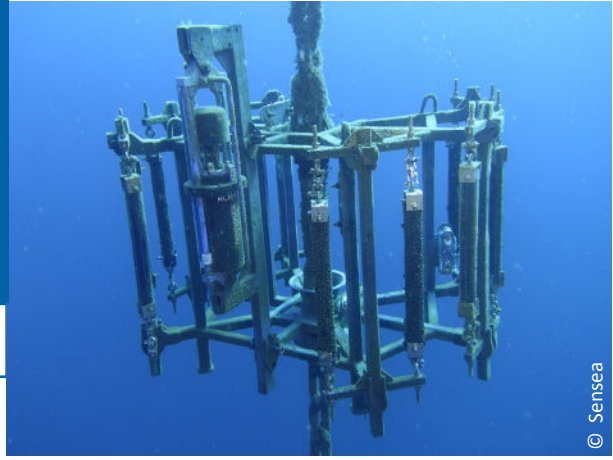
BIODHYL

Integrative characterisation of biofouling and associated hydrodynamic loads

DURATION: 40 months (2022-2026) | **BUDGET:** €1,900K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CONTEXT

The development of offshore renewable energies is leading to the large-scale deployment of artificial structures at sea. Once installed, these structures are rapidly colonised. This is known as biofouling, in the case of attached organisms, and the reef effect, in the case of all organisms using these structures. This dual phenomenon poses several challenges. **Biocolonisation can increase fatigue, accelerate material degradation and call into question the design assumptions for critical components such as moorings and dynamic cables. Whilst they may promote biodiversity, artificial offshore structures also raise questions regarding their long-term ecological impacts.**

OBJECTIVES

- To gain a better understanding of the early stages of biocolonisation on an offshore structure by studying the organisms involved and how their populations evolve over time and space
- To identify the most robust techniques and protocols for accurately characterising biofouling remotely and automatically

MAIN ACHIEVEMENTS

- Review of remote biofouling measurement techniques and the technologies used for underwater metrology and the identification of species groups
- Drawing up a roadmap for the development of automated biofouling characterisation technologies
- Multi-year monitoring of biocolonisation at several sites in the Atlantic and the Mediterranean, involving the development of suitable sampling devices and an associated innovative protocol
- Study of the variability of biofouling as a function of site, depth and timescale
- Identification of the main factors influencing biocolonisation based on various parameters measured on site
- Development of an integrative taxonomic approach combining morphological and molecular criteria(*metabarcoding*)
- Study of the potential for using biofouling as a passive sampler of the reef effect

CONCLUSION

Representative materials must be deployed for at least two years in order to characterise the nature and dynamics of biofouling at a site, with a view to taking these factors into account when determining the design parameters and defining the initial state. The integrative taxonomic approach provides a better understanding of the diversity of biofouling and mobile species, whilst also detecting non-native species. Characterising the potential for biofouling at different sites improves system design, yielding values that are closer to reality than certain standards based on experience from the North Sea.

TECHNOLOGIES

STAGES OF THE VALUE CHAIN

Preliminary studies | Design | O&M | Dismantling

MAIN OUTPUTS

- **Enhanced database** on biofouling of French coasts, including physico-chemical parameters measured in situ and variations with depth
- **Recommendations** for establishing a protocol for measuring biofouling on nylon mooring lines and dynamic cables prior to the installation of farms
- **Recommendations** for an integrative taxonomic approach (morphology and DNA) to improve the comprehensiveness of findings on biocolonisation diversity
- **Methodology** for measuring the influence of environmental variables on the dynamics of biocolonisation
- **Roadmap** for the qualification of innovative sensors designed to measure biofouling remotely

PARTNERS

This project received French State funding managed by the National Research Agency under the France 2030 investment plan.

With the financial support from the Brittany, Occitanie, Pays de La Loire et SUD Provence-Alpes-Côte d'Azur.