

Ny-Ålesund Newsletter

27th Edition – January 2011

Work on Environmental Management Plan for Eastern Svalbard has started

In December, The Governor of Svalbard announced that the work on the environmental management plan for the Nature Reserves of Eastern Svalbard has formally started. These nature reserves were established in 1973 and cover 51% of Svalbard's land and sea within the territory boundary.

The administration plan is intended to be a tool for the authorities that ensures a balanced and best possible knowledge-based administration of the Nature reserves in Eastern Svalbard. The Governor wishes to initiate a good cooperation in the planning process with all relevant partners and has established working groups. The work within these groups will form the basis for a drafted plan

which will be submitted for hearing. Read more at www.sysselmannen.no/hoved.aspx?m=63058.

Participants in the working group on research are SSF, NPI, UNIS, RCN (SIOS), NySMAC and LySEF. NySMAC will represent interests of the Ny-Ålesund research community and SSF will in addition represent interests of all international and Norwegian research groups that are not represented else in the working group.

If you have any input to this work please contact as soon as possible either Maarten Loonen, NySMAC (M.J.J.E.Loonen@rug.nl) or Christiane Hübner, SSF (post@svalbardscienceforum.no).

New Medusa instrument installed at Zeppelin

Last fall NILU installed a new Medusa at the Zeppelin station.

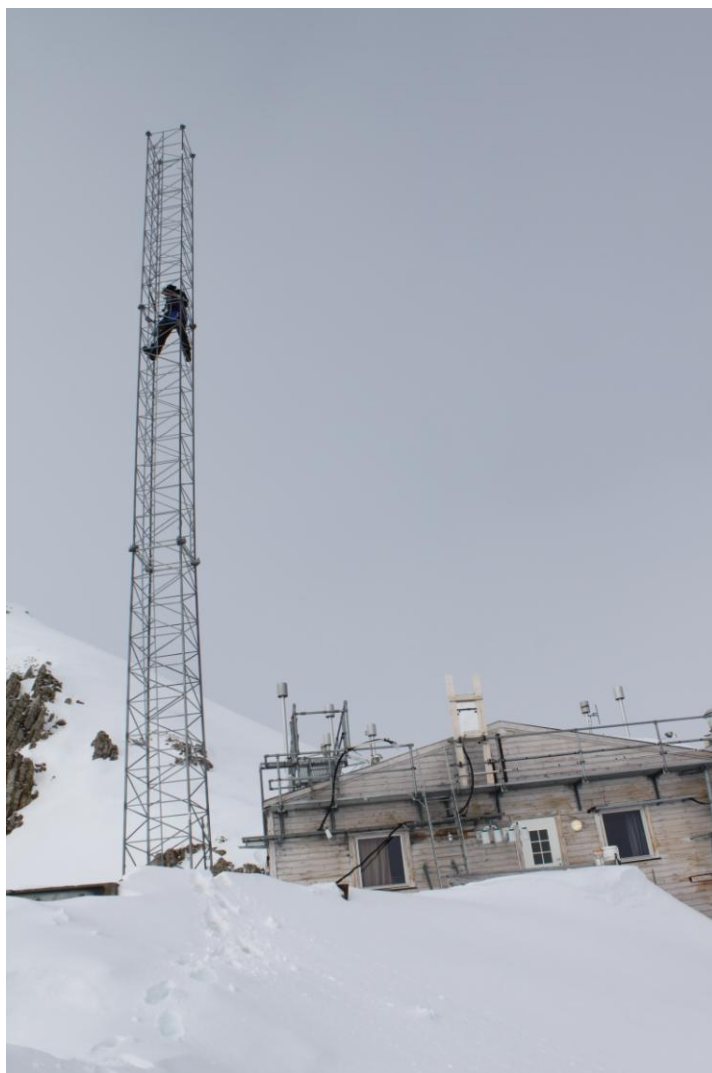
The instrument, number 19 of its kind, is developed to provide more accurate measurements of halocarbon gases and to extend the range of compounds monitored. These measurements are part of the AGAGE network of remote greenhouse gas monitoring stations.

Many of the halocarbons are man-made and several gases are regulated through the Montreal and Kyoto protocols as Ozone depleting substances and strong Greenhouse Gases.

Among the gases monitored are Chlorofluorocarbons (CFCs) and their replacement compounds such as HCFCs and HFCs. Perfluorocarbons and Halons are also measured. Whereas the amount of many ozone-depleting substances (ODS) in the troposphere is declining, some of their substitutes show relatively strong increasing trends in the levels measured at Zeppelin.



*NILU engineer Are Bäcklund about to install a new air inlet for the Medusa instrument.
Photo: NILU*



Svalbard Science Forum workshops 2011

Svalbard Science Forum is organizing 3 workshops in 2011:

- Joint Cooperation Initiative (JCI) workshop: “Environmental changes in Svalbard since the last glacial maximum – integrating marine and terrestrial records”.
Time & venue: 27-29 April, Fram Centre, Tromsø, Norway (open to all interested researchers).
The Planning Groups members: Matthias Forwick (UiT), Dorthe Klitgaard Kristensen (NPI), Riko Noormets (UNIS), and Grzegorz Rachlewicz (Adam Mickiewicz University in Poznan, Poland).
- Flagship initiation workshop: “Glaciers in Kongsfjorden – Opportunities & constrains for the future glaciology research in Ny-Ålesund”.

Time: 30 May- 1 June; Place: Tromsø or Longyearbyen (to be decided later). The workshop is by invitation only. The Planning Group members: Jack Kohler (NPI), Doug Benn (UNIS), Ian Willis (SPRI, UK) and Ireneusz Sobota (Nicolaus Copernicus University in Torun, Poland).

- Joint Cooperation Initiative (JCI) workshop: “Snow, Pollutants & Ecology”;
Time: planned for autumn 2011. Venue to be decided later.

More information about the workshops can be found on the Svalbard Science Forum website (Events in the left menu): www.svalbardscienceforum.no

Contact: SSF office v/Marzena Kaczmarek;
Marzena@svalbardscienceforum.no; tel. +47 777 50 542”

Our dynamic planet

If we want to understand the Earth properly, we require better observations. Norway can help by installing two new antennas at Ny-Ålesund in the Arctic Svalbard islands.



More accurate monitoring of the planet and continuous data collection is needed to improve our understanding of climate change and to maintain accuracy with the global positioning system (GPS).

The planned Earth observation antennas in Svalbard would represent a further extension of Norway's commitment to its far northern regions.

They will be part of a worldwide network in which NASA, for instance, is an important partner, and help to keep track of the planet's movements so that they can be better understood.

The Earth is not a perfect sphere. It is lumpy, and constantly moves in a number of directions and at varying speeds through the cosmos.

So the question scientists face is how to measure the effects of global climate change over time such as Polar ice melting and variations in sea level when nothing remains at rest?

And how can aircraft navigate or people find their way using GPS when the latest gadgets actually have no fixed point to measure from, because the Earth is in constant motion?

Quasar fix

Quasi-stellar objects (quasars) lie up to 13 billion light years away, right at the edge of the universe. Being so far away means they are stationary in relation to the Earth and can be regarded as fixed points.

This is perfect for measuring changes to our planet over time, since all measurements need to start from somewhere. In other words, we require a reference position which remains as stable as possible.

The solution is to pick up the radio signal transmitted by a quasar with the aid of very long baseline interferometry (VLBI) antennas which are linked in a voluntary global network.

Each country with such VLBI antennas finances and operates them at their own expense, in every case in order to hunt for quasars.

Limited life

The existing VLBI antenna at Ny-Ålesund is run by the Norwegian Mapping Authority (NMA). Almost 20 years old, it has yielded good results for many years but is now approaching the limit of its operational life.

This facility is naturally treated with care, but a little rust can be found here and there, while spare parts are no longer available.

More to the point, it fails to provide the level of accuracy required by modern society, climate researchers, and users of navigational/communication satellites and so forth.

Accordingly, the NMA wants to renew this geodetic (Earth measurement) observatory with two new antennas which meet current user requirements.

Continuously accurate

These units will be similar to the existing facility, but deliver measurements around the clock in a continuous data stream with an accuracy of better than one millimetre. That is why two antennas are required to replace today's one.

Their job will be to establish the Earth's rotational speed as well as the angle of its axis of rotation and how this moves in relation to the heavens. Measurements will also help to monitor changes to the planetary surface.

Crucial

These Earth observation antennas around the world are crucial for mapping the globe and identifying its exact position in space. That information is needed so that GPS and all satellite technology, in fact functions properly.

Without these data, the location of satellites in relation to the Earth's surface cannot be established with sufficient precision, and they are unable to provide a true position.

This means that pilots could have problems navigating their aircraft, while scientists lack exact information for measuring climate change.

Advantageous

Monitoring the globe from Ny-Ålesund is particularly advantageous. Its antenna is the northernmost in the worldwide network and has the advantage of being easily accessible.

In addition to being close to the Pole, local radio silence prevails in the settlement, disturbances are minimal and the

visibility of the heavens is good. These factors are crucial for obtaining reliable results from Earth observation studies worldwide.

The NMA also wants to build the new antennas at a site with stable ground conditions, an important factor when determining the distance between two continents with an accuracy of less than a millimetre.

Year-round

Ny-Ålesund is in such a favourable location that the NMA is able to work there year-round. Its involvement helps to strengthen Norway's presence in Svalbard and supports the commitment to scientific research at the site.

The NMA takes the government's far north policy and Svalbard White Paper seriously, and is pleased that the authorities have already resolved to lay a carbon-fibre cable from Longyearbyen capital of the islands to Ny-Ålesund.

This decision is important for the NMA's plans to expand its commitment in Ny-Ålesund with the new antennas and continuous measurements, since they depend on a high-speed data link.

Changes

The Earth has been subject to changes for millions of years, however, without long-term observations. We still lack understanding of how climate varies over longer timescales.

Monitoring must be conducted from the same location for a number of years in order to build up a good time series that can be of use to the scientific community.

The NMA has been working on this in Ny-Ålesund for the past 20 years, but these efforts could be wasted if the measurements are not continued on the same site.

Pleased partners

The NMA's partners are pleased at its commitment to Ny-Ålesund. That includes America's NASA, which wants Norway to continue its Earth observation studies with new antenna technology.

A delegation from the US agency's head office in Washington DC visited Norway recently to meet the NMA and the Ministry of the Environment.

The observatory at Ny-Ålesund plays a key role in Earth observation, NASA commented. But it needs to be modernised so that the world community can jointly reach the goal of even more accurate planetary monitoring.

That view is shared by the NMA, and it believes the coming years will be crucial. Planning and building antennas takes time, and the existing facility will have to remain operational while this takes place.

Renewing the Ny-Ålesund geodetic observatory is a matter of urgency if Norway is to continue contributing to climate research, safe navigation and the basis for all satellite technology.

The Earth will continue to be as dynamic as it has always been, but new antennas will make it possible to keep better track of its movements.

By Anne Jørgensen, Communication adviser, Geodetic Institute, Norwegian Mapping Authority

Information from Kings Bays AS

New Staff

Mr. Hallvar Gislén has been hired as the new Research Adviser and Ms. Elisabeth Råstad has been hired as the new Marine Lab Manager. They began their work in mid august.

MESOAQUA

The MESOAQUA project has finished its first reporting period, and Kings Bay has so far provided approximately 230 days of Transnational Access for mesocosm related research. See <http://mesoaqua.eu/> for more details.

AWIPEV

The year 2010 was fruitful and the 35 projects run in 2010 kept the AWIPEV crew busy on site. For the coming year, the base has the will to open a window on the ongoing projects hosted at the station via its new website www.awipev.eu

News is going to be published on regular basis giving up-to-date information about the scientific activities as well as the Ny-Ålesund life.

Renewed and completed, it guides the AWIPEV guests through the important steps in order to prepare their stay in Ny-Ålesund.

Furthermore, the webpage becomes an interesting tool gathering some of the monitored data such as the actual weather condition, radiation measurements (part of the Baseline Surface Radiation Network), daily radio sondings and ozone profiles.

At AWIPEV station, the overwintering team 2010-2011 has completed its half-period. The new team is already following the introduction period in Germany (AWI) and France (IPEV). The overwintering team 2011-2012 (Rudolf Denkmann, Base leader; Andrea Gross, Observatory Engineer and Christophe Brière, Logistics Engineer) is taking over current May.



AWIPEV crew: Christian Konrad, Observatory Engineer, Sébastien Barrault, Base leader, Thomas Bouchard, Logistics Engineer

Sverdrup Station

Besides the numerous guest researchers working from the Sverdrup Station, there were news both in permanent and temporary personnel.

We could welcome Steinar Aksnes as our logistics engineer in August this year as a valuable member of our team.

In September, Li Gang from China stayed with us for three month to get hands on experience in running a monitoring station.

In December and January, Leif Arild Håhjem will help at the station to fill in for vacation periods of our engineers.

Topics from the 33rd NySMAC meeting

Topics from the previous NySMAC meeting held in Ny-Ålesund 13-15 September 2010:

- Exchange of information. Status reports from members and Kings Bay As.
- Work report from Svalbard Science Forum.
- Status for SIOS. Preparatory phase started 1 October 2010.
- AMASE – Experiences from Ny-Ålesund based field work.
- Resource allocations and potential conflict of interests.
- International student camp in Ny-Ålesund.
- The Governor of Svalbard – responsibilities and routines. Search and rescue service at Svalbard.
- The information centre – report on updates and visit to the centre.
- Updates on VLBI 2010 and inspection of the site.
- Status on radio quiet conditions from the working group.
- Freeze lab capacity – status.
- Monitoring of local environment evaluation from the working group.
 - Presentation of the analyzed data from NILU
 - Follow-up on EIA action points from the appointed working group
- Support of distant field research
- How should Ny-Ålesund coordinate mass media contacts.
- Transporting frozen samples out of Ny-Ålesund.
- NILU will host the 10th Ny-Ålesund seminar in fall 2011.
- Wang Yong from Chinese Arctic and Antarctic Administration (CAAA) was elected Deputy Chairman for a period of two years.

34th NySMAC meeting and Arctic Science Summit Week 2011 in Seoul

The 34th meeting will take place 28 March in connection with ASSW2011 in Seoul, South Korea.

For more information about the meeting see npolar.no/nysmac

Tracking the migration of Arctic skuas

Migration enables animals to choose the optimal habitat for different parts of the year. Arctic and temperate areas attract many animals with favorable environmental conditions during summer, which ensures good conditions for successful reproduction. However, winter conditions are challenging, and many animals migrate long distances to seek better conditions elsewhere. This is especially the true for birds because of their ability to fly. Birds undertake the longest annual migrations known on earth.

Studying migration is important for understanding the factors that affect animal survival and for identifying the habitats they depend on throughout the year. Traditional methods, like bird ringing, have been insufficient to track the migration of many bird species. We are now using new logger technology to meet this challenge. Light-level geolocators (gl)s are miniaturized electronic loggers (1.5-2.5g) that are attached to the bird ring and easily carried by the bird. Light intensity is recorded to identify timing of sunrise and sunset, which in turn are used to calculate latitude and longitude.

The Arctic skua (*Stercorarius parasiticus*) is one of the species we have studied with this method. This species is famous for its kleptoparasitic behavior. They are stealing food from other seabirds, like gulls and terns. In Svalbard, they mainly kleptoparasitize kittiwakes. They steal the food during an impressive aerial pursuit. The previous knowledge about migration, however, has been very scarce, with very few ring recoveries. We therefore deployed Arctic skuas with gls-loggers in 2009. The birds were caught and equipped in their breeding territories in Kongsfjorden in Svalbard. We went back for recaptures in the same territories in 2010 and retrieved 11 loggers.

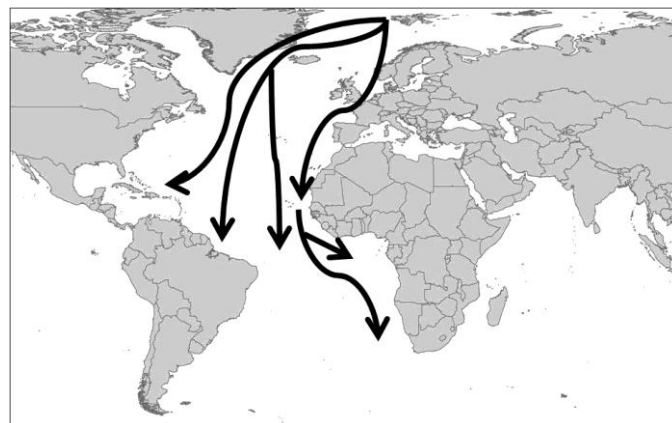
Being the first study to track the migration of Arctic skuas, we identified two main flyways and three main wintering areas. During autumn migration, 10 out of 11 skuas flew west towards Greenland and one skua flew south towards the North Sea. They all spent the winter in tropical or subtropical waters, off West Africa, in the Gulf of Guinea or off South America. The Arctic skuas utilized large oceanic areas during migration and during winter. The distances covered were among the longest animal migrations ever recorded.

The annual migration of Arctic skuas integrates arctic, temperate and tropical waters, and demonstrates impressive adaptations to cope with contrasting environmental and climatic conditions. It is not known whether the identified flyways and wintering areas are fixed individual preferences or whether individuals can be flexible

and choose different flyways and wintering areas between years. Nevertheless, the species do not seem to depend only on a few well defined and restricted habitats, so-called hotspots. The viability of Arctic skua populations is probably affected by the health of the entire North Atlantic Ocean. As this ocean basin is under intense human exploitation, including oil industry and fishing, this study highlights the need for environmental conservation and management on a transatlantic scale.



Arctic skua flying over the breeding territory in Kongsfjorden in Svalbard. Photo: E. Biersma



The main flyways and wintering areas of Arctic skuas breeding in Svalbard. Illustration: B. Moe

Børge Moe and Sveinn Are Hansen,
Norwegian Institute for Nature Research
-in cooperation with the University of Groningen, CEBC-CNRS
and Norwegian Polar Institute

Input to Ny-Ålesund Newsletter

If you would like to contribute to future editions of this newsletter, please e-mail nysmac@npolar.no. Any ideas or suggestions for topics are also welcomed. Editor: Marit R. Petterson, NySMAC Secretariat. **Next edition: June 2011**

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CONTACT ADDRESSES FOR STATIONS AND INSTITUTIONS PRESENT IN NY-ÅLESUND

AWIPEV Arctic Research Base

9173 Ny-Ålesund, Norway
 Tel: +47 79 02 71 14
 ax: +47 79 02 71 32
 E-mail: station@awi-koldewey.no
<http://www.awipev.eu>

Germany address:

Alfred Wegener Institut (AWI)
 Forschungsstelle Potsdam,
 Telegrafenberg A43
 D-14473 Potsdam, Germany
 Tel: +49 331 288 2129
 Fax: +49 331 288 2178
 e-mail: koldewey@awi-potsdam.de
<http://www.awi.de/en/go/koldewey>

France address:

Institut Français Polaire, Paul Emile
 Victor (IPEV)
 Technopôle Brest-Iroise, BP 75
 29280 Plouzané, France
 Tel: +33 298 056 556
 Fax: +33 298 056 555
 E-mail: fdelbart@ipev.fr
<http://www.ifremer.fr/irftp>

Chinese Arctic and Antarctic Administration (CAA)

Polar Research Institute of China
 Yellow River Station
 9173 Ny-Ålesund, Norway
 Tel: +47 79 02 79 89
 Fax: +47 79 02 79 88
 E-mail: wang_yong@263.net.cn

China address:

Chinese Arctic and Antarctic
 Administration
 No. 1 Fuxingmenwai Street
 Beijing 100860
 P.R. China
 Tel: +86 10 68036469
 Fax: +86 10 68012776
 E-mail: wang_yong@263.net.cn
<http://www.chinare.gov.cn>

Consiglio Nazionale delle Ricerche (CNR)

Dirigibile Italia
 9173 Ny-Ålesund, Norway
 Tel: +47 79 02 71 45
 Fax: +47 79 02 71 51
 E-mail: international@polarnet.cnr.it
<http://www.cnr.it>

Italy address:

CNR-ISAC
 Institute of Atmospheric Sciences
 and Climate
 Via Gobetti 101
 40129 Bologna, Italy
 Tel: +39 051 6399595
 Fax: +39 051 6399652
 E-mail: international@polarnet.cnr.it

GeoForschungsZentrum Potsdam (GFZ)

Telegrafenberg A17
 D-14473 Potsdam, Germany
 Tel: +49 331 288 1100
 Fax: +49 331 228 1111
 E-mail: falck@gfz-potsdam.de
<http://www.gfz-potsdam.de>

Kings Bay AS (KB)

9173 Ny-Ålesund, Norway
 Tel: +47 79 02 72 80
 Fax: +47 79 02 72 01
 E-mail: director@kingsbay.no
<http://www.kingsbay.no>

Korea Polar Research Institute (KOPRI)

Dasan Station
 9173 Ny-Ålesund, Norway
 Tel: +47 79 02 76 42
 Fax: +47 79 02 76 43
 E-mail: hchung@kopri.re.kr
 E-mail: shkang@kordi.re.kr

Korea address:

Korea Polar Research Institute (KOPRI)
 1903 Getbul Tower, Songdo Technopark
 7-50 Songdo-dong, Yunsu-ku
 Incheon, 406-840, Korea
 Tel: +82 32 360 6001
 Fax: +82 32 260 6039
 E-mail: polar@kopri.re.kr
ydkim@kopri.re.kr
<http://www.polar.re.kr>

National Centre for Antarctic and Ocean Research (NCAOR)

Himadri station
 9173 Ny-Ålesund, Norway
 E-mail: rasik@ncaor.org

India address:

National centre for Antarctic and Ocean
 Research (NCAOR)
 Headland Sada, Vasco da Gama
 Goa - 403 804, INDIA
 Tel: +91 832 2520876, 2525501
 Fax: +91 832 2520871, 2520877
 E-mail: rasik@ncaor.org
<http://ncaor.gov.in/>

National Institute of Polar Research (NIPR)

Rabben, 9173 Ny-Ålesund, Norway
 Tel: +47 79 02 71 07
 Fax: +47 79 02 70 05

Japan address:

National Institute of Polar Research
 1-9-10, Kaga, Itabashi-ku
 Tokyo 173, Japan
 Tel: +81 33962 4742
 Fax: +81 33962 5701
 E-mail: arctic@nipr.ac.jp
<http://www-arctic.nipr.ac.jp/>

Natural Environment Research Council (NERC)

Harland House,
 9173 Ny-Ålesund, Norway
 Tel: +47 79 02 70 11
 Fax: +47 79 02 70 22
 E-mail: nc@bas.ac.uk
<http://www.nerc.ac.uk>

UK address:

National Environment Research Council
 Polar House
 North Star Avenue
 Swindon, SN2 1EU, UK
 Tel: +44 1793 411 500
 Fax: +44 1793 411 691

Norwegian Institute for Air Research (NILU)

P.O. Box 100
 2027 Kjeller, Norway
 Tel: +47 63 89 80 00
 Fax: +47 63 89 80 50
 E-mail: paal.berg@nilu.no
<http://www.nilu.no>

Norwegian Mapping Authority (NMA)

Ny-Ålesund Geodetic Observatory
 9173 Ny-Ålesund, Norway
 Tel: +47 79 02 70 10
 Fax: +47 79 02 71 48
 E-mail: vlbi@statkart.no
<http://www.statkart.no>

Norwegian Polar Institute (NP)

Sverdrupstasjonen.
 9173 Ny-Ålesund, Norway
 Tel: +47 79 02 71 15
 Fax: +47 79 02 70 02
 E-mail: stationmanager@npolar.no
<http://npolar.no>

Norwegian Space Centre (NSC)

SvalRak, Andøya Rocket Range
 PO Box 54, 8480 Andenes, Norway
 Tel: +47 76 14 44 20
 Fax: +47 76 14 44 01
 E-mail: kiell@rocketrange.no
<http://www.rocketrange.no>

NySMAC

(Ny-Ålesund Science Managers Committee)
 c/o Norwegian Polar Institute Svalbard
 PO Box 505, 9171 Longyearbyen, Norway
 Tel: +47 79 02 26 00
 Fax: +47 79 02 26 04
 E-mail: nysmac@npolar.no
<http://npolar.no/nysmac/>

Stockholm University (SU)

Institute of Applied Environmental Research
 Air Pollution Laboratory
 Frescativägen 54
 10691, Stockholm, Sweden
 Tel: +46 8 674 72 87
 Fax: +46 8 674 76 39
 E-mail: peter.tunved@itm.su.se
<http://www.itm.su.se>

University of Groningen (UoG)

Arctic Centre
 P.O. Box 716
 9700 AS Groningen, The Netherlands
 Tel: +31 50 363 6834
 Fax: +31 50 363 4900
 E-mail: m.j.e.loonen@biol.rug.nl
<http://odin.let.rug.nl/arctic/>

University of Tromsø (UoT)

Department of Arctic and Marine Biology
 Faculty of Biosciences, Fisheries and Economics
 Tromsø University
 N-9037 Tromsø, Norway
 Tel: +47 77 64 60 00
 Fax: +47 77 64 60 20
 E-mail: svein.kristiansen@uit.no
<http://www2.uit.no/www/inenglish>