

Project information

Keywords

Plankton, Meroplankton, Arctic, Coast

Project title

Meroplankton biodiversity, seasonal dynamics and function in high latitude coastal ecosystems

Year

2017

Project leader

Janne E. Søreide

Geographical localization of the research project in decimal degrees (max 5 per project, ex. 70,662°N and 23,707°E)

Isfjorden Adventfjorden Time series station (Stn. IsA): 78.261 N; 15.535 E Fuglefjellet (Stn. S2): 78.188 N; 15.145 E Bohemanneset (Stn. N1): 78.380 N; 14.702 E New site –East Svalbard (Inglefielbukta): 77.893°N, 18.310°Ø

Participants

Janne E. Søreide– project leader (University Centre in Svalbard)

Tove M. Gabrielsen (University Centre in Svalbard)

Claudia Halsband (Akvaplan-niva);

Agata Weydmann (University of Gdańsk);

Marta Ronowicz and Piotr Kukliński (Institute of Oceanology PAS)

New from 2017/2018: Sebastian Gerland (Norwegian Polar Institute)

Flagship

Fjord and Coast

Summary of Results

The project has run according to plan and beyond by expanding it to also include tiny organisms living inside the sea ice (sympagic fauna) which primarily comprise of benthic larvae in seasonal sea ice. Extensive field weekly sampling was conducted in the ice free Adventfjorden (Stn. IsA) with comparative parallel studies in Van Mijenfjorden - a seasonal ice covered fjord. Preliminary results shows that the zooplankton community in ice free versus seasonal ice covered fjords are not that different in species composition, but that ice free fjords has a much higher total zooplankton and meroplankton abundance. In both fjords, cirripedia totally dominated the meroplankton fraction, peaking at the same time at the onset of the phytoplankton bloom in both fjords. Molecular analyses revealed that cirripedia mainly comprised of one species (*Balanus balanus*) and have a pelagic duration of 6 to 8 weeks before settling and grazing experiments suggest them to be important grazers in coastal waters.

Master and PhD-students involved in the project

Katarzyna Walczyńska, PhD student, Gdansk University and UNIS – molecular work

Eike I. Stübner, Phd student, meroplankton – successfully defended her thesis Dec. 2016

Helena Cuny, MsC student, UNIS – zooplankton community in ice-free vs. ice covered fjord

Hela Øen Åsnes, Bsc student, UiB and UNIS – zooplankton with focus on meroplankton

Vanessa Pitusi, MSc student, UiT and UNIS – sympagic meiofauna

Magnus Heide Jørgensen, MSc student, UiB and UNIS – sympagic meiofauna

Margot Ulfsdatter Nyeggen, MSc, UiB and UNIS - Coastal zooplankton dynamics in Svalbard

Anna Sowa, MSc, GU (Poland) - epifaunal recruitment on experimental panels in Isfjorden

Zuzanna Jaskólkowska, BSc, GU (Poland) - Meroplankton variability close to bottom in Isfjorden
For the Management

First of all this project gives new important knowledge on biodiversity and ecosystem functioning in Arctic coastal regions. Benthic invertebrates and their larvae are important prey items for several species of anadromous and marine fish, sea- and tundra birds in Arctic coastal waters. In the Meroplankton project we have now followed the seasonal dynamics of these benthic larvae. So far our results suggest that local production is very important and that the entire period from mid-April to late August is a period of intense benthic reproduction. During this time period coastal ecosystems are particularly vulnerable for disturbances.

Published Results/Planned Publications

Marquardt et al. (Subm.) Pan-Arctic distribution of the hydrozoan *Sympagohydra tuuli*? – First record in sea ice from Svalbard (European Arctic). *Polar Biology*.

Stübner et al. Timing of meroplankton in different Arctic primary production regimes.

Ostaszewska et al. Seasonal shifts in *Oithona similis* copepodid structure in a sub-Arctic fjord.

Dmoch et al. Seasonal and inter-annual dynamics in high-Arctic zooplankton communities.

Walczyńska et al. Cirripedia timing, duration and ecological role in Arctic coastal regions.

Communicated Results

Kuklinski P, Weydmann A, Walczyńska K, Balazy P, Søreide J, Gabrielsen, T, Halsband C, Ronowicz, M. LARVAE - Linking Annual cycle of Reproduction and recruitment to environmental variables in Arctic Epifauna – overview of the project. 14th Larwood Symposium, Vienna, Austria, 25-27 May 2017 - oral presentation

Søreide JE (2017) Meroplankton biodiversity, seasonal dynamics and function in high latitude coastal ecosystems. Fjord and Coast annual meeting, 17-18 October, Sommarøy, Tromsø.

*Polar2018, Davos Three planned meroplankton presentations

Outreach/ Popular science:

Kuklinski P, Balazy P (2017) Longyearbyen - Life beneath the waves. A celebration of the marine life in the heart of Svalbard. Institute of Oceanology, Polish Academy of Sciences, Gdańsk, ISBN 978-83-941037-7-4, 104 pp.

Citizen Science at MS Fram (Hurtigruten AS). UNIS has established a cooperation with Hurtigruten AS and will every summer join the cruises that circumnavigate Svalbard. Here UNIS researches and students will sample hydrography and plankton for research and do outreach. First trip was successfully conducted in Aug. 2017 and in Nov. 2017 UNIS got funding from Svalbard Miljøvernfond to support this work.

Marine biodiversity exhibition (algae, macroalgae and live invertebrates and fish) for kinder gardens in Longyearbyen at UNIS (May) Resulted in a 2 pages reportage in the newspaper Klassekampen.

UNIS open day 25 November. Plankton exhibition (live organisms) for everyone interested both children and adults.

Interdisciplinary Cooperation

This project consists of a multi-disciplinary team of international and national collaborators which bring new expertise in taxonomy and ecosystem understanding, novel methodology within molecular work and image analyses at the Fram Centre. New from 2017 is also the cooperation with sea ice physicists at the Norwegian Polar Institute (Sebastian Gerland). Improved knowledge of the biodiversity, seasonal dynamics and functionality of the understudied meroplankton will also be vital for the management of shallow benthic high-latitude communities (see 10).

The data collected in this project are valuable contributions to our newly established seasonal time series on hydrography and plankton in Isfjorden: Isfjorden Marine Observatory System (IMOS), funded by the Norwegian Research Council 2015-2018. In 2017 we also joined the fieldwork to the NRC funded project Faabulous (Future Arctic Algae Blooms – and their role in the context of climate change), led by APN (Eva Leu), conducting a seasonal plankton and sympagic meiofauna study in Van Mijenfjorden (ice covered) and Adventfjorden (ice free) with additional support from Arctic Field Grants for the MSc students that participated.

Budget in accordance to results

350 KNOK from Fram Centre, manpower and field support from the Polish funded LARVEA project (~250 KNOK in 2017). Field support from the NRC funded project Isfjorden Marine Observatory System (~100 KNOK in 2017). UNIS support in form of manpower and lab facilities (~100 KNOK in 2017).

Could results from the project be subject for any commercial utilization

No

Conclusions

This project is going according to plan and has resulted in many interesting master and bachelor theses in addition to related spin-off projects focusing on Arctic coastal ecosystems and management of these.