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MarBEF Theme 1: Global Patterns of Marine Biodiversity Across Ecosystems

Recent Theme 1 activities and workshops

By **Alexandra Kraberg, Fred Buchholz and Doris Schiedek**

The past few months have been a busy period for Theme 1 and its RMPs, as they have moved beyond the first phases of project establishment, co-ordination and data acquisition towards the core data analysis of spatial and temporal patterns of biodiversity that lie at the heart of Theme 1.

Modelling Workshop, Plymouth, 13-16 August 2007

This workshop was attended by participants from the UK, Germany, Norway and Greece. The workshop aimed to use statistical models to describe and understand spatio-temporal patterns, and on linking those patterns to large-scale drivers and processes through the use of ecosystem models. Analysis activities were based on the datasets in the **Macroben** database, which has developed into one of the largest integrated databases on soft-bottom fauna in the world. It is therefore a vital tool for addressing the core Theme 1 goals, i.e. the analysis of large-scale and long-term patterns in marine biodiversity. The workshop directly addressed these goals, including initial goals of RMP 3.9: 'Modelling key aspects of marine biodiversity.' Several concrete topics were covered:

1. Estimation of the total number of marine macrobenthic species in European shelf sediment
2. Spatial models and marine biodiversity
3. Ecosystem models and biodiversity

The full report is available at: http://www.marbef.org/modules.php?name=Downloads&d_op=viewdownload&cid=162

'Novel modelling approaches to relate biodiversity of marine sediments to ecosystem functioning'

This workshop was held in Amsterdam (15-17 October 2007). This joint MarBEF, CoML and EuroCoML activity brought together experts from Europe, USA and New Zealand to find answers to questions such as: (1) What governs patterns in benthic biodiversity at different scales? (2) Which ecosystem functions are most strongly affected by (or related to) benthic biodiversity and how can we model them? (3) How important are ecosystem engineers in controlling marine benthic biodiversity? (4) How important are communities of higher-level

consumers in structuring marine benthic biodiversity?

The answers to these questions formed the bases for the main activity during the meeting, i.e. the work on the development of mechanistic models and to define data requirements to support them. Such models are needed to evaluate different scenarios for environmental change, such as global warming, low-oxygen zones, changes in fishing pressure on benthic macrofauna and higher-level carnivores, and changes in natural resource management.

Other recent activities

RMP **LargeNET** held an oral presentation. The talk was given by Matt Frost of the MBA on behalf of the LargeNet team at the 42nd European Marine Biology Symposium in August in Kiel, Germany. This talk described the challenges faced in the analysis of long-term data, showed some preliminary results of LargeNet partners and examples of similar trends seen in multiple datasets. It was well received and resulted in one concrete offer of data to be used for upcoming LargeNet analyses. In this context we would like to take the opportunity to draw your attention to the special RMP forums established. On the LargeNet forum (www.marbef.org/modules.php?name=Forums&file=viewforum&f=9) all issues related to large-scale analyses of long-term data, from data acquisition and integration to methodological questions and potential collaborations, can be discussed. RMP **Marplan** has also created several forums, including one on flow cytometry (www.marbef.org/modules.php?name=Forums&file=viewtopic&t=283).

RMP **Deepsets** held a workshop from 22-24 October in Lisbon to discuss the progress made during the past months, plans for future publications within the project and the three studentships, as well

Table 1: THEME 1 RMPs (RESPONSIVE MODE PROJECTS)

<i>WP-RMP code and title</i>	<i>Principal Investigator(s)</i>
3-1 Causes and consequences of changing marine biodiversity – a fish and fisheries perspective (MarFish) (www.marbef.org/projects/marfish/index.php)	MacKenzie, Brian
3-2 Biodiversity and ecosystem function under changing climatic conditions – the Arctic as a model system (ArctEco) (www.marbef.org/projects/arcteco/index.php)	Weslawski, Jan Marcin
3-3 Deep-sea & Extreme Environments, Patterns of Species and Ecosystem Time Series (DEEPSETS)	Billet, Dave
3-4 Meiobenthic and Nematode biodiversity: Unravelling Ecological and Latitudinal Aspects (Manuela) (www.marbef.org/projects/manuela/index.php)	Vanaverbeke, Jan
3-5 Web Accessible Taxonomic Expertise in MarBEF: PROviding an e-Platform for the European Taxonomists (PROPE-taxon) (www.medobis.org/prope/index.php)	Arvanitidis, Christos
3-6 Large-scale and long-term Networking on the observation of Global Change and its impact on Marine Biodiversity (LargeNet) (www.marbef.org/projects/largenet/index.php)	Buchholz, Friedrich
3-7 Integration of different methods to study patterns and changes in pelagic biodiversity in the open ocean along the Mid-Atlantic Ridge (MARECO)	Pierrot-Bults, Annelies C. & Piatkowski, Uwe
3-8 European integration of marine microplankton research (MARPLAN) http://www.marbef.org/projects/marplan/index.php	Kooistra, Wiebe H.C.F.
3-9 Modelling key aspects of marine biodiversity	Lambshhead, John

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as steps to be taken to continue the project beyond the duration of MarBEF.

RMP **MarFish** organised an ICES theme session at the ICES Annual Science Conference in Helsinki (17-21 September) on “Marine biodiversity: A fish and fisheries perspective,” convened by Jim Ellis (UK), Remment ter Hofstede (the Netherlands) and Henn Ojaveer (Estonia). There were talks on various aspects of diversity, including genetic, functional and habitat diversity, as well as the diversity within feeding guilds and size spectra. These talks covered offshore as well as coastal and estuarine fish assemblages, and although most of these discussed adult fish stages, there were welcome contributions on ichthyoplankton as well. The talks addressed a variety of the factors affecting ‘diversity,’ such as climate change and impacts of non-native fish species. There were also contributions on the survivorship of net-caught fish and on discard survivorship, and clearly such studies are needed to better inform managers about the efficacy of various management measures.

The talks covered many aspects of marine biodiversity, such as the importance of fully understanding the implications of changes in hydrography and climate, fisheries and invasion of alien species on the diversity (and structure

and function) of several marine ecosystems. Globally, there is a commitment to reduce biodiversity loss and the ICES community, as demonstrated in the special session, is well placed to provide advice on many facets of this, including the still vital field of taxonomy, the importance of which was stressed during the special session as it forms the foundation of any type of biodiversity assessment.

Forthcoming events

Two other Theme 1 activities are already in preparation. A preliminary **data analysis workshop** is planned for RMP LargeNet. This is envisaged to take place in the second half of January 2008 and will be a first chance to look at the data so far assembled, for data owners to check the integrity of their data and to determine possibilities and priorities for upcoming database design tasks.

In co-operation with the ICES Benthic Ecology Working Group (BEWG), a **workshop on ‘Benthos Related Environmental Metrics’** is planned for February 2008 in Ostend. The aims of the workshop are (1) to identify gaps in the knowledge of the applicability and performance of different indicators to the impacts of human-induced activities and changes in ecological state, (2) to use multiple

datasets to test the performance of different indicators to human-induced activities and changes in ecological state, and (3) to assess the effectiveness of performance indicators in identifying cause-effect relationships.

More information about both events will be available soon on the MarBEF website.

Theme 1 (team and members) would like to express their sorrow on hearing of the death of John Gray who was leader of Theme 1 during the difficult early phase of MarBEF activities. During his term he initiated two important workshops that were held in 2005 (Oslo and Crete). These formed the bases for a series of hypotheses concerning “Variation across spatial and temporal scales” which have been tested since then, involving a variety of MarBEF partners.

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