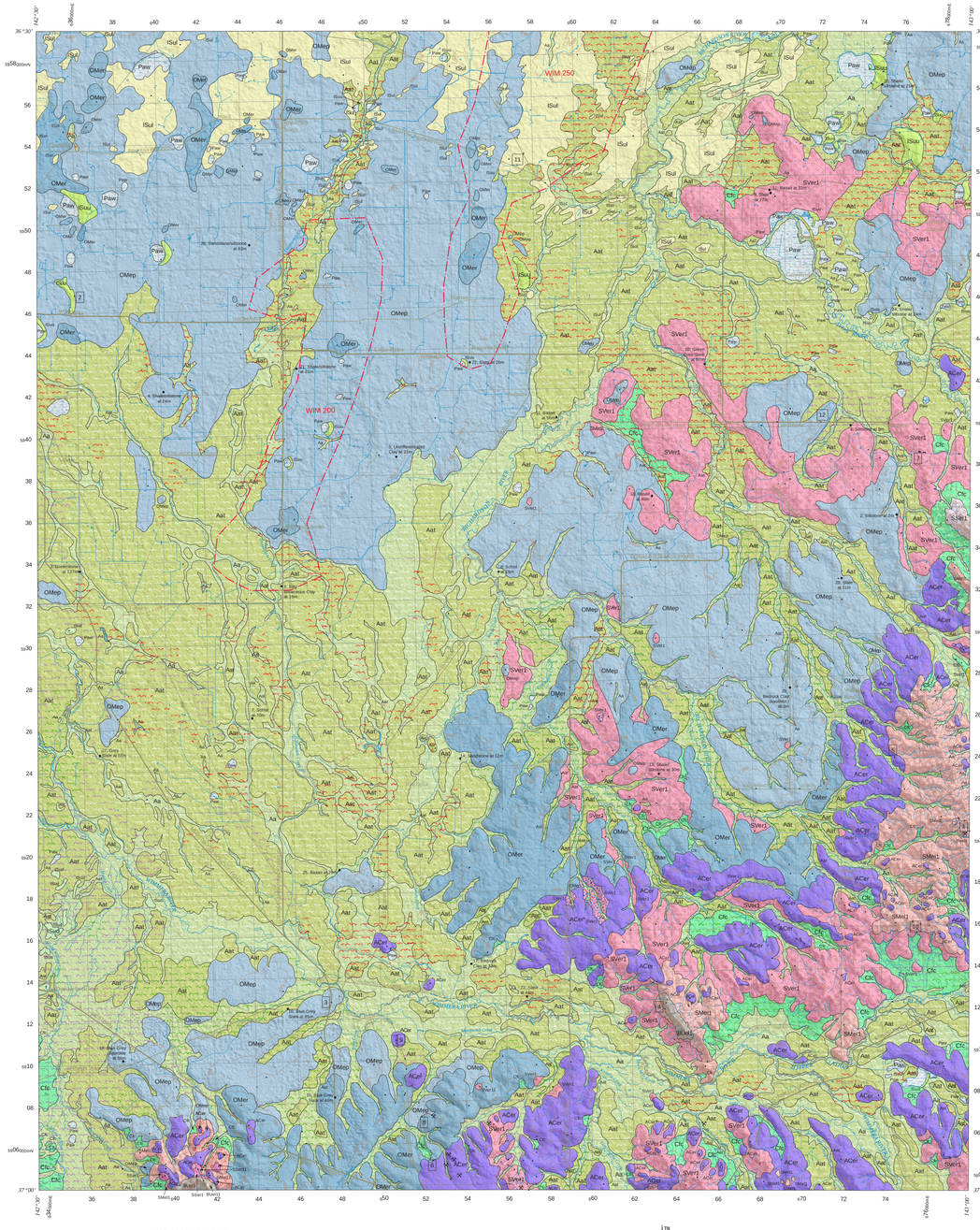


MAP SCALE 1:100 000

metres 2000 1000 0 2 4 6 8 10 kilometres

Transverse Mercator Projection: Map Grid Australia - ZONE 54
Grid interval: 2000 metres

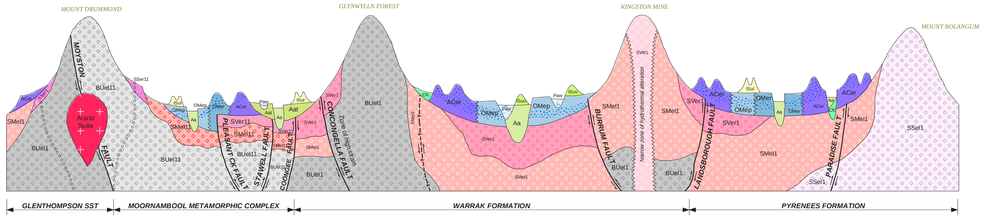
Vertical datum: Australian Height Datum 1971 (AHD)
Horizontal datum: Geocentric Datum of Australia 1994 (GDA)

GDA

Magnetic North is 10°12' 54" east of Grid North at the centre of this map. Magnetic North is correct for 2006 and increases annually at a rate of approximately 00° 43' east of True North.

Grid convergence is 02° 50" at the centre of the map.

REGOLITH LANDFORM RELATIONSHIP DIAGRAM



Transported units

	Regolith type	Landform pattern	Abstract
Alluvial			
Aa	Channel and overbank deposits	Alluvial landforms	*Slightly weathered polymictic gravel, sand, silt and clay; variably sorted and rounded; Red Vertosols and Sodosols dominant, Brown Sodosols and self-mulching Grey and Black Vertosols also present; no distinctive radiometric response*
Aat	Channel and overbank deposits	Alluvial terrace	*Slightly to moderately weathered polymictic gravel, sand, silt and clay; dissected, variably sorted and rounded; soils include Red Vertosols, Brown to Red Sodosols and self-mulching Grey to Black Vertosols; no distinctive radiometric response; deposits form alluvial terraces 1–10 metres above the current stream base*
ACer	Channel deposits	Rises	*Slightly to moderately weathered quartz pebble/cobble conglomerate preserved on undulating low hills and isolated rises; v ariably ferruginised, silicified and kaolinised deposits overlie both weathered marine sediments and pallid, very highly weathered bedrock, distinct mottling common below indurated horizons; soils dominantly skeletal Red and Brown Sodosols; low total radio element response, low K, variable Th and moderate to high U; unit topographically inverted*
Clc	Colluvial sediments	Colluvial fan	*Fresh to slightly weathered polymictic gravel, sand, silt and clay; poorly consolidated and sorted, some deposits di ssected; soils include Red Chromosols, Brown to Red Sodosols and self-mulching Brown to Black Vertosols; no distinctive radiometric signature*
Paw	Paludal sediments	Alluvial swamp	*Slightly to moderately weathered sand, silt and clay; variably sorted, unconsolidated and commonly rich in organic material; soils include well developed Red Chromosols, Brown to Red Sodosols and Grey to Red Vertosols; no distinctive radiometric signature*
ISau	Aeolian sand	Lunette	*Fresh quartz sand deposits; subangular to subrounded, medium to coarse grained, moderately sorted and poorly consolidated, orange to brown; soils commonly Red, Brown and Grey Sodosols, Chromosols, and self-mulching Vertosols; variable total count, high K a nd moderate to high Th and U; deposits flank the north-eastern margins of swamps and lakes.*
ISul	Aeolian sand	Longitudinal dunefield	*Fresh quartz sand deposits; subangular to subrounded, medium to coarse grained, moderately sorted and poorly consolidated, orange to brown; soils include self-mulching Brown, Red and Black Vertosols, Red Sodosols and Red Chromosols; low total radioelement response, moderate to high K, low to moderate Th and low U; dunes aligned parallel with the direction of the prevailing wind; deposits consist of reworked marine sediments (OMep and OMel)*
ISud	Aeolian sand	Aeolian dune	*Fresh quartz sand deposits; well rounded and sorted, fine to medium grained and poorly consolidated; soils include Grey, Red and Brown Rudosols, Tenosols and Sodosols; low radioelement concentrations in all channels; irregular shaped deposits represent new orked alluvial and colluvial material shed from the Grampians*
OMep	Marine sediments	Plain	*Slightly to moderately weathered quartz sandstone preserved on gently undulating plains and rises; bioturbated and intensely mottled, fine to coarse grained, induration in near surface horizons common on rises; soils include Red Sodosols and Chromosols, self -mulching Grey, Black, Brown and Red Vertosols; low to moderate total count, variable K (decreasing towards highland margin), moderate t o high Th and moderate U*
OMer	Marine sediments	Rises	*Slightly to moderately weathered quartz sandstone on undulating low hills and rises; moderately consolidated and sorted, fine to coarse grained, mottled and bioturbated, indurated sandstone lag common on surface; soils dominantly skeletal Red and Brown Sodosols, low to moderate total count, variable K (increasing basinwards), variable Th (decreasing basinwards) moderate to high U, unit topographically inverted*

In situ units

	Regolith type	Landform pattern	Abstract
BUer1	Unweathered bedrock	Low hills	*Unweathered bedrock forming rolling low hills; turbiditic sandstone, greywacke and mudstone with little or no regolith cover; soils grade from Tenosols on crests to weakly structured Chromosols on lower slopes; high total count response, high K, Th and mod erate to high U*
BUul1	Unweathered bedrock	Low hills	*Unweathered bedrock forming rolling low hills; predominantly fresh amphibolite schist, quartz -mica schist and intercalated metapsammite with little or no regolith cover; soils grade from skeletal Red and Brown Sodosols on crests to weakly structured Chromosols on lower slopes; high total count, high K, Th and U*
SSel1	Slightly weathered saprolite	Low hills	*Slightly weathered saprolite on undulating low hills; discoloured and partially ir iron-stained turbiditic sandstone and mudstone forming linear bedrock interfluves elevated 60-120 m above current stream levels; soils range from Orthic Tenosols and Red to Brown Sodosols and Tenosols on crests to well structured duplex Chromosols over shallower slopes; high total count, high K and Th, low U .*
SSer1	Slightly weathered saprolite	Rises	*Slightly weathered saprolite on gently undulating rises; contact-metamorphosed turbiditic sandstone and mudstone with little (<50 cm) or no regolith cover; soils dominantly skeletal Red and Brown Sodosols; high total radioelement response, high K, moderate to high Th and U*
SSer11	Slightly weathered saprolite	Rises	*Slightly weathered saprolite on gently undulating rises; c ontact-metamorphosed quartz-mica schist, metapelite and metapsammite forming large rock platforms with little (<50 cm) or no regolith cover; interlocking cornerstones common in finer grained lithologies; soils skeletal Red and Brown Sodosols; high total count response, high K, moderate to high Th and U*
SMel1	Moderately weathered saprolite	Low hills	*Moderately weathered saprolite on undulating low hills; locally iron -stained, mottled and/or bleached turbiditic sandstone and mudstone; prominent lesegang banding common in areas of low relief; Red to Brown Sodosols often shallow and stony throughout, mottling common in thicker profiles; moderate to high total count response, variable K, high Th and U; graded bedding and cross stratification common*
SMer11	Moderately weathered saprolite	Low hills	*Moderately weathered saprolite on undulating low hills; locally iron -stained, mottled and/or bleached quartz mica schist, metapsammite and metapelite; strongly schistose with prominent lesegang banding in places; soils predo minantly shallow, stony Red to Brown Sodosols and Chromosols; moderate to high total count, low K, moderate to high Th and U*
SVel1	Very highly weathered saprolite	Low hills	*Very highly weathered saprolite on rolling low hills; pallid turbiditic sandstone and mudstone capped by a thin vein quartz lag, iron mottled and extremely friable, sub/nde moulds common; soils predominantly stony Anthroposols and skeletal Red to Brown Sodos ols; high total count, K and Th, moderate to high U; unit contains zones of intense hydrothermal alteration*
SVer1	Very highly weathered saprolite	Rises	*Very highly weathered saprolite on gently undulating rises; friable, intensively bleached and/or iron -stained turbiditic sandstone and mudstone; mottling and lesegang banding common although not diagnostic; infrequent induration in near surface horizons; soils include Grey, Black and Brown Vertosols, stony Red to Brown Sodosols and minor Red Chromosols; moderat e to high total count, variable K, moderate to high Th and U*
SVer11	Very highly weathered saprolite	Rises	*Very highly weathered saprolite on gently undulating rises; friable, intensively bleached and/or iron -stained quartz mica schist, metapsammite and metapelite; highly schistose with prominent iron mottling and lesegang banding in places; soils include Grey, Black and Brown Vertosols, stony Red to Brown Sodosols and minor Red Chromosols; low to moderate total count, variable K, mode rate to high Th and U*

Induration modifier

Ferruginous/siliceous duricrust; topographically inverted cemented horizons overlie pallid, very highly weathered units, iron-staining and mottling common directly below indurated horizons; variably structured soils contain a distinctive pisolitic layer; variable total count, low K, high Th and moderate to high U

Radiometric Signature

Low K, Th & U — High K — High Th — High K, Th & U

Regolith - landform unit boundary
Excursion locality — 7
Field observation site
Borehole
Mine site
Heavy mineral sand deposit (WIM style) — WIM 200
Main road, minor road
Railway
Minor watercourse, river
Contour (10 metre interval) — 250

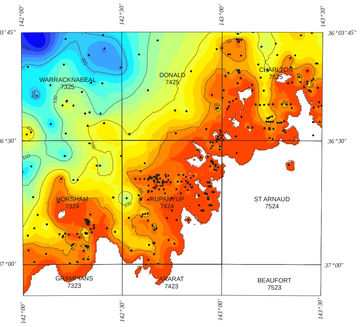
REGOLITH EXCURSION SITES

No	Location	MGA		Remarks
1	Kingston Mine	678342	5920456	*Very highly weathered St Arnaud Group (SVel1) on low hills. Rock mass overprinted by intense zones of hydrothermal alteration.*
2	Unnamed road east of Murtoa	635961	5946832	*Fresh aeolian quartz sand forming a large lunette (ISau) along the eastern margin of a former swamp.*
3	Stawell-Glenorchy Road	647632	5912803	*Partially developed pisoliths and distinct mottling in weathered marine sediments (OMep).*
4	Glynwilyn Forest	663664	5912491	*Highly strained St Arnaud Group in the hanging wall of the Concongella Fault (BUel1). Site demonstrates the control bedrock structures exert over regolith development and landform morphology.*
5	Readings Gravel Pit Road	674804	5924047	*Indurated, topographically inverted channel deposits (ACer) overlying quartz-rich marine sediments (OMep) in quarry.*
6	Rail cutting north of Deep Lead	652350	5905067	*Large cutting exposing a 10 m thick regolith profile in weathered marine sediments (OMer)*
7	Ron Road	676242	5938644	*Very highly weathered interbedded sandstone and siltstone (SVer1) in the walls of the Charlton Channel. Ad pervasively iron stained, mottled and bleached. Excellent examples of folding, faulting and bedform structures preserved in the rock face.*
8	Deep Lead–Glenorchy Road	651867	5907274	*Indurated marine sediments (OMep) with thin laminated mudstone interbeds. Finer grained lithologies represent material deposited into a low-energy offshore environment.*
9	Deep Lead–Glenorchy Road	650716	5910932	*Small outcrop of topographically inverted alluvium (ACer) containing pebble-sized lithics of indurated bedrock. Indurated material suggests the deposit postdates the denudation of the White Hills Gravel on adjacent map sheets (ARARAT).*
10	Callawadda–Navarre Road	675913	5916037	*Prominent east-dipping reverse fault (Burrum Fault) exposed in a weathered roadside cutting. The fault is marked at the surface by a degraded fault plane and discontinuous quartz veining.*
11	Minyip–Banyena Road	656872	5953013	*Thick roadside profile across the short axis of a longitudinal dune. Profile consists of almost 100% quartz sand sourced from adjacent marine units (OMer and OMep).*
12	Unnamed road south of Marnoo East	671577	5940159	*Silicified quartz arenite in weathered St Arnaud Group (SVer1).*

Metres

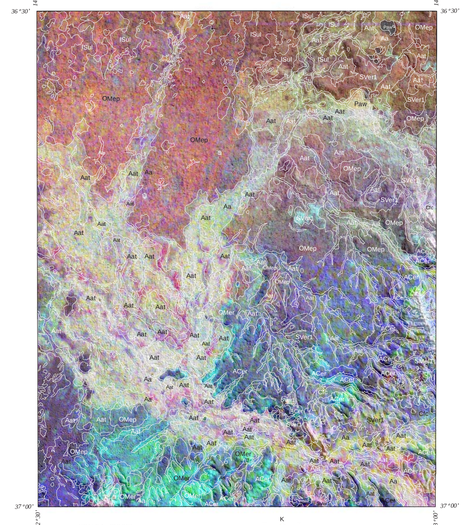
0 — 0 - 20 — 20 - 35 — 35 - 50 — 50 - 60 — 60 - 75 — 75 - 90 — 90 - 105 — 105 - 120 — 120 - 135 — 135 - 150 — 150 - 165 — 165 - 180 — 180 - 195 — 195 - 210 — 210 - 225 — 225 - 235 — 235 - 250 — 250 - 265 — 265 - 285 — Tile 100k — Borehole

DEPTH TO BASEMENT



Outcropping basement contoured from 1 : 250 000 surface geology polygons.

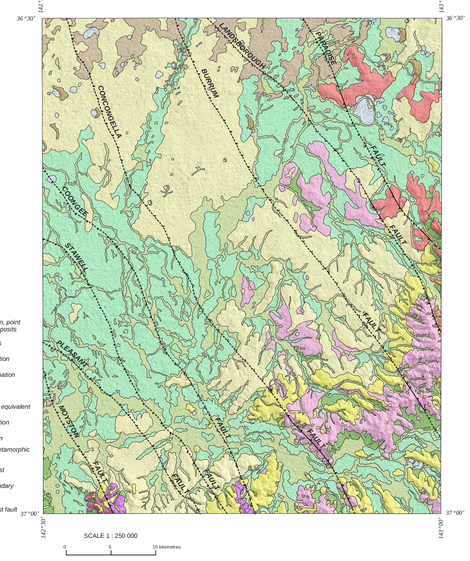
RADIOMETRIC TERNARY RATIO IMAGE WITH DIGITAL TERRAIN IMAGE AND REGOLITH - LANDFORM OVERLAY



SCALE 1 : 250 000
0 5 10 kilometres

K — U — Th

DIGITAL TERRAIN IMAGE WITH SIMPLIFIED GEOLOGY



SCALE 1 : 250 000
0 5 10 kilometres

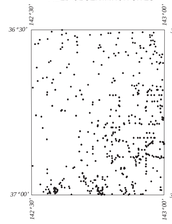
GEOLOGY

AGE

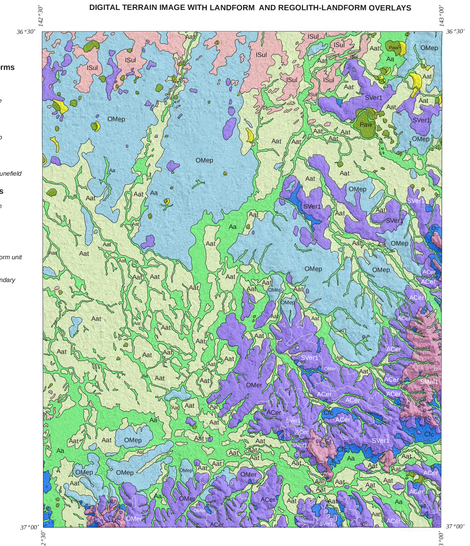
CAINOZOIC
- *Lunette/deposits*
- *Swamp deposits*
- *Alluvial flood plain, point bar & channel deposits*
- *Colluvial deposits*
- *Wooninen Formation*
- *Shepparton Formation*
- *Parilla Sand*
- *Calivil Formation equivalent*

PALAEOZOIC
- St Arnaud Group: *Pyrenees Formation*, *Warrak Formation*, *Moornambool Metamorphic complex*
- Nargoon Group: *Glenthompson Sst*
- *Geological boundary*
- *Thrust fault*
- *Concealed thrust fault*

FIELD OBSERVATION SITES



DIGITAL TERRAIN IMAGE WITH LANDFORM AND REGOLITH-LANDFORM OVERLAYS



SCALE 1 : 250 000
0 5 10 kilometres

LANDFORM TYPE

Depositional Landforms
- *Alluvium*
- *Alluvial terrace*
- *Colluvial fan*
- *Alluvial swamp*
- *Lunette*
- *Longitudinal dunefield*

Erosional Landforms
- *Erosional plain*
- *Erosional rise*
- *Low hill*
- *Regolith-landform unit boundary*
- *Landform boundary*

RUPANYUP

1:100 000
Regolith-landform map

Geological Survey of Victoria
GeoScience Victoia
Minerals and Petroleum Division
Department of Primary Industries

LOCATION DIAGRAM

ADJOINING 1 : 100 000 SHEETS

WARRACKNABEAL 7325	DONALD 7425	CHARLTON 7525
HORSHAM 7324	RUPANYUP 7424	ST ARNAUD 7524
GRAMPIANS 7323	ARARAT 7423	BEAUFORT 7523

BOREHOLES

No	GEDIS No	Borehole No	Company Name	Easting	Northing
1	911324	MAAC53	Forrestania Gold NL	673000	5939993
2	911332	MAAC61	Forrestania Gold NL	675120	5935678
3	77298	Marma 1	Department of Manufacturing & Industry Development	635957	5933641
4	415934	RP129	CRA Exploration	640120	5942178
5	416021	RP216	CRA Exploration	651220	5938878
6	416403	RP604	CRA Exploration	645620	5932778
7	954514	RP267	CRA Exploration	644095	5926478
8	416082	RP283	CRA Exploration	656020	5933278
9	416122	RP323	CRA Exploration	669321	5951328
10	959412	RP012	CRA Exploration	666070	5943048
11	959411	RP013	CRA Exploration	658920	5940628
12	959413	RP016	CRA Exploration	669371	5951178
13	415860	RP033	CRA Exploration	663520	5923478
14	415870	RP046	CRA Exploration	654020	5924378
15	64018	GAMPOLA 4	Department Manufacturing and Industry	647734	5908264
16	64020	GAMPOLA 6	Department Manufacturing and Industry	645542	5912540
17	65438	GLENORCHY 3	Private - unknown	654369	5914543
18	959415	RP083	CRA Exploration	663420	5936778
19	959416	RP084	CRA Exploration	637620	5910178
20	416178	RP379	CRA Exploration	674821	5956278
21	416253	RP454	CRA Exploration	646520	5943178
22	416286	RP487	CRA Exploration	654820	5943328
23	70925	KIRKELLA 4	Department Manufacturing and Industry	657005	5912932
24	416550	RP751	CRA Exploration	675421	5945677
25	914826	VIMP 4	NRE	648140	5919138
26	914827	VIMP 5	NRE	644360	5949128
27	101277	WARRANOOK 1	Department of Manufacturing & Industry Development	636770	5924816
28	911284	MAAC13	Forrestania Gold NL	672430	5932678
29	911306	MAAC35	Forrestania Gold NL	669870	5927478

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Regolith mapping: B. Williams, E. House and L. Bibby
Map compilation: B. Williams
Airphoto interpretation: B. Williams

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Cartography: S. I. Welch and J. J. Dunleavy
GIS data compilation and cartographic publishing process

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www.dpi.vic.gov.au/minpet/

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RUPANYUP

7424 ZONE 54

1:100 000
Regolith-landform map

2006 Edition 1

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