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GEOCHEMICAL DISPERSION AROUND THE MARONAN Cu-Au PROSPECT, N.E. QUEENSLAND

I.D.M. Robertson, Li Shu and J.E. Wildman

CRC LEME OPEN FILE REPORT 134

April 2002

(CSIRO Exploration and Mining Report 409R / CRC LEME Report 57R, 1997.
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CRC LEME is an unincorporated joint venture between CSIRO-Exploration & Mining, and Land & Water, The Australian National University, Curtin University of Technology, University of Adelaide, University of Canberra, Geoscience Australia, Bureau of Rural Sciences, Primary Industries and Resources SA, NSW Department of Mineral Resources-Geological Survey and Minerals Council of Australia.
Headquarters: CRC LEME c/o CSIRO Exploration and Mining, PO Box 1130, Bentley WA 6102, Australia

CSIRO/CRC LEME/AMIRA PROJECT P417
GEOCHEMICAL EXPLORATION IN REGOLITH-DOMINATED TERRAIN, NORTH QUEENSLAND 1994-1997

In 1994, CSIRO commenced a multi-client research project in regolith geology and geochemistry in North Queensland, supported by 11 mining companies, through the Australian Mineral Industries Research Association Limited (AMIRA). This research project, "Geochemical Exploration in Regolith-Dominated Terrain, North Queensland" had the aim of substantially improving geochemical methods of exploring for base metals and gold deposits under cover or obscured by deep weathering in selected areas within (a) the Mt Isa region and (b) the Charters Towers - North Drummond Basin region.

In July 1995, this project was incorporated into the research programs of CRC LEME, which provided an expanded staffing, not only from CSIRO but also from the Australian Geological Survey Organisation, University of Queensland and the Queensland Department of Minerals and Energy. The project, operated from nodes in Perth, Brisbane, Canberra and Sydney, was led by Dr R.R. Anand. It was commenced on 1st April 1994 and concluded in December 1997. The project involved regional mapping (three areas), district scale mapping (seven areas), local scale mapping (six areas), geochemical dispersion studies (fifteen sites) and geochronological studies (eleven sites). It carried the experience gained from the Yilgarn (see CRC LEME Open File Reports 1-75 and 86-112) across the continent and expanded upon it.

Although the confidentiality period of Project P417 expired in mid 2000, the reports have not been released previously. CRC LEME acknowledges the Australian Mineral Industries Research Association and CSIRO Division of Exploration and Mining for authority to publish these reports. It is intended that publication of the reports will be a substantial additional factor in transferring technology to aid the Australian mineral industry.

This report (CRC LEME Open File Report 134) is a second impression (second printing) of CSIRO, Division of Exploration and Mining Restricted Report 409R, first issued in 1997, which formed part of the CSIRO/AMIRA Project P417.

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Cataloguing-in-Publication:
Robertson, I.D.M.
Geochemical dispersion around the Maronan Cu-Au Prospect, N.E. Queensland.
ISBN 0 643 06816 3
1. Regolith - North Eastern Queensland 2 Landforms - North Eastern Queensland 3. Geochemistry
I. Li Shu II. Wildman, J.E. III. Title
CRC LEME Open File Report 134.
ISSN 1329-4768

PREFACE AND EXECUTIVE SUMMARY

The CRC LEME-AMIRA Project 'Geochemical exploration in regolith-dominated terrain of North Queensland' (P417) has, as its overall aim, to substantially improve geochemical methods of exploring for base metals and gold deposits under cover or obscured by deep weathering. The research includes geochemical dispersion studies, regolith characterisation, dating of profiles and investigation of regolith evolution.

An opportunity to examine geochemical dispersions at the Maronan Prospect was offered by MPI. A single drillhole was made available for a pilot study and a soil geochemical traverse was completed across the prospect. The results were discouraging so it was decided to focus resources elsewhere (district scale regolith study and geochemistry around the Eloise Mine). The results of the work at Maronan are presented for completeness.

The area around the Maronan Prospect is on the margin of the Eromanga Basin where the Proterozoic metamorphic rocks of the Mt Isa Inlier have been partly covered with Mesozoic, Tertiary and Quaternary sediments. This has provided some considerable challenges to geochemical exploration; exploration to date in the Eromanga and Carpenter basins has been by investigation of geophysical targets by drilling. The intent of this study was to determine the geomorphic and linked sedimentary history of this region and, using this framework, to investigate any opportunities for using geochemistry in this difficult environment.

On a district scale, this area has had a complex history of erosion and deposition in the Mesozoic and Tertiary. Fluvial and deltaic sediments were deposited in the Jurassic and early Cretaceous in what is now the headwaters of the Cloncurry, Bustard and Fullarton rivers; remnants of these now form mesas on the Proterozoic basement. Marine deposition covered the Eloise area with 50-150 m of mudstones. After marine regression, a veneer of Tertiary fluvial sediments was deposited on the Mesozoic sediments. Incision since the early Cretaceous has left erosional terraces, plains, higher river terraces and lower river terraces on which plains of black and brown soil have developed.

The Proterozoic rocks of the Maronan Prospect are weathered and are covered by Tertiary alluvium on which a brown soil has developed. The environs of the Maronan Prospect was mapped by Li Shu (Li Shu and Robertson, 1997) as brown soil over saprock and alluvium; this forms the ‘higher terrace’. No indications of Mesozoic sediments were found in the single drillhole investigated, though the edge of the Mesozoic cover, below the Tertiary is likely to be nearby.

There were no indications of mechanical dispersion of mineralised material from the Maronan mineralisation into the alluvium, the only geochemical indications were restricted to the saprolite in the single drillhole investigated. Consequently there were no geochemical indications in the soil over the prospect. Dispersion within the saprolite would seem the most useful geochemical target; this is likely to be limited. This report forms one of a pair of reports. The other, more detailed report (LEME 56R) covers the Eloise area.

R. R. Anand
Project Leader

I.D.M. Robertson
Deputy Project Leader

CONTENTS

ABSTRACT

The area around Maronan homestead is on the margin of the Eromanga Basin where the Proterozoic metamorphic rocks of the Mt Isa Inlier have been partly covered with Mesozoic, Tertiary and Quaternary sediments. This has presented a considerable challenge to geochemical exploration in the region. To date, exploration in the Eromanga and Carpentaria basins has been by investigation of geophysical targets by drilling.

There has been a complex history of erosion and deposition during the Mesozoic and Tertiary. In the late Jurassic and early Cretaceous, fluvial and deltaic sediments of the Gilbert River Formation were deposited in broad valleys which later became mesas on the Proterozoic basement at the headwaters of the Cloncurry, Bustard and Fullarton rivers to the southwest of the study area. Subsidence of the Eromanga Basin and marine transgression in the Cretaceous covered the Eloise area with mudstones and limestones 50-150 m thick, concealing mineralisation in the Proterozoic basement.

The ancestral Fullarton River later deposited 5 to 8 m of Tertiary fluvial sediments on the Mesozoic. Since the early Cretaceous, incision has created erosional terraces, plains, higher river terraces and lower river terraces. The Tertiary fluvial sediments were slightly ferruginised and mottled and brown soil was developed on them.

There were no indications of mechanical dispersion of mineralised material from the Maronan mineralisation into the alluvium, the only geochemical indications were restricted to the saprolite in the single drillhole investigated. Consequently there were no geochemical indications in the soil over the prospect.

Thick Tertiary alluvial cover at Eloise presents an effective barrier to geochemical exploration. Dispersions within the saprolite would seem to be the best geochemical target; these are likely to be limited.

1. INTRODUCTION

The Maronan Cu-Au Prospect lies 60 km south-east of Cloncurry at 21°03'47"S, 140°55'21"E (Figure 1). It is hosted by Proterozoic metasediments and metabasic rocks. The mineralisation and its Proterozoic host rocks are buried beneath 20 m of Tertiary cover and soil of the margin of the Eromanga Basin. It was discovered by regional and local aeromagnetic, ground magnetic and electromagnetic surveys and by subsequent drilling by BHP Minerals Exploration. It was later passed to MPI who provided the opportunity for this study while a more intensive investigation of the Eloise area was underway. It was later passed to Acacia Metals Pty Ltd. Locally, the host rocks consist of folded but generally north-striking metapelites, amphibolites and metapsammites.

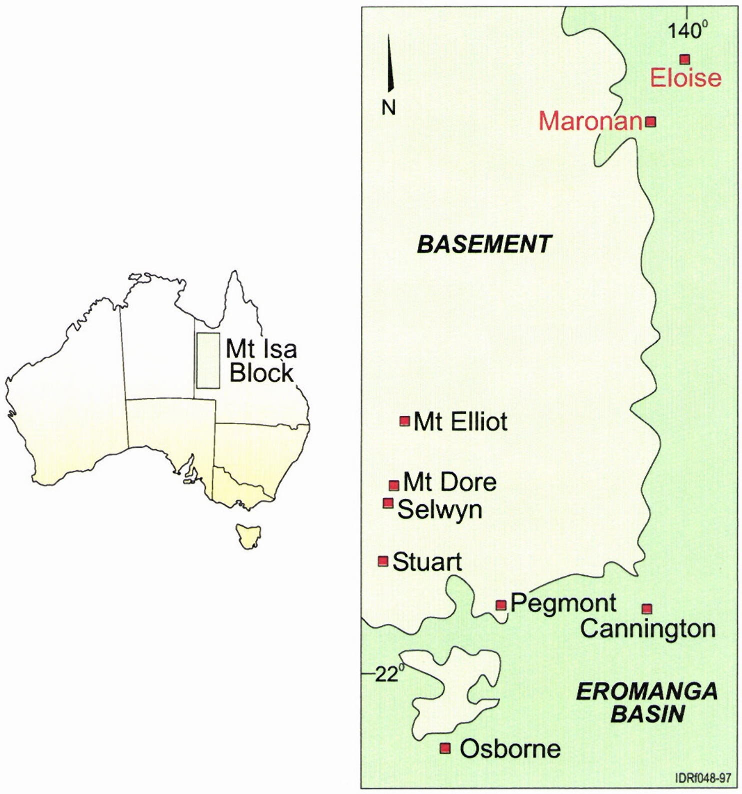


Figure 1. Location map of the Maronan Prospect in relation to the Proterozoic basement of the Mt Isa Inlier and the Eromanga Basin.

1.1 Regional geology and geomorphology

The mapped study area is about 21 x 34 km and consists of undulating plains, river terraces, fluvial ridges and bedrock outcrops. The undulating alluvial plains dominate and have a relief generally of less than 10 m. There are some low hills in the southwest and the terrain is comparatively rugged due to stream incision.

Geologically, the study area is located on the eastern margin of the Eastern Fold Belt. This fold belt runs predominantly north-south and consists mainly of Proterozoic rocks capped in places with remnants of Late Jurassic to Early Cretaceous fluvial sediments (the flat-lying Gilbert River Formation). In the modern landscape, the Jurassic-Cretaceous sediments are distributed mainly in the headwaters of the Fullarton, the Cloncurry and the Bustard rivers; they probably once covered a much larger area, overlapping onto some of the Eastern Fold Belt in the pre-Tertiary. Folding and faulting in the Eastern Fold Belt occurred prior to deposition of the Gilbert River Formation; patches of Mesozoic sediments on the Cloncurry Fault are unaffected by its movements. These fluvial sediments, now occurring as mesas at the top of the modern landscape, vary in elevation from 480 m above mean sea level on the Selwyn Range to 300 m about 35 km to the south and 60 km to the north of the range. They are now about 150-200 m above the pediment immediately to the east of the Mount Isa Inlier

The Maronan Prospect lies very close to the western margin of the Eromanga Basin. This basin received extensive fluvial sediments through braided streams, meandering rivers, swamps and lakes. Sedimentation was initiated in the early Jurassic and continued to the early Cretaceous (Senior *et al.*, 1978). A marine transgression from the north and northwest of the basin took place in the early Cretaceous when deposition in marginal marine environments took over from fluvial sedimentation.

Geomorphologically, the southwestern part of the area consists of the foothills of the Selwyn Range which stands immediately to the west and about 150 m above the plains; the eastern and northern parts of the area are rolling plains constructed of sediments over the western margin of a Mesozoic basin, derived from the Range. Major streams, of intermittent flow, such as the Williams and Fullarton rivers, derive their detritus from the eastern flank of the Range and drain northeast, ultimately into the Gulf of Carpentaria.

1.2 Climate and vegetation

The climate is tropical, monsoonal and semi-arid, with an annual rainfall of about 380 mm, falling largely between November and April. Variations in rainfall are marked, ranging from 500 mm in some years to less than 200 mm in others (Bureau of Meteorology, 1975 and 1977). Major drainages flow only after significant rains. At Cloncurry, to the northwest of the study area, average daily temperatures range from 10–24°C during July to 24–38°C in November to January.

Sparse bushes of eucalypt and spiky hummocks of spinifex cover much of the southwestern part of the area. The northern and eastern parts have been cleared for grazing, particular the black soil plains. Grasses grow well on black soil but less well on brown soil which has a lag of fluvial gravel. This makes it possible to delineate the distribution of black and brown soils by their vegetation patterns on aerial photographs.

1.3 Work Program

Field work was undertaken in the middle of December 1995, including regolith mapping, soil and drillspoil sampling, and geomorphic and sedimentological observations. The specific objectives were to understand (i) landscape evolution of the area, (ii) regolith development and characteristics, and (iii) geochemical dispersion, if any, into the overburden. This report should be read in conjunction with that on the Eloise area (Li Shu and Robertson, 1997) which deals with the geomorphology and landscape evolution of the whole area and geochemical exploration around the Eloise mineralisation.

2. GEOCHEMICAL INVESTIGATION

The thick Tertiary cover at Maronan appears to present an effective barrier to geochemical exploration and exploration in this environment has been primarily by drilling geophysical targets. The top part of drillhole MND18 was investigated to test for dispersion within the alluvium. A soil traverse across the prospect was also investigated to see if surficial materials could be utilised.

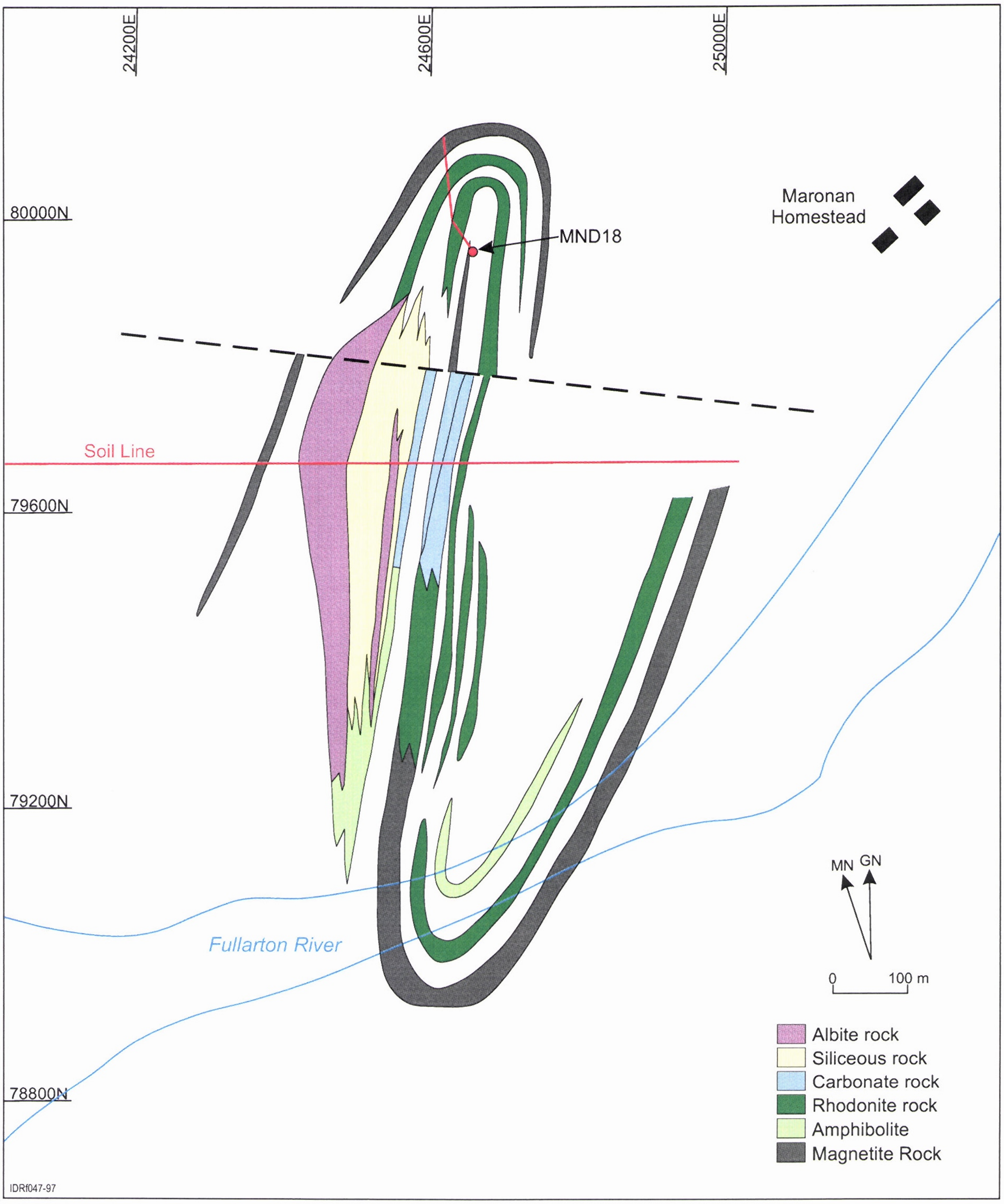


Figure 2. Map of the Maronan Prospect, showing the location of the soil traverse and drillhole MND18 in relation to the underlying Proterozoic geology, which is overlain by alluvium (not shown).

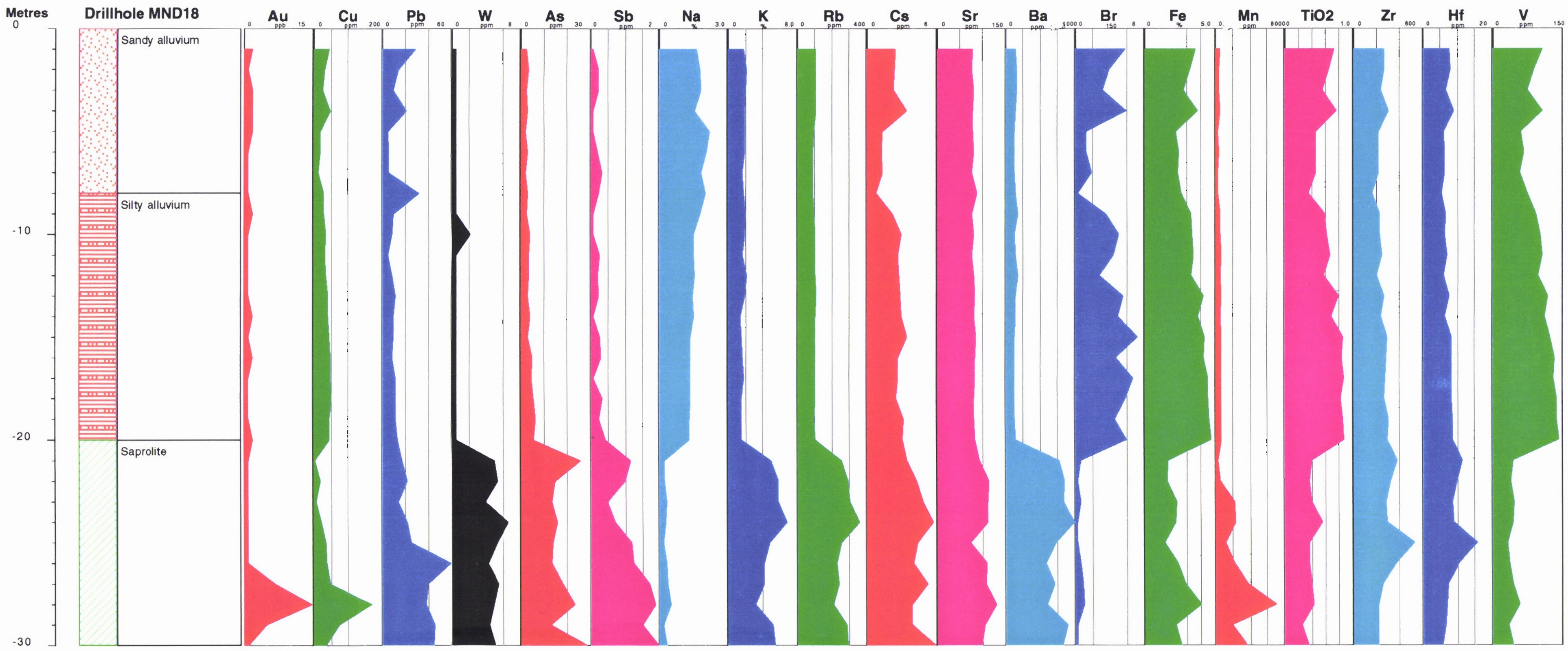


Figure 3. Lithology and geochemistry of the top part of drillhole MND18

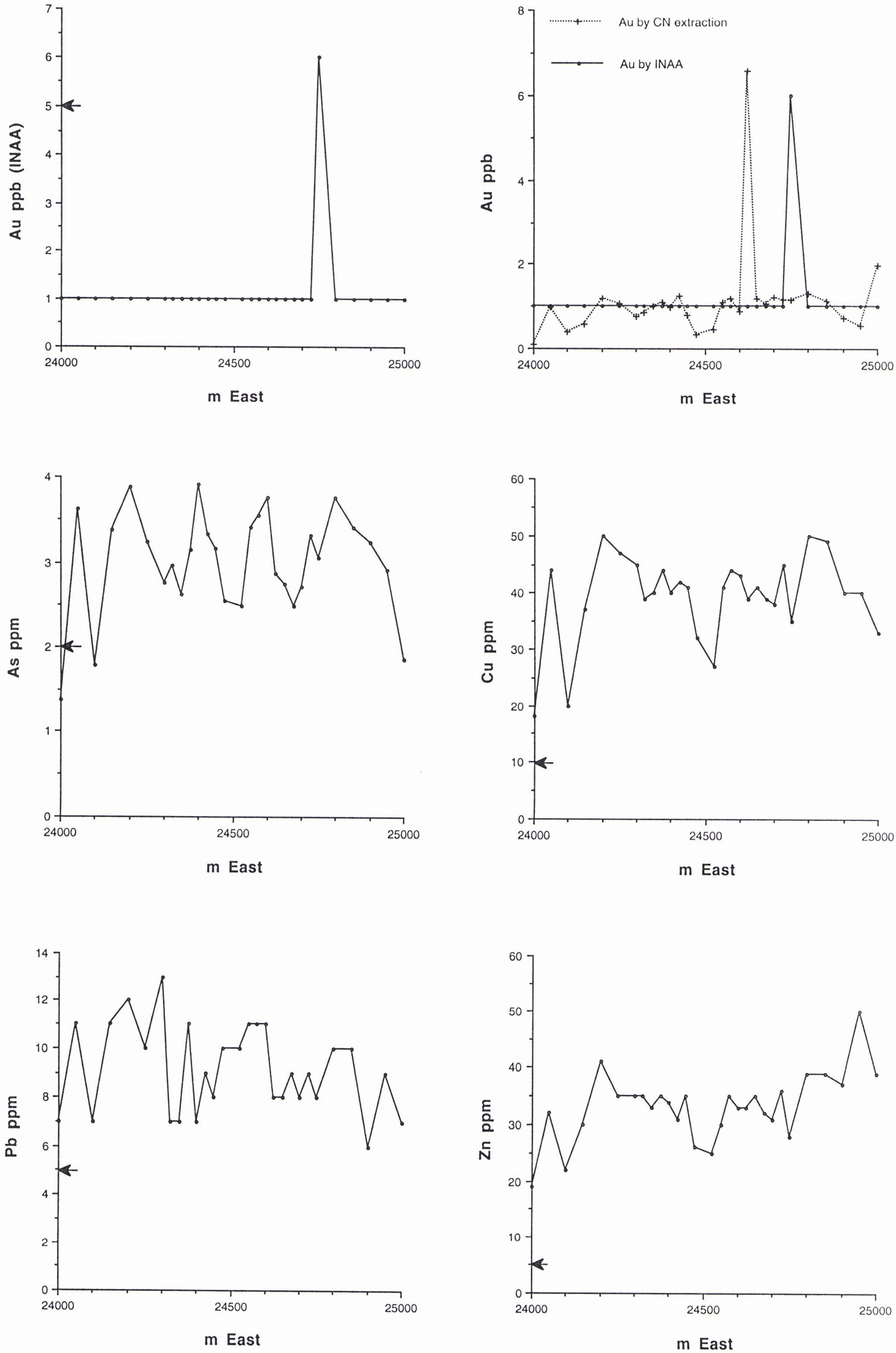
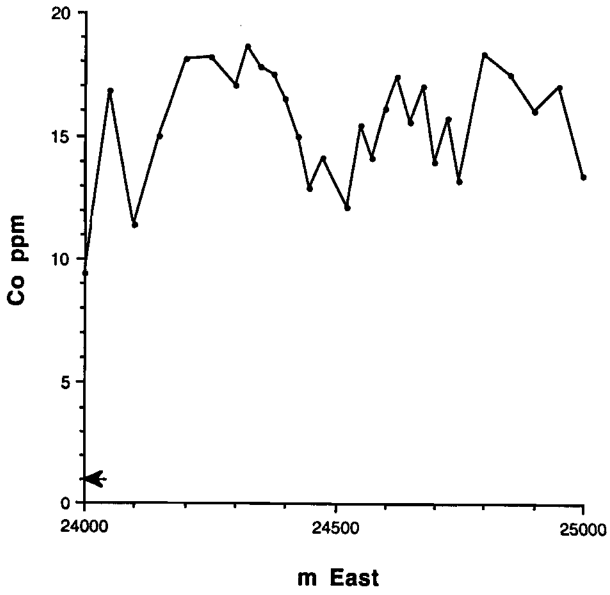
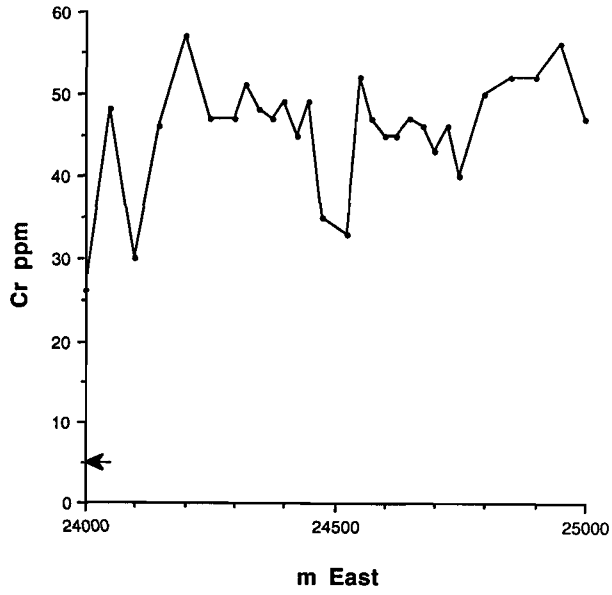


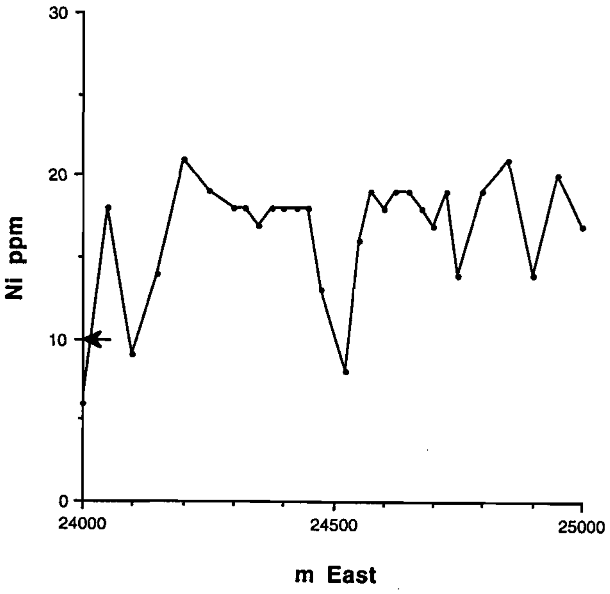
Figure 4. Soil geochemical traverse across the Maronan Prospect (see Figure 2). Arrows mark detection limits.



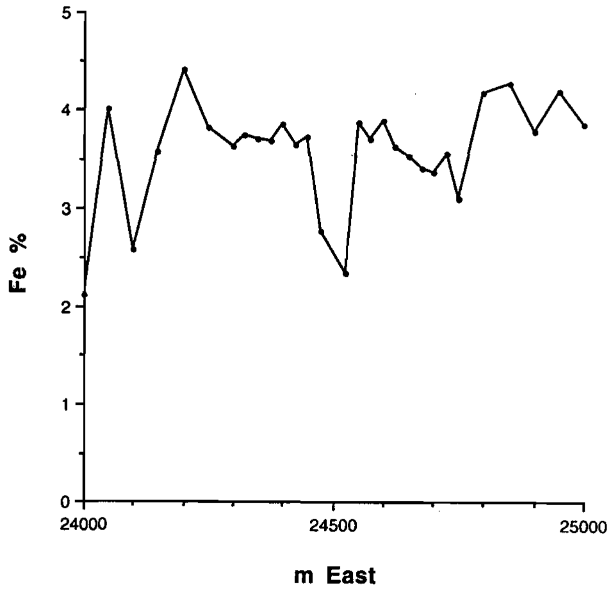
Co ppm
m East



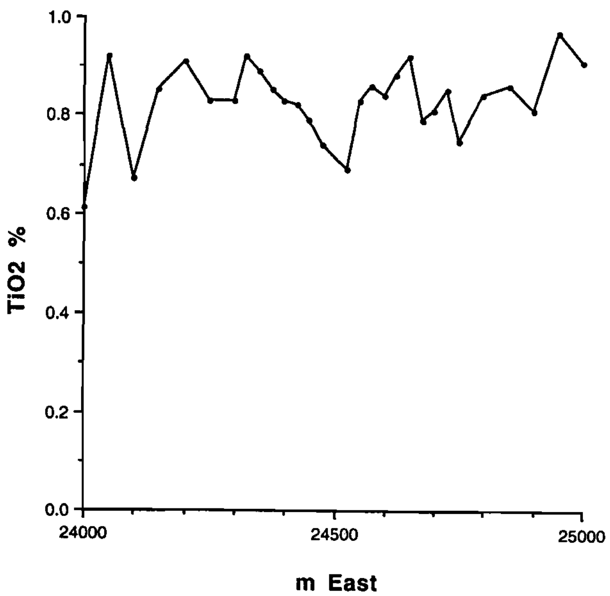
Cr ppm
m East



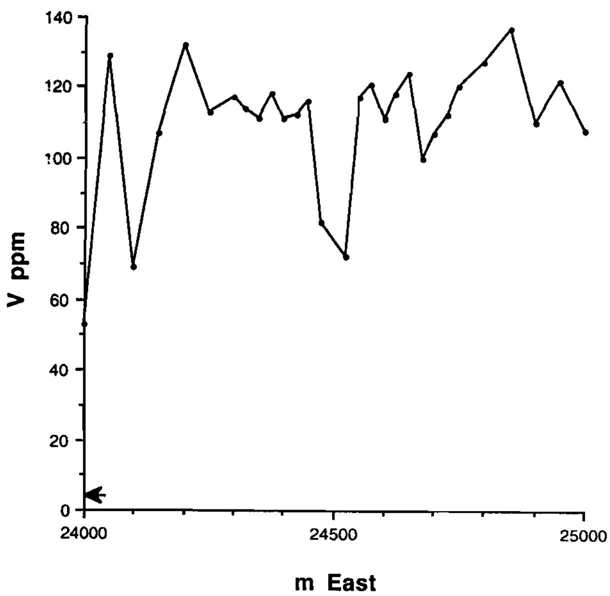
Ni ppm
m East



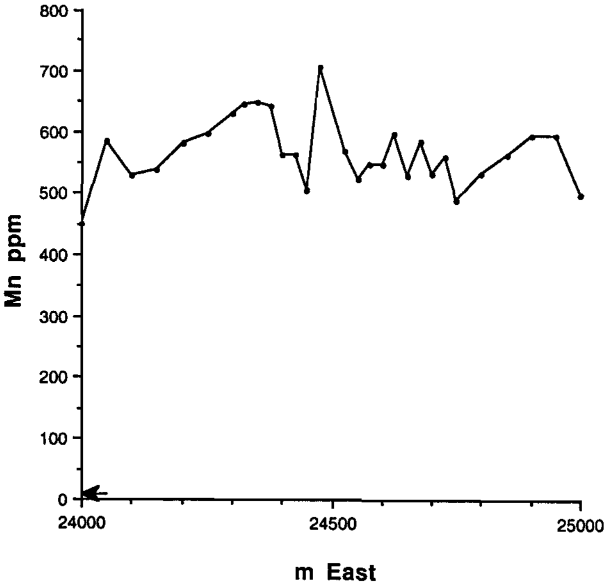
Fe %
m East



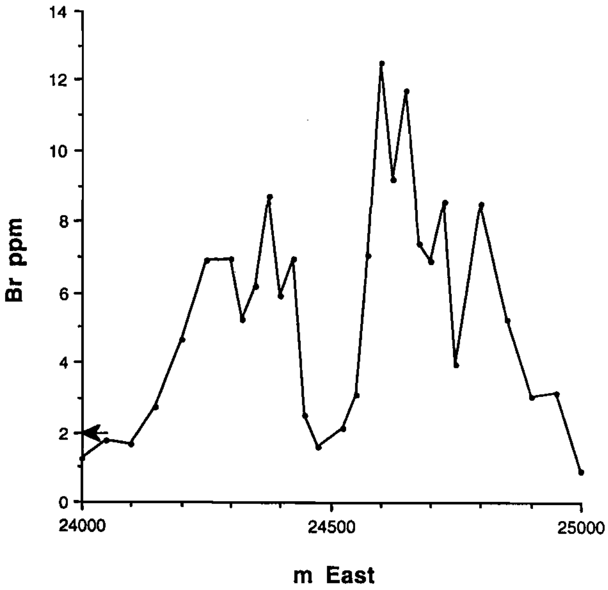
TiO2 %
m East



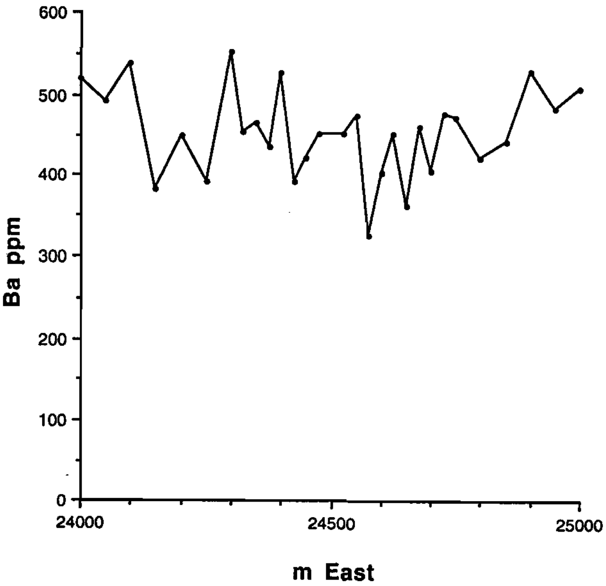
V ppm
m East



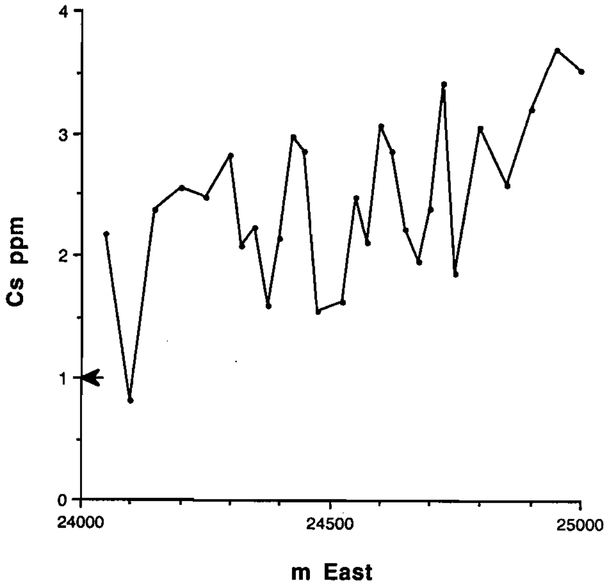
800
700
600
500
400
300
200
100
0
Mn ppm
24000
24500
25000
m East



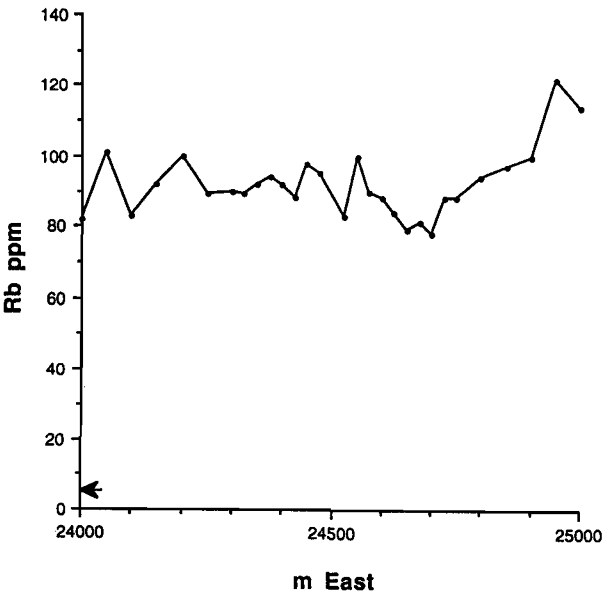
14
12
10
8
6
4
2
0
Br ppm
24000
24500
25000
m East



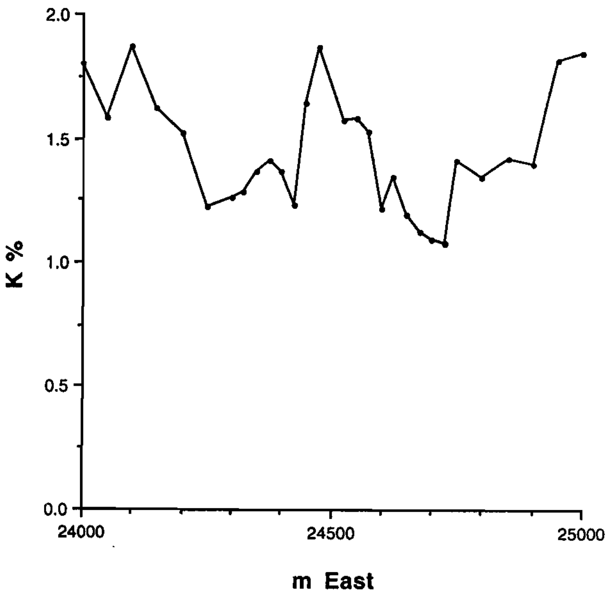
600
500
400
300
200
100
0
Ba ppm
24000
24500
25000
m East



4
3
2
1
0
Cs ppm
24000
24500
25000
m East



140
120
100
80
60
40
20
0
Rb ppm
24000
24500
25000
m East



2.0
1.5
1.0
0.5
0.0
K %
24000
24500
25000
m East

2.1 Drillhole MND18

A drilled section through the alluvium and into the upper saprolite (Figure 2) was made available by MPI. The upper part of the alluvium (0-8 m) consists of sandy material, the lower part (8-20 m) is more silty with sandy intercalations (Figure 3). Intervals of 1 m were sampled to a depth of 30 m and analysed by INAA and XRF. Results are presented in tabular form (Appendix 1). The contact with the saprolite is very clear in the drill chips and is also shown by sharp increases in W, As, Sb, K, Rb, Ba and by marked decreases in Na, Br, Fe, Ti and V on passing from alluvium to saprolite. Increased Rb, Ba and K in the saprolite reflects an increase in mica content. More Fe, Ti and V reflects the elevated Fe oxides content of the alluvium. The upper (sandy) and lower (silty) part of the alluvium are weakly distinguished by increased Br, Fe, Ti, V and Cs in the silty material; Na is slightly decreased.

In the saprolite (7 m below the unconformity), there are weak anomalies in Au (15 ppb in a background of <5 ppb), Cu (170 ppm in a background of 30 ppm), Pb (60 ppm in a background of 20 ppm). The low Au contents required repeat analysis using a sensitive CN extraction with ICP/MS finish. The results are generally quite comparable with, but slightly less than, the INAA data, implying incomplete extraction (occlusion of some Au), but the anomaly in the deep saprolite is co-incident.

2.2 Soil traverse

A traverse across the soils developed on the alluvium was investigated across the prospect (Figure 2). The central part of the traverse was sampled at 25 m intervals, the outer parts at 50 m intervals. After scraping away the top 25 mm of the soil, to avoid any contamination, a 500 g sample of the complete soil was collected (25-250 mm depth). Results are presented in tabular form (Appendix 1) and the important elements graphed in Figure 4.

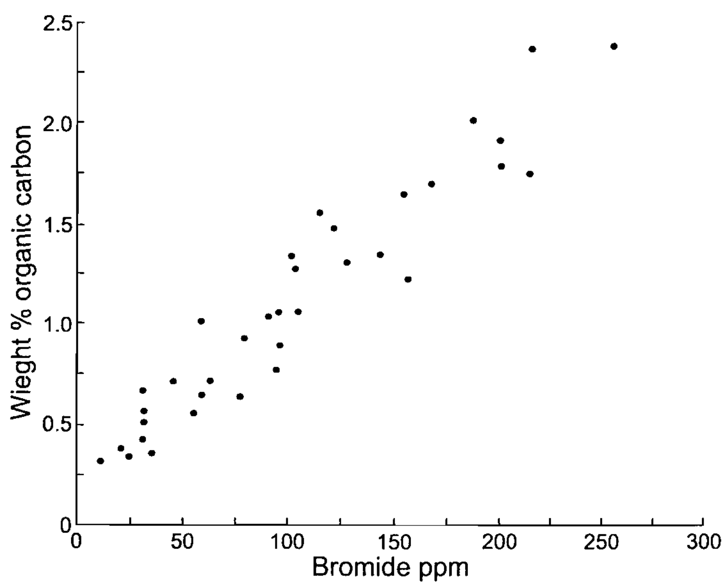


Figure 5. A strong relationship between organic C and Br (Price *et al.,* 1970). This suggests that soil Br is related to the humus (biomass) of the soil.

INAA Au data were all below detection, only one sample being fractionally above (6 ppb). In view of the very low Au content, the Au analyses also were repeated using a very sensitive CN extraction with ICP/MS finish. The results (Figure 4) are very similar, confirming the INAA data. Again one sample was anomalous (6.56 ppb) but it was not co-incident with the INAA results. This suggests that the samples are slightly 'nuggetty', a likely occurrence in a soil developed from fluvial materials.

All other elements are at typical background abundances for soils developed on fluvial materials in the region (Li Shu and Robertson, 1997) and their transect plots indicate nothing anomalous but rather geochemical noise. Only Br shows some consistent behaviour with two multi-point peaks. The Br contents of the soils and alluvium are much greater than would be expected if contributed solely from rock-forming minerals. The Br content is very likely related to the content of organic carbon (biomass); there is a linear relationship between organic carbon and Br (Price *et al.*, 1970; Figure 5). The lithophile elements (Co, Cr, Ni, Fe, Ti, V) are strongly correlated and this is probably related to their Fe oxide content. There is little correlation amongst the alteration halo elements (Ba, Cs, Rb, K) or the pathfinder elements (Au, As, Cu, Pb, Zn), apart from As-Cu.

3. CONCLUSIONS AND IMPLICATIONS FOR MINERAL EXPLORATION

3.1 Geochemistry

Investigation of the vertical profile through the alluvium and into the saprolite suggested that there is no significant dispersion from mineralisation in the Proterozoic into the alluvium, however some dispersion, possibly by hydromorphic means, is likely within the saprolite. However, at the time of the investigation, it was not clear if weathered mineralisation had reached the Proterozoic-Tertiary unconformity. Also, as only one drilled profile had been investigated, the influences of the topography of the unconformity or of any ancient flow directions could not be determined. The soil transect across the prospect showed no geochemical anomalies.

The general comments on the available surficial media made by Li Shu and Robertson (1997) for the Eloise area apply equally to this area. The only significant difference is that the top of the Proterozoic formations at Maronan have been weathered during and since the Tertiary, allowing some hydromorphic geochemical migration here, possibly enlarging the drill target in the saprolite.

4. ACKNOWLEDGMENTS

MPI allowed access to the Maronan Prospect and provided drill-spoil for analysis. In particular, assistance from MPI was provided by S. Chaku. The Muller family at Maronan Station were most hospitable during some very hot weather and showed us ichthyosaur and belemnite fossils. Geochemical analyses were by M.K.W. Hart (XRF) at CSIRO in Perth, and Becquerel Laboratories (INAA) at Lucas Heights. Sample preparation was by S.L. Derriman. Artwork was prepared by A.D. Vartesi. R.R. Anand provided critical review of the manuscript. All this assistance is acknowledged with appreciation.

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APPENDIX 1

Tabulated geochemical data

GEOCHEMISTRY OF DRILLHOLE MND18 - MARONAN PROSPECT

				INAA	INAA	CNExt	INAA	INAA	INAA	INAA	INAA	INAA	XRFp	INAA	INAA	INAA	INAA	INAA	INAA	INAA	XRFp	INAA	INAA	XRFp
				As	Au	Au	Ba	Br	Ce	Co	Cr	Cs	Cu	Eu	Fe	Hf	Ir	K	La	Lu	Mn	Mo	Na	Ni
				2.00	5.0	0.20	100	2.00	10	1.0	5	1.00	10	1.00	0.05	1.00	20	0.40	0.5	0.20	10	10.0	0.02	10
FieldNo	LabSeqNo	LibNo	Depth	ppm	ppb	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppb	%	ppm	ppm	ppm	ppm	%	ppm
M18 01	L08-2020	08-1991	1	2.42	<4.2	1.64	573	5.85	97	13.7	42	2.43	45	1.38	3.65	7.69	<9.3	1.72	49.2	0.50	447	<6.8	1.67	17
M18 02	L08-2024	08-1992	2	3.20	<3.4	1.01	663	3.93	88	12.1	35	2.37	31	1.28	3.25	8.07	<9	2.14	44.0	0.50	420	<3.7	1.83	15
M18 03	L08-2004	08-1993	3	2.60	<4	1.12	628	3.21	77	10.1	29	2.31	26	1.16	2.76	6.53	<9.1	2.05	37.6	0.46	426	<3.5	1.84	9
M18 04	L08-2006	08-1994	4	2.91	<4.4	1.14	545	5.94	105	13.5	43	3.40	47	1.28	3.83	8.74	<9.9	1.89	50.9	0.57	545	<3.8	1.56	16
M18 05	L08-1997	08-1995	5	1.78	<4.1	1.97	504	1.21	61	7.3	24	1.29	19	0.89	2.24	5.91	<9.5	1.96	31.7	0.32	294	<3.5	2.26	7
M18 06	L08-1998	08-1996	6	2.64	<3.3	0.64	515	1.30	65	7.7	26	1.28	18	0.96	2.49	6.21	<9.3	1.90	34.3	0.33	344	<3.5	2.10	9
M18 07	L08-2013	08-1997	7	2.02	<3	0.35	482	1.94	66	8.1	26	1.30	13	0.91	2.39	6.24	<8.2	1.60	32.0	0.35	315	<4.1	1.84	5
M18 08	L08-2010	08-1998	8	2.71	<3.7	0.33	577	<0.57	46	6.6	28	0.78	28	0.78	2.64	5.26	<8.4	1.78	25.0	0.30	284	<6.5	2.03	4
M18 09	L08-2007	08-1999	9	2.59	<4.1	0.69	684	3.55	78	11.7	36	2.15	29	1.01	3.30	6.52	<9.3	1.98	39.1	0.44	511	<3.6	1.81	11
M18 10	L08-2005	08-2000	10	3.69	<3.2	0.91	535	5.04	85	12.1	37	2.95	35	1.41	3.45	6.22	<9.1	1.89	41.4	0.46	453	<3.5	1.51	11
M18 11	L08-2008	08-2001	11	3.29	<3.4	1.02	555	4.43	95	13.3	42	2.69	33	1.56	3.49	6.90	<9.4	1.68	45.4	0.48	597	<3.7	1.50	12
M18 12	L08-2018	08-2002	12	3.48	<3.1	0.94	700	2.84	76	11.3	38	2.73	34	1.00	3.34	6.15	<8.4	2.22	38.5	0.42	516	<3.4	1.56	11
M18 13	L08-2019	08-2003	13	2.80	<3.6	0.98	581	5.62	110	17.7	48	2.87	42	1.52	4.17	7.67	<11.4	1.92	53.2	0.57	631	<3.9	1.48	17
M18 14	L08-2017	08-2004	14	3.59	<4.1	0.96	595	4.92	98	15.7	46	2.93	40	1.43	3.78	6.42	<9.1	1.46	45.9	0.52	528	<3.6	1.50	13
M18 15	L08-2016	08-2005	15	3.05	<4.4	1.26	502	7.20	122	18.7	50	3.47	46	1.48	4.31	8.39	<9.8	1.57	56.7	0.59	668	<3.9	1.40	20
M18 16	L08-1996	08-2006	16	4.71	<4.3	1.41	500	4.64	111	16.3	47	2.63	47	1.69	4.22	8.25	<10	1.64	53.5	0.59	670	<3.9	1.37	18
M18 17	L08-2000	08-2007	17	4.44	<3.7	1.20	505	6.78	118	18.9	50	2.64	47	1.37	4.51	8.22	<10	1.73	56.5	0.59	631	<4	1.39	19
M18 18	L08-1993	08-20'08	18	5.16	<3.6	1.09	517	5.80	113	19.9	52	2.50	50	1.62	4.54	8.19	<11	1.51	53.8	0.57	659	<3.9	1.36	19
M18 19	L08-2001	08-2009	19	6.19	<3.5	0.78	502	4.51	109	19.4	50	3.10	45	1.47	4.60	8.48	<10	1.54	52.1	0.57	678	<3.9	1.34	18
M18 20	L08-2011	08-2010	20	5.17	<4.6	1.02	599	5.98	118	20.3	54	3.02	46	1.59	4.73	8.59	<10	1.53	57.0	0.61	662	<4	1.35	21
M18 21	L08-2003	08-2011	21	25.70	<3	0.40	3080	0.60	82	2.4	42	3.40	4	1.14	1.66	11.30	<6.7	4.94	44.1	0.34	202	<3.6	0.25	3
M18 22	L08-1999	08-2012	22	14.60	<2.7	0.70	3430	<0.39	74	2.1	38	4.30	19	1.22	1.60	9.71	<6.1	5.83	28.2	0.41	482	<5.1	0.24	3
M18 23	L08-2023	08-2013	23	13.40	<3.1	0.22	3360	0.62	74	4.3	39	4.90	6	1.08	2.31	8.64	<6.8	5.86	43.9	0.34	2126	<4.6	0.34	6
M18 24	L08-2009	08-2014	24	15.60	<3.4	0.33	4020	<0.52	112	3.8	64	5.69	21	1.56	2.24	8.97	<7.7	6.82	48.1	0.48	2299	<7.4	0.27	11
M18 25	L08-2014	08-2015	25	13.70	<3	0.59	2890	<0.46	111	3.0	40	4.37	35	1.54	1.42	15.90	<6.7	4.81	56.1	0.50	1143	<4.9	0.17	7
M18 26	L08-2021	08-2016	26	13.30	<2.6	0.83	2330	0.69	104	6.0	33	3.97	38	1.62	2.35	10.60	<7.1	4.13	61.6	0.48	2126	<6.6	0.35	9
M18 27	L08-1995	08-2017	27	18.30	6.8	2.33	2840	0.93	82	6.4	38	5.27	47	1.15	2.90	7.36	<7.2	4.15	43.5	0.45	3669	<6.6	0.38	7
M18 28	L08-1994	08-2018	28	23.10	14.7	7.60	2430	0.96	114	13.5	33	3.89	172	1.62	4.07	7.04	<8.5	3.20	55.5	0.71	7155	<3.5	0.54	15
M18 29	L08-2015	08-2019	29	12.90	4.9	2.61	3600	<0.39	58	5.9	28	3.90	72	1.07	2.24	6.75	<5.7	5.17	32.1	0.34	1956	<3	0.19	5
M18 30	L08-1991	08-2020	30	28.40	<2.8	2.27	3300	<0.39	57	6.0	35	5.88	34	0.99	2.65	5.85	<6.3	5.52	27.8	0.31	3516	10.0	0.31	11

GEOCHEMISTRY OF DRILLHOLE MND18 - MARONAN PROSPECT

				XRFp	XRFp	INAA	INAA	INAA	INAA	XRFp	INAA	INAA	INAA	XRFp	INAA	XRFp	INAA	INAA	XRFp	XRFp
			Depth	Pb	Rb	Sb	Sc	Se	Sm	Sr	Ta	Te	Th	TiO2	U	V	W	Yb	Zn	Zr
				5	5	0.50	0.10	10	0.20	5	1.00	50.0	0.5	0.003	2.00	5	2.0	0.50	5	5
FieldNo	LabSeqNo	LibNo	m	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm
M18 01	L08-2020	08-1991	1	30	105	<0.12	12.40	<3.5	7.96	78	2.56	2.1	22.2	0.73	4.42	107	<1.4	3.47	44	269
M18 02	L08-2024	08-1992	2	14	110	0.21	10.70	<3.3	7.32	77	2.49	<2.5	21.7	0.65	3.67	87	<1.7	3.24	33	267
M18 03	L08-2004	08-1993	3	10	108	0.21	8.90	<3.4	6.31	81	3.34	<2.5	18.3	0.55	3.53	74	<1.1	2.57	25	241
M18 04	L08-2006	08-1994	4	21	105	<0.12	13.00	<3.7	8.58	78	3.15	5.7	23.7	0.76	4.06	107	<1.3	3.69	41	303
M18 05	L08-1997	08-1995	5	5	98	<0.14	7.14	<3.5	5.28	79	<0.96	3.9	17.0	0.46	3.42	60	<1.1	2.24	21	220
M18 06	L08-1998	08-1996	6	6	92	0.19	6.81	<3.5	5.53	80	1.93	2.3	19.0	0.46	3.14	66	<1.1	2.37	21	218
M18 07	L08-2013	08-1997	7	6	87	0.31	6.60	<3.8	5.21	76	2.57	1.9	21.6	0.46	3.55	57	<1.4	2.46	19	219
M18 08	L08-2010	08-1998	8	32	87	0.23	5.87	<3.1	4.18	89	1.79	2.0	16.2	0.35	3.60	73	<1.1	2.11	35	164
M18 09	L08-2007	08-1999	9	10	98	<0.14	9.76	<3.4	6.56	77	2.09	2.5	21.0	0.59	3.98	94	<1.2	2.95	27	227
M18 10	L08-2005	08-2000	10	9	99	<0.14	10.60	<4.1	6.89	80	1.83	3.0	17.8	0.62	3.93	103	2.1	2.98	29	224
M18 11	L08-2008	08-2001	11	5	103	0.26	11.50	<3.5	7.58	77	1.12	<2.5	19.3	0.66	4.20	107	<1.5	3.33	29	246
M18 12	L08-2018	08-2002	12	9	102	0.20	10.00	<3.1	6.42	81	1.48	1.3	16.1	0.57	4.29	98	<1.2	2.88	27	196
M18 13	L08-2019	08-2003	13	11	107	0.23	14.20	<3.6	8.92	84	2.93	<4.2	21.6	0.8	4.17	118	<1.7	3.69	35	264
M18 14	L08-2017	08-2004	14	10	99	<0.2	12.40	<3.3	7.80	80	2.09	<2.5	21.2	0.69	3.25	112	<1.6	3.58	33	239
M18 15	L08-2016	08-2005	15	10	104	0.26	15.10	<3.6	9.66	85	2.15	1.5	23.3	0.85	4.42	124	<1.4	3.98	37	293
M18 16	L08-1996	08-2006	16	9	104	0.29	13.80	<3.8	9.06	83	3.06	2.5	22.4	0.84	4.25	134	<1.5	3.92	35	287
M18 17	L08-2000	08-2007	17	11	103	<0.16	15.00	<3.9	9.55	83	1.96	4.8	22.5	0.87	4.11	132	<1.3	4.00	37	274
M18 18	L08-1993	08-2008	18	11	100	0.33	14.60	<3.9	9.14	81	2.37	<1.5	21.9	0.83	4.12	139	<1.5	3.96	37	270
M18 19	L08-2001	08-2009	19	11	97	0.23	14.20	<4.6	8.96	81	1.55	2.7	22.4	0.86	4.70	138	<1.3	3.92	41	306
M18 20	L08-2011	08-2010	20	13	102	0.40	15.30	<3.8	9.71	84	2.62	1.5	22.1	0.87	4.64	143	<1.4	4.01	39	295
M18 21	L08-2003	08-2011	21	17	255	1.13	6.76	<2.6	6.27	92	1.11	0.6	22.9	0.39	4.38	42	5.0	2.28	14	379
M18 22	L08-1999	08-2012	22	22	295	0.98	6.89	<2.4	5.50	114	0.76	2.0	19.7	0.37	3.92	38	5.3	2.70	21	327
M18 23	L08-2023	08-2013	23	14	303	0.49	7.73	<2.6	6.02	113	1.51	<1.9	17.8	0.39	2.90	46	3.9	2.15	31	283
M18 24	L08-2009	08-2014	24	22	362	0.70	10.10	<2.9	8.22	113	2.45	<2.1	21.6	0.56	4.19	44	6.6	3.02	37	296
M18 25	L08-2014	08-2015	25	26	254	1.17	5.80	<3.3	8.79	74	2.00	2.3	35.9	0.36	5.02	30	5.3	3.60	37	538
M18 26	L08-2021	08-2016	26	60	229	1.25	5.46	<2.8	8.88	110	1.19	<1.3	22.6	0.36	4.17	35	4.3	3.21	73	368
M18 27	L08-1995	08-2017	27	40	242	1.71	7.06	<2.8	6.39	107	<0.61	<1.4	17.7	0.4	4.13	42	5.4	2.93	46	256
M18 28	L08-1994	08-2018	28	38	208	1.90	9.55	<3.3	8.95	132	2.47	1.7	17.7	0.43	5.42	57	5.0	4.64	44	218
M18 29	L08-2015	08-2019	29	46	284	1.49	5.01	<2.2	4.92	104	0.81	1.2	13.8	0.26	3.04	33	4.4	2.26	33	223
M18 30	L08-1991	08-2020	30	45	292	2.08	6.31	<2.4	4.41	98	1.28	1.7	13.4	0.35	4.00	43	5.1	2.17	52	217

SOIL GEOCHEMISTRY - MARONAN PROSPECT

				INAA	INAA	CNExt	INAA	INAA	INAA	INAA	INAA	INAA	XRFp	INAA	INAA	INAA	INAA	INAA	INAA	INAA	XRFp	INAA	INAA	XRFp
				As	Au	Au	Ba	Br	Ce	Co	Cr	Cs	Cu	Eu	Fe	Hf	Ir	K	La	Lu	Mn	Mo	Na	Ni
				2.00	5.0	0.20	100	2.00	10	1.0	5	1.00	10	1.00	0.05	1.00	20	0.40	0.5	0.20	10	10.0	0.02	10
FieldNo	LabSeqNo	LibNo	East	ppm	ppb	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppb	%	ppm	ppm	ppm	ppm	%	ppm
RMN 01	L08-1979	08-1964	24000	1.37	<3.1	0.08	519	1.22	72	9.4	26	<0.65	18	0.96	2.11	9.58	<9.5	1.80	34.0	0.41	450	<3.4	1.62	6
RMN 02	L08-1968	08-1965	24050	3.62	<3.6	0.97	493	1.78	107	16.8	48	2.17	44	1.60	4.00	10.20	<11	1.58	51.5	0.62	582	<3.9	1.31	18
RMN 03	L08-1985	08-1966	24100	1.78	<3.1	0.41	538	1.68	80	11.4	30	0.82	20	0.96	2.58	10.30	<9.6	1.87	36.4	0.45	527	<5.3	1.60	9
RMN 04	L08-1988	08-1967	24150	3.37	<3.4	0.58	382	2.70	100	15.0	46	2.36	37	1.45	3.56	11.20	<10	1.62	46.9	0.56	536	<3.7	1.40	14
RMN 05	L08-1987	08-1968	24200	3.88	<4.4	1.18	450	4.65	108	18.1	57	2.55	50	1.53	4.40	9.36	<11	1.52	55.1	0.63	580	<3.9	1.20	21
RMN 06	L08-1967	08-1969	24250	3.23	<3.4	1.08	391	6.91	101	18.2	47	2.47	47	1.32	3.81	9.07	<11	1.22	49.1	0.54	595	<3.7	1.07	19
RMN 07	L08-1965	08-1970	24300	2.76	<3.3	0.76	552	6.97	98	17.0	47	2.82	45	1.43	3.63	8.83	<11	1.26	48.4	0.53	628	<3.7	1.08	18
RMN 08	L08-1982	08-1971	24325	2.96	<4.2	0.84	454	5.25	111	18.6	51	2.08	39	1.49	3.74	10.50	<10	1.28	51.4	0.61	645	<3.7	1.11	18
RMN 09	L08-1975	08-1972	24350	2.63	<3.4	1.00	465	6.22	104	17.8	48	2.23	40	1.44	3.70	10.40	<11	1.37	49.5	0.63	648	<3.7	1.12	17
RMN 10	L08-1971	08-1973	24375	3.14	<4.1	1.10	436	8.72	100	17.5	47	1.60	44	1.64	3.69	9.35	<11	1.41	49.0	0.52	640	<3.5	1.09	18
RMN 11	L08-1983	08-1974	24400	3.91	<4.2	0.97	526	5.93	100	16.5	49	2.13	40	1.57	3.85	10.00	<10	1.37	49.2	0.56	563	<3.7	1.20	18
RMN 12	L08-1984	08-1975	24425	3.33	<4.2	1.24	391	6.96	102	15.0	45	2.98	42	1.49	3.64	9.83	<10	1.23	50.9	0.57	563	<3.7	1.19	18
RMN 13	L08-1969	08-1976	24450	3.16	<4	0.80	421	2.53	95	12.9	49	2.85	41	1.06	3.72	9.42	<10	1.64	45.8	0.54	503	<3.6	1.13	18
RMN 14	L08-1964	08-1977	24475	2.55	<3.3	0.34	451	1.58	93	14.1	35	1.55	32	1.14	2.76	10.80	<11	1.87	43.1	0.55	705	<3.7	1.43	13
RMN 16	L08-1970	08-1978	24525	2.49	<3.1	0.45	452	2.12	87	12.1	33	1.64	27	1.10	2.34	9.80	<9.7	1.57	38.7	0.49	568	<3.4	1.27	8
RMN 17	L08-1972	08-1979	24550	3.40	<4.2	1.10	473	3.12	102	15.4	52	2.47	41	1.32	3.88	10.40	<11	1.58	48.5	0.59	522	<3.7	1.17	16
RMN 18	L08-1973	08-1980	24575	3.54	<3.3	1.18	325	7.07	100	14.1	47	2.11	44	1.37	3.70	10.50	<10	1.53	49.4	0.58	547	<3.7	1.12	19
RMN 19	L08-1989	08-1981	24600	3.75	<4.2	0.89	402	12.50	104	16.1	45	3.07	43	1.56	3.90	9.75	<10	1.21	51.8	0.60	547	<3.8	1.16	18
RMN 20	L08-1986	08-1982	24625	2.87	<3.4	6.56	452	9.17	101	17.4	45	2.85	39	1.44	3.62	10.00	<10	1.34	50.2	0.55	594	<3.7	1.17	19
RMN 21	L08-1974	08-1983	24650	2.75	<4.2	1.19	361	11.70	100	15.6	47	2.21	41	1.21	3.54	10.00	<11	1.19	48.2	0.53	527	<3.7	1.18	19
RMN 22	L08-1981	08-1984	24675	2.49	<4.1	1.08	460	7.40	100	17.0	46	1.96	39	1.38	3.40	9.79	<10	1.12	47.7	0.58	583	<3.6	1.12	18
RMN 23	L08-1980	08-1985	24700	2.72	<3.4	1.23	406	6.90	101	14.0	43	2.38	38	1.42	3.36	10.00	<10	1.09	48.6	0.56	530	<3.7	1.20	17
RMN 24	L08-1977	08-1986	24725	3.32	<3.4	1.15	476	8.53	99	15.7	46	3.42	45	1.28	3.55	9.63	<11	1.08	48.9	0.57	560	<3.7	1.21	19
RMN 25	L08-1976	08-1987	24750	3.05	6.0	1.15	471	3.95	85	13.2	40	1.87	35	1.23	3.10	8.25	<10	1.41	42.1	0.48	489	<3.5	1.31	14
RMN 26	L08-2037	08-2037	24800	3.75	<3.6	1.32	421	8.51	112	18.3	50	3.06	50	1.66	4.18	9.26	<11	1.34	58.0	0.59	530	<3.9	1.26	19
RMN 27	L08-2038	08-2038	24850	3.41	<4.5	1.13	442	5.23	120	17.5	52	2.58	49	1.68	4.28	10.00	<11	1.42	58.5	0.66	563	<4	1.33	21
RMN 28	L08-2039	08-2039	24900	3.23	<3.5	0.73	529	3.02	111	16.0	52	3.21	40	1.69	3.77	10.10	<10	1.40	52.4	0.60	591	<3.9	1.54	14
RMN 29	L08-2040	08-2040	24950	2.91	<5.1	0.54	483	3.17	123	17.0	56	3.70	40	1.19	4.20	11.70	<12	1.82	62.6	0.68	591	<4.5	2.04	20
RMN 30	L08-2041	08-2041	25000	1.86	<5.1	1.99	508	0.91	118	13.4	47	3.52	33	1.16	3.86	13.10	<12	1.85	59.7	0.68	498	<4.5	2.43	17

SOIL GEOCHEMISTRY - MARONAN PROSPECT

				XRFp	XRFp	INAA	INAA	INAA	INAA	XRFp	INAA	INAA	INAA	XRFp	INAA	XRFp	INAA	INAA	XRFp	XRFp
				Pb	Rb	Sb	Sc	Se	Sm	Sr	Ta	Te	Th	TiO2	U	V	W	Yb	Zn	Zr
				5	5	0.50	0.10	10	0.20	5	1.00	50.0	0.5	0.003	2.00	5	2.0	0.50	5	5
FieldNo	LabSeqNo	LibNo	East	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm
RMN 01	L08-1979	08-1964	24000	7	82	<0.13	5.71	<3.6	5.77	67	2.75	2.8	19.7	0.61	3.71	53	<0.89	2.74	19	353
RMN 02	L08-1968	08-1965	24050	11	101	<0.15	14.10	<4.3	9.17	77	3.08	4.7	23.2	0.92	5.84	129	<1	3.99	32	362
RMN 03	L08-1985	08-1966	24100	7	83	<0.11	6.85	<3.6	6.31	73	<0.96	<2.5	21.4	0.67	4.44	69	<0.96	2.97	22	399
RMN 04	L08-1988	08-1967	24150	11	92	<0.14	12.30	<3.8	8.30	71	3.79	<2.7	22.4	0.85	3.95	107	<1.3	3.80	30	394
RMN 05	L08-1987	08-1968	24200	12	100	<0.12	16.00	<4	9.79	80	2.24	<2.9	22.0	0.91	5.02	132	<1.2	4.04	41	325
RMN 06	L08-1967	08-1969	24250	10	89	<0.14	13.70	<4.9	8.64	82	2.59	<2.8	21.4	0.83	3.33	113	2.2	3.75	35	355
RMN 07	L08-1965	08-1970	24300	13	90	<0.2	13.10	<4	8.50	85	2.18	<2.8	19.9	0.83	3.49	117	<0.93	3.59	35	342
RMN 08	L08-1982	08-1971	24325	7	89	<0.12	13.90	<3.9	9.00	87	2.70	<2.8	21.9	0.92	2.95	114	<1.3	3.93	35	359
RMN 09	L08-1975	08-1972	24350	7	92	<0.14	13.20	<3.9	8.84	88	2.63	2.1	22.1	0.89	4.31	111	<1	3.99	33	404
RMN 10	L08-1971	08-1973	24375	11	94	0.28	13.10	<4.8	8.61	81	3.10	2.8	20.2	0.85	3.43	118	<0.96	3.59	35	366
RMN 11	L08-1983	08-1974	24400	7	92	<0.21	13.30	<3.9	8.53	79	2.14	1.9	21.2	0.83	2.44	111	<1.1	3.78	34	368
RMN 12	L08-1984	08-1975	24425	9	88	<0.15	12.80	<3.8	8.85	89	1.83	3.5	20.8	0.82	4.41	112	<1.1	3.83	31	358
RMN 13	L08-1969	08-1976	24450	8	98	<0.11	12.10	<3.9	7.90	72	1.93	2.2	20.9	0.79	3.66	116	<1.2	3.54	35	346
RMN 14	L08-1964	08-1977	24475	10	95	<0.14	8.37	<4	7.41	73	2.03	<1.6	24.0	0.74	4.85	82	<0.89	3.46	26	395
RMN 16	L08-1970	08-1978	24525	10	83	0.23	8.03	<3.6	6.84	67	3.54	1.4	22.8	0.69	3.38	72	<1.1	3.11	25	340
RMN 17	L08-1972	08-1979	24550	11	100	<0.14	13.00	<4	8.33	73	3.05	1.5	24.4	0.83	4.77	117	<0.99	3.70	30	379
RMN 18	L08-1973	08-1980	24575	11	90	<0.2	12.80	<3.9	8.51	90	2.11	3.2	22.3	0.86	3.42	121	<0.98	3.71	35	357
RMN 19	L08-1989	08-1981	24600	11	88	0.29	13.70	<3.8	9.10	97	1.88	1.2	22.3	0.84	4.69	111	<1.1	3.90	33	357
RMN 20	L08-1986	08-1982	24625	8	84	<0.14	13.10	<3.8	8.75	95	1.43	2.6	21.7	0.88	3.22	118	<1.1	3.86	33	336
RMN 21	L08-1974	08-1983	24650	8	79	0.24	12.90	<4	8.44	100	3.03	<1.9	21.4	0.92	5.04	124	<0.99	3.67	35	351
RMN 22	L08-1981	08-1984	24675	9	81	<0.14	12.10	<3.8	8.31	87	1.77	1.8	19.6	0.79	4.14	100	<1	3.74	32	360
RMN 23	L08-1980	08-1985	24700	8	78	0.24	12.20	<4.7	8.44	92	1.99	4.8	20.4	0.81	4.31	107	<1	3.81	31	385
RMN 24	L08-1977	08-1986	24725	9	88	0.33	12.90	<4	8.49	91	1.80	1.4	21.5	0.85	4.12	112	<1	3.66	36	340
RMN 25	L08-1976	08-1987	24750	8	88	<0.11	10.40	<3.8	7.23	87	2.53	2.0	18.5	0.75	3.24	120	<0.95	3.15	28	273
RMN 26	L08-2037	08-2037	24800	10	94	<0.15	14.90	<4	9.68	92	3.26	1.4	23.6	0.84	3.97	127	<1.2	4.09	39	343
RMN 27	L08-2038	08-2038	24850	10	97	<0.16	15.00	<4.1	9.92	89	2.42	0.9	25.1	0.86	5.11	137	<1.5	4.30	39	365
RMN 28	L08-2039	08-2039	24900	6	100	<0.15	12.50	<3.9	9.08	88	2.07	5.9	23.0	0.81	4.98	110	<1.4	4.19	37	366
RMN 29	L08-2040	08-2040	24950	9	122	0.32	15.60	<4.6	10.70	96	4.24	4.9	26.5	0.97	6.34	122	<1.7	4.71	50	393
RMN 30	L08-2041	08-2041	25000	7	114	<0.18	13.40	<4.7	10.00	88	2.26	4.8	29.1	0.91	8.77	108	<1.4	4.48	39	454

STANDARDS - MARONAN PROSPECT

				INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	XRFp	INAA	INAA	INAA	INAA	INAA	INAA	INAA	XRFp	INAA	INAA	XRFp
				As	Au	Ba	Br	Ce	Co	Cr	Cs	Cu	Eu	Fe	Hf	Ir	K	La	Lu	Mn	Mo	Na	Ni
				2.00	5.0	100	2.00	10	1.0	5	1.00	10	1.00	0.05	1.00	20	0.40	0.5	0.20	10	10.0	0.02	10
FieldNo	LabSeqNo	LibNo		ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppb	%	ppm	ppm	ppm	ppm	%	ppm
STD 06	L08-1966	08-1988	-	1.91	82.9	381	4.86	38	<0.43	125	7.68	5	0.56	0.25	2.75	<7.2	2.88	20.2	0.14	3	<2.5	0.31	9
STD 06	L08-1978	08-1989	-	1.99	86.4	352	4.99	39	<0.41	122	7.88	6	0.58	0.26	2.82	<7.2	2.93	20.4	0.12	3	<2	0.31	6
STD 06	L08-1990	08-1990	-	2.23	98.6	315	5.54	40	<0.39	126	7.71	3	0.66	0.26	2.97	<7.1	2.98	21.0	0.13	5	<2.5	0.32	5
STD 06	L08-1992	08-2021	-	2.16	90.9	377	4.41	38	<0.47	128	8.11	3	0.72	0.26	3.06	<10	2.90	20.4	0.15	0	<1.6	0.31	5
STD 06	L08-2002	08-2022	-	2.32	86.7	434	5.18	41	<0.38	127	7.91	2	0.57	0.27	2.92	<7	2.95	21.1	0.15	1	2.1	0.32	4
STD 06	L08-2012	08-2023	-	1.60	83.4	308	4.80	40	<0.36	131	7.89	4	0.60	0.27	3.15	<7	2.99	21.0	0.13	2	<2.6	0.32	1
STD 06	L08-2022	08-2024	-	2.34	83.8	338	5.33	40	0.7	126	7.88	4	0.63	0.27	3.01	<6.6	3.11	20.8	0.15	3	2.8	0.31	3
		Mean		2.08	87.5	358	5.02	39	0.7	126	7.87	4	0.62	0.26	2.95	-	2.96	20.7	0.14	2	2.5	0.31	5
		AccVal		2.00	86.0	330	5.00	31	0.7	120	7.60	6	0.50	0.29	2.70	7	2.94	21.6	0.10	8	3.0	0.30	9

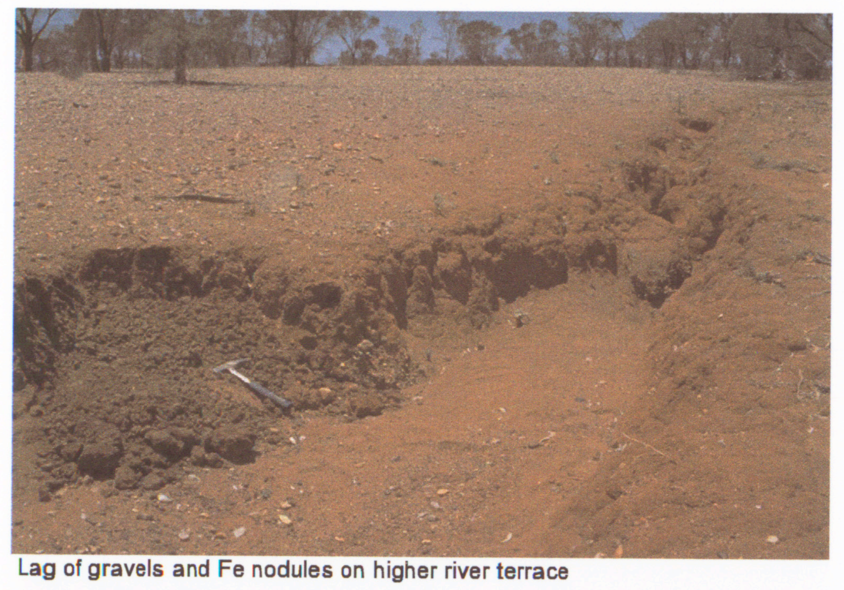
STANDARDS - MARONAN PROSPECT

				XRFp	XRFp	INAA	INAA	INAA	INAA	XRFp	INAA	INAA	INAA	XRFp	INAA	XRFp	INAA	INAA	XRFp	XRFp
				Pb	Rb	Sb	Sc	Se	Sm	Sr	Ta	Te	Th	TiO2	U	V	W	Yb	Zn	Zr
				5	5	0.50	0.10	10	0.20	5	1.00	50.0	0.5	0.003	2.00	5	2.0	0.50	5	5
FieldNo	LabSeqNo	LibNo		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm
STD 06	L08-1966	08-1988	-	10	102	12.90	13.80	<2.6	2.34	64	<0.53	<1.9	4.9	0.33	0.80	94	5.6	0.91	5	117
STD 06	L08-1978	08-1989	-	12	102	12.90	13.90	<2.6	2.37	64	<0.51	<1.9	4.9	0.33	0.96	95	6.3	0.86	6	115
STD 06	L08-1990	08-1990	-	9	104	13.60	14.40	<2.5	2.46	64	0.70	<1.9	5.2	0.33	1.32	94	6.6	0.91	4	115
STD 06	L08-1992	08-2021	-	10	104	13.30	14.20	<2.5	2.36	64	<0.48	<1.9	5.2	0.33	0.72	96	6.8	1.01	6	115
STD 06	L08-2002	08-2022	-	12	104	13.40	14.30	<2.5	2.44	64	0.52	<1.9	4.9	0.33	1.00	92	5.8	1.08	6	112
STD 06	L08-2012	08-2023	-	9	101	13.60	14.50	<2.5	2.40	64	0.73	<1.9	4.9	0.33	1.59	93	7.0	1.03	6	116
STD 06	L08-2022	08-2024	-	10	102	13.40	14.10	<2.4	2.42	64	0.45	2.8	4.7	0.34	1.00	92	6.0	0.91	4	118
		Mean		10	103	13.30	14.17	-	2.40	64	0.60	2.8	5.0	0.33	1.06	94	6.3	0.96	5	115
		AccVal		10	109	12.80	13.80	2	2.30	68	0.40	0.0	4.5	0.37	1.00	102	6.0	0.80	5	120

APPENDIX 2

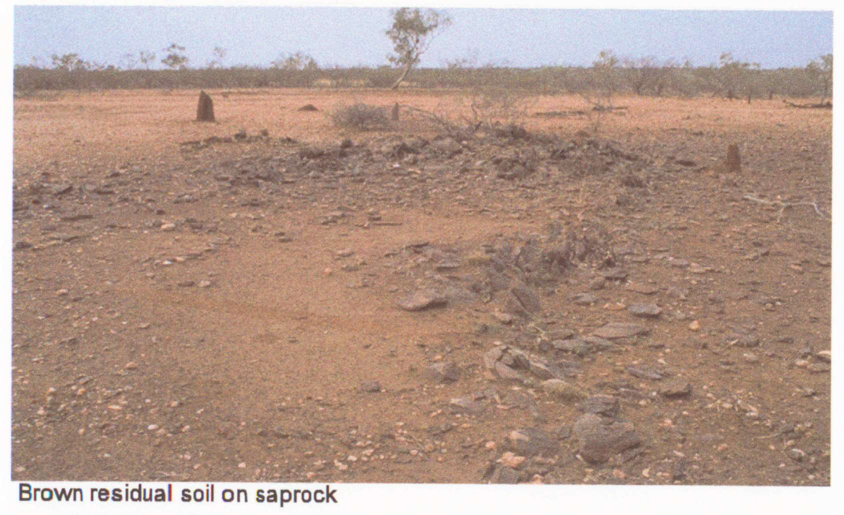
Regolith Map

REGOLITH - LANDFORM MAP OF MARONAN, NORTHWEST QUEENSLAND



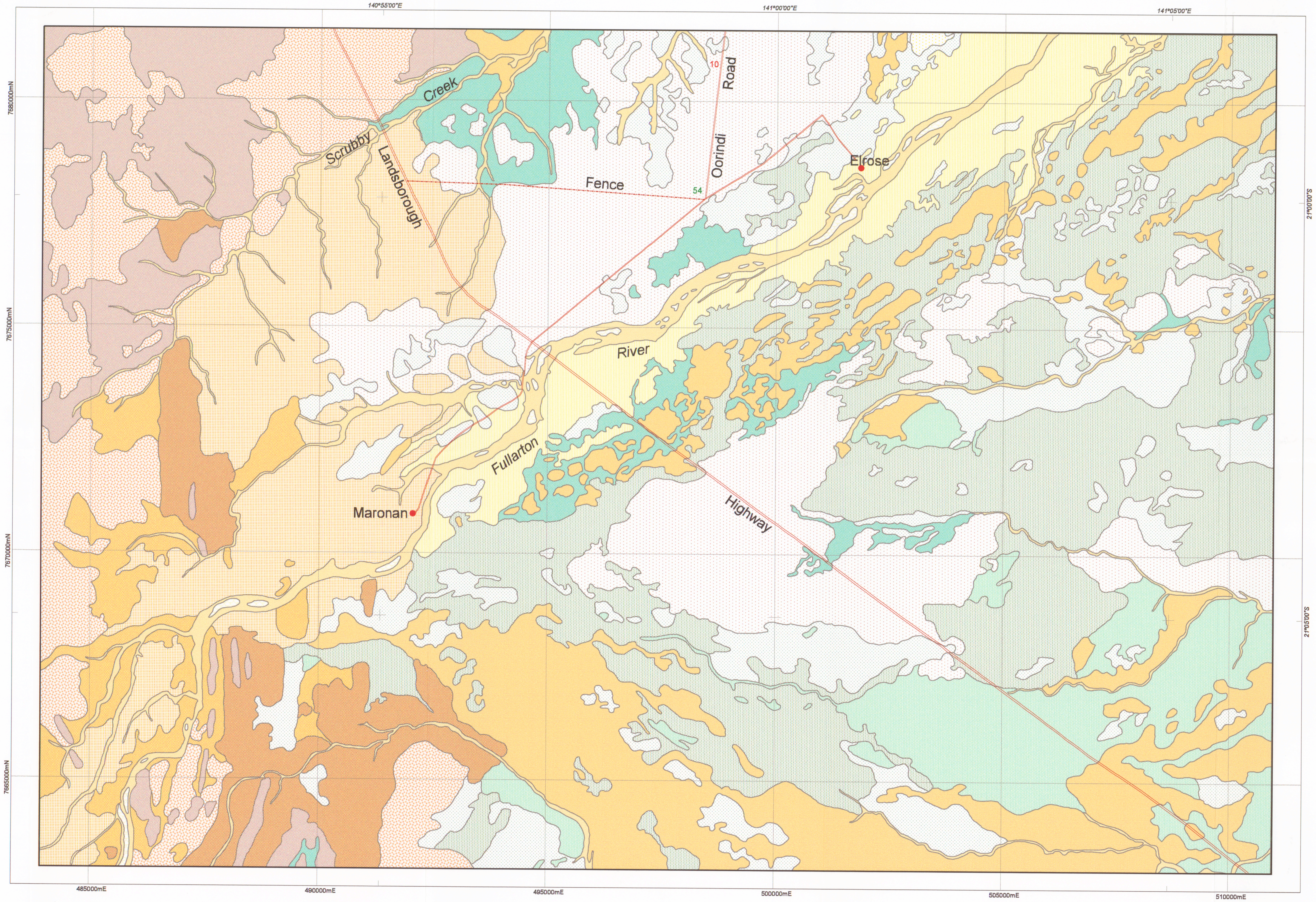
Lag of gravels and Fe nodules on higher river terrace

Lag of gravels on erosional plain



Brown residual soil on saprock

Weathering on bedrock hill



SAPROLITE

PROTEROZOIC

- Mixture of brown, residual, lithic soil over saprock with minor alluvium; higher terrace
- Non-ferruginous, residual, lithic soil; erosional terrace
- Residual, stony soil with Fe-rich nodules over saprock; erosional terrace
- Thin, residual, stony soil over saprock; undulating erosional plain
- Bedrock hill

COLLUVIUM/ALLUVIUM

- Alluvium in modern channel
- Sand bar inside river channel
- Recent alluvium; levee
- Gravelly alluvium, fluvial ridge and lower river terrace
- Lag of Fe-rich nodules, fluvial gravel and brown, sandy soil over mottled Tertiary sediments; higher terrace
- Brown, sandy soil over alluvium; minor rise on alluvial plain
- Brown, gravelly soil with patches of black soil over alluvium; lower terrace
- Patches of brown and black soil; plain and river terrace
- Black soil over sandy alluvium; plain and gilgai

Compiled by Li Shu (CRC LEME / CSIRO), 1997

It is recommended that the map be referred to as: Li Shu 1997 -- Regolith-landform map of Maronan, Northwest Queensland (1:50,000 map scale). Cooperative Research Centre for Landscape Evolution and Mineral Exploration (CRC LEME), Perth.

This map is based on aerial photograph interpretation and field observations.

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Published by CRC LEME, Perth, Australia

CRC LEME is an unincorporated joint venture between the Australian National University, University of Canberra, Australian Geological Survey Organisation and CSIRO Exploration and Mining, established and supported under the Australian Government's Cooperative Research Centre's Programme.

Appendix 7 - Li Shu and I.D.M. Robertson 1997: Surficial geology around the Eloise Cu-Au mine and dispersion into Mesozoic cover from the Eloise Mineralisation, NE Queensland - CRC LEME Restricted Report 56R

WARNING: Inks will fade with prolonged exposure to light.

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APPENDIX 3

Data Disc
Type README.DOC for contents and format