The AGSO Field Geological Note Books - A Users Guide

RICHARD BLEWETT & MURRAY HAZELL

RECORD 1999/16

AUSTRALIAN GEOLOGICAL SURVEY ORGANISATION

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DEPARTMENT OF INDUSTRY, SCIENCE & RESOURCES

AGSO RECORD 1999/16

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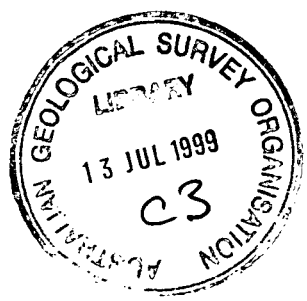
CANBERRA 1999



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Abstract

AGSO's Field Geological Notebooks were developed to standardise the capture of field geological observations and to speed the entry of this information into AGSO's field geological database, OZROX. This guide describes the use of the notebooks and defines the information required for each field. Data dictionaries are listed in the appendix. Current data dictionaries can also be accessed from AGSO's home page on the internet at the URL – www.agso.gov.au.

INTRODUCTION

This update has been to prepared to reflect changes to AGSO's field geological databases and data dictionaries since the original release of this record. The NGMA field geological databases have been renamed the OZROX field geological databases in recognition of their use in all AGSO geological mapping projects, not just NGMA projects. Some database fields in OZROX have been changed, added or deleted and certain codes and attributes in the data dictionaries have been either changed or added. This last procedure was undertaken with the cooperation of Terra Search Pty Ltd to include more descriptors required by the exploration geologist in their everyday work. Apart from the changes noted here most of the text in this Record remains the same as the original.

The Australian Geological Survey Organisation (AGSO) field geological databases were developed by a combined working group between the Minerals and Land Use Program and the Information Services Branch of the AGSO.

The AGSO field geological databases were largely developed and adapted from the Geological Survey of Queensland's Regmap Field Data Management System (Lang and others, 1987; Lang and others, 1990; Grimes and others, 1990; Withnall and others, 1992). Regmap is a very successful PC-based (dbase clone) system. However, it was found not suitable for AGSO's corporate requirements, and therefore adapted to the NGMA system using the Oracle database management system.

This Record is designed to form a useful field summary of the more comprehensive user guide to the NGMA databases (see Ryburn and others, 1993; Ryburn and others, 1995). The field guide accompanies the field notebooks that have been specially designed and printed to aid data recording in a format that is easily transferred into the Oracle databases.

The Record describes all the fields that are shown in the field notebooks. It includes a summary example of a page of field data. The data dictionaries are listed in the Appendices. Current data dictionaries can also be accessed from AGSO's home page on the internet at the URL – www.agso.gov.au.

NOTES ON NOTEBOOK ENTRY

- The note book is designed to fit into a standard plastic cover that can be obtained from most geological equipment suppliers. The inside cover contains space for instrument details. It is not essential that the designed note book be used or correct codes as it is possible to "translate" long hand writing straight into the Oracle forms but problems may occur if mandatory fields have not been recorded. It is also more difficult for someone other than the author or someone unfamiliar with the NGMA codes to enter data in this manner. The printed note books will make a contractor's or field hand's data entry more efficient.
- There are 50 pages in each book and most geologists would expect to fill between 10 and 15 books in an average 3 month field season.
- The pages of the notebook are broken down into sections for Sites, Outcrops, Rocks, Structures, and Lithdata. These sections are designed to allow easy data entry into the corresponding five OZROX database forms of the above names. The mandatory fields

are shown in bold on the note books.

- When fields are the same for the next site or sample, we recommend that one simply ticks the respective field(s) to show the data entry person that the field is unchanged. This is useful in the form entry of the databases as entire views can be copied to fresh records and only the varying fields need be changed (e.g. the SITE ID and position) and therefore data entry is quite rapid. It is also recommended that the geologist "rings" a field that changes at the next site, (e.g., hundred thousand sheet number or geological province fields) so that the change is easily noticed during data entry.
- *The system should not be restrictive. If you don't know the codes or formats etc. just write it out in full and "translate" it when you return to Base Camp or the office. This also applies to the right hand page of lithdata (sample) description.*

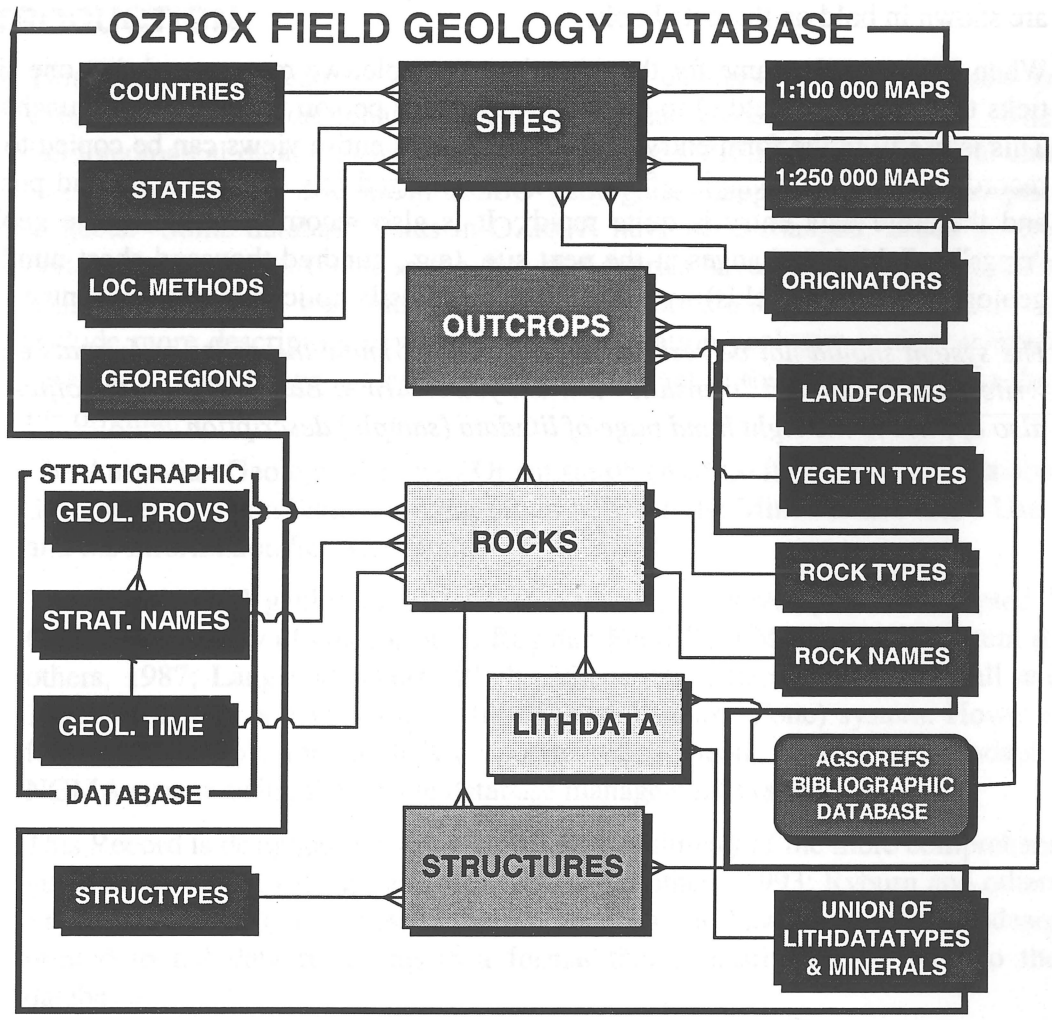


Figure 1. An entity relationship diagram of the NGMA (OZROX) databases. The tables that concern the field geologist are SITES, OUTCROPS, ROCKS/LITHDATA and STRUCTURES. These tables are controlled by a number of look-up or authority tables which are represented on each side of the tables in the diagram above. The descriptive values and corresponding codes are for these look-up tables are listed in the Appendix. The crows feet on the lines linking the tables represent the many end of the many to one relationships between these tables.

AUSTRALIAN GEOLOGICAL SURVEY ORGANISATION

GPO BOX 378
CANBERRA CITY
ACT, 2601

MINERALS DIVISION "OZROX" FIELD NOTES

GEOLOGIST .....

PROJECT .....

DATE .....

FIELD NUMBERS .....

LOCATION .....

BOOK NUMBER .....

IF FOUND, PLEASE RETURN TO ABOVE ADDRESS.

Figure 2a. The cover with space for name (Geologist), project, date, field numbers, location, and book number. The AGSO address is also clearly shown and a note asking for the book to be returned if found.

INSTRUMENT DETAILS

GPS **MAKE:** [_____]

SPHEROID: [_____]

MAGNETIC SUS **MAKE:** [_____]

UNITS: [_____]

SCINTILLOMETER **MAKE:** [_____]

UNITS: [_____]

SPECTROMETER **MAKE:** [_____]

UNITS: [_____]

NB. Check GPS spheroid and the base map that you are compiling on

Figure 2b. The inside front cover and is for the recording of instrument details.

THE SITES FORM

The Sites Form is for all the information which locates the geographic position of a field observation and also information on the name of the observer and how the position was obtained and its accuracy.

ORIG[___] **SITE ID**[_____] DATE [__-___-__] **STATE**[____]

REGION [_____] LOC DESCR [_____]

[_____]

1:100K[_____] **AMGEAST**[_____] **AMGNORTH** [_____]

LOC METHOD [___] **ABS ACC** [___] AIRPHOTO[_____]

Figure 2c. An example of the SITES section of the notebook.

Figure 2d (page 6). An example field sheet where a single lithology is located at a site.

Figure 2e (page 7). An example where more than one lithology is located at a site. This is explained later in the Rocks section of the guide.

ORIG[119] SITE ID[93834000] DATE [3-JUN-93] STATE[QLD]

REGION [22] LOC DESCR [10km W EDACOOLA]

[ ]

1:100K[7568] AMGEAST[753309] AMGNORTH [8404600]

LOC METHOD [3] ABS ACC [50] AIRPHOTO[EDACOOLA/4/326]

ROCK RELATIONS [GRANITE TORS]

[ ]

SKETCHES[ALIGNMENT OF KFS PORPS.]

[ ]

PHOTO [ ]

[ ]

VEG [S2G] LANDFORM [ER20]

SMPLID [1342] PROV/SUBP/DOMAIN [COEN]

UNIT/INFNAME[ ] MAPSYMBOL[ ]

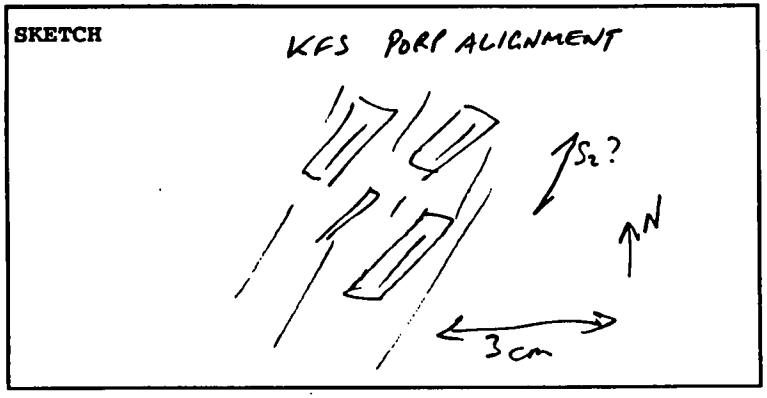
QUAL_3[ ] QUAL_2[ ] QUAL_1[POR]

LITHNAME[GRT] MODE[ ] ROCKTYPE[2]

DESCR[medium grained porphyritic biotite granite]

OTHER[ ]

SKETCH



ATTRIBUTE	VALUE	DESCRIPTION
WEA	SW	
ALT	PY	
MI	QZ	2mm
	KFS	ALIGNED NNE
	MS	<5%
	BT	5% along crude foln
TEX	POR	
	XL	Mafic enclaves rare
TEC	FO	Weak - mod // to S_2?
	JO	Well spaced - conjugate with sets
		N-S + E-W, subvert dip
COL	CY	
MAG	ME	20
	MAX	40
	MIN	5
RAD	TC	40
SP	IS	93834000
ST	RC	

TYPE	STYPE	AZ	INCL	DEFNO	DEFS	P
4	L	300	80			1
8	2	090	90			
8	2	360	90			

CARRY OVER [ ] SHEET [ ] OF [ ]

ORIG[✓] SITE ID[9383400/] DATE [__-✓-__] STATE[✓]

REGION [✓] LOC DESCR [✓]

[_____]

1:100K[✓] AMGEAST[753950] AMGNORTH [8405000]

LOC METHOD [✓] ABS ACC [✓] AIRPHOTO[✓]

ROCK RELATIONS [_____]

[_____]

SKETCHES[_____]

[_____]

PHOTO [_____]

[_____]

VEG [_____] LANDFORM [_____]

SMPLID [_____] PROV/SUBP/DOMAIN [✓]

UNIT/INFNAME[MACO CREEK SCHIST] MAPSYMBOL[_____]

QUAL_3[_____] QUAL_2[_____] QUAL_1[_____]

LITHNAME[_____] MODE[_____] ROCKTYPE[____]

DESCR[_____]

OTHER[_____]

SKETCH

ATTRIBUTE	VALUE	DESCRIPTION
[9383400/A]		[RT= 14 L= SCH]
[WEA]	[MW]	
[COL]	[BR]	
[GS]	[F]	
[MI]	[SIL]	
[ ]	[MS]	
[ ]	[BT]	
[ ]	[QZ]	
[TEC]	[CR]	
[ ]	[FO]	
[PH]	[S]	[93/1/3 - Five Sil needlesin granulated]
[ ]	[ ]	[diago ck schist.]
[ ]	[ ]	
[9383400/B]		[RT= 14 Q=CHT L= QZT]
[MAG]	[MT]	[35]
[RAD]	[TC]	[40]
[MTX]	[SA]	[Granular towards top]
[TEC]	[FO]	[Weak S2 fracture cleavage]
[SPH]	[SA]	[AT base]
[COL]	[WH]	
[GS]	[M]	

TYPE	STYPE	AZ	INCL	DEFNO	DEFS	P
[__]	[___]	[___]	[__]	[___]	[___]	[ ]
[__]	[___]	[___]	[__]	[___]	[___]	[ ]
[__]	[___]	[___]	[__]	[___]	[___]	[ ]
[__]	[___]	[___]	[__]	[___]	[___]	[ ]
[__]	[___]	[___]	[__]	[___]	[___]	[ ]
[__]	[___]	[___]	[__]	[___]	[___]	[ ]

CARRY OVER [_] SHEET [_] OF [_]

ORIG - Mandatory integer of up to 4 digits that is unique to each geologist (it may also be used for an institution in some cases e.g. 'GSWA', 'RSES') from the ORIGINATORS table

SITEID - Mandatory field of up to 16 characters for a user-supplied number or ID for the site. Any combination of numbers and letters may be used, but the Site ID must be unique to the originator. Most AGSO geologists use "AGSO" registered numbers for Site Id e.g. 93834000 - where 93 denotes the year, 83 denotes the project and 4000 denotes a unique number, e.g., a block of numbers allocated to R. Blewett 4000 ⇨ 5999.

DATE - The date that the field site was visited or observed.

STATE - Mandatory if country is Australia. Two or three capital letters indicating the State in Australia (see Appendix).

REGION - A field for the geological region. Mandatory if the country is Australia. Valid entries are stored in the GEOREGIONS authority table (see Appendix). The Geological region is similar to the geological province however it only represents the two-dimensional geographical region in which the sample was collected.

LOC DESCR - An optional descriptive field of 64 characters for additional information relating to the site's location - e.g., '5 Km SE of Brown's Bore'.

1:100K - A mandatory 4-digit integer identifying the 1:100 000 map sheet-area.

***AMGEAST** - A 6-digit positive integer for the full AMG easting of the site in metres. Mandatory if a decimal longitude is not entered.

***AMGNORTH** - A 7-digit positive integer for the full AMG northing of the site in metres. Mandatory if a decimal latitude is not entered.

**Use the above fields if you are using Lats/Longs and make a note so as to enter this into the correct fields in the office. Be aware of your GPS spheroid and age of base map and compilation sheets when using AMG's.*

LOC METHOD - A mandatory integer of up to 3 digits pointing to a record in the LOCMETHODS table (see Appendix) showing the method used to obtain the geographic coordinates of the site. A number of values are available for different spheroids from GPS or map sheets. If a standard series map is indicated it is assumed that the map used was the most up-to-date edition at the time the observation was made. If this was not the case then a specific map can be referenced with the Bibliographic reference field (not shown on SITES form of the notebooks).

ABS ACC - A mandatory numeric field for the absolute accuracy in metres for the measured coordinates. For example, points measured on a map at 1:100 000 scale are generally accurate to 1 mm on the face of the map or 100 metres on the ground. This field is important for assessing whether a point in the SITES table can be plotted at particular scales - it provides the table with a degree of scale independence. The accuracy of non-differential GPS units is usually around 50 - 100m.

AIRPHOTO - An optional field of 36 characters to identify the airphoto on which the site was located and/or plotted. The field is for the name of the airphoto series, the run number and the photo number - e.g. 'Ebagoola 8/2134'.

THE OUTCROPS FORM

The Outcrops Form is designed for descriptions of the outcrop as a whole and relationships between lithologies and structures in the outcrop. Information on individual lithologies, samples and structures belong in the ROCKS and STRUCTURES forms - both of which have a many-to-one relationship with OUTCROPS.

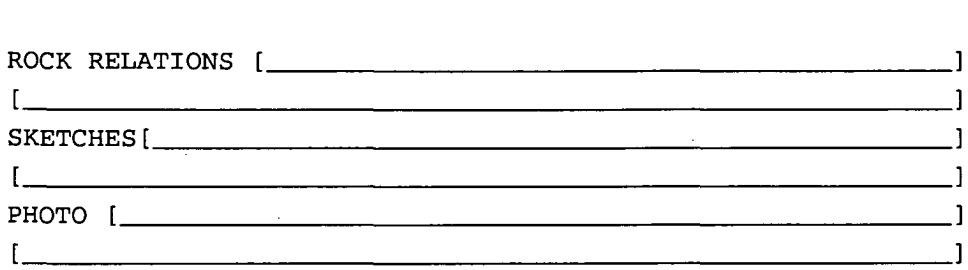


Figure 2f. An example of the OUTCROPS section of the notebook.

ROCK RELATIONS - An optional field of 120 characters for a description of the rock relations in the outcrop.

SKETCHES - An optional field of 60 characters noting any sketches made at the outcrop.

PHOTO -An optional field of 60 characters noting any photos taken at the outcrop.

VEG - An optional field of up to 4-characters for the vegetation type in the VEGTYPES or vegetation type table (see Appendix).

LANDFORM - An optional field of up to 4 characters for the land form in the LANDF table (see Appendix).

THE ROCKS FORM

The Rocks Form records data on lithologies and rock samples at a site. The ROCKS form has a many-to-one relationship with the SITES form (and is linked by the SITE ID) - and also with the OUTCROPS form if an outcrop record exists for a site.

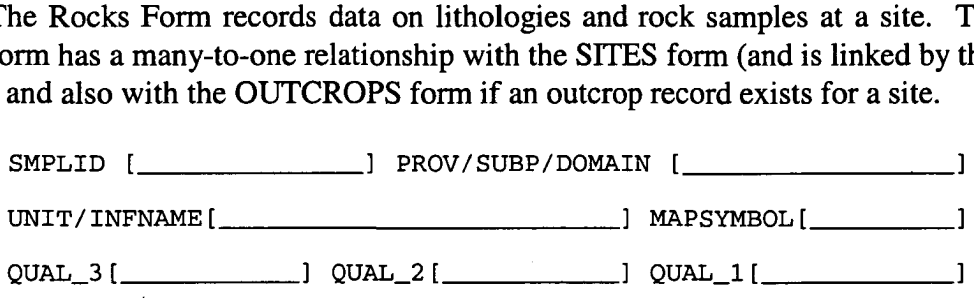


Figure 2g. An example of the ROCKS section of the notebook.

SMPLID - If a sample exists a sample ID (usually a number but can include letters) must be supplied, otherwise the record is regarded as a lithology observation without a sample having been taken. The sample ID or sample number can be the site number, or

can be different, but it must be unique to the originator (i.e. no two samples should have the same number for a single originator). If the site number is used and several samples were taken, then the site number is typically modified by adding letters to represent each sample (e.g. 93834000A, 93834000B, 93834000C etc). This is the recommended system, as it ensures the connection between samples and sites is clear.

The way the database, and therefore the notebook are set up means that when more than one lithology type occurs at a site, a new page is needed (see Figure 2d). This is OK in the relational database, but is a waste of paper in the field (a compromise is possible). For example, if you have interbedded sandstone and siltstone, we suggest that you adopt a REGMAP (Withnall, 1992) strategy where the lithology type is recorded on the right hand page - describe one lithology, rule it off and describe the next lithology (Figure 2d). The two geological descriptions will obviously be entered into different ROCKS forms back in camp or office (they will share a common SITE and OUTCROP via Site ID and Originator number).

PROV/SUBP/DOMAIN - An optional integer of up to 5 digits pointing to the Geological Province, Subprovince or Domain in the GEOPROVS authority table. Either the number or the name may be entered. (see Appendix).

UNIT/INFNAME - An optional positive integer of up to 5 digits that identifies the unit in AGSO's Stratigraphic Index. Alternativley, write out the unit in full in the space adjacent to STRAT UNIT. If the name is informal and not in the Stratigraphic Index the full name can also be written here. As it is not possible to include all the stratigraphic units for the country, each project should obtain the codes and units from the Stratigraphic Index for the Province that they are working in prior to field work. It is also recommended that each project ensures that the Stratigraphic Lexicon contains the units that are needed and that there are not multiple entries for the same unit e.g. ABC beds and ABC Beds etc. It is important that the project decides on what Strat Unit code is used for each unit as this will be a powerful attribute for searching and analysis in Oracle or in the GIS.

MAPSYMBOL - A 8-character optional field for recording recognised map symbols for lithological units. Only symbols already in the LITHUNITS authority table can be entered. This field is primarily for identifying units in Archaean terranes where little or no formal stratigraphy has been defined. Map symbols are unique for each province. The development of province-wide stratigraphy with matching geological units having the same symbol between sheets facilitates the easy integration of the data within a GIS.

QUAL3, 2, 1 - Three 20-character optional fields for the qualifying terms, if any, before the Lithology Name field that follows. The qualifying terms must be in the LITHNAMES authority table (see Appendix).

LITHNAME CODE - Lithology code or name without a qualifier e.g. GRT = granite (see Appendix). We suggest that you extract the required codes and names for your range of rock types and scribble them on to a crib sheet until they are familiar.

MODE - A 4-character field for recording the mode of occurrence of the sample (xenolith, dyke, sill, pipe). Valid occurrence modes are described in the LITHDATATYPES authority table having the Data Type 'IOM' for igneous occurrence mode or 'SOM' for sedimentary occurrence mode

ROCK TYPE - An optional positive integer of up to two digits that identifies the basic rock type from a look-up table of 21 possibilities (see Appendix). This field is designed for a first-pass coarse classification of rock types.

DESCR - A 64-character optional field for a description of the lithology.

OTHER - A 64-character optional field that may be used for any data not covered by the above fields that the user feels are relevant, such as general remarks.

THE LITHOLOGY DATA TYPES BLOCK (RIGHT PAGE)

ATTRIBUTE VALUE DESCRIPTION

[_____] [_____] [_____]

Figure 2h. An example of the LITHDATA section of the notebook.

ATTRIBUTE - A mandatory field of up to 4 capital letters for an abbreviation pointing to a Data Type (attribute name) in the LITHDATA table. The same Data Type may be inserted more than once (e.g. - a sample may exhibit two types of alteration). (see Appendix) Also for lithname codes, make up a crib sheet of the codes you feel you will need. We hope you will quickly become familiar with them.

VALUE - An optional field of up to 4 capital letters for an abbreviation pointing to a Subtype (value of an attribute) of a Data Type in the LITHDATA table (Appendix)

DESCRIPTION - An optional field of 128 characters for any additional descriptive information relating to the Data Type/Subtype record. For example, you may wish to comment on the mode of occurrence of a mineral in a sample. You can over run onto lines below - but only 128 characters can be stored on a single Oracle line. To get around this, just repeat the Subtype and carry on writing.

In some cases the absence of a feature might want to be emphasised or recorded. This is easily done by writing x in the description field (e.g., TEC FO X for a non foliated rock).

STRUCTURES

STRUCTURES are linked to SITES by the ORIGNO and SITE ID and are also linked to a particular rocks record. This means that a structural observation can also be linked to a rock or sample rather than a site as a whole.

TYPE	STYPE	AZ	INCL	DEFNO	DEFS	P
[__]	[___]	[___]	[__]	[___]	[___]	[ ]
[__]	[___]	[___]	[__]	[___]	[___]	[ ]
[__]	[___]	[___]	[__]	[___]	[___]	[ ]
[__]	[___]	[___]	[__]	[___]	[___]	[ ]
[__]	[___]	[___]	[__]	[___]	[___]	[ ]
[__]	[___]	[___]	[__]	[___]	[___]	[ ]

CARRY OVER [_] SHEET [_] OF [_]

Figure 2i. An example of the STRUCTURES section of the notebook.

TYPE & SUBTYPE - Structural features are stored as a mandatory TYPE and an optional SUBTYPE (e.g. bedding that dips is TYPE 1 SUBTYPE 1). A full list of codes is given in the Appendix. If you don't know the codes then fill it in as you would REGMAP (Withnall, 1992) by using the Bell and Duncan terminology (i.e. S0, S1, F3, L5 etc). The problem with the latter system is that there are a number of possible symbols (on a map) that represent S2 – it could be a crenulation cleavage, slaty cleavage, schistosity etc. Lineations that pitch on a plane need to be converted to an azimuth and inclination before entry. Write the value of the pitch next to the plane that contains the lineation, if you do not have a stereonet at the outcrop.

AZ - AZIMUTH is the direction of dip between 0^{o} and 359^{o}, this is oriented 90^{o} to a strike. This is important as the plotting routines will rotate (place) the symbols in an incorrect orientation if you use strike.

INCL - Inclinations are the amount of dip between 0^{o} and 90^{o}. The value provided will be placed along side the relevant symbol in the GIS plotting routines.

DEFNO - An optional field to store the deformation number or generation of a structure (e.g. bedding would be 0 and the first cleavage would be 1). It is particularly useful when the generation of a foliation or lineation is known (or inferred), for example F_3 would have a 3 in the DEFNO field.

DEFS - The deformed surface number is the generation of the surface that is deformed by a subsequent generation of structure (it is used in conjunction with DEFNO). For example, a third generation fold of an second generation surface (F_3^2) would be TYPE 3, DEFNO 3, DEFS 2.

P - An optional field for a numeric plotting priority or rank. This allows maps to be made with a single structural symbol at a site despite more than one structural reading for that site.

For palaeocurrent data you may want to use a REGMAP style (Withanll, 1992) as this preserves original data, no provision is made for rotated (restored) data in the present schema of STRUCTURE. A palaeocurrent database may have to designed in the future.

And finally the carry over is for those really great sites, which you get your teeth into!!! The LITHDATA table has no limits on the number of records for each Siteid/Sampleid and the limit of the page is one that should be sufficient for most Sites.

ACKNOWLEDGEMENTS

We are very grateful to the MLUP and ISB Database Working Group for their time and effort in getting the databases off the ground. I would also like to thank our working partners in GSQ, especially Ian Withnall, Ken Grimes, Mark Thorton, and Simon Lang for introducing me to the benefits of digital field data management (Regmap) and to Ian Withnall, Mark Thorton and Bill Whitaker for a useful review of this manuscript.

We would particularly like to thank Drs. Rod Ryburn and Peter Stuart-Smith for their help in preparing the original field guide. The working group who developed the field database was chaired by Richard Blewett and included Rod Ryburn, Lesley Wyborn, Mark Rattenbury, Morrie Duggan, John Sheraton and Jan Knutson. We would also like to thank Sue Edgecombe and Ollie Raymond for reviewing the updated version of the field guide.

REFERENCES

Lang, S.C., Murphy, P.R, Grimes, K-G. & Withnall, I.W. 1987. Regional Mapping Field Data Management System (REGMAP) - report on the trial period and the recommendations for full implementation. Geological Survey Queensland Record, 1987/13.

Lang, S.C., Withnall, I.W. & Grimes, ILG. 1990. Regional Mapping Field Data Management System (REGMAP) ~ guide to data collection and entry. Department of Resource Industries, Queensland, Geological Mapping Manual 2.

Grimes, ICG., Withnall, I.W., Lang, S.C, Murphy, P.R., and Thornton, M.P. 1990. Regional Mapping Field Data Management System (REGMAP) data release for the Ebagoola 1:250 000 Sheet area, Coen Inlier, Cape York Peninsula, 1990-2. Queensland Resource Industries, Record 199213.

Ryburn, RJ, Blewett R.S., Stuart-Smith, P.G., and Williams, P.R. in prep. The users guide to the NGMA field databases. Australian Geological Survey Organisation, Record 1993/49.

Ryburn, R.J., Bond, L.D. and Hazell, M.S. 1995. Guide to OZROX. AGSO's field geology database. Australian Geological Survey Organisation, Record 1995/79.

Withnall, I.W. 1992. REGMAP as a model for geological field data management. In: Geographic Information Systems, Cartographic and Data Standards, Bureau of Mineral Resources, Geology and Geophysics, Record 1992/27, pp.181-198.

APPENDICES

STATES

STATEID	STATENAME
ACT	Australian Capital Territory
NSW	New South Wales
NT	Northern Territory
QLD	Queensland
SA	South Australia
TAS	Tasmania
VIC	Victoria
WA	Western Australia

LOCATION METHOD

METHODNO	LOCMETHOD
0	unknown
1	GPS observation (WGS84 - World Geodetic System 1984)
2	GPS observation (AGD66 - Australian Geodetic Datum 1966)
3	GPS observation (AGD84 - Australian Geodetic Datum 1984)
4	GPS observation (GDA94 - Geocentric Datum of Australia 1994)
5	astronomical observation
6	surveyed from ground control
7	published report
8	unpublished report
10	non-standard topographic map
11	1:25 000 topographic map
12	1:50 000 topographic map
13	1:100 000 topographic map (AMG66)
14	1:250 000 topographic map
15	1:500 000 topographic map
16	1:1 000 000 topographic map
20	non-standard geological map
21	1:25 000 geological map
22	1:50 000 geological map
23	1:100 000 geological map (AMG66)
24	1:250 000 geological map
25	1:500 000 geological map
26	1:1 000 000 geological map
30	Differential GPS (WGS84)
31	Differential GPS (AGD66)
40	Orthophoto image
41	Orthophoto image 1:25 000 scale

GEOLOGICAL PROVINCES

PROVNO	PROVNAME	RANK	PROVNO	PROVNAME	RANK
1	Adavale Basin	Province	47	Lachlan Fold Belt	Province
2	Adelaide Fold Belt	Province	374	Lake Eyre Basin	Province
3	Albany-Fraser Province	Province	281	Lakefield Basin	Province
4	Amadeus Basin	Province	48	Laura Basin	Province
5	Arafura Basin	Province	49	Leeuwin Block	Province
6	Arckaringa Basin	Province	50	Litchfield Block	Province
7	Arnhem Block	Province	204	Lolworth-Ravenswood Block	Province
8	Arrowie Basin	Province	51	Maryborough Basin	Province
9	Arunta Block	Province	52	McArthur Basin	Province
112	Ashburton Basin	Province	53	Money Shoal Basin	Province
10	Bancannia Trough	Province	54	Mount Isa Inlier	Province
11	Bangemall Basin	Province	55	Mount Painter Block	Province
12	Birrindudu Basin	Province	120	Murchison Province	Province
13	Bonaparte Basin	Province	56	Murphy Inlier	Province
14	Bowen Basin	Province	57	Murray Basin	Province
15	Bremer Basin	Province	58	Musgrave Block	Province
16	Broken Hill Block	Province	59	Nabberu Basin	Province
192	Broken River Province	Province	60	New England Fold Belt	Province
17	Canning Basin	Province	61	Ngalia Basin	Province
191	Cape York Plutonic Belt	Province	62	Northhampton Block	Province
18	Cape York-Oriomo Inlier	Province	63	Oaklands Basin	Province
19	Carnarvon Basin	Province	64	Officer Basin	Province
20	Carpentaria Basin	Province	65	Ord Basin	Province
21	Clarence-Moreton Basin	Province	66	Otway Basin	Province
22	Coen Block	Province	67	Paterson Province	Province
23	Cooper Basin	Province	68	Pedirka Basin	Province
24	Daly River Basin	Province	69	Perth Basin	Province
25	Darling Basin	Province	70	Pilbara Block	Province
26	Davenport Geosyncline	Province	71	Pine Creek Geosyncline	Province
27	Denison Block	Province	72	Polda Basin	Province
28	Drummond Basin	Province	73	Rocky Cape Block	Province
29	Duaringa Basin	Province	74	Rum Jungle Block	Province
30	Dundas Trough	Province	75	South Nicholson Basin	Province
94	Eastern Goldfields Province	Province	95	Southern Cross Province	Province
31	Eromanga Basin	Province	78	St Vincent Basin	Province
32	Esk Trough	Province	76	Stansbury Basin	Province
33	Eucla Basin	Province	77	Stuart Shelf	Province
282	Fly-Highlands Province	Province	79	Styx Basin	Province
34	Galilee Basin	Province	80	Surat Basin	Province
35	Gascoyne Block	Province	81	Sydney Basin	Province
36	Gawler Craton	Province	82	Sylvania Dome	Province
37	Georgetown Block	Province	83	Tasmania Basin	Province
38	Georgina Basin	Province	84	Tennant Creek Block	Province
39	Gippsland Basin	Province	283	Tertiary Volcanic Province	Province
85	Granites-Tanami Block	Province	220	Thompson Fold Belt	Province
40	Halls Creek Province	Province	86	Torrens Basin	Province
41	Hamersley Basin	Province	87	Tyenna Block	Province
42	Hillsborough Basin	Province	0	unknown	Province
43	Hodgkinson Fold Belt	Province	88	Victoria River Basin	Province
44	Kanmantoo Fold Belt	Province	89	Warburton Basin	Province
45	Karumba Basin	Province	121	Western Gneiss Terrane	Province
46	Kimberley Basin	Province	108	Willyama Block	Province
92	Yambo Block	Province	90	Wiso Basin	Province
93	Yilgarn Craton	Super-province	91	Wonominta Block	Province

GEOLOGICAL REGIONS

REGNO	REGION	COUNTRY	REGNO	REGION	COUNTRY
2	Adelaide Region	AUS	53	Money Shoal Region	AUS
3	Albany Region	AUS	54	Mount Isa Region	AUS
4	Amadeus Region	AUS	55	Mount Painter Region	AUS
6	Anakie Region	AUS	56	Murphy Region	AUS
5	Arafura Region	AUS	57	Murray Region	AUS
7	Arnhem Region	AUS	58	Musgrave Region	AUS
8	Arrowie Region	AUS	59	Nabberu Region	AUS
9	Arunta Region	AUS	60	New England Region	AUS
112	Ashburton Region	AUS	357	New Zealand Intraplate Volcanic Region	NZ
10	Bancannia Region	AUS	61	Ngalia Region	AUS
11	Bangemall Region	AUS	104	Nongra Region	AUS
12	Birrindudu Region	AUS	62	Northampton Region	AUS
13	Bonaparte Region	AUS	105	Northeast Tasmania Region	AUS
14	Bowen Region	AUS	64	Officer Region	AUS
15	Bremer Region	AUS	65	Ord Region	AUS
94	Bresnahan Region	AUS	66	Otway Region	AUS
16	Broken Hill Region	AUS	67	Paterson Region	AUS
95	Burke River Region	AUS	68	Pedirka Region	AUS
43	Cairns Region	AUS	69	Perth Region	AUS
97	Caloola Region	AUS	70	Pilbara Region	AUS
17	Canning Region	AUS	71	Pine Creek Region	AUS
19	Carnarvon Region	AUS	72	Polda Region	AUS
20	Carpentaria Lowlands Region	AUS	106	Proserpine Region	AUS
83	Central Tasmania Region	AUS	48	Quinkan Region	AUS
98	Charters Towers Region	AUS	73	Rocky Cape Region	AUS
21	Clarence-Moreton Region	AUS	107	Savory Region	AUS
99	Clarke River Region	AUS	75	South Nicholson Region	AUS
22	Coen Region	AUS	78	St Vincent Region	AUS
24	Daly River Region	AUS	77	Stuart Region	AUS
25	Darling Region	AUS	79	Styx Region	AUS
26	Davenport Region	AUS	80	Surat Region	AUS
27	Denison Region	AUS	81	Sydney Region	AUS
28	Drummond Region	AUS	82	Sylvania Region	AUS
29	Duaringa Region	AUS	85	Tanami Region	AUS
30	Dundas Region	AUS	84	Tennant Creek Region	AUS
31	Eromanga Region	AUS	108	Tibooburra Region	AUS
33	Eucla Region	AUS	86	Torrens Region	AUS
282	Fly-Highlands Region	PNG	18	Torres Strait Region	AUS
100	Fraser Region	AUS	87	Tyennan Region	AUS
34	Galilee Region	AUS	88	Victoria River Region	AUS
35	Gascoyne Region	AUS	96	Wilsons Promontory Region	AUS
36	Gawler Region	AUS	109	Winnecke Region	AUS
37	Georgetown Region	AUS	90	Wiso Region	AUS
38	Georgina Region	AUS	91	Wonominta Region	AUS
39	Gippsland Region	AUS	93	Yilgarn Region	AUS
40	Halls Creek Region	AUS	0	unknown	
41	Hamersley Region	AUS			
44	Kanmantoo Region	AUS			
46	Kimberley Region	AUS			
101	King Island Region	AUS			
102	King Leopold Region	AUS			
47	Lachlan Region	AUS			
49	Leeuwin Region	AUS			
50	Litchfield Region	AUS			
51	Maryborough Region	AUS			
103	Marymia Region	AUS			
52	McArthur Region	AUS			

LANDFORM

L_CODE	L_DESC	L_CODE	L_DESC
AL00	alluvial landforms	ER31	residual low hill
AL10	alluvial plain	ER40	hills
AL11	flood plain	ER50	mountains
AL12	anastomatic plain	ER60	escarpment
AL13	bar plain	ER70	badlands
AL14	covered plain	ER80	drainage depression
AL15	meander plain	FA00	fan
AL16	floodout	FA01	alluvial fan
AL20	alluvial terrace	FA02	colluvial fan
AL30	stagnant alluvial plain	FA03	sheet-flood fan
AL40	terraced land	GL00	glacial features
AL50	alluvial swamp	GL10	depositional glacial features
CO00	coastal lands	GL20	erosional glacial features
CO01	beach ridge	KA00	karst
CO02	chenier plain	MA00	made land
CO03	coral reef	ME00	meteor crater
CO04	marine plain	PL00	plain
CO05	tidal flat	PL01	depositional plain
CO06	coastal dunes	PL02	lacustrine plain
CO07	coastal plain	PL03	playa plain
CO08	beach	PL04	sand plain
DE00	delta	PT00	plateau
DU00	dunefield	PT01	plateau edge
DU01	longitudinal dune field	PT02	plateau surface
ER00	erosional landforms	VO00	volcano
ER10	erosional plain	VO01	caldera
ER11	pediment	VO02	cone (volcanic)
ER12	pediplain	VO03	lava plain
ER13	peneplain	VO04	ash plain
ER14	etchplain	VO05	lava flow
ER20	rises	VO06	lava plateau
ER21	residual rise		
ER30	low hills		

VEGETATION

VEGID	DESCRIPTION
F1	Sparse open herbfield
G1	Sparse open tussock grassland
G2	Open tussock grassland
G3	Tussock grassland or sedgeland
G4	Closed tussock grassland or sedgeland
H2	Hummock grassland
L1	Low open woodland with no significant lower stratum
L1F	Low open woodland with other herbaceous plants
L1G	Low open woodland with tussock grasses
L1H	Low open woodland with hummock grasses
L1S	Low open woodland with tall shrubs
L1Z	Low open woodland with low shrubs
L2	Low woodland with no significant lower stratum
L2G	Low woodland with tussock grasses
L2H	Low woodland with hummock grasses
L2S	Low woodland with tall shrubs
L2Z	Low woodland with low shrubs
L3	Low open forest with no significant lower stratum
L3G	Low open forest with tussock grasses
L3S	Low open forest with tall shrubs
L3Z	Low open forest with low shrubs
L4	Low closed forest
M1G	Open woodland with tussock grasses
M1H	Open woodland with hummock grasses
M1L	Open woodland with low trees
M1S	Open woodland with tall shrubs
M2G	Woodland with tussock grasses
M2H	Woodland with hummock grasses
M2L	Woodland with low trees
M2S	Woodland with tall shrubs
M2Z	Woodland with low shrubs
M3	Open forest with no significant lower stratum
M3G	Open forest with tussock grasses and graminoids
M3L	Open forest with low trees
M3S	Open forest with tall shrubs
M3Z	Open forest with low shrubs
M4	Closed forest
MIX	Mix of several categories
NIL	No significant vegetation
S1G	Tall open shrubland with tussock grasses
S1H	Tall open shrubland with hummock grasses
S1Z	Tall open shrubland with low shrubs
S2F	Tall shrubland with other herbaceous plants
S2G	Tall shrubland with tussock grasses
S2H	Tall shrubland with hummock grasses
S2Z	Tall shrubland with low shrubs
S3G	Open scrub with tussock grasses or graminoids
S3H	Open scrub with hummock grasses
S3Z	Open scrub with low shrubs
T3L	Tall open forest with low trees
T3M	Tall open forest with medium trees
T3S	Tall open forest with tall shrubs
T4	Tall closed forest
Z1	Low open shrubland with no significant lower stratum
Z1F	Low open shrubland with other herbaceous plants
Z1G	Low open shrubland with tussock grasses
Z1H	Low open shrubland with hummock grasses
Z2	Low shrubland with no significant lower stratum
Z2F	Low shrubland with other herbaceous plants
Z2G	Low shrubland with tussock grasses and graminoids
Z3	Open heath
Z3G	Open heath with tussock grasses
Z4	Closed heath

ROCK TYPE

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	mineralisation
17	regolith
19	vein
20	volcaniclastic
21	tectonite

LITHOLOGY QUALIFIERS (Q) - CODE, DEFINITION

LITHID	LITHOLOGY	LITHID	LITHOLOGY
ABND	abundant	MK	medium-K
ADC	adcumulate	MEG	megacrystic
AGAL	algal	MCC	melanocratic
ALK	alkali	MCL	mesocumulate
ALT	altered	MET	meta
AMY	amygdaloidal	METM	metamorphosed
APH	aphanitic	MIC	micaceous
ARE	arenaceous	MIO	micro
AR	argillic	MX	microcrystalline
ARK	arkosic	MIGM	migmatitic
BA	banded	MIK	milky
BAS	basic	MON	monomictic
BED	bedded	MDY	muddy
BTM	bitumenous	MY	mylonitic
BR	brecciated	NOD	nodular
CS	calc-silicate	OO	oolitic
CALC	calcareous	ORG	organic
CLC	calcic	ORT	ortho
CAR	carbonaceous	OCL	orthocumulate
CHY	cherty	PALE	pale
CLT	chloritic	PAR	para
CLSS	clast supported	PBY	pebbly
CLAC	clastic	PEL	pelitic
C	coarse	PERA	peralkaline
CGC	conglomeratic	PHC	phosphatic
XL	crystal	PCR	picro
CUMM	cumulate	POIK	poikilitic
CYC	cyclic	PLY	polymict
DK	dark	POOR	poor
DMT	dolomitic	P	poorly sorted
EQ	equigranular	PORS	porous
EU	eutaxitic	POR	porphyritic
EXV	extrusive	POT	potassic
FEL	feldspathic	PSC	psammitic
FLS	felsic	PBX	pseudobrecciated
FER	ferruginous	PYR	pyritic
FIA	fiamme	PYC	pyroclastic
F	fine	QF	quartzo-feldspathic
FGR	fine grained	RDL	radiolarian
FLAG	flaggy	RX	recrystallised
FO	foliated	RES	residual
FR	fractured	RSNS	resinous
FRI	friable	RTRO	retrograde
GL	glassy	REW	reworked
GSN	gossanous	RL	rhythmic-layered
GRAN	granitic	RICH	rich
GPT	graphitic	SA	sandy
GTY	gritty	SCHS	schistose
HM	hematitic	SERC	sericitic
HET	heterolithic	SH	sheared
HK	high-K	SILI	siliceous
HMG	high-Mg	SI	silicified
HGR	high-grade	SLY	silty
MAG	highly magnetic	SDC	sodic

ITM	intermediate	SPCR	specular
ITV	intrusive	STRO	stromatilitic
JSP	jaspilitic	SUL	sulphidic
KA	kaolinised	TPI	tephri
LA	laminated	THL	tholeiitic
LPL	lapilli	TCY	trachy
LAT	lateritic	TFC	tuffaceous
LAY	layered	UB	ultrabasic
LEA	leached	UM	ultramafic
LCC	leucocratic	UND	undifferentiated
LT	light	UNW	unwelded
LIM	limonitic	VND	veined
LI	lineated	VE	vesicular
LTH	lithic	VI	vitric
LK	low-K	VOL	volcanic
LGR	low-grade	VCC	volcaniclastic
MAF	mafic	WEA	weathered
MGSN	magnesian	WEL	welded
MAS	massive		
MTXS	matrix supported		

IGNEOUS (I) LITHOLOGIES - CODE, DEFINITION

LITHID	LITHOLOGY	LITHID	LITHOLOGY
AGL	agglomerate	LITF	lithic tuff
ALB	albitite	MIRK	mafic intrusive
AFG	alkali feldspar granite	MLAV	mafic lava
AIRK	alkaline intrusive	MRK	mafic rock
ANT	andesite	MVOL	mafic volcanic
ANS	anorthosite	MZB	monzogabbro
APL	aplite	MZG	monzogranite
ASH	ash	MZT	monzonite
BLT	basalt	NPH	nephelinite
BSN	basanite	NRT	norite
BTH	bomb, block tephra	OBS	obsidian
BON	boninite	OPHL	ophiolite
CBT	carbonatite	PEG	pegmatite
CHAR	charnockite	PER	peridotite
CHT	chromitite	PNT	phonolite
XTUF	crystal tuff	PCT	picrite
DAC	dacite	PHY	porphyry
DRT	diorite	PRX	pyroxenite
DLT	dolerite	QFPY	quartz feldspar porphyry
DUN	dunite	QZG	quartz-rich granitoid
EPCR	epiclastic rock	QTE	quartzolite
FPY	feldspar porphyry	RHD	rhyodacite
FIRK	felsic intrusive	RHY	rhyolite
FLVA	felsic lava	SPIL	spilite
FRK	felsic rock	SYN	syenite
FVOL	felsic volcanic	TPH	tephra
GAB	gabbro	TPT	tephrite
GRT	granite	TNL	tonalite
GRD	granodiorite	TYA	trachyandesite

GRP	granophyre	TYB	trachybasalt
HZB	harzburgite	TYD	trachydacite
MGBS	high-Mg basalt	TRC	trachyte
HBT	hornblendite	TUF	tuff
HYA	hyaloclastite	UMRK	ultramafic
IGM	ignimbrite	UVOL	ultramafic volcanic
IJL	ijolite	VTUF	vitric tuff
IIRK	intermediate intrusive	VBX	volcanic breccia
IVOL	intermediate volcanic	VOLR	volcanic rock
KBL	kimberlite	VCR	volcaniclastic rock
KTT	komatiite		
LPR	lamproite		
LPY	lamprophyre		
LTUF	lapilli tuff		
LTT	latite		
LAVA	lava		

METAMORPHIC (M) LITHOLOGIES - CODE, DEFINITION

LITHID	LITHOLOGY	LITHID	LITHOLOGY
ATRK	altered rock	METS	metasediment
AMP	amphibolite	MTS	metasomatite
AUGN	augen gneiss	MIG	migmatite
CSRK	calc-silicate rock	MYL	mylonite
EGL	eclogite	PHYL	phyllite
GNS	gneiss	PSAM	psammopelite
GFL	granofels	QZT	quartzite
GRN	granulite	SCHT	schist
GST	greenstone	SRP	serpentinite
GRSN	greisen	SKN	skarn
HFL	hornfels	SLA	slate
MBL	marble	TOUM	tourmalinite
METB	metabasite		

SEDIMENTARY (S) LITHOLOGY CODES, DEFINITION

LITHID	LITHOLOGY	LITHID	LITHOLOGY
ARNT	arenite	IRFM	iron formation
AGLT	argillite	IRST	ironstone
ARKS	arkose	JASP	jasper
BIF	banded iron formation	JSPL	jaspilite
BHRK	beachrock	LIG	lignite
BIOC	biocarbonate	LMST	limestone
BIOM	biomicrite	MGST	magnesite
BIOS	biosparite	MTIF	magnetite iron formation
BIT	bitumen	MARL	marl
BLSH	black shale	MCRT	micrite
BDST	boundstone	MDST	mudstone
CALR	calcarenite	NFOS	nanofossil
CALU	calcilutite	NVLT	novaculite
CBIF	carbonate iron formation	OOZ	ooze

CBRK	carbonate rock	OXIF	oxide iron formation
CRNL	carnieule	PKST	packstone
CHLK	chalk	PEAT	peat
CHRT	chert	PELT	pelite
CLST	claystone	PHSP	phosphorite
COAL	coal	PCLN	porcellanite
CNGL	conglomerate	PSMT	psammite
CQNA	coquina	RDLT	radiolarite
CORL	coral	SDST	sandstone
DMCT	diamictite	SDBX	sedimentary breccia
DTMT	diatomite	SHLE	shale
DLAR	dolarenite	SLST	siltstone
DLST	dolostone	SPGT	sparagmite
EVPT	evaporite	SUIF	sulphide iron formation
FGLT	fanglomerate	TLL	till
FLNT	flint	TLLT	tillite
FOS	fossil	TRVN	travertine
GYST	geyserite	TBDT	turbidite
GNST	grainstone		
GPST	grapestone		
GSD	greensand		
GYWK	greywacke		
GUN	guano		
GYT	gyttja		

REGOLITH (R) "LITHOLOGY" CODES, DEFINITION

LITHID	LITHOLOGY	LITHID	LITHOLOGY
ALUV	alluvium	LOM	loam
CLCR	calcrete	LOS	loess
CLY	clay	MUD	mud
COLV	colluvium	PLDZ	pallid zone
DUR	duricrust	PIS	pisolite
DST	dust	PIST	pisolitic ironstone
FRCT	ferricrete	SND	sand
GO	gossan	SPRK	saprock
GSQ	gossanous quartz	SPLT	saprolite
GVL	gravel	SCRE	scree
GRU	grus	SLCT	silcrete
LAG	lag	SLT	silt
LATT	laterite	SOIL	soil

DATATYPE MI (MINERAL)

COMMON ROCK FORMING MINERALS - SUBTYPE (CODE), DEFINITION

Nb. Listed here is only a subset of the full mineral names table.

MINABBREV	MINNAME	MINABBREV	MINNAME
ACT	actinolite	LCT	leucite
AB	albite	MGS	magnesite
ALN	allanite	MGT	magnetite
ALM	almandine	MAL	malachite
ALSI	aluminosilicate	MCS	marcasite
AMPH	amphibole	MICA	mica
ANL	analcime	MC	microcline
AND	andalusite	MOL	molybdenite
ADS	andesine	MNZ	monazite
AN	anorthite	MNT	montmorillonite
ANR	anorthoclase	MS	muscovite
ATH	anthophyllite	NE	nepheline
AP	apatite	OGC	oligoclase
APY	arsenopyrite	OL	olivine
AUG	augite	OPL	opal
AZ	azurite	OPQ	opaque mineral
BRT	barite	OAMP	orthoamphibole
BRL	beryl	OR	orthoclase
BT	biotite	OPX	orthopyroxene
BN	bornite	ASOX	oxidised arsenopyrite
BTW	bytownite	CUOX	oxidised copper minerals
CAL	calcite	PBOX	oxidised lead minerals
CARB	carbonate	PYOX	oxidised pyrite
CST	cassiterite	ZNOX	oxidised zinc mins
CC	chalcocite	PHL	phlogopite
CCP	chalcopyrite	PHOS	phosphate
CL	chlorite	PGT	pigeonite
CLD	chloritoid	PL	plagioclase
CHR	chromite	PRH	prehnite
CIN	cinnabar	PMP	pumpellyite
CLAY	clay mineral	PY	pyrite
CAMP	clino-amphibole	PRP	pyrope
CPX	clinopyroxene	PRL	pyrophyllite
CZO	clinozoisite	PYRX	pyroxene
CRD	cordierite	PO	pyrrhotite
COR	corundum	QZ	quartz
CV	covellite	RDN	rhodonite
CRS	cristobalite	RT	rutile
CUM	cummingtonite	SANI	sanidine
CUP	cuprite	SCP	scapolite
DMD	diamond	SCH	scheelite
DI	diopside	SRL	schorl
DOL	dolomite	SERI	sericite
EN	enstatite	SERP	serpentine
EP	epidote	SD	siderite
FY	fayalite	SIL	sillimanite
FELD	feldspar	SPS	spessartine
FSPD	feldspathoid	SP	sphalerite
FL	fluorite	SPL	spinel
GN	galena	ST	staurolite
GNT	garnet	STB	stibnite

GLT	glauconite	STP	stilpnomelane
GLN	glaucophane	SULP	sulphide
GT	goethite	TLC	talc
GR	graphite	TTN	titanite
GRS	grossular	TOZ	topaz
GP	gypsum	TOUR	tourmaline
HL	halite	TR	tremolite
HEM	hematite	TRD	tridymite
HBL	hornblende	USP	ulvospinel
ILL	illite	U	uranium
ILM	ilmenite	UROX	uranium oxide mineral
JD	jadeite	VRM	vermiculite
KFS	k-feldspar	VES	vesuvianite
KLN	kaolinite	ZEOL	zeolite
KY	kyanite	ZRN	zircon
LAB	labradorite		
LMT	laumontite		
LWS	lawsonite		

LITHOLOGY DATATYPES & SUBTYPES - CODES, DEFINITION.

DATATYPE	TYPEDESC	SUBTYPE	SUBDESC
ALT	Alteration Style	AB	albitic
ALT	Alteration Style	ALU	alunitic
ALT	Alteration Style	AR	argillic
ALT	Alteration Style	CARB	carbonate
ALT	Alteration Style	CLT	chloritic
ALT	Alteration Style	EP	epidotised
ALT	Alteration Style	GRSN	greisen
ALT	Alteration Style	HEMC	hematitic
ALT	Alteration Style	KA	kaolinitic
ALT	Alteration Style	POT	potassic
ALT	Alteration Style	PR	propylitic
ALT	Alteration Style	PY	pyritic
ALT	Alteration Style	RR	red rock
ALT	Alteration Style	SERC	sericitic
ALT	Alteration Style	SRP	serpentinised
ALT	Alteration Style	SI	silicified
ALT	Alteration Style	SK	skarn
ALT	Alteration Style	UL	unaltered
ALT	Alteration Style	AA	undefined alteration assemblage
ALT	Alteration Style	ZEC	zeolitic
ALTI	Alteration Intensity	I	intense
ALTI	Alteration Intensity	MOD	moderate
ALTI	Alteration Intensity	PEV	pervasive
ALTI	Alteration Intensity	STG	strong
ALTI	Alteration Intensity	WE	weak
BED	Bedding Thickness	LA	laminated (<10 mm)
BED	Bedding Thickness	ME	medium (100-300 mm)
BED	Bedding Thickness	TK	thick (300-1000 mm)
BED	Bedding Thickness	TN	thin (30-100 mm)
BED	Bedding Thickness	VTK	very thick (>1000 mm)
BED	Bedding Thickness	VTN	very thin (10-30 mm)
COH	Coherence	COMP	compact
COH	Coherence	CONS	consolidated

COH	Coherence	FI	fissle
COH	Coherence	FRI	friable
COH	Coherence	HD	hard
COH	Coherence	IN	indurated
COH	Coherence	PORS	porous
COH	Coherence	UN	unconsolidated
COL	Colour	BK	black
COL	Colour	BL	blue
COL	Colour	BR	brown
COL	Colour	BU	buff
COL	Colour	CH	chocolate
COL	Colour	CR	cream
COL	Colour	FA	fawn
COL	Colour	GR	green
COL	Colour	GY	grey
COL	Colour	IR	iridescent
COL	Colour	KH	khaki
COL	Colour	MA	maroon
COL	Colour	OL	olive
COL	Colour	OR	orange
COL	Colour	PI	pink
COL	Colour	PU	purple
COL	Colour	RE	red
COL	Colour	VC	varicoloured
COL	Colour	VI	violet
COL	Colour	WH	white
COL	Colour	YE	yellow
COP	Colour pattern	MO	mottled
FOS	Fossil	FOSI	fossil invertebrates
FOS	Fossil	FP	fossil plants
FOS	Fossil	FV	fossil vertebrates
FOS	Fossil	FOS	fossiliferous
FOS	Fossil	FM	microfossils
FOS	Fossil	STRO	stromatolite
FOS	Fossil	FT	trace fossils
GS	Grain Size	BM	bomb (>64 mm)
GS	Grain Size	BO	boulder (>256 mm)
GS	Grain Size	MUD	clay (<0.002 mm)
GS	Grain Size	C	coarse (>5 mm)
GS	Grain Size	CG	coarse gravel (20-60 mm)
GS	Grain Size	CS	coarse sand (0.5-1 mm)
GS	Grain Size	CB	cobble (64-256 mm)
GS	Grain Size	F	fine (<1 mm)
GS	Grain Size	FG	fine gravel (2-6 mm)
GS	Grain Size	FS	fine sand (0.125-0.5mm)
GS	Grain Size	GL	granule (2-4 mm)
GS	Grain Size	GV	gravel
GS	Grain Size	LPL	lapilli (4-64 mm)
GS	Grain Size	M	medium (1-5 mm)
GS	Grain Size	MG	medium gravel (6-20 mm)
GS	Grain Size	MS	medium sand (0.25-0.5 mm)
GS	Grain Size	MX	microcrystalline
GS	Grain Size	PB	pebble (4-64 mm)
GS	Grain Size	PEG	pegmatitic
GS	Grain Size	SA	sand (0.062-2 mm)
GS	Grain Size	SLT	silt (0.002-0.062 mm)
GS	Grain Size	ST	stone

GS	Grain Size	VC	very coarse
GS	Grain Size	VCS	very coarse sand (1-2 mm)
GS	Grain Size	VF	very fine
GS	Grain Size	VFS	very fine sand (0.062-0.125 mm)
IOM	Igneous Occurrence Mode	BA	band
IOM	Igneous Occurrence Mode	BAG	banding in gneiss
IOM	Igneous Occurrence Mode	CEX	cryptoexplosive
IOM	Igneous Occurrence Mode	DY	dyke
IOM	Igneous Occurrence Mode	GM	groundmass
IOM	Igneous Occurrence Mode	PLUH	high-level pluton
IOM	Igneous Occurrence Mode	PLUL	low-level pluton
IOM	Igneous Occurrence Mode	MT	matrix
IOM	Igneous Occurrence Mode	PIPE	pipe
IOM	Igneous Occurrence Mode	PLU	pluton
IOM	Igneous Occurrence Mode	POD	pod
IOM	Igneous Occurrence Mode	SILL	sill
IOM	Igneous Occurrence Mode	SARL	subaerial
IOM	Igneous Occurrence Mode	SM	submarine
IOM	Igneous Occurrence Mode	UNK	unknown
IOM	Igneous Occurrence Mode	VEIN	vein
IOM	Igneous Occurrence Mode	XE	xenolith
IS	Internal Stratification	CLR	climbing ripples
IS	Internal Stratification	CTS	contorted stratification
IS	Internal Stratification	CV	convolute
IS	Internal Stratification	CLA	corrugated lamination
IS	Internal Stratification	XB	cross-bedded
IS	Internal Stratification	CMI	cryptomicrobial (algal laminae)
IS	Internal Stratification	FLS	flasers
IS	Internal Stratification	HXS	herringbone cross-stratification
IS	Internal Stratification	HO	horizontal
IS	Internal Stratification	HPL	horizontal parallel laminae
IS	Internal Stratification	HX	hummocky cross bedding
IS	Internal Stratification	LAM	lamination (within a bed)
IS	Internal Stratification	LEN	lenticular bedding
IS	Internal Stratification	LPX	low-angle planar cross bedding
IS	Internal Stratification	LTX	low-angle trough cross bedding
IS	Internal Stratification	MAS	massive
IS	Internal Stratification	GR	normal grading
IS	Internal Stratification	OXB	overturned cross bedding
IS	Internal Stratification	PID	pillowed
IS	Internal Stratification	PXB	planar cross bedding
IS	Internal Stratification	RG	reverse grading
IS	Internal Stratification	RXL	ripple cross laminae
IS	Internal Stratification	STRL	stromatolitic lamination
IS	Internal Stratification	TXB	trough cross bedding
IS	Internal Stratification	WB	wavey bedding
ITX	Igneous Texture	AM	amorphous
ITX	Igneous Texture	AMY	amygdaloidal
ITX	Igneous Texture	APH	aphanitic
ITX	Igneous Texture	APHY	aphyric
ITX	Igneous Texture	ABR	autobrecciated
ITX	Igneous Texture	CON	conchoidal
ITX	Igneous Texture	CX	cryptocrystalline
ITX	Igneous Texture	DV	devitrified
ITX	Igneous Texture	EQ	equigranular
ITX	Igneous Texture	EU	eutaxitic
ITX	Igneous Texture	FB	flow banded

ITX	Igneous Texture	FRAG	fragmental
ITX	Igneous Texture	GLSY	glassy
ITX	Igneous Texture	GRP	granophyric
ITX	Igneous Texture	MEG	megacrystic
ITX	Igneous Texture	MIA	miarolitic
ITX	Igneous Texture	MX	microcrystalline
ITX	Igneous Texture	OIK	oikocrystic
ITX	Igneous Texture	PI	pillows
ITX	Igneous Texture	POR	porphyritic
ITX	Igneous Texture	RL	rythmically layered
ITX	Igneous Texture	SER	seriate
ITX	Igneous Texture	SPH	spherulitic
ITX	Igneous Texture	SPX	spinifex
ITX	Igneous Texture	VE	vesicular
ITX	Igneous Texture	VI	vitric
ITX	Igneous Texture	VU	vuggy
ITX	Igneous Texture	XC	xenocrystic
ITX	Igneous Texture	XEC	xenolithic
MAG	Magnetic sus. (SI Units x 10-5)	MAX	maximum
MAG	Magnetic sus. (SI Units x 10-5)	MN	mean
MAG	Magnetic sus. (SI Units x 10-5)	MIN	minimum
MET	Metamorphic Grade	AE	albite-epidote hornfels
MET	Metamorphic Grade	AMP	amphibolite
MET	Metamorphic Grade	BL	blueschist
MET	Metamorphic Grade	EC	eclogite
MET	Metamorphic Grade	GRN	granulite
MET	Metamorphic Grade	GS	greenschist
MET	Metamorphic Grade	HB	hornblende hornfels
MET	Metamorphic Grade	KC	K-feldspar-cordierite hornfels
MET	Metamorphic Grade	PP	prehnite-pumpellyite
MET	Metamorphic Grade	ZEOL	zeolite
MTX	Metamorphic Texture	BA	banded
MTX	Metamorphic Texture	BR	brecciated
MTX	Metamorphic Texture	BK	broken
MTX	Metamorphic Texture	GN	gneissic
MTX	Metamorphic Texture	KN	knotted
MTX	Metamorphic Texture	MIG	migmatitic
MTX	Metamorphic Texture	POB	porphyroblastic
MTX	Metamorphic Texture	PS	pseudomorph
MTX	Metamorphic Texture	RX	recrystallised
MTX	Metamorphic Texture	SAC	saccharoidal
MTX	Metamorphic Texture	SCHS	schistose
PHO	Photodata	BW	black and white
PHO	Photodata	CP	colour print
PHO	Photodata	S	slide
RAD	Gamma Ray Spectrometry (cps)	K	potassium
RAD	Gamma Ray Spectrometry (cps)	TH	thorium
RAD	Gamma Ray Spectrometry (cps)	TC	total count
RAD	Gamma Ray Spectrometry (cps)	U	uranium
REF	Reference	AREF	AGSOREFS RefID
REM	Remarks	GE	general
RSTR	Rock Strength	R4	high rock strength (25-80Mpa)
RSTR	Rock Strength	R2	low rock strength (3-10Mpa)
RSTR	Rock Strength	R3	medium rock strength (10-25Mpa)
RSTR	Rock Strength	R5	very high rock strength (>800Mpa
RSTR	Rock Strength	R1	very low rock strength(1.5-3Mpa)
SEQ	Sequence Types	CU	coarsening upward sequence

SEQ	Sequence Types	FU	fining upward sequence
SEQ	Sequence Types	TKU	thickening upward
SEQ	Sequence Types	TNU	thinning upward
SF	Sampled For	AS	assay
SF	Sampled For	GC	geochronology
SF	Sampled For	HS	hand specimen
SF	Sampled For	MAPA	macropaleontology
SF	Sampled For	MIPA	micropaleontology
SF	Sampled For	PMAG	palaeomagnetism
SF	Sampled For	PI	PIMA
SF	Sampled For	RP	rock properties
SF	Sampled For	SO	soil chemistry
SF	Sampled For	SS	stream sediment chemistry
SF	Sampled For	TS	thin section
SF	Sampled For	UNK	unknown
SF	Sampled For	RC	whole-rock chemistry
SF	Sampled For	XRD	X-Ray Diffraction
SOM	Sedimentary Occurrence Mode	CMT	cement
SOM	Sedimentary Occurrence Mode	CLAS	clast
SOM	Sedimentary Occurrence Mode	CNC	concretion
SOM	Sedimentary Occurrence Mode	SDY	dyke
SOM	Sedimentary Occurrence Mode	MT	matrix
SOR	Sorting	B	bimodally sorted
SOR	Sorting	MSO	moderately sorted
SOR	Sorting	P	poorly sorted
SOR	Sorting	UNS	unsorted
SOR	Sorting	VP	very poorly sorted
SOR	Sorting	W	well sorted
SP	Sample Provenance	ADTS	aeolian detritus
SP	Sample Provenance	RB	alluvial detritus
SP	Sample Provenance	COLV	colluvium
SP	Sample Provenance	DSPB	displaced block (near situ)
SP	Sample Provenance	GLE	glacial erratic
SP	Sample Provenance	IS	in situ
SP	Sample Provenance	UNK	unknown
SP	Sample Provenance	VD	volcanic ejectamenta
SPH	Sphericity	ANG	angular
SPH	Sphericity	RO	rounded
SPH	Sphericity	SAN	sub-angular
SPH	Sphericity	SR	sub-rounded
SPH	Sphericity	VA	very angular
SPH	Sphericity	WR	well-rounded
SS	Sedimentary Structures	ADR	adhesion ripples
SS	Sedimentary Structures	AMB	armoured mud balls
SS	Sedimentary Structures	ASYM	asymmetrical ripple mark
SS	Sedimentary Structures	BP	ball-and-pillow
SS	Sedimentary Structures	BIO	bioturbated
SS	Sedimentary Structures	BUB	bubble prints
SS	Sedimentary Structures	BU	burrows
SS	Sedimentary Structures	CHB	churned bedding
SS	Sedimentary Structures	CCO	clast-concavity orientation
SS	Sedimentary Structures	CBL	clay balls
SS	Sedimentary Structures	CNC	concretions
SS	Sedimentary Structures	CIC	cone-in-cone
SS	Sedimentary Structures	COP	coprolite
SS	Sedimentary Structures	CRY	crystal casts
SS	Sedimentary Structures	CC	current crescents

SS	Sedimentary Structures	CSP	cusp structures
SS	Sedimentary Structures	DC	desiccation cracks
SS	Sedimentary Structures	DWS	de-watering structures
SS	Sedimentary Structures	DS	dish structure
SS	Sedimentary Structures	DB	dropped blocks, dropstones
SS	Sedimentary Structures	ES	erosive structures
SS	Sedimentary Structures	FGNS	faceted grains
SS	Sedimentary Structures	FN	fenestral fabric
SS	Sedimentary Structures	FLM	flame structures
SS	Sedimentary Structures	FL	fluting
SS	Sedimentary Structures	GSP	gas pits
SS	Sedimentary Structures	GEO	geopetal
SS	Sedimentary Structures	HMK	harrow marks
SS	Sedimentary Structures	ICI	ice crystal imprints
SS	Sedimentary Structures	IWT	ice wedge traces
SS	Sedimentary Structures	IM	imbricated
SS	Sedimentary Structures	IR	interference ripples
SS	Sedimentary Structures	ICL	intraclast (eg. mudflake)
SS	Sedimentary Structures	INV	involution
SS	Sedimentary Structures	LC	load casts
SS	Sedimentary Structures	MT	matrix
SS	Sedimentary Structures	MSV	mud and sand volcanoes
SS	Sedimentary Structures	MC	mud cracks
SS	Sedimentary Structures	PTG	parting
SS	Sedimentary Structures	PL	parting lineation
SS	Sedimentary Structures	PM	percussion marks
SS	Sedimentary Structures	POP	polished pebbles
SS	Sedimentary Structures	PN	pseudonodules
SS	Sedimentary Structures	PA	pull-apart
SS	Sedimentary Structures	RHP	rain and hail prints
SS	Sedimentary Structures	RS	reactivation surface
SS	Sedimentary Structures	RIL	rill marks
SS	Sedimentary Structures	RIP	ripple marks
SS	Sedimentary Structures	SD	sandstone dykes
SS	Sedimentary Structures	SHC	shale clasts
SS	Sedimentary Structures	SHR	shrinkage cracks
SS	Sedimentary Structures	SLS	slump structures
SS	Sedimentary Structures	SSD	soft sediment deformation
SS	Sedimentary Structures	SM	sole markings
SS	Sedimentary Structures	SP	spongy
SS	Sedimentary Structures	SLN	streaming lineation
SS	Sedimentary Structures	SC	striated clasts
SS	Sedimentary Structures	STY	stylolites
SS	Sedimentary Structures	SMR	symmetrical ripple mark
SS	Sedimentary Structures	SYN	synaeresis cracks
SS	Sedimentary Structures	TM	tool marks
SS	Sedimentary Structures	TO	toroids
SS	Sedimentary Structures	TR	trails
SS	Sedimentary Structures	VCLA	vertical clasts
SS	Sedimentary Structures	WBL	whirl-balls
SS	Sedimentary Structures	WM	wrinkle marks (runzelmarken)
SSTR	Soil Strength	S4	hard soil (150-700kPa)
SSTR	Soil Strength	S2	soft soil (30-70kPa)
SSTR	Soil Strength	S3	stiff soil (70-150kPa)
SSTR	Soil Strength	S5	trans. rock/soil (700kPa-1.5Mpa)
SSTR	Soil Strength	S1	very soft soil (<30kPa)
ST	Sample type	AUG	auger

ST	Sample type	DD	core sample
ST	Sample type	CUTT	cuttings sample
ST	Sample type	FLT	float sample
ST	Sample type	PERC	open hole percussion
ST	Sample type	OC	outcrop sample
ST	Sample type	PC	panned concentrate
ST	Sample type	REVC	reverse circulation percussion
ST	Sample type	RAB	rotary airblast
ST	Sample type	SIDE	sidewall sample
ST	Sample type	SOIL	soil
STX	Sedimentary Texture	BX	breccia
STX	Sedimentary Texture	CEM	cemented
STX	Sedimentary Texture	GP	geopetal
STX	Sedimentary Texture	MCC	micritic
STX	Sedimentary Texture	ON	oncolitic
STX	Sedimentary Texture	OO	oolitic
STX	Sedimentary Texture	PE	peloidal
STX	Sedimentary Texture	PIS	pisolitic
TEC	Tectonic Features	BOU	boudinaged
TEC	Tectonic Features	BR	brecciated
TEC	Tectonic Features	BK	broken
TEC	Tectonic Features	CAT	cataclastic
TEC	Tectonic Features	CLV	cleaved
TEC	Tectonic Features	CT	contorted
TEC	Tectonic Features	CR	crenulated
TEC	Tectonic Features	CRH	crushed
TEC	Tectonic Features	DEF	deformed
TEC	Tectonic Features	FA	faulted
TEC	Tectonic Features	FD	folded
TEC	Tectonic Features	FO	foliated
TEC	Tectonic Features	FR	fractured
TEC	Tectonic Features	FOI	intensely foliated
TEC	Tectonic Features	JO	joint
TEC	Tectonic Features	KI	kink
TEC	Tectonic Features	LI	lineated
TEC	Tectonic Features	FOM	moderately foliated
TEC	Tectonic Features	MU	mullions
TEC	Tectonic Features	MY	mylonitic
TEC	Tectonic Features	SCHS	schistose
TEC	Tectonic Features	SH	sheared
TEC	Tectonic Features	SL	slickensided
TEC	Tectonic Features	FOST	strongly foliated
TEC	Tectonic Features	STYD	stylolitised
TEC	Tectonic Features	TEN	tension gashes
TEC	Tectonic Features	VEIN	vein
TEC	Tectonic Features	VER	vergence
TEC	Tectonic Features	FOW	weakly foliated
VEIN	Vein, dyke or sill	APL	aplite
VEIN	Vein, dyke or sill	CARB	carbonate
VEIN	Vein, dyke or sill	DAC	dacite
VEIN	Vein, dyke or sill	DLT	dolerite
VEIN	Vein, dyke or sill	GRT	granite
VEIN	Vein, dyke or sill	GRD	granodiorite
VEIN	Vein, dyke or sill	GRSN	greisen
VEIN	Vein, dyke or sill	LPY	lamprophyre
VEIN	Vein, dyke or sill	QMG	multi-generation quartz veins
VEIN	Vein, dyke or sill	PEG	pegmatite

VEIN	Vein, dyke or sill	PHY	porphyry
VEIN	Vein, dyke or sill	QZ	quartz
VEIN	Vein, dyke or sill	SYN	syenite
WEA	Weathering	FRS	fresh
WEA	Weathering	HW	highly weathered
WEA	Weathering	MW	moderately weathered
WEA	Weathering	SW	slightly weathered
WEA	Weathering	VHW	very highly weathered

STRUCTURE CODES

TYPE	TYPEDESC	SUBTYPE	LEGEND
0	Vector	0	drill hole/measured section vector
1	Bedding	1	Bedding (gen. dipping)
1	Bedding	2	Bedding (gen. vertical)
1	Bedding	3	Bedding gen. horizontal
1	Bedding	4	Bedding gen. overturned
1	Bedding	11	Bedding(facing definite)
1	Bedding	12	Bedding vertical
1	Bedding	13	Bedding horizontal
1	Bedding	14	Bedding overturned
1	Bedding	15	Bedding horizontal invert
1	Bedding	21	Bedding (facing unknown)
1	Bedding	22	Bedding unknown vertical
1	Bedding	23	Bedding unknown horizontal
2	Cleavage	1	Cleavage dipping
2	Cleavage	2	Cleavage vertical
2	Cleavage	3	Cleavage horizontal
2	Cleavage	11	Crenulation cleavage
2	Cleavage	12	Crenulation cleavage vert
2	Cleavage	13	Crenulation cleavage hori
3	Foliation	1	Foliation dipping
3	Foliation	2	Foliation vertical
3	Foliation	3	Foliation horizontal
4	Igneous Layering	1	Igneous layering dipping
4	Igneous Layering	2	Igneous layering vertical
4	Igneous Layering	3	Igneous layering horizont
5	Axial Surface	1	Axial surface dipping
5	Axial Surface	2	Axial surface vertical
5	Axial Surface	3	Axial surface horizontal
6	Fault Plane	1	Fault dipping
6	Fault Plane	2	Fault vertical
6	Fault Plane	3	Fault horizontal
7	Vein	1	Vein quartz
7	Vein	2	Vein porphyry
7	Vein	3	Vein dolerite
7	Vein	4	Vein granite
7	Vein	5	Vein lamprophyre
7	Vein	6	Vein pegmatite
7	Vein	7	Vein rodingite
7	Vein	8	Vein aplite
7	Vein	9	Vein microgranite
7	Vein	10	Vein syenite
8	Joint	1	Joint dipping
8	Joint	2	Joint vertical
8	Joint	3	Joint horizontal
9	Airphoto Dip	1	0-5 degree dip
9	Airphoto Dip	2	5-15 degree dip
9	Airphoto Dip	3	15-45 degree dip
9	Airphoto Dip	4	45-90 degree dip
9	Airphoto Dip	5	dip not estimated
9	Airphoto Dip	6	vertical dip
9	Airphoto Dip	7	horizontal dip
20	Fold	1	Fold hinge
21	Lineation	1	Mineral elongation
21	Lineation	2	Stretching lineation
21	Lineation	3	Intersection lineation
21	Lineation	4	Crenulation lineation
21	Lineation	5	Slickenside
21	Lineation	6	Mullion
22	Palaeocurrent	1	Palaeocurrent
23	Boudin axis	1	Boudin axis
31	Kink band	1	Kink band
32	Shearing	1	Shearing direction
35	Mylonite fabric	1	C plane
35	Mylonite fabric	2	S plane