

MANGANESE NODULES AND ENCRUSTATIONS IN THE VICINITY OF NEW CALEDONIA AND THE LOYALTY ISLANDS

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DESCRIPTION OF SAMPLES AND ANALYTICAL RESULTS

During the GEORSTOM I and II cruises, a number of manganese nodules and encrustations was dredged in the New Caledonia-Loyalty Islands region. This paper describes the samples collected and presents the results of their analysis. Photographs of the nodules are shown in Figs. 1a-c and the location of the stations are shown in Fig. 2.

STATION GO 202:

Position and Depth

18°02.5'S, 160°46.7'E, 2,550-2,300 m.

Environment

The slightly inclined southern flank of a small massif. Practically no sedimentation.

Samples

30 kg. of dredged encrustations from 5 to 9 cm. thick, showing a mamillated outer

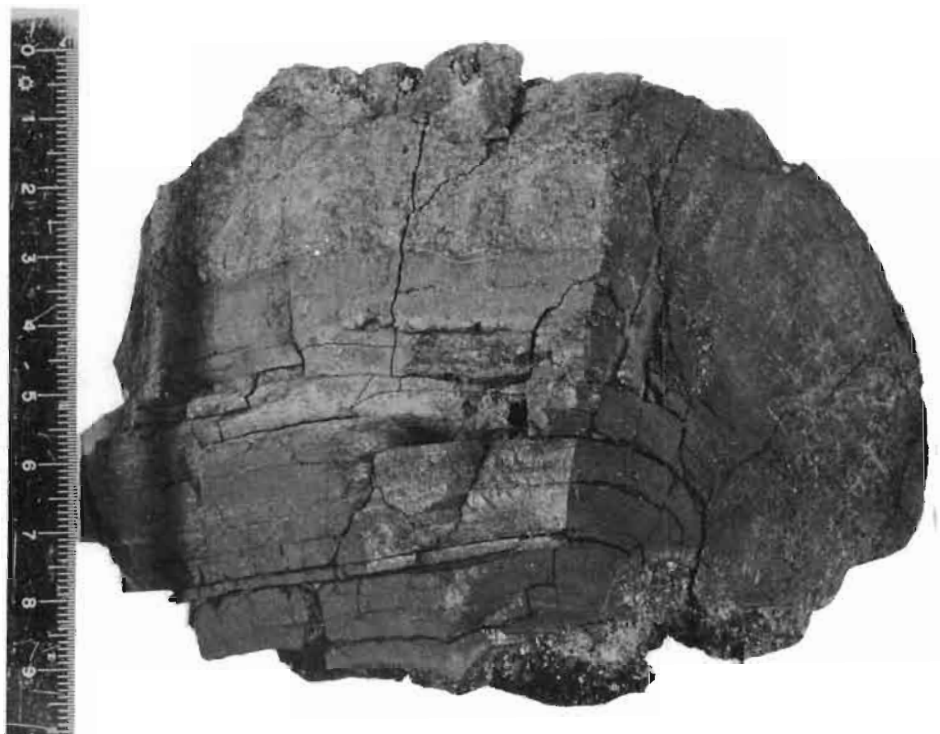


Fig. 1a. Manganese encrustation from station GO 202 showing upper surface of encrustation at top.

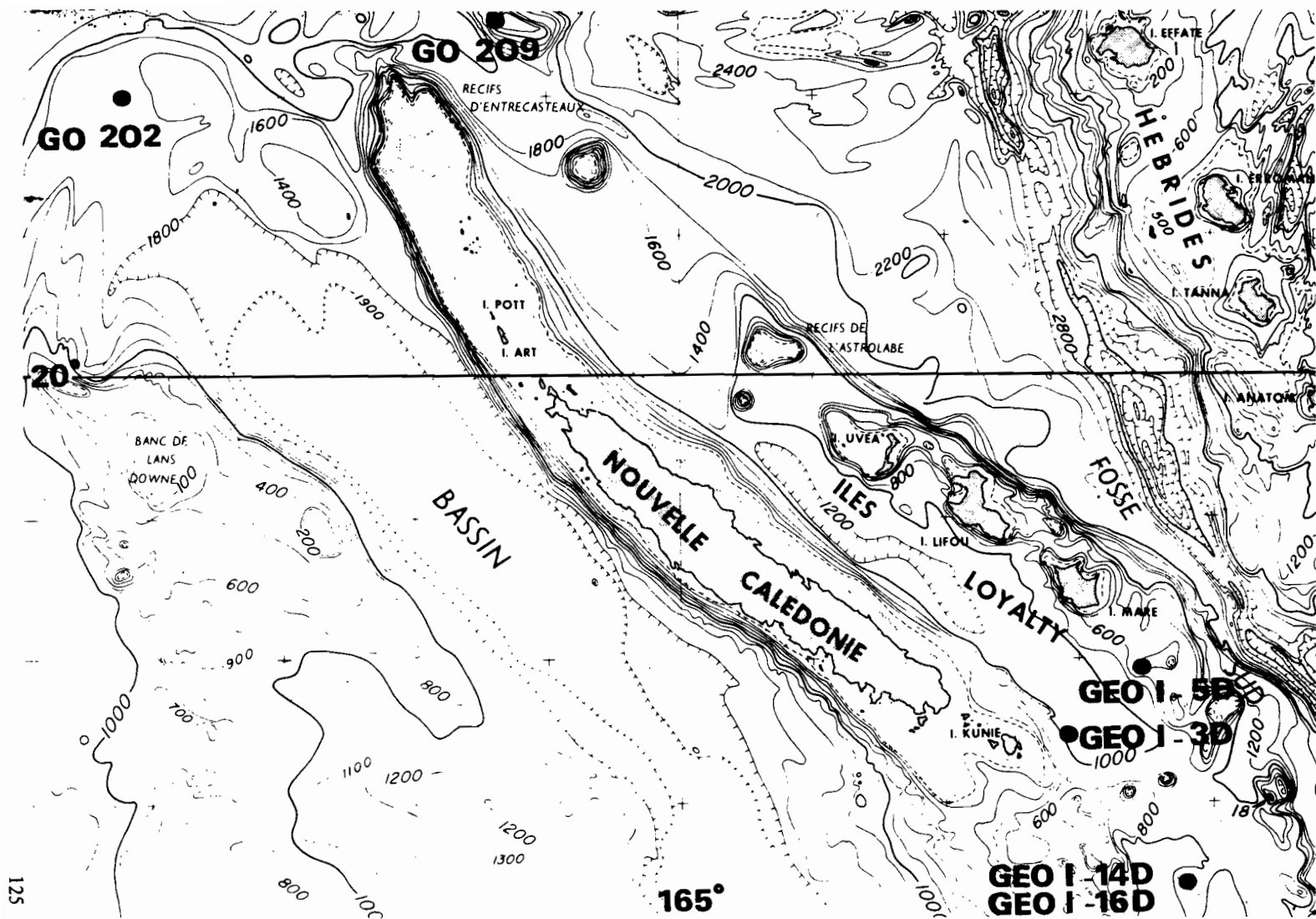


Fig. 2. Location of stations from which manganese nodules were recovered during GEORSTOM I and II cruises.

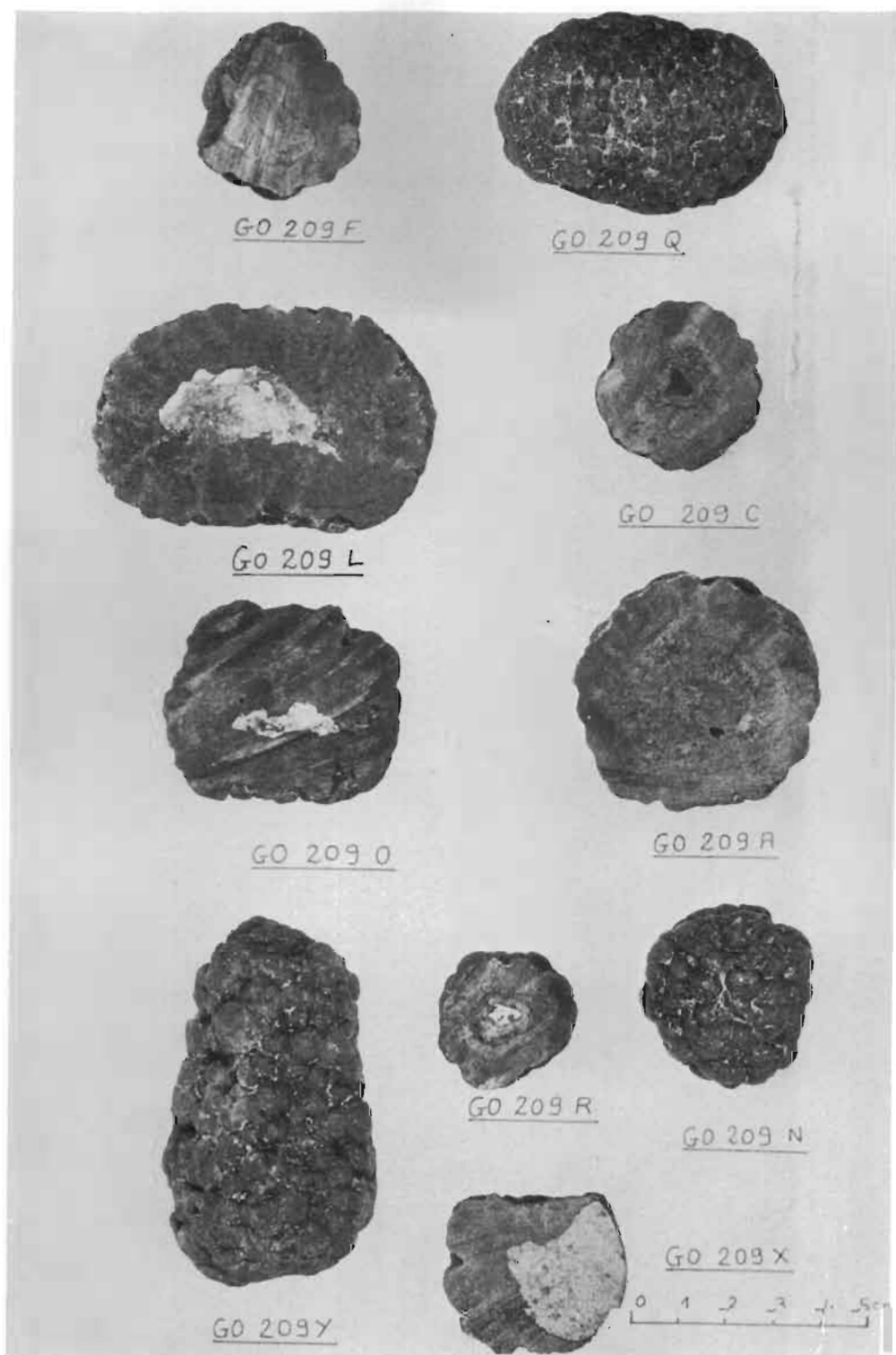


Fig. 1b. Manganese nodules recovered from dredge station GO 209 (GEORSTOM II cruise). Nodules without visible nuclei (GO 209F, GO 209C, GO 209A); nodules with calcareous nuclei (GO 209Q, GO 209L, GO 209O, GO 209R, GO 209Y, GO 209N), encrusted pebble of basalt (GO 209X).

surface, a black, unlayered external zone marked with numerous rusty-yellow patches, and a thinly-layered very black inner zone, with an irregular base surface, underlain by rusty-orange iron oxides.

Analysis

Analysis of a complete cross-section of encrustation: Si 7.70%, Fe 23.11%, Mn 19.85%.

STATION GO 209:

Position and Depth

17°27'S, 163°40'E, 1,300-1,320 m.

Environment

An isolated massif which seems to extend the Loyalty Chain-outcropping substratum.

Samples

5 kg. of irregularly formed, rather thin encrustations. 2 kg. of nodules, one half without visible nuclei, the other with calcareous nuclei. These nodules show a mamillated external surface and variable sphericity, especially the largest samples. Their dimensions vary between 1.5 and 7 cm. (mean 3 cm.), and the calcareous nuclei range between 0.5 and 3 cm.

Analysis

- A — Analysis of a complete cross-section of encrustation.
- B — Mean of the analysis of 10 nodules without visible nuclei.
- C — Mean of the analysis of 12 nodules with calcareous nuclei (These analyses have been made on half nodules with nuclei included).

%	Loss on												
	Ignition	Si	Al	Fe	Mn	Ca	Mg	K	Na	Ni	Cr	Co	Cu
A	18.13	2.56	1.20	18.64	22.95	3.18	1.32	0.36	1.64	0.33	0.0016	0.598	0.070
B	15.18	5.94	1.93	17.58	20.78	2.02	1.57	0.42	1.95	0.38	0.0033	0.449	0.101
C	15.54	5.39	1.88	17.36	20.26	2.98	1.51	0.38	1.52	0.39	0.0031	0.469	0.103

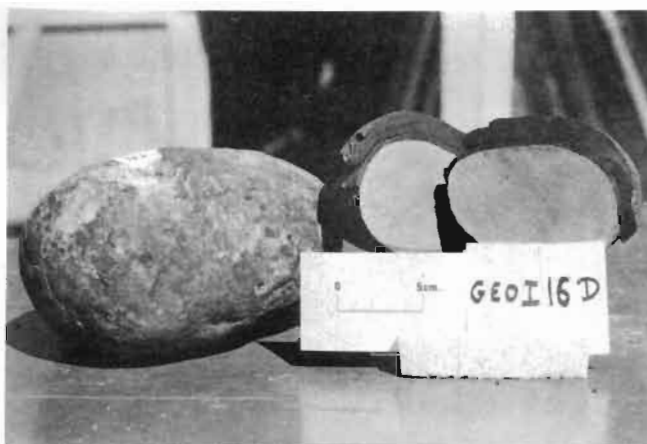


Fig. 1c. Encrusted pebbles of basalt from station GEO I. 16D.

STATIONS GEO 1.3D-1.16D:

Position and Depth

GEO 1.3D	22°33.0'S,	167°57.8'E,	1,875 m.
GEO 1.5D	22°05.4'S,	168°30.0'E,	800 m.
GEO 1.14D	23°33.0'S,	168°48.5'E,	1,450-1,200 m.
GEO 1.16D	23°38.5'S,	168°50.6'E,	1,200 m.

Environment

Southern extension of the Loyalty Chain (GEO 1.5D) and of the New Caledonia Ridge (other samples). Thin sediment covering (sedimentary breccias with volcanic elements and detrital limestones), outcropping substratum.

Samples

Encrusted pebbles of basic eruptive rocks (gabbros, basalts). The dimensions of the pebbles vary between 4 and 20 cm.; the thickness of the manganese encrustations varies between 1 and 2 cm.

Analysis

A — Encrustation of a pebble (GEO 1.3D).

B — Mean of the analysis of 3

encrustations (GEO 1.5D).

C — Mean of the analyses of 8 encrustations (GEO 1.14D and GEO 1.16D).

	<i>Loss on</i>							
<i>%</i>	<i>Ignition</i>	<i>Si</i>	<i>Fe</i>	<i>Mn</i>	<i>Ni</i>	<i>Cr</i>	<i>Co</i>	<i>Cu</i>
A	14.40	6.46	32.20	10.56	0.42	0.0030	0.48	0.09
B	15.80	3.25	24.03	14.84	0.36	0.0036	0.37	0.12
C	16.10	3.21	25.10	19.86	0.51	0.0028	0.65	0.11

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