

2022 New Zealand SCAGI Report

To the Scientific Committee on Antarctic Research's
Standing Committee on Antarctic Geographic Information

Virtual Zoom Meeting

Wednesday 26 October 10pm to midnight (NZ time)

Wednesday 26 October 10am to midday (UK time)

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1 New Zealand SCAGI Members

Graeme Blick	Chief Geodesist, Toitū Te Whenua Land Information New Zealand
Wendy Shaw	Secretary, Ngā Pou Taunaha o Aotearoa New Zealand Geographic Board

2 Geodesy and Surveying

The Positioning team within Toitū Te Whenua LINZ operates an annual K150 Event to Scott Base that encompasses geodesy and surveying activities necessary to maintain the Ross Sea Region spatial reference system and geodetic datum. The key components of the K150 event are discussed below. COVID has impacted activities for the past two years but 2022/23 will see the return of a full programme.

2.1 Tide gauges and sea level information

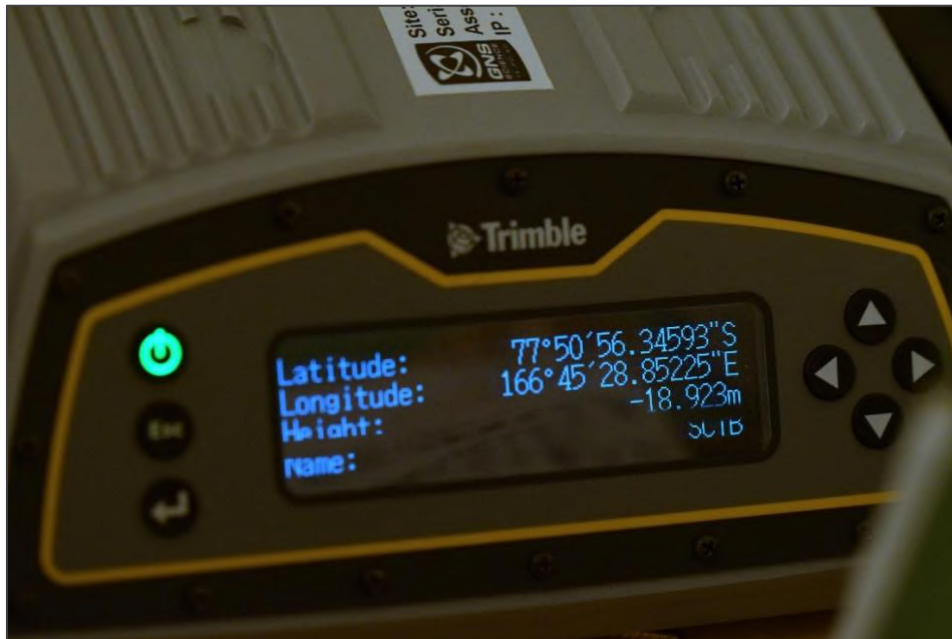
Part of Toitū Te Whenua LINZ's role in the Ross Sea Region is monitoring tides and sea levels for hydrographic charting and geodetic heighting purposes. Sea level observations are critical to the study of sea level change and for climate change scientists. Toitū Te Whenua LINZ operates two long-term tide gauges at Scott Base and Cape Roberts. To enhance the long-term value of the sea level records Toitū Te Whenua LINZ carries out tide gauge calibration checks. This is done by using GPS to measure the height of the sea ice as it rises and falls and compare it with the data from the tide gauges. Both gauges failed several years ago and these have now been repaired and are now fully operational.



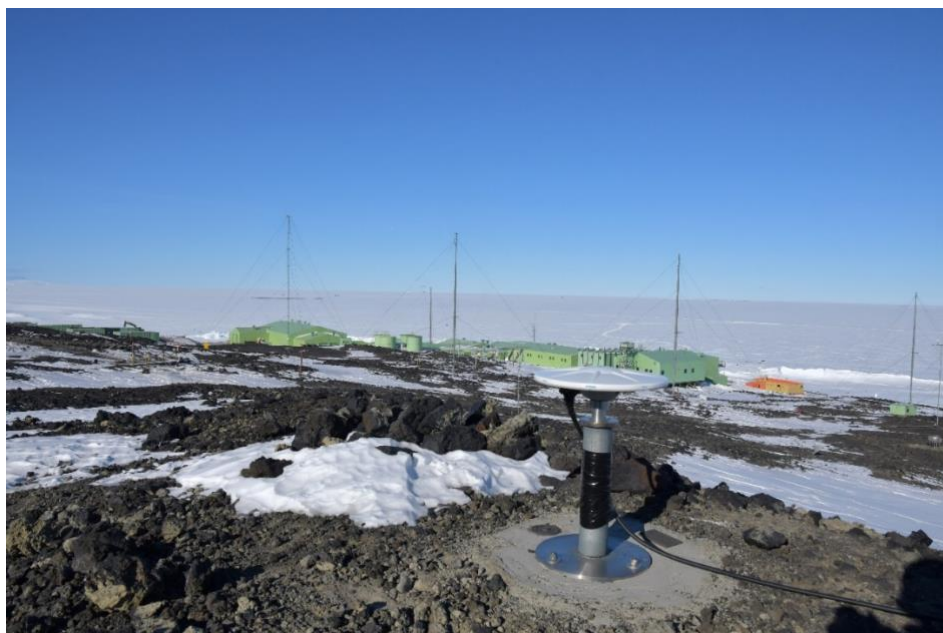
GNSS set up on floating ice for calibration of Scott Base tide gauge, 9 November 2019
Photo: Christopher Stephens

2.2 Continuously operating GNSS receivers

Toitū Te Whenua LINZ manages four continuously operating Global Navigation Satellite Station (GNSS) sites in the Ross Sea Region. These sites provide real-time positioning data about ground movement of the Antarctic continent, as well as being used as reference marks for regional science projects. The data is used to maintain the Ross Sea Region Geodetic Datum. The data from these sites underpins global reference frames and is used by the international science community. Regular maintenance of these sites is carried out and they continue to operate successfully.



Upgraded GNSS reference receiver for [SCTB](#), connected 2 November 2019
Photo: Christopher Stephens



GNSS site SCTB in situ behind Scott Base, 9 November 2019
Photo: Christopher Stephens

2.3 Gravity observations

Toitū Te Whenua LINZ collaborates with international groups to support the collection of absolute gravity readings at sites within the Ross Sea Region. Absolute Gravity observations provide data which is used to better define the shape of the Earth. This information is then used in models such as those which predict the impacts of sea level rise. These absolute gravity measurements also provide a local baseline for scientists who are using gravity to explore structures below the ice sheet. Gravity observations are typically collected every 3-5 years. The most recent campaign was in November 2018 in conjunction with the government of Finland.

2.4 SBAS ground station

Toitū Te Whenua LINZ is currently working with Geoscience Australia on the establishment of a GNSS satellite-based augmentation system (SBAS) called the Southern Positioning Augmentation System (SouthPAN) across Australasia (see more information [here](#)). It is proposed that a ground-based segment of this network will include a GNSS base station located at Scott Base. Toitū Te Whenua LINZ is working with Antarctica NZ (AntNZ) during the 2022/23 summer field season to locate a site which is planned for installation in 2023/24.

2.5 Wind turbine monitoring

To decrease the reliance on fossil fuels Scott Base and McMurdo Station have recently been using power generated from wind turbines. The foundations of these turbines sit in permafrost and to check their stability Toitū Te Whenua LINZ continues to carry out an annual survey of the towers to check their stability.



One of three wind turbines at Crater Hill above Scott Base, November 2021
Photo: Toitū Te Whenua LINZ

2.6 Local survey support for AntNZ

Toitū Te Whenua LINZ supports AntNZ by capturing positioning information which is used for Antarctic projects for management and planning around Scott Base and the Ross Sea Region. These activities include erosion surveys of the shoreline around Hut Point, collecting data for defining the location of the Antarctic Specially Protected Areas (ASPA), maintaining topographic data around Scott Base and small engineering surveys, such as road layouts. Toitū Te Whenua LINZ continues to work with AntNZ on site surveys for the proposed new Scott Base buildings.

2.7 Supporting preservation of historic huts

Toitū Te Whenua LINZ supports the Antarctic Heritage Trust (AHT) and its on-going preservation efforts of four historic huts from the exploits of Captain Robert Falcon Scott, Sir Ernest Shackleton and Sir Edmund Hillary. Over the years these huts have been at increased risk due to such effects as ice accumulation, weathering, erosion, and sea level rise. Toitū Te Whenua LINZ undertakes regular height surveys so that AHT can consider any changes over time.



Deformation survey of TAE¹ Hut, Pram Point, on 7 November 2019
Photo: Christopher Stephens



Precise levelling undertaken to check the stability of the site where the historic Trans-Antarctic Expedition/International Geophysical Year hut, at Pram Point, November 2021
Photo: Toitū Te Whenua LINZ

¹ Trans Antarctic Expedition

3 Mapping and Charting

Toitū Te Whenua LINZ's responsibility for topographic mapping extends to the Ross Sea Region of Antarctica and the sub-Antarctic Islands. Publications include 1:50,000 scale maps of Ross Island, the Dry Valleys and the Darwin Glacier. Toitū Te Whenua LINZ's responsibility for hydrographic charting also extends to the Southern Ocean, the Ross Sea Region including Cape Adare and Ross Island. With the increase in the number and size of tourist ships visiting the Ross Sea Region and the remoteness of the region, there is an increased awareness for of the need for accurate charts to ensure safe navigation.

4 Antarctic place naming

4.1 Antarctic Place Naming Standard for New Zealand

Pou Taunaha² published its updated [Standard for Antarctic place names in New Zealand's area of interest - NZGBS60003](#) in February 2021 in both English and Māori. It provides guidelines for people making place name proposals in Aotearoa New Zealand's area of interest and helps achieve quality and consistency in decision making. The standard covers longstanding Aotearoa New Zealand Antarctic naming policy. It aligns closely with the [International Principles and Procedures for Antarctic Place Names](#) published later in October 2021.

4.2 International Principles and Procedures for Antarctic Place Names

Aotearoa New Zealand actively contributed as a member of the SCAGI Working Group tasked with developing this modern naming guideline for use by members for new naming and for changing existing names. Excellent collaboration demonstrated goodwill to produce a document to meet the objectives of good naming practice in Antarctica and alignment with Antarctic Treaty objectives.

4.3 Antarctic Officials Coordination Group

Manatū Aorere Ministry of Foreign Affairs and Trade (MFAT) formed an Antarctic Officials Coordination Group which has met regularly in the past two years. The Group steers cross-government policy, domestic outreach, and international engagement, in relation to New Zealand interests in Antarctica.

In December 2021, MFAT released Aotearoa New Zealand's [Antarctic Research Directions and Priorities 2021-2030](#). Noting that its guiding principles include a cultural statement 'to recognise that Māori have their own knowledge system, mātauranga Māori, which enhances science and research in Antarctica and the Southern Ocean.'

4.4 Pou Taunaha Strategic Initiative

One of Pou Taunaha's strategic priorities is to officially name places in Antarctica and our undersea regions. See the 2020-2025 Strategy [here](#). By providing high quality, accessible,

² Ngā Pou Taunaha o Aotearoa New Zealand Geographic Board

timely, consistent and reliable data, Pou Taunaha contributes to managing places for scientific research, exploration and environmental management. Aotearoa New Zealand's naming role in Antarctica also provides a consistent reference for Antarctic science.

4.5 New place names for features on the ice

In 2021 Pou Taunaha accepted a proposal from the United States Advisory Committee on Antarctic Names (US-ACAN) for Troy Peak and assigned it as an official place name in June 2022. The New Zealand Antarctic Names Committee (ANC) also considered a second proposal from US-ACAN in 2022 for Murray Stream to honour an Antarctic freshwater scientist. Pou Taunaha works with MFAT who observe at our ANC meetings.

5 SCAR-CGA rationalisation

Aotearoa New Zealand's contribution to the Scientific Committee on Antarctic Research's (SCAR's) Composite Gazetteer of Antarctica (CGA) enables the recognition of our place names and their stories and ensures high quality place naming data is available internationally.

Aotearoa New Zealand added 116 entries to the Composite Gazetteer (covering recent decisions and older names missing from CGA) and improved 435 existing entries. c.40% of Aotearoa New Zealand's Antarctic existing place name entries in CGA have been upgraded, including populating the coordinate review fields (ie Source Identifier, Name, Publisher, Scale) and adding original approval dates which were absent from existing CGA entries.

These updates are the outcome of our project to review all Antarctic place names, which will continue in future years. Unfortunately, relatively little progress was possible on this longstanding rationalisation exercise in 2021/22 due to other work priorities within a small Secretariat team.



Mount Erebus, Antarctica, looking northeast from Scott's Terra Nova Hut, October 2019
Photo: Christopher Stephens