

## **The French-German Arctic Research Base AWIPEV**

Report to the NySMAC Meeting in Seoul, Korea, March 2011

The French-German research base AWIPEV was operated in full during winter 2010/11. The base is headed by Mr Sebastien Barrault, with Christian Konrad and Thomas Bouchard as observatory and logistics engineers, respectively.

During winter 2010/11 more than 465 person-days were counted at the AWIPEV-Base in addition to the base personnel. Main projects since September 2010 were the Hydro Sensor FLOWS project on Lovenbreen, and the rebuilding of the Star-photometer instrument for aerosol optical depth measurements at the atmospheric observatory. Currently intensified observations of the stratospheric ozone layer take place, as this winter's ozone loss is approaching record values for the Arctic. In April the international CICC campaign will start, which gets strong support from AWIPEV base.

A new web site for the awipev base is available on <http://www.awipev.eu/>

Outlook for 2011 :

Again major works will be performed at the Corbel Scientific station, the last building 'living building' will be renovated

- CHIMERPOL and ePOP projects in spring : Interactions between snow microorganisms and snowpack chemistry.
- PRE-APOLOBIS project in summer : First part of establishing a marine benthic observatory
- Marine scientific diving activities for several projects, including macroalgae and marine ecosystem investigations.

A more detailed overview of base usage and which projects are on the base at which times is given on the next page.

We will try to limit AWIPEV base usage to a maximum of 20 guests at any time. This could become the guaranteed usage capacity for AWIPEV, as discussed by NySMAC.

AWIPEV base on the web:

<http://www.awipev.eu/>

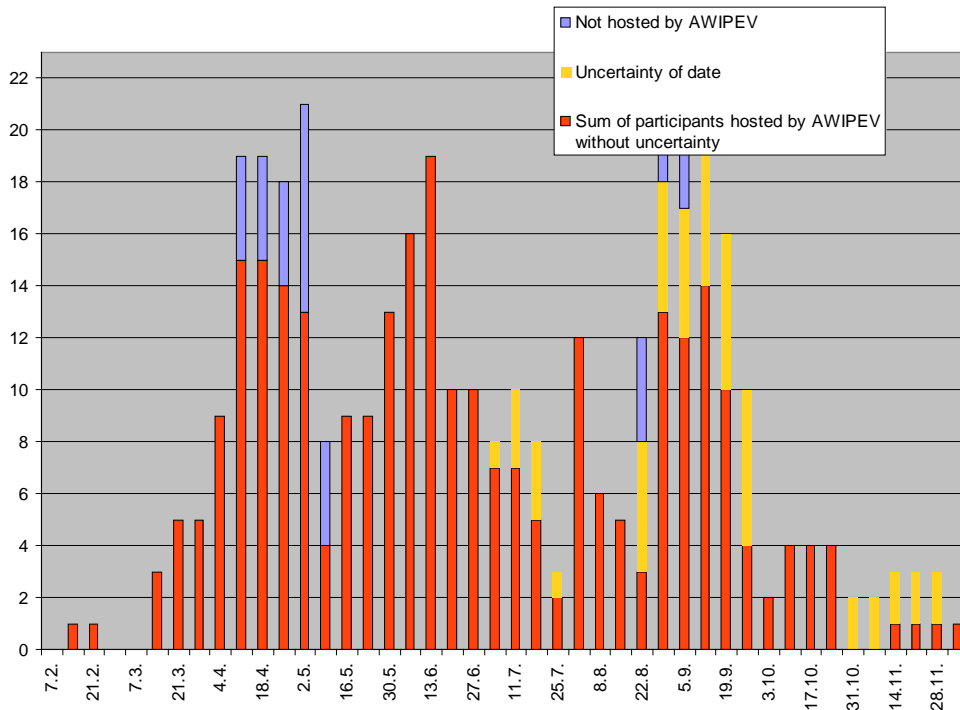
All projects for this year are listed at

<http://www.awipev.eu/en/science/>

# Overview of expected base usage AWIPEV in 2011

Projects	February	March	April	May	June	July	August	September	October	November
1							Radiation Measurement for Baseline Surface Radiation 2			
2		Microwave Stratospheric Observations + Trace Gas Measurement with FTIR for NDACC 2								
3		Aerosol Photometer Observation 1	1							Aerosol Photometer 2
4					Benthic Macro-algae UV Resistance + Ocean 11	10		Benthic Macro-algae UV 1		
5									Heavy Metals in Aerosols Determination 2	
6		Tropospheric Aerosols Investigation by Lidar 2								
7	Atmospheric Trace Gases Measurement with DOAG 1									
8						Permafrost & Hydrology, Heat & Mass Flux 2				
9						GPD-Meteorology Occultation Measurements + Atmospheric Effects on Satellite Receiving + GPS Sea Ice Observation 1				
10			Tethered Balloon Measurement of Arctic Turbulence boundary layer 2				Tethered Balloon Measurement of Arctic Turbulence boundary layer 1			
11								Benthic Resilience in Polar Environment + Bivalve Population Dynamics 6		
12							Last glacial Svalbard-Barents Sea Ice Sheet Reconstruction 2			
13								Ocean Acidification & Warming Impact on bio 2	2	
14				Comparison of Climatic Adaptability of Krill Species 2			Comparison of Climatic Adaptability of Krill Species 2			
15							Field Study of Mars Analogues 6			
16								Climatic Boundary Layer Measurement with Eddy-Flux 3		
17			Emerging Persistent Organic Pollutants in Air and Snow ePOPActic 3	2	1					Persistent Organic 1
18		Aerosol, trace gases & radiation measurements within CIOCI & PAM-ARCIMP 6								
19			Ornithological & Endocrinological observations 4							
20			Atmospheric Mercury Chemistry (CHIMERPOL III) 3	2	3					
21								Thermodynamical Observations of the Sea Ice Mass Balance 6		
22							Photosynthetic Prodrumes Studies (pre-APOLOBIS) 5			
SUM	1	5	15	10	19	14	19	20	4	3

Distribution of projects at AWIPEV in 2011



Base usage per week in 2011



# Dirigibile Italia C.N.R.

## ACTIVITIES 2011

During the last winter season in addition to activities carried out through instrumentation working automatically, two launching of little stratospheric balloons were performed at the beginning of January in the frame of the **Polar Observation Platform (POP)** - PI Paolo De Bernardis, Department of Physics, Roma University "LaSapienza". Launched balloons had a volume of 2500 m<sup>3</sup>, filled with helium. Payload was composed by two locators based on the ARGOS system, batteries and antennas close in a insulated box, and so with a very limited weight of 2-4 kg. Goal of the missions was to investigate stratospheric circulation characteristics during winter time. Second launching after 5 days flew over Barents and Kara Seas at an altitude of 32 km. In performing this activity, the support of AWIPEV personnel was fundamental to prepare and execute balloon launchings.

Moving to activities planned during spring 2011, those related to the **Climate Change Tower Integrated Project (CCT-IP)** - PI Vito Vitale, ISAC-CNR will joint and will be strongly coordinated with a great number of other ground based and UAV, airborne, research activities, to carry out the **Coordinated Investigation of Climate-Cryosphere Interactions (CICCI)** campaign. Italian contribution will involved measurements at the CCT, chemical and physical aerosol measurements at Gruebadet, studies of nitrogen fluxes at the air-snow interface and snow reflectance investigations. Moreover along the whole period of the CICCI campaign (end of March – beginning of May) vertical profiles of aerosol parameters and chemical composition will be performed thanks to an aerostatic balloon equipped with a gondola hosting dust monitors, BC monitor, 5-stage impactor, meteo sensors. The latter activity will be carried out in strong coordination with Tethered balloon activities performed by AWIPEV during the same periods, allowing to have up to three profiles of key parameters in the Ny Alesund ABL on a short spatial scale. Snow reflectance activities will be carried out in strict coordination with analogous measurements performed by Norwegian and US research groups, with the aim to validate UAV measurements. Finally, Gruebadet will give hospitalities to aerosol measurements performed by NOAA-PMEL research groups and will allow to perform intercomparison of different aerosol payloads. Activities are started half of March and will continue until the end of May regularly. Large maintenance of the CCT will be later performed during a couple of weeks in the summer season.

During March, Gruebadet hosted for three weeks instrumentation installed by Indian research colleagues of NCAOR

More activities related to CCT-IP and CICCI projects, other activities will be performed in the frame of a large project founded by the Italian Antarctic National Programme (PNRA). This is a consequence of a change in the perspective of this programme that will become in the future much more bipolar than in the past. Target of the **Chemical and physical processes influencing Cycle of atmospheric Mercury in polar regions** – PI Nicola Pirrone, IIA-CNR will be to investigate Mercury in the Arctic Troposphere.

While spring field activities are well defined, we still have a no accurate plan for summer activities, but just priorities:

- 1 – Extend up to September activities related to CCT-IP project and repeat vertical profiles with aerostatic balloon
- 2 – Perform the activities planned in the frame of the project

**Sensor network for oceanography in shallow water - Kongsfjord experiment (SNOW)** - PI Stefano Aliani, ISMAR-CNR

- 3 – Perform the activities planned in the frame of the project

**Diversity and changes on temporal and spatial scales of the cyanobacterial community in the high arctic environment of Spitsbergen, Svalbard Islands** - PI Stefano Ventura, ISE-CNR

On a regular base will continue project based on measurements performed automatically along the year at Ny alesund, that are:

- 1 - **Cloud Effects on UV Irradiance Measurements (CEUVIM)** - PI Claudio Rafanelli, IDAC-CNR
- 2 - **Ionospheric Scintillations Arctic Campaign Coordinated Observations (ISACCO)** - PI Giorgiana De Franceschi, INGv3
- 3 - **Sun-Earth Interaction: Joint High-Latitude Aurora Observations from Svalbard and North-East Greenland, with ITACA<sup>2</sup> Twin All-Sky Cameras** - PI Stefano Massetti, INAF.



## Dirigibile Italia C.N.R.

Below statistical information about activities performed and planned in 2011 until the end of May. Information about the activities will be performed during summer will be supplied with the second 2011 status report in fall.

<b>Operational days of Dirigibile Italia station</b>	<b>90 days</b>
<b>TOTAL Man days</b>	<b>445</b>
<b>Man days for CCT-IP / CICC I projects</b>	<b>288</b>
<b>Man days for PNRA and POP projects</b>	<b>89</b>
<b>Logistics</b>	<b>61</b>
<b>Media and Journalists</b>	<b>12</b>
<b>Personnel involved in field activities</b>	<b>16</b>
<b>Supported not Italian projects</b>	<b>1</b>

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## **Status report of China**

In 2011, China will continue to carry out field works as usual. Routine observation and summary investigation will be done through the whole year. There are more than 44 persons will work at Yellow River Station from April to next year March. And one or two delegation will visit this area and the detail time will be informed Kingsbay as soon as possible before they fly to Ny-Alesund.

The detail field work and routine observation are:

1. The monitoring and studies of the glaciers Austre Lovénbreen and Pedersenbreen, Ny-Ålesund, Svalbard
2. Ionospheric observation at Chinese Arctic Yellow River station
3. The Structure and Function of Plankton in Kongsfjorden, Svalbard
4. Observational Research on the physical processes of boundary layer and single particle black carbon measurements over the tundra of the Arctic
5. Observations of sea-ice mass balance and radiation balance in Kongsfjorden, Svalbard
6. high altitude atmosphere wind measurement by FPI
7. Phospholipid Fatty Acid Composition, Biomass, and Activity of Microbial Communities over a high-Arctic glacier forland: Midtre Lovénbreen, Svalbard
8. Study on the diversity of microbes involved in the degradation of organic nitrogen in Arctic
9. Study of the long-range transport and environmental effect of new flame retardants in the Arctic
10. Study on photosynthetic activity and carbon metabolism of the dominant lichen species in the high Arctic, Ny-Ålesund, Svalbard
11. Exploration of plant diversity, collection of plant specimens and establishment of observation quadrat in Wangwan region of Svalbard, Arctic
12. Study on diversity and ecology function of Roseobacter clade bacteria in Kongsfjorden, Svalbard
13. Verification of source and long-term changes of Black Carbon Aerosol over Ny Ålesund in the summer Arctic
14. Study on photosynthetic activity and carbon metabolism of the dominant lichen species in the high Arctic, Ny-Ålesund, Svalbard
15. Monitoring and Study of atmospheric composition in Ny-Ålesund, Arctic
16. The GPR measurements of the glaciers Austre Lovénbreen and Pedersenbreen, Ny-Ålesund, Svalbard
17. Data quality management and control in the Arctic scientific expedition
18. Policy study of polar countries

# NySMAC REPORT (March, 2011)

## Korea Polar Research Institute (KOPRI) Research activities of the Dasan Station at Ny-Alesund

Status Report on March 24, 2011

### 1. Amount of man/days used at the Dasan Station during October, 2010- March, 2011

Project Organizations	Numbers	Project date
KOPRI (Korea Polar Research Institute)	6	
<b>Total</b>	<b>2 people</b>	<b>34 days</b>

\* Actual station open date : October 11, 2010

\* Actual station close date : November 12, 2010

(Currently station is working for this season.)

### 2. Science Activities in during October, 2010- March, 2011

#### 1) Atmosphere

##### ① Integrated research on the COMposition of Polar Atmosphere and Climate Change (COMPAC)

◇ Purpose: To relocate and examine the operational computer for infrared light interferometer and to implement the observation of the upper atmosphere in winter

◇ Period: 11. 9 – 11. 11

◇ Participants: 2 People

Dr. Jee, Geon Hwa / Dr. Kim, Jung Han (KOPRI),

◇ Summary

*The project "Integrated research on COMposition of Polar Atmosphere and Climate Change (COMPAC)" operated by Korea Polar Research Institute from 2006 to 1020 has three main topics: Polar atmospheric environment observation, understanding atmospheric composition, climate prediction modelling. The purpose of this project is to understand the role of Polar regions in the climate change for the mid latitudes. The Arctic climate change influences the mid latitude through a teleconnection by the Arctic Oscillation, which impacts the climate change especially in Winter Season.*

### 3. Non-Scientific Activities

1) Operation and Logistics Team

Officers who are in charge of operating Dasan Station in Logistics and operation team visited the station for routine maintenance and operation and management state for improvement. KOPRI had been preparing for improving the residential environment for scientists and to make space arrangements more efficiently.

It is supposed to relieve our scientists from chores and make them focus on their activities. In next season, we are planning on sending the personnel again to finalize the deal and relevant works.

## **NILU activities during the last six-months period**

September 2010 – March 2011

Approx. 150 man days in Ny-Ålesund this year, a moderate increase from previous years.

### **NILU monitoring at the Zeppelin station:**

#### **Persistent organic pollutants (POP's)**

- PCB A total of 33 PCB's, weekly samples, (48 hours sample)
- Pesticides, insecticides etc. HCB, HCH's chlordanes and DDT-group, weekly (48 hrs)
- Brominated Flame Retardants PBDE, 15 comp's, HBCD, 3 isomeres
- Poly aromatic hydrocarbons (PAH) ~ 40 comp's weekly (48 hrs) + Oxy Nitro PAH
- Perfluorinated Alkylated Substance 6 components, once a week (48 hrs sample)

#### **Inorganic compounds**

- Heavy metals, Hg (5 min), As, Cd, Co, Cr, Cu, Pb, Mn, Ni, V, Zn, 3/week (48+48+72 hrs)
- Acidification  $\text{HNO}_3/\text{NO}_3^-$ ,  $\text{NH}_4^+/\text{NH}_3$ ,  $\text{SO}_2$ ,  $\text{SO}_4^{2-}$  gases and particles, daily (24 hr sample)
- Inorganic Particle Bound,  $\text{Na}^+$ ,  $\text{K}^+$ ,  $\text{Ca}^{2+}$ ,  $\text{Mg}^{2+}$ ,  $\text{Cl}^-$  every day (24 hr sample)

#### **Greenhouse gasses**

- Methane ( $\text{CH}_4$ ) semi-continuously, every 15 minutes
- CFC's, HCFC's, HFC's, PFC's semi-continuously, every 2 hour
- CO Carbon Monoxide semi-continuously, every 20 minutes
- $\text{H}_2$  Hydrogen semi-continuously, every 20 minutes
- $\text{N}_2\text{O}$  Nitrous oxide every 15 minutes (new instrument)
- Tropospheric ozone Continuously, monitor every minute

#### **Meteorological data**

AWI have installed a Sun photo meter at the Zeppelin station for AOD-measurements above the boundary layer.

### **Monitoring in Ny-Ålesund (Sverdrup station):**

- Total ozone: Continuously UV/ VIS absorption instrument (Feb-Apr, Aug-Oct)
- Stratospheric  $\text{NO}_2$ : Continuously UV/ VIS absorption instrument (Feb-Apr, Aug-Oct)
- UV – irradiation: Continuously UV-irradiance measurements (Apr – Sep)
- Particles/aerosols: Continuously, Aerosol optical depth (AOD) (Apr – Sep).
- Precipitation: pH, conductivity,  $\text{SO}_4^{2-}$ ,  $\text{Na}^+$ ,  $\text{K}^+$ ,  $\text{Ca}^{2+}$ ,  $\text{Mg}^{2+}$ ,  $\text{Cl}^-$ ,  $\text{NO}_3^-$ ,  $\text{NH}_4^+$  (weekly avg.)

### **Monitoring of local air quality in Ny-Ålesund**

Monitoring started in July 2008, in-town, combination of monitors (high time resolution) and air sampling (low detection limits).

Measurement programme:

- Monitors:  $\text{SO}_2$ ,  $\text{NO}_x$ , CO BTEX
- Air sampling:  $\text{HNO}_3/\text{NO}_3^-$ ,  $\text{NH}_4^+/\text{NH}_3$ ,  $\text{SO}_2$ ,  $\text{SO}_4^{2-}$ ,  $\text{Na}^+$ ,  $\text{K}^+$ ,  $\text{Ca}^{2+}$ ,  $\text{Mg}^{2+}$ ,  $\text{Cl}^-$  24h samples

### **Project highlights**

CICCI- Spring Campaign April-May 2011

The VAUUAV project team will be operating their UAV (Unmanned Aerial Vehicle) in combination with ground based measurements this spring for albedo monitoring and studies of impact from aerosol and black carbon deposition on snow and ice. These activities will be part of a major CICCI measurement campaign involving several institutions based in Ny-Ålesund (NILU, AWIPEV, CNR, NPI, CAMS, SU) as well as institutions as NOAA-PMEL, NOAA-GMD, CIRES, UNIFI, UNIMI, NORUT and AARI. Measurements during this period will be executed on mobile platforms (VAUUAV, AWI Polar-5 aircraft, AARI Eleron UAS, NPI R/V Lance), at stations in and around Ny-Ålesund (Koldewey, Sverdrup, Gruvebadet, Amundsen-Nobile CCT and Zeppelin station) and in the field (Holtedahlfonna region).

SAOZ-network

The SAOZ-network of Arctic stations for the study of the high atmosphere have reported record low measurements of Stratospheric Ozone during March 2011. The unusually low measurement values have been observed at all high latitude measurement stations, Ny-Ålesund included.

## **Selected publications**

### **Long-term trends of black carbon and sulphate aerosol in the Arctic: changes in atmospheric transport and source region emissions.**

Hirdman, D., Burkhardt, J. F., Sodemann, H., Eckhardt, S., Jefferson, A., Quinn, P. K., Sharma, S., Ström, J., Stohl, A.  
*Atmos. Chem. Phys.*, 10, 9351-9368.

### **Lidar measurements of the Kasatochi aerosol plume in August and September 2008 in Ny-Ålesund, Spitsbergen.**

Hoffmann, A., Ritter, C., Stock, M., Maturilli, M., Eckhardt, S., Herber, A., Neuber, R.  
*J. Geophys. Res.*, 115, D00L12.

### **Brominated flame retardants in the Arctic - Spatial and temporal trends and new candidates.**

de Wit, C.A., Herzke, D., Vorkamp, K

*Proceedings of the 30th International Symposium on Halogenated Persistent Organic Pollutants (POPs) - Dioxin 2010. San Antonio, USA, 12-17 (ID 1160).*

### **Ozone variability and halogen oxidation within the Arctic and sub-Arctic springtime boundary layer.**

Gilman, J.B., Burkhardt, J.F., Lerner, B.M., Williams, E.J., Kuster, W.C., Goldan, P.D., Murphy, P.C., Warneke, C., Fowler, C., Montzka, S.A., Miller, B.R., Miller, L., Oltmans, S.J., Ryerson, T.B., Cooper, O.R., Stohl, A., de Gouw, J.A.  
*Atmos. Chem. Phys.*, 10, 10223-10236

### **POLARCAT - A unique snapshot of the Arctic atmosphere.**

Ed. Anne Nyeggen. Kjeller, Norwegian Institute for Air Research  
Book; ISBN: 978-82-425-2232-0 2010

## National Institute of Polar Research Activity in Ny-Ålesund

In the period from October 2010 to March 2011.

7 Japanese scientists of one project carried out in Ny-Ålesund, 178 man-day.

### 1. Atmospheric science

7 researchers, 22 December 2010 - 7 March 2011

Project name: Observation of Polar Stratospheric Clouds (PSC) with FTIR Spectrometer (RIS ID: 3158)

In the period from April 2011 –

### 1. Meteorology

6 researchers, 9 May – 6 June

Project name: An observational study on radiative and microphysical properties of mixed phase clouds in the Arctic (RIS ID: 3832)

### 2. Biology

3-4 researchers, July and August

Project name: Response of high Arctic tundra ecosystem to climate change (RIS ID: 3156). Study site will be wet land near bird cliff in a westward direction from Ny-Ålesund).

## Second International Symposium on Arctic Research (ISAR-2)

ISAR-2 was successfully held on 7-9 December 2010 at Hitotsubashi Memorial Hall in Tokyo, Japan in order to discuss the Arctic System in a Changing Earth. The total number of participants was 230, including 121 from Japan and 109 from 14 other countries. Public lectures were designed for the general public in the same venue on 6<sup>th</sup> December, 2010. The theme of the lecture was “How is the Arctic climate change understood?” This event was performed using a simultaneous translation system. The number of participants was 130 including approximately 50 ISAR-2 participants. Thank you very much for your kindly cooperation.

## Station

Since Rabben become too old, NIPR has just started to consider new station with Kings Bay.

**Status report of the measurements performed at Zeppelin by ITM/SU 2010 and upcoming changes of the current measurement program 2011.**

***Responsible Scientist: Peter Tunved, Atmospheric Science Unit, Department of Applied Environmental Science, Stockholm University.***

[Peter.tunved@itm.su.se](mailto:Peter.tunved@itm.su.se)

*Summary*

The monitoring of aerosol parameters has continued more or less as usual. Currently, the measurements performed by ITM/SU at the Zeppelin stations include aerosol scattering (three wavelength nephelometer, TSI 3076), aerosol absorption (custom built particle soot photometer), aerosol number concentration above 3 and 10 nanometers (TSI3025 and TSI010, respectively), aerosol number size distribution between 10-800nm (custom built DMPS system), weekly samples of organic and elemental carbon content (OC/EC; sampling on quartz filters, and analyzed at ITM using thermo optical method (SUNSET OC/EC analyzer). ITM/SU has also continued the observations of CO<sub>2</sub>. ITM now have a database of aerosol observations covering an excess of 10 years for certain parameters (e.g. aerosol size distribution). During following period, some upgrades of instrumentation/sampling will be performed.

*Activities during last period/2010*

A total of 38 man-days have been spent at Ny-Ålesund since last NySMAC-meeting. This includes both planning and experimental work.

ITM/SU have installed a new DMPS system that fully complies with the measurement standards set up by EUSAAR. This now means that the new system and analysis protocols comply with widely adopted EUSAAR standards employed at European sites regarding measurements of aerosol number size distributions. The new DMPS system has been run in parallel with the old system to assure the quality of data.

*Plans for the coming period*

A new measurement inlet will be installed during 2011. The plan is to finalize this installation during June 2011. The new inlet agrees with the standards suggested for high altitude sites as suggested by EUSAAR, and will hopefully increase the quality of the aerosol observations performed by ITM/SU at Zeppelin.

The current observations of the particle soot absorption will be up-graded with a new 3-wavelength PSAP to be installed during March 2011.

Observations of the larger end of the aerosol number size distribution will be re-initialized during June 2011 by again starting sampling with an Optical Particle Counter (OPC).

It should be mentioned that there are plans to perform observations of volatility and hygroscopic growth using combined H-TDMA/V-TDMA. When these measurement are planned to begin is however more uncertain, but will likely start before end of 2011.

The SU-room at Zeppelin will be refurnished to better host the measurements performed. This will include new electrical wiring in the room, a work that will be finalized before June 2011.

## **Status report from University of Tromsø to NySMAC meeting in Seoul March 28, 2011.**

### **Project: A predictive model of plant distribution in Svalbard**

The project aim is to produce a predictive model for distribution of and plant species in the island of Spitsbergen. Correlations between species occurrences and the large scale gradients of temperature and geological substrate of Spitsbergen will be used to develop a simple niche based model. A temperature model of Spitsbergen will be made in cooperation ...

Duration: 01-01-2005 - 30-12-2008 Institution(s): UiT

### **Project: Effects of spatiotemporal variation in food quality and quantity on ungulate ...**

The objective of this study is to examine changes in large herbivore foraging trade-offs as a function of spatial and temporal variation in important plant characteristics. More specifically, I will use a simple high-arctic system inhabited by predator-free Svalbard reindeer (*Rangifer tarandus platyrhynchus*) to: (1) map and quantify spatiotemporal patterns ...

Duration: 01-12-2008 - 30-05-2010 Institution(s): NPI, NTNU-IBI, UiT

### **Project: Biodiversity and activity of methane oxidising bacteria in northern ecosystems**

The presence and activity of methane oxidising bacteria (methanotrophs) in arctic and subarctic soils are studied both through isolation of organisms and in situ. This methanotroph community is important in northern high organic ecosystems due to their role as the biological sink for methane. A culture collection from different latitudes is used for ...

Duration: 01-01-2004 - 30-12-2007 Institution(s): UiB, UiT

### **Project: IPY-Arctic Predators**

Strongly cyclic interaction between plants, herbivores and predators typically drives the food web dynamics over large tracts of the arctic tundra biome. These interaction cycles, however, now appear to be fading out at the southern edge of tundra, possibly due to climate warming. The Arctic Climate Impact Assessment (ACIA) highlights this change, if it was ...

Duration: 01-01-2007 - 30-12-2010 Institution(s): NPI, UiT

### **Project: The effects on population dynamical key-processes of a changing climate in ...**

The present project aims at understanding and predicting how variations and changes in climate can affect key-processes that operate both on population dynamical and ecosystem level. More specifically, we will use long-term monitoring data on population dynamics and population specific demography to parameterize stochastic population models. The models will ...

Duration: 01-01-2007 - 30-12-2010 Institution(s): Norut IT, NTNU-IBI, UiT, DNMI, IMR

### **Project: Regulation of methane by soil microbes in Arctic terrestrial ecosystems**

About 75 % of the Earth's biosphere is permanently cold, with a significant part consisting of permafrost. Arctic permafrost soils contain >14 % of the global organic soil carbon representing a major yet currently resilient part of the global carbon budget. The ongoing temperature increase in the northern hemisphere will make available these carbon ...

Duration: 01-01-2007 - Institution(s): UiT

### **Project: Microbial genomes and community gene expression in High Arctic terrestrial ...**

Soil microorganisms are key players in the degradation of stored organic carbon in High Arctic ecosystems. The soil processes are carried out by remarkably diverse and complex microbial communities, which adapt to the Arctic environment. The communities harbor microorganisms which are central in climate processes, and can influence the climate both at a ...

Duration: 01-08-2009 - 30-06-2012 Institution(s): UiT, Uni Wien, MPI

### **Data Set: Foraging behavior and energetics in Kittiwakes and Little auks**

The overall goal of this project is to determine the influence of climate variability and change on the energy transfer in the marine pelagic ecosystem in different water masses on the west coast of Spitsbergen. The project will compare the pelagic food webs in fronts involving Arctic (ArW) and Atlantic water masses (AW) in this high Arctic region. Welcker, ...

Institution(s): NPI, UiT

Data collected from the RiS database. Svein Kristiansen March 14, 2011.