

IODP Proposal Cover Sheet

Campbell Drift climate

831 - Apl

Title	Re-drill of ODP Site 1121: Paleogene and Cretaceous sequences of the Campbell Drift		
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Abstract

We propose a re-drill of ODP Site 1121, located near the base of the Campbell Plateau southeast of New Zealand, as an additional site for Proposal 567, Paleogene South Pacific Transect. "Drilling of Site 1121 during ODP Leg 181, Southwest Pacific Gateways," revealed that the Campbell Drift, "previously believed to be a Neogene contourite drift, was Paleocene in age. Because the scientific results from Site 1121 were not in line with the proposed objective to record the history of the modern Deep Western Boundary Current, the site was terminated after recovery of a single, shallow hole (139.7 mbsf). A deeper, multi-hole re-drill of Site 1121 is needed to (a) create a continuous spliced section, and (b) to recover the early Paleocene and upper Cretaceous--the first truly deep water record of these times from the SW Pacific. The overarching goal is to provide a critical high-latitude record of the warm Late Cretaceous and Paleogene, including the first record of the Cretaceous/Paleogene boundary from an abyssal, high latitude South Pacific site.

ODP Site 1121 is ideally located to assess characteristics of high-latitude ocean circulation during times of extreme warmth, including the possibility that the South Pacific was proximal to deep water formation in the Late Cretaceous and Paleocene. With a water depth of ~4500 m (Paleocene paleodepth ~3800 m), Site 1121 also offers one of the deepest sites in the global Paleocene ocean, key for understanding the evolution of the carbonate compensation depth. Preliminary data from ODP Site 1121 indicate the potential for developing multiple paleoceanographic proxy records, including geochemistry of carbonate microfossils, $\delta^{15}N$ of fossil fish teeth, and TEX-86 SST, and records from multiple fossil groups, including carbonate nannofossils, benthic foraminifera, and radiolarians. High sedimentation rates (2-11 cm/kyr) indicated by available biostratigraphy demonstrate the possibility of developing detailed records of ocean and climate evolution.

We have obtained high-quality SCS lines from other parts of the Campbell "Drift" that show it is possible to recover sedimentary sequences younger than those recovered in ODP 1121. There are no crossing lines for these new lines, but the deep water depths, location on oceanic crust, and thin sediment cover (~1 km), suggest the safety hazard is small. Hence, it is possible to locate other sites on the "Drift" that could obtain an expanded Paleogene record if site survey requirements were relaxed.

Scientific Objectives

- 1.Role of the Ross Sea in Paleogene and Cretaceous deep water formation in the Pacific Basin
- 2.Paleocene & upper Cretaceous history of strength of Deep Western Boundary Current
- 3.South Pacific Paleogene and upper Cretaceous CCD history
- 4.SW Pacific Paleogene temperature history
- 5.SW Pacific protist paleobiology, nutrient chemistry and surface ocean circulation

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

None--standard paleoceanography tools

Proposed Sites

Site Name	Position (Lat, Lon)	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
CAMP-1A	-50.8979, 176.9977	4500	500	0	500	Re-drill ODP Site 1121 in order to obtain a multiple hole, stratigraphically continuous record of Paleocene and Cretaceous nannofossil and siliceous ooze and chalks down to 500 mbsf.