

1982/39. The 1981 West Coast aeromagnetic survey : summary of
information and results

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Abstract

Technical and geological aspects of the 1981 aeromagnetic survey of western Tasmania, conducted for the Department of Mines, are briefly described and discussed. The survey provides valuable insights into the distribution of rock units and potential mineralised zones, and should act as a significant incentive for further exploration. Several important but previously unsuspected geological features are indicated, including a belt of mafic-intermediate volcanic rocks and possible ultramafic rocks in the Strahan area, and a possible ultramafic body south-west of Zeehan. A tabulation is given of some 67 magnetic anomalies and their geological interpretation.

INTRODUCTION

The need for a uniform, high-standard aeromagnetic coverage of western Tasmania, to serve as a guide for mineral exploration and for interpretation of regional geology, has been apparent for many years but has not been possible because of lack of funds. During the 1980-81 financial year the Commonwealth Government made available a sum of \$200 000 for additional mineral exploration in Tasmania. Various proposals were submitted by the Department of Mines, and \$149 280 was allocated for a regional aeromagnetic survey of part of western Tasmania.

The area selected for the survey extended from the southern end of Macquarie Harbour (AMG gridline 300 km N) to north of Mt Bischoff (gridline 422 km N), and from the west coast eastwards to the margin of the Tyennan Precambrian region (gridline 395 km E). Total area covered is of the order of 620 km², at a cost of about \$24 per km².

TECHNICAL ASPECTS OF THE SURVEY

Specifications and equipment

The aim of the survey was to provide sufficient data to resolve problems and to commence a unified, moderately detailed aeromagnetic coverage using reproducible specifications. The survey was not intended to replace company exploration projects at 150-300 m line spacing, but rather to provide a basis for future surveys. Existing geological maps of the area indicated that a flight line spacing of 500 m was the optimum spacing to adequately define the structures.

The survey was flown with a fixed-wing aircraft equipped only with a magnetometer and associated recording equipment, to minimise aircraft weight. The east-west flight direction chosen is approximately normal to the main geological structures. Flying was completed over a period of eight months, commencing in May 1981. Bad weather during winter forced suspension of flying for several months when flying time fell to less than one hour per week.

The survey specifications may be summarised as follows:-

Flight line direction:	east-west
Flight line spacing:	500 m
Tie-line spacing:	10 km
Terrain clearance:	150 m nominal (135 m actual coverage)
Sample interval:	42 m nominal

The observed data were corrected for diurnal variation, and the International Geomagnetic Reference Field subtracted. Although some negative residual values resulted, it was not felt necessary to apply a base shift to make all values positive. The data was smoothed along flight lines using a three-point filter. No other corrections were performed. The data was gridded on a 125 m square mesh before contouring. No attempt has been made to correct for the effect of varying terrain clearance, and this may have introduced spurious anomalies or diminished real anomalies.

Data available

The data was supplied by the contractor in three forms:

- (i) flight path plots,
- (ii) stacked profile plots,
- (iii) contour maps

All data was at a scale of 1:50 000, with the Australian Map Grid shown. The contour maps have a contour interval of 5 nT except in areas of steep gradient where the interval is increased. This has the effect of enhancing the low-amplitude anomalies, and the contour maps should be used in conjunction with the stacked profile plots.

The contour maps have been photographically reduced by the Department of Mines, and are now available at scales of 1:63 360, 1:100 000, 1:250 000 and 1:500 000, to coincide with the scales of existing geological maps. Flight path plots and stacked profile plots are available only at 1:50 000 scale.

Copies of the data may be obtained by writing to the Director of Mines.

Extension of survey and further data treatment

It is clearly desirable that the aeromagnetic coverage be extended to encompass the major mineralised areas in the west and north of the state, as a further incentive for mineral exploration. This should preferably be done over the next two or three years. The remainder of the state should then be covered over a number of years. The technique of using a minimum-weight fixed-wing aircraft has proven cost effective, and further work should use the same technique and specifications.

When adequate in-house computing facilities are available, the data should be re-processed to remove possible spurious effects and to make interpretation easier. The suggested processing sequence is:

- (i) Production of regional and residual magnetic field contour maps
- (ii) Re-contouring of the data at selected intervals
- (iii) Correction to a uniform terrain clearance on a line-by-line basis and performance of (i) and (ii) above

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- (iv) Correction to a uniform terrain clearance on an areal basis and performance of (i) and (ii) above

GEOLOGICAL ASPECTS OF THE SURVEY

Introduction

The aeromagnetic data provide a valuable guide to the distribution of rock types and geological structures in western Tasmania. Many rock types have a characteristic magnetic signature, and the aerial technique allows penetration through a considerable depth of cover rocks in some circumstances. For example, anomalies due to basement sources are apparent over the 200 m+ thick sequence of Tertiary sediments around Macquarie Harbour. The technique is also effective in areas of vegetation cover where outcrop is limited and access is difficult, as is the case over much of western Tasmania. A brief examination of the data has been made in conjunction with available geological information to determine the characteristics of the known geological features and to interpret or comment upon those features of the aeromagnetics not clearly referable to known geological structures.

Significant regional features

The following features are prominent at a regional scale (refer fig. 1):

- (1) The marked contrast between the magnetically 'quiet' units, e.g. the Siluro-Devonian Eldon Group sedimentary sequence, the Ordovician Gordon Limestone, the Devonian granitoids, much of the Precambrian basement, and the magnetically 'noisy' units, e.g. most Cambrian rocks, the Owen Conglomerate (in part), the Tertiary basalt, and the metamorphosed Precambrian rocks. This contrast makes the technique particularly useful in areas of poorly-known geology or in areas of extensive superficial cover.
- (2) The strong magnetic signature of the belt of Precambrian schist and amphibolite (Arthur Lineament) in the north-west part of the area. The magnetite bodies within this belt in the Savage River area record maximum values in excess of 10 000 nT above nominal zero.
- (3) The strong signature of the Cambrian ultramafic-mafic complexes, with values generally in the range of 1000-5000 nT. The areal extent of these bodies is indicated with considerable accuracy by the magnetic data, and the presence of a previously unsuspected body is suggested south-west of Zeehan.
- (4) The moderately strong but variable signature of the Cambrian Mt Read Volcanics belt, with values generally in the range of 250-1000 nT. The magnetite-bearing rhyolites which extend intermittently between South Darwin Peak and Mt Farrell are prominent sources within this belt. Some known andesite bodies give positive responses (e.g. around Queenstown), but by contrast the andesites near the Que River Mine and near Tullah have little magnetic expression. This may be a function of the latter being mainly extrusive rocks. The Tyndall Group volcanic-epiclastic sequence has a strong magnetic signature in many areas around Queenstown, possibly because of concentrations of detrital magnetite. Some strong positive features are associated with the Owen Conglomerate along this belt, and could reflect hematite-rich beds and/or buried Cambrian sources. A particularly large and strong feature is located over the Owen Formation north-east of Mt Sedgwick.

(5) A strong positive anomaly associated with a belt of Cambrian ultra-mafic rocks and andesitic volcanic rocks south of Macquarie Harbour apparently extends north as an arcuate belt through a large positive feature near the mouth of the King River. Most of the area is covered with Tertiary sediments, but Cambrian basalt and andesite crop out to the east. A probable extension of the anomaly belt occurs near the coast north-west of Strahan. The magnetic signature suggests a near continuous belt of volcanic rocks and possibly ultramafic rocks, comparable in size to the Mt Read Volcanics.

(6) The contrast between the 'flat', low-profile magnetic response of the Devonian granite plutons and the prominent positive responses of the adjacent Precambrian and Cambrian country rocks. Much of the positive response can be attributed to contact metamorphism (hornfels-skarn development). The contrast is accentuated by a dipole effect in some areas, e.g. northern margin of Meredith Granite, north-east margin of Heemskirk Granite, where a complementary trough parallels the ridge of high values.

(7) The highly noisy magnetic signature of the Tertiary basalt in the Waratah-Guildford area, with values generally in the range of -150 to +300 nT. Locally stronger positive values in excess of 500 NT possibly indicate sub-basalt sources.

Tabulation of anomalies and their geological interpretation

Some 67 prominent features on the aeromagnetic map (fig. 2) are listed below, together with probable and possible geological sources, and comments on the geology. Co-ordinates are given to the nearest kilometre, and are shown in brackets after the location.

1. Cape Sorell [352325]

Anomaly shape : Circular
Relative intensity: 150 nT
Known geology : Precambrian quartzite and mudstone
Possible sources : Dolerite intrusion and/or granite contact
Comments : Abundant dolerite boulders (Precambrian?) at Split Rock [351325] indicate probable off-shore intrusion (P.W. Baillie, pers. comm.). Devonian granite occurs 3 km to south, with some contact metamorphic effects.

2. Backagain Point [358318]

Anomaly shape : Part of lensoid feature
Relative intensity: 90 nT
Known geology : Precambrian quartzite and mudstone
Comments : No obvious source

3. South-west of Liberty Point [357312]

Anomaly shape : Two small circular features
Relative intensity: 50-100 nT
Known geology : Precambrian quartzite-mudstone-conglomerate sequence
Comments : BHP mapping shows NE-trending conglomerate unit in this area

4. Double Cove-Lucas Creek area [360310]

Anomaly shape : Linear belt 2 km wide
Relative intensity: Peaks to 250-400 nT
Known geology : Cambrian basalt, gabbro, and sedimentary sequence
Probable source : Cambrian basalt and gabbro
Comments : Corresponds to a belt of pillow basalt, breccia, and gabbro mapped by BHP ('Lucas Creek Volcanics' of White, 1975). Anomaly indicates volcanic rocks extend south-west to coast.

5. Near Birthday Bay [300358]

Anomaly shape : Several small circular features
Relative intensity: 50-100 nT
Known geology : ?Early Cambrian carbonate-quartzite sequence and adjacent Precambrian schist
Comments : Hematite-magnetite vein at Precambrian contact known to be cause of one anomaly

6. 6 km south of Double Cove [363307]

Anomaly shape : Several small features trending NNE
Relative intensity: Peak at 150 nT
Known geology : Cambrian mudstone-greywacke-conglomerate sequence
Possible source : Mafic intrusive or volcanic rocks

7. Head of Big Creek [362302]

Anomaly shape : Several small features
Relative intensity: Peak at 110 nT
Known geology : Precambrian schist faulted against Cambrian sequence
Comments : Westernmost anomaly due to serpentinised gabbro dyke at faulted contact

8. Asbestos Point-Noddy Creek area [370305]

Anomaly shape : Linear belt 5 km wide trending NNE
Relative intensity: Peaks to 1000-1500 nT
Known geology : Cambrian ultramafic rocks, gabbro, intermediate to acid volcanic rocks, mudstone, greywacke.
Probable source : Ultramafic, intermediate to acid volcanic rocks, gabbro
Comments : Western part of this belt lies over faulted strips of serpentinite. Eastern part corresponds to a belt of andesitic and dacitic volcanic rocks and associated intrusive rocks ('Noddy Creek Volcanics' of White, 1975). Large high over central Macquarie Harbour probably due to continuation of ultramafic-volcanic rock belt, which apparently continues beneath Tertiary cover to connect with King River anomaly (13).

9. Birch Inlet [375300]

Anomaly shape : Northern end of linear feature
Relative intensity: 650 nT
Known geology : Tertiary sediments
Probable source : Cambrian basalt
Comments : Cambrian basalt sequence ('Birch Inlet Volcanics' of White, 1975) probably extends beneath Tertiary cover.

10. Mt McCall to Raglan Range

Anomaly shape : Irregular clustered and isolated features
Relative intensity: Peaks to 250-400 nT
Known geology : Precambrian metasediments, with some garnet schist, possible amphibolite and eclogite
Possible sources : Garnet schist, amphibolite, eclogite

11. 3 km north of Kelly Basin [380313]

Anomaly shape : Two small circular features
Relative intensity: 50 nT
Known geology : Gordon Limestone adjacent to fault contact with Tertiary sediments
Comments : Possible sources include near-surface feature in Gordon Limestone, or buried extension of Cambrian source at Mt Sorell

12. Pine Cove Creek [367324]

Anomaly shape : Ovoid feature within larger belt
Relative intensity: 240 nT
Known geology : Cambrian basalt and andesite
Probable source : Basalt, andesite
Comments : Coincides with outcrops of basalt and andesite mapped by Cox in the Strahan Quadrangle (Baillie et al., 1977) at western margin of Cambrian sequence.

13. Mouth of King River [363327]

Anomaly shape : Elongate NW-trending lens 3 km wide
Relative intensity: 600 nT
Known geology : Cainozoic sediments overlying Cambrian volcano-sedimentary sequence
Possible source : Mafic-intermediate volcanic, ultramafic rocks. Recent pyritic delta deposits.
Comments : Lies partly over King River delta pyritic deposits, but size, shape, trend, association with larger belt, and similarity to anomaly over Macquarie Harbour, all suggest relation to buried Cambrian source of volcanic and/or ultramafic rocks. Small offshoot to north [364329] lies over andesite and basalt in Beehive Creek area (Cox, in Baillie et al., 1977).

14. Ocean Beach [358335]

Anomaly shape : Truncated NW-trending feature possible continuation of arcuate belt (8, 12, 13).
Relative intensity: 450 nT
Known geology : Cainozoic sediments over Palaeozoic basement
Possible source : Mafic-intermediate volcanic, ultramafic rocks
Comments : Similar in dimensions to anomalies 13 and 8 (northern end) - possibly continuation of that belt offset by faulting. Siluro-Devonian sediments crop out 2 km to north-east, and gravity data (Leaman, 1974) indicate 80-400 m of Tertiary cover.

15. Tully River [361341]

Anomaly shape : Cluster of small features
Relative intensity: 150 nT
Known geology : Tertiary boulder beds and Permo-Carboniferous tillite
Possible source : Dolerite boulder beds in Tertiary

16. Badger River [355350]

Anomaly shape : Irregular
Relative intensity: 200 nT
Known geology : Jurassic dolerite intruding Permian sequence
Probable source : Jurassic dolerite
Comments : Similar morphology to dolerite feature at 54.

17. Bottle Creek [364346]

Anomaly shape : Small east-west feature with extension to north-west
Relative intensity: 180 nT
Known geology : Large fault displaces Cambrian and Ordovician rocks against Devonian, with some Permo-Carboniferous cover.
Comments : Mineralisation along strike at Queensberry Mine gives no magnetic response

18. Melody Creek [368346]

Anomaly shape : Small, NW-elongated ovoid anomaly
Relative intensity: 125 nT
Known geology : Cambrian felsic volcano-sedimentary sequence faulted against quartzwacke sequence
Possible source : Felsic volcanic rocks
Comments : Thick felsic volcanic sequence in Melody Creek is cut-off by NW-trending fault parallel to anomaly

19. Professor Range [368350]

Anomaly shape : Narrow linear anomaly
Relative intensity: 125 nT
Known geology : Late Cambrian quartzwacke-mudstone-conglomerate sequence on west flank of anticline
Possible source : Detrital magnetite in sandstone
Comments : No known source. Anomaly follows strike of bedding, with suggestion of continuation around nose of anticline. No dykes or volcanic rocks known in area.

20. The Sisters [375345]

Anomaly shape : Irregular N-S to NNE-trending belt
Relative intensity: 280 nT
Known geology : Cambrian volcano-sedimentary sequence with felsic tuffs
Probable source : Felsic tuffs
Comments : Features follow strike of mapped felsic tuff units, with faulted boundaries to south and west (Baillie et al., 1977).

21. Rinadeena [377332]

Anomaly shape : Two small circular features on N-S trend
Relative intensity: 50 nT
Known geology : Siluro-Devonian Eldon Group, possibly some Ordovician limestone-shale
Comments : Geology poorly known. Old Mt Lyell Co. map shows N-S fault in Eldon Group, with nearby prospect

22. South Darwin Peak [383315] to King River [383333]

Anomaly shape : Complex N-S belt 6-8 km wide
Relative intensity: Peaks at 1000 nT
Known geology : Cambrian Mt Read Volcanics with some Owen Conglomerate cover
Probable source : Magnetite-bearing volcanic and epiclastic rocks.
Comments : Main ridge of high values corresponds to central rhyolite sequence, which carries veins of magnetite-hematite and patchy Cu-sulphides. Breaks in ridge coincide with Owen Conglomerate cover. Subsidiary eastern peak at South Darwin Plateau overlies east margin of Darwin Granite and base of overlying epiclastic sequence containing detrital hematite-magnetite. Trough in Clark River-Garfield River area corresponds with volcano-sedimentary sequence. Western ridge of high values lies over volcanoclastic conglomerate sequence with detrital hematite on east flank of Mt Sorell.

23. Lower Queen River [378334]

Anomaly shape : Two small circular anomalies
Relative intensity: 50-80 nT
Known geology : Cambrian volcano-sedimentary sequence
Possible source : Mafic-intermediate volcanic rocks
Comments : Sequence poorly known but includes basalt and andesite further north (Corbett, 1979)

24. Mt Huxley-Whip Spur [383337]

Anomaly shape : Irregular
Relative intensity: Peaks to 250 nT
Known geology : Cambrian Mt Read Volcanics
Probable source : Felsic-intermediate volcanic rocks
Comments : Double high anomaly NE of Mt Huxley [384334] lies over volcanoclastic conglomerate sequence with detrital hematite. Complex anomalies over upper Whip Spur correspond with Darwin-type rhyolite. Trough at foot of Whip Spur lies along contact between central and western sequences (Corbett, 1979).

25. Lynchford [374337]

Anomaly shape : Irregular lens with NNE orientation
Relative intensity: 250-500 nT
Known geology : Intermediate tuff (Tyndall Group) overlying Lynch Creek basalt
Probable source : Tyndall Group tuff
Comments : Closely follows outcrop of Comstock Tuff, even to fault displacement. Adjacent Lynch Creek basalt gives little response.

26. Queenstown-Lake Margaret area

Anomaly shape : Complex belt
Relative intensity: Peaks to 250 nT
Known geology : Mt Read Volcanics, including volcano-sedimentary sequences, acid and intermediate intrusive rocks, altered and mineralised volcanic rocks.
Probable source : Various volcanic and intrusive units
Comments : Complex belt with many sources. Identifiable sources include andesite bodies at Little Owen Spur, Reservoir, Mill-magazine area, Crown Hill and lower Lake Margaret Road. Linear western anomaly along Zeehan Highway corresponds with dacite porphyry body. A linear high lies over altered volcanic rocks on Philosophers Ridge, but no clear response from the Mt Lyell ore-bodies is apparent at this scale. A strong positive anomaly (400 nT+) covers the known outcrop of the Comstock Tuff in the Comstock Valley. The cause of the arcuate high in the upper Langdon River [377346] is not known.

27. Mt Owen-Mt Lyell

Anomaly shape : Complex large lens
Relative intensity: Peaks to 500-700 nT
Known geology : Mt Read Volcanics, including much Tyndall Group, with overlying Owen Conglomerate
Probable source : Mainly Tyndall Group volcanoclastic conglomerates, also Owen Conglomerate.
Comments : Large high at east end of Mt Lyell reflects Tyndall Group exposed beneath Owen Conglomerate, particularly volcanoclastic conglomerate sequence. Narrower belts of volcanoclastic conglomerate at Mt Owen also have strong positive response. Positive anomalies over Owen Conglomerate may reflect hematitic units. Source of spot high beneath moraine near Gormanston not known.

28. Mt Sedgwick [387350]

Anomaly shape : Large circular high and several smaller features.
Relative intensity: 700 nT
Known geology : Mt Read Volcanics, Owen Conglomerate
Probable source : Various, including magnetite-bearing felsic volcanic rocks, volcaniclastic conglomerate
Comments : Smaller features include low over limestone in Comstock Valley, central high (650 nT) over Darwin-type rholite with magnetite veins, small high SW of Lake Beatrice [388346] over volcaniclastic conglomerate, and western high over quartz-feldspar porphyry sequence [385347; Corbett, 1982]. Small inflection over Jurassic dolerite at Mt Sedgwick suggests no feeder present. Large circular feature (720 nT) NE of Mt Sedgwick lies entirely over Owen Conglomerate, but intensity and poor correlation with strike trends suggest a deeper (Cambrian) source may be involved.

29. Lake Dora-Lake Rolleston

Anomaly shape : Part of complex N-S belt
Relative intensity: Peak at 800 nT
Known geology : Mt Read Volcanics, including volcaniclastic conglomerate sequence, with overlying Owen Conglomerate
Probable source : Mainly felsic volcanic rocks with magnetite
Comments : High areas correspond with patchily mineralised felsic volcanic rocks with hematite-magnetite veins. Small high east of Lake Dora [389354] corresponds with intrusive porphyry. Negative gradient to west may reflect increasing thickness of Owen Conglomerate

30. Henty River-Farrell Rivulet

Anomaly shape : Irregular NNW-trending belt
Relative intensity: Peak at 450 nT
Known geology : Cambrian sedimentary sequence with some gabbro and pillow basalt, overlain by Pleistocene moraine
Probable source : Gabbro, basalt
Comments : Southern part of belt corresponds with known outcrop of gabbro and basalt, including pillow lava

31. Mt Dundas [373361]

Anomaly shape : Small spot high
Relative intensity: 115 nT

Known geology : Jurassic dolerite overlying Cambrian and Precambrian rocks
Probable source : Dolerite
Comments : The small anomaly lies at the western margin of the dolerite outcrop

32. Upper Henty River [377357]

Anomaly shape : Large NE-trending wedge
Relative intensity: Peak at 1500 nT
Known geology : Ultramafic rocks and gabbro intruding Cambrian sedimentary sequence between North and South Henty Falls
Probable source : Ultramafic rocks, gabbro
Comments : Main peak corresponds with large, poorly known area of gabbro, pyroxenite, and serpentinite at SW end of North Henty Fault. Only small serpentinite bodies known along fault plane to NE, but anomaly suggests larger bodies at depth

33. Mt Geikie to Mt Read

Anomaly shape : Complex N-S belt
Relative intensity: Peak at 250 nT
Known geology : Mt Read Volcanics, including central volcanic sequence, western volcano-sedimentary sequence, and Tyndall Group
Probable source : Various sources in volcanic rocks
Comments : Main southern ridge [381355] lies mainly over Tyndall Group but overlaps onto underlying patchily mineralised andesite sequence. 'Toe' at southern end [379353] may correspond to andesite body or possibly to mineralisation. Main ridge north of Henty River [377363] lies over ash-flow sequence near western margin of central volcanic belt, and partly over Jones Creek shale lens. Two small highs NE of Hercules Mine lie on shale lenses, but Hercules host-rock shale has no obvious expression. Isolated high to the west of main belt [376362] lies near contact between large tuff unit and shale-greywacke sequence.

34. Lake Julia-Red Hills

Anomaly shape : Complex belt
Relative intensity: Peak at 1500 nT
Known geology : Mt Read Volcanics, Owen Conglomerate
Probable source : Felsic volcanic rocks, Tyndall Group
Comments : Strong ridge over Red Hills [383367] reflects mineralised magnetite-bearing rhyolite. Smaller highs near Lake Julia [382363] lie over fault wedges of volcanic rocks (Tyndall Group) exposed beneath Owen Conglomerate.

35. Lake Selina-Mt Murchison

Anomaly shape : Complex belt
Relative intensity: Peaks to 550 nT
Known geology : Mt Read Volcanics, Owen Conglomerate, Murchison Granite
Probable source : Mainly felsic volcanic rocks and granite
Comments : Several highs near Lake Selina over patchily mineralised felsic volcanic rocks and volcani-clastic conglomerate. A linear high north of the Anthony River [386367] lies over Owen Conglomerate. Two circular highs east of Mt Murchison [387368] lie over Cambrian Murchison Granite.

36. Mt Murchison-Mt Farrell

Anomaly shape : Complex belt
Relative intensity: Peaks to 500-600 nT
Known geology : Mt Read Volcanics, Owen Conglomerate, Murchison Granite
Probable source : Mainly felsic volcanic rocks and granite
Comments : Series of highs follows belt of Murchison Granite, known to have high magnetic susceptibility (Collins et al., 1981). Highs due north of Mt Murchison [386373] probably due to magnetite-bearing rhyolite. Arcuate high over Owen Conglomerate SE of Mt Farrell [388375] may reflect underlying granite. NNE-trending ridge along western margin of Mt Farrell may reflect altered or mineralised volcanic rocks. Strong negative gradient to Henty Fault Zone at western margin of this zone. Andesitic rocks along western side of Henty Fault Zone have negative expression.

37. Sophia River-Mt Romulus

Anomaly shape : Complex NNE-trending belt
Relative intensity: Peaks to 300 nT
Known geology : Precambrian-Cambrian contact, Owen Conglomerate, Tertiary basalt
Possible source : Various
Comments : Noisy magnetic response over Precambrian quartzite near contact contrasts with quiet magnetic response over Granite Tor granite. Line of highs along Cambrian-Owen Conglomerate contact interrupted by noisy area of Tertiary basalt.

38. Rosebery-Tullah-Bastyan Dam area

Anomaly shape : V-shaped belt
Relative intensity: Peaks to 300 nT

Known geology : Mt Read Volcanics
Possible source : Various
Comments : Anomalies show poor correspondence with known rock units. Significance of the broadening ridge of highs extending north from Rosebery is not clear. Position of Rosebery orebody is marked by small high-low couplet.

39. Mt Kershaw-Boco area

Anomaly shape : NE-trending double belt
Relative intensity: 300 nT
Known geology : Mt Read Volcanics
Possible source : Andesite

40. Mt Block-Mt Charter

Anomaly shape : Scattered small anomalies
Relative intensity: 150 nT
Known geology : Mt Read Volcanics
Probable source : Volcanic units
Possible source : Andesite
Comments : Andesite sequence around Que River Mine has no obvious expression, nor does Jurassic dolerite at Mt Charter

41. 2 km east of Que River Mine [393393]

Anomaly shape : Spot anomaly
Relative intensity: 150 nT
Known geology : Contact between Mt Read Volcanics and Owen Conglomerate

42. Bulgobac [380393]

Anomaly shape : NE-trending belt 2 km wide
Relative intensity: 350 nT
Known geology : Cambrian sedimentary sequence adjacent to Mt Read Volcanics
Comments : NE trend is parallel to strike, but there are no known sources. Irregularities at NE end probably due to Tertiary basalt.

43. Dundas to Pieman River

Anomaly shape : Complex broad belt
Relative intensity: Peaks to 3500 nT
Known geology : Cambrian ultramafic-mafic complexes, Dundas Group, Crimson Creek Formation, Devonian mineralisation.

Probable source : Ultramafic rocks, Devonian mineralisation and hornfels

Comments : Prominent arcuate high over Razorback ultramafic body [369364] has peak at north margin of body. Connecting ridge to Serpentine Hill area may partly reflect Devonian hornfelsing in Dundas Group. Serpentine Hill complex has main central high over Stichtite Hill [368367], with an unconnected ridge to NE in Ring River area [373370]. Narrow NE-trending ridge of highs along Great Northern Creek [372367] may indicate Devonian hornfelsing. N-S ridge along Colebrook Hill reflects the ultramafic body, with an easterly extension [375372] probably reflecting adjacent mineralisation. Isolated high south of this ridge [374367] lies over Fahl and Rich P.A. prospects. An ovoid anomaly (500+ nT) is located over the main massive pyrrhotite ore bodies at Renison Bell [370371].

44. Pieman River to Webbs Creek

Anomaly shape : N-S belt

Relative intensity: Peaks to 3500 nT

Known geology : Cambrian ultramafic belt and sedimentary sequence

Probable source : Ultramafic rocks

Possible source : Mafic volcanic rocks

Comments : Main ridge corresponds to outcrop belt of sheared serpentinite, pyroxenite, peridotite. Broadening of anomaly at north end indicates continuation of ultramafic rocks at depth. Subsidiary N-S ridge at east side [376377] lies near contact between Cambrian greywacke sequence and Rosebery Group.

45. Pieman River to Parsons Hood

Anomaly shape : Complex NW-trending belt

Relative intensity: Peaks to 3500 nT

Known geology : Cambrian ultramafic complex and sedimentary sequence; granite contact

Probable source : Ultramafic rocks, Devonian hornfels

Comments : Prominent ridge follows belt of layered pyroxenite-peridotite-serpentinite from Pieman River [372374] to mouth of Little Wilson River [363388]. Ridge on west flank of main ridge [367377] reflects dunites of same complex. Noisy magnetic response west of this reflects Crimson Creek Formation with basalt intercalations. Steep gradients and associated lows reflect margin of Meredith Granite. Several positive anomalies (to 600+) in Parsons Hood-Salmon Creek-Mt Livingstone area correspond to Devonian hornfelsing in Cambrian rocks. A positive anomaly (1000 nT) at 361382 may reflect the Mt Lindsay skarn.

46. Huskisson River area

Anomaly shape : Curved N-S belt of lows
Relative intensity: -200 nT
Known geology : Large syncline of Siluro-Devonian sedimentary rocks

47. Upper Webbs Creek [367393]

Anomaly shape : Three highs in E-W line
Relative intensity: Maximum 120 nT
Known geology : Meredith Granite contact with Gordon Limestone and Eldon Group
Possible source : Hornfelsesed limestone

48. East of Mt Ramsay

Anomaly shape : N-S belt
Relative intensity: Peak at 1000 nT
Known geology : Cambrian sedimentary sequence adjacent to Meredith Granite
Possible source : Devonian hornfels or skarn; Cambrian basalt

49. Coldstream River [376402]

Anomaly shape : Double lens
Relative intensity: Peak at 500 nT
Known geology : Tertiary basalt overlying possible Precambrian sedimentary sequence
Possible source : Devonian hornfels; Tertiary basalt

50. NW of Melba Flats [365367]

Anomaly shape : Large circular feature
Relative intensity: Peak at 350 nT
Known geology : Cambrian Crimson Creek Formation faulted against Precambrian rocks
Possible source : Cambrian basalt or gabbro? Devonian mineralisation.
Comments : Area of poor outcrop and poorly known geology

51. Trial Harbour-Zeehan area

Anomaly shape : Complex arcuate belt
Relative intensity: Peaks to 2000 nT
Known geology : Precambrian and Cambrian sequences with ultramafic-mafic bodies, intruded by Heemskirk Granite to west and faulted against Ordovician and Siluro-Devonian to east and south.
Probable source : Ultramafic rocks, basalt, Devonian hornfels and mineralisation.

Comments : Strong ridge (to 1800 nT) over ultramafic body at Trial Harbour. Similar ridge (to 2000 nT) with classic dipole effect over area mapped as Crimson Creek Formation at Comstock Creek [355357] suggests another ultramafic body. Strong ridge (to 2500 nT) occurs over magnetite-serpentinite body at Tenth Legion mine [356362] and extends SE along line of Tenth Legion Fault. The McIvors Hill gabbro shows a variable response. A circular high (500 nT) in the vicinity of the Swansea-Grubbs-North Tasmanian mines [360359] and another over Queen Hill [362362] may reflect basalt in these sequences.

52. North margin of Heemskirk Granite

Anomaly shape : Complex belt
Relative intensity: Peaks to 100-350 nT, up to 1500 nT
Known geology : Devonian granite intruding Precambrian Oonah Formation. Some Tertiary basalt and associated sediments.
Probable source : Devonian hornfels and skarn, Tertiary basalt
Comments : Series of low-profile highs over the Heemskirk Granite east of Mt Heemskirk possibly due to hornfels rafts in granite. Other magnetic highs in Oonah Formation probably due to hornfelsing and metasomatism associated with granite emplacement. A small circular anomaly of 100-150 nT above background is located over the St Dizier skarn deposit at 345368.

53. Granville Harbour [337373]

Anomaly shape : Arcuate lens
Relative intensity: Peak at 1500 nT
Known geology : Cainozoic sediments and Tertiary basalt overlying Precambrian Oonah Formation to south, and Ordovician-Silurian-Devonian to north.
Possible source : Ultramafic body; skarn
Comments : Anomaly much higher than others along north margin of granite, and higher than expected for Tertiary basalt. Northern part of anomaly probably overlies Gordon Limestone.

54. Northridge Creek, Pieman River [350374]

Anomaly shape : Lens 10 x 5 km
Relative intensity: Peaks to 300 nT
Known geology : Jurassic dolerite ring intrusion in Precambrian
Probable source : Jurassic dolerite
Comments : Greater intensity along NE side suggests thicker dolerite on this side.

55. Lower Pieman-Savage River

- Anomaly shape* : Complex belt of parallel ridges, trending NNE, up to 12 km wide
- Relative intensity*: Peaks to 10 000 nT
- Known geology* : Belt of Precambrian schist, quartzite and amphibolite (Arthur Lineament) with large magnetite lenses.
- Probable source* : Magnetite lenses, amphibolite, basic volcanic rocks
- Comments* : Prominent ridges probably reflect lithological units. Belt shows marked thinning or 'necking' at Savage River. Strong eastern ridge with peaks over 10 000 nT follows line of magnetite bodies from Savage River to Rocky River. A continuation of this ridge crosses the Pieman River north of Stringer Creek. Narrow western ridge (1000+ nT) follows line of amphibolite and basalt SE of Corinna [341385]. Westernmost ridge corresponds to basalt of Bernafai Ridge [338385].

56. Pieman Heads [327383]

- Anomaly shape* : Irregular
- Relative intensity*: Maximum 300 nT
- Known geology* : Pieman Granite intrudes Precambrian relatively unmetamorphosed sequences
- Possible source* : Hornfels
- Comments* : Positive features at margins of granite north and south of Pieman Heads may reflect hornfelsing of country rocks.

57. Interview River-Norfolk Range area

- Anomaly shape* : Irregular, scattered and linear anomalies over large area
- Relative intensity*: Maximum 150 nT
- Known geology* : Sequences of Precambrian siltstone and quartzite, with scattered dolerite dykes
- Comments* : Geology poorly known north of Lagoon River [403 km N]. Positive features south of this show strong correlation with siltstone sequences, whereas adjacent quartzite sequence is relatively quiet. Some linear features may correspond to dolerite dykes.

58. Bald Hill area [360410]

- Anomaly shape* : Large complex arcuate lens 18 x 8 km
- Relative intensity*: Maximum 3000 nT
- Known geology* : Ultramafic-mafic complex with associated basalt and Cambrian sediments.

Probable source : Ultramafic complex
Comments : The prong subtended to the NE from the main complex lies over Cambrian sediments, but suggests presence of ultramafic rocks.

59. Lower reaches of Whyte River [353400]

Anomaly shape : Arcuate belt 5 x 1 km
Relative intensity: 300 nT
Known geology : Cambrian and Precambrian rock, Devonian granite
Probable source : Devonian hornfels
Possible source : Cambrian mafic rocks

60. Mt Stewart [359400]

Anomaly shape : Irregular
Relative intensity: 250 nT
Known geology : Ultramafic-mafic complex, Devonian granite
Probable source : Ultramafic rocks
Comments : The low profile to negative response suggests a thin pendant of ultramafic rocks, with the granite-country rock contact passing north of Mt Stewart.

61. Luina area [365407]

Anomaly shape : NE-trending lens (3 x 1 km) surrounded by low magnetic intensity
Relative intensity: 800 nT
Known geology : Cambrian basalt, sedimentary sequence (Crimson Creek Formation correlate) and ultramafic rocks.
Probable source : Basalt
Comments : Positive anomaly due to major basalt unit (Deep Creek Volcanics). Local highs may be due to minor basalt units. The Cleveland pyrrhotite-cassiterite deposit shows as an inflection on the gradient near 365407. The lack of response may be due to mining, as most of the upper ore bodies have been mined out.

62. Magnet Dam-Wombat Flat-Mt Ramsay area

Anomaly shape : Arcuate belt around granite margin
Relative intensity: Maximum 1500 nT, mostly 250-750 nT
Known geology : Cambrian sediments and basalt (Crimson Creek Formation correlate) intruded by Devonian granite. Tertiary basalt cover in places.
Probable source : Cambrian basalt, hornfels, Tertiary basalt.

Comments : Strong positive anomalies are due to Cambrian basalt and contact-metamorphosed Cambrian sediments, and are strong enough to mask the magnetic response of overlying Tertiary basalt between Johnson Creek [373398] and Corinna Road. Strong negative anomalies over granite are probably dipole effects. Three spot highs over granite 3 km north of Mt Ramsay are probably due to Tertiary basalt.

63. Mt Bischoff area [375412]

Anomaly shape : Low intensity wedge with central heart-shaped anomaly
Relative intensity: Peak 250 nT
Known geology : Precambrian quartzite-mudstone sequence intruded by Devonian porphyry dykes and flanked by Cambrian sediments and ultramafic rocks and by Tertiary basalt.
Probable source : Devonian mineralisation
Comments : Low intensity area due to Precambrian rocks. Central anomaly with NE lobe due to massive pyrrhotite mineralisation at Mt Bischoff mine. No significant magnetic response due to Magnet Dyke, but positive ridge to north [375416] probably due to Cambrian basalt (P.R. Williams, pers. comm.)

64. Guildford-Waratah area

Anomaly shape : Large area of complex low-order noisy magnetics
Relative intensity: Mostly -200 to +200 nT scattered peaks of 250-300 nT
Known geology : Mostly Tertiary basalt plain overlying Lower Palaeozoic and Permo-Carboniferous
Probable source : Mainly Tertiary basalt
Comments : Basalt has characteristic random pattern of small, irregular, low-order anomalies

65. Waratah River area [376421]

Anomaly shape : Wedge broadening northwards
Relative intensity: 250-500 nT
Known geology : Cambrian basalt and sediments (P.R. Williams, St Valentines Quadrangle mapping)
Probable source : Cambrian basalt

66. Wardle River-Goderich Road area [383421]

Anomaly shape : Irregular
Relative intensity: Peaks to 550 nT
Known geology : Tertiary basalt

Probable source : Cambrian basalt under Tertiary basalt

67. Mt Pearse area [384403]

- Anomaly shape : Arcuate quiet area
- Relative intensity: 0-50 nT
- Known geology : Owen Conglomerate correlate of Mt Pearse syncline, surrounded by Tertiary basalt
- Probable source : Ordovician clastic rocks
- Comments : NE-trending ridge with 250-350 nT values west of Mt Pearse [381403] may reflect Cambrian source under Tertiary basalt.

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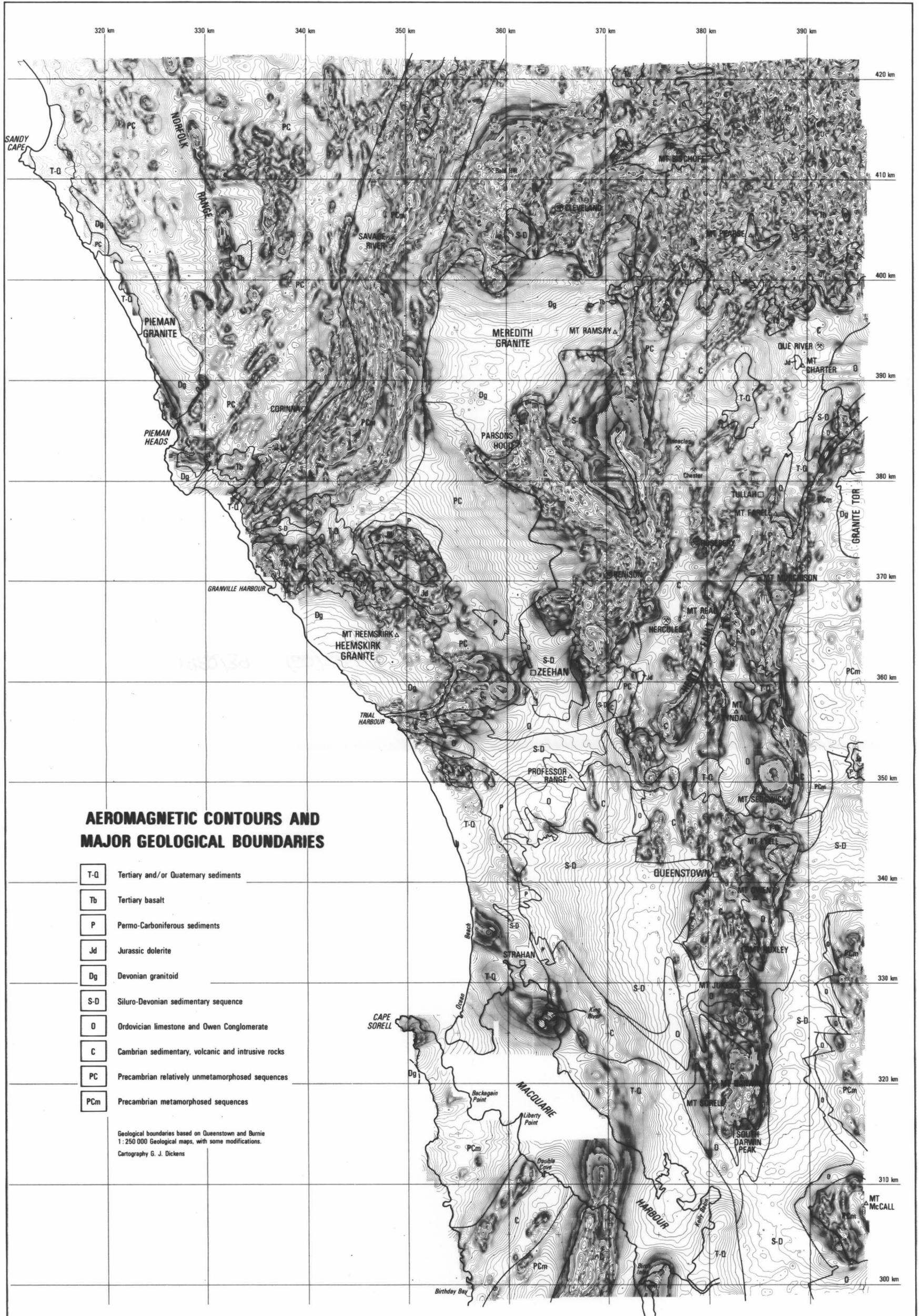
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[21 December 1982]



AEROMAGNETIC CONTOURS AND MAJOR GEOLOGICAL BOUNDARIES

- T-Q Tertiary and/or Quaternary sediments
- Tb Tertiary basalt
- P Permo-Carboniferous sediments
- Jd Jurassic dolerite
- Dg Devonian granitoid
- S-D Siluro-Devonian sedimentary sequence
- O Ordovician limestone and Owen Conglomerate
- C Cambrian sedimentary, volcanic and intrusive rocks
- PC Precambrian relatively unmetamorphosed sequences
- PCm Precambrian metamorphosed sequences

Geological boundaries based on Queenstown and Burnie 1:250 000 Geological maps, with some modifications.
Cartography G. J. Dickens

5 cm

SCALE 1:250 000

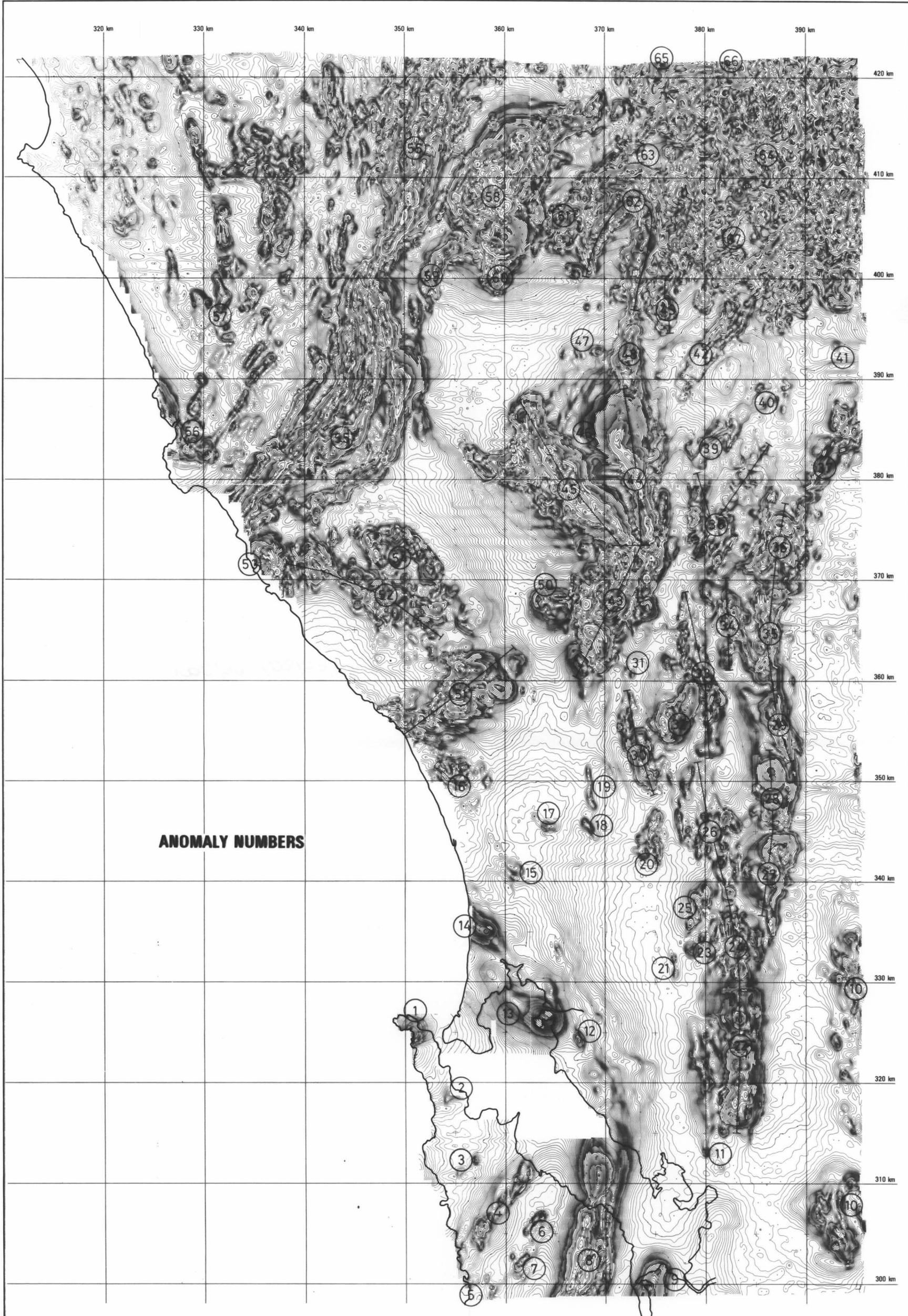
Airborne Geophysical Survey and Compilation by **GEOEX** PTY LTD

FOR
DEPARTMENT OF MINES TASMANIA
WEST COAST AREA TASMANIA
CONTOURS OF RESIDUAL TOTAL MAGNETIC INTENSITY

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Figure 1



ANOMALY NUMBERS

SCALE 1:250 000

5 cm

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Map of Tasmania showing the location of the West Coast Area. Includes a legend for symbols and a scale bar.

Figure-2