

Newsletter BIODHYL #1

June 2024

PARTNERS



CONTEXT

The current trend is to limit or eliminate cleaning operations in farms in order to preserve their reef effect, and thus reduce their environmental impact, while drastically limiting maintenance costs. This is only possible if the phenomenon of biocolonisation is sufficiently understood to be anticipated.

A focus on mooring lines and dynamic cables seems essential, as these key components are presumed to have different hydromechanical behaviour and therefore different wear once colonised. As biocolonisation can vary according to environmental conditions, it is also necessary to characterise biofouling at the sites of future wind, wave and tidal farms.



36 months
(2022-2025)



Total budget
€1,607K



This project benefits from French government funding managed by the ANR as part of the France 2030 investment plan, and financial support from the Brittany, Occitanie, Pays de la Loire and SUD Provence-Alpes-Côte d'Azur regions.

PROJECT OBJECTIVES

- Gaining a better understanding of biofouling, the characteristics of the organisms that make it up, its evolution over time and the environmental parameters that influence it
- Identifying the most reliable and robust techniques and protocols for accurately characterising biofouling automatically in order to model its effects

A MULTI-SITE EXPERIMENT

Introduction of hydromechanical effects in the analysis of parameters influencing biofouling typology

Identification of factors influencing the typology and evolution of biofouling by multi-variate analysis of environmental, depth and hydromechanical parameters

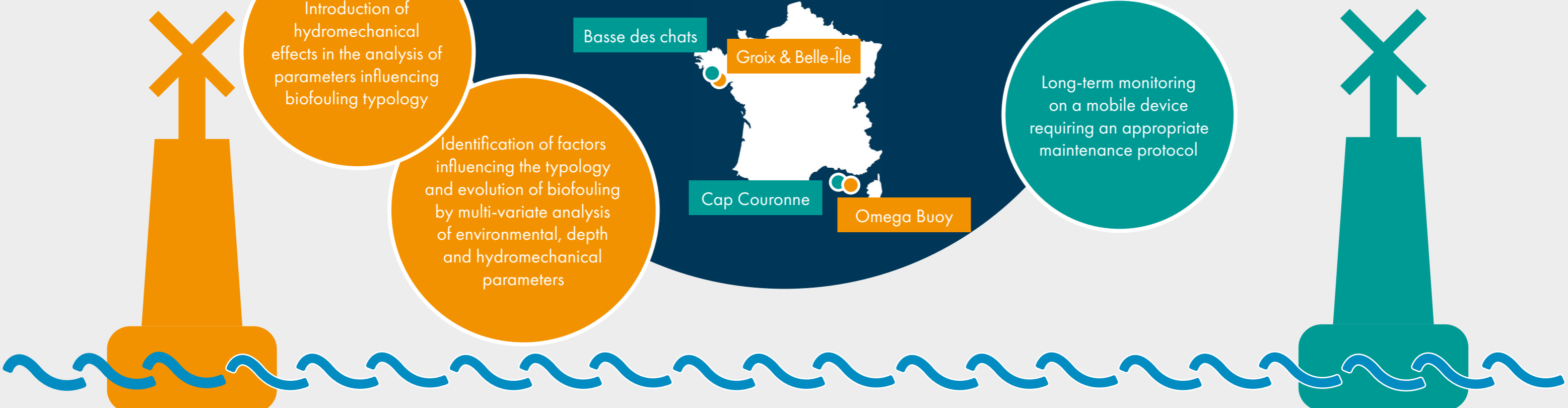
Basse des chats

Groix & Belle-Île

Cap Couronne

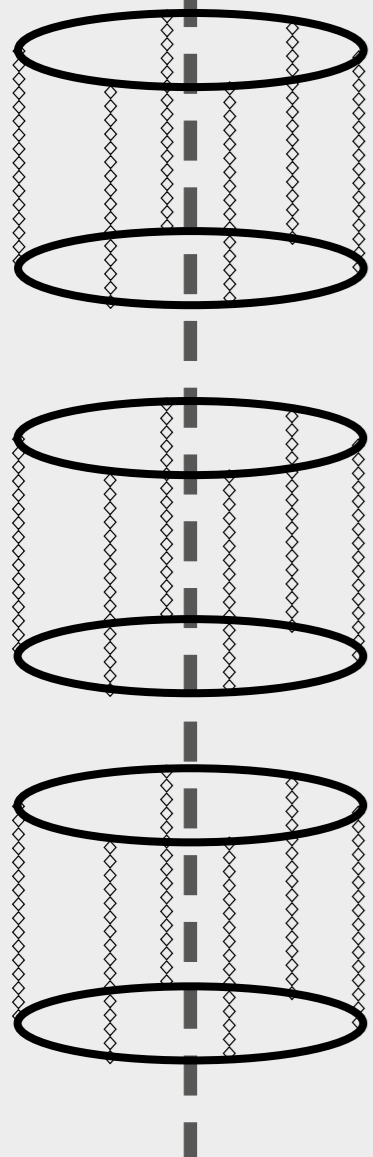
Omega Buoy

Long-term monitoring on a mobile device requiring an appropriate maintenance protocol



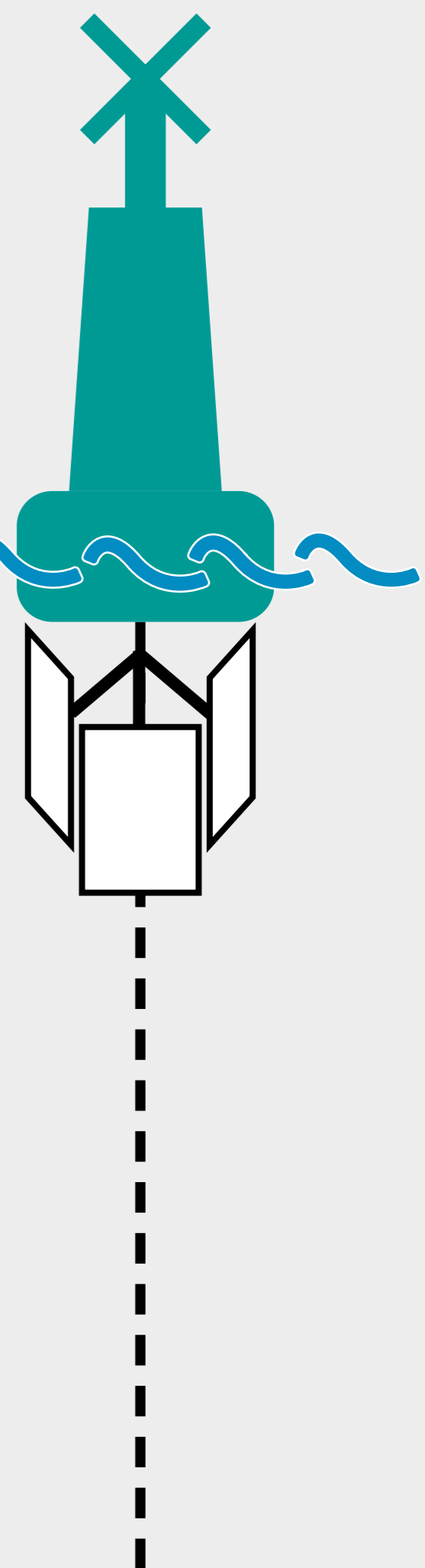
DEVICE WITH CYLINDERS

- **Objectives:** Following biocolonisation of moorings and power cables of floating wind turbines, quantifying hydromechanism
- **3 depths:** -2, -20, -40 m
- **2 materials:** high-density polyethylene (HDPE), polyethylene terephthalate (PET)
- **Monitoring frequency:** 3 dates between the beginning of monitoring and the end of the project
- **Monitoring of environmental parameters:** in situ measurements (dissolved oxygen, temperature, salinity, pH, turbidity, chlorophyll), water sampling (nitrate, nitrite, phosphate, silicium), Copernicus database
- **Monitoring of hydromechanism:** measurements with accelerometers and Doppler current sensors (DCS)
- **Taxonomic analysis:** study on morphological criteria, meta-barcoding



DEVICE WITH PLATES

- **Objective:** long-term monitoring (up to 5 years)
- **1 depth:** -2 m
- **1 material:** polyvinyl chloride (PVC)
- **Monitoring frequency:** 12, 24 and 60 months
- **Subsea photography**
- **Taxonomic and genomic analysis** of the plates collected



November
2023

The APPEAL observation buoy was redeployed on 26 November 2023 off Groix & Belle-Île after extensive maintenance (cleaning, changing the structure and the energy system) and the installation of an innovative experimental device. The aim is to characterise the development of living organisms on submerged infrastructures

such as the floating wind turbines that will be deployed by winner of the call for tender n°5 in Southern Brittany by 2031. This mission was masterfully carried out by the team on site!



December
2023

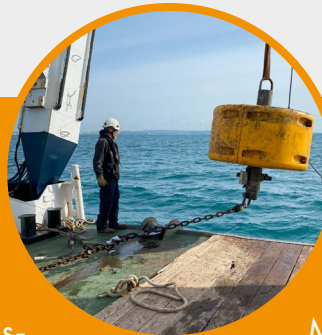
Inspection of the Cap Couronne buoy on the edge of the Parc Marin de la Côte Bleue was carried out at the end of 2023. Underwater

observations were carried out to monitor the biofouling process initiated 4 years ago.



February
to May
2024

On 12 February, the MEMOFLOW buoy located on the Mistral site underwent extensive maintenance, resulting in the installation of an innovative experimental device for monitoring the biocolonisation of mooring lines and power cables in floating offshore wind farms. This delicate operation was successfully completed after several months of preparation. Unfortunately, less than 48 hours later, the buoy was trawled. The mooring and subsurface float that remained in position



were recovered. The buoy was found in Corsica, off Bonifacio. The solution envisaged for maintaining a study site in the Mediterranean is the installation of a device with cylinders on the Omega buoy. This buoy is located in the delta of Rhône and anchored at a depth of 100 m which is ideal for studying offshore conditions. Discussions on this subject are underway with the Mediterranean Lighthouses and Beacons Service.

