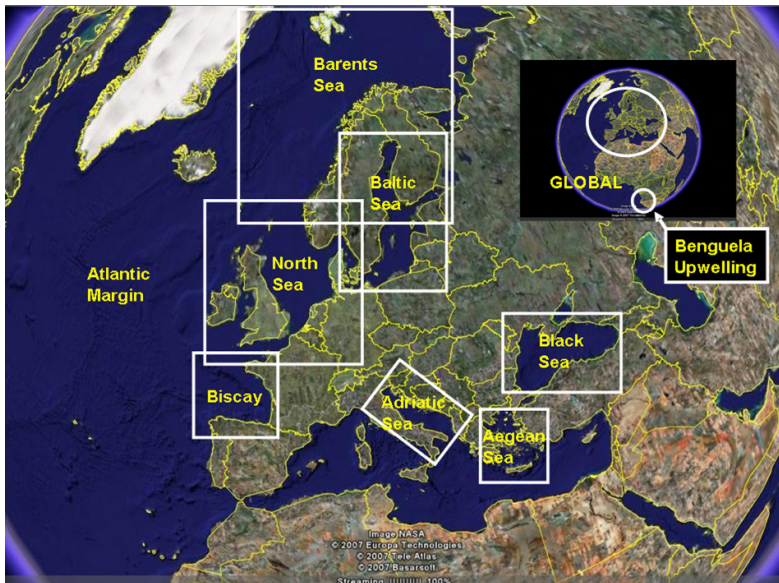


# MEECE: managing and measuring interactions in the marine environment

## About the Project

In September 2008 the MEECE (Marine Ecosystem Evolution in a Changing Environment) project was launched. MEECE is a European Commission Seventh Framework Programme (FP7) project including 22 partners from Universities, Marine Institutes and small private companies across Europe. MEECE will investigate the sensitivities and potential responses of marine ecosystems to both climatic change and the direct effects of human activity. By investigating the key drivers of change set by the European Union's marine strategy (changes in temperature, ocean circulation, stratification and acidification, consequences of pollution, overfishing, invasive species and eutrophication) the project aims to gain a better understanding of the direct and interactive effects of these factors on marine ecosystems. The focus of the research will be on the most important components of both the planktonic and benthic European marine ecosystems. Information and data gathered in the early stages of the project will then be used to develop innovative and predictive management tools and strategies to help policymakers and society adapt to the changing marine environment over the coming decades. The project is coordinated by Plymouth Marine Laboratory in the UK and will run from 2008-2012.

## MEECE's goals and objectives



The 9 regions of characteristic and dominant European ecosystems identified by MEECE, across which modelling tasks will be applied.

Marine ecosystems are changing and it is essential that we develop the knowledge necessary to learn how to live with, and adapt to these changes. MEECE scientists will use a combination of data synthesis, numerical simulation and targeted experimentation to further our knowledge of how marine ecosystems will respond to combinations of multiple climate change and anthropogenic drivers.

*"If we don't understand how the ecosystem will respond to the multiple drivers in the future we will find it very difficult to manage marine ecosystems. Multiple driver assessment may provide the secret to managing coastal marine ecosystems, and the goods and services they provide, in a holistic and effective manner."*  
**Icarus Allen,**  
MEECE Project Coordinator

## The specific goals of MEECE are:

- \* To improve the knowledge base on marine ecosystems and their response to climate and anthropogenic driving forces.
- \* To develop innovative predictive management tools and strategies to resolve the dynamic interactions of global change drivers, i.e. changes in ocean circulation, climate, ocean acidification, pollution, overfishing and alien invasive species, on the structure and functioning of marine ecosystems.

A strong knowledge transfer element will provide an effective means of communication between end-users and scientists. With a focus on the European Marine Strategy (EMS), MEECE will improve the decision support tools to provide a structured link between management needs and the knowledge base that can help to address them.

## Achieving the results

MEECE is the first project to attempt to use predictive models that consider the full range of drivers to elucidate the responses of the marine ecosystem in a holistic manner, rather than driver by driver as has been done in the past. This innovative approach will help scientists and decision makers to respond to the multiple driver impacts with appropriate, knowledge-based, management applications.

MEECE will explore multiple driver impacts on complex environments through numerical simulation models which include dynamic feedbacks. MEECE follows a logical process starting with targeted data synthesis, experimentations, model parameterisation and development, followed by model exploration through a range of scenarios addressing the full set of drivers. Outputs from these experiments and model simulations will then be used to devise decision support tools and develop management strategies. The implications of this scenario analysis for policy will be developed in consultation with and disseminated through the user community. Furthermore a library of decision making tools (end-to-end ecosystem models) will be delivered to provide support for the EC Marine Strategy, EC Maritime Policy and the EC Common Fisheries Policy in European Seas.

Finally, MEECE will provide methodologies to evaluate the performance of the new decision making and management tools developed by the project.



Scientists from Plymouth Marine Laboratory working on model development

### Next steps

- MEECE will maximize our understanding of the functioning of European seas and then use that understanding to develop innovative tools and strategies to rebuild, protect and better manage degraded marine ecosystems.
- MEECE adopts a multi disciplinary, multi driver approach to provide the next generation of end to end ecosystem models.
- MEECE will create a library of models and decision making tools in support of the EC Marine Strategy, EC Maritime Policy and the EC Common Fisheries Policy in European Seas, for wider use beyond the life of the project.

To achieve its ambitious goals and wide range of activities, the project has been split into three types of activity:

**Establishing tools:** to define model parameters for key processes, put forward hypotheses and develop scenarios for testing and model validation.

**Running the Scenarios:** for both climate and anthropogenic drivers and their impacts on marine ecosystems end to end.

**Implications and Knowledge Transfer:** through which resource management tools will be developed and knowledge from the project disseminated to relevant users.

## MEECE Project Partners

Plymouth Marine Laboratory, UK - Coordinator

Universitetet i Bergen, Norway

University Hamburg, Germany

Fundación AZTI - AZTI Fundazioa, Spain

Alma Mater Studiorum Università di Bologna, Italy

Wageningen IMARES B.V, The Netherlands

Centre for Ecosystem, Fisheries and Aquaculture Science, UK

Natural Environment Research Council, UK

Institut de Recherche pour le Développement, France

Technical University of Denmark, Danish Institute for

Fisheries Research, Denmark

Institute of Marine Research, Norway

Institute of Marine Sciences, Middle East Technical University, Turkey

Hellenic Centre for Marine Research, Greece

Centre National de la Recherche Scientifique, France

Sir Alister Hardy Foundation for Ocean Science, UK

Università del Piemonte Orientale "Amedeo Avogadro", Italy

Klaipeda University, Coastal Research and Planning

Institute, Lithuania

Bolding & Burchard ApS, Denmark

Instituto Español de Oceanografía, Spain

Commissariat à l'Énergie Atomique, France

Syddansk Universitet, Denmark

University of Cape Town, South Africa

For further details about the MEECE project and its activities please contact:

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