PLOSEG
Plataforma de Observación Submarina del Estrecho de Gibraltar

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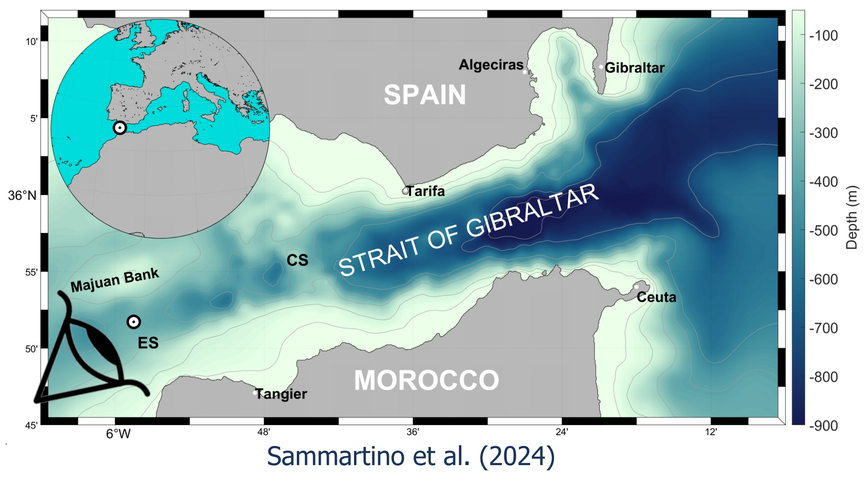


Sammartino et al. (2024)

Aiming to monitoring the properties of the Mediterranean outflow in the Strait of Gibraltar, a station was first deployed in 2004 in **Espartel Sill** (ES), the last topographic constriction that Mediterranean waters encounter before spreading into the Atlantic Ocean. The location was chosen due to the more regular properties of the outflow here compared with what happens in the main sill of the Strait (Camarinal Sill, CS), a few km to the east.

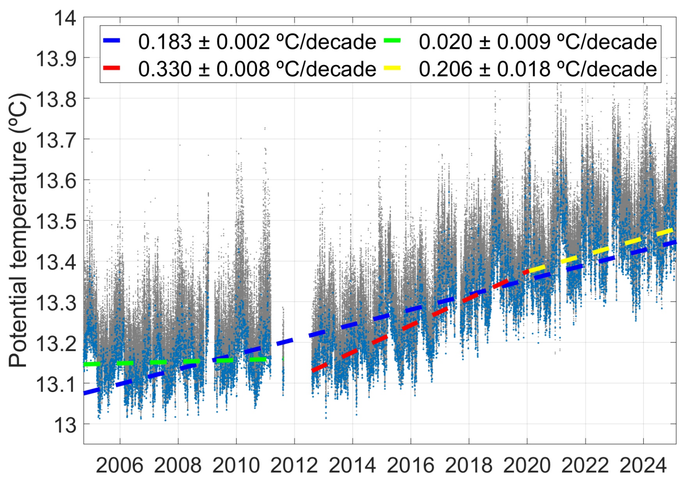
To date, **48 deployments** have been completed!

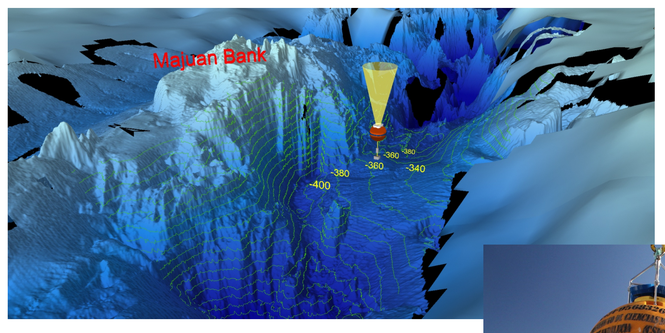
THE MONITORNING STATION

The monitoring station has evolved over time towards more complex configurations, including the incorporation of biogeochemichal sensors mounted on a cage. Upgrades have been focusing on improving the vertical resolution and accuracy of the velocity measurements, for which a down-looking ADCP aimed to resolve the bottom boundary layer was installed in 2016 and the main up-looking ADCP replaced in 2019 (RDI Workhorse 75 kHz ADCP → Nortek Signature 100). However, inaccuracies resulting from the motions of the subsurface buoy housing the instruments (tilt, lift, vibration) still persist.

INTRODUCTION

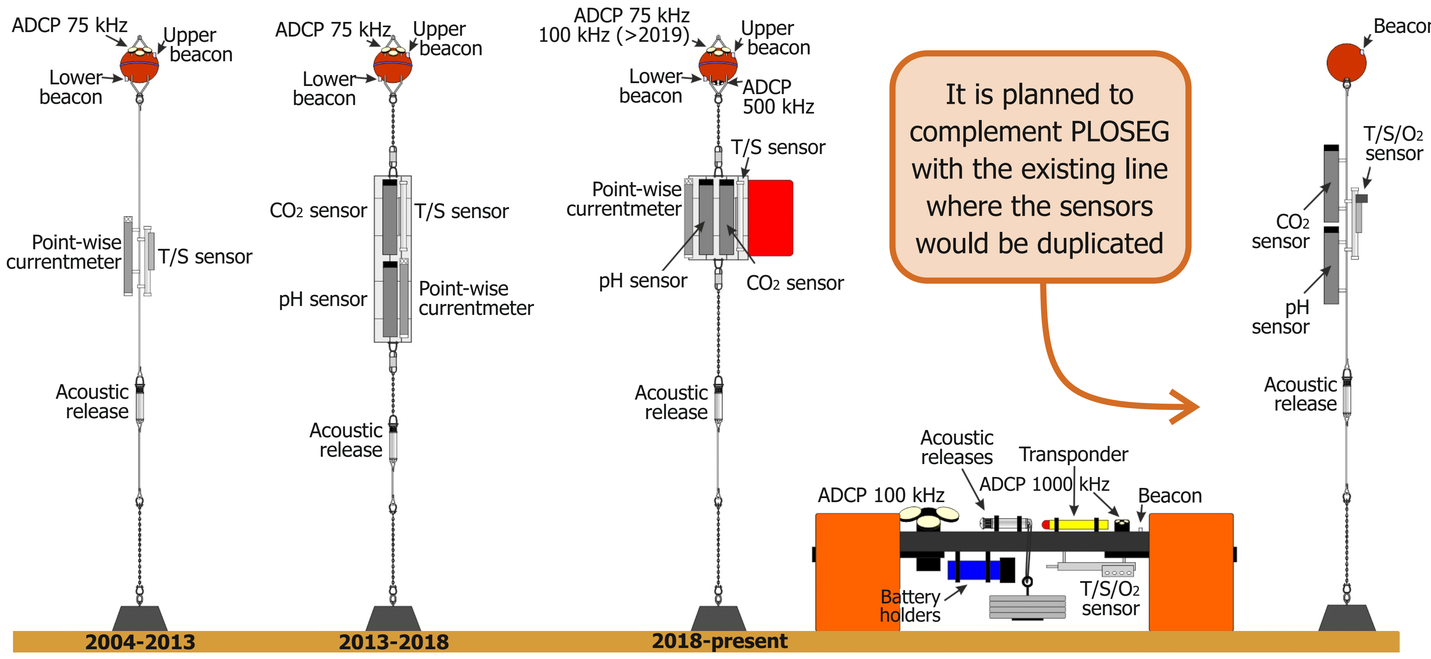
The freshwater deficit of the semi-enclosed Mediterranean Sea is compensated by a net flow through the **Strait of Gibraltar**, which is the result of a two-layer (baroclinic) exchange with the Atlantic ocean, the Atlantic water flowing into the Mediterranean Sea at the surface and the Mediterranean water flowing out underneath.



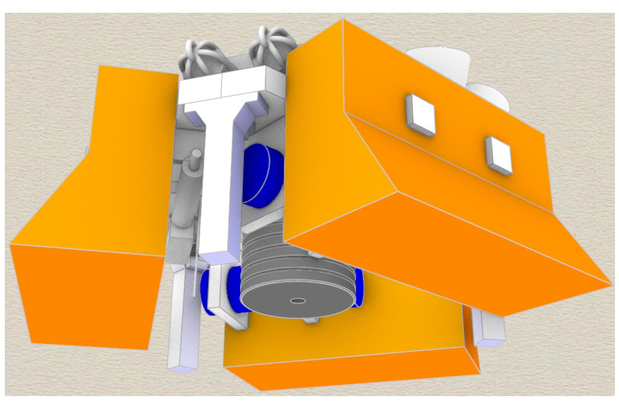


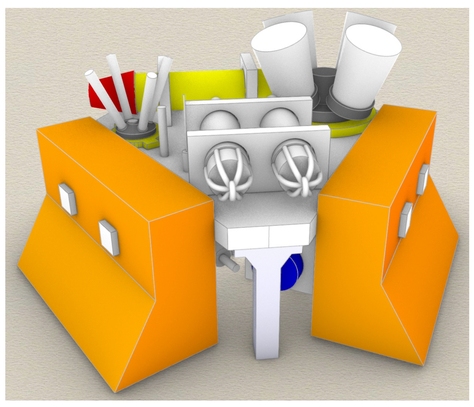
Reliable estimates of these flows and their variability are basic requisites for the oceanographic community studying the Mediterranean Sea.

They have been carried out using hydraulics, basin-scale mass and energy balances and numerical models (including fully 3D models) that must be validated with observations. Therefore, **in situ measurements become crucial**, not only because they allow for independent estimates by themselves, but also for numerical validation purposes. Additionally, the privileged location of the station provides robust hints on the basin-integrated changes the Mediterranean Sea is presently undertaking.



PLOSEG: PLATAFORMA DE OBSERVACIÓN SUBMARINA DEL ESTRECHO DE GIBRALTAR





PLOSEG is a compact and robust seabed mounted structure that has been designed within the frame of **ESMER4** project(*). It guarantees the proximity of the instruments to the seafloor and avoid the detrimental motions of a conventional mooring line. Built with high-tensile strength **DELRIN** thermoplastic and titanium screws for corrosion resistance, it houses various oceanographic instruments, including:

- A Nortek Signature 100 short-body model with two external alkaline batteries.
- A Nortek Signature 1000.
- A SBE37-SMP-ODO for measuring conductivity, temperature, and dissolved O_2.
- Two paired iXblue Oceano R5 acoustic releases, attached to a 150 kg fungible weight.
- A Kongsberg cNODE Midi transmitting the position and inclination of the platform.
- Two Argos Xeos XMA-11K beacons.
- Three custom-designed DeepWater Buoyancy floating modules.

Several advantages characterize PLOSEG:

1. The distance from the main ADCP to the bottom is **notably shortened** (17 m in the conventional mooring line to 0.5 m in PLOSEG).
2. Its double external battery power supply **reduces the station's maintenance frequency** (4–6 months → 1 year).
3. The second, higher frequency ADCP, now lodged in up-looking mode in PLOSEG, **avoids the bottom interference** that occurs in the down-looking mode when it is installed in the subsurface buoy, providing better profiles of the bottom boundary layer.
4. The fixed structure eliminates vibration and other unwelcome motions of the traditional subsurface line, providing a clear advantage in terms of **quality of the profile** obtained and reduction of background noise.

PLOSEG is scheduled for its inagural deployment in June 2025!

EXPLORE A 3D SCHEME OF PLOSEG HERE!

REFERENCES

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S. Sammartino et al., "Coupled echosounder and Doppler measurements in the Strait of Gibraltar", Scientific Reports, vol. 14, 2024, doi: 10.1038/s41598-024-82670-7.

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