PETCHEM DATA SET: AUSTRALIA AND ANTARCTICA — DOCUMENTATION

RECORD 1989/19

by LAI Wyborn and RJ Ryburn

Division of Petrology and Geochemistry

Bureau of Mineral Resources, Geology and Geophysics

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ABSTRACT

PETCHEM is the whole rock geochemical data storage system of the Division of Petrology and Geochemistry and utilises the relational database management system ORACLE. This data set, which is only a preliminary release, contains approximately 12 500 analyses (both major and trace elements) from various regions of Australia and Antarctica. Most samples are located by AMG grid references and/or decimal latitude and longitude. This record describes tables used in PETCHEM and defines the fields used within these tables. The data set can be subdivided into 13 regional databases and one thematic database. Short descriptions and bibliographies are given for each database.

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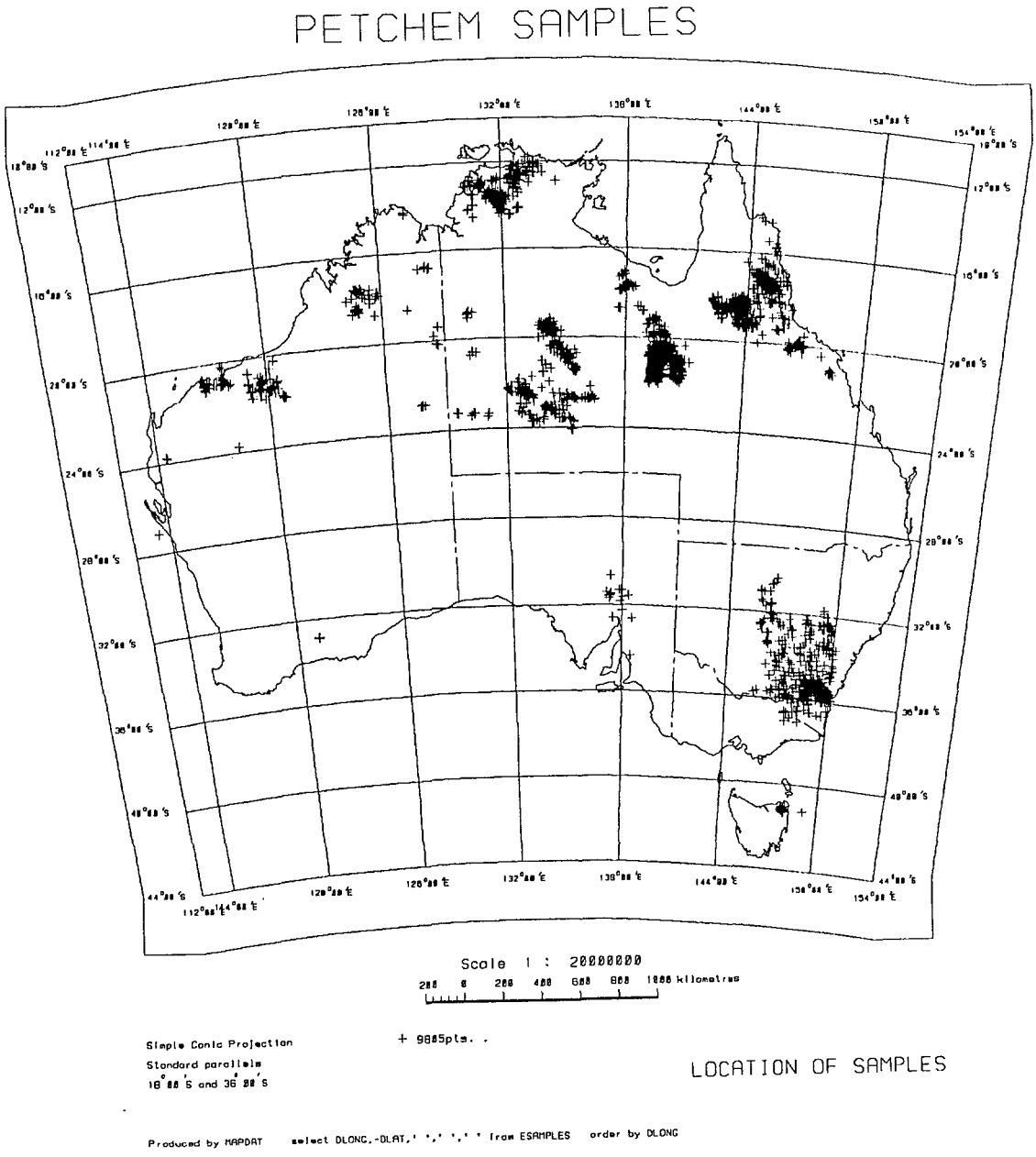

Figure 1 Location of PETCHEM samples in Australia included in this release.

1. INTRODUCTION

PETCHEM is the whole-rock geochemical data storage system of the Division of Petrology and Geochemistry, Bureau of Mineral Resources. It is based on the commercial relational database management system ORACLE and is intended eventually to include all whole rock chemical analyses carried out by the BMR laboratories. PETCHEM is a small part of a larger database for information on BMR rock samples and all laboratory data derived from them. On completion, PETCHEM will contain virtually all whole rock analyses acquired by the Division (and its predecessor, the former Geological Branch) since 1970. In addition, analyses compiled from sources external to the BMR will be included progressively.

This PETCHEM data set on Australia and Antarctica is a preliminary release of approximately 12 500 analyses from which have recently been compiled from diverse computer databases held within BMR. It can be subdivided into a series of 13 databases based on geological provinces and one thematic database (alkaline rocks). Table 1 list the major components of the data set and Figure 1 shows the distribution of the analyses on the Australian continent. Appendix 1 contains brief descriptions and bibliographies of the individual databases.

Database	Number of samples
Alkaline Rocks	880
Antarctica	1300
Arunta	471
Capricorn	227
Davenport	170
Granites-Tanami	35
Halls Creek	62
Lachlan	1488
Mount Isa	2045
NE Queensland	1466
Pilbara	1062
Pine Creek	1263
Tennant Creek	1394
Stuart Shelf	238

Table 1 List of databases within the PETCHEM data set: Australia and Antarctica

This data set is a preliminary release of the majority of the whole rock chemical major and trace element (in ppm) data held within BMR. Because of the amount of data, this data set will only be available on magnetic tape. However, within 12 months BMR hopes to release this data set and other data in a series of regional or thematic subsets (Table 2) in either tape or diskette form and to include data from other tables that are currently being developed. These include trace elements (precious metal and rare earth) at ppb level , geophysical properties, petrological data, and structural data. Geochronological and organic geochemistry databases are also being developed.

Subset	Areas Covered	Number of analyses[1]	Coordinator
Regional Databases			
Antartica	Antarctica	1300	J.W. Sheraton
Lachlan	Lachlan Fold Belt	1800	D. Wyborn
	NE Tasmania		
	NW Tasmania		
Mount Isa	Mount Isa Inlier	2300	L. Wyborn
McArthur[2]	McArthur Basin	800	K. Plumb, L. Wyborn
	Murphy Tectonic Ridge		
New Guinea[2]	New Guinea	1000	R.W. Johnson
	Manus Island		
	New Georgia		
NE Queensland	Georgetown Inlier	1700	D.E. Mackenzie
	NE Queensland		
Pine Creek	Pine Creek Inlier	1700	L. Wyborn
Tennant Creek	Tennant Creek Inlier	1600	L. Wyborn
	Davenport Province		
Pilbara	Pilbara Block	1100	A.Y. Glikson
Other	Gascoyne Province	1200	R.G. Warren, L. Wyborn
Proterozoic	Arunta Block		
	Stuart Shelf		
	Halls Creek Inlier		
	Granites-Tanami Block		
Thematic Databases			
Alkaline	Kimberlites	880	A.L. Jaques
	Alkaline Rocks		
EAVS[2]	East Australian	3000	J. Knutson
	Volcanics (Cainozoic)		

Note (1) These numbers differ from those in Table 1 because they include analyses in progress.

(2) These databases are not included in this present data set.

Table 2 List of proposed subsets of PETCHEM to be released from 1989 onwards

2. STRUCTURE OF THE AUSTRALIA AND ANTARCTICA DATA SET.

Three main tables of PETCHEM and 7 associated 'authority' tables are contained in this data set and are listed as follows -

Table Name	Contents
Main Tables	
SAMPLES	Samples and their locations and provenance
MAJORS	Major element analyses in weight percentages of oxides
TRACES	Trace element analyses in ppm
Authority tables	
ORIGINATORS	List of valid contributors
COUNTRIES	List of valid countries
STATES	List of valid Australian States
REGIONS	List of valid regions
HMAPS	List of valid 1:100 000 maps
ROCKTYPES	List of valid rock types
SOURCES	List of valid analytical laboratories

The fields in the main tables are described in the next section. Full definitions of all tables are listed in Appendix 2.

The authority tables generally consist of a number and a text field. For example, the REGIONS table consists of a region number and a region name (see Appendix 2). The region names in this table are unique. Each region appears once, and only once, in this table, and nowhere else in the database. The SAMPLES table refers ('relates') to the region name via its associated number.

3. DESCRIPTION OF THE MAIN TABLES

3.1 - THE SAMPLES TABLE

This table contains information about samples and their provenance. The Samples Block has 12 relational fields - Originator, Rock Type, Country, State, Region, Hmaps, and 5 Reference numbers. In each case there is an associated table containing the value pointed to by a number (a 3-letter mnemonic for Countries). The number field is what is stored in the SAMPLES table. All fields are either mandatory or optional. All BMR users must enter the mandatory fields before the geochemical data can be entered. (The references are not included in this preliminary release.)

Description of fields:

Origno - Mandatory relational field of 5 digits. The originator is represented by a number and the full name is recorded in the relational 'Originator Table'. The originator is generally the person or organization that collects the sample and/or submits it for laboratory work. The main purpose of this field is to ensure a unique combination of originator and sample number.

Sample Number - Mandatory field of 16 characters. Any combination of letters and numbers may be entered, provided that it is unique to the originator. All BMR samples should have registered 8 digit numbers, which should be unique. The first two digits in the BMR sample number refer to the year in which the sample was collected, the next two digits refer to a region in Australia (e.g. Arunta, Pine Creek), and the remaining four numbers are used by individuals belonging to that project at their discretion.

Field Number - Optional field of 16 characters. This field is designed to accommodate any alternative numbering systems that might apply to a sample or group of samples. For example, some samples are given field numbers that differ from the final registered numbers.

Group or Batholith - Optional field of 64 characters, giving the name of the stratigraphic group or igneous batholith from which the sample was collected.

Subgroup or Suite - Optional field of 64 characters, giving the name of the stratigraphic subgroup or igneous suite pertaining to the sample.

Stratigraphic Formation - Optional field of 64 characters, giving the relevant stratigraphic unit at formation level.

Stratigraphic Member - Optional field of 64 characters for the name of a stratigraphic member, if appropriate.

Stratigraphic Height - Optional number field with up to two decimal places. Designed for samples from measured sections or drill holes.

Map Symbol - Optional field of 10 characters: the letter symbol used on 1:100 000 or 1:250 000 geological maps for the rock unit from which the sample was collected.

Rock Type - Mandatory relational field of 5 digits. See the description of the authority tables for the list of 17 permissible rock types, 1 being 'unknown'.

Lithology - Optional field of 64 characters for a full lithological description.

Grouping - Optional field of 22 characters to allow the user to supply other divisions for samples, for example, the alteration zones of an ore body.

Age - Optional field of 64 characters for the geological age e.g., late Ordovician. If known, the absolute age is included in brackets, e.g., early Proterozoic (1860 Ma).

References - 5 optional relational numeric fields of 5 digits each. Up to five numbers for bibliographic references may be entered. These must be existing reference numbers in the REFERENCES table. The form will not allow you to enter a reference number that does not already exist. The five fields are a compromise that obviates the requirement for a separate samples-versus-references table which a fully relational solution would require.

Country - Mandatory relational field of 3 capital letters. The default value is 'AUS'.

State - Relational field of 3 capital letters, mandatory if country is Australia. Only the standard capital letter abbreviations for Australian states can be entered in this field, and it cannot be used for other countries.

Region - Mandatory relational field of 5 digits. Only those regions in the REGIONS table may be entered. A region is a recognised geological province or area such as the Lachlan Fold Belt, Mount Isa Inlier, or Carnarvon Basin. As regions may overlap one another, the region that is entered is dependent on the purpose for which the sample was collected.

Geographic Area - Optional 64 character field for the name of the geographic area (e.g., valley, plain, mountain range) from which the sample comes. Examples are 'Newcastle Range' and 'Tuggeranong Valley'. Another purpose for which this field is used is for subprovinces of major regions (e.g., the Leichhardt River Fault Trough of the Mount Isa Inlier).

Locality - Optional 64 character field for a description of the sample site to aid in its relocation in the field. For example, '5.5km NW of Brown's Bore, on east bank of dry creek'.

1:100 000 Map - Relational field of 4 digits - mandatory if country is Australia. The number supplied must identify one of the standard series 1:100 000 map in the HMAPS table. In insert or update mode, the name may be entered and the number retrieved automatically. Only the map number is stored in the SAMPLES table.

Grid Reference - Field of 6 digits - mandatory if 1:100,000 map name is given. The 6-digit reference required is that described on the face of Australian 1:100 000 maps. The grid reference given must be metric and on the Australian National Spheroid.

Decimal Latitude - Field of 8 digits - mandatory if sample is not from Australia. Up to 6 digits may follow the decimal point. For Australian samples this field may be entered, or it may be filled in later by running a BMR program called 'GetLat', which calculates latitudes and longitudes from the 1:100 000 maps and metric grid references and inserts them back in the SAMPLES table.

North or South - Single character field, 'S' by default. Only 'N' or 'S' may be entered.

Decimal Longitude - Field of 9 digits, 7 of which may follow the decimal point. Otherwise as for latitude.

East or West - Single character field 'E' by default. Only 'E' or 'W' may be entered. Make sure this field is correctly filled in for samples from outside Australia (e.g. Antarctica). It must be given as 'W' for latitudes measured west of the Greenwich Meridian.

Drill Hole - Optional field of 22 characters. If the sample is from a drill hole, its name, or some other identification, is required.

Depth in Metres - Optional field of 10 characters. The depth of the sample from within the drill hole. A character field is used here to enable depth ranges to be entered, e.g., '112-115' - as some samples are collected from finite depth intervals.

Other Data - Optional field of 64 characters. May be used for any data not covered by the above fields that the originator feels are relevant.

Entry Date - Invisible date field. This field automatically assumes the date that the sample data is inserted into the SAMPLES table via the form.

3.2 - THE MAJORS TABLE

The majors table contains all of the major element data with all values expressed as weight percentages of oxides.

Description of fields:

Sample Number - As for samples table

Analysis Number - Mandatory field of up to 5 digits. Primary key field assigned by the system - cannot be inserted or updated. May be used to query the tables.

Origino - As for samples table

Source Number - Mandatory relational field of up to 5 digits. The 'source' of an analysis is normally the laboratory that performed the analysis or the person or organization that provided the data (e.g., BMR, BMR restricted, BHP, B.W. Chappell). The SOURCES table contains the authority list of all sources.

Major Elements - Optional numeric fields of up to 4 digits, two after the decimal point. Automatically right justified. Detection limit values are entered as negative numbers and it is impossible to enter '<' or 'n.d.'.

Rest - trace elements are converted to oxide percent, summed and then added to the total.

Total -Optional numeric field of up to 5 digits. This is for an entered total.

Calculated Total - The value in this field is automatically calculated from the data in the major-element fields. It cannot be entered and is not a database field. Except where

detection limit values are involved, this field provides a check on the entered total - the two should coincide. Because detection limit values are entered as negative numbers, they are subtracted from the calculated total.

3.3 - THE TRACES TABLE

This table includes all trace elements in ppm.

Description of Fields:

Origno - as in samples table

Sampno - as in samples table

Analno - as in majors table

Sourceno - as in majors table

Trace Elements - Optional numeric fields of up to 8 digits, two of which may be after a decimal point. The fields are automatically right justified and as is the case for major elements, a negative entry signifies a detection-limit value.

4. DESCRIPTION OF AUTHORITY TABLES

4.1 - THE 1:100 000 MAPS FORM

The 1:100 000 maps form table has the underlying HMAPS table as an important table in its own right.

Field Descriptions:

100K Map Number - The unique four digit number for any 1:100 000 map sheet from Australia.

1M Map ID - The 1:1 000 000 map sheet in which the 1:100 000 sheet lies. This is identified by two capital letters followed by two numbers - e.g., 'SF54'. The two digits are the UTM zone, which is needed to convert metric references to latitude and longitude.

250K Map Number - Up to 2 digits identifying the 1:250 000 map sheet from 16 covering each 1:1 000 000 map area. The full 1:250 000 map ID is obtained by joining the 1:1 000 000 map ID to this number - e.g., SF54-12, which is the Winton 1:250 000 map sheet, in Queensland. Note that the 1:250 000 map sheets in Tasmania are the theoretical ones, not the shifted ones actually published.

100K Map Name - Up to 22 upper case characters for the name of the 1:100 000 map sheet identified by the 100K Map Number. There are many offshore sheets which are named 'UNNAMED'.

100K Map NW Corner Lat. & Long. - The decimal latitude and longitude of the northwest corner of the 1:100 000 map sheet. It is possible, using a single SQL*Plus command, to make use of this field to select a 1:100 000 map name for any given latitude and longitude.

100K Map AMG Ref. SW Corner Easting and Northing - The metric easting and northing of the southeast corner of the 1:100 000 map sheet. These values are necessary to convert a 6-digit grid reference obtained from a 1:100 000 map to the full Australian Map Grid metres east and metres north.

4.2 - COUNTRIES TABLE

This table is for recognised countries. All have an associated ID.

ID	Country
AUS	Australia
PNG	Papua-New Guinea
SI	Solomon Islands
ANT	Antarctica
UK	United Kingdom
SEA	International Waters

4.3 - STATES TABLE

This table is for the states of Australia only and all have a set ID.

ID	State
???	unknown
ACT	Australian Capital Territory
NSW	New South Wales
NT	Northern Territory
QLD	Queensland
SA	South Australia
TAS	Tasmania
VIC	Victoria
WA	Western Australia

4.4 - ORIGINATOR TABLE.

This table refers to the collector of the sample in the field. With some BMR authors, it is possible to refer to original sample note books which are stored within BMR so as to obtain more precise location descriptions of any samples that are of interest.

The following list gives the key for the entries in this authority table.

origno	Originator
1	unknown
2	Blake, D.H.
3	Branch, C.D.
4	Bultitude, R.J.
5	Gardner, C.
6	Croxford, W.
7	Cruikshank, B.I.
8	Hoatson, D.M.
10	Dallwitz, W.B.
11	Derrick, G.M.
12	Duff, B.
13	Ellis, D.J.
14	England, R.N.
15	Ewers, G.R.
16	Warren, R.G.
17	Glikson, A.Y.
18	Tanaka, H.
19	Hill, R.M.
20	Holmes, R.D.
21	Hutton, L.J.
22	Lambert, I.
23	Knutson, J.
24	Jaques, A.L.
25	Chapple, K.
27	Lewis, J.D.
28	Etheridge, M.
29	Mackenzie, D.E.
30	McNaughton, N.
31	Mitchell, J.M.
32	Mock, C.M.
33	Higgins, N.C.
34	Oversby, B.S.
35	Cook, P.
36	Stuart-Smith, P.G.
37	Page, R.W.
38	Plumb, K.A.
39	Valenta, R.
40	Needham, R.S.
41	Santul, J.
42	Sheraton, J.W.
43	Smith, S.E.

44	Tunks, A.
45	Wallace, D.A.
46	Willmott, W.F.
47	Wilson, I.H.
48	Withnall, I.W.
49	Wyborn, D.
50	Wyborn, L.A.I.
51	Bain, J.H.C.
52	Johnson, R.W.
53	Williams, P.R.
54	Miller, A.
55	Bettenay, L.
56	Black, L.P.
57	Pederson, C.P.
58	Ferguson, J.
59	Hegge, M.R.
60	Wilkes, P.G.
61	Roberts, W.M.B.
62	Walpole, B.
63	Joplin, G.
64	Crick, I.
65	Hills, J.
66	Rhodes, J.
67	Smart, P.
68	Sweet, I.P
69	Shaw, R.D.
70	Stewart, A.J.
71	Wyche, S.
72	Watchman, A.
73	Stuart, J.E.
74	Stratton, J.
75	Duggan, M.B.
76	Yeates, A.N.
77	ANU RSES
78	Allen, A.R.

4.5 - REGIONS TABLE

The following list of regions was initially compiled from all the existing data bases. However, for the purpose of database management, only a select number of major regions are now used for the Australian section of this data set. Those that have been used with the regional databases are marked * in the list below. Most of those Australian regions listed below now entered in the field "Geogarea"; Antarctic regions used are marked +.

regiono	REGION
1	unknown
2	Adelaide Fold Belt
3	Albany-Fraser Province
4	Arunta Block *
5	Bunger Hills +
6	Cape York Peninsula
7	Carnarvon Basin
8	Commonwealth Bay +
9	Cummins Range
10	Davenport Province *
11	Denman Glacier +
12	East Kimberley
13	Enderby Land +
14	Gawler Craton
15	George V Land +
16	Georgetown Inlier
17	Halls Creek Inlier *
18	Kemp Land +
19	Lachlan Fold Belt *
20	Lawn Hill Platform
21	Mawson Coast +
22	McArthur Basin
23	Mount Isa Inlier *
24	Northern Prince Charles Mountains +
25	NE Queensland *
26	NE Tasmania
27	NW Tasmania
29	North Victoria Land +
30	North Kimberley
31	Pilbara Block *
32	Pine Creek Inlier *
33	Prydz Bay Coast +
34	Southern Prince Charles Mountains +
35	Stuart Shelf *
36	Granites-Tanami Block *
37	Tasman Fold Belt
38	Tasmania
39	Tennant Creek *
40	Turee Creek
41	Tuross
42	Vestfold Hills +
43	West Kimberley
44	Wilhelm II Land +
45	Wilkes Land +
46	Willyama Block
47	Yilgarn Block
48	Hammersley Basin

49	SE Tasmania
50	SW Tasmania
51	New Georgia Island
52	Eastern Goldfields
53	Capricorn Orogen *
54	Ashburton Trough
55	Gascoyne Province
56	Glengarry Sub-basin
57	Earaheedy Sub-basin
58	Murphy Tectonic Ridge
59	South Nicholson Basin
60	Westmoreland Region
61	New England Fold Belt
62	Sydney Basin

4.6 - ROCK TYPES TABLE:

This table provides a coarse subdivision was initiated primarily for database management and block retrieval, and for future online extraction of data. This table can be used to extract all mafic extrusive rocks from the database or all alkaline rocks. The following gives a list of the 17 permitted rock types:

rockno	**Rocktype**
1	unknown
2	felsic intrusive
3	intermediate intrusive
4	mafic intrusive
5	felsic extrusive
6	intermediate extrusive
7	mafic extrusive
8	ultramafite
9	alkaline igneous
10	clastic sediment
11	chemical sediment
12	metabasite
13	felsic gneiss
14	metasediment
15	metasomatite
16	ore
17	regolith

4.7 - SOURCES TABLE:

This table gives the laboratory or organisation which analysed the sample.

sourceno	Source
1	unknown
3	ANU
4	Adelaide University
5	AMDEL
6	BMR
7	BMR restricted
8	CSIRO/BMR
9	Macquarie University
10	Melbourne University
11	NTGS (AMDEL)
12	W.A. Govt. Chem. Lab.
13	WA/BMR Restricted
14	University of Queensland
15	James Cook University of North Queensland
16	Tasmanian Department of Mines
17	University of Tasmania
18	Queensland Department of Mines

5. ACKNOWLEDGEMENTS

The compilation of the BMR geochemical data into one database has been a long and arduous process. Without the backing of two previous Chiefs of the Division of Petrology and Geochemistry, Dick Henley and Mike Etheridge, and their ideals of the "Corporate Database" this project would not have been achieved. The support of Paul Shelley of ADP section in this project is also gratefully acknowledged. There are many who typed in data over the years, but in particular, thanks is given to Bill Pappas, Julie Haldane, Jonathon Hardy, Ian Burrows and Ian Atkinson for their willing efforts. Dave Blake and John Sheraton are thanked for their critical reviews of this manuscript and Mary Silver for designing the cover. Finally, we wish to thank Mike Owen, who designed the first geochemical database in BMR in the early 1970's, and who along with Peter Sharman, assisted in the final stages of this release by helping the senior author learn the intricacies of the VENTURA desk-top publishing system.

APPENDIX 1. DESCRIPTION AND BIBLIOGRAPHY OF INDIVIDUAL DATABASES (listed alphabetically).

A1.1 - Alkaline rocks of Australia Database.

Database type:

thematic

General Selection Criteria:

See individual data groups.

Data description:

This database comprises 880 analyses of alkaline rocks in Australia obtained from unpublished BMR data and from two data groups previously published in microfiche form.

- Group 1 is a compilation of 317 previously published analyses from the literature of alkaline rocks of all ages from Australia published as a microfiche Appendix to a review of the alkaline rocks of Australia by Jaques & others (1985).

  Specific Selection Criteria:

  Field = other data ***Entry*** = Alkaline rocks review.

- Group 2 contains 563 analyses of kimberlites and lamproites from Western Australia and features data from the diamond- bearing lamproites of Argyle and the West Kimberley region, including both the Ellendale pipes and the better known lamproites of the Noonkanbah field (Fitzroy Lamproites). This group includes previously unpublished BMR analyses as well as 496 analyses published as a microfiche Appendix to GSWA Bulletin 132 (Jaques & others, 1986).

  Specific Selection Criteria:

  Field = group ***Entry*** = Fitzroy Lamproites (530 analyses)

  Entry =Argyle Lamproite (33 analyses)

Future work:

Further expansion of this database is continuing under present program.

Bibliography:

Jaques, A.L., Creaser, R.A., Ferguson, J., and Smith, C.B. 1985. A review of the alkaline rocks of Australia. *Transactions of the Geological Society of South Africa*, 88, 311-334.

Jaques, A.L., Lewis, J.D., and Smith, C.B. 1986. The kimberlites and lamproites of Western Australia. *Geological Survey of Western Australia, Bulletin*, 132, 268pp.

A1.2 - Antarctic Database

Database type:

regional

General Selection Criteria:

Field = country *Entry* = ANT

Data description:

The database contains approximately 1300 whole rock analyses from the Australian Antarctic Territory. The vast majority are Archaean or Proterozoic igneous or high-grade metamorphic rocks from the East Antarctic Shield, although 51 early Palaeozoic granitic rocks from northern Victoria Land are included. The main groups are -

- Approximately 700 analyses of medium to high grade metamorphic rocks of Archaean to Proterozoic age (3100 to 1000 Ma) including metabasites, felsic orthogneisses and a variety of metasediments. Most are from Archaean cratonic blocks (i.e., the Napier Complex of Enderby Land, the Vestfold Block, and the southern Prince Charles Mountains) or from the late Proterozoic terrains of the Bunger Hills and Enderby Land - Princess Elizabeth Land area (including the 1000 Ma Rayner Complex). Those from the Napier Complex include 17 samples of unusually high-temperature (950^{o}) sapphirine and/or osumilite-bearing metapelites. Amongst the felsic orthogneisses are Napier Complex tonalites which have been dated by ion microprobe at 3900 Ma - the oldest dated rocks in the world.
- 550 or so unmetamorphosed igneous rocks ranging from ultramafic to granitic (s.s.). About half are mafic dykes, mostly from the Napier Complex, Vestfold Block, southern Prince Charles Mountains and Bunger Hills. They range in composition from tholeiite, through alkali basalt to lamproite, and in age from early Proterozoic (~2400 ma) to Phanerozoic, but most are of dolerites of late Proterozoic age (~1200 Ma). Eleven analyses of late Pleistocene ultrapotassic leucitites from Gaussberg are also included. The remaining analyses are mainly of intermediate to felsic plutonic rocks, including diorite, monzodiorite, monzonite, syenite, granodiorite, and , in particular, granite. These range from late Archaean (2800 ma) to Cambrian (500 Ma), and come from all of the aforementioned areas.

Future work:

Further analyses will be added to the database when obtained as part of the Antarctic program.

Bibliography:

Sheraton, J.W., 1985. Chemical analyses of rocks from East Antarctica: Part 2. *Bureau of Mineral Resources, Geology and Geophysics, Australia, Record,* 1985/12.

Sheraton, J.W., Tingey, R.J., Black, L.P., Offe, L.A., and Ellis, D.J., 1987. Geology of Enderby Land and western Kemp Land, Antarctica. *Bureau of Mineral Resources, Geology and Geophysics, Australia, Bulletin, 223.*

A1.3 - Arunta Block Database

Database type:

regional

General Selection Criteria:

Field = regiono *Entry* = 4

Data description:

The 471 samples included in the Arunta Block geochemical database mostly represent the results of regional studies carried out as part of the joint BMR/Northern Territory Geological Survey regional mapping program. Sampling in the Arunta is made difficult by widespread deep weathering; thus the database does not contain any samples collected east of the Tarlton Fault, where exposures are invariably intensely weathered, nor are there many samples from the northwestern region, which is very poorly exposed. The western part of the Arunta is as yet unmapped, and only a few samples from the southwestern area are included: consequently most of the samples are from east of latitude 132 ^{o} E.

The rocks represented in the database are predominantly granites from the northern and southern tectonic provinces, and quartzo-feldspathic gneiss from the central zone. Most of the mafic rocks in the collection are mafic granulites from the central province in the Alice Springs 1:250 000 sheet area, but there is a small number of samples from the Attutra Metagabbro and other mafic rocks in the Huckitta 1:250 000 Sheet area. Very few rocks that were recognized in the field as meta-sediments were collected for geochemistry; however many of the quartzo-feldspathic gneisses have chemical signatures that indicate some modification from an originally igneous composition, and may represent volcaniclastic rocks.

Future work:

The present BMR program in this province is virtually completed.

Bibliography:

Warren, R.G., (in prep.). Geochemical sampling in the Arunta 1984/1985. *Bureau of Mineral Resources, Geology and Geophysics, Australia, Record.*

A1.4 - Capricorn Province Database

Database type:

regional

General Selection Criteria:

Field = regiono *Entry* = 53

Data description:

The Capricorn Province database contains 227 analyses of drill core samples from the Turee Creek uranium prospect. The data contain both mineralised and non-mineralised samples form the early Proterozoic Wyloo Group and the middle Proterozoic Bresnahan Group.

Future work:

None is planned.

Bibliography:

Ewers, G.R., and Nakatsuka, N., 1986. Uranium mineralisation at Turee Creek, Western Australia - petrology, geochemistry and genesis. *Uranium*, 3, 27- 53.

A1.5 - Davenport Province Database

Database type:

regional

General Selection Criteria:

Field = regiono *Entry* = 10

Data description:

The 170 analysed samples from the Davenport Province, central Australia, are of Proterozoic igneous rocks collected in 1981-1984 as part of the joint BMR/Northern Territory Geological Survey Davenport project. They comprise representative samples of felsic volcanics from the Warramunga Group and cogenetic granites, isotopically dated (U-Pb zircon) at about 1870 Ma; felsic and mafic volcanics from the unconformably overlying Hatches Creek Group, dated at around 1870 Ma, and comagmatic sills; younger granite; and lamprophyre dykes.

Future work:

No further geochemical work is planned in this province.

Bibliography:

Blake, D.H., Stewart, A.J., Sweet, I.P., & Hone, I.G., 1987. Geology of the Proterozoic Davenport province, central Australia. *Bureau of Mineral Resources, Geology and Geophysics, Australia, Bulletin, 226.*

Blake, D.H., & Page, R.W., 1988. The Proterozoic Davenport province, central Australia: regional geology and geochronology. *Precambrian Research,* 40/41, 329-340.

A1.6 - Granites-Tanami Block Database

Database type:

regional

General Selection Criteria:

Field = regiono *Entry* = 36

Data description:

The Granites-Tanami database comprises 35 analyses of granites and felsic volcanics from throughout the region. The major element analyses were published by Blake & others (1979) and the trace element data were obtained in 1988.

Future work:

BMR is currently undertaking limited geochronological work on granites and volcanics in this province as part of the Proterozoic Framework Project and hopes to release a further 50 analyses by late 1989.

Bibliography:

Blake, D.H., Hodgson, I.M., and Muhling, P.C., 1979. Geology of the Granites- Tanami Region Northern Territory and Western Australia. *Bureau of Mineral Resources, Geology and Geophysics, Australia, Bulletin,* 197.

A1.7 - Halls Creek Region Database

Database type:

regional

General Selection Criteria:

Field = regiono *Entry* = 17

Data description:

The Halls Creek Database consists of 62 analyses of mainly mafic igneous rocks obtained from (a) layered ultramafic-gabbroic intrusions, (b) tholeiitic dykes and (c) country rocks adjacent to the igneous bodies. The samples were collected in 1984 during a reconnaissance study to assess the platinum group element potential of this province.

Future work:

The BMR is presently undertaking limited geochronological work on granites and volcanics in this province as part of the Proterozoic Framework Project. Analyses of these samples, including some from the Brockman Deposit, should be available by late 1989.

Bibliography:

Wallace, D.A., Hoatson, D., and Sun, S-S. (in prep.). Whole rock geochemistry and petrography of selected mafic and ultramafic suites in the Pilbara Block and east Kimberley region, Western Australia. *Bureau of Mineral Resources, Geology and Geophysics, Australia, Record.*

Sun, S-S., Wallace, D.A., Hoatson, D.M., Glikson, A.Y., Keays, R.R., Hamlyn, P.R., and McCulloch, M.T., (in prep.). Geochemical characteristics of late Archaean to early Proterozoic mafic- ultramafic rocks from the west Pilbara Block and Halls Creek Mobile Zone, Western Australia, and their potential for platinum group-element mineralisation. *Bureau of Mineral Resources, Geology and Geophysics,* Australia, *Report.*

A1.8 - Lachlan Fold Belt Database

Database type:

regional

General Selection criteria:

Field = regiono ***Entry*** = 19

Data description:

This database contains 1488 samples from the Lachlan Fold Belt. These can be divided into five major groups:

- 528 analyses of mainly igneous rocks collected during BMR 1:100 000 mapping in the vicinity of Canberra. The samples are mostly from the Tantangara, Brindabella, Canberra and Araluen 1:100 000 sheet areas, but some come from outside and are thought to be related to rock suites from these sheet areas.

  Specific Selection Criteria:

  Field = origno ***Entry*** = 49

- 405 analyses of rocks collected by Wyatt & others (1984) in a regional study by BMR of geophysical rock properties of the Lachlan Fold Belt. The samples include a wide variety of mainly igneous rocks from all over the NSW sector of the Lachlan Fold Belt.

  Specific Selection Criteria:

  Field = origno ***Entry*** = 76

- 234 analyses of rocks collected during a detailed CSIRO study of alteration and mineralisation around the Woodlawn mine by Petersen & others (1977).

  Specific Selection Criteria:

  Field = origno ***Entry*** = 32

- 300 analyses of samples collected from Tasmania by BMR, the Tasmanian Geological Survey, University of Tasmania, and ANU. The samples are mostly granites from NE Tasmania and include samples from the underground workings at the Aberfoyle Mine.

  Specific Selection Criteria:

  Field = geogarea ***Entry*** = NE Tasmania

- 40 altered volcanics and sediments from the Red Hills Fe-Cu massive sulphide prospect on the western edge of the Mount Read Volcanics; these were collected as part of a study of the alteration associated with the massive sulphide ores.

  Specific Selection Criteria:

  Field = geogarea ***Entry*** = NW Tasmania

Future work:

As part of the Lachlan Fold Belt mineral project, BMR will be undertaking limited sampling of Ordovician volcanics.

Bibliography:

Higgins, N.C., Solomon, M., and Varne, R., 1985. The genesis of the Blue Tier batholith, northeastern Tasmania. *Lithos*, 18, 129-149.

MacKenzie, D.E., Black, L.P., and Sun, S-S., 1988. Origin of alkali-feldspar granites: and example from the Poimena Granite, northeastern Tasmania, Australia. *Geochimica et Cosmochimica Acta*, 52, 2507-2524.

Owen, M., and Wyborn, D., 1979. Geology and geochemistry of the Tantangara and Brindabella area. *Bureau of Mineral Resources, Geology and Geophysics, Australia, Bulletin*, 204.

Petersen M.D., Lambert I.B., and Ayres D.E., 1977. Results of analyses of country rocks around the Woodlawn copper-lead-zinc orebody, southeastern New South Wales. *CSIRO Minerals Research Laboratories Technical Communication*, 63 .

Wyatt B.W., Yeates A.N., Tucker D.H., and Vetter U.W.K., 1984. A rock property database for the Lachlan Fold Belt of New South Wales. *Bureau Mineral Resources, Geology and Geophysics, Australia, Report*, 244.

Wyborn, D., and Owen, M., 1986. Araluen, New South Wales. *Bureau of Mineral Resources, Geology and Geophysics, Australia, 1:100 000 Geological Map Commentary*, 44pp.

A1.9 - Mount Isa Inlier Database

Database type:

regional

General Selection Criteria.

Field = regiono *Entry* = 23

Data description:

The Mount Isa Inlier Database contains 2045 analyses of rocks collected since 1969 during the joint BMR/Geological Survey of Queensland 1:100 000 regional mapping program of the Inlier, and the adjacent Lawn Hill Platform. The majority of samples have full major and trace element analyses and are representative of the main igneous rock units and several sedimentary rock units in the Inlier. Except for 30 Cambrian phosphates, the samples analysed are of Proterozoic age. Significant components of the database are 700 granite samples; 400 samples, mainly basalts, from the Eastern Creek Volcanics; 350 felsic volcanic samples; 150 dolerite samples; 170 samples of the Corella Formation; and 70 samples of the Soldiers Cap Group. Many of the older, trace element analyses, including those compiled by Rossiter and Ferguson (1980) and the mafic rock analyses of Smith and Walker (1970), have been repeated to obtain more accurate and more comprehensive trace element values.

Future work:

The current BMR project in this area is nearing completion. Several small data sets, mainly on the Williams Batholith and the related breccias have yet to be completed. It is hoped to include these, together with 200 metasediments analysed by the Division of Continental Geology, in the Mount Isa Database Subset which will be released by late 1989.

Bibliography:

Bultitude, R.J. and Wyborn, L.A.I., 1982. Distribution and geochemistry of volcanic rocks in the Duchess-Urandangi region, Queensland. *BMR Journal of Australian Geology and Geophysics*, 7, 99-112.

Ellis, D.J., and Wyborn, L.A.I., 1984. Petrology and geochemistry of Proterozoic dolerites from the Mount Isa Inlier. *BMR Journal of Australian Geology and Geophysics*, 9, 19-32.

Glikson, A.Y., and Derrick G.M., 1978. Geology and geochemistry of Middle Proterozoic basic volcanic belts, Mount Isa/Cloncurry, Northwestern Queensland. *Bureau of Mineral Resources, Geology and Geophysics, Australia, Record* 1978/48 (unpublished).

Glikson, A.Y., Derrick, G.M., Wilson, I.H., and Hill, R.M., 1976. Tectonic evolution and crustal setting of the middle Proterozoic Leichhardt River Fault trough, Mount Isa region, northwestern Queensland. *BMR Journal of Australian Geology and Geophysics*, 1, 115-129.

Rossiter, A.G., and Ferguson, J., 1980. A Proterozoic tectonic model for northern Australia and its economic implications. *In*: Ferguson, J., and Goleby, A. (Editors)

Uranium in the Pine Creek Geosyncline. International Atomic Energy Agency, Vienna, 209-232.

Smith, S.E., and Walker, K.R., 1970. Mount Isa geochemical project, analyses of core samples. *Bureau of Mineral Resources, Geology and Geophysics, Australia, Record,* 1970/47.

Smith, S.E., and Walker, K.R., 1971. Primary element dispersion associated with mineralisation at Mount Isa, Queensland. *Bureau of Mineral Resources, Geology and Geophysics, Australia, Bulletin,* 131, 80 pp.

Wilson, I.H., 1978. Volcanism on a Proterozoic continental margin in northwestern Queensland. *Precambrian Research,* 7, 205-235.

Wilson, I.H., 1983. Geochemical discrimination of acid volcanic units from the Mount Isa region, Queensland. *BMR Journal of Australian Geology and Geophysics,* 8, 109-117.

Wilson, I.H., Derrick, G.M., and Perkins, D.J., 1985. Eastern Creek Volcanics: their geochemistry and possible role in copper mineralisation at Mount Isa, Queensland. *BMR Journal of Australian Geology and Geophysics,* 9, 317-328

Wyborn, L.A.I., 1987. The petrology and geochemistry of alteration assemblages in the Eastern Creek Volcanics, as a guide to copper and uranium mobility associated with regional deformation, Mount Isa, Queensland. *In*: Pharaoh, T.C., Beckinsale, R.D., and Rickard, D. (editors), *Geochemistry and mineralisation of Proterozoic Volcanics Suites,* Geological Society Special Publication, 33, 425-434.

Wyborn, L.A.I. and Page, R.W., 1983. The Proterozoic Kalkadoon and Ewen Batholiths, Mount Isa Inlier, Queensland: source, chemistry, age and metamorphism. *BMR Journal of Australian Geology and Geophysics,* 8, 53-69.

Wyborn, L.A.I., Page, R.W., and McCulloch, M.T., 1988. Petrology, geochronology, and isotope geochemistry of the post-1820 Ma granites of the Mount Isa Inlier: mechanisms for the generation of Proterozoic anorogenic granites. *Precambrian Research,* 40/41, 509-542.

A1.10 - Northeast Queensland Database (including Georgetown Inlier and Cape York Province).

Database type:

regional

General Selection Criteria:

Field = regiono *Entry* = 25

Data description:

The NE Queensland database contains approximately 1466 analyses of samples ranging in age from lower Proterozoic to upper Palaeozoic. The data are mainly of igneous rocks and were collected during joint regional mapping programs with the BMR and the Geological Survey of Queensland. This database contains the following groups:

- 144 Proterozoic granites and volcanics from the Georgetown, Croydon and Dargalong areas, including the Croydon Volcanic Group and Esmeralda granite suite.

  Specific selection criteria:

  Field = geogarea *Entry* = Georgetown-Coen Province: Croydon Region

  Entry = Georgetown-Coen Province: Georgetown region

  Entry = Georgetown-Coen Province: Dargalong region

- 138 Proterozoic sediments and metabasites from the Etheridge Group of the Georgetown Inlier.

  Specific selection criteria:

  Field = geogarea *Entry* = Einasleigh Region

  Entry = Georgetown-Coen Province: Georgetown Region

- Approximately 200 early Palaeozoic granites and volcanics including the Ravenswood Batholith and Siluro-Devonian granites intruding the Georgetown Inlier.

  Specific selection criteria:

  Field = Geogarea *Entry* = Cape York Plutonic Belt: Cape York Peninsula

  Entry = Cape York Plutonic Belt: Einasleigh region

  Entry = Cape York Plutonic Belt: Georgetown region

  Entry = Lolworth Ravenswood Province

- 945 Permo-Carboniferous igneous rocks from the Coastal Ranges Igneous Province including the Herbert River, "Elizabeth Creek" and Mareeba Granites, and Featherbed and Newcastle Range Groups, the Glen Gordon and Nanyeta Volcanics, the Bagstowe Ring Dyke Complex, and the Cumberland Range, Maureen and Agate Creek Volcanics.

  Specific selection criteria:

  Field = Geogarea ***Entry*** = Coastal Ranges Igneous Province: Cape York Peninsula

  Entry = Coastal Ranges Igneous Province: Broken River region

  Entry = Coastal Ranges Igneous Province: Croydon region

  Entry = Coastal Ranges Igneous Province: Einasleigh region

  Entry = Coastal Ranges Igneous Province: Featherbed Region

  Entry = Coastal Ranges Igneous Province: Georgetown Region

  Entry = Coastal Ranges Igneous Province: Georgetown Region - Woolgar

  Entry = Coastal Ranges Igneous Province: Georgetown/ Hodgkinson region (This selects the Elizabeth Creek Granite)

  Entry = Coastal Ranges Igneous Province: Hodgkinson region

- 110 samples of the Mount Carbine tungsten (70) and Red Dome gold (40) deposits.

  Specific selection criteria:

  Field = Locality ***Entry*** = Mount Carbine

  Entry = Red Dome Deposit

Future work:

BMR currently has a major program in this area, and the database will be expanded in the future (particularly in the Bulgonunna Volcanics and the granites of the Charters Towers area).

Bibliography:

Sheraton, J.W., 1974. Chemical analyses of acid igneous rocks from northeast Queensland. *Bureau of Mineral Resources, Geology and Geophysics, Australia, Record,* 1974/162.

Sheraton, J.W., and Labonne, B., 1978. Petrology and geochemistry of acid igneous rocks of northeast Queensland. *Bureau of Mineral Resources, Geology and Geophysics, Australia, Bulletin,* 169.

Withnall, I.W., 1985. Geochemistry and tectonic significance of Proterozoic mafic rocks from the Georgetown Inlier, north Queensland. *BMR Journal of Australian Geology and Geophysics,* 9, 339-351.

A1.11 - Pilbara Block Database

Database type:

regional

General Selection Criteria:

Field = regiono *Entry* = 31

Data description:

This database comprises 1062 analyses belonging to two main groups.

- A suite of 996 samples collected during 1975, 1976, and 1980 in conjunction with a joint BMR-GSWA study of Archaean greenstone and late Archaean plateau volcanic sequences. The data include analyses of volcanic rocks from the Warrawoona Group (581 analyses), the Gorge Creek Group (96 analyses), Whim Creek Group (112 analyses), and Fortescue Group (175 analyses).
- A suite of 66 mafic and ultramafic rock samples from several late Archaean to early Proterozoic hypabyssal and plutonic bodies, mostly in the west Pilbara, as part of a reconnaissance survey to assess the potential for platinum group element mineralisation.

Future work:

As part of the BMR's platinum project 260, analyses of layered intrusions from the Pilbara block including 130 analyses from the Munni Munni Intrusion will be released.

Bibliography:

Glikson, A.Y. and Hickman, A.H., 1981. Geochemistry of Archaean volcanic sequences, eastern Pilbara Block, Western Australia. *Bureau of Mineral Resources, Geology and Geophysics, Australia, Record,* 1981/36.

Glikson, A.Y., Davy, R., and Hickman, A.H., 1986. Geochemical data files of Archaean volcanic rocks, Pilbara Block, Western Australia. *Bureau of Mineral Resources, Geology and Geophysics, Australia, Record,* 1986/14.

Sun, S-S., Wallace, D.A., Hoatson, D.M., Glikson, A.Y., Keays, R.R., Hamlyn, P.R., and McCulloch, M.T., (in prep.). Geochemical characteristics of late Archaean to early Proterozoic mafic- ultramafic rocks from the west Pilbara Block and Halls Creek Mobile Zone, Western Australia, and their potential for platinum group element mineralisation. *Bureau of Mineral Resources, Geology and Geophysics, Australia, Report.*

Wallace, D.A., Hoatson, D.M., and Sun, S-S., (in prep.). Whole rock geochemistry and petrography of selected mafic and ultramafic suites in the Pilbara Block and east Kimberley region, Western Australia. *Bureau of Mineral Resources, Geology and Geophysics, Australia, Record.*

A1.12 - Pine Creek Inlier Database

Database type:

regional

General Selection Criteria:

Field = regiono *Entry* = 32

Data description:

This database contains 1263 analyses from almost all Precambrian units in the Pine Creek Inlier. Most of the data were collected as part of the BMR and Northern Territory Geological mapping programs. The data can be divided into 4 main groups.

- A compilation of 350 whole rock analyses by Ferguson and Winer (1980) completed up to 1978 in the Pine Creek Inlier. At least one third of these analyses do not include trace elements.
- A group of 346 analyses of sediments from the early Proterozoic Pine Creek Geosyncline obtained by Ewers (1982) and published by Ewers & Higgins (1985) and Ewers & others (1985).
- 350 analyses of samples from the Cullen Batholith, 120 collected by Ewers and Scott (1977), the remainder by P. Stuart-Smith (1987).
- 350 analyses of samples collected since 1978 in association with 1:100 000 geological mapping. The samples mainly come from the southern and central part of the Pine Creek Inlier and are representative of most of the major rock units and include some sampling of significant regolith profiles developed on both Proterozoic and Archaean rock units.

Future Work:

BMR is currently running a project in the Kakadu Conservation Zone. Whole rock geochemical data from this project will be released as a separate data set.

Bibliography:

Ewers, G.R., 1982. Chemical analyses of early Proterozoic metasedimentary rocks from the Pine Creek Geosyncline. *Bureau of Mineral Resources, Geology and Geophysics, Australia, Record* 1982/17.

Ewers, G.R. and Higgins, N.C., 1985. Geochemistry of the early Proterozoic metasedimentary rocks of the Alligator Rivers Region, Northern Territory, Australia. *Precambrian Research,* 29, 331-357.

Ewers, G.R., Needham, R.S., Stuart-Smith, P.G., and Crick, I.H., 1985. Geochemistry of the low-grade early Proterozoic sedimentary sequence in the Pine Creek Geosyncline, Northern Territory. *Australian Journal of Earth Sciences,* 32, 137-154.

Ewers, G.R. and Scott, P.A., 1977. Geochemistry of the Cullen Granite, Northern Territory. *BMR Journal of Australian Geology and Geophysics,* 2, 165-176.

Ferguson, J. and Winer, 1980. Pine Creek Geosyncline: statistical treatment of whole rock chemical data. *In:* Ferguson, J. and Goleby, A.B. (editors), *Uranium in the Pine Creek Geosyncline. International Atomic Energy Agency, Vienna, pp. 191-208.*

Stuart-Smith, P.G., 1987. Geology and metallogeny of the Cullen Mineral Field, Northern Territory. *M.Sc. thesis, James Cook University of North Queensland* (unpublished).

A1.13 - Tennant Creek Inlier Database

Database type:

regional

General Selection Criteria:

Field = region *Entry* = 39

Data description:

The Tennant Creek Database consists of 1394 analyses that are the result of three separate projects carried out by BMR in the Tennant Creek Inlier between 1970 and 1973. The data were obtained from surface outcrops and from Australian Development, Geopeko, NTGS and BMR drill holes and can be subdivided into three main groups.

- 973 ironstones that were sampled to investigate the feasibility of using trace element chemistry to distinguish between mineralised and non-mineralised ironstones. Only partial analyses of the ironstones are available, as the major elements do not include Na_2O (although the levels are expected to be low and <1 wt %) and only 10 trace elements (Pb, Cr, Co, Mn, Ni, Cu, Zn, Mo, Ag, and Bi) were run.
- 363 representative analyses of the major rock units in the Inlier.
- analyses of 64 geochronology specimens described by Black (1977).

Future work:

Work is currently in progress upgrading the trace element analyses for Group 2 and as part of the division's Alkaline Rocks Project: a small group of lamprophyres from the Tennant Creek Block is also being reanalysed. These data will be released as part of the Tennant Creek-Davenport Database subset in 1989.

Bibliography:

Black, L.P., 1977. A Rb-Sr geochronological study in the Proterozoic Tennant Creek Block, central Australia. *BMR Journal of Australian Geology and Geophysics*, 2, 283-330.

Smith, S.E., 1980. Trace metal content of ironstones, Tennant Creek Au-Cu mineral Field, N.T. In: Butt, C.R.M., and Smith, R.E. (editors), Conceptual Models in Exploration Geochemistry, Australia. *Journal of Geochemical Exploration*, 12, 207-211

A1.14 - Stuart Shelf Database

Database type:

regional

General Selection Criteria:

Field = regiono *Entry* = 35

Data description:

This database comprises 238 mainly unpublished analyses of sedimentary and igneous rocks from the Stuart Shelf. The majority are drill core samples of Adelaidean rocks from the vicinity of Mount Gunson and Myall Creek. Stratigraphic units represented are the Pandurra Formation, Tapley Hill Formation, Whyalla Sandstone and the Beda Volcanics. Fewer than 30 of the analyses represent the pre-Adelaidean volcanic sequence near Mount Gunson; these rocks include mafic and trachytic volcanics (including K-rich types) and tuff.

Future work:

No future work is planned in this area.

Bibliography:

Knutson, J., Donnelly, T.H., and Tonkin, D.G. 1983. Geochemical constraints on the genesis of copper mineralization in the Mount Gunson area, South Australia. *Economic Geology*, 78, 250- 274.

Knutson, J., Donnelly, T.H., Eadington, P., and Tonkin, D.G. 1985. Hydrothermal alteration of Middle Proterozoic rocks in the Mount Gunson area of South Australia. CSIRO Division of *Mineralogy and Geochemistry Research Review*, 12-13.

Lambert, I.B., Knutson, J., Donnelly, T.H., Etminan, H., and Mason, M.G., 1984. Genesis of copper mineralisation, Myall Creek Prospect, South Australia. *Mineralium Deposita*, 19, 266- 273.

Lambert, I.B., Knutson, J., Donnelly, T.H., and Etminan, H. 1987. Stuart Shelf-Adelaide Geosyncline copper province, South Australia. *Economic Geology*, 82, 108-123.

APPENDIX 2 - PETCHEM DATABASE DEFINITIONS

A2.1 - Samples Table Description:

```
CREATE TABLE SAMPLES (
        ORIGNO                  NUMBER          (5,0)           NOT NULL,
        SAMPNO                  CHAR            (16)            NOT NULL,
        FIELDNO                 CHAR            (16),
        STRATGROUP              CHAR            (64),
        SUBGROUP                CHAR            (64),
        STRATUNIT               CHAR            (64),
        STRATMEMBER             CHAR            (64),
        STRATHEIGHT             NUMBER          (8,2),
        MAPSYMBOL               CHAR            (10),
        ROCKNO                  NUMBER          (5,0),
        LITHOLOGY               CHAR            (64),
        GROUPING                CHAR            (22),
        AGE                     CHAR            (64),
        REFNO1                  NUMBER          (5,0),
        REFNO2                  NUMBER          (5,0),
        REFNO3                  NUMBER          (5,0),
        REFNO4                  NUMBER          (5,0),
        REFNO5                  NUMBER          (5,0),
        COUNTRYID               CHAR            (22),
        STATE                   CHAR            (10),
        REGIONO                 NUMBER          (5,0),
        GEOGAREA                CHAR            (64),
        LOCALITY                CHAR            (64),
        MAPNO                   NUMBER          (5,0),
        AIRPHOTO                CHAR            (22),
        GRIDREF                 CHAR            (10),
        DLAT                    NUMBER          (8,6),
        NS                      CHAR            (1),
        DLONG                   NUMBER          (9,6),
        EW                      CHAR            (1),
        DRILLHOLE               CHAR            (22),
        DEPTH                   CHAR            (10),
        OTHERDATA               CHAR            (64),
        ENTRYDATEDATE                                           )
SPACE SPACE_GCSAMPLES;


CREATE UNIQUE INDEX ORIGSAMP ON SAMPLES ( ORIGNO, SAMPNO );
CREATE        INDEX SAMPLENO ON SAMPLES ( SAMPNO );
CREATE        INDEX REGIONS ON SAMPLES ( REGIONO );
CREATE        INDEX HMAPS ON SAMPLES ( MAPNO );
```

A2.2 - Majors Table description:

```
CREATE TABLE MAJORS (
        ORIGNO                  NUMBER          (5,0)           NOT NULL,
        SAMPNO                  CHAR            (16)            NOT NULL,
        ANALNO                  NUMBER          (5,0)           NOT NULL,
        SOURCENO                NUMBER          (5,0),
        METHODNO                NUMBER          (5,0),
        SIO2                    NUMBER          (4,2),
        TIO2                    NUMBER          (4,2),
        AL2O3                   NUMBER          (4,2),
        FE2O3TOT                NUMBER          (4,2),
        FE2O3                   NUMBER          (4,2),
        FEO                     NUMBER          (4,2),
        MNO                     NUMBER          (4,2),
        MGO                     NUMBER          (4,2),
        CAO                     NUMBER          (4,2),
        NA2O                    NUMBER          (4,2),
        K2O                     NUMBER          (4,2),
        P2O5                    NUMBER          (4,2),
        H2OPLUS                 NUMBER          (4,2),
        H2OMIN                  NUMBER          (4,2),
        CO2                     NUMBER          (4,2),
        LOI                     NUMBER          (4,2),
        REST                    NUMBER          (4,2),
        TOTAL                   NUMBER          (5,2),
        ENTRY                   DATEDATE                        )
SPACE SPACE_GCMAJORS;

CREATE UNIQUE INDEX  MANALNO  ON  MAJORS ( ANALNO );
CREATE        INDEX  MORIGSAMP  ON  MAJORS ( ORIGNO, SAMPNO);
CREATE        INDEX  MSAMPLENO  ON  MAJORS ( SAMPNO );
```

A2.3 - Traces Tables Description:

```
CREATE TABLE TRACES     (
    ORIGNO              NUMBER          (5,0)       NOT NULL,
    SAMPNO              CHAR            (16)        NOT NULL,
    ANALNO              NUMBER          (5,0)       NOT NULL,
    SOURCENO            NUMBER          (5,0),
    METHODNO            NUMBER          (5,0),
    AG                  NUMBER,
    AL                  NUMBER,
    ARS                 NUMBER,
    AU                  NUMBER,
    B                   NUMBER,
    BA                  NUMBER,
    BE                  NUMBER,
    BI                  NUMBER,
    BR                  NUMBER,
    C                   NUMBER,
    CA                  NUMBER,
    CD                  NUMBER,
    CE                  NUMBER,
    CL                  NUMBER,
    CO                  NUMBER,
    CR                  NUMBER,
    CS                  NUMBER,
    CU                  NUMBER,
    DY                  NUMBER,
    ER                  NUMBER,
    EU                  NUMBER,
    F                   NUMBER,
    FE                  NUMBER,
    GA                  NUMBER,
    GE                  NUMBER,
    GD                  NUMBER,
    HF                  NUMBER,
    HG                  NUMBER,
    HO                  NUMBER,
    IR                  NUMBER,
    K                   NUMBER,
    LA                  NUMBER,
    LI                  NUMBER,
    LU                  NUMBER,
    MG                  NUMBER,
    MN                  NUMBER,
    MO                  NUMBER,
    NA                  NUMBER,
    NB                  NUMBER,
    ND                  NUMBER,
    NI                  NUMBER,
    OS                  NUMBER,
    P                   NUMBER,
    PB                  NUMBER,
    PD                  NUMBER,
    PR                  NUMBER,
    PT                  NUMBER,
```

```
    RB                      NUMBER,
    S                       NUMBER,
    SB                      NUMBER,
    SE                      NUMBER,
    SC                      NUMBER,
    SI                      NUMBER,
    SM                      NUMBER,
    SN                      NUMBER,
    SR                      NUMBER,
    TA                      NUMBER,
    TB                      NUMBER,
    TE                      NUMBER,
    TI                      NUMBER,
    TH                      NUMBER,
    TL                      NUMBER,
    TM                      NUMBER,
    U                       NUMBER,
    V                       NUMBER,
    W                       NUMBER,
    Y                       NUMBER,
    YB                      NUMBER,
    ZN                      NUMBER,
    ZR                      NUMBER,
    ENTRYDATE               DATE      )
SPACE SPACE_GCTRACES;

CREATE UNIQUE INDEX  TANALNO  ON  TRACES ( ANALNO );
CREATE        INDEX  TORIGSAMP  ON TRACES ( ORIGNO, SAMPNO );
CREATE        INDEX  TSAMPLENO  ON  TRACES ( SAMPNO );
```

A2.4 - Originators Table Description:

```
CREATE TABLE ORIGINATORS (
      ORIGNO                  NUMBER          (5,0)          NOT NULL,
      ORIGINATOR              CHAR            (22)           NOT NULL )
SPACE SPACE_GCSMALL;

CREATE UNIQUE INDEX ORIGNOS ON ORIGINATORS ( ORIGNO );
CREATE UNIQUE INDEX ORIGINS ON ORIGINATORS ( ORIGNATOR );
```

A2.5 - Regions Table Description:

```
CREATE TABLE REGIONS (
      REGIONO                 NUMBER          (5,0)          NOT NULL,
      REGION                  CHAR            (64)           NOT NULL )
SPACE SPACE_GCSMALL;

CREATE UNIQUE INDEX REGIONO  ON REGIONS ( REGIONO );
CREATE UNIQUE INDEX REGIONAME ON REGIONS ( REGION );
```

A2.6 - Rock Types Table Description:

```
CREATE TABLE ROCKTYPES (
      ROCKNO                  NUMBER          (5,0)          NOT NULL,
      ROCKTYPE                CHAR            (64)           NOT NULL )
SPACE SPACE_GCSMALL;

CREATE UNIQUE INDEX ROCKNO  ON ROCKTYPES ( ROCKNO );
CREATE UNIQUE INDEX ROCKNAME ON ROCKTYPES ( ROCKTYPE );
```

A2.7 - Sources Table Description:

```
CREATE TABLE SOURCES (
      SOURCENO                NUMBER          (5,0)          NOT NULL,
      SOURCE                  CHAR            (64)           NOT NULL )
SPACE SPACE_GCSMALL;

CREATE UNIQUE INDEX SOURCENOS ON SOURCES ( SOURCENO );
CREATE UNIQUE INDEX SOURCES  ON SOURCE ( SOURCE );
```