

Welcome to the CoralFISH newsletter

Issue 5 October 2011

This is the fifth issue of our newsletter intended to inform interested parties of the progress of the project in addressing some of the key policy issues related to the sustainable exploitation of deep-sea resources.

CoralFISH is a unique collaboration between marine scientists, fisheries biologists and fishermen from eleven countries. It represents an important first step towards improving the science base for the implementation of an ecosystem approach to fisheries management in the deep-sea.

Included in this issue are reports of collecting data for coral food web modelling off the Norwegian coast (p6-7); habitat mapping in the Azores (p2-4); and outreach activities in Italy (p5) and the UK (p8). The publication of a new global seamount database (following analysis of improved global ocean bathymetric (GEBCO) charts) by our partners in the Zoological Society of London, greatly increases the number of potential seamounts likely to exist in the world's oceans to 33,500 (p5). As only 250 of these have been explored to date, many interesting discoveries await.



The young hard-working CoralFISH team participating in the video attribution & annotation workshop in Faro.

CoralFISH is stepping up its collaborations with other EU-funded projects. In June, MeshAtlantic, an Atlantic Area INTERREG project, held a very interesting 3 day video survey techniques workshop in the University of the Algarve, Portugal. MeshAtlantic expands on the work undertaken in MESH (Mapping European Seabed Habitats – www.searchmesh.net) that set about establishing standard approaches to habitat mapping, primarily around the British Isles. As CoralFISH is doing similar work in the deep-sea, a number of CoralFISH partners were invited to address the meeting. Alessandra Savini spoke about integrated multiple scale mapping, Inge van den Beld presented an overview of our COVER (Customizable Video Image Observation Record) software while Fernando Tempera spoke about multidisciplinary mapping and ecological studies at Condor Seamount in the Azores

(p2-4). The workshop attracted participants from all over the globe, including a large contingent from Brazil who are carrying out environmental surveys for the petroleum company Petrobras. Immediately following the MESHAtlantic meeting, Jorge Gonçalves from the University of the Algarve kindly hosted a CoralFISH video workshop. This allowed partners to share their experiences using COVER, enabling iterative improvement of the software.

The FP7 project ODEMM (Options for Delivering Ecosystem-based Marine Management) held its annual science meeting in Galway in June. A invited presentation about CoralFISH provided the opportunity to explore synergies, particularly with regard to the implementation of the Marine Strategy Framework Directive.

Finally, this is an important year for deep-sea sustainable development policy. A major review of the status of implementation of the United Nations General Assembly resolutions 61/105 and 64/72, seeking to protect vulnerable marine ecosystems from the impact of bottom fishing, was held in New York in September. In the lead up to that event, a number of expert meetings were held.

In early April 2011, world experts met in the University of Oxford to discuss the stresses and impacts faced by the world's oceans. The meeting was organized by CoralFISH researcher Alex Rogers in his capacity as scientific director of the non-government organization International Programme on the State of the Ocean (IPSO). A short report on the meeting is on p8. The ensuing report called upon the UN Security Council and the UN General Assembly to implement effective governance of the High Seas through the creation of a global body empowered to ensure compliance with the UN Convention on the Law of the Sea and other relevant legal duties and norms. The report provided a detailed proposal for a new Global Ocean Compliance Commission (GOCC).

A second workshop organised in May by Phil Weaver (HERMIONE) and Matt Gianni (Political and Policy Advisor to Deep Sea Conservation Coalition), brought experts on fishing in the High Seas (including a number of CoralFISH partners) to Lisbon, to evaluate progress on implementing the UNGA resolutions. The outcomes of the meeting were presented at a side event around the main UNGA meeting in New York.

As always, I wish all CoralFISH participants, our sister projects, and all those working to improve management of deep-sea resources and biodiversity, every success over the coming months.

Anthony Grehan CoralFISH

Inside this issue:

<i>Condor Seamount: a CoralFISH study site in the Azores</i>	2-4
<i>Upcoming Event: ISDSC 5</i>	4
<i>Seamounts: Undersea mountains 'litter' ocean floor</i>	5
<i>Schools' programme in Italy</i>	5
<i>'Breathe in, breathe out'...: Træna reef's respiration studied by IMR-led team</i>	6-7
<i>'State of the ocean' meeting; Finding with MEMO; OceanLab outreach</i>	8

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Condor Seamount: a CoralFISH study site in the Azores

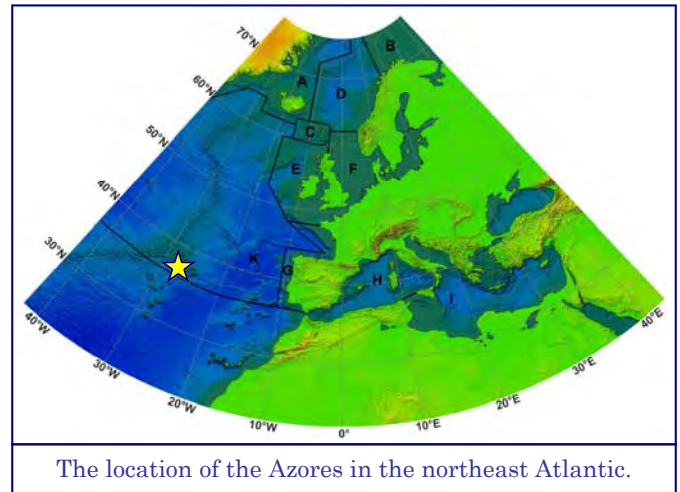
CoralFISH researcher Fernando Tempera and other members of the CONDOR consortium of IMAR-Azores contributed the feature article below to this edition of the newsletter. It is a little longer than our normal newsletter pieces, but it illustrates nicely the interdisciplinary nature of the CoralFISH project, and how scientists from across a wide range of disciplines are studying the special habitat of the Condor Seamount in the Azores. A glossary is provided at the end of the article.

(Fernando Tempera & the CONDOR consortium, Department of Oceanography and Fisheries (DOP), University of the Azores, IMAR - Instituto do Mar Institute of Marine Research, 9901-862 Horta (Azores), Portugal)

Introduction

Condor is a seamount located about 17km to the WSW of Faial island in the archipelago of the Azores (northeast Atlantic) (right). The site has been chosen as one of the CoralFISH research hotspots by the IMAR/DOP-University of the Azores team working in this mid-Atlantic archipelago.

For decades, Condor has been targeted by local artisanal fisheries, mostly using bottom-tending long-lines and hand-lines. The lack of bottom trawling has maintained the benthic environment of Condor in a relatively good state, with exploratory visual surveys revealing well-preserved deep-sea biotopes of conservation importance such as *coral gardens* and *deep-sea sponge aggregations*.



The location of the Azores in the northeast Atlantic.

Scientific observatory

A scientific observatory has been established on Condor that will improve our understanding of seamount ecological structure and functioning. Joint meetings between fisheries associations, representatives of several maritime activities, regional administrative bodies and the University of the Azores were instrumental in moving this endeavour ahead. The 2-year fishing closure agreed by these stakeholders finally came into law in May 2010. This closure permits scientific instruments to be securely installed on the seamount, benefiting several complementary projects. A suite of remote sensing technologies (multibeam sonars, EK500 sonar, satellite imagery), *in situ* sensors (CTDs, ADCP, current meter arrays) and sampling gear (grabs, mid-water trawls, traps and longlines) has already been used on Condor and the ample data retrieved is currently being analysed. In the process, four different vessels and two ROVs have visited the area and the new manned submersible *Lula 1000* is expected to visit the area in 2011 under project CORAZON.

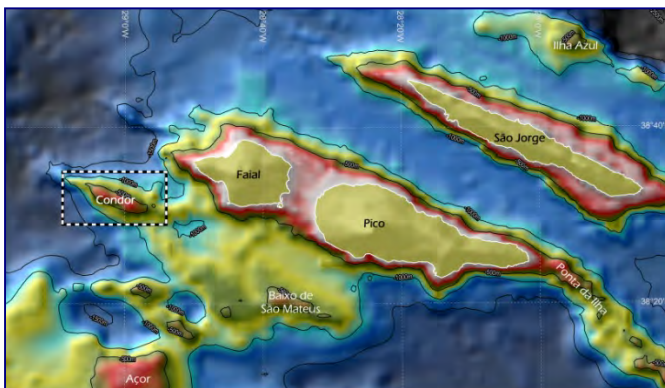


Figure 1: Condor seamount in the vicinity of Faial Island, Azores. (Bathymetry data credits: Lourenço et al., 1998).

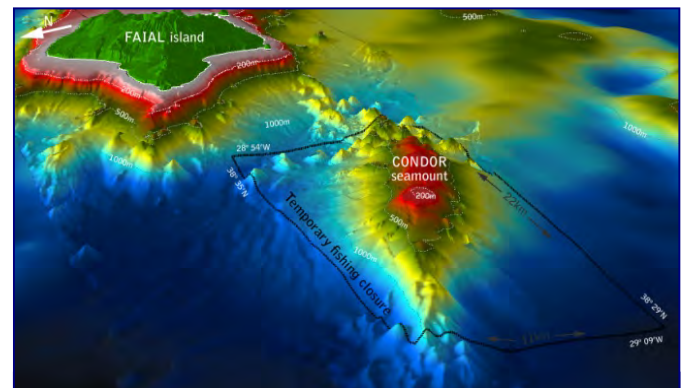


Figure 2: Perspective of the Condor seamount (2x vertical exaggeration) showing the spatial limits of fishing closure that permits the installation of the seamount scientific observatory. (Bathymetry data credits: EMEPC, DOP-UAz, Project STRIPAREA/UAIG-CIMA, Lourenço et al., 1998).

Geomorphology

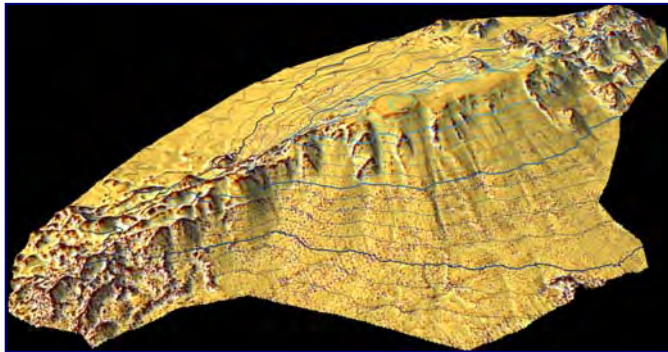
High-resolution bathymetry is a fundamental data layer that describes the geomorphology of an area, and should provide a preliminary map of seafloor habitats. An early acquisition of such datasets generally guarantees a better targeted and cost-effective sampling strategy for the duration of the project as well a basis for oceanographic and benthic habitat modeling.

The Condor bathymetry grid has been collated from three different multibeam surveys and resolved the seamount morphology in unprecedented detail. Condor was revealed to be essentially made up from a linear volcanic edifice likely produced by lavas erupting from dykes oriented along the ridge. The resulting elongated structure presently totals 12km by 4km at the 500m contour level. A landscape classification produced on the basis of classical biological depth zones,

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slope classes and topographical categories revealed a structure dominated by bathyal slopes (66.5%), flats (13.5%), depressions (10.4%) and crests (9.1%).



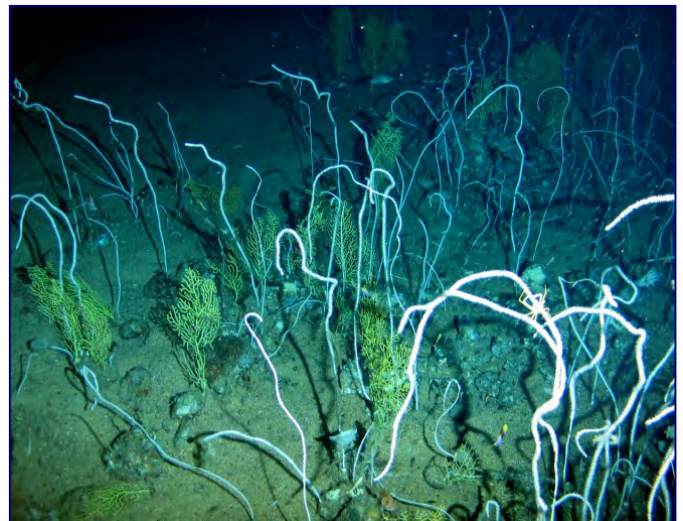
In order to develop statistical models of benthic species distributions and abundances, several terrain variables (e.g., slope, aspect, curvature and ruggedness) have also been computed from the bathymetry and will be related to the biological occurrences.

Left: 3-D representation of Condor's curvature map, highlighting convex areas (dark brown) more prone to accelerated currents and rocky exposures. Bathymetry data credits: EMEPC, DOP-UAz; Project STRIPAREA/UAlg-CIMA.

Summit habitats

The seamount summit is dominated by a broad area that was likely flattened by surf during earlier times of lower sea-level. This theory is supported by the finding of concentrations of well-rounded boulders (such as are found on a beach). Biological communities developing in the area are characterized by dense gorgonians gardens colonizing mixed substrates. *Viminella flagellum* and *Dentomuricea* sp. dominate these assemblages between 197m and 287m depth (right) but other less abundant gorgonians (e.g., *Callogorgia verticillata* and cf. *Narella/Paracalyptophora*) have also been observed. These tall organisms, which can exceed heights of 1.5m, augment the structural complexity of the seafloor at different scales, creating a higher diversity of surfaces for attachment, shelter, feeding and a number of other biological associations with more or less benefits for the organisms involved.

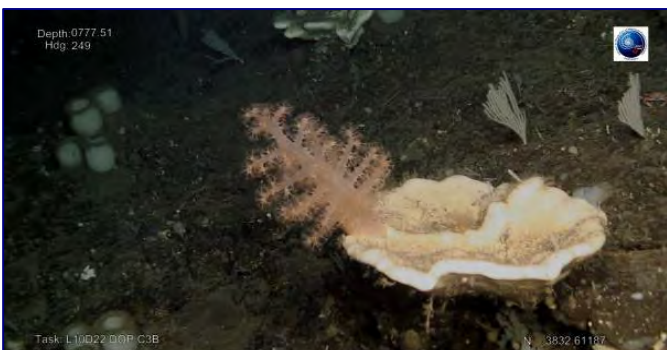
A total of 12 teleost fish and 3 shrimp species were recorded on the fishing sets conducted on the seamount summit down to 300m. The blackspot seabream *Pagellus bogaraveo* was the most abundant fish (45% of the total catch) whilst crustacean catches were dominated by the soldier striped shrimp *Plesionika edwardsii* (99.6% of the total catch).



Above: Coral gardens dominated by *Viminella flagellum* (White whip coral) and *Dentomuricea* sp. (Yellow fan gorgonian) on Condor's summit. (Image credits: ©Greenpeace/Gavin Newman).

Flank habitats

The flanks of the seamount are characterized by slopes of 10 to 25° that have been generally smoothed by considerable sedimentary deposits likely produced by Surtseyan eruptions on the shallowest parts of the ridge. Unconsolidated sediments were generally poor in tall epibenthic species but showed an abundance of short and encrusting sponges where hard surficial crusts had formed. Dense aggregations of the bird nest sponge *Pheronema carpenleri* were found lower down the flanks, between 720 and 860m depth, as well as abundant cidarid urchins (830-965m).



Left: Large soft coral on a lithistid sponge on a Condor flank. Other suspension feeders like bird nest sponges (*Pheronema carpenleri*) and primnoid gorgonians are also visible in the image.

The few across-slope rocky ridges and the cones and lava ridges observed on the seamount extremities are likely colonized by a richer epibenthic assemblage as indicated by the variety of large suspension feeders found on a northern flank rocky ridge explored by the ROV (left).

Fisheries surveys on the seamount flanks revealed the occurrence of 20 teleost fish species, 7 elasmobranch fish species and 9 shrimp species. The most abundant teleosts were the blackbelly rosefish *Helicolenus dactylopterus dactylopterus* (35.9% of total catch) and the common mora *Mora moro* (34.4% of total catch). Among the elasmobranchs, the birdbeak dogfish *Deania calcea* made up 40.9% of total catch. The dominant shrimp species was the soldier striped shrimp *Plesionika edwardsii* (66.5% of total catch), followed by the golden shrimp *Plesionika martia* (23.2% of total catch).

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Future

The multidisciplinary research effort focusing on Condor is supported by the projects CORALFISH, CONDOR, CORAZON and HERMIONE and will continue until 2012. The resulting information will produce a more comprehensive understanding of physical and biological processes occurring in a seamount context from the sea surface down to the seafloor.

Further reading:

The webpage created by project CONDOR at <http://www.condor-project.org/> presents a lot of interesting information about this site and the ongoing research activities.

Morato, T., T.J. Pitcher, M.R. Clark, G. Menezes, F. Tempera, F. Porteiro, E. Giacomello & R.S. Santos (2010). Can we protect seamounts for research? A Call for Conservation. *Oceanography*, 23 (1): 190-199.

Tempera, F., E. Giacomello, N. Mitchell, A.S. Campos, A. Braga Henriques, A. Martins, I. Bashmachnikov, T. Morato, A. Colaço, F.M. Porteiro, D. Catarino, J. Gonçalves, M.R. Pinho, E.J. Isidro, R.S. Santos and G. Menezes (in press). Mapping the Condor seamount seafloor environment and associated biological assemblages (Azores, NE Atlantic). In Baker, E. and P. Harris (eds.). *Seafloor Geomorphology as Benthic Habitat: Geohab Atlas of Seafloor Geomorphic Features and Benthic Habitats. Elsevier Insights.*

Acknowledgements

Thanks are due to several researchers collaborating in the consortium studying the Condor seamount, including Eva Giacomello, Gui Menezes, Diana Catarino, Neil Mitchell, Aldino Campos, Andreia Henriques, Ana Martins, Igor Bashmachnikov, Eduardo Isidro, Telmo Morato, Ana Colaço, Filipe Porteiro, João Gonçalves, Mário Rui Pinho and Ricardo Serrão Santos.

Glossary

ADCP (Acoustic Doppler Current Profiler): A sonar that attempts to produce a record of water current velocities for a range of depths. They can be configured for mounting on the seabed for long term current & wave studies, and can stay underwater for years at a time.

Artisanal fishery: Traditional or small-scale fishery, usually operating close to shore, and catching fish mainly for local consumption. www.fao.org/fishery/topic/14753/en

Benthic: The ecological region at the bottom of the water column comprising the sediment surface and some sub-surface layers. Organisms that inhabit this zone are known as the benthos.

Biotope: An area of uniform environmental conditions providing a living place for a specific assemblage of plants and animals.

CTD: A conductivity, temperature, depth instrument used for continuous measurement of salinity, temperature, and depth of ocean waters. Salinity is calculated from measurements of electrical conductivity, and depth from hydrostatic pressure measurements.

Dyke: A sheet-like (often vertical – sub-vertical) body of igneous rock, often basaltic in composition.

Elasmobranch: Fish with cartilaginous skeletons such as sharks, skates and rays

Epibenthic: Living on the sea floor

Gorgonian: An order of colonial corals which includes sea whips and sea fans

Grab sampling: A method for collecting sediments (and associated fauna) from the seafloor with a bucket-like device.

Longline: A method of fishing which uses one long line to which many branch lines are attached. The branch lines have baited hooks at their ends. It is especially suitable for catching high value, large fish such as tuna. Long-lining has a relatively low rate of by-catch e.g. of turtles or sharks, but birds may get caught and drown if they dive after the bait.

Multibeam sonar: A highly accurate and high-resolution method for determination of water depth using multiple echo-sounders transmitting from and recording to an underwater vessel.

Seamount: A mountain rising from the seafloor that does not reach the surface (and is therefore not an island). They have a volcanic origin, and often occur in chains. Ecologically they are important because they provide habitats which contrast with the surrounding deep sea, and because they may cause deflection of ocean currents and e.g. upwelling of nutrient-rich waters.

Surtseyan A Surtseyan eruption is a type of volcanic eruption that takes place in shallow seas or lakes. It is named after the island of Surtsey off the southern coast of Iceland. The eruptions are commonly violent, depositing layers of fine material such as ash.

Teleost: Ray-finned bony fish e.g. salmon, herring

Upcoming Event: International Symposium on Deep Sea Corals (ISDSC 5)

The 5th International Symposium on Deep Sea Corals (ISDSC 5) will take place in Amsterdam, the Netherlands, from 2-7 April 2012. The symposium will be hosted and organized by the Royal Netherlands Institute for Sea Research (Royal NIOZ), who are major partners in CoralFISH, with considerable support from the Netherlands Organisation for Scientific Research (NWO) and other European, American and international Organisations. Since the first ISDSC, held in Halifax (Canada) in 2000, the symposium has established itself as the major conference for all aspects of cold-water coral research.

The meeting will cross the boundaries between marine geology, biology, chemistry and physics, and address key scientific issues such as ecosystem functioning, biodiversity, environmental forcing factors, coral carbonate mound initiation, and their role in past and present biogeography, deep-water reef development and diagenesis. More applied aspects will also be covered, including (potential) reservoir capacities of carbonate mounds (under past and present constraints) and the effects of climate change. All these issues will be discussed in a global context alongside dedicated science-policy interface sessions outlining the most recent developments in management and conservation. ISDSC 5 will host workshops of pan-European and Trans-Atlantic Coral Ecosystems Study groups.

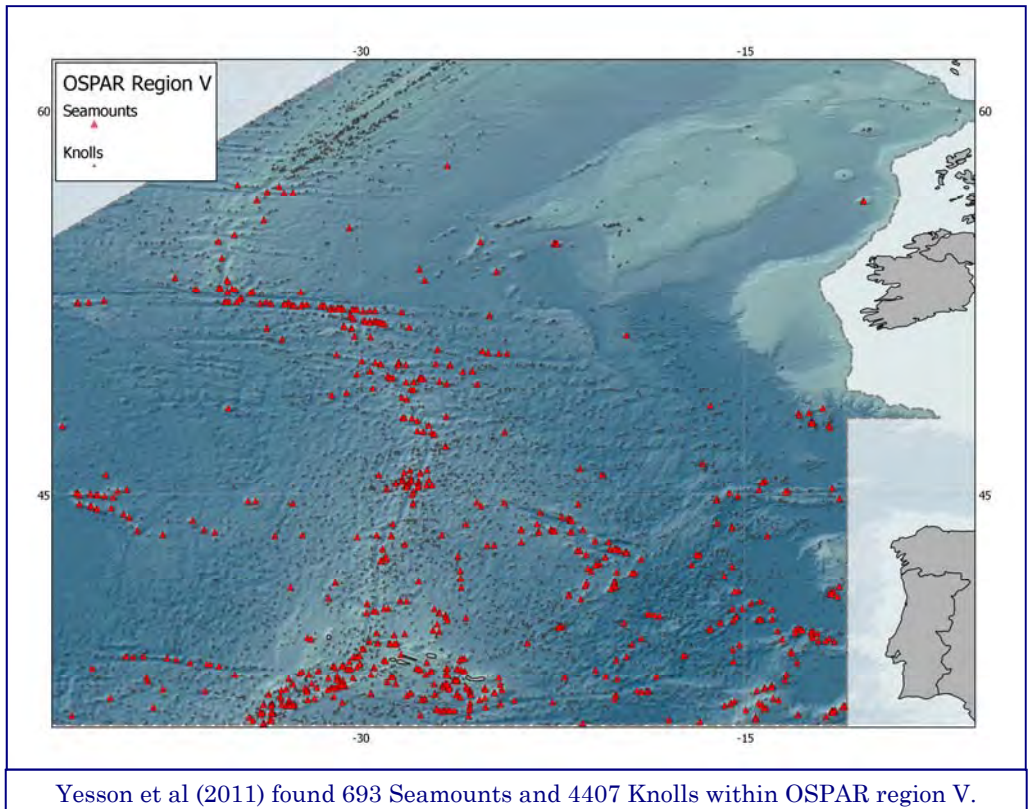
For more information on the Symposium, visit www.deepseacoral.nl/index.htm



Seamounts: Undersea mountains 'litter' ocean floor

CoralFISH researchers Chris Yesson (Zoological Society of London) and Alex Rogers (formerly ZSL, now University of Oxford) received quite a bit of international media coverage recently for their team's work on seamounts (published in *Deep Sea Research Part 1*, April 2011). As featured elsewhere in this newsletter (Condor Seamount, Azores, p2-4), seamounts are undersea mountains. They are distinct ecosystems, which may be important to local and 'visitor' species, including commercially important fish stocks. The biological communities associated with seamounts may be vulnerable to physical damage and slow to recover from such damage, and so methods for identifying and protecting seamounts are an important area of research.

Chris and his team used a recent high resolution US Geological Survey map of the ocean floor to identify potential seamounts and knolls (similar but smaller structures than seamounts), based on the size and shape of peaks identified rising from the ocean floor. By cross-referencing the seamounts identified from the global map with known well surveyed areas in New Zealand and the Azores, the team estimated that there are approximately 33,500 and 138,500 knolls in the world's oceans, covering an area between them of over 20% of the



Yesson et al (2011) found 693 Seamounts and 4407 Knolls within OSPAR region V.

ocean's floor. Only a tiny fraction of these seamounts have been biologically surveyed – approximately 250 – so Chris and his team are hoping that their recent work will be an important resource for other scientists and conservationists to help manage seamounts and knolls for future generations.

Deep Sea Research Part I: Oceanographic Research Papers Volume 58, Issue 4, April 2011, Pages 442-453
<http://dx.doi.org/10.1016/j.dsr.2011.02.004>

Schools' programme in Italy

CoNISMa's Antonella Indennidate (right), is researching for her PhD in Bari, under the supervision of Prof. Gianfranco D'Onghia. In May, she visited the Scuola Media Statale "Carlo Levi" in Bari, to give presentations to the 11-12 year old students about "The deep sea" and "Cold Water Corals". Antonella focussed on the work being carried out by CoralFISH and the relevant research activities being carried out in the Santa Maria di Leuca coral province (Ionian Sea).



'Breathe in, breathe out' ...: Træna reef's respiration studied by IMR-led team

During the final week in May, the IMR's research vessel, the 'Håkon Mosby' visited the Træna coral reef off the northern coast of Norway. The title of the cruise was 'Respiration studies of a cold-water coral ecosystem and preparation for long-term monitoring of the near-bottom environment and the coral reefs' Jan Helge Fosså (IMR) sent this report and photos from the cruise.

General purpose of the cruise

The cruise starts from Bodø on the 26th of May, in quite cold weather with snow in the surrounding mountains. After all the necessary equipment was loaded we head for the Træna coral reef field. This field is protected against bottom trawling and contains 1500 elongated reefs.

In addition to the regular crew, there are 3 scientists from the Institute of Marine Research in Norway (IMR), three engineers who help with the electronics and ROV (unmanned submersible) operations, and 3 visiting scientists from the Netherlands.

According to cruise leader Tina Kutti (left), the main purposes of the cruise are to start monitoring of the environment and coral reefs, and make respiration measurements of the sediments. The oxygen uptake will be measured in the laboratory on board and at the bottom, 300m below the sea surface. The results will be used as input to the CoralFISH numerical model of the coral ecosystem.

Monitoring the near bottom environment and coral reefs

Eirik Tenningen is responsible for the two sediment traps will be placed on the seabed - one in a non coral area and one in an area with coral reefs and sponges (below). These traps will obtain information about the environment close to the seabed, describe seasonal variations, and possible differences between coral and non coral areas. Other studies indicate that corals and sponges grow places with high density of particles. We will try to test this for the Træna field.

The two traps will sample a whole year before we take them up.



Eirik Tenningen prepares to launch a sediment trap



Tina Kutti, the cruise leader, holds a newly brought up coral branch.

Particulate matter is collected in 21 bottles that are placed in a circle. Every third week, a new bottle is opened by a computer-controlled motor, powered by batteries that can last for up to 5 years.

The samples collected in the bottles will give information about how much food there is in the near-bottom water for corals and other benthic animals. We are also interested to know if there is a difference in the quality of the food between the two areas.

Two reefs will be chosen for monitoring. Markers will be placed close to colonies that are easily accessed with the ROV. We hope that this study is the start of a long-lasting monitoring program, an issue that has recently become more important since the area has been opened for oil exploration. A time series, such as that collected over the course of a year, can give valuable baseline information for such monitoring.

Sediment respiration and food web studies

This study will give an estimate of the activity of the benthic fauna in the sediment by measuring the oxygen consumption. The higher the oxygen consumption, the higher the activity. Marc and Dick (NIOZ & NIOO-KNAW) use a box-corer that takes a quantitative undisturbed sediment sample from the bottom (opposite, top left). A smaller sample is taken from the box-core into the laboratory on board, where the oxygen consumption is measured over a time period of 10 hours with a so-called incubation method.

Samples will be taken from a non coral area and in an area with corals and sponges. In this way we can see if there is a difference in the activity in the sediment in these two areas.

(Continued from page 6)



Marc Lavaleye and Dick van Oevelen have a philosophical discussion over a rather small box-corer catch.



A piece of live *Lophelia*-coral with some blue eggs from a squid attached.

We have also taken a small piece of live coral with the 'hand' on the ROV and will measure the oxygen consumption of this. A tissue sample of the corals can tell us what kind of food they eat by measuring the ratio of stable isotopes of carbon and nitrogen in the tissue (right).

The information from the sediment and the coral will be used in a numerical ecosystem model of the coral habitat. The data that we obtain on this cruise is very important to complete the CoralFISH model.

Integrated benthic mineralisation

By measuring oxygen uptake rates over various sediment environments, we aim to quantify the benthic degradation activity and link it to the supply of organic matter to the seafloor. The technique is based on a relatively newly developed method named "Eddy covariance measurements". The method provides a promising large scale (>20m²) technique to quantify degradation rates (oxygen uptake = respiration).

In coral reef environments, incubations are difficult to perform: the complex 3D structure of the seabed makes it difficult to obtain proper and reliable enclosure respiration experiments.

This new Eddy covariance technique does not disturb the sediment or the corals. Therefore it seems to be a good alternative or complement to the sediment respiration incubations. Since we are using both methods on the cruise we can compare the results. We will sample on the top and in front of a reef. An area without corals serves as a control or comparison.

The instruments are put on a small lander placed on the bottom facing the current for 2 hours (Figures 5 and 6). There is an oxygen sensor and a device that measures the current 64 times per second on the lander.



Dick and Cecile Cathalot mount the instruments on the "Eddy covariance" lander (above) before it is deployed at 280m depth in the Træna coral field (right). It gives an estimate of oxygen uptake by the benthic habitat without taking a sample of the bottom. The lander is about 1.5m high.



Scientists participating in the cruise:

Cecile Cathalot, Dick van Oevelen, NIOO; Netherlands Institute of Ecology; Marc Lavaleye, NIOZ, Netherlands Institute of Sea Research; Tina Kutti, Eirik Tenningen, Jan Helge Fosså, Institute of Marine Research (IMR), Norway.

'State of the ocean' meeting

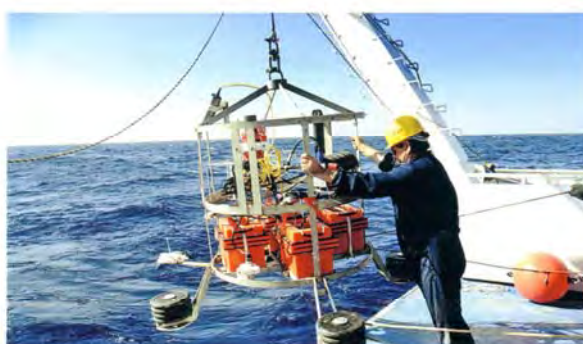
In early April 2011, world experts on the ocean met in the University of Oxford to discuss the stresses and impacts faced by the world's oceans, and to propose creative solutions to these. The event was led by the International Programme on the State of the Ocean (IPSO), in partnership with the International Union for Conservation of Nature (IUCN). CoralFISH researcher Prof Alex Rogers, in his capacity as scientific director of IPSO, played a pivotal role organising and chairing the workshop.

The delegates, including a number of CoralFISH researchers had a stark message for us "...that not only are we already experiencing severe declines in many species to the point of commercial extinction in some cases, and an unparalleled rate of regional extinctions of habitat types (e.g. mangroves and seagrass meadows), but we now face losing marine species and entire marine ecosystems, such as coral reefs, within a single generation. Unless action is taken now, the consequences of our activities are at a high risk of causing, through the combined effects of climate change, overexploitation, pollution and habitat loss, the next globally significant extinction event in the ocean. It is notable that the occurrence of multiple high intensity stressors has been a pre-requisite for all the five global extinction events of the past 600 million years."

For more information on the meeting's findings, visit <http://www.stateoftheocean.org/>

Finding with MEMO: CoralFISH features in popular Italian magazine "L'Espresso"

The headline translates as 'One thousand leagues under the sea', which might be a slight exaggeration (given that 1 league equals 5,556m) but this was the eye-catching top of an article in L'Espresso. The weekly Italian magazine, with a circulation of over 350,000, featured CoNISMa's MEMO lander in its science section at the start of July. CoralFISH gets a mention in the article



UNA RICERCA DEL CNR Scienze

A SINISTRA: LA SONDA MEMO VIENE CALATA NELLO IONIO. SOTTO: ALCUNE IMMAGINI CHE HA RIPRESO



Mille leghe sotto i mari

Una sonda calata nello Ionio. A grande profondità. Per studiare la vita negli abissi. Tra specie sconosciute e colonie di coralli

È qui che proliferano paromole dagli arti lunghi più di 20 centimetri, squali, e colonie di coralli bianchi. Ma non solo, perché i biologi scoprono nuove specie ogni volta che esplorano un settore dello Ionio: sui fondali tra i 400 e i mille metri di profondità, al largo di Santa Maria di Leuca hanno osservato che le colonie di candidi coralli «ospitano più di 200 specie», spiega Gianfranco D'Onghia, professore di Ecologia all'Università di Bari: «Di cui almeno cento sconosciute». Le colonie di coralli formano un habitat molto diverso dai fondali fangosi e sterili dell'immagine classica degli abissi. Sono ancora scarse le rife-

Oceanlab (University of Aberdeen) outreach activities

Oceanlab scientists Mark Shields and Thomas Linley have been busy in Aberdeen with outreach activities. In February, they hosted a visit from the Association for Science Education. The event was attended by local primary and secondary school teachers with the aim of helping teachers identify and develop teaching resources for incorporating marine science into the school curriculum. Teachers left with a greater understanding of cold water corals and associated habitats and where they can be found in European waters.

In March, Oceanlab staff were involved in the National Science and Engineering Week (NSEW), an annual event organised by the British Science Association. The week consists of a huge variety of science and engineering events and activities for everyone. This year, Oceanlab were at the Discovery Day hosted by the Maritime Museum in Aberdeen, which was visited by almost 400 people. Visitors were welcomed by a fantastic range of events and exhibitions aimed at all the family. Oceanlab staff gave an insight into life in the deep oceans and highlighted some of the technology we use in CoralFISH. The event was a great success and provided an excellent opportunity for the public to interact with scientists and learn more about our current understanding of our deep oceans.



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