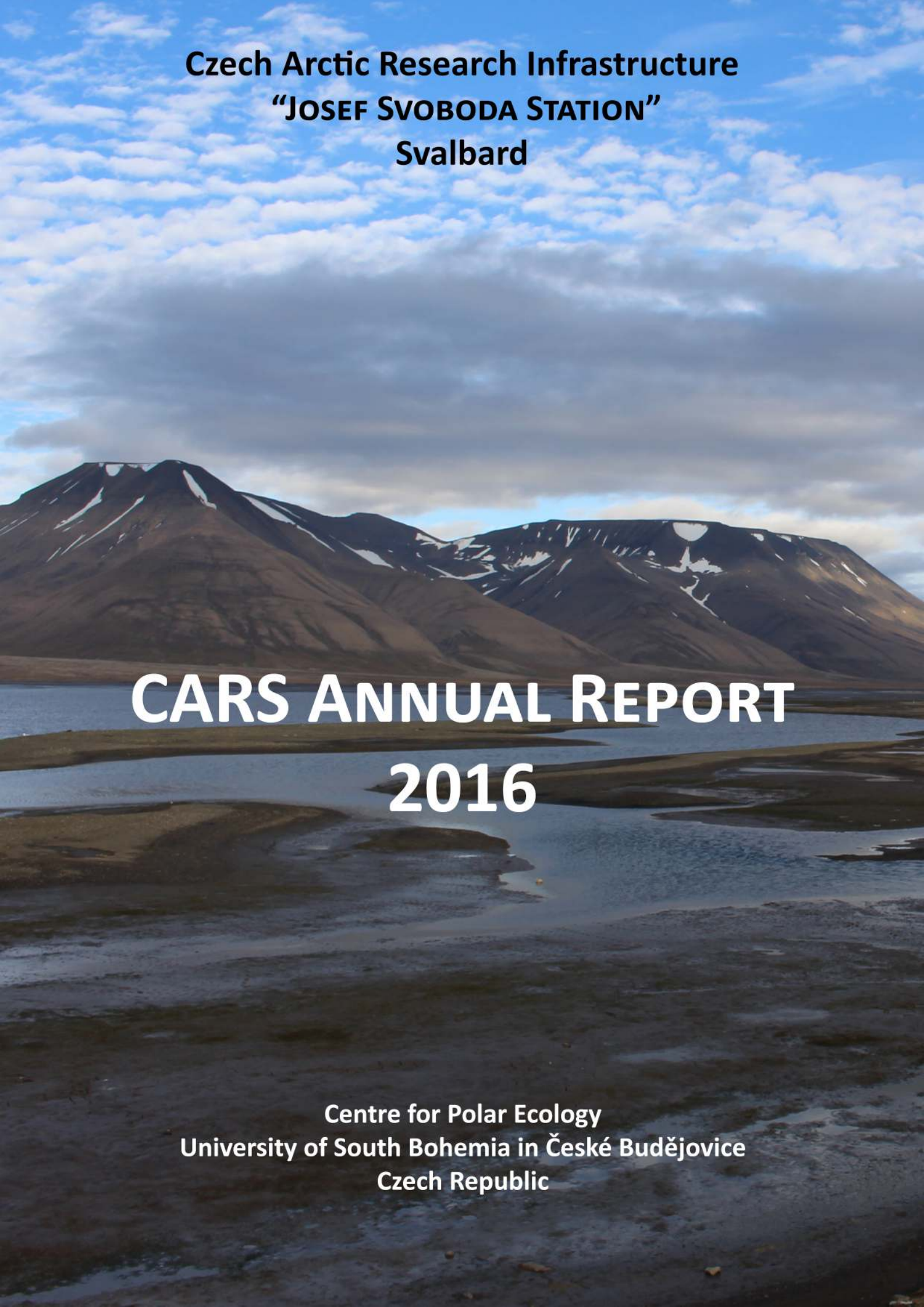
Czech Arctic Research Infrastructure
"Josef Svoboda Station"
Svalbard



CARS Annual Report 2016

Centre for Polar Ecology
University of South Bohemia in České Budějovice
Czech Republic

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Cover photo: Jana Kvíderová
Editor: Jana Kvíderová

2016

1. Introduction

The year 2016 was the first year of the project CzechPolar2 - Czech Polar Research Infrastructure. The Czech Arctic Research Infrastructure "Josef Svoboda Station" (CARS) became fully operational including the RV CLIONE, field station NOSTOC in Petuniabukta, and JULIUS PAYER HOUSE in Longyearbyen.

As in previous years, we worked in Petuniabukta and Longyearbyen areas. In this year, the RV CLIONE was used for transport between Longyearbyen and NOSTOC, and for research activities for the first time. The JULIUS PAYER HOUSE in Longyearbyen served as a base for our long-term friends and colleagues from the University Adam Mickiewicz (PL).

We had the pleasure to welcome many researchers from abroad, and to host several educational courses focused on polar sciences (Fig. 1.1.). For the first time, the CARS provided support to researcher from the field of arts – Scottish landscape painter and painting lecturer Georgia Rose Murray from University of Dundee (UK), introducing thus novel – artistic – approach to the Arctic.

Daria Tashyreva and Tomáš Tyml defended successfully their doctoral theses at University of South Bohemia (CZ).

For more information visit polar.prf.jcu.cz, please.

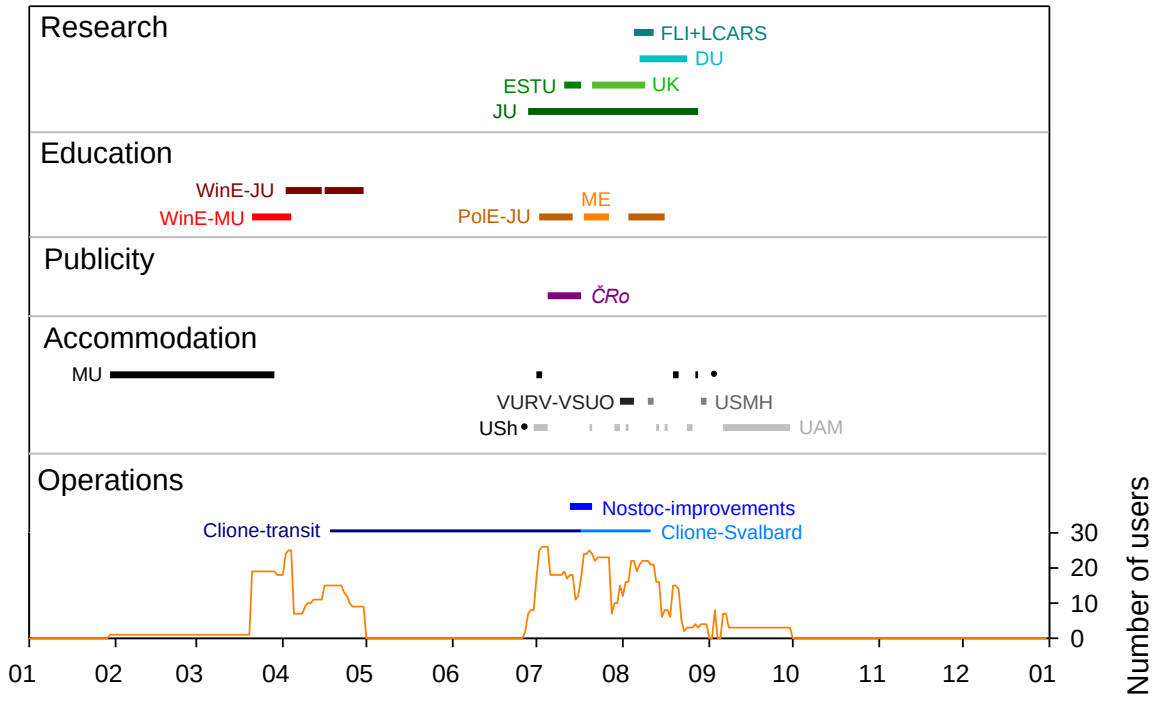


Fig. 1.1. The CARS utilization in 2016. Course abbreviations: ME – Training Course in Polar Ecology and Research of Polar Wetlands organized by the Ministry of Environment; PolE-JU – field part of the Polar Ecology Course organized by the University of South Bohemia; WinE-JU – Winter Arctic Ecology course organized by the University of South Bohemia; WinE-MU - Winter Polar Geosciences Course organized by the Masaryk University. For institution abbreviations, see Tab. 2.1.

1.1. Research station JULIUS PAYER HOUSE in Longyearbyen

The JULIUS PAYER HOUSE in Longyearbyen (Fig. 1.2.) was used for research, education and as base short-term accommodation of researches and students (usually after arrival and before departure) during the year 2016. The facility utilization is shown in Fig. 1.3.

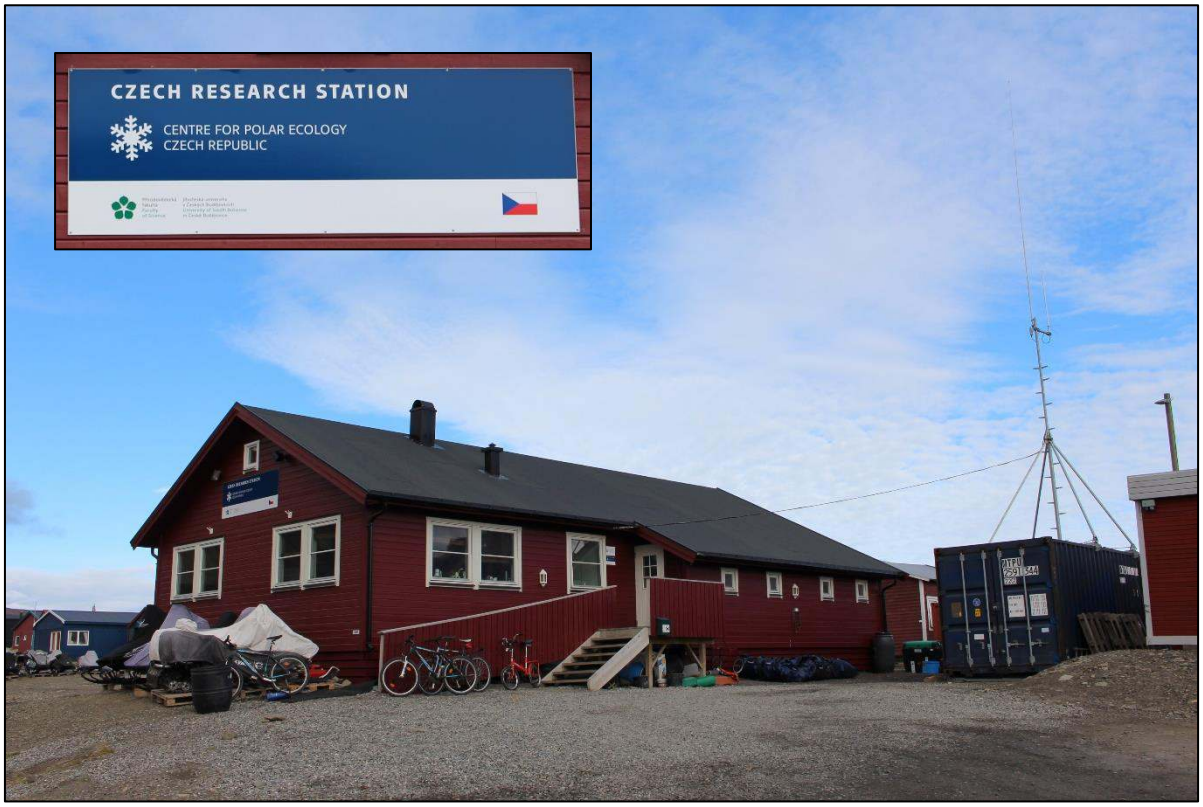


Fig. 1.2. The JULIUS PAYER HOUSE in Longyearbyen, Svalbard, August 2016. Author: Jana Kvíderová.

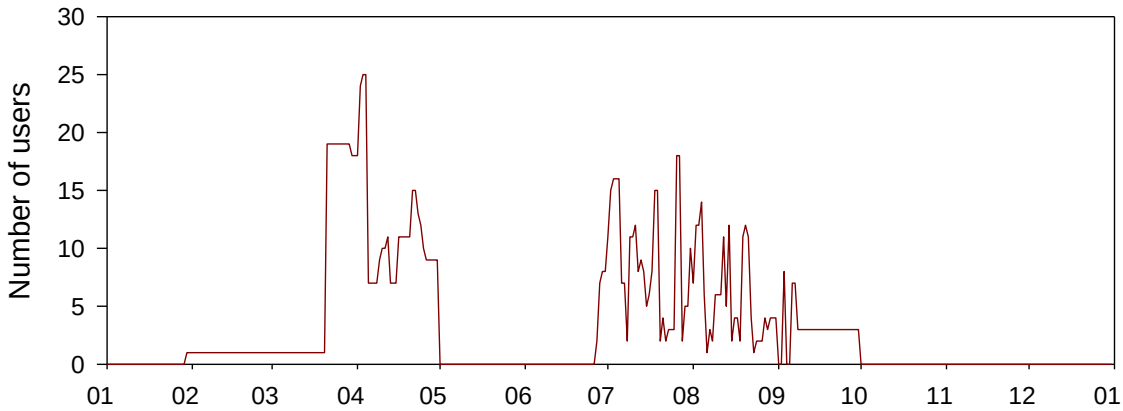


Fig. 1.3. The utilization of the JULIUS PAYER HOUSE in Longyearbyen, Svalbard in 2016.

1.2. Field Station NOSTOC in Petuniabukta

The field station NOSTOC designed for use during summer season primarily, however short stays in winter are possible. The facility was used for short-term visits in April (13-20/04, Fig. 1.4.), and was used during summer (01/07-26/08) for research and education (Fig. 1.5.).

Fig. 1.4. The field camp NOSTOC in Petuniabukta, Svalbard, April 2016. Author: Josef Elster

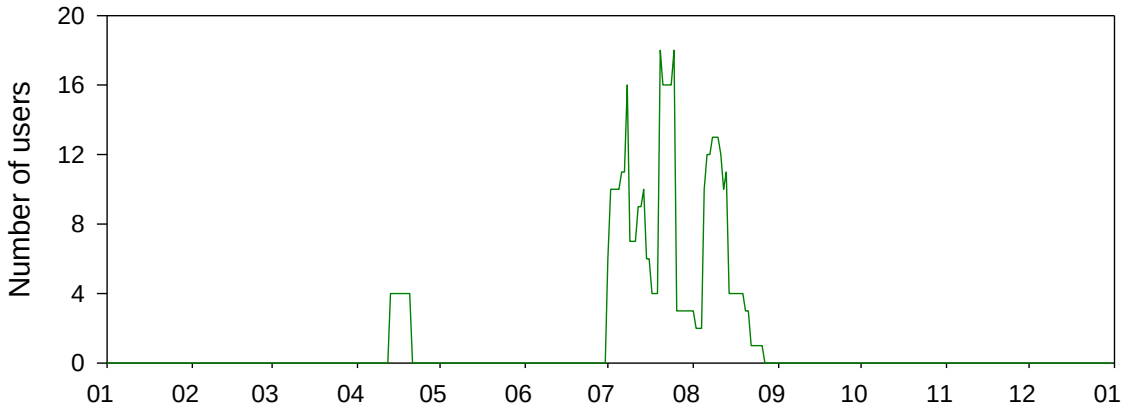


Fig. 1.5. The utilization of the field camp NOSTOC.

1.3. RV CLIONE

During spring, the RV CLIONE was moved to Svalbard (Fig.1.6.). RV CLIONE left Ghenthin (DE) on 18/04/2016 and arrived to Svalbard on 17/07/2016. Her crew consisted of Miloš Jahoda (skipper, 18/04-14/08), Fratišek Kadlec (engineer/boatsman, 18/04-14/08), and was short time added by Oldřich Straka (2nd skipper, Barents See, 07-20/07), and Tomáš Záhora (deckhand, 08-14/08).

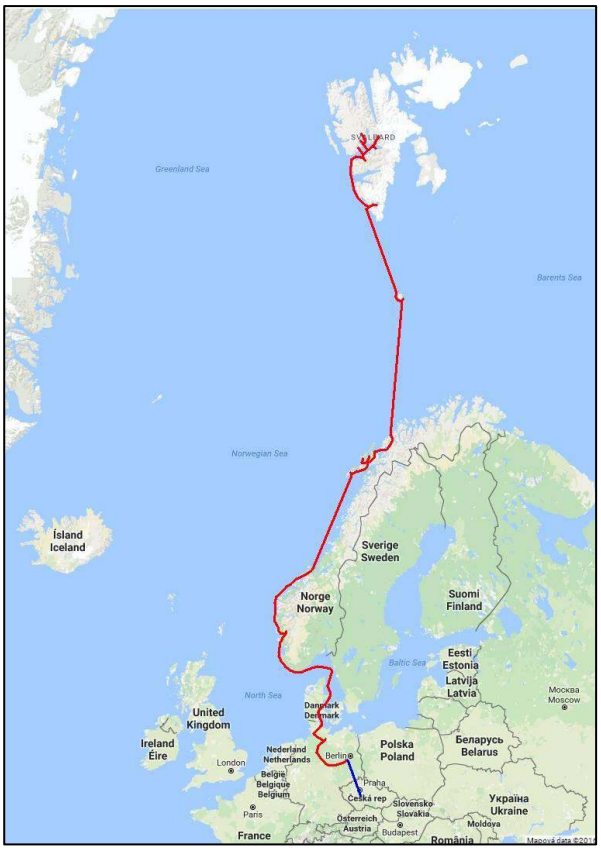


Fig. 1.6. Map of RV CLIONE cruise. Source: Miloš Jahoda.

The transfer to Longyearbyen was considered as a test cruise. The total cruised log was 2831 nm (5243 km). During the cruise, all systems were tested and set-up. No serious technical problems occurred. The test cruise revealed some minor technical and operation issues, which can be eliminated by minor technical improvements and operation procedures changes. In Bergen (NO), the RV CLIONE and her crew participated in introduction of the Czech Arctic Research Infrastructure organized by the Ambassador of the Czech Republic in the Kingdom of Norway, the Honorary Consul of the Czech Republic in Bergen, and the Mayor of Bergen. Short stop at Bjørnøya island was used for sampling.

After the successful test cruise, the RV CLIONE was cleared for operations in Svalbard. The total distance covered was 254 nm (470 km). The operations included one-day and several-days trips in the Isfjorden area. RV CLIONE was used to transport persons and material between Longyearbyen and the field camp NOSTOC in Petuniabukta and for sampling. During Svalbard operations, remaining tests were performed, since they had not been able to be performed during the test cruise due to specific Svalbard conditions (Figs. 1.7. and 1.8.)

Fig. 1.7. RV CLIONE in front of Nansenbreen, Svalbard, August 2016. Author: Miloš Jahoda.

Fig. 1.8. Expedition boat in Skansbukta, Svalbard, July 2016. Author: Miloš Jahoda.

The RV CLIONE was lifted ashore and maintained for winter storage on 11/08/2016 (Fig. 1.9.).

Fig. 1.9. RV CLIONE ready for winter. Author: Josephin Brandes.

2. Year 2016 Programme

The winter educational courses organized by Masaryk University in Brno (21/03-04/04/2016) and Faculty of Sciences, University of South Bohemia (02 – 17/04, botany, and 16 – 30/04, phycology, microbiology and zoology). The summer field research season started on June 27, 2016, and was completed on August, 28, 2015. The lists of Infrastructure users from the Centre for Polar Ecology (CPE users) and from other institutions (external users), their periods of stay are summarized in Tabs. 2.1. and 2.2.

Tab. 2.1. List of CPE users with their affiliations, their periods of stay, their CARS utilization and person-day numbers. Refer to Tab. 2.2. for abbreviations explanations.

		Affiliation(s)	Field of research	Dates	CARS utilization	Number of person-days
Alexandra Bernardová	E	MU + JU		21/03-04/04	L	15
Oleg Ditrich	IR	JU	ZOO	30/06-28/07	CLN	27^{+2}
Josef Elster	IRE	JU + IBOT	MICRO	12-22/04 15/07-24/08	CLN	48^{+3}
Tereza Hromádková	R	UK + JU	ZOO	27/06-28/07	CLN	30^{+2}
Miloš Jahoda	C	JU		17/07-12/08	CLN	29^{+89*}
František Kadlec	C	JU		17/07-12/08	CLN	29^{+89*}
Helge Kampen	R	FLI	ZOO	05-12/08	LN	8
Jan Kavan	E	MU + JU		21/03-04/04 19-21/08 03/09	L	19
Jana Kvíderová	IR	JU	MICRO	02-24/08	L	19^{+4}
Martin Lulák	CRE	UK + JU	MICRO	21/03-04/04 27/06-28/08	CLN	76^{+2}
Petr Macek	IR	JU	BOTA	02-22/04 01-21/07	CLN	39^{+3}
Eva Myšková	R	JU + PARU	ZOO	27/06-18/07	CLN	20^{+2}
Václav Pavel	EIR	UPOL + JU	ZOO	10-25/04 27/06-25/07	CLN	37^{+3}
Petra Polická	R	JU	GEO	27/06-28/07	CNL	30^{+2}
Marie Šabacká	IR	+ JU	MICRO	08-30/04 30/06-09/07 29/07-11/08	CLN	46^{+2}
Oldřich Straka	C	JU		17/07-20/07	CL	4^{+8}
Tomáš Tyml	IR	JU + MU	ZOO	27/06-28/07	CLN	25^{+3}
Tomáš Záhora	C	JU		08-14/08	CL	7

*89 - Cruise to Longyearbyen

Tab. 2.2. List of CPE users with their affiliations, their periods of stay, their CARS utilization and person-day numbers.

		Affiliation(s)	Field of research	Dates	CARS utilization	Number of person-days
Hynek Adámek	E	NG		13-16/04	LN	16
Klára Ambrožová	E	MU		30/01-29/03	L	60
Veronika Anděrová	E	MU		19-21/08 03/09	L	4
Dovile Barcyte	S	UK	MICRO	02-16/08	CLN	11^{+4}
Alena Bartoňová	S	JU	ZOO	01-15/07	LN	13^{+2}
Libor Borák	E	OSU		16-30/04	L	15
Josephin Brandes	E	UCON		06-21/08	LN	14^{+2}
Kristian Brát	E	MU		21/03-04/04	L	15
Martins Briedis	S	UPOL	ZOO	01-15/07	LN	13^{+2}
Marek Brož	RS	JU	ZOO	30/06-17/07	L	17^{+2}
Viktorie Brožová	S	JU	BOTA	01-15/07	LN	13^{+2}
Ivana Bufková	E	NPS		18-28/07	CLN	10^{+2}
Marie Bulínová	RE	UK	CLIMA	02-06/08 19-21/08 03/09	CL	12^{+2}
Tomáš Čejka	E	MU		19-21/08 03/09	L	4
Jiří Černý	R	PARU	ZOO	02-16/08	LN	11^{+4}
Karel Chobot	E	AOPK		18-28/07	CLN	10^{+2}
Miloslav Devetter	E	ISB + JU	ZOO	16-30/04	L	15
Lukáš Dolák	E	MU		21/03-04/04	L	15
Marie Doležalová	E	MU		21/03-04/04	L	15
Martina Eiseltová	E	VURV		18-28/07	LN	10^{+2}
Jiří Flousek	E	KRNAP		18-28/07	CLN	10^{+2}
Geir Wing Gabrielsen	E	NPI		18-28/07	CLN	10^{+2}
Zuzana Gajarská	S	JU	MICRO	02-16/08	CLN	11^{+4}
Klára Hajšmanová	E	MU + JU		21/03-04/04	L	15
Tiit Hallikma	R	ESTU	BOTA	10-17/07	LN	7
Irena Hladová	E	UK		19-21/08 03/09	L	4
Martin Hložek	E	MU + UK		21/03-04/04	L	15
Petr Holík	E	MU		21/03-04/04	L	15
Kim Holmen	E	NPI		18-28/07	CLN	10
Vojtěch Holubec	A	VURV		31/07-05/08	L	6
Karel Janko	E	IAPG+JU		16-30/04	L	15
Tereza Jaroměřská	R			24/07-16/08	CLN	21^{+3}
Tomáš Jedlička	E	UHK		16-30/04	L	15
Barbora Jonášová	S	JU	BOTA	01-15/07	LN	15
Roman Juras	E	MU + CZU		21/03-04/04	L	15
Eva Kadlčková	E	JU		19-21/08 03/09	L	4
Helge Kampen	R	FLI	ZOO	05-12/08	LN	8
Jan Kavan	E	MU + JU		21/03-04/04 19-21/08 03/09	L	19
Adam Klimeš	UK	JU		02-15/04	L	14
Jitka Klimešová	E	IBOT+JU		02-15/04	L	14
Nikol Kmentová	S	MU	ZOO	01-15/07	LN	13^{+2}
Tyler Kohler	R	UK	CLIMA	01-10/08	CLN	8^{+2}
Klára Kopicová	S	JU	BOTA	01-15/07	LN	13^{+2}

Miroslav Kosík	E	Enki o.p.s.		18-28/07	CLN	10+2
Klára Kopicová	S	JU	BOTA	01-15/07	LN	13+2
Lauri Laanisto	R	ESTU	BOTA	11-17/07	LN	7
Romana Lehmannová	P	CRo		04-18/07	CLN	13+2
Jakub Małecki (+7 persons)	A	UAM		30/06-30/09 short stays	L	145
Inga Martinek				22/07-01-08	LN	9+2
Šárka Mazánková	E	AOPK		18-28/07	CLN	10+2
Jana Müllerová	S	JU	MICRO	02-16/08	CLN	11+4
Georgia Rose Murray	R	DU	ART	06-25/08	LN	18+1
Milan Novák	E	MU		19-21/08 03/09	L	4
Aga Nowak	R	USh	HYDRO	27/06	L	1
Daniel Nývlt	E	UK + MU		21/03-04/04 19-21/08 27-28/08	L	20
Lenka Ondráčková	E	MU		02-04/07 27-28/08	L	5
Jakub Ondruch	R	MU	GEO	27-29/06 03/09	L	4
František Paprštejn	A	VSUO		31/07-04/08	L	5
Anita Petrů	E	UK		02-15/04	L	14
David Pithart	E	Beleco, z.s.		18-28/07	CLN	10+2
Tomáš Plojhar	E	MU + UK		21/03-04/04	L	15
Matěj Pokorný	E	UK		16-30/04	L	15
Anna Polášková	S	JU	MIKRO	02-24/08	CNL	19+4
Dominika Prochová	E	JU		16-30/04	L	15
Kateřina Pužejová	E	UK		16-30/04	L	15
Vojtěch Richtr	E	UPOL		16-30/04	L	15
Jan Russnák	E	MU		21/03-04/04	L	15
Pavlína Šámalová	E	UK		02-15/04	L	14
Jiří Sedlák	A	VURV		31/07-04/08	L	5
Petr Sklenář	IR	JU	BOTA	01-15/08	LN	13+2
Katarína Slabeyová	E	CSO		18-28/07	CLN	10+2
Josef Štemberk (+3 persons)	A	USMH		10-12/08 29-31/08	L	24
Hana Štěrbová	A	VURV		31/07-05/08	L	6
Oldřich Straka	C	JU		17/07-20/07	CL	4+8
Otakar Strunecký	E	JU	HYDRO	19-21/08 27-28/08	L	5
Radim Stuchlík	E	MU		21/03-04/04	L	15
Jana Svobodová	A	VURV		31/07-05/08	L	6
Pavla Trachtová	E	AOPK		18-28/07	CLN	10+2
Anna Troppová	E	MU		21/03-04/04	L	15
Kateřina Trumhová	E	JU		16-30/04	L	15
Vojtěch Tryzna	E	MU+CZU		21/03-04/04	L	15
Karolina Vávrová	S	UK	MIKRO	02-16/08	CLN	11+4
Lenky Vejrostová	E	MU + UK		21/03-04/04	L	15
Libuše Vlasáková	E	ME		18-28/07	CLN	10+2
Veronika Vosáhlová	E	UHK		02-15/04	L	14
Doreen Walther	R	LCARS		05-12/08	LN	8
Jacob Yde	R	HiSF	CLIMA	01-10/08	CL	8+2
Jakub Žárský	RE	UK		10-25/04 20/07-10/08	CLN	36+2
Ondřej Zvěřina	E	MU		21/03-04/04	L	14

Abbreviations:

Purpose of the stay:

A – accommodation and equipment use
C – construction, operation or management of the Svalbard infrastructure
E – scientific education (with exception of Polar Ecology course organized by the Centre for Polar Ecology)
I – instructor of the Polar Ecology course
R – research
P – publicity
S – student of the Polar Ecology course

Affiliations:

AOPK -Nature Conservation Agency of the Czech Republic, Prague (CZ)
CSO – Czech Society for Ornithology, Prague (CZ)
CRo – Czech Radio, Prague (CZ)
CZU – Czech University of Life Sciences, Prague (CZ)
ESTU – Estonian University of Life Sciences, Tartu (EE)
FLI - Friedrich-Loeffler-Institut, Federal Research Institute for Animal Health, Greifswald - Insel Riems (DE),
HiSF - Høgskulen i Sogn og Fjordane, Sogndal (NO)
IAPG – Institute of Animal Physiology and Genetics AS CR, Liběchov (CZ)
IBOT – Institute of Botany CAS, Třeboň (CZ)
ISB – Institute of Soil Biology, Biological Centre CAS, České Budějovice (CZ)
JU – University of South Bohemia, České Budějovice (CZ)
KRNAP – Krkonoše National Park, Vrchlabí (CZ)
LCARS – Leibniz Centre for Agricultural Landscape Research, Muencheberg (DE)
ME – Ministry of the Environment, Prague (CZ)
MU – Masaryk University, Brno (CZ)
NG – National Geographic Česko (CZ)
NPI – Norwegian Polar Institute, Longyearbyen (NO)
NPS – Šumava National Park, Vimperk (CZ)
OSU – University of Ostrava, Ostrava (CZ)
PARU – Institute of Parasitology, Biological Centre CAS, České Budějovice (CZ)
UAM - University Adam Mickiewicz, Poznań (PL)
UCON – University of Constance, Konstanz (DE)
UD - Dundee University, Dundee (UK);
UHK – University of Hradec Králové, Hradec Králové (CZ)
UK – Charles University, Prague (CZ)
UPOL – Palacký University, Olomouc (CZ)
USh – University of Sheffield, Sheffield (UK)
USMH - Institute of Rock Structure and Mechanics CAS, Prague (CZ)
VSUO – Research and Breeding Institute of Pomology, Holovousy(CZ)
VURV – Crop Research Institute, Prague (CZ)

Field of research:

ART – Arts
BOTA - botany/plant physiology
CLIMA - climatology/glaciology
GEO - geology/geomorphology
HYDRO - hydrology/limnology
MICRO - microbiology/phycology
ZOO - zoology/parasitology.

CARS utilization:

C – RV CLIONE
L – JULIUS PAYER HOUSE (Longyearbyen)
N – field camp NOSTOC (Petuniabukta)

3. Research activities

3.1. Geology and Geomorphology

3.1.1. Palaeoecology of nearshore environments during the Pleistocene/Holocene transition on central Svalbard

Martin Lulák

Important records of the Late Pleistocene geologic history of Svalbard archipelago represent raised marine terraces. They expose sediments of several glacial advances, which provide basis for the reconstruction of an evolution of archipelago during Pleistocene and Holocene times. Every depositional cycle begins with glacigenic sediments from advancing phase of glaciations. Marine, deltaic and coastal sediments from deglaciation phase lie above glacigenic sediments. These deposits have been the main focus of geological and palaeontological research of our group for few years.

Palaeontological remains within the glacimarine sediments, such as fossil mollusks, are valuable indicators of palaeoecological/environmental conditions. This project is aimed to reconstruct these conditions with the use of palaeoenvironmental proxies hidden in organic remains, mainly fossil mollusks.

This year I was mainly focused on gathering samples from our three best localities. These localities lie in Mimerdalen valley and are pictured in Fig. 3.1.1. I revealed around 250 sub-fossil marine shells (mainly *Mya truncata* species) for further laboratory analyses (such as delta ^{18}O and lithophile element ratio). Some of them were revealed in living position (Fig. 3.1.2.) for ^{14}C dating. As comparison for Mimerdalen I also worked on Kapp Ekholm locality which is the most important stratigrafic locality of Svalbard for last four glacial maximums. At Kapp Ekholm site I also collected sub-fossil marine shells for the same analyses.

Fig 3.1.1. Three main localities of my thesis (source: toposvalbard.npolar.no).

Fig 3.1.1. Bivalve *Mya truncata* preserved on Bertil 1 site in living position. Measuring its age, we can gather info about precise age of this layer of sediment.

Except the work on my Ph.D. I also helped other colleagues (mainly Petra Polická and few others) on their projects: Also, I provided service for our AWSs (Automatic Weather Station) net around Petuniabukta and took a part of the service of the NOSTOC field station for a whole season.

3.1.2. Initial soil development in the Nordenkioldbreen forefield

Petra Polická, Hana Šantrůčková & Martin Hanáček

We continued with a project initiated last year which is focused on the rate of soil development in after deglaciation of the Nordenskiöldbreen (100 years) in two chronosequences with different bedrock mineral composition. We assume that the bedrock chemistry is particularly important for initial microbial colonization and establishment in this this nutrient poor environment. Here, in front of the Nordenskiöldbreen the northern "silicate forefield" is mostly made of metamorphites (significantly higher amount of silica), while the southern "silicate + carbonate" forefield is built of magmatites, metamorphites and carbonates and is a source of a significantly higher soil cationt exchange capacity (mainly Ca^{2+}, Mg^{2+}, Na^{+} and K^{+} ions) and higher water holding capacity. Our initial hypothesis was that with increasing age of soil, the effect of bedrock mineralogy will decrease and effect of organic matter will increase. Therefore, the similarity of soil development between two chronosequences on different bedrocks will be gradually increasing.

After a number of analyses from the last year examining the physical, chemical and biological properties of soils (e.g. pH, cation exchange capacity, organic matter, total CN content, CNP microbial biomass, available phosphorus and forms of nitrogen), this year we collected samples for enzyme activity measurements and DNA analysis to capture more properly the microbial functioning which play significant role in the soil development (Fig. 3.1.3.).

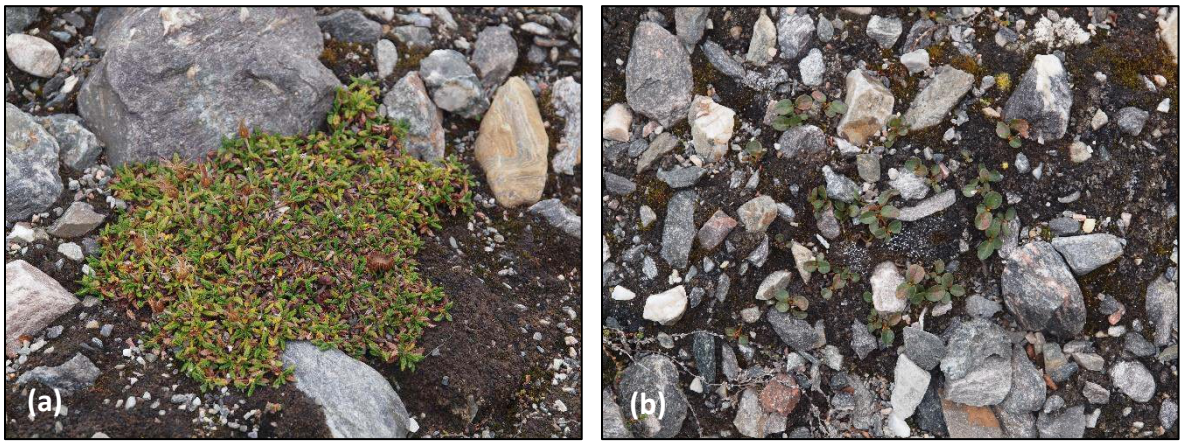


Fig. 3.1.3. The forefield has a high amount of skeleton **(a)** therefore the pioneer vegetation needs to find sheltered sites **(b)**.

3.2. Climatology and Glaciology

3.2.1. The fate of sub-glacial carbon in an era of deglaciation

Jakub Žárský, Tyler Kohler, Marie Bulínová & Jacob Yde

Three sediment samples were taken from three different glaciers, and very little trouble was encountered. In addition to the sediments, adjacent stream water chemistry, temperature, conductivity, and pH were collected and/or determined.

The first trip was made across the fjord to the Nansenbreen glacier, on the Czech Center for Polar Ecology RV CLIONE. A Zodiac was taken from RV CLIONE ashore to Nansenbreen, where subglacial sediments were identified after a brief walk to the margin. After taking a complete suite of samples (including several bags of sediments, microbiological samples, and water chemistry), it was possible to return to RV CLIONE by Zodiac. Sefströmbreen was sampled in an identical fashion several days later, and finally Sveabreen, where the survey was completed (Figs. 3.2.1. – 3.2.6.)

In the following months, these sediment samples will be freeze-dried, carbon-dated, and characterized at the molecular level using nuclear magnetic resonance (NMR) spectroscopy (ex. Pautler et al. 2012). Nucleic acids (DNA and RNA) will be extracted from microbiological samples and sequenced, and all water chemistry samples will be analyzed.

Fig. 3.2.1. The northern shore of Sefströmbreen forefield.

Fig. 3.2.2. Polar bear track.

Fig. 3.2.3. Crevasse squeezed ridges.

Fig. 3.2.4. Crevasse squeezed ridges (detail).

Fig. 3.2.5. Tyler Kohler and Jacob Yde in the front of Sveabreen.

Fig. 3.2.6. RV CLIONE in Nordfjorden.

References:

Pautler, B. G., Woods, G. C., Dubnick, A., Simpson, A. J., Sharp, M. J., Fitzsimons, S. J., & Simpson, M. J. (2012). Molecular characterization of dissolved organic matter in glacial ice: coupling natural abundance ^{1}H NMR and fluorescence spectroscopy. Environmental science & technology 46(7): 3753-3761. doi: 10.1021/es203942y

3.3. Microbiology and Phycology

3.3.1. *Vaucheria* – a xanthophycean alga from intertidal zone

Jana Kvíderová & Josef Elster

The xanthophycean alga *Vaucheria* forms large amounts of biomass in the estuary of the Adventelva, Longyearbyen, Svalbard, representing thus the main primary producer in this ecosystem. The occurrence of this alga seems to be restricted to the intertidal zone, since it forms green belt along the coastline (Fig. 3.4.1.). Therefore, it must be adapted to changes in temperature, irradiance (photosynthetically active radiation, PAR, and ultra-violet radiation, UVR), water availability and salinity, especially with respect of tidal rhythms.

Fig. 4.3.1. Locality in Adventelva estuary.

The aim of this study was to characterize the *Vaucheria* community, to test the instrumentation for measurement of its photosynthetic activity, to measure *Vaucheria* photosynthetic activity and to define relations between encountered environmental conditions and *Vaucheria* photosynthetic activity and the in late Arctic summer.

Fig. 4.3.2. "The Yard" experimental set-up.

The *Vaucheria* community was collected in the estuary of the Adventelva, Longyearbyen, Svalbard (78°13'22.51''N, 15°40'7.39''E) during low tide. The ecophysiological measurements were performed ex situ at the JULIUS PAYER HOUSE, Czech Arctic Research Infrastructure "Josef Svoboda Station (Fig. 3.4.2.) from August 12 to August 23, 2016. A piece of the *Vaucheria* community was placed into a plastic dish of 25 cm in diameter and were submerged in ca 5 cm of seawater ("The Yard"), and the environmental (temperature, irradiance) and physiological parameters (oxygen evolution, quantum yield) were measured.

The *Vaucheria* genus was dominant in the community. Small numbers of marine pennate diatoms were also observed. The environmental conditions were typical for late Arctic summer. The diel changes in the quantum yield and dissolved oxygen in *Vaucheria* thali followed the PAR course. The dissolved oxygen concentrations revealed anoxic conditions in the sediment (Fig. 3.4.3). The values of the quantum yields were negatively correlated to PAR and water temperature, while the changes in oxygen concentration were not dependent significantly on any of studied environmental variables.

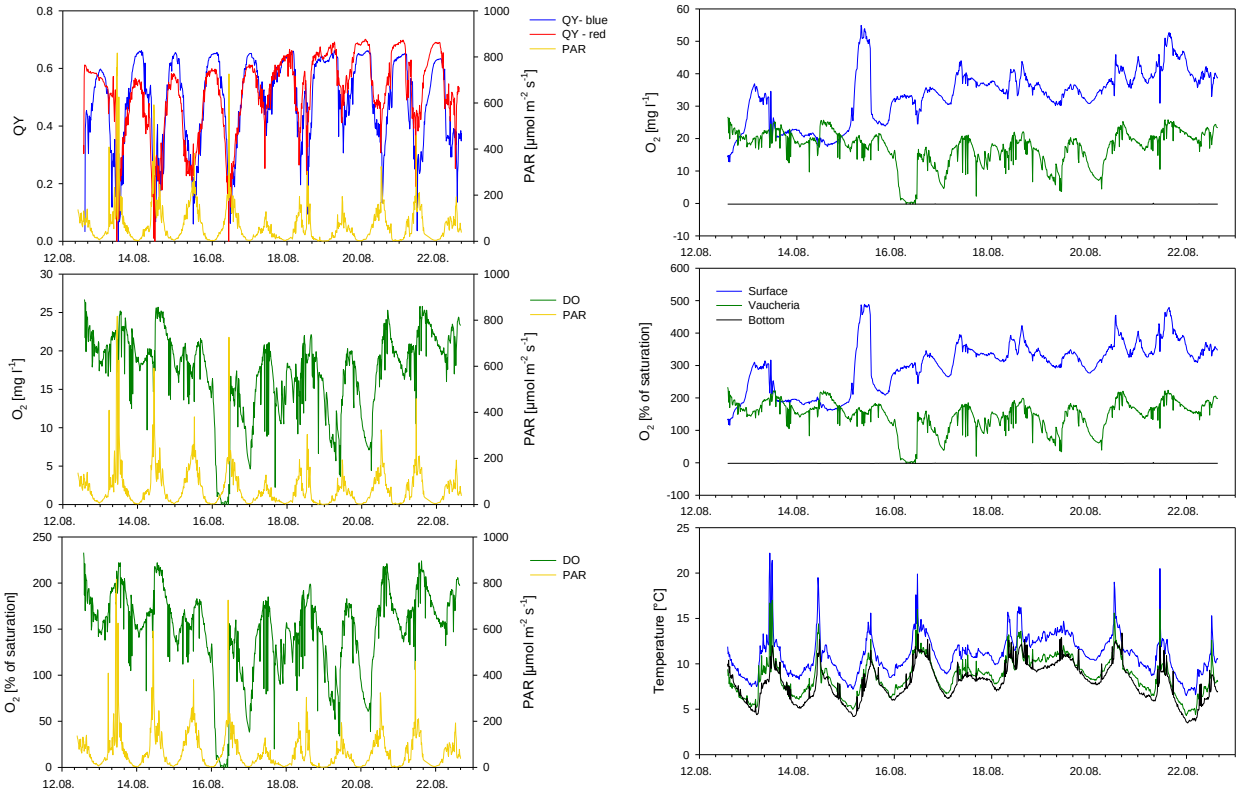


Fig. 4.3.3. The record of (left) the photosynthetic activity of *Vaucheria*, and (right) the oxygen concentrations at the water surface, near the *Vaucheria* thalli and in the bottom sediment.

3.4. Botany and Plant Physiology

3.4.1. Plant ecology

Lauri Laanisto & Tiit Hallikma

The purpose of our visit was to set up a Nutrient Network meta-experiment site. Nutrient Network http://nutnet.org/ that begun in 2006, is a global research initiative focusing on assessing the ecological relationship between productivity and (plant) diversity.

A NutNet site consists of 30 5x5 m plots that we set up in proximity to NOSTOC Field Camp. Setting the site up requires two years of work – in the first year the plots will be measured and marked down; plant diversity is assessed in 1x1 m quadrats; soil and aboveground biomass sampled from all the plots. This is what we did in 2016, together with Petr Macek, who helped with identifying the plants.

Obtained data will be added to NutNet global dataset, from where NutNet members can extract this data for their analysis. In 2017 we will return to Petuniabukta in order to set up nutrient treatment in the same plots and after that there will be annual data gathering for seeing how treatment(s) affect the productivity-diversity relationship.

Fig. 3.4.1. Nutrient Network site in Petuniabukta.

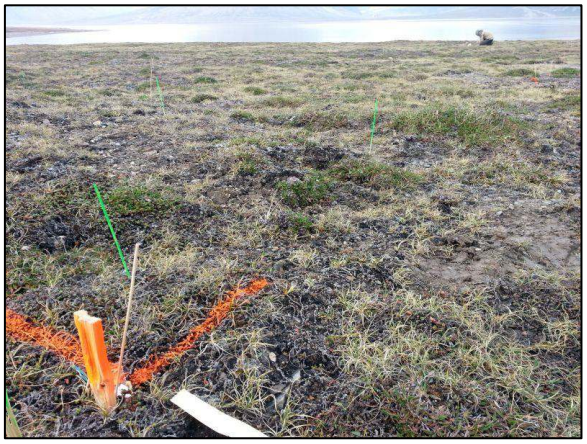


Fig. 3.4.1. Nutrient Network site in Petuniabukta (detail).

3.5. Zoology and Parasitology

3.5.1. Intestinal parasites of terrestrial animals

Marek Brož, Oleg Ditrich & Eva Myšková

The investigation of intestinal parasites of terrestrial animals has been aimed to intestinal parasites of imported mammals. We examined 63 sibling voles (Fig. 3.5.1.) and fecal samples of 36 dogs in season 2016. No vole harboured cysts of *Echinococcus multilocularis*. A new genotype of *Cryptosporidium* has been found in one sample from sibling vole. One sample from dog was positive for *Cryptosporidium canis*.

Fig. 3.5.1. Sibling vole in trap.

Remarcable results were achieved in case of microsporidia: almost 20 % of dog samples were positive for *Enterocytozoon bieneusi.* Genetic analysis revealed unusual genotype that had been recorded in Switzerland (Fig. 3.5.2).

Non-indigenous mammals can be source of parasitic infections for free-living animals.

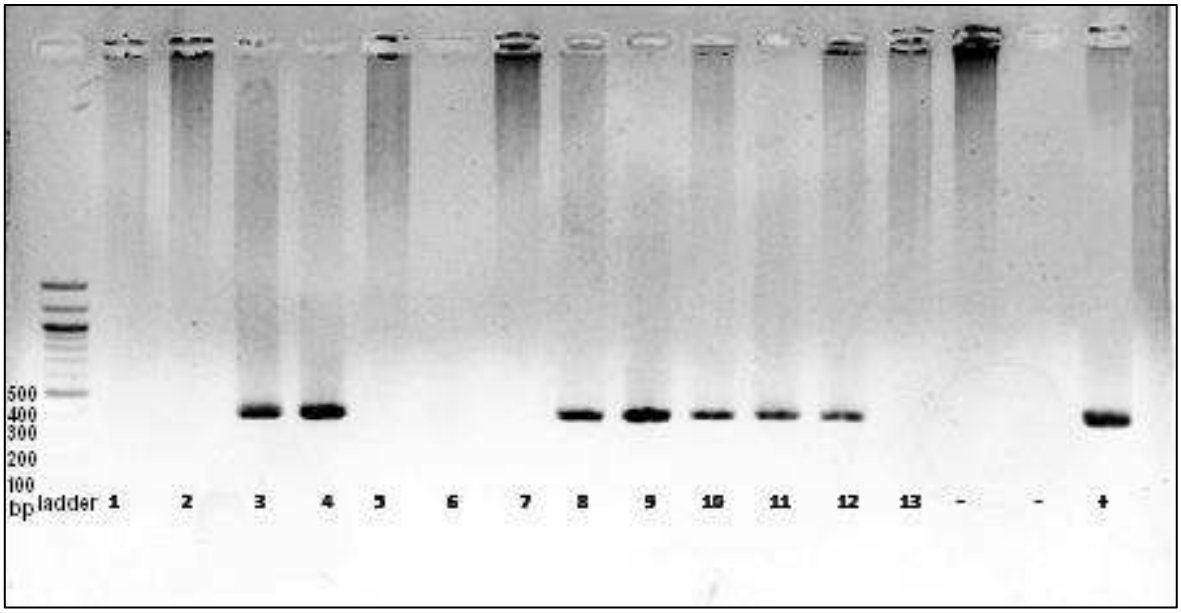


Fig. 3.5.2. Electroforesis of DNA from dog feaces after nested PCR. Distinct band in samples with *Enterocytozoon bieneusi*.

3.5.2. Monitoring of mosquitoes (Diptera: Culicidae) on Svalbard

Helge Kampen & Doreen Walther

The study was embedded in the VectorNet project, funded by the European Center for Disease Prevention and Control (ECDC) and the European Food Safety Authority (EFSA). VectorNet's main tasks are to promote networking among entomologists and public health experts working in the field of vector-borne diseases and to map the distribution of arthropod vector species in the EU and riparian states.

Mapping the distribution data of culicid vectors as obtained from the literature and expert data showed collection gaps in northern Europe, particularly as to the northern distribution limits of *Cx. pipiens* s.s., a demonstrated vector of West Nile virus. A study was therefore designed to collect mosquitoes along a transect in northern Fennoscandia, starting in Umeå, Sweden, and going northwards through Sweden, Finland and continental Norway to Berlevag. The monitoring in these parts of the study was covered by mosquito specialists from Sweden, Finland and Norway. The northernmost area to be checked for mosquitoes was Svalbard.

The study on Svalbard was scheduled for early August, usually the period of highest mosquito activity on the archipelago. Initially, it was intended to try to collect adult and aquatic mosquito stages by trapping, netting and dipping. However, as it turned out, in 2016 the summer season on Svalbard took place had three weeks earlier than usual and was approaching its end in early August. In fact, high mosquito population densities had been observed by mid-July. During the study, the weather was quite autumnal for Svalbard standards, with frequent rainfalls, low temperatures (5-8 °C maximum) and strong frosty winds. The study therefore concentrated on checking potential breeding places for larvae in Longyearbyen and later in Pyramiden, and netting in the tundral surroundings of Petuniabukta.

Few mosquitoes were collected (in Petuniabukta), all of them belonging to the species *Aedes nigripes* which had been the only species known to occur on Svalbard. No evidence for an introduction of *Cx. pipiens* complex was found, however, it cannot completely be excluded that this was due to the adverse weather conditions (Figs. 3.5.4. and 3.5.5.).

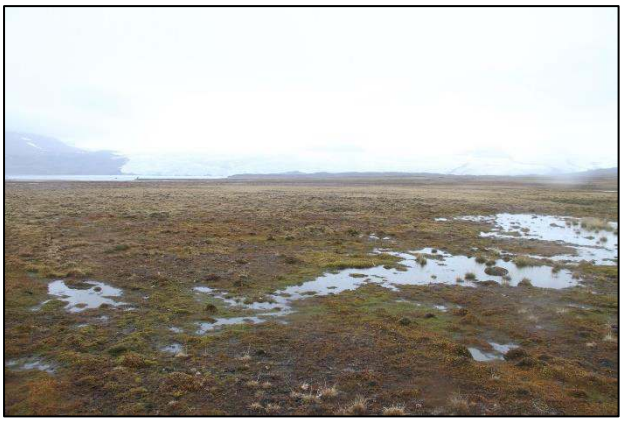


Fig. 3.5.4. Water pools serving as breeding sites for *Aedes nigripes* in tundral areas of Petuniabukta.

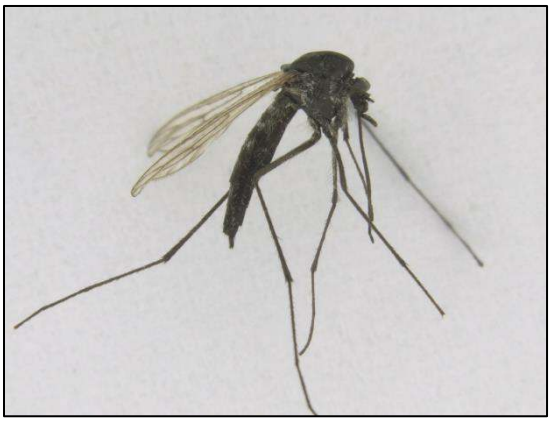


Fig. 3.5.5. *Aedes nigripes* (female).

3.5.3. Free-living amoebae

Tomáš Tyml* & *Oleg Ditrich

Free-living amoebae (FLA) are unicellular eukaryotes ubiquitous in soil, fresh- and seawater where they play an important ecological role as predators in microbial communities. Taxonomically, FLA are scattered across the eukaryotic tree of life and can be found in majority of eukaryotic "supergroups". FLA may switch between highly motile flagellate and more stationary amoeboid forms (e.g., *Naegleria* spp.), produce resting stages, i.e., cysts (e.g., *Acanthamoeba*, *Naegleria*, Fig. 3.5.3.) and even exhibit an ability to form fruiting structures, i.e., sorocarps (e.g., some *Acrasis* spp. or *Copromyxa* spp.).

During our previous projects focused on FLA occurring in the polar regions, we have isolated a considerable number of amoeba strains. Among these strains, we have recognised a strong geographical pattern in the distribution of several lineages within some FLA groups (e.g., *Naegleria*, vannellid amoebae, *Vermistella*). During summer season 2016, we have begun to collect a material to assess a diversity of some FLA lineages using culture-independent approaches.

During the fieldwork, we collected samples of soil, freshwater and seawater sediments, preserved them using Xpedition Lysis/Stabilization Solution and DNA/RNA Shield (Zymo Research, Irvine, CA, USA). The samples have been sampled from all of the typical habitats in the central part of the Svalbard archipelago (Longyearbyen, Billefjorden area) and even from a remote island Bjørnøya. We took a chance and sampled soil/sediment samples on Bjørnøya during our cruise from Tromsø to Longyearbyen. The exceptionality of this locality is because of its remoteness and because it can be considered as a 'bridge' between Norway mainland and Svalbard. We believe that samples collected on the Bjørnøya island will help with an interpretation of our data from both the Svalbard and the Scandinavian peninsula.

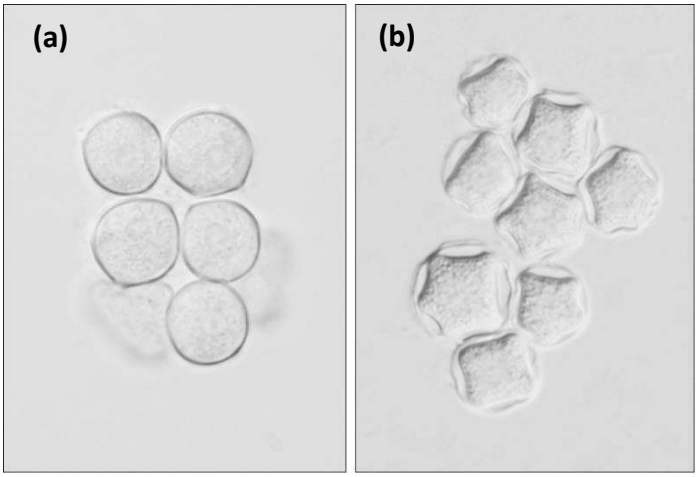


Fig. 3.5.3. Cysts of **(a)** *Naegleria* and **(b)** *Acanthamoeba*.

3.6. Arts

3.6.1. Landscape painting

Georgia Rose Murray

Summer 2016 was an enlightening experience for Scottish landscape painter and painting lecturer Georgia Rose Murray. Supported by the Scottish International Education Trust, Georgia experienced a truly unique landscape that was constantly illuminated by her scientific companions and an Arctic sun that didn't set for the duration of her 3-week visit.

A guest researcher of the Center for Polar Ecology, Georgia stayed in two different Svalbard locations; the base station in Longyearbyen (the capital of Svalbard) and NOSTOC Field Station, Petuniabukta, approximately 60km further north in a remote bay surrounded by mountains, fjords, glaciers and ice-caps.

Georgia was the first artist to have ever been invited to use the station to make painting research alongside Polar scientists who were researching the biology, geology and ecology of the Arctic region. Josef Elster, an inspirational director of the research station, understood and appreciated the expressive landscape paintings Georgia made after a residency to Iceland during a period of Polar Night, winter 2015 and he has great empathy for her passion to connect to the incredible, spiritually rich Arctic landscape of Svalbard.

Excerpts from Georgia Rose Murray's daily dairy written whilst making painting research in the Arctic during a period of Midnight Sun, August 2016:

"Questions forming every hour, my inquisitiveness about this Arctic land is constant and growing more-so as I draw and paint with intense concentration, beginning to profoundly understand what this majestic landscape is about."

"Desires to learn about the Geology of Svalbard- amazing red shafts of stone tumble down the mountains up high. It is known locally as 'Old Red' as it is the oldest sediment in Svalbard which usually remains very deep down in the land but due to mining has shifted up to the surface of the Earth.

"The soul cleansing river 'Longyear Alva' which I love standing on top of (straddling the fast passage of water there are several bridges in Longyearbyen,) is a gushing surge of glacier melt from three sources south of the city…10.38PM BLUE SKY IS APPEARING, THE MIST IS THINNING AND GOLDEN SUNBEAMS ARE KISSING THE PEAKS WITH CLEAR DAZZLING COLOURS."

"…As the mild summer season changes to autumn and the active layer of ground freezes over the deep permafrost, Longyear Alva freezes and the flow ceases. As winter endures the glaciers continuously grow back to their full size again, until late spring when the temperatures rise once more and the melting process resumes. (The warmer the annual temperatures get, the less time the glaciers have to grow, the more melt water flows down to the Fjords, causing sea levels to rise; we must do all we can to prevent human behaviour creating climate change!)"

"The colours and light are constantly changing, the glacial river is gushing, geese are gathering (with fluffy grey babies) ready to migrate South, the Arctic sterns are aggressively protecting their eggs and babies (I was dived at today which was great fun!) and the wild flowers and cotton are dancing in the summer air. It is cold and has been mostly foggy and drizzly but

even in dull weather it is amazing to be living in one of the Northernmost settlements on Earth- I am constantly so excited and grateful to the universe for being here!"

"11pm the clouds in front of the sun completely cleared and golden light streaked across the thriving summer vegetation and up the mountain sides. Patches of snow high on the Prussian mountains and the glaciers suddenly shone brighter than ever before in the last three days (since I landed in Longyearbyen), the startling white insisted that I put my wellies and double coats on and go out to experience the light first hand."

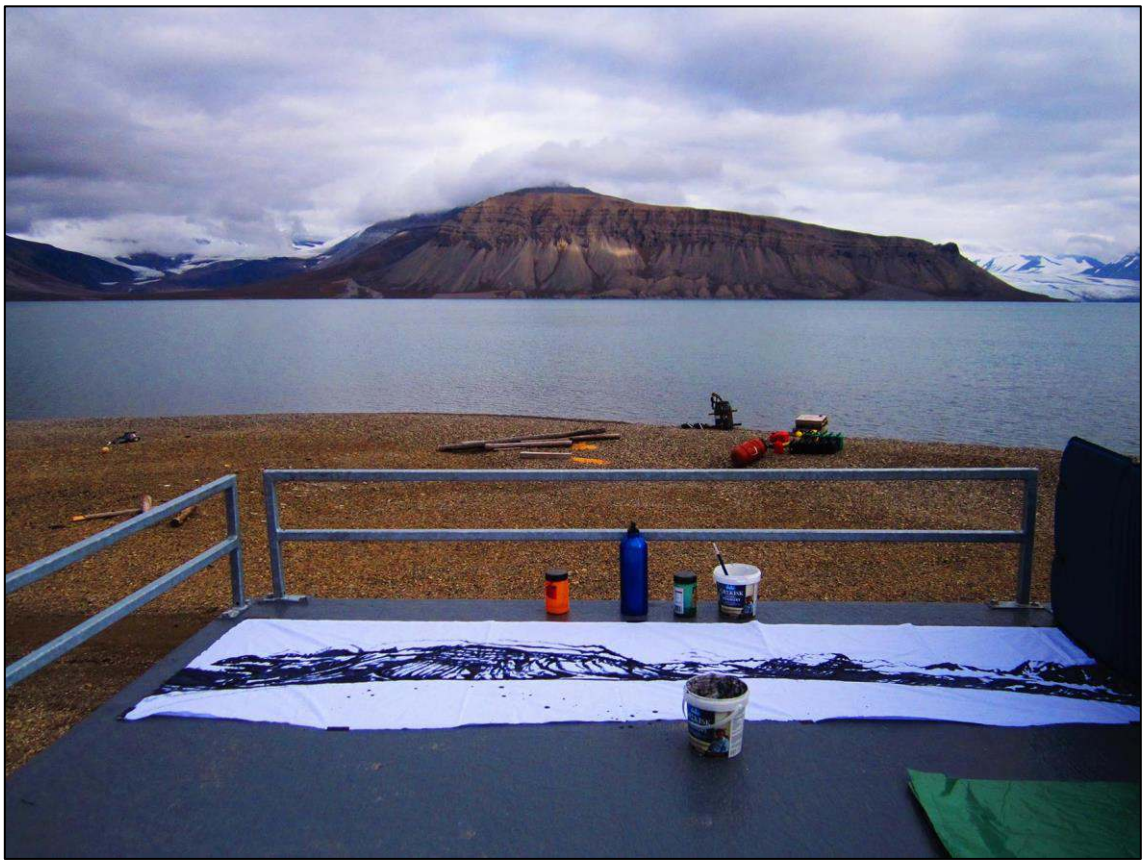
Sketchbook. Petuniabukta, Towards The North Pole. 22×30×2cm. Pen, Ink, Paper. 2016.

"This period of work is thrilling and each moment my engagement with this amazing Arctic landscape is building. Today I realised that I am falling in love with this magical place. The light, the space the atmosphere, the constant feelings of awe in reaction to existing on a platform where humans, Arctic creatures and this amazing Arctic environment are equal and all in respect of each other; it is completely wonderful."

"Today was my first experience of a glacier and it was incredibly magical - a dazzling mass of ice with a fresh layer of snow, tiny tributaries now frozen making tiny winding tracks all over the surface; wonderful to feel snow crunching beneath my feet- it was like walking on a sea of clouds. The views of the surround snow-capped Prussian and limestone/ black coal mountains were astounding- a whole army of peaks rising up to join the sky and the tiny fjord below, snaking out towards the sea- bright turquoise in the gorgeous clear summer light. Blue sky, blue fjord. As we ascended and approached the glacier we felt noticeably colder, the wind blew the icy temperature off the surface of the giant frozen mass and into the air - it was magical."

"9pm bright sunshine on the fjord, E/N (BEI), an expedition to the bird hut decking by the fjords edge to make a large material painting. Pigments and gouache mixed in pots, a jar of ink and lots of big brushes, evening painting in the warm light; what a dream."

Making 78 degree Arctic Ash Black, Longyearbyen. Coal, Buckets, Mallet, Sieve, Gazing medium. 2016.



Polar Bear proof studio on top of Cabin, Petuniabukta. White Cotton, 78 degree Arctic Ash Black. 2016.

"Wonderful, warm hospitality from everyone in the Czech Arctic Research Infrastructure. It was inspiring and enriching to work alongside researchers from The University of South Bohemia/ other areas of Czech Republic; an artist and lots of scientists investigating the Arctic environment together and sharing/ discussing our insightful perspectives. Josef Elster and I continue to communicate about the Arctic and will work together at The Arctic Science Summit Week 2017 in Prague, where my next exhibition of Arctic paintings will also open."

Petuniabukta North Pole to South Pole Concertina Sketchbook. 22×540×4cm. Watercolour, 78 degree Arctic Ask Black on paper. 2016.

"At almost 79 degrees north the location of Petuniabukta is humbling. Mirror like Billefjorden, the surrounding snow scattered peaks and the rushing sky comprise the most incredible space. The constantly circling sun illuminates the bay 24 hours a day creating ever evolving shafts of bright colour and deep shadows from every angle. Always aware of the power of nature, in a place where there are more polar bears than people, I experienced consistent feelings of awe, fear, elation and complete liberation. As the ancient turquoise 'Nodenskiöld' glacier cracked and giant shards of ice shattered into the sea, tremendous rumbles echoed through the entire bay. My work as a painter was to observe, absorb and expressively respond to the thrilling situation. Submerging oneself into a landscape where humans are insignificant initiates an ability to spiritually connect to universal energies which are highly inspirational to me. Clearing space to focus all of my energy on responding to the moment by mixing and applying colour to paper, wood or fabric, is how I choose to work as a painter whenever possible."

More information is available at www.georgiarosemurray.com

4. Educational activities

4.1. Polar Ecology Course – Phycology/Microbiology

Josephin Brandes **(external participant)**

Algae and cyanobacteria are the predominant phototrophs in alpine and polar regions. Despite their major biological role in these ecosystems they reveal unique physiology and biochemistry linked to their high adaptability to these environments. The Algology and Microbiology course in Svalbard organized by the CPE and held by Prof. Josef Elster gives an introduction in properties of microbial organisms in this exceptional diverse environment.

As the ground in the area of Petuniabukta (were the CPE research station is based) is in constant movement, due to temperature changes, causing freezing and toughing events, ice boiling of ground water and a lack of vascular plants keeping the ground stable, different stages of habitats for cyanobacteria are observable. In the younger areas (recent movement) were the ecosystem begins to develop (Figs 4.1.1 and 4.1.2.), the high concentration of precipitated salt (white spots) is limiting factor. At this first stage of succession there is no macroscopically visible biomass. Especially due to the low nutrient composition and high salinity, the first organisms developing are mainly cyanobacteria (black material).

Fig. 4.1.1. Young soil crust (cross section).

Fig. 4.1.2. Young soil crust.

In the second stage of succession, the soil is covered by cyanobacteria. Samples taken from these areas revealed that most abundant cyanobacteria species are *Microcoleus* and *Leptolyngbya*. Later, more cyanobacterial species and especially *Nostoc* spp. start to grow as nitrogen is becoming a limiting factor. Other limiting factors in these environments are the lack of water, phosphorus, light (for several months) and the low temperatures. In late stage of succession, different compositions of lichen, colored differently, as well as some small vascular plants appear (Fig. 4.1.3.). The cyanobacterial communities in soil crusts are very complex and not studied in detail, yet.

Fig. 4.1.3. Old soil crust.

Apart from soil crusts also little ponds and streams serve habitats for different algae species (mainly diatoms) and cyanobacteria.

Fig. 4.1.4. Cryoconite.

Cryconites on glaciers are particularly attractive biospheres for cyanobacteria and algae (Fig. 4.1.2.). Particular spots on the ice, were sediment particles are settled, it has a darker color; therefore, it is melting, due to higher absorption of sunlight. Little "ponds", called cryconites are formed, containing mainly sediment with high content of nutrients. Certain bacteria and algae in the sediment produce a unique ecosystem. During the course samples were taken from cryconic sediment as well as strait form the ice to distinguish between the different areas. It was found, that in sediment samples mainly *Leptolyngbya*, *Cylindrocystis* and *Nostoc* species were present.

The pure ice samples contained much smaller quantities and diversities of algae. Mainly *Ancylonema nordenskioeldii*, *Chlamydomonas nivalis and Cylindrocystis brebissonii* are found in this environment.

Apart from general student excursions for sampling at cryconites ponds and different soil crusts, every student had a project during the course. Following, these projects are listed:

1. *Zygnema* experiment

   Samples of *Zygnema* spp. were collected at different places (Fig. 4.1.5.) of the area and kept in beakers outside at the research station. To the mixed samples five different concentrations of nitrogen were added. Effects of different concentrations on phenotype (microscopic observations every day) and photosynthetic activity (Fluorpen measurements of quantum and maximum quantum yield) were investigated.

Fig. 4.1.5. *Zygnema* spp. mat.

2. Coccal green algae species in Svalbard

   Different environmental samples were taken, especially from environments, which are typical habitats for coccal green algae species (Fig. 4.1.6.). Samples were observed under the microscope and 18SrRNA-gene analyses was performed to determine, which coccal species are present in the different habitats of Svalbard.

Fig. 4.1.6. Green algae on anthropogenic substrate. Insert: Green alga, not identified.

3. Separation experiment: cyanobacterial species in the moss of wet meadows

Samples of moss were taken at different locations of a wet meadow. As most cyanobacteria in the meadow are associated with the moss, separation of mosses and the other organisms needs to be implemented to characterize cyanobacterial communities in the wet meadow. Water was removed from samples and dried by air at the station (Fig. 4.1.7.). Also, water and sediment samples were collected to compare communities with the ones associated with the moss (16SrRNA- gene analysis and microscopy). Different methods, like using a mortar or sonication will be used for separation back in the laboratory.

Fig. 4.1.7. Air drying of mosses.

4. Toxin producing cyanobacterial species in Svalbard

At four different locations of Ferdinand and Hørby glaciers, soil samples were collected (collection has been done here in previous years). At Ferdinand glacier samples were taken at different elevations. Duplicates of the samples were wrapped in filter paper (Fig. 4.1.8.). For later analysis of samples in HPLC and LC/MS samples were preserved in methanol, to determine if certain bacterial secondary metabolites are present (mainly toxins). Samples which contain secondary metabolites of interest will be analysed via gene analysis and/or used for bacterial cultivation, to identify responsible species.

Fig. 4.1.8. Sampling at Ferdinand glacier.

Different samples of *Peltigera* foliose lichen (association of fungi and nostocal cyanobacteria, Fig. 4.1.9.) were collected in a certain area near Longyearbyen (Adventdalen). Lichen was cleaned of moss and wrapped in filter paper. 20 samples from different locations were taken (collection has been done here in previous years). These samples will be handled the same way as samples described above.

Fig. 4.1.8. *Peltigera* foliose lichen.

5. Bird flu in Svalbard

   As much as possible samples of fresh bird excrements, mainly from pink-footed and barnacle goose, were collected from different locations around the research station in Petuniabukta. Samples were transferred to RNAse preservant, for later viral RNA analysis to determine, if bird flu is present in these areas.

6. Invertebrate communities in cryconites

   Samples from cryconites at different locations on surrounding glaciers were taken to investigate invertebrate communities.

General flora and fauna of the arctic and history of the region was additionally taught during the course. The complete report on Polar Ecology course is available at http://polar.prf.jcu.cz/docs-reports.

4.2. The Winter Polar Geosciences Course on Svalbard

Kamil Láska

The Polar Ecology Course – Geosciences was carried out in the area of Svalbard archipelago from 21st March to 4th April 2016. Fieldwork activities of students and instructors from the Masaryk University took place in area of Longyearbyen (Central Spitsbergen) with the use of the research station "Payer's House" of the University of South Bohemia in České Budějovice. The course was held under auspices of the EEA and Norway Grants in collaboration with the and the University Centre in Svalbard and the Centre for Polar Ecology of the University of South Bohemia. Similarly to previous years, one of the main objectives of the expedition team was the training of the students who carried out their research in the coastal zone of Billefjorden and other localities selected for long-term monitoring of the Arctic eco- and geo-systems (Fig. 4.2.1.).

Fig. 4.2.1. Student avalanche search and rescue training. Author: Jan Russnák.

The Polar Geosciences Course was attended by thirteen students with guidance from seven instructors (Alexandra Bernardová, Lukáš Dolak Marie Doleželová, Roman Juras, Jan Kavan, Daniel Nývlt, Ondřej Zvěřina). The students installed and took care about automatic weather station and monitored specific winter atmospheric conditions and then processed the measured values. Moreover, they learned how to describe the snow characteristics by digging the snow pits, how the orographic situation changes the snow deposition by measuring the snow depth, or they collected samples of snow for analyses of heavy metals pollution and did microbiological investigations for bacteria and their resistance against antibiotics.

4.3. Training course in polar ecology and research of polar wetlands

Libuše Vlasáková

The subject of the initiative has been a training course of polar ecology and research of polar wetlands in Svalbard. The initiative advanced the field of research of the predefined project 'Conservation, research and sustainable use of wetlands in the Czech Republic'.

The goal of the initiative was to exchange information and share know-how among partners of the predefined project 'Conservation, research and sustainable use of wetlands in the Czech Republic' and Centre of Polar Ecology and Norwegian Polar Institute. That had been in the field of research and conservation of various types of polar wetlands - including their plant and animal communities - in extreme climate conditions, in appropriate research methodology, and in the further utilization of research results (figs. 4.4.1 and 4.4.2.). The participants also benefit through research on climate change and its impact on wetland ecosystems in the polar region.

The partner organization, the Norwegian Polar Institute (NPI), is focused on all kinds of research on Svalbard. NPI cooperates closely with the Centre of Polar Ecology of University of South Bohemia (CPE-USB) that has its own base on Svalbard and who has been the second partner of the initiative. The Centre of Polar Ecology (CPE-USB) has been responsible for the logistics and the organization of the arrangement of the training course, and also led a set of theoretical lectures and provided accommodation for participants at its base in Svalbard during the course.

Fig. 4.3.1. Polar wetlands, Adventalen

Fig. 4.3.2. Polar wetlands – wet thufur tundra.

The training course started by the set of theoretical lectures over the weekend of 18-19 June 2016 at the Centre of Polar Ecology (CPE-USB) in the University of South Bohemia. The participants there obtained specific knowledge on polar ecology, learnt of the logistical arrangements and organization of the practical training course, and the health and safety principles of work in a polar environment during their stay in Svalbard. The practical training course hold during 16-28 July 2016 in Svalbard and included field trips, research of polar wetlands, and theoretical lectures that supplemented the practical course.

The participants of the training course were representatives of institutions that contribute to the implementation of the predefined project - Ministry of Environment and its partners - Nature Conservation Agency, Crop Research Institute, Czech Society of Ornithology, Beleco, ENKI and three guarantors of wetlands of international importance (Krkonoše peatlands, Šumava peatlands and Upper Jizera River) which have similar ecological conditions as those of Svalbard. All participants were experts on wetlands and will use their newly-obtained knowledge in their future work (Fig. 4.4.3.).

Outputs of the initiative have been 10 trained experts, articles on polar wetlands and their research, a seminar on training course and Svalbard, and strengthened bilateral cooperation between the Czech Republic and the Kingdom of Norway in the field of wetlands conservation and research.

Fig. 4.3.3. Course participants.

5. Publications in 2016

5.1. CPE employees (past and present)

5.1.1. Journal articles

Bradley J.A., Arndt S., Šabacká M., Benning L.G., Barker G.L., Blacker J.J., Yallop M.L., Wright K.E., Bellas C.M., Telling J., Anesio A.M. (2016) Microbial dynamics in a High Arctic glacier forefield: a combined field, laboratory, and modelling approach. Biogeosciences 13: 5677-5696. doi:10.5194/bg-13-5677-2016 IF=3.700

Cepák V., Kvíderová J., Lukavský J. (2016): The first description of snow algae on Mount Olympus (Greece). Nova Hedwigia 103: 457-473. doi: 10.1127/nova_hedwigia/2016/0365 IF=0.876

Elster J., Margesin R., Wagner D., Häggblom M. (2017) Polar and Alpine Microbiology – Earth's Cryobiosphere. Editorial. FEMS Microbiology Ecology 93: fiw221, 4p. doi: 10.1093/femsec/fiw221 IF=3.530

Elster J., Nedbalová L., Vodrážka R., Láska K., Haloda J., Komárek J. (2016) Unusual biogenic calcite structures in shallow lakes, James Ross Island, Antarctica. Biogeoscience 13: 535-549. doi: 10.5194/bg-13-535-2016 IF=3.700

Hodač L., Hallmann, Ch., Spitzer K., Elster J., Fashauer F., Brinkmann N., Lepka D., Diwan, V., Friedl, T. (2016) Widespread green algae *Chlorella* and *Stichococcus* exhibit polar-temperate and tropical-temperate biogeography. FEMS Microbiology Ecology, 92: fiw122FEMS, 16p. doi: 10.1093/femsec/fiw122 IF=3.530

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5.1.6. Popularizing articles

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5.1.7. Conference participations

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Černý J., Müllerová J., Elsterová J., Hrnková J., Růžek D., Grubhoffer L.: Emerging viral zoonoses in polar areas, Young Antigone Meeting, Cambridge, UK, 18.-20. 9. 2016.

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Elster J.: The 6th International Conference on Polar & Alpine Microbiology, České Budějovice, Czech Republic, September 2015. Terrestrial Working Group Meeting, ASSW2016. University of Alaska Fairbanks, Fairbanks, Alaska, USA, 12.-20.3.2016.

Elster J.: Arctic Science Summit Week in Prague, 2017. Plenary Meeting, ASSW2016. University of Alaska Fairbanks, Fairbanks, Alaska, USA, 12.-20.3.2016.

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Elster J..: Collecting samples in less than optimal environments. International Society for Biological and Environmental Repositories - ISBER – 2016 Annual Meeting & Exhibition, Breaking Down Walls: Unifying Biobanking Communities to Secure our Sustainability, Berlin, Germany, 5.-8.4.2016.

Elster J.: Český ekologický výzkum Arktidy. Krkonoše – tundra v srdci Evropy. Mezinárodní vědecká konference, Oborová srovnání tundry v Krkonoších a na severu Evropy, Krkonoše, Česká Republika, 19.-20. 10.2016.

Elster J.: Invited member of international panel “Siberian Environmental Change Network – SecNet – The international consortium for understanding and predictions societally-relevant changes in Siberia in a global context”, Tomsk State University, Tomsk, Rusko, 22.-28.10.2016.

Elster J.: Czech Arctic Research Infrastructure “Josef Svoboda Station” in Svalbard. National Institute of Polar Research, The seventh Symposium on Polar Science, Tokyo, Japan, 29.11.-4.12.2016.

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5.1.8. Presentations in media

18.12. ČRo: Den podle... [Day according to...] (26:42 - 32:02)

04.12. ČRo: Noční Mikrofórum: host Romana Lehmannová, cestovatelka, dokumentaristka, autorka dokumentu "Co se děje za polárním kruhem" [Noční Mikrofórum: guest Romana Lehmannová, traveller, documentary, author of document "What happens beyond the Arctic Circle"]

04.12. ČRo: Lidé se tam nerodí, ani nepohřbívají. A vědci tam chodí jen se zbraní... Dokument z míst, kam se nepodíváte [Preople are not born or burried there. And the scientists walk with gun only... Document from a place whither you will not see]

18.10. ČRo: Arktida taje a zelená. Budeme na ní žít, nebo o ni válčit? [Arctic is melting and getting green. Will we live there, or fight for it]?

18.10. ČRo: Dobývání Arktidy je symbolem lidského egoismu, říká skotská malířka Georgia Rose Murray [Explorationof the Arctic is a symbol of human egoism, Scottish landscape painter Georgia Rose tells]

18.09. ČRo: Arktická expedice Romany Lehmannové [Romana Lehmannová's Arctic Expedition]

18.07. ČRo: Nahlédněte s námi do výzkumů českých polárníků na Špicberkách! [Look at research of Czech explorers in Svalbard!]

13.07. ČRo: Reportérka v Arktidě: rejnočí řízky! Nová vanoční tradice bez kostí [Reporter in the Arctic: ray steaks! New Christmas tradition without bones]

5.2. External Infrastructure users

5.2.1. Journal articles

Trnková K., Barták M. (2016) Desiccation-induced changes in photochemical processes of photosynthesis and spectral reflectance in Nostoc commune (Cyanobacteria, Nostocales) colonies from polar regions. Phycological Research 64(4): doi:10.1111/pre.12157 IF=1.420

Zawierucha K., Ostrowska M., Vonnahme T.R., Devetter A.M., Nawrot P., Lehmann S., Kolicka M. (2016). Diversity and distribution of Tardigrada in Arctic cryoconite holes, Journal of Limnology 75(3): 545-559.
doi: 10.4081/jlimnol.2016.1453. IF=1.725

Zawierucha K., Vonnahme T.R., Devetter M., Kolicka M., Ostrowska M., Chmielewski S., Kosicki J.Z. (2016) Area, depth and elevation of cryoconite holes in the Arctic do not influence Tardigrada densities. Polish Polar Research, 37(2): 325-334.
doi: 10.1515/popore-2016-0009. IF = 1.182

5.2.2. Theses

Raabová L. (2016) Diversity and molecular identification of cyanobacteria and algae in selected polar biotops- polyphasic approache. [Dissertation thesis]. Commenius University in Bratislava. Faculty of Natural Sciences. Department of Botany, Bratislava, 135 pp

5.2.3. Conference proceedings/Conference abstracts books

Strunecký O., Raabová, L., Kováčik, L., Komárek J. (2016) Review of thin (< 5µm) filamentous cyanobacteria from both polar regions based on morphological and molecular data In: Kavan J., Bernardová J. (eds.): Polar Ecology Conference 2016. Přírodovědecká fakulta, Jihočeská univerzita v Českých Budějovicích, České Budějovice, p. 113-114.

Uxa T., Mida P., Křížek M. (2016):Distribution and Morphology of Sorted Circles and Polygons in the Northern Billefjorden. In: Günther F., Morgenstern A. (eds) XI. International Conference on Permafrost – Book of Abstracts. 20–24 June 2016, Potsdam, Germany, Bibliothek Wissenschaftspark Albert Einstein; 101–102.
doi: 10.2312/GFZ.LIS.2016.001.

5.2.4. Popularizing articles

Vejřík L., (2016) Daleko na severu a ještě mnohem dál. Rybářství 2016/5: 76-79.

Zeman P., Kubíček O. (2016) Jak se nakládá s odpady v extrémních podmínkách Svalbardu? Ekolisty.cz ISSN 1802-9019 (http://ekolist.cz/cz/publicistika/priroda/jak-se-naklada-s-odpady-v-extremnich-podminkach-svalbardu, published on-line 15/09/20106, accessed on 09/01/2017).

5.2.5. Conference participations

Strunecký O., Raabová, L., Kováčik, L., Komárek J.: Review of thin (< 5µm) filamentous cyanobacteria from both polar regions based on morphological and molecular data. Polar Ecology Conference 2016, České Budějovice, Česká republika, 19-21.9.2016.

Uxa, T., Mida, P., Křížek, M. (2016): Distribution and morphology of sorted circles and polygons in the Northern Billefjorden. In XI. International Conference on Permafrost, Potsdam, Germany, 20–24.6.2016.

5.2.6. Other

Střítecká M. (2016) Sledování filtrační aktivity vířníků a želvušek v kryokonitech. Seminární práce Česko-anglické gymnázium, České Budějovice, 28p.