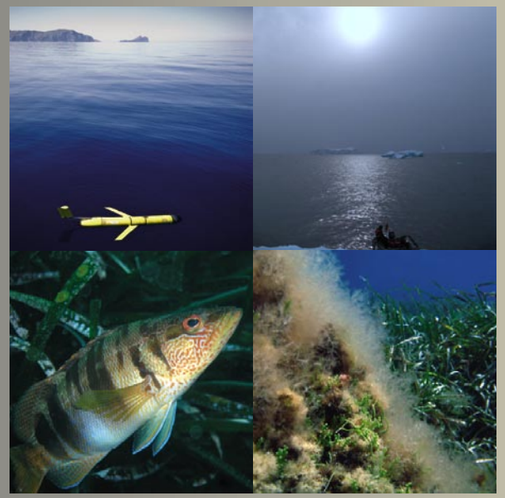


Plan de Actuación 2010 - 2013

IMEDEA

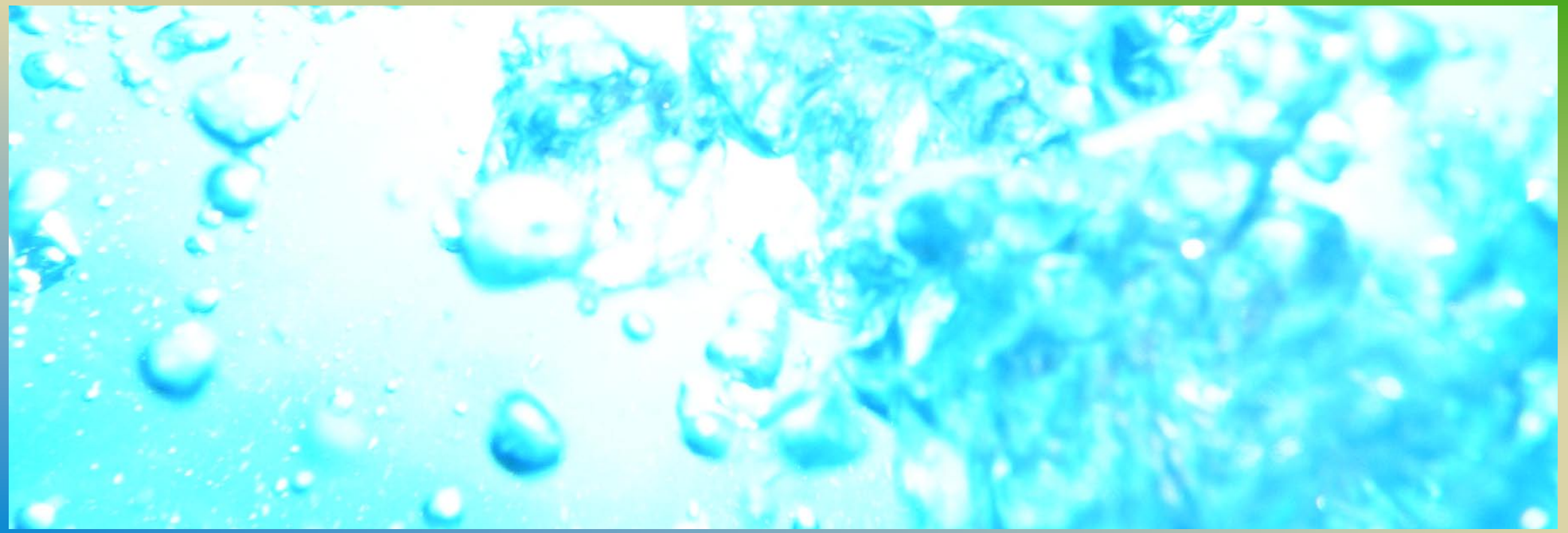
Instituto Mediterráneo de Estudios Avanzados

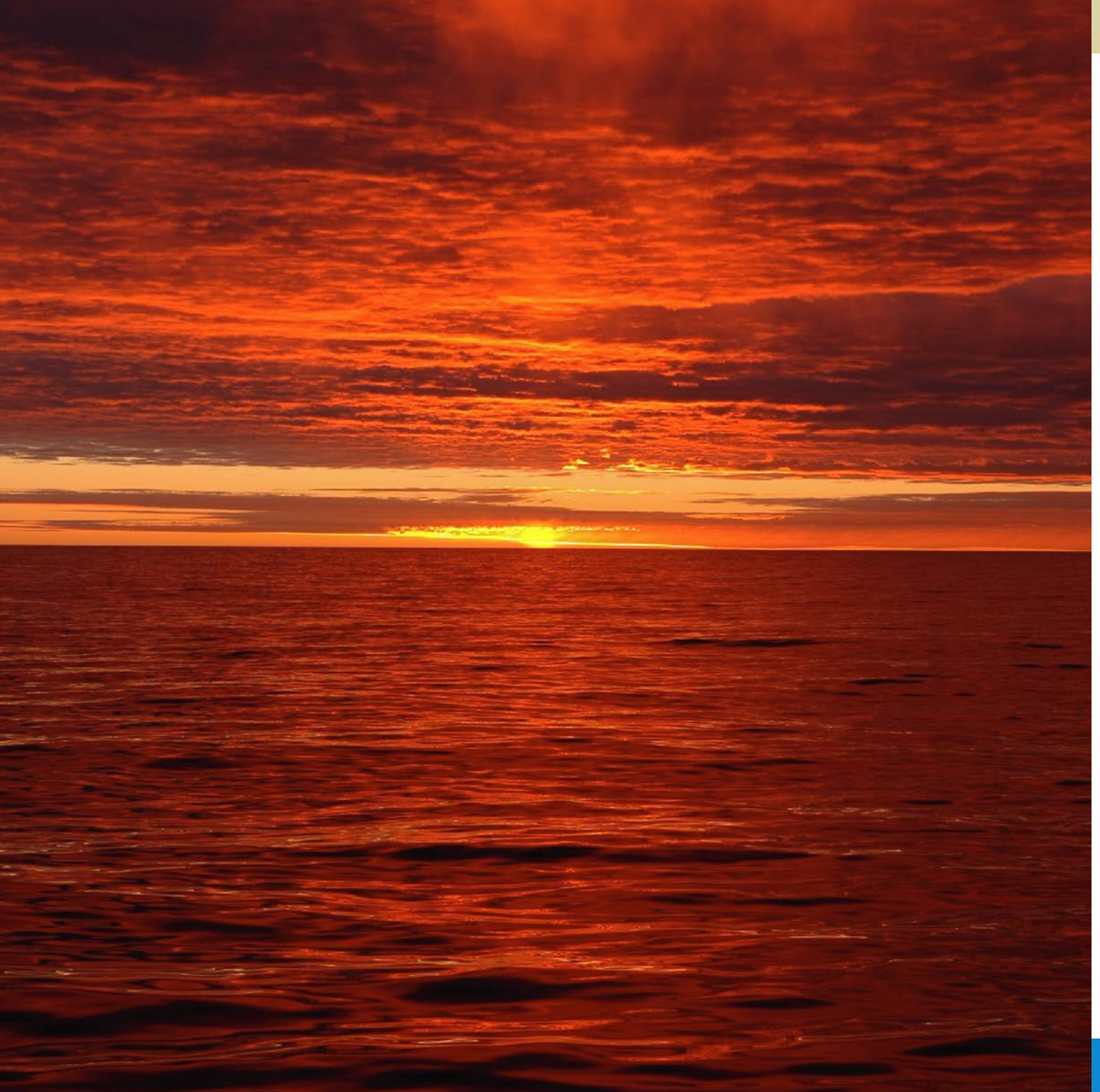
Plan de Actuación 2010 - 2013

IMEDEA

CSIC
Consejo Superior de Investigaciones Científicas

UIB
Universitat de les Illes Balears





Instituto Mediterráneo de Estudios Avanzados

Plan de Actuación 2010 - 2013

CSIC
Consejo Superior de Investigaciones Científicas

UIB
Universitat de les Illes Balears

IMEDEA

IMEDEA

Instituto Mediterráneo de Estudios Avanzados

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Salvador Balle Monjo
Josep Antoni Alcover Tomàs

Manager

Pilar Martin Bardon

Participating Institutions

Consejo Superior de Investigaciones Científicas
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Universitat de les Illes Balears
http://www.uib.es/

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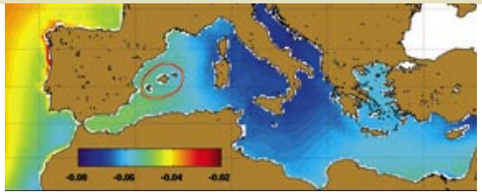
IMEDEA

Instituto Mediterráneo de Estudios Avanzados

IMEDEA,
the Mediterranean Institute for Advanced Studies
is a joint research centre between the
Spanish Council for Scientific Research (CSIC)[1]
and the University of the Balearic Islands (UIB)[2]
created in 1985.

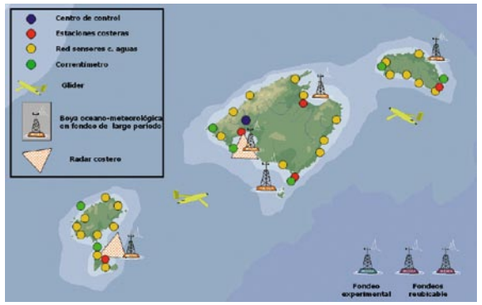
IMEDEA has two locations:
CSIC headquarters in Esporles (4 825 m^2)
and facilities at UIB Campus (10 km away from
Esporles).

[1] http://www.csic.es/
[2] http://www.uib.es/



Additionally two field stations are available at Cape Salines Light House and Calanova Nautical Club (http://www.imedea.uib.es/).

IMEDEA's staff is composed of 30 permanent researchers and up to 130 people including technical and administration staff, contracted scientists, postdocs and predoctoral students. Our productivity and resources generated, place us between the top Research Institutes in the CSIC Natural Resources Area to which IMEDEA is ascribed.



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Hay que incluir una figura que muestre las Baleares en el Mediterráneo y una ampliación con la localización de los locales. Estas imágenes son provisionales, como casi todas. No tienen por tanto ni la resolución adecuada ni son CMYK

IMEDEA aims to be a world-leading institute generating and communicating the highest quality research and translating this into sustainable technological, political and socio-economic responses to address the outstanding problem of the sustainable development of littoral regions. Moreover, global change is a further threat that marine, coastal and insular environments have to face.

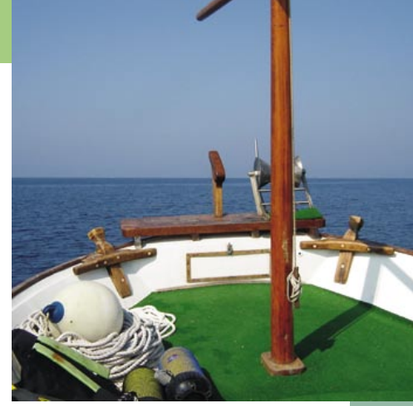
IMEDEA emphasizes the interdisciplinary approaches to marine, coastal and insular science. The general objective is to contribute to the advancement of knowledge in critical strategic areas and to contribute to improving the quality of life of European citizens and, in particular, those of the Balearic Islands.

Scientific objectives

Our objective is to understand the processes of global change, biodiversity, and evolution, improving our knowledge on aspects of island biodiversity relevant for conservation, and the direct and indirect impacts derived from human activities to contribute to the development of ecosystem-based management approaches.

Our strategy is to be a reference center to the scientific community and environmental managers; to this means we promote scientific excellence, develop strategic research and have an active presence trying to contribute to the solution of relevant societal issues formulating integrated and adaptive knowledge in support of the prevention and mitigation of global change impacts.

This will be achieved through interdisciplinary and proactive research addressing the multiple-scale interactions between the target environments.



Knowledge Transfer objectives

The activity of our researchers has led to founding Albatros Marine Technolgies , a spin-off company devoted to the development of instrumentation for marine research. We have developed some commercial products and registered several patents. Also, our researchers are actively involved in the International Laboratory on Global Change and in the Singular Facility OceanBIT.

We aim to sustain our role of know-how transference to managers and other social actors.

The management of the IMEDEA

The *Claustro Científico*, is the Institute's forum to debate scientific matters. It is chaired by the Director and it is composed of the staff scientists of CSIC and staff professors of the University of the Balearic Islands.

The *Junta de Instituto* advises and reports to the Director on all matters that affect the functioning of the Institute. The *Junta* is formed by the Director, the two Vice-Directors, the Manager (Gerent), the Heads of Department, and four representatives of the staff. It holds sessions every month, approximately. It was constituted on September 2008.

The direction, coordination and supervision of the activities of the Departments and the Management of the Institute is the responsibility of the Director and the two Vice-Directors, who were nominated on July 17th, 2008.

The Manager of the Institute is in charge of the Administration and General Services.

A Supervising Commission (*Comisión Rectora*) has been constituted on 2008 composed of high level representatives of UIB (2) and CSIC (2). This Commission meets at least once a year.

Training objectives

IMEDEA has a good rate of student formation at all levels and we aim to keep this record in proportion to the available staff. Introduction to research fellowships are sponsored by IMEDEA in collaboration to the *Fundación Universidad Empresa* (UIB) and the *Fundación Erdély Instituto Europeo de I+D+i en Ciencias Ambientales*.

We have generated a Master Programme at UIB and IMEDEA researchers are leading and participating on the Master and Ph Degree on Global Change from the *Universidad Internacional Menéndez Pelayo* (UIMP) and the *Consejo Superior de Investigaciones Científicas* (CSIC).

Regarding technician formation, we participate in the training programs developed by the CSIC and the Government of the Balearic Islands.

IMEDEA selective advantages are:

- **Interdisciplinary research based on disciplinary excellence.**
- **Insular ecology is an original and unique research aspect.**
- **Portfolio of research lines reflecting current and future trends on relevant areas of research.**
- **Strong international cooperation and synergy with many Institutes inside and outside Spain.**
- **Optimum geographic location for the deployment of marine and insular research, attractive to high-level foreign scientists.**

IMEDEA Structure

IMEDEA is organized into management, with a Director and two Deputy Directors supported by a Manager, four Departments and a Services Unit. The Services Unit comprises administration, maintenance, research support, information and communication technologies together with the two singular facilities. The overall coordination and supervision of the Institute is carried out by a Joint Govern Commission composed by the two parent organizations (UIB and CSIC).

Each Department develops a specific research line, although the transversality of our research implies many collaborations and joint projects.

Hay que incluir el organigrama

Department of Biodiversity and Conservation

The Department of Biodiversity and Conservation includes a team of scientists whose main common interest are in Ecology, Evolution and Systematics in Insular Environments.

Islands have been considered as the best natural laboratories for the study of plant and animal evolution. They are highly simplified, unique worlds, which harbour a rich biota including a high percentage of endemic species. Their evolutionary uniqueness and isolation makes island dwellers prone to extinction in a scenario of climatic change and biodiversity crisis. Insular taxa form simplified communities, where ecological relationships and evolutionary processes can be studied more easily than on the continent.

The Balearic Islands, as all islands in general, are particularly vulnerable to global change and human perturbations. Because of their reduced territory, their rich biodiversity (including ca. 555 animal and 130 plant endemic taxa) is threatened by loss of habitats and introduction of alien species. A research line focused on biodiversity and conservation issues is currently highly demanded by the Balearic society, one of the most aware in Spain at this respect.

The team joint at IMEDEA at this Department covers a broad expertise in taxonomic, biogeographic, evolutionary and ecological issues of insular biotas. The methodological approach is multidisciplinary, combining morphological, distributional, population-al and various kinds of molecular data to improve our understanding and promote the conservation of insular unique biotas.

The common research line of the Department of Biodiversity and Conservation aims at improving our knowledge on aspects of island biodiversity relevant for conservation, namely: 1) description and inventory of new or ecologically relevant taxa; 2) establishment of phylogeographic patterns by means of morphological, cytogenetic and/or molecular approaches; 3) study of the demography, population dynamics and conservation biology of endemic or endangered species; 4) study of the ecology and evolution of the interactions between plants and animals (specifically pollination and seed dispersal herbivory); 5) study of the eco-physiology of selected endemic plants; and 6) elucidation of the pristine state of pre human-arrival insular biotas.

A general goal of the Department of Biodiversity and Conservation is to study and interpret many sorts of biological phenomena at a variety of levels (from molecular, physiological and ecological systems). The aim of the research at the Department concerns at understanding the interactions between organisms and their environment including knowledge of population processes, their dynamics and interactions, together with community structure, development, and biodiversity and show an appreciation of the dynamic properties of ecosystems, also at an evolutionary scale. An additional aim is to link ecological science and conservation practice and show how conservation biology draws upon information from multiple disciplines, both scientific and social.

As a main scientific goal the research of the Department of Biodiversity and Conservation point out to improve our understanding of ecological systems, from genes to populations and communities, particularly by developing and using new mathematical tools; we plan to use our biological models (plants and animals), to increase our knowledge of complexity in ecology facing mathematical, statistical, and computational challenges in the frontier of our research topics. Increase reliability in predictions of outcomes in ecological systems is also a challenge, to be applied especially in conservation biology and the environmental crisis related to human activities and growth.

INCLUIR ASPECTOS RELEVANTES
SINGULARES: EQUIPOS, ETC.
GRAFICOS DE PERSONAL,
PUBLICACIONES Y PROYECTOS

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Convendría que la eligierais vosotros.

Department of Global Change Research

Global Change defines the impact of human activity on the functioning of the biosphere. Driven by a common force, the growth of human population coupled with an increased use of resources (energy, water, land, biodiversity, chemicals and key elements), Global Change is the result of activities exerted locally but with global impacts arising from transport processes in the hydrosphere, atmosphere and oceans. Global Change acts through a number of motors, including Climate Change, Desertification, Land Erosion, Water Shortage, Eutrophication, Hypoxia, Ocean Acidification, Pollution and Biodiversity loss. Global Change is the major challenge our society shall face in the 21st Century.

The contribution of science is central to address this challenge. Scientific research will contribute to better understand, forecast and ultimately manage the risks posed by Global Change, through adaptation and mitigation measures. Global Change Research requires an important transdisciplinar components as well as critical mass, traits that are not to be found, focalized in this problem, in any R&D actor in Spain at present.

The Balearic Islands are particularly vulnerable to Global Change due to ❶ the insularity fact; ❷ the strong dependence of their economy and social fabric on tourism, a sector particularly vulnerable to Global Change; ❸ the particular vulnerability of the Mediterranean area, particularly of its archipelagos, to climate change, with faster warming rates and drought intensity than any other area in the world, except the Arctic. Thus, this research line is particularly relevant as a contribution to addressing critical problems to the Balearic society, contributing as well to the global dimensions of the problem investigated.

The research line of the Department of Global Change Research aims at understanding the processes of Global Change, as defined above, and to inform the societal responses to address this problem. We emphasize the interactions between the two coupled geophysical fluids of planet Earth: the Atmosphere and the Oceans, and the Biosphere, addressing impacts on climate and atmospheric chemistry and the chemistry and biology of the oceans.

The general qualitative strategy for the research line of the Department of Global Change Research is to progress towards the completion of the research goal and, thus, emerge as the leading research group on research o Global Change in the Mediterranean, and within the top contributors to knowledge in this field in the international domain. This progress will require efforts in multiple domains including, critical mass and transdisciplinarity components, quantity and quality of research products, technical capacities and equipment.

Concrete scientific objectives of the Department of Global Change Research are: Develop future scenarios of climate-related risks. Evaluate the role of groundwater on coastal biogeochemistry. Improve our understanding of the role o aquatic ecosystems in the global carbon budget. Evaluate the role of marine biota on iron cycling in Antarctica. Develop new techniques to diagnose and forecast extreme events in the Mediterranean. Resolve the role of atmospheric inputs of organic matter, nutrients and metals on marine biogeochemical cycles. Assess the impacts of UV on marine organisms. Assess the effects of hypoxia on marine organisms. Develop tools to test for the existence of abrupt changes in ecosystems. Elucidate the impacts of climate change on polar ecosystems. Examine the impacts of climate warming on marine ecosystems. Develop new models to examine gene flow in ecosystems. Examine the role of global change components in inducing mortality in the marine environment. Expand the range on in-house analytical techniques.

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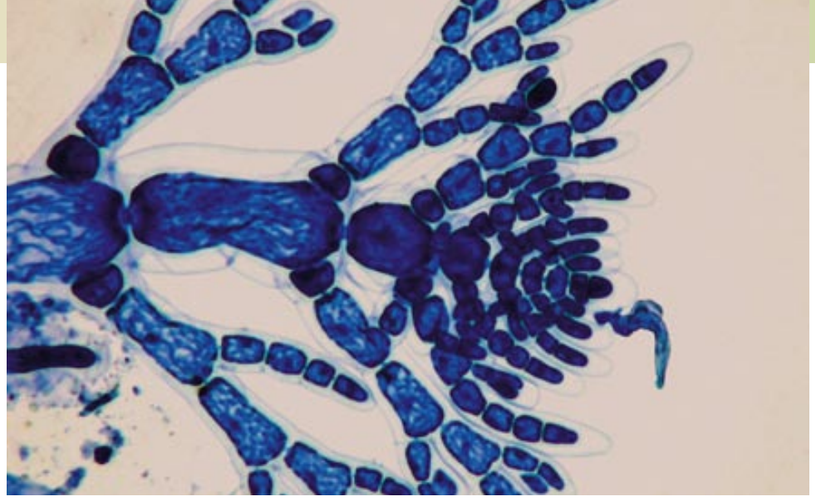
Department of Ecology and Marine Resources

The Department of Ecology and Marine Resources includes scientists sharing a common interest in the study of the structure, dynamics and functioning of marine Systems. The research line of the Department of Ecology and Marine Resources seeks to understand the functioning of the marine systems, their interactions, and the direct and indirect impacts derived from human activities with the aim of contributing to the development of ecosystem-based management approaches of marine resources. For this purpose, the marine environment is understood as a system in which physical, chemical and biological components are all important in defining total system properties. This research line requires interdisciplinary and integrated research approaches which, on one hand, are more difficult to achieve than narrower or partial approaches, but on the other hand constitute one of the major strengths of the proposed research. The envisioned products of the research line will help to elucidate the consequences of natural and anthropogenic pressures on the structure and functioning of coastal marine ecosystems and inspire the response of the Balearic society to them. Future research demands



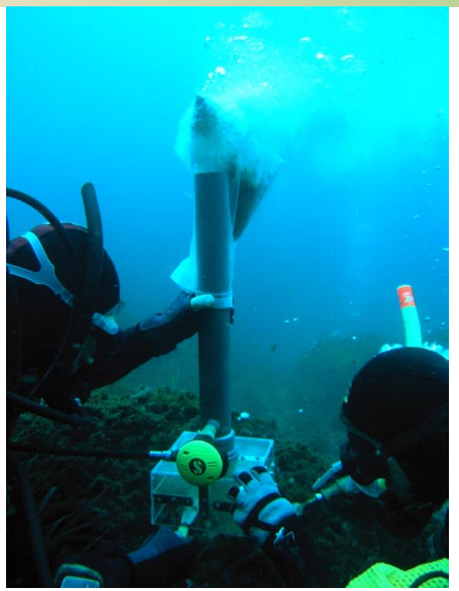
in the regional context of the research line will concentrate precisely on the sustainable use of coastal marine ecosystems for the life and economy of the inhabitants of the Balearic Islands depends to a large extent on the health of the marine ecosystems that surrounds the Archipelago.

The ultimate goal of the research line of the Department of Ecology and Marine Resources is to contribute to the sustainable use of marine systems through the provision of high quality scientific knowledge about the structure and functioning of marine systems and their response to natural and anthropogenic disturbances. The approach is multi-disciplinary and strives to combine knowledge and techniques of Physical Oceanography, Molecular Biology, Microbiology and Ecology to elucidate the changes of structure and functioning of coastal Mediterranean ecosystems driven by natural and anthropogenic disturbances. We aim to understand the coupling among the physical, chemical, and biological processes that participate in ❶ ecosystem disturbances such as harmful algal blooms, proliferation of macroalgae in benthic systems, or changes in the structure and functioning of marine microbiota and ❷ the connectivity among coastal systems and its relevance to fish population dynamics, and the management of fisheries and marine protected areas.

The ultimate goal of the research of the Department of Ecology and Marine Resources is to contribute to the sustainable use of marine systems through the provision of high quality scientific knowledge about the structure and functioning of marine systems and their response to natural and anthropogenic disturbances. The approach strives to integrate the study of physical, chemical, and biological components and processes of marine ecosystems. The envisioned products of the research line will help to elucidate the consequences of natural and anthropogenic pressures on the structure and functioning of coastal marine ecosystems and inspire the response of the Balearic society to them. Future research demands in the regional context of the research line will concentrate precisely on the sustainable use of coastal marine ecosystems for the life and economy of the inhabitants of the Balearic Islands depends to a large extent on the health of the marine ecosystems that surrounds the Archipelago

The main scientific objective is to elucidate the responses of coastal Mediterranean ecosystems to natural and anthropogenic variability. We aim to understand the coupling among the physical, chemical, and biological processes that participate in ❶ ecosystem disturbances such as harmful algal blooms, proliferation of macroalgae in benthic systems or changes in the structure and functioning of marine microbiota, and ❷ the connectivity among coastal systems and its relevance to fish population dynamics, and the management of fisheries and marine protected areas.

The Department has a Schlerochronological Laboratory equipped with state-of-the art instruments and techniques, which will be developed as a Service with the support of UIB and *Universidade A Coruña*.



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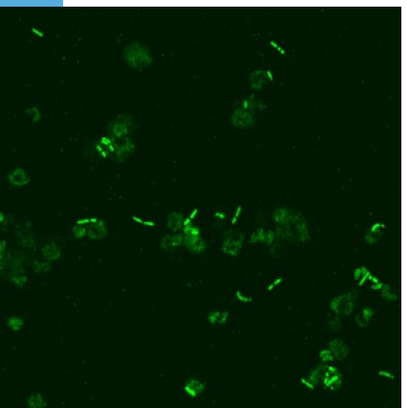


Department of Marine Technologies, Operational Oceanography and Sustainability

The research line carried out at the Department of Marine Technologies, Operational Oceanography and Sustainability (TMOOS, in Spanish) is focused on a common core: the study of the physical mechanisms that can explain the dynamics of the coastal ocean system and its interactions with the near-shore and the open ocean, in a global change context. In other words, using a physical and mathematical background, we study the underlying processes and the multidisciplinary effects of a well-defined complex, multidisciplinary and vulnerable system, the coastal ocean. The variability of scales involved, from meters to thousands of kilometers and from seconds to years, and their nonlinear interactions, makes the understanding of theses mechanisms a real internationally established challenge. We address this challenge combining theoretical, observational (in situ and remote) and numerical modeling approaches, in particular (but not only) in the Mediterranean Sea, an ideal laboratory small scale ocean to understand physical processes, to test new ideas and to support different maritime operations. On the shelf and open ocean area, we focus on the understanding of the

mesoscale, submesoscale and mean field contributions to natural and anthropogenic oceanic variability (both in the past and from IPCC based scenarios), also addressing biophysical coupling and multidisciplinary biogeochemical effects. In the nearshore,

We focus on the study between coastal dynamics and coastal morpho-dynamics, specifically considering the interactions between currents and waves, bottom topography and sediment transport. We also develop and implement new marine technologies specifically needed to better respond to our scientific objectives introducing new instruments (i.e., for sampling) or new techniques (i.e, modeling, visualization or data mining, data fusion and data management). We are convinced that knowledge, technology and transfer of know-how are increasing the capability to nowcast and forecast environmental conditions and open the possibility to build more reliable operational systems. Accordingly, managers and policy makers can now plan actions on the basis of scientific products and decision making tools. This research activity is carried out in the frame of peer-reviewed research projects with strong links with international leading scientists and engineers and with progressively new links with international scientific and technological initiatives such as Coastal Ocean Observing and Forecasting Systems.

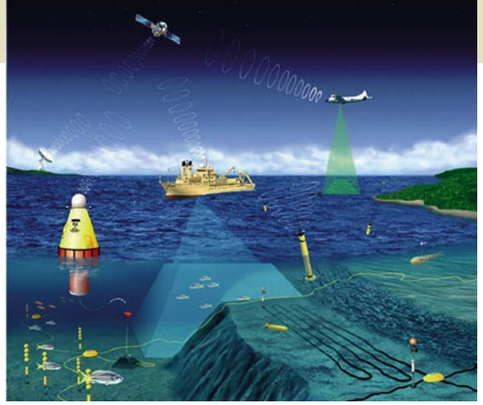
The common goal of the Department of Marine Technologies, Operational Oceanography and Sustainability is twofold: to contribute to the advancement of knowledge publishing in a variety of international leading journals and also to address and respond to specific problems and major questions raised by society in the coastal ocean in a frame given by the new sustainability science initiative from AAAS.

The general objective is to contribute to the advancement of science in key areas and disciplines of the coastal ocean system, identifying major knowledge gaps that need to be addressed. More specifically, the objective is to characterize and understand the coastal ocean, its interactions with the deep ocean and coastal zone and its response to anthropogenic influences. One of the specific outcomes of the research should be an operational oceanographic system (observations and models) that would embed the knowledge and technology delivered by this research. This operational system should be seen as a product or a service but also as a very useful tool to address further research objectives, establishing thus a fruitful feedback. We foresee to reach this objective making ❶ solid step by step continuous contributions (that will help to provide solid foundations to the knowledge structure) and ❷ making episodic significant outstanding contributions that can be considered major international breakthroughs. The strategy followed in the last years has been to apply the physical knowledge of the system together with observations and numerical modeling in order to get a general overview of the coastal ocean system from the outer side of the slope to the nearshore. In summary, from an initial core of physical oceanography and coastal dynamics, our goal is to incorporate technology developments to address coastal morpho-dynamical studies, process studies for operational coastal oceanography, together with bio-physical processes coupling, using numerical models and observations specifically implementing new sampling technologies such as gliders. We also want to transfer the knowledge obtained to coastal managers and decision makers following real, science based, sustainability principles.

The general objective of the research line of the Department of Marine Technologies, Operational Oceanography and Sustainability is the study of the physical mechanisms involved in coastal dynamics and its interactions with the near-shore and the open ocean, in a global change context. The variability of

scales involved, from meters to thousands of kilometers and from seconds to years as well as their nonlinear interactions, makes the understanding of theses mechanisms a real challenge.

High quality coastal ocean studies and development of needed technologies are the specific scientific qualitative goals of the Department of Marine Technologies, Operational Oceanography and Sustainability. These activities are specifically focused towards ❶ a better understanding of global change in the coastal zone therefore specifically including the modifications in climate, oceans, coasts and ecosystems, ❷ the development of operational oceanography and related strategic services to society and ❸ the development of new technological tools for coastal ocean studies.



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GRAFICOS DE PERSONAL, PUBLICACIONES Y PROYECTOS

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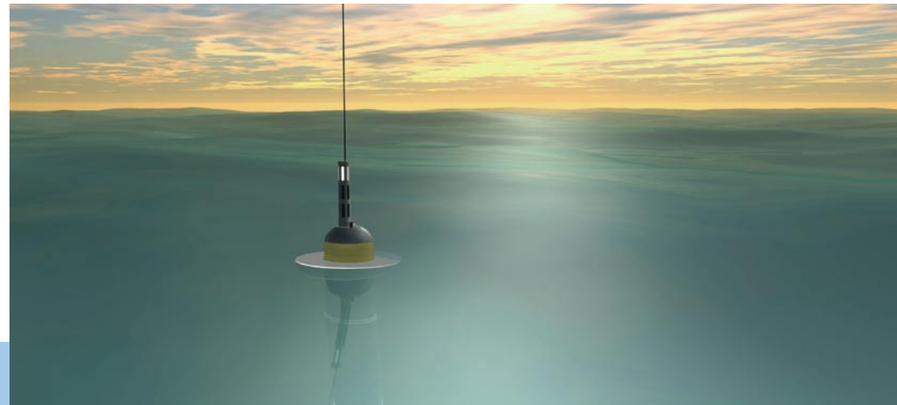
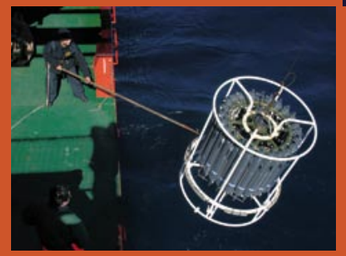




Services at the IMEDEA

Since its inception in 1995, all the technical and administrative staff of the Institute was grouped in the General Services Unit (GSU) which simultaneously covered the tasks of Management and Administration, Maintenance, Informatics and Support to Research.

The June 2008 Agreement between the CSIC and the UIB redefined the structure of IMEDEA and established that the General Services Unit had to be adapted to the new framework. The development of the *Plan Estratégico del Instituto* 2010-2013 represented the opportunity to organize the GSU into separate Services, which will:

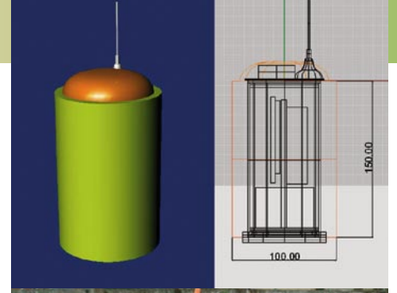
1. Allow for a better management and follow-up of each of the performances and tasks provided by the GSU via the definition of a consistent Service Unit that bypasses the heterogeneity of the GSU.

2. Improve the visibility and appreciation of the performances and tasks provided by the Services.

3. Permit a better use of the resources allocated, via:
   a. Centralized purchase of equipment, fungible, etc.
   b. Avoiding unnecessary multiplicities of equipment among researchers and research lines who share common needs.

4. Stimulate scientific cooperation and exchange among researchers and research lines at the Institute.

5. Improve the quality of the research performed by incorporating the existing but disperse know-how in a single entity, establishing unified protocols.



The structure of Services provided at present by the IMEDEA consists of:

1. Management and Administration
2. Infrastructures and Maintenance
3. Information and Communication Technologies
4. Research support
5. Singular facilities

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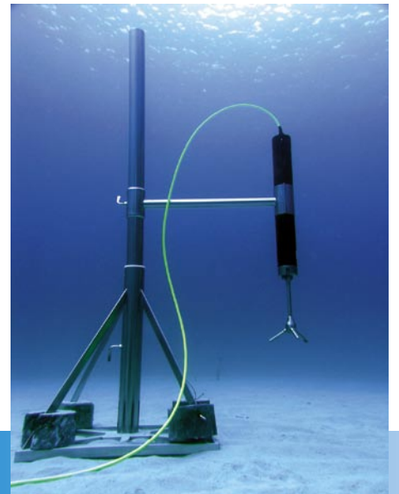
The Research Support Service gives direct support to the different research lines at IMEDEA, providing a common infrastructure for the development of their research projects, which in many cases share common needs. Specifically, the Service comprises five separate units or laboratories:

1. Laboratory of Molecular Biology, which provides a general infrastructure and unified protocols for the common tasks of molecular biology required to characterize biological samples and environments.

2. Laboratory of Analytical Chemistry, which provides a general infrastructure and unified protocols for the common tasks of analytical chemistry required to characterize aquatic ecosystems.



Compprobar selección fotos

3. Workshops and Oceanographic Instrumentation, which coordinates and gives logistic support to the research tasks involving the use and/or development of marine instrumentation and instrument platforms.

4. Field Ecology, which provides technical and logistic support in the marine and terrestrial fieldwork campaigns conducted by several research lines of the IMEDEA, as well as on data processing and analysis.

5. Laboratory of Flux Citometry, which provides a general infrastructure and unified protocols for the methods implemented in the FacsAria II Citometer.

On the other hand, the Singular Facilities Service is devoted to the maintenance and booking system for the experimental stations at Cap Salines Lighthouse and Cala Nova Marina, which are run by IMEDEA. Moreover, the two coastal boats owned by IMEDEA are run and maintained by the GSU.

The accessory buildings of the lighthouse on Cap Salines are loaned to IMEDEA by virtue of the agreement between the *Autoridad Portuaria de Baleares* (APB) and the *Consejo Superior de Investigaciones Científicas* (CSIC). They constitute Coastal Research Station for the observation of Global Change impacts on the Mediterranean ecosystem. The facilities were refurbished in October 2005 thanks to the support of the *Fundación Banco Bilbao-Vizcaya-Argentaria* (FBBVA).

Cala Nova Marina loans to IMEDEA, thanks to an agreement between the *Conselleria de Presidència i Esports del Govern de les Illes Balears* and the *Consejo Superior de Investigaciones Científicas* (CSIC), a number of facilities that constitute a field station to develop marine research associated to nautical sports and coastal sustainability. This field station comprises two berths as well as two on-land boat places, services for boat hauling and storage and laboratory facilities.

Imagino que habrá algunos aparatos más

En vista de lo que se añada se remaquetará el texto y se elegirán las imágenes ilustrativas.

Este pliego es necesario ponerlo porque las páginas han de ser múltiplos de 4

ñadirlo a un departamento los desigualaría.

Sólo cabría ponerlo en la primera parte general del Imedea, esponjando todo un poco

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