PLOCAN consorcio

Plataforma Oceánica de Canarias

Ciencia y Tecnología para la Sostenibilidad del Océano Profundo

Multi-instrumental observation development for exploration and exploitation of deep sea ocean resources

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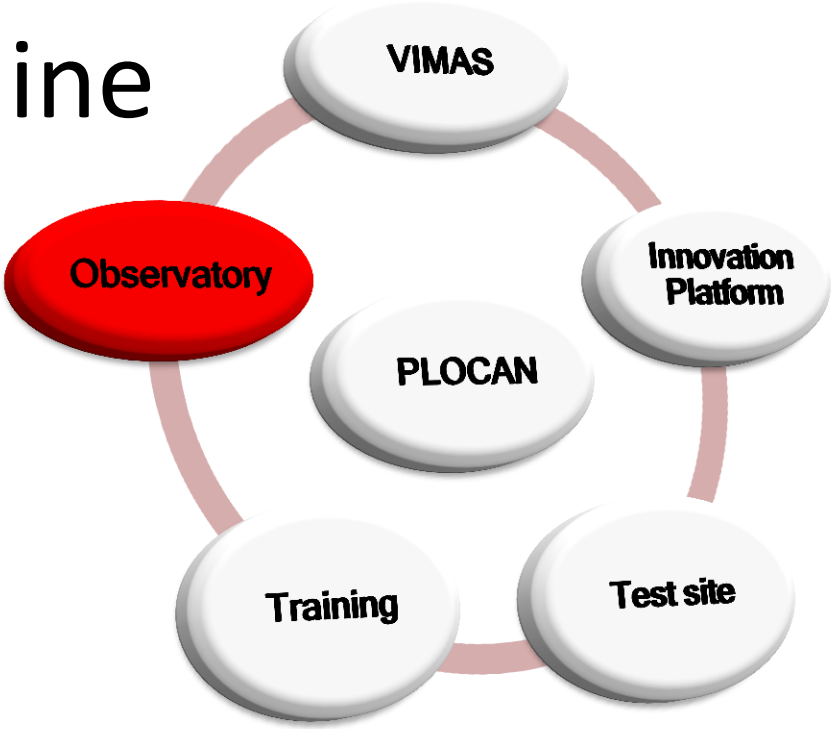
ATLANTIC FORUM
Coastal and Deep Sea Natural Resourses

Outline



- Introduction
- Objectives
- Drivers
- Capacities
- Standards and interoperability
- Oceanic observing research infrastructures

PLOCAN consorcio PLATAFORMA OCEÁNICA DE CANARIAS

MINISTERIO DE ECONOMÍA Y COMPETITIVIDAD

Gobierno de Canarias

canarias OBJETIVO de PROGRESO

Observatory

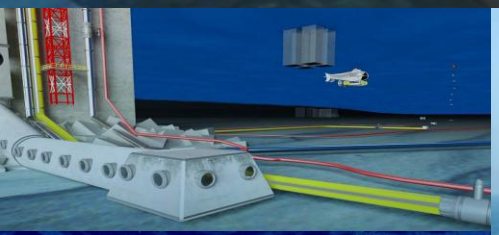
Innovation

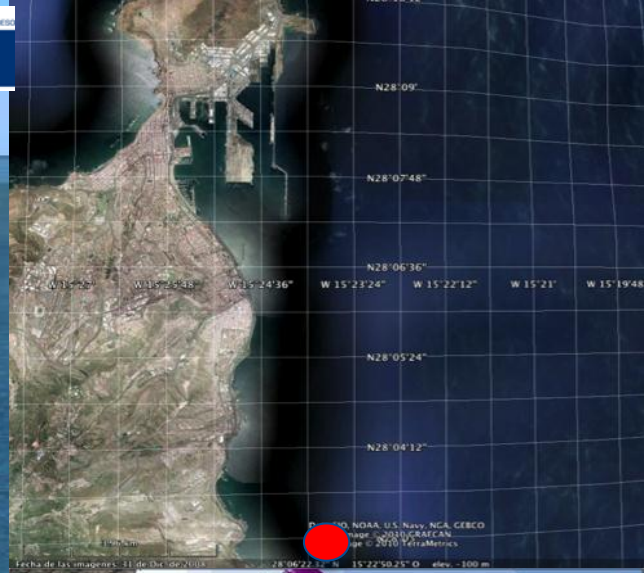
PLOCAN

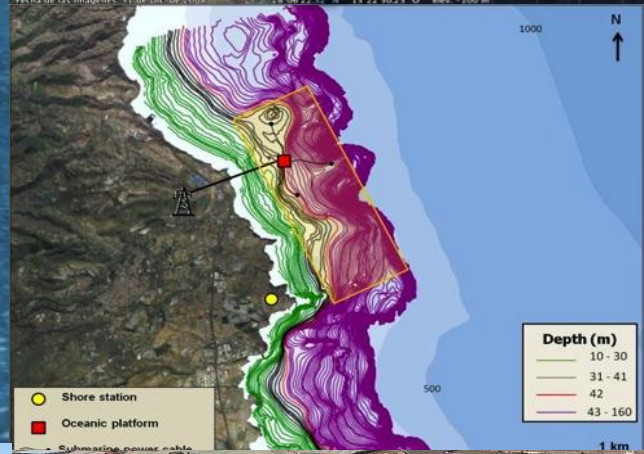
Test site

Training

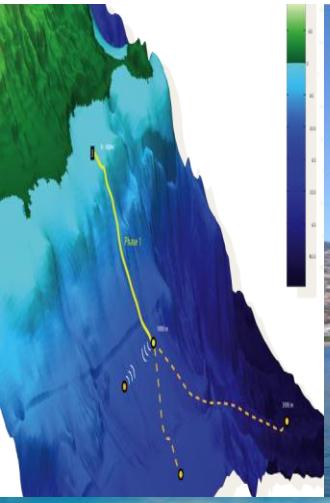
Underwater Vehicles

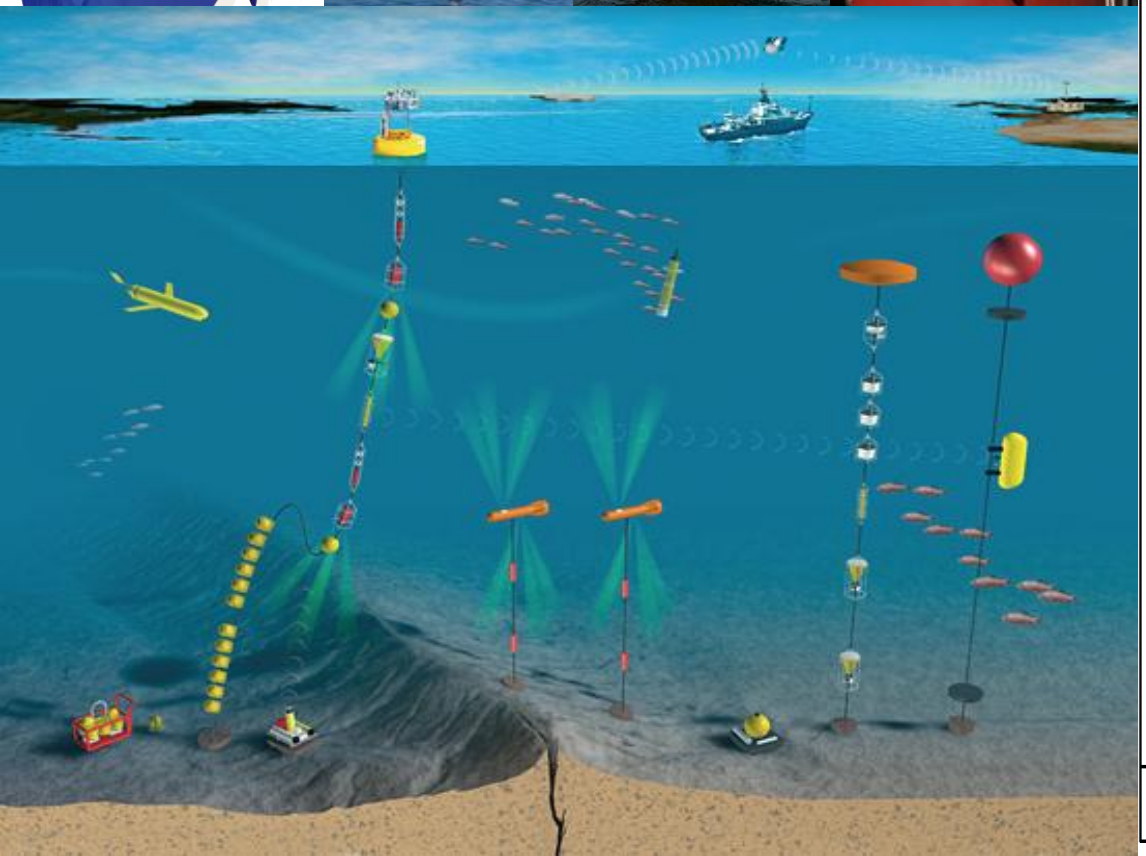


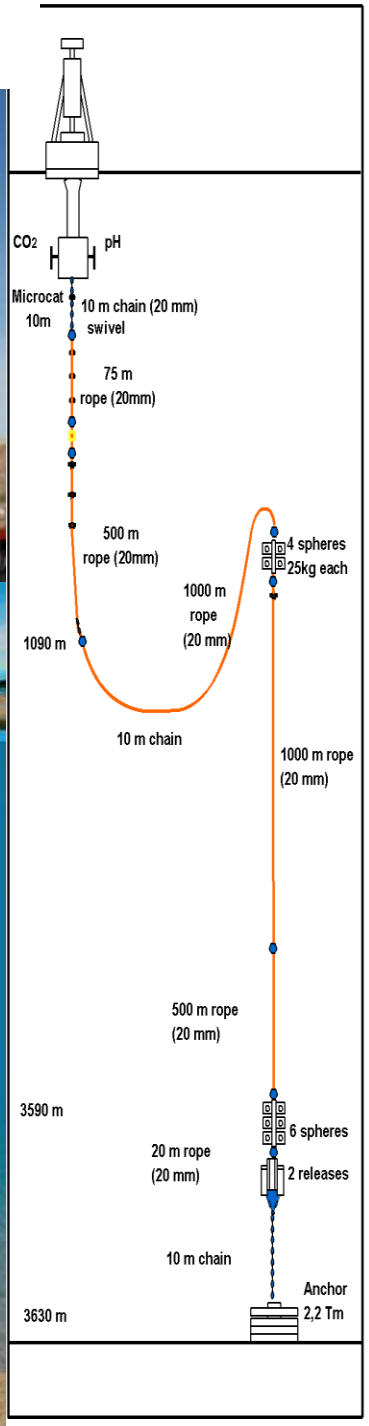


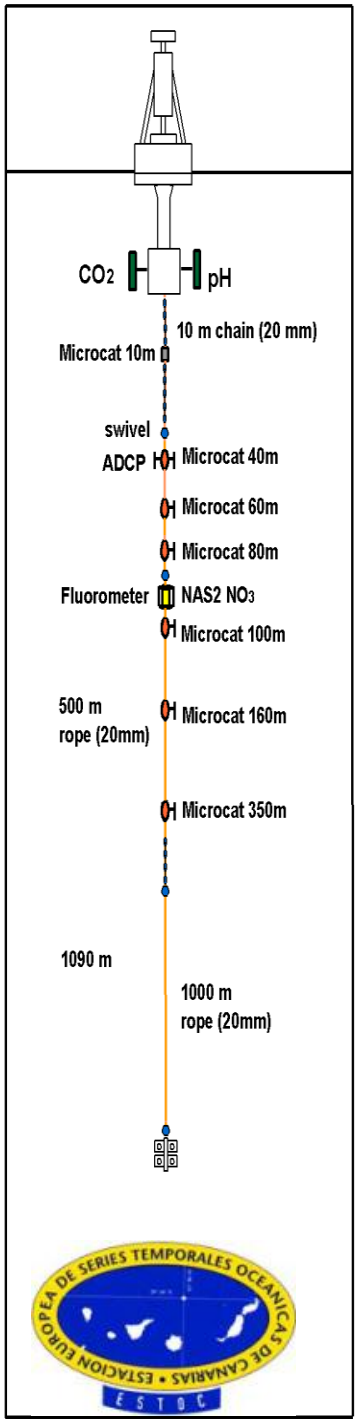


OCEANIC OBSERVATORY







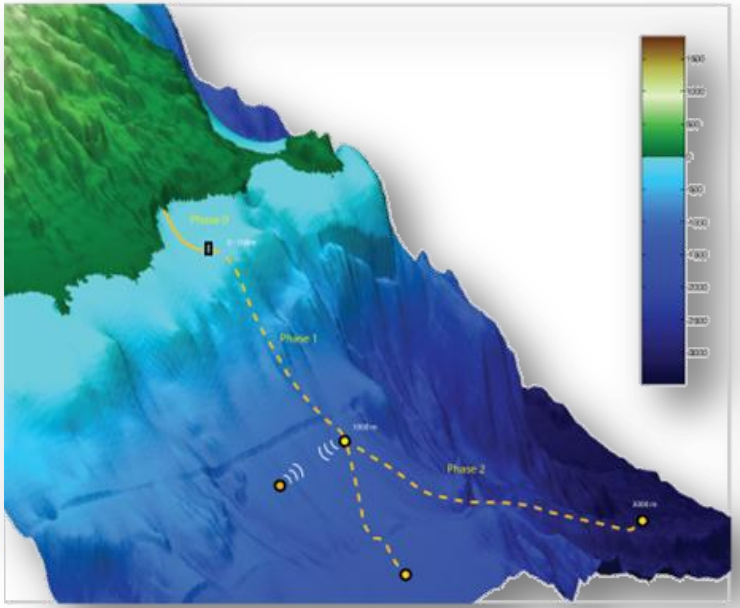


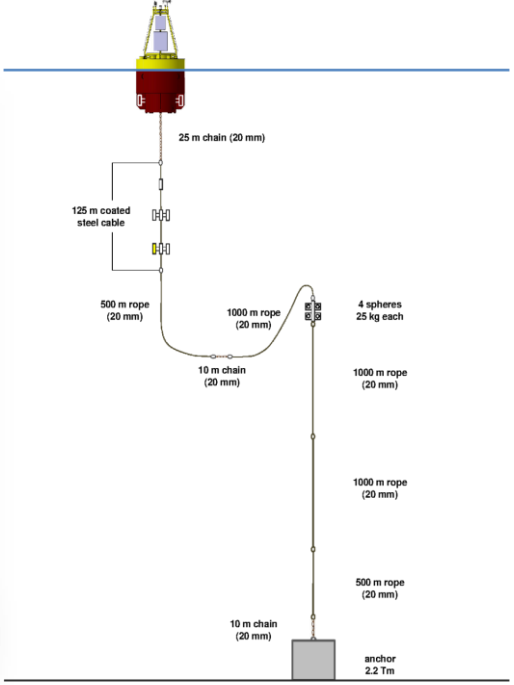
Taking the pulse of the C.-E. Atlantic Ocean at increasing depths

- ✓ The continuous volcanic tremor, frequent landslides, intrusions, and seabed stability
- ✓ Deep ecosystems monitoring, e.g. new species and adaptation to extreme environments
- ✓ Explore untapped resources
- ✓ Study the importance of subtropical gyres in the carbon flux, point out trends from seconds to decadal time scales and elucidate the degree and conditions within the climate change is happening (pCO_2, acidification).
- ✓ The important influence of Saharan aerosols on the ocean biogeochemistry
- ✓ The African coast upwelling, the North-Atlantic subtropical gyre and mesoscale structures occurring south of the islands.
- ✓ Provide information about the connection between the regional systems variability and its contribution to global change, as well as study the oceanic processes dynamics at different scales

Taking the pulse of the C.-E. Atlantic Ocean at increasing depths

- ✓ The Canary Islands were recognized by the International Maritime Organization (IMO) as a Particularly Sensitive Area (PSSA) in 2005 . Due to the chosen criteria for this recognition, being ecological and scientific as well as socio-economical, it is expected that the observatory infrastructure of the Canary Islands node will contribute to the monitoring and protection of the area.
- ✓ Harmonizing and contributing to the construction and operation of large distributed Research Infrastructures, dedicated to Global Monitoring for Environment and Security (GMES).
- ✓ New instrument testing and Environmental Impact Assessments of human activities: warrant environmental safety of PLOCAN tests, starting with the planned test site (off-shore aquaculture farms, ocean energy conversion system, new instruments, S&T experiments, etc.).





Taking the pulse of the C.-E. Atlantic Ocean at increasing depths

Regional Observing system (ESTOC-PLOCAN)

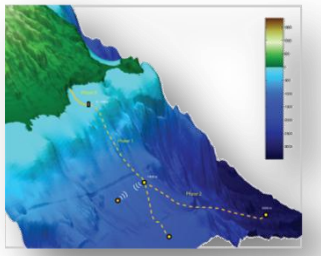
Coastal Observing system (1st phase: secured funds for cable down to 100m, 4km offshore, deep water planned)

Mobile Observing platforms (3 gliders ready to operate at the regional station, down to 1500m depth)

CI: Interoperable, service oriented

PLOCAN Observatory is associated to **ESONET** and has been accepted as an **EMSO** site infrastructure . All observatory components are open to science and R&D projects with third parties, including sensor connection and testing.

Existing and planned capacities



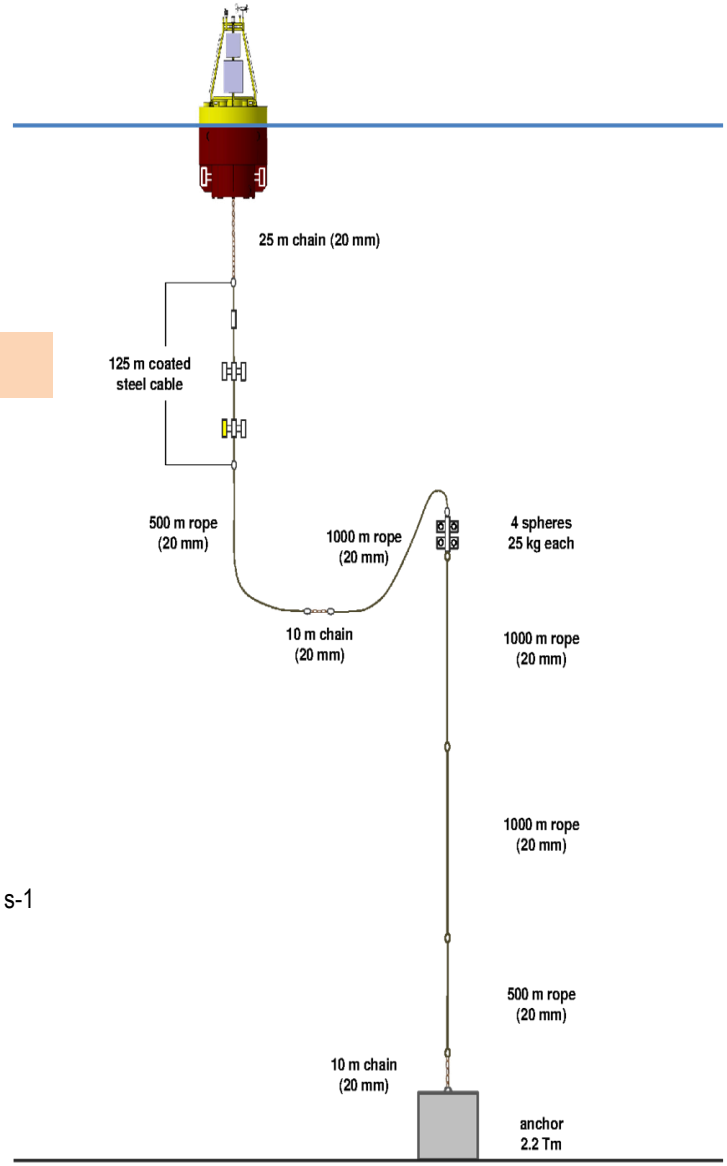
- **Coastal node**

Type of sensor	Range	Accuracy	Sampling frequency
Conductivity	0 to 9 S/m	0.001 S/m	4 Hz
Temperature	-5 to +35°C	0.01 K	4 Hz
Pressure	0 to 300 bar	0.1 % FSR	4 Hz
Dissolved oxygen	0 to 500µM	5%	0.01 Hz
Carbon Dioxyde (pCO2)	0 to1000 ppm	<1%	0.2 Hz
Turbidity	0 to 150 NTU	10%	1 Hz
Currents	0 to 2 m/s	2%	1 Hz
Passive acoustic array	50 to 180 dB re 1 µPa	+-3dB	192 KHz
3 axes Seismometer - 1m deep @1500m	Adjustable	Pr. High SNR	Min 20Hz
Vision system	TBD	TBD	TBD
Chl-a	TBD	TBD	TBD

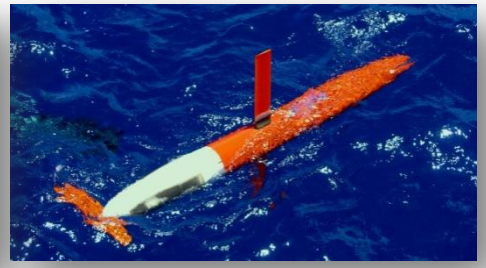
Existing and planned capacities

- Oceanic node

Sensors	Company	Model	Measuring Range	Accuracy	Resolution
Wind direccion and speed	RM Young	05103V	0-100m/s 0-360^{o}	± 3m/s ±3^{o}	
Wind direccion	Vaisala	WXT520	0-360^{o}	±3^{o}	1^{o}
Wind Speed	Vaisala	WXT520	0-60 m/s	<±5%	0,1m/s
Air Temperature	Vaisala	WXT520	-52^{o}C to 60^{o}C	±3% at 20^{o}C	
Barometric Pressure	Vaisala	WXT520	600 - 1100 hPa	≤1hPa	0,1hPa
Humidity	Vaisala	WXT520	0 - 100% RH	±3%	0,1% RH
Air Temperature	Vaisala	HMP155	-80 to 60 ^{o}C	±(0.07 + 0.0025 x temperature) °C	
Humidity	Vaisala	HMP155	0 - 100% RH	±(1.0 + 0.008 x reading) %RH	
Barometric Pressure	Vaisala	PTB110	800 - 1060 hPa	±0,3 hPa at 20^{o}C	0,1hPa
Solar Radiation	Apogee	SQ	0-2000 µmol m-2 s-1	±5%	5.00 µmol m-2 s-1 per mV
CO2	TBD	TBD	>600ppm	1 ppm – 0.2Hz	<0.01 ppm
pH	ULPGC	SW-3	7- 8.5		
Water Temperature	Desin	Pt100	0-50^{o}C		0,1^{o}C
Water Temperature	SeaBird	SBE-37	-5 to 35 ^{o}C	0,002^{o}C	0,0001^{o}C
Water Conductivity	SeaBird	SBE-37	0 to 70 mS/cm	0,003 mS/cm	0,0001mS/cm
Water Temperature	SeaBird	SBE-3	-5 to 35 ^{o}C	±0,001^{o}C	
Water Conductivity	SeaBird	SBE-4	0 to 7 S/m	0,0003 S/m	
Chlorophyll	Turner	Cyclops-7	0 to 500 µg/L		0,025µg/L
Turbidity	Turner	Cyclops-7	0 to 3000 NTU		0,05 NTU
Hydrocarbon Detector	OPW				



Mobile platforms


- In support to the planned real-time observing capacity, autonomous platforms will provide characterization and calibration capability to the observatory
- Three deep-sea gliders were recently acquired, some are already operating in Spanish waters. Besides the conventional suite of sensors they will be equipped with an on-board ADCP.

Continuous power & real-time communication

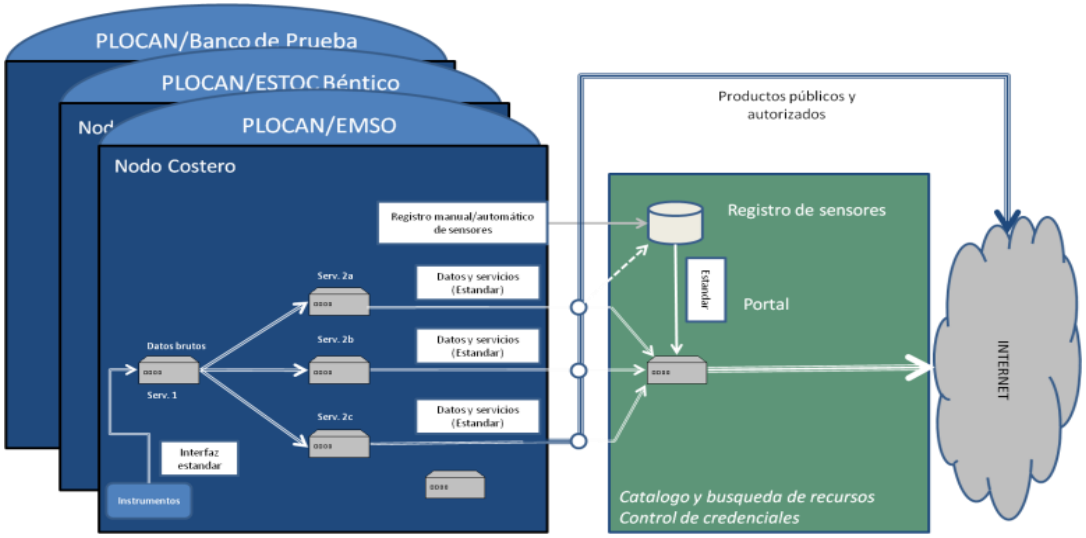
All fixed sensors are planned to receive continuous power and be connected to a broadband communication link for real-time or near real-time data transmission and interface control.

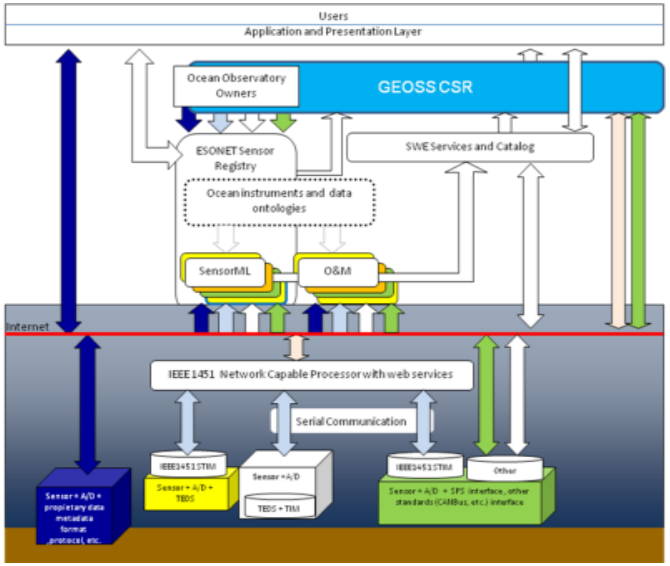
Infrastructure standards and interoperability

Physical or virtual standard interfaces shall be used for observatory sensors and interconnection systems, focusing on interoperability with regard to sensor metadata and physical connection.

Time synchronization will be achieved across sensor platforms through the implementation of standard timing protocols, in agreement with time precision requirements in fields like seismic and acoustics.

PLOCAN observatory nodes and sensor packages will seek progressive compliance and harmonization with current practices in ocean and earth observation systems.





Ocean Observing Research Infrastructures

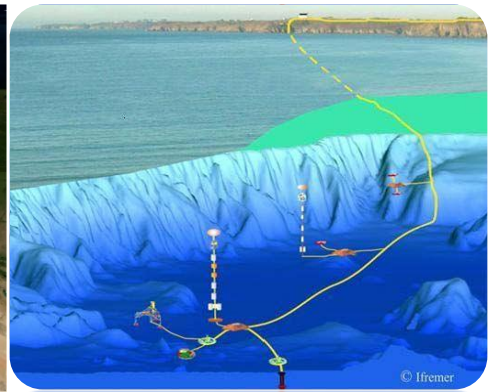
european multidisciplinary seafloor observatory emso

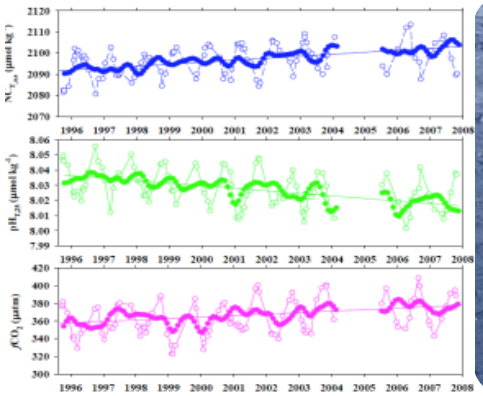
ESONET NOE

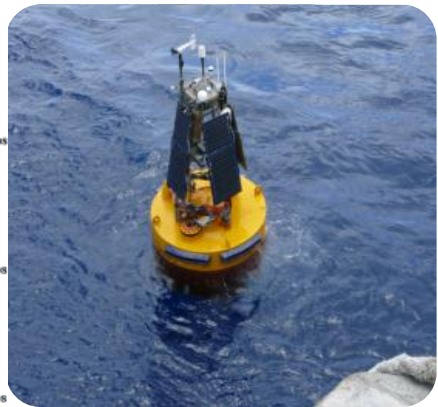
integrated carbon observation system

- Focus: Ocean observatories
- EMSO in preparatory phase, in progress to present an ERIC
- EMSO ERIC funded on the basis of national formal support (EU approx. 10%)
- PLOCAN accepted as EMSO site in 2010

- Focus: Carbon Observation
- ESTOC-PLOCAN part of the ocean-based carbon observing infrastructure
- Candidate as ICOS Ocean Thematic Centre
- Collaboration with ULPGC/QUIMA







Ocean Observing Research Infrastructures

- ✓ Develop long-term strategic plan for European oceanic observing infrastructures (funding, master plan, operation, overall coordination, …).
- ✓ Maximise synergies at EU level and within member states
- ✓ Better coverage of the Atlantic area, especially long-term observation of critical parameters.
- ✓ Trans-Atlantic cooperation of observing infrastructures (e.g.: EC-COOPEUS)
- ✓ Move from research based to long term sustained data acquisition, ensuring full access to data for all users, value for users and responding to societal needs…
- ✓ Strengthen innovation capacity in ocean observation (multi-use infrastructures, public-private partnership initiatives, …)
- ✓ More engaged in society / education

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MUITO OBRIGADO!

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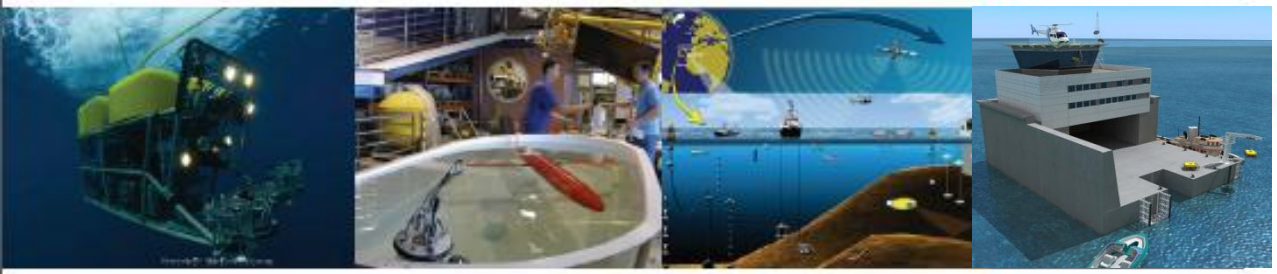

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