2.1.1 Research at the Princess Elisabeth Base in Antarctica

The Belgian Science Policy Office supports scientific research in Antarctica since 1985. The internationally recognized expertise thus built up allows the researchers to enrol in international research initiatives and working groups and to contribute as such to today's research landscape.

This call is aimed at scientific research at and in the vicinity of the Belgian Princess Elisabeth research station in Antarctica (PEA). The station offers both the opportunity to conduct year-round monitoring at the station and fieldwork in a radius of 200 km around the station, giving access to the coast, the mountain range, the dry valleys, ... in Dronning Maud Land.

**The general objective** of this call is to stimulate high-level research in 6 areas, corresponding to some of the most important scientific questions that should be addressed by research in and from the Antarctic over the next two decades[[1]](#footnote-1)[[2]](#footnote-2):

The Antarctic ice sheet and sea level rise - understand how, where and why the Antarctic ice sheet loses mass

* what are the processes that control the dynamic ice discharge from the Antarctic ice sheet?
* what is the role of the interaction between the cryosphere and the lithosphere on ice flow and mass changes of east-Antarctic ice sheets?
* what is the rate of change of the Antarctic ice mass?
* how will these changes influence future sea level rise?

Antarctic ecosystem biodiversity - evolution, survival and conservation

* are the present changes attributable to environmental and/or climate change and what is the response of Antarctic organisms and ecosystems to these changes
* which species, processes and/or systems are suitable for tracking the impacts of environmental and/or climate change?
* how has Antarctic biodiversity changed in the past and how can this predict future changes?
* what is the impact of invasive alien species on the present biodiversity and ecosystem functioning?
* are there irreversible environmental thresholds/tipping points?

Dynamic earth - beneath the Antarctic ice

* how do the Antarctic crust and mantle structure affect surface motions due to present ice sheet loading and glacio-isostatic adjustment?
* how does volcanism affect the evolution of the Antarctic lithosphere, ice sheet dynamics and/or global climate?
* how do tectonics, dynamic topography, ice loading and isostatic adjustment affect the spatial pattern of sea level change on all time scales?

Link with the Earth's outer layers and the Solar System

* How can the Antarctic region contribute to our understanding of the formation of the Solar System?
* What are the characteristics and their origins of the Antarctic ionosphere and the overlying magnetosphere, and what is the influence of solar variability and space weather phenomena?

Atmospheric processes - define the global reach of the Antarctic atmosphere

* What is the cause of the unusual 2015 ozone hole? Is there a link with El Nino?
* how can coupling and feedbacks between the atmosphere and the surface (land ice, sea ice and ocean) be better constrained?
* what are the patterns of variability and change at all levels? What are the processes which drive these changes and variability, and what are the feedbacks?
* how do Antarctic atmospheric processes affect mid-latitude weather and extreme events?
* how do the generation, propagation, variability and climatology of atmospheric waves affect atmospheric processes over Antarctica?

Antarctic paleoclimate - knowing past climate to predict future changes

* what do the climate records over Antarctica show?
* what changes have occurred on glacial-interglacial timescales and what are the responsible forcings and feedbacks?
* what are the processes that link hemispheric climate variations?

Project proposals must clearly state how they tie in strategically and contribute to the above research questions.

Proposals having an interaction with initiatives supported by other (inter)national partners or actors and/or generating new interactions, are encouraged.

The Antarctic continent provides a unique opportunity for scientific research that cannot be performed elsewhere on Earth. The researchers need to describe clearly in the proposal the reasons and added value of carrying out their research in Antarctica as well as the links with other on-going (inter)national research initiatives in Antarctica.

All project proposals should include a data management plan, specifying how the external access to the data during and/or after the project will be assured in accordance with the Antarctic Treaty (Art. III), and in which (inter)national open access data repository(ies) the data will be deposited after the project.

Metadata describing the datasets generated by the project should be provided to BELSPO, for use in discovery and search services. Content of the metadata and their format, in line with the most relevant standard(s) or best practices, will be commonly agreed by the promoter and BELSPO.

PEA provides for the necessary infrastructure and support (staff, logistics, field work support, ...).

The indicative budget for this theme is between **2,5 and 3M€**

1. Polar research: six priorities for Antarctic science - Kennicutt, et al., Nature 512, 23-25 (06 August 2014) [↑](#footnote-ref-1)
2. A roadmap for Antarctic and Southern Ocean science for the next two decades and beyond - Kennicutt, et al., Antarctic Science, First View, 1-16 (September 2014) [↑](#footnote-ref-2)