

4. DATA REPORT: ORGANIC CARBON AND NITROGEN VARIATIONS AT SITE 958, OFF WEST AFRICA ON THE CONTINENTAL SLOPE¹

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INTRODUCTION

Cores taken at Site 958 off the African west coast on the continental slope at a water depth of 3789 m are primarily nannofossil ooze, but contain distinct olive-green organic-rich turbidites in the upper 80 m of the 133-m cored sequence (Blum et al., 1996). In this data report, analyses of organic carbon and nitrogen in the sediments at Site 958 are reported, as well as the mineral content of the organic-rich turbidites.

METHODS

Total carbon and nitrogen were measured on a CHN Leco 900 analyzer. Samples were weighed into tin capsules, which were folded and weighed together with an oxidant. The instrument was calibrated with EDTA (having carbon = 42% and nitrogen = 9.50%). Calibration standards and blanks were run in the beginning and at the end of the samples, with several spaced in between as well. Precision of the instrument is $\pm 0.5\%$. The overall accuracy of total carbon and nitrogen analyses is $\pm 3\%$.

The present study focuses on samples collected for carbonate and subsequent analysis of total carbon and nitrogen. Samples were taken from all different types of lithologies, including olive-green intervals with higher organic content. Sample volumes were 5 cm³. The samples were freeze-dried and crushed. Carbonate content (Fig. 1A) was measured on a Coulometrics 5011 carbon dioxide coulometer equipped with a System 140 carbonate carbon analyzer. The overall accuracy of the coulometer measurements is $\pm 3\%$.

RESULTS

Mineral Content

Sporadic layers of olive-green sediments with fining upward were found down to 88 mbsf. The XRD analyses of four olive-green turbidites indicate that they are composed of mainly quartz and calcite (Table 1). The quartz lines may also involve diatoms to some extent. Kaolinite, smectite, and mica are present in the upper two samples, but there is only mica at 22.9 mbsf, and only kaolinite and mica at 71 mbsf. A general decrease with depth in mineral content (quartz, bio-silica, clay minerals, and volcanic glass) was reported by Blum et al. (1996).

Great fluctuations in mineral content were also indicated down to 45 mbsf. The major lithologic component is nannofossil ooze.

Organic Carbon and Nitrogen

Organic carbon and nitrogen analyses were made on 32 samples (Table 2). The organic carbon varied between 0 and 2.66 wt% C (Fig. 1B). Nitrogen (Fig. 1C) covaries with organic carbon and ranges be-

tween 0 and 0.34 wt% N. Total organic carbon:nitrogen (C:N) ratios range between 18.2 and 34.6 (Table 2 and Fig. 1D).

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REFERENCE

Blum, P., Lindblom, S. Michels, K., Sager, W.W., and Winkler, A., 1996. Site 958. In Firth, J.V., et al., *Proc. ODP, Init. Repts.*, 159T: College Station, TX (Ocean Drilling Program), 3–13.

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Table 1. XRD data of minerals in the organic-rich turbidites from Hole 958A.

Sample	Depth (mbsf)	Main minerals	Accessory minerals	Organic carbon (wt%)
159T-958A-1H-3, 68 cm	3.68	Quartz, calcite	Halite, kaolinite, micas, smectites (rare)	0.71
3H-1, 64 cm	19.64	Quartz, calcite	Halite, kaolinite, micas, smectites (rare)	1.37
3H-3, 94 cm	22.94	Quartz, calcite	Halite, pyrite, micas (altered)	1.68
8H-4, 15 cm	71.15	Quartz, calcite	Halite, kaolinite, micas (altered)	1.39

¹Firth, J.V. (Ed.), 1998. *Proc. ODP, Sci. Results*, 159T: College Station, TX (Ocean Drilling Program).

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Table 2. Carbonate, organic carbon, and nitrogen data from Hole 958A.

Sample	Depth (mbsf)	Carbonate (wt%)	Total organic carbon (wt%)	Total nitrogen (wt%)	C:N ratio
159T-958A-					
1H-3, 68 cm	3.68	28.07	0.711	0.037	19.2
1H-5, 113 cm	7.13	88.96	0.135	ND	
2H-2, 91 cm	11.91	42.42	0.934	0.027	34.6
2H-4, 78 cm	14.78	45.68	0.416	ND	
3H-1, 64 cm	19.64	33.67	1.369	0.073	23.1
3H-3, 94 cm	22.94	31.66	1.677	0.092	18.2
3H-4, 85 cm	24.35	49.11	0.248	ND	
4H-1, 88 cm	29.38	49.06	1.975	0.105	18.8
5H-2, 78 cm	40.28	74.68	0.226	ND	
6H-2, 42 cm	49.42	51.28	0.419	0.018	23.3
6H-5, 102 cm	54.52	83.08	0.208	ND	
7H-1, 80 cm	57.80	56.53	0.139	ND	
7H-5, 145 cm	64.45	54.54	1.023	0.033	31.0
8H-2, 119 cm	69.19	55.40	2.661	0.134	19.9
8H-4, 11 cm	71.11	61.57	0.359	ND	
8H-4, 15 cm	71.15	34.81	1.386	0.068	20.4
9H-2, 76 cm	78.26	77.32	0.036	ND	
10H-2, 144 cm	88.44	37.46	1.573	0.085	18.5
14H-1, 69 cm	124.19	76.83	0.698	ND	
159T-958B-					
1H-4, 30 cm	4.80	53.41	0.064	ND	

Note: ND = not determined.

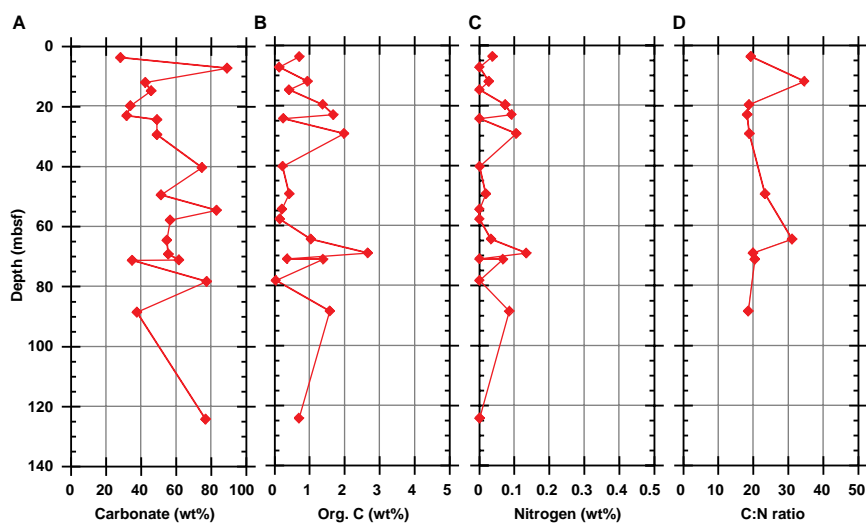


Figure 1. **A.** Carbonate content vs. depth from Hole 958A (only samples with detectable organic carbon). **B.** Total organic carbon content vs. depth from Hole 958A. **C.** Total nitrogen content vs. depth from Hole 958A. **D.** Total organic carbon/total nitrogen vs. depth from Hole 958A.