

RAPPORTS DE MISSIONS
SCIENCES DE LA TERRE
GÉOLOGIE GÉOPHYSIQUE

N° 41

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Bathymetric survey of the submarine platforms
around the island of Vaté (Vanuatu)
Cruise R/V IRD Alis NEOTECT

Bernard PELLETIER
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**Institut de recherche
pour le développement**

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Nouméa : IRD. Février 2000. 40 p.
Missions ; Sci. Terre ; Géol-Géophys. 41

CAMPAGNE Océanographique ; PALEOENVIRONNEMENT ; NIVEAU MARIN ; RELIEF SOUS
MARIN ; BATHYMETRIE ; RECIF CORALLIEN ; HOLOCENE / VANUATU ; EFATE

Bathymetric survey of the submarine platforms around the island of Vaté (Vanuatu) Cruise R/V IRD Alis NEOTECT

Bernard Pelletier*, Guy Cabioch*, Julien Perrier* & Jean-Michel Boré**

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** Antenne IRD de Port-Vila, Vanuatu

I - Objectives

The cruise "Neotect" on the R/V IRD Alis was scheduled from 25 May to 3 June 1999 to survey the shallowest areas, at a depth ranging from 0 to 200 m, around the island of Vaté in the south of the archipelago. The specific objective of this cruise is to detect, in the bathymetry records, the paleo-sea level markers, i.e. submarine platforms or ancient reef flats, or ancient marine notches, of the last 125 000 years (125 ka) (see sea level curve of the last 125 ka in Bloom *et al.*, 1974) especially the one belonging to the last glacial maximum (LGM) dated of 20 ka (Bard *et al.*, 1990) and corresponding to a low sea level stand at -120 m by comparison with the modern sea level). If visible, the 20 000 years-old coral reef will constitute a key for the study of the uplift motions, between the 125 000 years-old and the Holocene coral reefs known on land (Neef and Veeh, 1977, Jouannic *et al.*, 1982, Lecolle *et al.*, 1990).

This cruise was devoted to bathymetric measurements along lines orthogonal to the coast from 0 to 200 m. No soundings was done at night due to the very shallow depths of the surveyed areas. Some dredging was done depending on the results of bathymetry.

II - Technical informations

- NEOTECT Cruise, Efaté (Vanuatu), Resaerch Vessel IRD Alis, Capt Raymond PRONER.
- Scientific Team : Bernard Pelletier & Guy Cabioch (IRD Scientists, Nouméa), Julien Perrier (IRD technician, Nouméa) and Jean-Michel Boré (IRD technician, Port-Vila).
- Scientific survey : bathymetric survey and dredgings.
- IRD Research Unit 6.

III - Equipment

The bathymetric survey was realized using a FURUNO FCV echo sounder (frequency ranging from 28 kHz to 88 kHz) and a GPS MAGNAVOX giving the navigation. The ASCII data were stored in real time on a PC computer.

IV - Schedule of the cruise (see figure “schedule of the NEOTECT cruise” in “annexes”)

25 May : departure : Nouméa

25-26 May : transit to Port-Vila

27 May : transit to Tukutuk Point and Devil Point

28 May : Tukutuk Point and transit to Port-Havannah

29 May : North-Moso and West-Moso

30 May : North N'Guna and East N'Guna

31 May : East and south coast of Vaté, Pango Point and arrival at Port-Vila

1 June : Devil Point

1-3 June: transit to Nouméa

3 June : arrival

V - Study areas & dredging operations

VI - 1 - Port-Vila to Devil Point and Tukutuk Point (see figures in “annexes”)

TR 1 (from Port-Vila bay to Devil Point and Tukutuk Point) :
from 17°45.113S, 168°10.455E to 17°41.025S, 168°10.313E

VI - 2 - Tukutuk Point (see figures in “annexes”)

Box 1 (Tukutuk Point) : from 17°43.011S, 168°09.683E to 17°42.789S,
168°08.897E

Dredging :

D 1 (120 / 90 m)

D 2 (130 / 150 m)

D 3 (120 / 80 m)

TR 2 (from Tukutuk Point to Port-Havannah) : from 17°41.816S,
168°08.897E to 17°36.271S, 168°14.584E

VI - 3 - North Moso and West Moso (see figures in “annexes”)

TR 3 (from Port-Havannah to North Moso) : from 17°36.249S,
168°14.578E to 17°32.019S, 168°12.948E

Box 2 (North Moso) : from 17°30.007S, 168°16.570E to 17°29.722S,
168°16.476E

Box 3 (West Moso) : from 17°30.594S, 168°14.313E to 17°30.417S,
168°13.957E

Dredging :

- D 4 (157 / 100 m)
- D 5 (123 / 90 m)
- D 6 (120 / 90 m)
- D 7 (117 / 90 m)

TR 4 (from West Moso to Port-Havannah) : from 17°31.483S, 168°13.042E to 17°36.162S, 168°14.570E

VI - 4 - North N'Guna and East N'Guna (see figures in “annexes”)

TR 5 (from Port-Havannah to North N'Guna) : from 17°36.162S, 168°14.570E to 17°25.002S, 168°17.754E

Box 4 (North N'Guna) : from 17°25.002S, 168°17.754E to 17°24.204S, 168°19.244E

Dredging :

- D 8 (125 / 102 m)
- D 9 (150 / 107 m)

VI - 5 – Emao (see figures in “annexes”)

TR 6 (from N'Guna to Emao) : from 17°24.204S, 168°19.244E to 17°28.634S, 168°28.001E

Box 5 (West Emao) : from 17°28.634S, 168°28.001E to 17°28.926S, 168°25.654E

Dredging :

- D 10 (125 / 102 m)
- D 11 (150 / 107 m)

Box 6 (Mangea Reefs to North Emao) : from 17°28.926S, 168°25.654E to 17°29.089S, 168°28.055E

VI - 6 - East and South coast of Efaté (see figures in “annexes”)

TR 7 (from North Emao to Manuro Point) : from 17°33.262S, 168°30.436E to 17°42.514S, 168°36.420E

Box 7 (Manuro Point) : from 17°42.512S, 168°36.241E to 17°43.260S, 168°38.337E

TR 8 (from Manuro Point to Meslep Point) : from 17°43.260S, 168°38.337E to 17°48.590S, 168°33.353E

TR 9 (vicinity of the Meslep Point) : from 17°48.590S, 168°33.353E to 17°49.700S, 168°34.284E

TR 10 (from Meslep Point to Narpow Point) : from 17°49.700S, 168°34.284E to 17°49.990S, 168°23.351E

TR 11 (vicinity of Narpow Point) : from 17°49.990S, 168°23.351E to 17°51.448S, 168°23.282E

TR 12 (from Narpow Point to Pango Point) : from 17°51.448S, 168°23.282E to 17°46.845S, 168°13.473E

VI - 7 - Pango Point (see figures in “annexes”)

Box 8 (Pango Point) : from 17°46.845S, 168°13.473E to 17°46.609S, 168°14.500E

TR 13 (from Pango Point to Port-Vila bay) : from 17°46.609S, 168°14.500E to 17°44.312S, 168°18.482E

VI - 8 - Devil Point (see figures in “annexes”)

Box 9 : from 17°44.252S, 168°18.504E to 17°45.082S, 168°10.754E

Acknowledgments

We wish to thank the Vanuatu government and the “Service des Mines” for permits to work around Vaté and for their assistance. We would like also thank Michel Lardy (IRD, Port-Vila) for assistance in the cruise preparation and the crew of the R/V IRD Alis and its captain R. Proner

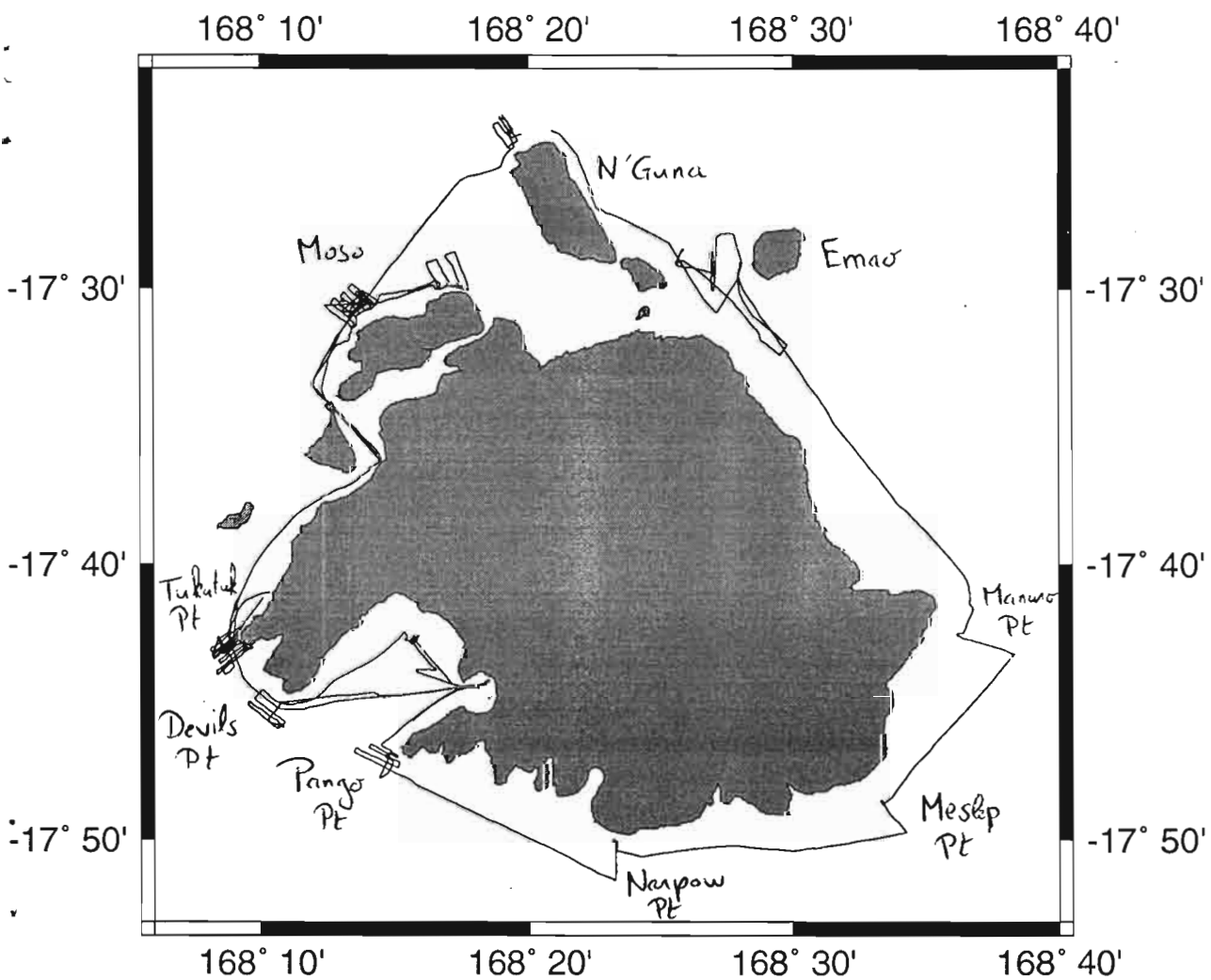
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- Neef G. & Veeh H.H. (1977) Uranium series ages and late Quaternary uplift in the New Hebrides. *Nature*, **269** : 682-683.

ANNEXES

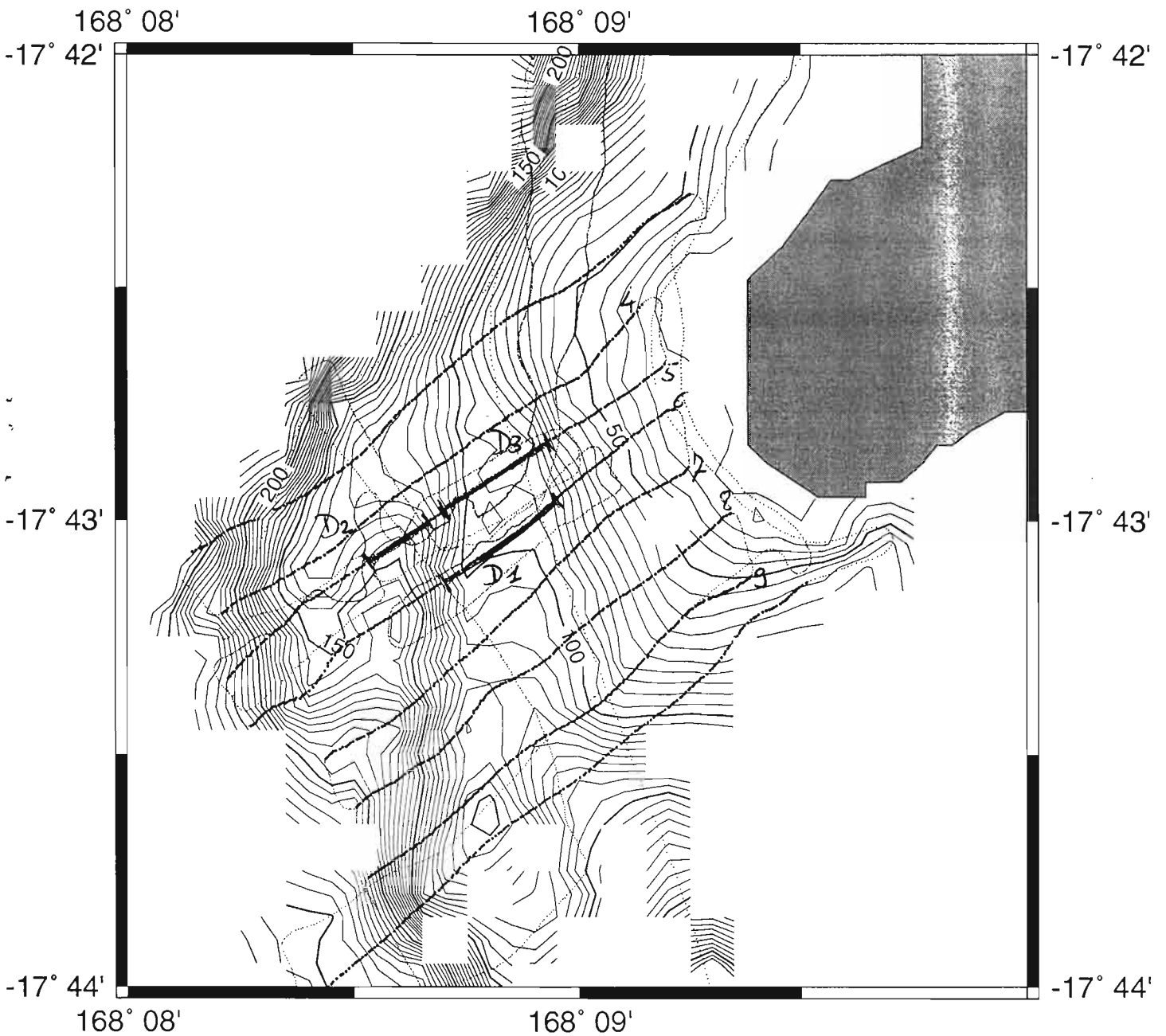
Schedule of the NEOTECT cruise

NEOTECT, R/V Alis, 1999



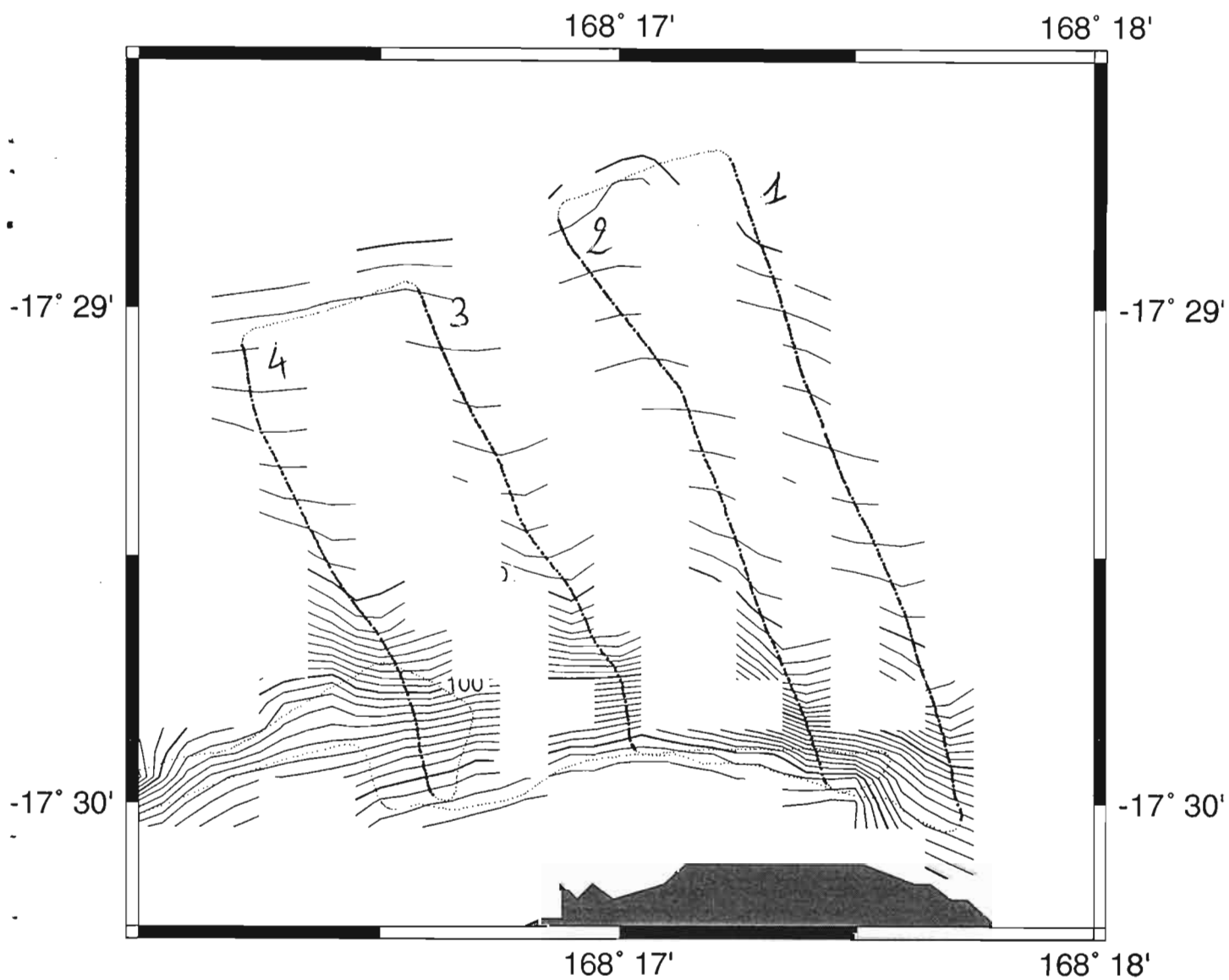
Profiles of Tukutuk Point

Tukutuku Point, 1/25000, 5m

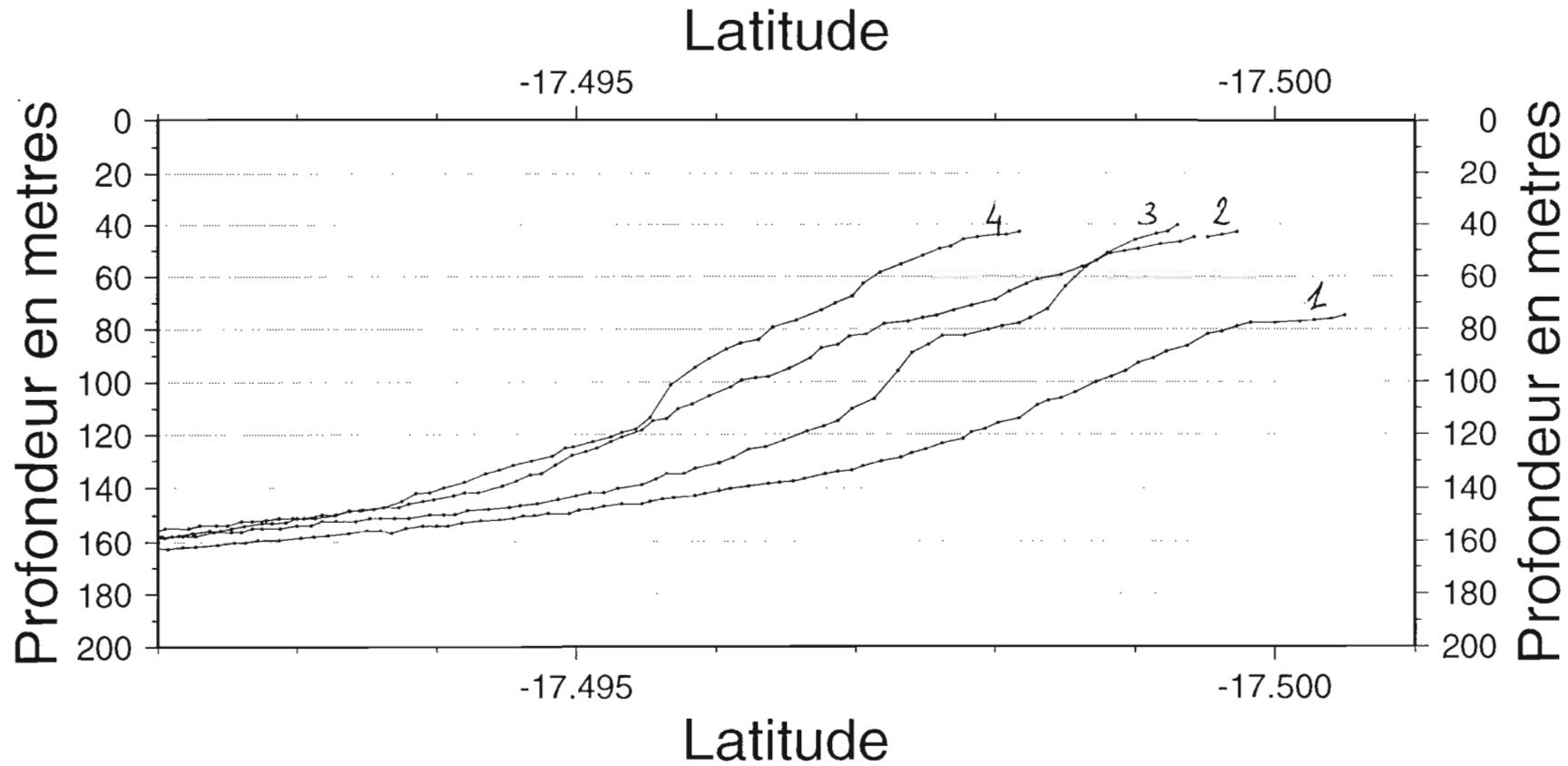


Profiles of North Moso

North Moso, 1/25000, 5m

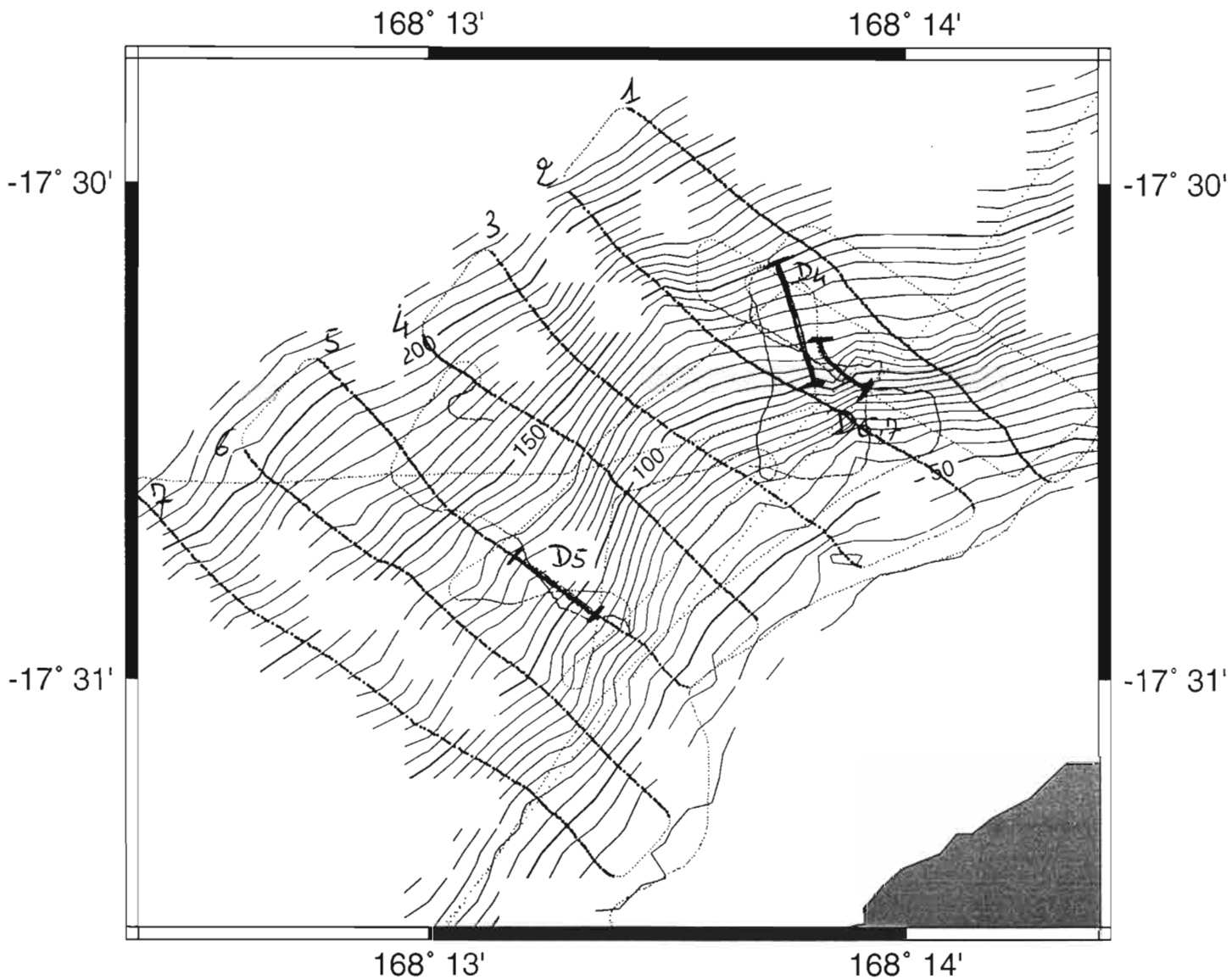


Profils 1 to 4 - North Moso

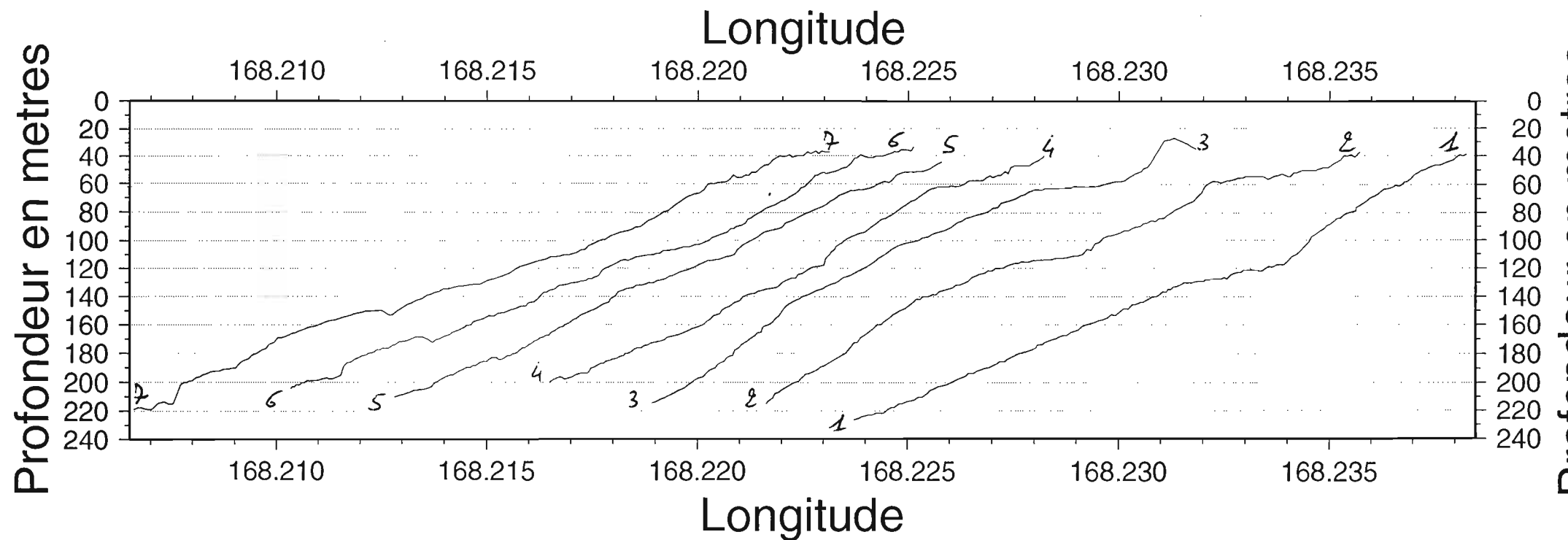


Profiles of West Moso

West Moso, 1/25000, 5m

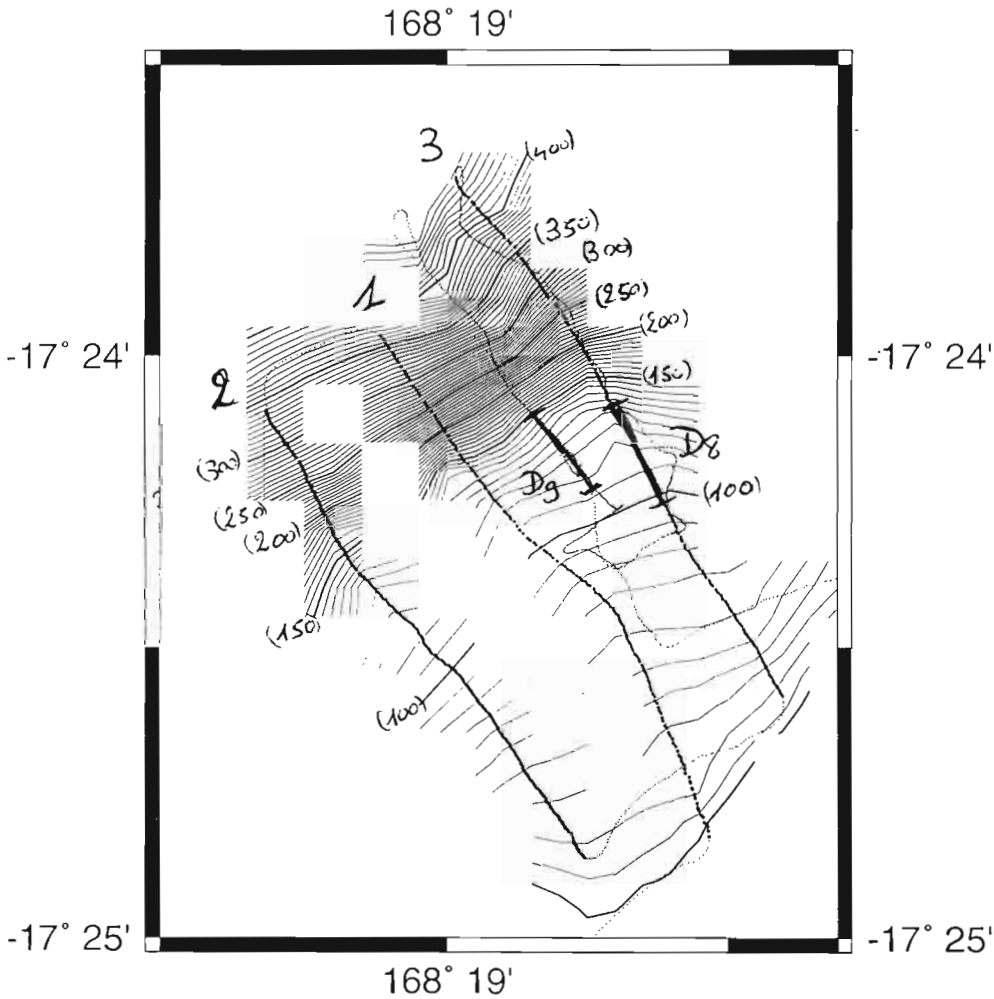


Profils - West Moso



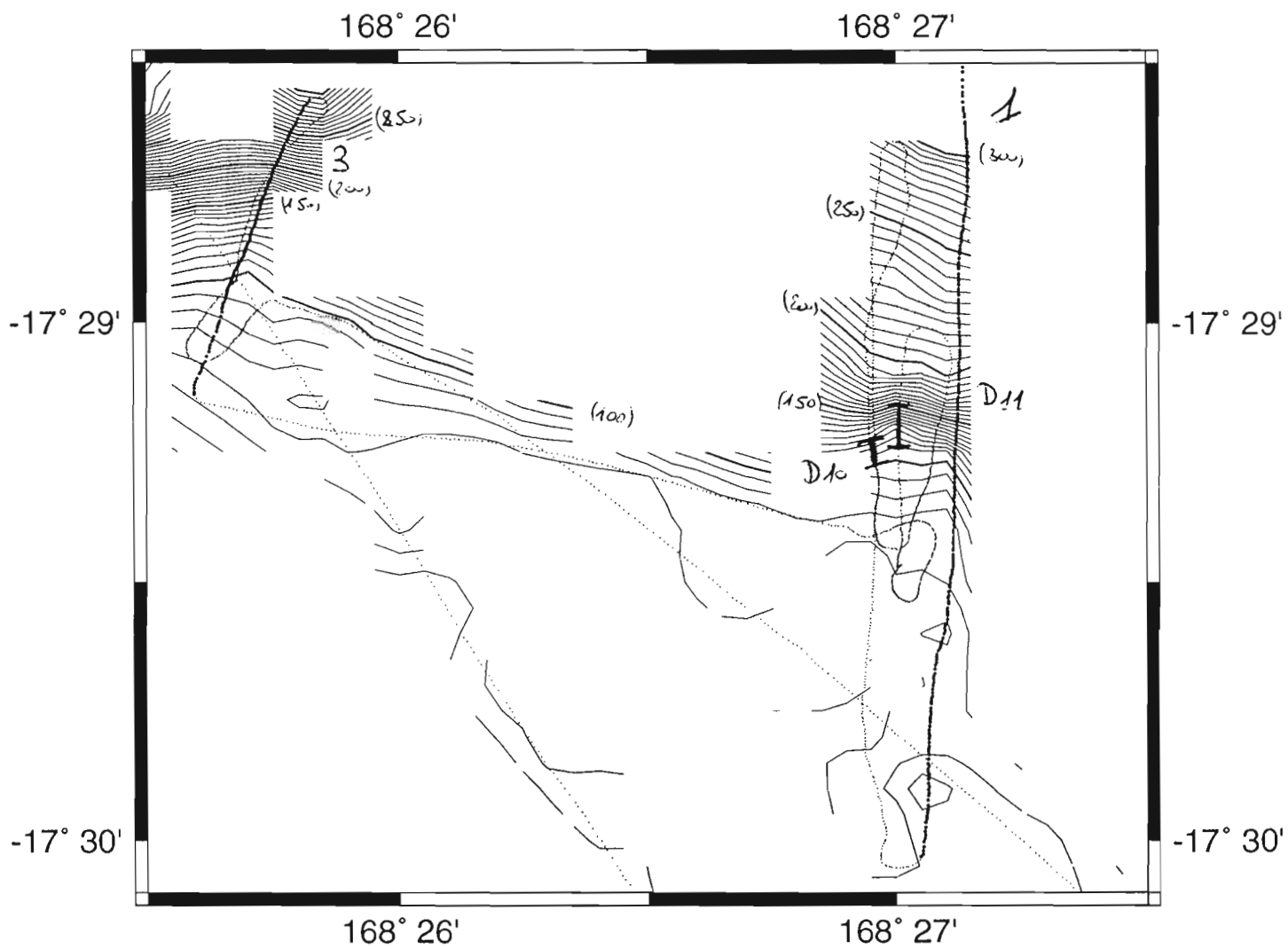
Profiles of North N'Guna

North Nguna, 1/25000, 5m



Profiles of West Emao

West Emao, 1/25000, 5m



Profils 1 and 3 - West Emao

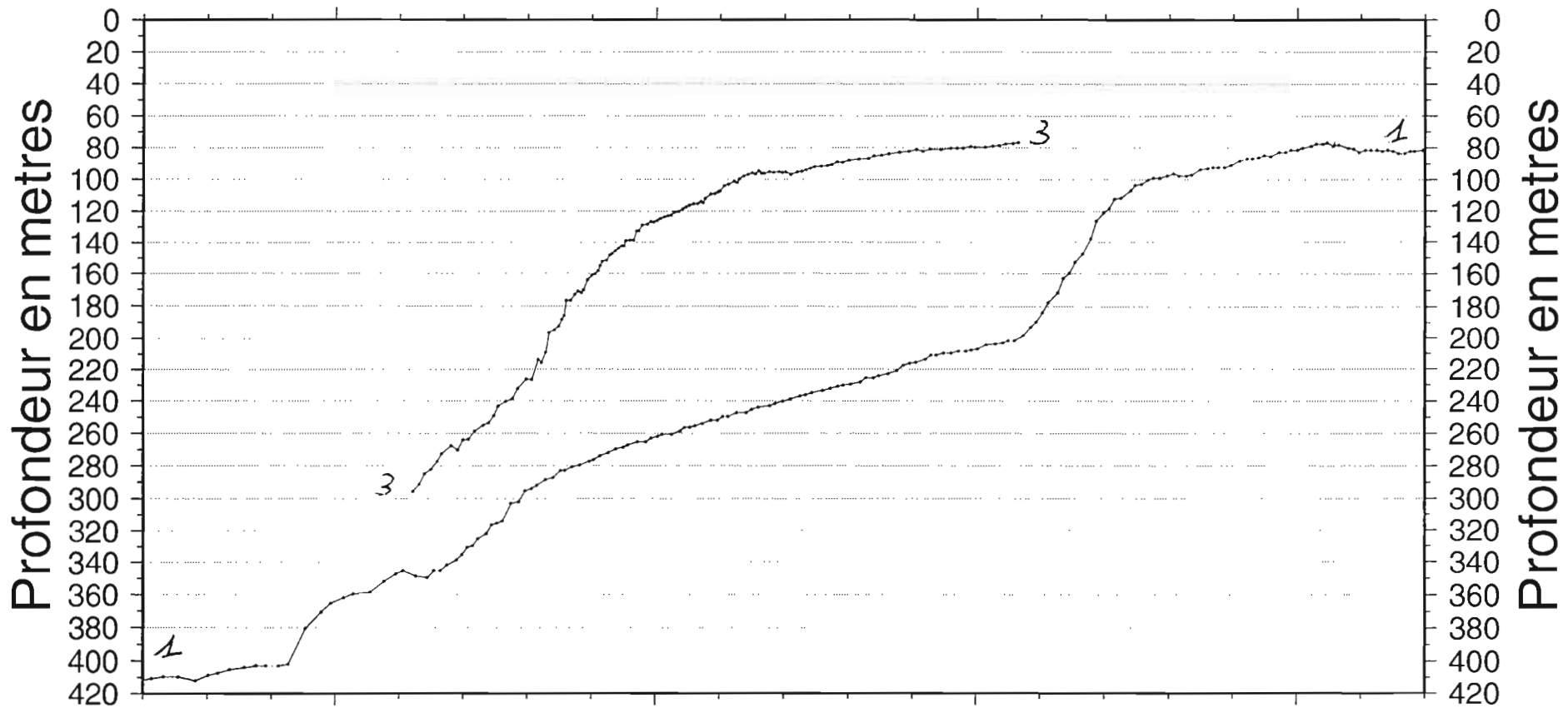
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-17.480

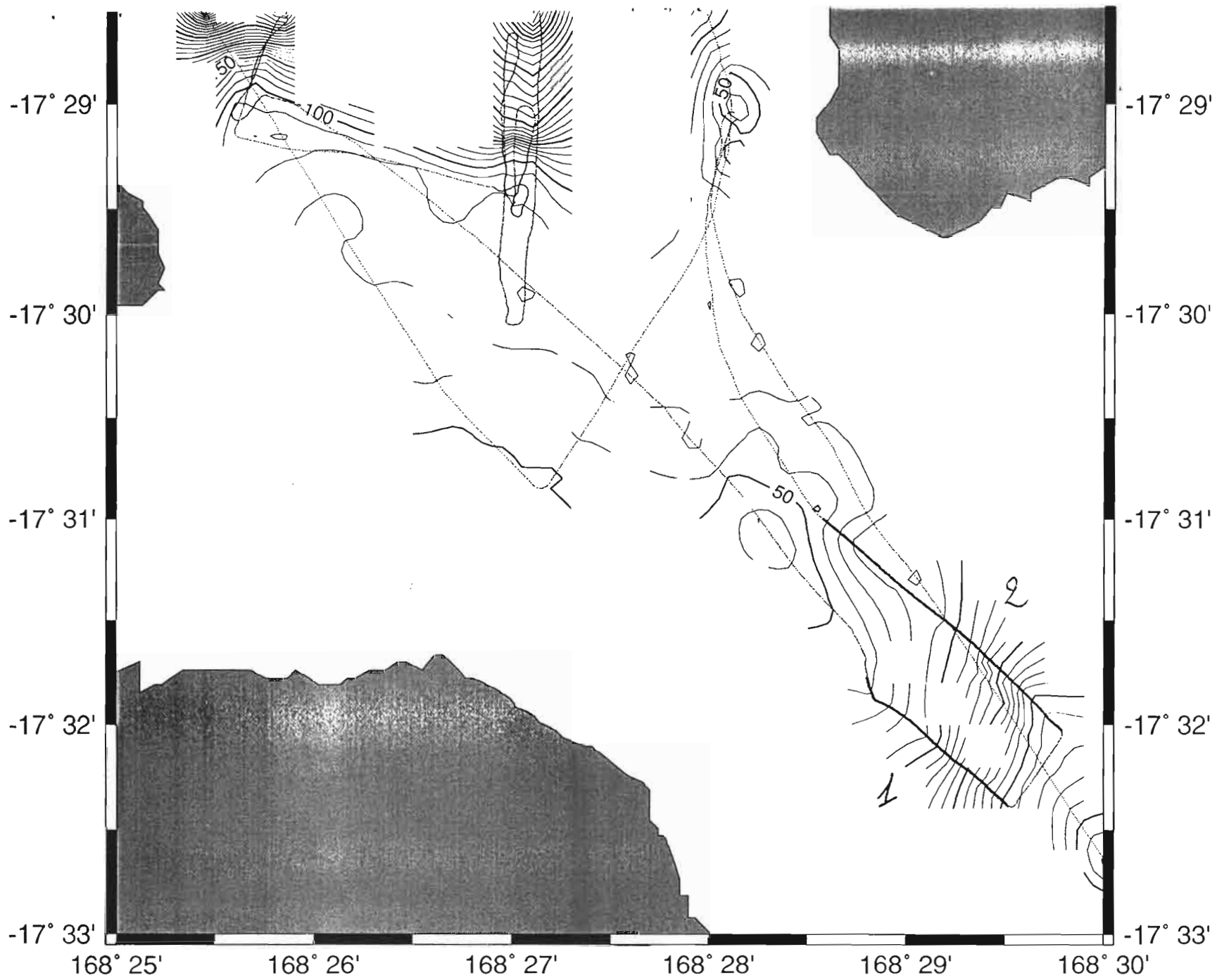
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-17.490

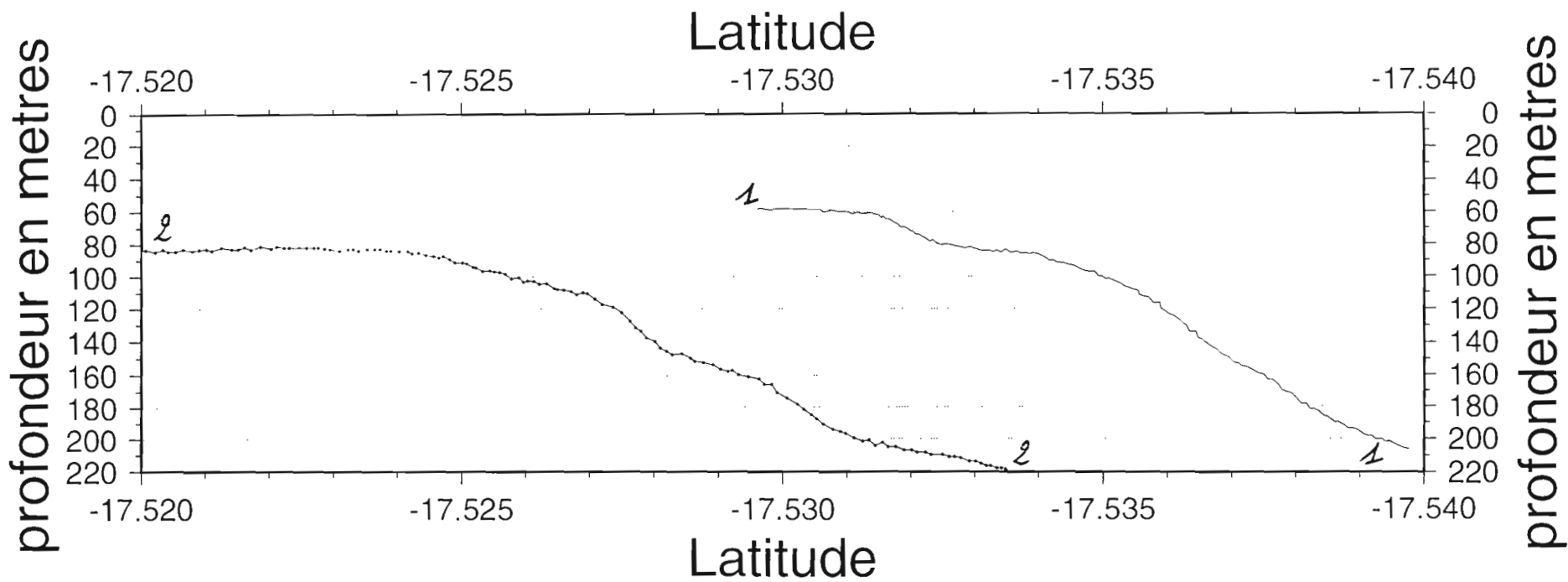


Latitude

Profiles of South Emao

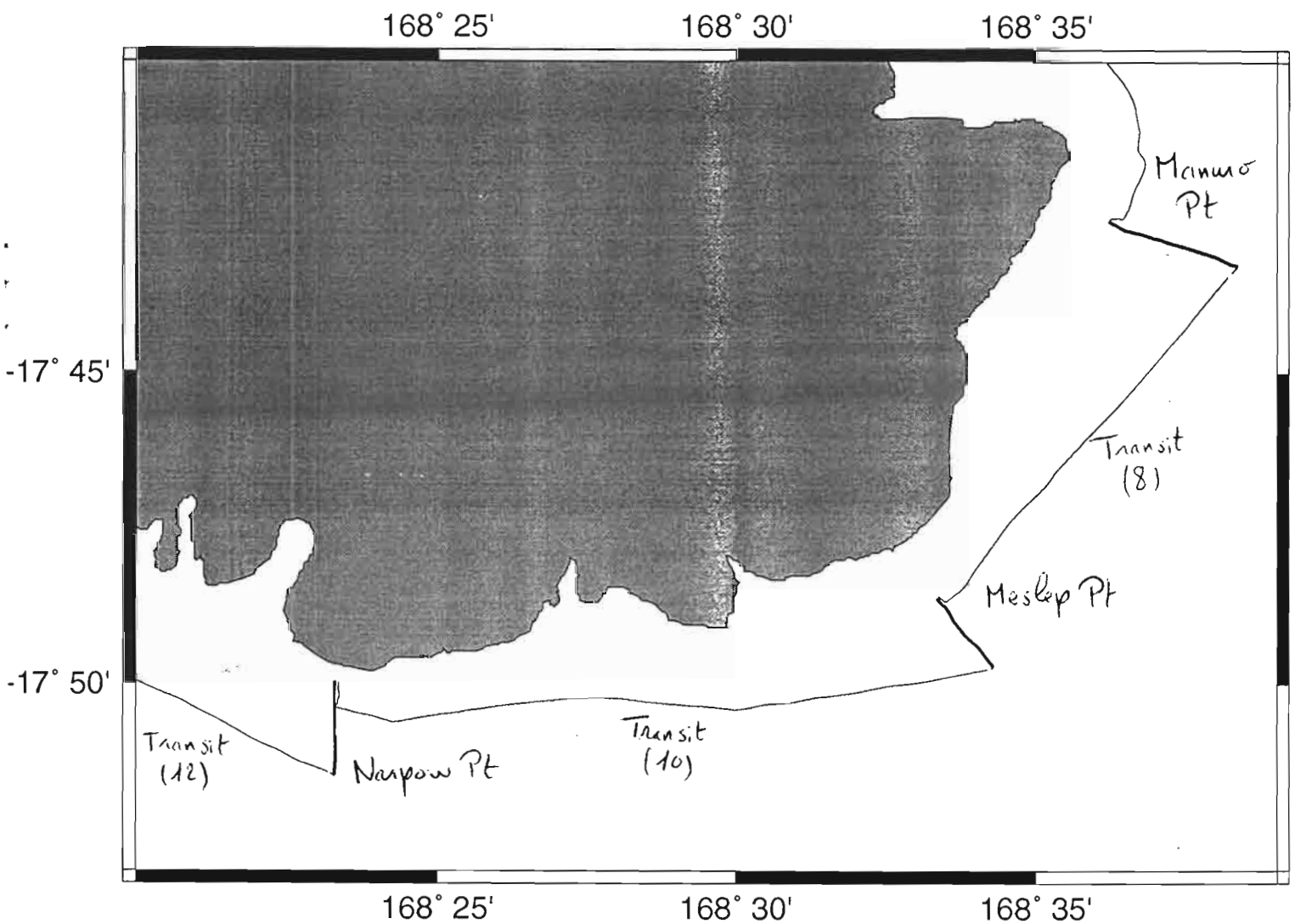


Profils 1 and 2 - South Emao

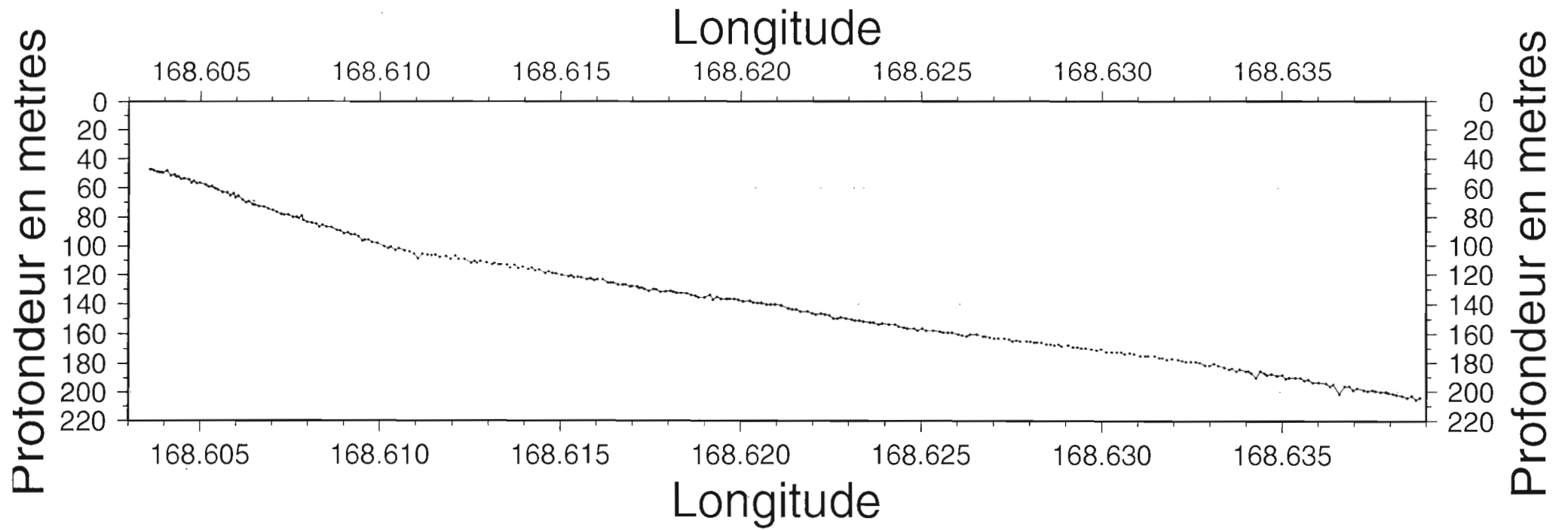


Profiles along East and South Vaté

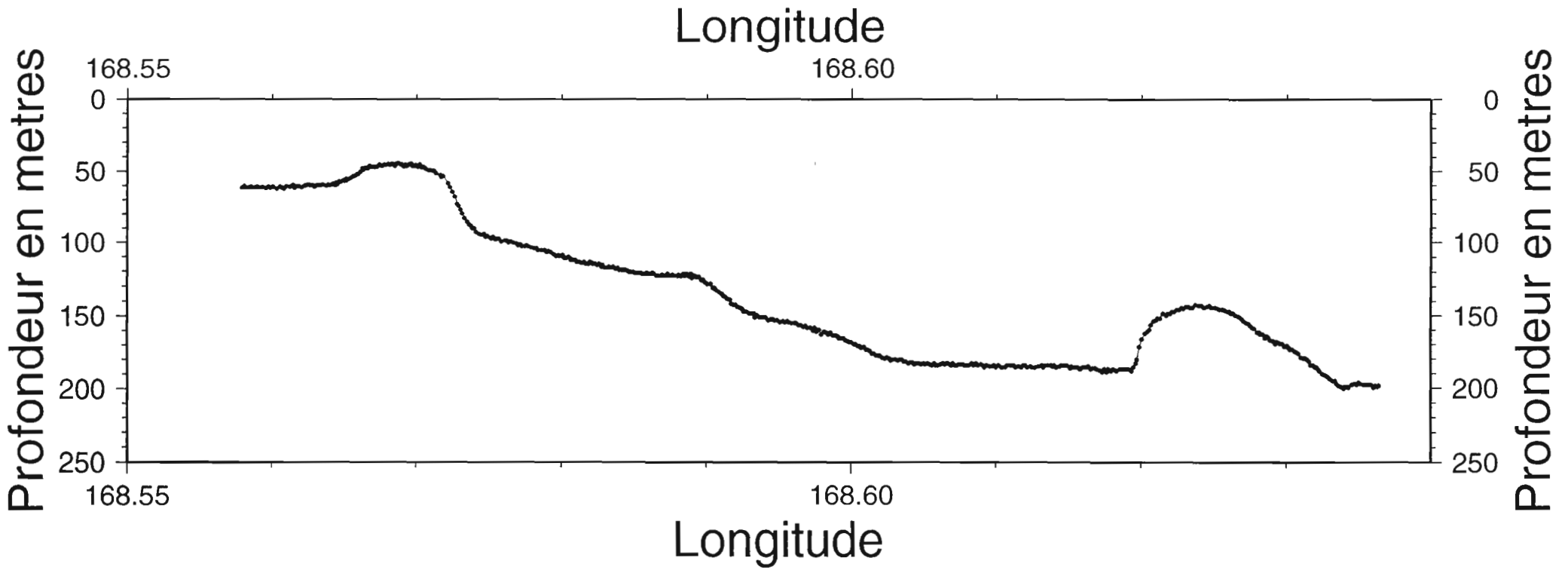
Southeast Efate profiles



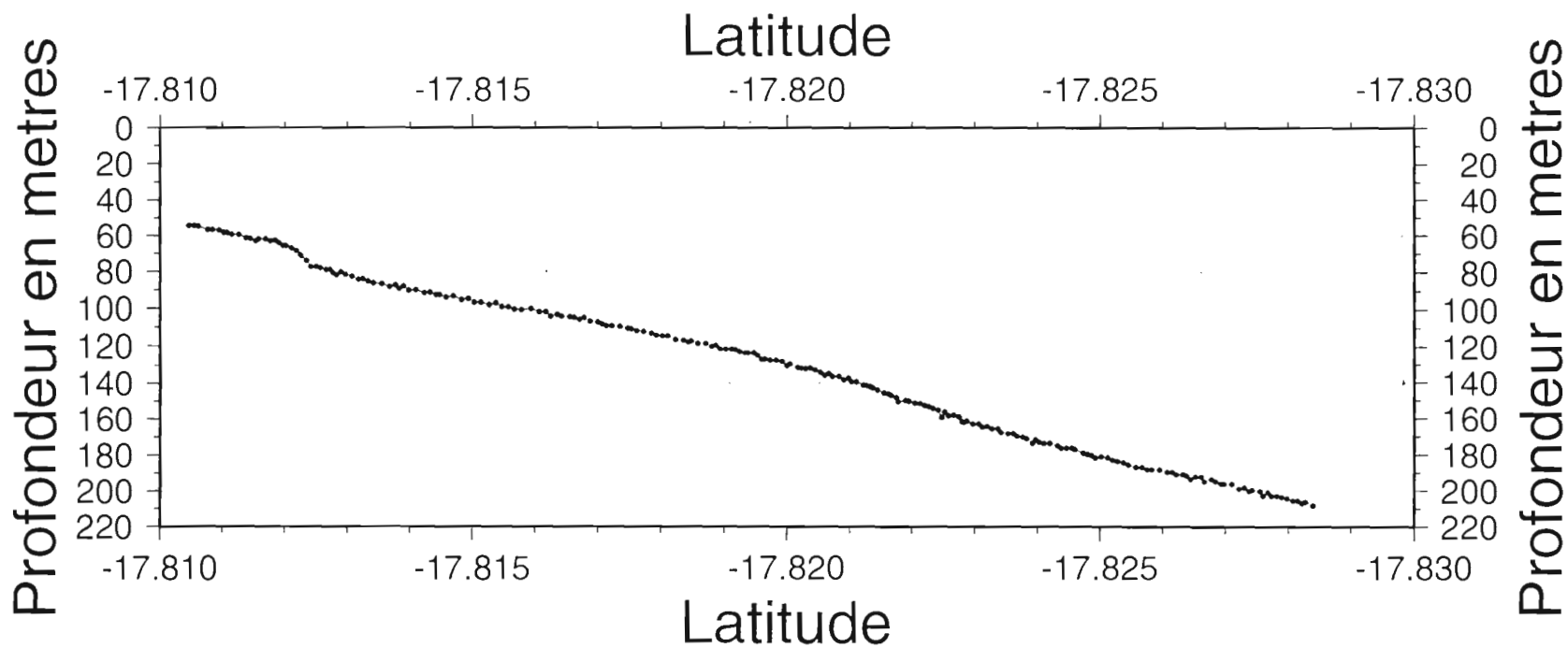
East Efate - Manuro Point



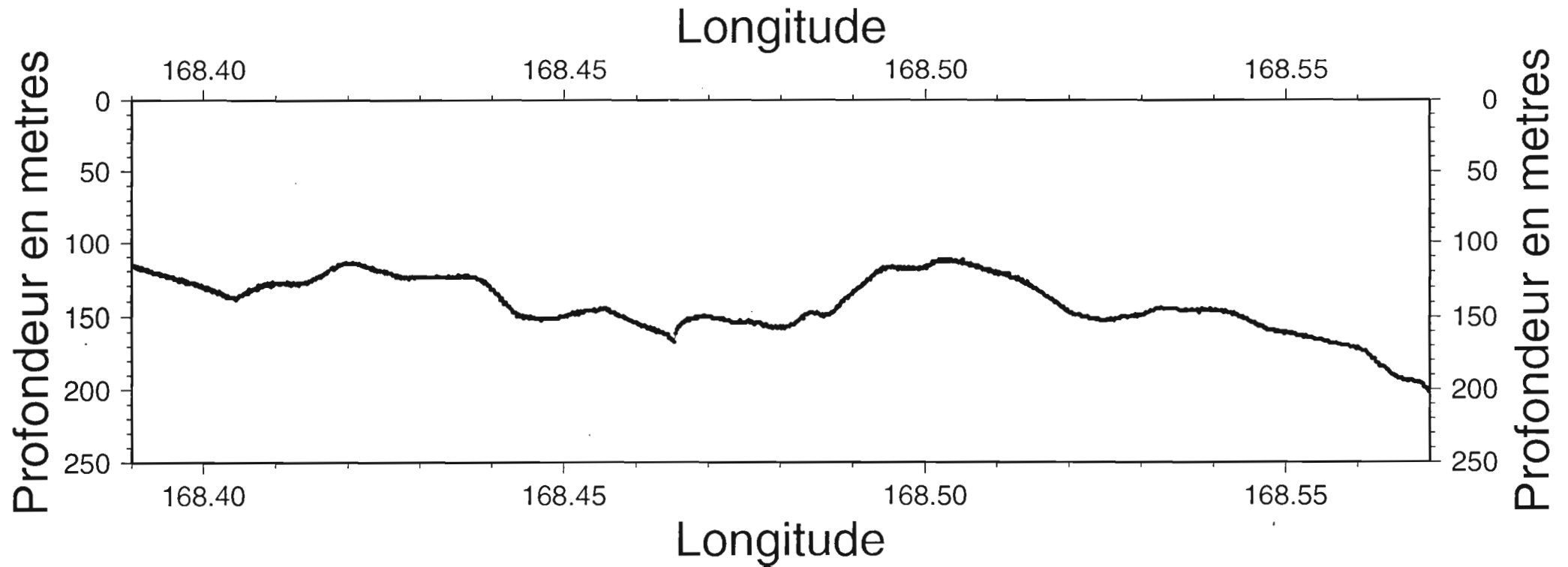
SE Efate, Meslep Point to Manuro Point



Southeast Efate - Meslep Point



South Efate, Narpow Point to Meslep Point



South Efate - Narpow Point

Latitude

-17.835

-17.840

-17.845

-17.850

-17.855

Profondeur en metres

0
20
40
60
80
100
120
140
160
180
200
220

Profondeur en metres

0
20
40
60
80
100
120
140
160
180
200
220

Latitude

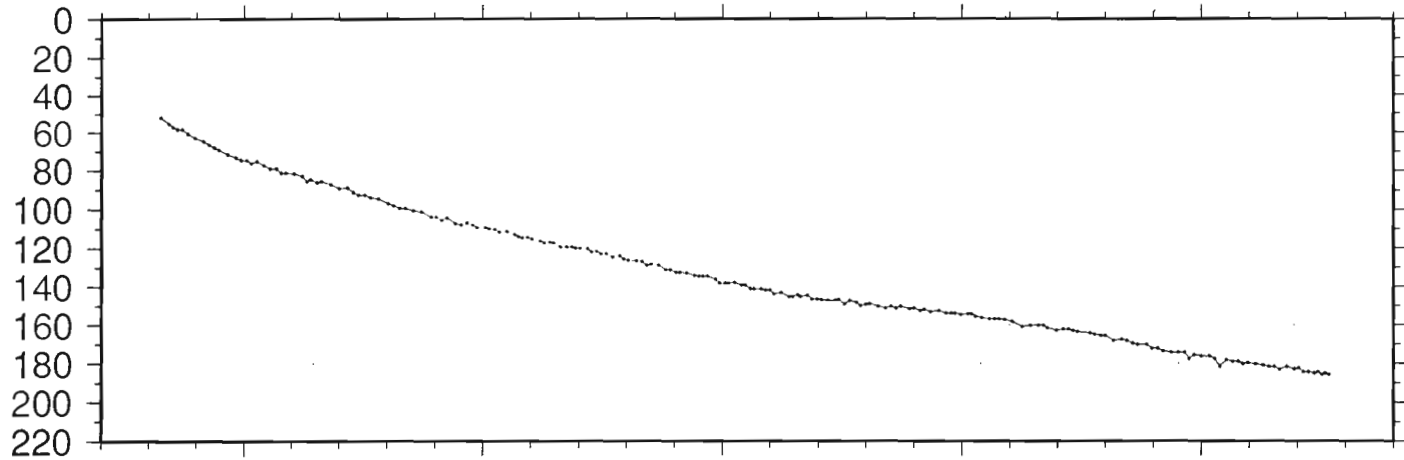
-17.835

-17.840

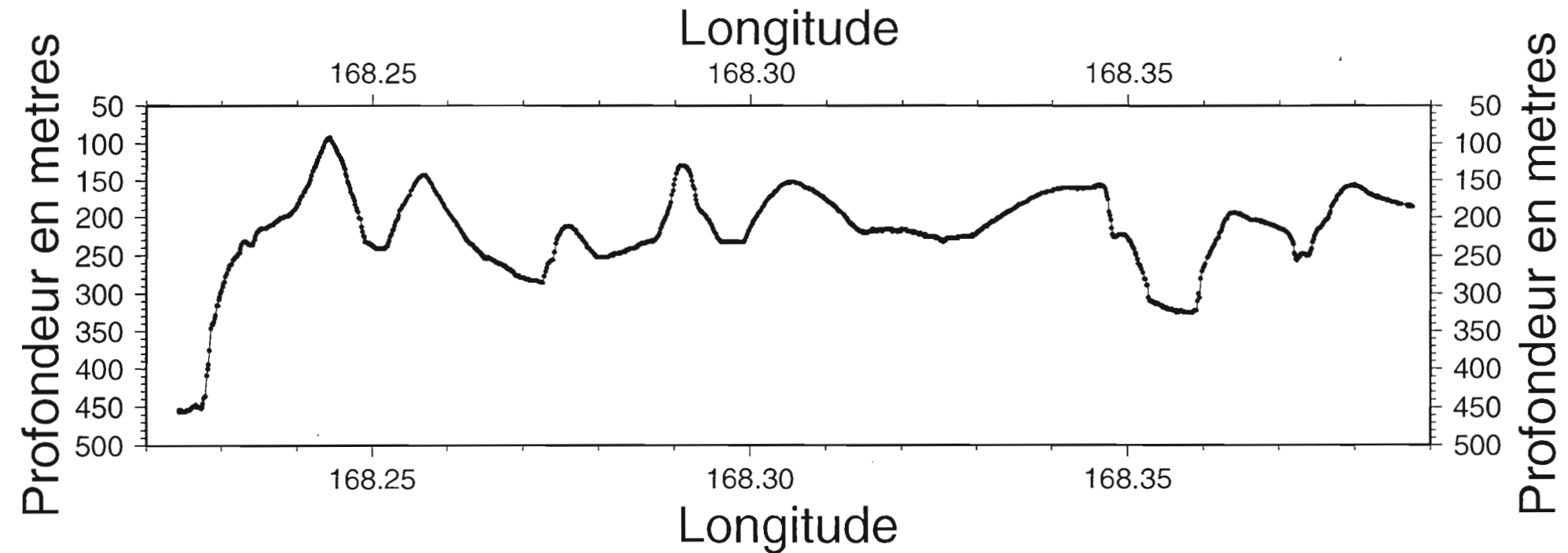
-17.845

-17.850

-17.855

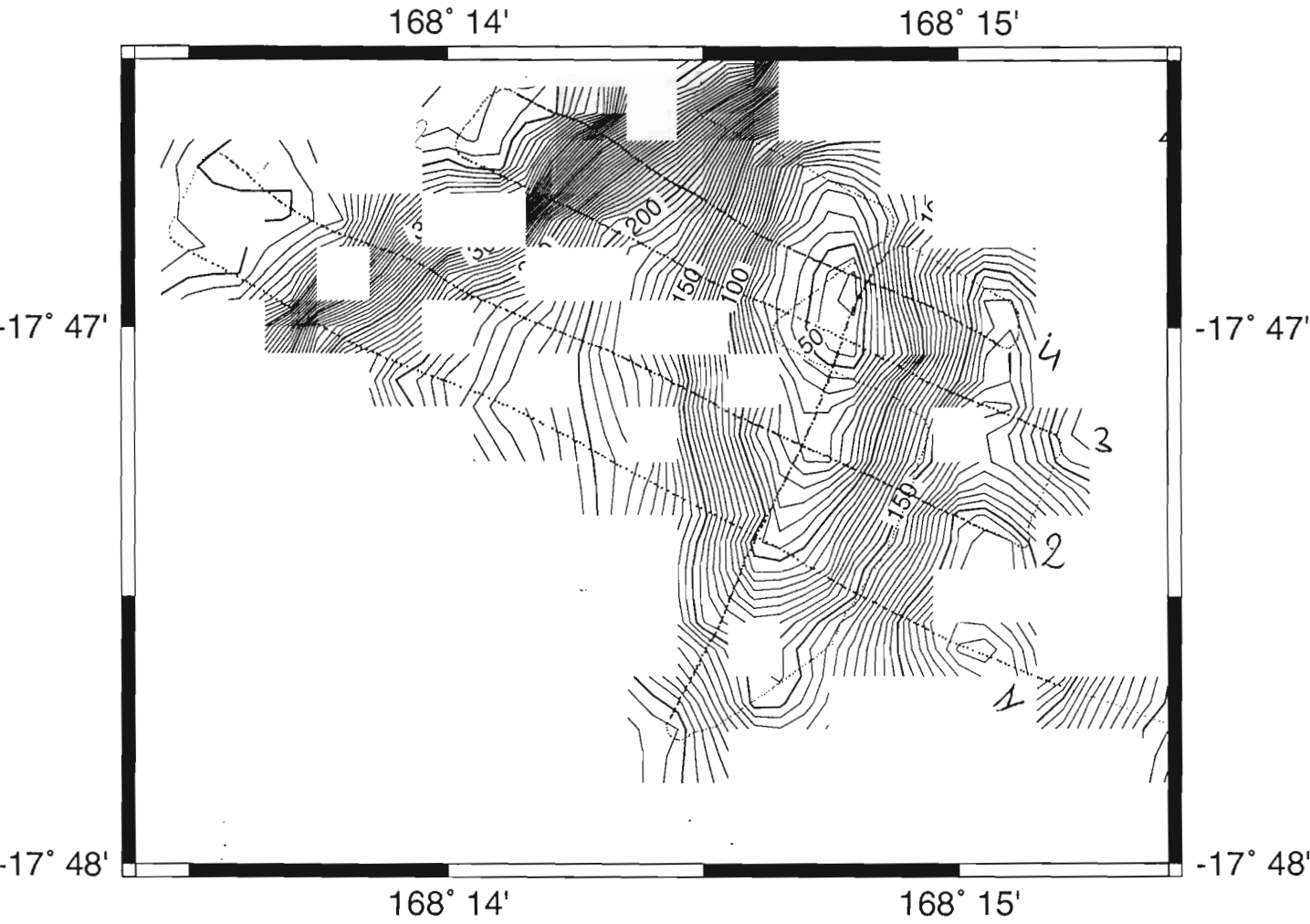


South Efate, Pango Point to Narpow Point

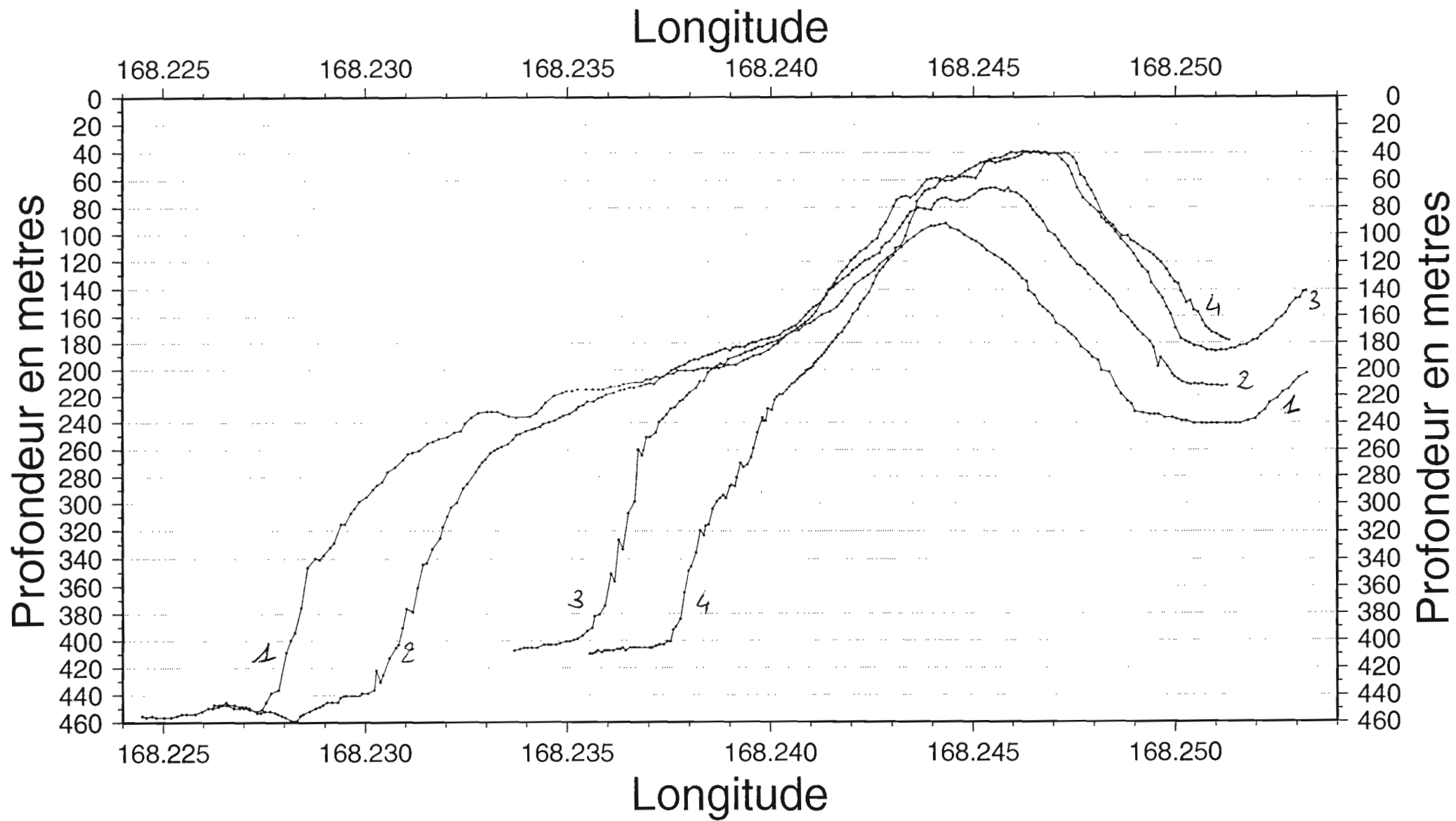


Profiles of Pango Point

Pango Point, 1/25000, 5m

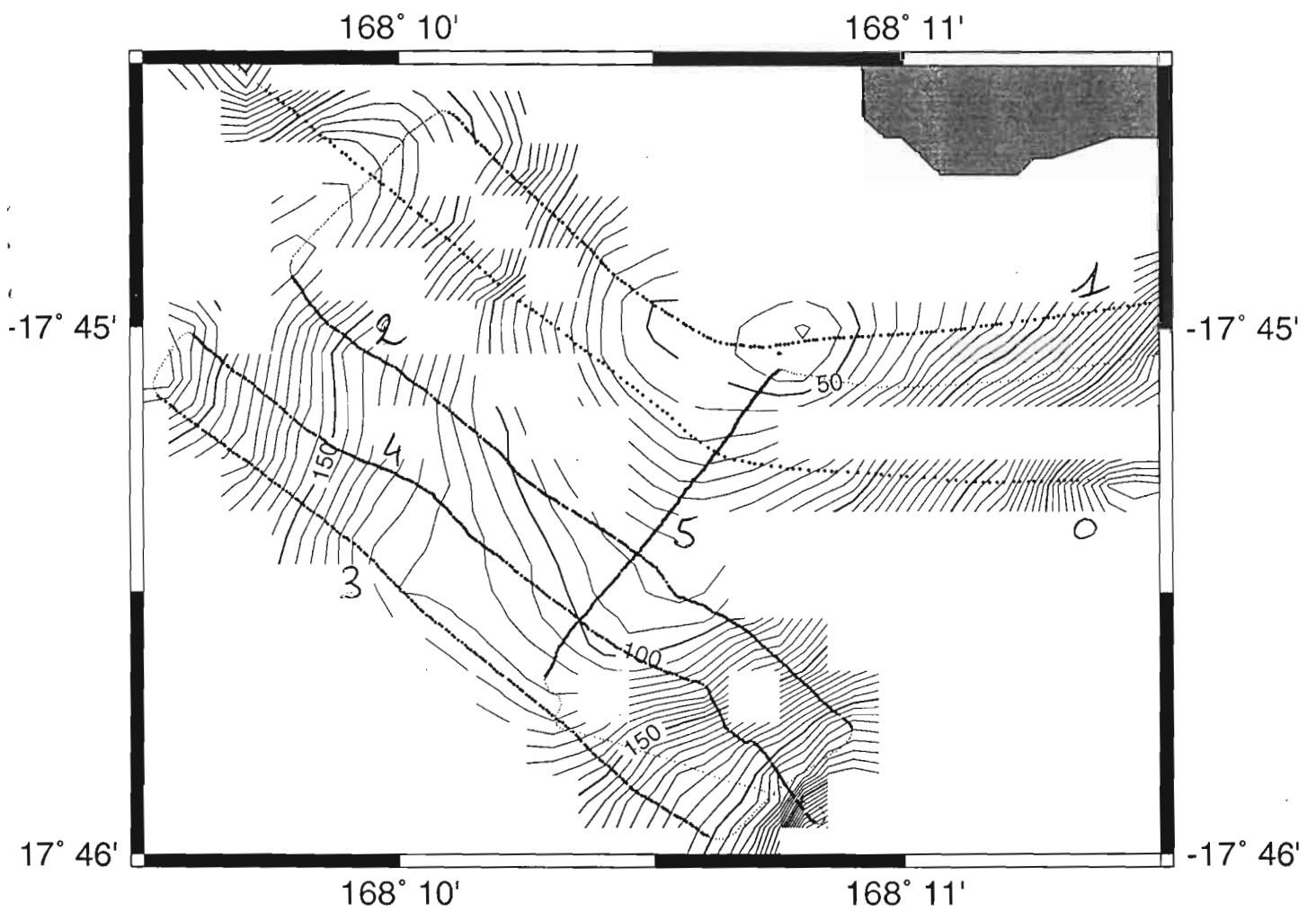


Profils - Pango Point

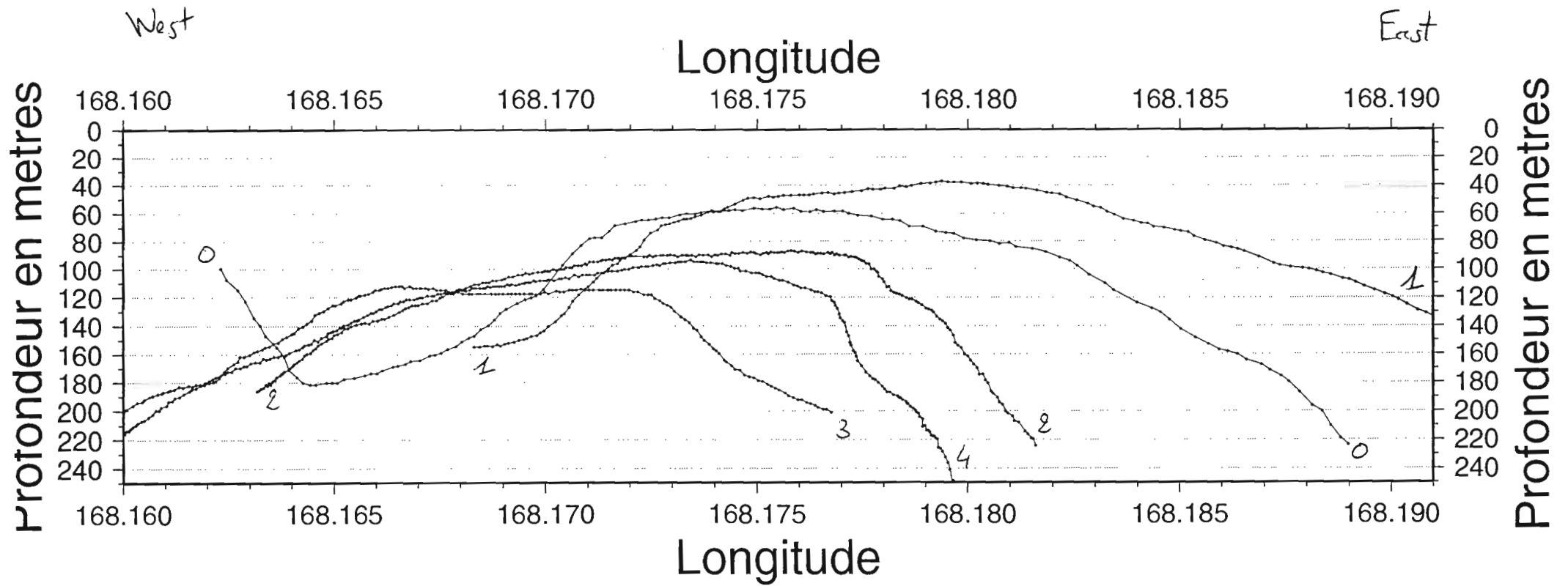


Profiles of Devil Point

Devil Point, 1/25000, 5m

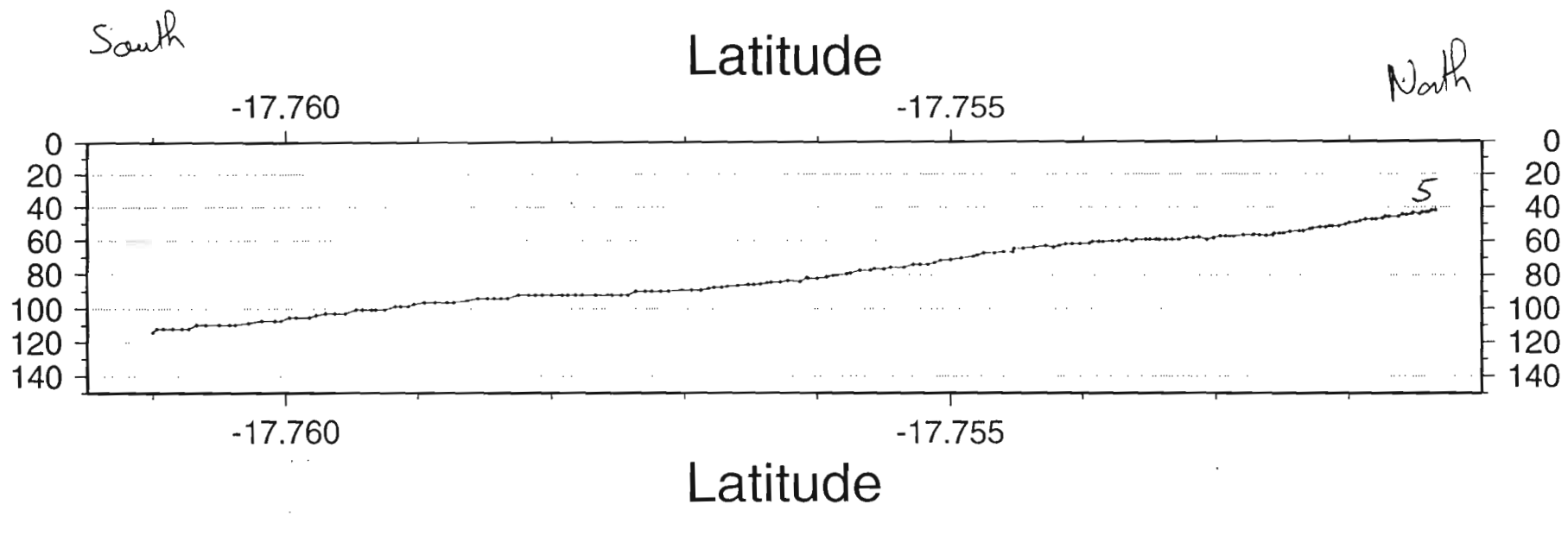


Profils - devil Point



Profil 5 Devil Point

Profondeur en metres



Profondeur en metres

