Predicting what is likely to happen in the marine environment is an essential part of the management of marine resources which are being subjected to anthropogenic stress. If an operational coastal ocean environmental monitoring and forecast system is to be developed, the marine science community must be able to determine the potential timescales of predictability of the marine ecosystem.

Such a system should be able to:

- provide estimates of the changes in both the physical and biogeochemical marine environments
- provide greater understanding of how marine ecosystems function, an essential element in guiding resource management
- provide an early warning system of potentially harmful ecological events
- aid the formulation of cost effective preventive and remedial measures.

To address these issues the project takes existing ecosystem models and explores, models and quantifies the potential predictability of certain ecosystems. The IMBC contribution to the project takes the ERSEM model and applies it to the Cretan sea.
Coordinator:
ISAO-CNR : Istituto di Scienze dell'Atmosfera e dell'Oceano - Consiglio Nazionale delle Ricerche

Partners:
CRAM-ENEA : Centro Ricerche Ambiente Marino - Ente per le Nuove Tecnologie, l'Energia e l'Ambiente
NCMRG-IO-DMG : National Centre for Marine Research, Institute of Oceanography, Department of Marine Geology and Geophysics
CLS-SOC : Collecte Localisation Satellites SA, Direction Oceanographie Spatiale
UPST-LEGOS : Universite Paul Sabatier de Toulouse III - Laboratoire d'Oceanographie et de Geophysique par Observations Spatiales
UAT-DAP-LM : National and Kapodistrian University of Athens - Department of Applied Physics - Laboratory of Meteorology
NERC-PML : Natural Environment Research Council - Plymouth Marine Laboratory
IFREMER-CB-I : Institut Francais de Recherche pour l'Exploitation de la Mer - Centre de Brest - Systemes d'Informations Scientifiques pour la Mer
IOLR-DPO : Israel Oceanographic and Limnological Research Ltd - Department of Physical Oceanography

Associate Partners
ISDGM-CNR : Istituto per lo Studio della Dinamica delle Grandi Masse - Consiglio Nazionale delle Ricerche
DOGA-OGS : Dipartimento di Oceanologia e Geofisica Ambientale - Osservatorio Geofisico Sperimentale
ISTT-CNR : Istituto Sperimentale Talassografico di Trieste - Consiglio Nazionale delle Ricerche
CICCE : Consorzio Interuniversitario per la gestione del Centro di Calcolo Elettronico dell'Italia nord orientale
IMC : Centro Marino Internazionale, Italy
CETIIS : Cabinet d'Etudes Techniques Industrielles et d'Innovations Scientifiques SA
CNRS-DIMAR-O : Centre National de la Recherche Scientifique - Centre d'Oceanologie de Marseilles - UMAR 6535
SAHFOS : Sir Alister Hardy Foundation for Ocean Science, UK.
IMBC : Institute of Marine Biology of Crete, Greece
MARTEDEC : Marine Technology Development Company S. A., Greece
DMN-SCEM : Meteo-France - Service Central d'Exploitation de la Meteorologie, France
ACRI : Mecanique Appliquee et Sciences de l'Environnement, France
CNRS-LPCMA : Centre National de la Recherche Scientifique - URA 2076, France
UPMC-LODYC : Universite Pierre et Marie Curie - Paris VI - Laboratoire d'Oceanographie Dynamique et de Climatologie, France
NRSC : Nansen Environmental and Remote Sensing Center
CSIC-CEA : Consejo Superior de Investigaciones Cientificas - Centro de Estudios Avanzados de Blanes, Spain
UPC-LEM : Universitat Politecnica de Catalunya - Laboratorio d'Ingenieria Maritimar, Spain
Methodologies

The specific aims of Work Package 7 is to determine the requirements for setting up a pre-operational forecast system for the Mediterranean ecosystem. The specific objectives are:

- to implement, validate and calibrate 1-D ecosystem models in data-rich regions of the Mediterranean basin
- to develop a data assimilation system for an ecosystem model which is suitable for use in an operational context
- to assess the forecast capability and predictability window of a state-of-the-art ecosystem model
- to establish the dynamic responses of models to variability in physical forcing and to indicate the appropriate temporal and spatial resolution of forcing functions
- to make recommendations for the cost-effective monitoring of those pelagic biogeochemical variables that most clearly indicate the state of the ecosystem, thus providing guidelines for the observational aspects of the second phase of the MFS.

With these aims in mind, the Marine Dynamics and Numerical Simulations team has applied the ERSEM model in the Cretan sea to study the biogeochemical cycles of carbon, the exchange of organic matter (suspended or dissolved), between pelagic and benthic systems, as well as the control mechanisms in primary production (respiration, grazing excretion, mortality, carbon, oxygen, phosphorus, and nitrogen).