



SEVENTH FRAMEWORK PROGRAMME
THEME 6

Environment (Including Climate Change)

***MEECE 18 month Science Meeting and
Workshops Report***

Proposal Acronym: **MEECE**

Proposal full title: **Marine Ecosystem Evolution in a
Changing Environment**

Grant agreement no: **212085**

Date of preparation of report: **03/2010**

MEECE 18 month Science Meeting and Workshops Report

Heraklion, Crete

1st – 4th February 2010

Meeting Report

The 18month Science Meeting of the Marine Ecosystem Evolution in a Changing Environment (MEECE) project was hosted by HCMR in Heraklion, Crete from the 1st – 2th February 2010

The goals of the meeting were to initiate the project by:

- a) Reviewing the progress of the Project.
- b) Planning the next phase of delivery
- c) Identifying and clarifying work-package linkages
- d) To maintain good working relationships between the project participants.

Presentations: available online at http://www.meece.eu/meetings/Crete/crete_pr.html

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Summary of Actions

Action	WP	Responsible
Collate meta data for missing regional data to augment D1.1 and D1.3	WP1	Richard Bellerby and regional leaders
Organise WP5 workshop	WP5	Gerjan Piet.
Organise Scenario definition workshop: Bologna	WP3/4	Marco Zavatarelli, Jess Heard,
Define a simulation work plan for each region.	WP3/4	Marco Zavatarelli Xabier Irigoien
Inform key players in ICES/JRC working group and MSFD about MEECE activities	WP1	Icarus Allen Serjeg Olenin
Summarise MEECE capability to contribute to MSFD GES descriptors	All	WP leaders
Identification of target GES indicators for MEECE to address.	All	Icarus Allen / All
Focus and finalise meta analysis task	WP1	Richard Bellerby
Establish venue and steering committee for the MEECE summer school (2011)	WP6	Baris Salihoglu, Jess Heard, Icarus Allen
Explore options for co-funding of summer school	WP6	Baris Salihoglu, Jess Heard, Icarus Allen
Further modelers-experimentalists links between FP7 MEECE and FP7 MESOAQUA to communicate parameterization priorities of WP2 to experimentalists	WP2	Ivo Grigorov
Explore Links to Euro-Sites	WP1	R Bellerby / I Allen
Expand range of Fact Sheets	WP6	Jess Heard
Organise a technical workshop on advancing the model couplers	WP2	K Bolding, I Allen
Use summary of MEECE capability to contribute to MSFD GES descriptors to enhance the MEECE Module Library by constructing a front-end guide to the tools capabilities	WP2	Ivo Grigorov
Include IBM models currently developed by George Triantafyllou, Asbjørn Christensen, Ute Daewel, Geir Huse into the IBM Library	WP2	Ivo Grigorov, Mike St John

Minutes of the meeting

Monday, 1st February

Morning session

The meeting was opened by Icarus Allen (Project Coordinator), who gave thanks for everyone's participation and began with a brief overview of the status of the project. He concluded that the project was in good shape, with the majority of activities on track. He also identified that the definition of climate and anthropogenic scenarios for each region was crucial to the next phase of the project.

The session then continued with a series of presentations on 'Driver parameterisations and model scenarios', which focus on activities in WP1 and 2. Richard Bellerby gave an overview of progress in WP1 then the following presentations were made.

- Parameterization of invasive alien species impacts in marine ecosystems (*S. Olenin*)
- Distributional changes of plankton standing stock and non-indigenous species collected in the North East Atlantic by the Continuous Plankton Recorder (*P. Licandro*)
- A satellite view of the PFT dynamic in MEECE regions: from the seasonal cycle to the interannual variability (*I. Masotti, C. Moulin, S. Alvain*)
- Climate change/marine biogeochemistry from coupled models at the global scale (*L. Bopp*)
- Carbonate system and ocean acidification (*R. Bellerby and T. Tyrrell*)
- Fishing as a driver of fish and benthic communities (*C. Smith*)
- Fluvial inputs to the MEECE domains (*R. Bellerby and B. Pfeil*)
- Carbonate system model, background, application and pitfalls (*J. Blackford*)

The session illustrated the progress made in collating data set which indicates spatial and temporal shifts in plankton distributions, the collation of forcing functions for the MEECE simulations and data sets for meta analysis.

Afternoon session

After lunch the Driver parameterisation and model scenarios session continues, this time with a focus on the development of coupled plankton fish models and model validation.

- NEMO-PISCES-APECOSM size structure end-to-end model (*T. Gorgues*)
- Ecosim/Ecopath (*J. Beecham*)
- Advances on end-to-end modelling in the Black Sea (*B. Salihoglu*)
- Model Validation (*I. Allen*)

The session concluded with a discussion on how best to focus the meta analysis collated in WP1 to help parameterise models and define scenarios. It was agreed that this work lacked some focus and that this would be returned to during the workshop which followed.

The final session of the day was on recent experimental work. The following presentations were made:

- Effect of organic pollutants on microalgae. Preliminary results (*E. Fiori*)
- Studies of functional role of invaders in coastal lagoon ecosystem: an experimental approach (*A. Zaiko, E. Griniene*)
- MERCLIM/MEECE shipboard perturbations done this summer in the arctic (*H. Frigstad*)
- UPiedmont experiments (*A. Viarengo*)

The presentation demonstrated substantial progress with the experimental work. In particular how to use such data to inform model parameterisation was demonstrated (Fiori).

The project Steering committee met in the evening

Tuesday, 2nd February

Morning session

The first session focused on the progress in the simulations of climate driver impacts on regional ecosystems. An overview of WP3/4 along with the strategy for achieving the project objectives was outlined by X. Irigoien. A series of talks followed demonstrating the progress of the modelling work in each region. In general each region had made reliable hindcast simulations:

- Preliminary results from a 3-D coupled hydrodynamic-ecosystem model of the Black Sea (*H. Cannaby*)
- Hindcast simulations of the North Aegean (*K. Tsiaras*)

- Advances on the carbonate system and pelagic fish modeling in the N. Aegean (*V. Avgoustidi & G. Triantafyllou*)
- Simulating the interannual variability of the Adriatic Sea ecosystem (*E. Clementi*)
- Validation and projection of climate impacts on the biogeochemistry of the NE-Atlantic shelf region (*M. Butenschon, S. Wakelin*)
- SMS Modelling (North Sea, Baltic) (*A. Christensen*)
- Hindcast simulations in the North- and Baltic Sea using the coupled bio-physical model ECOSMO (*U. Daewel*)
- The Benguela Upwelling System: Preliminary coupled bio-physical simulations (*B. Le Vu*)
- Overview of impacts of alien invasive plankton species (*A. Zaiko, S. Olenin*)

Afternoon session

The afternoon session 'Resource Management and Knowledge Transfer' focused on WP5 and WP6.

- Strategy for implementation of WP5 (*J. Allen*)
- Strategic approach for testing Management Strategies (*F. Köster*)
- Proposals for a cross-system analysis of ecological indicators effected by invasive species and other anthropogenic stressors (*A. Zaiko, S. Olenin*)
- Ecological risk assessment in the management of marine ecosystems (*A. Dagnino*)
- Knowledge Transfer in the context of MEECE (*M. Barange*)
- indiSeas update and progress (*S. Mackinson*)

There was a robust discussion of the strategy for WP5 and how the other WP's feed into it, along with demonstration of the considerable progress with the indicators work. Progress with the Knowledge Transfer activities was outlined and recommendations for the series of fact sheets were made.

The day concluded with parallel sessions. The User Advisory Group met in private (reported elsewhere), while the main project met to summarise the first two day of the workshop. The preparation of the 18 month report to the commission was discussed. The progress of each work package was identified and actions noted. The idea of developing a 'risk register ' or simulation plan for each model and region so we can keep a track on the modelling activity in each region was mooted. The Project Officer reminded the coordinator that MEECE needs to engage with the development of the Marine Strategy Framework Directive (MSFD).

Visit to Aquarium followed by Group dinner hosted by HCMR

Wednesday, 3rd February

Summary of Advances in model parameterisation Workshop

The objectives of the workshop were to:

- To analyze data from WP1 to inform modelling in the rest of the programme;
- To identify key processes, parameters so that we can analyse data effectively.

The workshop opened with a series of talks to give the background to the workshop:

- Summary of WP1 datasets/information available, including experiments (*R. Bellerby*)
- What is required from the perspective of WP2 – focus on invasive species, pollution and Ecotoxicological effects, parameterising fishing effects, acidification (*M. St. John*)

This was followed by a break out session to discuss what is the best information we can extract from WP1 to inform WP2. What are the issues, how do we use the information, what do we have already, what is missing?

The topic groups were as follows:

- Climate scenarios
- Invasive species
- Pollution
- Ecotox effects
- Fishing effects
- Acidification

The groups reported back in plenary. The climate scenarios group identified issues with atmospheric forcing, boundary conditions and model outputs. All of these will be taken up at the Scenario Definition Workshop. The anthropogenic drivers groups reports all tended toward a common theme of a lack of focus in terms of where exactly they should prioritise their efforts. This was most apparent with the fisheries and acidifications groups. Sergej Olenin identified the importance of the definition of indicators of Good Ecological Status (GES) and highlighted that the process was ongoing mediated by ICES/JRC and that several MEECE partners are involved in this. Steve Mackinson pointed out that the GES could provide a framework for MEECE helping to identify the focal points and hence the targets for meta analysis, simulation and management strategy evaluation. An action was taken to devote part of the workshop the following day to mapping the GES indicators onto the project.

Links to Other projects.

In the afternoon we explored links with other projects: firstly through a SKYPE link with the Coordinator of the EuroSites project and then with members of the FP7 MESOAQUA Project. Jens Nejstgaard, Stella Berger gave an overview of the project and a presentation on Ecosystem modelling and parameter estimation in mesocosms was given by Frede Thingstad.

Summary of Advancing Ecosystem Modelling Workshop

WP2 Task 2.2 Creation of the Module Library

(Ivo Grigorov)

The workshop made an overview of the Module Library progress, and focused on the applicability of the two technical solutions proposed for making the MEECE modules as 'stand alone' and as portable as conceptually and technically as possible.

The Fortran (Karsten Bolding, B&B) and the XML-based (Jonathon Beecham, Cefas) will have a ready proof-of-concept by June 2010 allowing all model developers 12 months to make their module 'stand alone' according to one of the solutions proposed, before the library must finally be delivered in Month 36. To aid the process, the coordinator (Icarus Allen; PML) has proposed a technical workshop of interested parties, to put together a strategy for technical support and implementation of the 'module stand-alone' part of the task.

Strategy for input into the Marine Strategy Framework Directive (MSFD)

To help identify how the outcomes from MEECE could be used to support the MSFD and to provide a focal point for MEECE meta analysis and scenario definition, MEECE drivers were mapped on to the MSFD qualitative descriptors of Good Ecological Status (GES). Seven of the 11 GES descriptors are considered to be relevant to the work of MEECE (Table 1).

The GES descriptors considered are:

- biodiversity (lead Steve Mackinson; CEFAS)
- non-indigenous species (lead Sergej Olenin; CORPI)
- commercial fish & shellfish (lead Fritz Köster; DTU-AQUA)
- food web (lead Michael St John; UHAM)
- eutrophication (lead Icarus Allen; PML)
- seafloor integrity (lead Chris Smith)
- contaminants (lead Jerry Blackford; PML)

Building on the mapping, workshop participants identified/selected the specific proposed indicators within each descriptor that could be determined in each region, using either data from surveys or from models. Discussions also included consideration of other useful indicators that might readily be calculated. The outcome of this was a concise description (see Table 2) of the GES descriptors that MEECE can contribute to in each region. It provides a way to help guide meta analysis of the data collected in WP1, by focussing on establishing how each driver impacts upon specific indicators of GES (e.g. how fishing impacts biodiversity by assessing changes in the link between fishing and species relative abundance). It is also the goal of the meta analysis to help in defining and parameterising processes that support the numerical modelling of the impact of drivers on ecosystem components, such that where possible the models are able to make predictions that relate to the descriptors of GES, either directly or indirectly.

There is still some information missing from Table 2 because some relevant people were not present during the workshop. When complete, the next step will be to promote MEECE participation in the MSFD process by presenting the information to the ICES task groups responsible for developing the GES indicators on 16th February 2010.

Table 1. MEECE drivers mapped to MSFD descriptors of GES

MEECE driver MSFD descriptor	Fishing	Invasives	Pollution	Eutrophication	Acidification	Circulation	Terrestrial CDOM
1. Biodiversity	X	X			x	X	
2. Non-indigenous sp		X		X		X	
3. Commercially exploited sp	X				X		
4. Foodwebs	X	X		X	X	X	
5. Eutrophication				X			X
6. Seafloor Integrity	X						
8. Pollution			X				

Table 2. Example of on how data and modelling work in MEECE can be used to provide information on MSFD descriptors of GES. Presented in table form, it allows information to be organised in a variety of appropriate ways such as by region, by descriptor or by partner.

MSFD Descriptor	MSFD Attribute	MSFD Criteria	MSFD Indicator variable	Region	Key Species	Data Source	Model	Institute	Person
Biodiversity	Habitat/Community state	Community composition	Community structure	North Sea	Phyto and Zoopl functional types		ECOSMO	UiB	Ute
Biodiversity	Habitat/Community state	Community composition	Community structure	NW shelf	Phyto and Zoopl functional types		POLCOMSERSEM	PML, POL	Momme, Yuri
Biodiversity	Habitat/Community state	Community composition	Community structure	NW shelf	Micro and Mesozooplankton		ECOHAM	UniHAM	Moll
Biodiversity	Habitat/Community state	Community composition	Community structure	North Aegean		Surveys	ERSEM	HCMR	Triantafyllou
Biodiversity	Habitat/Community state	Community composition	Community structure	Benguela	?		ROMS-NPZD	IRD, University Capet	Machu, Shin

								own	
Biodiversity	Habitat/Community state	Community composition	Community structure	Baltic Sea	Phyto and Zoop functional types		ECOSMO	UiB	Ute
Biodiversity	Habitat/Community state	Community composition	Community structure	Black Sea	3 Phyto and 4 Zoop		BIMS-ECO	IMS-METU	Baris, Temel
Biodiversity	Habitat/Community state	Community composition	Community structure	Biscaya	?		ROMS-NPZD, POLCOMS-ERSEM	AZTI	Xabier
Biodiversity	Habitat/Community state	Community composition	Community structure	Barents Sea	?		?	IMR	Geir Huse, Svein Sundby
Biodiversity	Habitat/Community state	Community composition	Community structure	Adriatic			?	UniBoI	Marco

Annex I Agenda

MEECE 18th Month Meeting
Heraklion, Crete, 1-4 February 2010

Meeting Agenda

Day 1: Monday

Management Overview

8:40 -----Registration-----
9:00 Welcome and summary overview of MEECE 1st reporting Period (*Icarus Allen*)

Science Highlights

Driver parameterisations and model scenarios (Chairs R. Bellerby & I. Allen)

09:20 Introduction and overview of progress (*R. Bellerby*)
09:40 Parametrization of invasive alien species impacts in marine ecosystems (*S. Olenin*)
10:00 Distributional changes of plankton standing stock and non-indigenous species collected in the North-East Atlantic by the Continuous Plankton Recorder (*P. Licandro*)
10:20 A satellite view of the PFT dynamic in MEECE regions: from the seasonal cycle to the interannual variability (*J. Masotti, C. Moulin, S. Alvain*)
10:40 Climate change/marine biogeochemistry from coupled models at the global scale (*L. Bopp*)
11:00 ----- Coffee -----
11:30 Carbonate system and ocean acidification (*R. Bellerby and T. Tyrrell*)
11:50 Fishing as a driver of fish and benthic communities (*C. Smith*)
12:10 Fluvial inputs to the MEECE domains (*R. Bellerby and B. Pfeil*)
12:30 Carbonate system model, background, application and pitfalls (*J. Blackford*)

12:50 ----- Lunch -----

Driver parameterisations and model scenarios (Chair J. Blackford)

14:00 NEMO-PISCES-APECOSM size structure end-to-end model (*T. Gorges*)
14:20 Ecosim/Ecopath (*J. Beecham*)
14:40 Advances on end-to-end modelling in the Black Sea (*B. Salihoglu*)
15:00 Model Validation (*J. Allen*)
15:15 Discussion and questions
15:45 -----Coffee-----

Recent experimental work (Chair R. Bellerby)

16:15 Effect of organic pollutants on microalgae. Preliminary results (*E. Fiori*)
16:30 Studies of functional role of invaders in coastal lagoon ecosystem: an experimental approach (*A. Zaiko, E. Griniene*)
16:45 MERCLIM/MEECE shipboard perturbations done this summer in the arctic (*H. Frigstad*)
17:00 UPiedmont experiments (*A. Viarengo*)
17:15 Questions and general discussion

Steering Committee Meeting (evening dinner)

Day 2 – Tuesday

Ecosystem Drivers

(Chair X. Irigoien)

- 9:00 Overview and strategy for achieving WP3/4 project objectives (*X. Irigoien*)
9:15 Preliminary results from a 3-D coupled hydrodynamic-ecosystem model of the Black Sea (*H. Cannaby*)
9:35 Hindcast simulations of the North Aegean (*K. Tsiaras*)
9:50 Advances on the carbonate system and pelagic fish modeling in the N. Aegean (*V. Avgoustidi & G. Triantafyllou*)
10:10 Simulating the interannual variability of the Adriatic Sea ecosystem (*E. Clementi*)
10:30 Validation and projection of climate impacts on the biogeochemistry of the NE-Atlantic shelf region (*M. Butenschon, S. Wakelin*)
10:40 -----Coffee-----
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11:10 SMS Modelling (North Sea, Baltic) (*A. Christensen*)
11:30 Hindcast simulations in the North- and Baltic Sea using the coupled bio-physical model ECOSMO (*U. Daewel*)
11:50 The Benguela Upwelling System: Preliminary coupled bio-physical simulations (*B. Le Vu*)
12:10 Overview of impacts of alien invasive plankton species (*A. Zaiko, S. Olenin*)
12:30 Discussion
13:00 -----Lunch-----

Resource Management and Knowledge Transfer (Chair Manuel Barange)

- 14:00 Strategy for implementation of WP5 (*I. Allen*)
14:10 Strategic approach for testing Management Strategies (*F. Köster*)
14:20 Proposals for a cross-system analysis of ecological indicators effected by invasive species and other anthropogenic stressors (*A. Zaiko, S. Olenin*)
14:40 Ecological risk assessment in the management of marine ecosystems (*A. Dagnino*)
15:00 Knowledge Transfer in the context of MEECE (*M. Barange*)
15:20 indiSeas update and progress (*S. Mackinson*)
15:40 -----Coffee-----
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Parallel Session

- 16:00 Summary of progress towards deliverables and the next 18months (Chair Icarus Allen)
Open discussion session
16:00 User Advisory Group parallel session – discussion, feedback (Chair Manuel Barange)

17:00

Group Dinner

(Visit to Aquarium, followed by dinner in town hosted by HCMR)

Workshops

Day 3: Wednesday

9:15 Discussion session on exploring linkages between work packages – Lead by Icarus Allen

9:45 **Workshop: Advances in model parameterisation**
(Chairs R. Bellerby & M. St. John)

Objectives:

- *To analyze data from WP1 to inform modelling in the rest of the programme*
- *To identify key processes, parameters so that we can analyse data effectively*

9:50 Summary of WP1 datasets/information available, including experiments (*R. Bellerby*)

10:00 What is required from the perspective of WP2 – focus on invasive species, pollution and *Ecotoxicological* effects, parameterising fishing effects, acidification (*M. St. John*)

10:15 Progress since Sete (*I. Allen*)

10:30 Break out session (coffee will be available)

What is the best information we can extract from WP1 to inform WP2. What are the issues, how do we use the information, what do we have already, what is missing?

e.g. potential group topics (select groups/topics in Crete)

- Invasive species
- Pollution
- Ecotox effects
- Fishing effects
- acidification

13:00 -----Lunch-----

14:00 Report back in plenary

14:45 Links with other projects:
EuroSites – skype link

15:00 FP7 MESOAQUA Project Overview – *Jens Nejstgaard, Stella Berger*

15:20 Ecosystem modeling and parameter estimation in mesocosms – *Frede Thingstad*

15:40 Definition of actions for data analysis in WP1 and its use in WP2

In break out groups or further plenary as appropriate

17:30 Report back to group

Day 4 Thursday

Workshop: Advances in model coupling (chair M. St. John)

Advances in model coupling - case studies and brainstorming on potential model coupling solutions for the models included in the MEECE Model Library. Developers are invited to feature their own coupling case studies.

09:00 Strategy for achievement of WP2 current and future objectives and Summary of previous day,

objectives for today (M. St John)

09:30 ROMS-PISCES-APECOSM coupling compared to NEMO-PISCES-APECOSM (E. Machu)

09:50 Any other example case studies?

10:00 ----- Coffee -----

10:30 Interface variables & Couple Library 'brainstorming'

- EwE coupler case study (XML) – J. Beecham
- Linking physical/bio-geochemical – a few technical issues (K. Bolding)
- A generic framework for biogeochemical models (J. Bruggeman)

DISCUSSION – break out groups/or plenary as appropriate

13:00 ----- Lunch -----

14:00 MEECE drivers were mapped on to the MSFD qualitative descriptors of Good Ecological Status (GES).

The GES descriptors considered:

- biodiversity (lead Steve Mackinson; CEFAS)
- non-indigenous species (lead Sergej Olenin; KU CORPI)
- commercial fish & shellfish (lead Fritz Köster; DTU AQUA)
- food web (lead Michael St John; UHAM)
- eutrophication (lead Icarus Allen; PML)
- seafloor integrity (lead Chris Smith)
- contaminants (lead Jerry Blackford; PML)

16:00 ----- Coffee -----

16:30 Plenary discussion, report back from each group, actions for next 6 months

17:00 Summary and close of meeting from Icarus Allen

Annex II Attendees

In attendance	Institute	
Icarus Allen	PML	<i>Project Coordinator</i>
Yuri Artoli	PML	
Valia Avgoustidi	HCMR	
Jerry Blackford	PML	
Manuel Barange	PML	<i>WP5 Leader (meeting only)</i>
Jonathon Beecham	Cefas	
Richard Bellerby	UiB	<i>WP1 Leader</i>
Stella Berger	MESOAQUA	<i>(workshop only)</i>
Jerry Blackford	PML	
Karsten Bolding	BB	
Laurent Bopp	CNRS	
Jorn Bruggeman	BB	
Jan Busstra	Dutch Ministry	<i>User Advisory Group (meeting only)</i>
Momme Butenschon	PML	
Ana Teresa Caetano	EU	<i>Meeting only</i>
Heather Cannaby	IMS-METU	
Asbjørn Christensen	DTU Aqua	
Emanuela Clementi	UNIBO	
Ute Daewel	UiB	
Alessandro Dagnino	UPiedmont	
Emanuela Fiori	UNIBO	
Helene Frigstad	UiB	
Véronique Garçon	IRD	
Thomas Gorgues	CNRS	
Evelina Griniene	KU CORPI	
Jessica Heard	PML	<i>Project Manager</i>
Reiner Hille Ris Lambers	IMARES	
Xabier Irigoien	AZTI	<i>WP3 Leader</i>
Fritz Köster	DTU Aqua	
Eva Krassakopoulou	HCMR	
Briac Le Vu	IRD	
Priscilla Licandro	SAHFOS	
Eric Machu	IRD	
Steve Mackinson	Cefas	
Anaïi Mangos	PlanBleu	<i>User Advisory Group (meeting only)</i>
Italo Masotti	CNRS	
Andreas Moll	UHAM	
Jens Nejstgaard	MESOAQUA	<i>Workshop only</i>
Gisle Nondal	UiB	
Sergej Olenin	KU CORPI	
George Petihakis	HCMR	
Rossella Pistocchi	UNIBO	
Dimitris Politikos	HCMR	
Annika Pollani	HCMR	
Baris Solihoglu	IMS-METU	
Sonia Sanchez	AZTI	
Chris Smith	HCMR	
Nadia Smith	HCMR	
Mike St John	UHAM	
Sturla Winger Svendsen	UiB	
Frede Thingstad	MESOAQUA	<i>Workshop only</i>

George Triantafyllou	HCMR
Kostas Tsiaras	HCMR
Aldo Viarengo	UPiedmont
Sarah Wakelin	NERC-POL
Wojciech Wawrzynski	ICES
Anastasija Zaiko	KU CORPI

User Advisory Group (meeting only)

Meeting gender ratio 1 women: 1.85 men