

information

Keywords

Biodiversity, climate indicator species, ecology, physiology, sea ice biology

Project title

Ice-Free Arctic Ocean: Dead end or new opportunities for biodiversity and habitat Expansion (FADE)

Year

2019

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)

N-Ice drift from February to June 2015, North of Svalbard (80.5°-83.2°N, 05.1°-25.5°E) Nansen Legacy transect, Northern Barents Sea (75.5-83.3°N, 31-34°E) MOSAiC transpolar drift 2019-2020 Storfjorden/Inglefieldbukta 77.899°N, 18.301°E and Van Mijenfjorden 77.854°N, 16.738°E

Participants

- The University Centre in Svalbard, project leader: Janne E. Søreide (janne.soreide@unis.no), Anna Vader
- Norwegian Polar institute (NPI); Haakon Hop (haakon.hop@npolar.no), Anette Wold
- UiT the Arctic University of Norway (UiT): Malin Daase (malin.daase@uit.no), Rolf Gradinger
- Other national partners: Marvin Choquet, Nord University, Norway
- International partners: Ksenia Kosobokova; Shirshov Institute of Oceanology Russian Academy of Sciences, Moscow, Russia, Gerald Darnis, Université Laval, Québec, Canada; Barbara Niehoff, Alfred Wegener Institute, Bremerhaven, Germany
- Administrative responsible: Harald Ellingsen (Harald.Ellingsen@unis.no)

Flagship

Arctic Ocean

Funding Source

Project partners contribute with ca 3 weeks salary in kind every year. The project data has been collected through several smaller and larger field campaigns which have been funded through other projects.

Summary of Results

Project started this year and it is a 3 years project if funding is provided also in 2020 and 2021.

Project kickoff meeting at 21.03.2019 where priorities were made for 2019. Project is going according to plan, with one exception: our July cruise to the Arctic Ocean North of Svalbard with RV Kronprins Haakon got cancelled only 2 weeks prior to departure due to damages on the ship. Several of the project partners planned to go on that cruise: Malin Daase, Janne E. Søreide, Gerald Darnis and Marvin Choquet. This cancellation has made to some budget changes. Now most 2019 funding goes to analyses of already existing samples and personell to analyse and write up existing data and to publish student theses work.

Results so far:

Two master students have successfully defended their theses on sympagic meiofauna (with best grade possible) and they are currently writing their theses into papers for publications.

Main results: In Van Mijenfjorden, 13 metazoan taxa were identified from the ice and 15 taxa from the water column with low abundances of dominant ice fauna in the water samples. Total sympagic metazoan abundance peaked in late April with over 25,000 ind m⁻², due to the reproduction of ice-associated nematodes.

Molecular analysis indicated the presence of two polychaete species not yet considered to be sympagic, *Melaenis loveni* and a *Spio* sp., and at least two nematode species not priory described from Svalbard sea ice. The finding of *M. loveni* challenges the presumption of *Scolecopsis squamata* as the resident sympagic polychaete in Svalbard. The nematodes collected in this study likely provide the first molecular evidence for *Theristus melnikovi* and possibly the first sign of an Arctic sympagic species within the genus Halomonhystera.

One PhD student submitted her thesis this September with tentative defense date 20.11.2019. She is the lead author on one FADE manuscript there *Calanus* data from N-Ice and Isfjorden is compared. We aim to submit this manuscript by the end of the year.

Main results:

Adult males and females of *C. glacialis* appeared as early as December-January, up to two months earlier than in *C. finmarchicus*, with a corresponding 1 month earlier peak in recruitment for *C. glacialis*. The seasonal regulation of anabolic and catabolic enzyme activities were overall similar for the two species, but with some ontogenetic species specific differences. Wake-up from overwintering and reproduction started earlier in adults of *C. glacialis* than *C. finmarchicus*, and onset of dormancy earlier for the overwintering stages of both species. Furthermore, *C. glacialis* was found to be more specialized in efficiently building up lipids, as reflected by an earlier and higher mobilization of lipase enzyme activities.

FADE prioritize to write up already existing data in 2019 and molecular analyses of N-Ice zooplankton samples is the next priority.

Master and PhD-students involved in the project

Vanessa Pitusi (MSc)

Magnus H. Andreasen (MSc)

Maja K. Hatlebakk (PhD)

For the Management

Will be addressed in the annual report in January 2020 and not in this first year progress report.

Published Results/Planned Publications

MSc theses:

Pitusi V (2019) Seasonal abundance and activity of sympagic meiofauna in Van Mijenfjorden, Svalbard. MSc thesis, UiT the Arctic University of Norway and the University Centre in Svalbard, 75 pp. Supervisors: Rolf Gradinger (UiT) and Janne E. Søreide (UNIS)

Andreasen MH (2019) Community composition, population structure and phylogeny of coastal sympagic meiofauna in eastern Svalbard. University of Bergen and the University Centre in Svalbard. Supervisors Lise Øverås (UiB) and Janne E. Søreide (UNIS)

PhD thesis

Hatlebakk MK (2019) New insights into *Calanus glacialis* and *C. finmarchicus* distributions, life histories and physiology in high-latitude seas. PhD thesis, Nord University and the University Centre in Svalbard.

Talks

Hop H, Wold A, Søreide JE, Hatlebakk MKV, Meyer A, Vihtakari M, Bailey A, Assmy P, Mundy CJ (2019) Zooplankton ascent and reproduction below drifting sea ice after winter in the Arctic Ocean.

Wold A, Hop H, Søreide JE, Hatlebakk MKV, Meyer A, Vihtakari M, Bailey A (2019) Awakening of zooplankton below drifting sea ice after a dark winter in the Arctic Ocean. IMBER, June 2019.

Manuscripts prepared 2019

Wold A, Hop H, Søreide JE, Hatlebakk MKV, Meyer A, Vihtakari M, Bailey A (in prep) Awakening of zooplankton below drifting sea ice after a dark winter in the Arctic Ocean.

Hatlebakk M, Niehoff B, Eide H, Daase M, Choquet M, Hoarau G, Søreide JE. (in prep)
Seasonal changes in population dynamics and enzyme activity of *C. glacialis* and *C. finmarchicus* in the high Arctic.
Manuscript (submitted as part of PhD thesis to Hatlebakk).

Choquet M, Burckard G, Skreslet S, **Hoarau G**, **Søreide JE** (in prep.) No evidence for hybridization between *Calanus finmarchicus* and *C. glacialis* in sympatric areas. *Published as part of Choquet's PhD thesis*

Communicated Results

See above. In addition, the work has been extensively communicated in UNIS regular student courses.

Interdisciplinary Cooperation

Yes between “traditional” and molecular biologists which make it possible to reveal species identity of sympatric meiofauna which is poorly known and to correctly species identify *Calanus* – regarded as important climate indicator species

Budget in accordance to results

Project is going according to plan, with one exception: our July cruise to the Arctic Ocean North of Svalbard with RV Kronprins Haakon got cancelled only 2 weeks prior to departure due to damages on the ship. Several of the project partners planned to go on that cruise: Malin Daase, Janne E. Søreide, Gerald Darnis and Marvin Choquet. This cancellation has made to some budget changes. Now most 2019 funding goes to analyses of already existing samples and personell to analyse and write up existing data and to publish student theses work.

Could results from the project be subject for any commercial utilization

No

Conclusions

One deviations from the original project plan; cancellation of the July cruise with RV Kronprins Haakon. Otherwise the project proceed according to plan with main focus on analyse already collected samples and to write up existing data for publications.