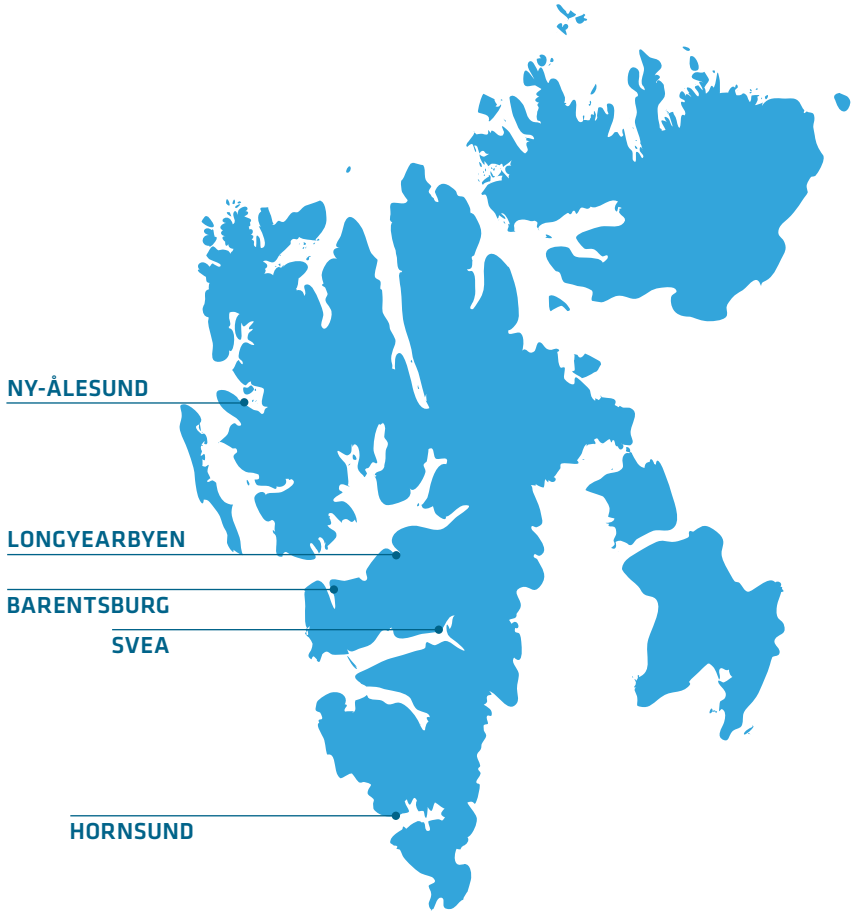
ANNUAL REPORT 2015

UNIS

The University Centre in Svalbard

Front page | **20 March 2015:** The total solar eclipse observed from the roof of the Kjell Henriksen Observatory. Photo: Noora Partamies/UNIS.
Editor | Eva Therese Jenssen/UNIS.


NY-ÅLESUND
LONGYEARBYEN
BARENTSBURG
SVEA
HORNSUND


SVALBARD

FROM THE DIRECTOR

UNIS continues to grow and a total of 690 students from 44 nations were admitted to our 96 courses in 2015. This was an increase of nearly 100 students and resulted in a total of 202 student-years in 2015, a growth of 12 student-years from 2014. The whole organization is working hard to reach the target of 220 student-years the Ministry of Education and Research has set for UNIS. This is a target we will reach in 1-2 years with the expected time lag between hiring more staff, designing new relevant courses and increase student recruitment. UNIS is continuously working in close collaboration with all the Norwegian universities to design an Arctic profile within existing study programmes at the mainland universities. This will secure a stable recruitment of students to UNIS and make the Norwegian universities more attractive in times when focus is on the Arctic and climate change.

This year we can report on yet another high publication rate following the increasing trend in number of publications since UNIS was established 23 years ago. So far, a total of 121 publications in authorized publication channels and peer-reviewed journals have been registered for UNIS in 2015, whereof 75 were published in level 1 journals, and 46 in level 2 journals. Highlights are: *Benn et al. (2015)* in *Nature Geoscience* with important contributions to the Snowball Earth theory and evidence suggesting that the ice sheets would have been sensitive to orbital forcing although the pCO_2 level was not yet at the threshold required for complete melt-back. *Gjermundsen et al. (2015),* also in *Nature Geoscience,* with evidence that the steep, rugged mountains of northwestern Svalbard are much older than previously assumed and not the product of the latest ice age erosions. Through a multidisciplinary study programme and time series collection, *Luckman et al. (2015)* demonstrate a direct link between ocean temperature and glacier calving rates by the dominating glacier erosion process known as 'melt undercut calving' in *Nature Communication. Berge et al. (2015)* have two papers in *Progress in Oceanography* on ecosystem processes and unexpected levels of biological activity during the Arctic polar night.

The increased quality and number of publications reflect the fact that UNIS has become the fifth largest institution within polar research in Norway. Our papers are cited above the global average citation index as reported in the 2015 report on *Norwegian Polar Research – Research in Svalbard* by The Nordic Institute for Studies in Innovation, Research and Education (NIFU). UNIS is the second largest institution on polar research within the university sector measured in man-years, and UNIS has become the largest Norwegian institution conduction research in Svalbard and the ocean areas surrounding Svalbard, both in man-years and in number of publications.

UNIS is an attractive partner in research projects and has an important role in three Centres of Excellence within three different departments at UNIS. We are partner in SAMCoT: Centre for Research-based Innovation in Sustainable Arctic Marine and Coastal Technology (led by NTNU); Centre for Excellence in Biology Education (led by University of Bergen); and the Birkeland Centre of Excellence for Space Science (led by University of Bergen). These Centre partnerships, acquired in public competitions, show that UNIS is recognized as a high quality institution within Arctic science and education.

UNIS is more often the project manager in collaboration projects. In 2015, we became project manager for two projects that are not only important for the development of UNIS, but also for the development of the Longyearbyen community and international research collaboration in Svalbard: The Svalbard Integrated Arctic Earth Observatory System (SIOS) and The Arctic Safety Centre (ASC). UNIS will receive NOK 7 million over the next three years from the Norwegian Ministry of Foreign Affairs programme "Arctic 2030" to establish a new centre for Arctic safety in Longyearbyen. This will be achieved through a combination of natural science education with a special focus on climate and research-based knowledge, and competence within risk and safety-related disciplines. Projects like the ASC fit the UNIS strategy of strengthening existing disciplines and departments, but with a wider scope and inclusion of new disciplines, resulting in a multidiscipline research and education programme with relevance for society.

Outreach activity is an important part of research projects and education programmes at UNIS. UNIS offers courses that are also open to the general public. During the spectacular total solar eclipse in March 2015, the geophysics team at UNIS contributed with instruments and expertise to a live broadcast aired all over the world, and the course "The Stormy Sun and the Northern Lights" was especially designed to cover the solar eclipse event for UNIS students, pupils at Longyearbyen school and the general public.

A disastrous avalanche hit Longyearbyen on 19 December 2015 where two people tragically lost their lives. Two UNIS staff members and their families survived the massive volume of snow that destroyed 11 houses in Longyearbyen, and many UNIS staff members were heavily involved in the rescue operation. The enormous effort in the rescue operation by the people of Longyearbyen was vital and showed the large solidarity that exists in the Longyearbyen society.

I am honoured and proud to be shown the trust and given the responsibility to lead this great institution as the acting managing director in times of new opportunities and focus on the new white paper on Svalbard by the Norwegian government. I will continue to develop UNIS as a leading centre for Arctic science and higher education.

Frank Nilsen
Acting Managing director

EXCERPTS FROM THE BOARD OF DIRECTORS' REPORT 2015

The number of students to UNIS in 2015 increased to 690 students, which represents a total of 202.7 student-labour years. UNIS is a partner of BioCEED Centre of Excellence in Biology Education, the Birkeland Centre for Space Science, the Centre for Sustainable Arctic Marine and Coastal Technology (SAMCoT) and the Research Centre for Arctic Petroleum Exploration (ARCEX). In Longyearbyen, there has been a major focus on restructuring as a result of the drastic downsizing of the Store Norske Spitsbergen Kulkompani, and the Board of Directors has indicated to the Ministry of Education and Research that UNIS can take on a greater role in supporting the local community. In conjunction with the new White Paper on Svalbard, input has been given concerning the continued development of existing subject areas at UNIS, possible new subject areas and the need for a construction stage III. As part of the Ministry of Foreign Affairs' Arctic 2030 initiative, UNIS was allocated the Arctic Safety Centre project, which will be developed into a Department of Arctic Safety at UNIS. The Board of Directors notes that the financial situation is in good shape, accompanied by good research results in several areas.

The University Centre in Svalbard AS (UNIS) was established as a state-owned limited corporation on 29 November 2002. This company replaced the original foundation established in 1994 by the Norwegian University of Science and Technology (NTNU), the University of Bergen (UiB), the University of Oslo (UiO) and the University of Tromsø (UiT). Since 2011, UNIS AS has had an identical collaboration agreement with the eight universities on the Norwegian mainland, and five members of the Board of Directors come from NTNU, UiB, UiO, UiT and the Norwegian University of Life Sciences (NMBU). The company's objective is to provide tuition and engage in research based on Svalbard's geographic location in the High Arctic and the special advantages this offers. The educational provision shall act as a supplement to the tuition offered at the universities and form part of the ordinary programmes of study that culminate in degrees at Bachelor, Master or PhD level. The educational provision shall have an international profile, and all tuition shall be given in English.

EDUCATION

In 2015 UNIS continued the four fields of study:

- Arctic Biology (AB)
- Arctic Geology (AG)
- Arctic Geophysics (AGF)
- Arctic Technology (AT)

In 2015 UNIS offered 96 different courses; 25 Bachelor level courses, 39 Master level courses and 32 PhD level courses. A total of 690 qualified students were admitted to courses in 2015, which follows the trend of an annual increase in the student mass. Furthermore, UNIS arranged 109 exams. In addition to the course students, 58 guest Master's students were at UNIS for all or part of 2015 to work on their Master's theses. A total of 202.7 student-labour years was produced in 2015. Of this, 22.3 student-labour years constitute the production by guest Master's students.

THE STUDENT MASS

A total of 690 students from 44 countries took courses at UNIS, which represents an increase of 91 more students compared to the previous year (599 students from 44 countries in 2014). A total of guest 58 Master's students worked on UNIS-related Master's theses during the year. Of the student mass 50% were women and 50% men. In 2015 there were 310 Norwegian degree students at UNIS. This accounted for 45% of the student mass*.

These were divided as follows between the Norwegian universities:
111 students from UiT – The Arctic University of Norway (35.8%)
80 students from NTNU (28.8%)
50 students from the University of Bergen (16%)
25 students from the University of Oslo (8%)
23 students from the University of Stavanger (7.4%)
15 students from NMBU (4.8%)
4 from the University of Nordland (1.3%)
2 from the University of Agder (0.6%)

In addition to the Norwegian degree students listed above, the majority of the institutions also have students via exchange agreements. As has been the case previously, all international students who do not have an exchange agreement with a university on the Norwegian mainland are registered at UiT – The Arctic University of Norway. In 2015 a total of 219 Norwegian citizens took courses at UNIS (32%). Of the international students, the largest groups were from Germany (11.4%), the Nordic countries (11%), the Netherlands (8.8%), the United Kingdom (6.5%), and Russia (6%).

* As of 2014, UNIS is stating the Norwegian proportion based on the student's programme affiliation at the Norwegian universities and not only Norwegian citizenship.

April 2015: HRH Crown Princess Mette-Marit and HRH Crown Prince Haakon met the AG-330/830 students on Longyearbreen. Photo: Eva Therese Jenssen/UNIS.

COOPERATION WITH THE UNIVERSITIES – THE QUOTA SCHEME

Following a longstanding wish from the Norwegian universities regarding quota places on courses at UNIS, a quota scheme was implemented in 2015 for the parties in the collaboration agreement with UNIS (NTNU, UiO, UiB, UiT - The Arctic University of Norway, NMBU, UiS, UiA and UiN). The background for the introduction of the quota scheme was the wishes from the universities and the conditions for the operation of UNIS, laid down by the Ministry of Education and Research, which states that there should be a balanced proportion of international students and students from Norwegian programmes of study. The purpose of the quota scheme is to create greater predictability in admission to UNIS courses for students admitted to study programmes at Norwegian universities, strengthen the implementation of UNIS courses in programme descriptions at the universities, as well as facilitate that the proportion of students at UNIS from programmes of study at the Norwegian universities meets the Ministry's target.

RESEARCH

The research activity at UNIS continues to grow. Examples of central projects from the departments follow below. More details about UNIS research projects are found in each of the scientific departments' chapters in this annual report.

One of the largest uncertainties in predicting sea level rise in a warming climate is the iceberg calving rate, the rate at which marine-terminating glaciers discharge ice into the sea. A study by scientists from UNIS' departments of Arctic Geophysics and Arctic Geology and partners from the United Kingdom demonstrates for the first time a direct link between sea temperatures in the Arctic fjords and calving of marine-terminating glaciers into the sea. The work, which was published in *Nature Communications,* also demonstrates that it is possible to use remote sensing and satellite data to study glacier dynamics (a slow process) and understand what affects the glacier with observations and time series from the sea and atmosphere (rapid processes). Calving of the glacier terminus dominates the runoff from glaciers in Svalbard, and this process will also be important elsewhere.

In December 2015 it was confirmed that the project "Innovative Strategies for Observation in the Arctic Atmospheric Boundary Layer" would be financed by the Research Council of Norway. The project is managed by the University of Bergen, while UNIS' Department of Arctic Geophysics is one of the main partners. The main focus of the project will be the improvement of the physical processes in weather and climate models using innovative measurements with unmanned aircraft in Svalbard.

The Space Physics Group at the Department of Arctic Geophysics is part of Birkeland Centre for Space Science (BCSS), which is a Centre of Excellence. The group owns and operates two large field installations; the Kjell Henriksen Observatory (KHO) and SuperDARN (Super Dual Auroral

Radar Network), the latter completed in November 2015. The group was also heavily involved in the solar eclipse events that took place in Svalbard in March as well as the NASA-led missile launch RENU 2 (Rocket Experiment for Neutral Upwelling 2) in December.

The Department of Arctic Biology observes biological processes in polar marine and terrestrial ecosystems, with particular focus on climate-related changes. In 2015 the department completed the three-year international project "Climate effects on planktonic food quality and trophic transfer in Arctic marginal ice zones II" (CLEOPATRA II), funded by the Research Council of Norway. The project has so far resulted in a PhD degree, three Master's degrees and 10 published articles. These studies have been presented in a number of media reports, videos and blogs (see: www.mare-incognitum.no).

At the Department of Arctic Geology, three PhD candidates presented their theses in 2015. One thesis was in glaciology, and focused on surging glaciers and their dynamics, while two were in marine geology, and focused on paleo oceanography and climate development in the northern part of Svalbard and the methane emissions from Svalbard fjords respectively. During the autumn an international cooperation was established concerning coastal processes, sedimentation and interaction between valleys and fjord communities in Svalbard. The consortium has received funding for a joint pilot project in Dicksonfjorden and Kongsfjorden and is now working on the interaction between coastal sedimentation and biology.

The presence of sea ice creates significant challenges for marine operations in the Arctic. In this connection the Department of Arctic Technology participated in the innovative and exciting research programme Oden Arctic Technology Research Cruise 2015 (OATRC2015), which was conducted by NTNU in autumn. OATRC2015, which was funded by ExxonMobil, was conducted in collaboration with the Swedish Polar Research Secretariat (SPR) and the Swedish Maritime Administration (SMA).

NEW WHITE PAPER ON SVALBARD

In late autumn 2014, it became clear that low coal prices resulted in heavy losses for the Store Norske Spitsbergen Kulkompani. This situation led to the need for restructuring in Longyearbyen, and the UNIS Board of Directors signalled as early as in December 2014 that UNIS could take on a greater role in supporting the local community. In connection with the new White Paper on Svalbard, which will be presented in spring 2016, there have been several meetings with representatives from the Ministry of Justice and Public Security, which is responsible for the White Paper. The Board of Directors has arranged special seminars and provided input to the Ministry of Education and Research on both a general and more detailed level about how UNIS can be further developed. It is proposed that existing subject areas be strengthened, new subject areas be developed and that there is a requirement for a construction stage III of the science centre. If such development is realized, the level of activity at UNIS should be double that of today within a few years.

ARCTIC SAFETY CENTRE

As part of the Ministry of Foreign Affairs' Arctic 2030 initiative, UNIS was allocated the Arctic Safety Centre project. A number of collaboration partners, such as NTNU, SINTEF, the Norwegian Petroleum Institute, Svalsat and UArctic, are also participating in the project. It is the intention that in the long term this project will be developed into a new department at UNIS.

DISSEMINATION

UNIS has made a solid effort in 2015 to disseminate our activities both nationally and internationally. There were a total of around 200 media reports in publications ranging from *Scientific American* and *CNN to Der Spiegel* and *The Borneo Post* (Malaysia). The most spectacular event of 2015 was the total solar eclipse on 20 March, and Pål Brekke, Adjunct Professor of Solar Physics at the Department of Arctic Geophysics, arranged extensive outreach activities through open lectures and interviews.

UNIS is popular among the delegations and groups which visit Longyearbyen. In 2015 UNIS was visited by around 90 national and international groups. Queen Sonja came on an unofficial visit in February. During the year, other visitors included: The Crown Prince and Crown Princess of Norway; the German Minister of Education, Johanna Wanka; the Acting Minister of Education and Research, Elisabeth Aspaker; the Minister of Agriculture, Sylvi Listhaug; the Minister of Health and Care Services, Bent Høie; the EU Commissioner for Health and Food Safety Vytenis Andruikaitis; and delegations of French and American senators.

The Svalbard Seminars are held annually for the local population of Longyearbyen during the polar night, and in 2015 each evening was attended by around 120 people. Several of our scientists had a collaboration project with Longyearbyen School, whereby the pupils learned more about research on plankton and ocean currents. In June UNIS participated in UiT's Outreach cruise, and arranged the Svalbardkurset and Studietur Nord later in the summer, all of which received positive feedback.

In 2015 UNIS got a completely new, user-friendly website, which has a responsive design. UNIS continued its growth in social media channels such as Facebook, Instagram, Twitter and LinkedIn.

SOCIAL RESPONSIBILITY

UNIS shall be a resource for the local communities in Svalbard. This applies to the staff, students and the knowledge we possess. The staff shall live and work in Longyearbyen and contribute to the development of the institution and the community. Everyone shall engage themselves in the community's social and cultural life rather than starting their own clubs or societies.

August 2015: The Dutch Minister of Foreign Affairs Bert Koenders (left) and the Norwegian Minister of Foreign Affairs Børge Brende visited UNIS and met with staff and students. Photo: Eva Therese Jenssen/UNIS.

STAFF

As of 31 December 2015, the academic staff at UNIS comprised 12 professors, 15 associate professors, three researchers, nine postdocs, 25 PhD candidates and 43 with adjunct professor/associate professor attachments. The technical staff comprised 19 full-time equivalent work years, while the administrative staff (including academic affairs) comprised 26 full-time equivalent work years. Women accounted for 45% of the technical and administrative positions, 35% of the academic positions (including PhD candidates and postdocs) and 50% of the students. Six of the 10 members of the Board of Directors were women. The Board of Directors is not aware of discrimination of any form taking place at UNIS.

The following positions (29) are funded in full or part by external partners: three researchers (the Research Council of Norway, NFR), nine postdocs (six NFR, two Conoco-Philips and one EU), nine PhD candidates (six NFR, one EU and two by industry partners) and eight adjunct professorships (two each by NFR, NGU and ARS/NAROM and one each by Lundin and NERSC. The Board of Directors would like to thank these institutions for their contribution to UNIS.

HEALTH, SAFETY AND ENVIRONMENT

Absence due to illness at UNIS in 2015 was 2.78%. HSE at UNIS is systemised in order to implement all activities for students and staff in a safe manner. We have a particular focus on implementing fieldwork and cruise activities in Arctic areas with small margins in a manner that is as safe as possible. Two injuries involving different people were registered in 2015. These injuries were both related to snowmobile accidents.

UNIS is unaware of contamination of the wider environment to any significant degree as a result of the company's operations. UNIS is working continually to limit the environmental impact of its activities.

AVALANCHE TRAGEDY 19 DECEMBER

Two UNIS PhD candidates, one along with his wife and two daughters, were rescued from the avalanche that hit Longyearbyen around 10:30am on Saturday 19 December. The avalanche claimed two lives. Nearly 30 of the more than 100 volunteers who participated in the rescue operation were employees at UNIS. UNIS made its premises available for debriefing of the rescue crews and public meetings, while 28 apartments at UNIS Guest House were made available to evacuated residents from Longyearbyen. UNIS employees participated in the follow-up work, including media liaison work for the Governor of Svalbard and as members of the group that assessed the avalanche risk in Longyearbyen in the aftermath of the incident.

ECONOMIC DEVELOPMENT

Funds for operation and investments at UNIS are appropriated in the budget of the Ministry of Education and Research. In 2015 appropriations from the Ministry totalled NOK 121,827,000.

Income over and above the appropriations from the Ministry of NOK 66.1 million comprises NOK 48.5 million in external project income for research and NOK 17.6 million in income from consultancy services and rentals. UNIS has also experienced an increase in external funding for research from 8% of its gross income in 2001 to 36.4% in 2015. The Board of Directors is extremely satisfied with the increase in external income.

The annual accounts for UNIS for 2015 show an operating deficit of NOK 5,253,043. After financial items, the figure is NOK 5,408,177, which was covered by shareholder equity. The group's result is identical as the subsidiary company's unused funds for the operation of the CO_2 project have been adjusted as deferred income.

Details regarding the 2015 accounts and equity are found on pages 12 and 13.

In 2015 a salary of NOK 1,029,086 was paid to the Managing Director. The Chair of the Board of Directors received a fee of NOK 85,000, the Deputy Chairperson NOK 47,000 and the other members of the Board of Directors each received a fee of NOK 42,500.

The accounts were audited by PricewaterhouseCoopers A/S.

February 2015: HM Queen Sonja visited UNIS. From left: Director of HSE and infrastructure Fred Skancke Hansen, professor Hanne Christiansen, HM Queen Sonja, PhD candidate Heïdi Sevestre, administrative officer Marry Kristin Waal Sandstå and director Ole Arve Misund. Photo: Inger Lise Næss/UNIS.

RISK AND INTERNAL CONTROL

UNIS' location in the High Arctic provides special challenges in the entire HSE spectrum. In particular, it is important to take a proactive approach in our responsibility for the safety of our students and staff when travelling in the Svalbard nature. Safety is the number one priority at UNIS.

All students and staff at UNIS must undergo thorough safety training before they are allowed to embark on fieldwork. Quality assurance of the planning and implementation of field-based projects is implemented in a structured manner with strict requirements for work procedures and methods.

During 2015 UNIS initiated a collaborative project with the Norwegian Water Resources and Energy Directorate (NVE) to put in place avalanche bulletins for Nordenskiöld land. After a trial period in 2015, the avalanche bulletins are in place in 2016 as a result. UNIS helps by entering observations and NVE prepares the avalanche bulletins.

Work at UNIS' laboratories is subject to the same quality assurance as work in the field. Students and staff must undergo necessary training and supervision before they gain access to the laboratory areas, in addition to HSE/risk analyses before the laboratory work commences.

UNIS is reliant on confidence from the management authorities that our activities have as little negative impact on the natural environment as possible. UNIS cooperates closely with the local management at the Governor of Svalbard and the Longyearbyen Community Council in order to find good solutions, particularly in connection with UNIS' activity in the field.

UNIS' internal regulations are based on the formulation of objectives from the Svalbard Environmental Protection Act, which states that in the event of conflict between the activity and the environment priority must be given to environmental considerations.

BOARD OF DIRECTORS AND ANNUAL MEETING

The Board of Directors held four meetings in 2015, one of which was in Longyearbyen. A total of 85 items were officially discussed. The Annual General Meeting was held in Oslo on 10 June 2015.

THE PATH FORWARD

Special conditions in the course of the year mean that the accounts for 2015 show a significant deficit of NOK 5.4 million. In the future there must be increased focus on cost drivers, particularly boat-related costs and HR-related costs. On the positive side, the level of debt is significantly reduced and the shareholder equity ratio is still above 20%.

The collaboration with the universities will be of high priority in the future. This will occur in accordance with the collaboration agreement with the universities in mainland Norway through the appurtenant plans of action. The Board of Directors has high expectations for this process and believes it will be a win-win situation for all parties.

From the Board of Directors' perspective, UNIS has taken new steps towards achieving its overall goal of being a leading international centre for Arctic studies. The Board of Directors would like to thank all the staff for their good effort in 2015.

THE UNIS BOARD, 24 FEBRUARY 2016:

Chair Berit Kjeldstad (NTNU); Deputy chair Jarle Nygard (University of Oslo); Lise Øvreås (University of Bergen); Morten Hald (University of Tromsø); Eva Falleth (Norwegian University of Life Sciences); Geir Hekne (Longyearbyen Community Council); Pernille Bronken Eidesen, Elise Strømseng and Eli Anne Ersdal (staff representatives); and Helene Overaa Eide (student representative).

EDUCATIONAL QUALITY

By Ane Hammervoll Bjørsvik, Head of the Department of Academic Affairs

QUALITY ASSURANCE WORK

UNIS Quality Assurance System for the Educational Activities was approved by UNIS Board in 2011 and provides a description of UNIS`s strategic and systematic efforts relating to quality of education. The system description reveals the joint elements included in quality assurance of educational activities and defines the distribution of work and responsibility among all parts of UNIS. The purpose of UNIS' quality assurance system is to secure and develop the quality of UNIS' courses at all levels: bachelor, master and PhD. Quality assurance comprises all the processes and activities that affect the quality of courses, from information provided to potential applicants to the completion of their courses. The effort to improve UNIS' courses is a continual process. All UNIS course descriptions are revised annually in accordance with the National Qualifications Framework. Internal course evaluations are being conducted electronically by students and course responsible.

All semester courses at the bachelor level have a mid-term evaluation. This is a student-led process within each scientific department, which aims to detect any course related issues that can be addressed and improved instantaneously. This means that improvements will benefit not only future students, but also the students addressing the issues.

In autumn 2015, UNIS started the process of revising the quality assurance system. This included a visit to UiT – The Arctic University of Norway to exchange experiences and a presentation to UNIS Educational Committee (ECom) and all staff at UNIS during Learning Forum November 2015. The process will continue throughout 2016.

LEARNING ENVIRONMENT

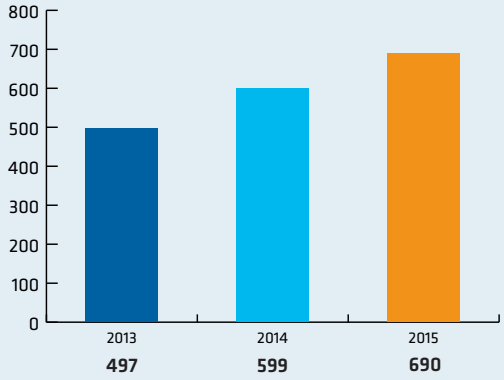
Guest Master and guest PhD students at UNIS are assigned an office space at UNIS, but there are no reading rooms available for students attending courses at UNIS. However, the Library has extended their opening hours until early evening during weekdays, providing extended access both to library resources and to group rooms and reading areas located within the library. Students report on the learning environment through the UNIS course evaluation system. UNIS aim to detect shortcomings related to the facilities and services students take use of in the academic context.

The overall conclusion is that the UNIS students are satisfied with their experiences and outcomes from the field-based education at UNIS.

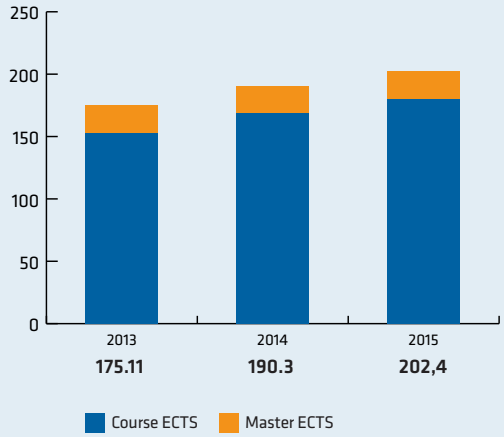
November 2015: All scientific staff together with the Department of Academic Affairs gathered at UNIS for the Learning Forum. Photo: UNIS.

STATISTICS

TOTAL NUMBERS OF STUDENTS

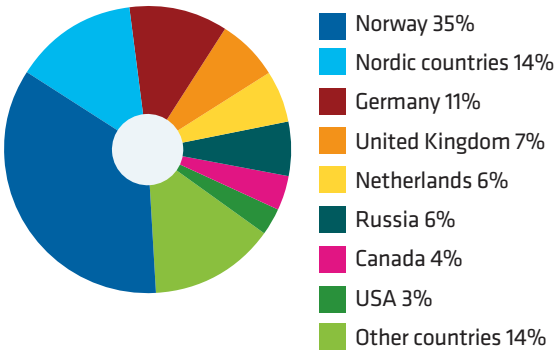


PRODUCTION IN STUDENT-LABOUR YEARS (1 YEAR = 60 ECTS CREDITS)

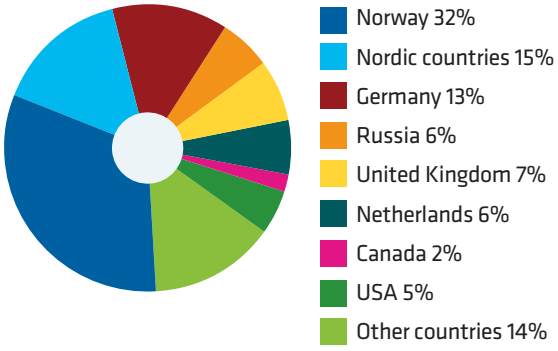


Note: UNIS registers ECTS by 1) course production and 2) master student attendance

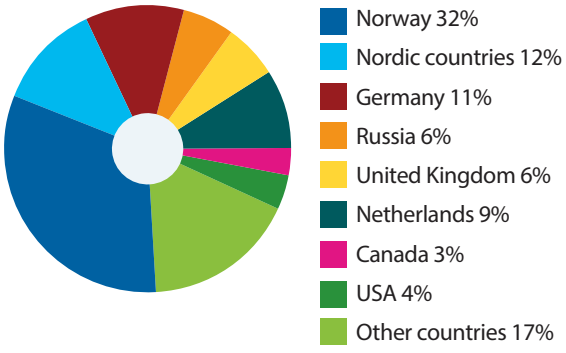
STUDENT NATIONALITY 2013



STUDENT NATIONALITY 2014



STUDENT NATIONALITY 2015



PROFIT AND LOSS ACCOUNT 2015

GROUP*			University Centre in Svalbard AS	
2015	2014		2015	2014
NOK	**NOK**	**OPERATING INCOME**	**NOK**	**NOK**
121 827 000	116 535 000	Operating grant from the Ministry	121 827 000	116 535 000
-6 220 860	-6 290 808	Appropriation for investments	-6 220 860	-6 290 808
115 606 140	**110 244 192**	**Operating grant from the Ministry**	**115 606 140**	**110 244 192**
48 442 879	46 214 814	External project income	48 467 514	46 968 441
3 741 285	12 624 308	Operating grant from sponsors	0	0
17 650 809	13 587 137	Other incomes	17 650 809	14 087 024
185 441 113	**182 670 451**	**Gross operating income**	**181 724 463**	**171 299 657**
41 904 593	39 043 251	Direct project expenses	41 994 593	39 043 251
143 536 520	**143 627 200**	**Net operating income**	**139 729 870**	**132 256 406**
		OPERATING EXPENSES		
71 664 830	62 875 489	Salary and related expenses	71 276 616	60 991 422
10 687 246	7 748 827	Fieldwork and cruise	10 687 246	7 748 827
3 092 654	9 068 897	Consultancy services	0	0
35 271 046	36 549 212	Buildings	35 271 046	36 549 212
26 095 629	22 858 909	Other operating expenses	25 760 155	22 356 145
1 987 849	2 519 441	Depreciation	1 987 849	2 519 441
148 799 255	**141 620 776**	**Sum operating expenses**	**144 982 913**	**130 165 048**
-5 262 735	**2 006 424**	**OPERATING SURPLUS**	**-5 253 043**	**2 091 358**
		FINANCIAL INCOME AND EXPENSES		
916 614	1 326 968	Financial income	905 148	1 233 105
1 062 055	1 228 445	Financial expenses	1 060 281	1 219 516
-145 441	98 523	Net financial items	-155 133	13 589
-5 408 176	**2 104 947**	**Net profit for the year**	**-5 408 176**	**2 104 947**
		Information about appropriations to:		
		Transferred from/to other equity	-5 408 176	2 104 947
		Sum transfers	**-5 408 176**	**2 104 947**

* The UNIS group consists of the University in Svalbard AS and the subsidiary company UNIS CO_2 lab.

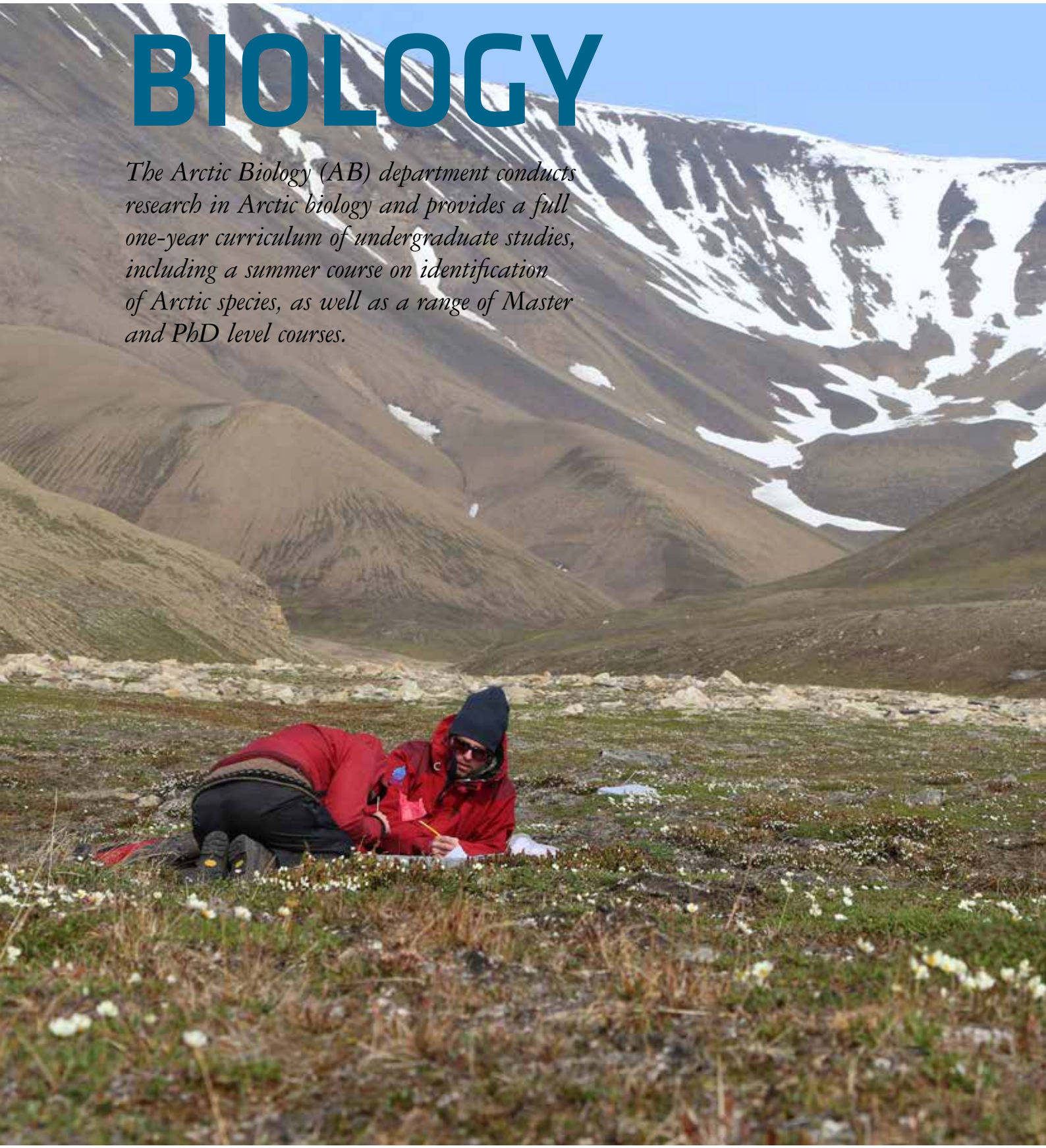
BALANCE SHEET 31.12.2015

GROUP*			University Centre in Svalbard AS	
2015	2014		2015	2014
NOK	**NOK**	**FIXED ASSETS**	**NOK**	**NOK**
		Fixed assets (tangible)		
36 381 208	38 369 057	Buildings	36 381 208	38 369 057
36 381 208	**38 369 057**	**Sum tangible fixed assets**	**36 381 208**	**38 369 057**
		Fixed assets (financial)		
0	0	Investments in subsidiary company	100 000	100 000
0	0	Sum financial fixed assets	100 000	100 000
36 381 208	**38 369 057**	**Sum fixed assets**	**36 481 208**	**38 469 057**
		CURRENT ASSETS		
147 409	1 154 242	Inventory	147 409	1 154 242
4 409 852	4 657 558	Accounts receivable	5 977 735	7 918 566
6 687 096	1 682 951	Other short-term receivables	5 642 386	602 270
32 517 494	52 721 440	Cash and bank deposits	31 840 668	48 326 007
43 761 851	**60 216 191**	**Sum current assets**	**43 608 198**	**58 001 085**
80 143 059	**98 585 248**	**SUM ASSETS**	**80 089 406**	**96 470 142**
		EQUITY		
		Accumulated equity		
2 054 025	2 054 025	Share capital	2 054 025	2 054 025
0	0	Other accumulated equity	0	0
2 054 025	**2 054 025**	**Sum accumulated equity**	**2 054 025**	**2 054 025**
		Retained equity		
14 109 262	19 517 573	Other equity	14 109 262	19 517 573
14 109 262	**19 517 573**	**Sum retained equity**	**14 109 262**	**19 517 573**
16 163 287	**21 571 598**	**Sum equity**	**16 163 287**	**21 571 598**
		LIABILITIES		
		Allowances for liabilities		
1 132 898	8 293 552	Deferred income	1 132 898	6 864 421
1 132 898	**8 293 552**	**Sum allowances for liabilities**	**1 132 898**	**6 864 421**
		Other long-term liabilities		
21 633 305	23 621 154	Housing loan	21 633 305	23 621 154
21 633 305	**23 621 154**	**Sum other long-term liabilities**	**21 633 305**	**23 621 154**
		Short-term liabilities		
3 964 165	9 460 423	Trade creditors	3 910 512	8 774 448
6 080 987	5 603 541	Public fees and duties	6 080 987	5 603 541
31 168 418	30 034 979	Other short-term liabilities	31 168 418	30 034 979
41 213 570	**45 098 944**	**Sum short-term liabilities**	**41 159 917**	**44 412 969**
63 979 772	**77 013 650**	**Sum liabilities**	**63 926 119**	**74 898 543**
80 143 059	**98 585 248**	**SUM EQUITY AND LIABILITIES**	**80 089 406**	**96 470 142**

* The UNIS group consists of the University in Svalbard AS and the subsidiary company UNIS CO_2 lab.

ARCTIC BIOLOGY

The Arctic Biology (AB) department conducts research in Arctic biology and provides a full one-year curriculum of undergraduate studies, including a summer course on identification of Arctic species, as well as a range of Master and PhD level courses.



July 2015: AB-326/826 Arctic Plant Ecology students perform fieldwork at Hiorthhamn. Photo: Ingibjörg Svala Jónsdóttir/UNIS.

By Børge Damsgård, Head of Department

PEOPLE

At the end of 2015, the AB department consisted of two professors, four associate professors, one project position, two support positions, two postdocs, five PhD students and eight adjunct professors.

Pernille Bronken Eidesen was on sabbatical until June 2015, visiting the Botany Department at the University of Otago, New Zealand, and the School of Biology, University of St. Andrews, Scotland. Ole Jørgen Lønne was appointed director of SIOS from June 2015, and Øystein Varpe took over as acting head of department from June to the end of December. Tove M. Gabrielsen started her sabbatical at the University of Laval, Quebec City, Canada, in September. Mads Forchhammer from the University of Copenhagen, Denmark, was appointed full professor in terrestrial zoology in December 2015. Mads became course responsible for AB-203 Arctic Environmental Management after Steve Coulson, who terminated his UNIS engagement in 2015. Tina Dahl was appointed as teaching executive officer at bioCEED from January 2015. Stuart Thomson was appointed as technician in September 2015.

EDUCATION

In 2015 the AB department started a new bachelor structure. AB-202 Marine Arctic Biology and AB-203 Arctic Environmental Management became spring courses, while AB-201 Terrestrial Arctic Biology and AB-204 Arctic Ecology and Population Dynamics run in the autumn and with collaborative fieldwork. Previously AB-204 was a spring course and AB-202 was an autumn course. AB-329/829 Arctic Winter Ecology was run in a new form in March. In addition to field experience under challenging winter conditions the students in AB-329/829 were able to run experiments on winter survival of invertebrates, and the effects of winter conditions on germinability of seed and other plant propagules.

The bioCEED Centre of Excellence in Biology Education is a collaboration between UNIS and the Department of biology and the Department of education at the University of Bergen, and the Institute of Marine Research. The bioCEED collaboration launched several cross-cutting educational development projects in 2015, and the AB department is a partner in several common projects, besides initiated local activities. An important bioCEED priority is to develop our teaching culture. Locally we have organized a range of meeting places and fora for educational development, reflection and collaboration, including teacher's retreats, seminars, a journal club, and contributed to the Learning Forum at UNIS. Four staff members have followed the collegial courses arranged by bioCEED in 2015, and a number of PhD students followed the course in teaching. We have worked towards better course alignment and course coordination at UNIS, in

particular at bachelor level. We have also tested alternative learning methods, and coordinated educational research using our courses and students. The latter is an important aspect of bioCEED, as educational development within bioCEED is research-based in two dimensions. Firstly, our education builds on and links explicitly to our ongoing biological research. Secondly, our education is based on and contributes to educational research and especially on links between educational activities, motivation, and learning.

RESEARCH

In 2015, the project *Climate effects on planktonic food quality and trophic transfer in Arctic marginal ice zones II* (CLEOPATRA II) officially ended. This highly international three-year project, led by UNIS, has been very successful. So far this project has resulted in one completed PhD thesis and three master theses. At present ten papers are published and several manuscripts are in progress. CLEOPATRA II results have been presented at several national and international meetings and conferences, and the project has been highly visible in media with a number of popular science articles, videos and blogs (www.mare-incognitum.no). The new UNIS PhD Maja Hatlebakk continues the CLEOPATRA II work, focusing on the life history and physiology of the copepod *Calanus finmarchicus.*

The CLEOPATRA II project created the basis for many new smaller initiatives, such as *Big Black Box: Marine ecological processes during the polar night, Fate of COPePod secondarY production in a chancing Arctic* (COPPY), and the Isfjorden Marine Observatory System (IMOS). The seasonal plankton monitoring continues a plankton time series sampled since 2008 in Isfjorden. In December UNIS organised and hosted a large workshop on *Plankton Research in Svalbard* (PRiS), where 30 leading plankton scientists and database developers discussed how we could best coordinate plankton research in the future to establish valid time series to detect potential climate change impacts on the plankton community. UNIS took part in the freeze-in campaign *Norwegian Young Sea Ice Cruise* (N-ICE2015) on RV Lance.

Central studies on key actors of Arctic marine ecosystems include phytoplankton, zooplankton and fish. Øystein Varpe was awarded a Fulbright Arctic Initiative Scholarship with the project *The seasonal ecology of Arctic marine ecosystems: Fundamentals, multidisciplinary approaches, and relevance to society.* Related work published in 2015 emphasized how a decline in sea ice will lead to more light entering the water column. This will increase feeding conditions for visually searching predators such as fish, and may be a potential driver behind northward shifts of fish distributions.

Focusing on consequences of rapidly shrinking sea ice cover on the terrestrial ecosystem, the *Adventdalen Integrated Research Operations* (ANCHOR) is a newly established research platform aiming at providing a base of knowledge and education necessary for an integrated understanding of how the Arctic terrestrial ecosystem in Adventdalen is structured and functions under long-term environmental and climatic changes. Specifically, ANCHOR embraces targeted research projects and ongoing monitoring with Arctic education at UNIS.

Phenological responses to changes in climate have been documented in a vast range of species. In particular, plants have demonstrated an incredible ability to adjust their timing of flowering as well as annual growth to climatic changes. Although discussions of resilience have gained momentum in recent years, so far no quantitative models focusing on the resilience of plant phenology have been presented. Ongoing research at the AB department focuses on the complex resilience dynamics in Arctic plant phenology and growth by integrating theory with long-term records from Svalbard and Greenland.

Sampling at the UNIS time series station IsA (Isfjorden/Adventfjorden) continued in 2015 through the project *Adventfjorden - a modelsystem for climate change* as well as the *MicroFun project*. We now have five years of microbial community and environmental data that are currently being analysed to understand seasonal turnover and community changes due to environmental alterations, i.e. increased influx of warm Atlantic water. The first year of high temporal resolution data has already resulted in several publications.

In December 2015, Sunil Mundra defended his PhD thesis, composed of four first-author papers, focusing on plant-fungal interactions. Mundra's work represents novel and baseline knowledge of how root-associated fungi respond along environmental gradients at different spatial and temporal scales in the Arctic. Nutrients limit plant growth in the Arctic, and fungi are essential for nutrient cycling and acquisition. Still, we know almost nothing about drivers of their diversity and composition in the Arctic environment. Developments within molecular technology have made it possible to efficiently investigate these communities.

Martin A. Mörsdorf, a guest PhD student, defended his thesis addressing how local and regional drivers shape vascular plant diversity within and between plant communities at various spatial scales based on a thorough evaluation of sampling design for diversity assessments. The main conclusions were that two local drivers, topography and habitat productivity, strongly shaped community diversity at various spatial scales, while diversity was not affected by ungulate grazing. Furthermore, by comparing island localities with mainland localities, it became apparent for the first time that local diversity patterns were amplified by large species pool size, a regional driver of diversity. These results have important implications for understanding the resilience of Arctic island ecosystems in the face of disturbance and climate change.

A PhD project within the research framework *Complex Plant-Herbivore Interactions* was initiated by Matteo Petit Bon. The research framework addresses how herbivory modulates ecosystem responses to climate change and is linked to two research networks, the *International Tundra Experiment* (ITEX) and the *Herbivory Network*. Within ITEX standardized protocols are applied across multiple Arctic and alpine tundra

July 2015: Students go ashore on Bohemanflya in Isfjorden. Photo: Ingibjörg Svala Jónsdóttir/UNIS.

sites where simulated climate warming is combined with long-term monitoring of tundra plant communities. Data syntheses of both approaches demonstrated that species with warmer thermal niches increased in abundance in response to warming relative to species with colder thermal niches. Comparison with a third approach, a space-for-time substitution, showed that inference based on natural gradients overestimates the magnitude of responses to contemporary climate warming. This shows the value of long-term monitoring in combination with field experiments for realistic predictions of climate change impacts. UNIS has been running an ITEX site since 2001. Another macro-ecological data synthesis focusing on climate niches of plants showed that they are constant in space and time for Arctic and alpine species, at least on the time scale of 10^{4S} years.

APPOINTMENTS

Ingibjörg Svala Jónsdóttir was re-elected as the Chair of the *Terrestrial Working Group of the International Arctic Science Committee* (IASC, www.iasc.info)

Ingibjörg Svala Jónsdóttir represents UNIS in COAT that has now received infrastructure funding from the Norwegian Research Council and Tromsø Forskningsstiftelse.

GRADUATES 2015

PHD DEGREE:

SUNIL MUNDRA
Richness and community structure of High Arctic fungi through space and time explored using high-throughput sequencing.

MARTIN A. MÖRSDORF
Effects of local and regional drivers on plant diversity within tundra landscapes.

MASTER DEGREE:

TRINE CALLESEN
Polar night plankton communities in western Svalbard; their composition, abundance, vertical distribution and feeding, evidenced by metagenetic and microscopy analyses.

TOM JASPER LANGBEHN
Feeding success in an extreme-light environment: modelling seasonal prey encounter of Arctic fish.

KELSEY ERIN LORBERAU
Mycorrhiza and root-associated fungi of the ericaceous Arctic plant Cassiope tetragona after artificial warming and in the natural environment.

JON RUNAR LORENTZEN
Marine biomass consumption by wild Svalbard reindeer: fecal stable isotope analysis as a tool to detect climate change effects.

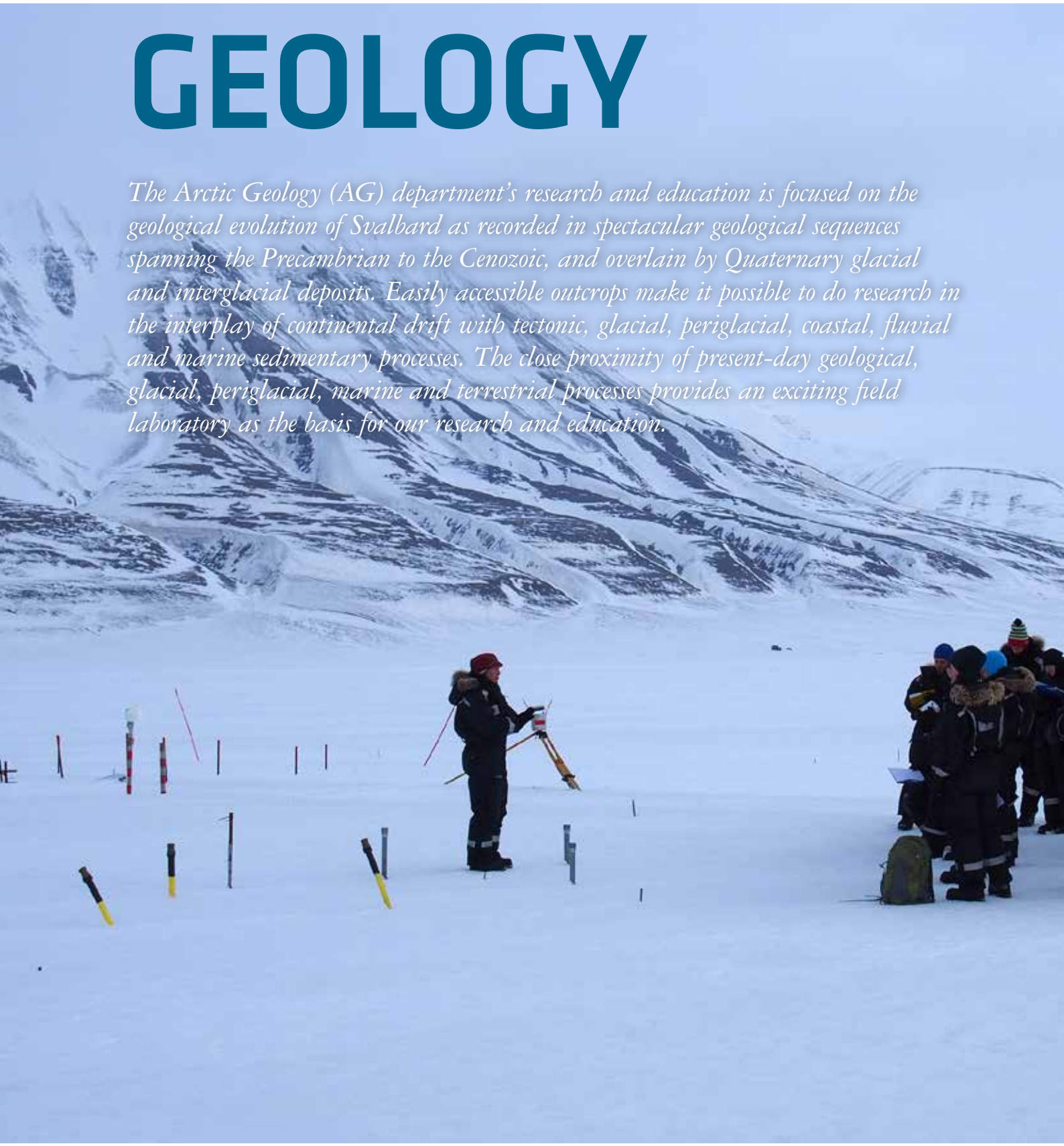
SAMUEL LOUIS EGLUND NEWBY
Feeding activity and diet of Arctic and boreal fish species during the Polar night.

KIM SCHERRER
Light, temperature and competition: understanding the causes for climate-driven regime shifts in Arctic marine benthos.

CHARLOTTE DE VRIES
Disentangling mortality and development rates in an Arctic copepod population.

ARCTIC GEOLOGY

The Arctic Geology (AG) department's research and education is focused on the geological evolution of Svalbard as recorded in spectacular geological sequences spanning the Precambrian to the Cenozoic, and overlain by Quaternary glacial and interglacial deposits. Easily accessible outcrops make it possible to do research in the interplay of continental drift with tectonic, glacial, periglacial, coastal, fluvial and marine sedimentary processes. The close proximity of present-day geological, glacial, periglacial, marine and terrestrial processes provides an exciting field laboratory as the basis for our research and education.



April 2015: Professor Hanne Christiansen teaches the AG-330/830 students at the permafrost observatory in Adventdalen. Photo: Ole Humlum/UNIS.

By Hanne H. Christiansen, Head of Department

PEOPLE

During 2015 the department had nine full-time faculty positions, which were filled by four professors, four associate professors and a temporary part time associate professor. Kim Senger and Alexander Prokop started as associate professors in our department during the autumn semester 2015. Lena Håkansson worked in the temporary part time position during all of 2015. We had fourteen adjunct positions, four of these were externally funded, and six of these are from Norwegian universities and two from the Geological Survey of Norway. Mike Retelle and Helge Hellevang started in new adjunct positions in 2015. Four externally funded postdocs have been part of our staff in 2015. Ten internally and externally funded PhD students worked full-time in our department here in Svalbard.

EDUCATION

Six bachelor courses, 13 master courses and 11 PhD courses were taught in our department in 2015. We had quite large numbers of qualified applicants for most of our courses, and thus operated with waiting lists for several courses. Our courses were on average filled to 99%, as we expanded the capacity on some courses where possible to accommodate large demands. 27 guest master students worked on their master theses.

For the second time the AG-218/219 International Bachelor Summer Field School was held as an UNIS course as part of the University of the Arctic (UArctic) Thematic Network on Permafrost (TNP) activities in June 2015 with Norwegian UArctic funding. The course had 19 students attending.

RESEARCH

Basin studies

Three new PhD positions were recruited within the UNIS co-led R&D project "Lower Cretaceous clastic wedges in the Northernmost Atlantic" (LOCRA – www.locra.ux.uis.no). Two postdoc and 7 PhD positions are now recruited in total in this large-scale research project with significant industry support. Two of the new PhD positions are based at UNIS; Hanna Hjálmarsdóttir within micro palaeontology and Mads Jelby in facies and sequence stratigraphy. Professor Snorre Olaussen and co-workers are compiling all onshore data, and manuscripts are submitted to international journals. Fieldwork in eastern Spitsbergen has resulted in new interpretation of the dinosaur tracks and delta deposits in Kvalvågen, as well as a bone, possibly from a bird from lower Cretaceous, has been identified.

Extended fieldwork was carried out in the Petromaks2 project "Triassic North" (2014–2017), coordinated by University of Oslo with University of Bergen and UNIS as key research partners. The project is conducted in collaboration with institutes and international universities, and supported by Norwegian industry. The focus in 2015 has been on analysing data from fieldwork in eastern Svalbard and acquiring data from the Barents Sea.

Snorre Olaussen is leader of WP2 Petroleum Systems within the new Centre for Arctic Petroleum Exploration (ArcEX – www.arcex.no). High resolution stratigraphy of the Upper Jurassic succession and provenance of the Paleocene and Eocene basin fill will be published in 2016.

The final phase two report of UNIS CO_2 Lab is now available at http://co2-ccs.unis.no. Olaussen is leading a De-Risk project (Improved delineation of an unconventional reservoir in Adventdalen for future CO_2 injection tests) which will be terminated during spring 2016. New 2D conventional seismic together with broad band seismic were acquired. University in Ghent are analysing fluid flow in sandstones. The first storage capacity estimates from the UNIS CO_2 lab have been published in *Environmental Earth Sciences.*

Maria Jensen and adjunct professor William Helland-Hansen continue studying the basin fill of the Central Tertiary Basin (CTB). Fieldwork in Braganzavågen in inner Van Mijenfjorden and in inner Dicksonfjorden has resulted in sediment maps from the coastal zone and new sediment cores, used for describing sedimentation patterns and deposits from Arctic tidal systems. During autumn an international collaboration on coastal processes and sedimentation and the interaction with valley systems and fjord environments in Svalbard, was established. The group has funding for a joint pilot project in Dicksonfjorden and Kongsfjorden working on the interaction between coastal sedimentation and biology. Malte Jochmann has started as PhD student focusing on the lower part of the CTB fill.

Snorre Olaussen and adjunct professor Lars Stemmerik continue to study the Upper Palaeozoic succession in Svalbard and the Barents Sea. The research has shown a complex facies, sequence stratigraphic order and burial history with several exposed surfaces through geological time given a complex diagenesis of the carbonate and chert deposits. This work is now published in *Norwegian Journal of Geology*.

Kim Senger joined UNIS in September and has started to further develop the state-of-the-art seismic data lab in the department, including organizing direct access for UNIS to subsurface data from the Norwegian continental shelf through the DISKOS database. In November, he participated in the MIMES/YPF project field campaign in the Argentinian Neuquen Basin, aiming to characterize the natural fracture network of the igneous intrusions.

Adjunct professor Jørn Hurum and colleagues did excavations in the Flowerdalen valley finding thousands of bones from different fish lizards from the beginning of the Trias period. These are now being described.

The cryosphere

Alexander Prokop started in October as associate professor in snow science. He is focusing on establishing a major snow monitoring site in the Longyeardalen valley, which can be used for both research and education, but also be part of continuous snow observations that can improve the snow avalanche warning system in Longyearbyen. As part of this he worked on getting terrestrial laser scanning technology included in our teaching and research methodology. He has experience from training avalanche commissions in the Austrian Alps, which will also be useful for the Longyearbyen authorities addressing potential avalanche evacuation.

Within glaciology we significantly advanced our work to understand calving processes within the ConocoPhillips-Lundin funded CRIOS project led by Professor Doug Benn together with adjunct professors Nick Hulton and Adrian Luckman, amongst others.

We undertook fieldwork on Kronebreen and Tunabreen, which exhibit contrasting calving behaviours. They extended the work done in 2014, using time-lapse cameras on Kronebreen, by installing an array of 8 cameras over the glacier which recorded spectacular detail of calving behaviour from May to October. The analysis of the 2014 data and imagery has yielded a lot of new information on changing surface lake levels that provide an indication of the changing water-pressure regime within the glacier. The group is investigating how this relates to recorded glacier velocity.

In August 2015 fieldwork at Tunabreen focused on the role of crevassing in calving processes, and the marine-ice interface. We combined in-situ measurements of crevasse stretching rates on the glacier with time-lapse studies of glacier movement, a UAV-based survey of crevasse profiles, surface-Lidar profiling of the ice front and side scan sonar profiles of the submarine part of the glacier tongue. This provided a unique integrated perspective on the combined terrestrial and marine processes acting on the calving margin which has been undertaken by very few previous studies. The UAV was a specific innovation being equipped with a laser range finder that enabled us to capture detailed profiles of the crevasse structure of the glacier. It was the first time this has ever been undertaken in this way, and has provided a unique dataset on directly measured crevasse form over the whole glacier. We are additionally comparing this with a complimentary 3-D model of the glacier surface constructed using conventional structure-from-motion techniques using the UAV-based photography. This work was reported in UK national newspapers and by the BBC.

Doug Benn's work on 'Snowball Earth' derived from the study of Svalbard's Neoproterozoic glacial record was published in *Nature GeoScience*. Heïdi Sevestre successfully defended her PhD thesis on surging glaciers on Svalbard.

The permafrost and periglacial geomorphology group consisted of Professor Hanne H. Christiansen, adjunct professor Ole Humlum, PhD students Graham Gilbert and Stefanie Cable, and master student Sarah Strand. The group operated 12 boreholes in the Adventdalen area and around Kapp Linné. The boreholes provided ground thermal information enabling detailed studies of freezing and thawing processes in different landforms. This data was compared with the same type of data from other key arctic research sites in the PAGE21 project, showing that Svalbard has by far the warmest permafrost this far north. During 2015 the last PAGE21 fieldwork was carried out in Zackenberg NE Greenland by Gilbert. The PAGE21 framework project ended in 2015, and we are now interpreting

data and working on publications from this project.

Together with Kings Bay and Italian researchers we drilled in late spring a 49 m deep borehole in the Ny-Ålesund area. Our Italian colleagues have instrumented the borehole with a thermistor string for continuous ground thermal monitoring, for the first time allowing new information on the permafrost thermal regime from deeper parts of the permafrost in the Ny-Ålesund area.

The EU funded "LowPerm" project was launched in 2015 with the aim of understanding nutrient transport within permafrost landscapes that may lead to changes in greenhouse gas production and fertilization of the Arctic Ocean. The project is led by adjunct Andy Hodson with several co-investigators, including Hanne Christiansen. LowPerm will quantify microbial processes, changes in microbial populations and their functional potential, as well as understand the physical process dynamics of permafrost soils at field observatories in West Spitsbergen. Seasonal microbial-driven greenhouse gas production and fjord fertilization, due to runoff export of nutrients and organic matter, are being quantified, and responses of microbial communities to different temperatures, water, oxygen, and nutrient substrate conditions are determined. Semi-empirical tuning parameters will be developed for integrating these biogeochemical processes into biophysical models, while taking sub-grid heterogeneity into account.

Adjunct Lena Rubensdotter started a project to produce a detailed geomorphological and sedimentological map of the Longyeardalen valley. The map is made by using the latest digital technology and utilizes high resolution aerial photographs in a digital 3D environment. The original aim was an improved understanding of, and comparison between, different slope systems on Svalbard. The map product will now also, after request from NVE, be used as support to the Longyearbyen slope hazard evaluation being made in 2016.

Quaternary geology

The terrestrial Quaternary geology group consists of professor Ólafur Ingólfsson, associate professor Lena M. Håkansson, PhD student Wesley Farnsworth and MSc students Lis Allaart, Nína Aradóttir and Daniel Ben-Yehoshua. UNIS adjunct professor Mike Retelle and adjunct associate professor Lena Rubensdotter affiliate with the group.

The studies on the morphological fingerprints of Neoglacial oscillations as expressed by glacial landforms and sediments, both in the terrestrial and marine environments, were continued with fieldwork at the foreland of Nordenskiöldbreen (Billefjorden), and at Harrietbreen and Kjerulfbreen (Trygghamna). The focus was on the subglacial land system with studies of sediments and landforms exposed by the retreating glaciers. Nordenskiöldbreen is a polythermal glacier, and one of the very interesting features being exposed in its forefield is a small drumlin field. MSc student Lis Allaart performed fieldwork at Nordenskiöldbreen, mapping the geomorphology of the forefield. A part of her map is based on marine geological data, and that part of the project is under the supervision of associate professor Riko Noormets. In Trygghamna the focus is on fingerprints of surging glaciers. MSc students Nína Aradóttir and Daniel Ben-Yehoshua conducted fieldwork there. The focus of Aradóttir was on mapping the geomorphology and glacial sedimentology of the forefield, while Ben-Yehoshua studied the geneses of crevasse squeeze ridges. Both projects work with terrestrial and marine data, and Noormets supervises the marine work.

PhD student Wesley Farnsworth focused on glacial history within the project "Holocene history of Svalbard ice caps and glaciers". During an expedition to Nordaustlandet and north-easternmost Spitsbergen, data was collected to highlight Holocene glacial oscillations, focusing on meltwater signals in threshold lake-sediment archives, glacial morphology and raised beaches.

The marine Quaternary geology group focused mainly on the reconstruction of glacial and palaeoenvironmental history of Svalbard fjords, submarine hydrocarbon seeps and evolution of the former Svalbard-Barents Sea Ice Sheet.

Associate professor Riko Noormets continued his research into the glacial evolution of the northern Barents Sea and the fjords of Svalbard through two larger projects: 'Barents Sea Source Rocks and Hydrocarbon Seeps', which is part of a ConocoPhillips-Lundin funded Northern Area Programme, and the EU ITN Glaciated North Atlantic Margins (GLANAM). A number of fjords where the retreat of tidewater glaciers in recent years has exposed new seafloor were mapped with high-resolution acoustic instruments. In collaboration with CRIOS project (also part of Northern Area Programme); unique time series of the high-resolution glacier front morphology of Tunabreen glacier were acquired to study the calving processes and its imprints on the seafloor.

Martin Liira, postdoc in geochemistry, studied the concentrations and isotopic composition of hydrocarbons in the fjord sediments of Svalbard as part of the "Barents Sea Source Rocks and Hydrocarbon Seeps" project. PhD student Anne Flink continued her research into the glacial history of eastern Svalbard with focus on Wahlenbergfjorden and Vaigattbogen areas. GLANAM PhD student Oscar Fransner studied the ice sheet dynamics and deglaciation history in the Rijpfjorden and Duvefjorden, and on the adjacent continental shelf. Master's students Christine Ireland, Lis Allaart, Nína Aradóttir and Peter Hill studied the glacial history of different fjords in Svalbard using a combination of marine geophysical, sedimentological and remote sensing data, terrestrial observations and aerial imagery. Svalbard Science Forum's Arctic Field Grant scheme allowed our PhD and master's students to successfully conduct their fieldwork in different fjords using a new coring system for acquisition of sediment cores from sea ice.

Marine geology staff and graduate students presented their research on a number of international conferences, such as the PAST-Gateways meeting in Potsdam, AGU Fall meeting in San Francisco and FEMME in Singapore, as well as on several national meetings and workshops. We also hosted the 3rd annual workshop of the GLANAM network at UNIS.

March 2015: All 47 students in the AG-325/825 Glaciology course together with their instructors in front of Paulabreen, Van Mijenfjorden. Photo: Nick Hulton/UNIS.

GRADUATES 2015

PHD DEGREE:

TEENA CHAUHAN
Late Quaternary paleoceanography of the northern continental margin of Svalbard.

SRIKUMAR ROY
Geological controls on fluid flow and seepage in western Svalbard fjords

HEÏDI SEVESTRE
Surge-type glaciers: Controls, processes, distribution.

MASTER DEGREE:

JONAS ENGA
Paleosols in the Triassic De Geerdalen and Snadd formations.

INGUNN FARSUND
Crevasses on Svalbard Glaciers: Distribution and Dynamic Controls.

NINA FRIIS
Stratigraphy and sedimentary properties of drumlinoid landforms in the forefield of Nordenskiöldbreen, Svalbard.

MADS ENGHOLM JELBY
Sedimentology and sequence stratigraphy of the Lower Cretaceous Rurikfjellet Formation, central Spitsbergen.

SILJE SMITH JOHNSEN
Time-lapse techniques for surface velocity, front position and calving rate measurement of a fast-flowing tidewater glacier in Svalbard.

MICHAEL J. LAWRENCE
Processing and analysis of seismic data acquired on a frozen surface.

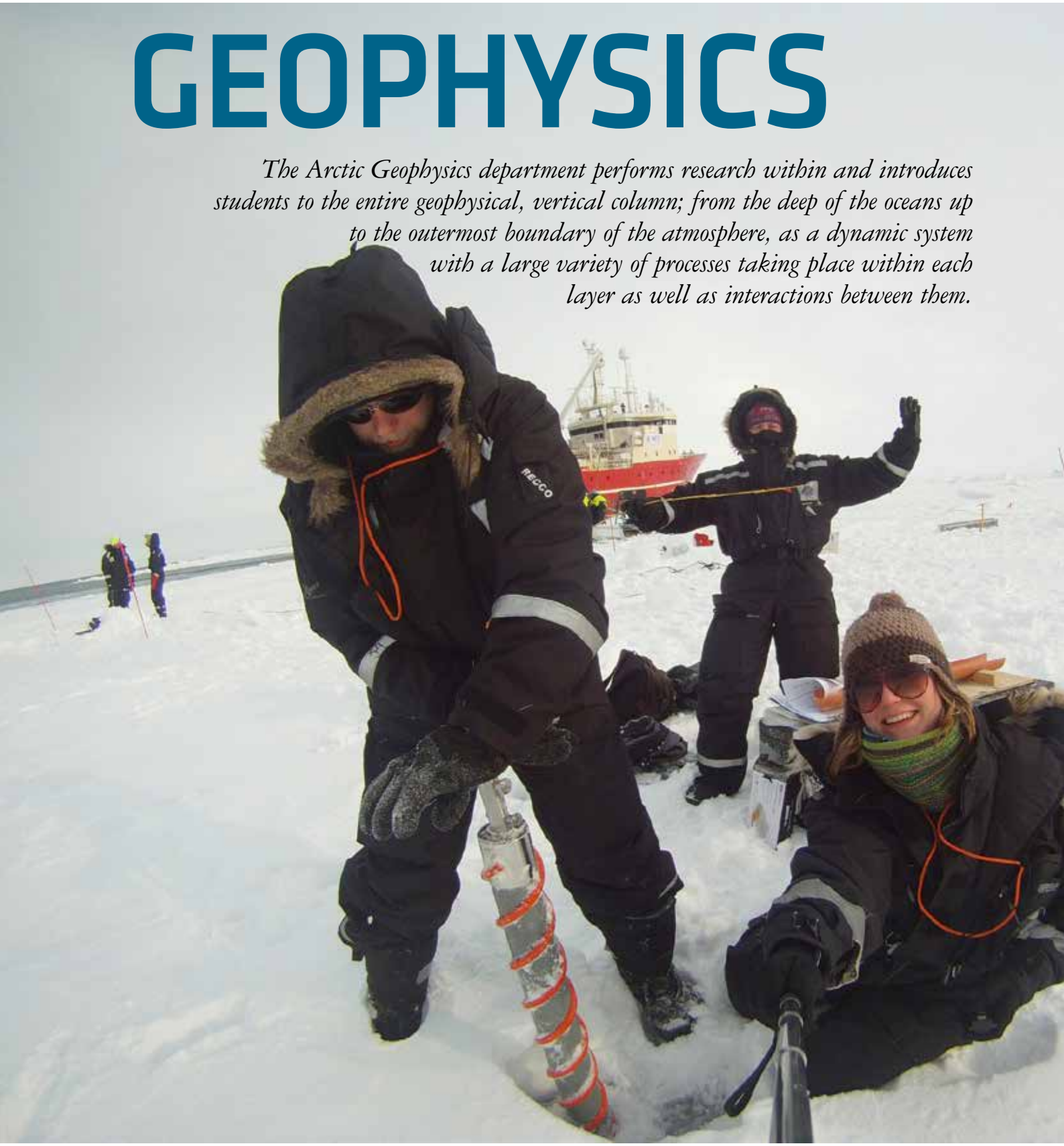
TROELS FRØHLKE NIELSEN
A sedimentological analysis of the Bashkirian Trikolorfjellet Member, Billefjorden, central Spitsbergen, Arctic Norway.

SIRI ANNE HAUGLAND STRAND
Layer parallel shortening and cataclastic flow by fractures in the Permian Kapp Starostin Formation, Mediumfjellet, Spitsbergen.

July 2015: The AG-332/832 students on excursion in Linnédalen. Photo: Ólafur Ingólfsson/UNIS.

ARCTIC GEOPHYSICS

The Arctic Geophysics department performs research within and introduces students to the entire geophysical, vertical column; from the deep of the oceans up to the outermost boundary of the atmosphere, as a dynamic system with a large variety of processes taking place within each layer as well as interactions between them.



April 2015: AGF-211 students performing fieldwork on the sea ice in Palanderbukta, Nordaustlandet. Photo: Franziska Hellmuth.

By Marius O. Jonassen, Acting Head of Department

PEOPLE

The department has in total eight full time faculty positions, and conducts research within physical oceanography, chemical oceanography, cryosphere, meteorology and middle- and upper polar atmosphere. The department also consists of eleven adjunct professors, as well as one researcher (oceanography), one postdoc (middle polar atmosphere) and five PhD students (upper polar atmosphere, middle polar atmosphere, cryosphere, physical oceanography and meteorology).

EDUCATION

Teaching was conducted at both the undergraduate and graduate level, with six courses at the undergraduate level and five at the graduate level. Fieldwork is a central part of all courses; it allows the students to actively carry out research in the field. During 2015 the department carried out several courses with teaching of field methods on glacier, in the surface boundary layer over land and sea ice, at the Kjell Henriksen Observatory (KHO) and on two scientific cruises around Svalbard. The data collected are typically used in course reports, giving the students valuable experience in analysing and presenting scientific data in a coherent manner.

RESEARCH

In order to offer relevant full term combinations of courses, and to strengthen the research strategies, we have two dedicated research groups within the department: The Space Physics Group (SP) and the Air-Cryosphere-Sea Interaction Group (ACSI).

THE SPACE PHYSICS (SP) GROUP

The Space Physics Group at the Department of Arctic Geophysics is part of the Birkeland Centre for Space Science (BCSS), which is a Centre of Excellence. Through BCSS three new positions have been filled in late 2014 and early 2015: postdoc Pål Gunnar Ellingsen, associate professor in middle atmosphere physics Noora Partamies and KHO technician Mikko Syrjäsuo.

The SP group owns and operates two large field installations; the Kjell Henriksen Observatory (KHO), which is an optical observatory for studies in the middle and upper polar atmosphere, and SuperDARN (Super Dual Auroral Radar Network), which is a radar for the studies of particle motion in the upper polar atmosphere.

The SuperDARN radar was finished in November 2015. SuperDARN is part of a global radar network that measures the velocity of particles in the atmosphere at an altitude between 200 and 300 km. The field of view stretches across the polar cap. The motion of the particles studied is controlled

by the interaction between the magnetic fields of the Sun and the Earth.

The Kjell Henriksen Observatory (KHO) operated a number of optical and non-optical instruments during 2015. A detailed description of the performance and scientific objective of the each instrument can be found at the KHO home page: kho.unis.no.

Her Majesty Queen Sonja visited KHO for the second time in two years in February. The group was also heavily involved in monitoring of the eclipse that took place in Svalbard on 20 March, in addition to the NASA lead rocket launch RENU 2 (Rocket Experiment for Neutral Upwelling 2) that took place in December. During the rocket campaign, KHO was used as a scientific centre for the launch. Both these campaigns were successful and generated a lot of interest.

KHO has also gained two new research groups with instrumentation; University of Calgary with an all-sky camera in addition to NORSAR (Norwegian Seismic Array) that routes all data communication from Janssonhaugen through KHO. The observatory has also been used as field station by five UNIS courses throughout the year and there were a large number of presentations, visits and interviews conducted at the observatory during 2015.

THE AIR-CRYOSPHERE-SEA INTERACTION (ACSI) GROUP

The ACSI group treats the three most dominant geophysical components in the Arctic climate system on Svalbard. The Arctic is characterized by extremes in both weather and climate, and significant interactions between the atmosphere, ocean, sea ice, glaciers, and land ice take place in the region that affect the weather, not only regionally, but also on a global scale. These types of interaction studies are conducted through field-based research projects.

We seek to strengthen the existing competence within the ACSI group by expanding the existing staff composition and a position as associate professor in large-scale meteorology was filled in 2015 by by Marius O. Jonassen. Marius will work together with oceanographers in the ACSI group in studying air-sea interactions in the Svalbard region. Marcos Porcires was hired as a technician in the ACSI group and will work with oceanography and meteorology as well as glaciology.

Through the UNIS-led project "Remote Sensing of Ocean Circulation and Environmental Mass Change" (REOCIRC) and other collaborative projects (AWAKE2, Arctic Ocean Under Melting Ice), the warm and cold currents flowing northward in the Fram Strait were observed from the sea using underwater rigs and from space using altimeter satellites. The aim is to improve transport estimates of heat, mass and freshwater into the Arctic Ocean in order to explain the effect this has on the ice cover in the Arctic. The warm Atlantic Ocean waters north of Svalbard melt the ice that is transported towards the northern coast of Svalbard and limits the freezing of sea ice in the winter.

In December 2015 it was confirmed that the project "Innovative Strategies for Observation in the Arctic Atmospheric Boundary Layer" would be financed by the Research Council of Norway. The project is managed by the University of Bergen, while UNIS is one of the main partners. The main focus of the project will be the improvement of the physical processes in weather and climate models using innovative measurements with unmanned aircraft in Svalbard.

In the course of 2015 the department purchased a complete automatic weather station for observations in Tempelfjorden. The automatic weather station will provide important atmospheric data from the area. An underwater rig was recently installed in the same area, in front of Tunabreen, which will monitor the area with cameras and satellite measurements. Tempelfjorden, which is extremely well suited for studying interactions between air, ice and sea, was defined in 2015 as a new focus area for the department.

In 2015 there have been several activities within meteorology combining research and course activity. During the annual bachelor course in meteorology, AGF-213, the students were for the first time brought out of Longyearbyen and to Kapp Linné to experience the ideal coastal setting that this location represents for performing meteorological measurements in a marine setting. The students conducted fieldwork for one week, and operating traditional instruments and instrument platforms like weather stations, a weather balloon and the novel UAV SUMO. Moreover, a stronger (than traditionally) meteorological component was added to the fieldwork AGF-211, where the students were brought on a scientific cruise to Nordaustlandet. Both the fieldwork at Kapp Linné and the meteorological field component in AGF-211 were highly successful and will be followed up on in 2016.

GRADUATES 2015

MASTER DEGREE:

MARTIN ARNTSEN
Ice and Brine production in Hornsund.

EMILIANO CIMOLI
Determining Snow Depth Distribution from Unmanned Aerial Vehicles and Digital Photogrammetry.

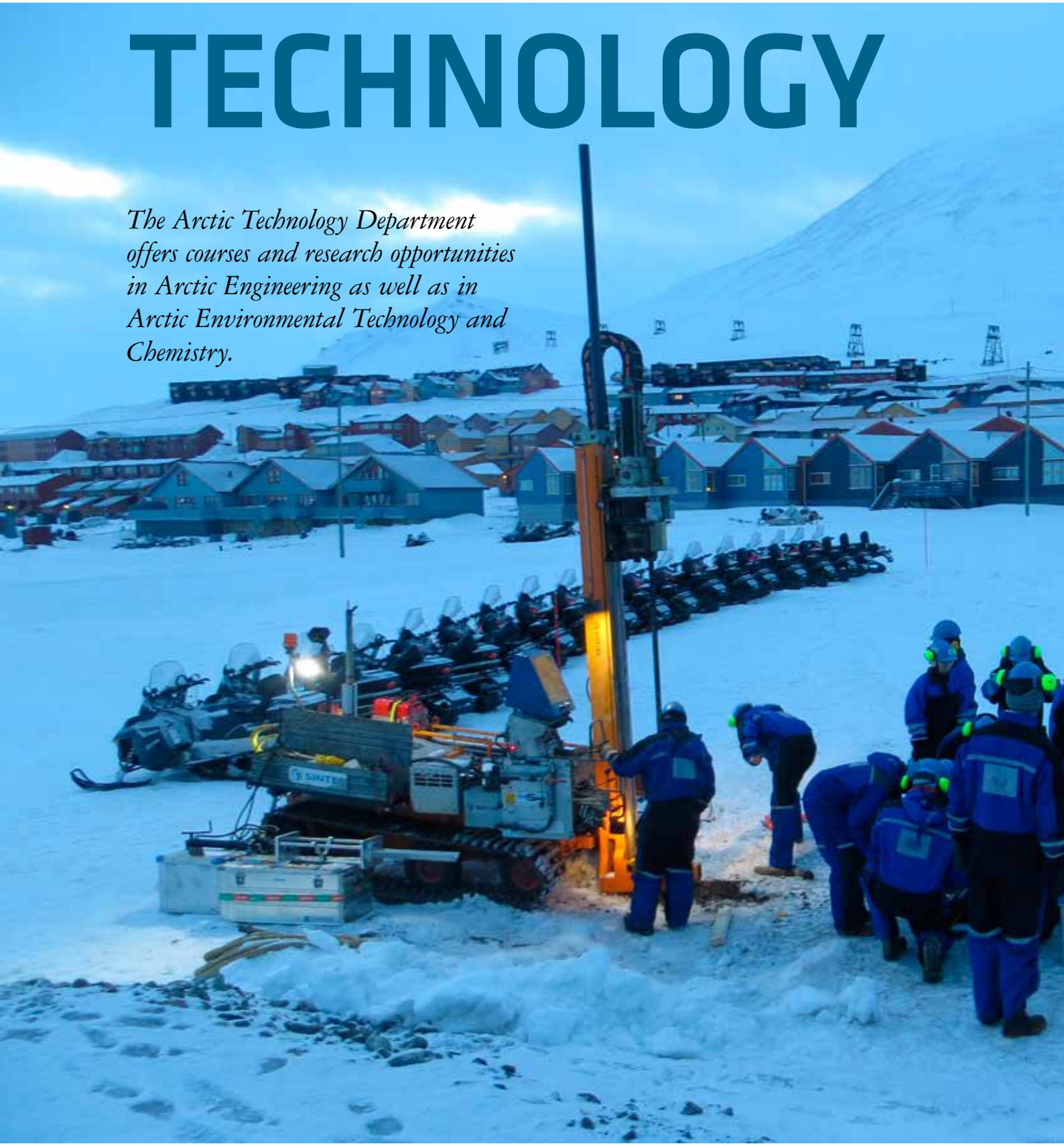
KNUT OLA DØLVEN
Interannual variations of freshwater content in Hornsund.

MARCO MARCER and **BAPTISTE VANDECRUX**
Snow Distribution Statistical Modelling and UAV-borne Remote Sensing of Snow Reflectance in the Arctic.

April 2015: AGF-211 students sending up a weather balloon in Palanderbukta, Nordaustlandet. Photo: Ragnheid Skogseth/UNIS.

ARCTIC TECHNOLOGY

The Arctic Technology Department offers courses and research opportunities in Arctic Engineering as well as in Arctic Environmental Technology and Chemistry.



February 2015: AT-205 and AT-329 students share forces in a drilling operation outside UNIS. Photo: Anatoly Sinitsyn/UNIS.

By Aleksey Marchenko, Head of Department

Arctic Engineering concentrates on engineering problems to be tackled when settling in the Arctic environment: living and building on frozen ground that may be subject to landslides and avalanches, Arctic offshore oil and gas exploitation, and potable water supply.

Arctic Environmental Technology and Chemistry concentrates on current and potential pollution problems, environmental impacts and feasible remediation techniques in Arctic areas.

PEOPLE

In 2015 the department consisted of two professors, one associate professor, one research associate, one postdoc, four PhD candidates, six adjunct professors, one staff engineer and one adjunct senior engineer.

EDUCATION

The research activities generate material for courses offered in all areas given at all levels, giving students a good opportunity to study both the theoretical and practical aspects of Arctic technology. In 2015, the department offered altogether 24 courses at Bachelor, Master and PhD level.

RESEARCH

The Arctic Technology Department had a wide portfolio of research activities in 2015, within ice mechanics and offshore engineering; environmental chemistry rock mechanics and hydrology/hydromechanics.

Ice mechanics and offshore engineering

This section of the AT department consisted of one full-time professor and one adjunct professor. In addition, one research associate, one postdoc and one PhD candidate was attached to the section through external projects. There were also five master students in 2015.

The section conducted additional fieldwork and data collection at various sites around Svalbard; Van Mijenfjorden (Svea, Kapp Amsterdam), the Arctic Ocean and Wahlenbergfjorden focusing on ice mechanics, pressure ridges and iceberg studies. In the local area around Longyearbyen, the anchor line tension of plastic floating dock was monitored in the freshwater lake at Mine 7. Monitoring was also conducted on ice loads on the coal quay at Kapp Amsterdam and the shoreline of the Sveabukta. Lab studies focused on ice structures, strength and thermo-mechanical properties.

Adjunct professor Sveinung Løset is the director of the Centre for Excellence in Innovation project “Sustainable Arctic Marine and Coastal Technology (SAMCOT)”. Professor Aleksey Marchenko is leader of work package 1 “Data

collection and process modelling" while postdoc Aleksey Shestov is the deputy leader of WP 1.

The GI system of SAMCoT data storage and processing was expanded in 2015. In addition, the department performed modelling and numerical simulations of ice berg drift, thermodynamic consolidation of pack ice and passive motion of anchored vessels in icy conditions.

The presence of sea ice constitutes considerable challenges for marine operations in the Arctic. Ships and platforms performing drilling or production of hydrocarbons in the Arctic will need protection through ice management (IM), such as a fleet of ice breakers that plough the ice upstream, first into big ice floes and later into smaller pieces in the area in front of the ship or platform. The aim is to reduce the ice impact on the structures by actively manipulate the ice conditions.

In order to analyse the efficiency of different IM tactics, validate theoretical models or test new technology, full scale data are very valuable. Therefore, UNIS participated in the innovative research programme "Oden Arctic Technology Research Cruise 2015" (OATRC2015), managed by NTNU. OATRC2015 was financed by Exxonmobil, and executed in collaboration with the Swedish Polar Research Secretariat and the Swedish Maritime Administration. The ice breakers Oden and Frej were the scientific platforms in the latter half of September 2015, for scientific expeditions in the international waters north of Spitsbergen.

In addition, the section is involved in a number of international research and education projects:

FIMA (2015–2017) in partnership with NTNU, State Research Oceanographic Institute (Moscow), and VNIIGAZ Gazprom (Moscow).

Petromaks2 Waves in Oil and Ice (WOICE) in collaboration with University of Oslo.

SITRA (2015–2018) in cooperation with Memorial University of Newfoundland (Canada), Dartmouth College (USA), University of Alaska (USA), and Moscow University of Physics and Technology (Russia).

SMIDA (2012–2015) in collaboration with Moscow University of Physics and Technology, Moscow State University, St. Petersburg State Polytechnic University, and St. Petersburg State Marine Technical University (Russia).

MarPart (Maritime Preparedness and International Partnership in the High North) in collaboration with Nord University (Norway), University of Greenland, University of Iceland, Northern (Arctic) Federal University Arkhangelsk, and Murmansk State Technical University (Russia).

Environmental chemistry
This section had one full-time professor, three adjunct professors, one postdoc, one PhD candidate and three master students in 2015.

The section performed investigations of contaminants in local air and high-elevation glaciers. Air samplers on the UNIS roof have been used to measure concentrations of brominated and organo-phosphorus flame retardants in Longyearbyen air.

Since 2000, ice cores have been drilled at Holtedahlfonna, Lomonosovfonna, and Austfonna, and analyzed for ~330 different organic contaminants in 5 classes. Most concentrated contaminants include Chlorpyrifos, a pesticide, and Hexabromo- cyclododecane (HBCD), a brominated flame retardant. Both are still in use.

In addition, the section also had focus on: Local PFAS contamination in Linnévatnet (3 master projects); IMF project FluorosImpact in collaboration with the Swedish University of Agricultural Sciences on local sources for perfluorinated pollution; IMF project AtmoPart completed on atmospheric emission from fossil fuel engines as local pollution source in collaboration with TU Darmstadt, Germany; project in C Stable isotope patterns of chiral pesticides in Arctic biota in collaboration with UFZ Leipzig and collaboration programme with the Research Centre in Barentsburg (Barelab), coordinated by NILU.

Environmental Waste Management (EWMA) is a project that examines the effect of food waste on organisms in the environment. Scientific experiments are planned in order to understand the effects of mining waste disposal in fjords on the early life of cod. Focus will be on the finer particles of copper-enriched waste, and one object will be to evaluate the cod's reproductive success, development and molecular toxicology in cod eggs and larvae. The project is in cooperation with University of Tromsø and Akvaplan-Niva.

Rock mechanics
This section has one full-time professor and one PhD candidate, in addition to one master student who completed his thesis in 2015.

The section investigated the impact of blasting on resource recovery, economy, safety and the environment; studied the effect of water and temperature on rock fracture in rock engineering such as the Svea mines; performed field investigation of cuttability in Lunckefjellet; carried out blasting tests with rock blocks and measured shock waves in the blocks.

A comprehensive study on the theories and applications of rock fracture and blasting was also performed. A new book entitled "Rock Fracture and Blasting: Theory and Applications" is to be published by Elsevier Science in May 2016. In addition, several papers were published.

Hydrology and Hydromechanics
This section consists of one full-time professor and one adjunct professor.

September 2015: AT-209 excursion on Bertilbreen. Nordenskiöldbreen can be seen in the background. Photo: Nils Roar Sælthun/UNIS.

The section performed field investigations of the hydrology in Braganzavågen and in the waters near Paulabreen during the sea ice season. In Isfjorden, the surface currents were monitored, and sea current profiling was investigated in and around the Longyearbyen harbor.

In Tempelfjorden, the section measured the penetration of surface waves below the sea ice and also monitored the sea currents and tidal induced currents in Akselsundet. Finally, the construction of a wave tank for the UNIS cold laboratory was completed.

GRADUATES 2015

MASTER DEGREE:

ANTON AGAFONOV
Deformations of quay cofferdam under the effect of ice and ice-rich soil thermal expansion.

BÅRD BLÆSTERDALEN
Permeability, Growth and Morphology of Coastal Ice – Site Study in Van Mijenfjorden, Svalbard.

FABIENNE FICHTNER
Feasibility study on accessing the coalfield at Bassen, Svalbard.

DARIA KSENOFONTOVA
Thermodynamic consolidation of broken ice and ice ridges.

JOHANNES P. LORENTZEN
Electromagnetic Principles for In Situ Ice Thickness Determination.

KIRSTEN HUSBY MELIEN
A Quantitative Analysis of Organochlorine Pesticides in Svalbard Reindeer *(Rangifer tarandus platyrhynchus)*.

DMITRII MURASHKIN
Influence of brine migration on the thermal expansion of the sea ice.

AYK SCHINDEWOLF
A field study on rock cuttability in the Lunckefjell coal mine.

STUDENT COUNCIL

May 2015: Glimpses from the "Fake the chance" sledge race in Nybyen. Photos: Tom Langbehn (top three) and Franziska Hellmuth (bottom two).

By Andreas Alexander (Vice-President Autumn 2015).

The UNIS Student Council is a group of 13 elected students who are responsible for everything related to student life in Svalbard. The members represent the students' opinion, take part in the UNIS politics, administrate the Student Welfare fund, as well as own savings. They also manage the student activity groups, which organize social events and provide services like student equipment and Friday Gatherings. The activity groups are a significant part of students' life in Svalbard and reshape every semester. It is therefore an important task for the Student Council to ensure the proper function of the groups and of the Council itself. Elections for the Student Council positions (Leader, Vice Leader, Treasurer, Vice Treasurer, Board Representative, Board Observer, Vice Board Member, Biology Representative, Geology Representative, Geophysics Representative, Technology Representative, Master Representative and Arctic Nature Guide Representative) take place at the beginning of every semester.

GROUPS

The student activity groups are traditionally more active in spring semesters than in autumn semesters. Therefore a huge variety of activity groups could be seen in spring 2015. Students formed the popular knitting club and gathered together in a cabin group to design two new student cabins. One student with a yoga teacher license from Indonesia initiated the very famous "Snowga - Yoga in the Arctic" group and gave several yoga lessons per week in Svalbardhallen and at UNIS. The lessons were very popular both among students and locals from town. As a result, quite complicated yoga poses could be observed at the most magnificent places in Svalbard.

The kitchen equipment group succeeded in making a full inventory of all kitchens in Nybyen. By purchasing a lot of new equipment and organizing second-hand equipment, they improved the kitchen situation in Nybyen a lot.

The safety group offered additional safety trainings in the use of crampons and ice axes, avalanche and glacier rescue. The trainings were given by three students in their spare time and about 80 students participated in these trainings.

The student equipment group did a great job by introducing an online booking system and as a result students didn't have to wait several hours outside in the cold anymore without getting any equipment. As a result of the high request numbers, a huge order for new student equipment was placed and purchased in summer.

In the autumn semester the activity groups were less active. However, the knitting group continued being popular and lots of knitting students during lectures became a common sight. A baking group was initiated and students gathered for weekly baking sessions. The Friday Gathering group managed to get a tap of the new Svalbard beer, thus offering local brew to staff and students.

Thanks to the efforts of the re-established Yearbook group the student yearbook was brought back to life and can now be read in the UNIS library or online.

Over both semesters students were running the local thrift store "Bruktikken" and organizing Norwegian lessons for international students. "Bruktikken" had an important function in the days after the avalanche in December, and students provided a great service by expanding the opening hours so that those affected by the avalanche could stop by and get necessary things.

EVENTS

Several events were organized by the students throughout the year. In each semester the traditional Icebreaker party took place. The spring party had the motto "Bad taste party" and in autumn the theme was "Summer Olympics". Both events were very popular among students and also staff and guest lecturers joined in. Additionally, the famous Kitchen-to-Kitchen parties took place in both semesters. In April the northernmost baking competition took place in Sjøskrenten and the participating students ended up with the duty to taste about forty different cakes.

On 1 May the students resurrected the "Ta Sjansen" sledge race, but changed the name of the race to "Fake the chance". The sledge race took place behind the barracks in Nybyen and several sledges competed in the race and delivered a spectacular show!

In addition, the students also worked as volunteers at the annual Longyearbyen festivals, such as Polarjazz, Sun Festival and the Dark Season Blues.

October 2015: Aurora Borealis show above Longyearbreen and Sarkofagen. Photo: Solvik Photography/UNIS.

SCIENTIFIC PUBLICATIONS 2015

Scientific publications (NVI level 1 and 2) published with UNIS as author address in journals accepted by the Norwegian Association of Higher Education Institutions (UHR)

Alkire, M.B., **Nilsen, F.**, **Falck, E.**, **Søreide, J.**, & **Gabrielsen, T.M.** (2015). Tracing sources of freshwater contributions to first-year sea ice in Svalbard fjords. *Continental Shelf Research, 101*, 85-97. doi: http://dx.doi.org10.1016/j.csr.2015.04.003

Alsos, I.G., Ehrich, D., **Eidesen, P.B.**, Solstad, H.M., Westergaard, K.B., Schonswetter, P., Tribsch, A., **Birkeland, S.**, Elven, R., & Brochmann, C. (2015). Long-distance plant dispersal to North Atlantic islands: colonization routes and founder effect. *AoB Plants, 7*(1), 1-19. doi: http://dx.doi.org10.1093/aobpla/plv036

Ayele, Y.Z., & **Løset, S.** (2015). Drilling waste handling practices in low temperature operations: a risk perspective. *Proceedings - International Conference on Port and Ocean Engineering under Arctic Conditions, 2015-January*, 12.

Benediktsson, Í.Ö., Schomacker, A., Johnson, M.D., Geiger, A.J., **Ingólfsson, Ó.**, & Gudmundsdóttir, E.R. (2015). Architecture and structural evolution of an early Little Ice Age terminal moraine at the surge-type glacier Múlajökull, Iceland. *Journal of Geophysical Research - Earth Surface, 120*(9), 1895-1910. doi: http://dx.doi.org10.1002/2015JF003514

Benn, D., Le Hir, G., Bao, H., Donnadieu, Y., Dumas, C., **Fleming, E.J.**, Hambrey, M.J., McMillan, E.A., Petronis, M.S., Ramstein, G., Stevenson, C.T.E., Wynn, P.M., & Fairchild, I.J. (2015). Orbitally forced ice sheet fluctuations during the Marinoan Snowball Earth glaciation. *Nature Geoscience, 8*(9), 704-707. doi: http://dx.doi.org10.1038/ngeo2502

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Berge, J., **Heggland, K.N.**, **Lønne, O.J.**, Cottier, F.R., Hop, H., **Gabrielsen, G.W.**, Nøttestad, L., & **Misund, O.A.** (2015). First records of Atlantic mackerel (Scomber scombrus) from the Svalbard archipelago, Norway, with possible explanations for the extension of its distribution. *Arctic, 68*(1), 54-61. doi: http://dx.doi.org10.14430/arctic4455

Berge, J., **Renaud, P.**, Darnis, G., Cottier, F., Last, K., **Gabrielsen, T.M.**, **Johnsen, G.**, Seuthe, L., Weslawski, J.M., Leu, E., Moline, M.A., Nahrgang, J., **Søreide, J.**, **Varpe, Ø.**, **Lønne, O.J.**, Daase, M., & Falk-Petersen, S. (2015). In the dark: a review of ecosystem processes during the Arctic polar night. *Progress in Oceanography, 139*, 258-271. doi: http://dx.doi.org10.1016/j.pocean.2015.08.005

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Bjoland, L.M., **Chen, X.**, Jin, Y., Reimer, A.S., **Skjæveland, Å.**, Wessel, M.R., Burchill, J.K., Clausen, L.B.N., Haaland, S., & McWilliams, K.A. (2015). Interplanetary magnetic field and solar cycle dependence of Northern Hemisphere F region joule heating. *Journal of Geophysical Research - Space Physics, 120*(2), 1478-1487. doi: http://dx.doi.org10.1002/2014JA020586

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Brynjólfsson, S., Schomacker, A., Guðmundsdóttir, E.R., & **Ingólfsson, Ó.** (2015). A 300-year surge history of the Drangajökull ice cap, northwest Iceland, and its maximum during the 'Little Ice Age'. *The Holocene, 25*(7), 1076-1092. doi: http://dx.doi.org10.1177/0959683615576232

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Chen, X., **Lorentzen, D.A.**, **Moen, J.I.**, **Oksavik, K.**, & **Baddeley, L.** (2015). Simultaneous ground-based optical and HF radar observations of the ionospheric footprint of the open/closed field line boundary along the geomagnetic meridian. *Journal of Geophysical Research - Space Physics, 120*, 9859-9874. doi: http://dx.doi.org10.1002/2015JA021481

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Cohen, I.J., Lessard, M.R., Varney, R.H., **Oksavik, K.**, Zettergren, M.D., & Lynch, K.A. (2015). Ion upflow dependence on ionospheric density and solar photoionization. *Journal of Geophysical Research - Space Physics, 120*, 10039-10052. doi: http://dx.doi.org10.1002/2015JA021523

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Convey	Peter	British Antarctic Survey, UK
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Coyer	James Allen	Cornell University, USA
Cusa	Marine	University of Tromsø, Norway
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Gullestad	Peter Andreas	Directorate of Fisheries, Norway
Hamilton	Charmain Danielle	Norwegian Polar Institute
Hansen	Brage Bremset	Norwegian University of Science and Technology
Hansen	Svein Are	The Norwegian Institute for Nature Research
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Herbold	Craig William	University of Vienna, Austria
Herstad	Bente	Norad, Norway
Hoarau	Galice	University of Nordland, Norway
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Ludvigsen	Martin	Norwegian University of Science and Technology
Lydersen	Christian	Norwegian Polar Institute
Mariash	Heather Lynn	Carleton University, Canada and University of Antwerp, Belgium
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Sands	Chester John	British Antarctic Survey, UK
Speed	James	Norwegian University of Science and Technology
Spjelkavik	Sigmund	Freelance
Svenning	Martin	Norwegian Institute for Nature Research
Søchting	Ulrik	University of Copenhagen, Denmark
Søli	Geir	University of Oslo, Norway
Sørensen	Asgeir Johan	Norwegian University of Science and Technology
Tandberg	Anne Helene	Institute of Marine Research, Norway
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Tojo	Motoaki	Osaka Prefecture University, Japan
Tombre	Ingunn	Norwegian Institute for Nature Research
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Christoffersen	Poul	University of Cambridge, UK
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Eiken	Trond	University of Oslo, Norway
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Hogan	Kelly Anne	University of Cambridge, UK
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