

PALAEOGEOGRAPHY 37

BMR RECORD 1991/105

PAPUA NEW GUINEA DATA COMPILATION:

**STRATIGRAPHIC SUMMARY COLUMNS
AND DATA MAPS
FOR THE PAPUA NEW GUINEA OROGEN
AND NEOGENE BASINS**

by

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Phanerozoic History of Australia Project



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This Record's status is **IN-CONFIDENCE** until 31/12/92.

ISSN 0811-062X
ISBN 0 642 17040 1

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Enclosure 3	Cainozoic stratigraphic summary columns for the Papua New Guinea Orogen (northern ranges and Papuan Peninsula).
Enclosure 4	Cainozoic stratigraphic summary columns for the islands of Papua New Guinea.
Enclosure 5	Stratigraphic summary columns for Neogene basins of Papua New Guinea.

1. INTRODUCTION

Eighteen stratigraphic summary columns for the Papua New Guinea part of the New Guinea Orogen (Enclosures 1-3), thirteen columns for the islands of Papua New Guinea (Enclosure 4), seven columns for Neogene basins of the Papua New Guinea mainland (Enclosure 5) and sixteen data maps (Figures 6-21) have been produced as part of the BMR-APIRA Phanerozoic History of Australia Project. They form the data base for plate tectonic reconstructions of the region (Struckmeyer, 1991) and for interpretative palaeogeographic maps plotted on the palinspastic bases (Struckmeyer, in prep.).

The New Guinea orogen extends across the island of New Guinea and is composed of a northern belt of allocthonous terranes (Figure 1) and a southern belt of para-autochthonous deformed Australian craton (Papuan Fold Belt) (Pigram & Davies, 1987). Data for the Papuan Fold Belt were presented in an earlier report on the Papuan Basin (Struckmeyer, 1990). The allochthon consists of a central to southern belt of subduction complexes representing remnants of distal passive margin sediments, ?arc volcanics and oceanic crust, and a northern belt of island arc complexes. The terranes accreted to the Australian craton from the Oligocene onwards as a result of the collision between the Australian and Pacific plates. The collisional events are reflected in the syn- to post-tectonic successions of the Papuan Basin, the North New Guinea Basin and the Cape Vogel Basin (Figure 1). The islands of Papua New Guinea (New Britain, New Ireland, Bougainville, New Hanover and Manus Island) form part of the orogen, but they have not yet accreted to the craton (Figure 2). They typically consist of Cainozoic island arc volcanics, derived sediments and carbonates.

2. STRATIGRAPHIC SUMMARY COLUMNS (Enclosures 1-5)

The stratigraphic summary columns are based on the compilation of basic data, such as thickness, lithology, sedimentary structures, fossil assemblages, biochronological ages and isotopic ages, from various data sources including explanatory notes for 1:250,000 and 1:100,000 geological maps, well completion reports, and published and unpublished reports and papers. The information summarised in the columns will be used as a basis for interpretative palaeogeographic maps plotted on palinspastically reconstructed base maps; these are currently in preparation. The columns are drawn against the Mesozoic time scale of Harland & others (1982) and the Cainozoic time scale of Berggren (1969) and Berggren & others (1985a, b). Isotopic ages based on old (pre-1978) decay constants were adjusted using the standard decay constants given by Harland & others (1982).

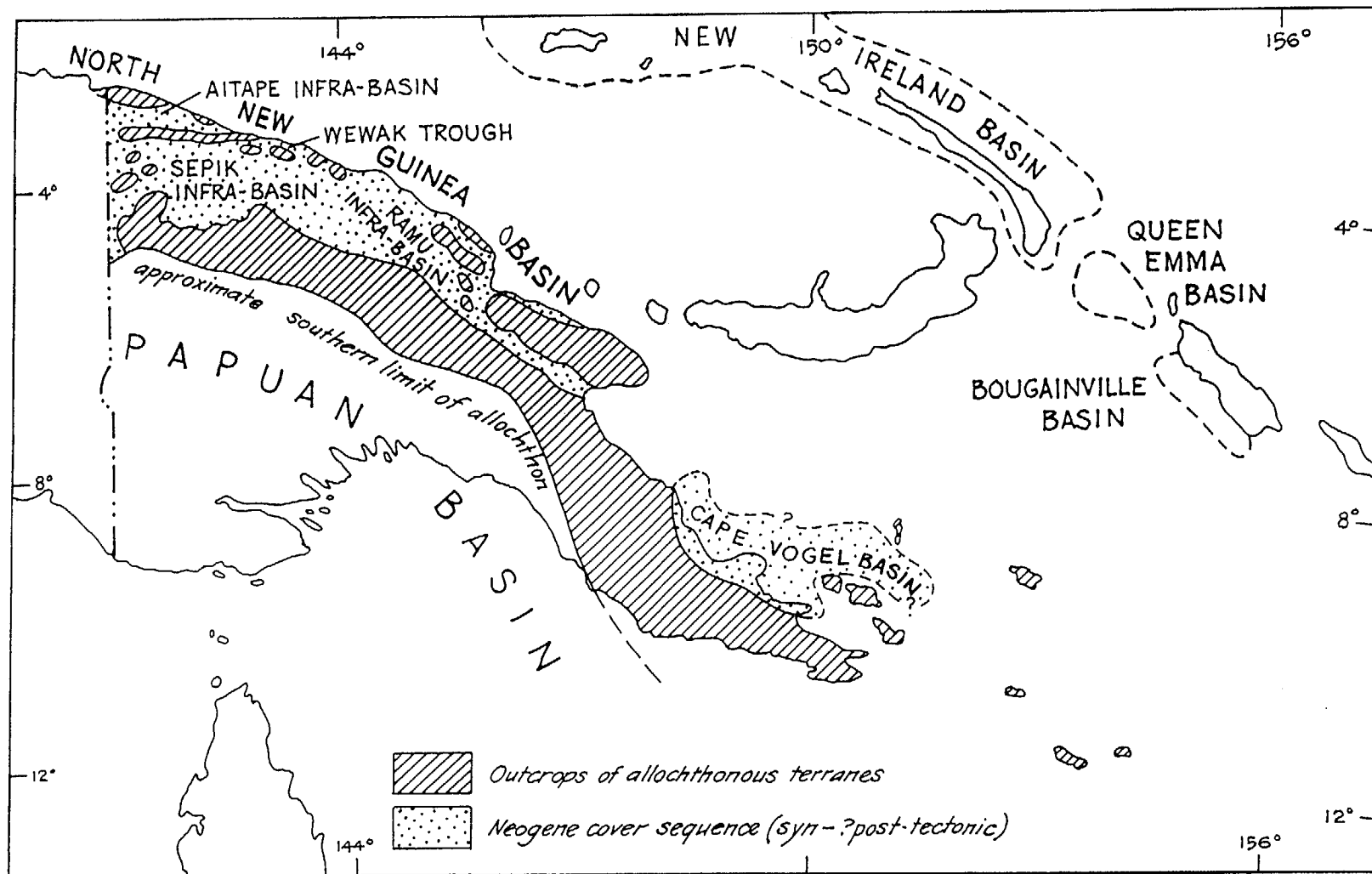


Figure 1: Map of Papua New Guinea showing outcrops of allochthonous terranes and the location of sedimentary basins.

In view of the scale of the palaeogeographic maps to be drawn (1:10,000,000), the minimum number of columns required to characterise the Mesozoic to Cainozoic sequences of the orogen and the Neogene cover sequence was compiled. Therefore, not all formations or units described in the literature could be considered, but the key sequences were compiled. The columns are presented as a number of sections across the western, central, eastern and northern parts of the orogen, the Neogene basins and the Papua New Guinea islands (Figure 2). Column location is given in Figures 3 and 4 and listed in Tables 1 to 3. The columns were compiled independently of a regional tectonic model, however, in many instances, the columns for the orogen summarise the geology of tectonostratigraphic terranes or composite terranes described by Pigram & Davies (1987).

3. Data Maps (Figures 6-21)

The data maps show the lithology and thickness (where known) of sediments for the Mesozoic to Cainozoic time slices (Table 4) at the relevant data points. Two types of data points are given on the maps: those which depict true data *points*, i.e. petroleum exploration wells (shown as circles), and those which draw together information for an area of outcrop, i.e. outcrop summary points (shown as squares). The selection and number of the data points was based on criteria such as availability of biostratigraphic data, completeness of section and areal coverage of the basin. In many cases, the detailed biostratigraphic control for defining the time slices was not available. In these instances, the thickness and lithology for the *time slice range* is given. For example, if a 450m thick sequence of interbedded mudstone and sandstone has a general Late Cretaceous age, this information is shown as "K8-11, 450m" on each of the two time slices K 8 and 10b. This is considered to be a more realistic mode of illustration than dividing the thickness of sediment between the two time slices. Localities with no sediments in a given time slice, due to either erosion or non-deposition, are not shown on the data maps. Data points for the Papuan Basin which were presented in an earlier report (Struckmeyer, 1990), are included in the data maps and on Table 4.

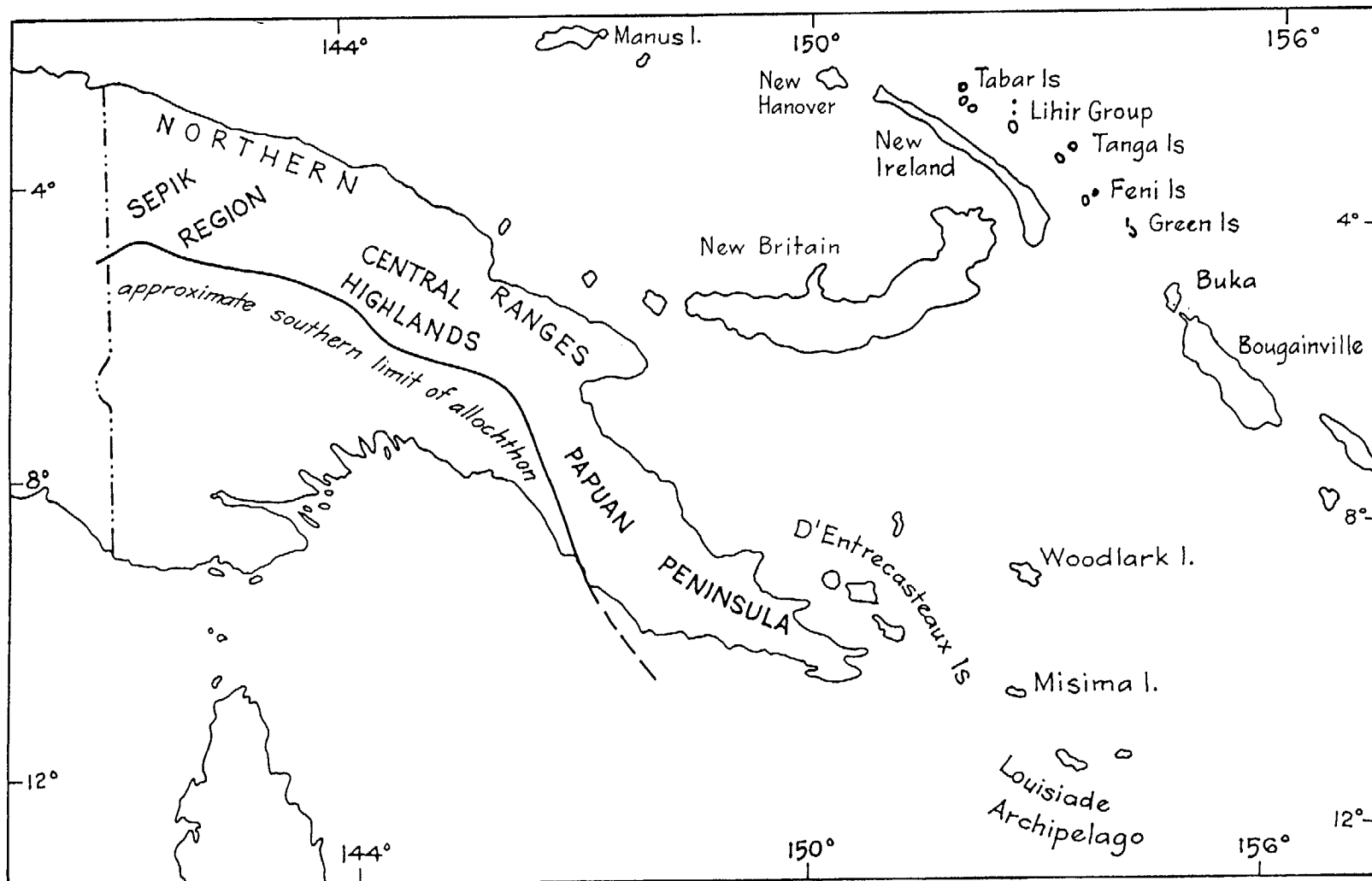


Figure 2: Regional location map.

TABLE 1: Mesozoic-Cainozoic stratigraphic summary columns for the Papua New Guinea orogen.

SEPIK REGION

- 18** Schatteburg Mountains to Hunstein Range
- 19** Landslip Ranges to Amanab area
- 20** Prince Alexander Mountains to Mount Turu

CENTRAL HIGHLANDS

- 21** Kimil Range to Bismarck Range
- 22** Goroka to Kainantu area
- 23** Schrader Range
- 24** Marum Ophiolite Complex

PAPUAN PENINSULA

- 25** Menyamya area to Owen Stanley Range
- 26** Bowutu to Sibium Mountains
- 27** Mount Suckling / Mount Dayman area
- 28** Southeastern Papuan Peninsula
- 29** Port Moresby area
- 30** D'Entrecasteaux Islands
- 31** Misima Island (Louisiade Archipelago)
- 32** Woodlark Island

NORTHERN RANGES

- 33** Bewani / Torricelli Mountains
- 34** Adelbert to Finisterre Range
- 35** Huon Peninsula

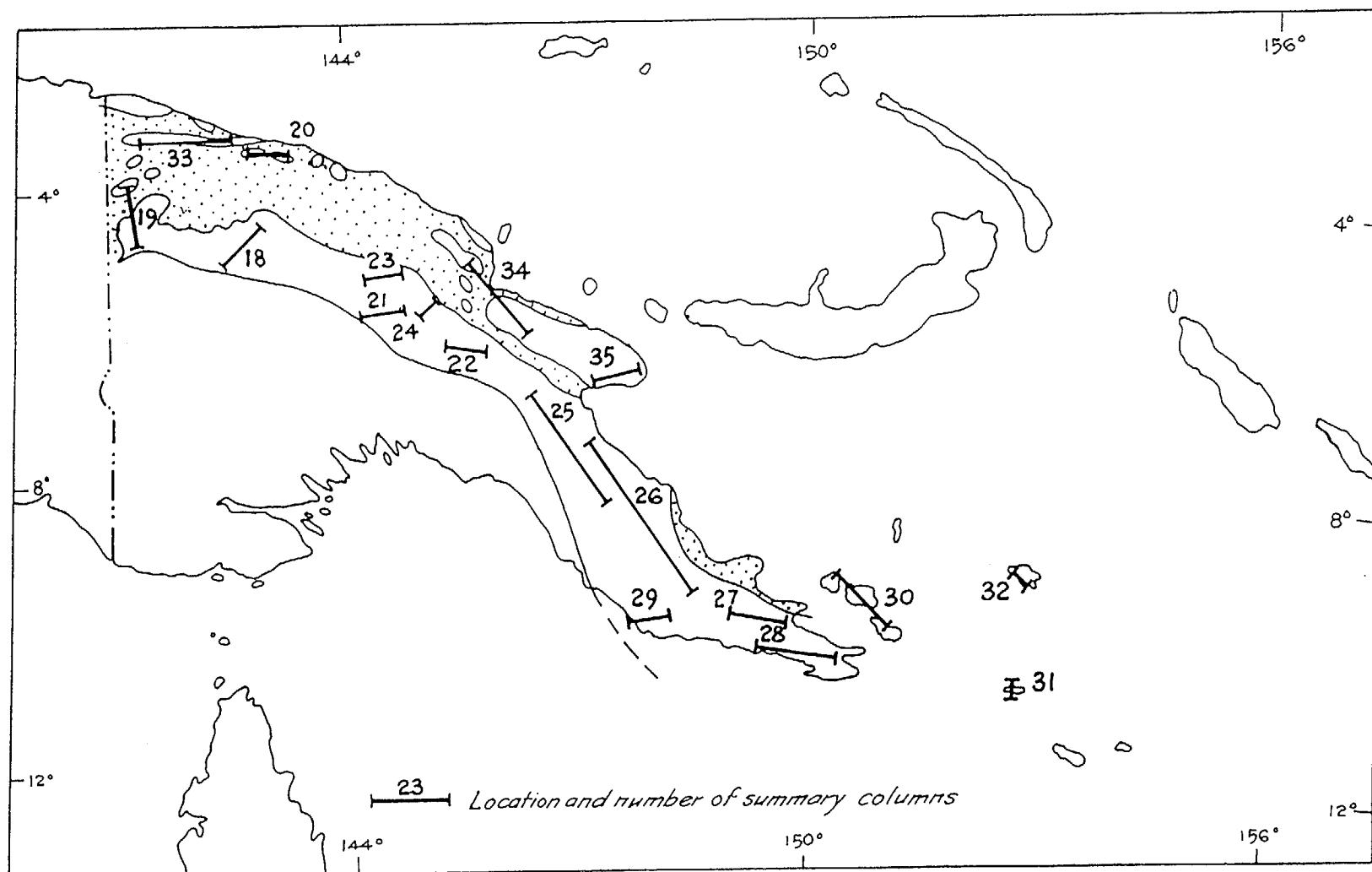


Figure 3: Location of summary columns for the Papua New Guinea orogen.

TABLE 2: Stratigraphic summary columns for Neogene basins of mainland Papua New Guinea.

NORTH NEW GUINEA BASIN

Sepik Infra-Basin

36 Wogamush Embayment to Nopan-1

37 Yawa Trough to Bongos-1

Aitape Infra-Basin

38 West: Pulan-1 to Puwani-1

39 East

40 *Wewak Trough*

41 *Ramu Infra-Basin: NW, Keram-1 to Tsumba-1*

CAPE VOGEL BASIN

42 Cape Vogel Peninsula to Goodenough-1

43 Trobriand Depocentre to Nubiam-1

TABLE 3: Cainozoic stratigraphic summary columns for Papua New Guinea islands.

	<u>NEW BRITAIN</u>
44	West
45	Central
46	East
	Intrusive Rocks
	<u>MANUS ISLAND</u>
47	South West Bay to Lorengau
48	<u>NEW HANOVER</u>
	<u>NEW IRELAND</u>
	Onshore
49	North west
50	Central
51	South
52	Offshore
	<u>BOUGAINVILLE and BUKA</u>
53	Queen Emma Basin to Buka Island
54	Central and southern Bougainville
55	Bougainville Basin (incl. L'Etoile-1)

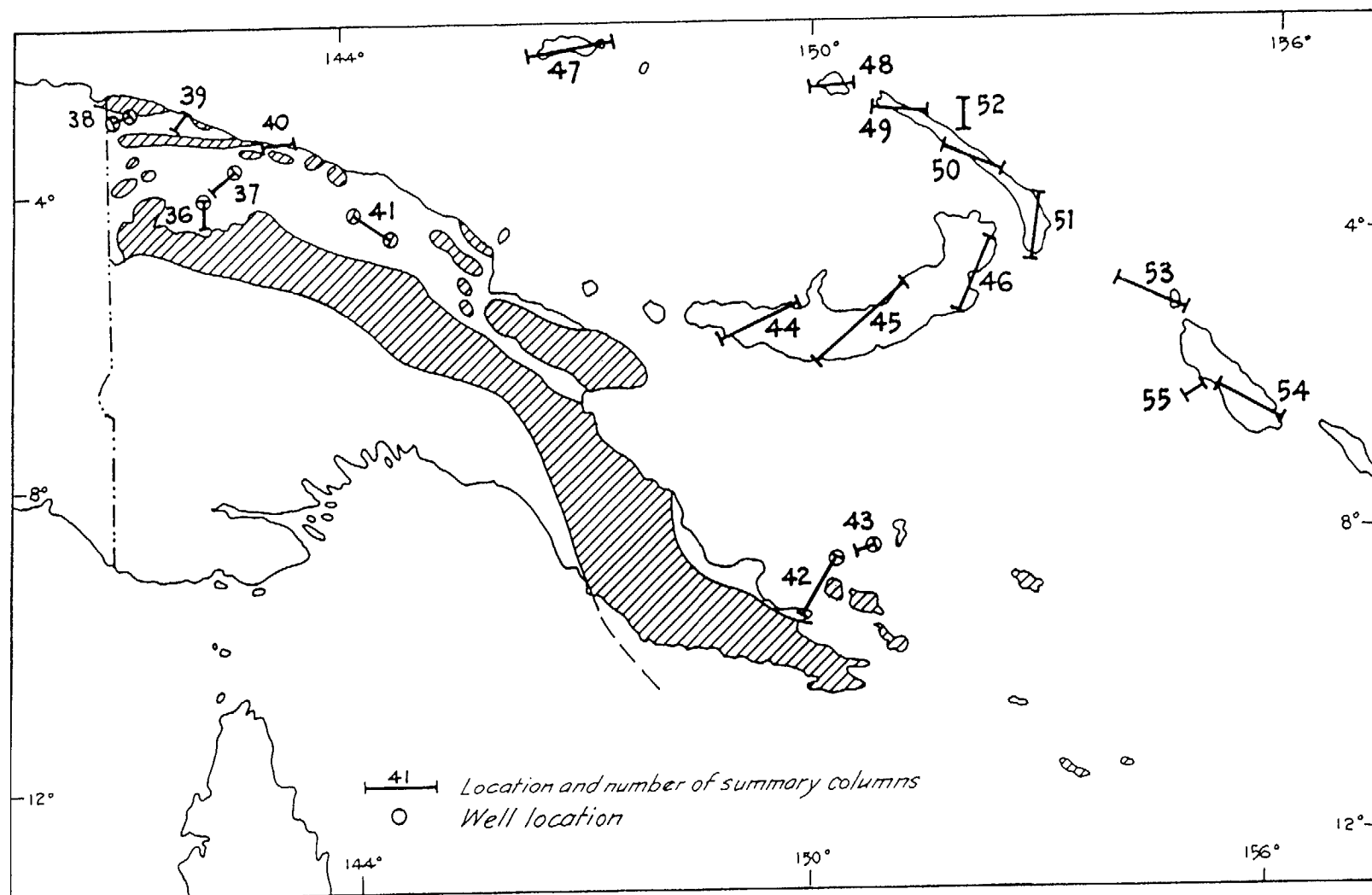


Figure 4: Location of summary columns for Neogene basins and the islands of Papua New Guinea.

LITHOLOGICAL SYMBOLS

	<i>Conglomerate</i>		<i>Undifferentiated carbonate</i>
	<i>Sedimentary breccia</i>		<i>Evaporites</i>
	<i>Diamictite</i>		<i>Chert</i>
	<i>Quartzose sandstone</i>		<i>Pyroclastics</i>
	<i>Lithic sandstone</i>		<i>Felsic lavas: >67% SiO₂</i>
	<i>Feldspathic sandstone</i>		<i>Mafic to intermediate lavas: 45-67% SiO₂</i> A = Andesite
	<i>Undifferentiated sandstone</i>		<i>Felsic intrusives: >67% SiO₂</i>
	<i>Undifferentiated greywacke</i>		<i>Mafic to intermediate intrusives</i> 45-67% SiO ₂
	<i>Mudstone (inc. shale)</i>		<i>Ultramafics</i>
	<i>Siltstone</i>		<i>Weathered profile</i>
	<i>Claystone</i>		<i>Silcrete</i>
	<i>Oil shale</i>		<i>Ferricrete</i>
	<i>Coal</i>		<i>Bauxite</i>
	<i>Marl</i>		<i>Metamorphics</i>
	<i>Limestone</i>		<i>Siliceous ooze</i>
	<i>Dolomite</i>		<i>Calcareous ooze</i>
	<i>Marine microfossil</i>		<i>Oil discovery</i>
	<i>Marine macrofossil</i>		<i>Gas discovery</i>
	<i>Spores/pollen</i>		

Figure 5: Key to lithological symbols.

3. MAJOR REFERENCES FOR SUMMARY COLUMNS

- COLUMN 18:** Arnold & others (1979); Davies (1982); Davies (1983); Davies & Hutchison (1982); Dow & others (1972);
- COLUMN 19:** Davies (1982); Dow & others (1972); Hutchison & Norvick (1980); Norvick & Hutchison (1980);
- COLUMN 20:** Hutchison & Norvick (1978); Hutchison & Norvick (1980); Pawih (1989);
- COLUMN 21:** Bain & Binnekamp (1973); Bain & others (1975); Bain & Mackenzie (1975); Francis (in prep.); Francis & others (1990); Haig (1981); Haig & others (1986); Mackenzie (1980); Pigram & others (1987);
- COLUMN 22:** Bain & Mackenzie (1975); Francis & others (1990); Haig (1981); Haig & others (1986); Mackenzie (1980); Robinson & others (1976); Rogerson & others (1988); Tingey & Grainger (1976);
- COLUMN 23:** Bain & Mackenzie (1975); Jaques & Robinson (1980); Pigram (1978);
- COLUMN 24:** Jaques (1981b); Jaques & others (1978);
- COLUMN 25:** Brown (1977); Brown & others (1975); Cussen & others (1986); Davies & Smith (1974); Pieters (1978); Rogerson & Hilyard (1990); Rogerson & others (1988); Tingey & Grainger (1976); Worthing (1988);
- COLUMN 26:** Davies (1971); Davies (1980b); Davies & Smith (1971); Davies & Smith (1974); Smith & Compston (1982); Stewart & others (1986);
- COLUMN 27:** Davies & Smith (1974); Davies (1980a); Smith & Compston (1982); Smith & Davies (1976); Walker & McDougall (1982); Worthing (1988);
- COLUMN 28:** Smith & Compston (1982); Smith & Davies (1973a); Smith & Davies (1973b); Smith & Davies (1976);
- COLUMN 29:** Haig (1982); Haig & Malagun (1980); Haig & Tamu (1980); Pieters (1978); Rogerson & others (1981);
- COLUMN 30:** Davies (1973a); Davies & Warren (1988); Smith (1976); Smith & Compston (1982); Smith & Davies (1973a);
- COLUMN 31:** Williamson & Rogerson (1983);
- COLUMN 32:** Ashley & Flood (1981); Trail (1967);
- COLUMN 33:** Hutchison & Norvick (1978); Hutchison & Norvick (1980); Norvick & Hutchison (1980);
- COLUMN 34:** Francis (1990); Francis & Deibert (1988); Jaques (1976); Jaques & Robinson (1980); Robinson & others (1976); Tingey & Grainger (1976);

- COLUMN 35:** Chappell (1974); Crook (1989); Francis (1990); Francis & Deibert (1988); Jaques (1976); Robinson (1974); Rogerson & others (1988);
- COLUMN 36:** Davies (1982); Doust (1990); Dow & others (1972); Francis (1990); Francis & Deibert (1988);
- COLUMN 37:** Davies (1982); Doust (1990); Dow & others (1972); Francis (1990); Francis & Deibert (1988); Hutchison & Norvick (1980);
- COLUMN 38:** Francis (1990); Francis & Deibert (1988); Hutchison & Norvick (1980); Kugler (1990); Norvick & Hutchison (1980);
- COLUMN 39:** Francis (1990); Francis & Deibert (1988); Hutchison & Norvick (1980); Kugler (1990); Norvick & Hutchison (1980);
- COLUMN 40:** Francis (1990); Francis & Deibert (1988); Hutchison & Norvick (1978, 1980); Pawih (1989, 1990);
- COLUMN 41:** Doust (1990); Francis (1990); Francis & Deibert (1988); Harrison (1974); Hutchison & Norvick (1978, 1980); Jaques & Robinson (1980);
- COLUMN 42:** Bickel (1974, 1976); Davies & Smith (1974); Durkee & others (1987); Garside & Stoen (1973); Walker & McDougall (1982);
- COLUMN 43:** Bickel (1974, 1976); Durkee & others (1987); Stoen & Garside (1973);
- COLUMN 44:** Belford (1988a), Johnson (1977), Page & Ryburn (1977), Ryburn (1976)
- COLUMN 45:** Johnson (1976), Page & Ryburn (1977), Ryburn (1975)
- COLUMN 46:** Davies (1973b), Johnson (1976), Lindley (1988), Page & Ryburn (1977), Ryburn (1974)
- COLUMN 47:** Belford (1988b), Exon & Marlow (1980), Francis (1988), Jaques (1980, 1981a), Jaques & Webb (1975), Johnson & others (1988)
- COLUMN 48:** Belford (1988b), Brown (1982), Exon & Marlow (1988, 1990)
- COLUMN 49:** Exon & Marlow (1988, 1990), Exon & others (1986), Glikson (1988), Haig & Coleman (1988), Hohnen (1978), Stewart & Sandy (1986, 1988)
- COLUMN 50:** Durkee & others (1987), Exon & Marlow (1988, 1990), Exon & others (1986), French (1966), Glikson (1988), Haig & Coleman (1988), Hohnen (1978), Stewart & Sandy (1986, 1988)
- COLUMN 51:** Durkee & others (1987), Exon & Marlow (1988, 1990), Exon & others (1986), French (1966), Glikson (1988), Haig & Coleman (1988), Hohnen (1978), Stewart & Sandy (1986, 1988)
- COLUMN 52:** Belford (1988b), Durkee & others (1987), Exon & Marlow (1988, 1990), Exon & others (1986), Johnson & others (1976), Johnson &

others (1988), Marlow & others (1988), Stewart & others (1987),
Wallace & others (1983)

COLUMN 53: Blake & Mieztis (1967), Bruns & others (1989), Hilyard & Rogerson
(1989), Rogerson & others (1989), Vedder & others (1989)

COLUMN 54: Blake & Mieztis (1967), Bruns & others (1989), Hilyard & Rogerson
(1989), Rogerson & others (1989)

COLUMN 55: Durkee & others (1987), Rogerson & others (1989), Shaw (1985),
Stewart & others (1987)

Table 4: PAPUA NEW GUINEA DATA POINTS**a) Petroleum Exploration Wells**

Data Point No.	Name	Location	
		Longitude	Latitude
4001	Morehead-1	141° 31' 35"	08° 44' 46"
4002	Lake Murray-1	141° 19' 04"	07° 10' 04"
4003	Kiunga-1	141° 18' 36"	06° 00' 56"
4004	Magobu Island-1	143° 16' 31"	08° 31' 47"
4005	Aramia-1	142° 19' 05"	07° 51' 16"
4006	Mananda-1	142° 49' 32"	06° 10' 10"
4007	Kanau-1	143° 11' 26"	06° 54' 45"
4008	Barikewa-1	143° 55' 21"	07° 06' 52"
4009	Goari-1	143° 51' 44"	07° 38' 08"
4010	Anchor Cay-1	144° 03' 31"	09° 26' 29"
4011	Kusa-1	144° 13' 03"	08° 42' 29"
4012	Dibiri-1A	144° 40' 17"	08° 16' 57"
4013	Uramu-1A	144° 41' 41"	07° 48' 28"
4014	Kariava-1	145° 29' 27"	07° 24' 52"
4015	Tovala-1A	146° 08' 45"	08° 04' 23"
4016	Maiva-1	146° 06' 36"	08° 27' 18"
4017	Puwani-1	141° 15' 15"	02° 52' 59"
4018	Nopan-1	142° 13'	04° 07'
4019	Keram-1	144° 09' 23"	04° 23' 06"
4020	Tsumba-1	144° 34' 54"	04° 42' 53"
4021	Goodenough-1	150° 19' 49"	08° 57' 51"
4022	L' Etoile-1	154° 47' 46"	06° 12' 45"

b) Outcrops

Composite Data Point	Area	Location (approximate)
4030	Southern Hindenburg Range (western Muller Anticline)	141°00' - 141°45' E 05°05' - 05°25' S
4031	Eastern Muller Anticline area	142°00' - 142°40' E 05°20' - 05°35' S
4032	Area southeast of Kubor Anticline	144°00' - 145°00' E 06°00' - 06°35' S
4033	Area northeast of Kubor Anticline (Wahgi-Chimbu Gorge area)	144°50' - 145°05' E 05°53' - 06°05' S
4034	Aure Scarp	145°20' - 145°30' E 07°00' - 07°15' S

Table 4b continued

Composite Data Point	Area	Location (approximate)
4035	Oiapu - Yule Island - Oroí region	145°30' - 147°00' E 07°45' - 09°20' S
4036	Border Mountains	141°00' - 141°20' E 03°37' - 03°50' S
4037	Area between Lagaip and Frieda Fault Systems	142°00' - 143°00' E 04°30' - 04°40' S
4038	Ambunti area/Yawa Trough	142°25' - 143°00' E 04°00' - 04°20' S
4039	Eastern Aitape Basin	141°50' - 142°20' E 03°00' - 03°10' E
4040	Torricelli/Bewani Mountains	142°10' - 142°40' E 03°20' - 03°40' S
4041	Mt Turu/Prince Alexander Mts/ Wewak Trough	143°20' - 144°00' E 03°10' - 03°30' S
4042	Schrader Range	144°00' - 144°50' E 04°45' - 05°27' S
4043	Kimil/Bismarck Range	144°00' - 145°10' E 05°00' - 06°00' S
4044	Marum Ophiolite Complex	144°45' - 145°30' E 05°10' - 05°48' S
4045	Goroka/Kainantu area	145°10' - 146°10' E 05°48' - 06°30' S
4046	Adelbert Range (western Finisterre terrane)	144°45' - 145°30' E 04°15' - 05°00' S
4047	Finisterre Range (central Finisterre terrane)	145°45' - 147°00' E 05°30' - 06°40' S
4048	Huon Peninsula (eastern Finisterre terrane)	147°00' - 147°53' E 05°55' - 06°45' S
4049	Western Owen Stanley Ranges (incl. Bulolo/Menyamya/ eastern "Aure Trough" areas)	145°50' - 147°00' E 06°50' - 07°40' S
4050	Central Owen Stanley Ranges	147°00' - 148°00' E 07°40' - 09°40' S

Table 4b continued

Composite Data Point	Area	Location (approximate)
4051	Papuan Ultramafic Belt (NW)	147°30' - 148°20' E 07°30' - 08°30' S
4052	Papuan Ultramafic Belt (SE)	148°20' - 149°00' E 09°00' - 09°50' S
4053	Port Moresby area	147°00' - 148°30' E 09°15' - 10°08' S
4054	Southeast Papuan Peninsula - W	148°30' - 150°00' E 10°00' - 10°35' S
4055	Southeast Papuan Peninsula - E	150°00' - 151°20' E 10°15' - 10°45' S
4056	Mt Dayman/Mt Suckling area	149°00' - 149°40' E 09°30' - 09°50' S
4057	Cape Vogel	149°40' - 150°05' E 09°30' - 09°40' S
4058	D'Entrecasteaux Islands (Fergusson Island)	150°27' - 150°58' E 09°25' - 09°45' S
4059	Misima Island	152°30' - 152°45' E 10°40' S
4060	Woodlark Island	152°30' - 152°40' E 09°10' S
4061	Western New Britain - W	148°30' - 149°15' E 05°30' - 06°10' S
4062	Western New Britain - NE	149°15' - 149°55' E 05°25' - 05°50' S
4063	Western New Britain - SE	149°15' - 150°00' E 05°55' - 06°20' S
4064	Central New Britain - W	150°00' - 150°45' E 05°30' - 06°00' S
4065	Central New Britain - E	151°10' - 151°30' E 05°00' - 05°25' S
4066	Eastern New Britain (Gazelle Peninsula)	151°50' - 152°50' E 04°30' - 05°00' S
4067	SE New Ireland	152°35' - 153°10' E 03°50' - 04°55' S

Table 4b continued

Composite Data Point	Area	Location (approximate)
4068	Central New Ireland	151°35' - 152°50' E 03°10' - 03°50' S
4069	NW New Ireland	150°30' - 151°40' E 02°30' - 03°10' S
4070	New Hanover	150°00' - 150°25' E 02°20' - 02°40' S
4071	Manus Island	146°25' - 147°55' E 01°55' - 02°35' S
4072	SW to central Bougainville	155°00' - 156°00' E 06°00' - 06°50' S
4073	Buka Island	154°30' - 155°00' E 05°00' - 06°00' S

Table 5: MESOZOIC TO CAINOZOIC TIME SLICES (based on time scales of Harland & others [1982], Berggren [1969] and Berggren & others [1985a, b]).

TIME SLICE	AGE	MA
Cainozoic		
Cz 7	Quaternary	0 - 1.7
Cz 6a	Early Pliocene	3.0 - 5.0
Cz 4b	Early Miocene to earliest Middle Miocene	15.2 - 22.0
Cz 4a	Late Oligocene to earliest Miocene	22.0 - 30.0
Cz 2b	Late Eocene	36.5 - 40.0
Cz 1	Paleocene to Early Eocene	52.0 - 66.4
Cretaceous		
K 10b	mid-Campanian to mid-Maastrichtian	78.0 - 70.0
K 8	latest Albian to Cenomanian	99.0 - 91.0
K 4	Aptian	119.0 - 114.0
K 1	Berriasian to earliest Valanginian	144.0 - 137.0
Jurassic		
J 8	Oxfordian to Kimmeridgian	162.0 - 150.0
J 5	mid-Bajocian	180.0 - 177.0
J 2	Pliensbachian to early Toarcian	200.0 - 191.0
Triassic		
TR 5-6	Carnian to Rhaetian	231.0 - 213.0
TR 3-4	latest Anisian to Ladinian	239.0 - 231.0
TR 1-2	Scythian to Anisian	248.0 - 239.0

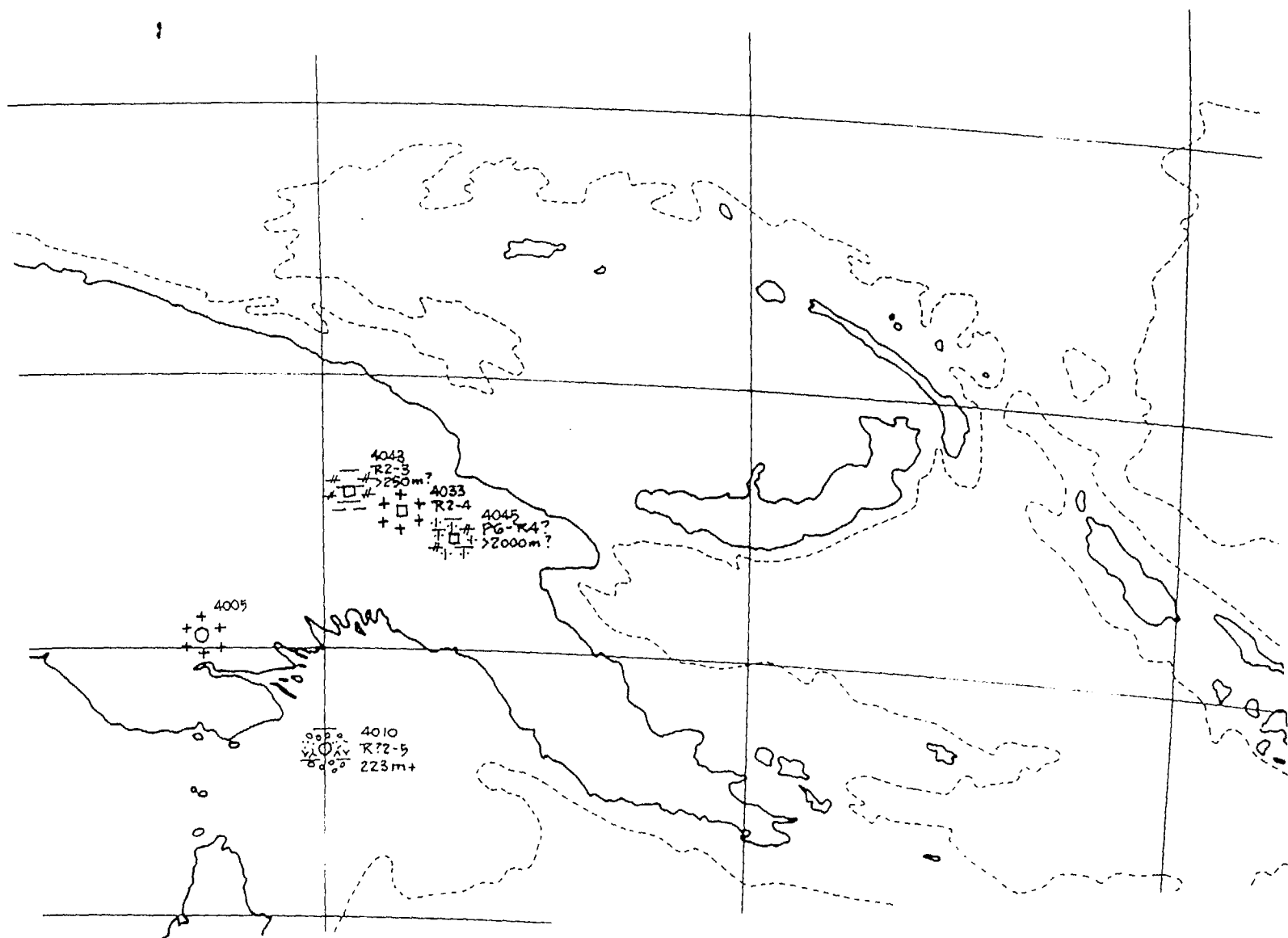


Figure 6: Early Triassic data map (TR 1-2).

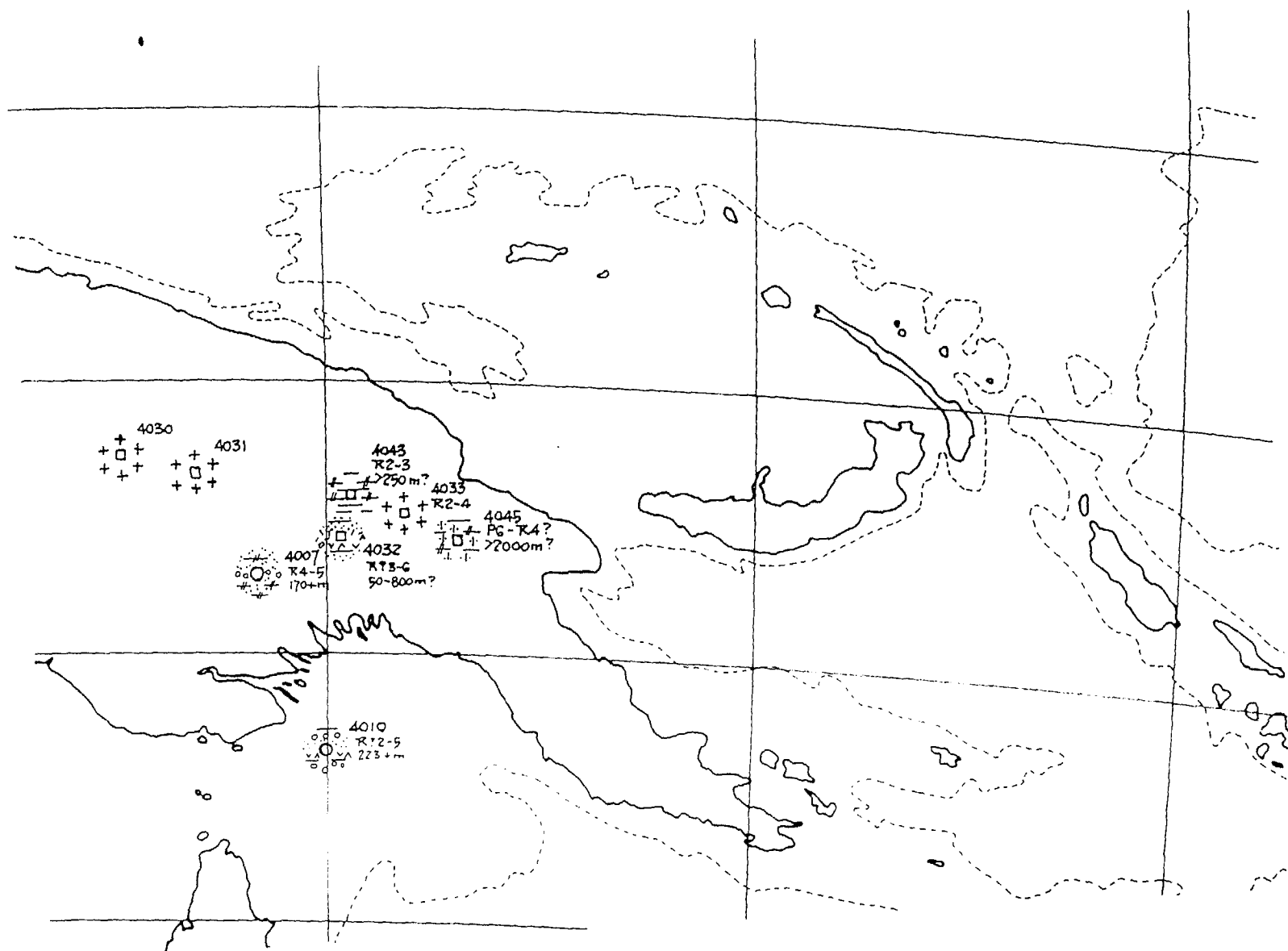


Figure 7: Middle Triassic data map (TR 3-4).

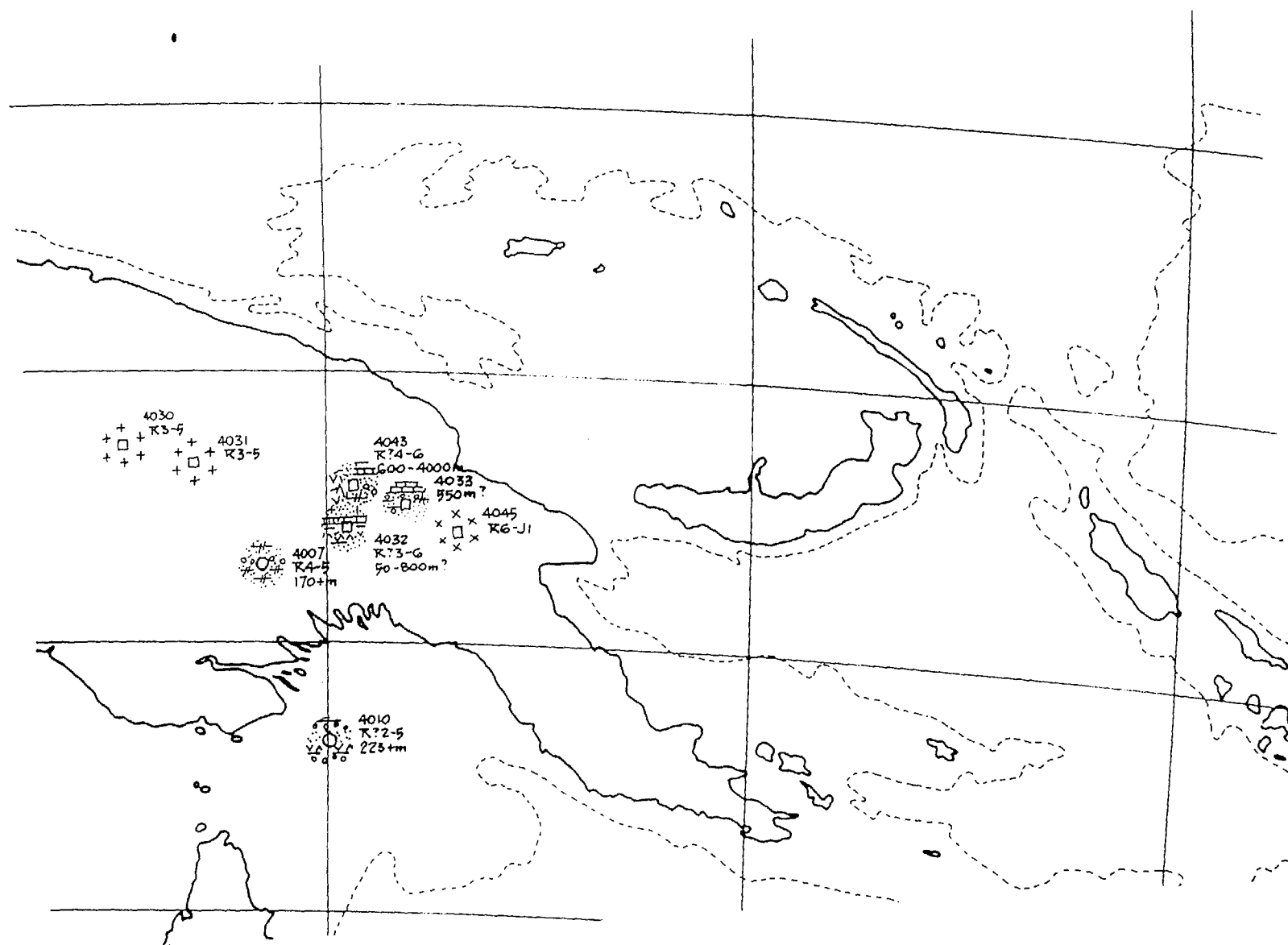


Figure 8: Late Triassic data map (TR 5-6).

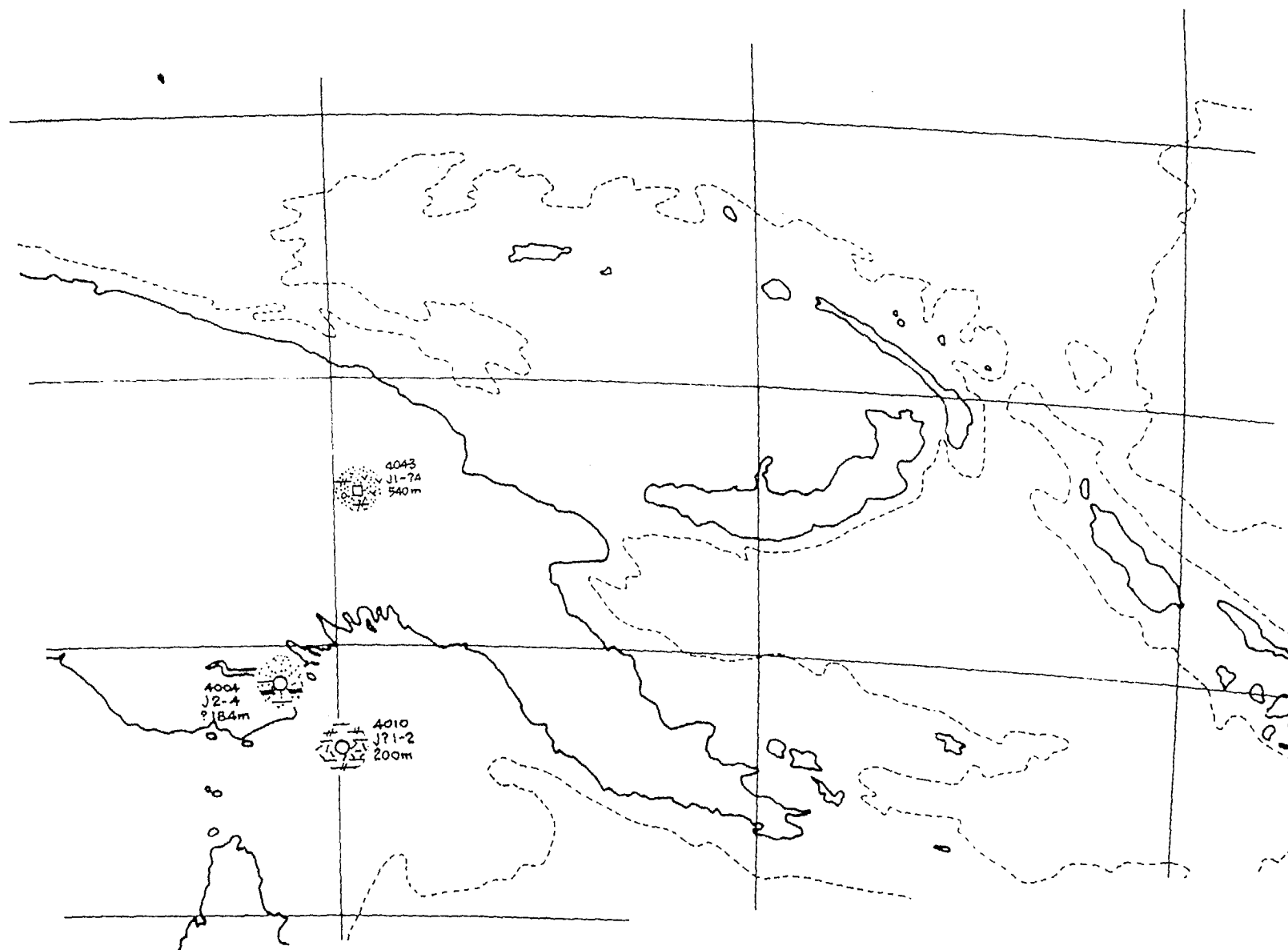


Figure 9: Early Jurassic data map (J 2).

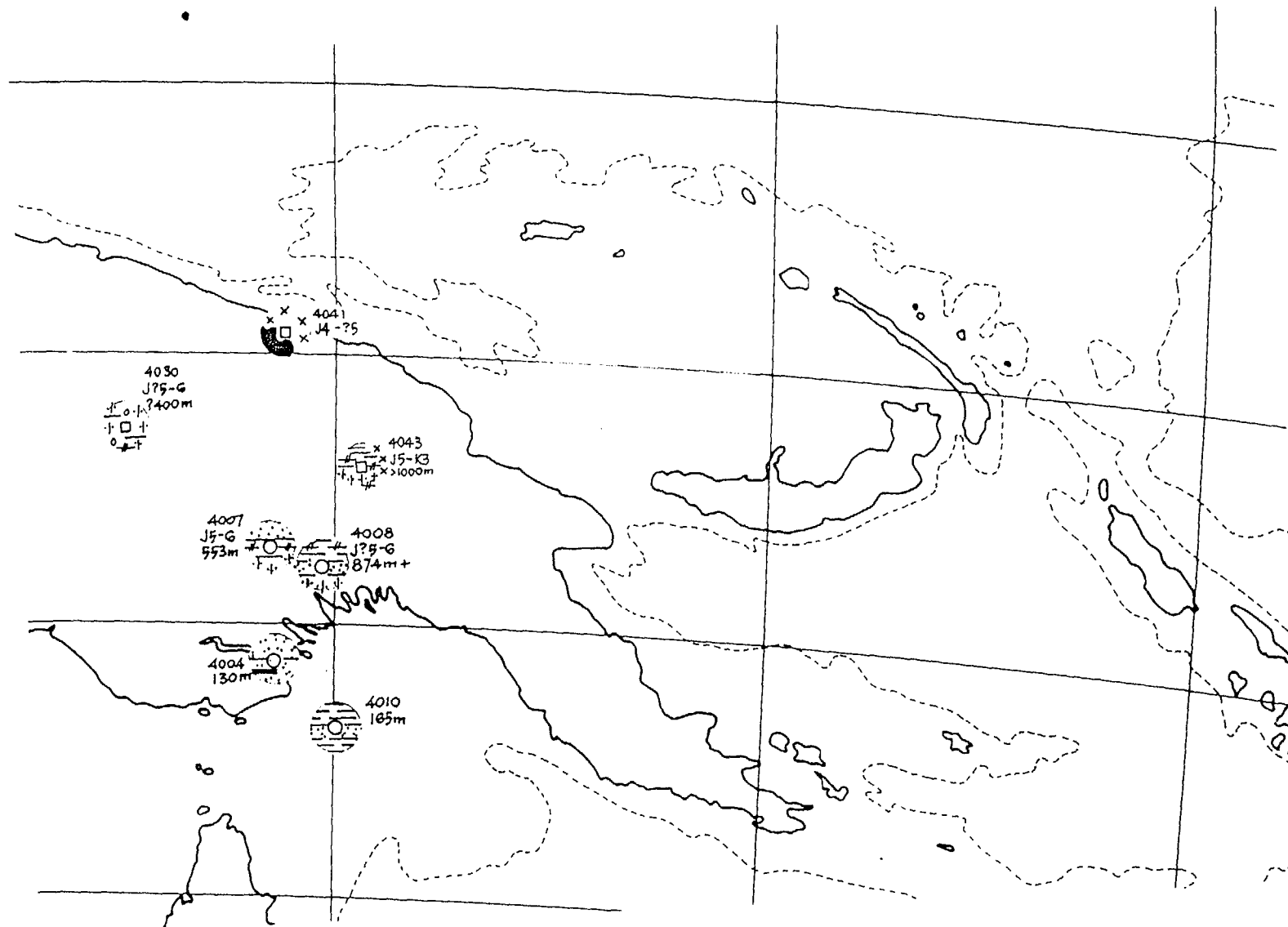


Figure 10: Middle Jurassic data map (J 5).

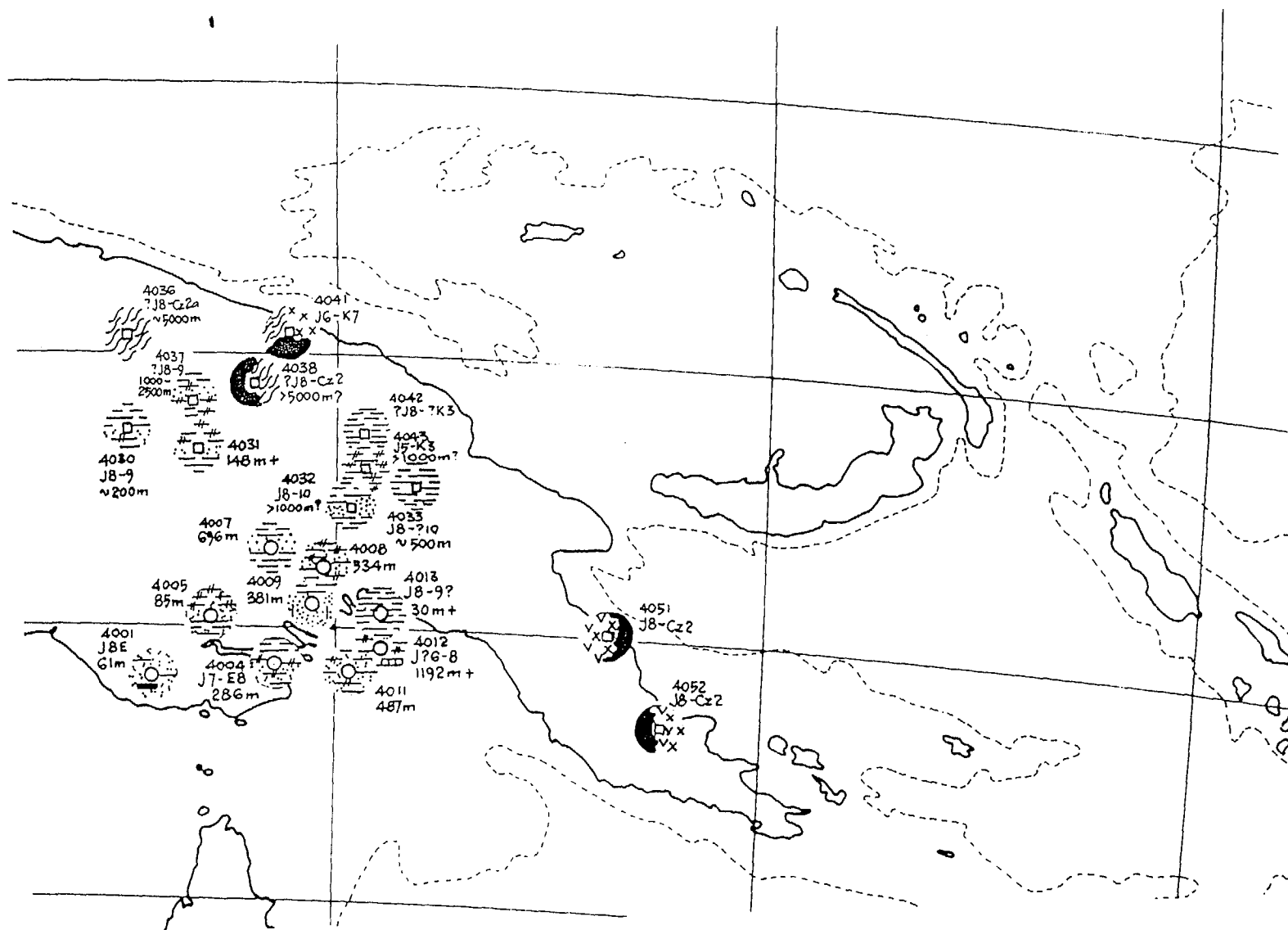


Figure 11: Late Jurassic data map (J 8).

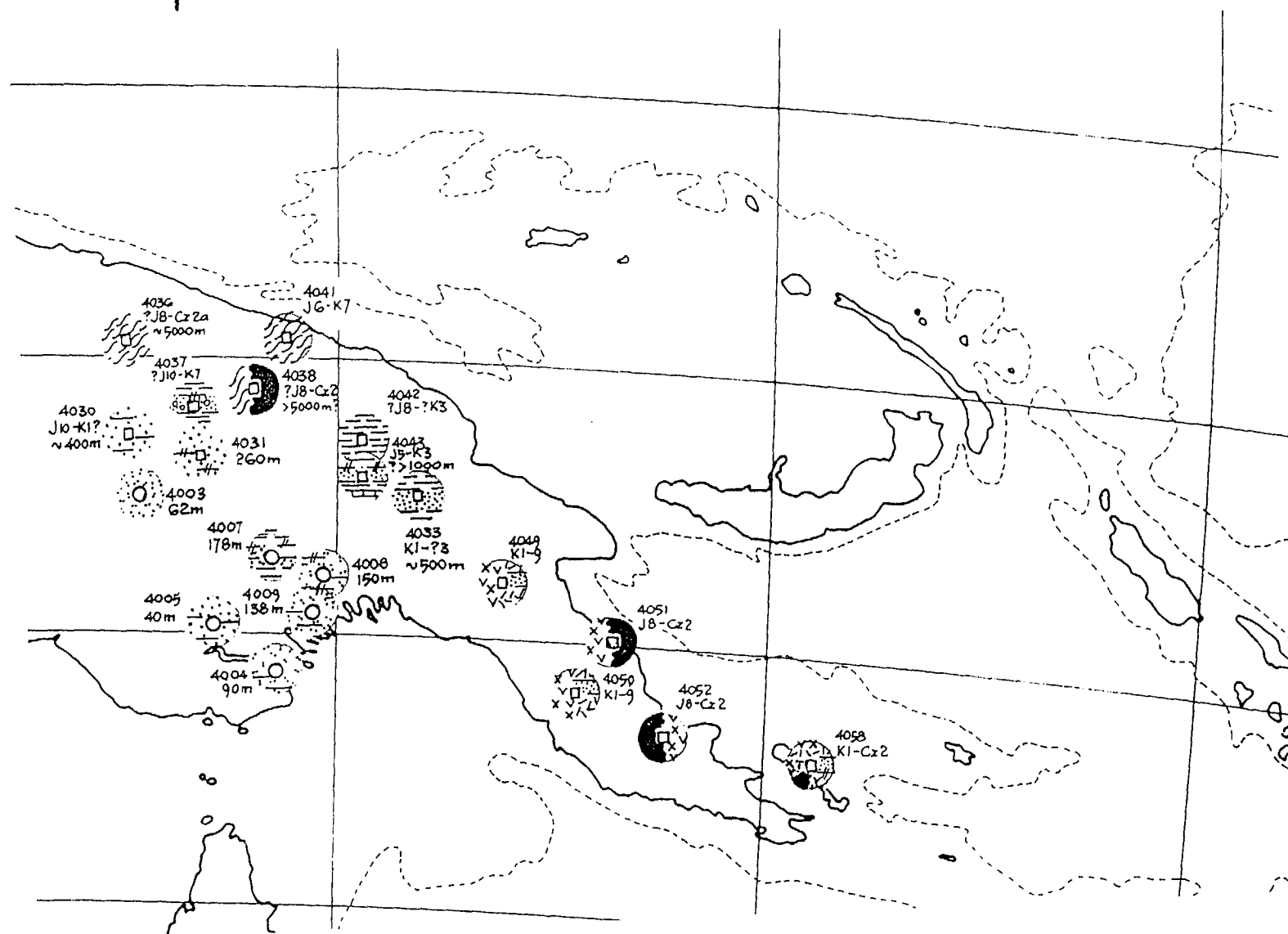


Figure 12: Berriasian data map (K 1).

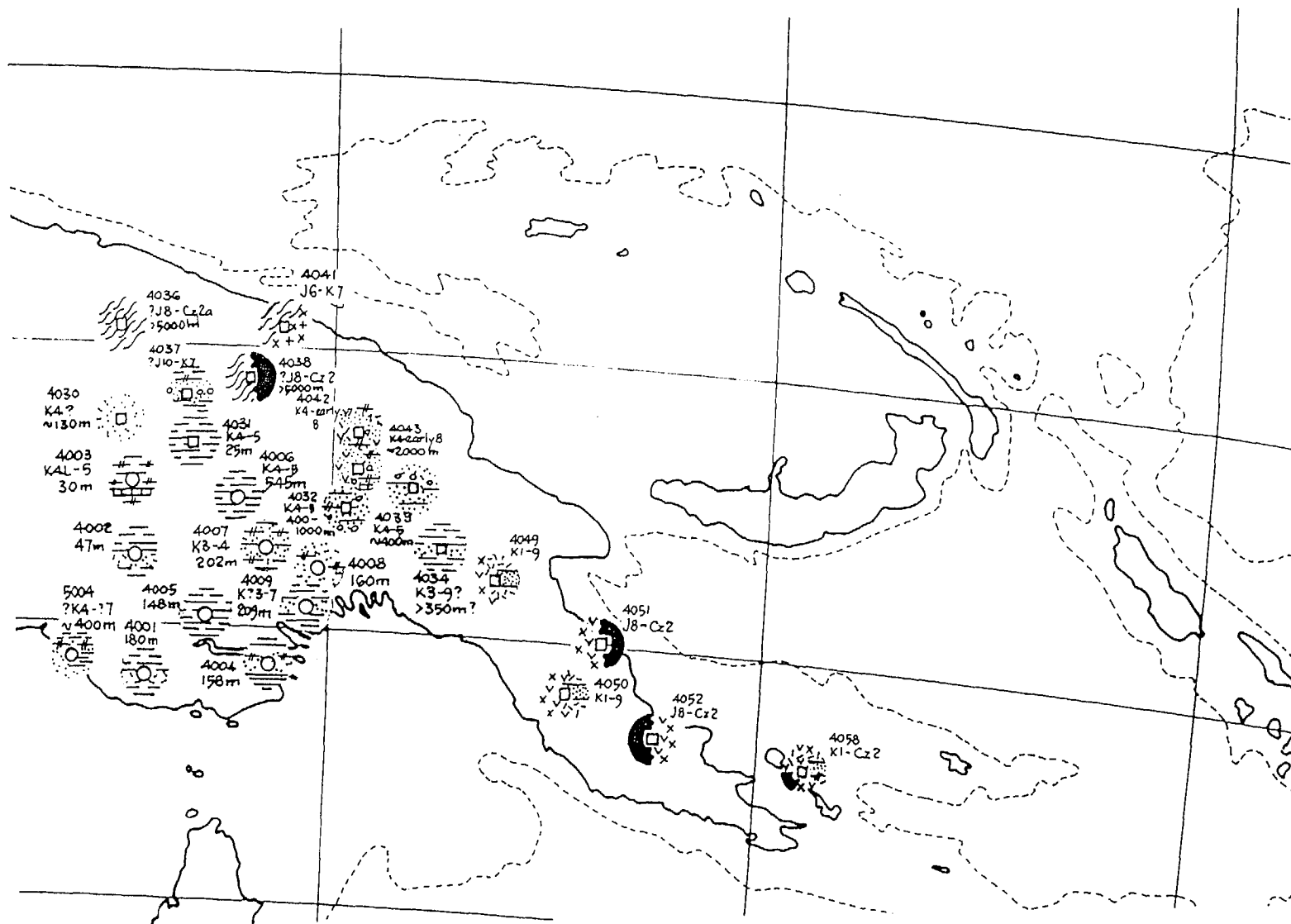


Figure 13: Aptian data map (K 4).

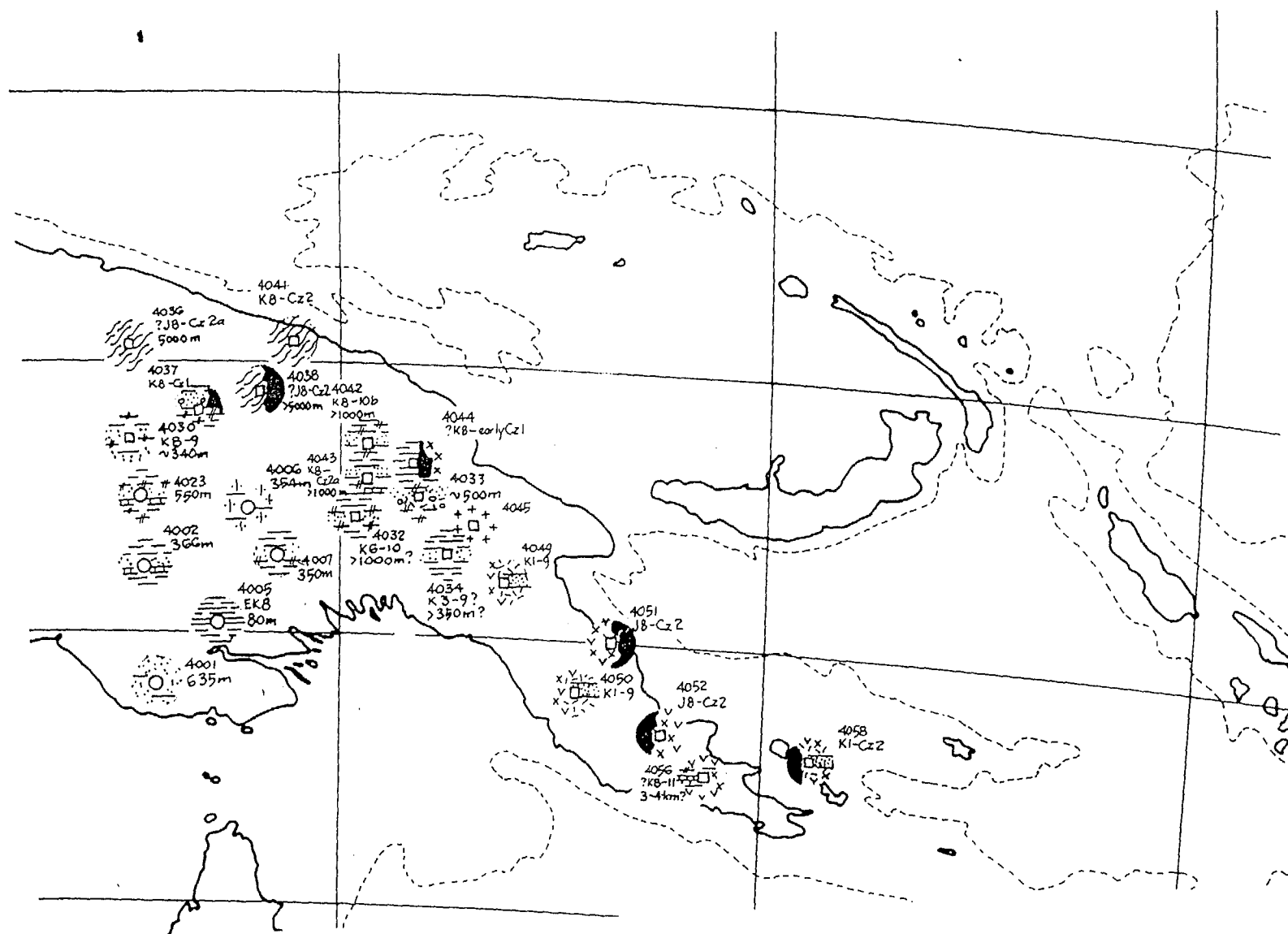


Figure 14: Cenomanian data map (K 8).

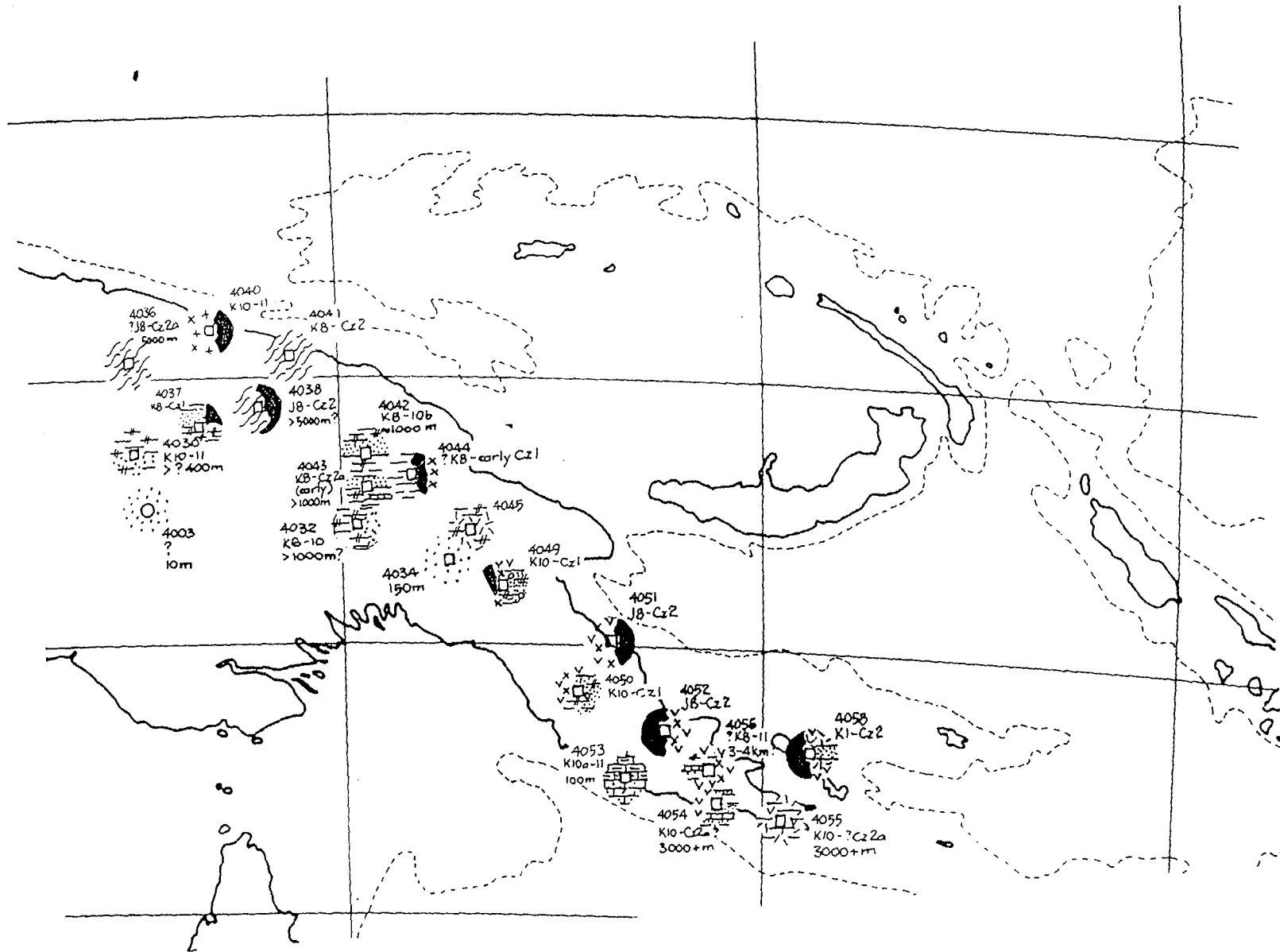


Figure 15: Campanian/Maastrichtian data map (K 10b).

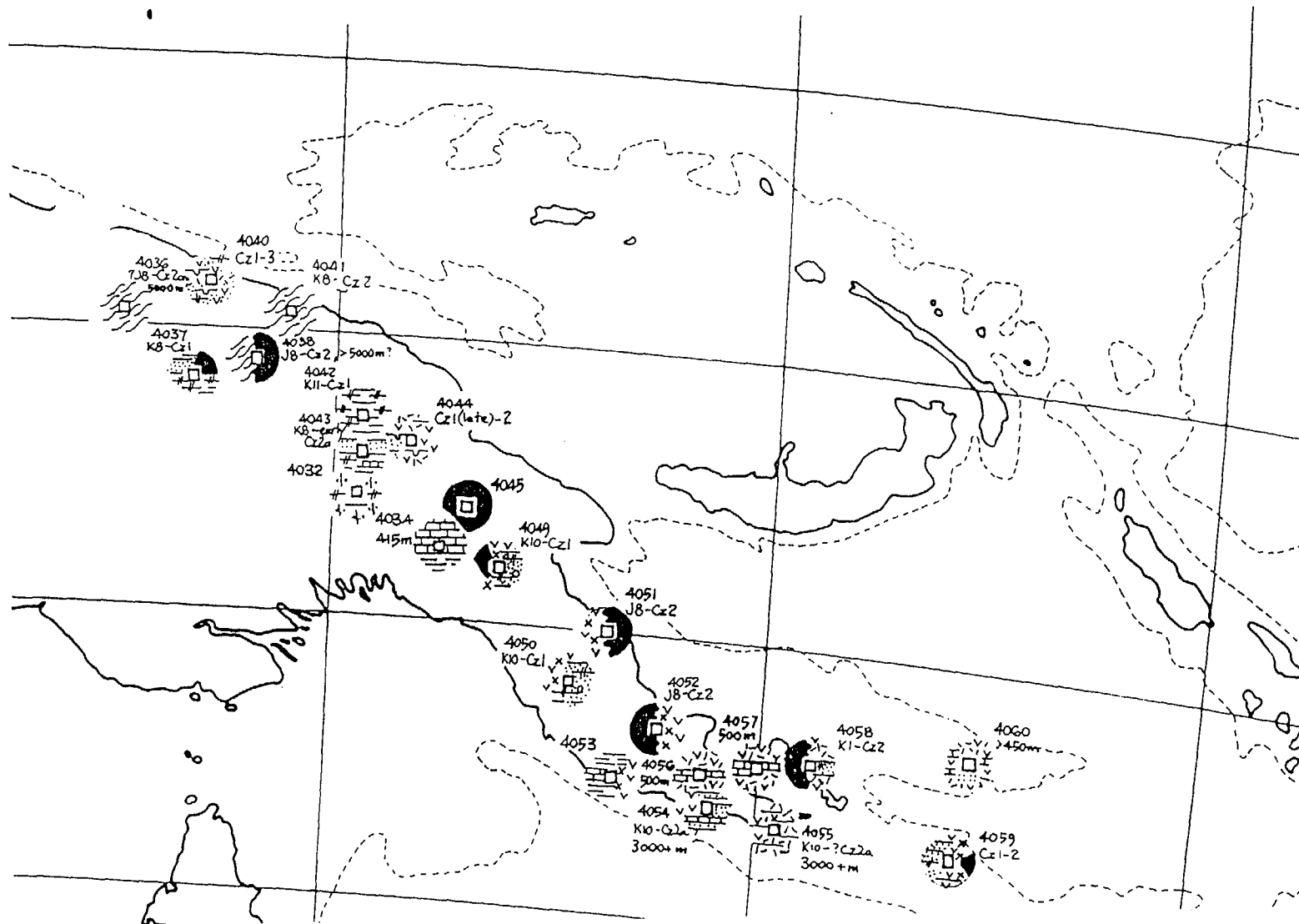


Figure 16: Paleocene data map (Cz 1).

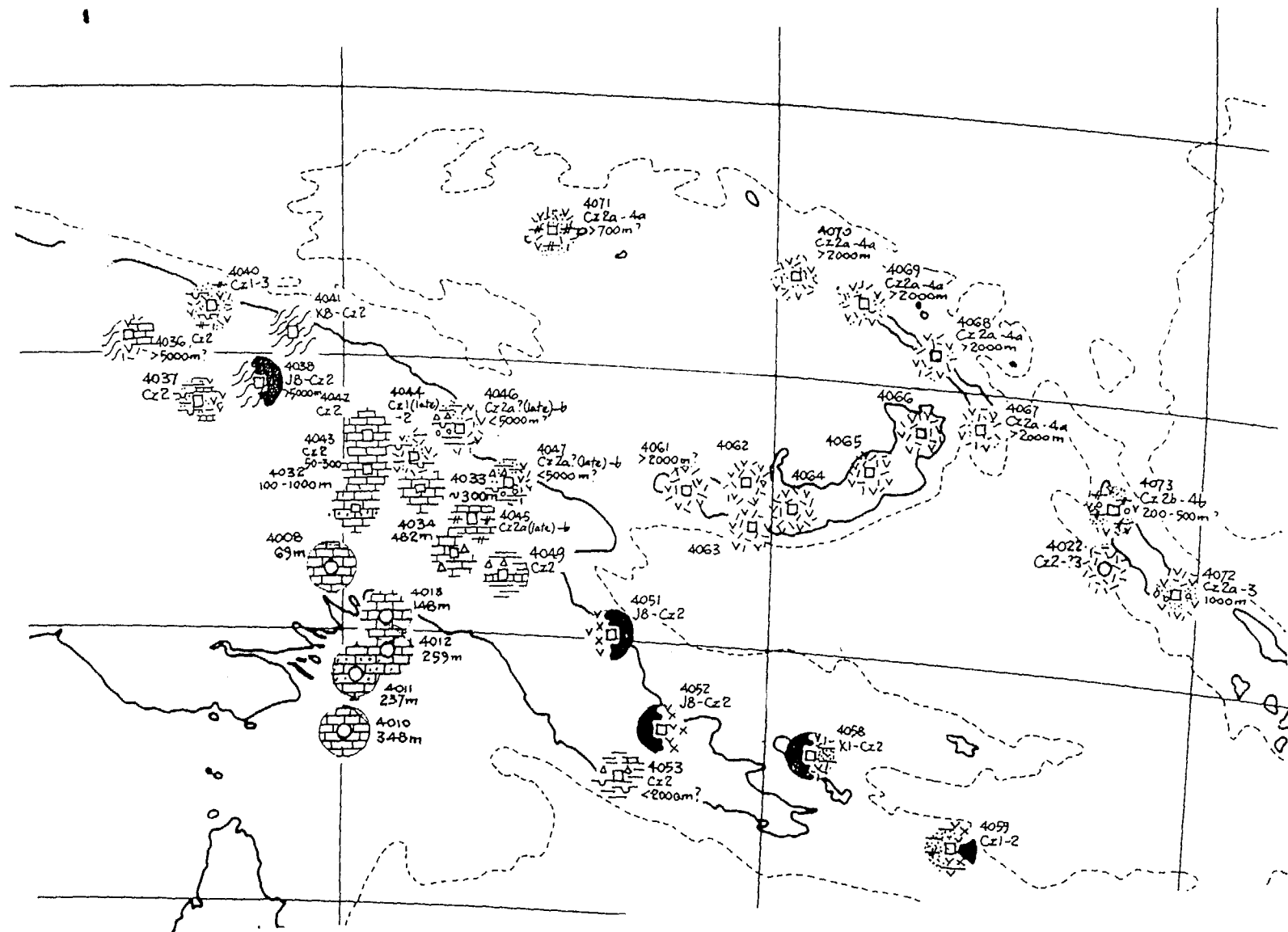


Figure 17: Late Eocene data map (Cz 2b).

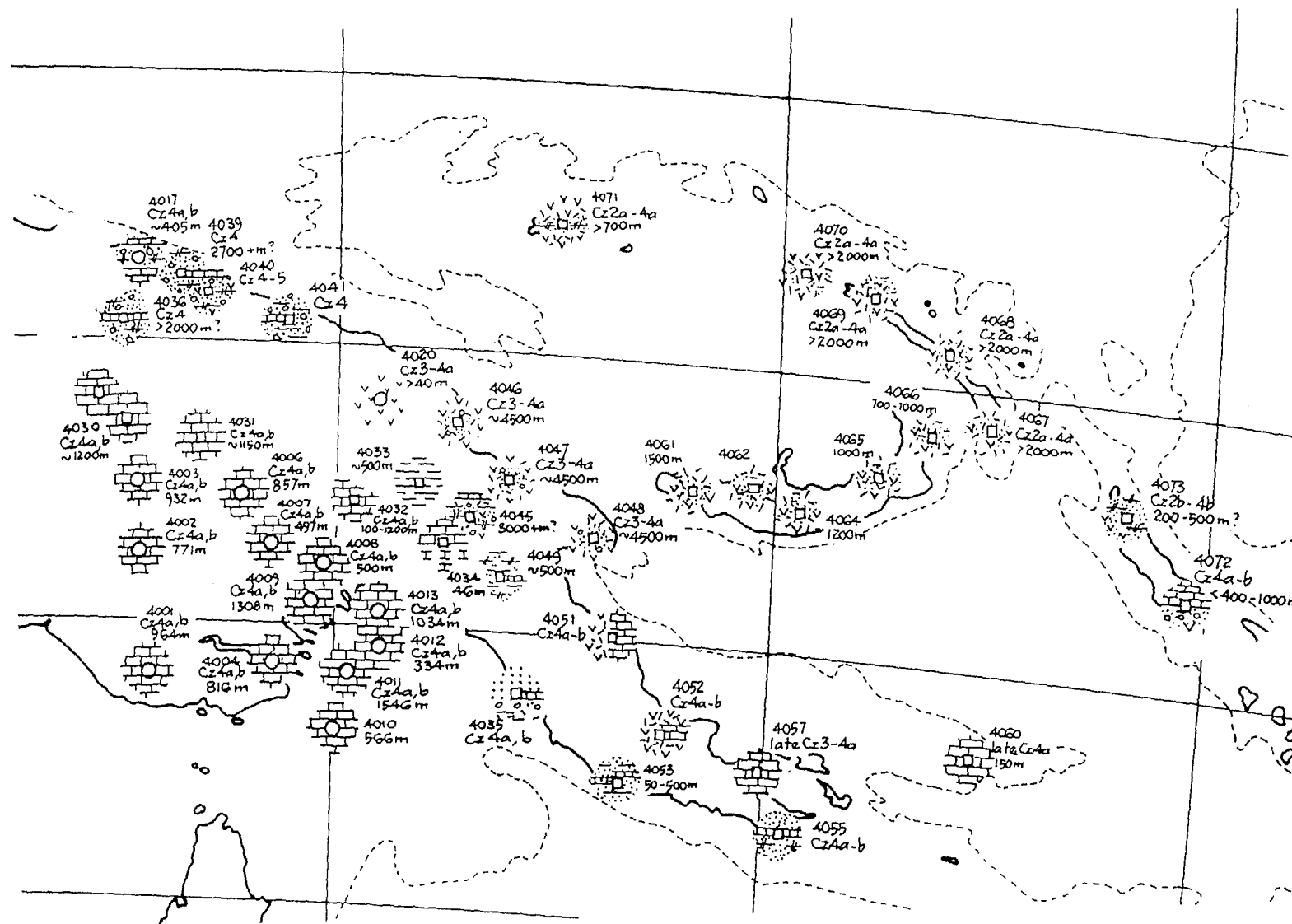


Figure 18: Late Oligocene/Early Miocene data map (Cz 4a).

Figure 19: late Early/Middle Miocene data map (Cz 4b).

Figure 20: Early Pliocene data map (Cz 6a).

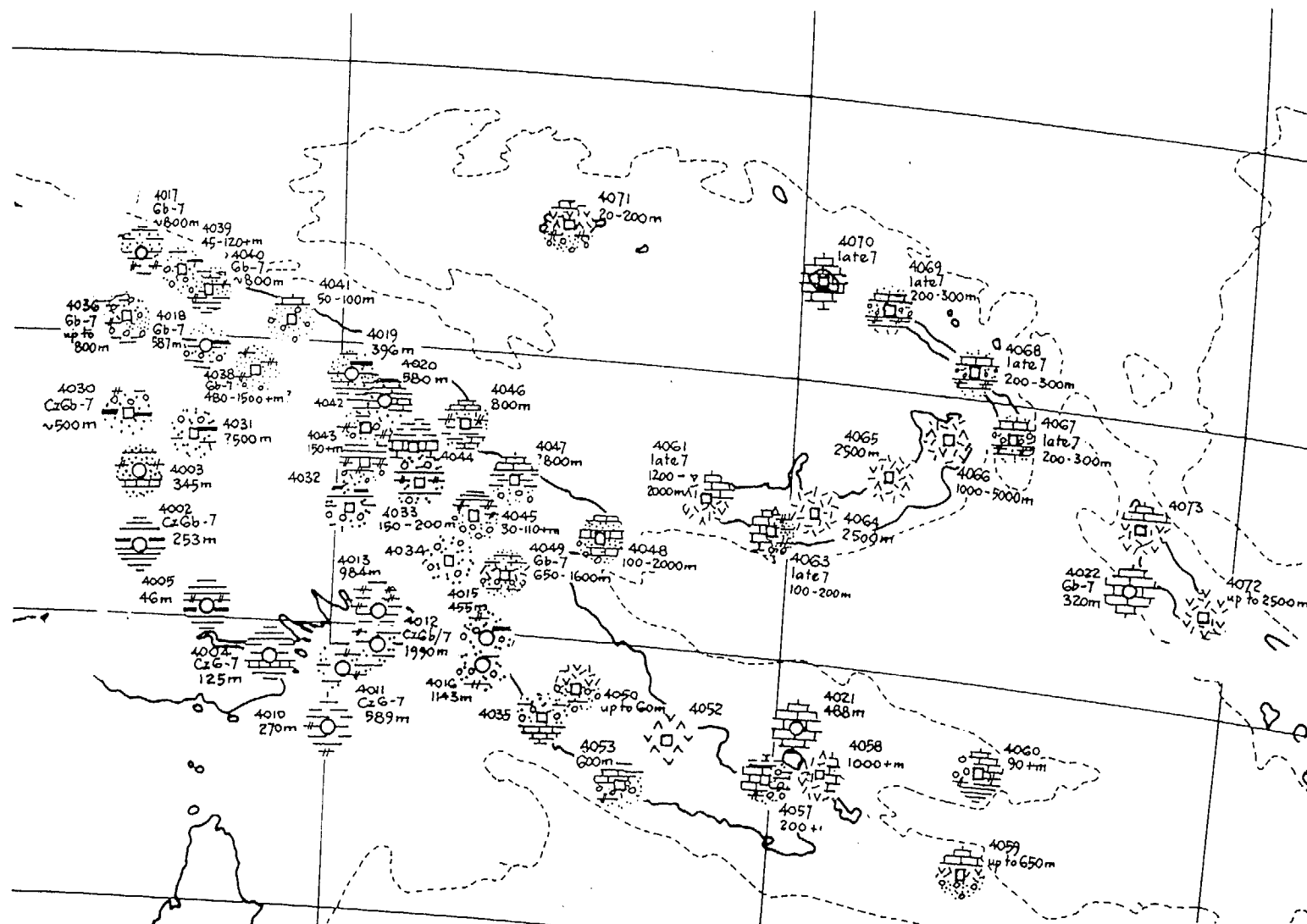


Figure 21: Pleistocene data map (Cz 7).

5. ACKNOWLEDGEMENTS

The Mesozoic to Cainozoic summary columns and data maps have been compiled as part of the BMR-APIRA Phanerozoic History of Australia Project and sponsoring companies are thanked for their input to the project. Particular thanks are extended to C.J. Pigram (BMR) and G. Francis (Geological Survey of Papua New Guinea) for their comments and suggestions. W.D. Palfreyman, J.M. Totterdell and A.M. Walley helped by reading the manuscript, and P.J. Brown is thanked for drafting the illustrations.

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