New developments on Biscay-AGL Observatory. From derived products to sensor networks.

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Introduction

The Santander standard section has been running from early 90's as a series of monthly hydrographical series under the broader IEO program RADIALES. This program was devised to provide hydrographical and biogeochemical series in marine waters around Spain. The sampling scheme was designed to perform the sampling typically in 1-day journeys assisted by small ships, therefore the main focus was in the continental shelf. However, due to the proximity of the shelfbreak in front of the city of Santander (SE Bay of Biscay) it was possible to gather a monthly series of intermediate waters since early 90's in the outer stations. The sampling was limited to 1000 m until late 2007, then it was extended to 1500 and since 2014, after the construction of a larger regional ship, RV Ramón Margalef, that is in charge of the sampling, it covers the full-depth 2400 m.

The Augusto Gonzalez de Linares oceano-meteorological buoy (named after the Santander Oceanographic Center founder in 1886) was set close to Station 7, the first deep water station of the Santander Standard Section. The section covers shelf, slope and deep waters. Both systems form part of the Spanish Institute of Oceanography Observing System (IEOOS) which provides quality controlled data and information about Spanish surrounding waters and comprehends several subsystems.

Location





The combination of the monthly regular sampling and the AGL buoy provides us with a continuous status of the oceanic waters in the region, providing a basis for basic science [1,2]. Moreover, the existence of water samples nearby the buoy allows a monthly check and calibration of the sensors, this is of major importance for the less stable optical sensors as O₂ and chlorophyll-fluorescence. Starting on September 1st, 2014 a number of products from the observatory will be delivered operationally as part of the EU-FP7 FixO³ project.



Figure on the left shows different type of data managed by IEO. Data provided by AGL buoy and Santander monthly cruises, both specifying the type of date (real time or delayed) and their most common use.

Figure below, shows the automated process that data from AGL buoy follows, from reception to public display in several web portals of selected institutions



Biscay AGL Buoy Data Series

The following figures show some samples of data series obtained from the AGL Buoy [3,4].



Significant wave height series from mooring to summer 2014









Derived Products

Products are elaborated from data both of the Buoy and the monthly cruise. Below there are some samples











Sea surface temperature and salinity from mooring to autumm 2014. Dots show crosscheck from monthly cruises.

Chlorophyll-A series since 2007. Green line series shows AGL buoy data and blue dots shows data from monthly cruises.

Besides the samples shown here there are also time series for air temperature, humidity, wind speed and direction, currents speed and direction up to 90 m deep, wave mean and peak period, chlorophyll and oxygen.

Santander Standar Section. Station 6

Station 6 is located at 43° 42.5' N, 003 47' W at a depth of 850m, very close to the shelf break and have been monthly sampled since May 1992. It can be considered representative of continental slope conditions in thesouthern Bay of Biscay







Acknowledgements The Biscay AGL buoy and the Santander Standard Section form part of the IEOOS, and are funded by the Spanish Institute of Oceanography and the EU Infrastructure Project FixO3 (Fixed Point Open Ocean Observatories) and the VACLAN/COVACLAN Projects of the Spanish Funding Agency. We want to thank the staff of the Santander, Gijón, A Coruña, IE O Centers and the crew of the IEO Oceanographic vessel Ramón Margalef.



IMDIS 2016 Gdansk 11-13 October





Analysis of temperature profile [5] of Nov 27, 2014. Respect to the climatological average profile, Mixed Layer temperature is 1.5°C warmer, Mixed Layer Depth is nearly 15 meters shallower and stratification strength of the seasonal thermocline is more than double (0.11 °C m⁻¹ vs 0.05°C m⁻¹).

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Best–Fit of profile Measured Profile

natological Profile

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