PROTEROZOIC SOLID GEOLOGY OF THE PATERSON AREA

d

Scale 1:250 000

0 5 10 15 20 25 Kilometres

Projection: Universal Transverse Mercator, Zone 51
Grid Coordinates: Map Grid of Australia (MGA94)
Horizontal Datum: Geocentric Datum of Australia (GDA94)

Geological Survey of Western Australia

PALEOZOIC

Disappointment Group

Woora Woora Formation: *Medium-grained ferruginous sandstone, lithic sandstone, quartz wacke and siltstone.*

Tchukardine Formation: *Medium- to coarse-grained sandstone, quartz wacke, siltstone and shale; minor conglomerate.*

Boondawari Formation: *Glacigene diamictite, sandstone, siltstone, conglomerate and shale.*

Sunbeam Group

Mundadjini Formation: *Fine- to coarse-grained sandstone, conglomerate and siltstone; minor shale and mudstone.*

Undifferentiated sedimentary rocks of the Sunbeam Group.

NEOPROTEROZOIC

Tarcunyah Group

Wongarlong Formation: *Fine- to coarse-grained sandstone; minor siltstone and shale.*

Altered, pillowed mafic lava.

Yandanunyah Formation: *Laminated to thin-bedded dolomite; interbedded with minor stromatolitic dolomite, dolomitic siltstone, shale and siltstone.*

Brownrigg Sandstone: *Fine- to medium-grained quartz sandstone and medium-to coarse-grained sandstone sandstone with scattered pebbles.*

Waroongunyah Formation: *Laminated to massive dolomite, stromatolitic dolomite, sandy dolomite, siliceous oolite, siltstone and shale.*

Googhenama Formation: *Medium- to coarse-grained sandstone and polymictic pebble to cobble conglomerate.*

Undifferentiated sedimentary rocks of the Tarcunyah Group.

Undifferentiated sedimentary rocks from the Wongarlong, Yindanunyah or Brownrigg Formations

Nooloo Formation: *Thinly bedded to massive dolomite and limestone; minor thinly bedded, fine- to coarse-grained sandstone, siltstone and shale.*

Choorun Formation: *Medium- to coarse-grained sandstone, pebbly sandstone, quartz wacke, nodule-bearing sandstone,polymictic pebble to cobble conglomerate, quartz pebble conglomerate; minor siltstone and tourmalinite.*

Karara Formation: *Quartz arenite and quartz-feldspar wacke; minor beds of shale and conglomerate*

Yeneena Basin

Wilki Formation: *Fine- to medium-grained quartz sandstone, massive to bedded; minor shale and laminated sandstone.*

Puntapunta Formation: *Dominantly clastic carbonate rocks interbedded with siltstone and shale, minor chert; commonly dolomitic and arenaceous*

Malu Formation: *Fine- to medium-grained quartz sandstone, massive to bedded; minor interbedded shale and dolomite; includes Telfer Member.*

Isdell Formation: *Thickly bedded carbonate rocks, calcareous siltstone, minor shale, locally sulphidic.*

Broadhurst Formation: *Siltstone, sandstone, shale, carbonaceous and sulphidic in places.*

Relatively conductive.

Coolbro Sandstone *Massive and thickly bedded sandstone, minor siltstone, shale and carbonate rocks, basal conglomerate in some areas.*

Taliwanya Formation: *Arkose, arkosic sandstone and siltstone, medium- to coarse-grained.*

Undifferentiated sedimentary rocks of the Yeneena Supergroup.

Undifferentiated amphibolite

Lower carbonate unit with overlying interbedded psammite and pelite with more abundant psammite at the top of the sequence, intruded by a series of dolerites and gabbros sills, non magentic; identified from drill data.

Psammites with laterally continuos highly magnetic pelite interbeds; identified from drill data.

Black shale and pelite, non magnetic; identified from drill data.

PALEO - MESOPROTEROZOIC

Rudall Complex

Amygdaloidal Basalt; metamorphosed

Amphibolite, quartzite, metamorphosed banded iron formation, metapelitic schist and ultramafic rock.

Fingoon Package: *Metasedimentary succession comprised of feldspar-rich paragneiss, muscovite-schist and quartzite (Larry, Fingoon, Butler Creek and Poynton formations).*

Orthogneiss derived from metamorphosed and deformed granite or monzogranite; may be biotite- or muscovite-rich.

Metamorphosed banded iron formation, metachert and pyrite-graphite schist.

Undifferentiated metasedimentary rocks of the Rudall Complex, includes muscovite-schist, quartzofeldspathic schist and quartzite.

Metamorphosed ultramafic rock (metamorphosed dunite, peridotite and pyroxenite), typically serpentinised.

Lithologically layered orthogneiss derived from granite or monzogranite; alternating biotite and feldspar-rich layers; lenticular inclusions of mafic, ultramafic and metasedimentary rocks.

Yandagooge Formation: *Dominantly pelitic to semi-pelitic assemblage of quartz-muscovite schist, haematitic biotite schist, with minor intercalations of muscovitic quartzite, psammitic gneiss, graphitic schist, chert and metamorphosed banded iron formation. Comprises part of 'Fingoon Package'.*

Archean Pilbara Craton

Tabletop Terrane: Undifferentiated granite to tonalite, amphibolite, ultramafic rock, metamorphosed banded iron formation, quartzite and orthogneiss.

McFadden Formation: Laminate fine- to coarse-grained quartz sandstone, feldspathic sandstone and quartz wacke; minor conglomerate and siltstone.

@gr Monzogranite to syenogranite; containing ilmenite (non-magnetic)

@go Monzogranite to syenogranite; containing magnetite (magnetic)

Geological boundary
Fault
Dyke, interpreted from geophysics
Anticline -showing plunge direction
Syncline -showing plunge direction
Overturned anticline
Overturned syncline
Trend of bedding
Magnetic linear feature, interpreted from geophysics
Boundary of magnetic high, interpreted from geophysics to be intrusive body at depth.
Selected mines and deposits
Significant roads or tracks
Rudall River National Park boundary

Waukarlycarly embayment
depth to basement greater than 1000m
age of fill Permian or younger

Kingrum Au Cu
Telfer Au Cu Ag
Minyari Hill Au
Fallows-Field Au
O'Callaghans Zn Pb W
Trotmans Stockwork Au Sn Bi
Backdoor Au
Grace Au
Goosewacker Cu
Maroochydore Cu Co
Kintyre U
Nifty Cu
Duke Zn
Warrabarry Zn Pb
Greenvale Zn Pb Ag
Rainbow Cu Zn
Finch Cu Pb
Copper Hills Pt Pd Au Cu

TELFER ROAD
TELFER MINE ROAD
TELAWANA TRACK
CANNING STOCK ROUTE

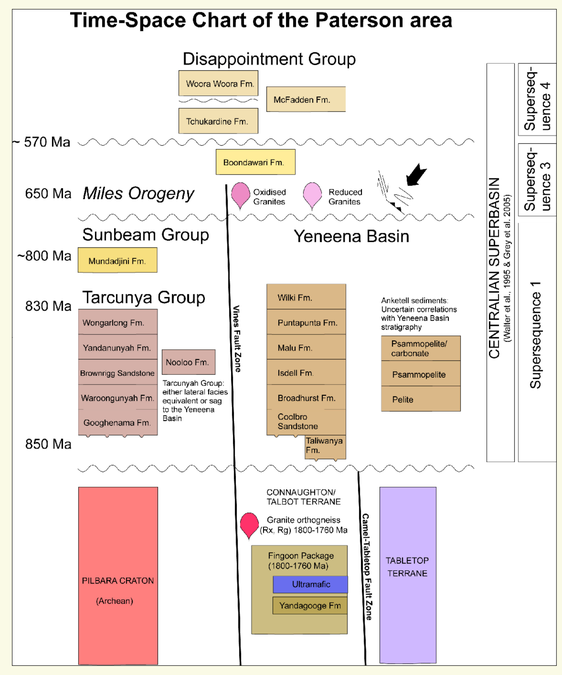
Map Locality

Sheet index

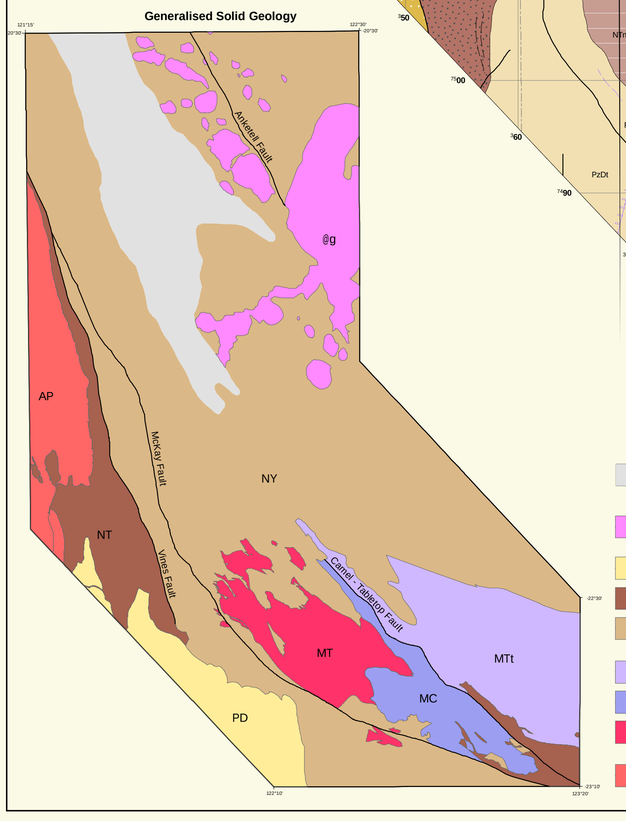
1:250000 map series

YARRIE SF 51-01 | ANKATELL SF 51-02 | JOANNA SPRING SF 51-03
NULLAGINE SF 51-05 | PATERSON RANGE SF 51-06 | SAHARA SF 51-07
BALFOUR DOWNS SF 51-09 | RUDALL SF 51-10 | TABLETOP SF 51-11
ROBERTSON SF 51-13 | GUNANYA SF 51-14 | RUNTON SF 51-15

Time-Space Chart of the Paterson area



Generalised Solid Geology



Waukarlycarly embayment
Limit of interpretation - modelled depth to basement > 1000m age of fill permian or younger

@g Neoproterozoic granite

PD Disappointment Group

NT Tarcunyah Group

NY Yeneena Basin

MTt Tabletop Terrane
MC Connaughton Terrane
MT Talbot Terrane
Rudall Complex

AP Archaean Pilbara Craton

Abstract

An interpretation of the Paterson area has been carried out to understand the distribution of Proterozoic bedrock beneath thin (<300 m) Phanerozoic cover. Numerous granitic intrusions have been identified to the north of Telfer, which intrude a pre-deformed Neoproterozoic sequence, suggesting that this shallowly covered area is prospective for Telfer-style Au-Cu mineralisation. Neoproterozoic sedimentary rocks in the south of the area previously interpreted to be part of the Tarcunyah Group might instead be part of the Yeneena Basin. The absence of Neoproterozoic granites in this part of the area means that these rocks have a reduced potential for Au-Cu mineralisation, but they have potential for base metal and unconformity-style uranium mineralisation.

Depth to Proterozoic basement modelling has been carried out for the area, effectively mapping the depth of the surface represented by the solid geology interpretation. This has shown that much of the area has only a relatively thin cover (typically less than 300 m), making it accessible for exploration. In contrast, the Phanerozoic Waukarlycarly Embayment in the northwest of the orogen contains a relatively thick succession (with maximum depths exceeding 3000 m) within a NNW-trending, steep-sided graben that is 30-40 km wide.

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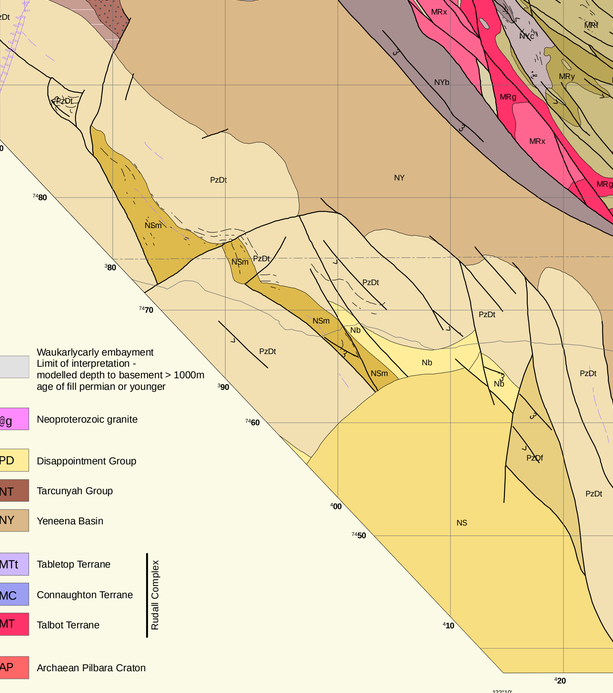
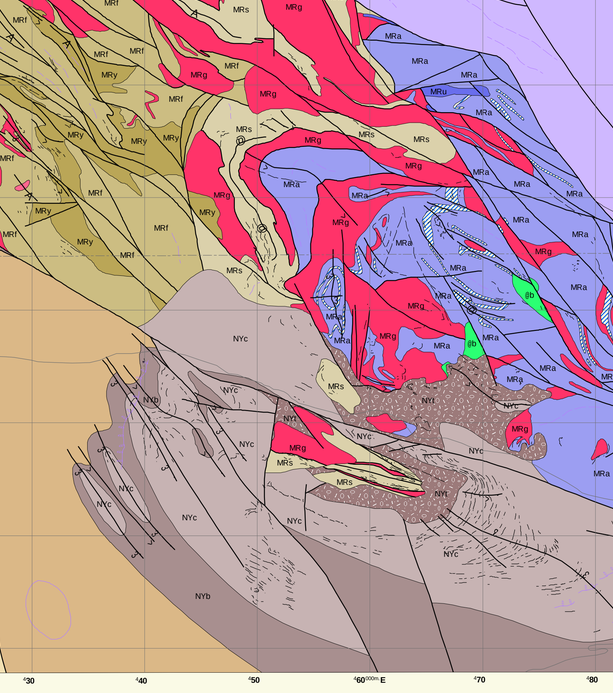
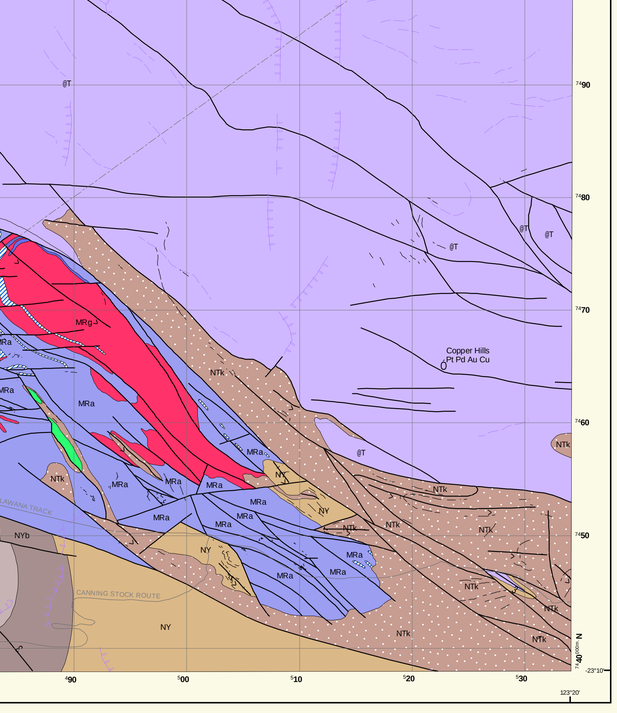
Bouguer gravity image with a north-easterly sun-shading.



Total magnetic intensity, reduced to pole image with a north-easterly sun-shading.



Radiometrics RGB ternary image (red - potassium, green - thorium, blue - uranium) of the radiometric data.



Depth to Proterozoic basement image. Contours consist of 100 m, 300 m (thick black line), 500 m, and then 500 m intervals. The grey polygons enclose the generalised regions of Proterozoic outcrop. The black squares indicate the point locations where the depths were constrained