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IODP Proposal Cover Sheet

564-Full2

☐ **New** ■ **Revised** ☐ **Addendum**

Please fill out information in all gray boxes

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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		
Keywords: *(5 or less)*	New Jersey Sea Level	Area:	NJ continental shelf

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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.

564-Full2

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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