Red ACOMAR: Real-time networking activities in the Macaronesian region as a contribution to the Coastal Ocean Observations Panel (COOP)

C. Barrera(1), M.J. Rueda(1), M.D. Gelado(2), R. Moran(1), E. Azevedo(3) and O. Llinás(4)

(2) Chemistry Department. Universidad de Las Palmas de Gran Canaria (ULPGC). Las Palmas. Spain.
(4) Plataforma Oceanica de Canarias (PLOCAN). Las Palmas. Spain

OCEANS ’09 Biloxi, MS (USA) 29th October 2009
... the GOAL

NRT Coastal Monitoring Network in the Macaronesian region (1998)

Instituto Canario de Ciencias Marinas (ICCM) - Canarian Government

Increase the Marine Environmental Observations Quality and Quantity

Understand and Forecast

PROCESSES AND PHENOMENA

ENVIRONMENTAL + SOCIO-ECONOMICAL EFFECTS AND REPERCUSSIONS
Integrator System

To make compatible and accessible the ALL INFORMATIONS on the Canarian marine environment, independently of the data provider institution or monitoring source.

+ 

To promote and encourage specific direct /indirect FINAL USERS for each kind of observation and location.
Real-time monitoring network with final users in the coastal area and directly linked with open-ocean EU-Operational Oceanography projects with ICCM as a partner.

- ANIMATE (FP5)
- MERSEA (FP6)
- ALERMAC (Interreg)
- CLIMARCOST (Interreg)
- AMASS (FP7)
- EuroSITES (FP7)
- PLOCAN
ACOMAR Network

- ** Açores**
  - 6 x Datawell Buoy Units
  - 4 x Meteo Stations

- **Madera**
  - 4 x Datawell Buoy Units
  - 2 x Meteo Stations
  - 2 x HC Buoy
  - 1 x ICCM ODAS buoy

- **Canaries**
  - 8 x Meteo Stations
  - 8 x HC Buoy
  - 1 x ICCM ODAS buoy

- **Cape Verde**
  - 1 x ODAS buoy

→ Rest of Macaronesian Region
The integration spreads over the instrumental approach, because the aim is to add and make available the “in-situ” observations from both moored and drifting devices, on surface or undulate through the water column, and remote sensing as well.
Deep-ocean moorings

ESTOC Mooring

Lat. 29° 10 N
Long. 015° 30 W
<table>
<thead>
<tr>
<th>Depth (incl. stretch)</th>
<th>Component</th>
<th>SN</th>
<th>Rope # &amp; Length</th>
<th>Distance from lower rope end</th>
<th>In/Out of Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 m</td>
<td>Sphere 11*</td>
<td>#1 top</td>
<td>25m Pinch/Rope 8 mm</td>
<td>951 m</td>
<td>6Benthos</td>
</tr>
<tr>
<td>29 m</td>
<td>MCP-IM</td>
<td>#1 bottom</td>
<td></td>
<td>1445 m</td>
<td>2Benthos</td>
</tr>
<tr>
<td>60 m</td>
<td>MCP-IM</td>
<td>#2 top</td>
<td>114m Pinch/Rope 8 mm</td>
<td>1947 m</td>
<td>2Benthos</td>
</tr>
<tr>
<td>90 m</td>
<td>MCP-IM</td>
<td>#3 bottom</td>
<td></td>
<td>2449 m</td>
<td>2Benthos</td>
</tr>
<tr>
<td>150 m</td>
<td>MC-IM</td>
<td></td>
<td>6</td>
<td>2952 m</td>
<td>6Benthos</td>
</tr>
<tr>
<td>157 m</td>
<td>Workhorse+F45°</td>
<td></td>
<td>WDS506 (glass tube)</td>
<td>3019 m</td>
<td>RCM-8</td>
</tr>
<tr>
<td>240 m</td>
<td>MC-IM</td>
<td></td>
<td>#2 top</td>
<td>790m</td>
<td>3/10°</td>
</tr>
<tr>
<td>400 m</td>
<td>MCP-IM</td>
<td>#11</td>
<td>549</td>
<td>3/10°</td>
<td>3/10°</td>
</tr>
<tr>
<td>650 m</td>
<td>MC-IM</td>
<td>#12</td>
<td>300</td>
<td>3/10°</td>
<td>3/10°</td>
</tr>
<tr>
<td>945 m</td>
<td>MC-IM</td>
<td>#13</td>
<td>5</td>
<td>3/10°</td>
<td>3/10°</td>
</tr>
</tbody>
</table>
Coastal moorings

→ Met: ws/wd, at, rh, ap, sr, GPS,

→ Ocean: wt, c, do, hc, cs, cd, t..

• GSM/RF
Hydrocarbon Detection System (worldwide patent) + Aditional Sensors (Wind Speed and direction, water temperature, current,…)
Spanish Deep-Water Monitoring Network
(Canary Islands)

Datawell Network
(Canaries, Madera and Açores Archipelagos)
The obvious need to increase the acquired information quantity and quality, has involved directly the proposal with TECHNOLOGICAL DEVELOPMENTS on wide range of devices and tools, with the aim to bring out them more accessible both technically and economically.
ACOMAR Network
Agreement with NOAA since 1998.
Drifting buoys deployed monthly at ESTOC site since January 1998.
ACOMAR Network

MET station

Total Suspended Particles (TSP) Samplers

Pico de la Gorra
(1930m)

Tafira
(269m)
Transects between shore and ESTOC site (100 nm) and Gran Canaria and Morocco coast
Bellamite slocum glider from NOCS was deployed last 17th September at the East coast of Gran Canaria for real time transects between Canaries and Morocco, under the frame of RAPID project.
Partnership RU COOL and PLOCAN - Transatlantic glider Missions
6-years SST time-series at three different sites around Canaries. (1) NE-Gran Canaria; (2) SE Tenerife and (3) ESTOC.

- Moored Buoy
- AVHRR
- CTD cast
- NOAA drifter
- Moored Buoy
DELTA Tropical Storm. Canary Islands. November 2006
(Barrera et al. 2008 Journal Operational Oceanography)
La Red ACOMAR Canarias presentada en el Congreso OCEANS'09 Biloxi (MS, USA)

26 de Octubre de 2009. El evento congrega a numerosos investigadores y las principales empresas del sector a nivel internacional.

Participación (Proyecto NET-BIOME) en la 1ª Conferencia del Grupo de Expertos de la Convención de Berna sobre Diversidad Biológica de las Islas Europeas

1 al 3 de Octubre 2009, Sta. Cruz de Tenerife.

La conferencia titulada "NET-BIOME Soporte Europeo a la Investigación sobre

5ª Reunión del Project Steering Committe del Proyecto AMASS

21 al 23 de Octubre, Praga, República Checa.

Nuevo modelo de Boya ODAS (v.2009-2)

1 de Octubre de 2009.

La primera unidad formará parte del fondeo EuroSITES en la estación ESTOC.
Visita al National Data Buoy Center (NDBC) de la NOAA en Mississippi (USA)

26-10-2009. Miembros de PLOCAN presentaron la iniciativa a directivos y responsables de la mencionada institución.

Reunión de Constitución del Comité de actividades socioeconómicas de PLOCAN

9-10-2009. Por unanimidad se eligió a D. José Reglero, Rector de la Universidad de Las Palmas de Gran Canaria, como presidente y a D. Arturo González, Director General de la Fundación INNOVAMAR, como secretario.

La Provincia, 25/10/2009: Entrevista a Dña. Cristina Garmendia, Ministra de Ciencia e Innovación.

25-10-2009. ¿Qué papel cree que puede jugar la Plataforma Oceánica de Canarias en el campo de la investigación marina?

Consejo de Ministros en Las Palmas de Gran Canaria

9-10-2009. El Consejo de Ministros celebró una reunión extraordinaria el día 8 de octubre en Las Palmas de Gran Canaria.

La Provincia, 25/10/2009: Entrevista a Dña. Cristina Garmendia, Ministra de Ciencia e Innovación.
<table>
<thead>
<tr>
<th>TIPO</th>
<th>Boya Compleja</th>
</tr>
</thead>
<tbody>
<tr>
<td>UBICACIÓN</td>
<td>Emisario Puerto de las Palmas</td>
</tr>
<tr>
<td>POSICIÓN</td>
<td>28°05,44N 15°24,02W</td>
</tr>
<tr>
<td>GESTOR</td>
<td>Puertos de Las Palmas</td>
</tr>
<tr>
<td>FECHA DE INSTALACIÓN</td>
<td>16 de septiembre de 2006</td>
</tr>
<tr>
<td>ÚLTIMO FONDEO</td>
<td>6 de septiembre de 2007</td>
</tr>
<tr>
<td>VALORACIÓN</td>
<td>en mantenimiento</td>
</tr>
<tr>
<td>OPERATIVA</td>
<td></td>
</tr>
<tr>
<td>CONTACTO</td>
<td><a href="mailto:carlos@iccm.rcanaria.es">carlos@iccm.rcanaria.es</a></td>
</tr>
<tr>
<td>PROFUNDIDAD DE</td>
<td>38 m</td>
</tr>
<tr>
<td>FONDEO</td>
<td></td>
</tr>
<tr>
<td>ALTITUD</td>
<td>n/a</td>
</tr>
</tbody>
</table>

**Último reporte recibido 09-10-2007 00:42**

<table>
<thead>
<tr>
<th>Hidrocarburos</th>
<th>1 presencia/ausencia?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humedad Relativa</td>
<td>72,10 porcentaje</td>
</tr>
<tr>
<td>Temperatura del Aire</td>
<td>22,35 °C</td>
</tr>
<tr>
<td>Presión Atmosférica</td>
<td>1022,90 milibares</td>
</tr>
<tr>
<td>Turbidez</td>
<td>-1000,0 unidades FTU</td>
</tr>
<tr>
<td>Temperatura Agua</td>
<td>24,66 °C</td>
</tr>
<tr>
<td>Dirección</td>
<td>290,00 grados</td>
</tr>
<tr>
<td>Componente X</td>
<td>0,06000 metros.segundo</td>
</tr>
<tr>
<td>Componente Y</td>
<td>-6,00000 metros.segundo</td>
</tr>
</tbody>
</table>

**PROFUNDIDAD DE FONDEO**: 38 m

**ALTITUD**: n/a
Temperatura del Aire

- Boya 1
- Boya 4
- Boya 7
- Boya 3

13/may 14/may 15/may 16/may 17/may

14.0 16.0 18.0 20.0 22.0 24.0 26.0

Boyas disponibles en selección actual:

- Boya 1 Isleta ALERMAC Puerto de las Palmas de GC
- Boya 3 La Honduras ALERMAC Puerto de Sta. Cruz de TF
- Boya 4 Dársena ALERMAC Puerto de Sta. Cruz de TF
- Boya 7 odas

Humedad Relativa

- Boya 1
- Boya 4
- Boya 7
- Boya 3

13/may 14/may 15/may 16/may 17/may

20 30 40 50 60 porcentaje
The network has been build from up to down, starting from SPECIFIC FINAL USERS towards general users, and at the same time, holding the aims established by national and international agencies and organizations, focused on to understand the processes and phenomena at global scale.

- Harbours (commercial and sportive).
- Sailing and Fisher Community.
- Aquaculture (Fish-farming).
- Windsurf riders community.
- Tourist and local beach users.
- Search and Rescue Agency (SAR).
- Military.
- Scientific community.
- Government agencies.
- ...
Harbours
Harbours
Harbours

Valencia’s Harbour Authority
Aquaculture - Fishfarming
Marine Protected Areas

• Garajau (Madeira, PT)
• Illes Medes (Girona, SP)
Search and Rescue Exercises

XBT/XCTD probes
Gliders
Drifting buoys
Turtles
Search and Rescue

Theoretical and real exercises.
Velocidad del viento (m/s)

15 10 5

Temperatura superficial del mar (°C)

Corriente + fitoplancton

Anterior <> Siguiente

Oleaje y Viento

Tendencias (últimos 20 días)

AIS
Seleccione la isla, para acceder a la información de sus playas, datos de temperatura del mar, velocidad y dirección del viento, determinado por zonas.

Una vez en los datos puedes recorrer isla por isla con los botones de avance y retroceso, o volver al menú principal.

Resolución óptima: 1024x768.
The Red ACOMAR Canarias Network
A Real-Time Moored Buoy Network for Coastal Monitoring in The Canary Islands Archipelago

Ocean News & Technology
November 2007

JOO
March 2008

SeaTechnology
December 2006

Hydro
February 2009
The ACOMAR Network should be understud as a regional proposal to promote socio-economical approaches in the maritime sector through OPERATIONAL OCEANOGRAPHY ACTIVITIES and their DERIVED PRODUCTS.
The AMASS project is led by Carl Zeiss Optics, in collaboration with the following organisations:

Armed Forces of Malta
Celtise Consulting Ltd
Fraunhofer-Institut für Informationssystem- und Bildverarbeitung ITB
Hugo-OCEANOR
HDF spol s r o
Instituto Canario de Ciencias Marinas
IC Waters
CSIC-Centro Tecnologico Maritimo
Universidad de Las Palmas de Gran Canaria

Would you like to know more about this pioneering project? Then visit our website

www.amass-project.eu
Coastline control: a complex and costly challenge

Illegal immigration by sea has become a major headache in recent years. In fact, EU member states detected more than 800,000 cases in 2017 alone (source: Frontex annual report). It is difficult to monitor — and is dangerous, often ending in tragedy. Other criminal activities, such as drug smuggling and terrorism, are also harder to police at sea. In short, controlling blue borders is a complex and costly challenge.

Until now, border agencies have relied on ships, planes or helicopters to patrol and protect coastlines. But this approach is not completely reliable — and is a drain on vital resources such as money and manpower. That’s why the EU is seeking a more effective response to the challenge.

Europe unites to pioneering project

Now, Carl Zeiss Optics is leading the development of a new, groundbreaking solution for monitoring maritime borders: MAASS — the Autonomous Maritime Surveillance System. Commissioned in 2008, the initiative is partially funded by the EU and has seen Carl Zeiss team up with nine technology specialists and border agencies from across Europe — including Fraunhofer-Institut für Informations- und Bildverarbeitung TFE, Instituto Canario de Ciencias Marinas and the Armed Forces of Malta.

In a trailblazing project, the EU-backed consortium is creating an innovative system to enable the early detection and location of small and medium vessels. Their aim? To provide authorities with early warning of illegal activities at sea and improve overall protection of European shores.

Benefits at a glance

- Reliable, around-the-clock surveillance
- Improved situational awareness
- Highly cost-efficient
- Functional in all weather conditions
- Better use of human resources
- Greater safety for all concerned

The nuts and bolts: how it works

MAASS comprises a network of unmanned platforms located at a considerable distance from shore. Each platform is fitted with cutting-edge sensors and operates self-sufficiently. If without the need for manual intervention, data captured by the sensors is transmitted to a central command centre, where an operator views it on screen. If a suspicious entity is detected, a crew can be dispatched to investigate or other action taken.

Always on guard

The leading-edge technology behind MAASS provides reliable, 24/7 surveillance — giving border agencies the early, accurate warnings they need. But that’s not all. The sensors offer a 360-degree view of the area above water — significantly improving situational awareness for coast patrols. What’s more, the platforms remain fully functional in all weather conditions.

MAASS is also significantly more economical to operate than patrol ships, and frees up human resources for other tasks — providing an all-round more cost-efficient solution. But most importantly, MAASS helps border agencies protect their own personnel and save the lives of immigrants. The upside? Safer, more secure European coasts.
WELCOME
Wave Energy Lift Converter Multiple España
Mapa mundial mostrando la energía media de olas en kW/metro de frente de ola.
ACOMAR Network

The Deep-Ocean Gate

2007-2011

PLOCAN

Plataforma Oceánica de Canarias

MINISTERIO DE CIENCIA E INNOVACIÓN

Gobierno de Canarias

The Deep-Ocean Gate
• OBSERVATORY
• BASE FOR UNDERWATER VEHICLES AND INSTRUMENTS
• TECHNOLOGICAL TEST BED
• SOCIO-ECONOMIC INNOVATION PLATFORM
Thank you for listening

...Any questions?