

QUATERNARY

PHANEROZOIC

CARBONIFEROUS-PERMIAN

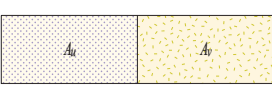
NEOPROTEROZOIC

PROTEROZOIC

MESOPROTEROZOIC

1078-1060 Ma

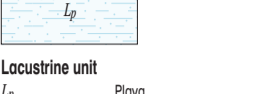
Varakuma Supersuite



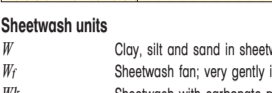
**Alluvial units**  
*A<sub>s</sub>* Superficial channel  
*A<sub>f</sub>* Alluvial fan



**Colluvial units**  
*C<sub>g</sub>* Colluvium; dominantly quartzofeldspathic materials; found at base of outcrop  
*C<sub>q</sub>* Colluvium; dominantly quartz



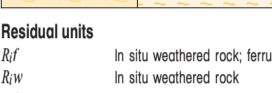
**Lacustrine unit**  
*L<sub>p</sub>* Playa



**Sheetwash units**  
*W* Clay, silt and sand in sheetwash fans  
*W<sub>f</sub>* Sheetwash fan; very gently inclined landform (less than 1° slope)  
*W<sub>k</sub>* Sheetwash with carbonate material  
*W<sub>l</sub>* Sheetwash with lithic fragments



**Eolian units**  
*E<sub>d</sub>* Eolian dunefield  
*E<sub>r</sub>* Eolian sandplain

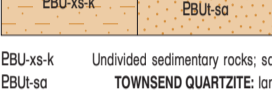


**Residual units**  
*R<sub>f</sub>* In situ weathered rock; feruginous  
*R<sub>w</sub>* In situ weathered rock  
*R<sub>g</sub>* Groundwater calcrete; locally forms low mounds; nodular to massive; commonly with alternating layers of carbonate and chalcocedary

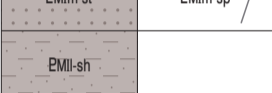


**PATERSON FORMATION:** conglomerate (including diamictite), sandstone, and siltstone; largely glaciogenic

**Petermann Orogeny (570-530 Ma<sup>1</sup>)**



*E<sub>od</sub>* Dolerite dyke, sill or plug; fine- to medium-grained dolerite and gabbro  
*E<sub>zq</sub>* Massive, coarse-grained quartz vein



**Bulkya Group**  
*E<sub>B</sub>U-x<sub>s</sub>-k* Undivided sedimentary rocks; sandstone, siltstone, shale, dolomite, limestone, evaporites (halite, gypsum, anhydrite) in subsurface and diapirs  
*E<sub>B</sub>U-sa* **TOWNSEND QUARTZITE:** laminated to very thickly bedded, well-sorted, medium- to coarse-grained quartz arenite and feldspathic arenite; minor conglomerate and shale beds; medium- to large-scale cross-bedding

**Giles Event (1085-1040 Ma<sup>1,2,3</sup>)**



**Miesia Formation**  
*E<sub>M</sub>im-st* Poorly sorted fine- to coarse-grained sandstone; minor beds with rare rounded pebbles to 5 cm, and conglomerate units with rounded pebbles to 10 cm  
*E<sub>M</sub>im-sp* Conglomerate; subangular to subrounded granules and pebbles of quartz, pinkish quartzite, and epidiotite basalt; interbedded with faintly laminated to thinly bedded ferruginous sandstone  
*E<sub>M</sub>im-bb* Basalt and basaltic andesite; strongly vesicular and amygdaloidal, with well-developed autoclastic brecciation including peperite; minor interlayered sandstone and conglomerate; epidiotized  
*E<sub>M</sub>im-sh* **LILIAN FORMATION:** shale; red to olive-green; minor sandstone, dolomite, chert, microbialite, basalt, and conglomerate

**FRANK SCOTT FORMATION**  
*E<sub>M</sub>if-bb* Basalt and basaltic andesite; massive to weakly vesicular; epidiotized  
*E<sub>M</sub>if-kds* Intercalated limestone, stromatolitic limestone, dolomitic limestone, shale, and ripple cross-laminated sandstone  
*E<sub>M</sub>ig-sg* **GAMMINAH CONGLOMERATE:** matrix-supported pebble to cobble conglomerate; basalt and rhyolite clasts up to 20 cm; local planar- and cross-bedding; thin sandstone interlayers



**Cassilly Group**  
*E<sub>CA</sub>x-bb-fr* Massive to vesicular and amygdaloidal basalt and porphyritic rhyolite; locally common volcanolithic conglomerate and sandstone  
*E<sub>CA</sub>m-bb* **MILLER BASALT:** basalt and basaltic andesite, with vesicular and amygdaloidal flow tops and local flow-top breccia; minor quartz-rich mudstone to sandstone interbeds; epidiotized  
*E<sub>CA</sub>m-xbb-sg* Interlayered massive to vesicular and amygdaloidal basalt and basaltic andesite, and volcanolithic conglomerate and sandstone  
*E<sub>CA</sub>h-tp* **HILMA RHYOLITE:** porphyritic rhyolite with minor trachyte and dacite; massive to flow banded and locally spherulitic vitric lavas; subhedral to euhedral alkali-feldspar phenocrysts; minor plagioclase and embayed bi-pyramidal quartz phenocrysts  
*E<sub>CA</sub>w-xbb-s* **WARUBUJU BASALT:** massive to amygdaloidal basalt and basaltic andesite, interlayered with volcanolithic mudstone, siltstone, ripple cross-laminated sandstone, conglomerate, and laminated microbialite; local hyaloclastite; epidiotized  
*E<sub>CA</sub>w-bbf* Basalt and basaltic andesite, typically massive, but includes interlayers of amygdaloidal basalt and of fine-grained sandstone; epidiotized  
*E<sub>CA</sub>w-bbg* Basalt and basaltic andesite, typically amygdaloidal, but includes interlayers of massive basalt and of fine-grained sandstone; epidiotized  
*E<sub>CA</sub>w-sp* Interlayered volcanolithic conglomerate and sandstone  
*E<sub>CA</sub>t-tp* **THOMAS RHYOLITE:** porphyritic rhyolite with minor trachyte and dacite; massive to flow banded and locally spherulitic vitric lavas; subhedral to euhedral alkali-feldspar phenocrysts; minor plagioclase and embayed bi-pyramidal quartz phenocrysts  
*E<sub>CA</sub>g-bbg* **GURGADI BASALT:** basalt with vesicular and amygdaloidal flow tops; epidiotized  
*E<sub>CA</sub>u-tp* **WURURU RHYOLITE:** porphyritic rhyolite; massive to flow banded



**Pussy Cat Group**  
*E<sub>PU</sub>g-xbb-s* Volcaniclastic rhyolite; typically a densely welded, flow-banded rheomorphic ignimbrite; locally well-developed autaxitic- and fiamme-textures; local layers rich in quartz and feldspar phenocrysts  
*E<sub>PU</sub>g-bbf* Volcaniclastic rhyolite; fine- to coarse-grained, locally crystal-rich, lapilli-ash tuff; locally abundant relict glass shards  
*E<sub>PU</sub>g-bbp* Vesicular and amygdaloidal basalt, and minor basaltic andesite; locally plagioclase porphyritic; epidiotized; minor siliciclastic interbeds  
*E<sub>PU</sub>g-sgb* Matrix to clast-supported conglomerate; mainly basalt cobbles, with minor rhyolite and granite; interbedded with medium- to fine-grained siliciclastic rocks  
*E<sub>PU</sub>g-bbg* Diamicite; subrounded to angular mafic to felsic volcanic clasts, supported in a poorly sorted, biotite- and chlorite-rich matrix  
*E<sub>PU</sub>g-sdv* Interbedded planar-bedded, ripple- and trough cross-bedded sandstone, and massive to laminated siltstone to mudstone  
*E<sub>PU</sub>g-ss* Medium- to fine-grained siliciclastic rocks, interbedded with vesicular and amygdaloidal basalt; rare calc-silicate rocks, evaporite horizons, and microbialites  
*E<sub>PU</sub>g-xss-bb*



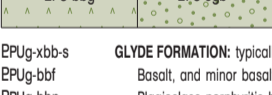
**Bentley Supergroup**  
*E<sub>PG</sub>w-mfr* Quartz-muscovite schist; locally with contorted veins and pockets containing granoblastic andalusite and relict kyanite, typically mylonitic  
*E<sub>PG</sub>w-fr* Rhyolite; typically flow banded and sparsely quartz- and feldspar-phyric  
*E<sub>PG</sub>w-sdv* Diamictite; subrounded to angular mafic, and rarer felsic, volcanic clasts supported in a poorly sorted micaceous matrix; interbedded with conglomerate, sandstone, and siltstone  
*E<sub>PG</sub>w-x<sub>s</sub>-b* Siliciclastic rocks, including diamictite, conglomerate, sandstone and siltstone, interbedded with amygdaloidal basalt  
*E<sub>PG</sub>s-fr* **SCAMP FORMATION:** rhyolite, possibly as lavas and pyroclastic rocks, but may also include subvolcanic intrusions; typically shows a fine- to coarse-grained granofelsic texture, indicating weak to moderate recrystallization  
*E<sub>PG</sub>s-fry* Rhyolite, possibly as lavas and pyroclastic rocks; typically shows a fine-grained granoblastic texture, indicating weak recrystallization; relict flow banding, spherulites, and fiamme; locally contains accessory garnet



**Mount Palgrave Group**  
*E<sub>PG</sub>e-frx* Autoclastic rhyolite breccia; angular rhyolite blocks up to 1 m; includes flow-breccia and hyaloclastite  
*E<sub>PG</sub>e-frc* Rhyolitic conglomerate; poorly sorted volcanoclastic rock containing abundant subangular to subrounded clasts, up to 30 cm in size, of rhyolitic lavas and volcanoclastic rocks  
*E<sub>PG</sub>e-frb* Flow-banded rhyolite mainly as lavas, but likely including subvolcanic sills and possibly rheomorphic pyroclastic rocks; mm- to cm-scale flow laminations and bands; typically feldspar-quartz-phyric  
*E<sub>PG</sub>e-spv* Clast- to matrix-supported conglomerate containing subrounded to rounded cobbles of basalt, and rhyolite lavas and volcanoclastic rocks  
*E<sub>PG</sub>e-bbp* Vesicular and amygdaloidal basalt and basaltic andesite; locally plagioclase porphyritic; epidiotized  
*E<sub>PG</sub>e-fdg* Amygdaloidal dacite lavas and subvolcanic sills; typically dark, vitric, and feldspar-phyric, with quartz-filled amygdaloids up to 1.5 cm; locally well-developed perite  
*E<sub>PG</sub>e-frvm* Rhyolitic volcanoclastic sandstone, abundant angular volcanolithic fragments, including fiamme  
*E<sub>PG</sub>e-frw* Rhyolite, mainly as lavas, but including subvolcanic sills and possibly rheomorphic pyroclastic rocks; well-developed spherulitic textures and perite locally overprinting flow-banding; typically feldspar-quartz-phyric  
*E<sub>PG</sub>e-xfrw-fra* Rhyolite lavas, minor subvolcanic sills, and pyroclastic rocks, with spherulites and perite locally overprinting flow-banding; interlayered with massive to weakly banded aphyric rhyolite lavas or volcanic siltstones



**Alama Dolerite**  
*E<sub>WK</sub>-od* Dolerite sill or plug; fine- to medium-grained dolerite and gabbro  
*E<sub>WK</sub>-o* Dolerite in dykes, sills, or plugs, with olivine gabbro, olivine norite, ferromylonite, and ferrodiorite



**Varakuma Supersuite**  
*E<sub>WK</sub>-ge* Fine- to medium-grained quartz syenite; contains K-feldspar phenocrysts up to 5 cm; locally with rapakivi texture  
*E<sub>WK</sub>-gfh* Medium-grained, leucocratic alkali feldspar granite with hornblende clusters and pervasive granophyric texture  
*E<sub>WK</sub>-gta* Fine- to medium-grained leucocratic tonalite; contains quartz and plagioclase phenocrysts

<i>E<sub>PK</sub>-frt</i>	<i>E<sub>PK</sub>-frw</i>	<i>E<sub>PK</sub>-frn</i>	<i>E<sub>PK</sub>-frxj</i>	<i>E<sub>PK</sub>-frxr</i>	<i>E<sub>PK</sub>-frp</i>	<i>E<sub>PK</sub>-frva</i>	<i>E<sub>PK</sub>-frb</i>
<i>E<sub>PK</sub>-xfrm-fr</i>	<i>E<sub>PK</sub>-xfrt-fr</i>	<i>E<sub>PK</sub>-hta</i>	<i>E<sub>PK</sub>-bb</i>	<i>E<sub>PK</sub>-sgv</i>	<i>E<sub>PK</sub>-xfrtm</i>	<i>E<sub>PK</sub>-xfrspv</i>	<i>E<sub>PK</sub>-frq</i>

**1068-1052 Ma**

**Kaernma Group**

*E<sub>PK</sub>-frt* Rhyolite laminated siltstone; ash tuff locally containing up to 15% tabular feldspar phenocrysts; includes spherulitic layers and purpura-rich layers  
*E<sub>PK</sub>-frw* Rhyolite, mainly as lavas, but likely including pyroclastic rocks; abundant spherulites up to 5 cm; alkali-feldspar phenocrysts in a vitric groundmass; locally contains lithophyses  
*E<sub>PK</sub>-frn* Rhyolitic sandstone and siltstone; ash- to lapilli-tuff; typically contains up to 5% feldspar phenocrysts and angular vitric lithic fragments; rare lithophyses and fiamme  
*E<sub>PK</sub>-frxj* Autoclastic rhyolite breccia, and redeposited clast-rich to clast-poor volcanoclastic breccia; strongly altered to an assemblage of tourmaline and quartz  
*E<sub>PK</sub>-frxr* Autoclastic rhyolite breccia; angular blocks up to 1 m, typically of feldspar-porphyritic rhyolite; includes flow-breccia and hyaloclastite; local interlayers of redeposited, clast-rich to clast-poor, volcanoclastic breccia  
*E<sub>PK</sub>-frp* Feldspar-quartz-porphyritic rhyolite; subvolcanic intrusion; abundant subhedral to euhedral alkali-feldspar phenocrysts to 1 cm, and rarer rounded quartz phenocrysts to 5 mm, in a micrographic to felsitic groundmass  
*E<sub>PK</sub>-frva* Trachytic to rhyolitic sandstone; lapilli-tuff with phenocrysts of feldspar, embayed quartz, and lithic fragments; crystal-rich to -poor; local graded beds; interbeds of fine- to coarse-grained pyroclastic rocks and diamicite  
*E<sub>PK</sub>-frb* Flow-banded rhyolite; includes lavas, subvolcanic sills, and rheomorphic pyroclastic rocks; 1-2 cm scale flow-bands; local autoclastic brecciation; typically feldspar-quartz-phyric  
*E<sub>PK</sub>-xfrm-fr* Trachytic to rhyolitic volcanoclastic siltstone and sandstone, including crystal-rich lapilli-tuff and tuff-breccia; interlayered with rhyolite as vitric and feldspar-porphyritic lavas, tuffs, and minor subvolcanic sills  
*E<sub>PK</sub>-xfrt-fr* Rhyolite as vitric and feldspar-porphyritic lavas, tuffs, and subvolcanic sills, interlayered with trachytic tuff, crystal-rich lapilli-tuff, and tuff-breccia; minor volcanolithic siltstone, sandstone, and diamicite  
*E<sub>PK</sub>-hta* Aphyric trachyte and rhyolite; pyroclastic siltstone with phenocrysts of feldspar and rare embayed quartz, in a felsitic groundmass; rare layers with accretionary lapilli; minor interlayers of crystal-rich pyroclastic sandstone  
*E<sub>PK</sub>-bb* Basalt and basaltic andesite; massive to amygdaloidal; locally as thin flows, showing well-developed autoclastic breccia margins with interbedded volcanoclastic rhyolite; epidiotized  
*E<sub>PK</sub>-sgv* Poorly sorted, matrix-supported, volcanolithic pebble conglomerate, with rounded volcanic clasts to 30 cm; includes interbeds of well-graded chloritic sandstone to siltstone  
*E<sub>PK</sub>-xfrtm* Rhyolite as vitric and variably feldspar-porphyritic lavas, tuffs, and subvolcanic sills, interlayered with trachytic to rhyolitic volcanoclastic siltstone and sandstone, including crystal-rich lapilli-tuff and tuff-breccia  
*E<sub>PK</sub>-xfrspv* Rhyolite as vitric and variably feldspar-porphyritic lavas, tuffs, and minor subvolcanic sills, interlayered with chloritic volcanolithic siltstone, sandstone, conglomerate, and diamicite  
*E<sub>PK</sub>-frq* **KAKALYALYA FORMATION:** quartz-feldspar-porphyritic rhyolite; subvolcanic intrusion; rounded and embayed quartz phenocrysts, and subhedral and embayed alkali-feldspar phenocrysts, both up to 7 mm, in a very fine grained felsitic groundmass

Officer Basin

Bentley Basin