

**Antarctic Research Centre,  
School of Geography Environment and Earth Sciences  
Victoria University of Wellington**

We are seeking to attract two PhD students to Wellington New Zealand



*Our team at Dart Glacier, Southern Alps of New Zealand*

The students will join an international glaciology and climate modelling team seeking to identify the drivers of the Antarctic Cold Reversal, a Southern Hemisphere climate change that occurred around 14,000 years ago. This project is supported by the New Zealand Royal Society Marsden Fund, and it will start on September 1<sup>st</sup>, 2018.

We are seeking to fill two positions:

**Position 1 – Glacial geology and Beryllium-10 dating.** The candidate will carry out geological/geomorphological field work in a small team on and around the beautiful and remote glaciers in New Zealand's Southern Alps. In Wellington, this student work in our cutting edge cosmogenic nuclide laboratory <https://www.victoria.ac.nz/sgees/research/facilities/cosmogenic-nuclide-laboratory>. This student may also, depending on aptitude, skills and experience, contribute to the development or application of glacier models to palaeoclimate problems.

**Position 2 – Glacier and palaeoclimate modelling.** The candidate will carry out numerical modelling of glaciers in modern and past climates. This student will be based in our glacier modelling group <https://www.victoria.ac.nz/antarctic/research/glacial-modelling> but will also have the opportunity to work in other, international climate modelling centres. This student will also have the chance to join fieldwork in the New Zealand Southern Alps.

Both students require a first class Master's degree in an appropriate field (geology, geophysics, physical geography, meteorology/climatology, oceanography). An ideal candidate for Position 1 would have a background in physical geoscience with strong field skills and an aptitude for geochemical work, along with GIS skills and quantitative /computing ability. A strong candidate for position 2 would have a geophysics/climate/oceanography background, including well-developed programming skills (e.g. Matlab, Python, Linux).

The Marsden Fund is providing support for one PhD studentship (tuition fees + stipend). We will encourage a second, suitably qualified candidate, to apply for a Victoria Doctoral Scholarship (<https://www.victoria.ac.nz/study/student-finance/scholarships/find-scholarship/scholarship-detail?detailCode=100008>). These scholarships are competitive, and require a high GPA. Evidence of research success (e.g. peer-reviewed publications) also hold weight in the assessment process. Victoria Doctoral Scholarship applications close on July 1<sup>st</sup> and candidates require our assistance and support to submit an application.

Both students will be supervised by a Wellington-based team, including Professor Andrew Mackintosh (project leader), Dr Kevin Norton, Dr Brian Anderson, Dr Shaun Eaves, and Professor Lionel Carter. The PhD students will also have the chance to interact with international co-investigators, Dr Feng He (USA), Dr Laurie Menviel (Australia), Dr Joel Pedro (Denmark/Australia), Dr Maisa Rojas (Chile) and Dr Esteban Sagredo (Chile).

The Antarctic Research Centre (ARC) offers an outstanding academic environment for doctoral study, with more than 10 academic staff and around 20 PhD students, many of them international. The ARC is co-located within the School of Geography, Environment and Earth Sciences, which has broader expertise in fields that are relevant to this project (climate, geochemistry, etc.). Victoria University of Wellington was founded in 1897, and was ranked as the top university in the country for research quality in the most recent national assessment. Wellington is a beautiful, small city, which recently topped Deutsche Bank's list of 50 most liveable global cities, coming out at number one with the best quality of life. For more information, see

<https://www.victoria.ac.nz/antarctic>  
<https://www.victoria.ac.nz/sgees>  
<https://www.wellingtonnz.com/discover/>

Candidates should in the first instance send to [Andrew.Mackintosh@vuw.ac.nz](mailto:Andrew.Mackintosh@vuw.ac.nz) a CV, academic transcripts, and a letter containing the following information – which position (1 or 2) interests them, why they are applying, what they hope to get out of PhD study, why they are suited to the position and the name and contact details of two or more scientific referees. We will accept initial applications up until **June 15<sup>th</sup> 2018**, in time for the July 1<sup>st</sup> scholarship deadline. We hope that the successful candidates will begin their doctoral projects on September 1<sup>st</sup> or shortly thereafter.

More information about the Marsden project is provided on the following page.

## **Marsden project 17-VUW-094 'Did a previous collapse of the Antarctic Ice Sheet cause abrupt climate change in the Southern Hemisphere?'**

The Antarctic Cold Reversal was a ~2000-year cold interval which interrupted the most recent period of natural global warming approximately 14,000 years ago. While it is generally accepted that this abrupt climate event was initiated by circulation changes in the North Atlantic Ocean, new evidence suggests that the Antarctic Cold Reversal may have been enhanced by ice sheet loss and meltwater release from Antarctica to the Southern Ocean. Identifying the cause of this event is crucial for determining how melting ice sheets may influence the future climate system.

In this research, we will utilise geological deposits left behind by mountain glaciers in New Zealand and South America to reconstruct the magnitude and timing of climate change during the Antarctic Cold Reversal. We will then use our new glacier reconstructions with all available quantitative climate proxy archives to evaluate a suite of climate model experiments that are specifically designed to identify whether the Antarctic Cold Reversal was driven largely from the North Atlantic, or the Southern Ocean. Our findings will help to anticipate possible abrupt climate changes that could result from future ice sheet collapse.

The goal of our project is to test competing hypotheses on the origin of the Antarctic Cold Reversal (ACR) using climate modelling and new quantitative palaeoclimate reconstructions from New Zealand (NZ) and Patagonia. Specifically, our objectives are:

1. to constrain the extent and timing of ACR glacier positions with cosmogenic  $^{10}\text{Be}$  exposure dating, at three new sites across the Southern Alps of NZ, and two new sites in Patagonia;
2. to make quantitative reconstructions of past climate for ACR moraine sequences using glacier modelling in both NZ and Patagonia;
3. to identify the most likely drivers of ACR climate by evaluating a suite of transient climate model simulations against the new climate proxy evidence.