RAIA PROJECT. TWO YEARS OF OCEANOGRAPHIC MONITORING AND ITS SCIENTIFIC APPLICATIONS

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RAIA project is developing a cross-border oceanographic observatory in the NW of the Iberian Peninsula. In the first two years of the project, a total of 5 new oceanographic-meteorological buoys have been deployed and are nowadays operating and transmitting real-time data. This poster highlights some of the scientific applications of those data and above all tries to encourage their access and further utilization.

A DENSER OBSERVATIONAL NETWORK

Figure 1 shows the map of the region covered by the RAIA project and the current status of the observational network. Red placemarks indicate the buoys deployed during the project. This adds up to the already existing infrastructure managed by RAIA partners (green ones), whose contributions can also be accessed through their respective web pages. Buoys are equipped with sensors measuring meteorological and oceanographic variables. Depending on the locations, this includes air temperature, wind, humidity, salinity, sea water temperature, currents, waves, chlorophyl The current network design includes sampling points located inside and outside the Rías, at the mouths Miño and Douro river and at up to three different depths.

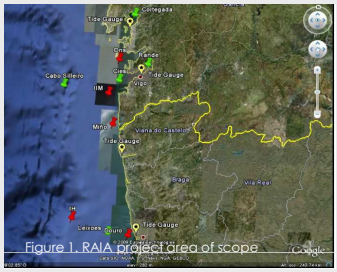
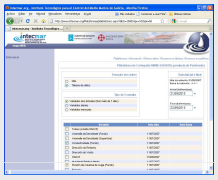


Figure 1. RAIA project area of scope

EASY AND FREE ACCESS TO REAL-TIME DATA

Data acquired by the buoys can already be accessed freely through the RAIA partners web pages. 10-min data as well as daily, monthly and annual averages can be downloaded



All data generated within the RAIA project will eventually be made available through a single interoperable platform (see companion poster by Vila Taboada and RAIA group.).

Figure 2. Web interface for data downloading

SOME HIGHLIGHTS

HIGHER-TEMPORAL AND SPATIAL RESOLUTION

Oceanographic and most in particular thermohaline variables have been broadly studied in the NW of the Iberian Peninsula in the last decades. Nevertheless, the real-time monitoring of those variables, with a sub-hourly sampling period has only been possible in recent years, after the deployment of the RAIA buoys. This opens a new field of information where new processes and the short-term response to forcings can be investigated. Thanks to the densified network, the study of the spatial heterogeneity of the oceanographic conditions will be possible under a new light (Figure 4).

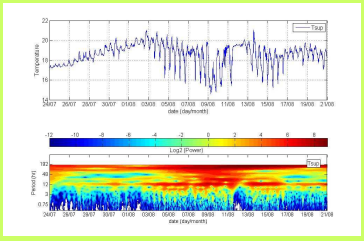


Figure 4. Time series of seawater temperature and its corresponding wavelet power spectra

Figure 3. RAIA buoy equipped with meteorological and oceanographic sensors

CONTINUOUS SAMPLING AND LONG-TERM VARIABILITY

Daily and monthly averages of all variables can be downloaded from the RAIA web page. This enables to overcome one of the limitations studies undertaken so far in the nonetheless heavily sampled Rías: the sparseness and lack of temporal continuity of the data.

Seasonal variability clearly arises when the monthly averages for the air and seawater temperature are depicted (Figure 5). Characterizing these cycles and investigating their interlinks with other periodic phenomena can now be done more accurately. As the project develops and longer time-series build up, it will also be possible to tackle the interannual variability. The study of teleconnection patterns influence on this long-term variability is another field worth considering.

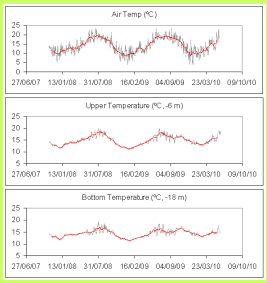


Figure 5. Daily and monthly averages of air and seawater temperature

IMPROVED FORECASTS

RAIA partners are currently running several models, both meteorological and hydrodynamical (see for instance, companion poster by Melo-Costa and RAIA group).

Data provided by the observational network can be used to initialize, calibrate and validate the models and hence improve the forecasts. (Figure 6)

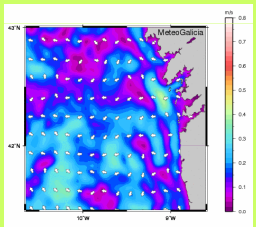


Figure 6. Velocity field provided by Mohid model

TESTING NEW EQUIPMENT

Buoys have been used as experiment sites to perform comparison tests with different equipment. This has allowed to evaluate the performance of new technologies and enabled a better network design and management (sampling strategy, data transmission, maintenance, location of sensors).

ENCOURAGING FURTHER USE OF RAIA DATA: NEW POSSIBILITIES

Beyond gaining a better understanding of the region hydrodynamics, data gathered through the RAIA observational network can serve to multiple purposes when combined with other datasets available in the region. Real-time oceano-meteorological data can serve to optimize the *Search and Rescue* efforts as well as to improve the response in case oil spills in coastal areas. Some of these applications may have a remarkable societal impact. For instance, the joint analysis with the growth or mortality rates of certain species living in the Rías (cockle, mussels, clams) can enable an improved management of the shellfish production areas.

A whole field of new possibilities yet to explore!

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(2) RAIA Project Partners: Meteogalicia, INTECMAR, IEO, CISC-IIM, CETMAR, GOFUVI-Uvigo, CIIMAR, INESCP, INEGI, FEUP, IH, Univ. Aveiro, FCUP.