COMARGE

- COntinental MARGin Ecosystems on a worldwide scale -

PI Names

Dr Myriam Sibuet

Institut Océanographique, 195 rue Saint-Jacques, 75005 Paris

Tel: +33, Fax: +33, myriam.sibuet@wanadoo.fr

Dr. Robert S. Carney

Dept. Oceanography and Coastal Sciences, Louisiana State University, USA

Phone 225-578-6511, Fax 225-578-6326, rcarne1@lsu.edu

Steering Committee Members

Dr David Billett	National Oceanography Centre, Southampton, UK	dsmb@noc.soton.ac.uk
Joëlle Galéron	Ifremer, Brest, France	joelle.galeron@ifremer.fr
Dr Baban Ingole	National Institute of Oceanography, Goa, India	baban@nio.org
Dr Hiroshi Kitazato	JAMSTEC, Yokosuka, Japan	kitazatoh@jamstec.go.jp
Dr Elena Krylova	P.P. Shirshov Institute of Oceanology, Moscow, Russia	elenamkr@mail.ru
Dr Lisa A. Levin	Integrative Oceanography Division, Scripps Institution of Oceanography, La Jolla, California	llevin@ucsd.edu
Dr Gary Poore	Museum Victoria, Melbourne, Australia	gpoore@museum.vic.gov.au
Dr Helena Passeri Lavrado	Universidade Federal do Rio de Janeiro, Ilha do Fundão, Rio de Janeiro, Brazil	hpasseri@biologia.ufrj.br
Dr Gilbert Thomas Rowe	Texas A&M University, POB 1675, Dept. of Marine Biology, Galveston, TX, USA	roweg@tamug.edu
Dr Javier Sellanes	Universida Catolica del Norte, Coquimbo, Chile	sellanes@ucn.cl
Dr Ann Vanreusel	Ghent University, Ghent, Belgium	ann.vanreusel@ugent.be

Project Manager & Education and Outreach Network Liaison

Lenaick Menot

Ifremer, centre de Best, Plouzané, France

Institut Océanographique, 195 rue Saint-Jacques, 75005 Paris

Phone +33 2 98 22 45 52, Fax +33 2 98 22 45 57 lmenot@ifremer.fr

1. NEW INFORMATION

A. GENERAL PROJECT REVIEW

In 2008-2009, COMARGE carried on with its scientific syntheses, networking as well as education and outreach activities.

i. Scientific syntheses

The three topics for syntheses were defined at the very beginning of the project. Major progresses were made on each topic in 2008/09.

- **Roles of Habitat Heterogeneity in Generating and Maintaining Continental Margin Biodiversity**

The topic is leaded by Dr Lisa Levin. Following the workshop organized in September 2008 at the Scripps Institution of Oceanography, a special issue of Marine Ecology is being prepared. Seventeen original papers including 3 synthesis papers have been submitted for this issue edited by Lisa Levin, Myriam Sibuet, Andrew Gooday, Craig Smith and Ann Vanreusel. The volume will be published in 2010 and papers freely available on the website of the journal. The references of submitted papers have been uploaded in the CoML bibliographic database.

- **How are species distributed on the large scale?**

The questions are addressed along four central themes:

1. The zonation of species on continental margins;
2. The bathymetric trends in diversity;
3. The biogeography of a widespread megafaunal taxon, the Galatheoidea;
4. The deep connection between Antarctica and South-America;
5. The discovery of new species.

The first of these is leaded by Dr Robert Carney. Following a literature survey on zonation undertaken at the beginning of COMARGE (Carney, 2005), the objective is to take advantage of the increase in the availability of data on the distribution of species, in particular through OBIS, to determine:

(1) if zonation is a most common distribution pattern along margins,
(2) if there is global similarities in the zonation found,
(3) if global correlations of zonation help identify most likely causes for the phenomena.

The work began with the distribution of fish species in the North Atlantic and will be pursed with other taxa for which the taxonomy is stable and consistent enough across datasets. A meeting with the Mapping and Visualization team at Duke University in August 2009 helped identifying mapping tools and statistical tools that would support the analyses and visualization of the results.

The synthesis on diversity-depth trends is leaded by Dr Lenaick Menot. The objective is to test the ubiquity of a unimodal relationship between diversity and depth (Rex, 1981) and identify factors driving this relationship. A literature survey as well as unpublished data provided by COMARGE members allowed to gather 16 cross-margin datasets from the Arctic, Atlantic, Pacific, Indian, Southern Oceans and the Gulf of Mexico, each spanning a depth range of 1000 m up to 4000 m. The first results were presented during the Ocean Science Meeting in Orlando, Florida (Menot et al., 2008a) and the World Conference on Marine Biodiversity in Valencia (Menot et al., 2008b). Analyses of correlations between diversity trends and environmental factors are ongoing. The low resolution of environmental data at global scale limited the power of the analyses until now. Discussions with the M&V team however allowed identifying models such as HYCOM that may provide high resolution

estimates of temperature and currents on the seafloor. Collaborations with the M&V team are ongoing to develop high resolution global maps for these two environmental variables.

Syntheses on Galatheoidea are leaded by Dr Gary Poore. Following the Workshop on Squat Lobster Biology held in Wellington, New Zealand, in October 2007 the participants have published a checklist of all species (Baba et al., 2008). This list is now available on the web through the World Register of Marine Species. Participants in the workshop, independently and collaboratively, continue to describe new taxa and revise others and are working on a biogeographic analysis of this diverse group world-wide. COMARGE invited a proposal from Museum Victoria, Melbourne, Australia, to further work on squat lobsters. A post-doc has now been appointed. The project will deliver: (1) free web-based illustrated multi-choice keys to identification for species (completion of work started at the workshop); (2) databases for description of species, and (3) a book on the biology and identification of squat lobsters. Benefits of the work are: (1) obscure or arcane literature becomes obsolete, (2) a common source for identification ensures that questions about the distribution and biogeography of squat lobsters can be answered reliably, (3) consistency of identifications permitting cross-study comparisons, (4) databases that provide a consistent platform for the description of new taxa, and (5) biogeographic analysis in collaboration with squat lobster workers worldwide.

The deep connections between Antarctica and South-America will be addressed during a workshop and symposium organized by Drs Helena Lavrado and Lúcia de Siqueira Campos that will be held at the Universidade Federal do Rio de Janeiro, 3-6 November 2009. The workshop is co-sponsored by COMARGE and CAML for the CoML. The workshop will be attended by about 60 scientists, who will share data and expertise. The workshop will be followed by a symposium attended by national authorities and a larger panel of scientists. The results of the workshop and symposium will be published in a special issue of *Oecologia Brasiliensis*.

A follow-up of Phlippe Bouchet's synthesis on the discovery of marine species has been funded by COMARGE. The first analysis covered species description published in 2002-2003. This new one extended the period to 2004-2006. About 8000 new marine species were described during the whole period. The list was sent to the World Register of Marine Life and allowed adding about 5000 new names to the database. Additionally, 600 publications were randomly chosen to further describe the origin of new species description. For COMARGE, it was particularly interesting to know the depth range and habitat of the new species. The results of this analysis are now used in the framework of the CoML synthesis on species richness and are among the candidate papers for a CoML cluster in Nature.

- **Human Threats on Continental Margin Habitats**

Continental margins are under increasing pressure from human activities. These include in particular the development of oil and gas exploitation, hard mineral mining, deep-sea fisheries, chemical contamination from large cities and climate change. Although the deep ocean might have been perceived as globally resilient due to its vastness, buffering environmental changes, the deep continental margins, where most human activities concentrate, are a tiny ribbon representing about 10% of the ocean seafloor. Key socio economic and governance issues related to the conservation, management and sustainable use of the deep-sea floor are pending knowledge on species distribution and diversity patterns as well as on the distribution and relative intensity of human activities.
In 2009, COMARGE decided to support Dr David Billett and Alan Hughes from the National Oceanography Centre in Southampton in an attempt to identify and map human activities occurring during one year (2005) in waters deeper than 200 m on the seafloor in the North East Atlantic. The footprints of activities will be quantified, where practicable. Problems of availability, access, content, veracity and consistency of information will be revealed and identified. Information flow between the various actors and organizations operating in the North East Atlantic will be identified. A further task

will be to investigate the vessel reporting requirements of States and Regional Fisheries Management Organizations (RFMOs). In addition, information to support mapping in the North West Atlantic will be explored and the feasibility of mapping determined.

ii. Networking: Ongoing affiliated projects and cruises

- **LOOME observatory**

LOOME for Long-term Observations on Mud-volcano Eruptions is a project of the E.-U. Network of Excellence ESONET. LOOME proposes a detailed investigation of the temporal variability at an active gas emitting mud volcano covering the sequence of events before, during, and after an eruption. It also intends to analyze their effects on gas hydrate stability, seafloor morphology and the distribution and colonization patterns of benthic communities. The autonomous non-cabled observatory is equipped to perform seafloor seismics, temperature and pore pressure measurements, chemical profiling, sonar detection of gas flares, and hydrography of bottom water, together with the study of colonization patterns, community structure and biodiversity.
The LOOME station has been successfully deployed in July 2009 on the Haakon Mosby mud volcano during a cruise of the R/V *Polastern* leaded by Dr. Mickael Klages. The station will be recovered in September 2010 during a cruise of the R/V Meriam.

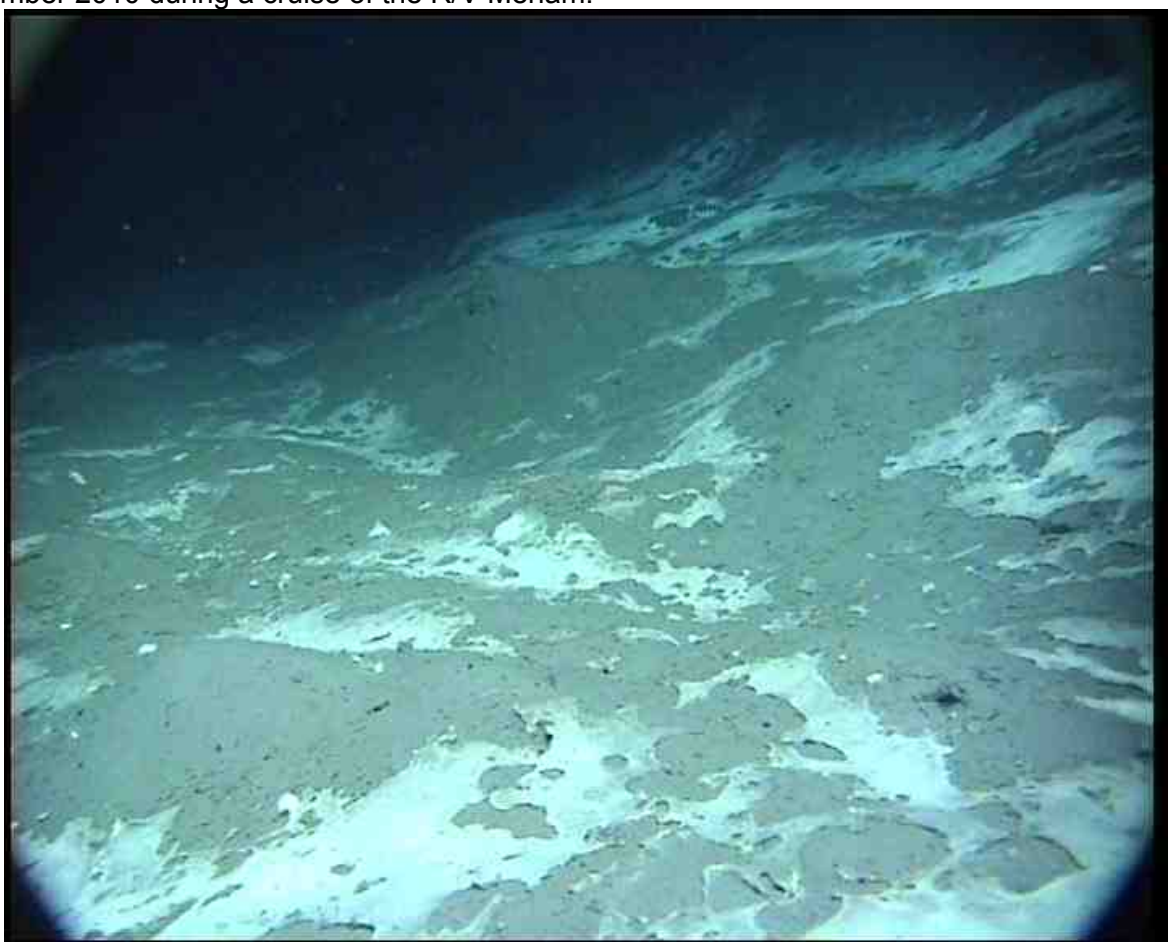

Figure 1: First picture taken by the video camera of the LOOME station showing a bacterial mat associated with an active site of the Haakon Mosby Mud Volcano. The camera will record two sequences of three minutes per day over a period of 14 months. © MARUM

- **Marine geological survey of the Vøring Plateau**

A marine geological survey of the Vøring Plateau was carried out by the University of Bergen in the framework of the Petromarks research project "Gas Hydrates on the Norway-Barents Sea-Svalbard margin" (GANS). The cruise on board R/V *G.O Sars* with ROV *Bathysaurus*, leaded by Pr. Haflidi Haflidason set sail the 28 July 2008 for 11 days. Biological samples from methane seeps were examined by Dr Elena Krylova at the Shirshov Institute of Oceanology in Moscow. One new species of Vesicomyidae was discovered, which is under description.

- **Biofun**

The BIOFUN programme (PIs: Prof. F. Sardà & Dr. E. Ramirez-Llodra) started in 2007, in the framework of the EuroDEEP Eurocores (ESF). BIOFUN has 10 European partners from 7 nations (http://www.eurodeep.net/biofun/) for the study of biodiversity and ecosystem functioning in contrasting Southern European deep-sea environments, from viruses to megafauna.
The field programme began in 2008 with two cruises on the Galicia bank in June and September 2008, one cruise in the central Mediterranean Sea in June 2008 and a trans-Mediterranean cruise in June 2009. Three more cruises are planned in October and November 2009.

- **Prometeo**

The national Spanish project PROMETEO (PI: Dr JB Company) started in 2008 to conduct an integrated seasonal study of deep canyons and slopes of the Western Mediterranean Sea.
Four 14-day cruises have been conducted (November 2008, February, May & September 2009) on board R/V *García del Cid* to sample the Blanes margin and canyon (Catalan Sea), between 900 and 1500 m depth. All cruises had two legs. The first legs (PI. A. Calafat) were dedicated to physical oceanography (CTD and moorings), geology and geochemistry (multicorers) and biology (multicorers for meiofauna and epibenthic sled for macrofauna). The second legs (PI: JB Company) were dedicated to biological studies (Agassiz for macro and mega-invertebrates and OTMS for mega-invertebrates and fishes). All fauna has been identified to species level, counted and weighted for biodiversity and biogeography analyses. Specific samples have been preserved frozen for future stable isotope and chemical contamination analyses. Gonads of all fish have been preserved in formol for reproductive studies. All litter sampled was qualified and quantified. The analyses of the samples are in progress.
One more cruise is planned for November 2009, following the same strategy as for the previous ones. This cruise will conclude the seasonal sampling to be conducted within PROMETEO.

- **CRROCKS!**

The CRROCKS! (Costa Rica Rocks) research cruise leaded by Dr. Lisa Levin on board the R/V *Atlantis* investigates cold seep and Oxygen Minimum Zones along the continental margin off Costa Rica. The objectives of the cruise relevant to COMARGE were to examine the role of anaerobic methane oxidation and carbonate production in structuring seep ecosystems (microbes, foraminifera, invertebrates) and study of the slope macro and meiofauna across the OMZ. During the day, 13 dives of the submersible *Alvin* allowed to sample and characterize the fauna and environment associated with methane seeps while acoustic mapping and OMZ sampling were done at night. The first results suggest that up to a dozen of species might be new to science.

- **Species' range size in the deep sea**

Dr David Thistle (Florida State University) was funded by the U.S. National Science Foundation to study species' range sizes in the deep sea using harpacticoid copepods as the study group. He and his team will use morphological methods to group individuals that appear to be conspecific and will then use gene-sequence analysis to test these taxonomic hypotheses. Multiple-corer sampling at each of eight stations was done during a 21-day cruise on the RV *Point Sur* in September and October, 2008. The stations were at 2700 m and 3700 m depth and were spread along much of the

west coast of the United States. On each multiple corer lowering samples were collected for granulometry and the abundance of bacteria, bioavailable protein, chloroplastic pigments, organic carbon, and organic nitrogen. The rest of the cores will be used for the biogeography study.
Graduate students from Florida State University and Texas A and M University received first-hand experience of sampling the deep sea. Two of the Florida State University students and one of the Texas A&M University students will use the samples for their graduate research.
A scientific publicist also participated in the cruise. He posted a blog while at sea (http://rinr.fsu.edu/issues/2008summerfall/goestosea/index.asp) and has written a popular article about the work since his return (http://rinr.fsu.edu/issues/2009winter/field01_a.asp).

Figure 2: Dr David Thistle and colleagues raise the CoML flag during their cruise on board the R/V *Point Sur*.

- **Oxygen Minimum Zone in the Arabian Sea**

Biogeochemical cycles, sedimentary processes and adaptive ecology of benthic organisms at sediment-water interface were investigated across an Oxygen Minimum Zone off India. The two legs of the cruise leaded by Dr Hiroshi Kitazato on board R/V *Yokosuka* lasted for 44 days.
In total, 26 dives were carried out at five sites 500, 750, 900, 1150, 2000m. At each site, diving strategy began with a transect along the slope aiming at characterizing oxygen concentrations, sediment characters and benthic organisms along slope direction. Clear zonation of benthic communities could be observed in connection to bottom oxygen concentrations. Highly abundant and dense megabenthic communities were seen under high oxygen concentrations (>15 µM). In contrast, only protozoa and polychaetes were observed under low oxygen concentrations (<0.5 µM).
According to the results from transect dives, three major sites (500m, 800m, 1150m) were selected for long-term *in situ* experiments. At each site were carried out:
- Observations of sediment characters and benthic communities;

- Measurements of environmental variables with planer optode system, in particular incoming and outgoing oxygen fluxes as well as benthic activities at the Sediment Water Interface (SWI);
- I*n situ* feeding and colonization experiments at SWI with 13C- and 15N-labeled organic materials for calculating carbon fluxes around SWI.

In parallel to *in situ* experiments, on board experiments with oxystat system and others were performed.

Both faunal and DNA analyses for benthic taxa are planned using biological sample collections with scoop and net during the dives.

- **African deep-sea biodiversity: Spanish Joint Surveys**

In 2008 and 2009, six joint surveys of Atlantic and Indian African continental margins onboard Spanish R/V *Vizconde de Eza* were carried out to prospect demersal resources and provide a large-scale overview of deep ecosystem biodiversity. As in previous years, surveys were headed by the Instituto Español de Oceanografía, in collaboration with research institutes of African countries and the Universidad de Vigo (Spain).

Two surveys were accomplished during February – March both years at Ewing and Valdivia Banks (Walvis Ridge). The characterization of the environment included acoustic and geophysics measurements with multibeam and TOPAS as well as hydrographic measurements at 89 CTD stations. The benthic fauna was investigated at 41 stations, 35 were sampled with a bottom trawl and 6 with a rocky dredge. First results suggest that the faunistic composition in deeper stations is similar to that of the Namibian slope, with a clear dominance of *Hygrosoma petersii* (Echinothuridae), *Epizoanthus paguriphylus* (Zoantharia). Higher biodiversity was found on the seamounts with a higher dominance of sessile taxa.

In total, 215 stations were sampled off Mozambique coast from 200 to 700 m depth, during March – April 2008 and 2009. Both surveys included CTD samplings. Between 200-600 m the megafauna was dominated by Echinoidea Irregularia and Asteroidea, wit occasionally high densities of Pennatulacea and Ophiuroidea. In this depth range, the fauna showed varied trophic strategies: detritivorous, carnivorous, suspension-feeders and scavengers. Nevertheless, between 600-700 m the dominance patterns showed a different figure, being Hexactinellida, with a filter feeding strategy, and Actiniaria, mainly opportunistic omnivorous in deep waters, the most representatives taxa.

Other two surveys on shelf and slope of Mauritania (80 to 2000 m depth, 178 stations, multibeam profiles and CTD) and one survey in Guinea Bissau (15 to 1000 m, 100 st, CTD and icthyoplankton sampling) will be carried out from October to December 2009. A further survey off Mauritanian waters will be carried out during November – December 2009.

Two PhD students and two post-doc, coordinated by Prof. Ramil, are working since September 2008 on the taxonomic identification of megabenthic invertebrates from Morocco, Namibia and Mozambique. The results will allow establishing and comparing the distribution and diversity patterns of the dominant megabenthic species at regional scale along African margins with the aim of providing basic knowledge in the definition and location of vulnerable ecosystems, habitats or zones of hot-spot biodiversity which should be preserved from human impact.

- **MAINBAZA: Deep-Sea Biodiversity Exploration off Mozambique**

The MAINBAZA expedition (MAputo, INhambane, BAzaruto and ZAmbezia), is a joint venture of the French National Museum of Natural History and of the Spanish Institute of Oceanography leaded by Pr. Philippe Bouchet and Dr. Ana Ramos. The expedition on board the Spanish vessel *Vizconde de Eza* took place between April 9 and 17, and used trawls and dredges to sample animal life living on the bottom at depths between 100 and 1,800 meters. The Indian Ocean and Mozambique in particular remain poorly known and, not unexpectedly, the expedition discovered species new to science.

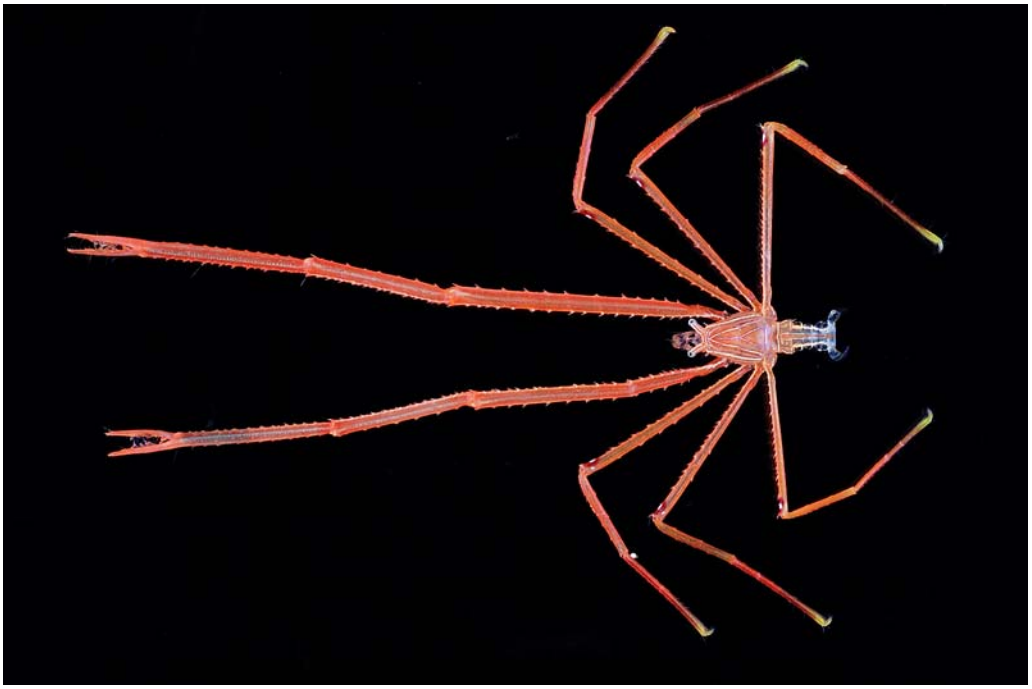

Figure 3: A new species of the spider like squat lobster of the genus *Chirostylus* which is generally associated with deep-water corals. Courtesy of Tin-Yam Chan (National Taiwan Ocean University, Keelung), MAINBAZA cruise.

- **MIRIKY: Deep-Sea Biodiversity Exploration off Madagascar**

The expedition leaded by Pr. Philippe Bouchet set sail from Nossi-Be the 24th of June 2009 for 22 days. In total, 41 dredge samples and 78 trawl samples were collected along the Northwestern margin of Madagascar at depth between 40m to 1200m. Among the main highlights of the cruise is the discovery of cold seep communities at 800 m depth, evidenced by the presence of characteristic bivalves in trawls such as *Bathymodiolus*, vesiocomyids and lucinids.

iii. Education and Outreach

- **"Deeper than Light": a Deep-Sea Life module**

In the framework of the DESEO group, COMARGE contributes on design and content of a new module on deep-sea life for the "Deeper than Light" exhibit. This new module is a large two-sided panel. One side shows a sketch of the Ocean with text describing the main deep-sea habitats. The other side is divided into three panels. One is covered with latin names of new deep-sea species described during the time-course of the Census. A second panel shows "artefacts" from the deep such as a fragment of a hydrothermal chimney, nodules, corals and garbage. The third panel has text about deep-sea science and human impacts in the deep sea.
This new module has been prepared for the opening of the exhibition "Deeper than Light" in Ålesund, Norway, the 9th of September 2009. It will next move to the Smithsonian Museum in Washington where the opening of the exhibition is planned on the 15th of February 2010.

Figure 4: One side of the new module of the “Deeper than Light” exhibition designed by the DESEO group.

- **COMARGE exhibition**

COMARGE had planned to develop its own exhibition on continental margin ecosystems. The exhibition should have been developed in parallel with the renovation of the “Centre de la mer” at the Institut Océanographique in Paris. This renovation however has been delayed.
We thus decided to focus our efforts on helping in the development of an exhibition on marine biodiversity at Oceanopolis in Brest. The exhibition will open in June 2010.

- **Ωcean movie**

Dr Myriam Sibuet has been involved in the development of scientific events accompanying the release of the movie Ωcean in France. In particular she helped on the design and content of the brochure and received an appreciated support from the Mapping and Visualization team to prepare the map for the brochure.

B. NEW OPPORTUNITIES

- **The use of metagenomic in deep-sea benthic ecology**

Taxonomic impediment is an important issue for ecological studies in the deep sea. Many macrofaunal and meiofaunal species remain undescribed and taxonomic keys for described species are not readily available. As a consequence, many ecological papers rely on putative species or even on a taxonomic resolution lower than species. The barcoding approach may prove useful to ascertain the identification of specimens but the use of now old sequencing techniques require that DNA extraction and duplication is performed on single specimens, a significant restriction when samples are made of thousands of individuals. New metagenomic techniques overcome this limitation and allow extracting and sequencing DNA from bulk sediment samples, without even the need of sorting the fauna. The use of metagenomic techniques such as the 454 already opened the window on bulk microbial diversity with some astonishing results (Sogin et al., 2006).
A new project leaded by Dr Sophie Arnaud at Ifremer and Dr Lenaick Menot for COMARGE will assess the possibility of using such metagenomic techniques for the study of meio- and macrobenthic communities. A pilot study will be undertaken in 2010 on intertidal communities that are regularly sampled in the framework of a monitoring programme of the state of health of coastal benthic communities in Britanny. If successful, a second phase of the project will aim at testing the method on deep-sea samples. The total coast of the pilot study is US$ 80.000, supported by Ifremer.
The oil company Total also expressed interest in the use of metagenomic for environmental baseline surveys and impact assessments, which offers an opportunity for matching funds.

2. UPDATES ONLY

A. SYNTHESIS PRODUCTS

Updates and changes from the 2008 Synthesis Plan with respect to COMARGE products are summarized in the table below:

Outputs	Lead author & Deadline
For Scientific Audiences	
DELTA (Descriptive Language for Taxonomic Analysis) database and interactive keys for 42 genera and 400 species from the most commonly encountered genera	Gary Poore July 2010
A book on the biology (identification, ecology, biogeography) of squat lobsters	November 2010
Biogeographic analyses using MGET (Marine Geospatial Ecology Tools) and publication	November 2010
The importance of deep-sea habitat heterogeneity for global nematode diversity	Vanreusel et al., manuscript submitted to Marine Ecology
Roles of Habitat Heterogeneity in Generating and Maintaining Continental Margin Biodiversity- A special issue of *Marine Ecology*	Edited by Lisa Levin, Myriam Sibuet, Andrew Gooday, Craig Smith and Ann Vanreusel – 17 manuscripts submitted, publication in 2010
A paper on global scale biodiversity patterns of Nematoda, their relationship with surface primary productivity	Vanreusel et al., manuscript to be submitted to PLoS Biology in December 2009

Outputs	Lead author & Deadline
Special issue of *Deep Sea Research II* "Deep Sea Benthic Ecosystems of the Equatorial African Margin: the multidisciplinary program BIOZAIRE"	Edited by Myriam Sibuet and Annick Vangriesheim, 18 papers accepted, publication in 2009
Special issue of *Deep-Sea Research II* on the Deep Gulf of Mexico Benthos Program.	Edited by Gilbert Rowe, DRSII, volume 55 (2008), 21 papers
For the General Public	
An educational exhibition illustrating the complexity of geological, physical or chemical processes on continental margins and their consequences on biological diversity	Myriam Sibuet, to be displayed in June 2010, in association with an exhibition on marine biodiversity developed by Oceanopolis in Brest.
For Conservation Stakeholders, Off Shore Industry and Environmental Agencies	
A GIS map of human activities on continental margins in the North East Atlantic	David Billet & Alan Hughes January 2010
A report on the social network that controls information flow between the various actors and organizations operating in the North East Atlantic	February 2010
A report detailing the reporting obligations imposed on fishing vessels by States and RFMOs	February 2010

References cited

Baba, K., Macpherson, E., Poore, G. C. B., Ahyong, S. T., Bermudez, A., Cabezas, P., Lin, C.-W., Nizinski, M., Rodrigues, C. & Schnabel, K. E. (2008) Catalogue of squat lobsters of the world (Crustacea: Decapoda: Anomura - families Chirostylidae, Galatheidae and Kiwaidae). *Zootaxa,* 1905**,** 1-220.

Carney, R. S. (2005) Zonation of deep biota on continental margins. *Oceanography and Marine Biology: an Annual Review,* 43**,** 211-278.

Menot, L., Carney, R. S., Sibuet, M., Rowe, G. T., Lavrado, H. P., Levin, L., Sellanes, J., Billet, D. S. M., Ingole, B., Hughes, D. J., Poore, G. C. B., Galéron, J., Vanreusel, A., Kitazato, H., Krylova, E. M., Ramos, A., Ramil, F., Narayanaswamy, B. E. & Gooday, A. J. (2008a) Local to global-scale biodiversity patterns on continental margins: First outputs from CoML/COMARGE syntheses. *2008 Ocean Sciences meeting.* Orlando, Florida.

Menot, L., Carney, R. S., Sibuet, M., Rowe, G. T., Lavrado, H. P., Levin, L. A., Sellanes, J., Billet, D. S. M., Ingole, B., Poore, G. C. B., Galéron, J., Vanreusel, A., Ramos, A., Ramil, F., Narayanaswamy, B. E. & Gooday, A. J. (2008b) The mid-slope depth peak in benthic diversity: Its commonality and potential causes. *World Conference on Marine Biodiversity.* Valencia, Spain.

Rex, M. A. (1981) Community structure in the deep-sea benthos. *Annual Revue of Ecology and Systematics,* 12**,** 331-353.

Sogin, M. L., Morrison, H. G., Huber, J. A., Welch, D. M., Huse, S. M., Neal, P. R., Arrieta, J. M. & Herndl, G. J. (2006) Microbial diversity in the deep sea and the underexplored "rare biosphere". *Proceedings of the National Academy of Sciences,* 103**,** 12115-12120.

References added in the CoML Bibliographic database

Ahyong, S. T. & Chan, T.-Y. (2008) Polychelidae from the Bohol and Sulu Seas collected by PANGLAO 2005 (Crustacea: Deapoda: Polychelidae). *The Raffles Bulletin of Zoology Supplement,* 19**,** 63-70.

Ammons, A. W. & Daly, M. (2008) Distribution, habitat use and ecology of deepwater Anemones (Actiniaria) in the Gulf of Mexico. *Deep Sea Research Part II: Topical Studies in Oceanography,* 55**,** 2657-2666.

Aranda Da Silva, A. & Gooday, A. J. (2009) Large organic-walled Protista (Gromia) in the Arabian Sea: Density, diversity, distribution and ecology. *Deep Sea Research Part II: Topical Studies in Oceanography,* 56**,** 422-433.

Babonneau, N., Cochonat, P., Dénnielou, B., Roest, W., Sibuet, M. & Vangriesheim, A. (2009) Obituary: A tribute to Bruno Savoye (1959-2008). *Deep Sea Research Part II: Topical Studies in Oceanography,* In Press, Corrected Proof.

Baco, A. R., Rowden, A. A., Levin, L. A., Smith, C. R. & Bowden, D. A. Initial characterization of cold seep faunal communities on the New Zealand Hikurangi margin. *Marine Geology,* In Press, Corrected Proof.

Baez, P. & Sellanes, J. (2009) New record of Scalpellum projectum (Crustacea: Cirripedia: Thoracica: Scalpellidae) for the continental slope of Chile and its relation with methane seeps. *Latin American Journal of Marine Sciences,* 37**,** 247-251.

Baguley, J. G., Montagna, P. A., Hyde, L. J. & Rowe, G. T. (2008) Metazoan meiofauna biomass, grazing, and weight-dependent respiration in the Northern Gulf of Mexico deep sea. *Deep Sea Research Part II: Topical Studies in Oceanography,* 55**,** 2607-2616.

Bangma, J. L. & Haedrich, R. L. (2008) Distinctiveness of the mesopelagic fish fauna in the Gulf of Mexico. *Deep Sea Research Part II: Topical Studies in Oceanography,* 55**,** 2594-2596.

Bernhard, J. M., Sen Gupta, B. K. & Baguley, J. G. (2008) Benthic foraminifera living in Gulf of Mexico bathyal and abyssal sediments: Community analysis and comparison to metazoan meiofaunal biomass and density. *Deep Sea Research Part II: Topical Studies in Oceanography,* 55**,** 2617-2626.

Biggs, D. C., Hu, C. & Müller-Karger, F. E. (2008) Remotely sensed sea-surface chlorophyll and POC flux at Deep Gulf of Mexico Benthos sampling stations. *Deep Sea Research Part II: Topical Studies in Oceanography,* 55**,** 2555-2562.

Bouchet, P., Lozouet, P. & Sysoev, A. (2009) An inordinate fondness for turrids. *Deep Sea Research Part II: Topical Studies in Oceanography,* 56**,** 1724-1731.

Bouloubassi, I., Nabais, E., Pancost, R. D., Lorre, A. & Taphanel, M.-H. (2009) First biomarker evidence for methane oxidation at cold seeps in the Southeast Atlantic (REGAB pockmark). *Deep Sea Research Part II: Topical Studies in Oceanography,* In Press, Corrected Proof.

Brand, T. D. & Griffiths, C. (2009) Seasonality in the hydrography and biogeochemistry across the Pakistan margin of the NE Arabian Sea. *Deep Sea Research Part II: Topical Studies in Oceanography,* 56**,** 283-295.

Breuer, E. R., Law, G. T. W., Woulds, C., Cowie, G. L., Shimmield, G. B., Peppe, O., Schwartz, M. & Mckinlay, S. (2009) Sedimentary oxygen consumption and microdistribution at sites across the Arabian Sea oxygen minimum zone (Pakistan margin). *Deep Sea Research Part II: Topical Studies in Oceanography,* 56**,** 296-304.

Brind'amour, A., Menot, L., Galéron, J. & Crassous, P. (2009) Spatial organization of a sedimentary macrobenthic community located on the West African Equatorial margin. *Deep Sea Research Part II: Topical Studies in Oceanography,* In Press, Corrected Proof.

Buhl-Mortensen, L., Levin, L., Buhl-Mortensen, A., Vanreusel, A., Priede, M., King, N. J. & Raes, M. (submitted) The role of biological structures as a source of habitat heterogeneity and biodiversity on the ocean margins. *Marine Ecology*.

Cambon-Bonavita, M. A., Nadalig, T., Roussel, E., Delage, E., Duperron, S., Caprais, J. C., Boetius, A. & Sibuet, M. (2009) Diversity and distribution of methane-oxidizing microbial communities associated with different faunal assemblages in a giant pockmark of the Gabon continental margin. *Deep Sea Research Part II: Topical Studies in Oceanography,* In Press, Corrected Proof.

Cordes, E. E., Ribeiro Da Cunha, M., Galéron, J., Mora, C., Olu-Le Roy, K., Sibuet, M., Van Gaever, S., Vanreusel, A. & Levin, L. A. (2009) The influence of geological, geochemical, and biogenic habitat heterogeneity on seep biodiversity. *Marine Ecology*. DOI:10.1111/j.1439-0485.2009.00334.x

Cowie, G. L. & Levin, L. A. (2009) Benthic biological and biogeochemical patterns and processes across an oxygen minimum zone (Pakistan margin, NE Arabian Sea). *Deep Sea Research Part II: Topical Studies in Oceanography,* 56**,** 261-270.

Cowie, G. L., Mowbray, S., Lewis, M., Matheson, H. & Mckenzie, R. (2009) Carbon and nitrogen elemental and stable isotopic compositions of surficial sediments from the Pakistan margin of the Arabian Sea. *Deep Sea Research Part II: Topical Studies in Oceanography,* 56**,** 271-282.

Deming, J. W. & Carpenter, S. D. (2008) Factors influencing benthic bacterial abundance, biomass, and activity on the northern continental margin and deep basin of the Gulf of Mexico. *Deep Sea Research Part II: Topical Studies in Oceanography,* 55**,** 2597-2606.

Escobar Briones, E., Estrada Santillán, E. L. & Legendre, P. (2008) Macrofaunal density and biomass in the Campeche Canyon, Southwestern Gulf of Mexico. *Deep Sea Research Part II: Topical Studies in Oceanography,* 55**,** 2679-2685.

Escobar Briones, E. & Garcia-Villalobos, F. J. (2009) Distribution of total organic carbon and total nitrogen in sediments from the deep sea Southwestern Gulf of Mexico. *Boletín de la Sociedad Geológica Mexicana,* 61**,** 73-86.

Escobar- Briones, E. & Gaytàn, A. (2008) Riqueza de especies de los mega crustáceos (Órdenes Lophogastrida, Isopoda y Decapoda) del Sur del Golfo de México. In Alvarez Noguera, F. & Rodríguez Almaraz, G. (Eds.) *Crustáceos de México: Estado actual de su conocimiento.*

Escobar, E., Legendre, P. & Alavarez Sanchez, L. F. (submitted) Beta diversity of benthic molluscs from the SW Gulf of Mexico. *Marine Ecology*.

Escobar-Briones, E. & Maass, M. (2008) Diversidad de procesos funcionales en los ecosistemas. *Capital natural de México, vol. I : Conocimiento actual de la biodiversidad.* Mexico, Conabio.

Escobar-Briones, E. G., Díaz, C. & Legendre, P. (2008) Meiofaunal community structure of the deep-sea Gulf of Mexico: Variability due to the sorting methods. *Deep Sea Research Part II: Topical Studies in Oceanography,* 55**,** 2627-2633.

Escobar-Briones, E. G., Gaytán-Caballero, A. & Legendre, P. (2008) Epibenthic megacrustaceans from the continental margin, slope and abyssal plain of the Southwestern Gulf of Mexico: Factors responsible for variability in species composition

and diversity. *Deep Sea Research Part II: Topical Studies in Oceanography,* 55**,** 2667-2678.

Fraussen, K. & Sellanes, J. (2008) Three new buccinid species (Gastropoda : Neogastropoda) from Chilean deep-water, including one from a methane seep. *Veliger,* 50**,** 97-106.

Galéron, J., Menot, L., Renaud, N., Crassous, P., Khripounoff, A., Treignier, C. & Sibuet, M. (2009) Spatial and temporal patterns of benthic macrofaunal communities on the deep continental margin in the Gulf of Guinea. *Deep Sea Research Part II: Topical Studies in Oceanography,* In Press, Corrected Proof.

Gonzalez, R. R., Quinones, R. A., Quiroga, E. & Sellanes, J. (2008) Aerobic and anaerobic enzymatic activities of Calyptogena gallardoi (Vesicomyidae): a clam associated with methane cold seeps off Chile. *Journal of the Marine Biological Association of the United Kingdom,* 88**,** 983-986.

Gooday, A. J., Bett, B., Escobar-Briones, E., Ingole, B., Levin, L., Neira, C., Raman, A. & Sellanes, J. (accepted) Habitat heterogeneity and its relationship to biodiversity in oxygen minimum zones. *Marine Ecology*.

Gooday, A. J., Levin, L. A., Aranda Da Silva, A., Bett, B. J., Cowie, G. L., Dissard, D., Gage, J. D., Hughes, D. J., Jeffreys, R., Lamont, P. A., Larkin, K. E., Murty, S. J., Schumacher, S., Whitcraft, C. & Woulds, C. (2009) Faunal responses to oxygen gradients on the Pakistan margin: A comparison of foraminiferans, macrofauna and megafauna. *Deep Sea Research Part II: Topical Studies in Oceanography,* 56**,** 488-502.

Guzman, G., Baez, P. & Sellanes, J. (2009) Primer registro de Trichopeltarion corallinus (Faxon, 1893) para el mar de Chile y nuevo registro de T. hystricosus (Garth, en Garth & Haig, 1971) (Decapoda: Brachyura: Atelecyclidae). *Latin American Journal of Marine Sciences,* 32**,** 275-279.

Haedrich, R. L., Devine, J. A. & Kendall, V. J. (2008) Predictors of species richness in the deep-benthic fauna of the northern Gulf of Mexico. *Deep Sea Research Part II: Topical Studies in Oceanography,* 55**,** 2650-2656.

Hernànez-Robles, D. & Escobar-Briones, E. (2008) Distribución de los tanaidàceos (Malacostraca: Peracarida) del mar profundo en el sector oeste del Golfo de México. In Alvarez Noguera, F. & Rodríguez Almaraz, G. (Eds.) *Crustáceos de México: Estado actual de su conocimiento.*

Hughes, D. J., Lamont, P. A., Levin, L. A., Packer, M., Feeley, K. & Gage, J. D. (2009) Macrofaunal communities and sediment structure across the Pakistan margin Oxygen Minimum Zone, North-East Arabian Sea. *Deep Sea Research Part II: Topical Studies in Oceanography,* 56**,** 434-448.

Ingole, B., Sautya, S., Sivadas, R. S., Singh, R. & Nanajka, M. (submitted) Patterns of macrofaunal abundances, diversity and biomass along the OMZ region of western Indian margin. *Marine Ecology*.

Jeffreys, R. M., Wolff, G. A. & Cowie, G. L. (2009) Influence of oxygen on heterotrophic reworking of sedimentary lipids at the Pakistan margin. *Deep Sea Research Part II: Topical Studies in Oceanography,* 56**,** 358-375.

Jochens, A. E. & Dimarco, S. F. (2008) Physical oceanographic conditions in the deepwater Gulf of Mexico in summer 2000-2002. *Deep Sea Research Part II: Topical Studies in Oceanography,* 55**,** 2541-2554.

Jorissen, F. J., Bicchi, E., Duchemin, G., Durrieu, J., Galgani, F., Cazes, L., Gaultier, M. & Camps, R. (2009) Impact of oil-based drill mud disposal on benthic foraminiferal assemblages on the continental margin off Angola. *Deep Sea Research Part II: Topical Studies in Oceanography,* In Press, Corrected Proof.

Komai, T. & Chan, T.-Y. (2008) Further records of deep-sea shrimps onf the genus Glyphocrangon A. Milne-Edwards, 1881 (Crustacea: Decapoda: Caridea) from the Philippines, with descriptions of three new species. *The Raffles Bulletin of Zoology Supplement,* 19**,** 39-62.

Kroeze, C., Middelburg, J., Leemans, R., Escobar-Briones, E., Fennel, W., Glaser, M., Harashima, A., Kee Liu, K. & Meybeck, M. L. (2009) Integrating Tools to Assess Changes in Semi-Enclosed Marine SystemsVulnerability of Semi-Enclosed Marine Systems to Environmental Disturbances. In Urban Jr., E. R., Sundby, B., Malanotte-Rizzoli, P. & Melillo, J. M. (Eds.) *Watersheds, Bays and Bounded Seas; The Science and Management of Semienclosed Marine Systems.* Island Press-SCOPE 70.

Lara-Lara, J. R., Arenas-Fuentes, V., Bazán-Guzmán, M. D. C., De La Cruz-García Abad, M., Díaz-Castañeda, V., Escobar-Briones, E., Gaxiola-Castro, G., Robles-Jarero, G., Sosa-Avalos, R., L.A., S.-G., Tapia-García, M. & Valdéz-Holguín, J. E. (2008) Los ecosistemas marinos. *Capital natural de México, vol. I: Conocimiento actual de la biodiversidad.* Mexico, Conabio.

Larkin, K. E. & Gooday, A. J. (2009) Foraminiferal faunal responses to monsoon-driven changes in organic matter and oxygen availability at 140 and 300 m water depth in the NE Arabian Sea. *Deep Sea Research Part II: Topical Studies in Oceanography,* 56**,** 403-421.

Law, G. T. W., Shimmield, T. M., Shimmield, G. B., Cowie, G. L., Breuer, E. R. & Martyn Harvey, S. (2009) Manganese, iron, and sulphur cycling on the Pakistan margin. *Deep Sea Research Part II: Topical Studies in Oceanography,* 56**,** 305-323.

Le Guilloux, E., Olu, K., Bourillet, J. F., Savoye, B., Iglésias, S. P. & Sibuet, M. (2009) First observations of deep-sea coral reefs along the Angola margin. *Deep Sea Research Part II: Topical Studies in Oceanography,* In Press, Corrected Proof.

Lecroy, S. E., Gasca, R., Winfield, I., Ortiz, M. & Escobar-Briones, E. (2009) Amphipoda (Crustacea) of the Gulf of Mexico. In Felder, D. L. & Camp, D. K. (Eds.) *Gulf of Mexico--Origins, Waters, and Biota. Volume 1, Biodiversity.* Texas A&M University Press.

Levin, L. A. & Dayton, P. K. Ecological theory and continental margins: where shallow meets deep. *Trends in Ecology & Evolution,* In Press, Corrected Proof.

Levin, L. A., Mendoza, G. F., Gonzalez, J., Thurber, A. R. & Cordes, E. E. (2009) Diversity of macrofauna on the northeastern Pacific margin: the influence of methane seeps and oxygen minimum zones. *Marine Ecology*. DOI:10.1111/j.1439-0485.2009.00335.x

Levin, L. A., Sibuet, M., Gooday, A. J., Smith, C. R. & Vanreusel, A. (submitted) The roles of habitat heterogeneity in generating and maintaining biodiversity on continental margins. *Marine Ecology*.

Levin, L. A., Whitcraft, C. R., Mendoza, G. F., Gonzalez, J. P. & Cowie, G. (2009) Oxygen and organic matter thresholds for benthic faunal activity on the Pakistan margin oxygen minimum zone (700-1100 m). *Deep Sea Research Part II: Topical Studies in Oceanography,* 56**,** 449-471.

Maccracken, M. L., Escobar Briones, E., Gilbert, D., Korotaev, G., Naqvi, W., Perillo, G., Rixen, T., Stanev, E., Sundby, B., Thomas, H., Unger, D. & Urban, E. (2009)

Vulnerability of Semi-Enclosed Marine Systems to Environmental Disturbances. In Urban Jr., E. R., Sundby, B., Malanotte-Rizzoli, P. & Melillo, J. M. (Eds.) *Watersheds, Bays and Bounded Seas; The Science and Management of Semienclosed Marine Systems.* Island Press-SCOPE 70.

Menot, L., Crassous, P., Desbruyères, D., Galéron, J., Khripounoff, A. & Sibuet, M. (2009) Colonization patterns along the equatorial West African margin: Implications for functioning and diversity maintenance of bathyal and abyssal communities. *Deep Sea Research Part II: Topical Studies in Oceanography,* In Press, Corrected Proof.

Menot, L., Galéron, J., Olu, K., Caprais, J. C., Crassous, P., Khripounoff, A. & Sibuet, M. (submitted) Spatial heterogeneity of macro-infaunal communities in and near a giant cold seep in the deep Gulf of Guinea. *Marine Ecology*.

Morse, J. W. & Beazley, M. J. (2008) Organic matter in deepwater sediments of the Northern Gulf of Mexico and its relationship to the distribution of benthic organisms. *Deep Sea Research Part II: Topical Studies in Oceanography,* 55**,** 2563-2571.

Murty, S. J., Bett, B. J. & Gooday, A. J. (2009) Megafaunal responses to strong oxygen gradients on the Pakistan margin of the Arabian Sea. *Deep Sea Research Part II: Topical Studies in Oceanography,* 56**,** 472-487.

Narayanaswamy, B. E., Bett, B. & Hughes, D. J. (submitted) Deep-water macrofaunal diversity in the Faroe-Shetland region (NE Atlantic): where Arctic and Temperate waters meet. *Marine Ecology*.

Olu, K., Caprais, J. C., Galéron, J., Causse, R., Von Cosel, R., Budzinski, H., Ménach, K. L., Roux, C. L., Levaché, D., Khripounoff, A. & Sibuet, M. (2009) Influence of seep emission on the non-symbiont-bearing fauna and vagrant species at an active giant pockmark in the Gulf of Guinea (Congo-Angola margin). *Deep Sea Research Part II: Topical Studies in Oceanography,* In Press, Corrected Proof.

Parra, M., Sellanes, J., Dupre, E. & Krylova, E. (2009) Reproductive characteristics of Calyptogena gallardoi (Bivalvia: Vesicomyidae) from a methane seep area off Concepcion, Chile. *Journal of the Marine Biological Association of the United Kingdom,* 89**,** 161-169.

Pattenden, A., Tyler, P., Masson, D. & Huvenne, V. (submitted) The influence of habitat heterogeneity on the structure of megabenthic communities in Nazaré Canyon, west of Portugal. *Marine Ecology*.

Priede, M., Godbold, J. A., King, N. J., Collins, M. A., Bailey, D. M. & Gordon, J. D. (2009) Deep-Sea demersal fish biodiversity of the Porcupine Seabight, NE Atlantic Ocean: Global trends versus local heterogeneity. *Marine Ecology*. DOI:10.1111/j.1439-0485.2009.00330.x

Quiroga, E. & Sellanes, J. (2009) Growth and size-structure of Stegophiura sp (Echinodermata: Ophiuroidea) on the continental slope off central Chile: a comparison between cold seep and non-seep sites. *Journal of the Marine Biological Association of the United Kingdom,* 89**,** 421-428.

Quiroga, E. & Sellanes, J. (2009) Two new polychaete species living in the mantle cavity of Calyptogena gallardoi (Bivalvia: Vesicomyidae) at a methane seep site off central Chile (similar to 36 degrees S). *Scientia Marina,* 73**,** 399-407.

Quiroga, E., Sellanes, J., Arntz, W. E., Gerdes, D., Gallardo, V. A. & Hebbeln, D. (2009) Benthic megafaunal and demersal fish assemblages on the Chilean continental margin: The influence of the oxygen minimum zone on bathymetric distribution. *Deep-Sea Research Part Ii-Topical Studies in Oceanography,* 56**,** 1061-1072.

Quiroga, E., Sellanes, J., Gerdes, D., Arntz, W. E., Gallardo, V. A. & Hebbeln, D. (2009) Demersal fish and benthic megafaunal assemblages of the continental margin off Chile: influence of the oxygen minimum zone on the bathymetric distribution. *Deep-Sea Research II,* 56**,** 1061-1072.

Rabouille, C., Caprais, J. C., Lansard, B., Crassous, P., Dedieu, K., Reyss, J. L. & Khripounoff, A. (2009) Organic matter budget in the Southeast Atlantic continental margin close to the Congo Canyon: In situ measurements of sediment oxygen consumption. *Deep Sea Research Part II: Topical Studies in Oceanography,* In Press, Corrected Proof.

Ragueneau, O., Regaudie-De-Gioux, A., Moriceau, B., Gallinari, M., Vangriesheim, A., Baurand, F. & Khripounoff, A. (2009) A benthic Si mass balance on the Congo margin: Origin of the 4000 m DSi anomaly and implications for the transfer of Si from land to ocean. *Deep Sea Research Part II: Topical Studies in Oceanography,* In Press, Corrected Proof.

Ramirez-Llodra, E., Company, J. B., Sarda, F. & Rotland, G. (accepted) Effects of the Blanes submarine canyon (Northwestern Mediterranean) in megafauna diversity pattern. *Marine Ecology*.

Rowe, G. T. (2008) Dedication. *Deep Sea Research Part II: Topical Studies in Oceanography,* 55**,** 2535-2535.

Rowe, G. T. & Kennicutt Ii, M. C. (2009) Northern Gulf of Mexico continental slope habitats and benthic ecology study, final report. Texas A&M University at Galveston.

Rowe, G. T. & Kennicutt, M. C. (2008) Introduction to the Deep Gulf of Mexico Benthos Program. *Deep Sea Research Part II: Topical Studies in Oceanography,* 55**,** 2536-2540.

Rowe, G. T., Morse, J., Nunnally, C. & Boland, G. S. (2008) Sediment community oxygen consumption in the deep Gulf of Mexico. *Deep Sea Research Part II: Topical Studies in Oceanography,* 55**,** 2686-2691.

Rowe, G. T., Wei, C., Nunnally, C., Haedrich, R., Montagna, P., Baguley, J. G., Bernhard, J. M., Wicksten, M., Ammons, A., Briones, E. E., Soliman, Y. & Deming, J. W. (2008) Comparative biomass structure and estimated carbon flow in food webs in the deep Gulf of Mexico. *Deep Sea Research Part II: Topical Studies in Oceanography,* 55**,** 2699-2711.

Santschi, P. H. & Rowe, G. T. (2008) Radiocarbon-derived sedimentation rates in the Gulf of Mexico. *Deep Sea Research Part II: Topical Studies in Oceanography,* 55**,** 2572-2576.

Sautya, S., Tabachnick, K. R. & Ingole, B. (Submitted) A Bird nest sponge *Hylascus andamanensis* sp. Nov, from a seamount in the Andaman Back Arc Basin, Indian Ocean. *The Biological Journal of the Linnean Society*.

Savoye, B., Babonneau, N., Dennielou, B. & Bez, M. (2009) Geological overview of the Angola-Congo margin, the Congo deep-sea fan and its submarine valleys. *Deep Sea Research Part II: Topical Studies in Oceanography,* In Press, Corrected Proof.

Schlacher, T. A., Williams, A., Althaus, F. & Schlacher-Hoenlinger, M. A. (2009) High-resolution seabed imagery as a tool for biodiversity conservation planning on continental margins. *Marine Ecology*. DOI: 10.1111/j.1439-0485.2009.00286.x

Schwabe, E. & Sellanes, J. (Accepted) Revision of Chilean bathyal chitons (Mollusca: Polyplacophora) with the description of a new species of Leptochiton (Leptochitonidae) associated to cold-seeps. *Organisms Development and Evolution*.

Schwartz, M. C., Woulds, C. & Cowie, G. L. (2009) Sedimentary denitrification rates across the Arabian Sea oxygen minimum zone. *Deep Sea Research Part II: Topical Studies in Oceanography,* 56**,** 324-332.

Sellanes, J., Neira, C. & Quiroga, E. (2009) Benthic community diversity patterns associated with habitat heteogeneity along and across the Chilean slope. *Marine Ecology*.

Sellanes, J., Quiroga, E. & Neira, C. (2008) Megafauna community structure and trophic relationships at the recently discovered Concepcion Methane Seep Area, Chile, similar to 36 degrees S. *Ices Journal of Marine Science,* 65**,** 1102-1111. DOI:10.1111/j.1439-0485.2009.00332.x

Sibuet, M. & Vangriesheim, A. (2009) Deep-sea environment and biodiversity of the West African Equatorial margin. *Deep Sea Research Part II: Topical Studies in Oceanography,* In Press, Corrected Proof.

Soliman, Y. S. & Rowe, G. T. (2008) Secondary production of Ampelisca mississippiana Soliman and Wicksten 2007 (Amphipoda, Crustacea) in the head of the Mississippi Canyon, northern Gulf of Mexico. *Deep Sea Research Part II: Topical Studies in Oceanography,* 55**,** 2692-2698.

Soliman, Y. S. & Wade, T. L. (2008) Estimates of PAHs burdens in a population of ampeliscid amphipods at the head of the Mississippi Canyon (N. Gulf of Mexico). *Deep Sea Research Part II: Topical Studies in Oceanography,* 55**,** 2577-2584.

Thurber, A. R., Kröger, K., Neira, C., Wiklund, H. & Levin, L. A. Stable isotope signatures and methane use by New Zealand cold seep benthos. *Marine Geology,* In Press, Corrected Proof.

Van Gaever, S., Galéron, J., Sibuet, M. & Vanreusel, A. (2009) Deep-sea habitat heterogeneity influence on meiofaunal communities in the Gulf of Guinea. *Deep Sea Research Part II: Topical Studies in Oceanography,* In Press, Corrected Proof.

Van Gaever, S., Raes, M., Pasotti, F. & Vanreusel, A. (submitted) Spatial scale and habitat-dependent diversity patterns in nematode communities in three seepage related sites along the Norwegian margin. *Marine Ecology*.

Vandewiele, S., Cowie, G., Soetaert, K. & Middelburg, J. J. (2009) Amino acid biogeochemistry and organic matter degradation state across the Pakistan margin oxygen minimum zone. *Deep Sea Research Part II: Topical Studies in Oceanography,* 56**,** 376-392.

Vangriesheim, A., Khripounoff, A. & Crassous, P. (2009) Turbidity events observed in situ along the Congo submarine channel. *Deep Sea Research Part II: Topical Studies in Oceanography,* In Press, Corrected Proof.

Vangriesheim, A., Pierre, C., Aminot, A., Metzl, N., Baurand, F. & Caprais, J.-C. (2009) The influence of Congo River discharges in the surface and deep layers of the Gulf of Guinea. *Deep Sea Research Part II: Topical Studies in Oceanography,* In Press, Corrected Proof.

Vanreusel, A., Fonesca, G., Danovaro, R., Da Silva, M. C., Esteves, A. M., Ferrero, T., Gad, G., Galtsova, V., Gambi, C., Genevois, V., Ingels, J., Ingole, B., Lampadariou, N., Merckx, B., Miljutin, D. M., Miljutina, M. M., Muthumbi, A., Netto, S., Portnova, D., Radziejewska, T., Raes, M., Tchesunov, A., Vanaverbeke, J., Van Gaever, S., Venekey, V., Bezerra, T., Flint, H., Copley, J., Pape, E., Zeppeli, D., Martinez, P. & Galeron, J. (submitted) The importance of deep-sea habitat heterogeneity for global nematode diversity. *Marine Ecology*.

Veit-Kohler, G., Gerdes, D., Quiroga, E., Hebbeln, D. & Sellanes, J. (2009) Metazoan meiofauna within the oxygen-minimum zone off Chile: Results of the 2001-PUCK expedition. *Deep-Sea Research Part Ii-Topical Studies in Oceanography,* 56**,** 1093-1099.

Vetter, E. W., Smith, C. R. & De Leo, F. (submitted) Megafaunal Abundance and Diversity in Submarine Canyons on Oceanic Islands. *Marine Ecology*.

Vierros, M., Cresswell, I., Escobar-Briones, E., Rice, J. & Araron, J. (Eds.) (2009) *Global Open Oceans and Deep Seabed (GOODS) – Biogeographic Classification,* Paris, UNESCO-IOC.

Von Cosel, R. & Olu, K. (2009) Large Vesicomyidae (Mollusca: Bivalvia) from cold seeps in the Gulf of Guinea off the coasts of Gabon, Congo and northern Angola. *Deep Sea Research Part II: Topical Studies in Oceanography,* In Press, Corrected Proof.

Wade, T. L., Soliman, Y., Sweet, S. T., Wolff, G. A. & Presley, B. J. (2008) Trace elements and polycyclic aromatic hydrocarbons (PAHs) concentrations in deep Gulf of Mexico sediments. *Deep Sea Research Part II: Topical Studies in Oceanography,* 55**,** 2585-2593.

Warén, A. & Bouchet, P. (2009) New gastropods from deep-sea hydrocarbon seeps off West Africa. *Deep Sea Research Part II: Topical Studies in Oceanography,* In Press, Corrected Proof.

Wei, C.-L. & Rowe, G. T. (2009) Faunal zonation of large epibenthic invertebrates off North Carolina revisited. *Deep Sea Research Part II: Topical Studies in Oceanography,* 56**,** 1830-1833.

Williams, A., Althaus, F., Dunstan, P., Poore, G. C. B., Bax, N. J., Kloser, R. J. & Mcennulty, F. R. (submitted) Scales of habitat heterogeneity and megabenthos biodiversity on an extensive Australian continental margin (100-1,000 m depths). *Marine Ecology*.

Wilson, G. D. F. (2008) Local and regional species diversity of benthic Isopoda (Crustacea) in the deep Gulf of Mexico. *Deep Sea Research Part II: Topical Studies in Oceanography,* 55**,** 2634-2649.

Winfield, A., Escobar- Briones, E. & Alvarez, F. (2008) Composición, dominancia y distribución batimétrica de los anfípodos bentónicos (Caprellidea y Gammaridea) en la porción mexicana del Golfo de México. In Alvarez Noguera, F. & Rodríguez Almaraz, G. (Eds.) *Crustáceos de México: Estado actual de su conocimiento.*

Woulds, C., Andersson, J. H., Cowie, G. L., Middelburg, J. J. & Levin, L. A. (2009) The short-term fate of organic carbon in marine sediments: Comparing the Pakistan margin to other regions. *Deep Sea Research Part II: Topical Studies in Oceanography,* 56**,** 393-402.

Woulds, C. & Cowie, G. L. (2009) Sedimentary pigments on the Pakistan margin: Controlling factors and organic matter dynamics. *Deep Sea Research Part II: Topical Studies in Oceanography,* 56**,** 347-357.

Woulds, C., Schwartz, M. C., Brand, T., Cowie, G. L., Law, G. & Mowbray, S. R. (2009) Porewater nutrient concentrations and benthic nutrient fluxes across the Pakistan margin OMZ. *Deep Sea Research Part II: Topical Studies in Oceanography,* 56**,** 333-346.