

## Project information

### Project title

The Arctic scallop *Chlamys islandica* as a biosensor for detection of effects of climate upon ecosystem functioning and anthropogenic impact in Svalbard

### Year

2016-2017

### Project leader

Lionel Camus

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

78.930197°N 11.919607°E

### Participants

University of Bordeaux-CNRS: Damien Tran, Mickael Perrigault, Jean-Charles Massabuau. UiT: Jørgen Berge. Akvaplan-niva AS: Hector Andrade

### Flagship

Fjord and Coast

### Funding Source

FRAM

## Summary of Results

Several activities have been carried out:

Biosensor construction: The French team (University of Bordeaux-CNRS) build the electronics for the deployment of two biosensors, one to work with *Chlamys islandica* and a second one for working with blue mussels *Mytilus edulis*. The second biosensor is an in-kind contribution from CNRS as this was not part of the original project.

First *Chlamys islandica* and *Mytilus edulis* collections: First the clams needed for the polar day experiment and biosensor deployment were collected in a cruise around Svalbard (APN-UiT) and deposited in a cage in Ny-Ålesund. Collection of blue mussels was performed by Peter Leopold from UiT, in Isfjorden.

Fieldwork: A fieldtrip was planned and carried out to Ny-Ålesund from the 25th of April to May 2nd to install the 2 biosensors comprised of 16 *C. islandica* and 16 *M. edulis*, but also to collect organisms for the polar day genetic sequencing experiment. A cage was installed under the old pier in Ny-Ålesund. The system is working successfully.

Second *Chlamys islandica* collection: The collection of a new batch of 300 scallops was carried out thanks to a collaborative effort between the project and the UiT-UNIS Svalbard Autumn cruise. This batch is in Ny-Ålesund and will be employed to perform the winter and spring experiments

Gene sequencing: Efforts are being carried out to identify the genes controlling the molecular clock and light perception in *C. islandica* and *M. edulis*. So far, genes have been identified for *M. edulis*, i.e. the clock genes *Clock*, *Timless* and *Cryptochrome 1* and genes coding for opsins involved in light perception. For *C. islandica*, no clock genes have been sequenced until now, but we have already identified several opsins genes.

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Winter fieldwork: A second and booked, to sample the first part of the second batch of *C. islandica* at the end of January 2017. All permits have been obtained.

Spring fieldwork: A third fieldtrip has been planned to Ny-Ålesund to sample the last part of the second batch of *C. islandica* at the end of March 2017. We are awaiting the permits.

### Outreach:

A project page has been opened in the site ResearchGate: <https://www.researchgate.net/project/Study-of-the-circadian-clock-of-the-Arctic-Scallop-Chlamys-islandica-during-the-polar-night>

Results are published daily on the MolluScan Eye webpage.

A Facebook Page has been developed <https://www.facebook.com/TalkingClams/>

Initial results presented at the FRAM researchers meeting

Master and PhD-students involved in the project

Peter Leopold, The Arctic University of Norway

For the Management

Our results are providing key information about future trajectories of climate change upon benthic species in the arctic and ecological processes, and will further increase our understanding of the biology of *C. islandica* and *M. edulis*, species that can potentially be employed in real-time environmental monitoring.

Published Results/Planned Publications

Andrade H, Massabuau J-C, Cochrane S, Ciret P, Tran D, Sow M, Camus L (2016) High Frequency Noninvasive (HFNI) Bio-Sensors as a Potential Tool for Marine Monitoring and Assessments. *Frontiers in Marine Science* 3

Tran D, Sow M, Camus L, Ciret P, Berge J, Massabuau J-C (2016) In the darkness of the polar night, scallops keep on a steady rhythm. *Scientific Reports* 6:32435

Communicated Results

Tran D. Massabuau J-C., Andrade H., Sow M., Ciret P., Berge J., Camus L. 2016. Coastal waters quality surveillance using bivalve mollusk-based sensors. Aquatic Ecotoxicology group meeting, UMR EPOC seminar, Arcachon, France. 11 February 2016.

Tran D. Massabuau J-C., Andrade H., Sow M., Ciret P., Berge J., Camus L. 2016. Chronobiology of bivalves in high Arctic. Kick-off meeting ANR WAQMOS. Arcachon, France. 13 January 2016.

Budget in accordance to results

Yes. The funds allowed us to perform all activities planned for the first fieldwork. We have applied for a second year of funding to FRAM, as stated on the original proposal

Could results from the project be subject for any commercial utilization

No

Conclusions

The project has been a success so far, achieving all goals stated in the proposal. In addition, the project has been expanded to include a study of the gapping behavior and growth of blue mussels in Ny-Ålesund.