

AUSTRALIAN ANTARCTIC TERRITORY



GEOLOGY OF THE STILLWELL HILLS

KEMP LAND  
ANTARCTICA

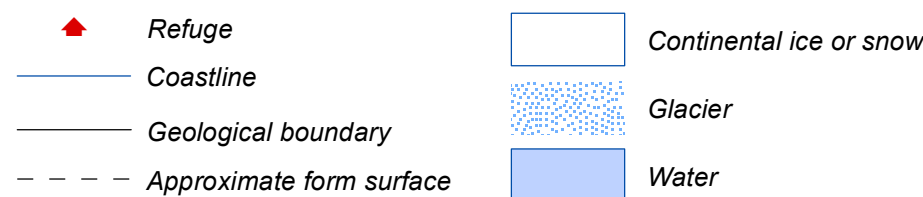
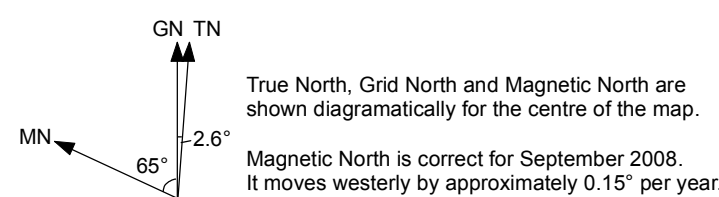
Edition 1  
Published in April 2012  
GeoCat - 72717  
Map number - 13521



PROJECTION: Universal Transverse Mercator Zone 40  
HORIZONTAL DATUM: WGS84  
VERTICAL DATUM: Mean Sea Level  
NOMENCLATURE: Names have been approved by the  
Australian Antarctic Names and Medals Committee

SCALE 1:25 000

0 0.5 1 2 3 4 Kilometres



NEO-  
PROTEROZOIC

- Cp** Cosgrove Pegmatites  
Coarse grained K-feldspar+plagioclase+quartz+biotite (garnet) pegmatite dykes  
range in width from 100m to 10m. May extend laterally for 100's of metres.
- Ppg** Stefansson Paragneiss  
Felsic gneiss with garnet+sillimanite+K-feldspar+quartz (biotite, plagioclase, magnetite).  
Locally developed layers dominated by sillimanite.
- Png** Point Noble Gneiss  
Mafic layers occur as 1-20m thick layers within the Ives Gneiss.  
Composed of clinopyroxene+orthopyroxene+garnet+plagioclase+hornblende+ilmenite+quartz.
- Pg** Ives Paragneiss  
Iron-oxide stained, metapelite gneiss comprised of garnet+sillimanite+alkali feldspar+quartz+biotite+rutile+ilmenite  
(plagioclase, magnetite, pyrite, graphite) with minor intercalated felsic gneiss. Variably migmatitic. Referred to as  
Rusty Gneiss by Halpin et al. (2007).

PALEO-MESO-PROTEROZOIC

- Pkd** Kemp Dykes  
Deformed or dismembered mafic dykes containing clinopyroxene+orthopyroxene+plagioclase+garnet (hornblende, ilmenite).  
May extend laterally for 100's of metres. Possible metamorphosed / deformed equivalent to the Amundsen dykes  
(Nespe Complex ca. 1190 Ma).
- Pkg** Keel Paragneiss  
Well layered calc-silicate and/or silica-undersaturated metapelite  
lenses pods interbedded with mafic gneiss, minor intermediate gneiss and metagranite.
- Psc** Scoresby Charnockite  
Felsic orthogneiss containing plagioclase+quartz+K-feldspar+orthopyroxene+ilmenite+magnetite  
(clinopyroxene, garnet, hornblende, biotite). May contain megacrystic K-feldspar grains up to 6cm. Xenoliths are common.
- Psp** Sperring Paragneiss  
Weakly foliated felsic gneiss dominated by perthitic alkali feldspar+quartz+plagioclase with minor  
garnet+biotite. Lenses of garnet+sillimanite+biotite metapelite magnatite are common.

ARCHEAN

- Adg** Dovers Paragneiss  
Garnet felsic gneiss, quartzite, biotite+sillimanite metapelite.  
minor hornblende+clinopyroxene+orthopyroxene+plagioclase mafic gneiss.  
Garnet+K-feldspar gneiss.
- Adp** Hornblende+clinopyroxene+orthopyroxene+plagioclase mafic gneiss.  
Quartzite with garnet felsic gneiss.  
Biotite+sillimanite pelite, minor hornblende+clinopyroxene+orthopyroxene+plagioclase gneiss.
- Adm** Magnetite quartzite.  
Quartzite with minor felsic gneiss,  
hornblende+clinopyroxene+orthopyroxene+plagioclase mafic gneiss.
- Aso** Stillwell Orthogneiss  
Granulite facies orthogneiss with a pervasive gneissosity (Aso, gneissic; Aso, massive) defined by alternating mafic and  
felsic-intermediate gneiss. Referred to as the Stillwell Gneiss by Trail (1970).  
Felsic layers contain K-feldspar+plagioclase+quartz+clinopyroxene+orthopyroxene+ilmenite.  
Mafic layers contain clinopyroxene+orthopyroxene+plagioclase+magnetite+ilmenite+quartz (garnet, biotite, hornblende).

Data compilation and acknowledgements

Geology:  
2002 G.L. Clarke, J.A. Halpin, F.C. Schröder, R.W. White  
1999 J.A. Fitzherbert, C.L. Gerakleys, N.M. Kelly  
1997/98 V. Bennett, N.M. Kelly, R.W. White  
1984/85 G.L. Clarke  
1991 I.R. McLeod, W.R. McCarthy, D.S. Trail

Compiled 2008 by J.A. Halpin  
GIS consultation U. Harris, D. Smith and H. Broisma, Australian Antarctic Data Centre  
Cartography by M.A. Woods, Geoscience Australia

Coastline, glacier tongue - Refer to metadata record 'Australian Antarctic Territory Coastline 2003' which can be accessed at <http://data.aad.gov.au/metadata>  
Plough Lake digitized from aerial photography (1997)

Place names - Australian Antarctic Gazetteer <http://data.aad.gov.au/aad/gazet/>

It is recommended that this map be referred to as: J.A. Halpin, G.L. Clarke, R.W. White, C.L. Gerakleys, N.M. Kelly, J.A. Fitzherbert, F.C. Schröder, V. Bennett and  
C.J. Carson, (2012) *Solid geology of the Stillwell Hills Antarctica*. 1st edition (1/25000) Geoscience Australia  
Stratigraphic column indicative only and largely based on available published and unpublished geochronology. Indicated conformable contacts and unconformities  
speculative and inferred only. Primary lithological contacts and relationships obtained by fieldwork during the ca. 1100-900 Ma Rayner Orogeny.

For further reference to the geology of the Stillwell Hills see the following publications:

- Clarke G.L. (1997) A comparative study of the structural and metamorphic evolution of the Oley (South Australia) and Stillwell Hills (Antarctica) Precambrian  
terranes. Ph.D. thesis, The University of Melbourne, Melbourne, 254 pp
- Clarke G.L. (1988) *Structural constraints on the Proterozoic reworking of Archean crust in the Rayner Complex, MacRobertson and Kemp Land coast, East  
Antarctica*. Precambrian Research 40-41: 137-156
- Crohn P.W. (1959) A contribution to the geology and glaciology of the western part of Australian Antarctic Territory. Bureau of Mineral Resources Geology and  
Geophysics Bulletin 52:1-103
- Halpin J.A., Gerakleys C.L., Clarke G.L., Belousova E.A., Griffin W.L. (2005) *In situ U-Pb geochronology and Hf isotope analyses of the Rayner Complex, east  
Antarctica*. Contributions to Mineralogy and Petrology 148: 689-706
- Halpin J.A., White R.W., Clarke G.L., Kelsey D.E. (2007) The Proterozoic P-T-t evolution of the Kemp Land coast, east Antarctica: constraints from Si-saturated  
and Si-undersaturated metapelites. Journal of Petrology, 48: 1321-1349
- Halpin, J.A. (2007) *Metamorphic and geochronological evolution of the Kemp and MacRobertson Land coast, east Antarctica*. Ph.D. thesis, School of  
Geosciences, The University of Sydney, 154 pp
- Halpin J.A., Clarke G.L., White R.W., Kelsey D.E. (2007) Contrasting P-T-t paths for Neoproterozoic metamorphism in MacRobertson and Kemp Lands, east  
Antarctica. Journal of Metamorphic Geology, 25: 883-701
- Kelly N.M., Clarke G.L., Fanning C.M. (2002) A two-stage evolution of the Neoproterozoic Rayner Structural Episode: new U-Pb sensitive high resolution ion  
microprobe constraints from the Dyvenden Group, Kemp Land, East Antarctica. Precambrian Research 116(3-4): 307-330
- McCarthy W.R., Trail D.S. (1994) *The high-grade metamorphic rocks of the MacRobertson Land and Kemp Land coast*. In: Adie R.J. (ed) *Antarctic Geology*.  
North-Holland, Amsterdam, p 473-481
- Sheraton J.W., Tingey R.J., Black L.P., Offe L.A., Ellis D.J. (1987) *Geology of an unusual Precambrian high-grade metamorphic terrane - Enderby Land and  
western Kemp Land, Antarctica*. Australian Bureau of Mineral Resources Bulletin 223:51 pp
- Trail D.S. (1970) *ANARE 1961 Geological Traverses on the MacRobertson Land and Kemp Land Coast*. Bureau of Mineral Resources, Geology and Geophysics  
Report 135:1-32
- Trail D.S., McLeod P.J., Cook G.R., Wallis G.R. (1967) *Geological investigations by the Australian National Antarctic Research Expeditions, 1965*. Bureau of  
Mineral Resources, Geology and Geophysics Report 116:1-46

HOW TO QUOTE A GRID REFERENCE FOR A PARTICULAR POINT

1. Quote this map. GEOLOGY OF THE STILLWELL HILLS 13521
  2. Locate the VERTICAL grid line to the left of the point. 602
  3. Estimate metres from the grid line to the point. 900
  4. Locate the horizontal GRID LINE BELOW THE POINT. 2519
  5. Estimate metres from the grid line to the point. 130
- Thus, the reference for KEMP PEAK is: GEOLOGY OF THE STILLWELL HILLS 13521 602900, 2519130

The grid interval on this map is 1000 metres



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