

EUROCEANS Consortium Foresight Workshop Call 2009

Coordinating priorities of MEECE (EU FP7 IP) and MESOAQUA (EU FP7 INFRASTRUCTURES) for the period 2010-2013

1. Contact person(s)

Scientific PI Contact: Frede Thingstad ???, Xavier Irigoien ???

MESOAQUA/AQUASHIFT PIs ??? (none yet approached or committed)

Applicant Contact: Ivo Grigorov (DTU-Aqua/CNRS), ivo_grigorov@hotmail.com, +33 6 78 81 13 72, +33 2 98 49 86 73

NB: Due to the short deadline of the call and the start of the summer holidays in July in the Nordic countries, no dedicated PI has been identified and committed to lead the proposed workshop, despite the support from both MEECE and MESOAQUA programs (see appendix for comm.). In the case that the EUROCEANS Consortium Executive finds the proposal of value, an autumn deadline of 5 September is proposed for identifying a suitable PI who would be interested in coordinating the workshop.

2. Organising institution(s) and scientists

DTU-Aqua/CNRS (Ivo Grigorov), Plymouth Marine Lab (Icarus Allen, MEECE Coordinator, AMEMR Coordinator), University of Bergen (Aud Larseen, MESOAQUA Project Officer)

3. Other institutions and scientists (please indicate the likely/target number of participants and whether participation would be upon invitation only or open to applications)

FSW Funds will allow a cross-program workshop between modelers and experimentalists, during an already planned and funded meeting in 2010 by either programs (MEECE or MESOAQUA). Fully travel funded attendance will be by invitation only, selected by the two programs MESOAQUA and MEECE and the workshop leader.

4. Topic, focus, objective (please specify whether the FSW aims, beyond its own output, at the preparation of a future EUR-OCEANS flagship or other activities)

Preamble

Pelagic ecosystems services are a subject of climate and anthropogenic pressures and our capacity to predict their response is still limited requiring strong interactions between modelling and experimentalist communities (Friedrich et al., 2007). Modeling tools' present ability to integrate trophic level interactions and predict the emergent patterns of marine ecosystems is still in the early stage of development (EUROCEANS International Symposium on Trophic Levels Interactions, St John et al., 2009) requiring further experimental data to better define the niche of key species in terms of physiological rates changes to environmental drivers, predator-prey interaction and element flow pathways, and the plasticity of physiological response under multiple concurrent stressors (EUROCEANS International Symposium on Trophic Interactions, St John et al., 2009; MEECE 2009; Savidge and Brandes 2009).

Under the latest framework program (FP7), two new programs were funded to address modeling predictive capacity under variable climatic and anthropogenic forcings (MEECE, Marine Ecosystem Evolution in a Changing Environment, description below) and integrate

and coordinate EU mesocosm facilities (MESOAQUA, description below), both with broad scientific priorities.

Experience has shown that mathematical models should be challenged with biological experiments by using near-natural pelagic ecosystems (Thingstad et al. 2007; Thingstad 2000), which itself improves our ability to explain empirical data, but also improves design of experimental work. Coordination of priorities of the two programs can potentially improve this lower trophic level validation approach at least for the period 2010-2013, and reinforce the necessary dialogue between the European modelling and experimentalists communities (Friedrich et al., 2007).

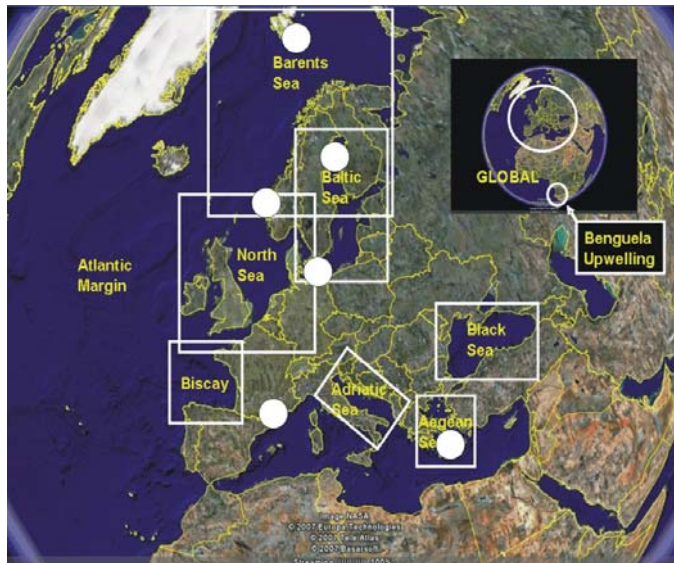


Figure 1. MEECE-MESOAQUA overlap. Geographic systems defined in MEECE IP (boxes) and major EU mesocosm facilities (circles) as coordinated by MESOAQUA (EU FP7 Infrastructures, 2009-2013, www.mesoaqu.eu – from north to south, [West Spitsbergen](#) (KOSMOS free floating bags), [Umea](#) (indoor tanks), [Bergen](#) (coastal bags), [Kiel](#) (KOSMOS bags & indoor tanks), [Montpellier](#) (coastal bags), [Heraklion](#) (tanks)).

Proposal

Foresight Workshop funds are sought from the EUROCEANS Consortium to organise an informal meeting between the ecosystem modellers and mesocosm experimentalists in an effort to propose a strategy for coordinating the concurrent programs (modellers priorities represented by MEECE, and the experimentalists community represented by MESOAQUA), in a way that reflects the two communities needs in terms of data generation, model parameterization and improved model predictive capacity, and prioritize future experimental work with state-of-the-art model tools' deficiencies in mind (Friedrich et al., 2007).

The proposed time for the event is February 2010 at which point MESOAQUA will be fully operational and provide the international community with updated information on opportunities for mesocosm cooperation in Europe and elsewhere. The project will also assist applicants to the MESOAQUA-Transnational Access Activities to find optimal cooperation partners within the MESOAQUA-facilities, based on the latest information on running and planned science at the different facilities. MEECE in turn can contribute with up-to-date European pelagic ecosystem model priorities on parameterization, validation and additional experiments.

The event can be held in Heraklion, Crete near CRETACOSMOS (a MESOAQUA-participating mesocosm facility¹) and can benefit financially from the already planned one

¹ Heraklion-CRETACOSMOS, Hellenic Centre for Marine Research (HCMR), Greece

day meeting on 'Advances on Model Parameterization' (MEECE WP2) and MEECE Annual General Meeting.

EUROCEANS Consortium grant will fund 10-12 PI's representing the experimentalists community via FP7 MESOAQUA or DFG Priority Program AQUASHIFT (description below) to participate in the discussion and strategy formulation. The potential deliverables and questions proposed in this proposal have also been identified as significant contribution to the AMEMR Conference in 2011 (pers.comm. Icarus Allen, Plymouth Marine Laboratory running the Advances in Marine Ecosystem Modelling Research).

5. Output(s) (need to be detailed with input from the leader PI)

Identify a strategy and propose a community roadmap for coordinating experimental data generation in Europe in view of pelagic ecosystem models necessity to improve parameterization and increase predictive capacity, integrate current ecosystem model deficiencies into the design and choice of future experiments. The deliverable can be in the form of **one** of the following:

- white paper on best experimental practices for modelling parameterization
- research article describing key necessary experiments for extending existing model predictive capacity (in either case not excluding an EUROCEANS Consortium Flagship bid should the subject allow)

6. Relevance to the Consortium objectives

The goal of the workshop is consistent with the EUROCEANS Consortium objectives to promote and coordinate (1) top-level scientific research on the impacts of anthropogenic and natural forcings on ocean ecosystems and (2) optimal use of shared technical infrastructures and scientific facilities. A resulting proposed roadmap for aligning modelling and experimentalists priorities will be immediately useful in the short-term (2010-2013) as well as offering potential for longer term coordinated effort of experiments/modelling needs via a potential future EUROCEANS 'Flagship' bid.

7. Links / synergies / added value with respect to existing programmes or projects see section 4

8. Tentative date, venue and host

February 2010, Heraklion, Crete (during MEECE Annual General Meeting and WP2 'Advances in model Parameterisation workshop') near CRETACOSMOS facility

9. Tentative budget and funding level requested from EUR-OCEANS

To maximise on travel time and funds, the event will be accompany an existing meeting planned and funded by either programs (first potential opportunity - MEECE in Heraklion, Crete, February 2010). As such the workshop is 50% co-funded by the EUROCEANS Consortium and MEECE/MESOAQUA. The max 12k euros funding by the EUROCEANS Consortium will cover travel costs for attendance of 10-12 invited scientists.

Funds could be handled through consortium members DTU-Aqua and/or CNRS (IUEM Brest, France), which currently employ I. Grigorov through a joint agreement until early 2010.

References:

Friedrich et al., 2007. Assessment of skill and portability in regional marine biogeochemical models: Role of multiple planktonic groups, *JGR* 112, doi:10.1029/2006JC003852

Savidge, W.B. & J.A. Brandes, 2009. Addressing Challenges for Chemical Oceanography, *EOS Transactions of the American Geophysical Union* 90:20, 19 May 2009

St. John M.A., Ruiz J., Monfray, P., Grigorov, I., 2009. Introduction to the Cadiz Symposium on "Parameterisation of Trophic Interactions in Ecosystem Modelling": Examining The State of Our Art. *Progress in Oceanography* Special Issue (in press)

MEECE 2009, Deliverable 2.1- Report on system-specific key species and processes, Workpackage 2 Advancing ecosystem modeling, June 2009

Thingstad, TF et al. 2007. Ability of a "minimum" microbial food web model to reproduce response patterns observed in mesocosms manipulated with N and P, glucose, and Si. *J.Mar.Sys.*, 64 15–34;

Thingstad, TF. 2000. Elements of a theory for the mechanisms controlling abundance, diversity, and biogeochemical role of lytic bacterial viruses in aquatic systems. *L&O*, 45:1320-1328

APPENDIX I

Description of Relevant Programs

AQUASHIFT - The impact of climate variability on aquatic ecosystems: Match and mismatch resulting from shifts in seasonality and distribution

DFG (Germany) Priority Program, 2006-2012 (<http://www.ifm-geomar.de/?id=1985&L=1>); *Coordinator:* Uli Sommer, IFM-GEOMAR, Germany

A program of field, experimental and modelling studies to analyse the impacts of the anticipated climate change on aquatic ecosystems. It is anticipated that climate change will differently affect light dependent processes (e.g. primary production) and temperature dependent processes (e.g. heterotrophic processes). As a consequence, not only changed phenologies and population dynamics of single species but also shifts in biotic interactions (competition, predation) are expected. The program will focus on the community and ecosystem level consequences of a temporal de-coupling ("mismatch") of hitherto synchronised processes ("match"; e.g. temporal coincidence of food abundance and prey demand by certain life-cycle stages of consumers), in marine (including brackish), lake, and running water systems.

MEECE - Marine Ecosystem Evolution in a Changing Environment

EU FP7 INTEGRATED PROJECT, 2008-2012 (www.meece.eu);

Coordinator: Icarus Allen, Plymouth Marine Labs, UK

Marine Ecosystem Evolution in a Changing Environment Project aims to increase ecosystem modelling predictive capacities. Both climate and anthropogenic drivers have an impact on the structure and function of marine ecosystems. Using a combination of data synthesis, numerical simulation and targeted experiments MEECE intends to boost our knowledge and develop the predictive capabilities needed to learn about the response of marine ecosystems.

MEECE will also provide decision making tools to support the [EC Marine Strategy](#), EC Maritime Policy and the [EC Common Fisheries Policy](#).

MESOAQUA

EU FP7 INFRASTRUCTURES, 2009-2013 (www.mesoaquaa.eu);

Coordinator: Jens Nejstgaard, Un. Bergen, Norway

Coordinator of 6 European mesocosm facilities, that aims to build up a Virtual Trans-national Pelagic Mesocosm Centre spanning from the Mediterranean to the Arctic. The coordination effort will address the urgent need to understand the functioning of the lower part of the pelagic food web and its response to natural and anthropogenic drivers, as well as its role in producing food for commercially important species at higher trophic levels. The project will develop new technologies for near-natural conditions experiments (including offshore), facilitate cross-disciplinary fertilization as well as provide access and coordination of the existing European large scale facilities.

EUROCEANS Consortium Scientific Objectives and CALL Descriptions - http://www.euroceans.eu/document/901/files/EOC_perspective_doc.pdf