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8. Data Report: Carbonate Concentrations of Paleogene Sediment at Hole 1121B, Campbell Drift[1]

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INTRODUCTION

Site 1121 is located southeast of New Zealand on the Campbell Drift (50°53.876′S 176°59.862′E) at a water depth of 4487.90 meters below sea level (mbsl). The site was drilled to recover an expanded sediment sequence from a Neogene contourite drift (Shipboard Scientific Party, 1999). Unexpectedly, the sequence between 32.7 and 132 meters below seafloor (mbsf) is composed of Paleogene siliceous and nannofossil-bearing ooze and chalk (Shipboard Scientific Party, 1999). This finding is intriguing because the location was probably fairly deep (>3800 mbsl) during the Paleogene (Shipboard Scientific Party, 1999), suggesting a carbonate compensation depth (CCD) significantly lower than expected from Cenozoic CCD curves (van Andel, 1975). Therefore, 39 samples of sediment were taken from Hole 1121B to construct a more detailed carbonate record of this interesting lithologic unit.

METHODS

Carbonate concentrations for all samples were analyzed using the "Karbonate-Bombe" method (Mueller and Gastner, 1971). All 39 samples were freeze-dried to remove pore water and crushed into a fine powder. Approximately 2 mg of powdered sample was then placed in a sealed chamber and reacted with HCl to produce CO_2 gas. The resulting gas volume was measured using water displacement in a burette and related to carbonate mass by comparison to a standard curve constructed by measuring volumes of gas produced from known masses of labora-

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tory-grade $CaCO_3$. All samples were analyzed twice. A sample of Paleogene siliceous limestone (JCU sample MS14) with a known $CaCO_3$ concentration of 72 wt% was also analyzed three times to evaluate accuracy and precision. Replicate analyses of the Site 1121 samples were consistently within 1.1 wt%. The measured carbonate concentration of MS14 was 71.9 ± 0.1 wt%.

RESULTS

Bulk carbonate concentrations vary significantly between 3.7 and 51.4 wt% and average 31 wt% (Table **T1**; Fig. **F1**). These results are consistent with shipboard carbonate concentrations, which, over a similar depth, vary between 0.6 and 52 wt% and average 30 wt% (Fig. **F1**). Although carbonate concentrations are moderately high (~30–50 wt%) between 32.9 and 131.7 mbsf, a marked low occurs at 74.4 mbsf (6.4 wt%). Carbonate concentrations are <5 wt% below 133.2 mbsf.

T1. Carbonate concentrations, p. 5.

F1. Summary log for Hole 1121B, p. 4.

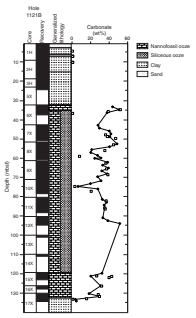

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Figure F1. Summary log for Hole 1121B with carbonate concentration (weight percent) from this study and from shipboard measurements (Shipboard Scientific Party, 1999). Solid diamonds = carbonate concentration. Open boxes = shipboard measurements.

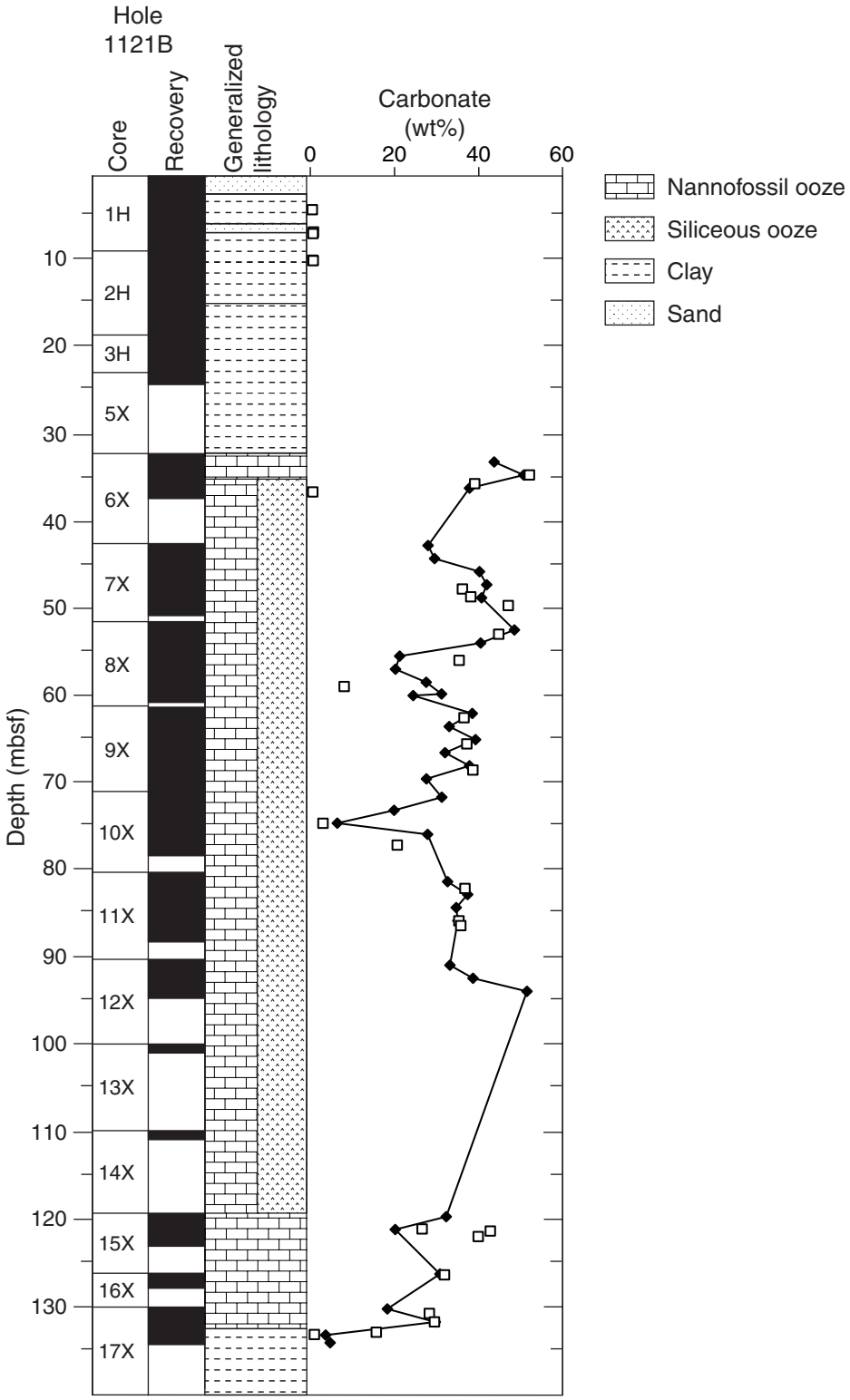

Table T1. Carbonate concentration, Hole 1121B.

Core, section, interval (cm)	Depth (mbsf)	Carbonate (wt%)*
181-1121B-		
6X-1, 20–22	32.90	43.6
6X-2, 21–23	34.41	50.7
6X-3, 20–22	35.90	37.8
7X-1, 20–22	42.50	28.0
7X-2, 20–22	44.00	29.5
7X-3, 20–22	45.50	40.2
7X-4, 20–22	47.00	41.9
7X-5, 20–22	48.50	40.7
8X-1, 20–22	52.20	48.5
8X-2, 20–22	53.70	40.5
8X-3, 20–22	55.20	21.2
8X-4, 20–22	56.70	20.2
8X-5, 20–22	58.20	27.5
8X-6, 20–22	59.55	31.2
8X-6, 39–41	59.74	24.4
9X-1, 20–22	61.80	38.5
9X-2, 20–22	63.30	33.0
9X-3, 20–22	64.80	39.2
9X-4, 20–22	66.30	32.0
9X-5, 20–22	67.80	37.8
9X-6, 20–22	69.30	27.6
10X-1, 20–22	71.40	31.2
10X-2, 20–22	72.90	19.9
10X-3, 20–22	74.40	6.4
10X-4, 20–22	75.69	27.9
11X-1, 20–22	81.10	32.6
11X-2, 20–22	82.60	37.4
11X-3, 18–20	84.08	34.6
11X-4, 20–22	85.60	35.0
12X-1, 20–22	90.70	33.1
12X-2, 20–22	92.20	38.6
12X-3, 20–22	93.70	51.4
15X-1, 20–22	119.60	32.3
15X-2, 18–20	121.08	20.2
16X-1, 20–22	126.20	30.8
17X-1, 20–22	130.20	18.3
17X-2, 20–22	131.70	29.7
17X-3, 20–22	133.20	3.7
17X-CC, 10–12	134.27	5.0

Note: * = average of two replicate samples.