

THE CEAB'S MARINE OBSERVATORY IN THE CATALAN SEA: CONSOLIDATING LONG TIME SERIES OBSERVATIONS?

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Abstract – The Operational Observatory of the Catalan Sea (OOCs), created in 2009 at CEAB-CSIC may be considered as a reference marine observatory because of its effectiveness and relatively low-cost functioning and maintenance. The number of time series obtained at the observation station of the meteorological conditions above the sea surface, along with physical and biogeochemical properties of the water layer over the continental shelf, supports its success. The strong fluctuations of atmospheric conditions registered in the last years altering the marine conditions make the simultaneous records of meteorological and marine observations essential for understanding present environmental fluctuations and for improving marine environmental predictions. Updated information regarding the observatory can be found at <http://www.ceab.csic.es/~oceans/>.

Keywords – Marine observatory, operational oceanography, numerical modelling, ocean forecast, NW Mediterranean Sea.

1. INTRODUCTION

The Operational Observatory of the Catalan Sea started its activities in 2009 sponsored by a research project entitled "Observations, Analysis and Modelling of the Mediterranean Sea" (OAMMS), coordinated by A. Cruzado at Centre d'Estudis Avançats (CEAB-CSIC) and granted by the Spanish Ministry of Science and Innovation. The observing system consists of several components from observations to ecological modelling of the conditions in the Catalan Sea [1, 2]. An oceanographic buoy is moored at a permanent observation station in the Blanes canyon head. The buoy holds a number of meteorological and oceanographic sensors with data transmitted to a land station through data phone calls and published on near-real time in a dedicated web site (<http://www.ceab.csic.es/~oceans/>).

2. ACHIEVEMENTS

During roughly two years of activity of the observatory, several goals has been achieved and several activities remain in progress.

2.1 Observations

- Since Sep 2009, the underwater instrumentation provides 30-minutes interval data at surface, 25 and 50 m depth of chlorophylls, dissolved oxygen (DO), photosynthetic available radiation (PAR), turbidity, water temperature and salinity, and current velocity and direction. Atmospheric data at 2 m above the sea surface are PAR, air temperature, atmospheric pressure, wind velocity and direction, geographical coordinates.

- Since March 2009, regular cruises provide CTD and bottle data for chlorophylls, DO, inorganic nutrients, PAR, turbidity, and water temperature and salinity of the upper 200 m depth. Samples for picoplankton are taken since Feb 2010.

- SST and chlorophylls satellite images (AQUA-MODIS), as well as sea surface salinity (SSS) and wind stress in the study area have been processed in order to investigate for signals of atypical winter conditions [3, 4].

- Historical oceanographic cruises performed in Western Mediterranean are available to public through the NOAA website <http://www.nodc.noaa.gov/cgi-bin/search/prod/accessionsView.pl/details/44830>

- A standard Operation Procedure was implemented for all the activities related to the observatory.

2.2 Ecological Modelling

- A 3D model coupling the hydrodynamic and biogeochemical conditions of the Western Mediterranean Sea was implemented [4] with 1/20 degree horizontal resolution and 52 sigma-layers.

- A high space resolution 3D model simulating the conditions of the Blanes canyon head is under development [5]. The model is based on OPA (General MFS model with 1/16° resolution), nested into a regional POM with a 1/20° resolution and a coastal POM with 1/60° resolution.

- A one-dimensional vertically-resolved model simulating the hydrographic conditions of the observation station was implemented based on an earlier model [6].

2.3 Collaborative Actions

- The European Space Agency approved a proposal to perform validation/calibration activities of salinity data from the satellite SMOS.

- The OOCs is currently a part of the consortium MOON: Mediterranean Operational Oceanography Network.

- Comparison of microbiological characteristics in the observation station against coastal waters is being carried out in collaboration with members of the Institute of Marine Science (ICM-CSIC) members.

- Assessment of effective light transferring to primary and secondary producers is carried out in collaboration with ICM members.

- Review of cabled marine observatories activities has been performed together with ICM members.

2.4 Academic Activities

- The Fresenius University of Applied Sciences and Ludwig Maximilians University in Munich (Germany), through the Erasmus Program has provided Chemical Engineering students and biologists since 2009.

- The research and academic activities are published on the dedicated website (www.ceab.csic.es/~oceans). Open discussions are performed throughout the blog <http://groups.google.com/group/mars-i-oceans>

3. DRAWING THE PRESENT, SHAPING THE FUTURE

The relative simplicity of structure and components of the CEAB's marine observatory, working effectively with relatively low-cost operation and maintenance, make the observatory promising. Implementing an operational forecasting system for local sea conditions is pending. Faster application of quality control filters to data is in progress. The observatory's infrastructure is pending to be recognised as a permanent infrastructure at CEAB. Submitted national and international research projects supporting the observatory activities are pending for approval.

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