

Geophysical Research Abstracts  
Vol. 17, EGU2015-14321, 2015  
EGU General Assembly 2015  
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## Research and operational products from the combination of a monthly hydrographic station and an oceanic buoy: The Biscay AGL fixed-point water column observatory.

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Long term time series are an important tool for increasing the knowledge of ocean processes as well as for studying water masses variability in different time scales and changes and tendencies in marine ecosystems.

Time series has been classically obtained by oceanographic ships that regularly cover standard sections and stations. From 1991, shelf and slope waters of the Southern Bay of Biscay are regularly sampled in a monthly hydrographic line north of Santander to a depth of 1000 m in early stages and for the whole water column down to 2580 m in recent times. Nearby, in June 2007, the IEO deployed an oceanic-meteorological buoy (AGL Buoy, 43° 50.67'N; 3° 46.20'W, and 40 km offshore, [www.boya-agl.st.ieo.es](http://www.boya-agl.st.ieo.es)).

The long-term hydrographical record have allowed to define the seasonality, trends, and interannual variability at all levels, including the mixing layer and the main water masses North Atlantic Central Water and Mediterranean Water. The relation of these changes with high frequency surface conditions has been examined using the AGL buoy data from 2007 as well as satellite and reanalysis data.

On that context and using that combination of sources, some products and quality controlled series of high interest and utility for scientific purposes have been developed and are offered hourly in the web page. Main products obtained are: SST and SSS anomalies, wave significant height character with respect to monthly average, and currents with respect to seasonal averages. Ocean-atmosphere heat fluxes (latent and sensible) are computed from the buoy atmospheric and oceanic measurements. Estimations of the mixed layer depth and bulk series at different water levels are provided in a monthly basis.

Quality controlled series are provided for sea surface salinity, oxygen and chlorophyll data. Some sensors are particularly affected by biofouling, and monthly visits to the buoy permit to follow these sensors behaviour. Chlorophyll-fluorescence sensor is the main concern, but Dissolved Oxygen sensor is also problematic. Periods of realistic smooth variations present strong offset that is corrected based on the Winkler analysis of water samples.

The incorporation of these observatories on larger scale research programs, as done in 2003 in the framework of the VACLAN and COACLAN projects, is important in order to provide them with a larger spatial dimension and maximize its utility for process-oriented studies. In 2003, the Santander section was extended 90 miles offshore in the framework of a large-scale hydrographic and circulation monitoring program.

Partnerships in a large EU project as FixO<sub>3</sub> has provided tools for coordination, homogenization and data validation as well as improve the use of chemical-biological data.