

# 2019 New Zealand SC-AGI<sup>1</sup> Report

Submitted by New Zealand to SCAR's Standing Committee on Antarctic Geographic Information

Pisa, Italy

3-4 June 2019

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<sup>1</sup> SC-AGI - Standing Committee on Antarctic Geographic Information

## 1 New Zealand SC-AGI Members

Graeme Blick	Group Manager Positioning & Resilience, Land Information New Zealand (LINZ)
Wendy Shaw	Secretary, New Zealand Geographic Board (NZGB)

## 2 LINZ Geodetic Activities

LINZ has continued with its geodetic activities in the Ross Sea Region of Antarctica undertaking the following activities:

- Continuing support of the POLNET project, by operating GNSS CORS stations at Cape Roberts and Scott Base, and support to the Butchers Ridge site. LINZ is in discussions with the US to take over operation of 2 further POLNET sites at Butchers Ridge and Minna Bluff.
- Absolute gravity measurements were made at Scott Base, McMurdo Station and a new mark at Crater Hill in November 2018. This work was a collaborative initiative by the Finnish Geospatial Research Institute (FGI) and LINZ. Measurements were made with the Finnish FG-5 absolute gravimeter.



- Maintenance, calibration and operation of tide gauges at Cape Roberts and Scott Base.



- Deformation surveys of:
  - Hillary's TAE Hut, Magnetic Huts at Scott Base; and
  - Scott's Discovery Hut at Hut Point
  - Scott's Terra Nova Hut at Cape Evans
  - Shackleton's Nimrod Hut at Cape Royds



- Monitoring surveys of the wind turbines at Crater Hill which supply electricity to Scott Base and McMurdo Station.
- GNS and traditional TPS observations to previously uncoordinated marks.

### 3 LINZ Hydrographic Charting

LINZ is extending its hydrographic activities in Antarctica by:

- Investigating ships that may provide an opportunity to acquire bathymetric data collected during scientific or tourist voyages to the Ross Sea.
- Including Antarctic charting and hydrographic surveys in future LINZ national hydrographic survey and charting programmes.

LINZ contributes to the IHO Hydrographic Commission on Antarctica and engages with the Ministry of Foreign Affairs and Trade, Antarctic Division.

### 4 LINZ Topographic Mapping

In April 2019 LINZ updated its [Ross Dependency Names vector layer to](#) incorporate the work of the NZGB's Antarctic Names Committee (ANC) correcting names and improving coordinates 2016-18. Once decisions on recommendations from the ANC's 6 March 2019 are finalised, the NZGB Secretariat will work with LINZ on further updates.

LINZ will update its topographic maps with the changes to the names layer once the NZGB has completed reviewing all names within the bounds of its mapping coverage. This is anticipated to be following the ANC's next meeting in 2020, but is dependent on priorities. For the Ross Sea region digital raster images are the lead topographic product rather than physical maps, however up to date physical maps could be reprinted on demand in 2020.

### 5 Antarctic basemap

LINZ has completed its first version of a continent-wide Antarctic basemap. The basemap was developed for the NZGB based on the need to provide context for Antarctic names in the New Zealand Gazetteer, as there is limited spatial coverage of current topographic mapping.

The NZGB and LINZ have also noted the potential demand for a basemap product by other geographic naming authorities and the Antarctic science community.

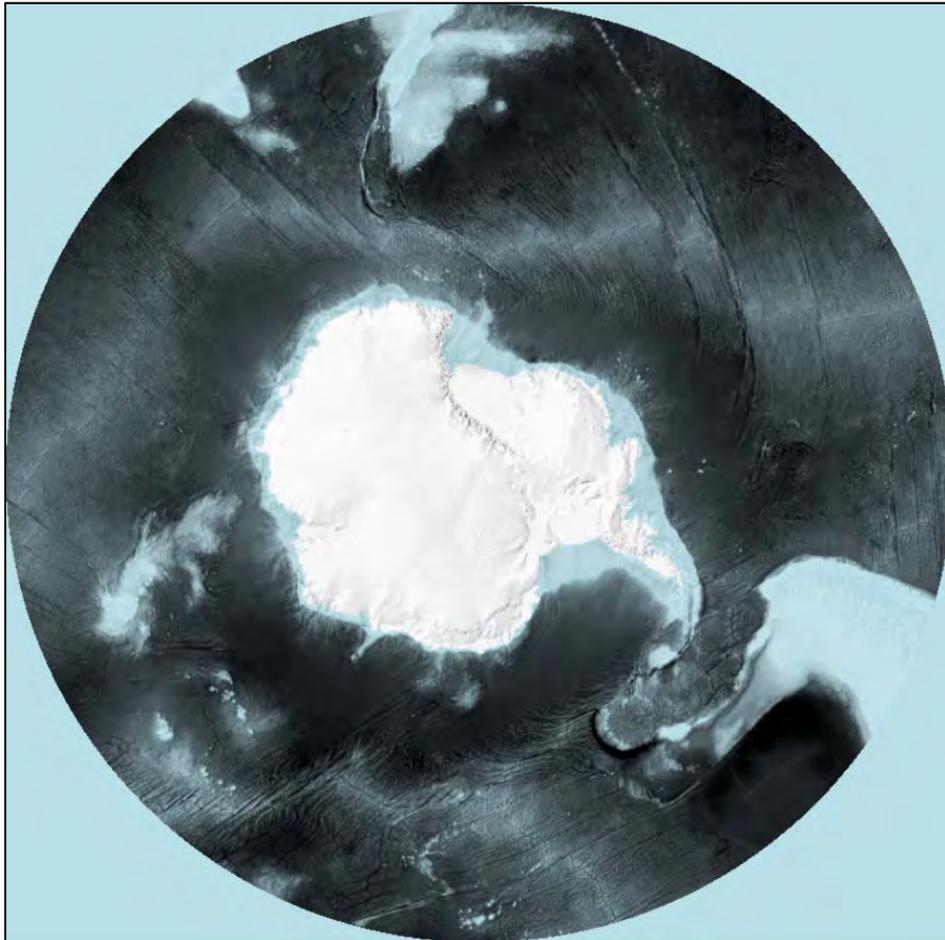
The basemap is built mostly from the [Reference Elevation Model of Antarctica \(REMA\)](#) Version 1, released October 2018 by the Polar Geospatial Center, University of Minnesota. Coastline, 20m contours, and hillshade were derived from REMA's mosaic of 1516 8m resolution 100km<sup>2</sup> tiles. Older, coarser DEMs fill some of REMA's current no-data areas. 1 minute arc/2km resolution bathymetry from ETOPO1 is included for undersea to 40°S.

Development on the basemap will continue following future releases of REMA, particularly to:

- address elevation errors and artefacts,
- improve poor representation of low lying coastal areas,
- include offshore islands.

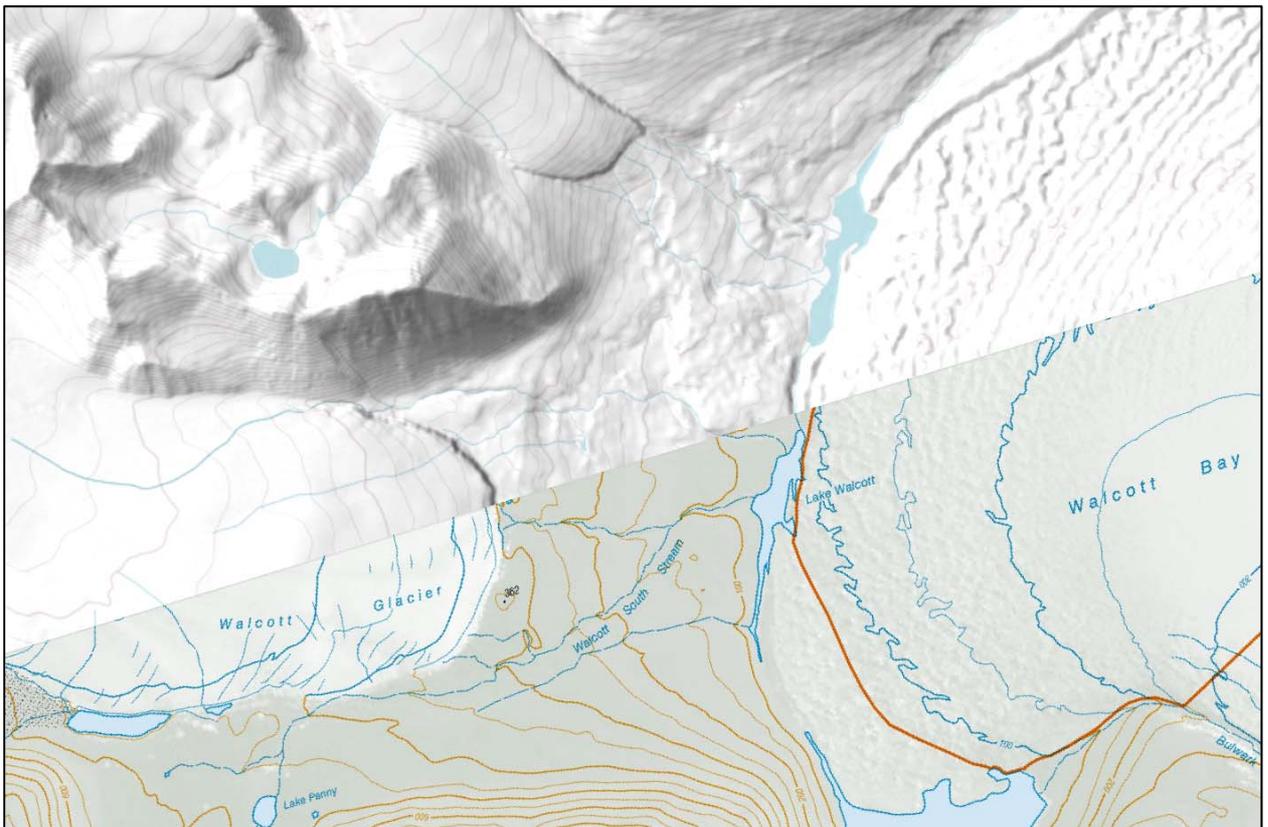
Undersea representation could also be improved with higher resolution bathymetry, ie the recently released [GEBCO 2019 grid](#). However, for some aspects no data currently exists at a suitable resolution and accuracy, particularly terrain coverage (such as ice-free areas).

The basemap is rendered to 1:50k scale. For its first release the basemap is projected in EPSG:5482 (Ross Sea Region Polar Stereographic) reflecting use for the New Zealand Gazetteer. Pending further development, LINZ may release the basemap publicly on [tiles.linz.govt.nz](https://tiles.linz.govt.nz), including in the Antarctic standard projection EPSG:3031 (Polar Stereographic).





Vicinity of [Edisto Inlet](#), [Hallett Peninsula](#), 1:100k scale



Comparison of basemap to LINZ AntTopo50-MH10 at [Walcott Bay](#) at 1:40k scale

## 6 ANC / NZGB Antarctic administrative actions

These actions resulted from the ANC meeting on 6 March 2019 and the NZGB agreed to them at its meeting on 11 April 2019:

- Update the Strategic Plan and Strategic Action Plan to better identify the NZGB's international roles, increase the priority of establishing and formalising naming agreements with other nations operating in Antarctica.
- Update the ANC's terms of reference to simplify them under headings of 'Purpose' and 'Structure', and increase the quorum to require at least one expert with operational experience.

## 7 ANC / NZGB Antarctic naming decisions

Under its standard process, on 31 January 2019 five subglacial lake names originally proposed by US-ACAN<sup>2</sup> were made official together with an alteration of Marchant Glacier to **Matataua Glacier**.

At its 6 March 2019 meeting the ANC considered 1270 names. Most of the ANC's work was on the project to review and confirm, correct, or improve Antarctic names as geographic information. The categories of the ANC's recommendations are detailed as follows:

Category	No.	Summary
Corrigenda	459	Mostly improvements or corrections to feature coordinates and a small number of corrections to feature types and official status.
s.25 Assign	75	10 proposed names for ponds at Bratina Island, in long term use in scientific literature, were recommended to the NZGB. 65 historic names or names in long term use not recorded in the New Zealand Gazetteer were recommended to the NZGB.
s.35 Validate	4	Names approved prior to the NZGB Act 2008 require gazetting (official notification) to 'validate' them under that Act. The majority of names were validated in 2009 and 2012 and further names were validated in 2017 and 2018, but a few have been under investigation.
No action	4	There was a lack of information to confirm where the names were originally intended to be applied and so could not be confirmed or improved.
Discontinue	1	The ANC recommended discontinuing one historic name.
Note	401	The ANC confirmed these names to be correct, with accurate positions, feature types, and status.
Defer	326	- (up to) 195 Italian and German names in Northern Victoria Land. - 115 names applied by US-ACAN but not approved by the NZGB. - 16 names subject to ongoing investigations.
<b>Total</b>	<b>1270</b>	

The ANC/NZGB will consult with US-ACAN on new names in terms of the long-standing mutual agreement, and continue working together to resolve investigations on a number of names. The NZGB anticipates gazetting (officially notifying) the ANC's recommendations on 539 improvements/corrections and new names later in June 2019.

The ANC also proposed a new initiative to more comprehensively record New Zealand's human activities in the Gazetteer, for cultural and heritage reasons. While some historic bases and stations and other sites of significance are officially named (ie, as historic sites), many others are not.

<sup>2</sup> US-ACAN: United States Advisory Committee on Antarctic Names

## 8 NZGB coordinate improvements/name review

### Progress

The NZGB has reviewed and confirmed, corrected or improved coordinates and other details for approximately 50.6%<sup>3</sup> of its Antarctic names since the 2017 ANC meeting. Most names reviewed at the ANC's 6 March 2019 were a comparison to the names and positions used by LINZ on its Antarctic Topo50 series.

At its 2019 meeting the ANC also reviewed all names from 74°S to 76°S in Victoria Land. Work on the remaining half of Antarctic names will likely continue in similar batches by map area/geographic area, or by decision year.

### New resources

The NZGB continues to make use of highly accurate and detailed NSF<sup>4</sup>/DigitalGlobe satellite imagery to improve coordinates. The Polar Geospatial Center (PGC) makes the imagery available to assist the SC-AGI initiative to improve Antarctic Gazetteer information.

In October 2018 the PGC released the Reference Model of Antarctica (REMA) derived from this satellite imagery. 100km<sup>2</sup> tiles at 8m resolution across the continent are available, as well as the many 2m resolution satellite strip DEMs they were created from.

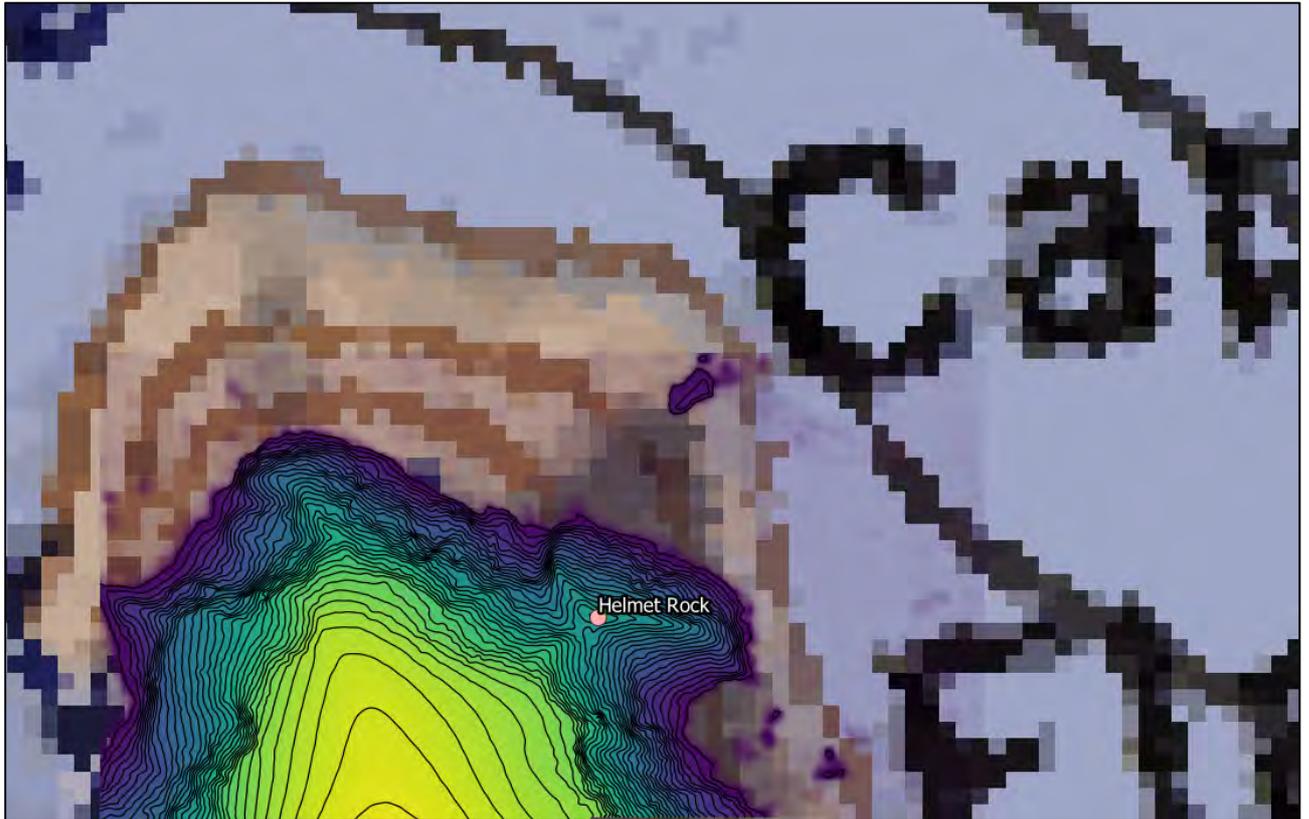
The NZGB's process involves first reviewing records to confirm the feature the name was originally intended for. New highly accurate coordinates for most positions can then be determined easily and efficiently using REMA, eg by applying typical colour gradients and hill shading to the DEMs and extracting tight contours.



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<sup>3</sup> 2308/4561 names

<sup>4</sup> NSF: National Science Foundation



REMA 2m satellite DEM with 10m contours

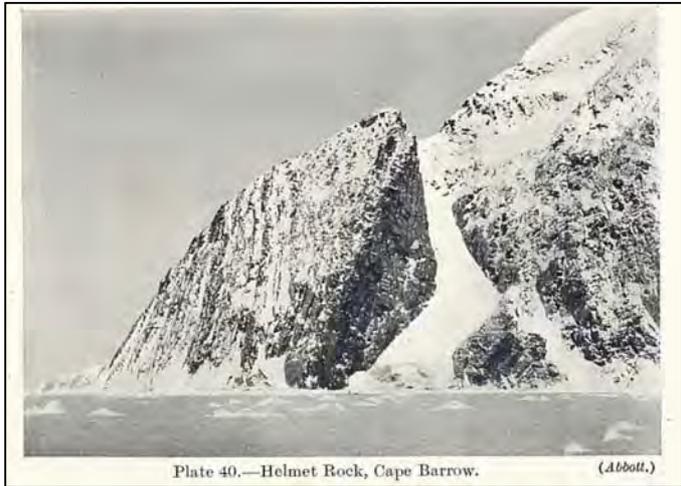


Plate 40. from R.E. Priestly, (1923), British Antarctic "Terra Nova" 1910-1913 Expedition Reports, Physiography (Robertson Bay and Terra Nova Bay Regions), London: Harrison and Sons

## 9 SCAR CGA rationalisation

The work on Antarctic names 2016-2019 was initially motivated by an attempt to rationalise significant differences between the New Zealand Gazetteer and SCAR-CGA. The attempt highlighted the extensive number of errors in the New Zealand Gazetteer.

Once final decisions are made on the ANC's latest recommendations, the gap between the quality and number of NZ names recorded in SCAR-CGA will grow further compared to the New Zealand Gazetteer. The difference will be at approx. 1700 names.

In summer 2019/20 the NZGB Secretariat will focus on rationalising improved and missing names with SCAR-CGA, rather than beginning review of further names.

## 10 SC-AGI meeting, April-May 2019

In conjunction with the UNGEGN conference at the UN, New York, meetings of SCAGI were held in the week 29 April to 2 May 2019, attended by the NZGB Secretary, with the primary focus being to compile draft Antarctic Toponymic Guidelines for consideration by SC-AGI at its meeting 3-4 June 2019.

## 11 New Zealand Annual Science Conference, 17-19 June 2019, Town Hall, Christchurch

The NZGB Secretariat will present a poster on how NZGB decision making is informed by state of the art technology and the latest geographic information products, namely:

- REMA on land for improving positions,
- Bathymetry recently collected by NIWA<sup>5</sup>'s R.V. Tangaroa for undersea features.

Additionally the NZGB is producing an A5 Antarctic naming flyer, which will be distributed at this conference. Antarctic New Zealand may be able to include it in the NZ event packs for those travelling to Scott Base over summer seasons.

## 12 NZGB Gazetteer: <https://gazetteer.linz.govt.nz/>

The NZGB launched its current online Gazetteer in April 2018, replacing the previous version released in June 2013. **21** enhancements are now under development with a target date of the end of June 2019 for completion. Many of the enhancements will continue improving user experience, particularly around giving users the ability to define their own preferences, and to make further enquiries of the Gazetteer without needing to use their own GIS.

The biggest enhancement is the integration of the Antarctic basemap (item 5 above). Other enhancements relevant to interrogating Antarctic place names include:

- Ability to search by coordinates and grid reference in several formats,
- Distance measuring tools,
- New vector layers that can be overlaid on the map.

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<sup>5</sup> NIWA – National Institute of Water and Atmospheric Research