

Project information

Project title

Effects of increasing jelly-plankton on benthic processes in north Norway and Svalbard

Year

2011/2012

Project leader

Paul Renaud, ApN

Participants

- Paul Renaud (ApN)
- Andrew Sweetman (NIVA)
- Jørgen Berge (UNIS, UiT)

Flagship

Fjord and coast, Theme: Structure, function and change in Arctic and boreal fjord ecosystems

Funding Source

Fram Centre, NRC

Summary of Results

During September 2011, the project participants took part in UNIS' AB321 course (Arctic Benthic Ecology) and visited a total of 5 fjord habitats, 2 shelf locations and 1 continental slope habitat around northern Svalbard. In addition to providing lectures and project assistance for the students, we were able to investigate a variety of locations for evidence of organic falls at the sea floor by using a drop camera system. We hoped to find evidence of deposition of jelly plankton (ctenophores, appendicularian houses, jellyfish). Diver observations in shallow areas of Kongsfjorden and Rijpfjorden have indicated episodic pulses of this material to the seafloor. The occurrence of this, and the impacts of seafloor carbon cycling processes, have never been investigated in the Arctic. As part of an NFR project to NIVA and partner institutions, we will investigate this during summer 2012, but used the ship-time availability and opportunity from Fram funding to run preliminary surveys to target locations, test equipment, and acquire pilot data on density of jellyfalls on the sea floor.

1. Out of a total of over 1000 seafloor photograph, which covered an area of almost 3000m², we found evidence of ctenophores (presumably dead) on the seafloor in at least one fjord (images have not been completely processed). This is a successful 'proof-of-concept' that this material does reach the seafloor, and a positive test of our ability to identify it with the drop camera technology. In addition, it allows us to target Rijpfjorden as one of our study sites for next year's experimental studies. The low density observed in the photographs suggests one (or more) of the following: 1. There is very little sedimentation of jelly plankton in Svalbard fjord and coastal waters, 2. There is little sedimentation in early autumn, 3. Material that does reach the bottom remains identifiable and is likely to be found in similar habitats around the Svalbard archipelago or 4. Significant quantities of jelly plankton sediment to the seafloor but the material is rapidly remineralized leading to very little accumulation of material .

2. The respiration incubation system we intend to use next year work well enough to identify very low rates of oxygen consumption. Furthermore, cold room facilities on R/V

Helmer Hanssen are sufficiently temperature controlled to run reliable rate studies there. In addition, we discussed the possibility of using UNIS facilities in addition to shipboard studies and these facilities are available.

Published Results/Planned Publications

None yet. This was a pre-project to help plan the NFR-funded experiments that will take place next year.

Communicated Results

The activities associated with the cruise and collection of preliminary data were communicated to students in the UNIS Arctic Benthic Ecology course. In addition, tools and insights were shared with one MS student in the course who has a related project. Finally, other scientists on the cruise were interested in establishing collaborations that use undersea imaging and process measurements. We will develop a joint proposal in the first half of 2012.

Interdisciplinary Cooperation

This project combines benthic biology with underwater photography technology and image analysis. In addition, physiological rate measurements are included. These elements contribute equally to the success of the project.

Budget in accordance to results

There was sufficient funding to perform the pilot study. It aids considerably in planning for experimental work next year and in testing equipment. Further it helped us locate sites for the main study to be conducted in 2012.

Could results from the project be subject for any commercial utilization

No

If Yes

Conclusions

- a. As a pre-project, this work has helped us define sites and methodologies for the work to be performed next year. This saves the NFR project considerable time and expense. In addition, it has led to new ideas that we and a number of Norwegian and international colleagues will pursue in a large research proposal (2M euro) in 2012.
- b. Whereas underwater photography and image analysis is not a new field, its use in documenting organic falls to the seafloor in Arctic seas has not previously been performed. In combination with process studies, these methods will provide a unique perspective for documenting the importance of organic falls in coastal and fjordic systems in the High North.