5as JORNADAS DE ENGENHARIA HIDROGRÁFICA
19, 20 E 21 DE JUNHO DE 2018

PLOCAN PLATAFORMA OCEÁNICA DE CANARIAS

Improving monitoring capabilities in the Macaronesia region with ocean gliders

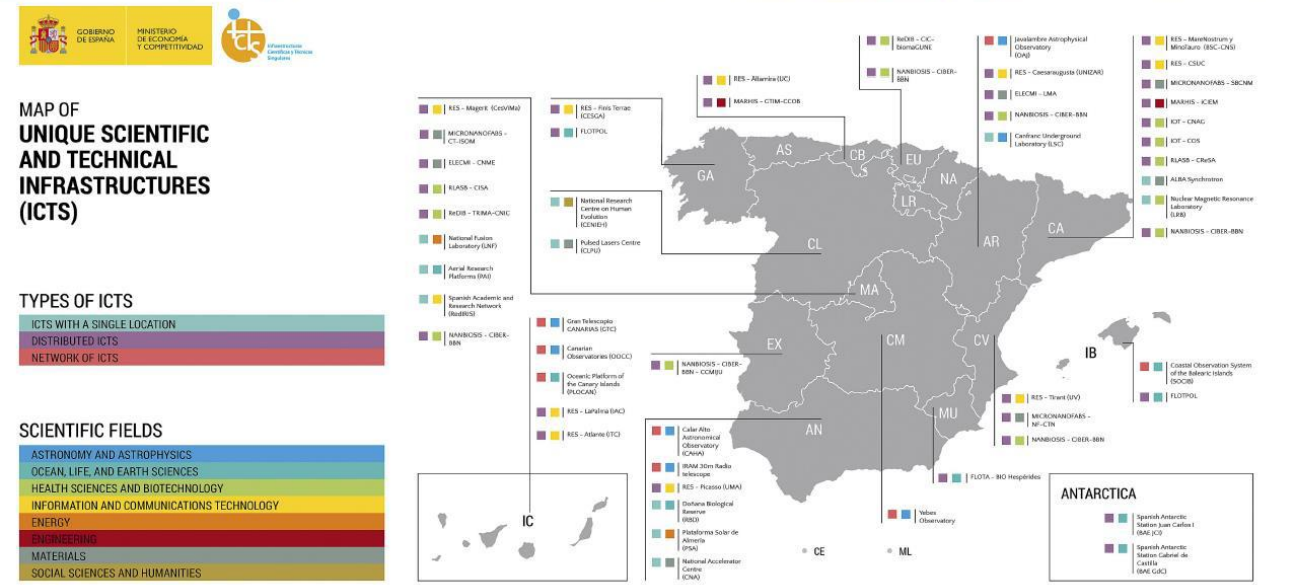
C. Barrera, R. Caldeira, C. Waldmann, M.J. Rueda, J. Brito and O. Llinas.

5JEH. Lisbon. 19th-21st June 2018.

Outline

- The **PLOCAN** infrastructure
- **Gliderport** facility
- Glider **missions** across the Macaronesia

PLOCAN INFRASTRUCTURE



National Government (50%)

50 M€
2007-2021

Regional Government (50%)

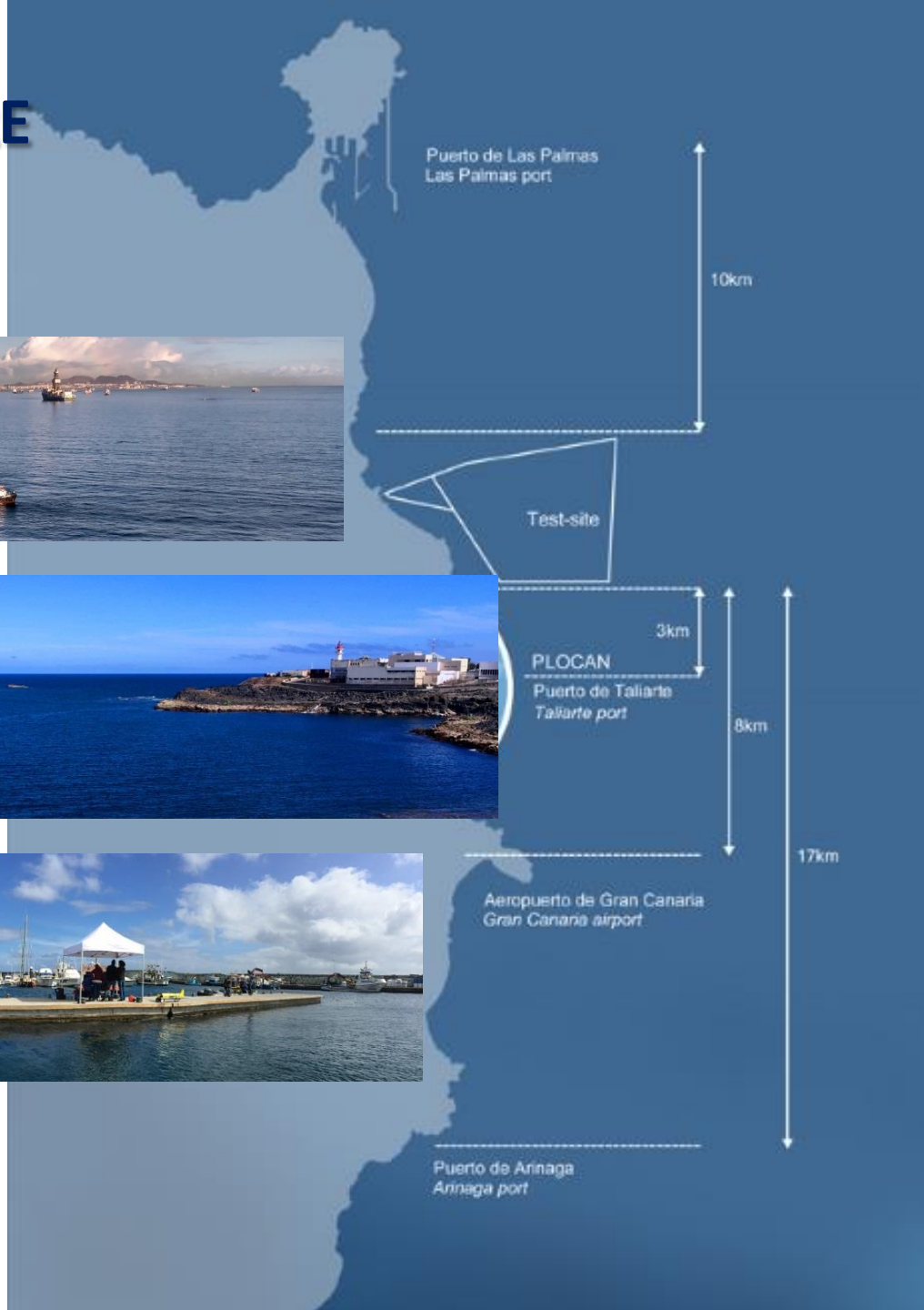
- **Main goal** :

Design, Construction and Operation of an offshore platform for *Research & Innovation* in the field of marine science and technologies.

- **Strategy in key words:**

Interdisciplinary, large projects, innovation oriented, Testing and Demonstration, cluster local R&D, international alliance, tailored infrastructures and services, leverage funds, public and political support.

PLOCAN INFRASTRUCTURE



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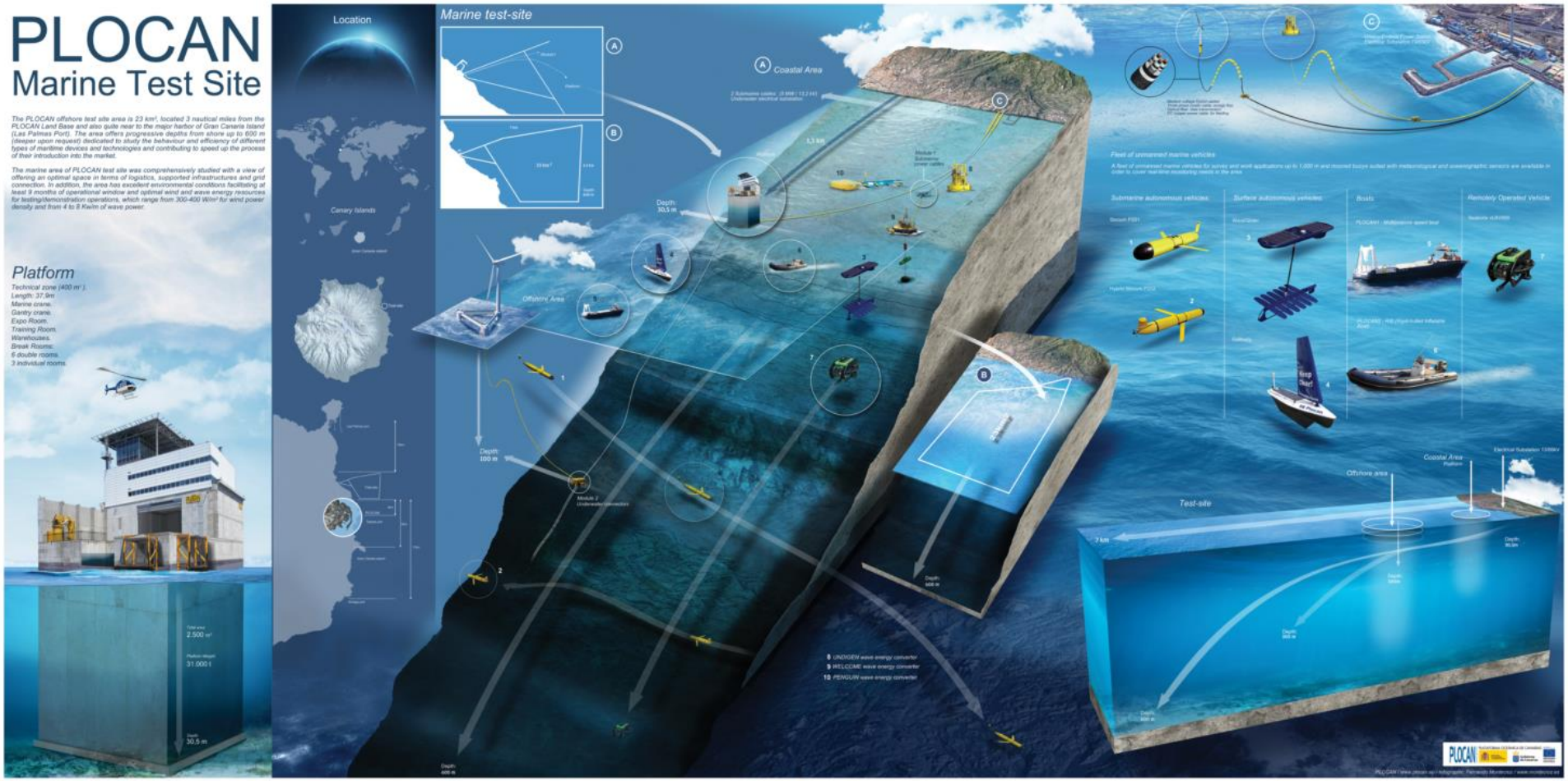
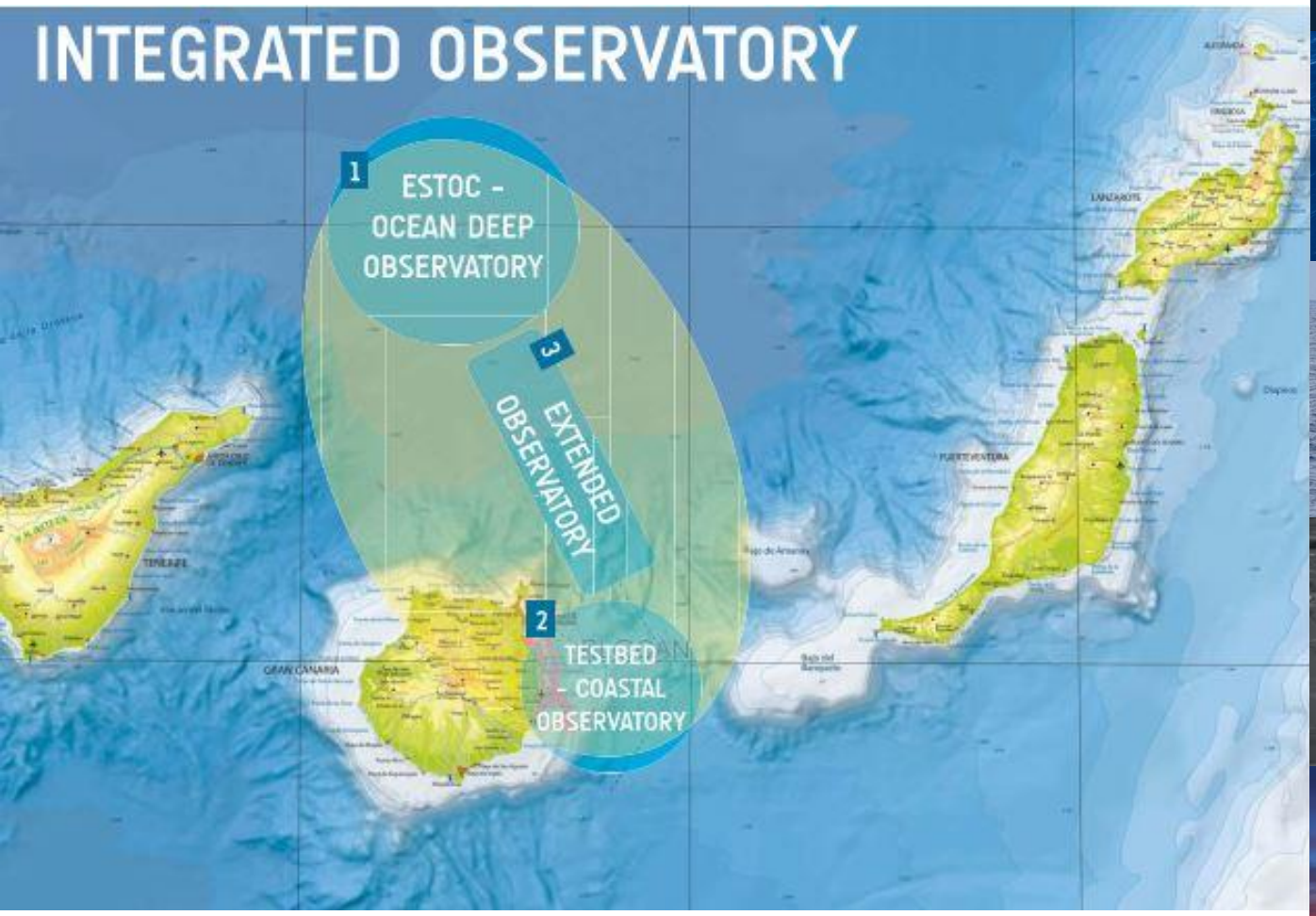
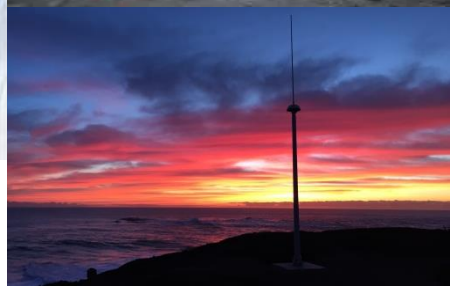
PLOCAN FACILITY – TEST SITE



PLOCAN FACILITY – TEST SITE

PLOCAN FACILITY – OBSERVATORY





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PLOCAN FACILITY – GLIDERPORT

FLEET

- **Slocum glider G3 (1000 m.)**
  CTD, DO, TURB and FLU
- **Slocum glider G2 (1000 m.)**
  CTD, DO, TURB and FLU
- **Seaglider M1 (1000 m.)**
  CTD, DO, TURB and FLU.
- **SeaExplorer (700 m.)**
  CTD, DO, TURB, FLU and HC
- **Wave Glider (SV2)**
  CTD, DO, MET and PAM
- **Sailbuoy**
  CTD, DO, MET, TUR, FLU and HC
- **ROV SeaBotix vLBV 950 (950 m.)**
  TEMP, ALTIM, B/W and COL CAM, IMAG SONAR
- **ROV BlueROV2 (100 m.)**
  TEMP, COLOR CAM

FACILITIES

- **Wet and Dry lab (200 m²)**
- **Dedicated benches and tooling**
- **Ballasting area (fresh and target water)**
- **Storage area**
- **Control room**
- **Teaching and meeting rooms**
- **Transport VAN**

ACTIVITIES

- **Mission planning and performance.**
- **Maintenance.**
- **Subsystem integration and testing.**
- **Piloting.**
- **Training.**
- **Deployment/Recovery maneuvers.**

PARTNERSHIP

- **Joining R&D projects with private and public entities.**
- **Support activities into specific programs and initiatives.**
- **Glider School.**
- **Prototype testing.**

PLOCAN GLIDERPORT FACILITY

PLOCAN GLIDERPORT FACILITY

9th International Glider School
Gran Canaria 1-5 October 2018

www.gliderschool.eu

Partners:

TELEDYNE WEBB RESEARCH · LIQUID ROBOTICS · RUTGERS · British Oceanographic Data Centre · ROCKLAND SCIENTIFIC · AADI · Offshore Sensing AS · OCEAN AERO · EuroGOOS · CONTROS · KONGSBERG · ULPGC · WET Labs · sensorlab · National Oceanography Centre Southampton · MEMORIAL UNIVERSITY · Ocean Sonics · CLS · marum · IOOS · SEA-BIRD SCIENTIFIC · ALSEAMAR

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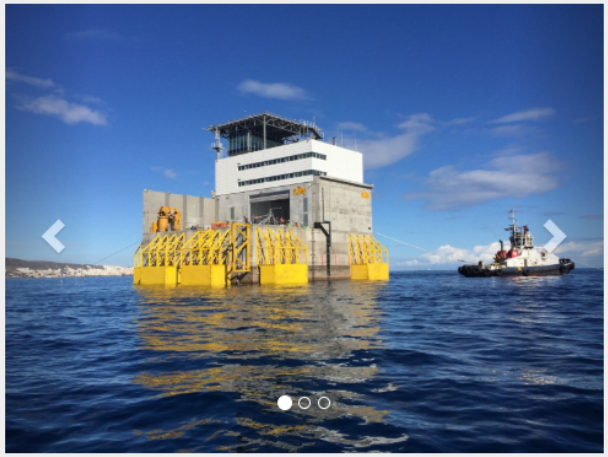

Oceanic Platform of the Canary Islands (PLOCAN)

Research Infrastructure (RI) labeled by the ICTS (Unique Scientific and Technological Infrastructure) Spanish National Roadmap.

PLOCAN is a multipurpose technical-scientific service infrastructure that provides support for research, technological development and innovation in the marine and maritime sectors, available to public and private users. PLOCAN offers both onshore and offshore experimental facilities and laboratories, operational throughout the whole year thanks to the Canary Islands excellent climatic conditions. PLOCAN also brings a broad experience in large national and EU marine/maritime projects.

As part ot its activitites, PLOCAN manages a variety of Observation Platforms in order to provide a continuous and real-time in-situ monitoring of the ocean. These platforms can be both fixed or mobile, providing information about the ocean surface and/or the water column. Different sensors are placed in PLOCAN Observation Platforms allowing access to physical, biochemical and climatological data.





VEHICLES | DRIFTERS | FIXED STATIONS | CLIMATOLOGY | EDUCATIONAL PASSAGES

http://obsplatforms.plocan.eu/

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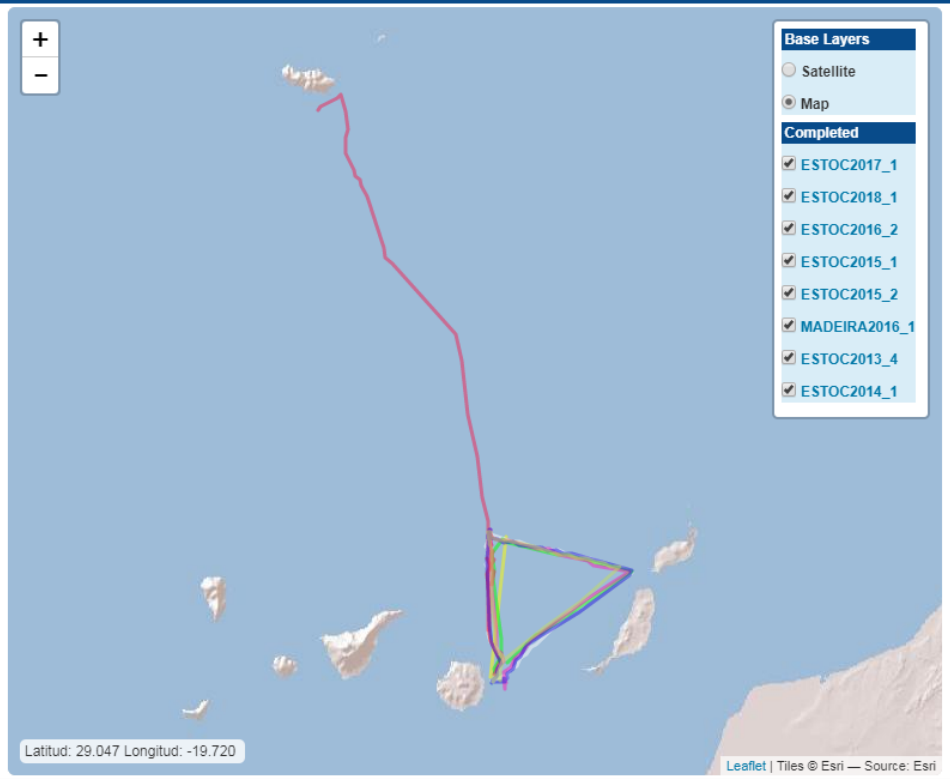
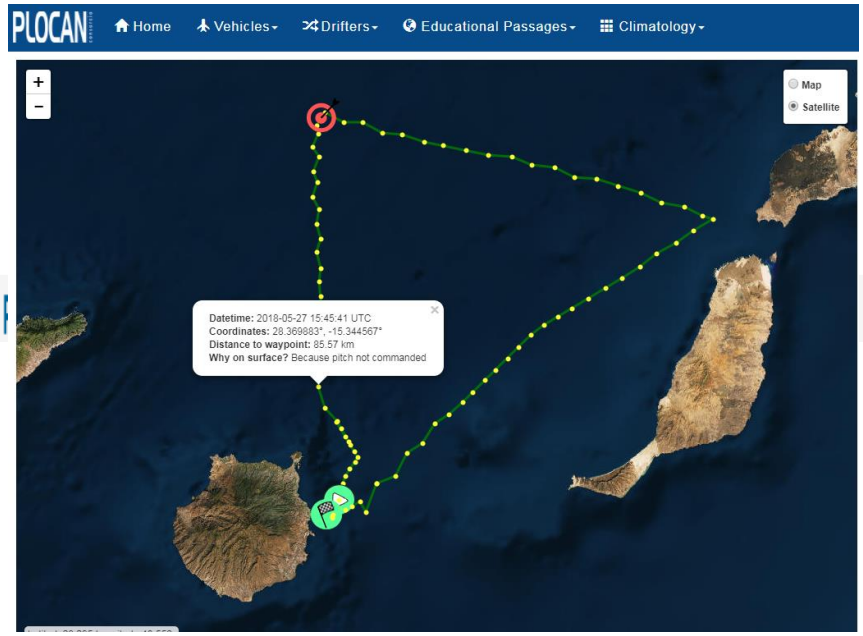
Search

Mission	Gliders	Start	Last comm	State
ESTOC2018_1	P202	2018-05-25 09:38	2018-06-13 12:42	Completed
ESTOC2017_2	P202	2017-06-19 10:34	No comms available	Completed
ESTOC2017_1	P202	2017-03-08 10:42	2017-03-09 11:12	Completed
ESTOC2016_1	P202	2017-03-02 10:12	No comms available	Completed
ESTOC2016_2	P201	2016-11-15 10:29	2016-11-20 00:04	Completed
MADEIRA2016_1	P201	2016-04-11 15:41	2016-05-09 12:38	Completed
TEST-SITE2016_1	P202	2016-01-13 09:30	No comms available	Completed

1 2 3 4 › »





GLIDER MISSIONS ACROSS THE MACARONESIA

- 7 weeks duration (360 dives@1000 m. depth)
- Seawater parameters sampled: CTD, DO, TURB and CHL-A
- Partnership with OOM, IH/Marinha y Armada.

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GLIDER MISSIONS ACROSS THE MACARONESIA

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GLIDER MISSIONS ACROSS THE MACARONESIA

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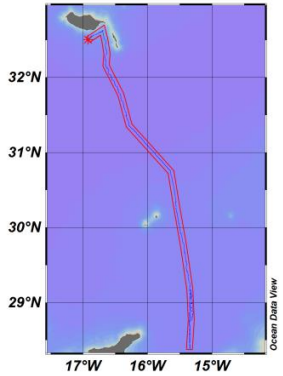

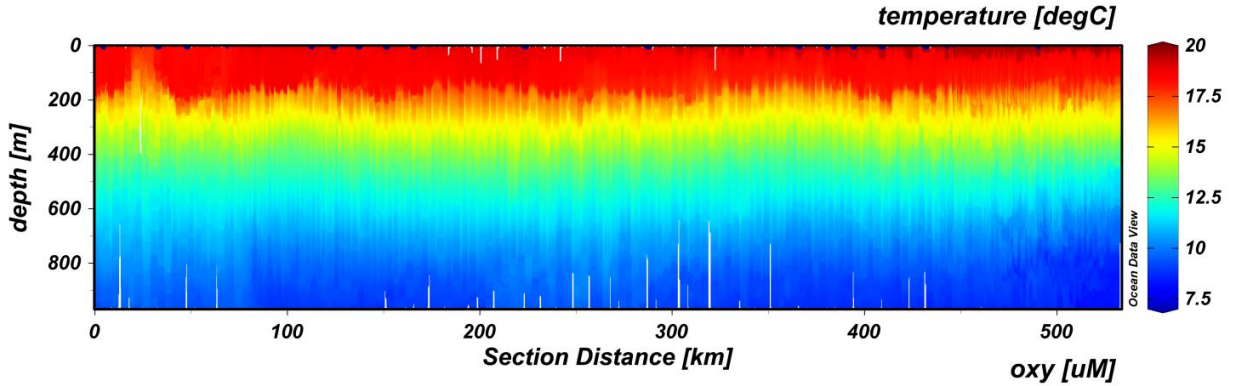

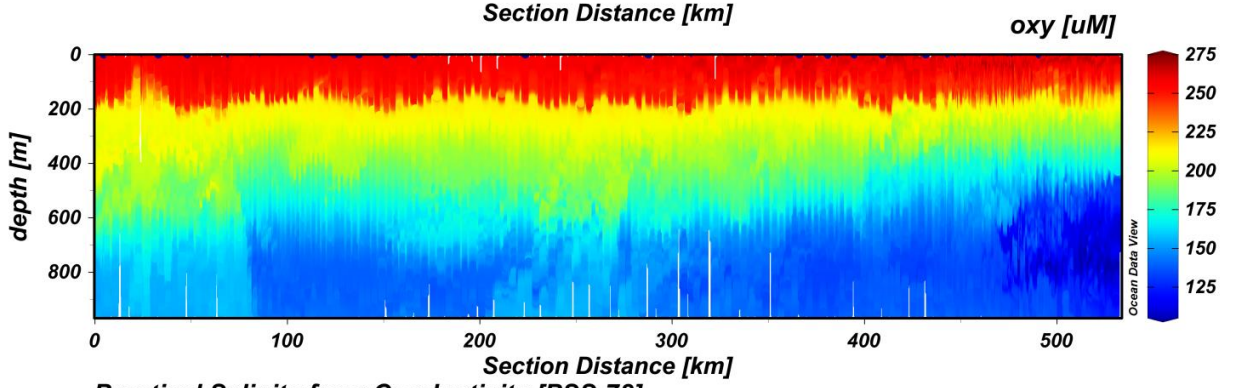

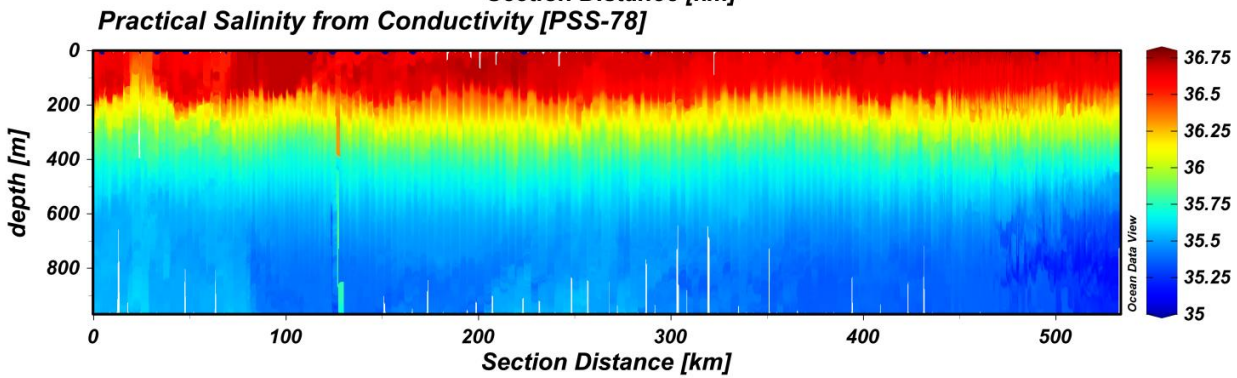

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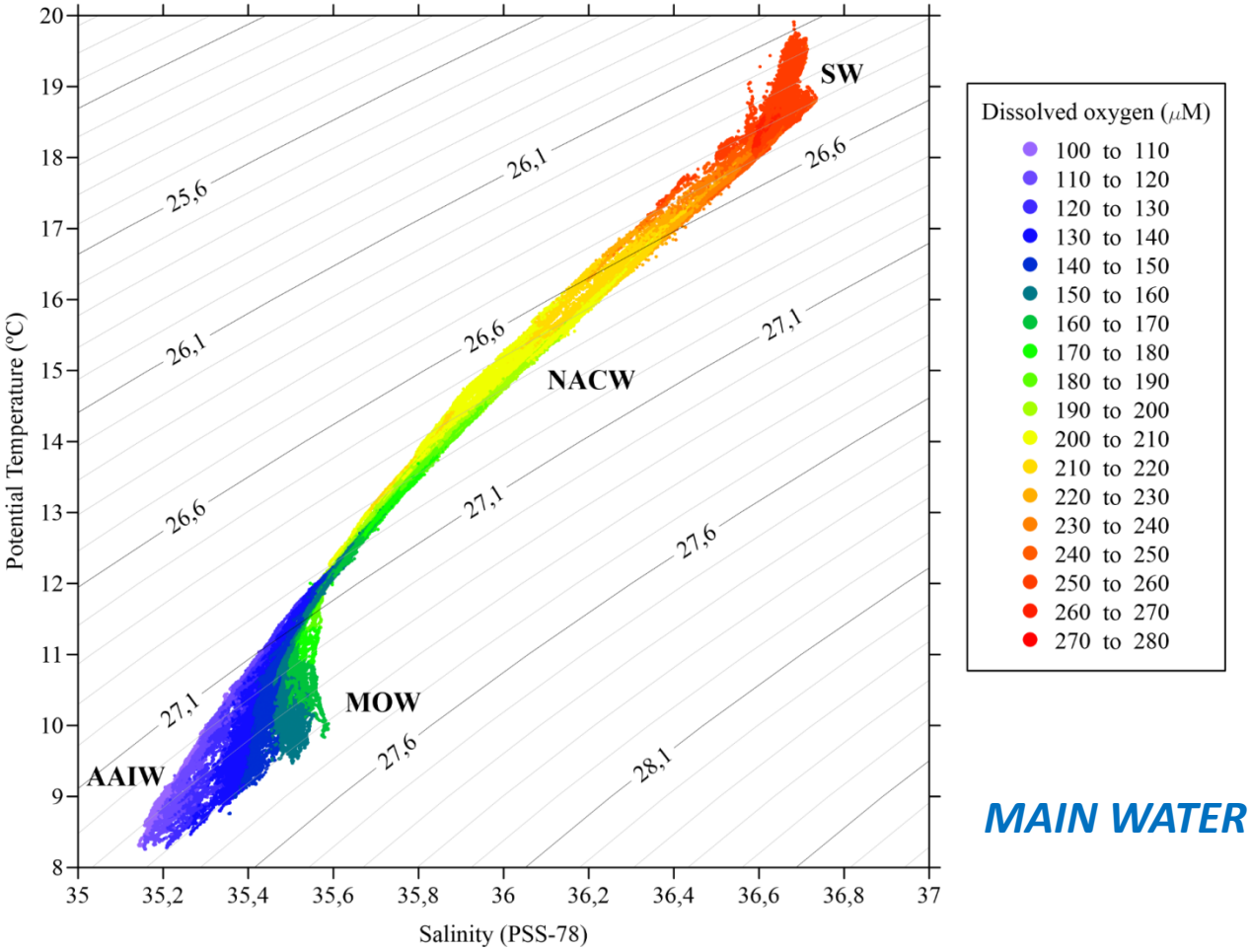
DIAGRAM OF TEMPERATURE-SALINITY AND DISSOLVED OXYGEN



MAIN WATER MASSES

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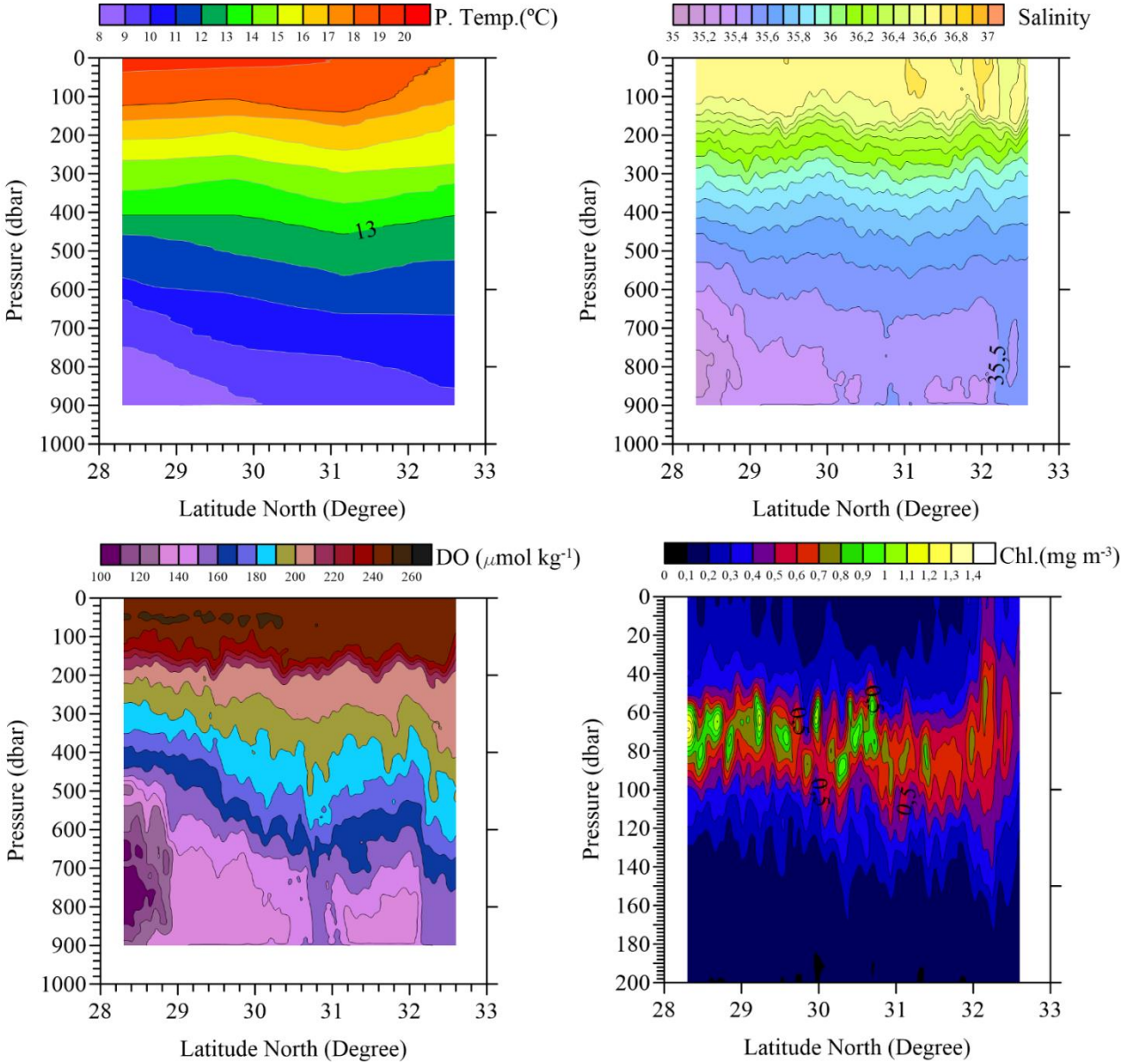

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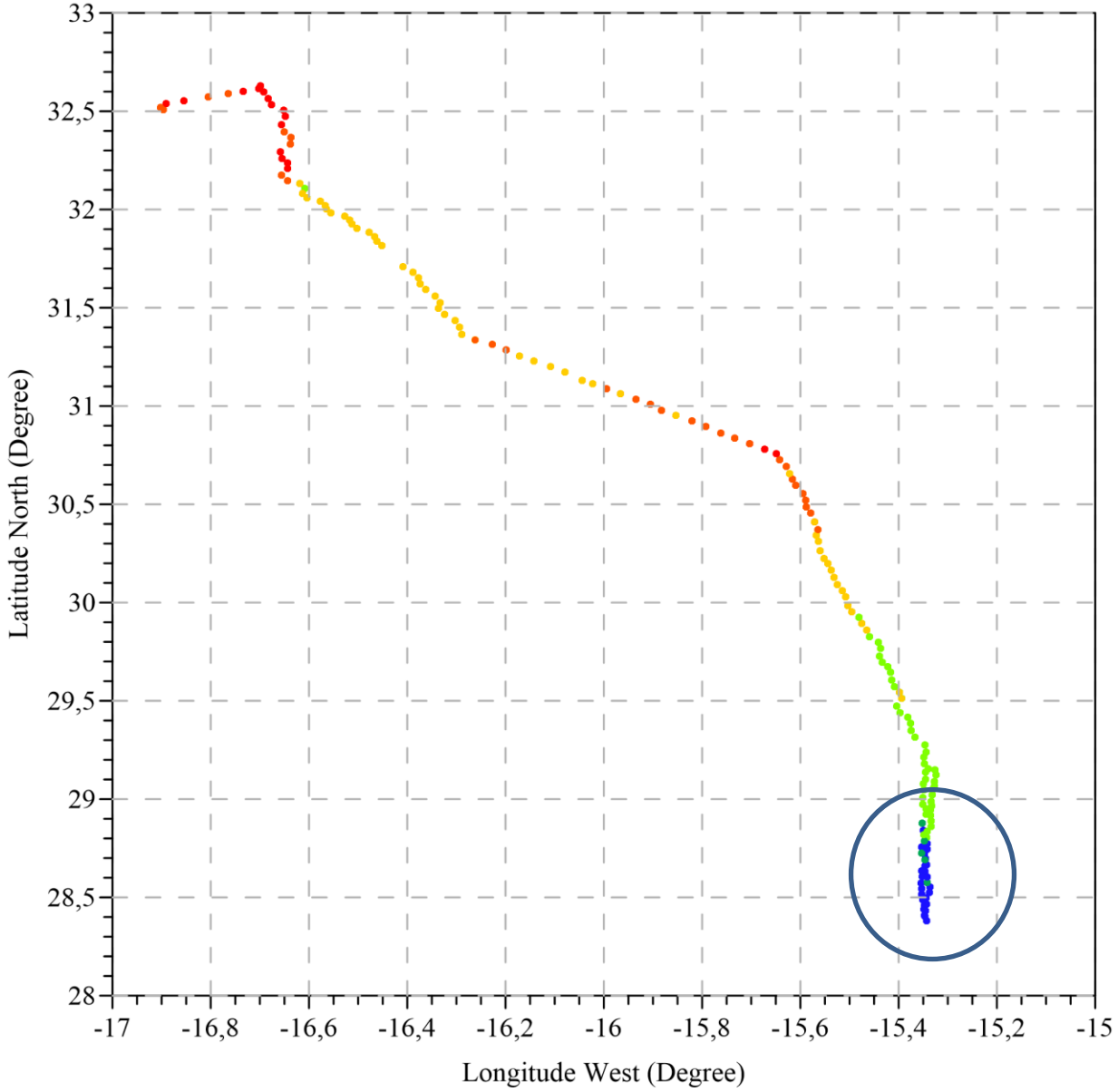

Dissolved Oxygen (μM)

- 110 to 120
- 120 to 130
- 130 to 140
- 140 to 150
- 150 to 160
- 160 to 170

SPATIAL DISTRIBUTION OF HIGHER PROPORTION OF AAIW (27,3- 27,4) SIGMA THETA

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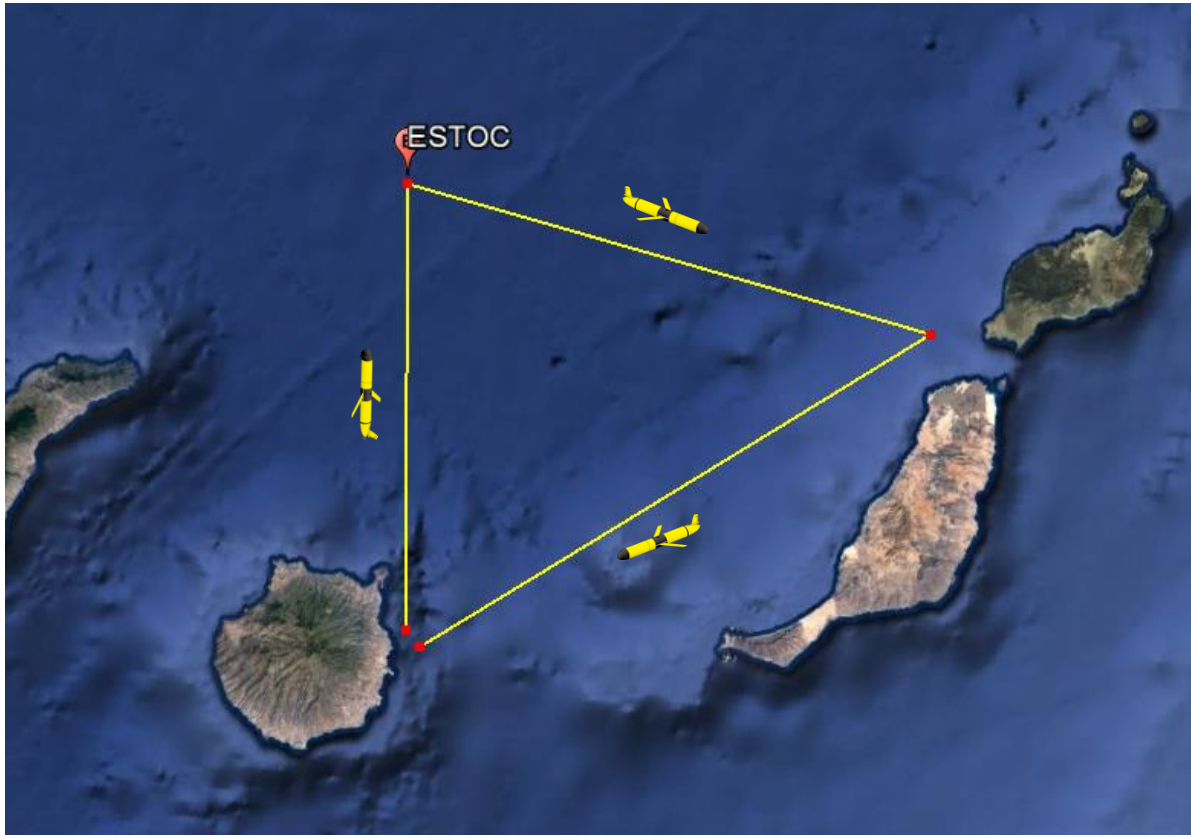
GLIDER MISSIONS ACROSS THE MACARONESIA

ESTOC ocean time-series site, as deep-node of the PLOCANS' Integrated Ocean Observatory, has a permanent multiplatform monitoring program since 1994, where ocean-gliders nowadays represent a key-one of the latest technologies able to provide data in NRT.

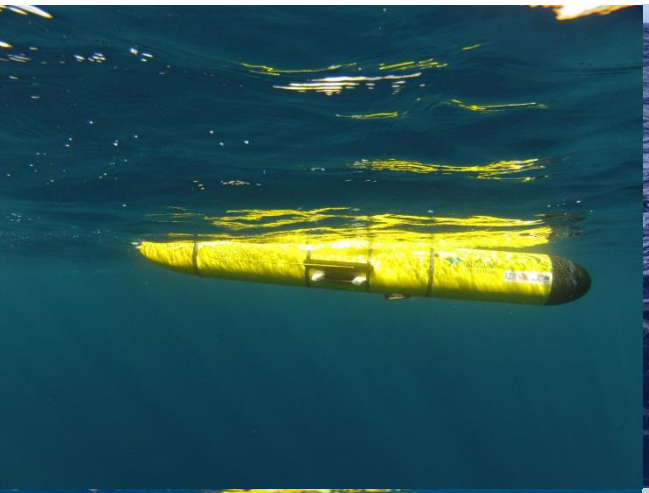
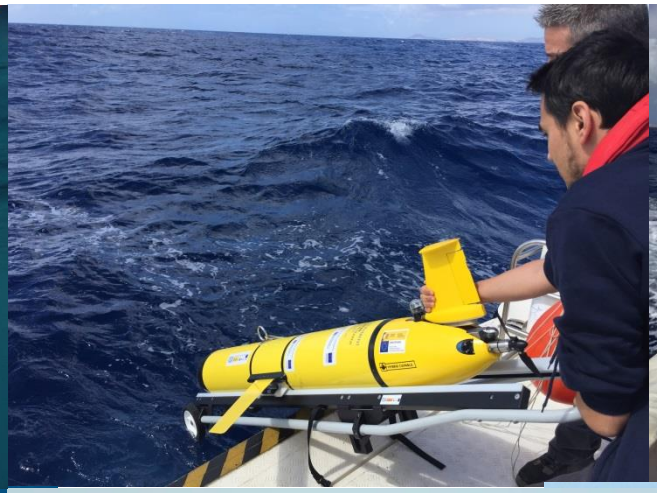
Different glider technologies (buoyancy-driven and surface) are operated interchangeably to support a seasonal observations program. Primary sampled parameters are conductivity, temperature, dissolved oxygen, Chl-a, turbidity and CDOM.

Gliders provide useful information for surface and intermediate water masses characterization (MMW, NASTMW, ENAW, MW, AAIW, etc.) in the area of interest. Each seasonal mission last three weeks in order to cover the distance of 200 nautical miles.
http://gliders.plocan.eu



- Seasonal mission – Endurance line.
- 3 weeks duration (aprox. 170 dives@1000 m. depth)
- Seawater parameters sampled: conductivity, temperature, dissolved oxygen, turbidity and chlorophyll-a
- Partnership with IEO (RAPROCAN line support)

GLIDER MISSIONS ACROSS THE MACARONESIA



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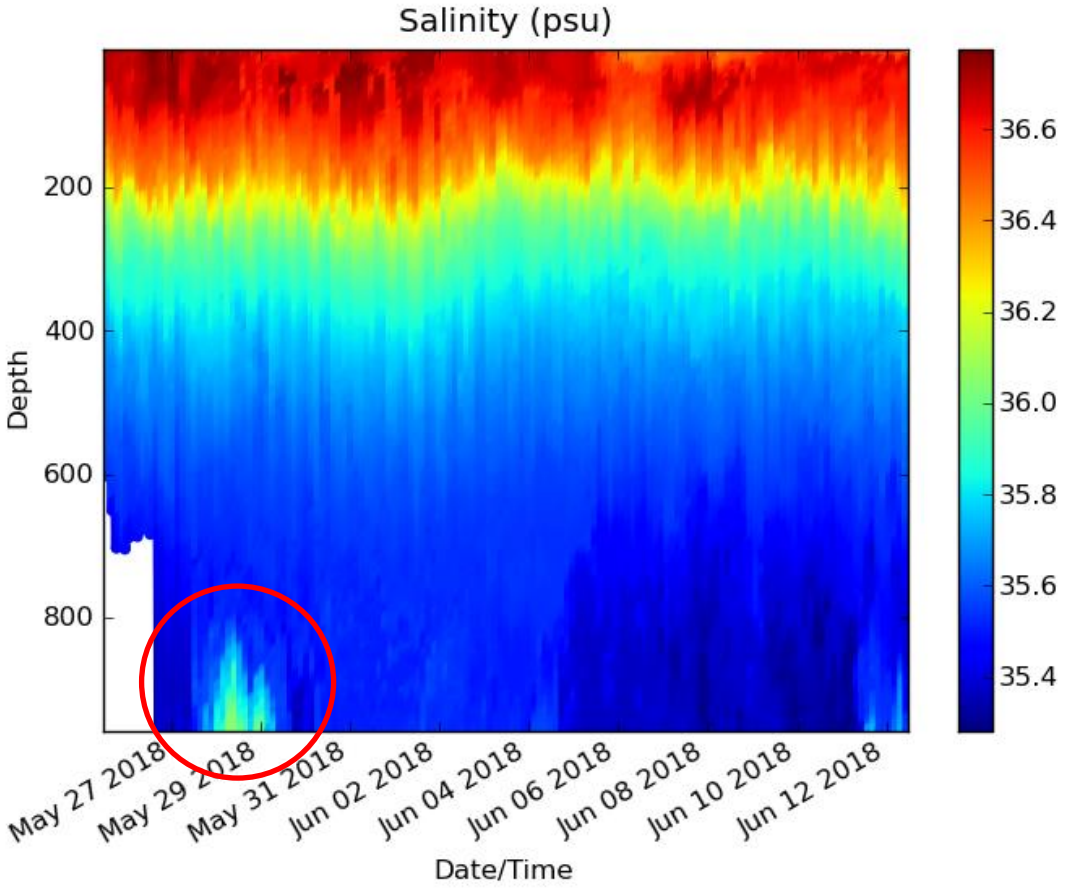
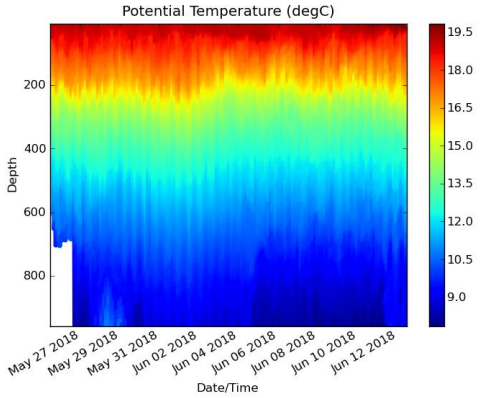
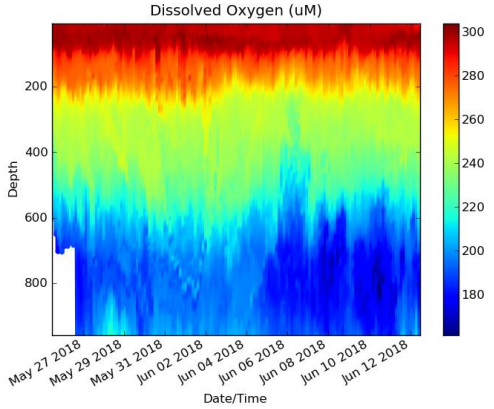
GLIDER MISSIONS ACROSS THE MACARONESIA







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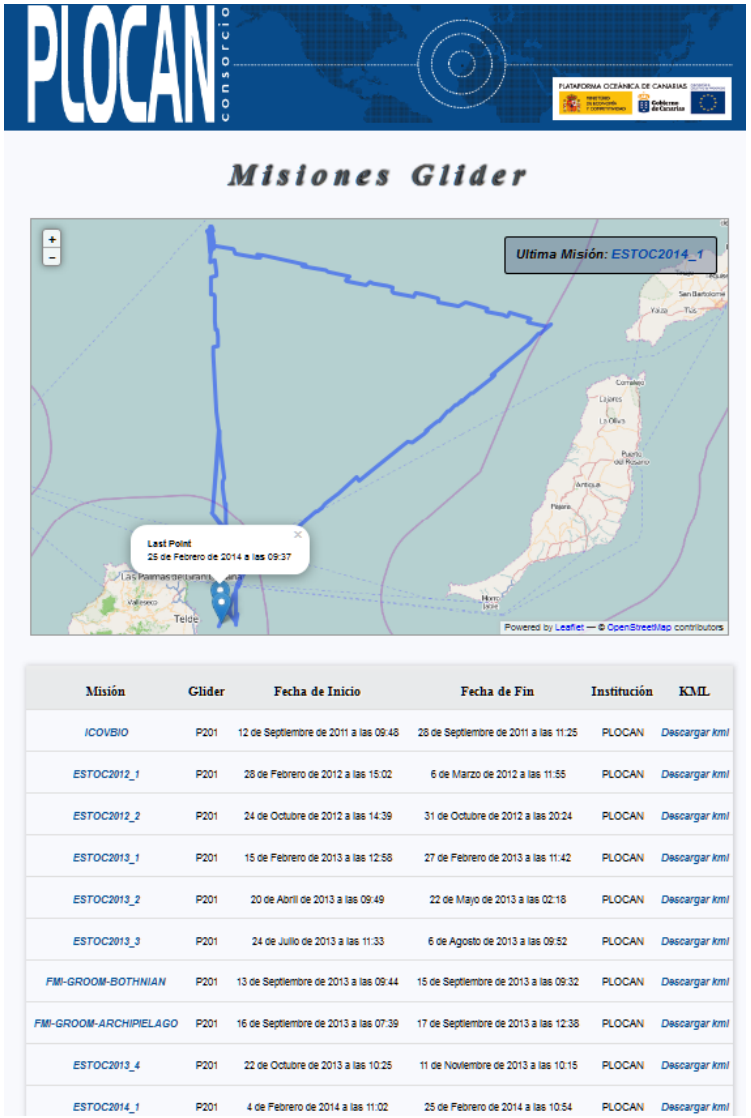
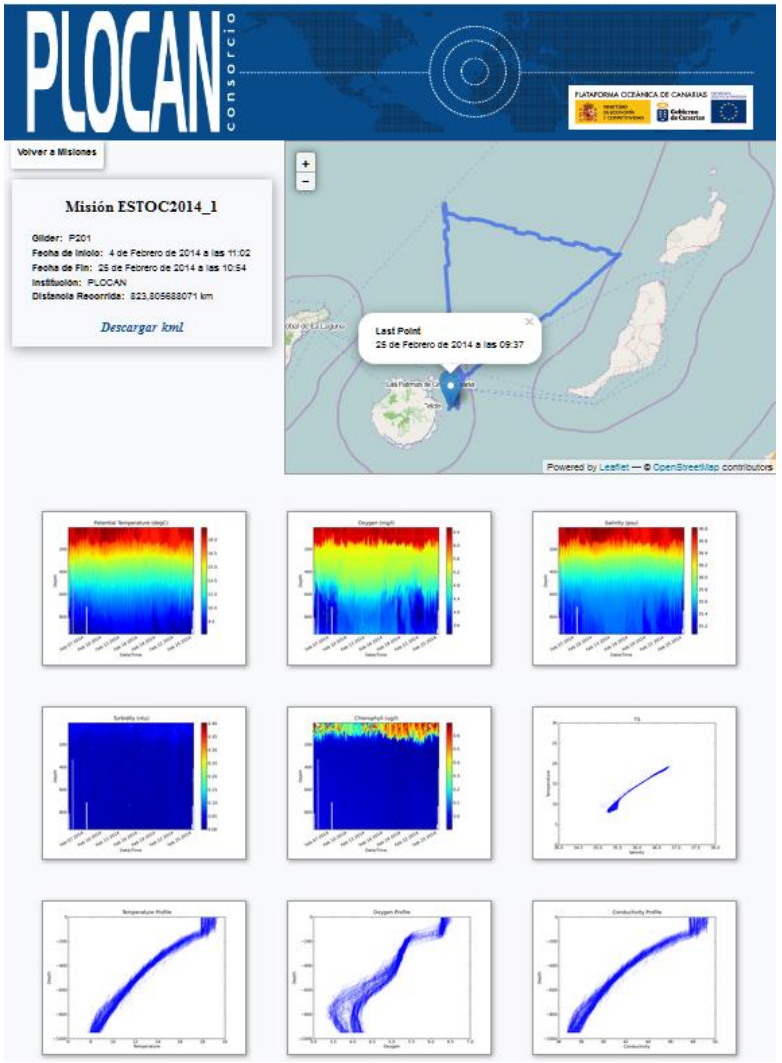


Misión	Glider	Fecha de Inicio	Fecha de Fin	Institución	KML
ICOVBIO	P201	12 de Septiembre de 2011 a las 09:48	28 de Septiembre de 2011 a las 11:25	PLOCAN	Descargar kml
ESTOC2012_1	P201	28 de Febrero de 2012 a las 15:02	6 de Marzo de 2012 a las 11:55	PLOCAN	Descargar kml
ESTOC2012_2	P201	24 de Octubre de 2012 a las 14:39	31 de Octubre de 2012 a las 20:24	PLOCAN	Descargar kml
ESTOC2013_1	P201	15 de Febrero de 2013 a las 12:58	27 de Febrero de 2013 a las 11:42	PLOCAN	Descargar kml
ESTOC2013_2	P201	20 de Abril de 2013 a las 09:49	22 de Mayo de 2013 a las 02:18	PLOCAN	Descargar kml
ESTOC2013_3	P201	24 de Julio de 2013 a las 11:33	6 de Agosto de 2013 a las 09:52	PLOCAN	Descargar kml
FMI-GROOM-BOTHNIAN	P201	13 de Septiembre de 2013 a las 09:44	15 de Septiembre de 2013 a las 09:32	PLOCAN	Descargar kml
FMI-GROOM-ARCHIPIELAGO	P201	16 de Septiembre de 2013 a las 07:39	17 de Septiembre de 2013 a las 12:38	PLOCAN	Descargar kml
ESTOC2013_4	P201	22 de Octubre de 2013 a las 10:25	11 de Noviembre de 2013 a las 10:15	PLOCAN	Descargar kml
ESTOC2014_1	P201	4 de Febrero de 2014 a las 11:02	25 de Febrero de 2014 a las 10:54	PLOCAN	Descargar kml



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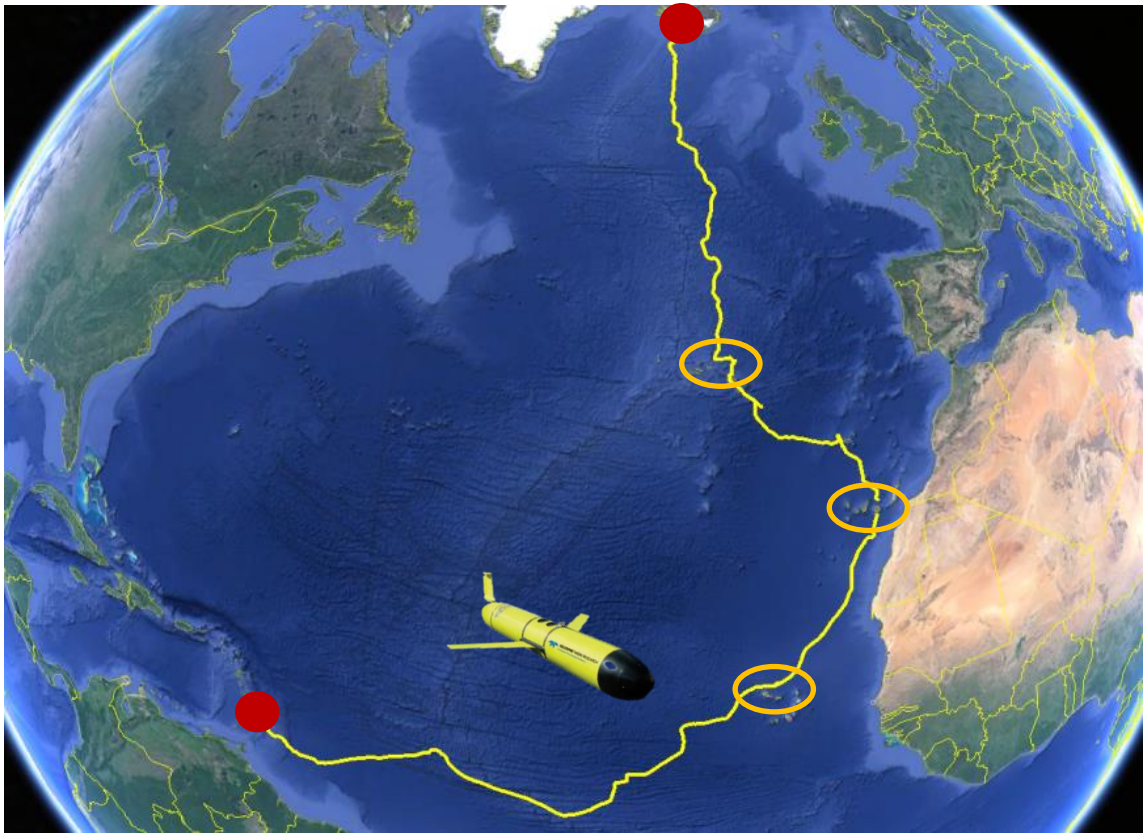

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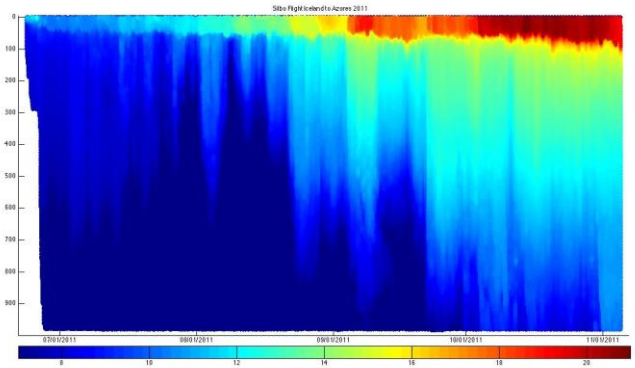

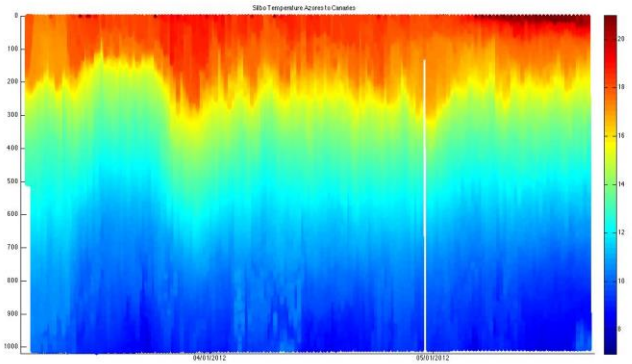

- Atlantic crossing mission / Challenger-One program.
- 614 days mission / 4925 dives@1000m. depth / 12030 kms.
- Deployment: Reykjavik (Iceland) /Recovery: Barbados (Caribbean).
- Refurbishment: Sao Miguel (Açores) and Gran Canaria (Canary Islands).
- Seawater parameters sampled: conductivity, temperature and pressure.
- Partnership with Teledyne Webb Research (USA) and Rutgers University (USA).

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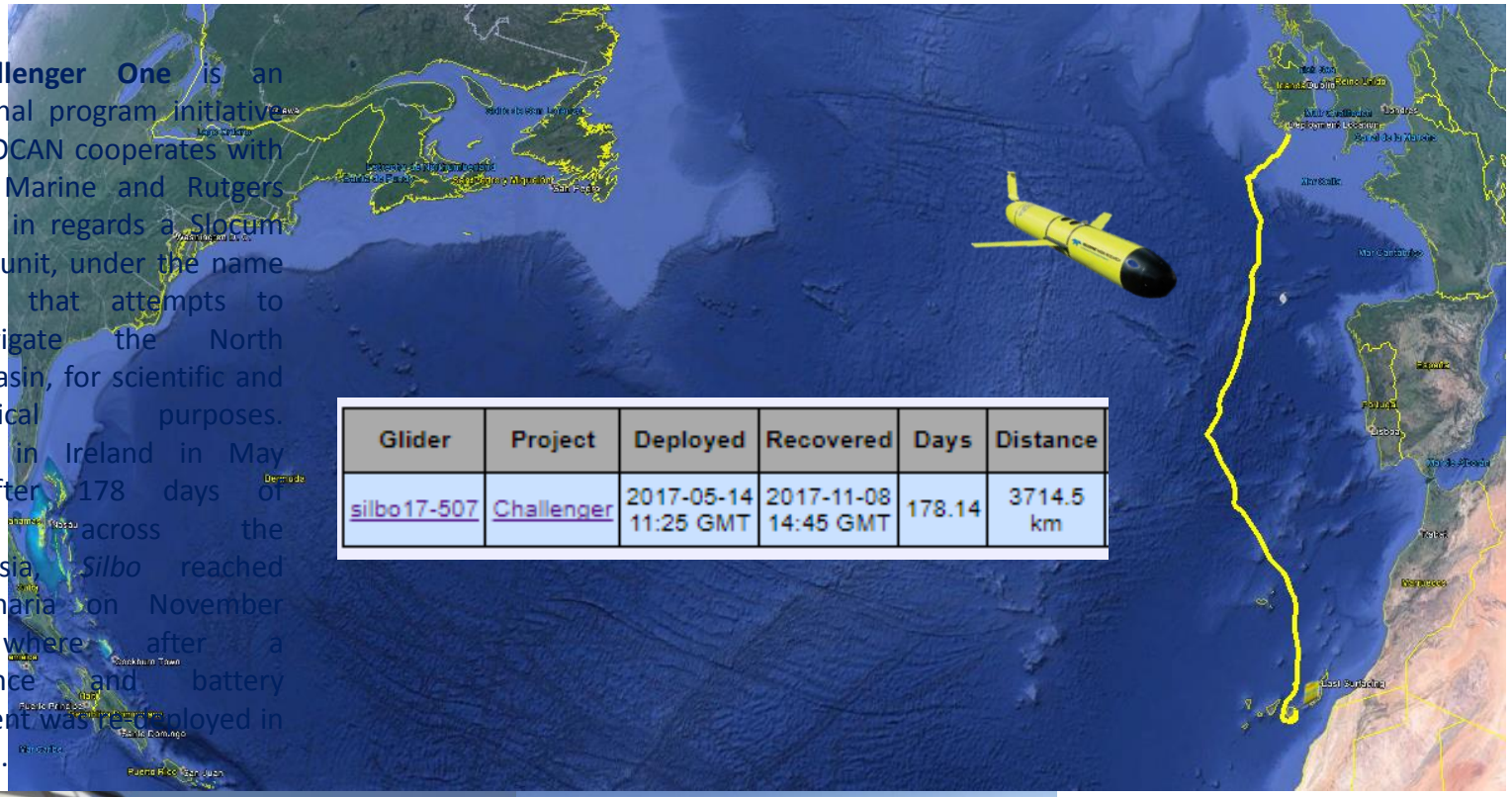
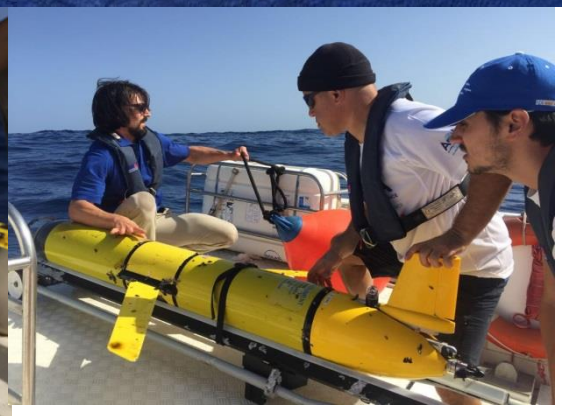
GLIDER MISSIONS ACROSS THE MACARONESIA

The **Challenger One** is an international program initiative where PLOCAN cooperates with Teledyne Marine and Rutgers University in regards a Slocum G2 glider unit, under the name of ***Silbo,*** that attempts to circumnavigate the North Atlantic basin, for scientific and technological purposes. Deployed in Ireland in May 2017, after 178 days of navigation across the Macaronesia, *Silbo* reached Gran Canaria on November 2017, where after a maintenance and battery replacement was redeployed in April 2018.



Glider	Project	Deployed	Recovered	Days	Distance
silbo17-507	Challenger	2017-05-14 11:25 GMT	2017-11-08 14:45 GMT	178.14	3714.5 km



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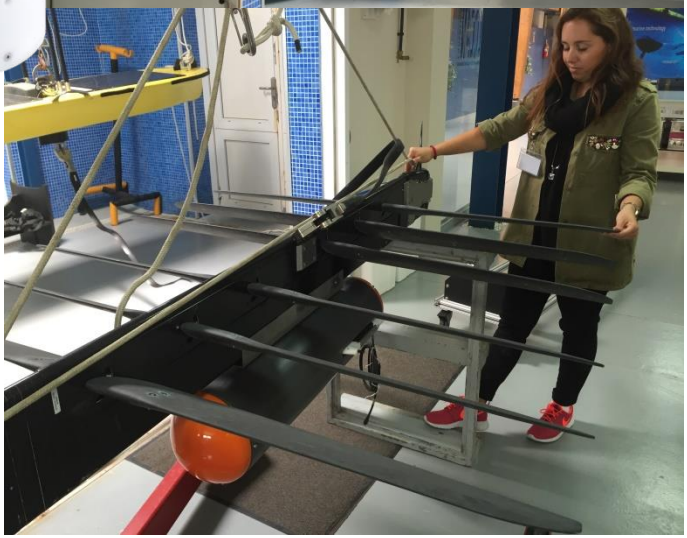
GLIDER MISSIONS ACROSS THE MACARONESIA



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GLIDER MISSIONS ACROSS THE MACARONESIA

Oceanographic cruise MSM61 aboard the German research vessel **RV/Maria S. Merian** to study the physical and bio-geo-chemical characterization of the outstanding ecosystem of the **Senghor Sea Mount** located Northwards **Cape Verde Archipelago**, and to assess the operational response and capability of new, autonomous oceanic observation technologies in real operational scenarios.

The study is part of the **AtlantOS EU-project**, and includes deploying and operating a range of autonomous observation equipment and platforms, such as multi-parameter modules anchored in the water column and on the seabed, autonomous surface marine vehicles (gliders) - SV2 and SV3 Wave Gliders - and profilers (Slocum G2-1000), all fitted with specific sensor equipment for taking samples and data in-situ, in response the scientific and technical needs and objectives set for the mission and the project.

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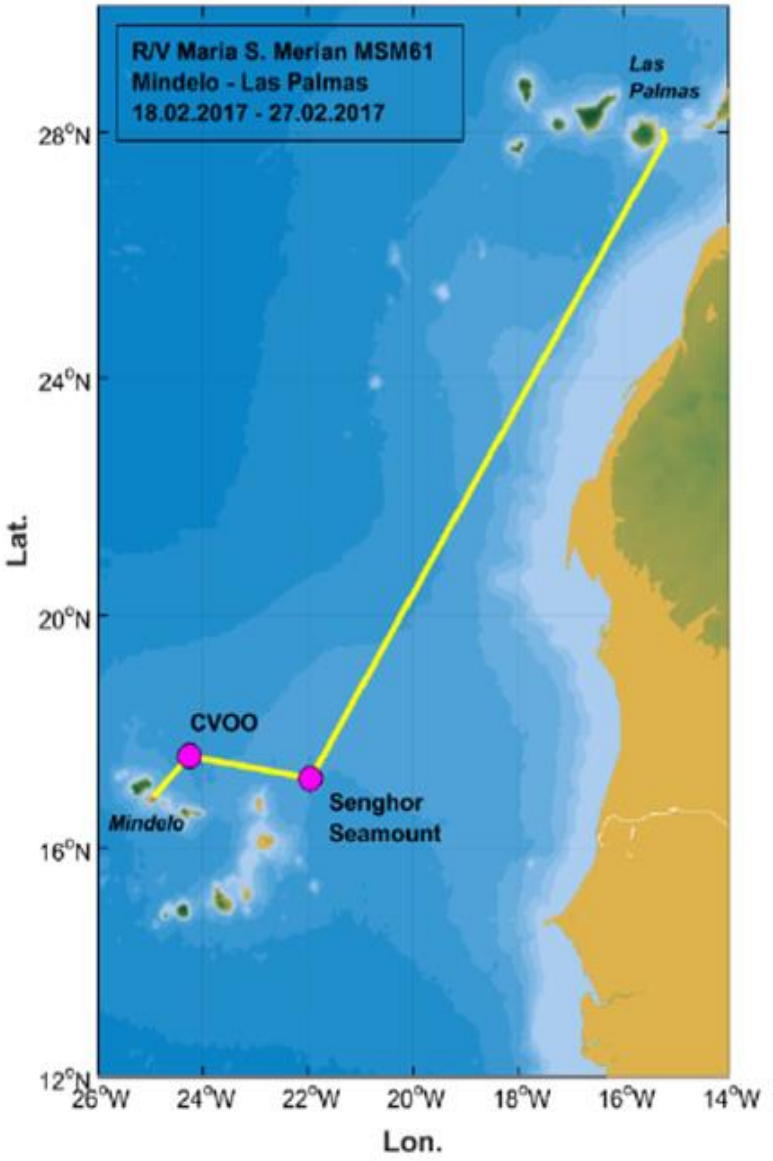

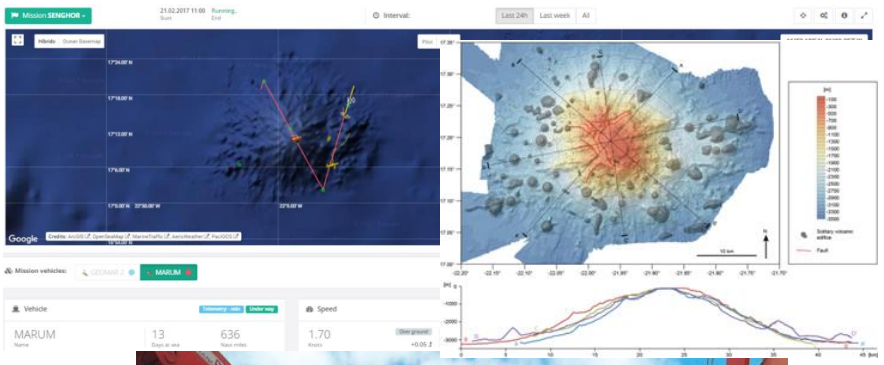

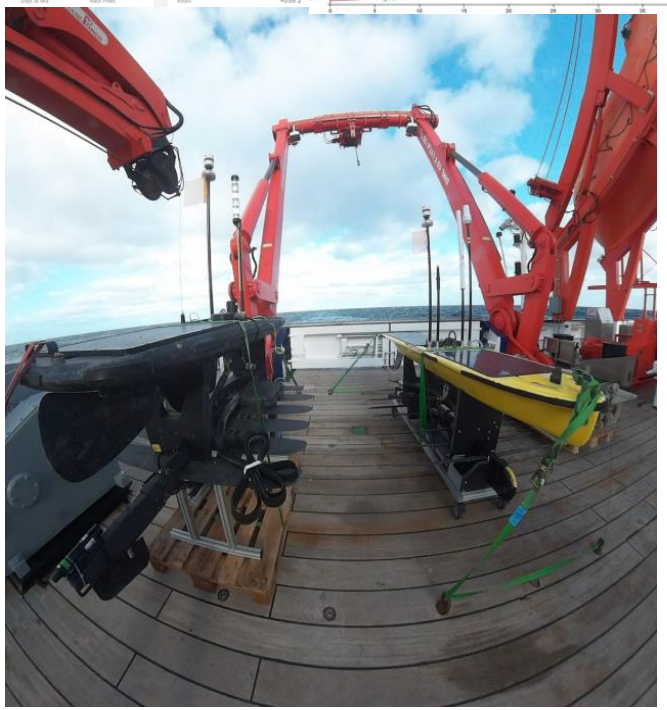

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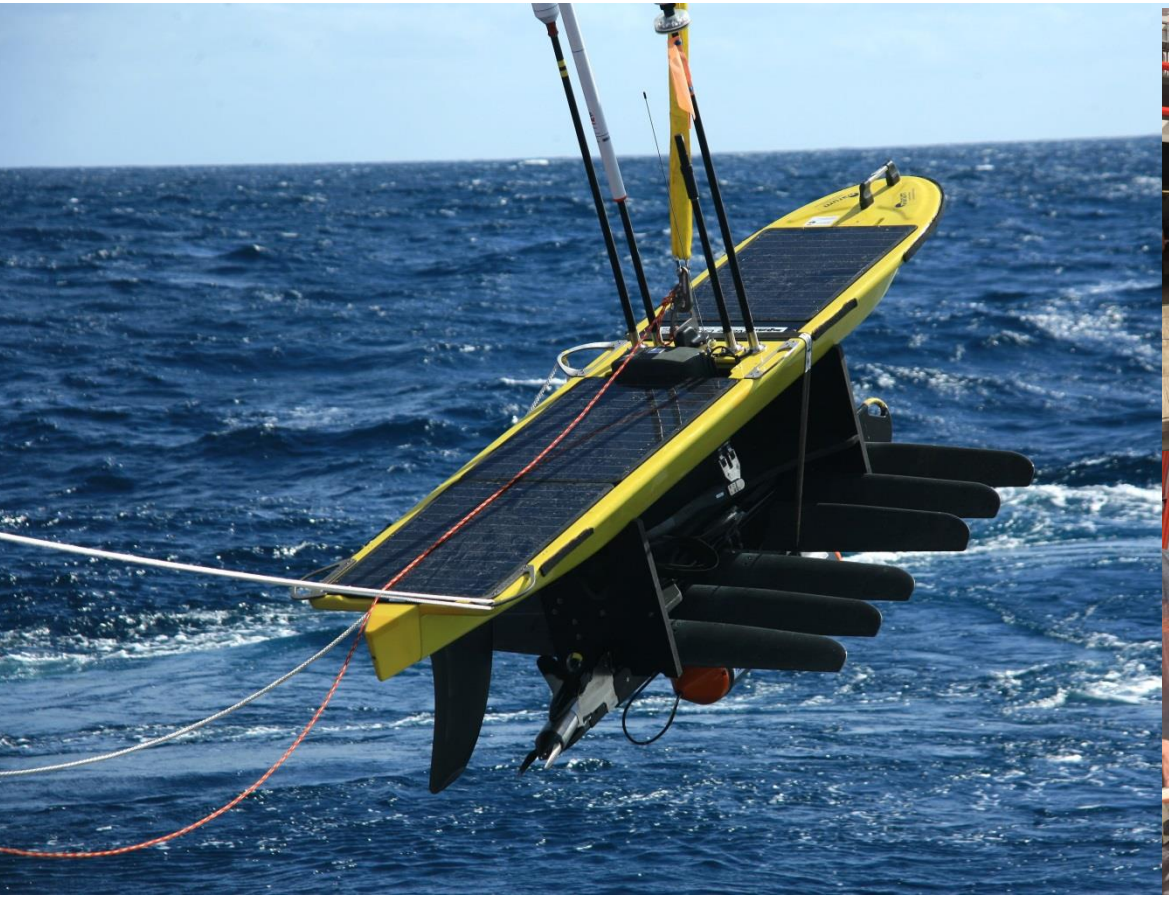

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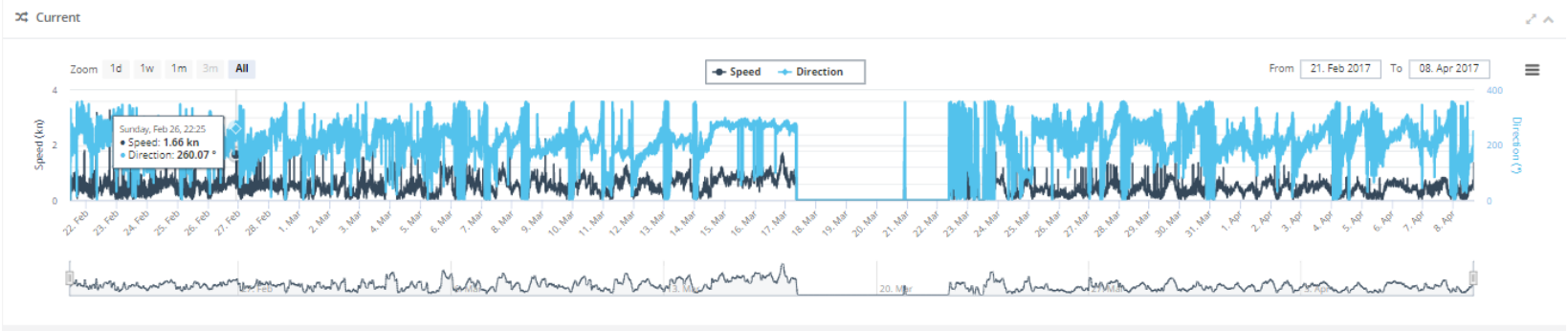

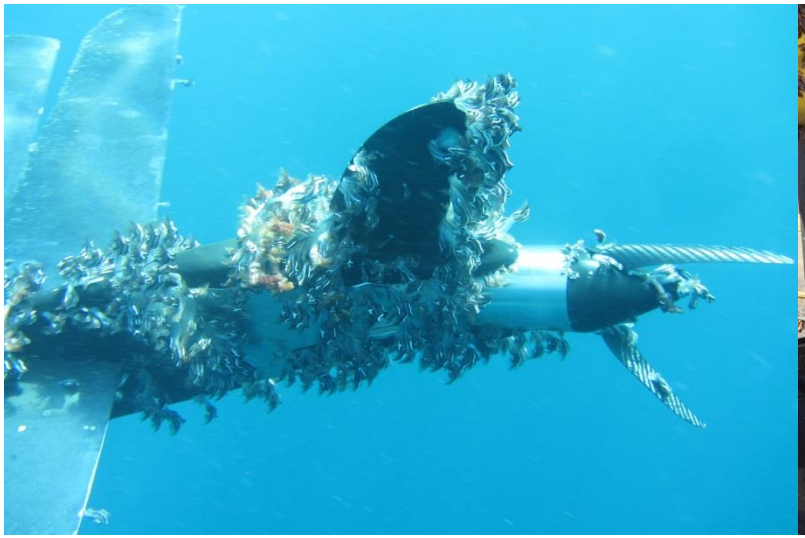

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Thank you / Muito obrigado

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