

## Observations for Model Development

### Request for Proposals

#### Background

The mission of The Deep South Challenge: Changing with our Climate (Te Kōmata o Te Tonga) is to enable New Zealanders to anticipate adapt, manage risk, and thrive in a changing climate.

Climate modelling is crucial to the Deep South Challenge achieving its mission; hence the Challenge aims to ensure the climate models it supports best represent climate processes and provide the best possible projection capability for New Zealand. As a component of its Phase 2 activities, the Challenge plans to further invest in research which will lead to improved understanding of climate processes from observations and set the pathway for the translation of this understanding into the next generation of climate models.

Phase 2 of the Challenge started on 1 July 2019. We are now seeking to fund research in the “Observations for Model Development” research round to support the development of new understanding to improve climate models that the Challenge supports and hence improve fidelity of projections of New Zealand’s future climate and hydrology. These models include: the New Zealand Earth System Model (NZESM), the New Zealand Regional Climate Model (RCM), and the New Zealand Water Model (NZWaM). In conducting this research, it is not expected that all advances will get to the stage of incorporation and testing of model parametrisations within the lifetime of the project, but a clear pathway for incorporation of research outcomes into one of the models the Challenge uses is required.

The scope of Observations for Model Development has evolved from the primarily Antarctic and Southern Ocean focus of Phase 1 to encompass all regional impacts on New Zealand in Phase 2 with the view that improved observations and understanding of key processes will feed into enhancements to our predictive capability and hence result in improved information on climate impacts in New Zealand.

#### RfP Scope

The Challenge invites proposals for specific research projects that will help deliver the Challenge mission and contribute to its success. It is vital that applicants understand this core requirement when drafting proposals. The project topics the Challenge is seeking to support have been developed from a combination of community consultation through a workshop held in June 2020 and other guidance. The Deep South Challenge is seeking research proposals that address one of the following topics.

*Precipitation distribution and orographic enhancement over New Zealand.* It is anticipated a project addressing this topic will target processes improving knowledge of orographic processes that play a major role in New Zealand rainfall patterns and that outcomes will contribute to improved hydrology projections and information for water resources management.

*Improving cloud representation to reduce modelled cloud-related radiation biases in the global Earth System Model.* It is anticipated this project will consider differentiating aspects of southern hemisphere clouds, namely low cloud droplet number densities and the prevalence of mixed phase hydrometers

with greater amounts of supercooled liquid water and that outcomes will contribute to improving the clouds in climate models.

*Snow and catchment processes for water resources management.* It is anticipated this project will consider how snowfall distribution is represented in the important alpine catchment and will seek to improve process knowledge for snow-pack quantification and provision of data for calibration and validation of snow accumulation, mass balance and snowmelt processes in the New Zealand Water Model (NZWaM).

*Regional influences of upper ocean temperature and heat fluxes on New Zealand climate.* It is anticipated this project will focus on new observational tools in the upper ocean with the potential to identify key drivers of exchange processes, the role of weather systems and resulting synoptic scale transport of heat and moisture, and that the outcomes will lead to improved climate projections at the regional scale for New Zealand.

The Challenge will not accept any proposals on topics that are not listed above

### RFP process and resourcing

The Deep South Challenge Governance Group has approved a total of up to \$2,200,000 (excl. GST) of funding for projects of three years in length. Deep South plans to fund either two projects at \$1.1 M each or three projects at \$733k each. Hence researchers are asked for two options for each project on at \$733k, and an extended option at \$1.1 M.

We are using a best teams approach and request a single proposal for each project topic. The Challenge invites project teams to self-organise and appoint a project lead or co-leads who will assemble the research team and lead the proposal development. Project (co-)leads are asked to notify Mike Harvey (Programme Leader, Process and Observations) which topic they will be addressing. We anticipate this notification will to be made within a week of the RFP release, and by 20 November at the latest. Should more than one team be interested in submitting a proposal for consideration of funding in any one project topic the Challenge Director, at his discretion, shall either facilitate the formation of a single team, or invite one of the interested project teams to apply. For the avoidance of doubt, only one proposal per topic will be considered by the Challenge for funding

Research proposals should include sufficient resource (including FTE) to support both the planned research and engagement with partners and stakeholders. It is expected key researchers will be adequately funded and able to meet their obligations in the project, and proposals which have low FTE across a large number of researchers are not encouraged.

Potential proposers are expected contact and engage with the P&O Programme Leader, Mike Harvey, or the Director, Mike Williams regularly during the proposal development.

### Assessing Proposals

In proposal development, the Challenge leadership will consult with proposal leaders ahead of final proposal submission. Once proposals have been received, they will be sent for peer review and also to the Challenge Independent Science Panel (ISP) for their review. Feedback from reviews will be incorporated into the final funding recommendations submitted to the Deep South Governance Group for approval in May 2021.

The Deep South Challenge research must meet a range of criteria to receive funding. The three primary criteria are 'fit to the Challenge mission', 'research excellence', and 'engagement and proposal co-development'. All of these must be met before other criteria are assessed.

In considering these primary criteria, proposals submitted should detail:

- which model and process is targeted for improvement and the relevance of this to the application of the model(s) in New Zealand;
- the relevant experience and expertise of the research team to address the topic;
- the pathway to impact and which organisations or persons the project will engage with to achieve this impact;
- relevance to Māori and Vision Mātauranga
- relevance to and planned co-development with stakeholders;
- how the research will engage with other research being undertaken in the Challenge.

Secondary criteria against which the proposal will be assessed are:

- Best team expertise
- Additionality
- Feasibility of proposed work and value for money
- Capacity building
- Collaboration
- Co-funding and aligned funding
- Risk management and ethical implications

## Timeline

RfP released	11 November 2020
Confirmation of RFP leads	20 November 2020
RfP close	3 February 2021
Review (Peer review and Challenge ISP)	February and March
CLT recommendations	April 2021
Governance Group approval of selected projects	4 May 2021
Projects commence	1 July 2021
Projects completed	30 June 2024

## Deep South Challenge Science Leadership Team Programme Leaders

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