atlas

A trans-Atlantic assessment and deep-water ecosystem based spatial management plan for Europe

ISSUE 3 | APRIL 2018

project news

ATLAS is a four-year research and innovation project that aims to advance our understanding of the deep Atlantic Ocean ecosystems. **ATLAS** will provide essential new knowledge for effective ocean governance and adaptive management strategies that stimulate Blue Growth. It is the largest integrated study of deep Atlantic ecosystems ever undertaken. Funded under the European Union's Framework Programme for Research and Innovation, Horizon 2020, it has a total budget of €9.4 million and is led by the University of Edinburgh (Scotland, UK).

24+1 PARTNERS

12 COUNTRIES

IN THIS ISSUE:

Photo © M. Bilan (IMAR-UAz)

WELCOME FROM THE ATLAS COORDINATOR

Prof J Murray Roberts
(The University of Edinburgh (UEDIN), ATLAS Coordinator)

I'm writing this immediately after the 18-month **ATLAS** review and it's a great chance to reflect on what we've achieved and think about how we focus our efforts for the second half of the project. In the project's first 18 months the **ATLAS** team have led or participated in 19 offshore research expeditions with 15 more planned for this year and next. We have published 17 papers since the project started on topics as diverse as the worrying decline in silicate concentration in the North Atlantic to the bioeconomic modelling of fish and habitat connections – see page 12 and check the website for our full publications list.

Huge congratulations are due to everyone across the project for your hard work and dedication. We all know how much effort goes into each research cruise or producing just one paper! One of the best aspects of coordinating **ATLAS** is reading all our outputs and having the privilege of presenting the project not just at scientific meetings but to government and industry bodies. I'm delighted that in this issue we're showcasing one of our industry partners, Statoil, and their hugely innovative Lofoten-Vesterålen (LoVe) seafloor observatory in northern Norway. The partnership between industry and **ATLAS** to analyse the amazing data from this observatory is a fantastic example of what we can achieve by working seamlessly across industry and academic research.

In the first 18 months of **ATLAS** we've created a sound foundation for the second half of the project. Our first five work packages are all running with new equipment recording vital aspects of the Atlantic's circulation, databases on Atlantic biodiversity established and our socioeconomic assessment of human activities on deep Atlantic ecosystems underway. We're now spinning up work that will draw the discoveries from these parts of the project through into practical steps that will help managers manage deep Atlantic ecosystems into the future. It's in this science-to-policy arena that **ATLAS** stands to make its greatest overall impact, and I'm convinced on the basis of what we've already achieved that we're well on the way!

Murray.Roberts@ed.ac.uk

FAREWELL AND WELCOME

Farewell Katherine

At the end of February 2018, the **ATLAS** project manager Katherine Needham left **ATLAS** to pursue her academic career in Economics. From all of the **ATLAS** team, we sincerely thank her for her dedication and hard work in the project office. Here she shares her memories with us:

"I'm now at the end of my journey here as **ATLAS** project manager but not at the end of our journey together. I say this because I bring great memories of the project with me and I hope that I'll see many of the **ATLAS** team again at conferences and workshops in the future. In my short 18 months here, my eyes have been opened up to the world of the deep sea, the fascinating creatures and organisms, the challenges facing it now and in the future, and the inspirational work of the scientists studying these ecosystems. Working with such passionate and enthusiastic researchers is what has inspired me to return to my academic career as an Environmental Economist.

Some of my favourite memories (among many):

- The 2nd **ATLAS** General Assembly, Mallorca, 2017. Despite being very hectic in the lead up to it, the

Katherine Needham (left, with her husband) from the ATLAS coordinating team, UEDIN

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successful meeting was one of my real highlights of **ATLAS**. Seeing all the consortium come together to present their ideas, discuss new research themes and plan for the year ahead. The social side of the event was rather amusing too but we'll keep those secrets to ourselves!

- Geeking Out. Sharing an office in Edinburgh with Fiona Murray and Alan Fox has led to some serious geeking out and me trying to understand a whole host of modelling and ecology I'd never heard of before. Occasionally I managed to geek them out with some economics too.
- Brussels. Working on an EU project I've come to know this city rather well with plenty of visits.

Despite only listening in at the **ATLAS** Science Policy Panel in March 2017, it was a huge deal to me to be sitting in the European Parliament listening to the **ATLAS** Science and Policy Goals being presented.

I'd also like to say a huge personal thanks to Murray Roberts, our **ATLAS** coordinator – his enthusiasm and dedication to **ATLAS** as a project and deep-sea researcher is limitless. I wish Murray, and all those involved in **ATLAS**, the best of luck in taking the project forward and taking the research findings to the very top!"

By: Dr Katherine Needham

Welcome Julia – Our new ATLAS Project Manager

Julia Eighteen will be taking over from Katherine Needham as the **ATLAS** project manager. Here, she introduces herself.

"I'm very much looking forward to joining the **ATLAS** team as project manager. I've worked at the University of Edinburgh supporting research projects for the last nine years, but worked in very different areas during that time. I have a background in events and project management and have worked on EU projects in carbon capture. More recently I've been privileged to be part of a biomedical research project working on new approaches to cancer treatment.

I am really looking forward to learning more about **ATLAS** and I'm excited to meet you all at the general assembly in Mallorca in April. I've been very grateful for Katherine's excellent handover sessions: she has provided a wealth of material and leaves the project in brilliant order. I hope you'll help me in the early days as I put names to faces, discover as much as possible about the valuable research **ATLAS** is carrying out, and the huge opportunities to inform policy in this area."

By: Julia Eighteen

Welcome to Emma Paterson, our new Project Officer at Dynamic Earth

Based in Edinburgh, Dynamic Earth is one of the UK's largest earth science outreach centres. As one of the **ATLAS** partners, Dynamic Earth works on developing and delivering a suite of outreach products. In August 2017, Emma Paterson moved into the **ATLAS** position at Dynamic Earth and here she introduces herself and her role in the **ATLAS** project.

"Hi! My name is Emma and I'm part of the "Dissemination, Knowledge Transfer and Outreach" team based at Dynamic Earth in Edinburgh. Over the course of the project I'll be developing and designing educational materials based on the outcomes of **ATLAS**. Along with the rest of the Learning Team, I'll also be delivering the **ATLAS** outreach package at various Science Festivals across Scotland.

My interest in deep-ocean ecosystems comes from looking at the fascinating life found at hydrothermal vents during my Geosciences degree. Aside from these areas, I've often been guilty of a common mistake: thinking about the oceans' surface rather than what lies beneath! As a student I was lucky

Emma Paterson from ATLAS partner Dynamic Earth (UK) about to join the crew of STS *Lord Nelson* in Auckland

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enough to go on many sailing trips, including crossing the Pacific Ocean and though I saw many amazing sights, it was still a superficial engagement. I'm really excited to gain a "deeper" (excuse the pun!) understanding through **ATLAS**, especially as some of the research is relatively close to home. Engaging the public in ocean science is a vital part of ensuring that people are aware of just how important it is. I hope to share our understanding of how human activity can and is having a detrimental effect on our oceans, even in those places which are generally inaccessible.

Charles Wyville Thompson, leader of the Challenger Expedition ©*Wikimedia*

I've been part of the Learning Team now for six years, so I have a fair amount of experience in making earth and environmental science engaging for everyone. This is a fantastic opportunity to bring a heritage aspect into our **ATLAS** outreach, in the guise of Charles Wyville Thompson and the Challenger Expedition. As I'm sure many of the **ATLAS** team knows, this expedition marked the birth of oceanography as a science and completely reversed the idea that the deep sea was lifeless. What makes an especially nice link for us is that much of the preliminary work and development of the equipment was accomplished off the Scottish coastline with the cruises of HMS *Lightning* and HMS *Porcupine*. And not forgetting of course, that Wyville Thompson was Regius Chair of Natural History at

Dredging and sounding equipment used on the HMS *Challenger* expedition of 1872–76 ©*NOAA photo library*

The Oceans Gallery at Dynamic Earth ©*Dynamic Earth*

the University of Edinburgh during the time of the cruises.

Alongside our outreach package and educational resources, Dynamic Earth will embed the **ATLAS** research into our in-house activities by way of a permanent addition to the Oceans Gallery and an **ATLAS**-themed workshop on our Learning Programme. As the only Earth and Environmental Science Centre in the UK dedicated to telling the

The Yellow Submarine Gallery at Dynamic Earth ©*Dynamic Earth*

story of how the Earth works, we are well placed to engage the public, welcoming around 240,000 visitors a year and 80,000 school pupils! We look forward to sharing not only the amazing discoveries from **ATLAS** but also the implications for the future and how the predicted changes might impact on peoples' daily lives."

By: Emma Paterson

INTRODUCING OUR ADVISORY BOARD MEMBERS: STATOIL

The **ATLAS** Advisory Board is made up of representatives and experts from industries including fisheries, blue technology and oil and gas. In this issue, we meet the team from Statoil.

Statoil is a Norwegian oil and gas company, founded in 1972, which has grown into an international energy company with approximately 20,500 employees across more than 30 countries around the world. Statoil is among the world's largest net sellers of crude oil and condensate, the second-largest supplier of natural gas to the European market and is also the world's largest offshore operator in waters deeper than 100 meters.

Statoil is also part of **ATLAS'** Associate Partners network, bridging gaps between research and industry. The Lofoten-Vesterålen (LoVe) ocean observatory, also featured in this issue (p 10), is financed by Statoil.

The Statoil team in **ATLAS** comprises Ingunn Nilssen and Anders Hermansen and here they share their background and insights.

Ingunn Nilssen holds a PhD in Marine Biology from the Norwegian University of Science and Technology (NTNU). Ingunn joined Statoil in 2004 and has primarily worked with environmental monitoring technologies and modelling for optimisation of environmental monitoring. She also has operational experience and held a temporary position with the 'Health, Safety and Environment' business area in the Development and Production sector (Norway), working towards Statoil's 'Zero Harm' vision. Before joining Statoil, Ingunn worked for the Norwegian pollution control authorities for seven years.

The Statoil team in **ATLAS**: Anders Hermansen (left) and Ingunn Nilssen (right) ©*Statoil*

Anders Hermansen holds a Masters in Chemical Engineering from the Norwegian University of Science and Technology (NTNU). He has been with Statoil since 2003, working broadly within renewable energy and environmental technology, both as a researcher, business developer and project leader. Since 2012, his main focus has been environmental monitoring, developing sensor-based technologies and methods. Before joining Statoil, Anders also worked for the Norwegian pollution control authorities for one year.

"Currently, our industry is experiencing fundamental challenges. From climate change and geopolitics to energy markets, we are facing new realities and we believe our job is to turn them into opportunities. Statoil continuously seeks new ways to utilise its expertise in the energy industry, exploring opportunities in new energy as well as driving innovation in oil and gas around the world. The future is low carbon and our ambition is to be the world's most carbon-efficient oil and gas producer, as well as driving innovation in offshore wind energy.

By combining our progressive technologies and operational expertise with foresight and responsiveness, we aim to seize the new business opportunities that are opening up in clean energy. Statoil's rationale for offshore wind is to combine known technologies in a new setting, enabling wind energy to be captured in deep-water environments which offer better wind conditions." **(www.bit.ly/2GNmTnT)**

"As member of the **ATLAS** Advisory Board, we believe we can act as a link between academia and industry, informing **ATLAS** about what the industry needs and in turn bring the findings from **ATLAS** back to our networks. Being able to get direct access to new high-quality knowledge about ocean ecosystems and dynamics is priceless. From experience we also know that this kind of collaboration often creates spin-off activities."

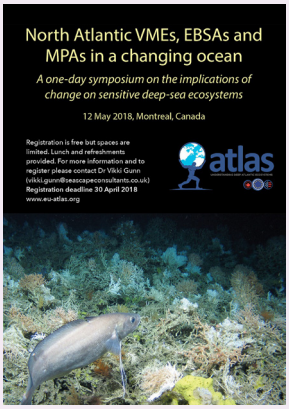
For more information on Statoil, please visit: www.statoil.com

*By: Ingunn Nilssen (PhD) and Anders Hermansen (PhD), Researchers and **ATLAS** Advisory Board members, Statoil*

NEWS AND HIGHLIGHTS

World Conference on Marine Biodiversity 2018: Register now!

The World Conference on Marine Biodiversity (WCMB) has become the major focal assembly to share research outcomes, management and policy issues, and discussions on the role of biodiversity in sustaining ocean ecosystems. Past events have attracted leading specialists from around the world and have been the hub for global discussions on marine biodiversity issues. The 4th WCMB will be held in Montréal, Québec, Canada, from 13 – 16 May this year. For more information and to register please see **http://wcmb2018.org/index.html**



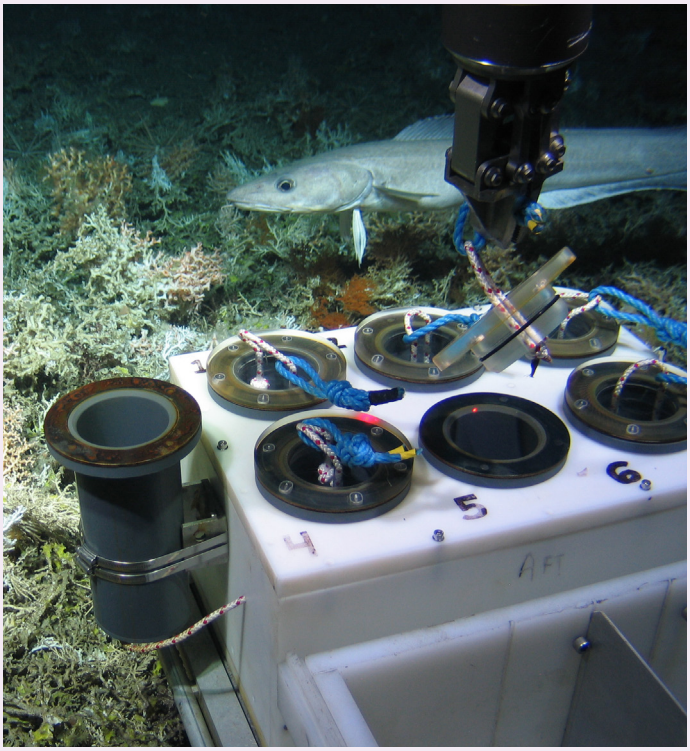
To maximise our impact at this important conference, **ATLAS** will be running a Science Policy Panel before the meeting in Ottawa (11 May) and then hosting a dedicated one-day symposium on the implications of change on sensitive deep-sea ecosystems in Montréal (12 May). This one-day symposium is aimed at scientists, practitioners, policy makers and representatives from civil society with expertise and interest in the future of area-based management tools in the North Atlantic. Presentations will highlight emerging results from **ATLAS**, and the status of Vulnerable Marine Ecosystems, Ecologically and Biologically Significant Areas, and Marine Protected Areas in a changing ocean. Predicted shifts in ecosystem dynamics will be reviewed and discussions will highlight opportunities, processes for adaptive management and future priorities and directions.

Following the symposium, **ATLAS**, along with sister projects SponGES and MERCES, will have a dedicated session at WCMB (13 May).

The deadline for registration for this special session is **30 April 2018.**

For more information on the **ATLAS** one-day symposium and to register please contact Dr Vikki Gunn **(vikki.gunn@seascapeconsultants.co.uk)**

Frontiers Research Topics 'Managing deep-sea ecosystems at ocean basic scale': Call for abstracts is now open!



Remotely Operated Vehicle collecting samples from Logachev Mounds (Rockall Bank). A common ling *Molva molva* is passing by ©*UEDIN*

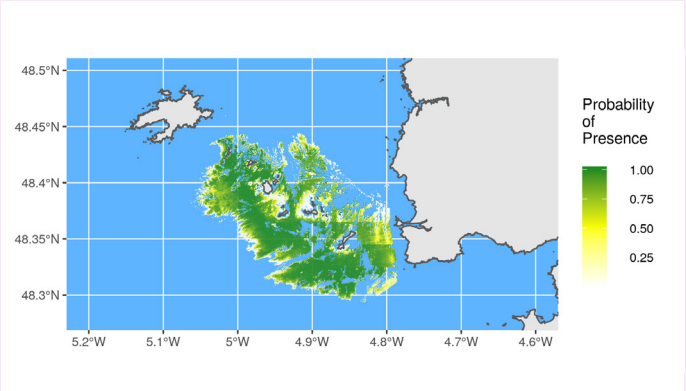
Frontiers is a growing open-access academic publisher and Research Topics are peer-reviewed article collections from specialised research communities. Drawing upon work by **ATLAS**, this issue will explore recent results and findings emerging from assessments of marine ecosystem connectivity, biogeography and function at ocean basin scale. This special issue of Research Topics is a great opportunity to increase the visibility of the **ATLAS** research outputs, bringing together key advances and approaches relevant to ocean basin scale research and management. Studies with new discoveries from the deep-ocean (community ecology, taxonomy, and ecosystem connectivity), on advances in oceanographic data, climate change and policy are welcome. The issue will be edited by J Murray Roberts (UEDIN) and Telmo Morato (IMAR-UAz/University of the Azores).

The deadline for the first round of **abstract submissions is 12 July 2018 and manuscripts 15 November 2018.** Second and third calls will follow in 2019 and 2020.

For more information and to submit your abstract, please see: **www.frontiersin.org/research-topics/7768/managing-deep-sea-ecosystems-at-ocean-basin-scale**

SDMSelect: A NEW R-package for covariates selection and species distribution modelling

In **ATLAS**, several teams are working on species distribution modelling using a variety of species, study areas and models. Within the framework of the **ATLAS** project, a new R-package has been developed as an attempt to make species distribution models



Predicted probability of presence of the brown kelp *Laminaria hyperborea* in the Parc Marin d'Iroise (France) ©*Ifremer*

reproducible and easy-to-use. Common modelling procedures will facilitate the comparison of model outputs and may allow for the combination of results.

Equations can be used to link biomass to environmental factors to predict the distribution of species. For example, it is possible to link the presence of species to depth, slope, current speed, wave strength and temperature, so that we can understand where species are and why. Thanks to a large variety of field observations and oceanographic models, a lot of potential environmental factors can be included in models. However, we cannot really include them all, as this would reduce robustness of the predictions and would be difficult to interpret ecologically.

SDMSelect is a package for R-software compiled from R scripts for species distribution modelling. It was designed to produce maps of predicted species distribution but is not specific to mapping purposes. Its main function is to select the factors explaining the best presence-absences or biomasses of species observed. The package's functions range from data and variable preparation to predictive maps, with special attention given to uncertainty estimations.

Read more information about SDMSelect on:

https://statnmap.com/2017-09-23-sdmselect-package-species-distribution-modelling

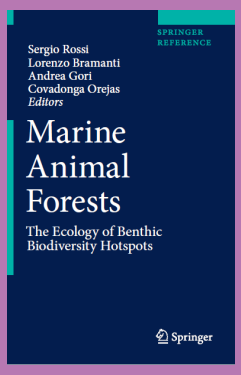
The library is freely available on github:

https://github.com/statnmap/SDMSelect

*By: Sébastien Rochette (PhD), **ATLAS** project partner, Ifremer / StatnMap (**https://statnmap.com**)*

New Book on "Marine Animal Forests: The Ecology of Benthic Biodiversity Hotspots" published – several authors from ATLAS involved

Congratulations to **ATLAS** partner Covadonga Orejas (Instituto Español de Oceanografia (IEO), Spain) who was one of the editors of this very special book! Several other **ATLAS** partners and affiliates have also contributed a variety of articles: Sophie Arnaud-Haond (Ifremer, France), Anthony Grehan (National University of Ireland Galway, Ireland), Lea-Anne Henry (UEDIN, Scotland, UK), Ellen L. R. Kenchington (Bedford Institute of Oceanography, Canada), Stefán Áki Ragnarsson (Marine and Freshwater Research Institute, Iceland), Jake Rice (Department of Fisheries and Oceans, Canada), and J Murray Roberts (UEDIN, Scotland, UK).



Evidence of drastic changes in marine ecosystems due to human-induced impacts is increasing. These impacts are clearly visible in benthic ecosystems or "marine animal forests", which are currently showing a dramatic loss of biomass and biodiversity all over the world. These communities are dominated by organisms such as sponges, corals, gorgonians and bivalves that generate three-dimensional structures similar to trees in a terrestrial forest. Animal forests provide food, protection and are nurseries to the associated fauna, playing an important role in the local hydrodynamic and biogeochemical cycles near the sea floor and also acting as carbon sinks. This book focuses its attention on these three-dimensional animal structures including, for the first time, all the different types of marine animal forests of the world in a single volume.

To see the full table of content and to order the book, please visit: http://**bit.ly/2fR60K9**

Marine Animal Forests: The Ecology of Benthic Biodiversity Hotspots

Editors: Sergio Rossi, Lorenzo Bramanti, Andrea Gori, Covadonga Orejas

ATLAS makes the News: El País – The Oceans are suffocating

Research findings from the **ATLAS** project were published online in the Spanish news outlet El País in July 2017. To read the full article, please see: **http://bit.ly/2vmiJ0U**

EVENTS

ATLAS partners have been busy promoting and representing **ATLAS** at a wide range of events during the second half of 2017, with a presence at more than 21 meetings in nine countries. To read more about past and upcoming events, please see the **ATLAS** calendar on the project website at: **http://bit.ly/2tRZFrn**

OUTREACH

ATLAS members have been actively carrying out outreach activities at public events throughout the latter half of 2017. **ATLAS** was well represented during various activities for the **100-year Jubilee of IEO-VIGO** (Spain)**, Cold-Water Coral Day on Faial Island** (Azores) and at the **Natural History Museum's Science Uncovered Night** (London, UK). To learn more about these inspiring outreach activities, please visit the **ATLAS** website: **http://bit.ly/2tUtgk0** and follow us on Twitter **@EU_ATLAS**

YOUNG SCIENTIST CORNER

Name: Evert de Froe
From: Breda, the Netherlands
Education: MSc Wageningen University, the Netherlands
Current Role: PhD candidate, NIOZ Royal Netherlands Institute for Sea Research and Utrecht University, Yerseke, the Netherlands

Hi Evert, welcome to ATLAS! What brought you here?

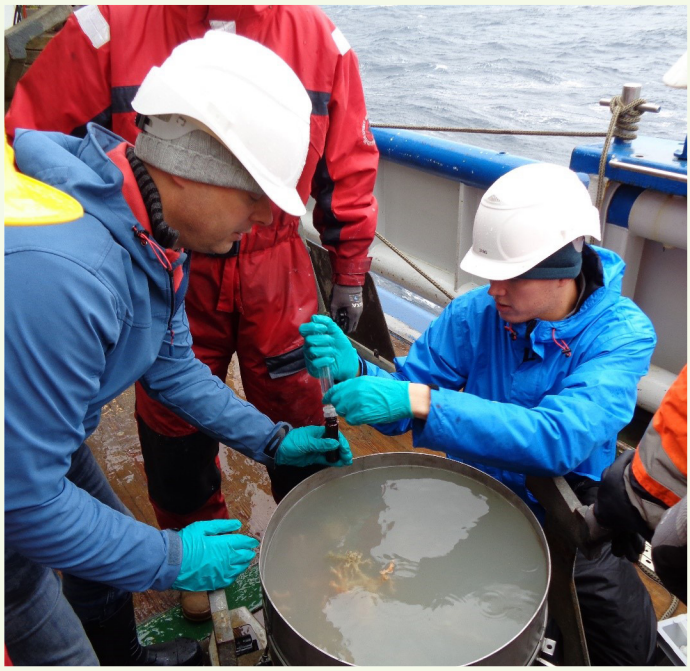
After my Masters in Marine Ecology at Wageningen University I got the opportunity to join the Royal Netherlands Institute for Sea Research and work with Dick van Oevelen and Karline Soetaert on the **ATLAS** project. I have always been particularly interested in coral reef ecosystems, so when I could work with deep-sea corals, I knew this was the right position for me!

What kind of research questions are you interested in?

One of the main questions I am interested in is: how can cold-water corals and sponges thrive in such a harsh environment as the deep-sea?

Why are you fascinated or curious about that topic or question?

I think it is quite spectacular if you consider that the vast majority of the ocean floor consists of fine sediment with a low faunal biodiversity. However, at particular places in the ocean there are suddenly large coral mounds, up to hundreds of meters high and wide and full of life. These mounds consist of corals, sponges, crustaceans, soft corals, polychaetes, starfish, and many more. I think it is a fascinating idea that such an ecosystem can exist in a dark and cold environment.



Dick van Oevelen (left) and Evert de Froe (right) taking water samples of a box core ©*Marc Lavaleye*

What is your project within ATLAS, and who do you work with and from which institutes? What have you discovered so far?

During my PhD project in **ATLAS**, I try to understand the food supply mechanisms that drive cold-water coral reef, sponge ground, and coral garden distributions in the North Atlantic Ocean. Together with Dick van Oevelen and Karline Soetaert, we will develop a new set of mechanistic models to better understand the current spatial distribution of these ecosystems. My focus will be on three **ATLAS** case study areas: Rockall Bank, Azores, and the Davis Strait.

So far, I have mainly worked on cold-water corals and specifically on the Rockall Bank. In May 2017, we went on a research cruise to the Rockall Bank to study the ecological functioning of the cold-water coral

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reef **(www.nioz.nl/en/blog/niozatsea-rockall-bank-expedition)**. My goal on this cruise was to quantify the metabolic activity of the coral reef framework by performing whole box core incubations. We measured oxygen consumption and nutrient dynamics of box core incubations. Preliminary results show that the cold-water coral reef on Rockall bank is a carbon and nutrient cycling hotspot.

Earlier in 2017 I worked with Cova Orejas and Dick van Oevelen to make a physiological database of cold-water corals by compiling all the physiological data we could find in the current literature. The database contains data on respiration, Particulate and Dissolved Organic Carbon, mucus excretion, food capture/ingestion, and calcification/growth rate of corals and sponges. This database will come in quite handy, when I want to calibrate my mechanistic models.

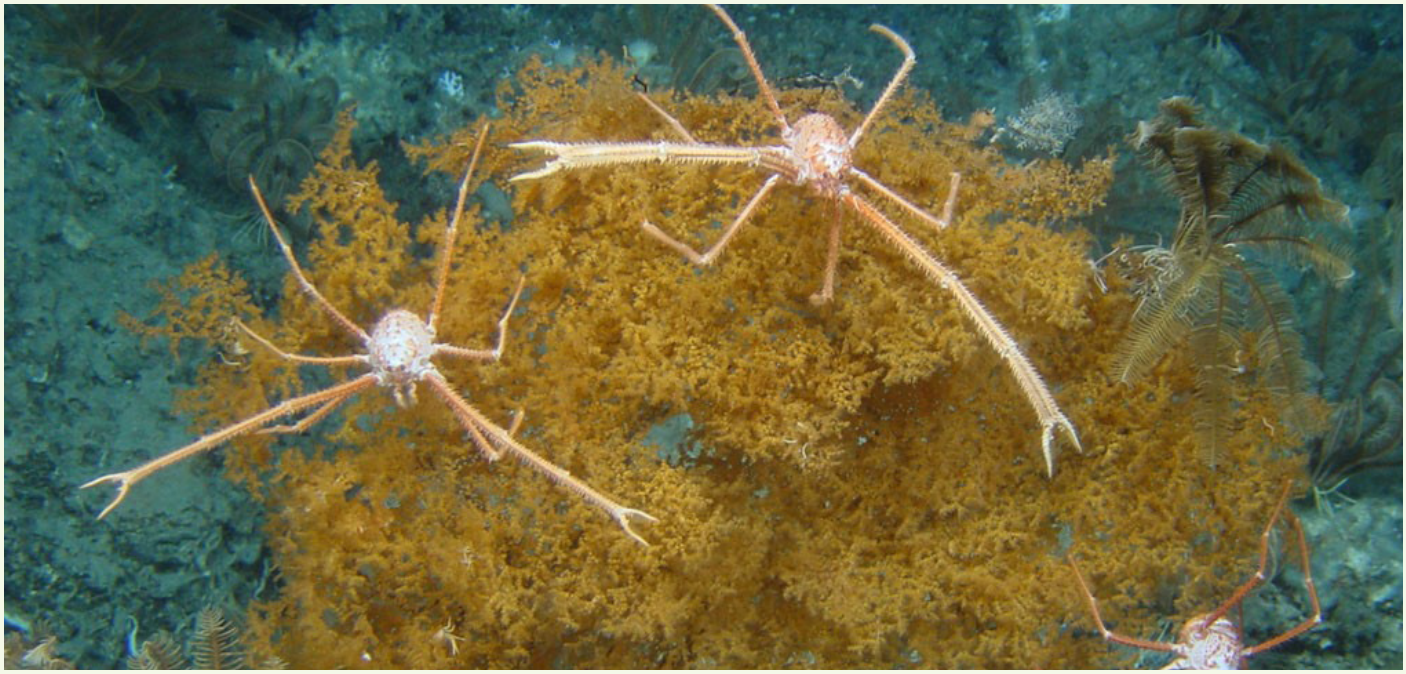
What are your plans for the next 3 years in ATLAS?

In January I participated in an **ATLAS** workshop on modelling connectivity. I presented a model in which I study the effect of a changing food or hydrodynamic regime on the deep-sea benthic community. The meeting was a great success and has lined up some excellent collaborations that I'm now following up.

For this year I plan to write a manuscript on quantifying the metabolic activity of the cold-water coral reef in the Rockall Bank case study area. I want to present my work at the general assembly of **ATLAS** in April, and I also hope to present at the 15th Deep-Sea Biology Symposium in September 2018 (Monterey, California). Furthermore, I plan to participate in a new research cruise to Rockall Bank in May this year.

What is the most exciting part for you?

One of the most exciting parts for me is definitely going on research cruises! My research cruise in May 2017 to the Rockall Bank was my first and I enjoyed it a lot. It was really exciting to see the ecosystem that I'm actually studying with my own eyes, albeit partly on the video screen of a Remotely Operated Vehicle. In May 2018 we will go to the same area to pick up the moorings we deployed last time, and who knows which research cruises will follow. I hope many!



Gastroptychus cf. formosus on the black coral *Leiopathes sp.* ©*AWI & Ifremer (2003) from Lophelia.org*

Speaking of the fascinating deep-sea, what is your favourite deep-sea species, do you have one?

That would be the squat lobster for me.

Why squat lobsters?

Though squat lobsters are not solely deep-sea species, we encountered and sampled several of the family *Munididae* during our research cruise to the Rockall Bank last spring. I was surprised at how agile and quick these animals were, but I especially love the way these animals position themselves in the water. They look as if they are afraid of nobody.

What would be your ATLAS highlight moment? Think big!

That would be two things for me: 1. Publish in Science or Nature (like every other scientist) and 2. Join a manned submersible to the deep-sea ocean floor, although I am not quite sure this is planned for **ATLAS**, this would be amazing!

CASE STUDY – THE LOVE OBSERVATORY

ATLAS is built around 12 case studies spanning the Atlantic Ocean from Norway to the Eastern Arctic that monitor a variety of ecosystems. Here we learn about the Lofoten-Vesterålen (LoVe) ocean observatory located off Lofoten and Vesterålen, Norway.

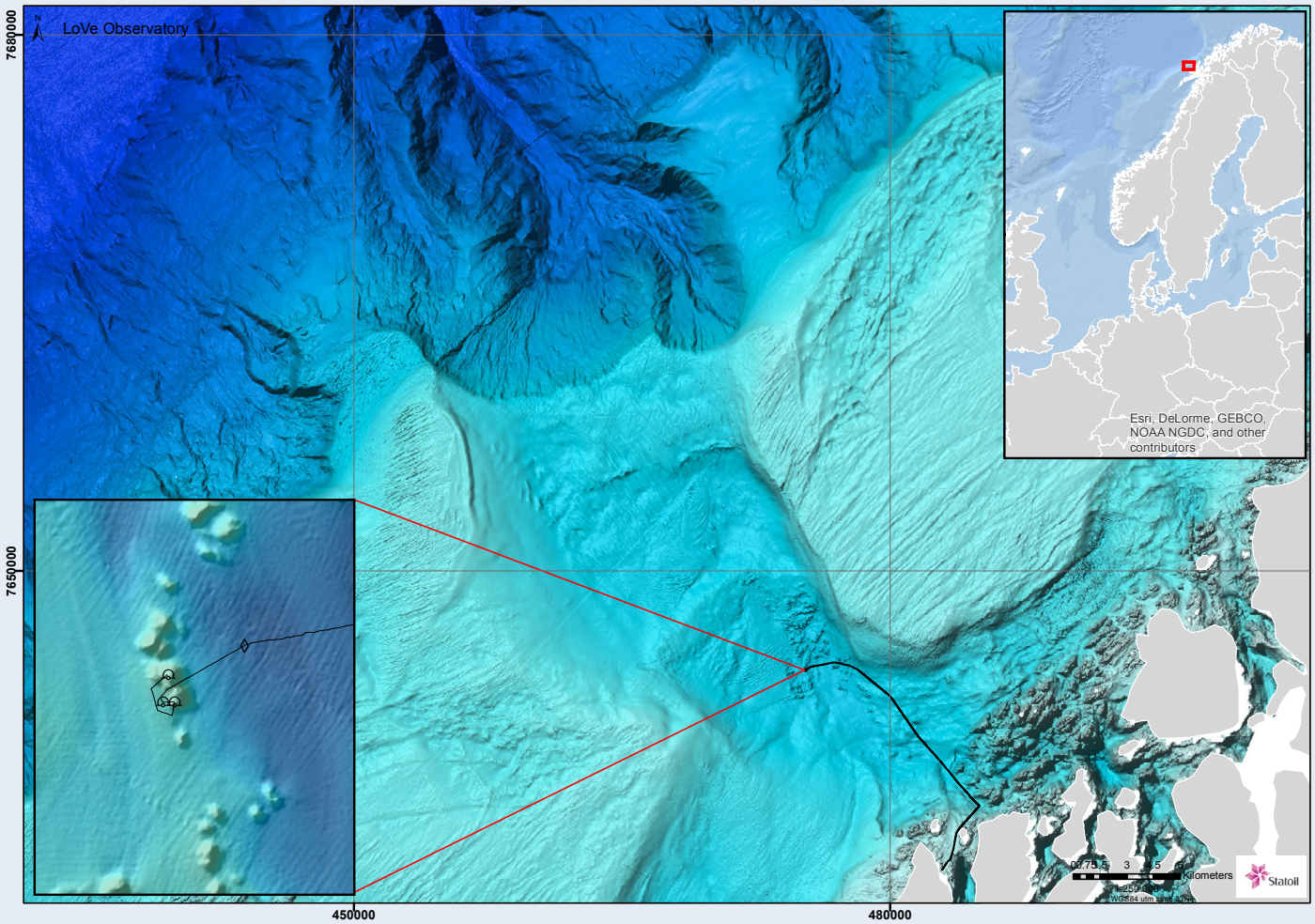
Case Study 1. The Lofoten-Vesterålen (LoVe) ocean observatory

The LoVe ocean observatory is located in the Norwegian Sea, approximately 12 km off the coast of Northern Norway (N 68°90.816', E 14°38.288'). Three sensor platforms powered from shore are located at depths of approximately 240 meters in a biological hot spot. The area hosts the main spawning area for the North Atlantic cod and a diverse and comprehensive cold-water coral habitat of *Lophelia pertusa*.

The observatory is financed by **ATLAS** partner Statoil and is a collaborative project with the Norwegian Institute of Marine Research and the technology provider METAS. The intention of the observatory is to:

- gain new knowledge about the dynamics of the ecosystem
- serve as a test site for new technology, and to test the capability of long term deployment of existing technologies
- develop new methodologies for data analyses and interpretation of data

The high temporal frequency of the data recovered so far has resulted in new knowledge about the dynamics both in the water column and in the *L. pertusa* reefs. The documentation of *L. pertusa* changing colour throughout the year was the most ground-breaking news.



Map showing the location of the Lofoten-Vesterålen (LoVe) ocean observatory off Norway ©*Statoil*

Data collected at LoVe is publicly available and can be downloaded from the web portal using Google Chrome: **http://love.statoil.com/**

A new extension of five more cabled nodes will cover various habitats across the continental shelf, the shelf break and down to deep waters (approximately 2500 m). The five new nodes are expected to be deployed in late summer 2018. The LoVe extension project has eight scientific partners within the

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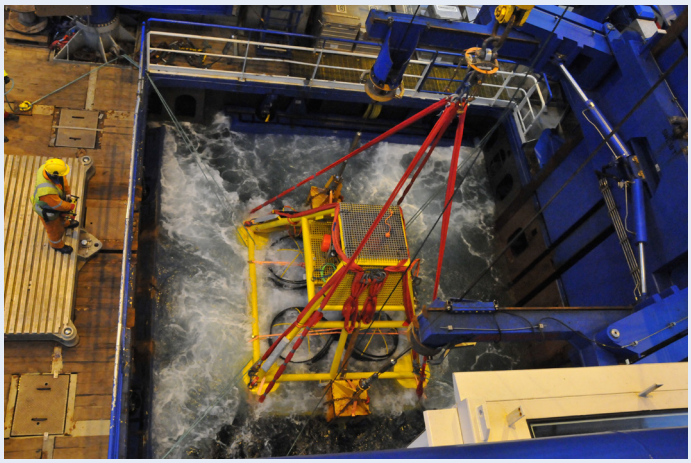
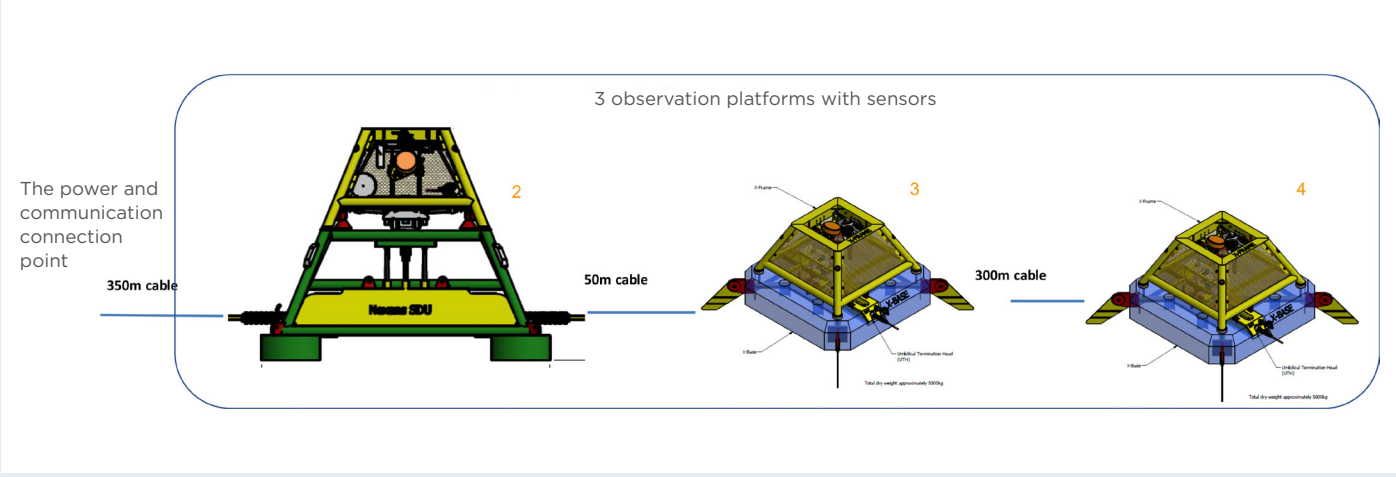
areas of geology, chemistry, ecology, fisheries, oceanography, modelling and technology. In addition, four more partners (from a total of 12) form part of the LoVe extension consortium that was founded by the Research Council of Norway's infrastructure programme.

Statoil believe the new knowledge gained from the high temporal and spatial coverage provided by data from the LoVe area, will allow for much greater insights into the natural variations and dynamics of local ecosystems including cold-water corals. **ATLAS** partners will collaborate and utilise the data gathered to develop new methodologies and new knowledge on the functioning of benthic ecosystems in the North Atlantic Ocean. Data from the LoVe observatory has already been used by **ATLAS** researchers at NIOZ, to help us understand the processes that provide organic matter supply to these cold-water coral reefs on the Norwegian shelf throughout an entire year (van Engeland et al. In prep)*.

**Van Engeland T, Godø OR, Johnsen E, Duineveld GCA, Dick van Oevelen D, (In prep) Cabled ocean observatory data reveal food supply mechanisms to a cold-water coral reef.*



The cabled observatory (X-Frame and two satellites) being deployed ©*Statoil*



LoVe cabled observatory infrastructure ©*Statoil*

ATLAS RECENT PUBLICATIONS

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