Marine Biodiversity and Ecosystem Functioning
EU Network of Excellence

General Assembly – Science Meeting

The value of biodiversity observatories and monitoring for science and society

Sopot & Gdynia, Poland
14-16 May 2007

Book of Abstracts

Marine biodiversity and ecosystem functioning

Mariene Biodiversiteit en het functioneren van het Ecosysteem

Biodiversität und Funktionsweise mariner Ökosysteme

Biodiversité marine et fonctionnement des écosystémes

A biodiversidade marinha e o funcionamento do ecosystem

Θαλάσσια Βιοποικιλότητα και Λειτουργία του Οικοσυστήματος

Meren monimuotoisuus ja ekosysteemin toiminnallisuus

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Marin Biodiversitet og Økosystem Funktioner

Local Organization	
Institute of Oceanography PAS - Sopot	**Institute of Oceanography UG - Gdynia**

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Day 2: Tuesday 15 May 2007

Location: Institute of Oceanography UG, Gdynia

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10:30	-	10:40	MarBEF: a view on the future: EMBEF - a virtual institute for NoE's - Dave Paterson, Geoff Boxshall
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Day 3: Wednesday 16 May 2007

Location: New Conference Center of UG, Sopot

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13:00	-	13:15	Walk to IOPAS for lunch and following RMP meetings

Location: Institute of IOPAS, Sopot

13:15	-	14:00	**Lunch**
14:00	-	18:00	**RMP meetings**
18:30			**Dinner / Social Programme**

Thursday and following days

After meeting activities

Largenet- Multidisciplinary approach to study long-term and large scale patterns in marine biodiversity.

Alex Kraberg[1], Doris Schiedek[2], Fred Buchholz[1]
1Biologische Anstalt Helgoland, Alfred-Wegener Institute for Polar and Marine Research, Germany
2Department of Biological Oceanography, Baltic Sea Research Institute, Germany

Global climate change is a topic of ever increasing importance and there are several examples of European long-term data series showing increases in sea water temperatures exceeding those at any time since instrumented measurements began in the 1860s (MacKenzie and Schiedek, 2007 a,b) or as found at Helgoland Roads (i.e. 1.1 ^{o}C) over the last 30-40 years (Wiltshire & Manly 2004). However, the impact of such changes on biota can vary and it is not known whether the same effects will be seen at large geographic scales and in different types of communities (e.g. benthic vs pelagic).
The aim of LargeNet, is therefore to compare long-term datasets on a European scale with comparable methods and statistical tools and to investigate if there are common trends in biodiversity and species interactions in both pelagic and benthic communities. Such large scale assessments are a prerequisite for making adequate recommendations to policy makers about potential remedial actions.
To achieve the LargeNet aims 6 working groups have been formed within LargeNet to address these aims. These are investigating:

1. Shifts in geographic ranges or range extensions of key species as the result of rising water temperatures. Such shifts have already been observed in a number of species (Mieszkowska et al. 2006) e.g. *Semibalanus balanoides* (barnacle), *Alaria esculenta* (brown alga) and *Coscinodiscus wailesii* (diatom,(Edwards et al. 2001)) but the potential effects of such shifts on local foodwebs are not yet well understood
2. Proportions of species with multifunctional feeding modes
3. Shifts in phenology (1) in relation to latitudinal gradients: match-mismatch situations in relation to regime shifts
4. Shifts in ß-diversity along latitudinal gradients,
5. Shifts in phenology (2): negative effects of rising temperatures on summer reproducing species,
6. Shifts in thermoclines.

All of these topics have important applied aspects, particularly for fisheries and their management and therefore also for the general GA theme: The value of biodiversity observatories and monitoring for science and society'. All of the tasks in the six groups also require detailed long-term biological and physico-chemical data sets and targeted searches for such data sets are being carried out. One focus of the resulting analyses will be an investigation into the timing of events, i.e. whether the same signals are apparent at the same time in systems in different geographic areas or different habitats (e.g. comparisons of regime shifts in benthic vs pelagic communities). Here we will build on the results already obtained for soft bottom fauna.
In this talk we will present an overview of available evidence based on data and studies from the different LargeNet partners and how those will be used to achieve the main goals of the different working groups.

References

Edwards, M.; John A.W.G.; Johns, D.G.; Reid, P.C. (2001). Case history and persistence of the non-indigenous diatom *Coscinodiscus wailesii* in the north-east Atlantic. J. Mar. Biol. Ass. UK 81: 207-211.
MacKenzie, B.R. and Schiedek, D. (2007). Daily ocean monitoring since the 1860s shows record warming of northern European seas. Global Change Biology, *in pres.*
MacKenzie, B.R. and Schiedek, D. (2007). Long-term sea surface temperature baselines - time series, spatial covariation and implications for biological processes. J. Mar. Sys., in press.
Mieszkowska, N.; Kendall, M.A.; Hawkins, S.J.; Leaper, R.; Williamson, P.; Hardman-Mountford, N.J.; Southward, A.J. (2006). Changes in the range of some common rocky shore species in Britain – a response to climate change? Hydrobiologia 555: 241-251
Wiltshire, K.H.; Manly, B.F.J. (2004). The warming trend at Helgoland Roads, North Sea: phytoplankton response. Helgoland Marine Research 58: 269-273.

Marfish: Causes and consequences of changing marine biodiversity from a fish and fisheries perspective.

Brian MacKenzie[1] and Pascal Lorance[2]
[1]Technical University of Denmark, Danish Institute for Fisheries Research, Department of Marine Ecology and Aquaculture, Charlottenlund, Denmark
[2] IFREMER, Brest, France

The MarFish network, which is one of the Responsive Mode Projects of MarBEF, is a group of European fisheries and marine research institutes investigating fish biodiversity. The presentation will highlight some of the scientific findings related to variations in fish biodiversity in European waters and some of the networking activities that have been conducted and are ongoing. These activities include a consensus policy statement for decisionmakers, a mechanism to facilitate participation of foreign colleagues on fisheries cruises, and an upcoming theme session at the 2007 ICES Annual Science Conference. Details of these activities will be provided during the presentation.

ArctEco - Biodiversity and ecosystem function under changing climatic conditions – the Arctic as a model system

Jan Marcin Weslawski[1], Maria Wlodarska- Kowalczuk[1], Joanna Legezynska[1], Monika Kedra[1], Slawek Kwasniewski[1], MartaGluchowska[1], Lech Kotwicki[1], Katarzyna Grzelak[1], Artur Opanowski[1], Sabine Cochrane[2]
[1]Institute of Oceanology PAS, Poland,
[2]AKVAPLAN, Norway

The main research question in this project was “how the biodiversity and the function of Arctic ecosystem changes under the climate warming ?” . The approach was to select two comparable marine areas- one under cold climatic, hydrological regime, and the second already warmed up. As the cold place Hornsund fjord (77oN), as the warmed Kongsfjorden (79oN) were selected, both on Svalbard, European Arctic. The field work took place in summers 2005 and 2006, additional information was collected in previous years in the same localities. The hydrological characteristics, shows, that in summer, Kongsfjorden, is under stronger influence of shelf- Atlantic waters, compared to Hornsund, being dominated by cold, coastal, local waters. Summer values of near bottom temperatures and salinities, show small, but constant difference between two areas, with Hornsund being cooler and less saline (average 2oC/34 PSU versus 2,5oC/34.5 PSU). Winter values are very similar, since both fjords use to have the entire water column cooled down to -1oC. The winter ice covers less area in Kongsfjorden compared to Hornsund, and the seasonal duration of ice is shorter in Kongsfjorden (recently 1-3 months, versus 3 -6 months in Hornsund). The biodiversity of both places is intensively studied, since Hornsund received a status of All Taxa Biodivesity Inventory, and Kongsjorden – the Long Term Biodiversity Research Site (www.iopan.gda.pl/projects/biodaff). The most complete taxonomic data so far, are for Crustacea, represented by 122 benthic species in Kongsfjorden and 97 species in Hornsund. There was a number of new species discovered during the project (1 Harpacticoid, 2 Bryozoa, 2 Calanoida, 1 Hydrozoan) and number of geographical range extensions findings. We have focused on the possible effect of climate warming to the communities and species composition, population structure and energy transfer to top predators in the system. In the area of investigation, the warming does not mean just the temperature increase, but also the change of the water mass (due to the increasing influence of Atlantic waters, moved North by NAO – related phenomena). This means that waters, carrying propagules and populations from species rich – boreal area are advancing, while, local, Arctic less diverse biota are retreating. The comparison of two areas shows, that number of rare species (represented by single specimens in collections) makes 20% in warmer Kongsfjorden while only 7% in Hornsund. Share of very abundant species (that makes over 20% of benthic specimens) was higher in cold place (14%) than in warmer (7%). The share of large species and specimens in benthos of Hornsund was 15% higher compared to warmer site. Meiofauna was twice as much abundant in cold site (1557 ind/10cm2)) than in warm one (580 ind/10cm2). Plankton shows higher share of larger specimens in cold site than in warm, and the their energy value is 30% higher in cold area. We assume, that warming of the area stimulated faster growth, move towards r- reproductive strategy, and energy dissipation among more diverse biocenose. This leads to the decrease efficiency of energy transfer to top trophic levels (seabirds and sea mammals). More biodiversity may mean less wildlife in the Arctic.

References

Renaud PE, Wlodarska-Kowalczuk M, Trannum H, Holte B, Weslawski JM, Cochrane S, Dahle S, Gulliksen B (2007) Multidecadal Stability of Benthic Community Structure in a High-Arctic Glacial Fjord (Van Mijenfjord, Spitsbergen). Polar Biology 30:295-305

Wlodarska-Kowalczuk M (2007) Molluscs in Kongsfjorden (Spitsbergen, Svalbard): a Species List and Patterns of Distribution and Diversity. Polar Research 26:48-63

Wlodarska-Kowalczuk M, Pearson TH, Kendall MA (2005) Benthic response to chronic natural physical disturbance by glacial sedimentation in an Arctic fjord. Marine Ecology Progress Series 303:31-41

Wlodarska-Kowalczuk M, Sicinski J, Gromisz S, Kendall MA, Dahle S (2007) Similar Soft-Bottom Polychaete Diversity in Arctic and Antarctic Marine Inlets. Marine Biology 151:607-616

Weslawski J.M.; Kwasniewski, S.; Stempniewicz, L.; Blachowiak-Samolyk, K. (2006). Biodiversity and energy transfer to top trophic levels in two contrasting Arctic fjords. Polish Polar Research. 27: 259-278.

DEEPSETS – Deep-sea and extreme environments, patterns of species and ecosystem time series.

Andrew J. Gooday[1], David S. M. Billett[1], John Copley[1], Daphne Cuvelier[1,3,9] Ana Colaço[2], Daniel Desbruyères[3], Nicole Boury-Esnault[4], Joelle Galeron[3], Michael Klages[5], Vassiliki Kalogeropoulou[6], Nikos Lampadaiou[7], Pedro Martinez Arbizu[6], Gordon Paterson[8], Thierry Perez[4], Ricardo Serrão Santos[9], Jozée Sarrazin[3], Sven Tatje[1], Paul Tyler[1], Ann Vanreusel[10]

[1]Ocean Biogeochemistry and Ecosystems, National Oceanography Centre, Southampton, United Kingdom
[2]Institute of Marine Research, Department of Zoology, University of Coimbra, 3004-517 Coimbra, Portugal
[3]IFREMER, DEEP/LEP Technopole de Brest-Iroise, BP 70, F-29280 Plouzané, France
[4]Centre National de la Recherche Scientifique; Centre d'Océanologie de Marseille, Rue de la Batterie des Lions, F-13007 Marseille, France
[5]Alfred Wegener Institute, Am Handelshafen 12, D-27570 Bremerhaven, Germany
[6]Naturmuseum und Forschungsinstitut Senckenberg, Südstrand 44, 26382 Wilhelmshaven, Germany
[7]Hellenic Centre for Marine Research, P.O. Box 2214, GR-710 03 Heraklion, Crete, Greece
[8]Natural History Museum, Cromwell Road, London, SW7 5BD,United Kingdom
[9]Departamento de Oceanografia e Pescas, Campus of Horta, Cais de Santa Cruz, PT-9901-862 Horta, Açores, Portugal
[10]Marine Biology Section, Krijgslaan 281, S8 - Sterre Campus, B-9000 Ghent, Belgium

DEEPSETS aims to integrate work on time series observations at contrasting deep-sea sites, namely the Porcupine Abyssal Plain (PAP), the abyssal Eastern Mediterranean, the Lucky Strike hydrothermal field, the Haakon Mosby Mud Volcano (HMMV), and the La Ciotat 3PP Cave. The work at PAP, E. Mediterranean and Lucky Strike is being undertaken by PhD students, two of them funded by the DEEPSETS consortium.

A dramatic increase in the abundance of megafauna occurred in 1995 at the European Sustained Ocean Observatory on the PAP. This regime shift, which is known as the '*Amperima* Event' after the dominant post-1995 holothurian, is believed to be linked to a change in the quantity and quality of the organic matter deposited on the seafloor. Sediment trap data reveal that a massive flux peak occurred in 2001 and this coincided with a renewed upsurge in the abundance of *Amperima*. Preliminary results for the metazoan meiofaunal suggest that there was an increase in the abundance of harpacticoid copepods between 1994 and 1997, as well as a shift in the dominant families. During the same period, the abundance of polychaetes increased by a factor of 3 and the number of families increased over a short period from 17 in the early 1990s to 36 in 1996, decreasing slowly over the following 2 years. Meiofaunal foraminifera also exhibited temporal trends, apparently related to the *Amperima* Event. Total foraminiferal abundance and the abundance of some species (notably *Trochammina* sp. and *Alabaminella weddellensis*) increased significantly after 1996 while diversity decreased. At Lucky Strike, the overall objective is to assess the temporal dynamics of hydrothermal vent ecosystems. Recent work has concentrated on the composition and distribution of faunal assemblages on the Eiffel Tower hydrothermal structure. These have been analysed based on photographic/video imagery obtained during the Momareto cruise held in 2006. The data will be compared to observations made in previous years (1994-2005). A variety of studies were conducted during 2006 on natural caves on the NW Mediterranean coast as well as 'artificial' caves at CNRS-Marseille. Temperature profiles suggest that the artificial caves accurately replicate conditions in the natural caves. The colonisation of the caves by new fauna has been studied by means of regular photographic surveys. Other cave investigations have focussed on sponge life cycles and phylogeny. Progress at the other two DEEPSETS sites, the HMMV and the E. Mediterranean, has mainly involved the collection of new samples and environmental observations during recent cruises.

MANUELA - Patterns in meiobenthic community structure on a European scale

Jan Vanaverbeke[1] & MANUELA partners
[1]Marine Biology Section, Ghent University, Belgium

During the previous year, focus within MANUELA was put on (1) continuing the development of the NeMys database and identification key; (2) the collection of datasets and the integration of these datasets in a central MANUELA database; the analysis of the data collected in the database.
During the period February 2006-February 2007, 620 taxa were added to the nematode dataset within NeMys. 353 literature sources were added, 290 were linked to a PDF. The total number of literature sources for nematodes is now 3396. About 90 new users were registered, which brings the number of users of the nematode dataset to 232. The nematode identification key was refined and new keys to species were added.
The final version of MANUELA central database was released in March 2007 and consists of 94 component datasets. In total 140431 distribution record on 1864 unique meiobenthic taxa are captured in the database. Based on this database, the ERMS for marine nematodes was updated with 333 valid nematode species (increase of 16%) and 35 datasets (38132 distribution records) were transferred to EurOBIS.
Analyses of the MANUELA database initially focuses on 6 topics: (1) Large Scale Patterns in European Meiobenthos; (2) Species Assembly Rules; (3) Universal response to disturbance; (4) Patterns in deep-sea meiobenthos; (5) Size and shape of nematodes (6) Patterns in harpacticoid copepod communities. Results are still preliminary but promising. Meiobenthic communities at the large scale are mainly structured by sedimentological and depth-related variables. There is a clear distinction between estuarine and marine nematode populations. In the deep sea, differences in communities were not related to latitude but to bathymetric depth. Communities living deeper then 2000 m were clearly different from shallower communities, each depth zone was characterised by typical genera. In addition, eutrophic and oligotrophic areas showed different nematode communities. The relationship bathymetric depth and nematode individual biomass was further explored by investigating patterns in Length, Width and Length/Width ratios of nematodes. Biomass, Length and Width were indeed higher at the shelf seas compared with deeper communities, however these patterns cannot be explained by depth/food alone. Local varying environmental characteristics such as mineralization rates, hydrodynamic stress and physical human disturbance are very important to explain the morphometric characteristics of nematode communities.
Although nematode communities are structured by environmental variables rather then by location, we observed a convergence of geographically distinct nematode assemblages subjected to disturbance, suggesting that a universal meiobenthic response to disturbance exists.
A preliminary analyses on the copepod data revealed that copepod communities were different between different areas as well.
The community composition of nematodes was modelled using artificial neural networks. The model is based on a subset of the database, containing all datasets from the Belgian Continental Shelf. At the moment, diversity can be predicted at a raster grid of 1 km² (depending on the maps of environmental variables), further modelling will focus on the composition of the nematode communities.
Final results will be presented at the MarBEF MANUELA session that will be organised on the forthcoming 13th International Meiofauna Conference in Recife (Brazil).

PROPE-taxon - Web Accessible Taxonomic Expertise in MARBEF: PROviding a e-Platform for the European Taxonomists

Christos Arvanitidis[1], Sarah Faulwetter[1], Edward Vanden Berghe[2], Ward Appeltans[2], Gordon Paterson

[1] Hellenic Centre for Marine Research, Institute of Marine Biology and Genetics, Heraklion, Crete, Greece
[2]Flanders Marine Institute, Ostende, Belgium
[3]Natural History Museum, London, UK

PROPE-taxon is an RMP which intends to create an e-Platform for the European taxonomists, based on existing technologies.

In the period May 2006 – May 2007, the main focus was on: (a) the development and publication of a questionnaire in order to collect specialists' opinion on what kind of information should be delivered by the portal; (b) the final choice of the system and of the web infrastructure. Additionally, it was decided that the PROPE-taxon Consortium should meet at least annually, during the GA MarBEF meetings. These meetings would enable members to discuss the various emerging issues and to make decisions on the very important ones without spending much of their budget. The feeling shared by all members was that resources should be spent to develop the system and web infrastructure and, most importantly to populate the system, rather than to travel. Links with other running Projects with similar interests have been established in Europe (e.g. EDIT, LifeWeb, Species 2000, Europe, NBI, Fauna Europaea, Algaebase) and in the USA (Encyclopedia of Life - EOL).

The results of the information accumulated from the answers to the questionnaire are now in the form of a formal Report, which will be presented to the General Assembly meeting: (a) so far scientists from 18 Countries in Europe and overseas have provided information to the questionnaire; (b) most of them were taxonomists but other specialists are also included such as geneticists and molecular taxonomists, and scientists working on Aquaculture, GIS and Conservation; (c) most of the scientists who visited the questionnaire value as high the information on the description, taxonomic identification keys and biogeographic information although many think that ecological information (e.g. habitat preferences) should be also included in taxonomic portals; (d) most of the scientists are well aware of technical terms such as wikipedia and Life Science Identifiers (LSIDs) and a few of them are also aware of the modern terms of Semantic web and Tagging; (e) scientists still use mostly portals with literature resources and portals with species information, such as names (e.g. ERMS, Species 2000, ITIS), distributions (e.g.OBIS) and descriptions (e.g. Fishbase, Algalbase, CLEMAM); (f) an "ideal" taxonomic portal should include, according to the answers delivered so far, mostly literature resources and links, distribution data and maps, identification keys and reliable classification.

The area of computer aided taxonomy (or cybertaxonomy) is a fast evolving field of research and development. A number of unexpected deliverables for the PROPE-taxon RMP have thus been achieved during the last year. These deliverables are:

(i)A PhD student (Sarah Faulwetter) has been appointed in HCMR and she is currently working on the interface between the PROPE-taxon and the EOL, as part of her studies;

(ii) The student has recently (December 2006) visited the Marine Biological Laboratory (MBL) in Woods Hole (USA) and explored the opportunity to link at least some of the main actions of the RMP to those adopted by the Project they developed, under the EOL Project. The latter is particularly important for saving resources on one hand and on the other as being part of the largest running Project in the domain on the Planet. All major organizations and initiatives, such as GBIF, Species 2000, International Code for Zoological Nomenclature, Fish Base, and other EU funded Projects (e.g. EDIT) are currently linked to the activities of the EOL. The benefits for the PROPE-taxon are considerable, mainly in having access to software needed for the development of the PROPE-taxon modules and in taking part in the development of the architecture of the new system, under EoL. Also, access to resources will be largely improved by linking to such a large network of Projects and initiatives.

(iii) PROPE-taxon has been represented during the first meeting, *informatics*, of the EoL (08-09/02/2007);

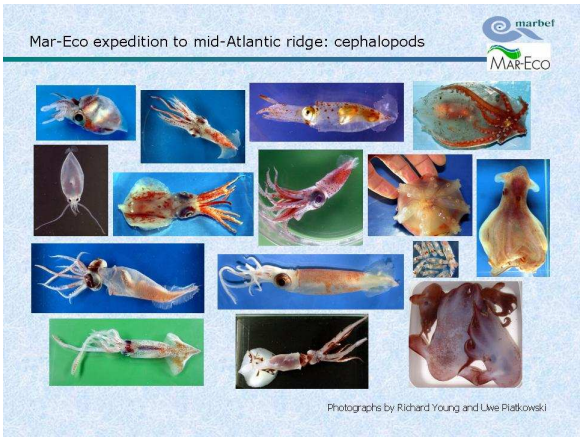
(iv) The *Names Summit* meeting of the EOL (19-20/02/2007) has been hosted by the HCMR, in Crete; report on this meeting is on the EOL website;

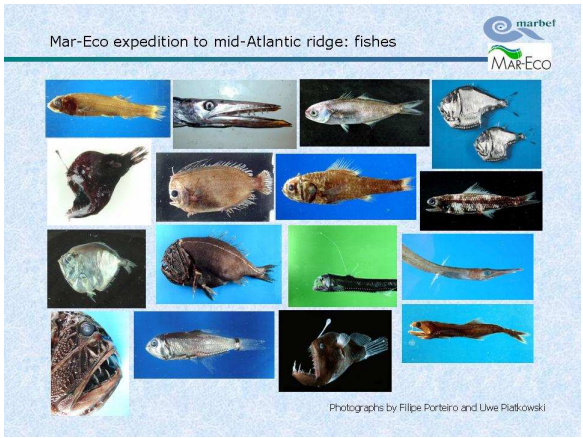
(v) PROPE-taxon has also been represented in the EDIT WP6 Workshop in London (26-27/04/2007), where some important links have been established. During this Workshop, another technical meeting has been suggested to be held in Crete, in the late summer or autumn 2007.

Mar-ECO - Integration of different methods to study patterns and changes ocean along the Mid-Atlantic Ridge

Uwe Piatkowski[1], Annelies C.Pierrot-Bults[2]
[1]*Leibniz-Institut für Meereswissenschaften, Germany*
[2]*University of Amsterdam, The Netherlands*

Two of the major topics of this RMP are (i) to broaden our knowledge about the North Atlantic pelagic ecosystems by adding new data to serve as a base-line dataset to monitor spatial-temporal changes in the open ocean, and (ii) to add data for different trophic guilds using a variety of technologies to enable an integrated approach enhancing our understanding of the ecosystem.
In addressing the objectives the RMP made significant progress during the reporting period. All contractors contributed to the objectives. The report of the first workshop ("Workshop on strategies and methods") held in October 2005 at IMR Bergen was put in a final stage. The second workshop of this RMP ("Workshop on pelagic reference sites") was held from 28 to 29 March 2006 at IFM-GEOMAR Kiel. The workshop was very efficient and resulted in various draft documents on (i) Open ocean deep-sea (High Seas) "sites" and regions for marine biodiversity, (ii) Pelagic deep-sea biodiversity, (iii) Network of deep-sea reference sites for long-term and large-scale marine biodiversity.
The workshop resulted in definition of pelagic reference sites for the open ocean Atlantic, a document with proposals for alternative reference localities, details on selection criteria, and recommended sites among the candidate locations.
Several partners of this RMP are engaged in studies on zooplankton from the mid-Atlantic ridge that was collected during an expedition in summer 2004; recent results on this are: (i) The SubPolar Front is a faunal boundary for many zooplankton groups (e.g. copepods, pelagic shrimps, medusae, chaetognaths), (ii) The SubPolar Front region was characterized by higher chorophyll concentrations, higher biomass of some groups (e.g. decapods) and increased egg-production rates of copepods (*Calanus*). (iii) Within the copepods 67 genera were found of which 113 could be identified to species. (iv) The gelatinous zooplankton comprised 38 siphonophore species, 21 hydromedusa species, and 5 scyphomedusae species. (v) Fourty-five pelagic decapod species were found (25 Caridean + 20 Dendrobranchiata), of which one species is new to science.
Further progress comprised a short extraordinary meeting of RMP partners during a MarECO project workshop at Aberdeen University, 6-7 July 2006; a poster presentation of MarECO/MarBEF related work (Title: Cephalopod diversity along the northern mid-Atlantic Ridge) at the meeting in Aberdeen and during the Cephalopod Life Cycles Conference in Hobart, Australia, 6-10 February 2006 and at ICES Annual Science Conference in Maastricht, the Netherlands, 19-23 September 2006. A new member was integrated into the RMP (St Andrews group, UK, MarBEF partner 5b) who will contribute on molecular research of marine mammals with a focus on the genetic characterisation and social structure of Scottish Bottlenose Dolphins (*Tursiops truncatus*).





Other highlights were detailed descriptions of the pelagic cephalopod and fish fauna of the mid-Atlantic ridge (see images above). Both animal groups contribute key species to the pelagic deep-sea fauna and will play significant roles in defining pelagic reference sites. From the cephalopod collection

of the expedition a new deep-water squid (*Promachoteuthis sloani*) was described (Young et al. 2006a), another one (*Planctoteuthis levimana*) was redescribed (Young et al. 2006b).

Publications:

Young, R.E., Vecchione, M., and Piatkowski, U. (2006a): *Promachoteuthis sloani*, a new species of the squid family Promachoteuthidae (Mollusca: Cephalopoda). *Proc. Biol. Soc. Washington*, 119(2), 287-292

Young, R.E., Vecchione, M., Piatkowski, U., and Roper, C.F.E. (2006b): A redescription of *Planctoteuthis levimana* (Lonnberg, 1896) (Mollusca: Cephalopoda), with a brief review of the genus. *Proc. Biol. Soc. Washington*, 119(4), 586-591

Plankton biodiversity and MarPLAN

Wiebe H.C.F. Kooistra,
Marine Botany, Stazione Zoologica Anton Dohrn di Napoli, Italy

Within the sabbatical program of MarPLAN, twelve staff researchers, post docs and PhD students have taken the opportunity to spend sabbaticals at partner institutes to obtain training and exchange research experience. Here follow examples of these collaborations.
Phytoplankton organisms without stiff cell wall (*Chattonella* sp., *Fibrocapsa,* naked dinoflagellates, *Phaeocystis*) are difficult to prepare for and observe in electron microscopy (EM). Sascha Klöpper (AWI) studies the morphology and phylogeny of Adriatic strains of *Chattonella* and *Fibrocapsa. Chattonella* includes two widely distributed, genetically distinct species whereas *F. japonica* is the only species known in its genus. All appear to be cosmopolitan, and all can form toxic blooms. Sascha visited SZN colleagues to learn preservation methods and EM handling. His work at SZN combined with phylogenetic results showed that both his strains of *Fibrocapsa* and *Chattonella* belong to new species. Nagore Sampedro and Laura Arin (ICM-Barcelona) learned to apply these techniques to obtain high quality images to permit taxonomical characterisation of naked bloom-forming dinoflagellates and *Phaeocystis* strains, respectively.
Ceratium is a diverse genus of large phytoplanktonic dinoflagellates with beautiful but bizarre cell wall architecture. Alina Tunin (LOV) uses these dinoflagellates as biological indicators of environmental change in the NW Mediterranean Sea. She visited SZN colleagues to compare *Ceratium* diversity in the Gulf of Naples and Villefranche at present and in the past. In order to sort out *Ceratium* systematics and phylogeny, Rodolphe Lemeé (LOV) spent two sabbaticals at SBR Roscoff to practice "Single Cell PCR" applied to *Ceratium*. He isolated numerous cells and amplified target marker regions at the SBR.
Numerous new genetic techniques have recently become accessible to study gene expression. Bente Edvardsen (UIO) spent a several months' sabbatical at SBR to collaborate on the molecular phylogeny, taxonomy, life cycle, molecular probe development, genetic variability and bloom dynamics of potentially toxic phytoplankton organisms. With the techniques acquired she determined genome size and ploidy level of the dictyochophyte microalga *Chattonella* aff. *verruculosa*. Ingvild Riisberg (UIO) visited the AWI to learn how to investigate gene expression in *Chattonella aff. Verruculosa*. Alberto Amato (SZN) visited the AWI to study gene expression during sexual reproduction in the toxic bloom forming diatom *Pseudo-nitzschia delicatissima* using the same technique. He identified several genes potentially involved in sexual reproduction using microarray methods, QRT-PCR for the reverse transcription of mRNA into cDNA and real time PCR for quantification purposes.
Secondary metabolites affect interactions among organisms during plankton blooms. François Ribalet (SZN) visited LOBB to test effects of metabolites produced by marine diatoms on bacterial cultures. Gram-negative bacteria showed a remarkable resistance to these compounds whereas Gram-positive ones generally were more sensitive.
Dr Philipp Assmy (AWI) visited SZN to collaborate with colleagues on morphological and life cycle traits of the polar marine diatom *Chaetoceros dichaeta*, and learned to apply genetic identification and molecular phylogenetics. He identified different morphotypes in EM and described the peculiar modality of cell division in the genus *Chaetoceros* in which setae protrude through indentations (openings) of the maternal girdle band. Phylogenetic results on various strains of *C. debilis* from different locations (Southern Ocean, North Pacific, North Sea US East and West coast) indicate that strains from different biogeographic locations are genetically and morphologically separated entities (cryptic diversity).

Synthesis of Theme 1 (WP3): Global Patterns of Marine Biodiversity across Ecosystems

Fred Buchholz[1], Doris Schiedek[2], Alex Kraberg[1]
[1]*Stiftung Alfred-Wegener-Institut für Polar- und Meeresforschung, Germany*
[2]*Baltic Sea Research Institute Warnemünde, Germany*

The central objectives of MarBEF are laid out in the Central Strategic Core Programme. The Responsive Mode Projects have turned out to be invaluable to follow the MarBEF Themes in detail and fill the Network of Excellence with life: organizationally and within many scientific activities. To detect patterns in European biodiversity in temporal and geographical structures a prerequisite is the accessibility to existing biodiversity data sets of the partners. Here, the RMPs play a key role, and even more importantly they are fora to formulate appropriate hypotheses on the occurrence and changes of pan-European patterns in marine biodiversity.

During the first phase of MarBEF, the MacroBen database has been established: Owing to the contributions of the different MarBEF partners it has developed into one of the most comprehensive marine benthic databases available globally. Based on these data a set of overall hypotheses has been formulated and already partly been tested with respect to soft bottom benthic biodiversity patterns and variations across spatial and temporal scales. As a CSP activity, a set of Theme 1 RMPs feed directly into the proceedings of MacroBen. Large-scale scientific analysis and publication of spatial variations in benthic fauna on a) a pan-European scale and b) several detailed studies of Arctic fjords are in progress. An overview will be presented and an additional example will be given on possible changes in the plankton. Furthermore, salinity dependent biodiversity patterns of soft bottom fauna along a gradient in the Baltic sea will be discussed. Biological indices have been used, as have been applied in historical comparisons of hard bottom benthos at Helgoland.

The work of RMP LargeNet is also gathering considerable momentum. Two databases for rocky shore and pelagic datasets will be established and form an additional basis for future work in Theme 1. Furthermore, to being vital for LargeNet analyses they will also facilitate greater and more durable integration between Theme 1 RMPs.

Another central effort within Theme 1 is the exchange of people, methods and ideas flanking data acquisition and analysis. The large-scale multi-author analyses carried out in Theme 1 also require a very large skills base and many RMPs are therefore engaged in exchange of methodology including experimental approaches, partly supported through the MarBEF sabbatical programmes. They also result in important, novel scientific insights that in most cases lead to peer-reviewed publications. Another mode to exchange ideas and to communicate is the MarBEF website and most RMPs have also now developed an active web presence and two RMP forums have been established

Discussions within the Theme 1 community are currently under way on the establishment of new research topics within the structures of the local institutes as well as within European research networks of institutions. This is essential as the continuation of long term ecological observation is the basis for ecological comparisons on pan-European scales, and these are in the responsibilities of the marine stations and institutes of the partner nations. To strengthen, support and supply the current observatories of the seas with new ideas is a task seen by MarBEF members but will carry on into the FP7 system and thus beyond the life-time of MarBEF. The legacy of the Marine Research Station's network (MARS) as well as the previous BIOMARE concerted action will be considered and discussed.

GBIRM - Genetic Biodiversity

Jean-Pierre Féral
Centre National de la Recherche Scientifique; Centre d'Océanologie de Marseille, Station Marine d'Endoume, France

RMP GBIRM is dedicated to sustain the genetic study of marine biodiversity by networking facilities (sampling, monitoring and training), gathering, at a European scale, as many involved laboratories as possible.
GBIRM species for which markers are already calibrated (i.e. technical conditions for genetic markers set up, and markers known to be polymorphic within the studied species) are preferred since only for these ones the genetic data will be available, before the end of MARBEF. That should lead eventually to meta-analysis across taxa for those species sampled in common localities and for which merged datasets should allow understanding better the nature and function of geographic boundaries and barriers to gene flow.
During this 12 months period, GBIRM activity followed four principal lines:
1- Defining the sampling gaps in our sampling schemes and organising joint sampling actions to fill them.
Those sampling trips are one of the primary goal of GBIRM and should be performed in zones that are usually the less accessible to European researchers, leading to important biogeographic gaps in their sampling schemes, namely the East and Southeast Mediterranean Sea and he Northern African coasts. A sampling campaign organised with Israel has been postponed due to difficulties to obtain administrative authorizations to work on the Turkish coast. Samplings on the coast of North Africa are still planned. Samplings in Adriatic (Italian and Albanian coasts) are planned for 2007.
2- Completing our molecular datasets within subclusters of laboratories, depending of the state of the art for each taxonomical groups.
Macrophytes and “fishes” are the most advanced taxa.
3- Compiling them to plan distinct meta-analysis in several biogeographic regions of particular importance, using if possible standardized analytical tools.
During the second GBIRM workshop, to be held in Tjärnö (SE) next june, data from algae (pan-European) and data from Atlantic (including macrophytes and invertebrates) will be tested (metadata analysis).
And 4- eventually writing integrative proposals.

MarENGIN - The role of native and/or invasive ecosystem engineers in explaining biodiversity

Tjeerd Bouma and Tom Ysebaert
Netherlands Institute of Ecology, The Netherlands

The **objective** of our RMP is to compare the relative importance of ecosystem engineering[1] for biodiversity and stability across **different types of native and/or invasive ecosystem engineers** (e.g. coral reefs, seagrass meadows, bivalve beds, algae meadows, salt marshes, etc.). We will focus on the effect of different environmental conditions and stress levels across different geographical regions and based on this we want to establish:

1. the importance of ecosystem engineering for biodiversity by comparing species occurrence patterns in areas with and without the dominant (invasive) ecosystem engineer. The data will be used to derive **assembly rules**, showing facilitation and/or inhibition.
2. the relative importance of the 2 main **mechanisms**: (1) modification of the physical and/or chemical environment versus (2) enhancing the structural complexity of the system. This will be achieved by comparing the biodiversity effect of native and/or invasive ecosystem engineers that strongly vary in this respect.
3. the consequences of ecosystem engineering for **ecosystem functioning** and **ecosystem stability**, e.g., by using a (conceptual) modelling approach.

Following our RMP workshop in January 2006 we further elaborated on the three main topics that were addressed during the joint workshop:
Topic 1) Biodiversity effect of native and invasive ecosystem engineers, across different scales – coordinated by Sergej Olenin – KUCORPI
Topic 2) compare biodiversity effects of auto- and allogenic ecosystem engineers in shallow coastal ecosystem – coordinated by Karsten Reise – AWI
Topic 3) importance of EE in relation to the environment and environmental stress level – coordinated by Tjeerd Bouma/Tom Ysebaert/Peter Herman – NIOO
In **topic 1** we test the hypothesis that invasive EE will enhance biodiversity. This is expected to strongly depend on the following aspects:
The characteristics of the receiving ecosystem: does the invader replace a similar functional group (diversity may remain similar), or does the invader add a new functional group to the system (diversity may increase/decrease).
Scale of observation (spatial and temporal): although there may be an increase in diversity locally in the receiving ecosystem, it may mean that diversity decreases at the scale of e.g. a whole coast line, as all parts start to resemble each other. Similarly, a short term increase in diversity may be the start of a long term loss of diversity.
Although an invasion may not necessarily lead to a decrease of diversity (at least at small and short scale), it may cause the loss of a landscape. Is diversity worth this price?
Topic 2 addresses the importance of ecosystem engineering above and below the sediment surface for coastal benthic diversity. Autogenic ecosystem engineers are engineers that modify the habitat via their own physical structures and generate primarily epibenthic structures. Allogenic ecosystem engineers are engineers that modify the sedimentary habitat via their activities, and are primarily endobenthic. We test the hypothesis that autogenic ecosystem engineers facilitate epibenthic diversity at the expense of endobenthic diversity, while allogenic ecosystem engineers facilitate endobenthic diversity at the expense of epibenthic diversity. The alternative is that effects of ecosystem engineering are entirely species specific.
The **3rd topic** will focus on the importance of EE in relation to the environment and environmental stress level. Species may in some areas act as EE, whereas in other environments they will not. Can we identify general mechanisms that explain the shift from EE to non-EE, by using environmental gradients such as: species rich ⇔ species poor; nutrient rich ⇔ nutrient poor; strong hydrodynamics ⇔ weak hydrodynamics. What is the importance of density, and how does that relate to environmental conditions? What may be the restoration implications? This topic will be worked out in the final stage of the RMP but it is foreseen that more data are needed to elaborate this topic.

[1]Ecosystem engineering has been defined as a biologically mediated modification of the physical and/or chemical environment that is relatively large. Thus, ecosystem engineers are known to modify habitats, which may facilitate or inhibit conditions to specific members of the community. As a result, many engineers function as keystone species with a large impact on the biodiversity, functioning and stability of ecosystems.

MarPACE – Marine Propagation Along the Coasts of Europe

C.J.M. Philippart[1] & Katell Guizien[2]
[1]*Royal Netherlands Institute for Sea Research, The Netherlands*
[2]*CNRS Laboratoire d'Océanographie Biologique de Banyuls, France*

Objectives of the project:

1. Identification of the intensity, timing, and temporal extent of production and (primary) settlement of pelagic propagules of benthic plants and animals along large-scale Pan-European transects representing spatial gradients in environmental conditions.
2. Further understanding of the factors that contribute to recruitment success of marine organisms to better resolve questions with regard to potential effects of global warming on marine ecosystems, and to contribute to identify phase-changes (if present) in recruitment along latitudinal gradients

On Friday December 15, 2006, we started the standardised sampling of larvae and post-larvae along a European gradient. Sampling is performed every other week. Water samples of 2 litres are taken to determine the presence of pelagic larvae (by means of molecular techniques). Standardised PVC panels are replaced by unfouled ones. There are two panels connected to one sampling unit (one "top" panel and one "bottom" panel), which also include a temperature logger. We deploy three sampling units per sampling station. The fouled panels are taken to the lab to determine the species which have attached during the past two weeks. This sampling will continue for one full year, implying that the last sampling date will be on Friday December 14, 2007.
Pelagic (larvae) samples are taken at 20 stations, viz. locations in the waters near Oslo (Norway: Julie Bremner), Sopot (Poland: Jakub Korthals), Helgoland (Germany: Fred Buchholz), Sylt (Germany: Birgit Hussel), Marsdiep tidal inlet (Netherlands: Katja Philippart), Easterscheldt (Netherlands: Peter Herman), southern North Sea (Belgium: Dre Cattrijsse), Roscoff (France: Eric Thiebaut), northern Iberian peninsula (Portugal: Isabel Sousa Pinto), Lisbon Marine Park (Portugal: Ester Serrao), Algarve (Portugal: Ester Serrao), Azores (Portugal: João Gonçalves), Banyuls (France: Katell Guizien), Mallorca (Spain: Iris Hendriks) and Lecce (Italy: Giuseppe Guarnieri).
Benthic (post-larvae) samples are taken at 19 stations, viz. locations in the waters near Oslo (Norway: Julie Bremner), Sopot (Poland: Jakub Korthals), Marsdiep tidal inlet (Netherlands: Katja Philippart), Easterscheldt (Netherlands: Peter Herman), Roscoff (France: Eric Thiebaut), northern Iberian peninsula (Portugal: Isabel Sousa Pinto), Lisbon Marine Park (Portugal: Ester Serrao), Azores (Portugal: João Gonçalves), Banyuls (France: Katell Guizien), Mallorca (Spain: Iris Hendriks) and Lecce (Italy: Giuseppe Guarnieri).
Outreach was realised by participation in Workshop for High school Biology Teachers in January 2007 (The Netherlands) by Katja Philippart (NIOZ) and Arjan Gittenberger (NHM). This outreach was communicated with Ecoserve for possible incorporation in general MarBEF outreach activities.
A workshop will be organised this summer (in Paris on 5 and 6th of June 2007) to compare and discuss the first results on the fouling on the standardised panels, to jointly work on the post-larvae that were found on the panels but could not yet be determined up to species level, and to exchange the first part of the (deep-frozen) pelagic samples.

BIOFUSE - Effects of biodiversity on the functioning and stability of marine ecosystems – European scale comparisons

Lisandro Benedetti-Cecchi[1], Tasman Crowe[2], Mathieu Cusson[1,2]
[1]*University of Pisa, Italy*
[2]*University College Dublin, Ireland*

Biodiversity is being lost at an unprecedented rate. The causes of this loss and its consequences for the functioning and stability of ecosystems are the current focus of intense research activity. BIOFUSE aims to quantify the **relationship between biodiversity and the functioning and stability of ecosystems** with variable regimes of diversity and disturbance. The project involves 19 partner institutions (46 researchers) from 13 EU countries. There are **five specific objectives**: **(1)** Quantify stability at sites of naturally differing degrees of diversity under a range of levels of exposure to natural and anthropogenic disturbance; **(2)** Discriminate between effects on ecosystem function and stability of numbers of taxa or functional groups and their identities (while controlling for changes in overall density/biomass); **(3)** Test effects of loss of diversity at one trophic level on the functioning of others; **(4)** Quantify the main effects and interactions between intensity and temporal variance of disturbance on ecosystem function under different levels of biodiversity; **(5)** Compare outcomes across systems and geographic regions to test the hypotheses that effects of loss of diversity/key species/functional groups vary depending on the initial diversity of the system and the environmental conditions (salinity, substratum, nutrient levels, etc).

Objective 1. We are using meta-analysis of existing data sets and a long term sampling programme to estimate stability of ecosystems of differing diversities by measuring temporal variance of species richness (univariate) and community dissimilarity (multivariate, square-root Bray-Curtis). Analyses were done using species richness measurements at the scales of quadrat (cm) and site (100s m). **Meta-analysis** of existing data sets (n = 23) revealed significant relationships between temporal stability and diversity in a minority of cases. All significant relationships were positive except one involving multivariate data at the quadrat scale. Results of meta-analyses showed that the overall effect size was significant and positive for univariate analyses at both quadrat and site scales. When using community level data (multivariate), stability was or not correlated with diversity. The **long-term sampling programme** focuses on rocky shores and will be completed in Feb 2008. After 3 of 6 planned sampling dates, preliminary analysis showed no significant relationships between temporal stability and diversity at either the quadrat or site scale.

Objectives 2-4. Simple manipulations of diversity and disturbance are being replicated on rocky shores, sedimentary shores and seagrasses. **Rocky shores**: Preliminary analyses indicate significant changes in community structure as a result of manipulations of diversity and disturbance which are partially reflected in measures of ecosystem functioning (such as community respiration and production). Again, these results are preliminary since 2 other sampling dates are yet to come (end August 2007). **Sedimentary shores**: Preliminary results from sedimentary shores indicate that organic enrichment has had no effect on the functional response of the community composition within the sediment or on the properties of the sediment itself. However there has been a change in community structure (i.e. diversity). The lack of significant changes in functional responses may suggest that *Arenicola marina* is not a key species in the functional processes within the study areas. **Seagrasses**: The addition of organic matter to the sediment in an intertidal *Zostera noltii* meadow has changed the characteristics of pore water compared to meadows where organic matter was not added. The presence of seagrass did not affect the response of the sediment to the addition of organic matter. After two months, however, seagrass mortality was evident in the plots where organic matter was added.

Complex manipulations to evaluate the effects of number versus the identity of taxa on ecosystem function and stability have been set up and the experiment will start in July 2007.

Objective 5. Findings from the meta-analyses, the long-term sampling programme and experiments (simple and complex manipulations) being undertaken in parallel in different systems and geographic regions will be compared to enable us to draw general conclusions about the role of biodiversity in European marine ecosystems.

FOODWEBIO - Functioning of FOOD WEbs across ecosystems of different BIOdiversity level

Adam Sokolowski
Institute of Oceanography, University of Gdansk, Poland

During the last year, the objectives of the RMP were:

- to establish methodological guidelines for collecting data on biodiversity of benthic communities, stable isotopes of living and non-living compartments of system and basic physiological processes of organisms
- to collect relevant data at selected locations along the European coast, and organise web page with database
- to make first inventories of available data for comparative analyses
- preparing first scientific papers

The current focus of the project is on the collection of data on stable isotopes in different components of ecosystem and data necessary for *Network Analysis* (such as standing stocks of auto- and heterotrophic species, rates of their basic physiological processes and their diets) from different European coastal systems. Data are gathered through a questionnaire that lists single parameters and variables required for each methodological approach. The institute in charge of data collection and maintenance for stable isotopes is Centre de Recherche sur les Ecosystèmes Littoraux Anthropisés (CRELA), France and for Network Analysis is Alfred-Wegener Institute for Polar and Marine Research (AWI), Germany.

Stable isotope approach

In order to reduce variations due to seasonal changes in environmental variables and ecophysiological traits of organisms, data should refer to one season i.e. spring (preferably May) at all sampling locations. It was underlined that differences in data may also derive from different methodologies of sample treatment, specifically acidification prior to analyses on IRMS-EA. Institutes which are sampling geological and biological materials and performing analyses should therefore use the same protocol as other institutes.

Network Analysis

In May 2006 a questionnaire on required data for assessing diversity of benthic communities and trophic relations at selected sites was prepared and distributed to all partner institutes by CRELA. The questionnaire has served as a guideline for gathering local environmental parameters, and carbon and nitrogen stable isotope composition of biotic and abiotic compartments of a system.

By the end of the year, CRELA collected relevant data on ten selected sampling locations from three European water-basins (Table 2).

Table 2. Sampling locations where data on biodiversity and carbon and nitrogen stable isotope composition of various ecosystem compartments were collected in 2006.

Location	Water basin	Country	Institute responsible for data delivery (ID no)
Lucky Strike vent field 1700 m Menez Gwen vent field 840m	the Mid-Atlantic Ridge	Portugal	DOP/UAç (13)
Bay of Banyuls-sur-Mer (marine) La Palme Lagoon (brackish) Canet Lagoon (brackish) Leucate Lagoon (brackish with marine influence)	western Mediterranean Sea	France	CNRS-LOB (44b)
Aiguillon Bay Marennes-Oleron Bay Arcachon Basin	Atlantic	France	CRELA
Bay of Puck Gulf of Gdansk	southern Baltic Sea	Poland	IO UG (39)

Data from other locations, situated in the English Channel and North Sea should be still delivered (Westerschelde, Oesterschelde, Grevelingen) to CRELA or checked for availability (Roscoff and Azores Islands). Stable isotopes data about trophic interactions and trophic structure of intertidal rocky shore (supra and medio-littoral) of Roscoff, data will be available for FOODWEBIO, and presented during the planned meeting in 2007. In Sylt-Romo Bay (eastern Wadden Sea) and Curonian Lagoon (eastern Baltic Sea) sampling works started in 2006 and subsequent isotopic analyses of potential organic matter sources and biota commenced to continue through the beginning of 2007. The results will be gathers by the responsible institute as soon as they are available.

AWI sent a separate questionnaire on data that are required for comparative studies of coastal ecosystems in terms of its functional processes and global properties. The questionnaire included information on the standing stocks of the major communities and species, and their basic physiological processes such as assimilation, production, respiration and excretion. This information will be further used to develop a quantitative food web model that illustrates the rate of energy uptake, dissipation and transfer between the components (species) of the particular system.

MarMICRO - Microbial diversity and ecosystem functions: concepts, open questions and recommendations for integration of microbes into general ecological frameworks

Pep Gasol[1] and Klaus Jürgens[2]
Consejo Superior de Investigaciones Cientificas, Spain
Baltic Sea Research Institute Warnemünde, Germany

During two RMP workshops within the last reporting period (12-13 Sept 2005 in Barcelona, 16-18 Jan in Palma de Mallorca) the framework and relevant topics for a position paper on the role of microorganisms in the biodiversity-ecosystem functioning debate have been developed and different tasks have been distributed among the participants. The plan for the last year was to proceed with these issues in three working groups and to present and discuss the results which have been worked out at another RMP meeting (Amsterdam, 6-9 Feb 2007).
On the basis of the first outline of a conceptual paper several issues had been developed further and we agreed on splitting the overall topic into several themes for which it is planned to write publications. These should summarize the results obtained during the workshops and later on by some of the participants at their home institutions
Besides the conceptual work, the planning and organisation of workshops focussing on methodological aspects continued. Preparations for the first of these workshops resulted in the MARBEF training course on "Genetic Fingerprints in Biodiversity Research", organised by Dr. Jens Harder at the MPI for Marine Microbiology March 5-9, 2007. Several of the RMP participants served as lecturers in this course for graduate and PhD students.
Plans for another workshop and course on cultivation techniques of microorganisms, to be scheduled for summer 2008, are in progress. Work has been conducted in several of the involved laboratories, to define what are the most used concepts in microbial biodiversity research and in which form are they used. The conceptual work performed in meetings and detailed above, has been combined with field and lab work in some of the labs, for which they have hired part-time some students or postdocs.

Among the work done, it is remarkable a study of comparison of the capability of different approaches to describe the biodiversity of a given marine environment. Figure 1 shows how three different approaches: DGGE fingerprinting, clone libraries and CARD-FISH with group specific probes are capable of describing the same fact: the bacterial diversity of a coastal Mediterranean environment.

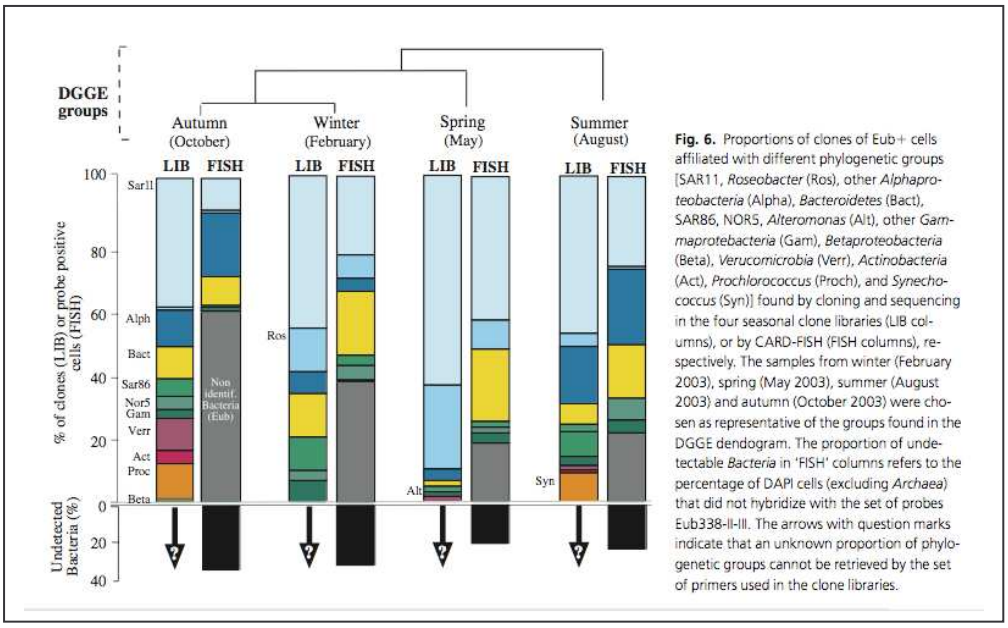


Fig. 6. Proportions of clones of Eub+ cells affiliated with different phylogenetic groups [SAR11, *Roseobacter* (Ros), other *Alphaproteobacteria* (Alpha), *Bacteroidetes* (Bact), SAR86, NOR5, *Alteromonas* (Alt), other *Gammaprotebacteria* (Gam), *Betaproteobacteria* (Beta), *Verucomicrobia* (Verr), *Actinobacteria* (Act), *Prochlorococcus* (Proch), and *Synechococcus* (Syn)] found by cloning and sequencing in the four seasonal clone libraries (LIB columns), or by CARD-FISH (FISH columns), respectively. The samples from winter (February 2003), spring (May 2003), summer (August 2003) and autumn (October 2003) were chosen as representative of the groups found in the DGGE dendogram. The proportion of undetectable *Bacteria* in 'FISH' columns refers to the percentage of DAPI cells (excluding *Archaea*) that did not hybridize with the set of probes Eub338-II-III. The arrows with question marks indicate that an unknown proportion of phylogenetic groups cannot be retrieved by the set of primers used in the clone libraries.

Figure 1
The biases inherent to each type of methodology get transferred to the nomenclature and the concepts used by both, microbial and general ecologists. This is what we try to resolve in the above-mentioned meetings and workshops. As an example, the dominance of different types of ecosystems

by different microbial groups gets complicated by the seasonally variable biases in the methodologies. Fig. 2 shows how at different times (different points), the ratio between two methodologies give different values for each group of microbes.

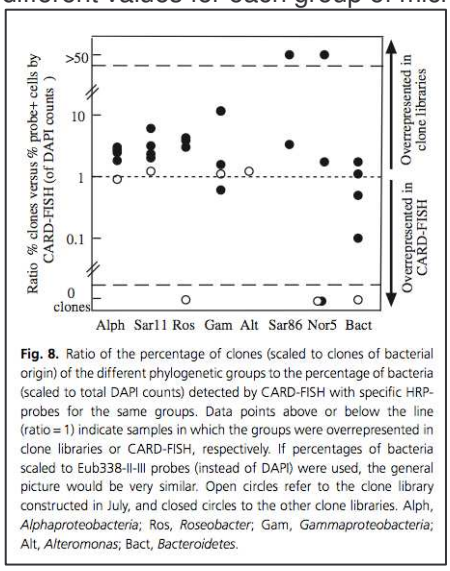


Fig. 8. Ratio of the percentage of clones (scaled to clones of bacterial origin) of the different phylogenetic groups to the percentage of bacteria (scaled to total DAPI counts) detected by CARD-FISH with specific HRP-probes for the same groups. Data points above or below the line (ratio = 1) indicate samples in which the groups were overrepresented in clone libraries or CARD-FISH, respectively. If percentages of bacteria scaled to Eub338-II-III probes (instead of DAPI) were used, the general picture would be very similar. Open circles refer to the clone library constructed in July, and closed circles to the other clone libraries. Alph, *Alphaproteobacteria*; Ros, *Roseobacter*; Gam, *Gammaproteobacteria*; Alt, *Alteromonas*; Bact, *Bacteroidetes*.

Figure 2

Finally, we have also done research on the conceptual linkages between carbon cycling and microbial (bacterial) biodiversity. This relationship might get confounded by the dependence of both variables on common environmental variability. Fig. 3 shows how it is possible to conceptualize such types of relationships.

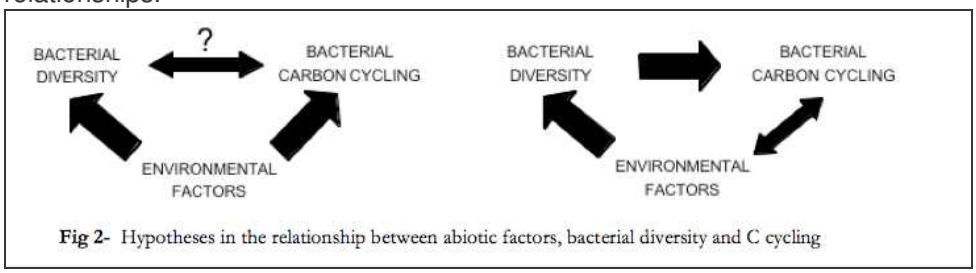


Fig 2- Hypotheses in the relationship between abiotic factors, bacterial diversity and C cycling

Figure 3

And in the following figure (Fig. 4)we show the statistical relationships between these types of variables in two contrasting environments, the subtropical North Atlantic (near the Canary Islands), and in a Mediterranean Bay.

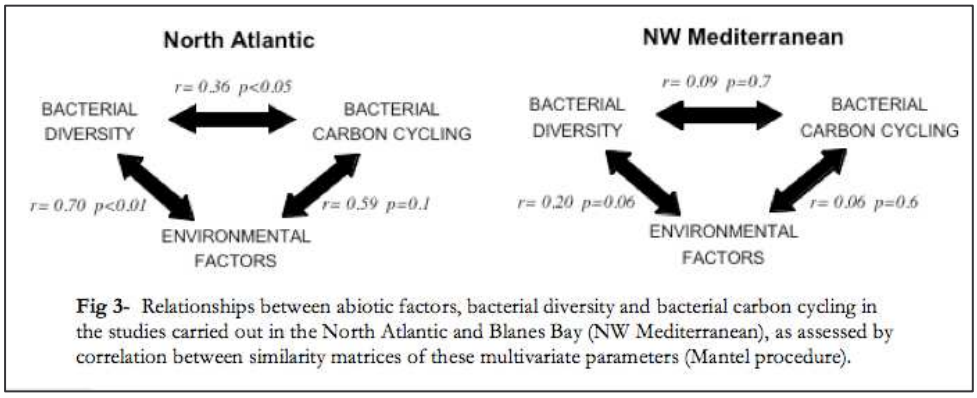


Fig 3- Relationships between abiotic factors, bacterial diversity and bacterial carbon cycling in the studies carried out in the North Atlantic and Blanes Bay (NW Mediterranean), as assessed by correlation between similarity matrices of these multivariate parameters (Mantel procedure).

Figure 4

The data we have analyzed in the framework of Marbef-Microbes indicates that the relationship between bacterial diversity and carbon cycling in the open ocean might or might not be significant, depending on the studied environment, and in any case it doesn't seem to be very strong, and mostly determined by the environment.

ROSEMEB research activities in 2006: Synthesis and future directions

Adrianna Ianora[1*], Maarten Boersma[2], Raffaella Casotti[1], Angelo Fontana[3], Jens Harder[4], Frederike Hoffman[4], Henrik Pavia[5], Serge Poulet[6], Gunilla Toth[5], Arturas Razinkovas[7] and Patrick Mayzaud[8]

[1]Stazione Zoologica A. Dohrn, Naples 80121, Italy
[2]AWI – Biologische Anstalt Helgoland, 27498 Helgoland, Germany
[3]Istituto per la Chimica Biomolecolare del CNR, 800078 Naples, Italy
[4]Max Planck Institute for Marine Microbiology, Celsiusstr. 1, D28359 Bremen, Germany
[5]Tjarno Marine Biological Laboratory, SE-452 96 Stromstad, Sweden
[6]Station Biologique CNRS, 29680 Roscoff, France
[7]Klaipeda University, Coastal Research and Planning Institute, H. Manto 84 LT-92294 Lithuania
[8]CNRS Laboratoire d'Océanographie de Villefranche, F-06234 Villefranche-sur-Mer, France

ROSEMEB aims at developing and applying novel and ecologically relevant methodologies to studies of allelopathy, antipredation, anifouling, antimicrobial, and other possible functions of secondary metabolites to better understand the diversity and function of these natural products, and what environmental factors trigger increased production of these compounds. Tasks worked on and achievements made in 2006 include the publication of a position paper (Ianora et al. 2006) which was the outcome of the kick-off meeting convened in November 2005 at the Benthos Laboratory of the Stazione Zoologica Anton Dohrn in Ischia, Italy. The essay reviews some of the new trends and emerging topics in marine chemical ecology, from microbial chemical interactions such as quorum sensing to chemically-mediated plant-animal interactions in the plankton and benthos. In 2006, we also organized a training course on bioassay methods in marine chemical ecology, held from September 9-14 at the Tjärno Marine Biological Laboratory, Strömstad, Sweden. The overall aim of the course was to teach some of the basic principles and protocols to monitor the responses of marine organisms to secondary metabolites and the role that these compounds play in mediating ecological interactions at sea. An article on the course appeared in MarBEF Newsletter number 5. A list of relevant publications on chemical ecology was constructed for the ROSEMEB web page relevant to the general field of marine chemical ecology. The list has several aims, from providing general reading to interested scientists, to offering a starting point for potential researchers in chemical ecology, to presenting supporting evidence from different models on the role of secondary metabolites in marine systems. In 2006, an ESF project on Infochemicals was prepared named DYNAPLAN (The impact of biochemicals and infochemicals on trophic dynamics and nutrient cycling in planktonic food webs) which was one of the 7 projects selected out of 54 by ESF for further funding. Unfortunately DYNAPLAN will not be funded this year due to the due to limited budget that was made available from the different countries for this programme. But we will resubmit the proposal again this year and hope to have more success this time. Finally, a series of short sabbaticals for specific training in methods in chemical ecology have been conducted in 2006, as well as the exchange of samples among different members of the group. Future activities for ROSEMEB in 2007 will include a training course on chemical isolation methods in Pozzuoli (Naples), Italy, in September which will precede the V European Conference on Marine Natural Products to be held in Ischia from16-21 September.

References

Ianora, A.; Boersma, M.; Casotti, R.; Fontana, A.; Harder, J.; Hoffman, F.; Pavia, H.; Poulet, S.A.; Toth, G. (2006) New trends in marine chemical ecology. Estuaries and Coasts 29 (4): 531-551.

MarDSS - Development of decision support systems

Mel Austen[1], Nicola Beaumont[1], Anne Marboe[2] et al.
[1]*Plymouth Marine Laboratory*
[2]*Roskilde University, Denmark*

The collaborative responsive mode action in the socio-economic theme 3 is moving ahead.
Six PhD students have been employed in the period to cover the areas of:

- Economic valuation
- Legal aspects of marine management
- Biological Valuation
- Development of Decision Support systems
- Socio-cultural valuation
- Valuation in the Gulf of Gdansk

An initial report outlining the design of a decision support system for marine reserves management using an economic analysis for the Dutch North Sea as an example has been prepared by Wageningen University. A joint MARBEF-ENCORA workshop on marine and coastal biological valuation took place in December 2006 at University of Ghent to progress the development of the methodology for the biological valuation. Economic, socio-cultural and biological valuations methodologies have been developed by MarDSS partners. These are being applied in the MarDSS case study areas (Isles of Scilly, Flamborough Head, Pico-Faial Canal, Dutch-Belgian Coast and Wadden Sea Island of Sylt and Romo, Gulf of Gdansk). Using the same methodology MSc students and PhD students will carry out the valuations this year. Many of the MSc students have been appointed. Economic valuation methodology was trialled in the Isles of Scilly in Summer 2006. The valuation methodologies were presented at a training course 'Valuation methodologies for the marine environment' in Faro, Portugal in April 2007. The course was attended by students who will be carrying out the valuations. After the course, a proposal was made to add Svalbard to the case study areas.

Synthesis on Theme 3 (WP5): The socio-economic importance of marine biodiversity - Synthesis

Poul Holm[1`], Anne Marboe[1], Tomaz Dentinho[2] et al.
Roskilde University, Denmark
University of the Azores

The socio-economic theme 3 is moving forward. This presentation focusses on the achievements of theme 3 and the synthesis work laying ahead. The presentation must be seen in conjunction with the presentation of MarDSS, the theme 3 RMP.
The CSP management team met in Bristol Airport 25 August 2006 and discussed the RMP progress, future activities and management handover. Roskilde University, team lead by Poul Holm, took over the responsibility of the CSP and administrative work. Roskilde University and Plymouth Marine Laboratory, team lead by Melanie Austen, continue to coordinate the leadership of the CSP and RMP of the socio-economic theme.
The RMP update meeting 16th and 17th November in The Hague was organized by National Institute for Coastal and Marine Management - RIKZ. The meeting focused on methodologies, future activities and a forward look for new activities and opportunities, such as FP7. A publication strategy for theme 3 was developed.
Alyne Delaney joined Roskilde University as a post-doc by 1 January 2007. Alyne holds a PhD in Cultural and Environmental Anthropology and has worked in European fisheries since 2003. Her first tasks under theme 3 were to develop the cultural valuation methodology, instruct MSc students on the methodology during the training course in Faro, Portugal, and to supervise the students conducting the fieldwork. Alyne will now coordinate the CSP program and synthesis work of theme 3.
The team at Roskilde University is embedded in the new Institute of Environmental, Social and Spatial Change, ENSPAC. The Department takes a holistic approach to solving complex environmental and societal problems and derives its strength from the integration of traditional disciplines to provide novel perspectives – and solutions – to these problems. The scope of the department is intentionally broad, exploring environmental and human dynamics over a range of temporal (past, present and future) and spatial (local, regional and global) scales. An important priority for the Department is strengthening relationships with public and private stakeholders; and collaborative activities with partners in industry, sector research institutions, regional organisations, NGOs and international bodies are strongly encouraged.
Two important publications have emerged under the theme 3 umbrella:
- N.J. Beaumont, M.C. Austen, J. Atkins D. Burdon, S. Degraer, T.P. Dentinho, S. Derous, P. Holm, T. Horton, E. van Ierland, A. H. Marboe, D.J. Starkey, M. Townsend, T. Zarzycki. Identification, Definition and Quantification of Goods and Services provided by Marine Biodiversity: Implications for the Ecosystem Approach in *Marine Pollution Bulletin* 54 (2007) 253–265
The aim of this research was to validate the definitions of goods and services, and to identify knowledge gaps and likely difficulties of quantifying the goods and services. It is concluded that the utilisation of this goods and services approach has the capacity to play a fundamental role in the Ecosystem Approach, by enabling the pressures and demands of society, the economy and the environment to be integrated into
environmental management.
- S. Derous, T. Agardy, H. Hillewaert, K. Hostens, G. Jamieson, L. Lieberknecht, J. Mees, I. Moulaert, S. Olenin, D. Paelinckx, M. Rabaut, E. Rachor, J. Roff, E.W.M. Stienen, J.T. van der Wal, V. van Lancker, E. Verfaillie, M. Vincx, J.M. Węsławski, S. Degraer. A concept for biological valuation in the marine environment in *OCEANOLOGIA*, 49 (1), 2007, pp. 99–128.
This paper provides a concept for marine biological valuation which is based on a literature review of existing valuation criteria and the consensus reached by a discussion group of experts.
Theme 3 held a successful training course on valuation methodologies for marine environments in Faro Portugal the 11-14 April 2007. Theme 3 was granted funding by the SSC for the training course. The training course involved 33 students and 10 lecturers. The program included some time to introduce the MarBEF project on socio-economic approaches to the marine environment, and included lectures on economic, ecological and socio-cultural valuation of the marine environment, on decision support systems for marine environmental policies and on regulatory policies for the marine environment. The appraisal by the students revealed a general contentment with the course because it was possible to promote cross-disciplinary communication amongst the students, students and

lecturers and across the MarBEF. Criticism was mainly related to the splitting of lectures between the different valuation approaches. It is an activity that should be repeated in the following years.
Theme 3 joined forces with MarFISH to hold a workshop on *Long term spatial impact of natural variability and human induced changes in marine ecosystems* at RUC the 22-23 February 2007. This workshop aimed at bringing together multiple disciplines with the intent to gain new insights into the driving forces of marine resource exploitation. The evidence presented included time series on a decadal to centennial scale, and spatially resolved data from the Mediterranean to the Barents Sea.

WP1: Towards more European marine biodiversity data integration

Ward Appeltans
MarBEF Data Management Office, Flanders marine institute (VLIZ), Belgium

Data integration and dissemination are some of the fruitful products of MarBEF, and for this good data management practices are essential. MarBEF is recognizing that and is making good progress. The amount of data integrated and effectively used is increasing. The responsive mode project on data archeology allows for rescuing data and making them available in a digital format suitable to share with a much larger public.

Europe has now two unique and large integrated databases, one on soft-bottom macrobenthos (macroben database) and one on meiobenthos (Manuela database). The subproject LargeNet will do a similar job on hard-bottom macrobenthos and pelagic biota. The benefits of these kinds of integrative projects are enormous. The analyses that are going to be done on these databases with such an extensive geographical, temporal and taxonomical scale will undoubtedly bring several new insights, which were impossible to obtain on an individual basis.

We strongly support the MarBEF's philosophy of open access to data within a partnership approach and actually thanks to many partners a lot of data have been contributed and are now freely available through the European node of the Ocean Biogeographic Information System (EurOBIS). With 3.5 million records from 47 data providers, EurOBIS serves one third of all species distribution records in the world and hopefully still much more will be added in the future. Also interesting is that EurOBIS integrates data from a variety of data sources, from large-scale monitoring surveys to time-series of a single location, from observational data to museum collections. EurOBIS is making good progress and is already an important source to data discovery. Although we are aware that this is just a tiny bit of the top of the iceberg, and we will have a lot more work just to get the data currently at risk of being lost forever, to be integrated and made publicly available as soon as possible.

Another big challenge is also to control data quality. We rely very much on the data providers, but there are a number of things we can do, such as to link the taxonomic names with the European Register of Marine Species (ERMS) – there is now also an online tool where you can do this exercise yourself (called taxon match) – and to check the geographical positions and other parameters related to them. Extensive metadata, the information on the datasets, describing the accuracy of the data, the protocols applied and the people involved, will be extremely important. The more data are available the more difficult it will be to find the right data that fit your needs and satisfy your standards.

It is heartwarming to see how many people are actually making use of the systems. Every month there are over 10,000 visitors (nearly half a million hits) on the MarBEF website. The taxonomic register ERMS comes up as one of the most visited pages and we have nearly 100 people visiting EurOBIS every day and many are effectively downloading the data. It is also encouraging to see that the mobility portal, a system that matches CVs and vacancies, is a success and the MarBEF calendar of events is serving details on many meetings, not only those organized by MarBEF. The MarBEF Open Archive (MOA), an initiative we started only one year ago, already includes over 250 scientific papers, fully downloadable in PDF. MOA is now also indexed by Google scholar, which increases our visibility. The weekly news bulletin (MarBEF web news) is a way to advertise the latest news from MarBEF, including related topics by a simple weekly email. The mailing list of this e-bulletin includes over 1,500 subscribers, and hereby has become a service that is now appreciated by a large community of scientists, students, policy makers and many others interested in marine sciences.

WP2: The Taxonomy Clearing System: a demand-driven interface

Geoff Boxshall
Department of Zoology, The Natural History Museum, London SW7 5BD, UK

Excellent, quality-controlled taxonomy is one of the keys to success for MarBEF. In order to provide special focus on taxonomic and systematic progress in the context of MarBEF's scientific goals, we established a Taxonomy Clearing System. The objectives of this system are twofold: 1. To facilitate integration between the taxonomists and ecologists within the MarBEF network. 2. To provide an effective interface - helping to match supply and demand for taxonomy within MarBEF. The Taxonomy Clearing System uses a small budget to provide financial support to help meet these objectives and every six months we have solicited proposals for funding. Funding has been requested for a wide variety of tasks and has been strongly driven by demand from within the network.
In the first year of MarBEF we held an e-conference via the MarBEF website and arrived at the following set of criteria, against which all funding applications are judged:

1. *Relevance to MarBEF programme*
2. *Criticality - support from Core Programme/Theme leaders*
3. *Ensuring progress across range of deliverables*
4. *Availability of expertise*
5. *Availability of suitable material*
6. *Cost [the maximum funding provided for any proposal will be 5,000 Euros.]*
7. *Track record on past delivery.*

These criteria are used to ensure that the Taxonomy Clearing System is demand led – primarily by the ecologists within MarBEF. The simple application process uses a proforma downloadable from the MarBEF website. There have been five calls for applications in the first three years. The results of the last two rounds are given below:

Applications funded in fourth round (month 30):

1. CNRS-DIMAR/VLIZ: *georeferenced and updated world list of living Brachiopoda*
2. CNRS-OOB: *Support for updating world planktonic Copepod database*
3. CNRS-LOV/IBSS: *Biodiversity and biogeography of tintinnids from Black Sea*
4. APN/NHM: *Identification & taxonomy of polychaete parasites*

Applications funded in fifth round (month 36):

1. CNRS-OOB: *updating and translating Copepod database*
2. SAHFOS/VLIZ: *harmonising CPR taxonomy with ERMS*
3. IFREMER/SNG: *identification and description of deep-sea tanaids*
4. IOPAS/NHM: *nematode taxonomy training*

The deadline for the sixth call has already been announced as 30th June 2007 and the seventh call will close on 15th December 2007.

WP6: Quality Assurance

Keith M Cooper
Centre for Environment, Fisheries & Aquaculture Science, United Kingdom

The aim of the Quality Assurance work package is to help ensure the quality of MarBEF products. This is important as MarBEF outputs may be used to influence policy makers.
This aim is being achieved by:

- raising awareness of the importance of quality assurance in all aspects of scientific work
- developing a MarBEF QA framework
- providing information and advice to
    - allow individual laboratories to improve their own in-house AQC procedures
    - individual projects in MarBEF
- encouraging participation in existing national or international QA schemes (e.g. BEQUALM)
- developing a MarBEF Procedures database.

The QA work package operates in a spirit of encouragement through the provision of advice and information in support of MarBEF activities.

The presentation will briefly cover the following:

1. MarBEF QA Framework register
2. Update on the BEQUALM QA scheme
3. Data Management tools
4. Assessing the quality of individual datasets
5. The MARBEF Procedures database
6. Sharing best practice

WP7: Progress in Training

Jens Harder
Max-Planck-Institute for Marine Microbiology, Bremen, Germany

Training in MarBEF focuses on training courses and individual short term sabbaticals. Progress will be reported and calls will be presented.

Links to open calls:
http://www.marbef.org/modules.php?name=Forums&file=viewtopic&t=271
http://www.marbef.org/modules.php?name=Forums&file=viewtopic&t=240

WP8: Outreach

Roisin Nash
Ecoserve, Ireland

Task 1: The development of a new revised publication strategy has started to provide a structured approach to disseminating information from the network for the next period. This publications and communications strategy document is updated regularly during MarBEF and is evolving with the development of the network.
A press office was established where press releases from MarBEF are circulated through subscriptions to the AlphaGalileo and IPCB (International Press Centre for Biodiversity) web services. Of the press releases circulated one reached over 1,500 hits to date. The use of these facilities by the MarBEF members has been actively encouraged.
Task 2: To promote links between research, industry and other stakeholders by inviting SMEs and other end-users, including SMEs, to join the network in particular tasks. To replace the e-conference a think tank meeting between key stakeholders identified by MarBEF members will be organised to discuss the strategy.
The development of a trial database of SME is being developed by APN (partner 30) and is currently being circulated amongst the MarBEF community.
Task 3: To develop web based tools to facilitate communication within and outside the network: web site bulletin board (permanent means of communication between network members, password protected), E-conferences and mailing list server. Existing infrastructures (MARINE B-list server, MARBENA E-conference, etc) have been adopted to minimise costs.
Tools were created through the central website development (mailing lists and bulletin board) and have been utilised for outreach dissemination and are still actively used.
Task 4: To develop web pages primarily for outreach.
The Outreach officer and Data/Web Management team met at VLIZ, Oostende in October 2006 to discuss the future development, in terms of management, appearance, and accessibility, of this online resource.
The outreach website was updated with a new layout to include weekly news items, in the form of press releases and stories from around Europe, and events directed to the public are visible on the outreach front page.
A number of different sections within the outreach have been updated.

a. The resources section includes an additional page where the images of new posters and presentations can be seen prior to download.
b. The careers page has new information
c. The children's section has been expanded to include more simple puzzles, colour me in pages and games. A new junior section on the different marine organisms has been included and a marine biodiversity competition has been launched on the website.
    i. Colourful work sheets have been developed for 4-6 year olds and will be available soon on the outreach website.
    ii. A limited number of posters and fact sheets are also currently ready to be incorporated into the education section once the pages have been developed.

The review of the European school curricular was expanded to include all European countries. This review identifies where inputs from MarBEF may be beneficial and how simply marine biodiversity can be introduced to the already existing curriculum in the majority of countries. The existence of cross-curricular themes such as sustainable development in education has also been taken into account.
The revised website review has shown us what marine biodiversity educational material is available for use and now with the newly revised review of the school curricula in Europe we see how it is possible to envisage where marine biodiversity could be incorporated into the curriculum. The combination of both has lead to the development of newly structured education pages, which are currently under construction, where a number of modules will be developed under the strand of marine biodiversity and ecosystem functioning.
Task 5: An updated brochure has been printed containing information about the networks' aims, ambitions, partnerships and contact details, and distributed at a number of scientific conferences and meetings throughout Europe. The brochure inserts are now multilingual and available to download on

the MarBEF website in English, Finnish, Dutch, French, German, Greek, Italian, Danish and Portuguese. Currently in translation are Spanish, Norwegian and Slovak.

Task 6: Two full colour newsletters were published, printed and distributed during the reporting period. The fourth newsletter was published in the middle of May 2006 (month 27) and was distributed in the third week of May to over 750 network members and readers outside of the network. The fifth newsletter was published and distributed to over 800 addresses in January (month 35). To coincide with the International Polar Year the newsletter had an Arctic theme including an educational pullout for children. All MarBEF newsletters are available to download from the outreach website. Notice of the downloadable version of the newsletter was sent to a number of marine list servers including Algae-L, Annelida, Ecsite, Marine-B, Marine Microbes and the internal MarBEF news bulletin.

Task 7: A range of publicity material was produced including a second up to date series of posters promoting the network and taking into account of the changes, increased participation and developing work programme, within the MarBEF network. Another series of posters is currently being produced highlighting key marine biodiversity issues and aimed towards the general public. The first of which is available to download on the MarBEF website.

A downloadable flyer (A4 folded in 3) was produced for dissemination by MarBEF members. A downloadable version was made available from the website

Publicity material was distributed and outreach officer made available at the following meetings and conferences:

Meetings

- MarBEF GA (Lecce) – outreach update talk to network members
- EDIT Network of Excellence Workshop (Stuttgart) – talk on MarBEF network
- AQUATNET annual meeting (Gent) – Curriculum review (MarBEF)
- EDIT Network of Excellence (Paris) – Launch and workshop – promotion of marine sites for EDIT All Taxa Biodiversity Inventories
- Communication conference – London

Conference Exhibitions (MarBEF Booths)

- ECCB (European Congress of Conservation Biology) – Eger (Hungary)
- EMBS41 (European Marine Biological Symposium) – Cork (Ireland)
- Baltic Sea and European Marine Strategy – Linking Science and Policy conference – Helsinki (Finland)
- Arctic Frontiers Conference, Tromsø, (Norway)

Task 8: To prepare a pilot project for a network of primary and high schools and amateur groups situated near the coast, that would monitor specific parts of the coast and will send regularly and irregularly information/questions, pictures etc to a central node with the MARBEF website.

A consortium of interested member has been found and discussions made as to how to proceed. CIMAR have an existing concept which has been developed and trialled as a MarBEF Coastwatch scheme. A proposal was been prepared to develop this Coastwatch study within MarBEF. Other existing programmes in UK and Poland are also being examined with a view to incorporating ideas from them into MarBEF. A draft website for the Coastwatch programme has been made although it has yet to be made live.

Task 9: To create a platform for interaction between MarBEF scientists and SMEs from sectors such as aquaculture, fisheries, instrument building, environmental impact assessment, chemical products.

This has been partially developed with partner 30 and a pilot database of Norwegian SMEs been completed. The platform for communication is available via the MarBEF website but as yet contact with only a few SMEs has been made.

Additional developments: A meeting was organised in Southampton by the outreach officer to meet with other outreach officers based in England and working on educational outreach in the marine area i.e. HERMES, CoML and MarLIN. It was decided to amalgamate to carry out a joint outreach educational activity. We have secured space at the BA Festival of Science in York in 2007 and are currently working out the logistics.

ERASMUS MUNDUS Master of Science in Marine Biodiversity and Conservation (EMBC) - Summary of the proposal submitted on April 30 2007

M. Vincx*, et al.*,
Ghent University Belgium

The Erasmus Mundus Master of Science in Marine Biodiversity and Conservation (EMBC) is offered by a University consortium consisting of 6 partners : Ghent University (Belgium), University of Bremen (Germany), University of Paris 006 (France), University of the Algarve (Portugal), University of Oviedo (Spain) and University of Klaipèda (Lithuania).
The study programme is divided in 3 thematic modules :

(1) Understanding the structure and function of marine biodiversity deals with the fundamental aspects of Oceanography (on a multidisciplinary basis, including physics, chemistry, geology, biology, ecology, biogeography, climate change), the structure and functioning of Marine Biodiversity (from genes to habitats) and with Impact studies.
(2) Toolbox for investigating marine biodiversity provides an advanced training in Statistics and experimental design, Modelling, Taxonomy, Data and Information Management, Field observations and interpretation and Molecular methods.
(3) Conservation and Restoration of marine biodiversity deals with the application of the above mentioned theories and methods in order to develop a sustainable use of the marine environment.

The programme (2 years or 120 ECTS) is complemented with summer schools on specialized topics in European Marine Research Stations operating within the EU-Network of Excellence MarBEF. A research project (Master thesis) of 30 ECTS is presented within the field of one of the three thematic areas.

Student mobility is an integral part of the Master. 50 students (25 third country students and 25 European students) start in one of the three group I Universities (Gent, Bremen or Algarve) for 2 semesters; for the third semester, students move to one of the group II Universities (Paris, Oviedo or Klaipèda). The research project for the thesis work can be performed in one of the partner institutions.

The language of instruction is English. During the study period, the 'survival' languages (Dutch, German, Portuguese, French, Spanish or Lithuanian) can be studied as well.

Successful students obtain the qualification and degree of Erasmus Mundus Master of Science in Marine Biodiversity and Conservation. This joint degree will be awarded and recognized by each of the participating institutions. Details of the thematic modules and research projects are provided in a Diploma Supplement.
The course is open to students with at least a bachelor (or Master) degree in biology, ecology, environmental sciences, oceanography, marine sciences, geography, geology, or other equivalent degrees with minimum 180 credits.

Poster Presentations

Role of secondary metabolites in driving ecosystem functionality and maintaining ecosystem biodiversity (RMP ROSEMEB)

Casotti Raffaella
Stazione Zoologica A. Dohrn, Italy

The ROSEMEB project now includes 9 institutions participating in an integrated effort of coordinating the research in chemical ecology at the European level. Integrating activities have included organization of workshops, short sabbaticals, exchange of material and samples, elaboration of updated reference material and redaction of a position paper on marine chemical ecology.
Training is indeed an important engagement of all partecipants in ROSEMEB. One course on Bioassay Methods in Chemical Ecology has been organized in Stromstad, Sweden and another one on Chemical Isolation Methods will be held in Pozzuoli, Italy in September 2007. Two workshops on marine benthic chemical ecology and on marine plankton chemical ecology are being programmed for 2008.
Exchange of biological material and individual training in chemical techniques has also taken place in the last year among participants, allowing the training of students and early researchers in specific aspects of chemical ecology.
Further initiatives are described in the poster and are continuously updated on the webpage (**http://www.marbef.org/projects/rosemeb/index.php)**.

Distribution of faunal assemblages on the Eiffel Tower hydrothermal structure (Lucky Strike) based on image analyses – An onset for a temporal evolution study.

Daphne Cuvelier[1, 2, 3], Jozée Sarrazin[2], Ana Colaço[1], Jon Copley[3], Daniel Desbruyères[2,] Ricardo Serrão Santos[1], Paul Tyler[3]
1Departement of Oceanography and Fisheries, University of the Azores,
2Département Etude des Ecosystèmes Profonds Ifremer Brest,
3National Oceanography Centre, Southampton

Eiffel Tower, a major active hydrothermal edifice (1690m depth) of the Lucky Strike vent field was discovered in 1993. Since then a lot of campaigns have been diving to this 11m high and 8m broad edifice, which makes it one of the most visited sites in the Atlantic Ocean. Consequently a bulk of imagery data is available for this sulphide structure. The most recent campaign that focused on Eiffel Tower was MoMARETO, which took place in August – September 2006. A complete imagery coverage was acquired through video transects which were carried out by ROV Victor 6000.
The fauna inhabiting the hydrothermal vent structures in the Atlantic is reasonably well known, the spatial and temporal distribution of faunal assemblages in relation to abiotic and biotic factors however remains unclear. In order to evaluate the spatial variation of faunal assemblages and their patchiness in relation to environmental and biological factors, faunal distribution maps are presented per side of the edifice (N, E, S and W). Since these observations represented on the maps are based on video images, the composition of the assemblages is solely constituted of visible fauna (mega- and macro fauna). The thriving engineering species at Eiffel Tower is *Bathymodiolus azoricus* (Mytilidae - Bivalvia) which forms extensive mussel beds covering up large parts of the structure. In association with these mussel beds, several accompanying species live hidden in the microhabitat created by the mussels. Mobile predators and scavengers such as alvinocaridid shrimps (often in the vicinity of hot fluid exits) and bythograeid crabs are also present.
Five types of distinct assemblages were defined according to their visual aspects. The differences observed in assemblage distribution were statistically analysed in order to show major distributional trends and to evaluate colonization patterns in relation to habitat characteristics (fluid exits, depths, structure orientation). This complete coverage will be used as a point of reference in the temporal evolution study, going back to the early nineties.

Diversity of the Baltic clam *Macoma balthica* in local and geographical scales (Barents Sea).

M.Gantsevich, P.Strelkov, L.Basova, E. Genelt
Moscow State University, Russia

Research of growth and morphological variation in *Macoma balthica* from Kola Bay and Murman coast (Barents Sea). Several parameters of *M. balthica* shell were studied and compared: variability of growth, shell color, shell globosity, variability of shell hinge plate.
The open shore (Murman coast) and southern part of Kola Bay are the most different in environmental conditions and correspondingly *M. balthica* from these areas has the strongest differences of most studied parameters except growth rate. The Kola Bay itself can be ecologically divided into three sectors: southern (estuary), northern (near oceanic) and transitory (in between first two). Variation scale of studied parameters in Kola Bay (local scale) is high - not smaller than in the whole Europe.

Unraveling the extent of algal diversity using the DNA-barcode for molecular assisted taxonomy.

«GreetingLine»
Muséum National d'Histoire Naturelle, France

The 'DNA barcode' is a short genetic marker developed with the objective of distinguishing organisms at and above the species level. The 5' end of the mitochondrial gene *cox1* (cytochrome oxidase subunit I) was selected as the preferred marker for researchers working on animals, and this system has also proven useful for reliable and rapid identification of red algae – these at times notoriously difficult to identify based on morphological characters. As a partner of the Canadian Barcode of Life network, I have actively contributed to developing a DNA-barcode database for the red macroalgae. I provide preliminary results regarding diversity of the Phyllophoraceae (Gigartinales, Rhodophyta) in Canadian waters. I have thus far analyzed ca. 200 individuals from the Atlantic and Pacific coasts resolving 18 species based on the Barcode analyses, and subsequent morphological/anatomical observations. I have also included these species in a large-subunit ribosomal DNA phylogeny to resolve their relationships relative to one another and other members of this family.

Census of Marine Life in Europe – 2007

Bhavani E. Narayanaswamy and Graham B Shimmield
European Census of Marine Life Project Office, Scottish Association for Marine Science, Dunstaffnage Marine Laboratory, UK.

The global Census of Marine Life project is a 10-year initiative in which it intends to assess and explain the diversity, abundance and distribution of marine organisms in the world's oceans; looking at the past, present and future. The European Census of Marine Life is a regional implementation committee for CoML.
EuroCoML has several aims including expanding partnerships and coordination with relevant European programmes/general growth of CoML; increase participation of European scientists in CoML projects; to improve taxonomy and species data throughout Europe as well as to improve biodiversity and ecosystem information.
To date EuroCoML has funded several workshops including Invasive species in European waters, Environmental Modulation of Biodiversity and Ecosystem dynamics and tracking of predators in the Atlantic, amongst others. The workshop outcomes are scientists committed to developing proposals to undertake large-scale investigations in European waters with the overall aim of contributing to the global CoML initiative. We are also co-funding workshops with other programmes such as Arctic Ocean Diversity and the forthcoming Benthic Modelling Workshop in conjunction with MARBEF.
Education and outreach is another important part of EuroCoML. Initiatives with four of the European led deep-water projects of CoML are under way including writing a book on environments

encountered in the deep-sea. This will be sold in conjunction with MAR-ECO's travelling exhibition "Deeper than Light." There are also plans to attend science fairs jointly with other European programmes again such as MARBEF and HERMES.

The new European on-line journal "Aquatic Invasions": services for marine biodiversity related information systems

Vadim Panov[1] and Stephan Gollasch[2]
[1]*Zoological Institute, Russian Academy of Sciences, Russia*
[2]*GoConsult, Germany*

Aquatic Invasions is a rapid on-line journal focusing on biological invasions in European inland and coastal waters and potential donor areas of aquatic invasive species for Europe (ISSN: 1818-5487, **http://www.aquaticinvasions.ru**). The journal provides the opportunity of timely publication of first records of biological invaders for consideration in risk assessments and early warning systems. Also, the journal provides the opportunity to publish relevant technical reports and other accounts not publishable in regular scientific journals. *Aquatic Invasions* is an important part of the developing Pan-European and regional early warning systems on aquatic invasive species, with an important service of protection of author rights on primary geo-referenced records on introduced species and biological monitoring and surveys. In 2006, more than 50 research articles and short communications in 4 regular issues of the first volume of *Aquatic Invasions* included geo-referenced information on range expansions and first records in European coastal waters of such highly invasive species as Conrad's false mussel *Mytilopsis leucophaeata*, Wedge clam *Rangia cuneata,* grapsid crab *Percnon gibbesi*, Chinese mitten crab *Eriocheir sinensis*, ctenophore *Mnemiopsis leidyi* and round goby *Neogobius melanostomus*.

Start-up funding for *Aquatic Invasions* is provided by the European Commission Sixth Framework Programme for Research and Technological Development Integrated Project ALARM (GOCE-CT-2003-506675), with general networking support from the EC FP6 Strategic Targeted Research Project DAISIE (SSPI-CT-2003-511202). *Aquatic Invasions* is also serving aquatic component of the European information system on alien species which is currently developing in frameworks of the EC FP6 STREP DAISIE (**http://www.europe-aliens.org**) through publication of the national checklists of aquatic alien species representing core component of the project database. In future *Aquatic Invasions* may provide relevant services for other projects and information systems related to marine biodiversity, including MarBEF-supported EurOBIS.

Phylogeography and dispersal of scyphomedusae in the European Southern Seas

Ramšak, A., Stopar, K., Malačič, V., and Malej, A.
Marine Biology Station Piran, National Institute of Biology, Slovenia

Scyphomedusae have life history traits that favour their capability for high dispersal rates and massive occurrences create a general concern for the ecology and economy of the impacted areas. Regional biogeographic studies of bloom forming *Pelagia noctiluca* and *Rhizostoma pulmo* based on species morphology indicated their widespread distribution in the European Southern Seas (ESS). The aim of the present study was to investigate genetic diversity and geographic distribution of mitochondrial DNA haplotypes based on COI gene sequences in order to identify gene flow among distant sampling sites in the ESS. The transport of *Pelagia noctiluca* was studied by the Lagrangian tracking of water mass in the climatic circulation of the Adriatic Sea. The results from tracing transport pathways suggest that this jellyfish is inflowing into the Adriatic at the eastern side of the Otranto Strait and there is a connection between the Adriatic and Mediterranean metapopulations. This connectivity is also supported by current phylogeographic studies.

Long-established marine lab on the youngest sea on Earth.

A.Tzetlin *et al.*
Moscow State University, Shirshov Institute of Oceanology, RAS, Russia

Presentation of conditions, possibilities, scientific objectives and projects that are presently carried out at the White Sea biological station of MSU. WSBS offers possibilities for full range of research: vessels, diving equipment, underwater apparatuses for field work; labs with analytical equipment for data treatment. There are several projects carried out on the station that are leaded by well-known marine researches from Moscow State University and Institute of Oceanology.

Current research projects at the station:

1. "Symbiotic photosynthetic bacteria in the tissues of Hydrozoa (Sertullariida)".
   Project leader: Dr. Igor Kossevitch
2. "Investigation of biology of underwater mast builders – amphipods, g. Dulichia".
   Project leaders: Dr. Anna Zhadan, Prof. Alexander Tzetlin
3. "A study of obligate ectoparasitic dwarf males found in polychaetes (*Scolelepis laonicola*)"
   Project leader: Dr. Elena Vortsepneva
4. "A study of marine ice invertebrate communities".
   Project leader: Prof. Alexey Tchesunov
5. "Development of sea floor landscape mapping techniques utilizing remote geophysical methods and traditional geological and biological sampling methods".
   Project leaders: Dr. Vadim Mokievsky, Prof. Alexander Tzetlin
6. "A study of Facetotectan larvae from the White Sea with description of a new species (Crustacea: Thecostraca)"
   Project leader: Dr. Gregory Kolbasov
7. "Annotated list of flora and fauna, found in the vicinities of the White Sea Biological station (WSBS MSU)".
   Project leader: Dr. Alexey Tchesunov
8. "The database (GIS) of marine flora and fauna at WSBS vicinities".
   Project leaders: Dr. Anna Zhadan, Dr. Elena Vortsepneva
9. "Illustrated key for most abundant invertebrates of the White Sea with description of biology and distribution of several hundred invertebrate species".
   Project leader: Prof. Nikolas Marfenin
10. "Monitoring sea mammal populations in Kandalaksha Bay".
    Project is supported by IFAW, responsible person at WSBS – Prof. Alexander Tzetlin

MANUELA: developing an integrated database to perform joint analyses

Leen Vandepitte[1], Jan Vanaverbeke[2], Edward Vanden Berghe[1]
[1] *Flanders Marine Institute, Belgium*
[2] *Ghent University, Marine Biology Section, Belgium*

In the old days – before the computer and internet era – all information was written down in books or on small pieces of paper, making it sometimes hard to retrace certain information. Now, since the advent of wide-spread access to computers and the World Wide Web, finding, exchanging and saving information or data for future use has become a lot easier.
Unfortunately, too many good datasets are still lost. Either data are lost through a lack of adequate management (failing back-ups or no back-ups at all) or data just 'disappear' at the end of a project, when the people who actively collected the data leave the institute.

The possibility to archive datasets in a proper way is offered to scientists through MarBEF (*Marine Biodiversity and Ecosystem Functioning*), a network of excellence funded by the European Union. It serves as a platform to integrate and disseminate knowledge and expertise on - amongst others - marine biodiversity. All the received datasets are well documented so they can easily be tracked (e.g. information on origin and which data they contain).
MANUELA (*Meiobenthic and Nematode biodiversity, unravelling ecological and latitudinal aspects*) is one of the separate research projects within the MarBEF network of excellence. The objective of the

MANUELA project is twofold: (1) to develop a central integrated database capturing all the available data on meiobenthos on a broad scale, with a focus on the European marine and estuarine habitats and (2) to perform a joint analysis on the collected data, focussing on different aspects of how the meiobenthos activities are linked to ecosystem processes (e.g. universal effects of disturbance, nematode biomass spectra, patterns in deep sea meiobenthos, …).
The first objective - creating an integrated database on meiobenthic species records - has already been reached. Twelve institutes from ten European countries have made a total of 86 datasets available. The collected data range from the deep sea to the coastal zone and from the Arctic to the Antarctic. Some of the data represent valuable time series, while others are just random in time. All these datasets have been documented in detail by metadata describing the actual data very accurately, but also giving information on the persons and institutes responsible for the collection of the data and an indication of the possible use of these data by third parties.
All these datasets have been compiled into one single - integrated - database, making it thus possible to perform joint analyses. The MANUELA-database not only gives the possibility to calculate diversity (e.g. Hill indices, taxonomic distinctness) but also provides the opportunity to exclude certain datasets or used sampling methods. Analyses can be performed on higher or lower taxon level, on presence or absence of certain taxa, replicates can be pooled and rare taxa can - if desired - be excluded. In short: the MANUELA integrated database gives a whole range of possibilities, but this has only been made possible by the contribution of a lot of scientists who were willing to share their data and provided a complete overview of their dataset (metadata) to make a good integration and standardisation possible.

As the integrated database has been fine-tuned, the scientific community of the MANUELA project has started their analyses. Results of these analyses and a detailed description of the database will be made available in scientific literature.

Biogeographic view on *Rhodopirellula baltica*: Intra-species specific differentiation of isolates from European Seas

Nadine Winkelmann, Ulrike Jaekel and Jens Harder
Max-Planck-Institute for Marine Microbiology, Bremen, Germany

A project within RMP MARPLAN
Planctomycetes are a monophyletic phylum in the domain *Bacteria* and are involved in the aerobic mineralization of particulate organic matter in marine water bodies. A representative, *Rhodopirellula baltica,* has been completely sequenced and first-generation specific probes for the in situ detection have recently been published.
In the framework of the EU FP NoE on Marine Biodiversity and Ecosystem Function (MarBEF), we have started the enrichment and isolation of new *Rhodopirellula baltica* strains from a wide range of water and sediment samples from allover Europe. PCR-based fingerprint methods were evaluated for the intraspecies-specific characterization. A Multi-Locus-Sequence-Analysis was developed and started to obtain a high resolution differentiation between the strains. Our ongoing characterization of new strains addresses the diversity of *R. baltica* on one location (as reference) and the diversity of the strains from several sampling sites in Europe to explore a possible link between strain diversity and geographic position.
Here first results of the fingerprint methods are presented. For future work DNA-DNA-Hybridization and electron microscopy will be applied to the strain collection during short term sabbaticals in MarBEF partner institutes.