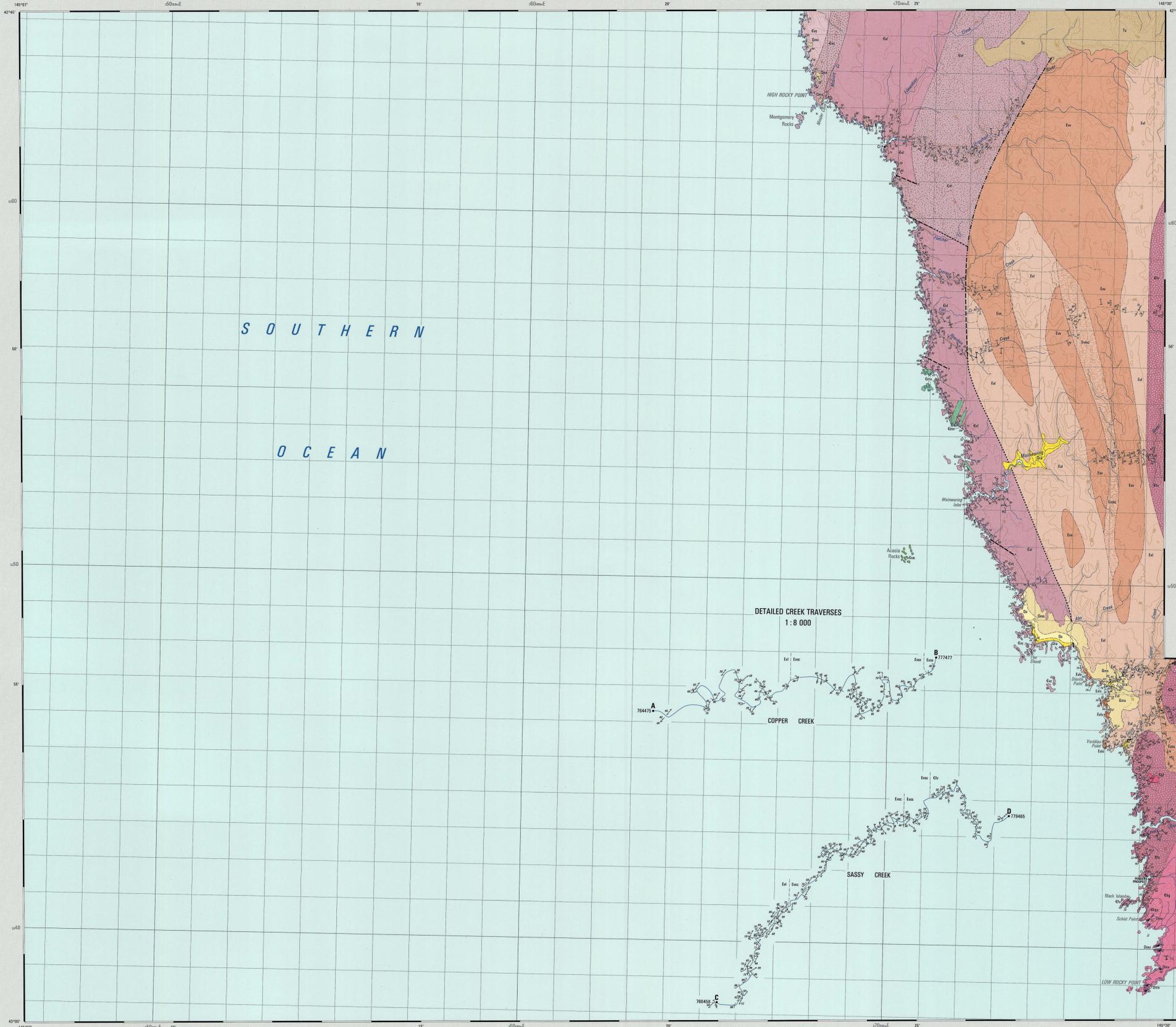


MONTGOMERY

GEOLOGICAL SURVEY OF TASMANIA — DEPARTMENT OF MINES — HOBART

GEOLOGICAL ATLAS 1:50 000 SERIES SHEET 7912 S

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GEOLOGICAL NOTES

The low topography and dense scrub of the coastal and inland areas covered by the Montgomery Quadrangle restricts outcrop to the coastal strip, especially the tidal platform, and deeply incised rivers. Due to the poor outcrop, contacts between different rock successions are rarely seen. The position approximately geological boundary symbol is used to represent a change of rock sequence, irrespective of its nature which may even be of unknown faults.

As well as recent beach deposits (Qa) and stabilized sand dunes (Qs), evidence of old sea levels can be found in a number of localities along the coast between High and Low Rocky Points. Remnants of older sand dunes (Qm) occur in three localities in the vicinity of High Rocky Point. The base of all three deposits is the local country rock but at a level 15-20 m higher than present mean sea level. One of the deposits (CN77677), which contains cross-bedding indicative of aeolian conditions, is now partly protected by vegetation. The other two deposits (CN78632, CN82829) occur in saddles behind the present shore platform. At numerous other points along the coast, present-day sea covers have roots of semi-consolidated talus deposits within a soil profile; the base of all these deposits is approximately 10 m above present mean sea level.

Geologically, the quadrangle is dominated by two volcano-sedimentary rock successions: one, containing dioritic and/or plagioclase phytic subalkaline basalt with tholeiitic chemical characteristics and associated sedimentary rocks (Ev); the second, containing andesitic-dacitic lavas with phenocrysts of dioritic and/or plagioclase (Ew) or hornblende (Em) and associated sedimentary rocks (Eva). The andesitic to dacitic volcanic rocks have calc-alkaline chemical characteristics. The basalt succession (Ev) has undergone a higher degree of structural and metamorphic alteration in comparison to the andesitic-dacitic lava succession (Ew), and on these criteria is considered to be the older succession.

Due to a N-S lateral change in the percentage of basalt to sedimentary rocks within Ev, the succession is dominated by basalt (Ev1) to the north of the upper reaches of Cypress Creek (around CN78000) and sedimentary rock sequences to the south. Further to the north the Ev succession disappears underneath a cover of interbedded, partially consolidated, silt, sand and gravel of Tertiary age (T). However, the aeromagnetic expression of this succession indicates that it continues northwards, under the Tertiary cover along the eastern side of the Point Hibbs Quadrangle, into the Birchs Inlet area of the Macquarie Quadrangle. In this area basic rocks with similar chemical characteristics and associated sedimentary rocks are to be found along the western side of Birchs Inlet. The outcrops of Ev within the Montgomery Quadrangle consist of vesicular pillow and sheet flows of pyroxene and/or plagioclase phytic basaltic rocks interlayered with hydroclastic and basaltic agglomerate, breccia, wacke, siltstone and mudstone. In some places for example around CN75550 and CN75555, the basalt contains a high percentage of native copper. A sequence of laminated mudstone and chert (Em1), separating two areas of Ev, is exposed along walking tracks around CN74874 and in the Mainwaring River (CN75933). The one of these areas is an approximately 100 m thickness of laminated black mudstone and white chert which forms a prominent ridge down the middle of the outcrop area. Another sequence of laminated chert and mudstone, with an associated basalt flow, occurs within the Ev1 sequence to the east and crosses out along the Cypress Creek walking track around CN787375. In the area of Ev1 transected by the upper reaches of the Mainwaring River (CN75655, CN78553) the sequence is highly folded and sheared by a strike, steeply westward dipping, fault which trends to the SSE. The outcrops of this succession in the Mainwaring River section are similar in character to those described above from the area of Ev1 to the north.

Across the southernmost area of outcrop, between Sassy and Abo Creeks (CN76455, 75043) the Ev succession consists of a three different sedimentary rock sequences and low angle transpressive, basalt sheets. Along the shoreline, between Sassy and Abo Creeks the first of these sequences (Ev1) contains interbedded volcanoclastic lithic waste and siltstone with interbedded mudstone and minor carbonate. Isoclinal folds are commonly observed in the four grand sedimentary rocks. This sequence was intruded by syndepositional magma flows which resulted in the formation of sheets of basalt (Ev1) which are petrologically and chemically similar to, but not identical with, the massive basalt flows (Ev1) to the north of this area. The Ev1 sequence is well exposed along Sassy, Copper and Camp Creeks. In both areas the Ev1 sequence can be observed to change to a sequence dominated by laminated black mudstone-siltstone, in places pyritic, with minor siltstone and sandstone zones (Ev1c). The transition between Ev1 and Ev1c is gradual over a small stratigraphic distance. The sandstone beds are graded and, around CN77264, have scored bases into underlying mudstone beds, indicating an east facing for the succession in this locality. Further to the east, the succession then changes rapidly, but gradually, with the increasing siliceous sandstone and granule sandstone-conglomerate and pebbly conglomerate (Eva). Sedimentary structures (cross-bedding and basal flame structures) indicate that the succession faces to the east at the transition from Ev1 to Ev1c in both Sassy and Camp Creeks (CN77446 and CN78477 respectively). To the south (around CN77450), the Ev1c sequence consists of siliceous sandstone, pebbly sandstone and minor pebbly conglomerate. The lithic fragments are dominantly quartzite, quartzite schist and micaceous quartzite.

The second of the two main volcanic rock successions (Ew) is characterized by the presence of calc-alkaline andesite and dacitic-dioritic lavas. Each of the four main sequences (Ew, Ew1, Ew2, Ew3) within this succession has constant E-facing sedimentary structures. The lowest sequence within the succession, Ew1, alternates between being dominated by volcanic rocks and volcanoclastic sedimentary rocks and occurs in the small area covered by the map sheet to the north of High Rocky Point (CN78953). Where volcanic rocks dominate the sequence, the units are predominantly interlayered pillow or lamina flows (e.g. CN74444) of porphyritic (dioritic and/or basaltic) and non-porphyritic andesitic lavas. In places the lavas are relatively felsic but still contain the mafic pyroxene phenocrysts. In the area where sedimentary rocks dominate (e.g. CN78550), the sequence consists of volcanoclastic siltstone and sandstone/wacke with minor interbedded, volcanoclastic, pebble to cobble granule conglomerate beds and lenses. The sand granite and coarser beds often have irregular scoured bases into underlying finer grained units. Numerous sand grade beds contain sedimentary structures. Some beds contain truncated cross-bedding at the top of the bed, while other beds contain multiple truncated cross-bedding throughout. Flame structures are common basal features in many beds. Some beds contain slump or convolute folds. Within the areas dominated by sedimentary rocks, the volcanic units are usually thin flows of subvolcanic lavas or agglomerate lavas flows. Some of the agglomerate units contain co-up blocks and fragments of what was originally soft sediment. In one area (CN78642) a succession of alternating, thin, porphyritic and non-porphyritic, lamina flows occur.

The transition from Ew1 into Ew2 is sharp and observable around CN76640 as well as just to the north of the map sheet around CN81862. The Ew2 sequence consists of interlayered units of porphyritic and non-porphyritic andesite lava forming subvolcanic and agglomerate flows, some of which grade upwards into flow-banded units (e.g. around CN78820). In other areas interlayered pillow or sheet flows with minor intercalations of silt and sand grade units (e.g. around CN78733) occur. The overall character of the Ew2 sequence indicates an increase in volcanic activity which swamped the formation of epiclastic units within the Ew1 sequence. Most of the flows are disrupted and/or broken and range from fine to coarse-grained glassy basaltic to porphyritic (dioritic and/or basaltic) pillow or massive flows. The southernmost outcrops of Ew2, on Montgomery Rocks (CN77327), consist of a very thick pile of massive volcanic agglomerate, without obvious bedding, but containing a mixture of lava flow types. The transition at the top of the Ew2 sequence, as at the base, is sharp but gradational into the Ew1 sequence. Around CN79631, the change coincides with the cessation of the major siliceous phase and the beginning of sedimentary rock sequences. Just to the north of the map sheet (around CN85670) the transition is marked by a sequence of black mudstone with interlayered, granitic, crystal full units. Some of the full units contain angular, laminated, black mudstone clasts. Ew2 consists of a sequence of interbedded black mudstone siltstone and volcanoclastic sandy siltstone and sandstone/wacke with minor crystal (quartz-feldspar) and vitric crystal full units with increased hydroclastic unit. Progressing up through the sequence, from McLure Creek towards the mouth of the Urquhart River, the nature of the associated volcanic change from that typical of Ew2 to minor, thin, syndepositional silt and flows of hornblende phytic and/or dioritic lavas (Ew3) (e.g. CN78720) and dacitic to rhyolitic lavas (Ew3) and full units (e.g. CN78925). The southern area of Ew3, extending along the coast between Abo and Fletcher Creeks is very similar to that described above, with the exception that in the syndepositional hornblende phytic flows and flows are more frequent and in places (e.g. around CN71955 and CN71864) much thicker than further north. To the south of Abo Creek a small area of pebbly conglomerate and interbedded siltstone (Ew3c) occurs. The conglomerate beds are dominantly composed of volcanoclastic material. Around CN73203, this sequence contains an area of siltstone with minor sand grade units. The siltstone beds contain 2-4 mm diameter siltstone specks aligned along the main cleavage which cross out bedding at a high angle.

The uppermost sequence in the Ew succession consists of felsic tuffaceous and volcanoclastic lithic waste units with interbedded volcanoclastic granule conglomerate, laminated siltstone and mudstone (Ew3). The lithic waste units vary in composition depending on the ratio of vitric, lithic and crystal (ranging from dominantly felsic to dominantly quartz) stratigraphically up sequence components. Along the coast between CN74000 and CN70611, the Ew3 sequence consists almost entirely of felsic tuffaceous and epiclastic volcanoclastic units. At CN71397, the Urquhart River occupies a 50 m thick pyroxene-feldspar phytic andesite flow within the sequence. This flow is petrologically and chemically similar to the Ew1 lavas.

Along the eastern edge of the map sheet, to the south and west of the area of Ew3, a sequence dominated by quartz phytic, felsic volcanic and associated tuffaceous rocks with interbedded siltstone, mudstone and minor carbonaceous units (Ew4) occurs. This felsic volcanic succession has been correlated with rocks from the Mt Read Volcanic belt in western Tasmania and is inferred to conformably overlie the Ew3 succession due to the exact rock distribution pattern to the south of, and in the upper reaches of, Sassy Creek (CN77240, CN77648). The small areas of Ew4 covered by the Montgomery Quadrangle consist of dominantly quartz phytic, felsic volcanic rocks (lava and tuffaceous rocks) which in places (CN77247) exhibit flow banding/grooving layering (defined by alternating chert-rich - chert-poor units) which is parallel to bedding within the interbedded sedimentary rocks. A significant proportion of the Ew4 succession is composed of interbedded epiclastic, volcanoclastic sandstone and sandy siltstone (CN77243). Cropping out around CN78832 are rocks which clearly exhibit the end product of an episode of deformation that produced a strong crenulation cleavage that modified the original igneous layering and sedimentary bedding to such an extent that the original bedding has been destroyed and a compositional banding formed. This compositional banding formed at between 20° and 40° to the original bedding and in places can be confused with bedding. The effect of the crenulation cleavage producing compositional banding is very evident in areas where carbonate units were originally interbedded with the volcanic rocks (e.g. around CN71430). Following the formation of the compositional banding this succession underwent a further episode of deformation which produced kink bands. The cleavage associated with the kink bands crenulate the compositional banding (e.g. around CN77045).

There is an old mining prospect (Penders Prospect) at CN77240. Secondary copper mineralisation is prevalent throughout the old prospect pit.

The southern portion of the land area covered by the map sheet is occupied by granitic rocks (G) and an associated area of granitic rocks which contain felsic volcanic screens (Gsp). Traditionally, the granitic rocks (G) have been considered to be of Cambrian age (KAr, 415-538 Ma) and Dore (KAr, 476-509 Ma) granites in western Tasmania. The younger radiometric age (KAr, 414 Ma) has been attributed to 'leakage' of the relevant radioactive isotopes. While a Cambrian age for the granitic body may still be correct, field evidence shows that (i) the granitic body is younger than the felsic volcanic (Ew) rocks, as in the area around CN78410 granitic rocks intrude the volcanic rocks resulting in numerous screens of volcanic rocks (Gsp) being incorporated within the granitic; and (ii) between CN78414 and CN77742 the volcanic succession has been altered by contact thermal metamorphism introduced by the granitic body, indicating that the granitic rocks are at least younger than the felsic volcanic suite if not younger than Cambrian. Overall, the granitic rocks in this area are medium-grained, equigranular, biotite granitoid/leucocratic. The grain size ranges from medium (0.5 mm) to very coarse (1.5 mm). The leucocratic grains are altered and weathered being cream, pink or green. Quartz grains exhibit extensive fracturing and grain recrystallisation. The percentage of biotite with an outcrop to the base. The larger biotite grains contain kink bands. Cutting the main granitic rocks are thin dykes and small areas of gneiss (e.g. around CN77390).

Another small body of granitic rock (Gg) intrudes the felsic volcanic (Ew) rocks around CN77447. This fine-grained, granitoid/leucocratic contains small (<10 mm) phenocrysts of feldspar, and has an irregular boundary with the felsic volcanic rocks. This granitic body also contains numerous block-screens of felsic volcanic rocks within its surface exposure.

In the southern half of the map sheet minor amounts of three further igneous rock types occur as dykes or small isolated bodies. The first area consists of the group of eleven large rock peaks, cropping out in the Southern Ocean approximately two kilometres offshore and collectively known as Acadia Rocks (CN77507). These rocks consist of brecciated, rhyolitic-dacitic lava or shallow intrusive flows (Ew) composed of feldspar and quartz micro-phenocrysts in a quartzite-dacitic granular matrix. The younger radiometric age for these rocks (KAr, 414 Ma) was recorded in March 1965 on the way from Hobart to Adelaide. The second group consists of numerous thin mafic dykes (Dm) which intrude the granitic rocks along a roughly E-W fracture system in the Low Rocky Cape area. These dykes all have chilled margins and are highly chloritized and pervaded by carbonate minerals. One of the dykes (CN77330) contain phenocrysts of quartz. The other dykes originally contained microphenocrysts of pyroxene. The third minor igneous rock type is a dyke of biotite rich leucocratic (C) which intrudes the Ew3 sequence at CN78619 with an E-W strike. This dyke contains small xenoliths of pyroxene granulate. Similar leucocratic dykes are known from further north along the west coast of Tasmania and on King Island, samples from both of these areas have been dated as being of Cretaceous age.

REFERENCE

- Qa Alluvium, beach sand, river flood plains.
- Qs Stabilized sand deposits including dune sand.
- Qm Older marine sands and raised beach deposits.
- Ts Interbedded, partially consolidated, sand, silt, clay and gravel.

- Ev1 Dominantly felsic tuffaceous rocks with interbedded lithic waste and laminated siltstone and mudstone.
- Ev2 Dominantly lithic waste with interbedded laminated siltstone and mudstone.
- Ev3 Dominantly pebbly conglomerate and lithic waste with interbedded siltstone.
- Ev4 Interlayered extensive porphyritic mafic volcanic rocks, including pillow, sheet, agglomerate and wacke/breccia flows.
- Ev5 Dominantly extensive porphyritic mafic volcanic rocks with interbedded laminated siltstone and mudstone.

- Ew1 Felsic volcanic rocks, dominantly quartz phytic, associated tuffaceous rocks, and minor interbedded siltstone and mudstone.
- Ew2 Inferred Dolerocosity.
- Ew3 Dominantly siliceous pebbly sandstone/siltstone with minor siliceous pebbly conglomerate.
- Ew4 Dominantly laminated siltstone/mudstone with minor carbonate beds.
- Ew5 Dominantly interlayered mafic volcanic flows with minor interbedded sedimentary rocks.
- Ew6 Dominantly laminated mudstone with interbedded laminated chert zones.
- Ew7 Dominantly interlayered mafic volcanic flows with minor interbedded sedimentary rocks.
- Ew8 Dominantly volcanoclastic lithic waste and siltstone with interbedded mudstone and mafic volcanic flows.
- Ew9 Syndepositional mafic volcanic intrusive units.

IGNEOUS ROCKS

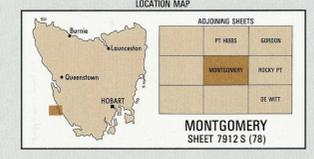
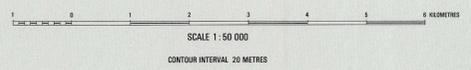
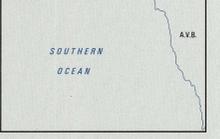
- G0 Lamprophyre dyke (CN80619).
- G1 Mafic dykes intruding granitic rocks in the Low Rocky Point area.
- G2 Medium to very coarse-grained, equigranular, biotite and/or hornblende with minor irregular patches and dykes of orthite. 414 Ma. (McDougall & Lago 1985; McDougall 1983); with acid-intermediate volcanic rock screens (Eg) (Eg).
- G3 Fine-grained, small feldspar phenocryst, granite/adamellite.
- G4 Dacitic-rhyolitic autobreccia (Acacia Rocks).
- G5 Andesitic dykes and sills intruding Ev1.

- Geological boundary — position approximate.
- Geological boundary — position inferred from geological data.
- Geological boundary — position inferred from aeromagnetic data.
- Fault — position approximate.
- Fault — position inferred from geological data.
- Fault — position inferred from aeromagnetic data.
- Dip and strike of bedding, facing known, facing unknown.
- Strike of bedding, vertical facing known, vertical.
- Dip and strike of bedding overturned, facing known.
- Dip and strike of igneous compositional banding, vertical.
- Dip and strike of compositional banding due to transposition in igneous rocks, vertical.
- Dip and strike of compositional banding due to transposition in sedimentary rocks, vertical.
- Dip and strike of predominant cleavage, undifferentiated, penetrative, vertical.
- Dip and strike of other cleavage, dipping, vertical.
- Dip and strike of crenulation cleavage, vertical.
- Dip and strike of bedding and associated parallel cleavage, fold hinge with plunge and axial surface, dipping, vertical.
- Dip and strike of minor igneous dykes, vertical.
- Fault in rock host.
- Minor prospect. (Cu — copper; Ag — silver; Au — gold).
- Lighthouse.

UNIVERSAL GRID REFERENCE

GRID ZONE DESIGNATION	UT ZONE AND EASTING INTERSECTION ON 100 000 METRE SQUARE DESIGNATION	SAMPLE POINT 3416, LOW ROCKY POINT
CH	50E	7440

RESPONSIBILITY DIAGRAM



Geology by A.V. Brown, B.Sc. (Hons), Ph.D.
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Department of Mines, Hobart.
Cartography by S. J. Dickson, C. A. Meach.
The Editor, B.S. (Hons), Ph.D., F.R.S., Supervising, Geologist in charge of Regional Mapping
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