SYNDEEP
Towards a first global synthesis of biodiversity, biogeography and ecosystem function in the deep sea

ChEss, CenSeam, COMARGE, CeDAMar, MAR-ECO & FMAP

Eva Ramírez-Llodra (lead) – ChEss. NOCS, UK & ICM-CSIC, ES – ezr@icm.csic.es
Paul Tyler – ChEss. NOCS, UK – pat8@noc.soton.ac.uk
Chuck Fisher – ChEss. PSU, USA – cfisher@psu.edu
Erik Cordes – ChEss. Temple Uni, USA – ecordes@temple.edu
Anna Metaxas – ChEss. Dalhousie Uni., CA – metaxas@dal.ca
Ashley Rowden – CenSeam/ChEss. NIWA, NZ – a.rowden@niwa.co.nz
Malcolm Clark – CenSeam. NIWA, NZ – m.clark@niwa.co.nz
Alan Williams – CenSeam. CSIRO, AU – Alan.Williams@csiro.au
Karen Stocks – CenSeam. UCSD, USA – kstocks@sdsc.edu
Thomas Schlacher – CenSeam. USC, AU – tschlach@usc.edu.au
Myriam Sibuet – COMARGE. Inst. Océanographique, FR – myriam.sibuet@wanadoo.fr
Lenaick Menot – COMARGE. IFREMER, FR – Lenaick.Menot@ifremer.fr
Lisa Levin – COMARGE/ChEss. SIO, USA – llevin@ucsd.edu
David Billett – COMARGE. NOCS, UK – dsmb@noc.soton.ac.uk
Bob Carney – COMARGE. LSU, USA – rcarne1@lsu.edu
Pedro Martinez – CeDAMar. SNG, DE – pmartinez@senckenberg.de
Stefanie Keller – CeDAMar. SNG, DE – skeller@senckenberg.de
Craig Smith – CeDAMar/ChEss. Uni. Hawaii, USA – craigsmi@hawaii.edu
Angelika Brandt – CeDAMar. Uni. Hamburg, DE – abrandt@zoologie.uni-hamburg.de
Odd Aksel Bergstad – MAR-ECO. IMR, NO – oddaksel@imr.no
Monty Priede – MAR-ECO. Uni. Aberdeen, UK – i.g.priede@abdn.ac.uk
Michael Vecchione – MAR-ECO. NMFS, USA – vecchiom@si.edu
Derek Tittensor – FMAP. Dalhousie Uni., CA – derekt@mathstat.dal.ca
Bhavani Narayansaswamy – EuroCoML. SAMS, UK – Bhavani.Narayanaswamy@sams.ac.uk
Paul Snelgrove – Synthesis Group. Memorial Uni. Newfoundland, CA – psnelgro@mun.ca
Laure Fournier – Fondation Total, FR – laure.fournier@total.com

MANAGEMENT

Project leader and Liaison to Synthesis Group

Eva Ramírez-Llodra is the SYNDEEP project leader, responsible for the proposal, organising the SYNDEEP workshops, communication within the group and, finally, for ensuring that the SYNDEEP goals are met and the products delivered in time to the Synthesis Group. Eva will be the liaison between SYNDEEP and the Synthesis Group, by maintaining regular communications with Paul Snelgrove and Myriam Sibuet.

Core SYNDEEP group
One person from each of the 5 CoML deep-sea projects, FMAP, EuroCoML and the Synthesis Group participating in SYNDEEP has been appointed as liaison between the projects and SYNDEEP. This forms the SYNDEEP core group, represented by:

Eva Ramírez-Llodra – ChEss. NOCS, UK & ICM-CSIC, ES – ezr@icm.csic.es
Ashley Rowden – CenSeam/ChEss. NIWA, NZ – a.rowden@niwa.co.nz
Lenaick Menot – COMARGE. Ifremer, NZ – Lenaick.Menot@ifremer.fr
Pedro Martinez – CeDAMar. SNG, DE – pmartinez@senckenberg.de
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Derek Tittensor – FMAP. Dalhousie Uni., CA – derekt@mathstat.dal.ca
Bhavani Narayansaswamy – EuroCoML. SAMS, UK – Bhavani.Narayanaswamy@sams.ac.uk
Paul Snelgrove – Synthesis Group, Memorial Uni., CA – psnelgro@mun.ca

CONTACT INFORMATON

Project Leader contact details
Dr Eva Ramirez-Llodra is employed under ChEss by NOCS, UK, but is most of the time based in the ICM-CSIC in Barcelona, Spain. The contact details are:

Dr Eva Ramirez-Llodra
Institut Ciències del Mar-CSIC
Psg. Marítim de la Barceloneta 37-49
08003 Barcelona, Spain
Tel. +34 932309544, Fax. +34 932309555
E-mail: ezr@icm.csic.es

Institution and Administrative contact for sub-award
Lorna Leverett (Mrs)
School Accountant for ORC & SOES
University of Southampton
Highfield, SO17 1BJ Southampton, UK

Tel: +44 (0)23 80598319; Fax: +44 (0)23 80592195
E-mail: ljl@noc.soton.ac.uk

SCIENCE

1. Problem statement

Since 2000, the Census of Marine Life initiative has provided an exceptional framework for the development of international collaborations and coordination of efforts in the field of marine biodiversity, biogeography and ecosystem functioning. This has been crucial for the current endeavour of generating a global vision of diversity, biogeography and abundance of life in the oceans in the past, present and future. The deep-sea component of the Census (ChEss, CenSeam, COMARGE, CeDAMar and MAR-ECO) have developed their research based on specific goals and scientific questions and are now entering the synthesis phase, with a 2010 deadline. At this time, results, conclusions and knowledge need to be synthesised into an overarching picture of current deep-sea biodiversity and biogeography, sharing our knowledge of observed patterns and understanding of environmental and anthropogenic drivers with the CoML, academic and societal communities.

2. Detailed description of Synthesis Product

2.1 Need for synthesis

To date, only 0.0001% of the deep-sea floor has been studied biologically. However, technological development is enabling pioneering research in the deep sea, both descriptive and experimental, at the same time that it facilitates increasing exploitation of deep-sea resources. To understand the observed deep-sea biological patterns and assess the long-term impact of both natural and anthropogenic change on deep-sea species, communities and habitats, it is essential that the projects' results and conclusions are shared, analysed, compared and contrasted. The different habitats investigated by the CoML deep-sea projects are characterised by specific abiotic and biological factors. However, the ecosystems studied are not independent from each other and no one realm can be fully understood in isolation. They can co-occur (e.g. vents can occur on mid-ocean ridges and seamounts, margins can have cold-seeps), individual species ranges can span more than one realm, endemism in a habitat is relative to the species inhabiting the surrounding areas, and there are ecologically-important transfers of larvae, biomass and energy between the realms. Appropriate interpretation of data from each individual project synthesis cannot be done without considering the biodiversity and function of adjacent or linked habitats. Therefore SYNDEEP will produce a **global synthesis of current knowledge** that has been acquired during CoML and **identify gaps in knowledge** that will lead to **future research.**

2.2 Scope of work and proposed preliminary products

The aim of SYNDEEP is to bring together leading scientists from the five CoML deep-sea projects and FMAP, to discuss the main cross-cutting patterns of biodiversity and distribution that have been observed in the deep-sea habitats, the links amongst communities and ecosystems, dispersal patterns, main environmental driving forces, anthropogenic impact, estimations of future change and gaps to knowledge. Three (potentially four) major questions are been addressed, the results of each of which will constitute a product:

1. What are the global/regional patterns of biodiversity *vs* area? Lead: Paul Snelgrove
2. What are the global/regional patterns of biodiversity *vs* productivity? Lead: Craig Smith
3. Why is the deep sea special? This includes discovery rate of new habitats, new species/genera/families, proportion of un-described species, differences in major functional groups between the deep sea and other systems, both marine and terrestrial, biogeography patterns. Lead: Eva Ramirez. The species richness analyses will be lead by Derek Tittensor as collaboration between SYNDEEP and the FMAP-OBIS-M&V synthesis project.
4. Human Impact on deep-sea ecosystems. Lead: Paul Tyler. This may constitute a fourth product or be incorporated in #3.

The products suggested for questions 1 and 2 are two papers to be submitted to a high impact factor journal such as Nature or Science. The product for question 3 would be developed as a review paper, also aimed at a journal with high impact factor such as Nature/Science/TREE.

2.3 Work plan

We propose to have a main workshop (SYNDEEP 1), followed by data analysis and product development. We are planning on hiring a data manager who will work on the integration of relevant deep-sea datasets and a postdoctoral researcher who will lead the analytical process, assisted by an advisory panel for each scientific question. ....[Budget information deleted, here.]

The postdoc would be based at UCSD with Dr Karen Stocks. We are also collaborating with the Fondation Total to hire a Total data manager that would work in the SYNDEEP initiative for 1 year, also based at UCSD. Project progress will be assessed in 2 follow-up meetings (SYNDEEP 2 & 3) and a final writing meeting for the core writing group (SYNDEEP 4):

SYNDEEP 1. 13-15 September 2008, SIO California (USA). Discuss emerging patterns of biodiversity and distribution in the different deep-sea habitats, identify links amongst habitats and discuss driving forces. **Outcome:** detailed description of product contents, structure, analyses needed, work plan and timeline. **Participants:** 22 members of the SYNDEEP team (see cover page), invited scientists in collaboration with COMARGE synthesis meeting (SIO, 8-12 Sept.) and CoML representation.

Preliminary agenda:
1. Brief summary of individual projects' key results (one 15 min talk per project). Speakers will be given a presentation template with selected science questions to be addressed, providing a common baseline for the discussion to follow.
2. Break out group discussions to address a series of pre-set scientific questions. These will be refined or abandoned, according to feasibility (a final list of questions will be defined in the upcoming months via email discussions):
3. Agree on analyses to be conducted, product content, structure, responsibilities, work plan and timeline.

SYNDEEP 2. A short, progress update meeting will be held on 11 Nov. 2008 in Valencia (Spain) just prior to the WCMB. Participants will discuss database integration, provide a detailed plan for each analysis and a timeline for product development, as well as discuss emerging needs and issues. **Outcome:** update on analysis development and assessment of progress. **Participants:** SYNDEEP members attending the WCMB any SYNDEEP person requiring participation in the meeting.

SYNDEEEP 3. Short progress update meeting to be held in Feb. 2009 on board the Queen Mary, California (USA), to coincide with the CoML Synthesis Workshop. **Outcome:** Progress report on analyses (half-time progress). **Participants:** SYNDEEP members attending the CoML workshop and any SYNDEEP person requiring participation in the meeting.

SYNDEEP 4. Meeting of the core SYNDEEP team to finalise draft products. Spring 2009, Barcelona, Spain. **Outcome:** initial draft of product. **Participants:** core SYNDEEP team (~10 people).

The SYNDEEP initiative is run by a significantly large group, reflecting the diversity and extension of the habitats considered: global biodiversity of sediment margins, canyons, corals, seamounts, vents, seeps, whale falls, OMZs, abyssal plains and MOR. For efficiency of communications and logistics, each CoML project involved in SYNDEEP (all deep-sea field programmes, FMAP, SG and EuroCoML) have selected one person as the main contact for their group, forming the SYNDEEP core group (see details p. 1). However, for scientific purposes, the group has divided into participation in one of the 4 scientific questions, providing expertise and data from all deep-sea habitats into each of the questions being addressed. Each group has a lead and an advisory panel who will work closely with the SYNDEEP postdoctoral researcher and data manager. This results in smaller groups that can efficiently work on the analyses and towards the selected products within the deadlines, with coordination between groups ensure by the SYNDEEP postdoc, the working group leads and the SYNDEEP core group.

2.4 Timetable of product development

Please, see Appendix 1.

2.5 Milestones

Date	Milestone
13-15 Sept 2008	1st SYNDEEP workshop, Scripps, USA: decision on product(s)
Sept-Nov 2008	Seek funding and hire postdoctoral researcher and database manager
11 Nov 2008	2nd SYNDEEP meeting. Valencia, Spain
Nov 08	Start databases integration
30 Dec 2008	Progress report to Synthesis Group
Jan 2009	Start scientific analyses
February 2009	3rd SYNDEEP meeting, Queen Mary, USA
1 Apr 2009	Preliminary drafts due for inclusion in Census Digest Book
30 Apr 2009	Progress report to Synthesis Group
July 2009	4th SYNDEEP meeting (core writing group), Barcelona, ES
15 Aug 2009	Drafts due to monitor progress and ensure complementary activities are ongoing
30 Aug 2009	Progress report to Synthesis Group
30 Dec 2009	Final submission to your selected journal
30 Dec 2009	Progress report to Synthesis Group
30 April 2010	Final report to Synthesis Group (includes budget reconciliation)
Oct 2010	Representation of SYNDEEP at the CoML grand finale events

Note: All reports and manuscripts (and final published papers) to be sent to Michele DuRand (mdurand@mun.ca).

3. Budget and matching funds (see Appendix 2 for detailed budget)

Note: Budget details deleted.

Appendix 1. SYNDEEP timeline.

	2008												2009												2010											
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
SYNDEEP proposal																																				
Proposal submitted																																				
SG proposal to Sloan																																				
Outcome of SG proposal																																				
SYNDEEP 1 workshop																																				
Postdoc & data manager hiring																																				
SYNDEEP 2 meeting																																				
Databases integration																																				
Pproduct development																																				
SYNDEEP 3 meeting																																				
SYNDEEP 4 meeting																																				
Draft product to SG																																				
Final product																																				
CoML grand finale																																				