EXPEDITION PROGRAM ANTARCTICA

(ANT – Land 2014/2015)

STATIONS AND FLIGHT MISSIONS

NEUMAYER STATION III

KOHNEN STATION

Flight Missions

DALLMANN LABORATORY

Other Activities

Coordinators:

Uwe Nixdorf

Eberhard Kohlberg

Dirk Mengedoht

Tom Brey

Daniel Steinhage

ALFRED WEGENER INSTITUTE

HELMHOLTZ CENTRE FOR

POLAR AND MARINE RESEARCH

November 2014

CONTENTS

1. NEUMAYER STATION III

1.1 Summary

The season ANT-Land 2015/2015 is scheduled for the period from 12 November 2015 until 25 February 2015.
Most of personnel will be flown into the Antarctic and back via the air link from Cape Town within the frame of Dronning Maud Land Air Network (DROMLAN). Ship calls are scheduled for RV POLARSTERN 25th of December 2015, to supply the majority of cargo, supply of Kohnen Station and fuel for NEUMAYER STATION III and aircraft operations. Furthermore ship calls are SA AGULHAS II 16th of December 2015 Begin of February 2015 second call for loading cargo returning to Germany.
No further scheduled ship calls.

NEUMAYER STATION III has successfully run its wintering period.
The main logistic objectives of the season 2015/2015 on the Ekström Ice Shelf will be the technical operation of NEUMAYER STATION III. Logistics will focus on two periods of lifting of the station. Furthermore a construction team will be onsite for maintenance of the station facilities. Another construction is supposed to do warranty work related to the leakages of the roof.
In the vicinity of NEUMAYER STATION III only geophysical projects are planned. during the summer season.
Medical studies of the Berlin Centre for Space Medicine (ZWMB) and University of Munich (LMU) will be continued and extended by the station staff during the winter period.

In parallel station facilities will be used to support the traverse to KOHNEN STATION, furthermore to operate the Basler BT-67 aircraft POLAR 6. The regular weather forecast service (AWI/DWD) will be provided to all aircraft operations within the Dronning Maud Land region, in particular as a contribution to DROMLAN.

KOHNEN STATION will be visited (7 technicians) for maintenance work such as lifting up the station and construction work inside bathroom and toilets.. A traverse, to KOHNEN STATION including supply goods will start from NEUMAYER STATION III after port call of RV POLARSTERN. Furthermore the station acts as base for scientific field work of the COFI project and an air chemistry project by Rolf Weller.

In total 64 scientists, engineers, technicians and visitors will be working or temporarily staying at NEUMAYER STATION III.

- Maintenance works (4)
- Revision technical facilities (4)

- warranty work (4)
- Logistic operations (3)
- Flight Missions Polar 6 (6)
- Operation of scientific observatories (4)
- Cooperation International Institutes scientists (2)
- AWI wintering staff (18)
- DWD weather forecast service (2)
- Maintenance of KOHNEN STATION (7)
- Public relations (1)
- National and international visits (10)

1.2 Operation of observatories

1.2.1 Meteorological Observatory

Gert König-Langlo (AWI), Elena Stautzebach (AWI), Elke Ludewig (AWI)

In the coming summer season 2014/2015 the following program will be performed at the meteorological observatory of Neumayer III:

- Arrival of the weather forecaster (NN) from German Weather Service and start of the DROMLAN-Service with the first aircraft arriving at Neumayer in November 2014
- Arrival of Elke Ludewig (wintering over person responsible for the meteorological observatory 2015) end of 2014
- Arrival of Gert König-Langlo (scientific leader of the meteorological observatory) beginning of 2015
- Teaching the new wintering over person responsible for the meteorological observatory
- Exchanging the IT-hardware including the server for the data acquisition from the meteorology
- Testing an autonomous automatic weather station (AWS) including wind generator, solar panel and IRIDIUM data transfer.
- Servicing all meteorological measurement systems
- Departure of Elena Stauzebach, Gert König-Langlo, the weather forecaster (NN) in February 2015

1.2.2 Operational weather forecast service for DROMLAN

Harald Rentsch (DWD), Robert Hausen (DWD)

Since 2002/03 the meteorological observatory of the German Antarctic station Neumayer offers a detailed and individual weather forecast service for all activities in Dronning Maud Land. This service is performed in close cooperation between the Alfred-Wegener-Institute for Polar and Marine Research (AWI) and the German Weather Service (DWD).
During the summer season 2014/2015 up to 5000 forecasts will be performed for field parties, ships, stations and especially aircrafts. It is obvious, that this service will increase the safeness of the ambiguous projects in the Dronning Maud Land. Furthermore, it will help to reduce weather induced idle times of expensive flight operations to a minimum.

1.2.3 Geophysical observatory

Jölund Asseng (AWI), Johannes Lohse (AWI), Daniel Armbruster (AWI), Annemarie Sticher (AWI), Andreas Leonhardt (AWI)

Period:	December 2014 – February 2015
Project:	Service works at remote seismographic stations
	Service works Geophysical Observatory
Scientific leader:	Jölund Asseng (AWI)
Area:	NEUMAYER STATION III, Dronning Maud Land (DML)

During summer season 2014/2015 no special or additional field program at or around Neumayer-III is planned. The main task is again servicing the remote seismic stations VNA2 and VNA3 on Halvfarryggen and Söråsen ice rises. Both stations had been almost entirely operational during the polar winter. VNA3 showed short breaks during the time period when the sun came back again after the polar winter and when the battery management system was switching back and forth between accumulators charged by a wind turbine and accumulators starting to be recharged again by solar panels. This disadvantageous effect should be eliminated during service works. Unfortunately VNA3 broad band recordings are contaminated by persistent 100 sec wave trains affecting the horizontal components. We have to look for the reasons for these very bad disturbances and to eliminate them.
VNA2 recordings currently suffer from the noise generated during strong winds by the 3 wind turbines mounted at the container. We will try to reduce this influence by replacing the sensor some 200 meters way from the container. Any damage, if there is one; at the wind generators should be repaired.
If possible, a short trip to SVEA station for a 2-4 days stay may be part of the summer program. In cooperation with the Swedish Polar Secretary we want to use this site for further seismic recording. However, some substantial efforts have to improve DC power supply and the recording conditions at the seismometer site. If there will be a chance to go to Svea we would try to construct a better shelter

for the seismometer. Further refurbishments are planned a year later together with Swedish colleagues.
At the base the computer systems will be completely exchanged and there will certainly arise some work to keep all systems and measurements running properly again.
This season a new technical staff member will be in charge coordinating all the seasonal service works at Neumayer III and is part of his training on the job.

1.2.4 Air chemistry observatory

Rolf Weller (AWI), Kerstin Schmidt (AWI), Bettina Nekat (AWI)

Period:	18 December 2014 – 24 February 2015
	Cape Town: 18 December 2014 (D6)
	Cape Town: 24 February 2015 (D9)
Area of activity:	Neumayer Station 70°40.37'S, 08°12.26'W

Scientific activities report:

Apart from the routine measuring program established at the Air Chemistry Observatory, a so-called ToF-ACSM (Time of Flight Aerosol Speciation Monitor) from the Finnish Meteorological Institute (FMI, PI: Risto Hillamo) is planned to be installed during the forthcoming summer campaign (2014/2015) for one season. With this instrument we aim at a chemical speciation of the aerosol, in particular concerning organic compounds. For the first time such a highly sophisticated instrument will be operated throughout a year in Antarctica. Primarily for the characterization of organic aerosol compounds, this experiment has to be regarded as a feasibility study due to the expected extremely low concentration levels. Our scientific summer activities will further focus on aerosol size distribution measurements within the nucleation mode. In addition we intend to continue size distribution measurements during austral late winter / spring. On-going particle concentration observations indicate particle nucleation processes even during this season, an up to now unexplained peculiarity. After overhaul, an ozone monitor will be re-installed during the forthcoming summer campaign. Finally, there will be the usual maintenance operation at the Air Chemistry Observatory as well as training of the new air chemistry over-winterer Bettina Nekat.

Participants:

Name	First Name	Institute	Profession	Nationality
Schmidt	Kerstin	AWI	Meteorologist Over winterer 2014	Germany
Nekat	Bettina	AWI	Chemist	Germany

Name	First Name	Institute	Profession	Nationality
			Over winterer 2015	
Weller	Rolf	AWI	Chemist	Germany

1.2.5 PALAOA - the Perennial Acoustic Observatory in the Antarctic Ocean

Daniel Zitterbart (AWI), Dirk Zimmermann (AWI), Jens-Peter Biethan (AWI)

Period:	December 2014 – February 2015
Project:	Service works PALAOA
Scientific leader:	Daniel Zitterbart (AWI)
Area:	Neumayer-III

Project summary

The Palaoa Observatory has been operated for 7 years at Neumayer Station to understand the acoustic ecology of the Atka Bay and surrounding areas. This Project will replace the current Palaoa Observatory with a new one that requires much less maintenance.

Project topic and goals

By the time PALAOA was designed, it was impossible to store all data at the observatory, and the acoustic landscape was fully unknown. So it was designed to be remote controlled from the AWI, using the Neumayer Satellite link, and designed to store the acoustic data at Neumayer Station. While this design is very suitable for an exploratory project phase, it requires a lot of power and therefore maintenance (i.e. replacing batteries) during the winter. The AWI developed during the last years together with Develogic the so called SONOVAULT (http://www.develogic.de/products/ss-r/sonovault/). An acoustic recording device which is capable of storing up to 1TB of acoustic data and runs with very low power requirements. The sonovault is deployed throughout the Weddell Sea.

This project aims to replace the PALAOA Container with a Zargesbox which is equipped with a refitted sonovault and shall be maintained by the winterers. Maintenance shall require a change of battery and SD-Cards twice a year.

The ZargesBox will be sent to Neumayer by plane, and shall be installed at Palaoa Site on the ice by the radio engineer during spring 2015 (Nov), to minimize data loss. The final installation shall be conducted by OZA in conjunction with the radio engineer (Uewi 2015) during the Polarstern visit in the end of December 2014. After initial installation the PALAOA Container can be pulled over to Neumayer and be dismantled (parts to remove see below), and prepared for shipping back to the AWI via Polarstern.

1.3 Scientific projects

1.3.1 Neutron-Monitor and Muon-Telescope

Michael Walter (DESY), Harm Moraal University Potchiefstrom, South Africa)

Installation of a mobile, lightweight Neutron Monitor which is easy-to-operate at the NEUMAYER STATION III. It would give new results for calibrating the long-term observations measured at the nearby Sanae, and for studying solar cosmic-ray events in greater detail.

In polar region the asymptotic cone of acceptance is very sensitive to the location and the geomagnetic activity. Thus the view cone at Neumayer is sufficiently different form that at Sanae allowing investigating in detail the onset phase of a Ground Level Event.

The installation of a muon telescope at the Neumayer station would allow comparing both measurement results for cross calibrations and would give a higher confidence of the results.

Galactic cosmic rays are high-energy charged particles, mainly protons, doubly ionized helium, and other fully ionized nuclei originating in the galaxy and bombarding the Earth from all directions. They are a direct sample of material from far beyond he solar system. Measurements by various particle detectors have shown that the intensity varies on different timescales, caused by the Sun's activity and geomagnetic variation. The role of Interplanetary Coronal Mass Ejections (ICMEs) in causing Forbush decreases, and Corotating Interaction Regions causing recurrent decreases in the GCR intensity observed at Earth, has been well established since the last twenty years. However, these interplanetary disturbances cause space weather effects, which warrant a more detailed study. Most of the research on GCR intensity variations is based on the analysis of ground-based neutron monitors and muon telescopes. Their measurements as explained in what follows depend on the geomagnetic position, and the processes in the Earth's atmosphere.

Beside the modulation of cosmic rays in the heliosphere there are two possible lines of defence: while the atmosphere shields life against cosmic radiation uniformly, the Earth magnetosphere acts as a rigidity filter. Before the primary particles can enter the atmosphere they are subject to the deviations in the magnetic field in the vicinity of the Earth, and as a consequence the intensity of charged particles on top of the atmosphere is reduced with respect to interplanetary space.

1.3.2 SPOT – Single Penguin Observation and Tracking

Daniel P. Zitterbart (AWI), S. Richter, W. Schneider, B. Fabry (Uni Erlangen)

This project aims to understand the reorganization process in penguin huddles and the implications for social thermoregulation.

The Emperor penguin (Aptenodytes forsteri) is the only species that breeds during the austral winter. They endure temperatures below -35° C and winds up to 50 m/s. From their arrival at the colony until

the eggs hatch, the males, who solely incubate the eggs, fast for about 4 months. To conserve energy and to survive, the penguins form huddles. It is crucial that the huddle structure is continuously reorganized so that time spent at the huddle periphery is limited. Penguins in a huddle are packed so tightly, however, that individual movements become impossible, reminiscent of a jamming transition in compacted colloids. We recently discovered that penguins overcome jamming by moving periodically in large, coordinated clusters.

The dynamics of huddling has previously been studied by analysing the temperature and light intensity pattern recorded with sensors attached to individual penguins.

However, for ethical and economic reasons, this approach can only be applied to a small number of individuals within the huddle. We therefore use a non-invasive approach by analysing high resolution video footage.

In 2012/2013 we installed a remote-operated penguin observatory at Atka Bay Emperor Penguin Colony including hard- and software for fast image acquisition and real-time processing. The observatory is capable of detecting the whole huddle, as well as tracking the movements of thousands of individual penguins throughout the winter. An accurate count of animals within the colony and the size of individual animals will also be recorded, and together our data will help to estimate how the increasing environmental strain such as ongoing climate changes, thinning sea ice and reduced krill availability, is affecting Emperor penguins.

After one year of operations we will replace several cameras with new models which perform better in low light, and do maintenance and relocation of the observatory according to the lessons learned during winter 2014.

1.3.3 Long term measurement of the cosmic radiation component on different geological positions.

Long term test of in-house developed gamma dose rate probes under extreme conditions

Roger Luff (Bundesamt für Strahlenschutz)

The German Federal Office for Radiation Protection (BfS) is the competent institution in Germany to protect man and the environment against ionising radiation. BfS runs a nation-wide ambient dose rate monitoring network since over 30 years. It comprises of about 1800 stationary gamma dose rate probes. The network technology is kept at state-of-the-art level through continuous development on soft- and hardware as well as on detector technology. This includes long-time test series under various environmental conditions, international data and technology exchange.

The ambient dose rate level is influenced by a number of natural phenomena. The main sources are precipitation of radon progeny products by rain and snow, attenuation of terrestrial radiation by snow cover and modulation of the cosmic component. In addition, artefacts from the detector system can

occur which are modulated by environmental parameters like e.g. temperature. The sensitivity of the detector and the interpretation of the data is highly related to an understanding of all these effects.

The probe to be installed at the Neumayer-Station is the standard BfS probe equipped with 2 Geiger-Müller tubes for high and low count rates. It measures automatically and continuously the environmental gamma dose rate in a wide range from some µSv/h up to 5 Sv/h. In general, it registers the radiation in a reference height of about 1 m above the ground to get the terrestrial as well as the cosmic component of the gamma radiation. Moreover the probe measures the temperature and the air pressure in the probe housing for quality insurance, error detection and to estimate the cosmic component. The Linux based microprocessor-controlled data logger stores the measurements of the probe, forms mean values and other statistical values of them and transfers the data via the AWI-network to the measuring and service centre in Germany. In case of electrical power outage the system runs up to three days on battery.

The research project at the Neumayer-Station is designed as a long term measurement series that consists of two different aspects as outlined below.

Project topic and goals

The research project at the Neumayer-Station is designed as a long term measurement series that consists of two different aspects as outlined below.

Global monitoring of cosmic radiation component

The cosmic radiation originating from the sun and from outer space is subject to a complex process of interaction with the earth’s magnetic field and atmosphere. Most of this radiation is attenuated and only a small fraction reaches the earth’s surface as ionizing radiation. At ground level, it contributes to the total measured local ambient dose rate between 15%-90%. It is modulated by atmospheric pressure, the solar cycle and, occasionally, by solar flare events. Dose rate probes of similar response to cosmic radiation at different latitudes will help to understand the characteristics of the temporal variability of cosmic radiation and to better separate these effects from other environmental parameters. In case of current solar flare events the data will help to assess the impact on the dose rate monitoring network. To compare the data according to the German (PTB) reference standard, in a further step, a second reference probe (Reuter-Stokes (high pressure ionisation chamber) or Automess (plastic-scintillator) may be installed next for shorter time intervals.

1.3.4 Consequences of long-term-Confinement and Hypobaric HypOxia on Immunity in the Antarctic Environment at NEUMAYER STATION III (CHO2ICE@NMIII)

Alexander Chouker (University of Munich) Hanns-Christian Gunga (University of Berlin, Charité) et al.

The recently published research reports indicate that health and the immune system are affected under conditions of confinement in the pole regions. Beside the consequences of confinement, altered day night cycles and severe physical challenges on stress-dependent immune-modulation may add to alter immunity (e.g. also through hypobaric hypoxia).

Objectives

In the unique environment of the NEUMAYER STATION III, stress- dependent immune-modulation can be investigated and compared to conditions at the Concordia (3200m) where hypoxia is an additional stressor as shown in the context of the recently completed European study CHOICE (Consequences of long term-Confinement & Hypobaric HypOxia on Immunity in the antarCtic Environment), allowing for the first time to investigate the effects of hypobaric hypoxia and confinement on the immune system in a standardized fashion.

Methodology

This study will get advantage of the experience of on-going and future Antarctic, space-related studies as well as in clinical setting to understand the interaction of stress & immunity on a multinational collaborative scale, using a battery of parameters from blood, saliva, urine as well as new innovative tools.

Conclusions

CHOICE@NMIII project in conjunction with the investigation on CONCORDIA- Station will increase knowledge on the physiological adaptation of humans´ health and immunity during long-term confinement without or with hypobaric hypoxia. Because both confinement stress and various oxygen tensions are major variables affecting any cells´ function and hereby impacting health and immunity, the Antarctic missions are of high significance for the future expeditions as well as for Space application, as both appear to be of comparable nature.

State of the art and relevant publications

The vulnerability of totally confined subjects is a concern which needs to be considered when planning health care and health monitoring during long-term space flights, manned lunar exploration and potential future “extraterrestrial” settlement. Medical statistics of Antarctic wintering-over teams in the last 50 years show that up to 3 medical consultations per subject occur mostly for surgical, internal medicine (~60%) or dermatological reasons (7-17%) [H. OHNO, Japanese Report on Antarctic Medical Program and Research, 2004], reflecting health consequences of confinement in the Antarctic. There is a need to understand these alterations of health under extreme living conditions that might result from confinement-associated neuroendocrine, stress-associated modulation of immunity due to the complex environmental challenges alike those that can be mirrored on earth by

confinement of a wintering group in Antarctica.

Project topic and goals

The goals of the planned project can be summarized as follows:

- 1) Assessment and understanding of stress-associated immune changes that result from confinement living and/or under mild hypobaric hypoxia comparable to the living situation in future lunar habitats where air pressure and oxygen may be lowered for technical reasons.
- 2) Workout for the rationale for the development of adequate countermeasures to counterbalance the potential risk of confinement and hypoxia-induced immune and health changes
- Deliverables
- During wintering over, blood, saliva, and urine collection occurred before and after the mission as well as during the isolation period. The immune tests included e.g. peripheral leucocyte distribution, innate and adaptive immunocyte functions when challenged with receptor dependent or independent agents as well as the Herpes virus replications as a marker of immune dysfunction. Complementary stress questionnaires will be assessed.

1.3.5 Antarctic Fast Ice Network – Sea Ice Monitoring in Atka Bay

Marcel Nicolaus, Mario Hoppmann (AWI)

Background

Sea ice fastened to coasts, icebergs and ice shelves (fast ice) is of crucial importance for climate and ecosystems. At the same time, it is not represented in climate models and many processes affecting its energy- and mass balance are currently only poorly understood. Near Antarctic ice shelves, this fast ice exhibits two unique characteristics that distinguish it from most other sea ice:

1. Ice platelets form and grow in super cooled water masses, which originate from cavities below the ice shelves. These crystals rise to the surface, where they accumulate beneath the solid sea-ice cover. Through freezing of interstitial water they are incorporated into the sea-ice fabric as platelet ice.
2. A thick and highly stratified snow cover accumulates on the fast ice, altering the response of the surface to remote sensing and affecting sea-ice energy- and mass balance.

At the same time, fast ice is ideal to monitor sea ice and its seasonal evolution, because it may be accessed from nearby stations. In order to improve our understanding of sea ice processes and mass balance, we perform a continuous measurement program on the fast ice of Atka Bay, Antarctica. This work contributes the international Antarctic Fast Ice Network (AFIN), which was initiated as legacy project under the International Polar Year (IPY) and is set out to establish an international network of

fast-ice monitoring stations around the Antarctic coastline. The monitoring program at Neumayer III base started in 2010.

Field work

The wintering team measures various sea ice and snow properties (mainly) between June and January (see map), when safe access to the ice is possible. Manual measurements of sea ice thickness, freeboard, and snow thickness (drillings and stake measurements) are repeated along a 25km-long transect across Atka Bay every 2 to 3 weeks. In addition, autonomous stations are operated on the sea ice. From those, we retrieve continuous measurements of snow and sea-ice thickness and temperatures as well as atmospheric conditions from an automatic weather station.

These routine measurements are occasionally complemented by more extensive sea-ice thickness and snow depth transects, using an electromagnetic thickness probe (EM31) pulled in a kayak by a snow mobile. At the end of the sea ice season, before the expected break out, sea ice cores are retrieved and shipped back to Bremerhaven for analyses.

During the field season in 2014/15, additional sea ice work will be carried out as part of the Polarstern expedition ANT XXX/2, which will also supply the Neumayer III base end of December 2014. The work during this time will intensify the monitoring activities and set up new instrumentation for test purposes:
1) Manual measurements of ice thickness, freeboard, and snow thickness (drillings and stake measurements) on the sea ice of Atka Bay along the AFIN East-West profile. Sampling of sea ice by taking ice cores along this transect. The samples will be transferred to the freezer lab on Polarstern.
2) Maintenance of existing autonomous measurement platforms of the AFIN project (sea ice and snow buoys).
3)Installation of a high-precision GPS station close to the Neumayer III met field.
4) Investigations of the layer of ice platelets under the sea ice with an remotely operated vehicle (ROV). If possible, those measurements will be performed in Atka Bay, but most likely closer to Polarstern than the main AFIN transect.

Data

Results will not only contribute to the AFIN network, but also support other sea-ice activities in Atka Bay. The measurements are also part of the DFG funded research project “Sea ice mass balance influenced by ice shelves (SIMBIS)” (2011-2015) and the HGF Alliance on Remote Sensing. All observations and data will be summarized in an (annual) field report, made available to the public through the Pangaea data-publishing platform, and finally be published in scientific journals. The data will also be published through Pangaea.

Reference (example)

Hoppmann, M., Nicolaus, M. and Asseng, J. (2012): Summary of AFIN Measurements on Atka Bay Landfast Sea Ice in 2011, hdl:10013/epic.39903

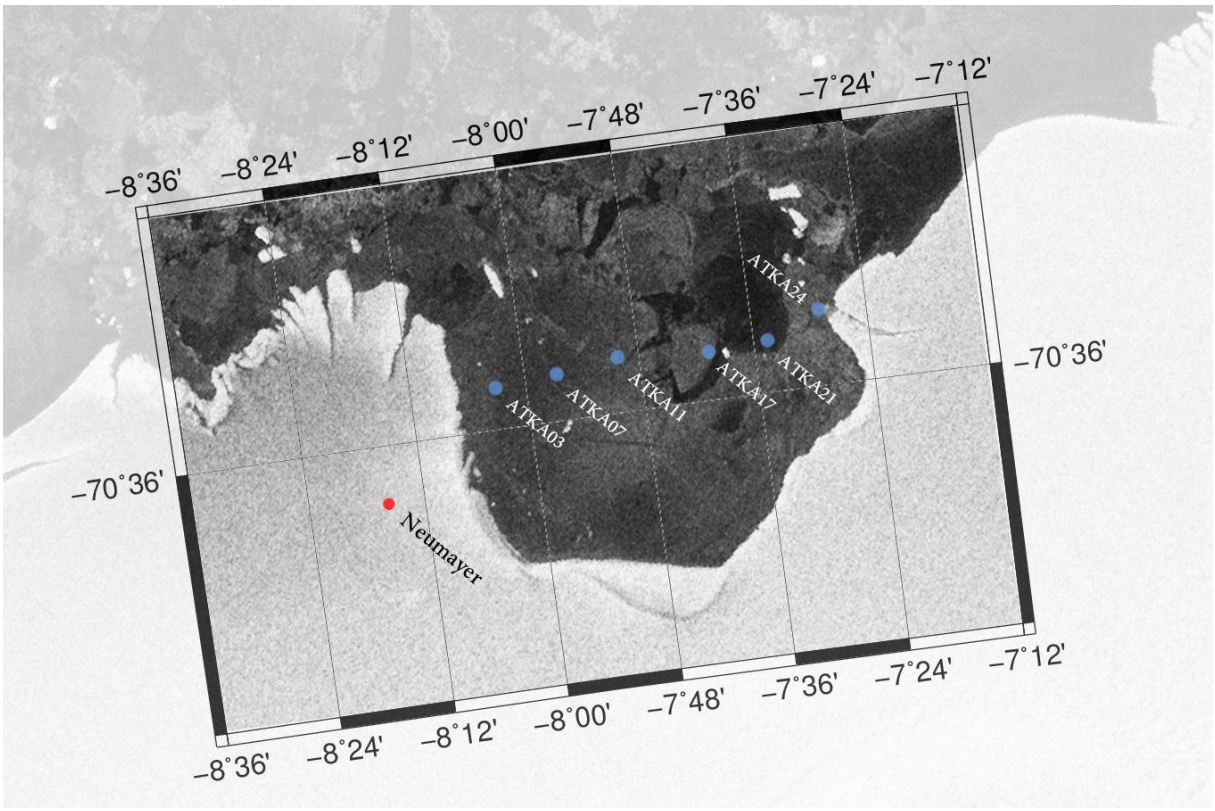


Figure 1: Measurement sites in 2010. Background image: ESA Envisat ASAR image (WSM on 11 Apr. 2011, http://polarview.aq)

1.4 National and international visits and inspections

1.4.1 National Visits

A delegation of German governmental authorities will give a brief visit to Neumayer Station and Kohnen Station to get an impression of the German scientific activities in Antarctica. The participants are members of the Ministery of Education and Research of the Federal Republic of Germany and the Federal State of Bremen and two members of the German Parliament accompanied by the directors of AWI.

1.4.2 International Guest Scientists

Two scientists of Finnish Meteorological Institute (FMI) cooperating with AWI in the frame of air chemistry will stay for 3 weeks (mid of November till begin of December 2014) at Neumayer Station to carry out their experiments.

1.4.3 International Inspection

No information.

1.5 Scientific projects during wintering

1.5.1 Human Physiology at Neumayer Station III – Campaign 2015

Alexander Stahn, Mathias Steinach, Hanns Christian Gunga (ZWMB Berlin, Charite), Eberhard Kohlberg (AWI), participants wintering team 2015 (AWI)

For more than five years the Alfred Wegener Institute for Polar and Marine Research (AWI) has now been closely cooperating with the Centre for Space Medicine Berlin (ZWMB). The aim of this partnership is the field based investigation of changes in human physiology under extreme environmental conditions such as altered circadian rhythms, isolation, confinement and cold. These studies are of very remarkable character, because they do not correspond to an artificial laboratory situation, but imply the chance to monitor human performance under real life conditions. In particular, this project is of importance to space medicine because overwintering in the Antarctic has various analogies to a long-term space travel such as isolation, confinement and extreme environmental conditions and the derived knowledge from this research could have important implications for space medicine, space physiology and living and travelling in extreme environments. Furthermore, some of this research could also have significant impact for basic research under terrestrial conditions and even the clinical setting and as new mechanisms underlying the regulation of the human body could be detected.

During the overwintering campaign 2015 the following experiments are planned:

- Circadian Rhythm (ZIRKA),
- Metabolic Rate (MR),
- SenseWear (SW),
- Body Composition (BIA),
- Autonomous Nervous System (ANS),
- Biomarkers (BM), and
- Cognitive Function (CF).

SW, BIA, ANS, and BM have made a long-standing contribution to the understanding of changes in body composition, energy balance, and regulation of the cardiovascular and hormonal system during overwintering in the Antarctic. Except for BM, requiring a small venous blood sample, all of these

experiments are non-invasive, require minimal to moderate time, and are easy to operate. These experiments have been successfully completed and are presently being analysed. Previous campaigns have shown diametrically adverse effects of overwintering on body composition in men and women. In addition, Vitamin D as an example of the experiment BM, affecting the remodelling of bone, neuromuscular function and inflammation, have been shown to be decreased to detrimental levels since 2010. In addition, both body composition and vitamin D seem to be significantly affected by the dark phase during the Antarctic winter. Similar results have been previously shown for other biomarkers (e.g. erythropoietin) during the campaign 2009. While the decrease in vitamin D could have been expected due to its light-sensitive synthesis, the degradation far exceeded of what would have been expected. Given the field-physiologic character of these studies, however, it remains to be determined whether these results can be replicated in other overwintering crews. It is therefore of crucial importance to continue all of these experiments. Furthermore, given the increasing role of hormones and proteins in the understanding of body composition and cell proliferation, differentiation and apoptosis, it is intended to promote the means to increase the number of biomarkers being investigated during overwintering at NEUMAYER STATION III.

Since 2011 the test battery was complemented by the experiments ZIRKA, MR and CF. ZIRKA promises to provide innovative and leading insights into the understanding of circadian rhythm. The experiment employs a hardware that allows a non-invasive core body temperature measurement for 36 h, allowing the characterization of the circadian timing system. The hardware has been now refurbished to meet the specific needs at NEUMAYER STATION III. The recording system is now smaller, connection cables are more robust, the recording device is less energy-consuming, the data download has been improved, and the device is smaller, lighter, more robust and much easier to operate. In addition, a special bag has been manufactured increase crew compliance. The knowledge of this experiment is expected not only to provide significant knowledge on the impact of isolation, confinement and altered day/night cycle on the circadian timing system, but also has significant practical implications by helping to improve physical exercise, rest- and work shifts as well as fostering adequate workplace illumination in the sense of occupational healthcare in future overwintering missions. In addition, these measurements will be of crucial importance for the ISS-project circadian rhythm and can serve as “reference data” during isolation under terrestrial conditions. Presently, Concordia Station has also asked to use the technology for replacing rather invasive techniques for long-term temperature profiling.

The wintering 2011 was also complemented by two additional projects: MR and CF. Both projects will be continued. MR is intended to provide an excellent addition to the experiment SW as MR provides a measure of resting metabolic rate based on spirometry and gas analysis. Thus, the MR will be used to validate some of the data generated by SW-device (other indices provided by SW are presently also validated in another validation study being conducted in the laboratory).

CF aims at monitoring cognitive function during overwintering at NEUMAYER STATION III. Research from polar stations such as McMurdo station has shown that cognitive performance can be substantially

affected during overwintering. For the first, a computer-based test battery has also now been employed that has been validated for tracking cognitive performance under extreme environmental conditions. Since cognitive function will excellently complement ZIRKA as well as BM and BIA – there seem to be close associations between circadian rhythm, cognitive performance, body composition, metabolic rate and even physical activity, it is clearly intended to carry out the experiments ZIRKA, SW, MR, BIA, BM and CF in 2015. It is specifically the respective influences of each of these experiments and their synergistic impact that will powerfully contribute to the understanding of human physiology in extreme environments as well as the clinical setting.

In addition to changes in hardware and software, a detailed, comprehensive documentation of each single experiment is used to implement successfully the entire project. Furthermore, all crew members were invited to the ZWMB for baseline testing in body composition and BM as well as to introduce all of the experiments and provide a better understanding of the background and objectives of the project. Finally, some of the experiments will also be carried out at the South African National Antarctic Expedition (SANAE) base. This is the success of the collaborative efforts between the South African National Antarctic Programme (SANAP), the South African Dept. of Environmental Affairs, Stellenbosch University, the Alfred Wegener Institute for Polar and Marine Research (AWI), and the Centre for Space Medicine Berlin at the Charité University Medicine Berlin. This partnership will not only enhance the number of subjects being monitored in the Antarctic, but also allow promote comparisons between different environmental conditions in the Antarctic (e.g. NEUMAYER STATION III at sea level vs. SANAE at 846 m above sea level) as well as between different nations, cultures, and teams. Given the real-world character and exciting research opportunities, the cooperation with SANAE and NEUMAYER STATION III will continue and extend to take a central research focus at the ZWMB of the University of Berlin.

2. KOHNEN STATION

2.1. Summary

Station leader: Sepp Kipfstuhl

The season ANT-Land 2015/2015 is scheduled for the period from 8 January 2015 until 3 February 2015.

KOHNEN STATION will be visited (7 technicians) for maintenance work such as lifting up the station and construction work inside bathroom and toilets. A traverse, to KOHNEN STATION including supply goods will start from NEUMAYER STATION III after port call of RV POLARSTERN. Furthermore the station acts as base for scientific field work of the COFI project and an air chemistry project by Rolf Weller.

The station also serves as base for the scientific flight missions of POLAR 6.

2.2 Scientific Projects

2.2.1 Coldest Firn (CoFi) 2014/15

Sepp Kipfstuhl (AWI)

CoFi investigates the evolution of the snow pack, the firnification and the air entrapment in ice on the Antarctic Plateau, the relationship between impurities and microstructure, how the seasonal climatic and environmental signals develop under the depositional conditions at Kohnen and how the radiation properties (e.g. albedo) of the snow are linked to the microstructure of the snow. Snow samples for isotopes and impurities will be taken during the entire field season.

Project topic and goals

Project topic is the effect of snow deposition on the formation of the seasonal signals in the firn and the microstructural properties of the snow from the surface to the firn-ice transition. A special topic during this season is the evolution of the isotopic cycle in the top few meters (last 20 years) and its relationship to the air temperature measured at the automatic weather station set up 1998. At Kohnen one goal is a comprehensive snow sampling program performed at various locations (5 or more; daily samples; top 1-3 m; entire season) in the close vicinity of Kohnen Station to find out how the summer signals form and develop over the summer season at the different sampling locations. A second goal is the variability of the isotopic signal directly at the surface (top 5 cm) to learn more about the processes affecting the isotopes in surface snow.

2.2.2 AMAK (Aerosol Measurements At Kohnen)

Period:	early January 2015 – early February 2015
	Cape Town: 18 December 2014 (D6)
	Cape Town: 24 February 2015 (D9)
Area of activity:	Kohnen Station 75°00’S, 00°04’E

Scientific activities report:

The main objective of our planned air chemistry research activities is to initiate a periodic intensive aerosol measuring program during summer campaigns at the EPICA drilling site in Dronning Maud Land (Kohnen Station, 75°00'S, 0°04'E). Up to now previous results from this site were restricted to the bulk chemical (ionic) composition of the aerosol, obtained during four summer campaigns and four year-round aerosol sampling by an automated aerosol sampler. Our intended new initiative will now concentrate on the dynamics of particle concentration and particle size distribution as well as on size segregated aerosol sampling. Such investigations in continental Antarctica are dedicated to

complement and expand the research program already established at the coastal Neumayer Station. In general, the influence of atmospheric particles on climate, ecosystems and human health is beyond doubt but measurements in pristine regions to quantify emissions from natural and anthropogenic sources as well as the transport- and deposition processes are still incomplete. In particular, the composition of aerosol particles is determined by chemical and physical processes occurring during particle generation and transport. In order to assess the source apportionment, long range transport, and deposition, it is necessary to characterize relevant physical and chemical aerosol properties, which is the main goal of our research program. Finally, our results also assist the interpretation of chemical tracer profiles measured in firn and ice cores (e.g. the EPICA-DML ice core).

As for the aerosol sampling program, we plan to install one low-volume aerosol sampler and a Berner type impactor during Kohnen summer campaigns, starting in 2015/2016. Aerosol samples are dedicated for ion chromatography (IC, ions to be determined: Cl^-, SO_4^{2-}, NO_3^-, methane sulfonate, Na^+, K^+, Mg^{2+}, Ca^{2+}, and NH_4^+), and for element (with ICP-MS = Inductively Coupled Plasma Mass Spectroscopy) analyses. Furthermore a scanning mobility particle sizer (SMPS) will be implemented to measure particle size distributions in the range between 5 nm and 200 nm or alternatively from 2.5 nm to 150 nm. These measurements will be completed by condensation particle (CP) measurements, capturing the total particle number concentration between 4 nm and 3.5 µm. The latter instruments have been successfully operated for several years at Neumayer Station.

Participants:

Name	First Name	Institute	Profession	Nationality
Weller	Rolf	AWI	Chemist	Germany

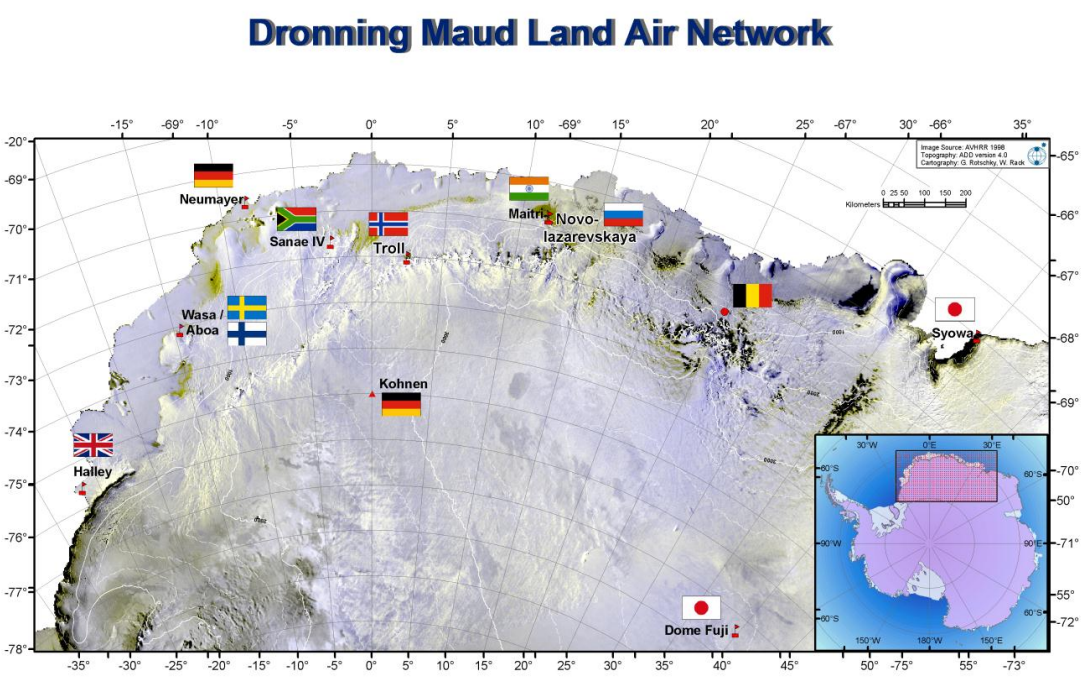
3. AWI FLIGHT MISSIONS AND DROMLAN

3.1 Dronning Maud Land Air Network (DROMLAN)

The aim of DROMLAN is to provide an intercontinental air-link from Cape Town to destinations within Dronning Maud Land (DML) to any member country of COMNAP and SCAR in science related activities, including logistics. This regularly operated air-link improves the accessibility and extends the time period for summer season activities. DROMLAN has been established as an international project by Belgium, Finland, Germany, India, Japan, Norway, Russia, South Africa, Sweden, The Netherlands, and UK.

Each summer season runways are prepared at NOVO Airbase close to the Russian station NOVOLAZAREVSKAYA and at the Norwegian station TROLL for landing of heavy aircraft. The runway at NOVO Airbase consists of compacted snow and is elevated about 500 m a.s.l.

The runway at TROLL STATION consists of blue ice at an elevation of about 1300 m a.s.l.



Both runways are operational for greater aircraft during the whole summer period. NOVO Airbase is operated by Antarctic Logistics Centre International (ALCI, Cape Town) in charge of the Russian Antarctic expedition (RAE). Figure 2-1: Overview map of Dronning Maud Land Air Network.

The Norwegian Antarctic Research Expedition (NARE) maintains the runway at TROLL. The weather forecast for intercontinental and internal flight operations is organized at NEUMAYER STATION III (AWI, DWD). This service covers the region between HALLEY and SYOWA for all intercontinental and internal flights in the scope of DROMLAN.

Since the establishment of DROMLAN, the Antarctic Logistics Centre International (ALCI) as the logistic operator of the Russian Antarctic Expedition (RAE) organises and performs intercontinental flights with cargo aircraft Iljushin (IL-76TD) between Cape Town and NOVO Airbase every summer season. Internal feeder flights are performed with ski-equipped aircraft Basler (BT-67). The map shows destinations within Dronning Maud Land. DROMLAN members coordinate the feeder flights with ALCI and provide necessary services, fuel and facilities at their stations.

The number of flight missions depends on logistic and scientific requirements of the national programs. Every season DROMLAN generally aims to perform 9-10 intercontinental flights with connecting flights to various destinations.

In season 2014/2015, for DROMLAN altogether 10 intercontinental flights are scheduled with IL-76TD, between 12 Nov. 2014 and 25 Feb 2015.

The IL-76TD flights running via Novo Airbase are arranged by ALCI.

At TROLL runway flight management is arranged by NPI. Pre-flight assistance in Cape Town will be provided by ALCI for all DROMLAN intercontinental flights with destination NOVO RUNWAY

This season scientists, technicians and other personnel from 9 DROMLAN members are going to join the intercontinental flights operated by ALCI.

In total - including support personnel, pilots and others for NOVO Airbase - 229 persons will fly into Antarctica and 212 persons back. About 51 tons of cargo have to be carried in and about 4 tons out.

The Norwegian Antarctic National Program carries out 5 intercontinental flights between Cape Town and TROLL, four by Boeing 737 and one by Hercules C130.

DROMLAN intercontinental flight activities and AWI share.

DROMLAN intercontinental transport			AWI share	
Aircraft – number of flights	Persons in / out	Cargo (ton) in / out	Persons in / out	Cargo (ton) in / out
IL-76TD – 9 flights	229 / 212	51 / 4	68 / 67	10 / 3

The three BT-67 POLAR 6 (C-GHGF), MIA (C-GEAJ) as well as LIDIA (C-GEAI) will carry out the feeder flights in Dronning Maud Land. ALCI coordinates and performs feeder flights according to the requirements for DROMLAN as well as for RAE activities at the Russian stations PROGRESS and VOSTOK.

3.2 DROMLAN operations for AWI

Altogether 68 scientists and technicians with about 10 tons of cargo will be carried from Cape Town to NEUMAYER STATION III, and 67 persons with about 3,0 tons of cargo back to Cape Town.

The following aircraft will perform logistic tasks of AWI personnel and cargo:

Iljushin (IL-76-TD) operated by ALCI for DROMLAN

Basler (BT-67) operated by ALCI (MIA) for feeder flights in the scope of DROMLAN and 1 (POLAR 6, AWI) for scientific and logistic tasks

The detailed flight schedules are shown in chapter 5.

3.3 Logistic flight missions of POLAR 6

Logistic flights (approximately 20 flight hours):

Logistic flights are planned to support the maintenance of outlying observatories at Neumayer III Station, to support the Coldest Firn project (CoFi), and within the DROMLAN project and transportation of snow samples from KOHNEN Station

No schedule exists yet for the feeder flights, as planning for the flights between Cape Town and Novo airfield or Troll Station has not been completed.

3.4 Scientific surveys with POLAR 6

Airborne Geophysics with POLAR 6 in Antarctica: projects CryoVEx ANT, RecFil, and WEGAS (Steinhage, Helm, Eagles, NN (AWI); Wayne Hewison (CMG); NN (Fielax))

In 2014/15 AWI's research aircraft POLAR 6, a Basler BT-67 on skis, will carry out survey flights for nine different scientific projects and logistic flights for DROMLAN, the maintenance of the remote observatories of the Neumayer Station, and moving ice cores of the CoFi project from Kohnen to Neumayer. In total, approximately 315 flight hours are planned over a period of 96 days from mid of November 2014 until mid of February 2015, including the ferry flights to and from Antarctica.

In total two scientists, five engineers, and three crew will participate in the three different projects, with support from station and traverse teams. The scientific equipment and personnel for the planned missions will be flown in from Punta Arenas, Chile, by BAS to Rothera, and from Cape Town, South Africa, by DROMLAN. A preliminary schedule of the season is given in table aero.tab1.

Table aero.tab1: Preliminary schedule of POLAR 6.

Begin	End	Project
13/Nov	25/Nov	Ferry to Rothera
26/Nov	10/Dec	CryoVEx ANT, Rothera, ISTAR camp, Novo
11/Dec	13/Dec	Reconfiguration, Novo airfield
14/Dec	19/Jan	WEGAS, Princess Elisabeth
20/Jan		Reconfiguration, Novo airfield
21/Jan	28/Jan	RecFil, Halley
29/Jan	30/Jan	De-configuration, Novo airfield
31/Jan	05/Feb	Logistics
06/Feb	16/Feb	Ferry to Calgary

The instrumentation of POLAR 6 varies for the three missions:

CryoVEx ANT:
ASIRAS, accumulation radar, snow radar, laser scanner, nadir video and photo camera, IR thermometer, 50 Hz and 1 Hz geodetic GPS receiver, basic meteorology (temperature, humidity, wind, and pressure), AIMMS20 probe.

RecFil:
Ice thickness radar, accumulation radar, snow radar, laser scanner, nadir video and photo camera, 50 Hz and 1 Hz geodetic GPS receiver, basic meteorology (temperature, humidity, wind, pressure), AIMMS20 probe

WEGAS:
Ice thickness radar, FMCW radar, gravity meter, magnetics, laser scanner, nadir video, 50 Hz and 1 Hz geodetic GPS receiver, basic meteorology (temperature, humidity, wind, and pressure).
AIMMS20 probe

On the ground, magnetic base stations will be set up during the surveys near the skiway from which POLAR 6 will be operated.

CryoVEx ANT (40 flight hours) (PI Helm et al.)
The aim of CryoVEx ANT is to perform altimeter measurements at a designated validation site in the vicinity of the Schirmacher Oasis, near Kohnen and Neumayer as well as in the Pine Island Glacier drainage basin. Parallel to the airborne survey, ground-based surveys will be carried out by the Institute for Planetary Geodesy of the Technical University Dresden in the blue ice area near the Schirmacher Oasis and by British scientists of the NERC project ISTAR in the Pine Island Glacier drainage basin. These activities are part of the CryoSat Cal/Val programme and their focus is on the surface roughness and morphology of blue ice areas, high and low accumulation regions in order to derive information that will help to evaluate CryoSat-2 data. The flight pattern comprises single flight tracks along survey profiles of the TU Dresden team as well as small grids above planned CryoSat-2 crossover points. The areas of interest are shown as dark grey shaded circles in figure 1. This is a joint activity between AWI, ESA, TU-Dresden, and NERC UK.

RecFil (45 flight hours) (PI Humbert/Steinhage):
This project aims to map the internal structure of the Filchner Ice Shelf (FIS) and the ice front west of Berkner Island as a pre-site survey for a major glaciological survey on the ice shelf that will include hot water drilling and phase sensitive radio-echo soundings (pRES).

WEGAS East (100 flight hours) (PI Jokat/Eagles):
The intension of this mission is to map magnetic and gravity anomalies of the western Sør Rondane in support of geological mapping activities by BGR in this region. The survey will link the geological studies and future planned overview mapping activities. It is planned to operate POLAR 6 for this mission from the Belgium Princess Elisabeth station. The aim is to extend the area investigated by earlier VISA and WEGAS survey flights further to the south and east. The line spacing will be 10 km and the flight level 11500 ft. The WEGAS data set will serve as a reference for satellite based

magnetic and gravity field measurements, e.g. CHAMP, GRACE.

Logistic flights and DROMLAN (approximately 20 flight hours):
Logistic flights are planned to support the maintenance of outlying observatories at Neumayer III Station, to support the Coldest Firn project (CoFi), and within the DROMLAN project. No schedule exists yet for the feeder flights, as planning for the flights between Cape Town and Novo airfield or Troll Station has not been completed.

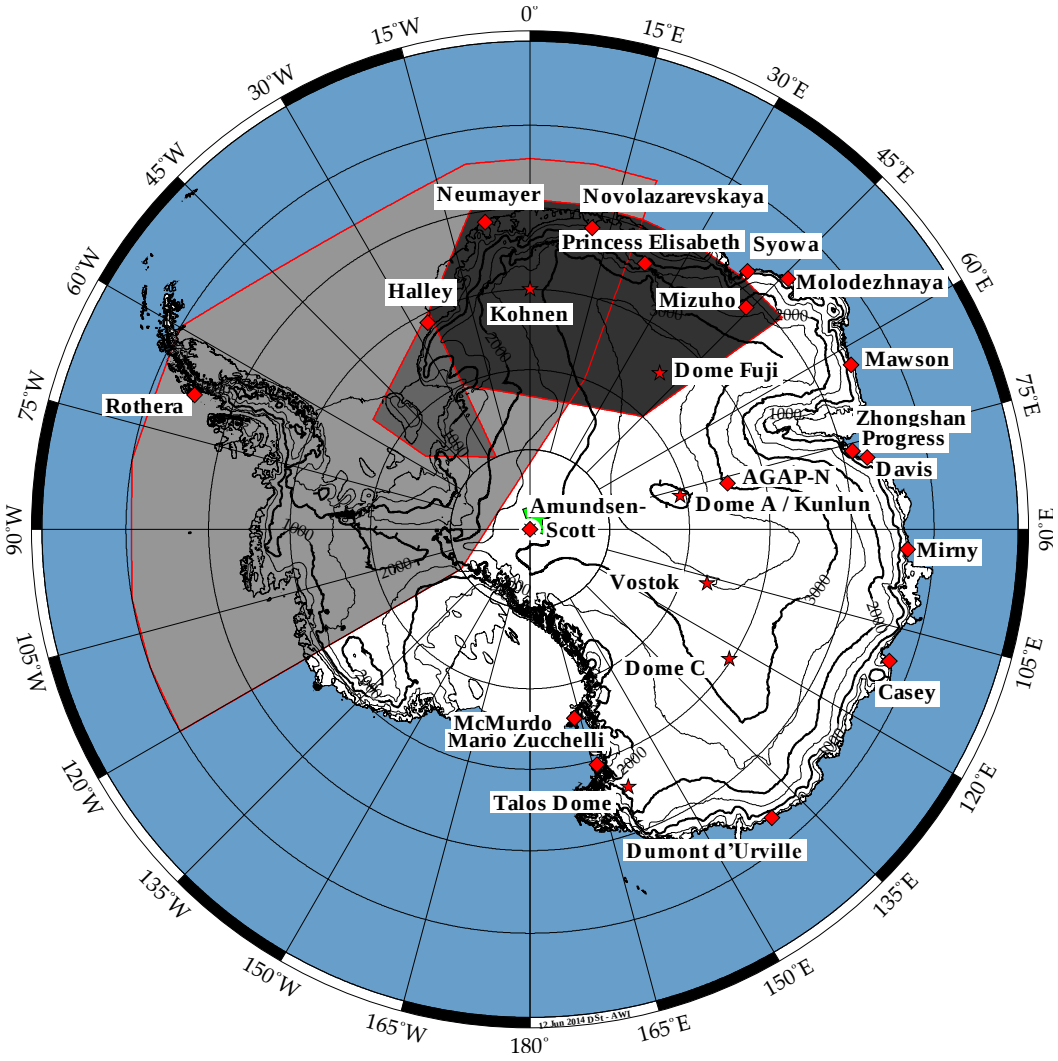


Fig. 1: Map showing the areas of investigation as grey regions, from West to East: CryoVEx ANT (light grey), RecFil (medium grey), and WEGAS (dark grey). Transit flights to the areas of investigation are not shown.

Acronyms:

ASIRAS	Airborne Synthetic Aperture Radar / Interferometric Radar Altimeter System
CryoVEx ANT	CrysoSat Validation Experiment in Antarctica
DROMLAN	Dronning Maud Land Air Network
GPS	global positioning system
GRACE	Gravity Recovery and Climate Experiment
ISTAR	NERC Ice Sheet Stability Programme
KBA	Kenn Borek Air Ltd
RecFil	Reconnaissance Filchner Ice Shelf
VISA	Verdichtung und Interpretation von Satellitendaten zur Bestimmung von Magnetfeld, Schwerefeld, Eismassenhaushalt und Krustenstruktur in der Antarktis unter Nutzung flugzeuggestützter und bodengebundener Messungen
WEGAS	West-East Gondwana Amalgamation and its Separation

4. KING GEORGE ISLAND

4.1 Summary

The transport of personnel and cargo to King Georg Island (KGI) needs close coordination and assistance by various national programs and commercial operators. That includes aircraft and ship transportation. Transport is organised by Dirección National del Antártico (DNA) and performed by Argentinean aircraft and vessels.
Furthermore, main cargo from AWI will be transported by the support of MV Polar Pioneer, from Bremerhaven directly to Potter Cove.

4.2 Dallmann Laboratory

The DALLMANN LABORATORY at Base CARLINI (Argentina) will be opened at the beginning of November 2015. It is operated in cooperation with the Instituto Antártico Argentino (IAA). During the season 2015/14 German and international scientists (7 scientific groups) will work at the Potter Cove and the station area. The planned scientific activities of AWI are focussed on coastal biological projects, furthermore glaciological and sedimentological projects.
In order to perform all planned scientific works 4.6 tons of cargo has to be shipped by sea.
Begin of November MV Polar Pioneer is scheduled to call at King George Island deliver cargo and to drop the first scientists. Station will be closed end of March 2015.

4.3 Planned scientific projects

The studies performed are part of the German-Argentinean cooperation at the Dallmann Laboratory/Jubany Station. The focus of the summer campaign 2014/15 is the synoptic investigation of climate driven physico-hydrographical, sedimentological, geochemical and biological change in the Potter Cove system.

4.3.1 Rapid climate warming effects on the relation between benthic biodiversity and biogeochemical functioning in polar marine ecosystems

4.3.3 Population genetics of storm petrels *Oceanites oceanicus* and *Fregetta tropica* and response to climate change

4.3.4 Potter glacier mass balance

4.3.5 The ecological role of scavenging amphipods

4.3.6 Rapid climate warming effects on the relation between benthic biodiversity and biogeochemical functioning in polar marine ecosystems

5. OTHER ACTIVITIES

5.1 AWI coordinated activities at other stations and locations

5.1.1 Long term monitoring of Antarctic seabirds and seals on Fildes

Peninsula, King George Island

Hans-Ulrich Peter et al. (Jena University)

Project description

Aim of this project is the continuation of the long term monitoring of fauna and flora of the Fildes Peninsula and Ardley Island with focus on birds and seals. Within this project the monitoring of breeding pair number and breeding success of penguins (Pygoscelis spec.) and Southern Giant Petrels (Macronectes giganteus) plays an important role. These species are sensitive indicators for climate change and human impact (see Peter et al. 2008).

A second part of the project is the continuation of the long-term study on the population ecology of both skua species and hybrid

5.1.2 CryoSat-2 Cal/Val with kinematic GNSS

Ludwig Schröder, Undine Strößenreuther,
not participating: Mirko Scheinert (project PI), Christoph Knöfel
TU Dresden, Institut für Planetare Geodäsie, D-01062 Dresden, Germany

One main objective of the European ice radar altimeter mission CryoSat-2, which has been launched in 2010, is the determination of the surface geometry of the continental ice sheets with a few centimeter accuracy which is an important input for studies of the mass balance of polar ice sheets (Drinkwater et al. 2004). In this context detailed information on the error budget of the mission are essential for the interpretation of ice mass changes obtained from CryoSat-2 observations. Therefore, investigations of the error budget form an essential part for a successful mission.

The activities of the season 2014/2015 are concentrated on the blue ice area south of the Schirmacher Oasis, central Dronning Maud Land, East Antarctica (Fig. 1). The Institut für Planetare Geodäsie of TU Dresden has been working in this area for a long time. From earlier observations up to 2009 a negative mass balance of the area with up to -20cm/year was inferred (Korth et al. 2000). Observations carried out during the season 2010/2011 resulted in an unexpected positive surface height changes within the area of investigation, which can probably dedicated to a precipitation anomaly in spring 2009. In the upcoming season the observations in the blue ice area have to be continued and extended with the following main purposes:
Determination of an independent ice mass balance of the area over a time span of more than two decades.
Determination of spatial and temporal covariances of the ice mass balance caused by natural fluctuations.
Subsequently, the determined observations shall be used for comparisons with the results based on CryoSat-2 observations. These comparisons will allow to yield reliable accuracy estimates for the long-term elevation changes determined with CryoSat-2.

The ice elevations are determined by kinematic differential GNSS. The observed data are processed with respect to data obtained from a static reference antenna. On the one hand repeated observations of an already existing track has to be performed, on the other hand dense grids have to be observed. Altogether it is planned to survey 3000 km of kinematic profiles with 2 skidoos. The spatial extension of the grids is planned to be 2 km by 10 km. The main activities will be based on a field camp in the blue ice area about 50 km south of the Novo Airbase. The accuracy of the determined kinematic

GNSS heights is expected to be in the level of a few centimeter. Additionally, reference stations on existing markers on bedrock shall be established. With respect to earlier epochs these observations can be also used to determine long-term horizontal and vertical crustal movements with a few millimeter accuracies, which may be caused by present tectonics or glacial isostasy.

The ground-based measurements are closely linked to the AWI Cal/Val airborne activities using the POLAR 5 aircraft. This aircraft is equipped with the ASIRAS radar altimeter as well as with a laser scanner and will be used for airborne surveys of the area. The respective results will also be compared and combined with the GNSS-inferred heights.

References

Drinkwater, M.R., Francis R., Ratier G. and Wingham D. (2004), The European Space Agency's Earth Explorer Mission CryoSat: Measuring Variability in the Cryosphere. Annals of Glaciology, vol.39, 313-320.

Korth W, Perlt J, and Dietrich R. (2000). Ergebnisse geodätisch glaziologischer Feldarbeiten während der Expedition 1998 in die Region der Schirmacher Oase. In Dietrich, R (Ed.), Deutsche Beiträge zu GPS-Kampagnen des Scientific Committee on Antarctic Research (SCAR) 1995-1998, DGK Series B, Vol. 310, 219-227, Munich.

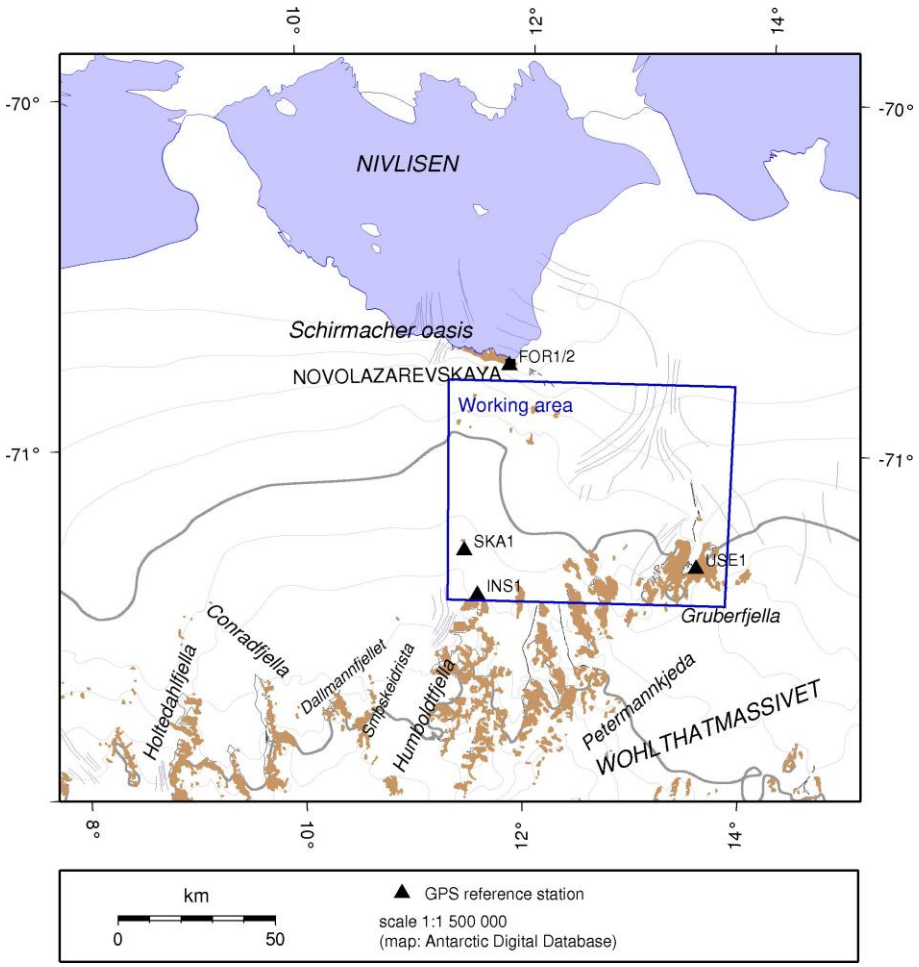


Figure 1: Location of the working area south of Schirmacher Oasis.

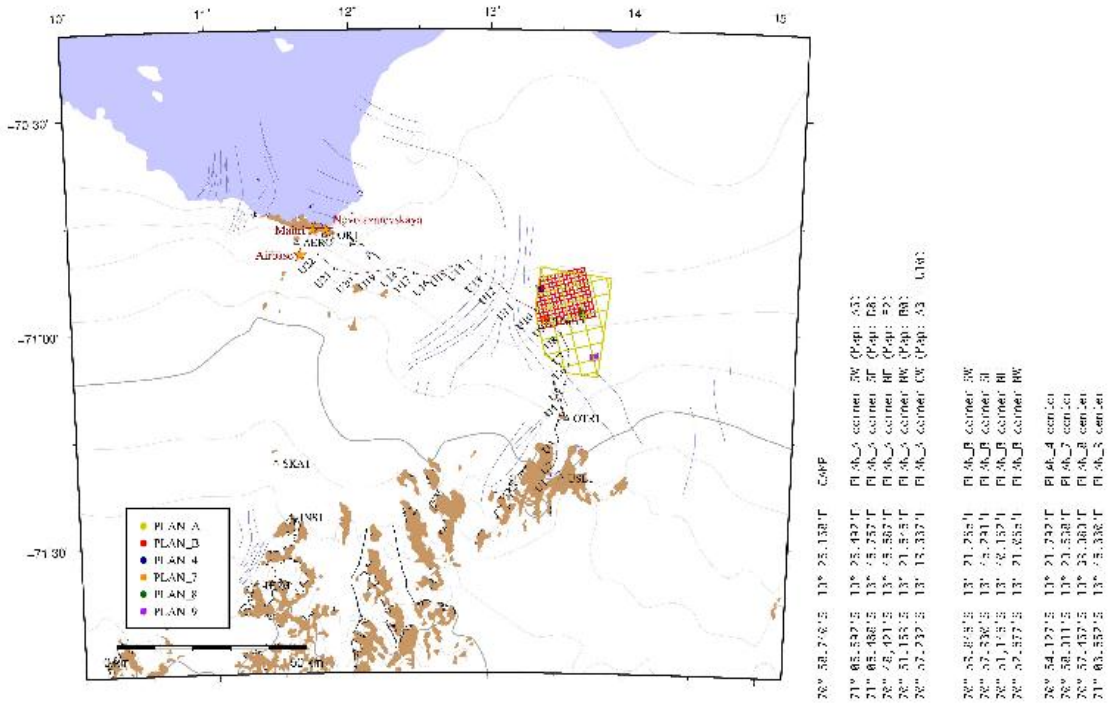


Figure 2: working area Schirmacher Oasis

6. LOGISTICS, SCHEDULES, PARTICIPANTS

6.1 DROMLAN flight schedules October 2014

Dronning Maud Land (DML) - Transport - ANT-Land 2014/15

14. Nov 14

Transport	Date		Flight No	Route	Pax in	Cargo in (kg)	Pax out	Cargo out (kg)
(Transport of personnel and cargo								
DROMLAN flight - IL-76TD	04.11.2014	05.11.2014	Technical	CT - Novo - CT	0	0	0	0
DROMLAN flight - IL-76TD	11.11.2014	12.11.2014	D2	CT - Novo - CT	6	1005	0	13
DROMLAN flight - IL-76TD	18.11.2014	19.11.2014	D3	CT - Novo - CT	4	978	0	0
DROMLAN flight - IL-76TD	25.11.2014	27.11.2014	D4	CT - Novo - CT	4	1004	0	0
DROMLAN flight - IL-76TD	03.12.2014	05.12.2014	D5	CT - Novo - CT	4	3422	3	0
DROMLAN flight - IL-76TD	10.12.2014	12.12.2014	D6	CT - Novo - CT	14	2491	6	0
DROMLAN flight - IL-76TD	18.12.2014	20.12.2014	D7	CT - Novo - CT	15	750	2	352
DROMLAN flight - IL-76TD	09.01.2015	12.01.2015	D8	CT - Novo - CT	24	1200	10	0
DROMLAN flight - IL-76TD	04.02.2015	05.02.2015	D9	CT - Novo - CT	0	700	28	560
DROMLAN flight - IL-76TD	24.02.2015	25.02.2015	D10	CT - Novo - CT	0	0	21	1060
				DROMLAN gesamt	71	11550	70	1985
Ship transportation								
RV Polarstern			PS	CT - Atka Bay-PA	0		3	
SA Agulhas			SAA	CT - Atka Bay/Penguin Bukta - CT	0		0	
Transport total					71	11550	73	1985

6.2 Travel schedule for participants, DML

surname	given name	profession	institution	responsibility	nationality	destination/ departure		in	out
Neumayer Station III:									
Coordination season 2014/2015									
Kohlberg	Eberhard	Physician	AWI	Expedition leader	Germany	Neumayer		D5	D10
Flight weather forecast (DROMLAN))									
Rentsch	Harald	meteorologist	DWD	DROMLAN weather forecast	Germany	Neumayer		D2	D8
Hausen	Robert	meteorologist	DWD	DROMLAN weather forecast	Germany	Neumayer		D7	D10
Coordination technical operation)									
Matz	Thomas	Engineer	AWI-LOG	Technical Super Intendant	Germany	Neumayer		D8	D9
Heuck	Hinnerk	Engineer	RFL	Technical Super Intendant	Germany	Neumayer		D2	D10

Denecke	Mirko	Engineer	RFL	Technical Super Intendant	Germany	Neumayer		D4	D6
(Safety-related inspection)									
Pohl	NN	Engineer	GL	technician	Germany	Neumayer		D4	D5
Hacker	Richard	Engineer	IgH	technician	Germany	Neumayer		D8	D9
Hettel	Björn	Engineer	Schönau	technician	Germany	Neumayer		D4	D5
Janson	Markus	Engineer	AWI	technician	Germany	Neumayer		D8	D10
NN	NN	Engineer	Fogtec	technician	Germany	Neumayer		D8	D9
Jahnke	Uwe	Engineer	KSF	technician	Germany	Neumayer		D4	D5
Maintenance team RFL logistics/Service									
Kooistra	Frerk	Technician	RFL	Technician	Germany	Neumayer		D2	D9
Eder	Pit	Technician	RFL	Technician	Germany	Neumayer		D2	D9
Trimborn	Klaus	Technician	AWI	Technician	Germany	Neumayer		D2	D9
Widdecke	Iris	Service	RFL	Housekeeping	Germany	Neumayer		D2	D10
ARGE (Warranty works)									
Tegge	Holger	Technician	Kaefer	warranty work	Germany	Neumayer		D8	D10
Lux	Reinhard	Technician	Kaefer	warranty work	Germany	Neumayer		D8	D10

Moeller	Thomas	Technician	Kaefer	warranty work	Germany	Neumayer		D8	D10
Dasko	Miroslav	Technician	Kaefer	warranty work	Germany	Neumayer		D8	D10
Scientific-technical operations									
Gerchow	Peter	Engineer	AWI	IT	Germany	Neumayer		D8	D9
Matthes	Joerg	Engineer	AWI	IT	Germany	Neumayer		D8	D9
Riess	Felix	Engineer	RFL	IT	Germany	Neumayer		D5	D10
Scientific super intendant observatories									
Weller	Rolf	Scientist	AWI	Airchemistry observatory	Germany	Neumayer		D7	D10
König-Langlo	Gert	Scientist	AWI	Meteorological observatory	Germany	Neumayer		D8	D10
Asseng	Jölund	Scientist	AWI	Geophysical observatory	Germany	Neumayer		D6	D10
Grasse	Torsten	Engineer	BGR	I27DE - Infrasound Array	Germany	Neumayer		D8	D10
Hoffmann	Mathias	Engineer	BGR	I27DE - Infrasound Array	Germany	Neumayer		D8	D10
Scientific projects at station and beyond)									

ANS, CHOICE (Medizin)									
kein Personal									
Neutron Monitor, Muon Telescope									
kein Personal									
SPOT									
kein Personal									
Polarstern ANT XXX/2									
Fischer	Philipp	Scientist	AWI	Taucher	Germany	Neumayer		D7	PS
Walcher	Christoph	Scientist	AWI	Taucher	Germany	Neumayer		D7	PS
Warmuth	Marco	Scientist	AWI	Taucher	Germany	Neumayer		D7	PS
Superior evaluation and certification									
Boche	Martin	Engineer	RFL	super intendent	Germany	Neumayer		D5	D6
Fischer	Jürgen		RFL	super intendent	Germany	Neumayer		D5	D6
Neumayer-Station III: (Winter staff exchange and briefing)									
(Winter staff 2014)									

Bauer	Holger	Physician	AWI-LOG	Station leader, physician	Germany	Neumayer		2015	D9
Lohse	Johannes	Scientist	AWI-LOG	Geophysics	Germany	Neumayer		2015	D9
Armbruster	Daniel	Scientist	AWI-LOG	Geophysics	Germany	Neumayer		2015	D9
Schmid	Kerstin	Scientist	AWI-LOG	Air chemistry	Germany	Neumayer		2015	D9
Stautzebach	Elena	Scientist	AWI-LOG	Meteorology	Germany	Neumayer		2015	D9
Brungs	Lothar	Engineer	RFL	Electrician	Germany	Neumayer		2015	D9
Zimmermann	Dirk	Engineer	RFL	IT, radio operator	Germany	Neumayer		2015	D9
Geisel	Ralf	Cook	RFL	Cook	Germany	Neumayer		2015	D9
Bischoff	Markus	Engineer	RFL	Station engineer	Germany	Neumayer		2015	D9
Überwinterung 2015 (Winter staff 2015)									
Gößmann-Lange	Petra	Physician	AWI-LOG	Station leader, physician	Germany	Neumayer		D7	2016
Sticher	Annemarie	Scientist	AWI-LOG	Geophysics	Germany	Neumayer		D7	2016
Leonhardt	Andreas	Scientist	AWI-LOG	Geophysics	Germany	Neumayer		D7	2016
Nekat	Bettina	Scientist	AWI-LOG	Air chemistry	Germany	Neumayer		D7	2016
Ludewig	Elke	Scientist	AWI-LOG	Meteorology	Germany	Neumayer		D7	2016

Eser	Markus	Engineer	RFL	Electrician	Germany	Neumayer		D7	2016
Biethan	Jens-Peter	Engineer	RFL	IT, radio operator	Germany	Neumayer		D7	2016
Wienekamp	Frank	Cook	RFL	Cook	Germany	Neumayer		D7	2016
Oertel	Peter	Engineer	RFL	Station engineer	Germany	Neumayer		D7	2016
Neumayer-Station III gesamt (Neumayer Station total):								42	39
Kohnen-Station									
Technical operations and supply									
Schubert	Holger	Technician	RFL	Logistic team Kohnen	Germany	Neumayer		D6	D10
Köhler	Jens	Technician	RFL	Logistic team Kohnen	Germany	Neumayer		D6	D10
Peter	Dirk	Cook	RFL	Logistic team Kohnen	Germany	Neumayer		D6	D10
Bischoff	Markus	Physician	RFL	Logistic team Kohnen	Germany	Neumayer		D6	D10
Schmid	Alexander	Technician	Kässbohrer	Logistic team Kohnen	Germany	Neumayer		D6	D10

Langenkämper	Torsten	Technician	AWI	Logistic team Kohnen	Germany	Neumayer		D6	D10
Strelow	Bernhard	Electrician	AWI	Logistic team Kohnen	Germany	Neumayer		D6	D9
Scientific projects									
CoFi									
Kipfstuhl	Sepp	scientist	AWI	science Kohnen	Germany	Kohnen		D8	D9
Münch	Thomas	scientist	AWI	science Kohnen	Germany	Kohnen		D8	D9
Kohnen Station total								9	9
(Scientific flight missions Polar 6)									
POLAR 6									
Eagles	Graeme	Scientist	AWI	Polar 6	Germany	Novo Runway		D6	D9
Hewison	Wayne	engineer Grav.	Canadian Grav.	Polar 6	CDN	Novo Runway		D6	D8
Nehring	Franziska	engineer 1	Fielax	Polar 6	Germany	PE		BAS	D7
Kässbohrer	Johannes	engineer 2	Fielax	Polar 6	Germany	PE		D7	D9

Behnisch	Madlen	engineer 3	Fielax	Polar 6	Germany	Novo Runway		D6	D8
Binder	Julia	engineer 4	AWI	Polar 6	Germany	Novo Runway		D8	D9
Freitag	Ralf	scientist	BGR	Polar 6	Germany	Novo Runway		D6	D9
Binder	Tobias	engineer	AWI	Polar 6	Germany	Novo Runway		D6	D9
Helm	Veit	Scientist	AWI	Polar 6	Germany	Neumayer		BAS	D7
Polar 6 Besatzung (Polar 6 crew)									
Emberley	Dean		KBAL	Polar6	Canada	Novo Runway		P6	D6
Elke (Blois)	Kevin (Brad)		KBAL	Polar6	Canada	Novo Runway	D6	P6	
Miller	Finlay		KBAL	Polar6	Canada	Novo Runway		P6	P6
Hudon	Roger		KBAL	Polar6	Canada	Novo Runway		P6	P6
Flight missions total								8	10
Scientific projects in DML)									

Cryovex Schirrmacher Oase Landexpedition									
Schröder	Ludwig	scientist	TU Dresden	Mirko Scheinert TU Dresden	Germany	Novo Runway		D3	D9
Strößenreuther	Undine	scientist	TU Dresden	Mirko Scheinert TU Dresden	Germany	Novo Runway		D3	D9
Projects total									
Nationale und internationale Besuche/Medien (National and international visits/Media):									
Visit at Neumayer Station III and Kohnen Station									
von Rauchhaupt	Ulf	journalist	newspaper		Germany	Neumayer		D8	D9
Quenet-Thielen	NN	state secretary	BmBF		Germany	Neumayer		D8	D8
Quante-Brandt	Eva	ministry of education	Senate of Bremen		Germany	Neumayer		D8	D8
Kretschmer	Michael		MdB		Germany	Neumayer		D8	D8
Röspel	NN		MdB		Germany	Neumayer		D8	D8
Nixdorf	Uwe		AWI		Germany	Neumayer		D8	D8
Miler	Heinrich		AWI		Germany	Neumayer		D8	D8

Jung	Thomas		AWI		Germany	Neumayer		D8	D8
Lihavainen	Heikki	scientist	FMI		Finland	Neumayer		D3	D6
Brus	David	scientist	FMI		Finland	Neumayer		D3	D6
DROMLAN interkontinental gesamt (DROMLAN intercontinental total):								69	68

6.3 Participants

Surname	Given name	Profession	Institution	Nationality
Armbruster	Daniel	Scientist	AWI-LOG	Germany
Asseng	Jölund	Scientist	AWI	Germany
Bauer	Holger	Physician	AWI-LOG	Germany
Behnisch	Madlen	engineer	Fielax	Germany
Biethan	Jens-Peter	Engineer	RFL	Germany
Binder	Julia	engineer	AWI	Germany
Binder	Tobias	engineer	AWI	Germany
Bischoff	Markus	Engineer	RFL	Germany
Bischoff	Markus	Physician	RFL	Germany
Boche	Martin	super intendant	RFL	Germany
Brungs	Lothar	Engineer	RFL	Germany
Brus	David	scientist	FMI	Finland
Dasko	Miroslav	Technician	Kaefer	Czech republic
Denecke	Mirko	Engineer	RFL	Germany
Eagles	Graeme	Scientist	AWI	United Kingdom
Eder	Pit	Technician	RFL	Germany
Blois	Brad	Pilot	KBAL	Canada
Emberley	Dean	Pilot	KBAL	Canada
Eser	Markus	Engineer	RFL	Germany
Fischer	Philipp	Scientist	AWI	Germany
Fischer	Jürgen	super intendant	RFL	Germany
Freitag	Ralf	scientist	BGR	Germany
Geisel	Ralf	Cook	RFL	Germany
Gerchow	Peter	Engineer	AWI	Germany
Gößmann-Lange	Petra	Physician	AWI-LOG	Germany
Grasse	Torsten	Engineer	BGR	Germany
Hacker	Richard	Engineer	IgH	Germany
Hausen	Robert	meteorologist	DWD	Germany
Helm	Veit	Scientist	AWI	Germany
Hettel	Björn	Engineer	Schönau	Germany
Heuck	Hinnerk	Engineer	RFL	Germany
Hewison	Wayne	engineer Grav.	Canadian Grav.	Canada
Hoffmann	Mathias	Engineer	BGR	Germany
Hudon	Roger	Engineer	KBAL	Germany
Jahnke	Uwe	Engineer	KSF	Germany
Janson	Markus	Engineer	AWI	Germany
Jung	Thomas	Inspection	AWI	Germany

Kässbohrer	Johannes	engineer 2	Fielax	Germany
Kipfstuhl	Sepp	scientist	AWI	Germany
Kohlberg	Eberhard	Physician	AWI	Germany
Köhler	Jens	Technician	RFL	Germany
König-Langlo	Gert	Scientist	AWI	Germany
Kooistra	Frerk	Technician	RFL	Germany
Kretschmer	Michael	Inspection	MdB	Germany
Langenkämper	Torsten	Technician	AWI	Germany
Leonhardt	Andreas	Scientist	AWI-LOG	Germany
Lihavainen	Heikki	scientist	FMI	Finland
Lohse	Johannes	Scientist	AWI-LOG	Germany
Ludewig	Elke	Scientist	AWI-LOG	Germany
Lux	Reinhard	Technician	Kaefer	Germany
Matthes	Joerg	Engineer	AWI	Germany
Matz	Thomas	Engineer	AWI-LOG	Germany
Miler	Heinrich	Inspection	AWI	Austria
Miller	Finlay	Pilot	KBAL	Canada
Moeller	Thomas	Technician	Kaefer	Germany
Münch	Thomas	scientist	AWI	Germany
Nehring	Franziska	engineer	Fielax	Germany
Nekat	Bettina	Scientist	AWI-LOG	Germany
Nixdorf	Uwe	Inspection	AWI	Germany
NN	NN	Engineer	Fogtec	Germany
Oertel	Peter	Engineer	RFL	Germany
Peter	Dirk	Cook	RFL	Germany
Pohl	NN	Engineer	GL	Germany
Quante-Brandt	Eva	ministry of education	Senate of Bremen	Germany
Quenet-Thielen	NN	state secretary	BmBF	Germany
Rentsch	Harald	meteorologist	DWD	Germany
Riess	Felix	Engineer	RFL	Germany
Röspel	Rene	Inspection	MdB	Germany
Schmid	Kerstin	Scientist	AWI-LOG	Germany
Schmid	Alexander	Technician	Kässbohrer	Germany
Schröder	Ludwig	scientist	TU Dresden	Germany
Schubert	Holger	Technician	RFL	Germany
Stautzebach	Elena	Scientist	AWI-LOG	Austria
Sticher	Annemarie	Scientist	AWI-LOG	Germany
Strelow	Bernhard	Electrician	AWI	Germany
Strößenreuther	Undine	scientist	TU Dresden	Germany
Tegge	Holger	Technician	Kaefer	Germany
Trimborn	Klaus	Technician	AWI	Germany

von Rauchhaupt	Ulf	journalist	newspaper	Germany
Walcher	Christoph	Scientist	AWI	Germany
Warmuth	Marco	Scientist	AWI	Germany
Weller	Rolf	Scientist	AWI	Germany
Widdecke	Iris	Service	RFL	Germany
Wienekamp	Frank	Cook	RFL	Germany
Zimmermann	Dirk	Engineer	RFL	Germany

7. PARTICIPATING INSTITUTIONS

7.1 Institute/Company Address

ALCI	Antarctic Logistics Centre Intl. (Pty.) Ltd. 97, Keerom Street Cape Town 8001 Republic of South Africa
AWI	Alfred Wegener Institute for Polar and Marine Research Postbox 12 02 61 27515 Bremerhaven Germany
BGR	Federal Institute for Geosciences and Natural Resources Stilleweg 2 30655 Hannover Germany
BMBF	Bundesministerium für Bildung und Forschung Heinemannstraße 2 53175 Bonn Germany
DEA	Department of Environmental Affairs Directorate: Antarctica and Islands P.O. Box 8172, Roggebaai 8012 Cape Town 9012 Republic of South Africa
DNA	Dirección National del Antártico Cerrito 1248 1010 Buenos Aires Argentina
DWD	Deutscher Wetterdienst Bernhard-Nocht Str. 76 20359 Hamburg Germany

FACH	Fuerza Aero de Chile, División Antártica Tarpaca No. 1129, 2°Piso Santiago de Chile Chile
IAA	Instituto Antártico Argentino Cerrito 1248 1010 Buenos Aires Argentina
INACH	Instituto Antarctico Chileno Plaza Munoz Gamero 1055 Punta Arenas Chile
Kässbohrer	Kässbohrer Geländefahrzeug AG Kässbohrerstr. 11 88471 Laupheim Germany
Kenn Borek Air Ltd.	Kenn Borek Air Ltd. 209 McTravish Rd NE Calgary, AB, CA, T2E 7G5 Canada
Laeisz	Reederei F. Laeisz GmbH Brückenstr. 25 27568 Bremerhaven Germany
RAE	Russian Antarctic Expedition 38, Bering St. 199397 St. Petersburg Russia
University of Berlin	Zentrum für Weltraummedizin (ZWMB), Charité Thielallee 71 14195 Berlin Germany
University of Bonn	Universität Bonn Walter-Flex-Str. 3 53113 Bonn Germany

University of Cologne	Institut für Geologie & Mineralogie Zülpicher Str. 49a 50674 Köln Germany
University of Heidelberg	Universität Heidelberg Grabengasse 1 69117 Heidelberg Germany
University of Jena	AG Polar- und Ornithoökologie Institut für Ökologie Dornburger Str. 159 07743 Jena Germany
University of Munich	Institut für Anästhesie und Intensivmedizin Marchioninistr. 15 81377 München Germany

7.2 DROMLAN – Partners

AWI	Alfred Wegener Institute for Polar and Marine Research, Germany
AARI	Arctic and Antarctic Research Institute, Russian Antarctic Expedition, Russia
BAS	British Antarctic Survey, UK
BELARE / PF	Belgian Antarctic Research Expedition, Belgium / Polar Foundation
FMI	Finnish Meteorological Institute
NCAOR	National Centre for Antarctic and Ocean Research, India
NIPR	National Institute of Polar Research, Japan
NPI	Norwegian Polar Institute, Norway
NWO	Netherlands Organisation for Scientific Research, The Netherlands
DEA	Department of Environmental Affairs, Directorate: Antarctica and Islands, South Africa
SPRS	Swedish Polar Research Secretariat, Sweden

7.3 DROMSHIP – Partners

AWI	Alfred Wegener Institute for Polar and Marine Research, Germany
BELARE/PF	Belgian Antarctic Research Expedition, Belgium
FMI	Finnish Meteorological Institute
NPI	Norwegian Polar Institute, Norway
SPRS	Swedish Polar Research Secretariat, Sweden

Address:
Alfred Wegener Institute
Helmholtz Centre for Polar and Marine Research
Am Handelshafen 12
D-27570 Bremerhaven

Phone: +49 471 4831 – 1161
Fax: +49 471 4831 – 1355

Email of coordinators:
uwe.nixdorf@awi.de
eberhard.kohlberg@awi.de
dirk.mengedoht@awi.de
thomas.brey@awi.de
daniel.steinhage@awi.de