Seventh Framework Programme Theme 6 Environment

Collaborative Project (Large-scale Integrating Project)

Project no. **212085**

Project acronym: **MEECE**

Project title: **Marine Ecosystem Evolution in a Changing Environment**

D0.2: Report on kick off meeting

Due date of deliverable: 31.11.08
Actual submission date: 31.11.08
Organisation name of lead contractor for this deliverable: PML

Start date of project: 01.09.08 Duration: 48 months
Project Coordinator: Icarus Allen, Plymouth Marine Laboratory

Project co-funded by the European Commission within the Seventh Framework Programme, Theme 6 Environment		
Dissemination Level		
PU	Public	x
PP	Restricted to other programme participants (including the Commission)	
RE	Restricted to a group specified by the consortium (including the Commission)	
CO	Confidential, only for members of the consortium (including the Commission)	

Marine Ecosystem Evolution in a Changing Environment

MEECE Kick Off Meeting Report

San Sebastian, Spain

29th September – 2 October 2008

Meeting Report

The first meeting of the Marine Ecosystem Evolution in a Changing Environment (MEECE) project was hosted by AZTI in San Sebastian Spain from the 29th September – 2 October 2008

The goals of the meeting were to initiate the project by

a) ensuring the project participants had a good overview of the aims and structure of the project.
b) Indentifying and clarifying and establishing responsibility for intra-workpackage linkages
c) Indentifying and clarifying and establishing responsibility for inter-workpackage linkages
d) To establish good working relationships between the project participants.

Summary of Actions from the meeting

Action	WP	Responsible
Relate the matrix of fishing drivers to each region and models to within that region to simplify the matrix.	WP1	Richard Bellerby Chris Smith
Identify database on concentrations of copper in the water	WP1	Aldo Viarengo
Explore PAH database	WP1	Icarus Allen
WP leaders agreed to produce one page summary of WP objectives, activities and overall context of their work, for first MEECE Fact Sheet	WP6	All leaders, coordinated by Jessica Heard
Participants were identified and agreed to provide a paragraph describing each model for the 'Model Library' webpage. Deadline end of October.	All	Those identified for each model (see page 7). Descriptions sent to Jessica Heard
1) In relation with point one a short meeting resulted in an initial agreement on the scenarios to be used. Two persons (Laurent Bopp and Jason Holt) agreed to produce a document with the scenarios to be commented and agreed. 2) For point two it was agreed that results will be synthesized in terms of percentage increase/decrease.	WP3	Laurent Bopp and Jason Holt
Website BLOG on determining time slices	WP3	BLOG set up by Jessica Heard, discussion to be initiated by Xavier Irigioen
WP3 BLOG page – what forcing used, what's been done and what the results look like	WP3	BLOG set up by Jessica Heard, discussion to be initiated by Xavier Irigioen

Minutes of the meeting

Tuesday, 30th September

Morning session

The kick off meeting was opened by Icarus Allen (Project Coordinator), who gave thanks for everyone's participation and began with a brief description of the project.

The session then continued with a series of presentations aimed at providing an overview of the project and its intended activities.

Presentations
(presentations available online http://web.pml.ac.uk/meece/meetings/Kickoff%20meeting.html)

» MEECE Overview – Icarus Allen
» Overview of FP7 – Ana Teresa Caetano
» WP1: Driver parameterisations and model scenarios – Richard Bellerby
» WP2: Advancing ecosystem modelling - Mike St John
» WP3: Ecosystem response to climate scale drivers – Xabier Irigoien
» WP4: Ecosystem response to direct anthropogenic drivers – Marco Zavatarelli
» WP5: Implications for resource management – GerJan Piet
» WP6: Knowledge Transfer and Outreach – Jessica Heard
» Project Management and Reporting Issues – Icarus Allen

Project Website
The draft MEECE website was presented for comment and feedback:

Additional pages suggested:
- Model library – including links to publications **PU (PUblic access)**
- Results and outputs section – "Highlights" **PU**
- "What's new" **PU**
- Google Calendar of events **PU**
- Wiki pages – discussion, planning, record scenario runs, include descriptions – a resource page for participants **PP (Private Permission, MEECE participants only)**
- Individual webpages per WP – to include full list of tasks, objectives, scientists assigned to each task. Individual mailing list per WP – **PP**
- Students section – project titles, contact details and discussion forum **PU**
- Systems pages? Including group mailing lists **PP**
- Deliverable page to include timetable **PU**
- Region/System pages – include outcomes, results etc….page for the future

Communication:
- Monthly electronic updates – meeting reports, websites updates, news, completed deliverables, upcoming workshops, KT activities etc
- MEECE discussion forum, split by WP and System
- Group mailing lists – all available on one main internal contacts page or placed within each WP page
- Reports emailed to management group, who will then format them and post on the website
- Automated monthly reminder before each deliverable – sent to WP leader
- Google calendar

Internal contacts database, which can be filtered by:
WP affiliation (can be affiliated to more than one WP)
WP leaders

System affiliation
Students
Area of interest
Website target group:
A stand alone website for Knowledge transfer and Outreach was suggested. Linked into the main project pages it would provide information of relevance to, and targeted at, socio-economic users and interested members of the public rather than scientists.

Points to think about in the future
How will the various MEECE products that will be delivered through websites be linked into the main site? E.g. will the Indicators website stand alone or be linked into the main website?

Afternoon session

WP1: Driver parameterisation and model scenarios (lead by Richard Bellerby)

Objectives
The overall objective is to quantify the sensitivity of marine organisms and ecosystems to important ecosystem drivers (climate patterns, ocean circulation, ocean acidification, overfishing, invasion of alien species and pollution (including eutrophication) and develop new model parameterisations and perturbation scenarios for implementation in, and testing of, ecosystem models.
The sub objectives are:

- To collate existing information on the drivers and their impacts on the marine ecosystem.
- To generate model boundary conditions and initial conditions for regional models.
- To provide validation for the regional models.
- To undertake experiments to investigate the response of ecosystem components to multiple drivers.
- To provide model parameterisations of new processes to WP2.
- To define the scenario envelopes for each driver on a regional scale.
- To contribute to knowledge transfer activities in WP6
- To publish advances in technical and scientific knowledge.

Task	Task Description	leader	Partners	Email of responsible persons
1.1.	Collating existing data on key processes and drivers a. climate change, ocean circulation, acidification b. fishing c. pollution d. Plankton e. Plankton metabolic rates	UiB	UiB NERC-NOCS CNRS IMARES CEFAS HCMR UPiedmont UNIBOCIRSA SAHFOS IEO	Richard.bellerby@bjerknes.uib.no Richard.Bellerby@bjerknes.uib.no Toby.Tyrrell@soton.ac.uk Laurent.Bopp@lsce.ipsl.fr GerJan.Piet@wur.nl Ralf.vanHal@wur.nl steve.mackinson@cefas.co.uk georgi.daskalov@cefas.co.uk csmith@her.hcmr.gr aldo.viarengo@mfn.unipmn.it marco.zavatarelli@unibo.it prli@sahfos.ac.uk alop@gi.ieo.es (Angel) xirigoien@pas.azti.es (Xabier Irigoien)
1.2.	Model Boundary and initial conditions	CNRS	UiB NERC-NOCS	Laurent.Bopp@lsce.ipsl.fr Richard.Bellerby@bjerknes.uib.no Toby.Tyrrell@soton.ac.uk
1.3.	Experimental work a. experiments on algae b. experiments on zooplankton and fish c. Acidification d. Molluscs and biomarkers	UHAM	UNIBOCIRSA SDU UiB UPiedmont	Michael.st.john@uni-hamburg.de marco.zavatarelli@unibo.it poul@biology.sdu.dk stjohn@biology.sdu.dk Richard.Bellerby@bjerknes.uib.no aldo.viarengo@mfn.unipmn.it

	e. Alien invasives		KU CORPI	sergej@corpi.ku.lt zita@corpi.ku.lt
1.4.	Validation data a. Plankton data b. Climate change, ocean circulation and acidification c. Satellite PFTs d. Fish, plankton and benthos e. Pollution	SAHFOS	SAHFOS UiB NERC-NOCS CNRS CNRS IMARES CEFAS HCMR UPiedmont KU-Corpi	prli@sahfos.ac.uk prli@sahfos.ac.uk Richard.Bellerby@bjerknes.uib.no Toby.Tyrrell@soton.ac.uk Laurent.Bopp@lsce.ipsl.fr cyril.moulin@lsce.ipsl.fr GerJan.Piet@wur.nl Ralf.vanHal@wur.nl steve.mackinson@cefas.co.uk georgi.daskalov@cefas.co.uk csmith@her.hcmr.gr aldo.viarengo@mfn.unipmn.it sergej@corpi.ku.lt zita@corpi.ku.lt
1.5.	Meta-analysis and parameterisations a. Plankton response b. Acidification c. Metabolic theory d. Fishing e. Pollution impacts f. Alien invasive species g. Multi-driver responses	UHAM	CNRS UiB NERC-NOCS IEO HCMR UNIBOCIRSA UPiedmont KU Corpi SAHFOS UHAM UiB	Michael.st.john@uni-hamburg.de Laurent.Bopp@lsce.ipsl.fr Richard.Bellerby@bjerknes.uib.no Toby.Tyrrell@soton.ac.uk alop@gi.ieo.es (Angel) xirigoien@pas.azti.es (Xabier Irigoien) csmith@her.hcmr.gr marco.zavatarelli@unibo.it aldo.viarengo@mfn.unipmn.it sergej@corpi.ku.lt zita@corpi.ku.lt prli@sahfos.ac.uk Michael.st.john@uni-hamburg.de Richard.Bellerby@bjerknes.uib.no
1.6	Scenario envelope definition	CNRS	All	

Action: Relate the matrix of fishing drivers to each region and models to within that region to simplify the matrix.

Action: Aldo Viarengo (UPiedmont) will identify database on concentrations of copper in the water

Action: Icarus Allen will explore PAH database

Wednesday, 1st October

Morning session

Discussion groups for remaining work packages continued throughout the second day of the meeting.

WP6: Knowledge Transfer and Outreach (lead by Jessica Heard)
Introduction to aims and objectives of KT, the fact sheet series and contacts database.

Participants were then divided into groups, roughly based on WP affiliation and provided feedback on the following points:

Fact sheet content and design
Use of additional colour was suggested. Several participants also proposed switching the layout from back to front. So that the important policy orientated 'Action points' and 'Science in Context' sections were on the front and would thus be read first by users.

Future fact sheet topics
Potential fact sheet topics were discussed and noted down for later follow up.

Action: WP leaders agreed to produce one page summary of WP objectives, activities and overall context of their work for first MEECE Fact Sheet.

Socio-economic contacts
Participants suggested several useful contacts for a range of countries. These were noted and will be entered into the socio-economic users database. A reminder will also be sent to all MEECE participants following the meeting to get additional contact information, especially from those unable to attend the meeting.

Discussion on User Group followed with several suggestions made for other possible participants including:

- European Fisheries Technology Platform (EFATP)
- ICSU
- Marine ERANets (Marinera, MariFish, Ampera) (Research funding agencies)
- GEO Secretariat
- HELCOM
- Black Sea Commission
- Ministry (Holland)
- OSPAR

General comments on how to select participants for the group:

- Balance between the participants in the User Group should to be considered carefully. Need a mix of both the 'communicators' (e.g. communication officers) in organisations who will 'pass the message on' and be able to advise on communication, as well as policy-makers able to push MEECE forward in the right places.
- Participants need to be motivated – select level of personnel carefully, need high level people within each organisation but not always the top person, they need to be willing, able and motivated to participate.
- To include RACs (too busy to actually attend the meeting) could actually go to them and present MEECE activities and capabilities)

WP2: Advancing ecosystem modelling (lead by Mike St John)

The overall object to WP2 is to create library of plug and play type models which can be coupled to existing coupled hydrodynamic and intermediate and complex NPZD type models and thereby provide the integrated End to End modeling tools necessary to assess how ecosystems are impacted by global change via drivers such as ocean circulation, ocean climate, ocean acidification, pollution, over fishing and invasive species.

Activities in this WP will be focused on the development of model modules to be coupled to existing coupled hydrodynamic ecosystem models thereby allowing these pre-existing tools to incorporate and predict the effects of:
a) acidification
b) contaminants
c) fisheries on dynamics of marine ecosystems.

These modules will be employed to assess the impacts of drivers in the MEECE systems in WP 3 to 5 as implemented via a system of generic 2-way couplers, 1-way coupling will be used as a first step. Critically, validation of resultant models will be undertaken using the datasets from WP1 by both conventional model data comparison, and multivariate analysis (e.g. Allen et al 2007a). The model evaluation strategy will use a number of approaches making use of both in-situ and earth observation data. We will determine model data misfit through standard techniques such as correlation, RMS error, cost functions and estimating model bias; using Taylor diagrams to summarize overall model performance.

The following modules will be assembled in the MEECE library for coupling

Module: Carbon Phytoplankton.
This module addresses plankton metabolism, employing a synthetic theoretical framework and stoichiometric nutrient responses determined in WP1. The module will inform the ecosystem models on the perturbations to energy transfer through the system (e.g. carbon and nutrient kinetics and pathways and export) regulating autotrophic carbon and nutrient uptake, heterotrophic respiration and carbon and nutrient pathways and export in response to light, temperature, pH, stoichiometry and community size structure.

Module: Acidification/carbonate system
The existing ERSEM model contains code which can simulate carbonate system variables (total alkalinity, dissolved inorganic carbon, pH, pCO2 etc) in shelf seas for present and future atmospheric CO2 scenarios. In collaboration with WP1 parameterizations will be incorporated to include the impacts of high CO_2 on various ecosystem processes including calcification, and nitrification

Module: Calicifiers.
This module will advance existing models of calcification rate and E. Huxley competitive ability to incorporate recent experimental and observational and experimental findings on e.g. acidification.

Module: Zooplankton.
Copepod Structured population model. A number of structured population models of marine copepods exist in the group and coupling will be developed to incorporate the impacts of the acidification and ecotoxicological modules of MEECE.

Module: Individual Based Models:
A number of Individual Based Modeling incorporating metabolic processes, predation and transport exist at present allowing the testing of recruitment hypotheses. These will be modified to incorporate where applicable acidification and ecotoxicological modules on the reproductive success of exploited fish stocks such as cod, anchovy sardine, sand eel and sprat.

Module SMS:
SMS (Stochastic Multi-Species model) is a fish stock assessment model including biological interactions estimated from a parameterised size dependent food selection model. The model can be used in forecast mode and includes extended possibilities for evaluating management scenarios which have been implemented for the Baltic and the North Sea. For the piscivorous species the model will be extended with a dynamic model for mean weight at age and sexual maturation, where food consumption and growth will be dependent of sea temperature and the available food estimated within the model. Recruitment success for all species included and available food and growth of prey fish like sandeel and herring will be obtained through linkage to NPDZ models as well as allowing the assessment of top down controls of zooplankton populations and hence trophic cascades.

Module : ECOSIM With ECOPATH (EWE)
The EwE suite is an Ecopath model, which creates a static mass-balanced snapshot of the resources in an ecosystem and their interactions, represented by trophically linked biomass ‘pools’. The biomass pools consist of a single species, or species groups representing ecological guilds. Pools may be further split into ontogenetic (juvenile/adult) groups that can then be linked together in Ecosim. Coupling will involve translating, the production dynamics of phytoplankton and zooplankton from the coupled hydrodynamic NPZD type models to changes in the availability of food to higher predators as well as predatory controls on ecosystem structure.

Module: OSMOSE
(**O**bject-oriented **S**imulator of **M**arine ec**OS**ystems **E**xploitation) The Osmose model is a multispecies and individual-based model (IBM) which focuses on fish species. This model assumes opportunistic predation based on spatial co-occurrence and size adequacy between a predator and its prey (size-based opportunistic predation). Output, includes a variety of size-based and species-based

ecological indicators which can be simulated and compared in situ data (surveys and catch data) at different levels of aggregation. The coupling process used to link to NPZD, ERSEM) models is via predation process and thereby allowing the estimation of the effects of trophic cascades on marine ecosystem structure.

Module: APECOSM
(Apex Predators ECOSystem Model) is a spatially explicit size-based model of open-ocean ecosystems which represents the flow of energy through the ecosystem with a size-resolved structure in four dimensions (space x, y, time t, and size). The uptake and use of energy for growth, maintenance and reproduction by the organisms are modelled according to the DEB (dynamic energy budget) theory and the size-structured nature of predation is explicit. Energy is provided at the basis of the model through primary production and transferred through a spatially explicit size-spectrum. Physical forcing (wind, temperature and current fields), biogeochemical forcing (light and oxygen fields in addition to primary production) as well as the effects of fishing can be explicitly taken into account.

Module: Ecotoxicology:
Parameterizations for the development of this module are based on the databases and meta-analyses performed by WP1 as well as on existing toxicological databases. Furthermore, this module integrates experimental activities in WP1 to incorporate toxically-induced effects(e.g. PAH) at different levels of biological organization and trophic levels (multilevel ecotoxicological dynamics) and thereby predict population and ecosystem changes based on changes in the reproductive potential of species at the level of phyto, zoo and growth and development of fish larvae.

Module Invasives
This module will follow two approaches a) adaptation of the bio pollution index to assess changes in vulnerability for invasion due to climate change b) building on the 'Follows' (Follows et al 2007) model approach which is based on building a plankton model with a number of plankton types, based on functional groups and a number of species per functional group these being parameterized by putting noise on the bulk parameters. This module will be coupled to GOTM in 1D. The potential for colonization by invasive species will be incorporated based on community structure (e.g. Kokkoris et al 1999). The data base from WP 1 will underpin parameter choices.

Action: Participants were identified and agreed to provide a paragraph describing each model for the 'Model Library' webpage. Deadline end of October.

The authors of each description for the model library webpage as follows:

Model	**Author**
Carbon phytoplankton	Richard Bellerby
Acidification/carbonate system	Jerry Blackford
Calicifiers	Toby Tyrell
Zooplankton	Mike St. John
Module IBM	Eric Machu
SMS	Morten Vinter
ECOSIM With ECOPATH (EWE)	Steve Mackinson
OSMOSE Driver/s:	Yunne Shin
APECOSM	Oliver Maury
Ecotoxicology	Icarus Allen
Invasives	Jerry Blackford

Pink = submitted (18/11/08)

Karsten Bolding gave a presentation on model coupling (available http://web.pml.ac.uk/meece/meetings/Kickoff%20meeting.html).

Discussion on MEECE Summer School
The organisation of a MEECE summer school is deliverable under WP6. This summer school will be organised by scientists within MEECE with support from WP6 as required.

IMR-METU offered to organise the summer school, and a discussion followed on applying for NATO funding to support summer school. This will lead to a commitment to produce a book following the summer school, which would include chapters based on lectures, as well as the presentations given.

The benefits of involvement with such a book include
» representative of MEECE approach looking at key principles right through to models.
» excellent resource for students both attending the summer school and further afield
» good way to develop the MEECE legacy.

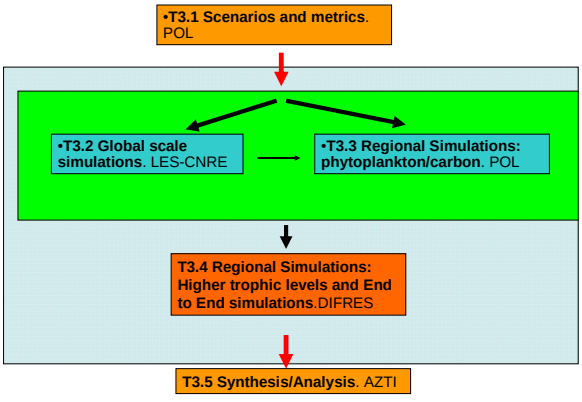
Decision: Taken forward based on interest from NATO then circulate draft of book for comment, see level of interest from the group and then decide whether or not to make an application to NATO.

WP3: Ecosystem response to climate scale drivers Discussion (lead by Xavier Irigioen)

OBJECTIVE: To define the envelope of response to climate and circulation drivers of marine ecosystem function both on a global and a regional scale. We shall analyze the impact on ecosystems end to end of changes in temperature, circulation, mixing, acidification, and light, focusing on physics, biogeochemistry and ecosystem productivity, and on higher trophic levels.

TASKS:
- T3.1 Scenarios and metrics.
- T3.2: Global scale simulations.
- T3.3 Regional Simulations: phytoplankton/carbon.
- T3.4 Regional Simulations: Higher trophic levels and End to End simulations.
- T3.5 Synthesis/Analysis

Figure 1 resumes the structure of the workpackage and identifies with red arrows the main risks. Two points are significant: 1) the early agreement on the scenarios and metrics to be used so they are available on time for the simulations, and 2) the synthesis of the results from higher trophic levels and end to end simulations that will be originated by a rather heterogeneous set of models.



ACTION TAKEN: 1) In relation with point one a short meeting resulted in an initial agreement on the scenarios to be used. Two persons (Laurent Bopp and Jason Holt) agreed to produce a document with the scenarios to be commented and agreed. 2) For point two it was agreed that results will be synthesized in terms of percentage increase/decrease.

Identification of the responsible people of the regional simulations:

Sub task	Region	Leader	Participants	Models
3.3.1	NE Atlantic	NERC-POL	PML	POLCOMS-ERSEM
3.3.2	Barents sea	UNIFOB	IMR	ECOSMO
3.3.3	North Sea	PML	UNIFOB, POL	POLCOMS-ERSEM, ECOSMO
3.3.4	Baltic Sea	UNIFOB	DIFRES	ECOSMO
3.3.5	Biscay Bay	AZTI	IRD, NERC-POL	ROMS-NPZD, POLCOMS-ERSEM
3.3.6	Black Sea	IMS-METU	PML	BIMS_CIR
3.3.7	Adriatic	UNIBO		BFM
3.3.8	North Aegean Sea	HCMR		ERSEM
3.3.9	Benguela	IRD	AZTI	ROMS-NPZD

Table 4: Subtasks including considered region, leader and participant institutes and phytoplankton-carbon models to be employed.

3.3.1NE Atlanctic: Jason Holt
3.3.2 Corinne Schrum
3.3.3 Jerry Balckford/Corinne Schrum
3.3.4 Corinne Schrum
3.3.5 Marina Chifflet/Jason Holt
3.3.6 Baris Salihoglu
3.3.7 Marco Zavatarelli
3.3.8 Kostas Tsiaras
3.3.9 Veronique Garcon

Sub task	Region	Leader	Participants	Models
3.4.1	Barents sea	IMR	UNIFOB	ECOSMO, ROMS-NORWECOM-IBM, SYSTMOD
3.4.2	North Sea	IMARES	CEFAS, DIFRES, IRD	ECOSMO, ECOSIM-ECOPATH, OSMOSE, 4M, SMS, IBM
3.4.3	Baltic Sea	DIFRES	IMARES	ECOSMO, 4M, SMS, ECOSIM-ECOPATH, IBM
3.4.4	Biscay Bay	AZTI	IRD	ROMS-NPZD-APESCOM, ROMS-IBM,
3.4.5	Black Sea	IMS-METU	PML	BIMS_CIR, BIMS_ECO
3.4.6	Adriatic	UNIBO	IRD	ERSEM-OSMOSE
3.3.8	North Aegean Sea	HCMR	UNIBO, IRD	ERSEM-OSMOSE
3.3.9	Benguela	IRD	AZTI	ROMS-N PZD-APESCOM, ROMS-IBM

Table 5: Subtasks including considered region, leader and participant institutes and higher trophic level models to be employed (the forcing physical and NPZD models are also included).

3.4.1 Frode Vikebo
3.4.2 Reinier Hille Ris Lambers
3.4.3 Asbjorn Christensen
3.4.4 Marina Chifflet
3.4.5 Bettina Fach
3.4.6 Marco Zavatarelli
3.4.7 Kostas Tsiaras
3.4.8 Eric Machu

Action: Website BLOG on determining time slices

Action: WP3 BLOG page – what forcing used, what's been done and what the results look like

Wednesday, 1st October

Afternoon session

WP4: Ecosystem response to direct anthropogenic drivers (lead by Marco Zavaratelli)

Status:
The WP seems ready to start. Directly involved people have been identified and the modelling systems to be used are known.

Issues (potential problems):

Within WP

All the WP4 activities involve the close co-operation between at least two different research units located in different Institutes and, often in different countries. The close cooperation among participants to the same modelling effort should be ensured and maintained across the Project lifetime.

Between WP

WP4 is crucially dependent on delivery from other WP's (process parameters, scenarios, computer codes etc). An “upstream” delay in delivery could put at risk some WP4 activities. Overall it should be stressed that the whole WP is centered around the achievement of computationally heavy (time expensive) numerical simulations.

Milestone and workshops:
M9: scenario and metrics workshops
Interaction with WP1 (scenario) and 3 (metrics, WP3 T3.1) desirable
London first choice (May)

M12: joint meeting WP2,3,4,5 on model coupling (E2E approach and direct driver process description) WORK IN PROGRESS
Bologna

M18: joint meeting WP 2,3,4,5 on model coupling (FINALLY)
Should maybe earlier, perhaps linked to annual MEECE meeting

Group social event took place at a local typical Cider Restaurant

Thursday 2nd October

Morning Session

WP5: Implications for resource management (lead by GerJan Piet)
Partners involved in this WP and tasks were assigned.

	Months	5.1 Integrated Assessment	5.1 Development decision-support tools	5.2 Develop management strategies	5.3 MSE tools	5.4 Ecological indicators
PML	1.5			?		
AZTI	23	SWW		SWW	X	
IMARES	**27**	**NS**	**X**	NS	X	
CEFAS	12	NS	X	NS	X	
IRD	18		X (AJ?)			X
DTU-AQUA	16	BS (UHAM?)	X (AJ?)	BS	X	
UPd	23	MS?	Pollution			X
KU corpi	8	BS?				X

The above table provides an outline of the different tasks within the WP5 and the institutes involved. This table was also the basis for the discussion on the contents of the work and actual persons contributing.
As the aim was to discuss the first 18 months of work the focus was on 5.1 and 5.2 as 5.3 and 5.4 as supposed to commence later.

5.1 integrated assessment
In the presentation an example of an integrated assessment was provided. Currently several frameworks exist (e.g. OSPAR, ICES). The aim is to do an integrated assessment for at least three geographic areas: North Sea, Baltic Sea and Bay of Biscay. The NS IA will be done by IMARES and CEFAS, the BS IA by DTU Aqua in collaboration with UHAM (who is not a formal partner in the WP but this will be sorted out amongst themselves) and a contribution of KU CORPI. Names for the BS: University of Hamburg (Rabea Diekmann and Christian Möllmann), DTU Aqua (Maciej Tomczak, Martin Lindegren) Bay of Biscay by AZTI (contacts: Leire Ibaibarriage and Sonia Sanchez) and work on IA is also done in the Barentz Sea but this will rely on input from partners outside the WP (UiB?).

5.1 Development of decision support tools
An overview of the type of decision support tools that are around is provided at the WP5 presentation. The work currently being done as part of e.g. EU-funded IMAGE will be distributed prior to the start of the task. Astrid Jarre of Uni Capetown has much expertise to contribute and will be involved through IRD. CEFAS will contribute through Steve Mackinson.

5.2
In the presentation is framework for management strategy evaluation was shown. This consists of an operating model creating our virtual reality (being a population or an entire ecosystem), a part that samples this reality and translates into indicators, a scientific framework including decision support tools that provides management advice in the form of a Harvest Control Rule (HCR) which affects the pressure on the ecosystem component for which we try to achieve an objective. A so-called full-feedback loop should allow us to evaluate management strategies.
Two approaches will be followed:
DTU will take the lead on management strategies aimed at achieving CFP objectives, IMARES will lead management strategies aimed at Marine Strategy objectives.

CEFAS and AZTI: start with conventional CFP but interest in hooking up with Marine Strategy management strategies.

5.4
IRD has already done much work on developing indicators for different systems. Website has been made, but is not online (indiseas).

General remarks
Throughout the tasks KU CORPI (Sergej Olenin) will focus on alien species, Upiedmont (Alessandro Dagnino) on pollution.
The WP5 is supposed to commence in month 12. Prior to this IMARES will distribute background information and a suggestion for an approach.

General Summary session:

Round table feedback on project, where participants were particularly asked to highlight any concerns.

WP2: Concerns about capabilities about coupling of models expressed. General agreement that participants will try to achieve what can be done and that any progress towards achieving coupling is a step forward in this area.

WP3: too long to get common forcing. Also concerned about coupling higher trophic levels.

Agreed that the coupling is the most risky part of the project.

WP4, 5 and 6: not concerns at present.

Icarus Allen closed the meeting, giving thanks to everyone for their participation. Many challenges ahead but exciting challenges and any progress me make is an achievement.

Quotes from participants:

“Good development so far, but way to go in understanding each others work and differences in languages used” Chris Smith

“lot of work to be done, agree that we need to find a common language – especially in terms of model coupling” Mike St. John

“any work that we do will be progress” - Fritz Koster

Karsten – problem with coupling, people already have a working system so difficult to convince people to change to a different system, to adapt to a new system. need to show the benefits of changing and that it is relatively easy to achieve.

Xavier – more difficult to couple the higher trophic level models. Question is not if it is possible, just whether it is possible within the time allowed.

“aim is not to change models, but to provide additional things to link into models in order to enhance them” Icarus Allen (PML)

Annex I Agenda

Monday 29th

19.30 Reception San Sebastian Aquarium

Tuesday 30th

9.00 Welcome

9.05 Overview of MEECE – *Allen*

9.25 EC expectations & FP7 calls Ana-Teresa Caetano

9.40 Summary of WP1 **Driver parameterisation and model scenarios** * *Bellerby*

10.00 Summary WP2 **Advancing ecosystem modelling** * *St John*

10.20 Summary WP3 **Ecosystem response to climate scale drivers** * *Irigoien*

10.40 Coffee

11.00 Summary WP4* **Ecosystem response to direct anthropogenic drivers** *Zavatarelli*

11.20 Summary WP5 **Implications for Resource Management** * *Piet*

11.40 Summary WP6 **Knowledge Transfer and Outreach** * *Heard*

12.00 MEECE Workshops and summer school

* Aim objectives, major tasks, linkages to other WP's

12.30 MEECE management and reporting: *Allen*

13.00 Lunch

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The rest of the meeting will follow as a series of joint sessions on each WP defining who is doing what when i.e. the scientific and technical delivery of the program. Thus putting names on actions and creating accountability.
Objectives are to

- **Establish the workplan and responsibilities to 18 months**
- **Timetable and venues for workshops**
- **Establish Interactions within the WP and between other WP's**

Breakout groups for different tasks as required – at the discretion of the WP leader
These sessions should be discussion lead and not an endless series of presentations

NB All participants are expected to participate in all the working groups

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14.15: **WP 1 Driver parameterisation and model scenarios:** Bellerby
Starts M1
The overall objective is to quantify the sensitivity of marine organisms and ecosystems to important ecosystem drivers (climate patterns, ocean circulation, ocean acidification, overfishing, invasion of alien species and pollution (including eutrophication) and develop new model parameterisations and perturbation scenarios for implementation in, and testing of, ecosystem models. The sub objectives are:

- To collate existing information on the drivers and their impacts on the marine ecosystem.
- To generate model boundary conditions and initial conditions for regional models.
- To provide validation for the regional models.
- To undertake experiments to investigate the response of ecosystem components to multiple drivers.
- To provide model parameterisations of new processes to WP2.
- To define the scenario envelopes for each driver on a regional scale.
- To contribute to knowledge transfer activities in WP6
- To publish advances in technical and scientific knowledge.

15.30 coffee

WP1 continued

17.30 finish

Steering committee dinner
Free evening for everyone else

Wed 1st October

9.00 WP6 Knowledge Transfer and Outreach *Heard*
Start M 1
Knowledge transfer is the process which facilitates the dissemination of research-based knowledge, expertise and skills between the project and the users of its results (e.g. Policy makers, advisory bodies, research managers, conservation and user groups, management bodies, all at European, regional and national level). *Public Outreach* is a more generic effort to connect to outside organisations, groups, specific audiences or to the general public. Outreach often takes on an educational component. Both Knowledge Transfer and Public Outreach are based on a two-way information flow, aiming at engagement rather than solely dissemination or education. Our objective are:

- To develop strategies, frameworks and tools to transfer knowledge acquired during MEECE to user communities
- To organise a Modelling Summer School to disseminate modelling skills to the next generation
- To coordinate user inputs to MEECE through meetings of a User Group

To facilitate knowledge outreach using web-based tools and printed documents

Establish workplan and responsibilities to 18 months
Breakout groups for different tasks as required – at the discretion of the WP leader

10.00 WP 2: Advancing ecosystem modelling: *St John*
Start M1
The overall object to WP 2 is to create library of plug and play type models which can be coupled to existing coupled hydrodynamic and intermediate and complex NPZD type models and thereby provide the integrated End to End modelling tools necessary to assess how ecosystems are impacted by global change via drivers such as ocean circulation, ocean climate, ocean acidification, pollution, over fishing and invasive species. In order to accomplish these objectives will be

- To identify system specific and generic key feedbacks and forcing for focused modelling activities.
- To assemble a library of biogeochemical, ecosystem, higher trophic level, alien invasive species and ecotoxicology modules necessary to assess the impacts of MEECE drivers on ecosystem dynamics.
- To develop a modular modelling structure to enable the flexible coupling of biogeochemical, ecosystem, higher trophic level, alien invasive species and ecotoxicology sub models modules to existing ocean atmosphere models

- To develop trophic couplers to enable the implementation of feedback loops into end to end modelling frameworks.
- To contribute to knowledge transfer activities in WP6
- To publish advances in technical and scientific knowledge

Establish workplan and responsibilities to 18 months
Breakout groups for different tasks as required – at the discretion of the WP leader

10.30 coffee

WP2 continued

13.00 Lunch

14.15 WP3 Ecosystem response to climate scale drivers: Irigoien/Holt
Start M6
To define the envelope of response to climate and circulation drivers of marine ecosystem function both on a global and a regional scale. We shall analyze the impact on ecosystems end to end of changes in temperature, circulation, mixing, acidification, and light, focusing on physics, biogeochemistry and ecosystem productivity (task 3.3), and on higher trophic levels (task 3.4). The sub objectives are

- To define common metrics and scenarios (task 3.1)
- To run/analyze base-line and ensemble scenarios (tasks 3.3, 3.2 and 3.4)
- To synthesize results (task 3.5).
- To contribute to knowledge transfer activities in WP6

To publish advances in technical and scientific knowledge

Establish workplan and responsibilities to 18 months
Breakout groups for different tasks as required – at the discretion of the WP leader

15.45 Coffee

16,00 WP 4 Ecosystem response to direct anthropogenic drivers: *Zavatarelli*

Start M9

Objectives

To define the envelope of response to combinations of direct anthropogenic drivers on marine ecosystem function both on a regional scale. We shall analyze the impact on ecosystems end to end of changes in pollution, fishing effort, fluvial nutrient and CDOM inputs, focusing on physics, biogeochemistry and ecosystem productivity and higher trophic levels (task 4.1, 4.2). The sub objectives are:

- To calibrate and validate hindcast simulations (task 4.1)
- To run/analyze base-line and ensemble scenarios (tasks 4.2)
- To synthesize results (task 4.3).
- To contribute to knowledge transfer activities in WP6
- To publish advances in technical and scientific knowledge

Establish workplan and responsibilities to 18 months
Breakout groups for different tasks as required – at the discretion of the WP leader

17.30 finish

Dinner (tbc)

Thursday 2nd October

9.00 WP 5 Implications for Resource Management: *Piet*

Start M12
This workpackage will investigate how our ecosystem and resource management capabilities are affected by trends in major ecosystem drivers such as (1) climate change and related oceanographic effects, (2) eutrophication and its effect on primary and secondary production, (3) pollution affecting reproductive success, (4) overfishing and introduction of alien species altering the structure of fish communities with cascading effects to lower trophic levels
It will contribute to the development and implementation of tools and management strategies being robust against trends in uncontrolled (e.g. climate) or difficult to control drivers (eutrophication, pollution) and allowing a better management of drivers under human control (i.e. fisheries and introduction of alien species), as an important contribution to the ecosystem approach to management, being a central element of the EMS, CFP and EMP. Specifically this includes:

- To develop methodology to integrate the dynamic response of marine ecosystems to the combined effects of various anthropogenic and natural drivers into multi-criteria tools supporting the scientific advisory and decision-making process
- To develop management strategies using these tools that support the EU Marine Strategy, EU Maritime Policy and the EU Common Fisheries Policy and their long-term ecological and resource management objectives
- To further develop and implement Management Strategy Evaluation tools (MSE) that allow the evaluation of strategies for the rebuilding of degraded marine ecosystems, the protection and the sustainable use of the sea and its resources, in the perspective of the ecosystem approach.
- To evaluate the tools supporting the decision-making process and management strategies using the MSE tools.

Establish workplan and responsibilities to 18 months
Timetable and venues for workshops
Interactions with other WP's
Breakout groups for different tasks as required – at the discretion of the WP leader

10.30 Coffee

11.00 Meeting summary and AoB

12.00 Finish

Annex II Attendees

In attendance	Institute	
Icarus Allen	PML	*Project Coordinator*
Jerry Blackford	PML	
Jessica Heard	PML	*Project Manager*
Corinna Schrum	UiB	
Einar Heegaard	UiB	
Helene Frigstad	UiB	
Richard Bellerby	UiB	*WP1 Leader*
Michael St John	UHAM	*WP2 Leader*
Sonia Sanchez	AZTI	
Marina Chifflet	AZTI	
Xabier Iriogien	AZTI	*WP3 Leader*
Leire Ibaibarriaga Contreras	AZTI	*Day 3 only*
Franca Guerrini	UNIBO	
Marco Zavatarelli	UNIBO	*WP4 Leader*
Rossella Pistocchi	UNIBO	
Gerjan Piet	IMARES	*WP5 Leader*
Reinier Hille Ris Lambers	IMARES	
Steve Mackinson	CEFAS	
Jason Holt	NERC-POL	
Eric Machu	IRD	
Asbjørn Christensen	DTU-Aqua	
Fritz Köster	DTU-Aqua	
Svein Sundby	IMR	
Baris Salihoglu	IMS-METU	
Chris Smith	HCMR	
George Triantafyllou	HCMR	
Kostos Tsiaras	HCMR	
Laurent Bopp	CNRS	
Priscilla Licandro	SAHFOS	
Aldo Viarengo	Upiedmont	
Alessandro Dagnino	Upiedmont	
Elena Fabbri	Upiedmont	
Zita Rasoule Gasiuniate	KU CORPI	
Sergej Olenin	KU CORPI	
Karsten Bolding	BB	
Tanja St John	SDU	
Ana Teresa Caetano	EU Commission	*EU Project Officer*

Meeting gender ratio 9 women: 25 men