AULAMAR: A SCHOOL PROJECT FOR COASTAL OCEANOGRAPHY

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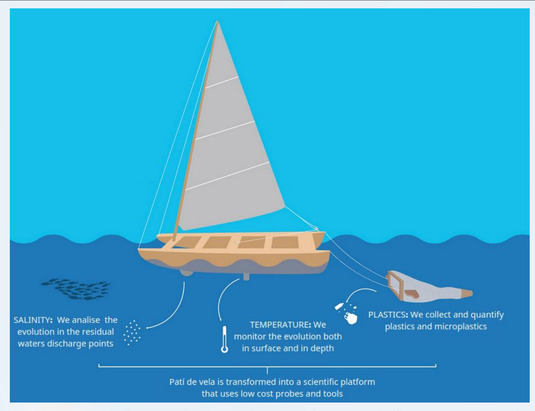
INTRODUCTION

Photos: (Left) A summer day at Bogatell beach (Barcelona). (Rigth) Trash on one of the Barcelona's beach a common summer morning.

AULAMAR is an ongoing educational project born with the **objective** of **promoting a harmonic relation between the citizens of Barcelona and the sea**. Today, **Barcelona's coastal ecosystem** is in a state of **vulnerability** due to the **pressure of urban activity and climate change** (Harley *et al.*, 2006). Furthermore, the **pressure of tourism** during the last decade has reduced the possibility for the citizens to be fully aware of the health and emotional values of its marine environment. **To help revert this situation**, we have designed **AULAMAR** with the will to **offer tools to better understand the city's coastline** and **encourage a critical reflection**. It is devised as both a real **oceanographic research project** and a **science education project for high school students in the framework of citizen science.**

Background - Pati Cientific

AULAMAR is the continuation of the successful experience of the Patí Científic, a citizen science project (Ortigosa *et al.*, 2022) where sensor prototypes were developed and installed in sustainable recreational sailing devices (*i.e.* boats, rowing, surfing kayaking).



Patí Científic infographic adapted from J. Mulet

HOW?

AULAMAR in high schools

Build

low cost monitoring sensors (**temperature-depth profilers**, **bathymetric probes**, **multi-parametric fixed stations** and **microplastics tow nets**)

Measure

Coastal sea water quality
Temporal evolution
Climate and anthropogenic dependency

Analyse

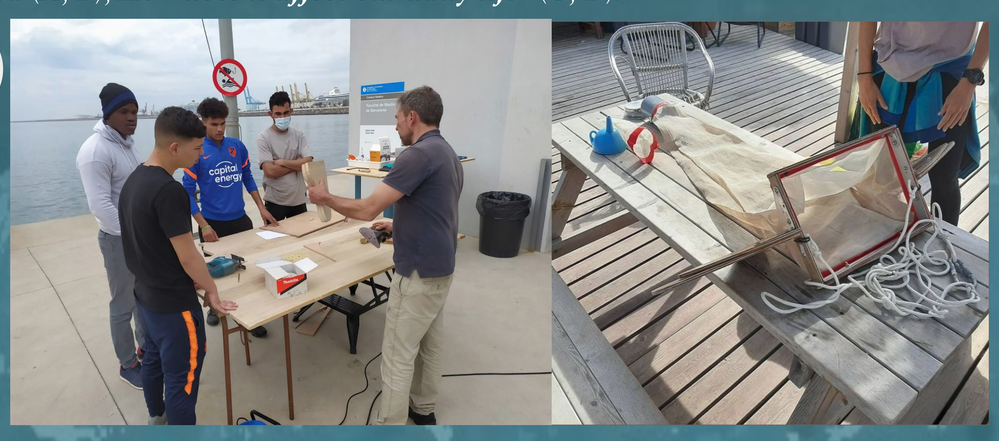
Data collected from all schools and research centers.
Available on open database

Increase sensibility

1) Microplastics workshop (April → June 2022)

Addressed to Hostelry students from IMPULSEM Foundation which aims to help young people at risk of labor expulsion to get professional formation. The context was focused on plastic marine pollution with the following goals: ***Why is there plastics in the Sea?*** (presentation of the problems, not shown); ***How to measure the concentration of plastic in the Sea*** (A, B); ***How does it affect our daily life?*** (C, D).

A



The context was focus on the plastics on the sea, with the purpose of manufacturing various microplastics tow nets, used by researchers and laymen.

B

Participate in a cruise to collect microplastics with the sailing vessel "Barcelona" of FNB-UPC.

C

IMPULSEN students visiting Barceloneta fishing dock to talk about "what are the plastics collected by local fishermen".

D

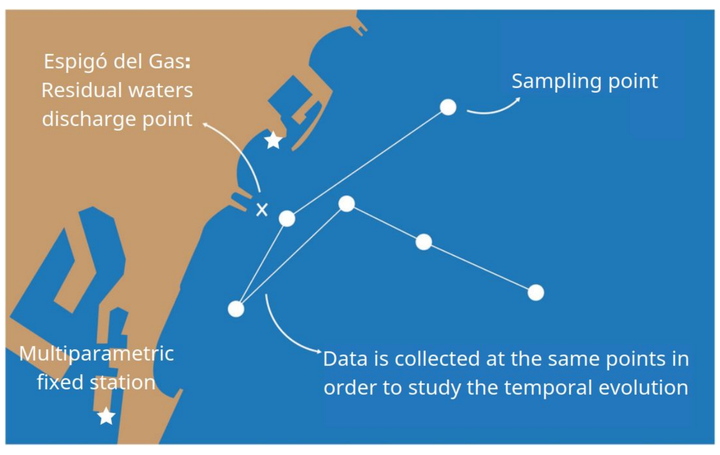
IMPULSEM students performed a fish dissection in the ICM-CSIC facilities

E

Microplastics workshop ended with a local fish meal offered by IMPULSEM students

2) Next workshops (September → December 2022)

Addressed to undergraduate student from Barcelona. The objectives are focused on providing **knowledge** and **tools** to monitorize Barcelona coastline (scheme below).



Scheme (adapted from J. Mulet infographic) of Barcelona coastline: future Multi-parametric stations (stars); Temp. profile sampling (circle); Bathymetric probe along the beach.

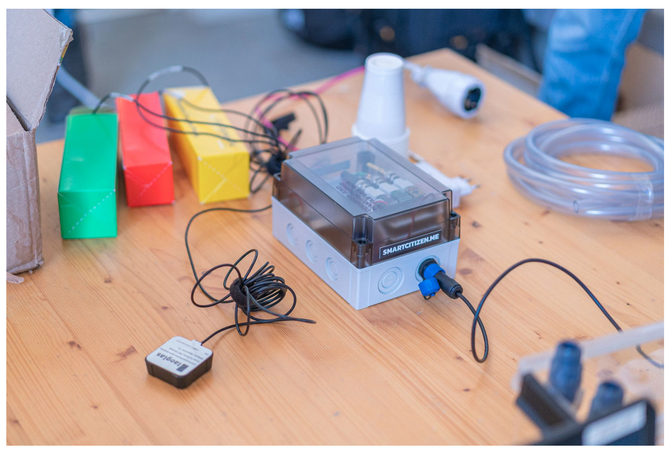


Photo: Multi-parametric station (https://fablabbcn.org/) to measure Temp., Cond., pH and oxygen (Atlas scientific sensors)

Photos: Temp.-Depth profiler (left) & Bathymetric probe (right), developed by J. Puigdefabregas (Universitat de les Illes Balears) for the Patí Científic (www.paticientifi.org) & SeCosta (https://secosta.wordpress.com/) projects.

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References

➢ Harley, C.D.G., et al. (2006). The impacts of the climate change in coastal marine systems. Ecol. Lett., No. 9(2), paper no. 228-241;
➢ Ortigosa, I. et al., (2022). Barcelona Coastal Monitoring with the "Patí a vela", a traditional sailboat turned into an oceanographic platform. Journal of Mar. Sci. Eng.