
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.	no
6	What "special" precautions will be taken during drilling?	Probably will be done from jack-up with BOP, diverter, casing, closed circulation, and mud
7	What abandonment procedures do you plan to follow:	industry-standard procedures
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	
9	Summary: What do you consider the major risks in drilling at this site?	platform stability during jack-up and jack-down operations

IODP Site Summary Forms:

Form 5 – Lithologic Summary

New ☐ *Revised* ■

Proposal #: 564	Site #: MAT-3C	Date Form Submitted: 1/27/2006

Sub-bottom depth (m)	*Key reflectors, Unconformities, faults, etc*	*Age*	*Assumed velocity (km/sec)*	*Lithology*	*Paleo-environment*	*Avg. rate of sed. accum. (m/My)*	*Comments*
0	seafloor						45 msecs
		late Pleist-early Middle Miocene	1.85	thick (5+ m) med to cse sand with occasional pebbles and shell frags	fluvial/estuarine/ nearshore	25	
248 mbsf	m4						315 msecs
		Middle to Early Miocene	1.90	mudstone with occasional sandy mudstone	pro-delta; slope	55	
752 mbsf	TD						845 msecs