

Project information

Keywords

Integrated Ecosystem Assessment (IEA), Svalbard, northern Barents Sea, Ecosystem Functioning, Vulnerability, Fish and Benthos, Climate, Trait-based Methods, Food Web Analyses

Project title

Assessment of ecosystem vulnerability and functioning in ice-affected waters (ICEEVA)

Year

2017

Project leader

Lis L. Jørgensen, Raul primicerio

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

76°N – 84°N and 05°E – 35°E

Participants

Project leader(s)/institutions: Lis Lindal Jørgensen (Institute of Marine Research) and Raul Primicerio (University of Tromsø)

Project participants/institutions:

o Institute of Marine Research, Lis L. Jørgensen lis.lindal.joergensen@imr.no (PL and benthos), Maria Fossheim (demersal fish), Harald Gjøsæter (demersal and pelagic fish), Randi Ingvaldsen (oceanography, lead SI_Arctic), Kirsteen McKenzie (stable isotope analyses)
o University of Tromsø, Raul Primicerio raul.primicerio@uit.no (co-PL and synthesis method), Bodil Bluhm (benthos), master student (stable isotope analyses)

o UNIS & Akvaplan-NIVA: Øystein Varpe oystein.varpe@unis.no (pelagic fish)

• Administrative responsible for lead institution: Frode Vikebø frode.vikeboe@imr.no (Head of Research Program, IMR) and Terje Aspen, terje.aspen@uit.no (Head of Department, UoT)

Flagship

Arctic Ocean

Funding Source

	2017	2018	2010
Arctic Ocean Flagship	500	500	500
Other Flagships	1000		
SI_Arctic 201418 (NRC SIP)	4820	4820	

Summary of Results

The project aims to provide an integrated assessment of the functioning and vulnerability of the southern reaches of the Arctic ocean ecosystem under climate change. The main objectives are: 1) characterize ecosystem functioning along depth gradients crossing Arctic and Atlantic water masses; 2) assess temporal changes in ecosystem functioning driven by climate warming; 3) investigate spatio-temporal variation in ecosystem vulnerability.

In 2017 we participated with results in the WGIBAR (Murmansk/Russia march 2017) ICES working group meetings where figures from the Barents Sea function based on trait analyses was published.

In 2017 we also had three workshops identifying 1) what data and knowledge was available 2) what methods to use, including trait analyses, and 3) formulation of "R" script and the first making of tentative maps (fig 1) of benthos (left) and fish (right) communities which will make up the baseline data for trait analyses in 2018.

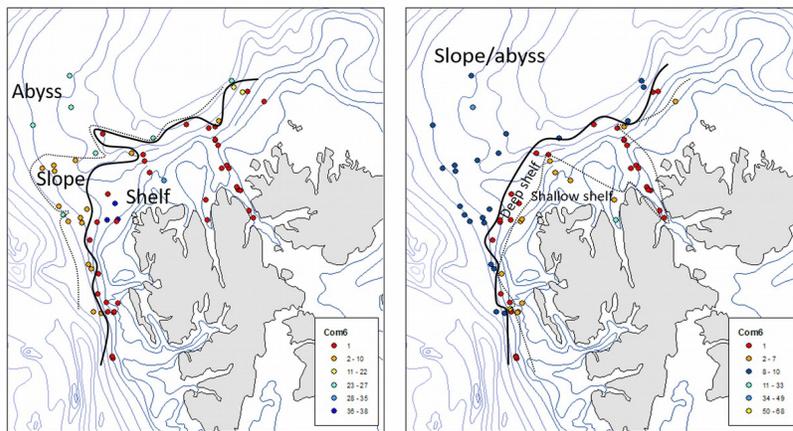


Figure 1. Benthos (left) and fish (right) communities given as color coded circles.

Three possible papers were outlined

- 1) Jørgensen et al. Arctic integrated faunal communities.
- 2) McKenzie et al. Faunal isotope compartments/communities
- 3) Blanchet, Primicerio, et al. Topology and foodwebs

Master and PhD-students involved in the project

The project involve:

Ella Weissenberg (masterstudent at UNIS/Øystein Varpe and IMR/ Tor Knutsen:

«Spatial structures of a high-Arctic marine zooplankton community”.

Ann Mikaela Tillman (masterstudent at UiT/Bodil Bluhm and IMR/Lis L. Jørgensen:

"Stable isotops analyses of Arctic food-webs"

one master student (supervised by Bodil Bluhm), working with stable isotope analyses at UoT. The master student will work closely with PostDoc Kirsteen McKenzie at IMR.

For the Management

The project addresses ecosystem functioning and vulnerability empirically, combining trait-based methods with food web analyses and stable isotope analyses of main energy pathways using ecosystem data from the southern Arctic Ocean and bordering Arctic reaches of the Barents Sea. The main findings will be summarized in maps visualizing areal specific ecosystem vulnerability indicators, suitable to inform areal management (e.g. Norwegian management of the Barents Sea), and to international working groups within ICES and the Arctic Council.

Our project will contribute to an Integrated Ecosystem Assessment (IEA) of the marine areas north and west of Svalbard and the northern Barents Sea, by evaluating ecosystem functioning and the vulnerability of ecosystem components (fish and benthos) affected by climate change. The findings are, and will be continuously communicated to the ICES (institution responsible for inter-governmental management of marine resources) by the project participants via dedicated working groups. The integrative approach to ecosystem assessment developed in this project can be further used to address other ecosystem components (e.g. marine mammals and seabirds),

other stressors and expanded areas (i.e. the entire Arctic Ocean) of interest for international working groups within Arctic Council (see publication list). This project will thus contribute to the knowledge base necessary to develop an IEA for the entire Arctic Ocean.

Published Results/Planned Publications

Jørgensen (2017) Trawl and temperature pressure on Barents benthos. FEATURE ARTICLE – ICES, 11 July 2017.

Jørgensen, LL., Archambault P., Blicher M., Denisenko N., Guðmundsson G., Iken K., Roy V., Sørensen J., Anisimova N., Behe C., Bluhm B.A., Denisenko S., Denisenko N., Metcalf V., Olafsdóttir S., Schiøtte T., Tendal O., Ravelo A.M., Kędra M., Piepenburg D. (2017) "Benthos" In: CAFF. State of the Arctic Marine Biodiversity Report. Conservation of Arctic Flora and Fauna, Akureyri Iceland.

Jørgensen LL, Raul Primicerio, Randi B. Ingvaldsen, Maria Fossheim, Natalia Strelkova, Trude H. Thangstad, Igor Manushin, Denis Zakharov (submitted) Impact of multiple stressors on sea bed fauna in a warming Arctic.

Communicated Results

Jørgensen et al (2017) *Effects of multiple stressors on the benthic ecosystem in the Barents Sea*. **ECRA General Assembly, 7-8 March 2017, Brussel. Climate Change and Vulnerable Regions** (oral presentation).

Jørgensen et al (2017) *Effects of multiple stressors on the benthic ecosystem in the Barents Sea*. **ESSAS conference, Tromsø, 11-15 June – Multiple stressors** (oral presentation)

Jørgensen (2017) *Bunndyr i Barentshavet*. **Fiskebåt, Ålesund, 04 April** (oral presentasjon).

Jørgensen et al (2017) *Effekt fra mange stressors samtidig på bunndyr i Barentshavet*. **CAFF – orientering om og oppfølging av arktisk marinbiologisk overvåking, Ons 13.sep. Miljødirektoratet Oslo** (oral presentation).

Jørgensen og Bakke (2017) *Sårbare bunndyr i nordlige Barentshavet, pågående arbeid siden 2007*. **Møte i Referansegruppen for ressursforskning, September, HI, Bergen** (oral presentation).

Jørgensen LL, R. Primicerio (UiTø), M. Fossheim (IMR), T. Thangstad, R. Ingvaldsen (IMR), N. Anisimova, D. Zakarov, O. Manuchin (PINRO, Russia). (2017). *Effects of multiple stressors on the benthic ecosystem in the Barents Sea*. **European Climate Research Alliance General Assembly, 7-8 March 2017, Brussels, Belgium** (Oral presentation).

Fossheim M (2017) Fisk på flyttefot; forventet utvikling i Barentshavet. **Torskefiskkonferansen, Tromsø, Norge, Oktober 2017**.

Fossheim M (2017) Open-ended Informal Consultative Process on Oceans and the Law of the Sea, 18th Meeting, Panel “The effects of climate change on oceans”: *Ecosystem effects of climate change in polar waters*, **United Nations, New York, USA, May 2017**

Interdisciplinary Cooperation

no

Budget in accordance to results

Budget is in accordance to results.

Could results from the project be subject for any commercial utilization

No

If Yes

no

Conclusions

The conclusions of this project will be provided in year 2019 if the project is continued.