

SPITZBERGENER ZEITUNG

SEPTEMBER - NOVEMBER 2005

BERICHTE VON DER DEUTSCH-FRANZÖSISCHEN FORSCHUNGSBASIS AWIPEV IN NY-ÅLESUND - SPITZBERGEN / NORWEGEN
ALFRED-WEGENER-INSTITUT FÜR POLAR- UND MEERESFORSCHUNG - INSTITUT POLAIRE FRANÇAIS PAUL ÉMILE VICTOR

Station engineer replacement

We experienced already the first snow storm this year with more than 25 m/s. We arranged this for our new station engineer Kai Marholdt who arrived on the 21st of august by boat Nordstjernen. With these weather conditions he already could accustomed himself to harsh conditions during the coming winter. Joann Schmid, the station engineer during 2004/2005, has shown that this might not be so hard than expected. Instead, for him it seemed an easy task. Whenever he could arrange with his demanding job in the observatory, he went out by ski, on his feet, by boat or by snowmobile. It is a pleasure working with him and it is not exaggerated that at least all people that like outdoor activity in Ny-Ålesund will miss him a lot. Beside the colleagues, which are convinced about the good work he carried out. Probably no one else has seen a faster burlled bowline knot than the one he performed with the overdimensioned winter gloves.

Good luck and thank you for the time we spent together up here, Joann!



Joann Schmid used these gloves to burl the fastest bowline knot ever (Lena Brey)

Kai Marholdt used the ship in August to travel to the research base and got used to the life up here very quickly. He went on a kayak tour in the very first days and waits desperately for his own kayak to come up in spring 2006.



Kai Marholdt surprises the local inhabitants - Katrine Røtnes - by speaking Norwegian

John Longyear and Charles Langmuir - A very personal view

John M. Longyear was a business man and mine owner from Michigan, USA, and he was also the leading pioneer of coal-mining on Svalbard. More than hundred years ago, in 1904, he bought coal field properties on Spitsbergen, which were extended during an expedition led by his cousin William D. Munroe in 1905. Munroe founded Longyear as a small settlement consisting of few buildings in 1906, and gratefully he gave his uncle's name to this new village at the Arctic gateway of northernmost Europe.

More than 30 years later, in 1938, the US American engineering scientist Charles Langmuir first reported on helical, convergent pairs of wind-parallel prograding vortices in the upper water column, which he investigated in the Atlantic Ocean and in tank experiments. The surface convergent zones of such counter rotating cell pairs are indicated by long extended streaks of floaters like foam, bubbles, seaweed, algae or fragile ice (Figure 1).



Fig. 1: Langmuir circulation in Ny-Ålesund port indicated by wind parallel surface streaks of foam.

Later, other scientists referred to this phenomenon proposed by pioneering Charles Langmuir. They gave more detailed face to this oceanographic mechanism conducting tank experiments, field investigations, mathematical approaches and modelling efforts. Thus, the standing term 'Langmuir circulation' (Lc) was born. Lc has enormous potential for the downward transport of momentum in the water column and, thus, wide influence on various processes like vertical heat and particle transport, oxygen ventilation, distribution and dislocation of planctic organisms, frazil formation and, finally, the entrainment of particles into newly forming ice.



Fig. 2: Outdoor tank experiment to investigate Langmuir circulation parallelized to the natural occurrence of Lc indicated by streaks of surface floaters off Ny Alesund port.

Reading this brief note, the following question will probably rise in the reader's mind: What do these two pioneers on their very particular fields may have in common so that the author refers to them? The answer is: Both men significantly pushed forward boundaries on their proper fields in ancient times, which today in combination has great consequences for the scientific work of the writer of these lines! Without having modern Longyear available as one of today's most important logistic and skylifting turntables to the north of Svalbard (like to the Arctic research station at Ny-Ålesund), the author would not have successfully run his experimental field work (Figure 2) once inspired by the ground breaking oceanographic findings of C. Langmuir. In that sense, for his present research on Svalbard, the author is grateful to both John Longyear and Charles Langmuir and their former individual pioneering efforts.

The observations and results of my little research project indicate that Lc may have also great influence on the above mentioned processes in shallow Kongsfjorden littoral water.

In conclusion, the author's studies at Ny-Ålesund probably would not have been conducted if Munro Longyear would not have given his business knowledge to drive his cousin towards extending the coal mining on Svalbard and (and finally to found the small village Longyear), and if Charles Langmuir would not have given me the inspiration to investigate Langmuir circulation in high Arctic coastal waters.

Dirk Dethleff
Institute for Polar Ecology,
Kiel, Germany

Herzlichen Glückwunsch Frau Doktor!

Mareile Wolff war die Stationsleiterin der Koldewey-Station 2001-2002. Am 28. Oktober 2005 hat sie nun erfolgreich ihre Doktorarbeit in Meteorologie mit dem

Titel „Development of a novel balloon-borne optical sonde for the measurement of ozone and other stratospheric trace gases“ abgeschlossen. Wir gratulieren ganz herzlich aus der Ferne.



Doktorhut von Mareile - zum Glück kommt erst jetzt der Eisbär um die Ecke geschlichen... (Photo von Jens Kube - auch ehemaliger Stationsleiter)

Klingons go north or Lipids in an Arctic marine food chain represented by pteropods and ctenophores

During summer most of the inhabitants of Ny-Ålesund are cruising every day through Kongsfjorden for scientific purpose or taking off for a hytta tour on weekend. They are not aware that there are millions of inhabitants living below the water surface. These organisms are belonging to the marine zooplankton including many taxa and species. Few of them could easily be seen from a small boat or in the harbour.

Our goal during 6 weeks stay at Koldewey was to investigate a specific food chain in the pelagic foodweb represented by ctenophores and pteropods by means of lipid and fatty acid trophic marker as well as stable isotopes

The pteropod *Clione limacina* is the most abundant non-shelled (gymnosomatous) pteropod of the pelagic food web in temperate and polar waters. It is

recognized as an important food for baleen whales and some fish.

In Arctic waters, *Clione limacina* is found throughout the central Arctic Ocean, and its distribution extends southwards into sub-Arctic waters in both the North Atlantic and the North Pacific to approximately 30° to 40° N.



Clione limacina (max -85mm)

Because many of the people at the Koldewey station had some difficulties to recall the species name *Clione limacina* a short form or nickname was immediately established: Klingons.

Klingons are remarkably skilled hunters, relying on their keen olfactory senses to pick up and stalk their prey. They eat their meat raw, seasoned more strongly than humans prefer, and find the human tradition of "burning their meat" to be somewhat repulsive. Moreover Klingons food consists of crude vegetables, worms and entrails. Klingons prefer their meal simmered or raw. A meal, which put on the table, twitching and screaming hit the Klingons common consent. Onto the table a various number of small dishes are placed, from which the guest are taking the food with their fingers.

As Klingones do, *Clione limacina* likes raw meat. Feeding studies have revealed that *Clione limacina* feeds exclusively on the cosome *Limacina helicina* in polar waters. When *Clione limacina* makes contact with its prey it rapidly everts a set of six buccal cones, which are in fact eversible tentacles, which grab the shell of *Limacina helicina* and turn it around until

its shell opening is facing the mouth of *Clione limacina*.



Photo by, Y.kitaguchi

Limacina helicina (max-10mm)

At this stage large chitinous hooks are everted from a pair of sacs, called hook sacs, and grasp the prey animal. It takes about 30-45 minutes for *Clione limacina* to pull *Limacina helicina* out of its shell and to swallow it whole. At this point it drops the empty shell. Is this less barbarous than Klingon behavior??



Mertensia ovum (max-80mm)

Clione limacina is producing unusual lipids (1-o-Alkyl-diacylglycerol ether (DAGE)) and odd chain fatty acids. These components are absent in the prey organisms. So, in the new marine laboratory we carried out experiments in order to understand the biosynthesis and metabolism of these unusual lipids. One of the most conspicuous features of the ocean

is the periodical occurrence of large gelatinous zooplankton. In fjords and estuaries, jellyfish can be so abundant that they overcrowd the sea.

The ctenophore *Mertensia ovum* are a significant predator of other zooplankton species in the pelagic marine food chain. *Mertensia ovum* uses its extensive tentacles to entrap and ingest prey. Only few studies have reported on lipids and fatty acids of ctenophores in polar waters. Several authors determined high proportions of wax esters in *Mertensia ovum* from the Arctic. According to the analysis of fatty acid trophic markers, the major prey for *M. ovum* are herbivorous zooplankton, e.g. *Calanus* species.



Calanus hyperboreus (max-5mm)

A further food chain we are investigating here, consist of copepods and ctenophores (jellyfish). Our objective is to follow the transfer of lipids from calanoid copepods to *Mertensia ovum* in order to describe the reconversion of wax esters and the fate of long-chain fatty alcohols of zooplankton origin.

Martin Graeve

Brief report on AWIPEV-INVEST, September 12-22, 2005

In order to learn more about sedimentological-biological processes, and finally sea ice-sediment interactions in the shallow marine environment of Kongsfjorden, various pre-investigative field campaigns and tank experiments were

conducted at Ny-Ålesund, Spitsbergen, during AWIPEV-INVEST in late fall 2005 from September 12-22.

Mostly fine-grained particles were sampled in the Bayelva river delta and in the shallow adjacent Kolhamnalaguna in suspended particulate material (SPM) and bottom sediments. Furthermore, SPM, bottom sediments and sediment trap material were obtained NW off Brandalpynten. In addition, several outdoor tank experiments were conducted under freezing and non-freezing conditions. In the experiments, tank floor sediments and particle covered algae were exposed to wind-wave-induced turbulences to learn more about sediment and algae behavior in ice free conditions and during ice formation.

A preliminary and very general sedimentological overview indicates that around Bayelva river delta, Kolhamnalaguna and Brandalpynten, bottom sediments and SPM are temporarily influenced by red-brown, fine-grained debris material probably discharged by the Bayelva river.

Various dead and alive macroalgae sampled in a temporary shallow laguna in the Bayelva river mouth, in Kolhamnalaguna and in Thiisbukta partly show brownish coatings consisting of fine grained rock particles and organic flocs. The red-brown color and the fine grain-size indicate that the coatings may consist of terrestrial rock debris from Bayelva river coagulating with marine organic flocs.

Tank experiment results indicate that fine grained particles (discharged from the Bayelva river) may be transported on the sea floor by wind-wave induced turbulence in shallow water, and may finally be incorporated into newly forming ice under turbulent flow conditions by Langmuir circulation. This assumption was varified from ice samples obtained in a small laguna in the Bayelva river mouth. Salinity measurement (about 6 psu) indicates that the ice was rather formed of brackish water

with a salinity of about 20. Patchy distributed inclusions of extremely fine grained, red-brown particles were visible in the ice (Fig. 1).



Fig. 1: Laguna ice with patchy sediment inclusions.

The small grain size of the particles points to turbulent entrainment of bottom material from the Bayelva delta into forming ice under stormy conditions. This is known from different ice studies in the Siberian and central Arctic, from Lake Hattie, WY, USA, and from freezing laboratory tank experiments.

ADCP recordings from inner Kolhamnalaguna (4-5m water depth) on turbulent Langmuir circulation will soon be processed for detection of small scale vertical turbulence in the shallow water column. The results may potentially give indications for vertical partial dynamics in the shallow water column under non freezing conditions, which may be extrapolated to the early winter freeze-up scenario.

Dirk Dethleff
Institute for Polar Ecology,
Kiel, Germany

Die Nikoläuse

Endlich, endlich ist es so weit. Wir haben tonnenweise Schnee, tausende von Sternen und grünes Polarlicht. Nun hatten nur noch die dutzend Pakete gefehlt, die wir auspacken können um uns schon mal auf die vorweihnachtliche Dezemberzeit zu

freuen. Der grosse Container kam am 24. November an. Zarges-Kisten, wissenschaftliches Equipment und viele Kartons warteten darauf herumgeschleppt, ausgepackt, registriert und verstaut zu werden. Ausserdem hatte die Potsdamer Gruppe uns ein Paket mit Sondierungsmaterial zugeschickt. Es waren genau 24 Ersatzteile plus eine Spezial-Ozonsonde für die Adventszeit.



24 Ersatzteile für die täglichen Wetterballon-Aufstiege und Ozonsonden

Aber oh je! Es fehlten immer noch passende warme Mützen für die Adventszeit. Da kam einen Tag später das Paket mit den roten Mützen gerade recht! Die Stations-Nikoläuse freuen sich jetzt bereits auf viele Sondierungstage...



Die Stations-Nikoläuse Anne und Kai

Rätsel - riddle

Solution for the July-August riddle:

Who was the first woman on which research vessel for an expedition to Svalbard?

Leonie d'Aunet - she was 19 years old and the wife of the artist François Biard on board.



Leonie d'Aunet

She wrote the book "Voyage d'une femme au Spitzberg" about the two years expedition starting in 1839 with the research vessel **La Recherche**.



Winter Riddle

Ebeltoftamna ist eine kleine Bucht im Krossfjorden nördlich von Ny-Ålesund. Ein Kulturdenkmal befindet sich in Ebeltoftamna. Was befand sich in den Jahren 1910-1914 in der kleinen Bucht? Welcher Wissenschaftler hat sich dort 1911 und 1912 aufgehalten?

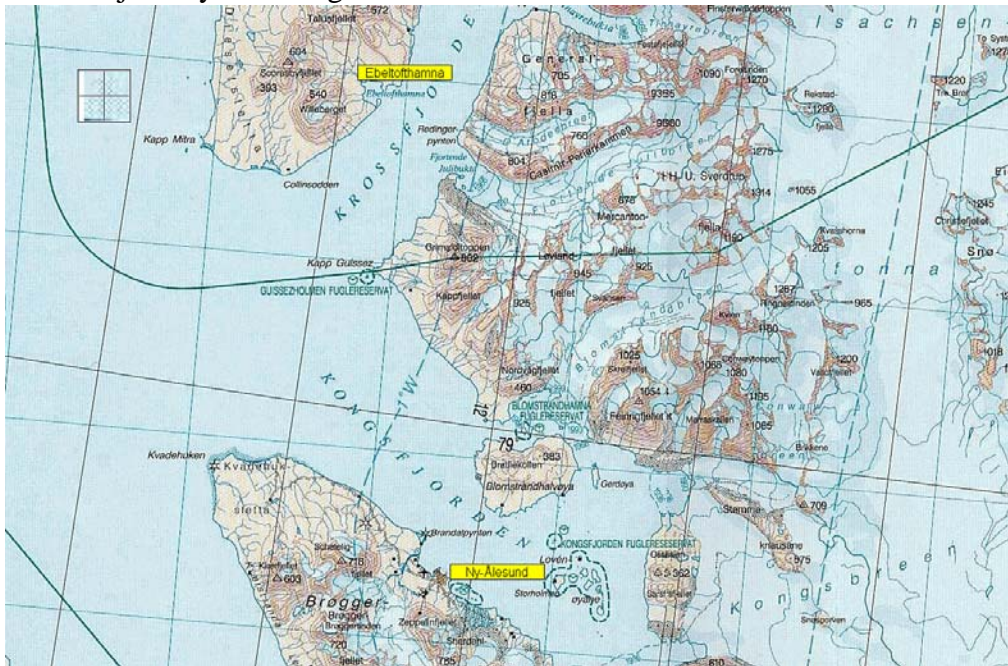
Ebeltoftamna is a little bay in Krossfjorden north of Ny-Ålesund. A cultural monument is located in Ebeltoftamna. Which facility was established in the little bay during the years

1910-1914 and which scientist stayed there in 1911 and 1912?

one of 3 surprise packages.

Die richtige Lösung bitte bis 15. Januar an die SpitZe-Redaktion senden. Zu gewinnen gibt es drei Überraschungspakete.

Please, send your answer to the research base until 15th of January. You might win



Address:



N – 9173 Ny-Ålesund/ Spitzbergen – Norge

e-mail: station@awi-koldewey.no

Martin Graeve
Ulrich Kunz
Jörg Plagge
Mara Schmiing
Ricardo Sahade
Jose Velez

Ansgar Gruber
Jürgen Laudien
Max Schwanitz
Philipp Schubert
Anne Theuerkauf
Christian Wecke

Base Personnel:

Anne Hormes
Joann Schmid

Kai Marholdt

At the base in September - November

Ingo Beninga
Ellen Damm
Carsten Falck

Lena Brey
Dirk Dethleff
Jürgen Graeser



Panorama over Kongsfjord and Ny-Ålesund with Zeppelin mountain (Joann Schmid)