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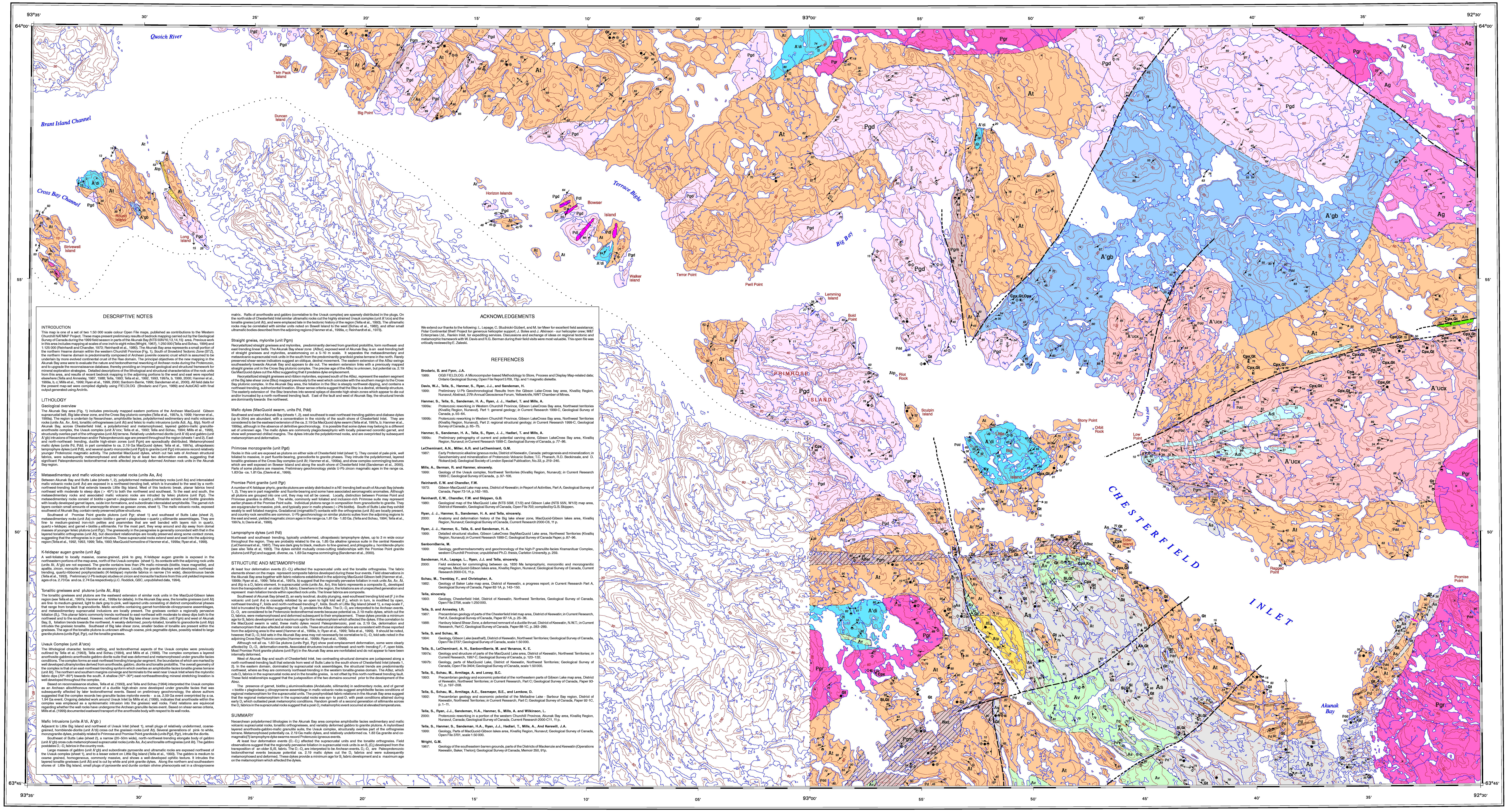
GEOLOGICAL SURVEY OF CANADA / COMMISSION GÉOLOGIQUE DU CANADA

NATMAP
CARTNAT
Canada's National Geoscience Mapping Program
Le Programme national de cartographie géoscientifique du Canada



DESCRIPTIVE NOTES

INTRODUCTION

This map is one of a set of two 1:50 000 scale colour Open File maps, published as contributions to the Western Churchill NATMAP Project. These maps present preliminary results of bedrock mapping carried out by the Geological Survey of Canada during the 1999 field season in parts of the Akunak Bay (NTS 55N/10,13,14,15) area. Previous work in this area includes mapping at scales of one inch to eight miles (Wright, 1967), 1:250 000 (Tella and Schau, 1994) and 1:125 000 (Reinhardt and Chandler, 1973; Reinhardt et al., 1980). The Akunak Bay area represents a small portion of the northern Hearne domain within the western Churchill Province (Fig. 1). South of Snowbird Tectonic Zone (STZ), the northern Hearne domain is predominantly composed of Archean juvenile oceanic crust which is assumed to be underlain by more evolved continental crust of the Rae domain. The principal objectives of the new mapping in the Akunak Bay area were to evaluate the nature and tectonothermal reworking of Archean rocks during the Proterozoic, and to upgrade the reconnaissance database, thereby providing an improved geological and structural framework for mineral exploration strategies. Detailed descriptions of the lithological and structural characteristics of the rock units from this area, and results of recent bedrock mapping in the adjoining portions to the west and east were reported elsewhere (Tella and Annesley, 1987, 1988; Tella, 1993; Tella et al., 1992, 1993, 1997a, b, 1999, 2000; Hanmer et al., 1999a, b, c; Mills et al., 1999; Ryan et al., 1999, 2000; Sanborn-Barrie, 1999; Sandeman et al., 2000). All field data for the present map-set were compiled digitally using FIELDLOG (Brodaric and Fyon, 1989) and AutoCAD with final output generated using ArcInfo.

LITHOLOGY

Geological overview

The Akunak Bay area (Fig. 1) includes previously mapped eastern portions of the Archean MacQuoid Gibson supracrustal belt, Big lake shear zone, and the Cross Bay plutonic complex (Tella et al., 1997a, b, 1999; Hanmer et al., 1999a). The region is underlain by Neoarchean, amphibolite facies, polydeformed sedimentary and mafic volcanics rocks (units As, Av, Am), tonalitic orthogneisses (unit At) and felsic to mafic intrusions (units Adi, Ag, Atp). North of Akunak Bay, across Chesterfield Inlet, a polydeformed and metamorphosed, layered gabbro-mafic granulite-anorthosite complex, the Uvauk complex (unit A'Ucx; Tella et al., 1993; Tella and Schau, 1994; Mills et al., 1999), structurally overlies part of the orthogneiss (unit At) terrane. Relatively undeformed diorite (unit A'di) and gabbro (unit A'gb) intrusions of Neoarchean and/or Paleoproterozoic age are present throughout the region (sheets 1 and 2). East- and north-northeast- trending, ductile high-strain zones (unit Pgm) are sporadically distributed. Metamorphosed mafic dykes (units Pd, Pdd; in part correlative to ca. 2.19 Ga MacQuoid dykes; Tella et al., 1997a), ultrapotassic lamprophyre dykes (unit Pdl), and several quartz-monzonite (unit Pgd) to granite (unit Pgr) intrusions record relatively younger Proterozoic magmatic activity. The potential MacQuoid dykes, which cut two sets of Archean structural fabrics, were subsequently metamorphosed and affected by at least two deformation events, suggesting that significant Paleoproterozoic tectonothermal events affected previously deformed Archean rock units in the Akunak Bay region.

Metasedimentary and mafic volcanic supracrustal rocks (units As, Av)

Between Akunak Bay and Butts Lake (sheets 1, 2), polydeformed metasedimentary rocks (unit As) and intercalated mafic volcanic rocks (unit Av) are exposed in a northwest-trending belt, which is truncated to the west by a north-northwest-trending fault that extends towards Little Big Island. West of this tectonic break, planar fabrics trend northeast with moderate to steep dips (> 45°) to both the northwest and southeast. To the east and south, the metasedimentary rocks and associated mafic volcanic rocks are intruded by felsic plutons (unit Pgr). The metasedimentary rocks consist of biotite + garnet + plagioclase + quartz ± sillimanite schists and biotite granofels with locally developed garnet layers, oxide iron formations, and subordinate intercalated amphibolite. The garnet-rich layers contain small amounts of arsenopyrite shown as gossan zones, sheet 1). The mafic volcanic rocks, exposed southwest of Akunak Bay, contain rarely preserved pillow structures.

Southwest of Promise Point granite plutons (unit Pgr; sheet 1) and southeast of Butts Lake (sheet 2), [illegible]

ACKNOWLEDGEMENTS

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REFERENCES

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1989: OGS FIELDLOG: A Microcomputer-based Methodology to Store, Process and Display Map-related data; Ontario Geological Survey, Open File Report 5709, 73p. and 1 magnetic diskette.

Davis, W.J., Tella, S., Hanmer, S., Ryan, J.J., and Sandeman, H.
1999: Preliminary U-Pb Geochronological Results from the Gibson Lake-Cross bay area, Kivalliq Region, Nunavut; Abstract, 27th Annual Geoscience Forum, Yellowknife, NWT Chamber of Mines.

Hanmer, S., Tella, S., Sandeman, H. A., Ryan, J. J., Hadlari, T. and Mills, A.
1999a: Proterozoic reworking in Western Churchill Province, Gibson LakeCross Bay area, Northwest territories (Kivalliq Region, Nunavut). Part 1: general geology; *in* Current Research 1999-C, Geological Survey of Canada, p. 55–64.
1999b: Proterozoic reworking in Western Churchill Province, Gibson LakeCross Bay area, Northwest Territories (Kivalliq Region, Nunavut). Part 2: regional structural geology; *in* Current Research 1999-C, Geological Survey of Canada, p. 65–75.

LEGEND

Relative ages of the units for the most part are uncertain and no chronological order is implied. Not all rock units or symbols appear on this map.

QUATERNARY

- **Q** — *Glacial, fluvial, and marine deposits*

PALEOPROTEROZOIC

- **Pgr** — *Promise Point granite, monzogranite; biotite-bearing, massive to weakly foliated, pink to salmon coloured, equigranular to porphyritic; may contain disseminated magnetite and fluorite; south and southeast of Butts Lake (sheet 2) this unit contains abundant inclusions of older lithologies*
- **Pgd** — *Primrose granodiorite-monzogranite; pink to grey, weakly to well foliated*
- **Pdl** — *Phlogopite lamprophyre and mafic syenite dykes*
- **Pdd** — *Diabase dykes*
- **Pgm** — *Straight gneiss, mylonite; principally derived from tonalite to granite protoliths; Big lake (Blsz) and Akunak Bay (ABsz) shear zones (hatched units) includes other lithologies; in part includes reactivated Archean straight gneiss and mylonite*
- **Pd** — *Diabase dyke swarm (correlative to ca 2.19 Ga MacQuoid dykes); predominantly east-trending, in part plagioclase phyric; weakly deformed and metamorphosed*

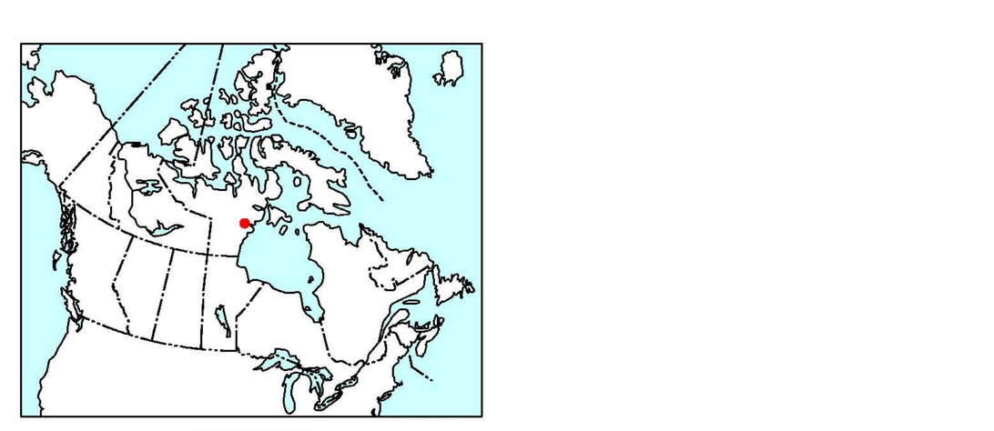
ARCHEAN AND/OR PALEOPROTEROZOIC

- **A'gb** — *Gabbro: massive to weakly foliated, coarse grained; includes subordinate ultramafic rocks, pyroxenite*
- **A'di** — *Diorite to gabbro; weakly to well foliated*
- **A'Ucx** — *Uvauk complex: layered anorthosite-mafic granulite-gabbro suite cut by diorite sheets; for the most part transformed into mylonite/ultramylonite; in part include Archean diorite and anorthosite*

ARCHEAN

- **Atp** — *Tonalite plutons: massive to well foliated; in part locally well lineated (L-tectonite); may contain fine grained disseminated magnetite*
- **At** — *Tonalite (gneissic): layered to banded hornblende-biotite orthogneiss; includes discontinuous layers of semipelite/psammite (As); may contain abundant xenoliths of metamafic rocks (Av), and remnants of banded iron-formation*
- **Ag** — *K-feldspar, augen granite-granodiorite; well foliated, in part mylonitic*
- **Am** — *Amphibolite*
- **Adi** — *Diorite to gabbro (gneissic)*
- **Av** — *Mafic volcanic rocks with subordinate intercalated volcaniclastic rocks; rarely preserved strained pillows; in part metamorphosed to garnet amphibolite and garnet-chlorite schists*
- **As** — *Metasedimentary rocks; semipelite/psammite with garnet + biotite ± andalusite ± kyanite ± sillimanite schist/paragneiss; local metamorphosed quartz-magnetite banded iron-formation*

Outcrop (observed)
Lithological boundary (approximate)
Limit of geological mapping
Main foliation (generation unspecified)
Mineral lineation (generation unspecified)
Fold axis (generation unspecified)
Fold style (U-, S-, Z-folds; unknown generation)
Fault (approximate trace; inferred)
Axial trace of major fold (F_1 antiform, synform)
Axial trace of major fold (F_2 antiform, synform)
Axial trace of major fold F_3 (antiform, synform, direction of plunge)
Axial trace of major fold F_4 (antiform, synform, direction of plunge)
Andalusite — An
Kyanite — Ky
Sillimanite — Si
Garnet — Gt
Clinopyroxene — Cpx
Orthopyroxene — Opx
Gossan
Pelite/Semipelite/Psammite
Gabbro
Diorite
Mafic volcanic rocks
Granodiorite/quartz monzonite/granite
Tonalite
Amphibolite
Mylonite, straight gneiss



LOCATION MAP

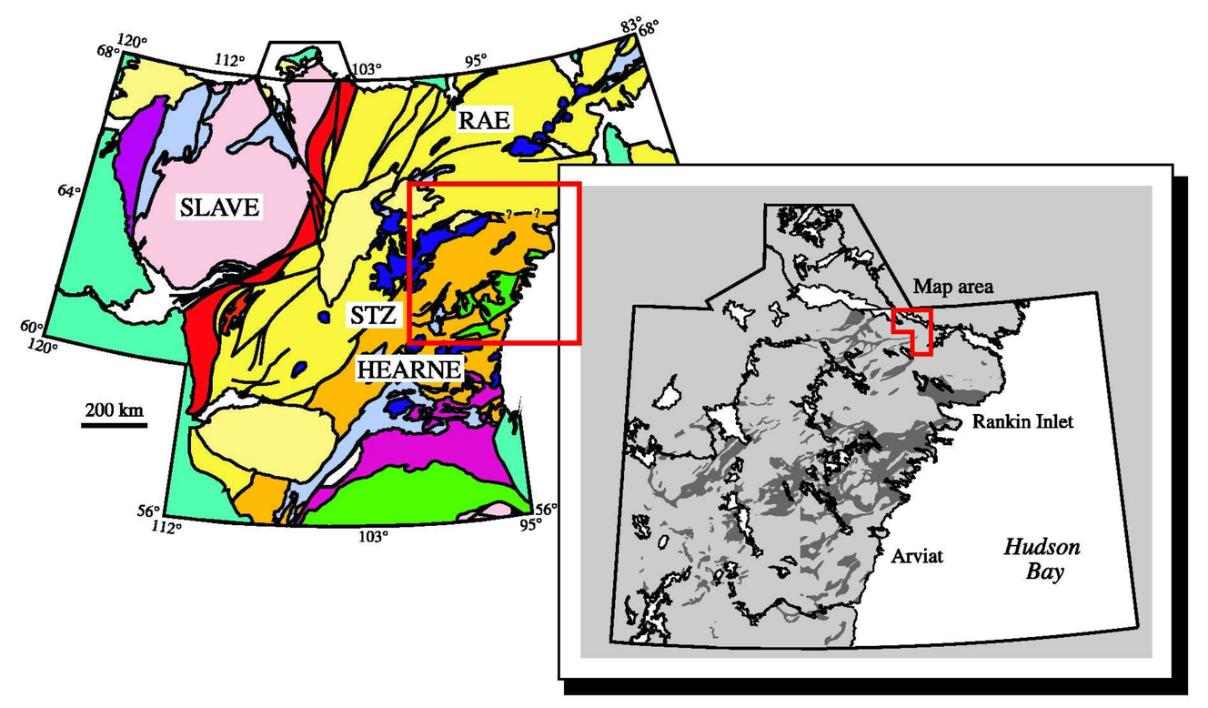


Figure 1. Schematic location map of the Akunak Bay map area represented by this set of maps. The Western Churchill map is composed of the Rae and Hearne domains separated by the Snowbird Tectonic Zone (STZ). Greenstone belt rocks in the enlargement window are represented in green.

OPEN FILE 3851

GEOLOGY

PARTS OF AKUNAK BAY AREA

KIVALLIQ REGION

NUNAVUT

Scale 1:50 000/Échelle 1/50 000

kilometres 1 0 1 2 3 4 kilomètres

Universal Transverse Mercator Projection
North American Datum 1983

Projection transverse universelle de Mercator
Système de référence géodésique nord-américain, 1983

Geology by S. Tella, J.J. Ryan, H.A. Sandeman, S. Hanmer, and L. Wilkinson, Geological Survey of Canada; A. Mills, Department of Earth Sciences, Carleton University, 1999

Co-ordinated by S. Hanmer through the auspices of the Western Churchill NATMAP Project

Digital cartography by E. Everett, Geoscience Information Division

Any revisions or additional geological information known to the user would be welcomed by the Geological Survey of Canada

Digital base map from data compiled by Geomatics Canada, modified by the Geoscience Information Division

The proximity of the North Magnetic Pole causes the magnetic compass to be erratic in this area
Magnetic declination 2000, 6°44'W, increasing 2.7' annually

Elevations in metres above mean sea level

55M/15	55M/16 OF 3701 Sheet 1	55N/13 OF 3701 Sheet 2	55N/14 OF 3851 Sheet 1 OF 3701 Sheet 3	55N/15
55M/10 OF 3404 Sheet 3	55M/9 OF 3701 Sheet 4	55N/12 OF 3701 Sheet 5	55N/11 OF 3701 Sheet 6	55N/10 Sheet 2
57M/7 OF 3404 Sheet 1	55M/8 OF 3404 Sheet 2	55N/5	55N/6	55N/7

NATIONAL TOPOGRAPHIC SYSTEM REFERENCE AND INDEX TO ADJOINING GEOLOGICAL SURVEY OF CANADA MAPS

OPEN FILE
DOSSIER PUBLIC
3851
GEOLOGICAL SURVEY OF CANADA
COMMISSION GÉOLOGIQUE DU CANADA
OTTAWA
04/2000

SHEET 1 OF 2
FEUILLET 1 DE 2

Sheet 1 of 2, Geology

Recommended citation:
Tella, S., Ryan, J.J., Sandeman, H.A., Hanmer, S., Mills, A., and Wilkinson, L.
2000: Geology, Parts of Akunak Bay Area, Kivalliq Region, Nunavut; Geological Survey of Canada, Open File 3851, scale 1:50 000.

Canada