



# **RESEARCH IN SVALBARD 2004**

**A yearly information bulletin based on contributions  
from scientists working in Svalbard**

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Title: Research in Svalbard 2004  
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ISBN: 82-12-01972-1

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## RESEARCH IN SVALBARD 2004

### - information about ongoing scientific projects -

This year's "Research in Svalbard" is the 23 in a row. The intention of the bulletin is to provide information about ongoing scientific work in the Svalbard region, and to assist the scientists involved in exchanging information about their projects, in order to obtain additional information or to co-ordinate field activities. In 1998, the Research Council of Norway established Svalbard Science Forum (SSF) in Longyearbyen. The aim is to give information about Svalbard as a science platform and to assist scientists and organisations in Svalbard with practical matters. SSF is the publisher of this year's bulletin. Please be aware that the registration of field projects is on a voluntary basis. This means that some projects may not be registered. We also would like to draw the reader's attention to the fact that the registration deadline is prior to the start of the majority of the field projects, and therefore *planned projects* have been registered. In spite of these limitations, it is our impression that the contents are fairly accurate in terms of distribution between nations, disciplines, and geographic areas. Registration forms for this publication have been registered into our database as they have been received. Svalbard Science Forum holds no responsibility for the information given. The database is also available via our Internet page <http://www.npolar.no/ris/> where updated information will be presented. We are grateful to all who have contributed to making this year's "Research in Svalbard" as complete as possible. Please contact Svalbard Science Forum should you require further information. For entries to the 2005 edition, please look at our web page at the end of this year.

*Longyearbyen, June 2004*

Kjell Tore Hansen  
Research Coordinator SSF

## Some statistics

Based on the information stored in our database we have compiled the following statistics. Since registration is volunteer and since we have no way of knowing if the projects have been carried out, the information here is only an approximate description of the research activity in Svalbard today.

### Total Number of registered Research Projects in Svalbard in 2004

This year we have received descriptions for a total 78 projects from 15 nations, including multinational projects.

**Table 1. The number of registered research projects in Svalbard pr. discipline and nation.**

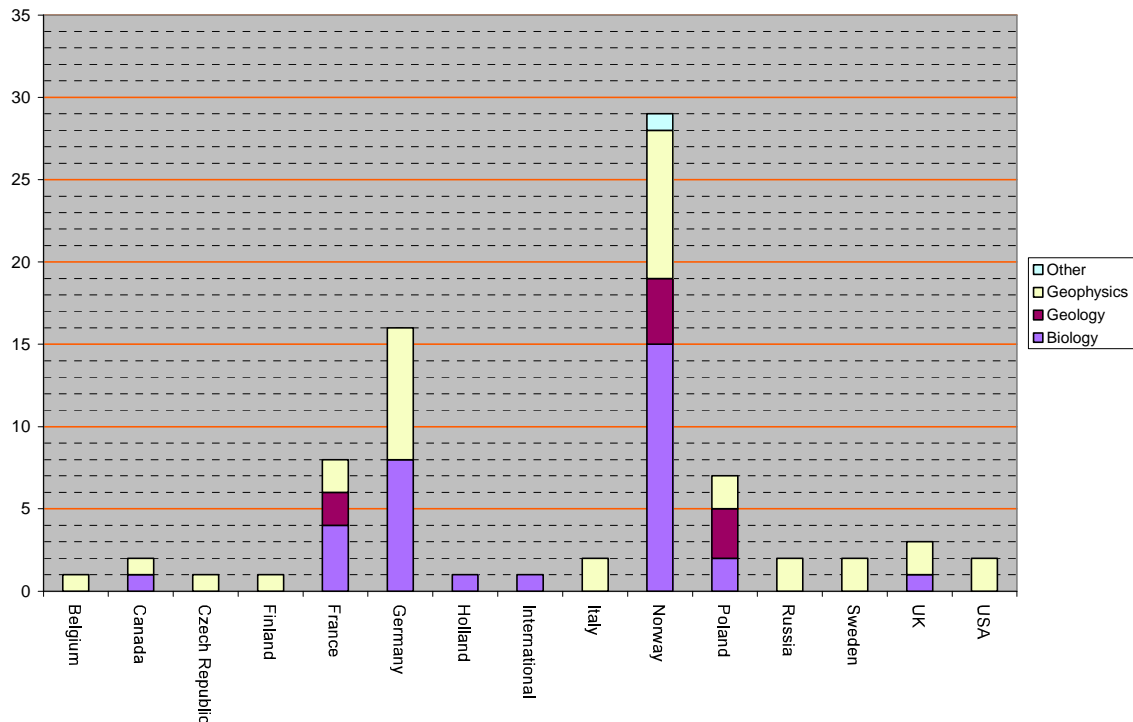
COUNTRY	Biology	Geology	Geophysics	Other	Grand Total
Belgium	0	0	1	0	1
Canada	1	0	1	0	2
Czech Republic	0	0	1	0	1
Finland	0	0	1	0	1
France	4	2	2	0	8
Germany	8	0	8	0	16
Holland	1	0	0	0	1
International	1	0	0	0	1
Italy	0	0	2	0	2
Norway	15	4	9	1	29
Poland	2	3	2	0	7
Russia	0	0	2	0	2
Sweden	0	0	2	0	2
UK	1	0	2	0	3
USA	0	0	2	0	2
<b>Grand Total</b>	<b>33</b>	<b>9</b>	<b>35</b>	<b>1</b>	<b>78</b>

1) Biology includes projects in Ecology, Ecotoxicology, Botany, Ornithology, and Zoology.

2) Geology includes projects in Geography, Geomorphology, and Soil science.

3) Geophysics includes projects in Atmospheric Chemistry and Physics, Geomagnetism, Hydrology, Glaciology, Hydrography, Meteorology, Oceanography, and Radioactivity.

4) Other includes projects in Archaeology, History, Arctic Technology, Topography, and Geodesy.



**Figure 1. The number of registered research projects in Svalbard in 2004 pr. nation.**

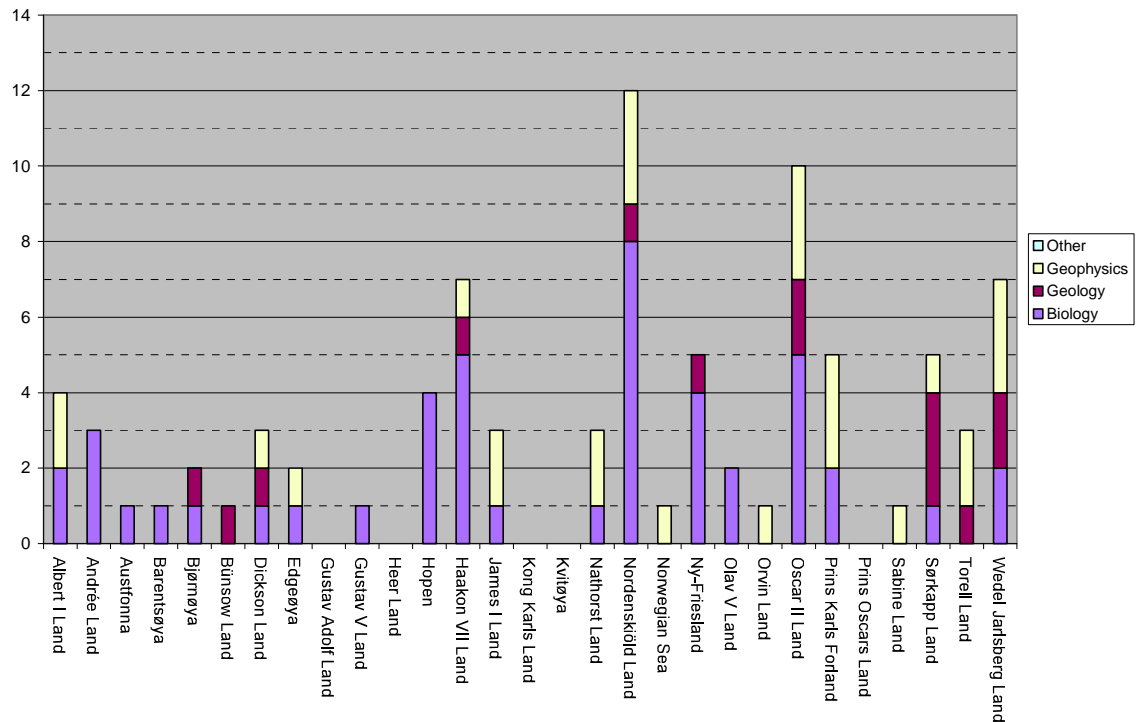
## The number of registered research projects in Svalbard 1992-2004

The total number of projects varies from year to year. Since the registration is voluntary we do unfortunately not receive information about all projects in the region. The following tables, therefore, only show a summary of the projects listed in each year's RiS bulletin.

**Table 2. The number of registered projects in Svalbard for each main discipline.**

Year	Total	Biology	Geology	Geophysics	Others
1992	155	48 (31%)	23 (15%)	73 (47%)	11 (7%)
1993	115	51 (44%)	12 (10%)	48 (42%)	4 (4%)
1994	126	43 (34%)	18 (14%)	59 (47%)	6 (5%)
1995	148	46 (32%)	23 (16%)	71 (47%)	8 (5%)
1996	146	46 (32%)	22 (15%)	72 (49%)	6 (4%)
1997	132	41 (32%)	41 (32%)	46 (35%)	2 (1%)
1998	137	44 (32%)	16 (12%)	75 (55%)	2 (1%)
1999	142	58 (41%)	15 (10%)	68 (48%)	1 (1%)
2000	105	44 (42%)	10 (9%)	50 (48%)	1 (1%)
2001	107	34 (32%)	14 (13%)	59 (55%)	0 (0%)
2002	106	36 (34%)	16 (15%)	52 (49%)	2 (2%)
2003	110	44 (40%)	14 (13%)	49 (45%)	3 (2%)
<b>2004</b>	<b>78</b>	<b>33 (42%)</b>	<b>9 (12%)</b>	<b>35 (45%)</b>	<b>1 (1%)</b>

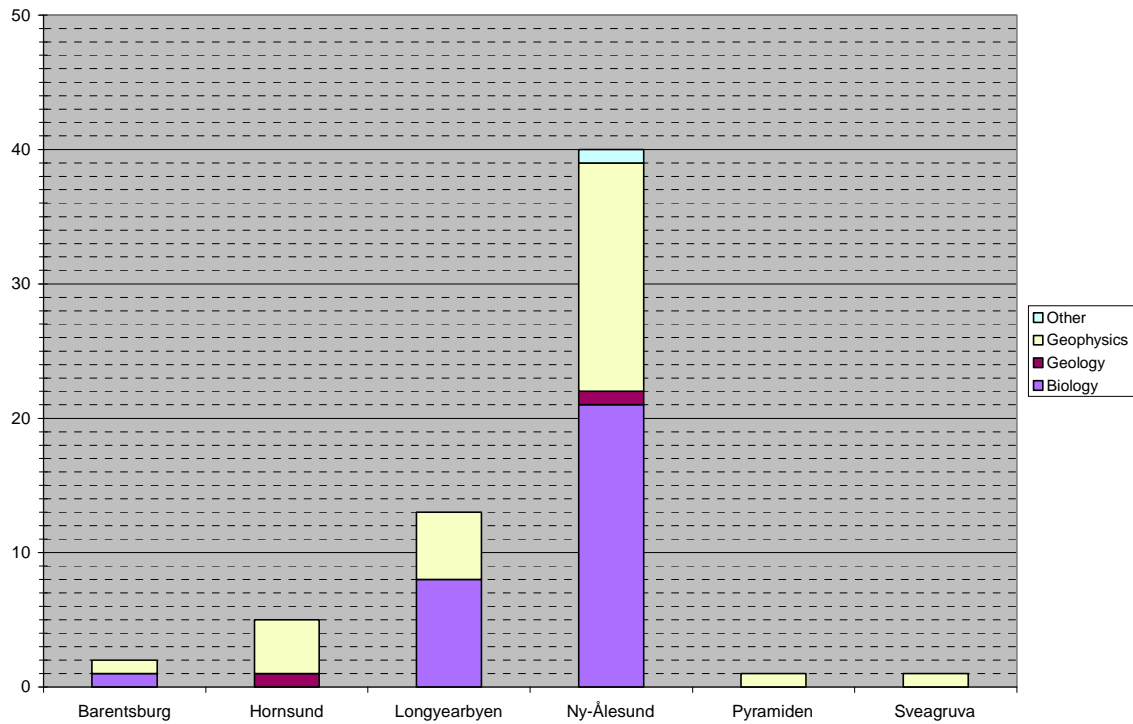




**Figure 2: The distribution of registered projects in Svalbard in 2004 in the geographic zones. The map in Appendix 2 indicates the zone division.**

**Table 3. The number of registered projects in Ny-Ålesund for each main discipline.**

Year	Total	Biology	Geology	Geophysics	Others
1992	59	24 (41%)	4 (15%)	28 (47%)	11 (7%)
1993	38	20 (53%)	0 (0%)	18 (47%)	4 (4%)
1994	64	24 (38%)	1 (2%)	39 (61%)	6 (5%)
1995	58	19 (32%)	8 (13%)	31 (53%)	0 (0%)
1996	62	21 (34%)	5 (8%)	36 (58%)	0 (0%)
1997	60	24 (40%)	7 (12%)	29 (48%)	0 (0%)
1998	48	18 (38%)	1 (2%)	29 (60%)	0 (0%)
1999	58	23 (40%)	2 (5%)	32 (55%)	0 (0%)
2000	57	24 (42%)	3 (5%)	30 (53%)	0 (0%)
2001	39	12 (31%)	2 (5%)	25 (64%)	0 (0%)
2002	46	14 (30%)	3 (7%)	28 (61%)	1 (2%)
2003	56	21 (38%)	3 (5%)	30 (54%)	2 (3%)
<b>2004</b>	<b>40</b>	<b>21 (53%)</b>	<b>1 (2%)</b>	<b>17 (43%)</b>	<b>1 (2%)</b>



**Figure 3: The number of registered projects in each Svalbard settlement in 2004 for each main discipline.**

**Listing of project reports starts on next page**

*Proj. Title*     **"Digestibility of ice algae and phytoplankton: The potential impacts of changing food supply to the arctic benthos"**

*Discipline*     **Marine Ecology**

*Nationality*   **Norway, U.S.**

*Institution*   **Akvaplan-niva, Polar Environmental Center, Tromsø**

*Proj. Period*   2002 to 2005

*Coop. Inst.*     Bates College, East Carolina University, University of Georgia, and State University of New York Stonybrook USA.

*Programme*     Norwegian Research Council, US-Norway Cooperation programme

*Description*   In Arctic marine ecosystems, primary production is partitioned between ice algae and phytoplankton. Reduced thickness and extent of sea ice associated with climatic shifts will likely lead to changes in the relative proportions of these two components to total primary productivity. There are potentially significant implications of such changes to benthic communities, which are totally dependent upon sedimenting organic matter from the overlying water column for their energetic requirements. To date it has been assumed that because both ice algae and phytoplankton are dominated by taxonomically similar species (e.g. diatoms and flagellates), both sources of food are identical in quality. Several indirect observations challenge this assumption. However, the comparative roles of ice algal- and phytoplankton-derived organic matter to the energetics of benthic species and communities has never been quantitatively addressed. We propose to investigate whether there are differences in the digestibility of ice algae and phytoplankton-derived organic matter to Arctic benthos. We have designed a series of ship-board and land-based experiments to identify patterns of differential selection, absorption, and assimilation of ice algae and phytoplankton on whole benthic communities and selected dominant taxa, and we will carry out simultaneous, identical experiments in Svalbard and Alaska in order to assess whether results are region-specific or pan-Arctic in nature. This proposed project compliments and will derive synergistic benefits from two funded projects: ARKTØK, funded by the Norwegian Research Council in Norway, and a recently-funded NSF project in Kotzebue, Alaska. The principal objective of this project is to experimentally determine whether there are differences in the digestibility and nutritional quality of ice algae and phytoplankton-derived organic matter to Arctic benthic communities.

*Results*        Previous fieldwork/cruises:  
 12-26 May, RV Jan Mayen - Norskebanken, Fram Strait, Kongsfjorden  
 10 Aug-6 Sept., RV Lance - Kongsfjorden, Norskebanken, Sofia Deep, Hinlopen Strait, Erik Eriskens Strait, Kvitøya, Polar Basin

Results under analysis

*Geographical Area(s)*   Hopen  
 Longyearbyen  
 Ny-Ålesund  
 Barents Sea

*Participants*

## Biology

121042

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Project Leader		12480
	<b>Dr. Michael Carroll</b> Akvaplan-niva, Tromsø, Norway	
Participating Scientist		12578
	<b>Kelton McMahon</b> State University of New York, Stonybrook, USA	
Participating Scientist		12579
	<b>Glenn Lopez</b> State of New York University, Stonybrook, USA	
Field Leader		12577
	<b>Dr. William G. Ambrose</b> Bates College, Maine, USA	

*Proj. Title*     **"On Thin Ice? Climatic Influence on Energy Flow and Trophic Structure in Arctic Marine Ecosystems"**

*Discipline*     **Marine Ecology**

*Nationality*    **Norway, U.S., Canada, Scotland, Australia**

*Institution*   **Akvaplan-niva, Polar Environmental Center, Tromsø**

*Proj. Period*   2004 to 2004

*Coop. Inst.*     Norwegian Polar Institute; Norwegian College of Fisheries Sciences  
Bates College and East Carolina University, USA, Univ. Saskatchewan, Canada, Stirling Univ., UK, and Univ. of Tasmania, Australia

*Programme*     Norwegian Research Council, ARKTØK programme (now under NORDKLIMA)

*Description*   The principal objective of this project is to determine the sensitivity of the Arctic marine ecosystem of northeast Spitsbergen to changing climate via sea ice cover in this region. This will be accomplished through the following subgoals:

- Quantify the timing and magnitude of primary production and its dominant sources for the northern Svalbard shelf
- Trace the trophic fate of the primary production in areas of different zooplankton population distributions
- Measure benthic biomass and community characteristics in the areas
- Relate the changes of carbon available both in quantity and origin to variations in ice conditions
- Determine food web trophic structure and response to climate variability using stable isotope and fatty acid profiles

We aim to test the hypothesis that changing ice conditions associated with different climatic regimes drives primary production on the northern Svalbard shelf through different carbon sources (ice algae vs. phytoplankton). We propose that such variation in the dominant source pathways of primary production has concomitant effects to both the pelagic and benthic systems, as well as the trophic pathways by which they are coupled. We will carry out an extensive field campaign, combined with laboratory analyses to test a series of working hypotheses related to the primary producers, zooplankton, and benthic components. Our test region is the northern Barents Sea near northeast Spitsbergen where sea ice varies on small spatial and temporal scales. We will compare systems influenced predominantly by different water masses, i.e. Atlantic water (warm scenario) vs. Arctic water (cold scenario) and we will assess temporal aspects by sampling in different seasons (i.e. spring vs. autumn) and in different years.

Ultimately, this study aims to provide insight into the energetic pathways and trophic structure of this ecosystem and its stability versus sensitivity in the face of predicted future climate changes.

*Results*        Previous fieldwork/cruises:  
12-26 May, RV Jan Mayen - Norskebanken, Fram Strait, Kongsfjorden  
10 Aug-6 Sept., RV Lance - Kongsfjorden, Norskebanken, Sofia Deep, Hinlopen Strait, Erik Eriskens Strait, Kvitøya, Polar Basin

Results under analysis.

*Geographical Area(s)*   Olav V Land  
Haakon VII Land  
Ny-Friesland

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Austfonna  
Hopen  
Longyearbyen  
Barents Sea

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## *Participants*

Project Leader		12480
	<b>Dr. Michael Carroll</b> Akvaplan-niva, Tromsø, Norway	
Field Leader		12511
	<b>Dr. Else Nøst Hegseth</b> University of Tromsø (UiT), Norges Fiskerihøgskole (NFH) Tromsø, Norway	

**Proj. Title**    **Environmental effects of offshore oil activities: Experimental tests of petroleum-associated components on benthos at community, individual, and cellular levels (EXPAC)**

**Discipline**    **Marine Ecology**

**Nationality**    **Norway, U.S.**

**Institution**    **Akvaplan-niva, Polar Environmental Center, Tromsø**

*Proj. Period*    2004 to 2006

*Coop. Inst.*    University of Oslo, Norwegian Institute of Water Research, University of Tromsø, Bates College, East Carolina University, University of Georgia, and State University of New York Stonybrook USA, University of Tasmania, Australia

*Programme*    Norwegian Research Council, PROOF programme

*Description*    This project will examine benthic processes in arctic and mid-latitude regions in order to derive specific conclusions on the sensitivity of benthic organisms and communities to acute spills of petroleum-related chemicals and routine releases of drill cuttings. We will carry out a series of controlled experiments on whole sediment communities and individual benthic organisms with additions of drill cuttings and petroleum-associated contaminants, arriving at a set of hypotheses on the likely impacts on the benthos of petroleum production activities at higher latitudes. A series of testable hypotheses will be formulated based on an examination of real-world monitoring data sets collected under Norway's Petroleum Regional Monitoring Programme and results of mesocosm experiments performed previously at the Norwegian Institute for Water Research (NIVA) Station at Solbergstrand. These data sets will be examined in order to identify the geographic scope of responses to petroleum industrial activities. Through this work, we intend to propose procedures to improve the interpretation of benthic monitoring data for diverse environmental regions in Norway. The project is linked to several on-going NFR projects within the Polarklima programme. By involving a Ph.D. student the project will advance the education and training of young scientists in the field of biological effects studies related to petroleum development and exploration activities.

Identify effects to benthos from routine releases of drill cuttings and acute spills of petroleum-associated chemicals in diverse regions of Norway.

1. To develop hypotheses on impacts to the benthos from petroleum operations in higher latitudes.
- 2 To identify benthic community responses to routine discharges of drill cuttings and to evaluate effects on benthic organisms (organism- and cellular-level) from acute spills of petroleum-associated chemicals.
3. To propose improvements to the interpretation of benthic monitoring data from dive

*Results*    New project.

*Geographical Area(s)*    Hopen  
 Longyearbyen  
 Ny-Ålesund  
 Barents Sea

**Participants**

## Biology

121049

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Project Leader

12586

**Dr JoLynn Carol**

Akvaplan-niva,

Tromsø, Norway

Field Leader

12577

**Dr. William G. Ambrose**

Bates College,

Maine, USA



---

*Proj. Title*    **Description of parameters of the population dynamics of polar bivalve communities, first year: growth and reproductive cycle of the dominant Greenland cockles (*Serripes groenlandicus*)**

*Discipline*    **Benthology**

*Nationality*    **Germany**

*Institution*    **Alfred Wegener Institute for Polar and Marine Research, Bremerhaven**

---

*Proj. Period*    2003 to 2005

*Coop. Inst.*    University of Córdoba, Córdoba, Argentina

*Programme*

*Description*    Greenland cockles (*Serripes groenlandicus*) inhabit arctic soft bottoms. This cockle was chosen for detailed studies of one organism having presumably a dominant effect on soft sediment succession. About 10 individuals will be sampled monthly over a year's period. Since there is no scientific diving team available throughout the year bivalves will be sampled, marked with the help of two parallel sanding discs fixed to a handhold electric drill and released in stainless steel cages. In 2003 these cages were already installed under the sediment surface in northern direction of the sheet piling of the harbour, at app. 10-meter depth that they will not interfere with the docking ships. Cages were fixed to a rope, which has been installed on the ground, turned around on a ground weight at the lower end of the sheet piling and fixed at the surface. Each month one cage will be lifted and cockles be frozen (-80°C) for further investigations (growth, reproductive cycle). At the laboratory in Bremerhaven, cockles will be measured to the lower mm and growth increments calculated (e.g. Laudien et al 2003). These parameters will be used to establish a von Bertalanffy growth function. Additionally acetate peels will be produced. The results will be needed for further investigations and age estimates from free living cockles for future campaigns. The reproductive cycle of *Serripes groenlandicus* will be analysed using histological methods.

*Results*    During the campaign 2003 it was observed that Greenland cockles (*Serripes groenlandicus*) were not as abundant in the study area (Kongsfjord) as in 2002. However, an area of higher abundances was found at an area between Forlandsundet and Kvadehuken, where animals are planned to be collected for this project, if they did not recover abundances found in 2002. The working group is experienced in the analysis of population dynamics of bivalves including age estimates and histological analyses (Laudien et al. 2001, Laudien 2002, Laudien et al. 2003).

*Geographical Area(s)*    Ny-Ålesund

---

*Participants*

Project Leader

**Prof. Dr. Wolf Arntz**  
 Alfred-Wegener-Institute for Polar and Marine Research (AWI),  
 Bremerhaven, Germany

12214

## Biology

120952

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Participating Scientist	12103
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Participating Scientist	12279
<b>Saskia Brandt</b> Alfred-Wegener-Institute for Polar and Marine Research (AWI), Bremerhaven Bremerhaven, Germany	
Participating Scientist	12549
<b>Nikolaus Probst</b> Alfred-Wegener-Institute for Polar and Marine Research (AWI), Bremerhaven Bremerhaven, Germany	
Participating Scientist	12550
<b>Neus Fernandez</b> Alfred-Wegener-Institute for Polar and Marine Research (AWI), Bremerhaven Bremerhaven, Germany	
Participating Scientist	12548
<b>Phillip Shubert</b> Alfred-Wegener-Institute for Polar and Marine Research (AWI), Bremerhaven Bremerhaven, Germany	
Field Leader	12206
<b>Juergen Laudien</b> Alfred-Wegener-Institute for Polar and Marine Research (AWI), Bremerhaven, Germany	

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*Proj. Title*     **Food in the Arctic pelagic system, its role in the diet of filter feeders, and fertilisation by exu-dates: an experiment in situ**

*Discipline*     **Benthology**

*Nationality*    **German**

*Institution*    **Alfred-Wegener-Institute for Polar and Marine Research (AWI)**

---

*Proj. Period*    2004 to 2004

*Coop. Inst.*     University of Córdoba, Córdoba, Argentina  
 Instituto de Ciencias del Mar-CSIC, Barcelona, Spain

*Programme*

*Description*    The role of different food items of the arctic pelagic system in the diet of selected suspension feeders will be evaluated from in situ feeding experiments. Six transparent incubation chambers made from hemispherical pieces of acrylic glass and approximately 1 litre in volume will be used. Selected suspension feeders like the cockle *Serripes groenlandicus* or the octocoral *Gersemia rubiformis* will be collected about one week prior to the experiments and acclimated. At the beginning of each experiment individual test animals will be fixed on the base of each experimental chamber. The behaviour of the incubated specimens will be monitored with an underwater video device before and during the experiment, confirming that the animals are actively filtering. During the acclimatisation period the outlet pipe of the incubation chambers will not be connected to the pump (open flow conditions). Thereafter three replicated initial water samples will be taken from the outlet of each chamber. Then the outlet pipe will be connected to the inlet of the pump providing a recirculation of experimental water until the final water samples will be taken.

The time required to detect changes in the concentration of food sources will be determined by examining the Chlorophyll a concentration within chambers with and without test animals over a period of 3 hours at 30 minutes intervals. Capture rates of the tested animals will be calculated using the variation in the concentration levels of bacteria, nanoflagellates, ciliates, dinoflagellates, diatoms, Chlorophyll a and total particulate organic carbon/nitrogen as well as nutrients in the water samples in Bremerhaven. The role of zooplankton as prey of passive suspension feeders has been demonstrated in many temperate and tropical regions (Sebens et al. 1996), but the value of trophically rich prey as is the zooplankton to cover the food demand of benthic suspension feeders is a subject not yet well studied.

*Results*        The working group is experienced in carrying out this kind of in situ experiments as comparable studies with clams and corrals were conducted in co-operation in 2003 in Spain. The techniques to analyze the quantity of food items are well established at the AWI (chlorophyll a, Phytoplankton counts, PON and POC analyses) and the ICM (analyses for chlorophyll a, nutrients, flowcytometrie). Furthermore the working group has published several studies on the feeding biology of filter-feeders in co-operation (e.g., Gili et al. 1998, Orejas et al. 2001, 2003, Laudien et al. in prep., Laudien and Gili in prep.). Additionally, several ecological studies were recently carried out in Kongsfjord and publications are submitted (Laudien et al. submitted., Herrmann in prep., Sahade et al. submitted). During the campaign 2003 it was observed that Greenland cockles (*Serripes groenlandicus*) can be found within Kongsfjord. The octocorals *Gersemia rubiformis* can be found in satisfactory abundances near Hansneset.

*Geographical Area(s)*    Ny-Ålesund

## Biology

121016

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### *Participants*

Project Leader		12214
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Field Leader		12206
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*Proj. Title*     **Succession of benthic communities in polar environments: Benthic resilience in polar environments: a comparison**

*Discipline*     **Benthology**

*Nationality*    **German**

*Institution*    **Alfred-Wegener-Institute for Polar and Marine Research (AWI)**

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*Proj. Period*    2004 to 2004

*Coop. Inst.*     University of Córdoba, Córdoba, Argentina

*Programme*

*Description*

Hard bottom succession panels (HBSP) at Kongsfordneset and soft bottom succession containers (SBSC) at Brandal installed in 2002 and recovered 2003 will again be sampled during 2004. Photos of all 40 HBSP will be taken with a macro-lens in order to document the recolonisation over time. As already in 2003 five original panels will be removed from the installed adapters and replaced by new panels. Furthermore five of the 2003 replaced panels will also be re-placed again in order to study annual differences in primary succession. Settled organisms will be removed in the laboratory and fixed for later identification. Biomass will be estimated from a subsample in Bremerhaven, thereafter ash free dry mass will be estimated.

After the development and establishment of this new and improved method for the analysis of succession and colonization patterns, focus will also be laid to obtain comparable results. Thus a parallel set-up using traditional plates (15 x 15 cm) and fixations will be installed at Kongsfjordneset, In turn this will allow valid comparisons between results obtained using the new method and the traditional one and therefore open the way for the extensive use of the new set up in other areas.

The ten natural areas of hard bottom cleaned and marked in 2003 will again be photographed and the succession be monitored by image analyses in Bremerhaven. The hard bottom succession will be followed during the next years. This year we will mark 10 additional natural (uncleaned) surfaces in the same way with anchor screws. For this long-term observation 10 additional small holes in the bedrock will be needed. Macrophotos of the surfaces of the 27 installed SBSC will be taken by SCUBA divers. Like in 2003 five SBSCs will be sampled by an underwater airlift system and species composition analysed in the laboratory thereafter. Again individuals will be counted, measured, weighted and thereafter ashed in order to calculate ash free dry mass. The Benthonit/sand mixture

*Results*        In 2002 41 succession panels were installed at Kongsfjordneset at a depth of 20 metres. During the campaign 2003 the panels were successfully recovered and sampled. Although a huge effort has been undertaken over the last 15 years this project (KOP 51) was the first successful attempt to recover succession panels in the arctic environment! Five panels were sampled and replaced by new ones. At the moment the identification of the fauna is being carried out showing that hydrozoans, bryozoans and barnacles are the first colonizing taxa. Furthermore during 2001 and 2002 photo transects were undertaken to describe the natural fauna, two publications are submitted and oral presentations at the Congreso Argentino de Ciencias del Mar in Mar del Plata were given. Additionally 27 Terracotta containers filled with a Benthonit/sand mixture were installed in soft sediments at Brandal (18 metres depth) in 2002. Again this project was successful as all the containers could be recovered in 2003 and five of them sampled as planned. Animals were fixed and the majority has been identified. Additionally we sampled the natural fauna inhabiting the research area with the same method. This comparison is currently undertaken as a diploma thesis.

# Biology

121017

*Geographical Area(s)* Ny-Ålesund

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Field Leader		12206
	<b>Juergen Laudien</b> Alfred-Wegener-Institute for Polar and Marine Research (AWI), Bremerhaven, Germany	

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*Proj. Title*    **UV effects on marine macroalgae**  
*Discipline*    **Marine Botany**  
*Nationality*    **German**  
*Institution*    **Alfred-Wegener-Institute for Polar and Marine Research (AWI),  
Bremerhaven, Germany**

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*Proj. Period*    1995 to 2010

*Coop. Inst.*    Institute for Polar Ecology, University of Kiel, Germany  
GSF-National Research Center for Environment and Health, Neuherberg, Germany  
Monash University, Melbourne, Australia  
Dalhousie University, Halifax, Canada

*Programme*

*Description*    Our studies are divided in four parts:

1. We will measure the UV radiation regime both at the surface and underwater.
2. The study will be conducted to describe the UVR susceptibility of zoospores of brown algae in relation to their depth distribution. Arctic species might be particularly affected due to the ozone losses over the Arctic and the related increase in UVBR levels. We will describe the protective potential of these propagules by the formation of phlorotannin containing physodes during and after an exposure to artificial UVR in the laboratory. Additionally, we will conduct studies on the performance of spores in the field
3. The effect of enhanced ultraviolet radiation on gene expression is studied in different macroalgal species, the two brown algae *Laminaria saccharina* and *Laminaria digitata* and the green algae *Monostroma arcticum* and *Acrosiphonia arctica*. The algal material will be collected by divers from different depths and will then be exposed to UV-radiation of various intensities and spectral properties in the laboratory and in the field. The main emphasis is to assess effects of naturally occurring UV-levels on gene expression of various macroalgae and to correlate these results to growth rate measurements. Additional experiments with artificial UV-radiation in the lab are also planned to support the field-data with measurements at well defined conditions.
4. The succession of benthic primary producers in the upper sublittoral will be investigated under four different light regimes (PAR, PAR+UVA, PAR+UVA+UVB, full sunlight) along the shoreline of Kongsfjorden. The aim of the project is the estimation of early, mid- and long-term effects of ultraviolet radiation (UVR) on the succession of benthic macroalgae communities. Moreover, the physiological and molecular biological properties of characteristic species of the succession process will be analysed under the aspect of UV-resistance/UV-sensitivity. The study comprises in situ measurements of photosynthesis

*Results*        So far we have focussed mainly on the physiological effects of UV radiation on marine macroalgae from Kongsfjorden. But little is known on UV effects on the molecular effects, especially on gene expression, on the effects on reproduction and on the effects on communities. This gap will be filled by our studies described above.

*Geographical Area(s)*    Ny-Ålesund

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*Participants*

## Biology

121003

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Project Leader

10102

**Prof. Christian Wiencke**

Alfred-Wegener-Institute for Polar and Marine Research (AWI),  
Bremerhaven, Germany

Field Leader

10102

**Prof. Christian Wiencke**

Alfred-Wegener-Institute for Polar and Marine Research (AWI),  
Bremerhaven, Germany



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*Proj. Title*    **Adoption in Geese - an adaptive strategy?**  
*Discipline*    **Biology**  
*Nationality*   **Netherland**  
*Institution*   **Animal Ecology Group, University of Groningen, P.O.Box 14, 9750 AA Haren, The Netherlands (field work)**

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*Proj. Period*    2003 to 2005  
*Coop. Inst.*     Arctic Centre, University of Groningen; Unis, Norway; CNRS - CEPE, France  
*Programme*

*Description*    Adoption in geese - does caring for non-genetic offspring make sense? In geese adoption is a common phenomenon. Upto 25% of the goslings is not raised by their genetic parents. Earlier studies indicate that increasing their family size might benefit the parents as well as their genetic kids. On the other hand , adoption might be a strategy by the adopted gosling to obtain better parental care and thus better chances for survival. By marking goslings with tape flags and webtags at hatch, adoption can be studied in the field. Around hatching time, daily nest checks will be carried out and goslings marked, while at the same time 24 hour observations of family composition will be carried out from fixed hides in the breeding colony and on the grazing areas.

*Results*        Adoption in barnacle geese was studied in the Kongsfjorden area in 2003 by observational as well as experimental approach. Due to time limitations and high predation pressure by arctic foxes, the observational data contains very few resightings of goose families with goslings. However, the few adoptions we did observe indicate interesting patterns about the identity of goose pairs which loose goslings to other families. The study in 2004 is aiming to increase this data set and make a thorough statistical analysis possible.  
 The results from the experimental part of the 2003 study on adoption also yielded some interesting data, which indicates that goslings might in fact choose families they approach for adoption. This data is currently being prepared for submission for publication. Further, two master projects at the University of Groningen are being finished at the moment on the experimental and observational parts of the study in 2003.

*Geographical Area(s)*   Ny-Ålesund

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**Participants**

Project Leader	<p><b>Dr. Ellen Kalmbach</b>                  University of Gröningen, Animal Ecology CEES                  Haren, The Netherlands</p>	12439
Participating Scientist	<p><b>Student Maaïke Versteegh</b>                  University of Gröningen, Animal Ecology CEES                  Haren, The Netherlands</p>	12440
Participating Scientist	<p><b>Student Marjan Bos</b>                  University of Groningen, Animal Ecology CEES                  Haren, Netherland</p>	12588

## Biology

121053

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Participating Scientist	12591
<b>Student Irina Andrea Muller</b> UNIS, Longyearbyen, Norway	
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Field Leader	12439
<b>Dr. Ellen Kalmbach</b> University of Gröningen, Animal Ecology CEES Haren, The Netherlands	

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*Proj. Title* **Goose breeding ecology: overcoming successive hurdles to raise goslings**

*Discipline* **Biology**

*Nationality* **The Netherlands**

*Institution* **Arctic Centre, University of Groningen, P.O.Box 716, 9700 AS Groningen, The Netherlands (field work)**

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*Proj. Period* 2003 to 2004

*Coop. Inst.* Norwegian Polar Institute, Norway, Wildfowl and wetlands Trust, Slimbridge, University of Birmingham, UK  
NERC-Centre for Ecology and Hydrology, Banchory, UK, University of Tromsø, Norway

*Programme* Netherlands Arctic Program

*Description* The population of Barnacle Geese in Kongsfjorden has been followed in detail, with ringing, measuring and observing individual geese since 1990. The population development is largely affected by the fluctuating presence of Arctic Foxes. Individual strategies of geese are examined and experimentally manipulated to determine their pay-offs in fitness. Population census are made in close cooperation with G. Gabrielsen of NPI.

Digestive constraints during growth in barnacle goose goslings. Geese have a relatively simple digestive tract. They utilize almost none of the cell walls in their food leaving most of the energy in their faeces (which are eaten by reindeer). In 6 weeks time, goslings grow from 70 grammes at hatch to nearly 1500 grammes at fledging and their intestines are going through a similar size development. Consequently their digestion must improve. Families are usually feeding on the tundra while non-breeders feed on moss. Tis diet difference is related to the digestive efficiency of goslings. By collecting faeces of individual goslings at different ages, we study diet selection and gosling size in more detail. This study is in cooperation with I. Jonnsdottir of UNIS.

Has goose grazing led to changes in the environment? We plan to collect data on vegetation change, goose utilization and goose diet and breeding birds over the last decade. Preliminary comparison of photo's from 10 years ago, show a large difference in vegetation structure. Much of these changes have been attributed to reindeer grazing. We hope to show the effect of goose grazing and want to do experiments on the reversibility of these changes using exclosures. This study is in close cooperation with F. Mehlum.

Adoption in geese is studied through intensified observations of visually marked wild goslings in cooperation with E. Kalmbach.

*Results* The barnacle goose population in Kongsfjorden is studied in detail, with annual catching, ringing and measuring and observation of individual geese since 1990. The local population established in 1982 and went through a rapid period of growth until 1993. Since then, the population stabilizes on a total number of adults between 700 to 1200 individuals. Polar fox predation varies between years. In years with foxes, survival of goslings is low, but also the surviving goslings are driven in heavily grazed safe areas, grow slowly and starve. With foxes, the population would stabilize around 700 adults. In years without foxes, more area of tundra is available and carrying capacity would be reached with 1200 adults. Individual geese are under severe intraspecific competition. Only few individuals are able to raise goslings which become breeding birds in later years. These dominant geese rely on subordinate flock members for finding the best food patches. The vegetation is changing under the heavy grazing pressure. This process is studied with exclosures and small scale vegetation manipulations.

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# Biology

120947

*Geographical Area(s)* Ny-Ålesund

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## *Participants*

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<b>Mr Annen Arjen</b> University of Gröningen, Arctic Centre Gröningen, The Netherlands	
Field Leader	1154
<b>Prof. Maarten Loonen</b> University of Gröningen, Department of Biology, Zoological Laboratory AA Haren, The Netherlands	

*Proj. Title* **Combined effects of goose grazing and climatic warming on vulnerable tundra ecosystems**

*Discipline* **Biology**

*Nationality* **European (Dutch, British, Norwegian)**

*Institution* **Arctic Centre, University of Groningen, P.O.Box 716, 9700 AS Groningen, The Netherlands (field work)**

*Proj. Period* 2003 to 2005

*Coop. Inst.* The University Centre on Svalbard, Longyearbyen, Norway; University of Tromsø, Tromsø, Norway  
University of Aberdeen, Plant and Soil Science, Aberdeen, UK  
NERC-Centre for Ecology and Hydrology, Banchory, UK

*Programme* FRAGILE: Fragility of arctic goose habitat: impacts of land use, conservation and elevated temperatures

*Description* Both large numbers of arctic breeding geese and climate change have the potential of changing and even destroying the arctic ecosystem. The program FRAGILE, funded by the European Union, will explore the potential for these devastating effects in the European arctic, especially Spitsbergen. In an experimental way, we hope to identify the tundra ecosystem processes which are most vulnerable to the combined drivers of high goose grazing pressure and climatic warming. Plots of arctic tundra vegetation (laid out in Adventdalen) will be grazed by captive geese in various intensity. In a full factorial design also global warming is simulated using open top chambers. The effects of these treatments will be studied in detail, focussing on ecosystem carbon balance, nutrient cycling, community structure (plants and microbes) and ecosystem stability. An experiment located in Ny-Ålesund will focus on the effect of increased amount of goose droppings on the biomass of primary producers and the knock-on effects throughout the aquatic food web. A field survey at Nordenskiöldkysten hopes to correlate aquatic parameters with goose presence. With our experiments, we determine thresholds for arctic tundra ecosystem degradation. The entire project FRAGILE also involves the modelling of goose numbers based on habitat availability over the entire flyway and goose energetics for performing the whole annual cycle. In combination with the tundra and lake experiments a model will be constructed to predict carrying capacity of Svalbard tundra for geese and potential effects of likely future goose populations. 2004 is the second out of three field seasons.

*Results* In the summer of 2002, we have selected a study site in Adventdalen. Experimental plots were staked out in both a wet and a dry vegetation type. In 2003, we used four geese caught in Ny-Ålesund for grazing the vegetation plots. Treatments differed in grazing pressure and temperature enhancement. Responses were measured in terms of carbon balance, nitrogen balance and phenology of plants. Most changes were observed in the wet habitat. Preferred food plants are depleted. Goose grazing decreases the capacity of the tundra to act as a carbon sink. Temperature enhancement causes a small positive effect on the amount of carbon incorporated in the tundra. Extra studies are initiated on the following items: a. the effect of moisture on element cycles, b. the effect of grubbing by geese in early spring on vegetation recovery, c. the effect of various forms of phosphate on the vegetation d. a comparison of gosling performance with adult goose performance e. trampling effects on vegetation. For up-to-date information we refer to our website: <http://www.fragile-eu.net>

Nordenskiöld Land

# Biology

120946

*Geographical Area(s)* Ny-Ålesund

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## *Participants*

Project Leader	1154
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## Biology

120946

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**Proj. Title**    **Metabolic and hormonal correlates of reproductive effort in the kittiwake**

**Discipline**    **Ecology**

**Nationality**   **French**

**Institution**   **CEBC / CNRS**

*Proj. Period*    2004 to 2004

*Coop. Inst.*     Norwegian Polar Institut, Tromsø, Norway (Dr. Geir . W. Gabrielsen).

*Programme*

*Description*    A co-operative project between France and Norway is proposed to study the physiological mechanisms (hormones and metabolic rate) involved in the regulation of parental effort (brood size) in an Arctic-breeding seabird, the kittiwake *Rissa tridactyla*. This project will be carried out at Kongsfjorden (Ny Ålesund, Svalbard) which constitutes one the northernmost (79° N) breeding site of the species. The main goal of this project is to understand the reasons of the very poor productivity of the species in this high-arctic area (only one chick/pair/year compared to 2-3 chicks/ pair/year in more temperate areas). To do so, we will concurrently study the metabolic cost of chick rearing and the metabolic cost of foraging. To test whether parent kittiwakes are apparently unable to rear more than one chick, we will manipulate brood size and will measure its consequences on basal metabolic rate (BMR) and foraging activity. We will experimentally manipulate the brood size by swapping chicks between nests shortly after hatching. Parent birds of the different experimental groups will be captured, weighted and a small blood sample (500 µL) will be taken for thyroid hormones. BMR will be estimated through thyroid hormones (Chastel et al. 2003, *J. Avian Biol.* 34: 298-306), a method that reduces handling time imposed by the use of a respirometer, whereas activity at sea will be estimated using miniature activity recorders (Daunt et al., 2002 *Mar. Ecol. Prog. Ser.* 245 : 239-247, Tremblay et al. 2003, *J. Exp. Biol.* 206: 1929-1940). Nests of the different groups (12 nests with 2 chicks and 12 nest with 1 chick) will be observed during 2 weeks after what parent birds will be recaptured, and bled again for T3 assay. On an other group of birds (N=10), we will calibrate these miniature activity recorders (N=10, weight:5 g) by observing the activities (rest, brooding, flying, etc..) of the instrumented birds in the colony. Food samples (N=12) will be collected from parent birds during capture

*Results*          We have previously shown that in kittiwakes rearing chicks, they was a significant decrease in basal metabolic rate. This decrease in basal metabolic rate might be adaptive and may allow the adults to diminish their maintenance costs and increase workload (FMR) to provision the chicks. Our hypothesis is that the ability of kittiwakes to increase its FMR during foraging is constrained by the need for the BMR to decrease. Feeding an extra chick would lead to an increase of the level of activity at sea. Accordingly, this may impose a further reduction in BMR which may set the physiological limit regulating brood size in this arctic-breeding kittiwake population. Because an increase in workload imposed by the rearing of an extra-chick has to be balanced by food intake, we will also study the energy content of the food brought back to the chicks by collecting meals throughout the chick-rearing period. Studies conducted on the energetic of breeding kittiwakes have shown that there was a strong repeatability of basal metabolic rate (BMR) within individuals (Bech et al, 1999 *Proceeding Royal Society* 266: 2161-2167). This suggests that some individuals have consistently higher levels of energy expenditure than others and raises the question of the fitness consequences of having a low or high BMR. We have shown in house sparrow *Passer domesticus* that individuals with a high BMR, laid their eggs early in the season and, as a consequence, achieved a greater annual reproductive success (Chastel et al. 2003, *J. Avian Biol.* 34: 298-306). Th is programm on arctic-breeding kittiwakes would allow measurement of the influence of individual variation



*Geographical Area(s)* Ny-Ålesund

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## *Participants*

Project Leader		11962
	<b>Dr. Olivier Chastel</b> Centre National de la Recherche Scientifique (CNRS), Centre D'Etude Biologiques de Chizé (CEBC) Villiers en Bois, France	
Participating Scientist		12192
	<b>Frederic Angelier</b> Centre National de la Recherche Scientifique (CNRS), Centre D'Etude Biologiques de Chizé (CEBC) Villier en Bois, France	
Participating Scientist		12562
	<b>Celine Clement</b> CEBC/CNRS, Villiers en Bois, France	
Field Leader		11962
	<b>Dr. Olivier Chastel</b> Centre National de la Recherche Scientifique (CNRS), Centre D'Etude Biologiques de Chizé (CEBC) Villiers en Bois, France	

*Proj. Title*    **Incubation behaviour and energetic strategy during reproduction in long-lived birds : Ecological and physiological aspects**

*Discipline*    **Ecophysiology**

*Nationality*   **French**

*Institution*   **Centre d'Ecologie et Physiologie Energetiques / CNRS / France (Yvon Le Maho)**

*Proj. Period*   2004 to 2004

*Coop. Inst.*    Norwegian Polar Institute

*Programme*    Ecological and physiological adaptations of incubating birds during long-term fasting

*Description*   The aim of this programme was to study the physiological and behavioural adaptations to the incubation fast in the female eider. This leads to study fundamental questions about three complementary field researches described below.

General programme:

1. Evolutionary and ecological approaches: energetic costs of reproduction during incubation

In long-lived birds as Eider, there must be trade-offs between the energy allocated in growth and in reproduction. Therefore, individuals develop different reproductive strategies in relation with biotic and non biotic factors to maximize their fitness. Among factors tested, we will first measure the effects of animal density on female reproductive success. Additionally, we will measure, thanks to genetic tests, the frequency of intra-specific nest parasitism and extra-pair copulations to link these events with female behavioural decisions. To link reproductive effort with female immunocompetence, we will then perform PHA (phytohaemagglutinine) skin tests at different stages of the incubation period. Finally, we will perform clutch reductions at different stages of the incubation period in order to highlight decision rules controlling nest desertion in females.

2. Physiological and ecological approaches: parental investment in reproduction

In a first experiment, we will focus on the implication of prolactin and corticosterone in the control of parental decision at the hatching stage. Implantation of exogenous hormones will be done on nesting birds to evaluate the respective role of these two hormones in the control of parental decisions in eiders.

Parental investment in incubation can be regulated by the reproductive value of the clutch size. To further understand the mechanism underlying nest desertion, we will measure the induced-changes in prolactin and corticosterone concentrations after clutch size manipulation overall the incubating period.

3. Physiological approach: regulation of body fuel utilization during fasting

The

*Results*        During the first five campaigns of this project carried out in Ny-Ålesund, we determined some important characteristics of the biology of incubating female eiders (sleep time evolution, recess behaviour, nest attendance, stress response, plasmatic concentrations of hormones and metabolites, reaction following human disturbance). After this general description of the ecophysiology of eiders, we described the prolactin changes related to an artificial prolongation of incubation and characterized a refeeding behaviour. Common Eider females seemed to adopt new incubation behaviour when facing an experimentally extended incubation period. Relating to the sequential mobilisation of its body reserves, this shift in behaviour can be associated to the achieved low threshold of the amount of body lipids.

During the last year, our principal aim was to determine (i) the behaviour of the female when taking a recess at sea (is it eating?), (ii) the evolution of plasma prolactin level during extended incubation, (iii) the effect of corticosterone and prolactin chronic injection on bird behaviour, (iiii) which factor(s) induce(s) the final nest desertion.

## Biology

121029

*Geographical Area(s)* Ny-Ålesund

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### *Participants*

Project Leader		12224
	<b>Dr. Thierry Raclot</b> Centre National de la Recherche Scientifique (CNRS), Centre d'Ecologie et de Physiologie Energetiques (CEPE) Strasbourg Cedex 2, France	
Participating Scientist		12503
	<b>PhD Stud. Sophie Bourgeon</b> CNRS, Centre d'Ecologie et Physiologie Energetiques Strasbourg Cedex 2, France	
Participating Scientist		12566
	<b>Master Student Luc Guillaume</b> CEPE/CNRS, Strasbourg Cedex 2, France	
Field Leader		12224
	<b>Dr. Thierry Raclot</b> Centre National de la Recherche Scientifique (CNRS), Centre d'Ecologie et de Physiologie Energetiques (CEPE) Strasbourg Cedex 2, France	

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<i>Proj. Title</i>	<b>Snow Algae in Svalbard (KOL 07)</b>
<i>Discipline</i>	<b>Biology and Ecology</b>
<i>Nationality</i>	<b>German</b>
<i>Institution</i>	<b>Fraunhofer Institute for Biomedical Engineering (IBMT), Branch Medical Biotechnology, Extremo-</b>

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<i>Proj. Period</i>	2004 to 2005
<i>Coop. Inst.</i>	Alfred-Wegener-Institute for Polar and Marine Research, Bremerhaven, Germany Humboldt University Berlin, Berlin, Germany Prof. Dr. C. Lütz, Leopold-Franzens-Universität Innsbruck, Austria
<i>Programme</i>	KOL 07, long time programme of the Alfred Wegener Institute for Polar and Marine Research (AWI), Bremerhaven (Germany) within the German DFG programme "Antarctic Research with Comparative Studies in A
<i>Description</i>	This project is a part of a long-time study of the taxonomy, physiology and ecology of Arctic snow algae in Spitzbergen. The main topics are: (i) mapping and characterization of snow algae fields and sampling of snow algae for the establishment of clonal laboratory cultures for further in vitro studies (the use of snow algae as a bioresource for biotechnological applications such as cold-active enzymes etc.) (ii) taxonomic and physiological characterization of snow algal strains/species (iii) extension of our algal culture collection CCCryo (Culture Collection of Cryophilic Algae) (iv) genetic sequencing of different strains, comparison with strains held in other culture collections (CCAP, UTEX, SAG) and other private snow algal collections (Dr. H.U. Ling, Australia; Dr. R. Hoham, U.S.A.).
<i>Results</i>	In our recent work we have been conducting: (i) cryomicroscopic studies to access the possible production of natural antifreeze proteins / substances in selected snow algal strains (ii) differential transcriptome studies on proteome and RNA level (cDNA fingerprinting)  Literature:  Müller, T., Bleiß, W., Martin, C.-D., Rogaschewski, S. & Fuhr, G. (1998): Snow algae from northwest Svalbard: their identification, distribution, pigment and nutrient content. - Polar Biology 20, 14-32. Müller, T., Schnelle, T. & Fuhr, G. (1998): Dielectric single cell spectra in snow algae. - Polar Biology 20, 303-310. Reichle, C., Schnelle, T., Müller, T., Leya, T. & Fuhr, G. (2000): A new microsystem for automated electrorotation measurements using laser tweezers. - Biochimica et Biophysica Acta 1459, 218-229. Leya, T. (2001): Eiskalt durch roten Schnee - Auf historischen Spuren durch den Schnee Spitzbergens. - In: Mikroskopie - Olympus Magazin für Mikroskopie, Mikrofotografie und Systeme, Hamburg. 27-32. Leya, T., Müller, T., Ling, H.U. & Fuhr, G. (2001): Psychrophilic microalgae from northwest Spitsbergen, Svalbard: their taxonomy, ecology and preliminary studies of their cold adaptation using single cell electrorotation. - Nova Hedwigia, Beiheft 123, 551-570. Müller, T., Leya, T. & Fuhr, G. (2001): Persistent snow algal fields in Spitsbergen: field

# Biology

120703

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*Geographical Area(s)* Prins Karls Forland  
Haakon VII Land  
Andrée Land  
Ny-Friesland  
Gustav V Land  
Ny-Ålesund

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## *Participants*

Project Leader 10070  
**Prof.Dr Günter Fuhr**  
Fraunhofer Institute for Biomedical Engineering (IBMT), Branch Medical Biotechnology,  
Extremophil, Institute of Biology and Membranephysiology  
Berlin, Germany

Participating Scientist 10073  
**Dr. Torsten Müller**  
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Participating Scientist 11580  
**Dipl. Biol. Thomas Leya**  
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Extremo-  
phil,  
Berlin, Germany

Participating Scientist 12301  
**Prof. Andreas Manz**  
Imperial College, Dept. of chemistry  
London, United Kingdom

Field Leader 10070  
**Prof.Dr Günter Fuhr**  
Fraunhofer Institute for Biomedical Engineering (IBMT), Branch Medical Biotechnology,  
Extremophil, Institute of Biology and Membranephysiology  
Berlin, Germany

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*Proj. Title*    **Arctic and Alpine Stream Ecosystem Research (AASER)**  
*Discipline*    **Freshwater Ecology**  
*Nationality*    **Multinational**  
*Institution*    **Freshwater Ecology & Inland Fisheries Laboratory (LFI), Natural History Museums & Botanical Garden, University of Oslo, P.O. Box 1172 Blindern, 0318 Oslo, Norway.**

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*Proj. Period*    2004 to 2004

*Coop. Inst.*    Museum of Natural Sciences, Trento, Italy; University of Innsbruck, Austria; University of Birmingham, UK, University of Iceland; University of Geneva, Switzerland; Norwegian Water Resources & Energy Directorate(NVE)

*Programme*

*Description*    Undertake studies of benthos in Bayelva and Ny London  
 Collect material for studies of stable isotopes in Svalbard freshwater systems in the vicinity of Ny Ålesund

*Results*        Freshwater invertebrate drift samples collected during 2003 have been sorted and are at present being analysed. Publication is planned at the Limnology Congress in Finland during August 2004. Earlier publications include:  
 Brittain, J.E. & Milner, A.M. 2001. Ecology of glacier-fed rivers: current status and concepts. *Freshwater Biology* 46: 1571-1578.  
 Castella, E., Adalstinsson, H., Brittain, J.E., Gislason, G.M., Lehmann, A., Lencioni, V., Lods-Crozet, B., Maiolini, B., Milner, A.M., Olafsson, J.S., Saltveit, S.J. & Snook, D.L. 2001. Macrobenthic invertebrate richness and composition along a latitudinal gradient of European glacier-fed streams. *Freshwater Biology* 46: 1811-1831.  
 Lods-Crozet, B., Lencioni, V., Olafsson, J., Snook, D., Velle, G., Brittain, J.E., Castella, E. & Rossaro, B. 2001. Chironomid (Diptera: Chironomidae) communities in six European glacier-fed streams. *Freshwater Biology* 46: 1791-1809.  
 Milner, A.M., Brittain, J.E., Castella, E. & Petts, G.E. 2001. Trends of macroinvertebrate community structure in glacier-fed rivers in relation to environmental conditions: a synthesis. *Freshwater Biology* 46: 1833-1847.

*Geographical Area(s)*    Ny-Ålesund

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**Participants**

Project Leader 10621  
                   **Prof. John Brittain**  
                   University of Oslo (UiO), Freshwater Ecology and Inland Fisheries Laboratory (LFI), Natural history Museum & Botanical Garden  
                   Oslo, Norway

Participating Scientist 12551  
                   **Dr. Leopold Fureder**  
                   University of Innsbruck,, Institute of Zoology & Limnology  
                   Innsbruck, Austria

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Field Leader

10621

**Prof. John Brittain**

University of Oslo (UiO), Freshwater Ecology and Inland Fisheries Laboratory (LFI),  
Natural history Museum & Botanical Garden  
Oslo, Norway

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*Proj. Title* **Biology and ecology of aphid populations in arctic environment: relationships between endemic and introduced species, adaptive strategies and population genetic structure**

*Discipline* **Population Biology**

*Nationality* **French**

*Institution* **Institut National de la Recherche Agronomique et Institut Polaire Paul Emile Victor**

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*Proj. Period* 2004 to 2006

*Coop. Inst.*

*Programme*

*Description* In a context of global change, arctic ecosystems are exposed to deep modifications not only of the biology and ecology of endemic species but also of the interactions they may have with an increasing number of introduced species. This project attempts to assess in Svalbard, the impacts of global changes on aphids. These phytophagous insects are particularly relevant organisms for studies on the effects of global warming and biological invasion because 1) of their extreme sensitivity to micro- and macro- changes due to their spectacular rate of increase and phenotypic plasticity and 2) of their colonizing capacity conferred by their parthenogenetic mode of reproduction and their dispersal potential. The objectives for the annual programme are three folds: 1) to have a first assessment of the environmental factors that influence the most aphid population biology in Svalbard, 2) to precise on site with our French and Norwegian colleagues specialized on plant ecology in Svalbard a joint programme on plant-aphid interactions and 3) to initiate in the field the 3 years work programme.

The field work includes:

- 1) Composition of aphid species in Svalbard : prospecting and identification
- 2) Habitat characterization of aphid species and colonization rate
- 3) Assessment of the relative importance of endemic and introduced species : elaboration of a sampling design for a temporal survey of aphid population dynamics over the whole growing season during the next two years
- 4) First approach of population genetic structure of the endemic species *Acyrtosiphon svalbardicum* : several populations will be collected in geographically distant sites and genotyped in the lab. Between population differentiation and inbreeding coefficient will be assessed based on population structure analyses.

*Results*

*Geographical Area(s)* Nordenskiöld Land  
Oscar II Land  
Longyearbyen  
Ny-Ålesund  
Barentsburg

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*Participants*

Project Leader

**Dr. Hullè Maurice**  
UMR INRA/Agrocampus Rennes,  
Cedex, France

12581



## Biology

121047

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Participating Scientist	12582
<b>Dr. Simon Jean-Christophe</b> UMR INRA/Agrocampus Rennes, Cedex, France	
Participating Scientist	12583
<b>Dr Mellet Martin</b> IPEV (Institut Paul Emile Victor), Technopôle Brest-Iroise Plouzané, rance	
Field Leader	12581
<b>Dr. Hullè Maurice</b> UMR INRA/Agrocampus Rennes, Cedex, France	

*Proj. Title* **Physiological acclimation of Arctic macroalgae along vertical stress gradients**

*Discipline* **Marine Botany**

*Nationality* **German**

*Institution* **Institute for Polar Ecology, University of Kiel, Germany**

*Proj. Period* 2004 to 2004

*Coop. Inst.* Alfred-Wegener-Institute for Polar and Marine Research, Bremerhaven, Germany

*Programme*

*Description* The project focus is on photosynthetic responses of Arctic macroalgae to changing abiotic conditions. Key species along the shoreline of Kongsfjorden will be studied for the combined effects of increased ultraviolet radiation and seawater temperature, according to scenarios of climate change. The addressed changes in physico-chemical conditions will exert hitherto unknown effects on macroalgal physiology. We will compare responses of specimens collected along depth gradients, by exposing them in temperature controlled mesocosm systems, shielded with filter foils or additionally equipped with UV-fluorescent tubes. We will conduct in situ-measurements of photosynthetic performance and conserve algae for later physiological analysis in the laboratory. These surveys will include changes in pigment composition including the regulatory xanthophyll cycle, as an important protection system in the response to high light stress, induction of stress (heat shock) proteins, DNA damage and the generation of reactive oxygen species. Results will allow new insights in the reaction of species physiology upon environmental changes. In combination with datasets from physical oceanography it will be possible to draw conclusions on the development of macroalgal communities in response to climate change.

*Results* New project. Starting 2004.

*Geographical Area(s)* Ny-Ålesund

**Participants**

Project Leader 10346

**Prof. Dr. Kai Bischof**  
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Kiel, Germany

Participating Scientist 12553

**Jana Fredersdorf**  
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Participating Scientist 12554

**Bettina Walter**  
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Kiel, Germany

Field Leader 10346

**Prof. Dr. Kai Bischof**  
Institute for Polar Ecology, University of Kiel,  
Kiel, Germany

## Biology

121014

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*Proj. Title* **Inventory of the Horsund fjord marine fauna and flora**  
*Discipline* **Marine Ecology**  
*Nationality* **Polish**  
*Institution* **Institute of Oceanology, Polish Academy of Sciences, Sopot, Poland**

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*Proj. Period* 2002 to 2006  
*Coop. Inst.* Polish Polar Station in Horsund, Institute of Geophysics, Polish Academy of Sciences, Poland  
*Programme* MARBENA , MARBEF  
*Description* FIRST OF ALL THE PROJECT WILL TRY TO DESCRIBE ALL THE BIODIVERSITY IN THE HORSUND FJORDIC SYSTEM. THE PROJECT IS BASED ON THE HISTORICAL DATA AND DATA COLLECTED DURING THE SUMMER EXPEDITION IN 2003. 2004. THE FIELD WORK IN 2003 WILL TRY TO COVER THE BIG GAPS IN OUR BIODIVERSITY KNOWLEDGE ABOUT CONCERNED FJORD.  
*Results* Part of the information is already available at [www.iofan.gda.pl/projects/biodaff](http://www.iofan.gda.pl/projects/biodaff)  
*Geographical Area(s)*

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### Participants

Project Leader 10233  
**Prof. Dr. Jan Marcin Weslawski**  
Institute of Oceanology,, PAS,, Department of Polar and Marine Research, Institute of Oceanology, Arctic Ecology Group  
Sopot, Poland

Participating Scientist 10452  
**PhD Marek Zajaczkowski**  
Polish Academy of Sciences (PAS), Institute of Oceanology, Arctic Ecology Group  
Sopot, Poland

Participating Scientist 12547  
**PhD Piotr Kuklinski**  
Institute of Oceanology, PAS,  
Sopot, Poland

Field Leader 12546  
**PhD. Maria Wlodarska - Kowalczyk**  
Institute of Oceanology, PAS  
Sopot, Poland

*Proj. Title*     **The effect of solar UV on lipids in the planktonic food chain of polar freshwater ponds.**

*Discipline*     **Biology**

*Nationality*   **German**

*Institution*   **Martin-Luther-University, Halle, Institute of Plantphysiology,  
Weinbergweg 10, D-06120 Halle/Saale**

*Proj. Period*   2004 to 2004

*Coop. Inst.*     AWI-Bremerhaven, Environment Canada, Burlington, Ontario

*Programme*

*Description*   Plankton of shallow polar freshwater water bodies is exposed to increasing levels of ultraviolet radiation (UVR) due to the limited water depth. Daphnia (Crustacea, waterflea) and algae are common representatives of the food chain in these water bodies. Daphnia almost exclusively use lipids for energy storage, which they obtain from their food (mainly algae). Therefore, Daphnia and algae are closely linked to each other. Preliminary experiments on the UV-induced damage in phyto- and zooplankton point to lipids as one of the key players. With this application we want to identify how algae specific lipids and fatty acids (FA) are modified by UVR. The factors modifying UV-doses to the animals and their food are depth of the waterbody and DOC (absorbs UV). A pondsurvey shall provide a wide spectrum on ponds which vary in DOC and depth. Lipid analysis of Daphnia and their food of these ponds as well as physical parameters of the pond waters shall identify correlations between UV-exposure and specific fatty acids. This shall enable us to estimate the effect of solar UVR on the freshwater plankton community in polar ponds.

*Results*        The project will start in June 2004. No results on high arctic habitats are yet available. A similar survey has started in subarctic Kilpisjärvi (Finland) area last summer. Results will be published in:

Zellmer I.D., M.T. Arts, D. Abele and K. Humbeck. 2004. Evidence of sub-lethal damage in Daphnia (Cladocera) due to solar UV radiation in sub-Arctic ponds. *Journal of Arctic, Antarctic and Alpine Research*. Special issue. 36(2):0000-0000 (in press).

*Geographical Area(s)*   Oscar II Land  
Ny-Ålesund

***Participants***

Project Leader 12544

**Dr. Iris D. Zellmer**  
Martin-Luther-University, Halle,, Institute of Plantphysiology,  
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Field Leader 12544

**Dr. Iris D. Zellmer**  
Martin-Luther-University, Halle,, Institute of Plantphysiology,  
Halle/Saale, Germany

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*Proj. Title*    **CABANERA-Carbon flux and ecosystem feedback in the northern Barents Sea in an era of climate change**

*Discipline*    **Marine Ecology**

*Nationality*    **Norwegian**

*Institution*    **Norwegian College of Fishery Science, University of Tromsø**

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*Proj. Period*    2003 to 2006

*Coop. Inst.*    Norwegian Polar Institute, Akvaplan-niva AS, Norwegian University of Science and Technology (NTNU), Geophysical Institute /University of Bergen, Bjerknes Centre for Climate Research, Institute of Marine Research, UNIS, SINTEF

*Programme*    Nordklima.

*Description*    Principle objective:  
Determine the climatic sensitivity of the dominant energetic and carbon pathways in the MIZ of the northern Barents Sea and Svalbard shelf.

Sub-goals:

- Sensitivity test an existing physically-biologically coupled 3D model
- Conduct fully integrated, seasonal process studies across the MIZ
- Use field investigations and data to improve model algorithms
- Improve the model by adding CO<sub>2</sub> and benthos module
- Validate simulation with field results
- Investigate the impact of climate variability on C flux and ecosystem feed back
- Forecast consequences of climate change for MIZ ecosystem

2003 is the first year of the project and the main activities planned is project kick-off, sensitivity testing and validation of the existing physical-biological coupled 3D model and the first of three cruises. During two weeks in July material will be sampled and process studies carried out to achieve increased understanding of the functional responses in the northern Barents Sea ecosystem including sea ice, the pelagic and benthos, physics, chemistry and biology.

*Results*    Last years cruise was successfully carried out, and presentation of results from the involved partners and associates is scheduled for the annual meeting in June 2004. Publications from the project are still in progress.

*Geographical Area(s)*    Barents Sea

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**Participants**

Project Leader 12479  
**Prof. Paul Wassmann**  
 University of Tromsø, Norwegian College of Fishery Science  
 Tromsø, Norway

Participating Scientist 1276  
**Prof. Harald Svendsen**  
 University of Bergen (UiB), Department of Geophysics  
 Bergen, Norway

## Biology

120975

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Participating Scientist	10418
<b>Dr. Haakon Hop</b> Norwegian Polar Institute (NPI), Tromsø, Norway	
Participating Scientist	12481
<b>Dr. Bellerby Richard</b> Bjerknes Centre for Climate Research, Geophysical Institute Bergen, Norway	
Participating Scientist	12483
<b>Dr. Geir Johnsen</b> NTNU/UNIS, Trondhjem Biological Station Trondheim, Norway	
Participating Scientist	12482
<b>Dr. Padmini Dalpadado</b> Institute of Marine Research, Bergen, Norway	
Participating Scientist	12480
<b>Dr. Michael Carroll</b> Akvaplan-niva, Tromsø, Norway	
Field Leader	12479
<b>Prof. Paul Wassmann</b> University of Tromsø, Norwegian College of Fishery Science Tromsø, Norway	

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**Proj. Title**    **The role of climatic variation in the dynamics and persistence of an Arctic predator-prey/host-parasite system**

**Discipline**    **Ecology**

**Nationality**    **Norwegian**

**Institution**    **Norwegian Institute for Nature Research (NINA), Tromsø, Norway**

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*Proj. Period*    2002 to 2006

*Coop. Inst.*    Norwegian Polar Institute  
Institute of Biology, University of Tromsø

*Programme*    ARKTØK/KLIMAEFFEKTER/NORKLIM(NFR)

*Description*    The project aims at elucidating the interactions between climatic variability and the dynamics of a predator-prey/host parasite system. The population dynamics of the sibling vole *Microtus epiroticus* in the Grumantbyen area are strongly influenced by the quality and quantity of snow, and in particular icing events which result in extensive population crashes. The parasite *Echinococcus multilocularis* has the sibling vole as intermediate host, and the arctic fox as final host. We will make field measurements of snow characteristics as well as intensive studies of the vole and fox populations. Prevalences of *Echinococcus* will be estimated based on blood and feces samples taken in the field.

*Results*

- In mid-April 2002, 2003 and 2004, we sampled snow depth along three transects at 50, 100 and 150 meters a.s.l., and recorded snow properties in snow pits located along the 4 ridges used as sampling locations for voles.
- In early August and September 2002, the temperature loggers and thermistor chains were installed according to the application send to the Governor of Svalbard.
- In early July, early August and early September 2002 and 2003, we live-trapped the four ridges, Grumantbyen area, as well as a new area between ridge 2 and ridge 3 which was trapped in 1990-96. Densities were very low in 2002, but high in 2003 as a consequence of vole reproduction in late spring 2003. Blood samples were taken in July, August and September 2003, and the samples will be processed later this spring.
- In early August 2002 and 2003, most of the area along Fugle fjella, E and W of Grumantbyen, was surveyed for vole signs, and patches with vole signs were snap-trapped to get EM prevalence data.
- In early August 2002 and 2003, the area below and above the main seabirds colonies were surveyed for arctic fox dens. Three active dens with pups were identified in 2002. Other dens, probably used only as rest dens, were mapped.
- In early July, early August and early September 2002 and 2003, feces densities were estimated using line transect methods in the 6 live-trapping areas. Approximately 50 transects, each ca. 20 m. long, have been established and permanently marked. Feces collected (ca. 200) will be further analysed for presence of EM.

Ims, R.A., Fuglei E., Mørk T., Stien, A. and Yoccoz N.G. 2003 Forekomst av østmarkmus, polarrev og parasitten *Echinococcus multilocularis* i Grumantområdet sommeren 2003. Report to the Governor of Svalbard.

Yoccoz, N.G., Fuglei E., Ims, R.A., Stien A., Winther J.-G. 2004. The role of climatic variation in the dynamics and persistence of an Arctic predator - prey / host -parasite system. Poster, NFR Lillehammer conference, January 2004.

*Geographical Area(s)*    Nordenskiöld Land  
Longyearbyen

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**Participants**

## Biology

120872

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Project Leader	1301
<b>Prof. Nigel G. Yoccoz</b> Norwegian Institute for Nature Research (NINA), Tromsø, Norway	
Participating Scientist	1111
<b>Prof. Rolf A. Ims</b> University of Tromsø (UiT), Department of Ecology, Institute of Biology Tromsø, Norway	
Participating Scientist	1296
<b>Dr. Jan-Gunnar Winther</b> Norwegian Polar Institute (NPI), Tromsø, Norway	
Participating Scientist	11458
<b>Dr. Audun Stien</b> University of Tromsø (UiT), Institute of Biology Tromsø, Norway	
Participating Scientist	10066
<b>Dr. Eva Fuglei</b> Norwegian Polar Institute (NPI), Tromsø, Norway	
Field Leader	1301
<b>Prof. Nigel G. Yoccoz</b> Norwegian Institute for Nature Research (NINA), Tromsø, Norway	



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*Proj. Title*    **Bioavailability and effects of organochlorine contaminants in relation to seasonal lipid cycles in arctic fox.**

*Discipline*    **Ecotoxicology**

*Nationality*    **Norwegian**

*Institution*    **Norwegian Institute for Nature Research, Tromsø**

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*Proj. Period*    2003 to 2005

*Coop. Inst.*    Norwegian Polar Institute, Tromsø,  
Agricultural University of Norway, Ås,  
University of Science and Technology, Trondheim,  
National Water Research Institute, Environment Canada, Burlington, ON, Canada

*Programme*    NFR-ProFo

*Description*    The project aims to study the influence of natural winter emaciation in an arctic top-predator on organochlorine contaminant tissue distribution, bioavailability and biological impact. Arctic animals utilize periods with high food availability for feeding and lipid deposition, whereas they rely on stored lipids during unfavourable periods. Hence, many arctic inhabitants exhibit profound seasonal cycles of fattening and emaciation. In the Arctic, feeding is associated with fat deposition and contaminant accumulation. When lipids are mobilized, accumulated contaminants are released into the circulation. Consequently, blood contaminant concentrations may increase markedly and result in a redistribution of the contaminant(s) from "insensitive", adipose tissues to sensitive organs, and increased contaminant bioavailability. Such variations complicate interpretations of pollutant toxicity, both in effect studies and in monitoring programs, and remains an important future research area. In the present study, we will use the arctic fox (*Alopex lagopus*) as a model species for investigating tissue distribution and bioavailability of organochlorine contaminants in relation to natural variations in lipid status (field study). One old, male arctic fox, with low levels of body fat, was trapped in July in 2003, and we plan to trap up to 6 summer-adapted foxes between July and August 2004. We collected winter-adapted foxes, with high levels of body fat, from the annual fur-trapping season on Svalbard in 2003-2004.

*Results*        The project started in 2003

*Geographical Area(s)*    Nordenskiöld Land  
Ny-Ålesund

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**Participants**

Project Leader 10270  
**Dr. Even Hjalmar Jørgensen**  
 Norwegian Institute for Nature Research (NINA), Norwegian College of Fishery Science and University of Tromsø  
 Tromsø, Norway

Participating Scientist 10066  
**Dr. Eva Fuglei**  
 Norwegian Polar Institute (NPI),  
 Tromsø, Norway

## Biology

120931

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Participating Scientist	10633
<b>Dr. Scient. Øystein Ahlstrøm</b>	
Agricultural University of Norway (NLH), Department of Animal Science Ås, Norway	
Participating Scientist	12082
<b>Dr. Hans Wolkers</b>	
Norwegian Polar Institute (NPI), Tromsø, Norway	
Participating Scientist	12145
<b>Dr. Derek Muir</b>	
National Water Research Institute, Environment Canada Burlington ON, Canada	
Participating Scientist	11794
<b>Prof. Bjørn Munro Jensen</b>	
Norwegian University of Science and Technology (NTNU), Department of Zoology Trondheim, Norway	
Field Leader	10066
<b>Dr. Eva Fuglei</b>	
Norwegian Polar Institute (NPI), Tromsø, Norway	

## Biology

121011

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**Proj. Title** Arctic fox den monitoring on svalbard  
**Discipline** Biology and Ecology  
**Nationality** Norwegian  
**Institution** Norwegian Polar Institute

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*Proj. Period* 1990 to 2004

*Coop. Inst.*

*Programme* Biodiversity, NP

*Description* The objectives of the project is to resume the long term data series on known arctic fox den sites and arctic fox reproduction in Adventdalen/Sassendalen and in Kongsfjorden. The den survey in Sassen/Adventdalen will be conducted in two weeks in July, and in Kongsfjorden it will be conducted in 7 days in July. Arctic fox scats will also be collected from as many locations on Svalbard as possible through other research projects and field parties, in order to do genetic analysis on arctic fox population structure.

*Results* The den survey in Sassen/Adventdalen has been conducted in two periods: 1982-1989 and 1997-ongoing.  
In Kongsfjorden the den survey data are from 1990-ongoing.

Prestrud, P. 1992. Arctic foxes in Svalbard: Population ecology and rabies. PhD thesis, The Norwegian Polar Institute/The University of Oslo, Norway.

Frafjord, K., Rofstad, G. og Fuglei, E. 1997. Døde fjellrev-valper på Svalbard av sykdom? (Did arctic fox pups die due to some kind of sickness?) Fauna 50(3): 108-113. (In Norwegian).

Fuglei, E., Prestrud, P and Vongraven, D. 1998. A status report of arctic foxes *Alopex lagopus* at Svalbard. Norsk Polarinstituttts rapportserie 44, pp 24

Eide, N. E. 2002. Spatial ecology of arctic foxes. Relations to resource distribution, and spatiotemporal dynamics in prey abundance. PhD thesis, Agricultural University of Norway, Norway.

Fuglei, E., Øritsland, N. A. & Prestrud, P. 2003. Local variation in arctic fox abundance on Svalbard, Norway. Polar Biology 26: 93-98.

*Geographical Area(s)* Nordenskiöld Land  
Oscar II Land  
Haakon VII Land

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### Participants

Project Leader 10066

**Dr. Eva Fuglei**  
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Participating Scientist 12412

**Bjørn Anders Nymoen**  
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## Biology

121011

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Participating Scientist	12542
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Participating Scientist	12543
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Field Leader	10066
<b>Dr. Eva Fuglei</b> Norwegian Polar Institute (NPI), Tromsø, Norway	

## Biology

120990

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*Proj. Title* **Svalbard reindeer monitoring, Brøggerhalvøya**  
*Discipline* **Ecology**  
*Nationality* **Norwegian**  
*Institution* **Norwegian Polar Institute**

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*Proj. Period* 1978 to 2050

*Coop. Inst.*

*Programme* MOSJ

*Description* Continue the animal monitoring of Svalbard reindeer population size that has been conducted since 1978 (winter). Estimate of dens population variance (summer).

*Results* Aanes et. al. (2000); *Ecography* 23; 437-443  
Aanes et. al. (2002); *Ecology methods* 5; 445-454  
Aanes et. al. (2003); *Can. J. Zool.* 81; 103-110

*Geographical Area(s)* Oscar II Land  
Ny-Ålesund

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### Participants

Project Leader 11558

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**Snorre Henriksen**  
Norwegian University of Science and Technology (NTNU), Department of Zoology  
Trondheim, Norway

Field Leader 11558

**Ronny Aanes**  
Norwegian Polar Institute (NPI),  
Tromsø, Norway

## Biology

121051

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*Proj. Title*    **Hydoacoustic (EK-60) survey of pelagic fish and invertebrates in Kongsfjorden**  
*Discipline*    **Marine Ecology**  
*Nationality*    **Norwegian**  
*Institution*    **Norwegian Polar Institute**

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*Proj. Period*    2004 to 2004

*Coop. Inst.*    SIMRAD

*Programme*

*Description*    1) Calibrate and test EK-60 echosounder on R/V 'Lance'.  
2) Conduct standard zooplankton transect Kongsfjorden - Kongsfjord shelf/slope. Sampling at stations with Multi Plankton Sampler (MPS), WP-3 plankton net, CTD, fluorometer, water bottles for phytoplankton.  
3) Locate patches of zooplankton and pelagic fishes and sample them with nets and trawls (tucker trawl and pelagic trawl). Zooplankton will be preserved for prey abundance/biomass and fish will be frozen for stomach content determination for predator-prey relationship. Samples will be taken for stable isotopes and lipids.  
4) Estimate biomass of predator/prey (polar cod/zooplankton) in dense patches.  
5) Survey the fjord for biomass concentrations of zooplankton and fish.

*Results*

*Geographical Area(s)*    Ny-Ålesund

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### *Participants*

Project Leader		10418
	<b>Dr. Haakon Hop</b> Norwegian Polar Institute (NPI), Tromsø, Norway	
Participating Scientist		10451
	<b>Dr. Stig Falk-Petersen</b> Norwegian Polar Institute (NPI), Tromsø, Norway	
Field Leader		10418
	<b>Dr. Haakon Hop</b> Norwegian Polar Institute (NPI), Tromsø, Norway	

## Biology

121039

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*Proj. Title*    **Population monitoring of Svalbard Rock Ptarmigan (*Lagopus mutus hyperboreus*): point count survey of territorial males in spring.**

*Discipline*    **Biology and Ecology**

*Nationality*    **Norwegian**

*Institution*    **Norwegian Polar Institute (NPI), Tromsø**

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*Proj. Period*    2000 to 2004

*Coop. Inst.*    Governor of Svalbard, Longyearbyen

*Programme*    Monitoring and assessment programme for Svalbard and Jan Mayen

*Description*    The objective of the study is to determine the relative density of territorial Svalbard Rock Ptarmigan (*Lagopus mutus hyperboreus*) males in order to monitor long-term trends of the populations. The survey will be conducted in Adventdalen and Sassendalen in April 2004. Point counts for 20 minutes from approximately 100 set geographical positions with a distance of 1-2 kilometers in between will be conducted 2-3 times during the study period. Relative densities of males are calculated by using the program Distance Sampling. Use of indexes to describe trend lines will developed.

*Results*        The previous surveys are described in unpublished annual reports (in Norwegian) to the Norwegian Polar Institute and the Governor of Svalbard. The results will be published internationally after five years of monitoring data are obtained.

*Geographical Area(s)*    Nordenskiöld Land

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### *Participants*

Project Leader 10066  
**Dr. Eva Fuglei**  
Norwegian Polar Institute (NPI),  
Tromsø, Norway

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**Cand. Scient. Marie Lier**  
University Centre on Svalbard (UNIS),  
Longyearbyen, Norway

Participating Scientist 12413  
**Heli Routti**  
,

Field Leader 12029  
**Stip. Åshild Pedersen**  
University of Tromsø, Institute for Biology  
Tromsø, Norway

**Proj. Title**    **Effects of organohalogen contaminants on the metabolic systems and thyroid functions of glaucous gulls (*Larus hyperboreus*) from Bjørnøya**

**Discipline**    **Ecotoxicology**

**Nationality**    **Norwegian**

**Institution**    **Norwegian Polarinnstitute**

*Proj. Period*    2004 to 2004

*Coop. Inst.*    Great Lakes Institute for Environmental Research (Windsor, Canada), Norwegian School of Veterinary Science (Oslo, Norway), and National Water Research Institute (Burlington, Canada)

*Programme*    Norwegian Polar Institute's Ecotoxicology Programme

*Description*    The main objectives of the current proposal are to investigate the effects of a suite of organohalogen contaminants on the metabolic systems of glaucous gulls, and to examine the implication of circulating thyroid hormone levels in the model. For this purpose, a total of 20 adult glaucous gulls will be captured on their nests during the incubation period at Bjørnøya. Various metabolic system measurements will be carried out, i.e. basal metabolic rate (BMR) and field metabolic rate (FMR), and each bird will be sampled for blood, and finally released in the colony. The present project is part of a three-year (2004-2006) doctoral fellowship (NFR; project no. 160919/V10-Jonathan Verreault) assessing the effects of organohalogen contaminants and metabolites of organohalogens on the endocrine, enzymatic, and metabolic systems of glaucous gulls from Bjørnøya. Briefly, the adult glaucous gulls will be captured during the incubation period, i.e. from May 20th to June 20th 2004. The trap consists of a snare placed on the edge of the nest bowl and attached to a mechanism triggered by a radio transmitter. Measurements of FMR will be performed by the use of doubly labelled water (DLW), according to published methods by Nagy (1980). Immediately following capture, the birds will be injected 3 mL of DLW (H218O) into the pectoral muscle. A blood sample (1 mL) will be taken from each individual 1 hour after injection of DLW, and released in the colony. The birds will be re-captured within 2 days of DLW injection and a second blood sample will be taken. This second blood sample (12 mL for 1500g of body weight), collected from the brachial vein of the wing, will also be used for measurements of organohalogen contaminant and thyroid hormone levels. The field procedures for measurement of FMR are described by Gabrielsen et al. (1991) and Ellis and Gabrielsen (2001). Measurements of BMR will be performed by the use of indirect calorimetry on the same glaucous gulls captured for FMR measur

*Results*    This NFR doctoral project has just started and has generated to date 1 publication from samples of glaucous gulls collected in 2001 on Bjørnøya. One publication is currently in preparation for samples of glaucous gulls collected in 2002 from the same study area, and 2 additional publications are also anticipated from this work.

Publications:

Verreault J, Skaare JU, Jenssen BM, Gabrielsen GW. 2004. Effects of organochlorine contaminants on thyroid hormone levels in Arctic breeding glaucous gulls *Larus hyperboreus*. *Environ Health Perspect* 112:532-537.

Verreault J, Letcher RJ, Muir DCG, Gebbink W, Shu S, Gabrielsen GW. Emerging halogenated contaminants and metabolites in glaucous gulls *Larus hyperboreus*; in preparation.

*Geographical Area(s)*    Bjørnøya



## Biology

121034

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### *Participants*

Project Leader		1064
	<b>Dr. Geir Wing Gabrielsen</b> Norwegian Polar Institute (NPI), Tromsø, Norway	
Participating Scientist		10526
	<b>Prof. Erik Ropstad</b> Norwegian School of Veterinary Science, Department of Reproduction and Forensic Medicine Oslo, Norway	
Participating Scientist		12145
	<b>Dr. Derek Muir</b> National Water Research Institute, Environment Canada Burlington ON, Canada	
Participating Scientist		12573
	<b>Dr. Robert J. Letcher</b> University of Windsor, Great Lakes Institute for Environmental Research Windsor, Canada	
Participating Scientist		12572
	<b>Mr Jonathan Verreault</b> Norwegian polarintitute., Tromsø, Norway	
Field Leader		1064
	<b>Dr. Geir Wing Gabrielsen</b> Norwegian Polar Institute (NPI), Tromsø, Norway	

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*Proj. Title*    **Effects of climate change on ecosystems in Svalbard: past and future immigration of thermophilous key species**

*Discipline*    **Botany**

*Nationality*   **Norwegian/French**

*Institution*   **The Natural History Museums and Botanical Garden, University of Oslo, Norway**

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*Proj. Period*    2002 to 2006

*Coop. Inst.*     Dept. of Soil and Water Sciences, Agricultural Univ. of Norway, Ås, Norway  
and Lab. de Biologie des Populations d'Altitude, Univ. J. Fourier, Grenoble, France

*Programme*     ARKTØK

*Description*    The archipelago of Svalbard was almost completely ice-covered during the last glaciation. The most thermophilous plants occurring there today must therefore have arrived postglacially by long-distance dispersal. Such species (e.g. dwarf birch, arctic blueberry) are probably relics from the hypsithermal, which was 1-2 °C warmer than today. Climate models predict an increase of the average temperature by 3-3.5 °C from 1990 to 2070 in Svalbard. Thus, even more thermophilous species may establish, given that they are able to cross the oceans. Species such as mountain birch, grey willows, and blueberry dominate more southern ecosystems and will cause ecological cascade effects if they succeed to establish in Svalbard. We will use molecular markers (AFLPs, DArTs, transposon displays, cpDNA markers), genotype assignment tests, and phylogenetic analyses to identify source areas and frequency of previous immigrations of plant species to Svalbard, to estimate dispersal abilities of putative immigrant species that have not yet arrived, and to compare the likelihood for successful immigrations of species that are bird-dispersed, wind-dispersed, and without particular adaptations. The research team combines molecular, phylogeographic, and paleoclimatological expertise and will train two post-doc, one PhD, and several MAs. Plant samples have been collected in the Kongsfjorden/Krossfjorden area and around Isfjorden during previous seasons. In 2004, we hope to have samples also from more remote areas. A master student may go on fieldwork in Hornsund area and volunteer contacts might sample during boat trips around Spitsbergen.

*Results*        A large amount of plant samples have been analysed for molecular variation and preliminary results were presented on a conference in Leeds August 2003. One Master student, Inger Skrede, has finished her thesis, and one more, Kristine Westergaard will finish in June 2004.

*Geographical Area(s)*    Sørkapp Land  
Wedel Jarlsberg Land  
Nathorst Land  
Prins Karls Forland  
Olav V Land  
Albert I Land  
Haakon VII Land  
Andrée Land  
Ny-Friesland  
Barentsøya  
Edgeøya

## Biology

121046

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### *Participants*

Project Leader

12524

**Prof. Chrstian Brochmann**

University of Oslo (UiO), The Natural History Museum and Botanical Garden  
Oslo, Norway

Field Leader

11016

**Dr. Inger Greve Alsos**

NCB - National Centre for Biosystematics  
Natural History Museums and Botanical Garden  
University of,  
Oslo, Norway

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*Proj. Title*    **Monitoring rabies, parasites and diseases in the arctic fox population on Svalbard**  
*Discipline*    **Biology and Ecology**  
*Nationality*    **Norwegian**  
*Institution*    **The Norwegian Polar Institute**

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*Proj. Period*    2001 to 2005  
*Coop. Inst.*    National Veterinary Institute, Tromsø, and Norwegian School of Veterinary Medicine, Tromsø, and National Veterinary and Food Research Institute in Oulo, Finland and the Governor of Svalbard  
*Programme*    Biodiversity NP  
*Description*    The goal of the study is to monitor the occurrence of rabies, parasites and other zoonotic diseases in the arctic fox population on Svalbard. Arctic fox carcasses are collected from the annual arctic fox trappers on Svalbard through cooperation with the Governor of Svalbard. All carcasses are transported frozen to NP in Tromsø for storing. The carcasses are autopsied and samples taken at the National Veterinary Institute, Tromsø/The Norwegian Polar Institute.  
*Results*        Arctic fox carcasses are annually collected from trappers on Svalbard and shipped to NP Tromsø for storing until sample collection.  
                      Mørk, T. & Fuglei, E. 2003. Polarrev fra Svalbard - rabiesdiagnostikk, kartlegging av aktuelle infeksjøsse agens, miljøgifter, populasjonsstudier og genetiske undersøkelser. Report to Justisdepartementet, Landbruksdepartementet, Miljøverndepartementet og Sysselemannen på Svalbard. Pp. 12.  
*Geographical Area(s)*    Nordenskiöld Land  
                                  Oscar II Land  
                                  James I Land  
                                  Dickson Land  
                                  Ny-Friesland  
                                  Hopen

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**Participants**

Project Leader 10066  
                      **Dr. Eva Fuglei**  
                      Norwegian Polar Institute (NPI),  
                      Tromsø, Norway

Participating Scientist 10529  
                      **Dr. Morten Tryland**  
                      University of Tomsø., Department of Arctic Veterinary Medicine  
                      Tromsø, Norway

Participating Scientist 10835  
                      **Dr. Antti Oksanen**  
                      National Veterinary and Food Research Institute, Oulu Regional Unit,  
                      Oulo, Finland

## Biology

120930

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Participating Scientist	12415
<b>Dr. Kjetil Aasbakk</b> University of Tromsø., Norwegian School of Veterinary Medicine Tromsø, Norway	
Participating Scientist	12416
<b>Dr. Terje Josefson</b> National Veterinary Institute, Tromsø, Norway	
Participating Scientist	12414
<b>Cand. Med.vet Torill Mørk</b> National Veterinary Institute, Tromsø, Norway	
Field Leader	10066
<b>Dr. Eva Fuglei</b> Norwegian Polar Institute (NPI), Tromsø, Norway	

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*Proj. Title*     **Spatial population/ metapopulation structure of the arctic fox within the Svalbard archipelago.**

*Discipline*    **Biology and Ecology**

*Nationality*   **Norwegian**

*Institution*   **The Norwegian Polar Institute**

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*Proj. Period*    2002 to 2004

*Coop. Inst.*

*Programme*

*Description*    The goal of the project is to study the structure of the arctic fox population within sub-populations, and migrations between and within sub-populations on the Svalbard archipelago. This is of importance for the management of the arctic fox trapping on Svalbard, but also in general for this species dispersal ecology on the archipelago. Samples to be analysed are collected through two sources:

1. More than 600 arctic fox carcasses trapped from 9 different locations on Svalbard have been collected from the annual arctic fox trappers on Svalbard since 1996. All carcasses are transported to the Norwegian Polar Institute in Tromsø for storing, and samples of muscles have been taken out and are stored frozen.
2. Arctic fox faeces are collected from as many locations as possible on Svalbard from different field parties.

*Results*        Dalèn, L., Fuglei E., Hersteinsson, P., Kapel, C., Roth, J., Samelius, G., Tannerfeldt, M., Angerbjørn, A. 2004. Population history and genetic structure of the arctic fox (*Alopex lagopus*) a circumpolar species. Accepted April Linnean Society.

*Geographical Area(s)*

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**Participants**

Project Leader	<p><b>Dr. Eva Fuglei</b> Norwegian Polar Institute (NPI), Tromsø, Norway</p>	10066
Field Leader	<p><b>Dr. Eva Fuglei</b> Norwegian Polar Institute (NPI), Tromsø, Norway</p>	10066

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**Proj. Title** Reproductive biology of the snow bunting, *Plectrophenax nivalis*  
**Discipline** Zoology  
**Nationality** Norwegian  
**Institution** The Royal Norwegian Society of Sciences and Letters (DKNVS)

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*Proj. Period* 1998 to 2004

*Coop. Inst.* Norwegian University of Science and Technology (NTNU)

*Programme*

*Description* The project aims at investigating the reproductive biology of the snow bunting, and how the species, which is the only regularly breeding passerine species in Svalbard, has adapted to the special environment, and how its behaviour is related to the reproductive success. Behavioural features (e.g. song, mate guarding, extra-pair copulations (EPC), incubation feeding, parental care, diurnal activity) and structural features (e.g. variation in plumage, biometric features) are analysed in relation to environmental variables, mate choice, timing of breeding and breeding success. General reproduction data and survival data are collected over years and analysed in relation to population dynamics and environmental adaptations. Blood samples are taken from family groups for DNA-finger printing. Adult and juvenile site fidelity, dispersal and philopatry is studied on the basis of recoveries and resightings of individually ringed birds. Special attention will be paid to the significance of hatching asynchrony and variation in egg size, and the termoregulatory development in the young.

*Results* In the past 6 years more than 500 breeding pairs have been monitored with respect to e.g. onset and length of breeding season (considerable annual variations), polyterritoriality (three recorded instances), double clutches (none in 1998, 2000 and 2001, nine, four and one in 1999, 2002 and 2003, respectively), mate guarding (males guard their mates intensively 3-4 days prior to egg laying), extent of EPC (approx. 10 % of DNA-finger printed young are EPO), song quality and song rate vs male quality (only song rate seems to be associated with male quality), parental care (both parents normally participate in feeding the chicks), clutch size (approx. 6 eggs and 5.5 chicks per clutch), breeding success (3-4 fledged young/clutch; variation mainly caused by varying predation pressure). More than 1500 snow buntings (ad. and pull.) have been ringed with metal and colour rings, mainly for monitoring population dynamics and recording of site fidelity and returning rate/philopatry. Preliminary results indicate a high rate of returning to previous breeding sites.

Publications:

Espmark, Y. 1999. Song of the Snow Bunting *Plectrophenax nivalis* in areas with and without sympatric passerines. - *Can.J.Zool.* 77, 1385-1392.

Hofstad, E., Espmark, Y., Moksnes, A., Haugan, T. & Ingebrigtsen, M. 2002. The relationship between song performance and male quality in snow buntings (*Plectrophenax nivalis*). - *Can.J.Zool.* 80, 524-531.

Hoset, K.S., Espmark, Y., Moksnes, A., Haugan, T., Ingebrigtsen, M. & Lier, M. (In print). Effect of ambient temperature on food provisioning and reproductive success in snow buntings *Plectrophenax nivalis* in the high arctic. - *Ardea*.

Manuscripts:

Lier, M., Hoset, K., Haugan, T., Espmark, Y., Moksnes, A. & Ingebrigtsen, M. The relationship between mate guarding, song activity and parental effort in male snow buntings *Plectrophenax nivalis* in Svalbard.

Espmark, Y., Ingebrigtsen, M., Moksnes, A. & Lier, M. Diurnal pattern of parental care in the snow bunting *Plectrophenax*

## Biology

121035

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*Geographical Area(s)* Longyearbyen

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### *Participants*

Project Leader 11113

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Trondheim, Norway

Field Leader 11113

**Prof. Yngve Espmark**

Norwegian University of Science and Technology (NTNU), Department of biology  
Trondheim, Norway



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*Proj. Title*    **Plant-herbivore interactions in an Arctic pre-breeding area for geese: effects of timing and foraging intensity**

*Discipline*    **Ecology**

*Nationality*    **Norwegian**

*Institution*    **University Centre on Svalbard (UNIS), Longyearbyen, Norway**

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*Proj. Period*    2004 to 2005

*Coop. Inst.*    Norwegian Institute of Nature research (NINA)  
Dept. for Arctic Ecology, University in Tromsø

*Programme*

*Description*    In spring, thousands of geese migrate from temperate wintering areas to Svalbard. Before arriving at their breeding grounds they stage in pre-breeding areas in Southern Svalbard to supplement their body reserves. For geese, feeding conditions in spring are suggested to be crucial for their breeding success and, hence, influence population dynamics. For plants, however, the outcome of grazing depends on intensity and timing of the event. Global change may alter the phenology for both, goose migration and plant growth, and thus, alter their relationship. Accordingly, only by examining the phenology of geese and plants, mechanisms controlling this relationship can be fully understood. Consequently, this three-years-study will involve (1) an examination of goose feeding habits in a pre-breeding area for geese in Svalbard, (2) an assessment of forage impact on the vegetation, by experimental altering the timing and intensity of the grazing, and (3) an evaluation of the consequences of feeding conditions for the reproductive performance of the geese. Very little is known about the pre-breeding areas for Arctic-nesting geese and this study will contribute to close the gap of knowledge of the present state and possible future development in such areas.

*Results*        Arrival and departure date as well as body condition of all 3 Svalbard goose species in Vårsolbukta could be registered in spring 2003. For the barnacle geese staging in that area also staging time, diet, time budget of individual geese were assessed. In addition, general conditions in the area, eg. time of snowmelt, temperature, plant growth were monitored.

*Geographical Area(s)*    Nordenskiöld Land

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*Participants*

Project Leader 12385  
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Participating Scientist 12630  
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Field Leader 12629  
**Christiane Hübner**  
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 Longyearbyen, Norway

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*Proj. Title*    **Germinable seed bank diversity at high altitudes on Svalbard and implications to vegetation population dynamics with climate change**

*Discipline*    **Botany**

*Nationality*    **Canadian**

*Institution*    **University in Tromsø**

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*Proj. Period*    2004 to 2004

*Coop. Inst.*    University Centre in Svalbard

*Programme*    N/A

*Description*    The purpose of this project is to compare spatial distribution and species composition of high altitude plant species in existing vegetation, seedling emergence, seed rain and the germinable seed bank in order to determine the potential for change in vegetation community structure with climate change.

All data collection for this project will be completed in 2004, with fieldwork on Svalbard from May - September, and germination of seeds in Tromsø from September - December 2004. Based on site accessibility and minimal influence from mining activities, six transects have been chosen in furrows or valleys ascending north-facing slopes of mountains bordering the South side of Adventdalen, Svalbard. Transects are from 100m to 500m in altitude. At each 100m elevation interval, for a total of 5 intervals per transect, a 5 x 5 m sampling area will be marked out. In each sampling area, 10 snow core and 25 soil cores will be taken, 5 seed mats and one temperature logger laid out (May-September) and 4 vegetation analysis and 4 seedling analysis will be conducted. Seed mat and snow core debris and soil cores will be used in germination trials in Tromsø from September - December to identify species present in the germinable seed rain and seed bank.

*Results*    This is the first year of this study.

*Geographical Area(s)*    Longyearbyen

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**Participants**

Project Leader 12596

**M.Sc candidate Rebecca Rose Barlak**  
UNIS,  
Longyearbyen, Norway

Participating Scientist 11379

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University of Tromsø (UiT), Department of Biology  
Tromsø, Norway

Participating Scientist 11596

**Dr. Elisabeth Cooper**  
UNIS,  
Longyearbyen, Norway

## Biology

121055

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Participating Scientist

12385

**Prof. Ingibjörg S Jónsdóttir**

University Centre on Svalbard (UNIS), Department of Biology

Longyearbyen, Norway

Field Leader

12596

**M.Sc candidate Rebecca Rose Barlak**

UNIS,

Longyearbyen, Norway

*Proj. Title*     **Some aspects of life strategies of marine ostracods and copepods from northern fjords and Nottinghambukta (SW Spitsbergen).**

*Discipline*     **Biology**

*Nationality*   **Polish**

*Institution*   **University of Gdansk, Department of Genetics**

*Proj. Period*    2004 to 2005

*Coop. Inst.*

*Programme*

*Description*    The aim of research in 2004 is to continue analysis and describe life cycles and distribution of marine meiobenthic organisms, specially crustaceans: ostracods and copepods (Harpacticoida) from Spitsbergen.

*Results*            Investigations in 1995-2002 concerned:

1. Faunistic characteristics of selected groups of crustaceans living in Nottinghambukta and in neighbouring freshwater ponds,
2. Nottinghambukta:
  - characteristics of salinity and temperature,
  - characteristics of winter and early-spring microenvironmental conditions upon and in bottom sediments,
  - overwintering life strategies of selected species of copepods,
  - characteristics of changes of ice seasons,
3. Genetic polymorphism of populations of selected species of ostracods,
4. Description of life strategies of freshwater ostracods: *Candona rectangulata* and *Tonnacypris glacialis*,
5. Genetic polymorphism of populations of *Lepidurus arcticus*,
6. Faunistic characteristics of selected groups of meiobenthic organisms living in Petuniabukta.

Wisniewska B. 1996. Life cycles of selected species of freshwater ostracods from South Spitsbergen (near Polish Polar Station). Polish Polar Stud. XXIII Polar Symp., Sosnowiec, Poland, 27-29.09.1996.

Wisniewska B., Laszczuk J. 1997. Life cycles of selected species of meiobenthic crustaceans in Nottinghambukta, South Spitsbergen. Internat. Conf. of PhD Students Proc., Univ. of Miskolc, Hungary, p. 204.

Wisniewska B. 1997. A new method of segregation of Copepoda (Crustacea) from bottom sediments. Polish Polar Stud. 24th Polar Symp., Warsaw, Poland.

Wisniewska B. 1999. Ice conditions in Nottinghambukta during 1993-1998 seasons. Polish Polar Stud. 26th Intern. Polar Symp.: 323-328.

Wisniewska B. 2000. Biologia małżoraczka *Tonnacypris glacialis* z rejonu południowego Spitsbergenu. Proc. XVIII Zjazdu Hydrobiol. Polskich, 4-8.09. Białystok, Poland: 284.

Wisniewska B. 2000. Nottinghambukta - changes of salinity and temperature between spring and summer of 2000. Mat. XXVII Miedzyn. Symp. Polarnego, Polish Polar Stud.

Wisniewska B. 2001.

Wisniewska B. 2001. Perennial fluctuation of Harpacticoida inhabiting Nottinghambukta (South Spitsbergen) with careful consideration for their wintering strategies. In

*Geographical Area(s)*    Wedel Jarlsberg Land

Albert I Land

Haakon VII Land

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Andrée Land  
Arctic Ocean

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## *Participants*

Project Leader	12592
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Participating Scientist	12594
<b>MSc. Jerzy Rozanski</b> ,	
Participating Scientist	12595
<b>MSc. Agnieszka Mackiewicz</b> University of Gdansk, Department of Genetics Gdansk 50, Poland	
Field Leader	12593
<b>Dr. Barbara Wisniewska-Wojtasik</b> University of Gdansk, Department of Genetics Gdansk 50, Poland	

**Proj. Title**    **Density dependent regulation of barnacle goose numbers**  
**Discipline**    **Ecology**  
**Nationality**    **Netherlands**  
**Institution**    **University of Groningen, The Netherlands**

*Proj. Period*    2003 to 2005  
*Coop. Inst.*    Wetlands and Wildfowl Trust (Slimbridge, UK)  
                       The University Centre on Svalbard (Longyearbyen, Norway)

*Programme*

*Description*    Although density dependent reduction in reproductive success is a well-studied phenomenon in animal ecology, the exact mechanism is often largely understood. The increasing size of several populations of arctic-breeding goose populations calls for further study in order to make predictions on population developments in the future. This study focuses on a local population of barnacle geese on the west coast of Svalbard, that has been intensively studied during the past 25 years. In line with growth of the total population (7000 in 1977, and approximately 25000 today), the population in the study area has more than tripled. The research of this year will involve a wide array of assessments on geese throughout the incubation period and early brood-rearing (body condition, food intake, demographic parameters) and on the tundra vegetations that are used by the geese (biomass availability, production, and grazing intensity by herbivores).

*Results*        Twenty years ago the study area produced a substantial proportion of all juveniles in the barnacle goose population. Since 1986 the numbers of goslings raised dropped drastically, although the total number of adults still increases. The main reason for this drop is hypothesised to be the limited amount of food resources. This limitation may occur during pre-breeding, during the egg-stage or during the brood-rearing period.  
 Drent RH, Black JM, Loonen MJJE, Prop J (1998) Barnacle geese *Branta leucopsis* on Nordenskiöldkysten, western Spitsbergen -in thirty years from colonisation to saturation. *Norsk Polarinst Skrifter* 200: 105-114  
 Prop J, De Vries J (1993) Impact of snow and food conditions on the reproductive performance of barnacle geese *Branta leucopsis*. *Ornis Scandinavica* 24: 110-121  
 Prop J, Black JM, Shimmings P (2003) Travel schedules to the high arctic: barnacle geese trade-off the timing of migration with accumulation of fat deposits. *Oikos* 103: 403-414  
 Prop J, Drent RH (2003) Goose census of Nordenskiöldkysten, West-Spitsbergen, Svalbard, summer 2003. Report Zoological Laboratory, Groningen  
 Prop J (2004) Food finding: on the trail to successful reproduction in migratory geese. PhD Thesis, University of Groningen

*Geographical Area(s)*

**Participants**

Project Leader

**Dr. Jouke Prop**  
 Zoological Laboratory,  
 Haren, Netherland

12584

## Biology

121048

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Participating Scientist

12585

**Ing. Jim De Fouw**  
Zoological Laboratory,  
Haren, Netherland

Field Leader

12584

**Dr. Jouke Prop**  
Zoological Laboratory,  
Haren, Netherland

*Proj. Title*     **Investigation of the physiological and cellular adaptation of higher plants and snow algae to the arctic environment.**

*Discipline*     **Botany**

*Nationality*    **Germany/austria**

*Institution*    **University of Innsbruck, Innsbruck, Austria**

*Proj. Period*    2004 to 2004

*Coop. Inst.*     Alfred Wegener Institute of Polar Science.

*Programme*

*Description*    The objective of the proposed research with arctic higher plants and snow algae is to study the range of adaptation of photosynthetic metabolism, of antioxidative and sun screen compounds in a cold and reduced UV-B climate in comparison with data already obtained from the high Alps, with plants living partially under colder and different light regimes, especially higher UV-B. Further, the ultrastructure of leaf cells will be studied to ascertain, whether adaptations found in some high alpine plants occur similarly in arctic plants, and to connect cytological results with metabolic functions. It is the advantage of the planned work, that a number of investigations ranging from ultrastructural studies over different aspects of photosynthesis to assays of UV-B sensitive compounds and antioxidants will be conducted mostly with measurements and sample collection in the field during the same experimental day at one place. Therefore we expect a good connection of the data raised, back to the plant system and expect a much broader description of vitality and adaptation under the cold and light conditions. This is a continuation of the project from 2002 at Ny-Alesund

*Results*        Previous work with high mountain plants was mainly done with selected members from a range of plant families growing in the alpine and nivale zones. Several of those plants are also found in the arctic as the same species, but other ecotypes, or as close relatives to these alpine species. The main interest of our work is to understand whether the range of adaptation of plants from alpine and arctic ecosystems differ under natural influences (mainly climate stress), but also how the evolutionary selected stress resistance will be influenced by anthropogenic impacts like UV-B or ozone.

Our work covers ultrastructural studies (Lütz and Moser 1977, Lütz 1987, Lütz 1996, Larcher et al. 1997), extended field measurements (up to 3200 m) of photosynthesis and microclimate followed by plastid and membrane physiology studies (Bergweiler and Lütz 1986, Lütz 1996). Other work included description of the metabolic status, especially of antioxidants and pigments (Wildi and Lütz 1996).

Concerning algae, the UV-B resistance of Desmidiaceae, which can be found as high as 2700 m in alpine peat bogs, has been described for photosynthesis, pigments, organelles, cytoskeleton (Meindl and Lütz 1996, Lütz et al. 1997) and experiments will continue. The Desmidiaceae are a well introduced biological system to study cytoskeleton function, recently to understand adaptive and regulatory processes (Holzinger 2000, Holzinger and Lütz-Meindl 2001). The cold stability of the cytoskeleton is not well understood; our planned studies including Desmidiaceae found in ponds in Svalbard, and including snow algae, take up this cellular question with new organisms.

References:

Bergweiler, P., Lütz, C., 1986: Determination of leaf pigments by HPLC after extraction with N,N-Dimethylformamide: Ecophysiological Applications. *Env. Exper. Bot.* 26, 207-210

Holzinger, A. 2000: Aspects of cell development in *Micrasterias muricata* (Desmidiaceae) revealed by cryofixation and freeze substitution. *Nova Hedwigia* 70, 2

Longyearbyen



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*Geographical Area(s)* Ny-Ålesund

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## *Participants*

Participating Scientist 12536

**Mag Daniel Remias**

University of Innsbruck, Institute of Botany  
Innsbruck, Austria

Field Leader 12535

**Univ. Prof. Dr Cornelius Lutz**

University of Innsbruck, Institute of Botany  
Innsbruck, Austria

## Biology

120924

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*Proj. Title*    **Effects of UV radiation on lipids, fatty acids and nutritional quality of Arctic marine algae and zooplankton**

*Discipline*    **Marine Biology**

*Nationality*   **Norwegian**

*Institution*   **University of Oslo, Biological Institute, Norwegian Polar Institute**

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*Proj. Period*    2002 to 2005

*Coop. Inst.*     NILU and Akvaplan NIVA

*Programme*     ARKTØK

*Description*    In this project we will investigate the impact of increased UV radiation on planktonic food webs in the Arctic. The experiments will focus on changes in lipid composition, fatty acids and the nutritional quality of microalgae and zooplankton. UV radiation is a key determinant of oxidation of poly-unsaturated fatty acids (PUFAs) in phytoplankton. These PUFAs cannot be synthesized de novo in zooplankton, but are key molecules for the marine pelagic food web via zooplankton to fish, particularly in the Arctic. Enhanced UV radiation could thus strongly affect structure and energy transfer in these food webs. During our stay in Ny Ålesund we will take samples (phytoplankton and zooplankton) from different depths, under different radiation conditions and during different stages of the spring bloom. Furthermore, we plan feeding experiments in the laboratory with irradiated algae fed to Calanus. The material will be analysed with respect to the fatty acid composition, CHN and P, content of MAA's (mycosporine like amino acids) and growth parameters.

*Results*        The data from the field sampling campaign have been analysed and are waiting for statistical analysis now, a publication is in preparation. The experimental part didn't show the expected effects, probably due to low UV doses applied.

Laboratory experiments in Oslo with a number of different diatom cultures revealed clear species-specific differences in their response to UV-radiation.

*Geographical Area(s)*   Ny-Ålesund

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### Participants

Project Leader 11500  
**Prof. Dag Hessen**  
University of Oslo (UiO), Institute of Biology  
Oslo, Norway

Participating Scientist 1044  
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Norwegian Institute for Air Research (NILU),  
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Participating Scientist 10799  
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Polish Academy of Sciences (PAS), Institute of Oceanology  
Sopot, Poland

## Biology

120924

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Participating Scientist	12405
<b>Anette Wold</b> Norwegian Polar Institute (NPI), Tromsø, Norway	
Participating Scientist	12404
<b>Wojtek Moskal</b> Polish Academy of Sciences (PAS), Institute of Oceanology Sopot, Poland	
Field Leader	12403
<b>Eva Leu</b> University of Oslo (UiO), Biological Institute Oslo, Norway	

*Proj. Title*     **"Biostratigraphy and ecological succession of permian-carboniferous Rugosa corals from Spitsbergen"**

*Discipline*     **Paleontology**

*Nationality*    **Polish**

*Institution*    **Adam Mickiewicz University, Department of Geographical and Geological Sciences, Poznan, Poland**

*Proj. Period*    2003 to 2004

*Coop. Inst.*

*Programme*

*Description*    The project deals with a thorough study of Rugosa corals from Carboniferous and Permian on Spitsbergen. Using the results of my area investigation of the area carried out during my stay on Spitsbergen in 1999 as well as data included in world-wide professional literature I have noticed that it seems very promising that abundant coral fauna may change the existing multi-variant interpretation of the complicated geological structure of Spitsbergen, and in many cases, it can make it more precise. I believe that complementing those studies with new research carried out not only in the West Spitsbergen, along fiord coasts explored the most often, but also inland in, among other places, Polakkfjellet (in this year) and on the adjacent islands of Edgeoya, Barents and Nordaustlandet in the future, will allow for determining the impact of, among other things, abiotic environment on the succession series and ecologic variability of corals. I hope that on the basis of a detailed research of the coral fauna from the entire archipelago, it will be possible to present a systematic development process of the ecosystem taking place not only in time but in space too. Rugosa corals as the most abundant and most precious group of Spitsbergen fossils contain information enabling to determine ecological issues concerning the analysed areas and provide significant data for the local and global stratigraphy of places poor in conodont elements and foraminifers. Due to a small number of studies concerning Rugosa corals on Spitsbergen, the above subject matter may become an important contribution to gap-bridging in stratigraphy, tectonics and broad palaeoecology. I assume that the research results will turn out useful in developing models of geological structure and tectonic evolution of Spitsbergen in Carboniferous and Permian periods.

*Results*

*Geographical Area(s)*    Sørkapp Land  
                                   Wedel Jarlsberg Land  
                                   Hornsund

*Participants*

<i>Project Leader</i>	<b>Dr. Edward Chwieduk</b> Adam Mickiewicz University, Department of Geographical and Geological Sciences, Institute of Geology Poznan, Poland	12394
<i>Participating Scientist</i>	<b>Bomugil Nowak</b> Institute of geology., Posnan, Poland	12537

## Geology

121007

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Participating Scientist	12538
<b>Remigiusz Palyga</b> Institute of geology, Poznan, Poland	
Participating Scientist	12540
<b>Bogumila Kecik</b> Institute of geology, Poznan, Poland	
Participating Scientist	12539
<b>Ewa Tarnawska</b> Institute of geology, Poznan, Poland	
Field Leader	12394
<b>Dr. Edward Chwieduk</b> Adam Mickiewicz University, Department of Geographical and Geological Sciences, Institute of Geology Poznan, Poland	

**Proj. Title** 3D geometry of karst and fractures in carbonate buildups  
**Discipline** Geology  
**Nationality** Norwegian  
**Institution** Center for Integrated Petroleum Research, University of Bergen,  
Bergen, Norway

**Proj. Period** 2004 to 2004  
**Coop. Inst.** Norges Geologisk Undersøkelse, Trondheim, Norway

**Programme**

**Description** The overall goal of the project is to map the 3D geometry of karst-solution and fracture systems in carbonate sedimentary rock. The motivation is that very little is known about the meter-scale, 3-D architecture of carbonate buildups. Ancient carbonate buildups are of interest for understanding processes of modern reef creation and destruction, for water resources and waste disposal in areas typified by carbonate bedrock, for the geological hazards of building on carbonate bedrock, for resources such as cement and dimension stone, and as an analog for oil-bearing reservoirs in many areas of the world. Although these important geological features are well described in 2D, both on Svalbard and elsewhere, their meter-scale 3D geometry is not well determined. Furthermore, the inter-relationships between the carbonate stratigraphy, the fractures, and the solution features is not well understood. The northern end of Billefjorden, Dickson Land, has world-class exposures of carbonate strata well suited to such study. This is a short pilot study to determine the feasibility of future work. We integrate classic surface-based geologic mapping with ground-penetrating radar (GPR) and resistivity techniques. Thus we expect to image the subsurface continuation of features we can see on the cliff sides and mountaintops. For this reason we plan to focus on the sides and tops of "Gisafjellet" and "Wordiakammen", on the east side of Petuniabukta. The steep sides and gently-sloping tops of these features are well suited to our geophysical imaging. Furthermore, both the structure and stratigraphy of these carbonate rock exposures have been studied previously, although the relationship of the structure (faults, joints) to the stratigraphy (especially karst dissolution features) was not a focus.

**Results** No previous years. This is a pilot study do determine feasibility of future work. However, the following articles are relevant:  
Braathen, Alvar, Bergh, S., Karlsen, F., Maher Jr., H., Andresen, A., Hansen, A.-I., Bergvik, A., 1999. Kinematics of the Isfjorden-Ymerbukta Fault Zone: a dextral oblique-thrust ramp in the Tertiary fold-thrust belt of Spitsbergen. Norsk geologisk tidsskrift, v. 79, p. 227-240.  
Eliassen, A. and Talbot, M.R., 2003. Sedimentary facies and depositional history of the mid-Carboniferous Minkinfjellet Formation, central Spitsbergen, Svalbard, Norwegian Journal of Geology, v. 83, p. 299-318.

**Geographical Area(s)** Dickson Land  
Bünsow Land

**Participants**

**Project Leader** **Dr. Walter Wheeler**  
University of Bergen, Center for Integrated Petroleum Research  
Bergen, Norway

12605

## Geology

121060

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Participating Scientist	12608
<b>Dr. Alvar Braathen</b>	
University of Bergen, Center for Integrated Petroleum Research Bergen, Norway	
Participating Scientist	12609
<b>Jan Rønning</b>	
Norges geologisk undersøkelse, Trondheim, Norway	
Participating Scientist	12610
<b>Einar Dalsegg</b>	
Norges geologisk undersøkelse, Trondheim, Norway	
Field Leader	12605
<b>Dr. Walter Wheeler</b>	
University of Bergen, Center for Integrated Petroleum Research Bergen, Norway	

**Proj. Title** ECLOCAL Prog IPEV 398  
**Discipline** Geology  
**Nationality** French / Norwegian  
**Institution** IPEV French Research Polar Institute

*Proj. Period* 2003 to 2003

*Coop. Inst.* Norwegian Polar Institute

*Programme*

*Description* The main purpose of the project is to outline a structural model for the exhumation of Caledonian high-pressure rocks in NW Spitsbergen. In addition to the more specific structural studies, the area will be remapped for the 1:100,000 geological map A4G Vasahalvøya, which is part of the larger geological mapping program under the Norwegian Polar Institute's direction. Three weeks of field work will be devoted to the central part of Biscayarhalvøya during July 2003.  
 The main purpose of the project is to outline a structural model for the exhumation of Caledonian high-pressure rocks in Central Spitsbergen. A two week field study is proposed to further constrain the retrograde history of the newly discovered carpholite-bearing schists in Motalafjella.

*Results* Fieldwork for the present project in Motalafjella started in 2002 and this years activity will complete the structural mapping and petrological sampling.

*Geographical Area(s)* Oscar II Land

**Participants**

- |  |       |
|--|-------|
| Project Leader<br><b>Prof. Laurent Jolivet</b><br>Université Pierre & Marie Curie, Laboratoire de Tectonique<br>PARIS Cedex 05, France       | 12326 |
| Participating Scientist<br><b>Dr. Synnøve Elvevold</b><br>Norwegian Polar Institute (NPI),<br>Tromsø, Norway                                 | 11381 |
| Participating Scientist<br><b>Dr. Claude Lepvrier</b><br>Laboratoire de Tectonique,<br>PARIS Cedex 05, France                                | 12327 |
| Participating Scientist<br><b>Pr Bruno Goffe</b><br>Laboratoire de Géologie Ecole Normals Supérieure,<br>Paris, France                       | 12557 |
| Participating Scientist<br><b>Dr. Philippe Agard</b><br>Laboratoire de Tectonique Université Pierre & Marie Curie,<br>PARIS Cedex 05, France | 12329 |



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Field Leader

12328

**Dr. Loic Labrousse**  
Laboratoire de Tectonique,  
PARIS Cedex 05, France

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**Proj. Title**    **Paraglacial geomorphology**  
**Discipline**    **Geomorphology and Glaciology**  
**Nationality**    **French**  
**Institution**    **Institut polaire français Paul-Émile Victor (IPEV)**

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*Proj. Period*    2002 to 2005

*Coop. Inst.*    GEOLAB - UMR 6042 CNRS Maison de la recherche 4, rue Ledru 63 057 Clermont-Ferrand France

*Programme*    Progr. 400 "Geomorphoclim" IPEV

*Description*    The aim is a better understanding of the impact of contemporary climatic change (posterior to Little Ice Age) on plant dynamics and the morphodynamic processes active at the glacial margins in polar environments. The selected research field is constituted of the Brøgger Peninsula, where erosion assessments will be evaluated for various processes (frost weathering, runoff, biological weathering, ...). In 2004, we continue, with more precisions, and comparisons, our field research started in 2002. First, we want to produce cartography of plant colonisation and field erosion with very precise scale using GPS and aerial photography. We selected field areas, like Engelsbukta, because this section gives us till deposits and Holocene marine shorelines. So we have a chronological sequence to compare rates of plant colonisation and erosion. We have good results for the last century and we hope to compare with oldest deposits. On the other hand, we continue our investigation about the third goal, rates of erosion of cold processes and weathering. We use Grant Squirell 1022 to have very precise thermic datas like in 2002 for erratic limestone. We use also a Schmidt hammer to know rates of weathering on slope that know paraglacial evolution since the end of glacial period.

*Results*        ANDRÉ M.-F., 2003 - Do periglacial areas evolve under periglacial conditions ?  
 Geomorphology, 52, 149-164.  
 ANDRÉ M.-F. & MERCIER D. (ed), 2003 - La recherche française actuelle dans les milieux polaires et subpolaires, Bulletin de l'Association de Géographes Français, 4, 343-416.  
 ÉTIENNE S. & ANDRÉ M.-F., 2003 - Variabilité de la hiérarchie des processus de météorisation dans divers milieux nord-atlantiques (Islande, Labrador, Laponie, Spitsberg). Géomorphologie, n°3, 177-190.  
 LAFFLY D. & MERCIER D., 2002 - Global change and paraglacial morphodynamic modification in Svalbard, International Journal of Remote Sensing, vol. 43, n°21, 4743-4760.  
 MERCIER D., 2000 - Du glaciaire au paraglaciaire : la métamorphose des paysages polaires au Svalbard, Annales de Géographie, 616, 580-596.  
 MERCIER D., 2002 - La dynamique paraglaciaire des versants du Svalbard, Zeitschrift für Geomorphologie, vol. 46, n°2, 203-222.  
 MERCIER D. & LAFFLY D. - 2004 - Actual paraglacial progradation of the coastal zone in the kongsfjorden area, West Spitsbergen (Svalbard), in Cryospheric Systems: Glaciers and Permafrost, Ch. Harris & J. Murton (eds), Special publication, Geological Society, Londres, (in press)  
 MOREAU M., MERCIER D. & LAFFLY D., 2004 - Un siècle de dynamiques paraglaciaires et végétales sur les marges du Midre Lovénbreen (Spitsberg nord-occidental), Géomorphologie, n°2, (in press).

*Geographical Area(s)*    Ny-Ålesund

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## Geology

121052

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### *Participants*

Project Leader		10288
	<b>Dr. Denis Mercier</b> University of Paris-Sorbonne, UFR of Geography Paris, France	
Participating Scientist		10290
	<b>Dr. Dominique Laffly</b> University of PAU, Department of Geography Pau, France	
Participating Scientist		10291
	<b>Prof. Marie-Francoise Andre</b> UMR 6042 CNRS Maison de la recherche 4, Clermont-Ferrand, France	
Participating Scientist		12312
	<b>Dr. Samuel Etienne</b> UMR 6042 CNRS, Clermont-Ferrand, France	
Participating Scientist		12313
	<b>Student Myrtille Moreau</b> UMR 6042 CNRS, Clermont-Ferrand, France	
Participating Scientist		12311
	<b>Prof. Dominique Sellier</b> University of Nantes, Institute of Geography Nantes Cedex 03, France	
Field Leader		10288
	<b>Dr. Denis Mercier</b> University of Paris-Sorbonne, UFR of Geography Paris, France	

*Proj. Title*     **Geotectonic and paleogeographic evolution of the Southern Spitsbergen based on the palaeomagnetic investigations of Paleozoic and Triassic rocks from the Hornsund region.**

*Discipline*     **Paleomagnetism**

*Nationality*   **Polish**

*Institution*   **Institute of Geophysics Polish Academy of Sciences - Laboratory of Palaeomagnetism**

*Proj. Period*   2003 to 2005

*Coop. Inst.*    University of Greenwich, England - geotectonic interpretation of revealed palaeomagnetic data.

*Programme*

*Description*   The aim of the project is to provide new palaeomagnetic data that would help to elucidate a Palaeozoic and an early Mesozoic geotectonic evolution of the southern Svalbard. The questions concerning the spatial relations among terranes of Svalbard during the early Palaeozoic, relative movements of the archipelago formations with respect to the main neighbouring continents, as well as contribution of different tectonic events on present-day geometry of fold structures may be resolved by palaeomagnetic method. A basis of the method is analysis of the natural remanent magnetization (NRM), which is present and detectable in almost all rock types. Acquired in the ambient geomagnetic field, NRM conserves its orientation within the rock and testifies later movements of the host formation with respect to the geomagnetic axis. A significant advantage of the palaeomagnetic method stems from the fact that it offers a quantitative resolution for relative movements of crustal blocks. Also, it enables us to put an independent time constraints on age of fold structures, brittle tectonics, fluid migration and orientation of the principal stress axes, conclusions that can hardly be made by other methods in absence of superposition evidence.

The main problems to be addressed and resolved by this project can be specified as follows:

- A. Early Palaeozoic palaeogeography of the Hornsund Terrane will be resolved.
- B. Hypothesis on the independent drift of Svalbard composite terrane with respect to Baltica will be tested and verified.
- C. Age of selected fold structures will be determined palaeomagnetically and subsequently confronted with current tectonic models.
- D. Fissure fills of unknown age will be palaeomagnetically dated and the upper age limit for the related fracturing process will be resolved.
- E. Palaeo-stress pattern will be identified and its evolution described.

This year activity:

- continuation of laboratory investigation of the Palaeozoic rocks collected in the Horn

*Results*        In order to test the viability of this project reconnaissance palaeomagnetic studies were carried out over Hornsund area in 1999/2000 (during XXII Institute of Geophysics Polish Academy of Sciences year expedition to Hornsund). Using modern superconducting magnetometer (SQUID) and cleaning devices of the palaeomagnetic lab at our host Institute of Geophysics, we were able to determine NRM components in Cambrian to Triassic rocks with a resolution meeting advanced requirements. Notably, we have demonstrated, for example, that the Cambrian and Ordovician successions possess identifiable NRM components, recorded in magnetite. This promising finding triggered a new expedition in the year 2002 (during XXIV Institute of Geophysics Polish Academy of Sciences year expedition to Hornsund) during which ca. 200 samples from the Palaeozoic formations were collected. The primary results of demagnetisation of the part of collected samples - Carboniferous

## Geology

121023

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*Geographical Area(s)* Sørkapp Land  
Wedel Jarlsberg Land  
Torell Land

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### *Participants*

Project Leader 12343  
**Dr. Marek Lewandowski**  
Polish Academy of Sciences (PAS), Institute of Geophysics  
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Participating Scientist 10093  
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Participating Scientist 12556  
**Msc. Aleksandra Holda - Michalska**  
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Warsaw, Poland

Field Leader 11667  
**MSc Krzysztof Michalski**  
Polish Academy of Sciences (PAS), Institute of Geophysics  
Warszawa, Poland

**Proj. Title**    **Genesis of hydrothermal mineral deposits in Svalbard**  
**Discipline**    **Geology**  
**Nationality**   **Norwegian**  
**Institution**   **Mineralogical-Geological Museum, University of Oslo (UiO), Norway**

*Proj. Period*    2000 to 2004

*Coop. Inst.*     Bergmesteren på Svalbard, Longyearbyen, Norway.  
 Norwegian University of Science and Technology (NTNU), Trondheim, Norway

*Programme*

*Description*    Genesis of hydrothermally formed mineral deposits in Svalbard. Field mapping of detailed geology in mineral deposits, establishment of mineral paragenesis, minor sampling of minerals for fluid inclusion microthermometry and light stable isotope analysis, in order to establish mineralization sequence, temperature, pressure, fluid salinity, concentration of chemical species in the hydrothermal solution, as input data for thermodynamic modelling of fluid evolution and mineral deposition, as well as finding sources of fluids and their components.

This year's field work activity is unknown at the time of writing.

Field radio communication calls LH2UB (MF/HF); LH2VB and LH2WB (VHF).

*Results*         The Kapp Mineral (near Isfjord Radio) zinc-lead sulfide mineral deposit was investigated during the summer of 1994.  
 See "Research in Svalbard" 1997 page 98 (Norsk Polarinstitutt, Oslo, 1997).  
 Mineral deposits along the western part of Spitsbergen and Bjørnøya were investigated during the summer of 2000, 2001 & 2002.

*Geographical Area(s)*    Nordenskiöld Land  
 Oscar II Land  
 Haakon VII Land  
 Bjørnøya

**Participants**

<i>Project Leader</i>		1240
	<p><b>Tom Victor Segalstad</b>                  University of Oslo (UiO), Mineralogical-Geological Museum                  Oslo, Norway</p>	
<i>Participating Scientist</i>		12198
	<p><b>Dr. Krister Sundblad</b>                  Norwegian University of Science and Technology (NTNU), Institute of Geology                  Trondheim, Norway</p>	
<i>Field Leader</i>		1240
	<p><b>Tom Victor Segalstad</b>                  University of Oslo (UiO), Mineralogical-Geological Museum                  Oslo, Norway</p>	

**Proj. Title** Lower Palaeozoic sedimentology and stratigraphy of NE Svalbard  
**Discipline** Geology  
**Nationality** Norwegian  
**Institution** Norwegian Polar Institute

*Proj. Period* 2004 to 2006

*Coop. Inst.* University of Bremen  
 UNIS

*Programme* Geo Kart-Geological mapping of Svalbard

*Description* The project is carried out in the frame of the geological mapping program for Svalbard (GEOKART), and results will be crucial for the compilation of geological maps. The project comprises sedimentological and stratigraphical studies on the Carboniferous/Permian rock formations exposed in NE Spitsbergen (Ny Friesland, Olav V Land) and SW Nordaustlandet (Gustav Adolf Land). Investigations will focus on different lithostratigraphical units of the Billefjorden , Gipsdalen and Tempelfjorden groups. Based on the interpretation of sedimentary structures, lithology, microfacies, geochemical analyses and relative age determinations, depositional processes and paleoenvironments will be reconstructed. During field season 2004 detailed geological mapping will be carried out in NE Spitsbergen (Lomfjorden peninsula and southern areas encircled by Lomfjorden, Veteranen, Kvitbreen and Hinlopenbreen). Within the investigation area, a number of lithological sections will be logged and sampled for laboratory investigations in different type localities.

*Results*

*Geographical Area(s)* Ny-Friesland

**Participants**

- |                         |  |       |
|-------------------------|--|-------|
| Project Leader          |  | 11382 |
|                         | <b>Dr. Dierk Blomeier</b><br>Norwegian Polar Institute (NPI),<br>Tromsø, Norway                  |       |
| Participating Scientist |  | 12533 |
|                         | <b>Dr. Christian Scheibner</b><br>University of Bremen, Department of Geology<br>Bremen, Germany |       |
| Participating Scientist |  | 12534 |
|                         | <b>Dr. Holger Forke</b><br>University of Bremen, Department of Geology<br>Bremen, Germany        |       |
| Field Leader            |  | 11382 |
|                         | <b>Dr. Dierk Blomeier</b><br>Norwegian Polar Institute (NPI),<br>Tromsø, Norway                  |       |

## Geology

121024

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*Proj. Title*    **Polar Karst**  
*Discipline*   **Geology**  
*Nationality*   **Polish**  
*Institution*   **Stowarzyszenie Klub Speleologiczny AVEN**

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*Proj. Period*   2004 to 2008

*Coop. Inst.*    Speleoklu Dabrowna Gornicza  
Polskie Towarzystwo Geograficzne Klub Krasu I Speleologii  
Silesian University

*Programme*

*Description*   Our expedition project include exploring and pf ounderground karst`s streams in areas of south Svalbard Carst.  
We plan knowing streams boosting the Trollosen source in Hilmarfjellet in year 2004.

*Results*        This year is the first of our research in Svalbard.

*Geographical Area(s)*   Sørkapp Land

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*Participants*

Project Leader 12558

**Mariusz Polok**

,  
Wryy, Poland

Field Leader 12559

**Wlodzinierz Porebski**

,  
Katowice, Poland



**Proj. Title**    **Spectrograph Imaging Facility (SIF)**  
**Discipline**    **Physics**  
**Nationality**   **British**  
**Institution**    **University of Southampton**

*Proj. Period*    2000 to 2050  
*Coop. Inst.*     University College London  
*Programme*

*Description*    HiTIES measures emissions from oxygen and nitrogen simultaneously with the hydrogen H-beta line. A study of the O+ multiplet at 4639-4696 Å in proton and electron aurora has been carried out. This multiplet is blended with the N2+ 1N(1,3) band, which is an important auroral diagnostic emission. A statistical study showed that the brightness of the O+ multiplet in electron aurora is on average 10% of N2+ 1N(0,2) band. The emission cross-section of the multiplet has been estimated. Case studies using the ESR data reveal the dependence of the relative brightness of the oxygen lines on the energies of precipitating electrons. In the studied case it was found that rayed aurora has a significant low energy population, resulting in a flat E-layer ionisation profile and enhanced O+ lines. In a separate case study it has been found that in proton aurora the oxygen multiplet is strongly enhanced.

*Results*        Measurements of the Doppler shifted Hbeta line, combined with modelling of the auroral ionosphere have resulted in a much better understanding of the role of proton precipitation over Svalbard. Data from the IMAGE satellite, which measures the effects of proton precipitation from space in the UV Lyman alpha emission have been combined with particle data from FAST as input to modelling. Other instruments on the facility are an imaging camera and two photometers. These optical data are used in conjunction with EISCAT Svalbard Radar data.

1. Lanchester, B. S., M. Galand, S. C. Robertson, M. H. Rees, D. Lummerzheim, I. Furniss, L. M Peticolas, H. U. Frey, M. Mendillo, and J. Baumgardner High resolution measurements and modeling of auroral hydrogen emission line profiles, *Annales Geophys.* 21, 1629-1643, 2003.
2. Lockwood, M., B.S. Lanchester, H.U. Frey, K. Throp, S.K. Morley, S.E. Milan, and M. Lester IMF Control of Cusp Proton Emission Intensity and Dayside Convection: Implications for component and anti-parallel reconnection. *Annales Geophys.* 21, 955-982, 2003.
3. Lockwood, M., B. S. Lanchester, H. Frey, K. Throp, S.Morley, S. E. Milan and M. Lester, IMF control of cusp proton emission intensity and dayside convection: implications for component and anti-parallel reconnection, *Annales Geophysicae*, 21, 955 - 982, 2003.
4. Lanchester, B. S., M. H. Rees, S. C. Robertson, D. Lummerzheim, M. Galand, M. Mendillo, J. Baumgardner, I. Furniss and A. D. Aylward Proton and electron precipitation over Svalbard - first results from a new Imaging Spectrograph (HiTIES) *Proc. of Atmospheric Studies by Optical Methods, SGO Pubs* 92, 33-36, 2003.
5. McWhirter, I., I. Furniss, B. S. Lanchester, S. C. Robertson, J. Baumgardner, M. Mendillo A new spectrograph platform for auroral studies in Svalbard. *Proc. of Atmospheric Studies by Optical Methods, SGO Pubs* 92, 73-37, 2003.
6. Ivchenko, N., B. S. Lanchester, M. H. Rees, D Lummerzheim, M. Galand, K. Throp and I. Furniss *Observat*

*Geographical Area(s)*    Longyearbyen

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## *Participants*

Project Leader

11942

**Dr. Betty Lanchester**

University of Southampton, Department of Physics and Astronomy  
Hamshire, United Kingdom

# Geophysics

121043

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**Proj. Title** Seismological Station at Ny Ålesund  
**Discipline** Seismology  
**Nationality** Germany, Norway, USA  
**Institution** Alfred Wegener Institute for Polar and Marine Research

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*Proj. Period* 1994 to 2004

*Coop. Inst.* Institute for Solid Earth Physics, University Bergen, Norway  
Norwegian Polar Institute, Tromsø,  
Albuquerque Seismological Observatory, USA  
Geoforschungszentrum Potsdam, Germany

*Programme* KOL 10

*Description* The seismological vbb-station KBS (very broad band station) at Ny Ålesund is operating since November 1994 and replaces the former WWSSN station operated by the Institute of Solid Earth Physics, University Bergen. With its modern data acquisition system (Quanterra system, 6-channels) and two sets of high performance broad band and long period seismometers (Streckeisen STS-1 and STS-2 seismometers) the station KBS meets all requirements of a modern seismological station. KBS is integrated into the international Global Seismological Network (GSN) and is also part of the Norwegian Seismological Network. Because of Svalbard's isolated location this station is an important contribution to the GSN network by filling a rather large gap in the arctic region. The main task of this station is monitoring the seismic activity on a global scale. Special research interests focus on regional seismicity at and around Svalbard and along the ridges in the arctic ocean. KBS is an open station, e.g., any interested scientist and international organization is allowed to retrieve data of special interest. Data are routinely processed and stored at the IRIS Data Management Center in Seattle and copies are available at the Geoforschungszentrum Potsdam (GFZ). The National Earthquake Information Center (NEIC), USA, frequently refers to KBS recordings for the determination of hypocenter parameters of global earthquakes. Data for processing are retrieved automatically via telephone line by this organization. KBS data are also included into the seismological processing routines of the Norwegian Seismological Network, operated by the University Bergen. Therefore these data contribute also to the monitoring of the seismic activity in Scandinavia and the adjacent arctic regions.

*Results* Onset and phase readings and other parameters of KBS recordings are listed in the  
o bulletins of the IRIS Data Management Center, Seattle  
o bulletins of the Norwegian Seismological Network, University Bergen  
No special publications using only KBS data are known until now

*Geographical Area(s)* Ny-Ålesund

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## Participants

Project Leader

**Dr. Alfons Eckstaller**  
Alfred-Wegener-Institute for Polar and Marine Research (AWI),  
Bremerhaven, Germany

10363

**Proj. Title**    **Heat and mass transfer in permafrost affected soils**  
**Discipline**    **Hydrology**  
**Nationality**    **German**  
**Institution**    **Alfred Wegener Institute for Polar and Marine Research**

*Proj. Period*    2004 to 2004

*Coop. Inst.*    Institute for Environmental Physics, University of Heidelberg

*Programme*

*Description*    The active layer, the annually freezing and thawing upper ground in permafrost areas, is of pivotal importance. The moisture and heat transfer characteristics of this layer also determine the boundary layer interactions of the underlying permafrost and the atmosphere and are therefore important parameters input for geothermal or climate modeling. Finally, changes in the characteristics of the permafrost and permafrost related processes may be used as indicators of global ecological change provided the system permafrost-active layer-atmosphere is understood sufficiently well. The dynamics of permafrost soils is measured with high accuracy and high temporal resolution at our two sites close to Ny-Ålesund. Using these continuous data we quantify energy balance components and deduce heat transfer processes such as conductive heat flux, generation of heat from phase transitions, and migration of water vapor. During the summer/fall 2004, the station will be maintained and sensors will be added/replaced.

*Results*        Continuous high resolution data on soil temperature and liquid water content from a are used to quantify thermal processes in a non sorted circle site close to Ny-Ålesund (Roth and Boike, 2001). It was found that a thicker layer of snow greatly reduced the heat exchange of the permafrost soil with the atmosphere. Soil cooling was about twice as pronounced during the winter of 2000 where the snow cover was about half as thick (about 0.4 m). The melting of the snow cover and possible infiltration of snow meltwater and/or temperature induced vapor flux towards colder layers warmed the permafrost soil at this site down to depths of 0.9 m. An energy balance model was applied to estimate atmospheric, ground heat and snow heat fluxes for snow-covered periods from autumn 1998 to winter 2000. Sensible heat and rain is primarily responsible for winter ablation of snow, while net radiation was primarily responsible for ablation during the spring. The ground heat flux is an important energy sink during spring melt, using between 30 to 50 % of total available energy.

Roth, K. and J. Boike, 2001. Quantifying the thermal dynamics of a permafrost site near Ny-Alesund, Svalbard. *Water Resources Research*, 37(12), 2901-2914.  
 Boike, J., K. Roth and O. Ippisch 2003. Seasonal snow cover on frozen ground: Energy balance calculations of a permafrost site near Ny-Alesund, Spitsbergen. *Journal of Geophysical Research*, Vol.108, D2, 8163.  
 Boike, J., L. D. Hinzman, P. P. Overduin, V. Romanovsky, O. Ippisch and K. Roth, 2003. A comparison of snow melt at three circumpolar sites: Spitsbergen, Siberia, Alaska. 8th International Conference on Permafrost, Zürich, Switzerland, 79-84.

*Geographical Area(s)*    Ny-Ålesund

*Participants*

# Geophysics

121020

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Project Leader

10659

**Dr. Julia Boike**

Alfred-Wegener-Institute for Polar and Marine Research (AWI), Research Department  
Potsdam  
Potsdam, Germany

Field Leader

12270

**Dipl. Ing. Christian Wille**

Alfred-Wegener-Institute for Polar and Marine Research (AWI), Research Department  
Potsdam  
Potsdam, Germany

## Geophysics

120905

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*Proj. Title* **KOL 02c, Trace gas measurements by Fourier Transform Spectroscopy (NDSC)**

*Discipline* **Geophysics**

*Nationality* **Germany**

*Institution* **Alfred Wegener Institute, Research Unit Potsdam**

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*Proj. Period* 2003 to 2003

*Coop. Inst.* University of Bremen, Germany  
JPL Pasadena, USA;  
NASA Langley, USA;  
NIWA Lauder, New Zealand

*Programme* Network for detection of stratospheric change

*Description* Ground-based FTIR-observations are performed as part of the long-term observations within the NDSC. The measurements are performed half automatically by the NDSC-engineer at the station. Spectra are recorded typically once or twice per week. The analysis of the spectra is performed at the University of Bremen and at AWI. In 2003 it is planned to study the long-term trend of a few tropospheric trace gases, like CO, HCN or C<sub>2</sub>H<sub>6</sub>.

*Results* The observations are performed regularly since 1992. The analysis of the total columns has been performed up to now at AWI. In 2002 our main focus was to study the long-term trend of chlorine species in the stratosphere, HCl and ClONO<sub>2</sub>. Furthermore, we studied the trend of the main sulphur containing species COS.  
T. Albrecht, J. Notholt, R. Wolke, S. Solberg, C. Dye, H. Malberg, Variations of CH<sub>2</sub>O and C<sub>2</sub>H<sub>2</sub> determined from groundbased FTIR measurements and comparison with model results, *Adv. Space Res.*, 29, 1713-1718, 2002.  
J. Mellqvist, B. Galle, T. Blumenstock, F. Hase, D. Yashov, J. Notholt, B. Sen, G.C. Toon, M.P. Chipperfield, Ground-based FTIR observations of chlorine activation and ozone depletion inside the Arctic vortex during the winter of 1999/2000, *J. Geophys. Res.*, in press.  
Notholt, J., Lehmann, R. (2003). The moon as light source for atmospheric trace gas observations: Measurement technique and analysis method, *Journal of Quantitative Spectroscopy & Radiative Transfer*, 76, 435-445.  
C.P. Rinsland, E. Mahieu, R. Zander, N.B. Jones, M.P. Chipperfield, A. Goldman, J. Anderson, J. M. Russell III, P. Demoulin, J. Notholt, G. C. Toon, J.-F. Blavier, B. Sen, R. Sussmann, S.W. Wood, A. Meier, D.W.T. Griffith, L.S. Chiou, F.J. Murcray, T.M. Stephen, F. Hase, S. Mikuteit, A. Schulz, T. Blumenstock, Long-Term Trends of Inorganic Chlorine from Ground-Based Infrared Solar Spectra: Past Increases and Evidence for Stabilization *J. Geophys. Res.*, in press.  
C.P. Rinsland, A. Goldman, E. Mahieu, R. Zander, J. Notholt, N.B. Jones, D.W.T. Griffith, T.M. Stephen, L.S. Chiou, Ground-based infrared spectroscopic measurements of carbonyl sulfide: Tropospheric trends from a 24-year time series of solar absorption measurements, *J. Geophys. Res.*, in press.

*Geographical Area(s)* Ny-Ålesund

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*Participants*

## Geophysics

120905

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Project Leader		1188
	<b>Dr. Justus Notholt</b> University of Bremen, Bremen, Germany	
Project Leader		1236
	<b>Prof. Otto Schrems</b> Alfred-Wegener-Institute for Polar and Marine Research (AWI), Bremerhaven, Germany	
Participating Scientist		12368
	<b>Voltaire Velazco</b> University of Bremen, Bremen, Germany	
Field Leader		1188
	<b>Dr. Justus Notholt</b> University of Bremen, Bremen, Germany	

## Geophysics

120907

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*Proj. Title*    **KOP 74, Observation of greenhouse gases by FTIR spectrometry (SOGE)**

*Discipline*    **Geophysics**

*Nationality*   **German**

*Institution*   **Alfred Wegener Institute, Research Unit Potsdam, Germany**

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*Proj. Period*   2004 to 2004

*Coop. Inst.*    University of Bremen, Germany  
JPL Pasadena, USA;  
NASA Langley, USA;  
NIWA Lauder, New Zealand

### *Programme*

*Description*   The aim of the project is to develop a cost-effective long-term European observation system for halocarbons and to predict and assess impacts of the halocarbons on the climate and on the ozone layer. In 2003 we will concentrate on measurements and analysis of three CFC's, CFC-11, CFC-12 and CFC-22. This requires considering the interfering gases, mainly water, in the correct way. The spectra are recorded within the NDSC activities by the NDSC-engineer at the station typically once per week.

*Results*        In 2002 the measurements were performed on a continuous basis. Up the now, the long-term trend of CFC-12 and CFC-22 since 1995 until present have been studied. Currently, we are concentrating on improvements in the measurement techniques for the CFC's and SF6. In the analysis we concentrated on the study of the seasonal and long-term variability of SF6

*Geographical Area(s)*   Ny-Ålesund

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### *Participants*

Project Leader 1188

**Dr. Justus Notholt**  
University of Bremen,  
Bremen, Germany

Project Leader 1236

**Prof. Otto Schrems**  
Alfred-Wegener-Institute for Polar and Marine Research (AWI),  
Bremerhaven, Germany



## Geophysics

120906

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*Proj. Title*    **KOP 67, Validation of the SCIAMACHY satellite instrument by ground-based FTIR spectrometry**

*Discipline*    **Geophysics**

*Nationality*   **German**

*Institution*   **Alfred Wegener Institute, Research Unit Potsdam, Germany and university of Bremen**

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*Proj. Period*   2002 to 2004

*Coop. Inst.*    University of Bremen, Germany  
JPL Pasadena, USA;  
NASA Langley, USA;  
NIWA Lauder, New Zealand

### *Programme*

*Description*   Long term validation of the SCIAMACHY satellite instrument on board ENVISAT by ground-based FTIR spectrometry.  
Solar and lunar spectra will be recorded on a regular basis (once to twice a week) , and are transferred automatically to AWI and University of Bremen for analysis. This work is done by the Koldewey Station engineer, who will be supported by a scientist in summer for alignment of the instrument.

*Results*        Measurements performed in 2002/2003 have been analyzed and submitted to the validation database. Comparisons with first analyzed SCIAMACHY data have been performed.

Schulz, A., Notholt, J., Homann, T., Burrows, J.P., Schrems, O.(2001). SCIAMACHY validation by ground based FTIR-spectrometry, Proceedings of the Pre-launch Workshop on the Atmospheric Chemistry Validation of Envisat (ACVE), 16-18 May.

Bramstedt, K., Buchwitz, M., Blum, U., Blumenstock, T., Frankenberg, C., Gathen, P. von der, Mazière, M., Richter, A., Savigny, C., Schrivjer, H., Schulz, A., Steinbrecht, W., Swart, D.(2003). Comparison of scientific SCIAMACHY products with ground-based measurements, Proceedings of the Envisat Validation Workshop, SP-531, ESA Publication Division

Schulz, A., Warneke, T., Notholt, J., Schrems, O., Neuber, R., Gathen, P. von der(2003). Groundbased FTIR, ozonesonde and LIDAR measurements for the validation of SCIAMACHY (AOID 331), Proceedings of the Envisat Validation Workshop, SP-531, ESA Publication Division.

De Mazière, M., Coosemans, T., Barret, B., Blumenstock, T., Griesfeller, A., Demoulin, P., Fast, H., Griffith, D., Jones, N., Mahieu, E., Mellqvist, J., Mittermeier, R. L., Notholt, J., Rinsland, C., Schulz, A., Smale, D., Strandberg, A., Sussmann, R., Wood, S., Buchwitz, M.(2003). Validation of ENVISAT-1 Level-2 Products related to lower Atmosphere O3 and NOy Chemistry by an FTIR Quasi-Global Network, Proceedings of the Envisat Validation Workshop, SP-531, ESA Publication Division.

*Geographical Area(s)*   Ny-Ålesund

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### *Participants*

## Geophysics

120906

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Project Leader		1188
	<b>Dr. Justus Notholt</b> University of Bremen, Bremen, Germany	
Project Leader		1236
	<b>Prof. Otto Schrems</b> Alfred-Wegener-Institute for Polar and Marine Research (AWI), Bremerhaven, Germany	
Field Leader		11676
	<b>Dr. Astrid Schulz</b> Alfred-Wegener-Institute for Polar and Marine Research (AWI), Research Department Potsdam Potsdam, Germany	
Field Leader		12367
	<b>Dr. Thorsten Warneke</b> University of Bremen, Institute of environmental physics Bremen, Germany	

## Geophysics

121000

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*Proj. Title* **Polarstern Cruise ARK XX/2**  
*Discipline* **Oceanography**  
*Nationality* **Germany**  
*Institution* **Alfred-Wegener-Institute for Polar and Marine Research (AWI),  
Bremerhaven, Germany**

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*Proj. Period* 2004 to 2004

*Coop. Inst.* Max Planck Institute for Chemistry  
GKSS Research Center

*Programme*

*Description* Work on Svalbard will be part of the Polarstern Expedition ARK XX/2 aiming for oceanographic, petrologic, bathymetric and geological work in Fram Strait and north of Svalbard. Measuring the Sea Ice thickness using a helicopter borne induction device (EM-bird) will be a main goal of the cruise. For sea ice thickness accuracy and system enhancements it is of great benefit to land the EM-bird on a Glacier within helicopter range from the ship for half a day once or twice during the expedition. Measuring on the surface of a glacier provides the unique opportunity to study the technical drift of the system far away of any electrical conductor, as glaciers are almost perfect resistors.

Polarstern will be west of Prins Karls Forland in the second half of July, making it suitable to fly the EM-bird to the Murraybreen at ca. 78°43' N, 10° 55'W. Due to bad weather the target area could be shifted to Albert I Land in August, as Polarstern will be operating north of Svalbard then. We won't take samples or do any drillings but only land the system on a remote place and keep it there for some hours. As a ground crew is needed to land the bird, the operation will involve 2 helicopters. One aircraft with the ground crew lands first and helps the pilot of the second helicopter to land the bird. Once the system is on the ground, the Helicopters are not needed until flying back to the ship.

The suggested position is not compulsory and can be changed to any other location on a glacier at least 300 m thick.

*Results* This type of investigation has never been published or carried out so far. A comparable trial experiment was conducted by Pfaffling and Bishop in Antarctica last October and yielded very promising results.  
System Drift is however a key problem in Helicopter EM work.  
Deszcz-Pan, M., Fittermann, D. V. and Labson, V.F., 1998, Reduction of inversion errors in helicopter EM data using auxiliary information: Expl. Geophys. 29, 142-146.  
Fitterman, D. V., 1998, Sources of calibration errors in helicopter EM data: Expl. Geophys. 29, 65-70.

*Geographical Area(s)* Prins Karls Forland  
Albert I Land  
Haakon VII Land

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*Participants*

## Geophysics

121000

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Project Leader	12529
<b>Prof. Dr. Peter Lemke</b> Alfred-Wegener-Institute for Polar and Marine Research (AWI), Bremerhaven Bremerhaven, Germany	
Participating Scientist	12531
<b>John Bishop</b> Mire Geophysics Pty Ltd, Sandy Bay, Australia	
Participating Scientist	12532
<b>Jan Lieser</b> Alfred-Wegener-Institute for Polar and Marine Research (AWI), Bremerhaven Bremerhaven, Germany	
Field Leader	12530
<b>Andreas Pfaffling</b> Alfred-Wegener-Institute for Polar and Marine Research (AWI), Bremerhaven Bremerhaven, Germany	

**Proj. Title**    **The meteorological conditions and climatic modifications study in Spitsbergen**

**Discipline**    **Meteorology**

**Nationality**    **Russian**

**Institution**    **Arctic and Antarctic Research Institute (AARI), St. Petersburg, Russia**

**Proj. Period**    2001 to 2010

**Coop. Inst.**    Norwegian Polar Institute

**Programme**

**Description**    In 2004 AARI plans to study the meteorological conditions and climatic modifications in Svalbard. The activity will include:

- The study of radiating characteristics of a snow and ice,
- The study of the snow cover on the rivers basins,
- Mass balance research of some West Spitsbergen glaciers,
- Water balance of some Svalbard rivers,
- Chemical sampling of river waters,
- Operation of hydrometric station and freshwater runoff research during melting period,
- The study of relict swamps for the reconstruction of modification paleogeographic's conditions in Holocene,
- The oceanographic observations in the Isfjord and Gronfjord areas,
- The man adaptation mechanisms to extreme climatic conditions study.

**Results**

1. Mavlyudov B.R., Solovyanova I.Yu. "Drainage system of Aldegonda Glacier, of Spitzbergen nature. 2003. Iss. 3. Apatity: Publ. KSC RAS, p. 136-142. (in Russian)
2. Shevnina E.V. Solovyanova I.Yu., Bystrov M.A. "Some results of Aldegonda Glacier runoff investigation in August - September 2002."// Complex investigations of Spitzbergen nature. 2003. Iss. 3. Apatity: Publ. KSC RAS, p. 146-150. (in Russian)
3. Mavlyudov B.R., Solovyanova I.Yu. "Caves of glaciers Aldegonda (Spitsbergen) and Bashkara (Caucasus)." //Karst i Speleologija, 2003, (Poland) (in publish) Mavlyudov B.R., Solovyanova I.Yu. "Aldegonda Glacier drainage system (Spitsbergen)"//Complex investigations
4. Spitsbergen" //Proceedings of 6th International Symposium Glacier Caves and Karst in Polar Regions Ny-Ålesund, 2003 (in publish)
5. Mavlyudov B.R., Solovyanova I.Yu. "Compare caves of cold and temperate glaciers"//Proceedings of 6th International Symposium Glacier Caves and Karst in Polar Regions", Ny-Ålesund, 2003 (in publish)
6. Mavlyudov B.R., Solovyanova I.Yu. "Hydrological system of polar glacier in conditions of changing climate"//Proceedings of Final Science Conference Arctic Climatic System Study, 2003, St-Petersburg (in publish)
7. Solovyanova I.Yu., Mavlyudov B.R. "Some particularities of distribution superficial water-streams on glaciers (West Spitsbergen)"//Theses of International conference in Myrmansk, 2004. (in publish), (in Russian)
8. Solovyanova I.Yu., Tretyakov M.V. "Suspended sediments supervision on the rivers of Grenfjord watershed."//Theses of international conference in Myrmansk, 2004. (in publish), (in Russian)
9. Priamikov S.M., Ivanov B.V., Svjashennikov., P.N., Solovyanova I.Yu., Tretjakov M.V. the complex Hydrometeorological investigations of some glacier basins in Spitsbergen. In book of papers: "Problems of Arctic and Antarctic" (in publish), (in Russian)
10. B. Ivanov, O. Andreev, A. Bezgreshnov, 2003. Preliminary investigations results of snow cover properties on Spitzbe

## Geophysics

121009

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*Geographical Area(s)* Prins Karls Forland  
Barentsburg  
Pyramiden  
Barents Sea

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### *Participants*

Participating Scientist 12419

**Dr. Mikhail Tretyakov**  
Arctic and Antarctic Research Institute (AARI),  
St.Petersburg, Russia

Field Leader 12541

**Irina Solovyanova**  
Arctic and Antarctic Research Institute (AARI),  
St. Petersburg, Russia

# Geophysics

121050

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*Proj. Title*    **EPIS**  
*Discipline*   **Atmospheric Physics**  
*Nationality*   **French**  
*Institution*   **Centre National de la Recherche Scientifique. Service d'Aéronomie**

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*Proj. Period*   2002 to 2008  
*Coop. Inst.*    Observatoire de haute Provence  
                    Laboratoire de Planétologie

## *Programme*

*Description*    The investigation is dedicated to the study of the upper atmosphere dynamics in the polar cap, a region where there are a direct influence of the solar particles on the Earth's atmosphere. The dynamics is observed by means of an interferometer. The instrument started its measurements in November 2002. The instrument is placed in a shelter at the Auroral Optical station, and it is operated from Observatoire de Haute Provence (France). We experienced some technical problems which lead to organize a mission by a technician after a remote investigation and some help received locally. These problems have been solved.

*Results*        An important fact is the local meteorological conditions of observations. Cloudy sky is frequent, and is a limitation to our scientific return. However, on 28 October a very large Coronal Mass Ejection occurred. When the particles arrived in the upper atmosphere by November 30, the conditions of measurements above Svalbard were acceptable, and we have observed the dramatic effect of the particles on the line intensity and wind velocity in the thermosphere. For the latter, the speed was increased up to 500 m/s, the zonal component being more perturbed than the meridional component, this effect being still persistent one day after the particles arrival.  
These results have been reported at the European Geosciences Union (Nice, April, 2004).

*Geographical Area(s)*   Longyearbyen

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## *Participants*

Project Leader 12232  
                    **Dr. Gérard Thuillier**  
                    Service d'Aéronomie du CNRS,  
                    Verrières le Buisson, France

Participating Scientist 12587  
                    **Dr. Michel Hersè**  
                    Service d'Aéronomie du CNRS,  
                    Verrieres-le Buisson, France

Field Leader 12232  
                    **Dr. Gérard Thuillier**  
                    Service d'Aéronomie du CNRS,  
                    Verrières le Buisson, France

## Geophysics

120898

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*Proj. Title* **Water, sediment and solute fluxes from the Midre Lovenbreen basin**  
*Discipline* **Glaciology**  
*Nationality* **British**  
*Institution* **Department of Geography, University of Sheffield, Winter Street, Sheffield**

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*Proj. Period* 1997 to 2050

*Coop. Inst.* Norwegian Polar Institute

*Programme* N/A

*Description* This year we will focus upon nutrient dynamics and runoff pathways in the catchment. We will therefore monitor runoff quantity and quality, collect snow, meltwater and ice samples, monitor meteorological conditions on the glacier and also undertake an intensive dye tracing programme.

*Results* Fluxes of water and solute, leading to estimation of rates of chemical denudation have been published.  
Hodson, A.J. and Tranter, M. 1999. CO<sub>2</sub> drawdown by contemporary glacial meltwater fluxes in high arctic Svalbard, IAHS Publications No. 256, 259-265.  
Hodson, A.J., Tranter, M. and Vatne, G. 2000. Contemporary rates of chemical denudation and atmospheric CO<sub>2</sub> sequestration in glacierised basins: an Arctic perspective, *Earth Surface Processes and Landforms*, 25, 1447-1471.  
Hodson, A.J., Mumford, P.N., Kohler, J. and Wynn, P.M. In Press. The High Arctic glacial ecosystem: new insights from nutrient budgets, *Biogeochemistry*.  
Hodson, A.J., Mumford, P.N. and Lister, D. In Press. Suspended sediment and phosphorus in proglacial rivers: bioavailability and potential impacts upon the P status of ice-marginal receiving waters, *Hydrological Processes*, 17.  
Irvine-Fynn, T.D.L. Moorman, B.J., Sjogren D.B., Willis, I.C., Hodson, A.J., Mumford, P.N., Williams, J.L.M., and Walter F.S.A. In Press. Geocryological processes linked to High-Arctic pro-glacial stream suspended sediment dynamics: examples from Bylot Island, Nunavut and Spitsbergen, Svalbard. *Hydrological Processes*.

*Geographical Area(s)* Ny-Ålesund

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### *Participants*

Project Leader 10536  
**Dr. Andrew Jonathan Hodson**  
University of Sheffield, Department of Geography  
Sheffield, United Kingdom

Participating Scientist 12526  
**Mr Tristram Irvine-Fynn**  
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Participating Scientist 12527  
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University of Sheffield, Department of Geography  
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## Geophysics

120898

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Participating Scientist

12528

**Ms Anita Asadullah**

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Sheffield, United Kingdom

Field Leader

10536

**Dr. Andrew Jonathan Hodson**

University of Sheffield, Department of Geography  
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## Geophysics

120957

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*Proj. Title*    **Allsky cameras in Longyearbyen and Ny Alesund**  
*Discipline*    **Geophysics**  
*Nationality*   **Finnish-Italian**  
*Institution*   **Finnish Meteorological Institute, Geophysical Research**

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*Proj. Period*    2003 to 2004  
*Coop. Inst.*     Istituto di Fisica dello Spazio Interplanetario del CNR, Rome, Italy (IFSI/CNR)  
*Programme*     MIRACLE (<http://www.geo.fmi.fi/MIRACLE>)  
*Description*    The cameras acquire during dark periods auroral images at three wavelengths, 557.7, 427.8 and 630.0 nm. The sample rates are 20, 60, 60 sec respectively.  
*Results*        The images are used together with other MIRACLE observations and satellite data in the research of auroral morphology or ionospheric electrodynamics, e.g. Kauristie et al., (Annales Geophysicae, 19, 1613-1640, 2001 or Massetti et al., (Journal of Geophysical Research, 107, 1255, 2002)  
*Geographical Area(s)*   Longyearbyen  
                                 Ny-Ålesund

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### Participants

Project Leader 12304  
                         **Dr. Kirsti Kauristie**  
                         Finnish Meteorological Institute, GEO  
                         Helsinki, Finland

Project Leader 12305  
                         **Dr. Stefano Orsini**  
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                         Roma, Italy

Project Leader 12555  
                         **Dr. Kari Pajunpaa**  
                         Finnish Meteorological Institute, Geophysical Research,  
                         Helsinki, Finland

Field Leader 12308  
                         **Stefan Claes**  
                         University Centre on Svalbard (UNIS),  
                         Longyearbyen, Norway

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**Proj. Title**    **Chemistry of size-fractionated atmospheric aerosols at the Zeppelin mountain station, Ny-Ålesund**

**Discipline**    **Atmospheric Chemistry**

**Nationality**    **Belgian**

**Institution**    **Ghent University, Institute for Nuclear Sciences, GENT, Belgium**

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*Proj. Period*    1994 to 2004

*Coop. Inst.*    Norwegian Institute for Air Research (NILU), KJELLER, Norway

*Programme*    Programme "Global Change and Sustainable Development", Belgian

*Description*    Size-fractionated atmospheric aerosols are continuously collected at the Zeppelin mountain station in Ny-Ålesund, Spitsbergen. The sampling device used consists of a modified Sierra-Andersen Hi-Vol cascade impactor, which separates the aerosol into a coarse and a fine size fraction. The collections are performed according to a 2-2-3-day schedule. The samples are analyzed for sulphate, methane sulphonate (MSA), and several other anionic and cationic species. The data sets are examined with receptor models and/or related to air mass trajectories in order to identify the major source regions of the various species, to evaluate the impact of each region, and to assess the extent of the anthropogenic perturbation.

*Results*    The atmospheric concentration data (in the <2.5 micrometer size fraction) for the 10-year period from 1991 through 2000 were examined. The anthropogenic elements As and Sb exhibited a clear seasonal cycle, with much lower levels during summer than during winter/early spring. For As, the summer levels were about 50 times lower than the winter/early spring levels, whereas for Sb they were about 30 times lower. Also non-sea-salt Br showed a clear seasonal cycle. The highest levels were observed in the period from March to mid-May, the lowest values in the period July through October, and the difference between both periods was about a factor of 20. Se and I exhibited much less variability, but also these two elements showed clear seasonal cycles, with for Se higher levels in winter/early spring than in summer. Iodine, on the other hand, had maxima in spring (March-April) and in fall (October). Natural sources, especially marine biogenic sources, are most likely quite important for both elements. Non-sea-salt (nss) sulphate was lower during summer than during the rest of the year, but the summer/winter difference remained limited to about a factor of 10. Methanesulphonic acid, a gas-to-particle conversion product of dimethylsulphide from marine phytoplankton, was very low during winter, increased steadily between day 100 and day 120 of the year, and remained high during the entire summer. The contributions from marine biogenic and from anthropogenic sources to the fine nss-sulphate during summer (June-July-August) were estimated: 38% of the fine nss-sulfate in summer was on average attributed to the marine biogenic source, but that attribution was around 50% for 1991 and 1994, versus only 20% for 1993 and 1998. The 10-year data set for the <2.5 micrometer size fraction was also subjected to principal component analysis (PCA) in order to examine the interrelations between the various chemical species and elements and to identify the major aerosol components (source types)

*Geographical Area(s)*    Ny-Ålesund

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*Participants*

## Geophysics

121044

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Project Leader	1157
<b>Prof. Dr. Willy Maenhaut</b> University of Gent, Institute for Nuclear Sciences Gent, Belgium	
Participating Scientist	1087
<b>Dr. Jan Erik Hanssen</b> Norwegian Institute for Air Research (NILU), Kjeller, Norway	
Participating Scientist	12199
<b>Xuguang Chi</b> University of Gent, Institute for Nuclear Sciences Gent, Belgium	
Participating Scientist	12510
<b>Nico Raes</b> University of Gent, Institute for Nuclear Sciences Gent, Belgium	
Field Leader	1157
<b>Prof. Dr. Willy Maenhaut</b> University of Gent, Institute for Nuclear Sciences Gent, Belgium	

**Proj. Title**    **Chemistry of mercury in polar areas (CHIMERPOL)**  
**Discipline**    **Chemistry**  
**Nationality**   **French**  
**Institution**   **Institut Paul Emile Victor - Technopôle Brest-Iroise - BP 75-29280  
PLOUZANE- FRANCE**

**Proj. Period**    2004 to 2004  
**Coop. Inst.**     Laboratoire de Glaciologie et Géophysique de l'Environnement du CNRS - 54, Rue  
Molière- BP 96- 38402 Saint Martin D'hères cedex- FRANCE  
Groupe de Recherche sur l'Environnement et la Chimie Atmosphérique- 39-41, Boulevard  
Gambetta- 38000 Grenoble- FRANCE

**Programme**     This program is a part of a large program with Italian, German, American, Norwegian,  
Canadian teams.

**Description**    The field annual scientific programme will be organised with four experimental studies :

- 1-Study of mercury dynamic in the snowpack taking into account the previous results obtained in Station Nord in 2002.
- 2- Studies under simulated conditions chemistry and photochemistry of Hg in the snowpack.
- 3-Atmospheric particulate mercury speciation. A way to better understand deposition fluxes of Hg to the snow pack.
- 4-Air/snow/firn/ice transfer fonction determinatio.

**Results**        The study of mercury dynamic in the seasonal snow pack has started for our group in 1998. The first studies were devoted to the speciation of mercury in Alpine snow, where we showed that reactive mercury was probably photoreduced in the snow. After these studies in Alpine snow, we started an important research program with the French Polar Institute (IPEV) for the study of mercury speciation in the air above snow, in the air of snow, and in snow. Two important field campaigns have been organised in the Arctic, one in Station Nord, Greenland from February to March 2002 shortly after polar sunrise and April in Kuujuarapik, Quebec. During these field campaigns:

- \* A new device dedicated to Hg<sup>0</sup> measurement in the air of snow has been build. \* We observed both in Greenland and Quebec an exponential decrease of Hg<sup>0</sup> in the air of snow anti-correlated with an increase of total Hg in snow, indicating an oxidative chemistry involving halogenated compounds. \* We observed a production of Hg<sup>0</sup> in the air of the snow pack directly linked with photochemical activity and production of photochemical species in the air of snow like HOO, Br, and BrO radicals. The aim of this 2003 campaign is to go deeper in these mechanisms so as to better understand this very active chemistry for that metal. References:
- Dommergue A., Ferrari C.P., Boutron C.F. First investigation of an original device dedicated to the determination of gaseous mercury in interstitial air in snow. Anal. Bioanal. Chem., 375,106-111, 2003.
- Ferrari C.P., Dommergue A., Boutron C.F. Gaseous distribution of mercury in interstitial of snow pack in Station Nord, Greenland. Submitted to J. Geophys. Res., 2003.
- Ferrari C.P., Dommergue A., Boutron C.F. Night Production of Elemental Gaseous Mercury in Interstitial Air of Snow at Station Nord, Greenland shortly after polar Sunrise. Submitted to Atmos. Environ., 2003.
- Dommergue A., Ferrari C.P., Poissant L., Gauchard P.A., Boutron C.F. Production of mercury in the air of the ...etc

## Geophysics

120923

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*Geographical Area(s)* Oscar II Land  
James I Land

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### *Participants*

Project Leader 12397

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Participating Scientist 12400

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**PhD Pierre Amato**

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Field Leader 12397

**Dr. Christophe Ferrari**

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Saint Martin D'hères cedex, France

**Proj. Title**    **Climate affecting substances in the Arctic**  
**Discipline**    **Atmospheric Science**  
**Nationality**    **Swedish**  
**Institution**    **Institute of Applied Environmental Research, Stockholm University**

**Proj. Period**    2004 to 2004  
**Coop. Inst.**    Norwegian Institute for Air Research (NILU)  
**Programme**    Miljöövervakning (Swedish EPA)  
**Description**    The objective of this investigation is to study substances that affect the climate, and in this case it concerns carbon dioxide and atmospheric aerosols over Spitsbergen (Svalbard). The observations aim towards:

- detecting any long-term trends in the carbon dioxide level, as well as any trends in the amount or composition of aerosols in the background atmosphere.
- provide a basis to study processes that control the aerosol life cycle from their formation through aging and transformation, until being removed from the atmosphere.
- provide a basis to study the processes (sources, sinks, and transport pathways) that control the level of CO<sub>2</sub> in the atmosphere.
- contribute to the global network of stations that perform continuous measurements of atmospheric particles and trace gases to determine their effect on the Earth's radiation balance and interaction with clouds and climate.

**Results**    Measurement of carbon dioxide is an ongoing activity on the Zeppelin station since 1998. Between 1998 and March 2003 the mean rate of increase has been 1.2 ppm per year and the annual amplitude (between summer minimum and winter maximum) is 17.7 ppm. Aerosol particles also present a marked annual cycle. The late winter and spring period is strongly influenced by anthropogenic sources in Europe and North America. The summer period shows small total particle masses, but is the period with the highest number densities that often exceeds many thousand particles per cubic centimeter. During late fall and early winter the aerosol is aged and number densities are often below 100 cm<sup>-3</sup>.  
 Ström, J., Umegård, J., Tørseth, K., Tunved, P., Hansson, H.-C., Holmén, K., Wismann, V., Herber, A. and König-Langlo, G., One year of particle size distribution and aerosol chemical composition measurements at the Zeppelin Station, Svalbard, March 2000-March 2001, *J. Phys. Chem. Earth*, 28, 1181-1190, 2003  
 Eneroth, K., Kjellström, E., K. J. Holmén, Inter-annual and seasonal variations in transport to a measuring site in western Siberia, and their impact on the observed atmospheric CO<sub>2</sub> mixing ratio, *Journal of Geophysical Research*, in press, 2003a.

**Geographical Area(s)**    Ny-Ålesund

## Participants

**Project Leader**    12513  
                           **Dr. Johan Strøm**  
                           University of Stockholm, Institute of Applied Environmental Research  
                           Stockholm, Sweden

## Geophysics

121040

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Participating Scientist

12575

**Mrs. Birgitta Noone**

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Participating Scientist

12576

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Field Leader

12513

**Dr. Johan Strøm**

University of Stockholm, Institute of Applied Environmental Research  
Stockholm, Sweden



# Geophysics

121036

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*Proj. Title* **ISPOG - Internal Structure and Bedrock of the Polythermal Glaciers in SW Spitsbergen**  
*Discipline* **Glaciology**  
*Nationality* **Internatonal**  
*Institution* **Institute of Geophysics of the Polish Academy of Sciences, Warsaw, Poland**

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*Proj. Period* 2003 to 2008

*Coop. Inst.* Institute of Geography of the Russian Academy of Sciences, Moscow, Russia  
Departamento de Matemática Aplicada ETSI de Telecomunicación, Universidad Politécnica de Madrid, Spain  
Faculty of Earth Sciences of the University of Silesia, Sosnowiec, Poland

*Programme* MAGICS - Mass Balance of Arctic Ice Sheets and Glaciers in Relation to the Climate and Sea Level Changes

*Description* Radioechosounding measurements on Hansbreen and radar profiling of a few glaciers on top of the Amundsenisen Plateau.

*Results* Pälli A., Moore J.C., Jania J., Kolondra L. and Glowacki P., 2003. The drainage pattern of two polythermal glaciers: Hansbreen and Werenskioldbreen in Svalbard. ? Polar Research, 22 (2): 355-371.  
Macheret, Yu.Ya. and A.F.Glazovsky. 2000: Estimation of absolute water content in glaciers from radar sounding data. ? Polar Research, 19 (2): 205-216.

*Geographical Area(s)* Wedel Jarlsberg Land  
Torell Land  
Hornsund

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## Participants

Project Leader 1072  
**Dr. Piotr Glowacki**  
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Participating Scientist 10139  
**Dr. Andrey F. Glazovsky**  
Russian Academy of Sciences (RAS), Institute of Geography  
Moscow, Russia

Field Leader 1072  
**Dr. Piotr Glowacki**  
Polish Academy of Sciences (PAS), Institute of Geophysics, Department of Polar and Marine Research  
Warszawa, Poland

## Geophysics

120991

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*Proj. Title* **ITACA<sup>2</sup> - twin 76-ilat auroral monitors**  
*Discipline* **Space Physics**  
*Nationality* **Italian**  
*Institution* **Institute of Interplanetary Space Physics - National Research Council (IFSI-CNR)**

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*Proj. Period* 2004 to 2004  
*Coop. Inst.* Institute for Atmospheric Pollution - National Research Council (IIA-CNR)  
Finnish Meteorological Institute.  
*Programme* Auroral observations from Svalbard islands with "ITACA"  
*Description* Developed in the frame of the Space Physics research, the project aims to monitor and study the high-latitude auroral activity, focusing on the dayside auroras, by means of two all-sky cameras located in Ny-Ålesund (Svalbard) and Daneborg (East coast of Greenland).  
The data acquisition period ranges from the mid-October to the end of March. Usually, a week for maintenance purpose is planned in Ny-Ålesund, at the beginning of the observational period (3rd or 4th week of October).

*Results* In 2002, the second ITACA<sup>2</sup> station was set up in Greenland, while a new all-sky camera was installed in the station of Ny-Ålesund. During the present winter season, for the first time, were achieved conjugated optical auroral observation from the two ITACA<sup>2</sup> stations and a preliminary analysis is in progress.  
- Orsini S., K. Kauristie, S. Massetti, P. Cerulli-Irelli, M. Candidi, M. Syrjäsuo, P. Baldetti, A. Morbidini, R. Sparapani, F. Tabacchioni: A new all-sky camera - ITACA - is part of the MIRACLE network", in Proceedings of ICS-5, ESA SP-443, July 2000.  
- Opgenoorth H. J., et al.: Coordinated ground-based, low altitude satellite and Cluster observations on global and local scales during a transient postnoon excursion of the magnetospheric cusp, Annales Geophysicae, Special Issue on Cluster First Results 2001, v. 19, pp. 1367-1398, 2001.  
- Kauristie K., et al.: Ground-based and satellite observations of high-latitude auroral activity in the dusk sector of the auroral oval, Annales Geophysicae, Special Issue on Cluster First Results 2001, v. 19, pp. 1683-1696, 2001.  
- Massetti S., S. Orsini, M. Candidi and K. Kauristie: Dayside pulsed aurora intensifications, observed by ITACA during constant IMF Bz ~ 0 and By << 0, JGR, 10.1029/2001JA009204, September, 2002.

*Geographical Area(s)* Ny-Ålesund

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### Participants

Project Leader 12307  
**Stefano Massetti**  
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Participating Scientist 12310  
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Istituto di Fisica dello Spazio Interplanetario (IFSI-CNR),  
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## Geophysics

120991

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Field Leader

12307

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## Geophysics

121015

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*Proj. Title*    **AREX 2004**  
*Discipline*    **Oceanography**  
*Nationality*    **polish/international**  
*Institution*    **Institute of Oceanology, Polish Academy of Sciences, 81-712 Sopot, Poland**

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*Proj. Period*    2004 to 2004

*Coop. Inst.*    Gdansk University, Norsk Polar Institute, Alfred Wegener Instiitut (Bremerhaven)  
Institute of Marine Research (Bergen), Universite Pierre et Marie Curie (France)

*Programme*    Arctic Subarctic Ocean Fluxes (ASOF), BIODAF, LITUS

*Description*    Measurements of temperature and salinity of sea water (CTD), ocean currents (ADCP) optical and acoustical properties of sea water, phito, zooplankton and benhos sampling in the area Norway-Spitsbergen, Storfjord and Storfjordrenna, West Spitsbergen Current, Kongsfjord, Hornsund and Bellsund.

*Results*        Piechura J., Beszczynska-Möller A. & Osinski R., 2001, Volume, heat and salt transport by the West Spitsbergen Current, Polar Research, Vol 20, No 2, pp.233-241  
Piechura J., 1996, Dense bottom waters in Storfjord and Storfjordrenna Oceanologia, No.38 (2), 285-292  
Piechura J., Walczowski W., 1996, Interannual variability in the hydrophysical fields of the Norwegian-Barents Seas confluence zone, Oceanologia, No. 38 (1), 81-98  
Piechura J., Walczowski W., 1995, The Arctic Front: structure and dynamics Oceanologia, No 37 (1), pp. 47 - 73  
Piechura J., 1993, Hydrological aspects of the Norwegian-Barents confluence zone Studia i Materialy Oceanologiczne, Polar Marine Research (2), No 65, pp.197 - 222

*Geographical Area(s)*    Longyearbyen  
Ny-Ålesund  
Hornsund  
Barents Sea  
Norwegian Sea  
Greenland Sea  
Arctic Ocean

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### *Participants*

Project Leader 1206  
**Prof. Dr. Jan Piechura**  
Polish Academy of Sciences (PAS), Institute of Oceanology  
Sopot, Poland

Field Leader 1206  
**Prof. Dr. Jan Piechura**  
Polish Academy of Sciences (PAS), Institute of Oceanology  
Sopot, Poland

## Geophysics

121025

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*Proj. Title*    **Investigations of perennial springs on Spitsbergen**  
*Discipline*    **Hydrology**  
*Nationality*    **Canadian**  
*Institution*    **McGill University, Montreal, Quebec, Canada**

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*Proj. Period*    2004 to 2004

*Coop. Inst.*

*Programme*

*Description*    The project seeks to investigate the nature of perennial springs at high latitudes and to understand their interaction with permafrost. The research on Svalbard will complement previous research that my team and I have been conducting on springs on Axel Heiberg Island in the Canadian High Arctic. The 2004 activities will consist on photographing the spring outlets, collecting surface water samples (approx. 1.5 litres), and taking small (100 g) samples of surface travertine deposits around the spring outlets, where they exist.

*Results*        First year.

*Geographical Area(s)*    Ny-Ålesund

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### *Participants*

Project Leader 12560

**Wayne Pollard**  
McGill University, Dept. of Geography.  
Montreal, Quebec, Canada

Field Leader 12561

**Ms Nicole Coure**  
McGill University, Department of Geography  
Montreal, Quebec, Canada

*Proj. Title*    **Mass balance of glaciers between Aavatsmarkbreen and Dahlbreen with detailed investigations of Waldemarbreen and Irenebreen**

*Discipline*    **Glaciology**

*Nationality*   **Polish**

*Institution*   **Nicholas Copernicus University, Torun, Poland**

*Proj. Period*    2002 to 2005

*Coop. Inst.*

*Programme*

*Description*    The Kaffiøyra region (Oscar II Land) is a traditional study area of polar expeditions organized by the Institute of Geography. Since 1975, 17 expeditions have been organized. The amount of publications is about 300. During 2001 we are planning: Continuation of the mass balance measurements, its include the winter balance, summer balance and net balance; the outflow from glaciers of the Kaffiøyra and selected the ecology problems of this region.

*Results*

The Waldemarbreen is located in the Oscar II Land, northwestern Spitsbergen. It is of the alpine type and flows down a valley to the Kaffiøyra. With the area of 2.68 km<sup>2</sup>, the Waldemarbreen occupies 61% of a catchment basin closed by ice-cored moraines at the water gap. The firn field occurs at 380-490 m a.s.l. and the snout at 130 m a.s.l. The glacier is composed of two parts, separated by a median moraine, 1600 m long. The foreland occupies 0.44 km<sup>2</sup>. The Kaffiøyra region together with the adjacent glaciers the Aavatsmark (75 km<sup>2</sup>), and the Dahl (132 km<sup>2</sup>) and six glaciers running off in its direction (28 km<sup>2</sup>) cover the area of 310 km<sup>2</sup>. Mountain ranges, valley glaciers and their marginal zones together with the Kaffiøyra Plain cover 103 km<sup>2</sup>. Since the nineteenth century the surface of the Kaffiøyra glaciers has decreased by approximately 30%. The Waldemarbreen has been retreating intensively lately and the glacier surface has been lowered at 1% every year. Annual mean air temperature of this area is about 4.6 °C. Detailed investigations into the glacier mass balance have been conducted since 1995.

*Geographical Area(s)*    Oscar II Land

James I Land

*Participants*

Project Leader 10236

**Prof. Marek Grzes**

Nicholas Copernicus University, Department of Cryology and Polar Research, Institute of Geography  
Torun, Poland

Participating Scientist 11671

**Dr. Ireneusz Sobota**

Nicholas Copernicus University, Institute of Biology  
Torun, Poland

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Field Leader

10236

**Prof. Marek Grzes**

Nicholas Copernicus University, Department of Cryology and Polar Research, Institute of  
Geography  
Torun, Poland

## Geophysics

121028

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*Proj. Title*    **Svalbardtokt 2004**  
*Discipline*   **Hydrographic Survey**  
*Nationality*   **Norwegian**  
*Institution*   **Norwegian Hydrographic Service (NHS)**

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*Proj. Period*   2003 to 2003  
*Coop. Inst.*    Norwegian Defense Research Establishment  
*Programme*  
*Description*   Collection of multibeam echosounder data for chart production.  
*Results*        Collection of multibeam echosounder data for chart production.  
*Geographical Area(s)*   Wedel Jarlsberg Land  
                                 Prins Karls Forland  
                                 Albert I Land

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### *Participants*

Project Leader 12498  
                  **Stig Øvstedal**  
                  Norwegian Hydrographic Service (NHS),  
                  Stavanger, Norway

Participating Scientist 12565  
                  **Mr Odd Harald Njærheim**  
                  NHS,  
                  Stavanger, Norway

Field Leader 12564  
                  **Mr Edgar Rasmussen**  
                  NHS,  
                  Stavanger, Norway



**Proj. Title**    **Monitoring Heavy Metals and Organic Pollutants in Air at Svalbard**  
**Discipline**    **Atmospheric Chemistry**  
**Nationality**    **Norwegian**  
**Institution**    **Norwegian Institute for Air Research (NILU), Kjeller, Norway**

*Proj. Period*    2003 to 2004

*Coop. Inst.*    Norwegian Polar Institute

*Programme*    Arctic Monitoring and Assessment Programme (AMAP)

*Description*    Monitoring air levels of heavy metals, polyaromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB) and chlorinated pesticides (hexachlorocyclohexanes, DDT and chlordanes) since 1993. Results are reported to and stored in the AMAP database and reported annually to the Norwegian State Pollution Authority (SFT). The data are included in the annual report from the air and precipitation chemistry monitoring network in Norway, "Atmosfærisk tilførsel".

*Results*    Results are reported to and stored in the AMAP database and reported annually to the Norwegian State Pollution Authority (SFT). The data are included in the annual report from the air and precipitation chemistry monitoring network in Norway, "Atmosfærisk tilførsel".

*Geographical Area(s)*    Ny-Ålesund

### *Participants*

Project Leader

**Stein Manø**  
Norwegian Institute for Air Research (NILU),  
Kjeller, Norway

11822

## Geophysics

121045

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*Proj. Title*    **Automatic Weather Stations**  
*Discipline*    **Meteorology**  
*Nationality*    **Norwegian**  
*Institution*    **Norwegian Meteorological Institute**

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*Proj. Period*    1986 to 2004  
*Coop. Inst.*    Norwegian Coast Guard  
                     Norwegian Polar Institute  
                     The Governor of Svalbard

### *Programme*

*Description*    Maintenance of Automatic Weather Stations at Ny-Ålesund, Edgeøya , Verlegenuken and Karl XII øya.  
                     Maintenance of Meteorological equipment at Airports in Ny-Ålesund, Longyearbyen and Svea.

### *Results*

*Geographical Area(s)*    Orvin Land  
                                 Edgeøya  
                                 Longyearbyen  
                                 Ny-Ålesund  
                                 Sveagruva

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### *Participants*

Project Leader 1028  
                     **Head of Section Ragnar Brækkan**  
                     Norwegian Meteorological Institute (DNMI),  
                     Oslo, Norway

Participating Scientist 12580  
                     **O.Ing. Gunnar Halvorsen**  
                     Meteorological Institute,  
                     Oslo, Norway

Field Leader 1028  
                     **Head of Section Ragnar Brækkan**  
                     Norwegian Meteorological Institute (DNMI),  
                     Oslo, Norway

**Proj. Title**    **Parameterisation of snow and ice albedo in the ECHAM5 General Circulation Model (GCM).**

**Discipline**    **Glaciology**

**Nationality**    **Norwegian with cooperating partners from USA, Germany, Switzerland and Russia.**

**Institution**    **Norwegian Polar Institute**

*Proj. Period*    2004 to 2004

*Coop. Inst.*    The project "Parameterisation of snow and ice albedo in ECHAM5 GCM" is a cooperation project between Norwegian Polar Institute, University of Tromsø, Max Planck Institute for Meteorology in Hamburg, NASA Goddard Space Flight Center in Maryland, Arctic Antarctic Research Institute in St. Petersburg, Swiss Federal Institute of Technology (ETH) in Zürich, The Norwegian Meteorological Institute and Norwegian Computing Centre.

*Programme*    NORKLIMA

*Description*    Snow and ice albedo is known to be crucial for heat exchange at high latitudes. Even so, the way snow and ice albedo is parameterised in GCMs today is strongly simplified. By developing characteristic spectral albedo curves for different snow and sea-ice surfaces, and combine this with ground truth and satellite data, we want to improve the albedo parameterisation, by introducing spectral resolution and developing more realistic decay functions.

This year activity includes the collection of data, the intercomparison of already existing models, and the validation of the best model. The work consists of two parts, one dealing with snow on ground and the other with sea ice. The collected time series data over snow covered surfaces include a 20 year time series from Ny-Ålesund, Svalbard, three years of data from Col de Porte, French Alps, six years of data from six stations in the Former Soviet and 12 years of data from Barrow, Alaska. The sea-ice part is covered by data from the Russian Drifting Ice stations in the Arctic Ocean, and the high quality one year data from the SHEBA experiment, also in the Arctic Ocean. Snow and sea-ice albedo parameterisations from 8 different global climate models are compared and validated against these datasets. The models include ECHAM5, UKMO, ECMWF, CLASS, ISAB, GISS, BATS and an one-dimensional thermodynamic sea-ice model by Ebert and Curry, 1993. For comparison a completely data-based regression model is built and compared to the parameterisations in the global climate models.

Albedo and reflectance data with spectral resolution is also collected, and this includes several datasets from the Svalbard area, data from the SHEBA experiment and also data from the Alps and Antarctic. This data will be used to develop characteristic spectral reflectance curves for each key cryospheric surface. For snow we want to develop one curve for each of the classes defined by the International Classification of Seasonal Snow on the Ground by Colbeck

*Results*    This years activity included the collection of data, the intercomparison of already existing models, and the validation of the best model. Snow and sea-ice albedo parameterisations from 8 different global climate models and a completely databased linear regression model are compared and validated against these datasets. We found that the iterative schemes worked best for the snow albedo parameterisation. The snow cover fraction parameterisation and the threshold for re-setting the snow albedo to its new-snow value also play an important role. The work that still needs to be done is to look at the problems at a larger scale; the mixed pixel problem, and to include snow cover- and forest fraction. It also seems necessary to include contamination since pollution decrease the albedo substantially.

However, for the sea ice albedo parameterisation it is different. The schemes that exists today for sea-ice is clearly too simple, and a more advanced sea-ice parameterisation

## Geophysics

121027

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*Geographical Area(s)* Nathorst Land  
Nordenskiöld Land

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### *Participants*

Project Leader 1296

**Dr. Jan-Gunnar Winther**  
Norwegian Polar Institute (NPI),  
Tromsø, Norway

Participating Scientist 12563

**Ph.D Student. Christina Pedersen**  
Norwegian Polar Institute, Polar Environmental Centre  
Tromsø, Norway

Field Leader 12417

**Frank Nilsen**  
University Centre on Svalbard (UNIS),  
Longyearbyen, Norway

**Proj. Title**    **Massbalance of glaciers in Svalbard**  
**Discipline**    **Glaciology**  
**Nationality**    **Norwegian**  
**Institution**    **Norwegian Polar Institute (NPI), Norway**

*Proj. Period*    1967 to 2050

*Coop. Inst.*    Department of Geography, University of Oslo (UiO), Norway.  
 Laboratory of Glaciology and Geophysics (LGGE), France

*Programme*

*Description*    The mass balance of Midtre Lovénbreen and Austre Brøggerbreen have been monitored since 1967 and Kongsvegen since 1987. The first two are the longest continuous mass balance series from the Arctic.

*Results*        The mean net balance for Austre Brøggerbreen and Midtre Lovénbreen have been negative for the whole measuring period while the balance for Kongsvegen is close to zero.

1. ENGESET, R.V., J. KOHLER, K. MELVOLD, B. LUNDÉN. 2002. Change detection and monitoring of glacier mass balance and facies using ERS SAR winter images over Svalbard. *Int. J. Remote Sensing*, 23(10), 2023-2050.
2. BRULAND, O., J.O. HAGEN. 2002. Glacial mass balance of Austre Brøggerbreen (Spitsbergen), 1971-1999, modelled with a precipitation-run-off model. *Polar Res.* 21(1), 109-121.
3. KÖNIG, M., WADHAM, J., WINTHER, J-G., KOHLER, J. & NUTTALL, A-M. 2002. Detection of superimposed ice on the glaciers Kongsvegen and Midre Lovénbreen, Svalbard, using SAR satellite imagery. *Annals Glaciol.* 34, 335-342.
4. WASHINGTON, R., A., HODSON, E. ISAKSSON and O. MACDONALD. 1999. Northern Hemisphere Teleconnection Indices and the Mass Balance of Svalbard Glaciers. *Int. J. Climatol.* 20, 473-487.
5. LEFAUCONNIER, B., J-O HAGEN, J.B. ØRBÆK, K. MELVOLD, E. ISAKSSON E., 1999. Glacier balance trends in the Kongsfjord area, western Spitsbergen, Svalbard, in relation to the climate. *Polar Res.* 18(2), 307-313
6. HAGEN J. O., MELVOLD K., EIKEN T. AND LEFAUCONNIER B. 1999. Mass balance methods on Kongsvegen, Svalbard. *Geogr. Ann.* 81(A4) 593-602.

*Geographical Area(s)*    Oscar II Land  
 Ny-Ålesund

## *Participants*

Project Leader 10394  
                   **Dr. Jack Kohler**  
                   Norwegian Polar Institute (NPI),  
                   Tromsø, Norway

Participating Scientist 1079  
                   **Prof. Jon Ove Hagen**  
                   University of Oslo (UiO), Department of Physical Geography  
                   Oslo, Norway

## Geophysics

103660

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Participating Scientist	10353
<b>Cecilie Rolstad</b> Norwegian Polar Institute (NPI), Tromsø, Norway	
Participating Scientist	10393
<b>Dr. Kjetil Melvold</b> University of Oslo (UiO), Institute of Physical Geography Oslo, Norway	
Participating Scientist	10395
<b>Dr. John Moore</b> University of Rovaniemi, Arctic Center Rovaniemi, Finland	
Field Leader	10392
<b>Dr. Elisabeth Isaksson</b> Norwegian Polar Institute (NPI), Tromsø, Norway	
Field Leader	10394
<b>Dr. Jack Kohler</b> Norwegian Polar Institute (NPI), Tromsø, Norway	

## Geophysics

121038

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*Proj. Title*    **Solar Radiation Monitoring at Sverdrup Station, Ny-Ålesund**  
*Discipline*    **Atmospheric Physics**  
*Nationality*   **Norwegian**  
*Institution*    **Norwegian Polaristitute**

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*Proj. Period*    1974 to 2004

*Coop. Inst.*     Alfred Wegener Institute, Norwegian institute for Air Research

*Programme*

*Description*    Regular calibration and intercomparison of broadband radiation sensors (pyranometers, pyrgeometers, pyrhemometers, PAR-sensors), UV-biometers and UV- spectrometer.

Measurements of surface spectral albedo at selected typical surfaces for the determination of regional albedo in support of the ASTAR2004 campaign by AWI and NIPR.

*Results*        Ørbæk, J.B. and Engelsen, O., 2004: Variability and Feedbacks of UV-radiation and Surface Radiation Budget in the Arctic. Proceeding of the ACIA Climate Feedback Seminar, Norwegian Polar Institute Report Series, (in press)  
Ørbæk J.B., Suortti, T., Wängberg, S.Å. and Kirchhefer, A., 2003: Ozone, UV-radiation and biological effects: Harmonisation of data, projects and instrumentation at the ENVINET sites. Technical Report for ENVINET, Norwegian Polar Institute, 2003  
Hinkler, J., Ørbæk, J.B. and Hansen, B.U., 2003: Detection of spatial, temporal, and spectral surface changes in the Ny-Ålesund area 79° N, Svalbard, using a low cost multispectral camera in combination with spectroradiometer measurements. In: J.B. Orbaek et al. (ed.), "The changing physical environment of Ny-Alesund Svalbard", Physics and Chemistry of the Earth, Parts A/B/C, Volume 28, Issues 28-32, 1229-1239

*Geographical Area(s)*    Ny-Ålesund

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### Participants

Project Leader 1198

**Dr. Jon Børre Ørbæk**  
Norwegian Polar Institute (NPI),  
Longyearbyen, Norway

Field Leader 1198

**Dr. Jon Børre Ørbæk**  
Norwegian Polar Institute (NPI),  
Longyearbyen, Norway

## Geophysics

121037

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**Proj. Title** Permanent observations of changes of terrestrial geophysical fields and environmental monitoring

**Discipline** Geophysics

**Nationality** Polish

**Institution** Polish Academy of Sciences (PAS), Institute of Geophysics, Poland.

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**Proj. Period** 1978 to 2004

**Coop. Inst.** Arctic Center, University of Lapland, Rovaniemi, Finland.  
Institute of Geography Russian Academy of Sciences, Moscow.  
Geophysical Research Division of the Finnish Meteorological Institute, FMI/GEO, Finland.  
NORSAR, Norway  
University of Silesia, Poland.  
Space Research Center, Polish Academy of Sciences, Poland.  
Institute of Oceanology Polish Academy of Sciences, Poland.  
Universidad Politecnica de Madrid, Spain

**Programme** Global Change, World Glacier Monitoring Service, Inter. Monitor. Auroral, Geomagn. Effects (IMAGE), OERSTED

**Description** Continuation of the permanent measurements and registrations started in 1978

- 1) Permanent measurements of magnetic field elements.
- 2) Monitoring of earthquakes and icequakes.
- 3) Atmospheric electricity measurements.
- 4) Ionospheric measurements.
- 5) Examination of local values of meteorological elements.
- 6) Examination of hydrological, glaciological and hydrochemical conditions.

Photogrammetric and laser survey of the dynamics of Hansbreen.

- 7) Environmental monitoring of selected climatic features and analyses of chemical buildup, air and water pollution.
- 8) Implementation of long term biodiversity monitoring in Europe.

**Results**

1. Permanent observations and publication of yearbooks with geomagnetic and seismological data.
2. Publication of current meteorological yearbooks.
3. Analysis of ionospheric and atmospheric-electricity data
4. Analysis of seismic activity of Hansbreen.
5. Magnetic anomaly maps of the southern part of Hansbreen and Tuvbreen.
6. GPS surveying on Hansbreen, Werenskioldbreen and Hornsbreen.
7. Spring and summer seasons measurements on Hansbreen.
8. Laser measurements of Hansbreen movement.

Burzyk M., Burzyk J. and Glowacki P., 2001. Comparative chemical characteristics of precipitation in the Hornsund region (SW Spitsbergen) in the years 1993-1994 and 1998-1999. *Pol. Polar Res.*, 12, 233-247.

Glowacki, P., Krawczyk, W. E. and Niedzwiedz, T., 2002: Precipitation in Hornsund (SW Spitsbergen) in Summers of 2000 and 2001 - its chemistry and influence of atmospheric circulation. In: G.G. Matishov & G.A. Tarasov (Eds.) International Conference Proceedings Collection - The complex investigations of the Spitsbergen Nature. Russian Academy of Sciences, Kola Science Centre, Apatity 2002: 112-116.

Glowacki, P. and Krawczyk, W. E., 2002: Long range transport of pollutants - evidence from rainfall chemistry in Hornsund (Svalbard). In: The Changing Physical Environment. Proceedings from the sixth Ny-Ålesund International Scientific Seminar. Tromso, Norway,



# Geophysics

121037

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*Geographical Area(s)* Sørkapp Land  
Wedel Jarlsberg Land  
Torell Land  
Hornsund

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## *Participants*

Project Leader 1072

**Dr. Piotr Glowacki**

Polish Academy of Sciences (PAS), Institute of Geophysics, Department of Polar and Marine Research  
Warszawa, Poland

Field Leader 12574

**Dr. Krzysztof Migala**

Polish Academy of Sciences (PAS), Institute of Geophysics  
Warszawa,, Poland

## Geophysics

121019

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*Proj. Title* **Tenth Czech Glaciological Polar Expedition , Spitsbergen 2004**  
*Discipline* **Glaciology**  
*Nationality* **Czech**  
*Institution* **SPELEO - Rehak - Czech , Chuchelská 293 , 513 01 Semily , Czech Republic**

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*Proj. Period* 2004 to 2004

*Coop. Inst.* Department of Geomorphology, University of Silesia , Poland ;  
Department of Meteorology and Climatology University of Wrocław, Poland;  
Institute of Botany Academy of Sciences of the Czech Republic;

### *Programme*

*Description* Continuation of the examination of the Werenskioldbreen, Nanbreen, Hansbreen and Torellbreen as well as the Hornsund glaciers.  
A) Hydrology and hydrochemistry of meltwaters.  
B) Investigation of the glacier - karst phenomena (inglacial and subglacial drainage channels) by means of speleoglacial exploration.  
C) Mapping and documentation of glacier caves.

### *Results*

*Geographical Area(s)* Hornsund

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### *Participants*

Project Leader 10169  
**Dipl. Tech. Josef Rehak**  
Czech Speleological Society (SPELEO),  
Semily, Czech Republic

Participating Scientist 12130  
**Stanislav Rehak**  
Czech Speleological Society (SPELEO),  
Zelezny Brod, Czech Republic

Participating Scientist 12552  
**Szymon Kostka**  
ul.,  
Wrocław, Poland

Field Leader 10169  
**Dipl. Tech. Josef Rehak**  
Czech Speleological Society (SPELEO),  
Semily, Czech Republic

## Geophysics

120938

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*Proj. Title*    **Ice ridges ion the Barents Sea**  
*Discipline*   **Ice thermomechanics and ice morphology**  
*Nationality*   **Norwegian - Russian**  
*Institution*   **UNIS**

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*Proj. Period*   2002 to 2006

*Coop. Inst.*

*Programme*

*Description*   We are investigating morphology and physico-mechanical properties of one or two ice ridges in the Barents Sea in May each year. We drill holes to examine the geometry and porosity of the ridge, we measure dimensions of the blocks in the sail, we sample and measure salinity, density, strength and ice texture of the ridge and the surrounding level ice. We also map the surface topography of the ridge.

*Results*

*Geographical Area(s)*   Barents Sea

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### *Participants*

Project Leader

**Knut Vilhelm Høyland**  
University Centre on Svalbard (UNIS),  
Longyearbyen, Norway

11164

## Geophysics

120942

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*Proj. Title*    **Sea ice formation and growth in the Van Mijen fjord**  
*Discipline*   **Ice thermomechanics and ice morphology**  
*Nationality*   **Norwegian**  
*Institution*   **UNIS**

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*Proj. Period*   2002 to 2006

*Coop. Inst.*

*Programme*

*Description*

*Results*        Characterize the ice conditions in the Van Mijen fjord, small scale physico-mechanical properties and larger scale conditions

*Geographical Area(s)*   Nathorst Land  
                                 Nordenskiöld Land

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### *Participants*

Project Leader

12417

**Frank Nilsen**  
University Centre on Svalbard (UNIS),  
Longyearbyen, Norway

## Geophysics

121022

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*Proj. Title*    **Ice physics and crystal structure**  
*Discipline*    **Ice physics**  
*Nationality*   **Norwegian**  
*Institution*    **Unis.**

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*Proj. Period*   2002 to 2005

*Coop. Inst.*

*Programme*

*Description*

*Results*

*Geographical Area(s)*   Nordenskiöld Land  
                                 Sabine Land

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### *Participants*

Project Leader

11164

**Knut Vilhelm Høyland**  
University Centre on Svalbard (UNIS),  
Longyearbyen, Norway

## Geophysics

120904

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*Proj. Title*    **KOP 60, Tropospheric aerosol observations by FTIR spectrometry**  
*Discipline*    **Geophysics**  
*Nationality*   **German**  
*Institution*   **University of Bremen, Germany**

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*Proj. Period*   2004 to 2004  
*Coop. Inst.*    Alfred Wegener Institute, Germany  
                    Free University, Berlin, Germany

### *Programme*

*Description*    In 2003 the aim of the project is to study the seasonal variability of the radiative properties of tropospheric aerosols using FTIR emission spectroscopy. Furthermore, the height distribution of aerosols and their composition will be investigated. During intense campaigns the observations are performed by the project scientist. For the rest of the year the spectra are recorded within the NDSC activities by the NDSC-engineer at the station typically once per month.

*Results*        The measurements in 2002 were performed on a regular basis. The analysis was performed by a dedicated radiative transfer model from the Free University of Berlin. In 2002 we concentrated on the comparison of observations from the Arctic with similar observations from the Antarctica.  
C. Rathke, J. Notholt, J. Fischer, A. Herber, Properties of coastal Antarctic aerosol from combined FTIR spectrometer and sun photometer measurements, Geophys. Res. Letters, in press.  
A. Herber, H. Gernandt, U. Leiterer, D. Nagel, L.W. Thomason, T. Albrecht, J. Kaptur, M. Lamakin, J. Notholt, K.H. Schulz, Day and Night Time Optical Observations of Aerosols in the Arctic - Methods and Results, J. Geophys. Res., in press.

*Geographical Area(s)*   Ny-Ålesund

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### *Participants*

Project Leader 1188  
**Dr. Justus Notholt**  
University of Bremen,  
Bremen, Germany

Project Leader 1236  
**Prof. Otto Schrems**  
Alfred-Wegener-Institute for Polar and Marine Research (AWI),  
Bremerhaven, Germany

Field Leader 12367  
**Dr. Thorsten Warneke**  
University of Bremen, Institute of environmental physics  
Bremen, Germany

# Geophysics

121032

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**Proj. Title** Lomonosovfonna Ice Dynamics  
**Discipline** Glaciology  
**Nationality** Swedish  
**Institution** Upsala University.

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*Proj. Period* 1997 to 2004

*Coop. Inst.* Norwegian Polar Institute

*Programme* Lomonosovfonna Ice core Project

*Description* Measuring ice motion and ice thickness on Lomonosovfonna outlets; Nordenskiöld-, Mittag-Leffler- and Grusdievbreen

*Results* We have successfully recovered ice cores at Lomonosovfonna since 1997, and made ice dynamical measurements in order to understand the long term massbalance in the area. We also have monitored weather parameters using a climate device up at the summit.

Isaksson, E., Pohjola, V., Jauhiainen, T., Moore, J., Pinglot, J-F., Vaikmäe, R., van de Wal, R.S.W., Hagen, J-O., Ivask, J., Karlöf, L., Martma, T., Meijer, H.A.J., Mulvaney, R., Thomassen, M.P.A. Van den Broeke, M. 2001. A new ice core record from Lomonosovfonna, Svalbard: viewing the data between 1920-1997 in relation to present climate and environmental conditions. *Journal of Glaciology*, 47(157), 335-345.

Pohjola, V.A., J.C.Moore, E.Isaksson, T.Jauhiainen, R.S.W.van de Wal, T.Martma, H.A.J.Meijer, and R.Vaikmäe. 2002. Effect of periodic melting on geochemical and isotopic signals in an ice core from Lomonosovfonna, Svalbard. *J.Geophys.Res.* 107(D4), 10.1029/2000JD000149.

Van de Wal, R., R.Mulvaney, E.Isaksson, J.C.Moore, J.-F.Pinglot, V.Pohjola and M.P.A.Thomassen. 2002. Reconstruction from the historical temperature trend from measurements in a medium-length bore hole on the Lomonosovfonna Plateau, Svalbard. *Ann.Glaciol.*, 35, 371-378.

Kekonen, T., J.C.Moore, R.Mulvaney, E.Isaksson, V.Pohjola and R.S.W.van de Wal. 2002. A 800 year record of nitrate from the Lomonosovfonna ice core, Svalbard. *Ann.Glaciol.*, 35, 261-265.

Pohjola, V.A., T .Martma, H. A. J. Meijer, J. C. Moore, E. Isaksson, R. Vaikmäe and R. S. W. van de Wal. 2002. Reconstruction of three centuries of annual accumulation rates based on the record of stable isotopes of water from Lomonosovfonna, Svalbard. *Ann.Glaciol.*, 35, 57-62.

*Geographical Area(s)* Dickson Land

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## Participants

Project Leader 12567

**Ph.D. Veijo Pohjola**  
Upsala University, Dept. of Earth Sciences.  
Uppsala, Sweden

Participating Scientist 12568

**Student Ann-Marie Berggren**  
Uppsala University, Dpt. Earth Sciences  
Uppsala, Sweden

## Geophysics

121032

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Participating Scientist	12569
<b>Student Peter Kuipers Munneke</b> Uppsala University, Dept. Earth Sciences. Uppsala, Sweden	
Participating Scientist	12571
<b>Consultant Anders Holmgren</b> , , Sweden	
Participating Scientist	12570
<b>Consultant Peter Sjøgren</b> , , Sweden	
Field Leader	12567
<b>Ph.D. Veijo Pohjola</b> Uppsala University, Dept. of Earth Sciences. Uppsala, Sweden	



## Other

120917

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*Proj. Title*    **Climate gas monitoring at the Zeppelin Station**  
*Discipline*    **Climate gases**  
*Nationality*    **Norwegian**  
*Institution*    **Norwegian Institute for Air Research (NILU)**

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*Proj. Period*    2001 to 2004

*Coop. Inst.*

*Programme*

*Description*    High frequent measurements of the climate gases methane, carbon monoxide and halogenated hydrocarbons and aerosols at the Zeppelin Station.

*Results*        Hermansen, O., Schmidbauer, N., Lunder, C., Stordal F., Braathen O.-A., Holmèn K. Greenhouse gas monitoring at the Zeppelin station, Annual report 2002. NILU OR 30/2003  
Hermansen, O., Schmidbauer, N., Lunder, C., Stordal F., Braathen O.-A., Holmèn K. Climate gas monitoring at the Zeppelin station, Annual report 2001. NILU OR 50/2002  
Hermansen, O., Stordal, F., Lunder, C., Schmidbauer, N., Braathen, O.A., Braathen, G.O. og Bjørklid, F. Overvåking av klimagasser Zeppelinstasjonen. Årsrapport 2000. OR 44/2001  
Hermansen, O., Lunder, C., Schmidbauer, N., Stordal, F. og Braathen, O.A. Klimaovervåking, Zeppelinstasjonen, 1999. OR 64/2000

*Geographical Area(s)*    Ny-Ålesund

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### *Participants*

Project Leader		11789
	<b>Ove Hermansen</b> Norwegian Institute for Air Research (NILU), Kjeller, Norway	
Participating Scientist		1235
	<b>Dr. Norbert Schmidbauer</b> Norwegian Institute for Air Research (NILU), Kjeller, Norway	
Field Leader		12381
	<b>Chris Lunder</b> NILU, Kjeller, Norway	

## Appendix 1: Address List

The following pages contains name and address information for all researchers that have been registered in Research in Svalbard as active in 2004. The last column (“Page No.”) refers to the page number(s) in this report where the person is listed.

We try to keep our address register up to date and accurate. If the information is incorrect we appreciate if you notify us. Please send change of address or corrections to:

[ssf@lby.npolar.no](mailto:ssf@lby.npolar.no)

or:

Research in Svalbard  
Svalbard Science Forum  
P.O. Box 506  
N-9171 Longyearbyen  
Norway

**Research in Svalbard 2004**  
List of Active Scientists

Title	First name	Last name	Institution	Mail Address	Postal Code	City	Country	Phone #	Fax #	E-mail	Page no.
Dr.	Ronny Kjetil	Aanes Aasbakk	Norwegian Polar Institute (NPI), University of Tromsø, Norwegian School of Veterinary Medicine	Polar Environmental Centre, Tromsø	N-9296 N-9000	Tromsø	Norway	+47 7775 0500	+47 7775 0501	aanes@npolar.no Kjetil.Aasbakk@veiths.no	53 60
Dr.	Philippe	Agard	Laboratoire de Technique Université Pierre & Marie Curie,	UPIMC-P6 Case 129 T26 E1 4, place Jussieu	F-75252 N-1432	Paris Cedex 05	France	+33 1 44 27 31 72	+33 1 44 27 50 85	philippe.agard@lgs.jussieu.fr	80
Dr. Scient.	Oystein	Ahlistrom	Agricultural University of Norway (NLH), Department of Animal Science	P.O.Box 5025,	N-1432	Ås	Norway	+47 6494 7970	+47 6494 7960	oystein.ahlistrom@lhf.nlh.no	49
Dr.	Inger Greve	Aisoos	NCB - National Centre for Biosystematics Natural History Museums and Botanical Garden University of,	PO Box 1172 Blindern,	N-0318	Oslo	Norway	+47 22 85 18 08	+47 22 85 18 35	ingerai@nhm.uio.no	58
PhD	Pierre	Amato	Laboratoire de Météorologie Physique (LAMP)- Université Blaise Pascal (Clermont-Ferrand II) bat. Phy,	, 24 Av des landais	F-63177	Aubiere Cedex	France	+33 4 76 82 42 00	+33 4 76 82 42 01	planchon@ggce.obs.ujf-grenoble.fr	109
Dr.	William G. Marie-Francoise	Ambrose Andre	Bates College, UMR 6042 CNRS Maison de la recherche 4,	Lewiston,	04240 F-63057	Maine rue Ledru, Clermont- Ferrand	USA France	+1 207 786 6114 +33 473 346 818	+1 207 786 8334 +33 473 346 824	wambrose@abacus.bates.edu m-francoise.andre@univ- bpdermont.fr	11, 15 82
Frederic		Angelier	Centre National de la Recherche Scientifique (CNRS), Centre D'Etude Biologiques de Chizé (CEBC)	P.O.Box 716, P.O.Box 12 0161,	F-79360	Villiers en Bois	France	+33 5 4909 7837	+33 5 4909 6526		32
Mr Prof. Dr.	Annen Wolf	Arjen Artiz	University of Groningen, Arctic Centre Alfred-Wegener-Institute for Polar and Marine Research (AWI),	P.O.Box 716, P.O.Box 12 0161,	NL-9700 AS D-27568	Grönningen Bremerhaven	The Netherlands Germany	0031-6-55304007 +49 471 483 1300	+31 50 363 4900 +49 471 483 1149	jo.annen@stud.vhali.nl wartz@awi-bremerhaven.de	27 17, 19, 21
Ms	Anita	Asadullah	University of Sheffield, Department of Geography	Winter Street,	S10 2TN	Sheffield	United Kingdom	+44 114 279 7912			104
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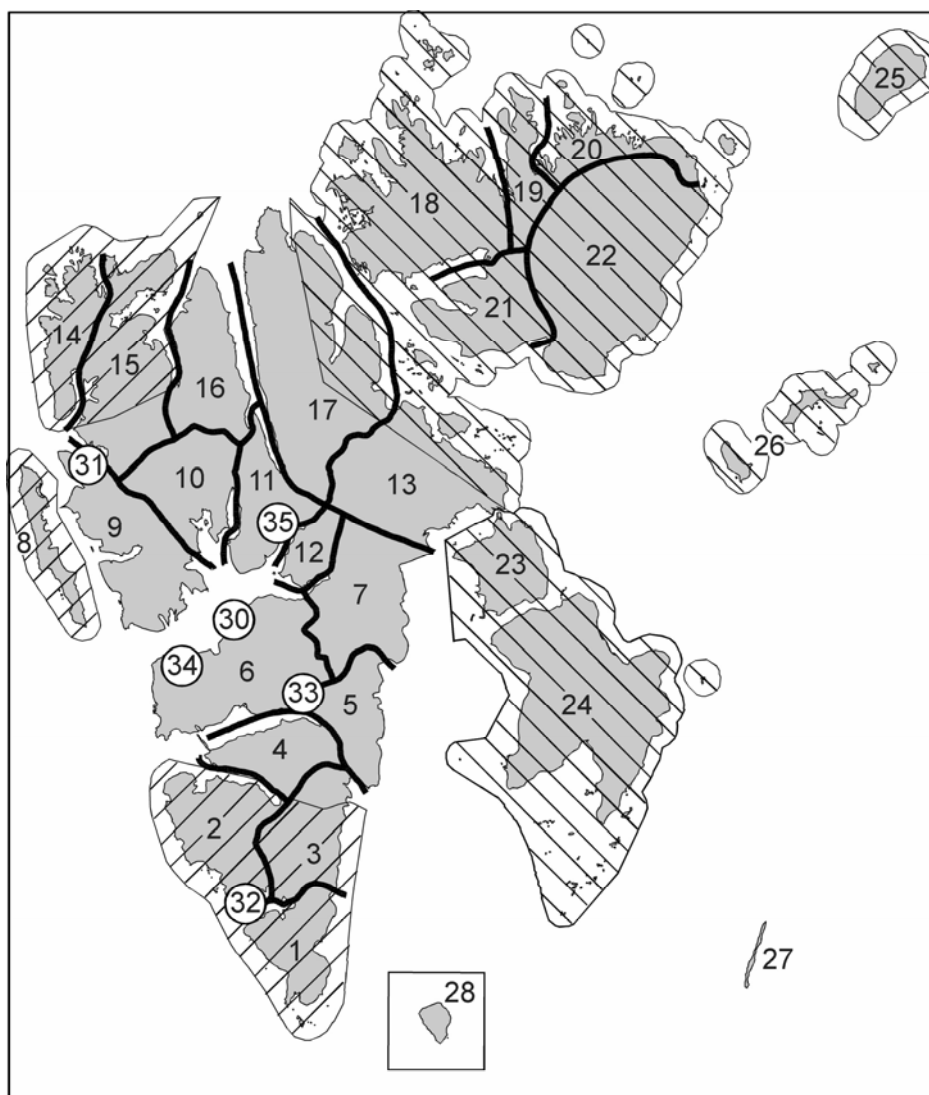


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## Appendix 2: RiS' Geographic Zones



1. Sørkapp Land
2. Wedel Jarlsberg Land
3. Torell Land
4. Nathorst Land
5. Heer Land
6. Nordenskiöld Land
7. Sabine Land
8. Prins Karls Forland
9. Oscar II Land
10. James I Land
11. Dickson Land
12. Bünsow Land
13. Olav V Land
14. Albert I Land
15. Haakon VII Land
16. Andrée Land
17. Ny-Friesland
18. Gustav V Land
19. Prins Oscars Land
20. Orvin Land
21. Gustav Adolf Land
22. Austfonna
23. Barentsøya
24. Edgeøya
25. Kvitøya
26. Kong Karls Land
27. Hopen
28. Bjørnøya
30. Longyearbyen
31. Ny-Ålesund
32. Hornsund
33. Sveagruva
34. Barentsburg
35. Pyramiden

- Numbers on the map refer to the list of names next to the map.
- Hatched areas represent the major protected areas.

40. Barents Sea
41. Norwegian Sea
42. Greenland Sea
43. Arctic Ocean