Fund Fonds
Fonds Baillet Latour

INTERNATIONAL POLAR FOUNDATION

Antarctica Fellowship
Research & Logistics at Princess Elisabeth

ANTARCTICA

Antarctica is on average the coldest, driest, and windiest continent on the planet and has the highest average elevation. The name 'Antarctica' arrives from the Greek word ἀνταρκτική (antarktiké) meaning "opposite to the Arctic" or "opposite to the north".

QUICK FACTS & FIGURES

DISCOVERY
American Captain John Davis (sealer), first set foot on the ice, ~1821
Norwegian Roald Amundsen (explorer), reached the South Pole on December 14, 1911

GEOGRAPHY
Size: ~14,000,000 km^2 (5,400,000 square miles), fifth-largest continent
Coastline: 17,968 km (11,165 mi) surrounded by the Southern Ocean
Highest peak: Mount Vinson, 4892 metres (16050 ft)
Largest lake: Lake Vostok, one of the largest sub-glacial lakes in the world
Ice: ~98% of Antarctica is covered by the Antarctic ice sheet, averaging at least 1.6 km (1.0 mi) thick
Freshwater: ~90% of the world's ice (and ~70% of the world's fresh water)

TEMPERATURE
Average: -5°C to -50°C
Coldest: -89.2 °C (-128.6 °F) recorded at Soviet Vostok Station (21 July 1983)
Warmest: 17.5 °C (63.5 °F) recorded at Esperanza Base (24 March 2015)

PRECIPITATION
Desert, with annual precipitation of ~200 mm (8 in) along the coast and far less inland

FLORA & FAUNA
Algae, bacteria, fungi, plants, protista, and certain animals, such as mites, nematodes, penguins, seals and tardigrades.
Vegetation, where it occurs, is tundra.

POLITICAL STATUS
Politically neutral
Antarctic Treaty System (1959): signed by 12 countries (49 nations today)
Territorial Claims: new claims have been suspended since 1959
The Treaty prohibits military activities, mineral mining, nuclear explosions and nuclear waste disposal. It encourages scientific investigation and promotion of international cooperation, provision for annual exchange of plans, personnel, and scientific observations and results.

HUMAN ACTIVITY
Number of research stations: ~80
Residents: 1,000 to 5,000 people throughout the year (none permanent)

PRINCESS ELISABETH ANTARCTICA RESEARCH STATION

First Zero Emission Research Station in the Antarctic

The International Polar Foundation[1], with the help of private sector partners, conceived of and built the Princess Elisabeth Antarctica; the first 'zero emission' polar research station run entirely on renewable energies (wind and solar). Electricity is produced by photovoltaic panels and wind turbines. Solar thermal technology is used to produce water from snow and to heat it for showers and kitchen use. A smart grid has been developed to optimize energy management at the station.

The station has been operational and has supported scientific research since the 2006-07 Antarctic season. IPF gifted the station to the Belgian State in March 2010, and became the operator with full responsibility for the management, maintenance, supervision, provision of logistical and technical support, and security for scientific missions undertaken at and in the vicinity of the station.

Several countries benefit from the support of the Princess Elisabeth Station in order to carry out research activities. Apart from the Belgian programmes, researchers of all nationalities and research institutes from across the world including from Switzerland, Germany and Japan, are regular visitors.

QUICK FACTS AND FIGURES

HISTORY
Commissioned by the Belgian Government
Important part of 4th International Polar Year legacy (IPY)
Inaugurated February 2009
Annual scientific expeditions since 2006-07

LOCATION
Region: Dronning Maud Land, East-Antarctica Utsteinen
Area: Sør Rondane Mountains
Coordinates: S 71°57' - E 23°20'
Distance from coast: 220 km
Altitude: 1397m
Site of scientific interest with easy and safe access to the coast and Antarctic plateau (3000m)

SURFACE
Main building: 500 m²
Technical areas: 1500 m²
Sleeping Facilities: 48 Beds

OPERATIONAL SEASON
November-February (Austral summer)
Average Temperature: -5°C to -50°C
Almost permanent daylight

ZERO EMISSION CONCEPT

PEA is built in line with Environmental Protocol to the Antarctic Treaty for maximum environmental protection and reduction of human impacts

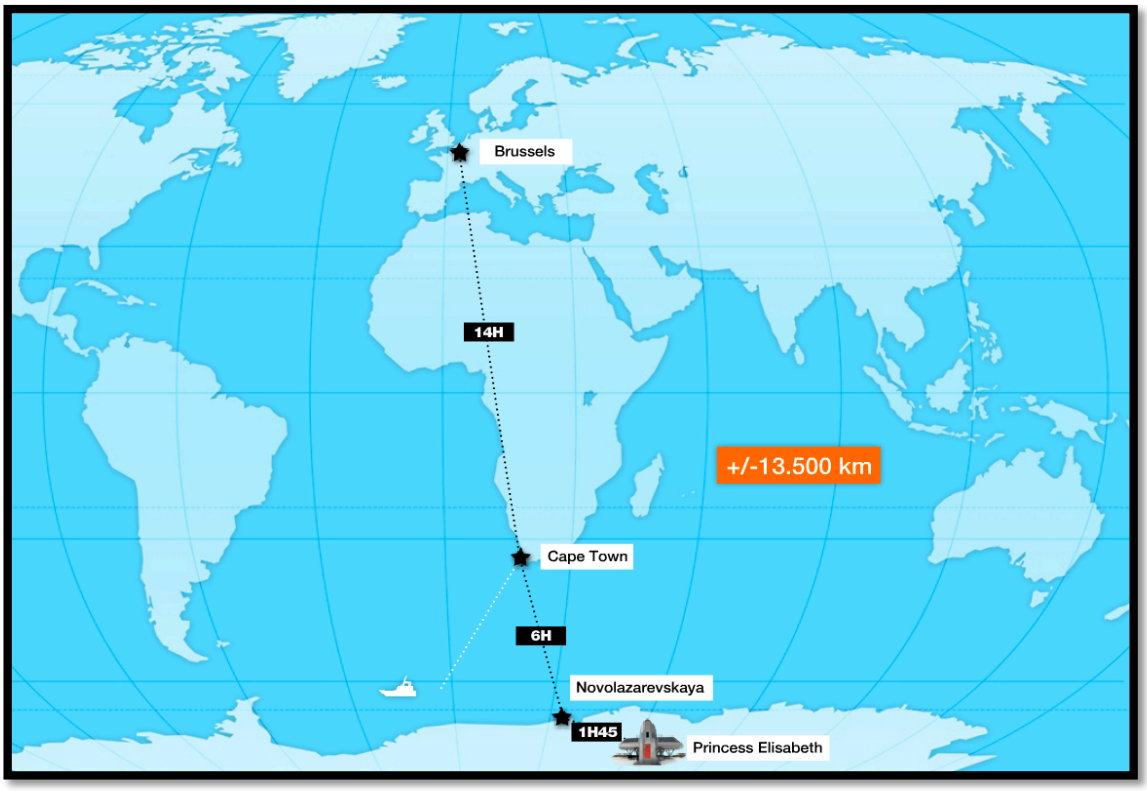
Electricity
54 kW wind turbines (9 x 6kW)
68 kW photovoltaic solar panels (374m²)
Acid-lead batteries: 4 Clusters of 48 elements (8000 Ah)
2 Diesel-generators as back-up

Heating
to melt snow: 21.6m² (18 panels)
for hot water: 21.6m² (18 panels)

[1] The International Polar Foundation (IPF) was founded in 2002, by Belgian polar explorer Alain Hubert, glaciologist, Prof. Hugo Decleir, and climate scientist, Prof. André Berger. IPF was created as a foundation for the public good, and HM King Philippe of Belgium is the Honorary President.

HOW TO GET THERE?

Cape Town, South Africa, is one of the gateways to Antarctica. From there, researchers fly by Ilyushin 76 to the Novozalarevskaya Air Base operated by DROMLAN (Dronning Maud Land Air Network). To reach Utsteinen and Princess Elisabeth Antarctica (PEA), another flight is required aboard a ski-equipped Basler DC3 plane or a De Havilland Twin Otter, which lands on a snow airstrip near the station.



Travel route from Brussels to Princess Elisabeth Antarctica

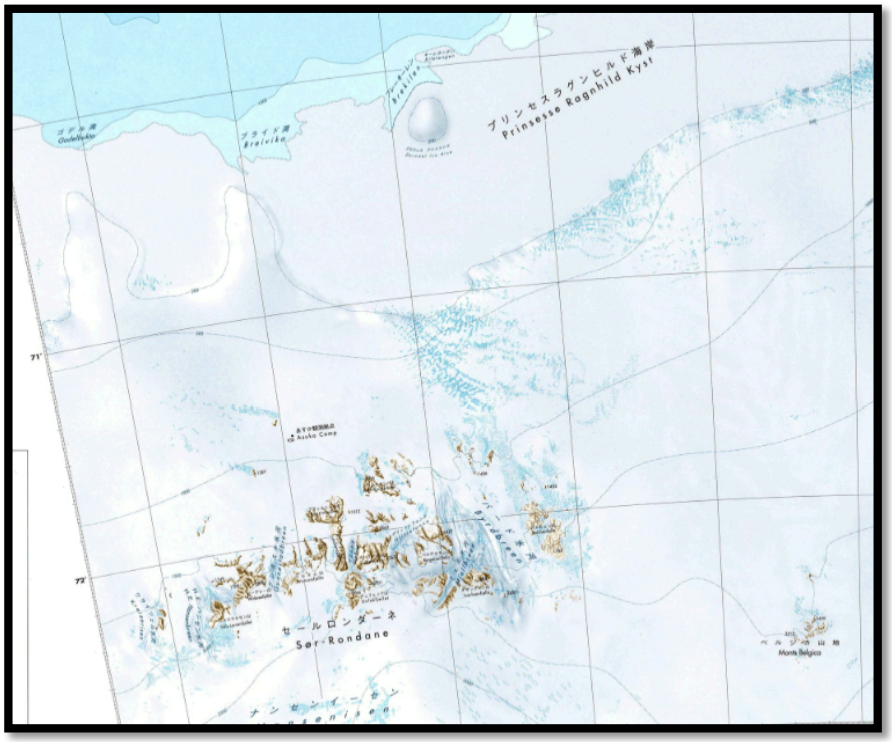
RESEARCH POSSIBILITIES IN THE VICINITY OF PRINCESS ELISABETH ANTARCTICA

Positioned just 200 km from the coast, Princess Elisabeth Antarctica is perfectly situated for scientific projects to be conducted in the Sør Rondane Mountains, glaciers and Antarctic Plateau. The stations unique location and accessibility to study areas mean that researchers do not need to travel far into the Antarctic wilderness to conduct research.

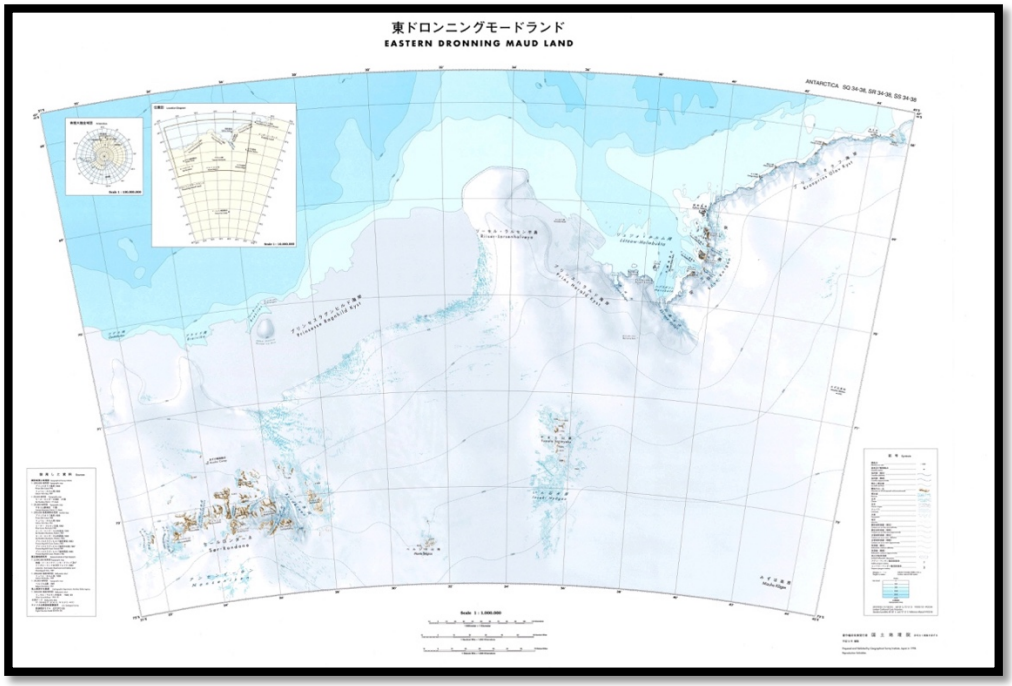
The Sør Rondane Mountains is a paradise for geology, geophysics, geomorphology and related disciplines, providing high interest areas for research. On the Antarctic plateau there are several confirmed sites for meteorites. There are several ice sheets in the vicinity of the station which are of interest to glaciologists heading into the plateau and over the grounding line to the ice shelves.

For biologists there are a surprisingly large number of possibilities. Hidden lakes harbour large communities of cyanobacteria, and hardy mosses, lichens and algae are present in the most unexpected places, and form communities endemic to the area. High on the plateau, evidence can be seen of the trace of extremophiles living under the ice next to moraines where air temperatures are always extreme. Small colonies of petrels occur inland, and large colonies of penguins early in the summer season breed along the Princess Ragnhilde Coast.

The area is also ripe with opportunities for cartographers using modern techniques. Existing maps date back to the US/Norwegian maps of the 1940s and more recent Japanese maps. However, to improve safety of operations, more detailed maps would be welcome.



PEA Area of Operations (NIPR Map 103, 1980)



Map of Eastern Dronning Maud land (NIPR, 1980)

RESEARCH AT THE STATION

Scientists have a clean palette on which to work with at Princess Elisabeth because the region has barely been studied. The station also offers a number of facilities including a reference GPS station, borehole seismometer, magnetometer station, geomagnetic observatory and other facilities and instruments.

The installation of Automatic Weather Stations (now four in the area) has provided much needed data for weather and climate modelling. Princess Elisabeth Antarctica has also begun an upper air sounding programme (a collaboration between the Royal Meteorological Institute, the ETH Zurich and IPF using radiosonde balloons to provide data for weather and climate models. This data is the only measure available within 2000 km^2.

For researchers interested in atmospheric chemistry the air is so pure that the signature of distant events can be monitored with ease. An atmospheric chemistry platform, boasting a complete instrumentation has been installed and operational over several seasons with collected data is of great interest. An automatic weather station operated by the AEROCLOUD project provides real time raw meteorological data. The data is available at: http://www.projects.science.uu.nl/iceclimate/aws/files_oper/oper_23670

An unmanned magnetometer at Utsteinen was installed in February 2009 as a collaboration between Belgium and Japan. The observed data is transferred to Japan daily via Iridium satellite data link during the summer seasons. For further information:
http://www.antarcticstation.org/science_projects/detail/jare_japanese_antarctic_research_expedition/

As mentioned above, the Royal Observatory in Brussels has a bore hole seismometer now installed in the North Science Platform. It has recorded earthquakes in far off locations like Chile, New Zealand and, recently, South Georgia. The seismometer is the sole one of its kind to be installed in this area and provides valuable information to seismic monitoring stations around the world.

Below are just some of the projects that have been conducted or are ongoing at Princess Elisabeth.

Atmospheric Sciences

AEROCLOUD: http://ees.kuleuven.be/hydrant/aerocloud/index.html
HYDRANT: http://ees.kuleuven.be/hydrant/index.html
BELATMOS: http://belatmos.blogspot.be
BENEMELT: http://benemelt.blogspot.be/

Glaciology

ICECON: http://icecon2012.blogspot.be
BEWISE: http://benicetoice.eu/
BELISSIMA: http://ulbonice.blogspot.be
SAMBA-GLACIOCLIM: http://lgge.obs.ujf-grenoble.fr/~christo/glacioclim/samba/home.shtml

Biology

BELDIVA: http://antarcticabelgium.blogspot.be
AMBIO: http://www.ambio.ulg.ac.be/index.html
ANTAR-IMPACT: http://www.antar-impact.ulg.ac.be/antarc-impactEN.htm

Geology

GIANT: http://www.gnss.be/antarctica.php
GIANT-LISSA: http://seismologie.be/dir1700/pdf/Poster_Antarctique.pdf (in French and Dutch)
GEAII: http://www.gea2.uni-bremen.de/hauptseite/index.html

Check out news from the 2017-2018 scientific season: www.polarfoundation.org/news_press/news_archive

STATION FACILITIES

In addition to the science platforms and mobile laboratories, desks are available where scientists can prepare reports and stay in contact with the outside world using the broadband internet satellite connection of the station. Many instruments are also able to communicate collected data in Real Time from the station to your home Institute or University.

Medical Assistance

Safety is always top priority but basic medical care is available at the station during the operational season. These do not extend to surgery, except for minor interventions. **Emergency evacuation procedures are only possible for serious cases.**

Scientific Instruments

Because Antarctic logistics are costly and shipping instruments to Antarctica can be complicated, the station has some scientific equipment for use on site. Prior to your trip, it is best to check with the station what is available, to avoid having to procure and transport costly materials. For additional information, pictures and videos, please refer to:

http://www.antarcticstation.org/science/facilities/

Science Support @PEA

A number of mobile labs are available at the station, as well as North and South Instrument platforms. These however, are currently quite full and plans are afoot to enlarge the platforms to improve the accessibility and management of the instrumentation. A fibre-optic cable provides a fast and efficient link with the station, and data is then transmitted to home institutes via satellite.

Field Support

The Princess Elisabeth Antarctica Vehicle Park can furnish ground transport for mobile camps, and laboratories as well as skidoos for field activities. The cost of these services depends on the distance at which the field activities take place as fuel must be provided for snow tractors, and generators as well as the skidoos. The mobile accommodation units have satellite communication capabilities. High plateau activities can benefit from this now, as the units will have iridium data communication facilities installed shortly.

Workshops and Technical Areas

The workshops at Princess Elisabeth Antarctica are well-equipped to repair station and field equipment. The station crew is sometimes requested to design and build specific pieces of equipment, which they will do on site when possible.

Field Equipment

The International Polar Foundation provides cold weather clothing and boots suitable for Antarctica. Field living equipment such as sleeping bags, tents, camping equipment and sledges may also be provided on request.

For additional information, pictures and videos, please refer to:

http://www.antarcticstation.org/science/logistics_support/

PRE-EXPEDITION PROCEDURES

Registration

All expedition participants must register themselves as well as their cargo. Most researchers also provide a detailed planning for their field activities so that the station staff can recruit additional staff if necessary (field guides, mechanics, and vehicle operators).

Physical exam before departure

As medical facilities at Antarctic stations are limited, all participants are required to be in good health prior to departure. All expedition participants must undergo a thorough physical examination prior to departure. Certain medical conditions will prohibit any travel to the Antarctic.

Field Training

Field training is provided before departure (as well as on arrival at the station) under the supervision of certified field guides. These team members have undergone extensive training and are experienced with working and taking care of others in harsh polar conditions.

Additional information

The website www.antarcticstation.org provides general information about the station and logistic operations as well as information on past and current science projects. During the research season, it is regularly updated with news, picture galleries and videos of activities at the station.

Station brochure: www.antarcticstation.org/assets/uploads/documents_files/brochure_pea_19_04_2013_web.pdf