
**Geological Logging Codes**
v3.0 Updated 14/02/2015

| Events | |
|---|---|
| **Code** | **Description** |
| BOCO | Base of Complete Oxidation |
| TOFR | Top of Fresh Rock |
| TOSA | Top of Saprolite |
| BOA | Base of Transported Overburden |
| WT | Water Table |
| TOSR | Top of Saprock |

| Regolith | |
|---|---|
| **Code** | **Description** |
| DU | Duricrust |
| FR | Fresh |
| LS | Lower Saprolite |
| MZ | Mottled Zone |
| SL | Soils |
| SR | Saprock |
| TN | Transition |
| TP | Transported |
| US | Upper Saprolite |

| | Lithology Codes | | |
|---|---|---|---|
| | **Code** | **Description** | **Class** |
| Quarternary | Qa | Alluvium | regolith |
| | Qc | Clay | regolith |
| | Qg | Gravel/talus | regolith |
| | Qh | Soil/loam | regolith |
| | Ql | Laterite, Transported | regolith |
| | Qm | Colluvium | regolith |
| | Qp | Gypsiferous sand | regolith |
| | Qs | Sand | regolith |
| | Qsl | Pisolitic, lateritic sand/soil | regolith |
| | Qsw | Sand, aeolian | regolith |
| Cainozoic | Cc | Clay | regolith |
| | Ccl | Lower Saprolite Clay | regolith |
| | Ccm | Mottled Clay | regolith |
| | Ccu | Upper Saprolite Clay | regolith |
| | Cg | Gossan | regolith |
| | Cgr | Gravels | regolith |
| | Clc | Calcrete | regolith |
| | Clf | Ferricrete | regolith |
| | Clh | Hardpan | regolith |
| | Cll | Laterite (undiff) | regolith |
| | Clm | Magnesite | regolith |
| | Clp | Pisolitic | regolith |
| | Cls | Silcrete | regolith |
| | Cs | Sands | regolith |
| Permian | P | Permian undiff | sediment |
| | Paf | Sandstone/Congl (fluvial) | sediment |
| | Pag | Tillite (glacial) | sediment |
| | Pal | Claystone/Siltstone (lac) | sediment |
| Sediment | Asb | Sedimentary Breccia | sediment |
| | Asc | Chert | sediment |
| | Ascl | Claystone | sediment |
| | Asd | Dolomite | sediment |
| | Asf | BIF | sediment |
| | Asg | Gritstone | sediment |
| | Ash | Shale | sediment |
| | Ashb | Black shale | sediment |
| | Asi | Intermediate sed | sediment |
| | Asm | Mafic Sediment | sediment |

| | Lithology Codes | | |
|---|---|---|---|
| | **Code** | **Description** | **Class** |
| Acid- Intermediate Rocks | Aae | Aplite | igneous |
| | Aau | Felsite undifferentiated | felsic |
| | Age | Pegmatite | igneous |
| | Agm | Monzonite | felsic |
| | Agmq | Quartz monzonite | felsic |
| | Ago | Granodiorite | felsic |
| | Agp | Porphyry | felsic |
| | Agpf | Feldspar porphyry | felsic |
| | Agpq | Quartz porphyry | felsic |
| | Agpy | Quartz feldspar porphyry | felsic |
| | Agr | Granite | felsic |
| | Agrm | Monzogranite | felsic |
| | Ags | Syenite | felsic |
| | Agsq | Quartz Syenite | felsic |
| | Agt | Tonalite | felsic |
| | Agu | Granitoid | felsic |
| Andesitic Rocks | Aia | Andesite | intermediate |
| | Aiig | Ignimbrite | intermediate |
| | Ait | Intermediate tuff | intermediate |
| | Aita | Intermediate tuff, ash fall | intermediate |
| | Aitc | Intermediate tuff, cherty | intermediate |
| | Aitl | Intermediate lapilli tuff | intermediate |
| | Aiu | Intermediate volcanic | intermediate |
| | Aivc | Intermediate volcaniclastics | intermediate |
| | Aivx | Intermediate volcanic breccia | intermediate |
| | Aiy | Trachyte | intermediate |
| Rhyolite - Dacite Rocks | Aad | Dacite | felsic |
| | Aaf | Felsic Volcanics undiff | felsic |
| | Aafc | Felsic Volcaniclastics | felsic |
| | Aaig | Ignimbrite, quartz-rich | felsic |
| | Aar | Rhyolite | felsic |
| | Aat | Felsic tuff | felsic |
| | Aata | Felsic tuff, ash fall | felsic |
| | Aatc | Felsic tuff, cherty | felsic |
| | Aatl | Felsic Lapilli tuff | felsic |
| | Aav | Felsic agglomerate | felsic |
| | Aavx | Felsic volcanic breccia | felsic |
| | Aitr | Crystal tuff | felsic |

| | Lithology Codes | | |
|---|---|---|---|
| | **Code** | **Description** | **Class** |
| Basic Rocks | Ab | Basic rock, undiff. | mafic |
| | Abi | Basic rock, intermediate | mafic |
| | Abk | Basalt, high mag | mafic |
| | Abt | Basalt, tholeiitic | mafic |
| | Abu | Basalt | mafic |
| | Abvc | Mafic Volcaniclastics | mafic |
| | Adl | Leucodolerite | mafic |
| | Adm | Meladolerite | mafic |
| | Ado | Dolerite | mafic |
| | Adq | Quartz dolerite | mafic |
| | Ala | Lamprophyre | mafic |
| | Aoa | Anorthosite | mafic |
| | Aoc | Chromitite | mafic |
| | Aod | Diorite | mafic |
| | Aog | Gabbro | mafic |
| | Aogm | Magnetite Gabbro | mafic |
| | Aol | Leucogabbro | mafic |
| | Aom | Melagabbro | mafic |
| | Aon | Norite | mafic |
| | Aoq | Quartz gabbro | mafic |
| | Aot | Troctolite | mafic |
| | Aou | Basic Intrusive, undiff | mafic |
| | Aov | Massive Magnetite | mafic |
| | Aoy | Granophyre | mafic |
| | Atm | Mafic Tuff | mafic |
| Ultramafic Rocks | Aua | tremolite rock | ultramafic |
| | Auac | tremolite-chlorite rock | ultramafic |
| | Aud | dunite (>90% olivine) | ultramafic |
| | Auh | harzburgite | ultramafic |
| | Auk | komatiite | ultramafic |
| | Aup | pyroxenite ( | ultramafic |
| | Aupp | peridotite (40-90% olivine) | ultramafic |
| | Aus | serpentinite | ultramafic |
| | Aut | talc rock | ultramafic |
| | Autc | talc-chlorite rock | ultramafic |
| | Auu | undifferentiated | ultramafic |
| | Agn | Gneiss | metamorphic |
| | Amt | Migmatite | metamorphic |

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**Geological Logging Codes**
**v. Feb 2015**

| Lithology Texture | | |
|---|---|---|
| **Code** | **Description** | **Class** |
| ah | aphanitic | igneous |
| am | agglomerate | volcanic |
| ap | aplitic | igneous |
| ay | amygdaloidal | volcanic |
| bb | blebby | volcanic |
| bc | bleached | weathering |
| bd | banded | sedimentary |
| be | bedded | sedimentary |
| bk | blocky | structure |
| cb | cross bedded | sedimentary |
| cc | contact - chilled | igneous |
| ci | contact - imbricated | igneous |
| cs | clast supported | sedimentary |
| ct | clastic | sedimentary |
| cu | cumulate | igneous |
| cx | contact - transitional | structure |
| cz | contact - sheared | structure |
| et | eutaxitic | volcanic |
| fl | flame structure | sedimentary |
| fr | fragmental | structure |
| fu | fluidal | volcanic |
| fy | flaggy | sedimentary |
| gb | granoblastic | metamorphic |
| gd | graded bedding | sedimentary |
| gn | gneissic | metamorphic |
| go | gossanous | sedimentary |
| gr | granitic | igneous |
| gy | greasy | metamorphic |
| ho | homogeneous | general |
| ht | heterogeneous | general |
| ib | interbedded | sedimentary |
| id | indurated | weathering |
| iq | inequigranular | igneous |
| ja | jasperoidal | sedimentary |
| kn | knotted | metamorphic |
| la | lapilli | volcanic |
| li | lineation | structure |
| lm | laminated | sedimentary |
| ln | lenticular | sedimentary |
| lt | lithic | sedimentary |
| ma | massive | igneous |

| Lithology Texture | | |
|---|---|---|
| **Code** | **Description** | **Class** |
| mo | monomictic | structure |
| ms | matrix supported | igneous |
| mt | migmatitic | metamorphic |
| nd | nodular | sedimentary |
| oo | oolitic | sedimentary |
| op | ophitic | igneous |
| or | orbicular | igneous |
| pb | porphyroblastic | metamorphic |
| pe | pegmatitic | igneous |
| pg | granophyric | igneous |
| pi | pillowed | volcanic |
| pm | polymictic | igneous |
| po | porphyritic | metamorphic |
| ps | pisolitic | sedimentary |
| py | pyroclastic | volcanic |
| qe | quartz eyed | metamorphic |
| re | recrystallized | metamorphic |
| s1 | sorting - very poor | sedimentary |
| s2 | sorting - poor | sedimentary |
| s3 | sorting - moderate | sedimentary |
| s4 | sorting - well | sedimentary |
| s5 | sorting - very well | sedimentary |
| sb | slabby | volcanic |
| se | schlieren | igneous |
| sg | stringer | general |
| si | siliceous/silica flooded | igneous |
| sl | slatey | metamorphic |
| so | subophitic | igneous |
| sp | spotted | metamorphic |
| sr | stromatolitic | sedimentary |
| sx | spinifex texture | volcanic |
| sy | stylolitic | structure |
| tt | trachytic | volcanic |
| tu | tuffaceous | volcanic |
| va | variolitic | igneous |
| ve | vesicular | volcanic |
| vg | vuggy | general |
| vi | vitric | volcanic |
| vv | varved | volcanic |
| we | welded | volcanic |
| wf | weakly foliated | metamorphic |
| wx | waxy | general |

| Structure Type | |
|---|---|
| **Code** | **Description** |
| ad | anticline downhole |
| au | anticline upole |
| bd | banded |
| be | bedded |
| bk | blocky |
| bu | boudinaged |
| bx | brecciated |
| ca | cataclastic |
| cb | cross bedded |
| cc | contact - chilled |
| ci | contact - imbricated |
| cr | crenulated/folded |
| cx | contact - transitional |
| cz | contact - sheared |
| fa | fold axis |
| fc | fractured |
| fd | folded |
| fl | flame structure |
| fo | foliation |
| gd | graded bedding |
| gn | gneissic |
| jo | jointed |
| li | lineation |
| ll | lit par lit |
| lm | laminated |
| my | mylonitic |
| qz | quartz veined |
| sb | slabby |
| sc | schistose |
| se | schlieren |
| sh | sheared |
| sk | slickensides |
| sl | slatey |
| sw | stockwork veined |
| va | actinolite vein |
| vb | carbonate vein |
| vcb | quartz carbonate vein |
| vh | hematite altered vein |
| vp | pegmatite vein |
| vv | varved |

| Vein Morphology | |
|---|---|
| **Code** | **Description** |
| bd | banded |
| bk | blocky |
| bu | boudinaged |
| bx | brecciated |
| cr | crenulated/folded |
| cx | contact - transitional |
| cz | contact - sheared |
| fc | fractured |
| fd | folded |
| lm | laminated |
| ln | lenticular |
| ma | massive |
| nb | nebulitic |
| sc | schistose |
| sh | sheared |
| sk | slickensides |
| sm | stromatic |
| sw | stockwork veined |
| sy | stylolitic |
| tb | tabular |
| vg | vuggy |

| Vein Style | |
|---|---|
| **Code** | **Description** |
| ac | acicular |
| an | anhedral |
| ap | aplitic |
| bl | bladed |
| bo | botryoidal |
| cl | chalcedonic |
| cn | conchoidal |
| dr | drusy |
| ds | disseminated |
| eg | equigranular |
| el | elongated |
| eu | euhedral |
| ic | inclusions |
| in | interstitial |
| mg | medium grained |
| mx | matrix |
| nb | nebulitic |
| oc | ocelli |
| pp | pseudomorphous |
| qz | quartz veined |
| r1 | roundness - very angular |
| r2 | roundness - angular |
| r3 | roundness - subangular |
| r4 | roundness - subrounded |
| r5 | roundness - rounded |
| r6 | roundness - very rounded |
| ra | radiating/stellate |
| rd | rounded |
| sa | saccaroidal |
| sg | stringer |
| sw | stockwork veined |
| tb | tabular |
| tr | translucent |
| vn | veined |

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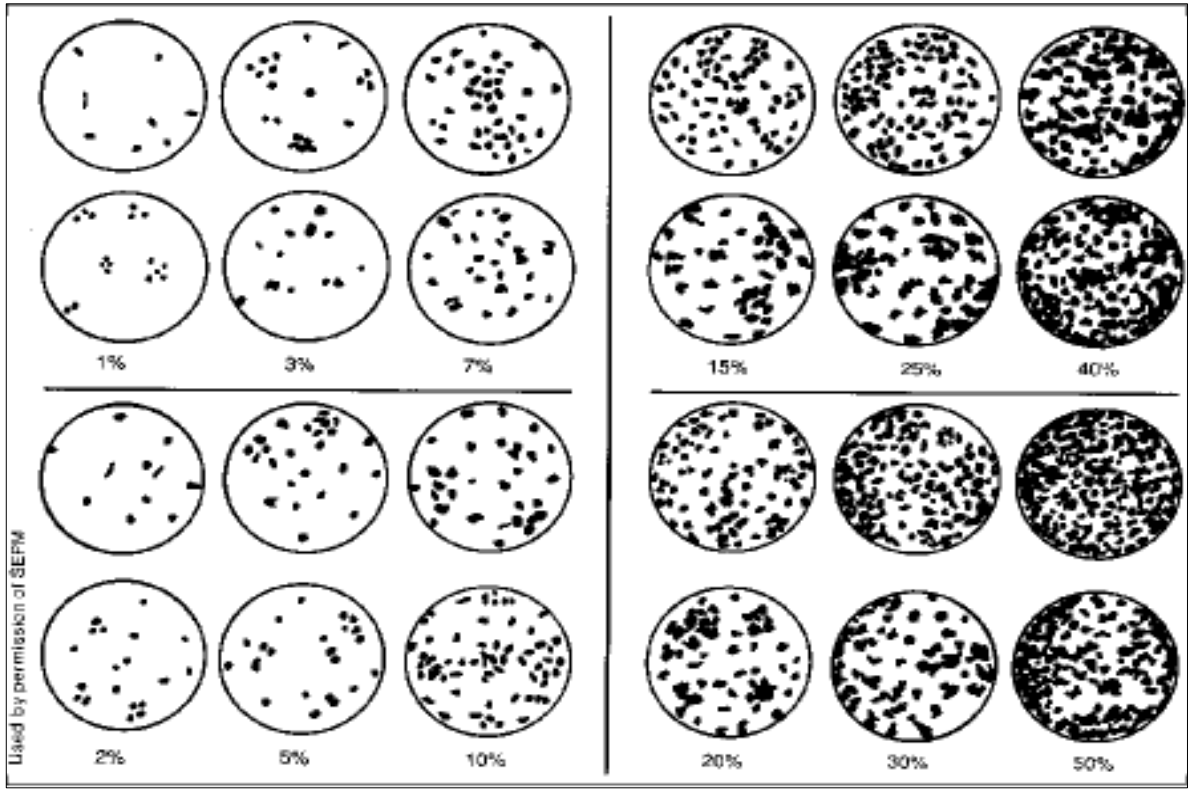
Geological Logging Codes
v. Feb 2015

| Colour | |
|---|---|
| **Code** | **Description** |
| bf | buff |
| bg | brown-green |
| bl | black |
| br | brown |
| bu | blue |
| cr | cream |
| gb | green-blue |
| gg | grey-green |
| gr | green |
| gy | grey |
| kh | khaki |
| mo | mottled |
| mv | mauve |
| ob | orange-brown |
| oc | ochre |
| or | orange |
| pb | pink-brown |
| pi | pink |
| pu | purple |
| rb | red-brown |
| rd | red |
| tn | tan |
| tw | tan-white |
| wb | white-brown |
| wh | white |
| yb | yellow-brown |
| ye | yellow |

| Miscellaneous | |
|---|---|
| **Code** | **Description** |
| LODE | Lode |
| MSU | Massive Suphides |
| NC | No core |
| NL | Not logged |
| NR | Not Recorded |
| NS | No sample |
| Pd | Proterozoic Dolerite Dyke |
| SHZ | Shear Zone |
| UNKN | Unknown Code |
| Vac | Actinolite vein |
| Vc | Carbonate Vein |
| Vq | Quartz Vein |
| Vqc | Quartz-Carbonate Vein |
| WKG | Stope/workings |

| Colour Tone | |
|---|---|
| **Code** | **Description** |
| d | dark |
| l | light |
| m | medium |
| mo | mottled |

| Grainsize | |
|---|---|
| **Code** | **Description** |
| cg | coarse-grained |
| fg | fine-grained |
| mg | medium-grained |
| vcg | very coarse-grained |
| vfg | very fine-grained |





*Above: Chart for estminating mineral grain percentage composition of rocks and sediments*

*Left: Grain size estimation chart*

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**Geological Logging Codes**
**v. Feb 2015**

| Alteration Code | |
|---|---|
| **Code** | **Description** |
| aa | advanced argillic |
| ab | albite |
| an | altered, type not recognized |
| ar | argillic |
| ascb_m | albite±sericite±chlorite±biotite |
| ascb_s | albite±sericite±chlorite±biotite |
| ascb_w | albite±sericite±chlorite±biotite |
| bi | biotite |
| bl | bleached |
| ca | calcite |
| cb | carbonate |
| ch | chlorite |
| cl | chalcedony |
| do | dolomite |
| ep | epidote |
| fe | ferruginous |
| fu | fuchsite |
| go | goethite |
| gr | garnierite |
| he | hæmatite |
| hemag | hematite ± magnetite |
| hs | specular hæmatite |
| il | illite |
| ka | kaolin |
| mi | mica |
| mm | montmorillonite |
| mt | magnetite |
| mu | muscovite |
| pc | phyllic |
| pp | propylitic |
| pr | pyrophyllite |
| pt | potassic |
| qc | quartz-carbonate |
| qf | quartzofeldspathic |
| qt | quartz-tourmaline |
| qz | quartz |
| sacb | sericite±albite±chlorite±biotite |
| se | sericite |
| si | sillimanite |
| sl | silica |
| ta | talc |
| tr | tourmaline |

| Alteration Style | |
|---|---|
| **Code** | **Description** |
| ac | acicular |
| an | anhedral |
| bb | blebby |
| bl | bladed |
| bo | botryoidal |
| cl | chalcedonic |
| cn | conchoidal |
| dr | drusy |
| ds | disseminated |
| eg | equigranular |
| el | elongated |
| eu | euhedral |
| ic | inclusions |
| in | interstitial |
| mg | medium grained |
| mx | matrix |
| nb | nebulitic |
| nd | nodular |
| oc | ocelli |
| pb | porphyroblastic |
| pp | Pseudomorphous |
| pr | pervasive |
| ps | pisolitic |
| qz | quartz veined |
| r1 | roundness - very angular |
| r2 | roundness - angular |
| r3 | roundness - subangular |
| r4 | roundness - subrounded |
| r5 | roundness - rounded |
| r6 | roundness - very rounded |
| ra | radiating/stellate |
| rd | rounded |
| rp | replacement |
| sa | saccaroidal |
| sg | stringer |
| sw | stockwork veined |

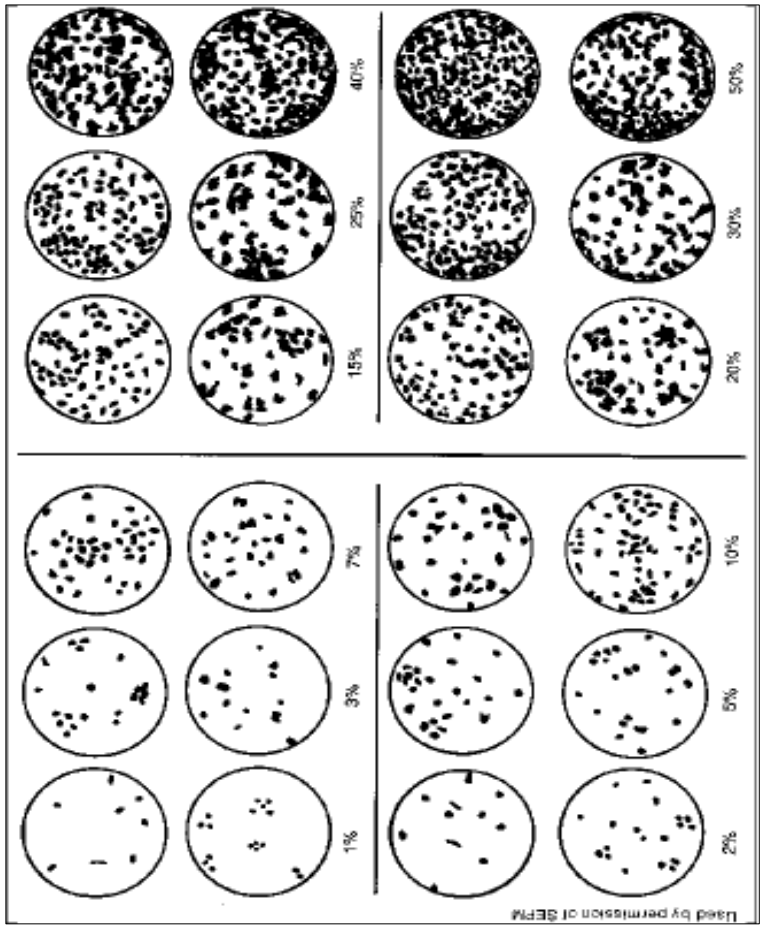
| Alteration Intensity | |
|---|---|
| **Code** | **Description** |
| m | moderate |
| s | strong |
| v | variable |
| w | weak |

| Sulphides | |
|---|---|
| **Code** | **Description** |
| as | arsenopyrite |
| bo | bornite |
| cc | chalcocite |
| cp | chalcopyrite |
| cv | covellite |
| ga | galena |
| mo | molydenite |
| mr | marcasite |
| pn | pentlandite |
| po | pyrrhotite |
| py | pyrite |
| sb | stibnite |
| sp | sphalerite |
| su | sulphide |
| td | tetrahedrite-tennantite |

| Sulphide Style | |
|---|---|
| **Code** | **Description** |
| an | anhedral |
| bd | banded |
| cg | coarse grained |
| cu | cumulate |
| ds | disseminated |
| eg | equigranular |
| et | eutaxitic |
| eu | euhedral |
| fg | fine grained |
| go | gossanous |
| iq | inequigranular |
| lm | laminated |
| ma | massive |
| mg | medium grained |
| ms | matrix supported |
| mx | matrix |
| pr | pervasive |
| re | recrystallized |
| se | schlieren |
| sg | stringer |
| su | subhedral |
| vcg | very coarse-grained |
| vfg | very fine-grained |
| vg | vuggy |
| vn | vein |

| Grainsize | |
|---|---|
| **Code** | **Description** |
| cg | coarse-grained |
| fg | fine-grained |
| mg | medium-grained |
| vcg | very coarse-grained |
| vfg | very fine-grained |

*Chart for estminating mineral grain percentage composition of rocks and sediments*



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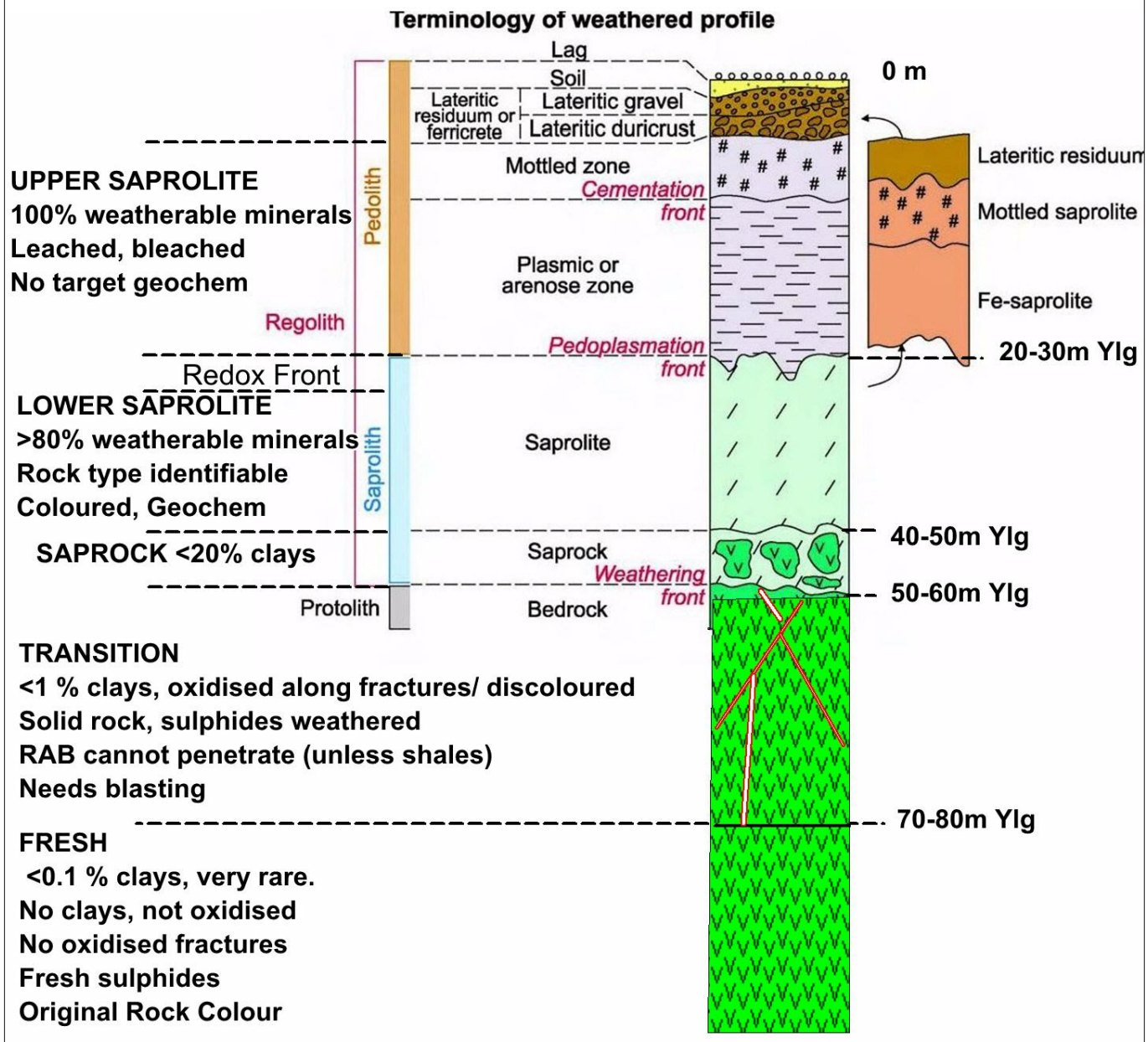
**Geological Logging Codes**
**v. Feb 2015**

| Minerals | |
|---|---|
| **Code** | **Description** |
| ab | albite |
| ac | actinolite |
| ad | andalusite |
| af | alkali feldspar |
| ag | silver |
| ah | anhydrite |
| ak | ankerite |
| al | aluminous |
| am | amphibole |
| ao | asbestos |
| ap | apatite |
| as | arsenopyrite |
| at | alunite |
| au | gold |
| ay | anthophyllite |
| az | azurite |
| ba | barite |
| be | beryl |
| bi | biotite |
| bo | bornite |
| ca | calcite |
| cb | carbonate |
| cc | chalcocite |
| cd | cordierite |
| ce | cerrusite |
| ch | chlorite |
| cl | chalcedony |
| cm | cummingtonite |
| co | copper secondary minerals |
| cp | chalcopyrite |
| cr | chromite |
| cs | cassiterite |
| ct | chloritoid |
| cv | covellite |
| cx | clinopyroxene |

| Minerals | |
|---|---|
| **Code** | **Description** |
| cy | clay |
| di | diopside |
| do | dolomite |
| ep | epidote |
| fd | feldspar |
| fl | fluorite |
| fu | fuchsite |
| ga | galena |
| gf | graphite |
| gh | gahnite |
| go | goethite |
| gr | garnierite |
| gs | gaspeite |
| gt | garnet |
| gu | grunerite |
| gy | gypsum |
| hb | hornblende |
| he | hæmatite |
| hs | specular hæmatite |
| il | illite |
| ja | jarosite |
| ka | kaolin |
| ky | kyanite |
| le | lepidolite |
| li | limonite |
| lo | lead secondary minerals |
| lx | leucoxene |
| ma | malachite |
| mf | mafic minerals |
| mi | mica |
| mm | montmorillonite |
| mn | manganese minerals |
| mo | molybdenite |
| mr | marcasite |
| ms | magnesite |
| mt | magnetite |
| mu | muscovite |
| nn | nontronite |
| ol | olivine |

| Minerals | |
|---|---|
| **Code** | **Description** |
| ox | orthopyroxene |
| pe | prehnite |
| pg | phlogopite |
| ph | phosphate |
| pi | pitchblende |
| pl | plagioclase |
| pn | pentlandite |
| po | pyrrhotite |
| pp | propylitic |
| pr | pyrophyllite |
| px | pyroxene |
| py | pyrite |
| qc | quartz-carbonate |
| qt | quartz-tourmaline |
| qz | quartz |
| rh | rhodocrosite |
| sa | saussurite |
| sb | stibnite |
| sc | scheelite |
| sd | siderite |
| se | sericite |
| si | sillimanite |
| sl | silica |
| sn | stannite |
| sp | sphalerite |
| sr | serpentine |
| st | staurolite |
| su | sulphide |
| ta | talc |
| td | tetrahedrite-tennantite |
| tm | tremolite |
| tr | tourmaline |
| tz | topaz |
| uo | uranium secondary minerals |
| up | uranophane |
| ur | uraninite |
| vl | violarite |
| zn | zinwaldite |
| zo | zinc secondary minerals |

| Mineral Style | |
|---|---|
| **Code** | **Description** |
| ac | acicular |
| an | anhedral |
| bb | blebby |
| bl | bladed |
| bo | botryoidal |
| cl | chalcedonic |
| cn | conchoidal |
| dr | drusy |
| ds | disseminated |
| eg | equigranular |
| el | elongated |
| eu | euhedral |
| ic | inclusions |
| in | interstitial |
| mx | matrix |
| nb | nebulitic |
| nd | nodular |
| oc | ocelli |
| pb | porphyroblast |
| pr | pervasive |
| ps | pisolitic |
| qz | quartz veined |
| r1 | roundness - very angular |
| r2 | roundness - angular |
| r3 | roundness - subangular |
| r4 | roundness - subrounded |
| r5 | roundness - rounded |
| r6 | roundness - very rounded |
| ra | radiating/stellate |
| rd | rounded |
| rp | replacement |
| sa | saccaroidal |
| sg | stringer |
| su | subhedral |
| sw | stockwork veined |
| tb | tabular |
| tr | translucent |
| vn | veined |


Terminology of weathered profile
Lag
Soil
Lateritic residuum or ferricrete
Lateritic gravel
Lateritic duricrust
Mottled zone
Cementation front
Plasmic or arenose zone
Pedoplasmation front
Saprolite
Saprock
Weathering front
Bedrock
Pedolith
Saprolith
Regolith
Protolith
Redox Front
UPPER SAPROLITE
100% weatherable minerals
Leached, bleached
No target geochem
LOWER SAPROLITE
>80% weatherable minerals
Rock type identifiable
Coloured, Geochem
SAPROCK <20% clays
TRANSITION
<1 % clays, oxidised along fractures/ discoloured
Solid rock, sulphides weathered
RAB cannot penetrate (unless shales)
Needs blasting
FRESH
<0.1 % clays, very rare.
No clays, not oxidised
No oxidised fractures
Fresh sulphides
Original Rock Colour
0 m
Lateritic residuum
Mottled saprolite
Fe-saprolite
20-30m Ylg
40-50m Ylg
50-60m Ylg
70-80m Ylg