IODP Proposal Cover Sheet

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Amazon Margin Drilling

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Title	Deep drilling of the Amazon continental margin: The evolution of Cenozoic neotropical biodiversity, climate, and oceanography		
Proponents	Paul Baker, Cleverson Silva, Sherilyn Fritz, Tadeu Reis		
Keywords	Biodiversity, Amazon, Paleoceanography, Paleoclimate, Tropics	Area	Amazon continental margin

Proponent Information

Proponent	Paul Baker
Affiliation	Duke University and Yachay Tech
Country	United States

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Abstract

We propose a single 1815 m deep drill hole to be located in 420 m water depth (with an alternate site of 1589 m subbottom depth in 237 m water depth) just to the northwest of the Amazon Fan in the long-lived Foz do Amazonas basin of the equatorial margin of Brazil. Here we will obtain a nearly complete sedimentary sequence spanning the Eocene through modern, which will contain a high-resolution record of terrestrial biodiversity and continental climate and of the oceanographic conditions that, in part, forced the climate of the adjacent continent. This record is the marine complement to a transect of continental drill sites proposed in a related ICDP proposal, which together form the "Trans-Amazon Drilling Project." This undertaking addresses fundamental questions about Cenozoic climatic evolution of the Amazon region, the origins of the neotropical rain forest and its incomparable biodiversity, the timing and development of the transcontinental Amazon River and the Amazon Fan, and the paleoceanographic history of the western equatorial Atlantic. Study of these first-ever scientific drill cores of the Cenozoic Amazon, both on-land and offshore, will transform our understanding of Amazonian geological, climatic, biotic, and oceanographic history.

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Scientific Objectives

(1) To generate a continuous record of the early history of the forests of the eastern Amazon and their diversity from the Eocene (or earlier) onward;
(2) To obtain an integrated record of the late Miocene-to-present history of the forests of the entire Amazon and tropical Andes, starting with the establishment of the trans-continental Amazon drainage into the Atlantic;
(3) To generate the longest and most continuous record of tropical South American climate from the Eocene onward at unprecedented resolution;
(4) To reconstruct at ultra-high resolution the oceanographic conditions that, in part, forced the South American terrestrial climate during this interval;
(4) To determine the onset of trans-continental drainage of the Amazon River into the Atlantic and the changing rates of Amazon outflow;
(5) To provide critical marine biostratigraphic control for correlation with the continental drilling sites of the Trans-Amazon Drilling Project.

Non-standard measurements technology needed to achieve the proposed scientific objectives

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Proposed Sites (Total proposed sites: 2; pri: 1; alt: 1; N/S: 0)

Site Name	Position (Lat, Lon)	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
AM-3A (Primary)	4.66178315 -50.02525856	420	1815	0	1815	Drill a continuous Quaternary-to-late Eocene section from sea-floor down to 1815 mbsf to provide a record of the climatic and biotic evolution of the Amazon rainforest, the origins of the transcontinental Amazon River and Amazon Fan, and the paleoceanographic history of the western equatorial Atlantic. Investigate the changes in provenance of the terrigenous components to determine the changes from an Eastern Amazon forest signature to a basin-wide signature of the entire Amazon and Andean forest.
AM-4A (Alternate)	4.62895935 -50.08952997	237	1589	0	1589	Drill a continuous Quaternary-to-late Eocene section from sea-floor down to 1589 mbsf to provide a record of the climatic and biotic evolution of the Amazon rainforest, the origins of the transcontinental Amazon River and Amazon Fan, and the paleoceanographic history of the western equatorial Atlantic. Investigate the changes in provenance of the terrigenous components to determine the changes from an Eastern Amazon forest signature to a basin-wide signature of the entire Amazon and Andean forest.