seanergy
17›18 June, 2025
Paris • France

Poster n°5

Assessing the chemical risk of element released from cathodic protections on the marine environment

Context

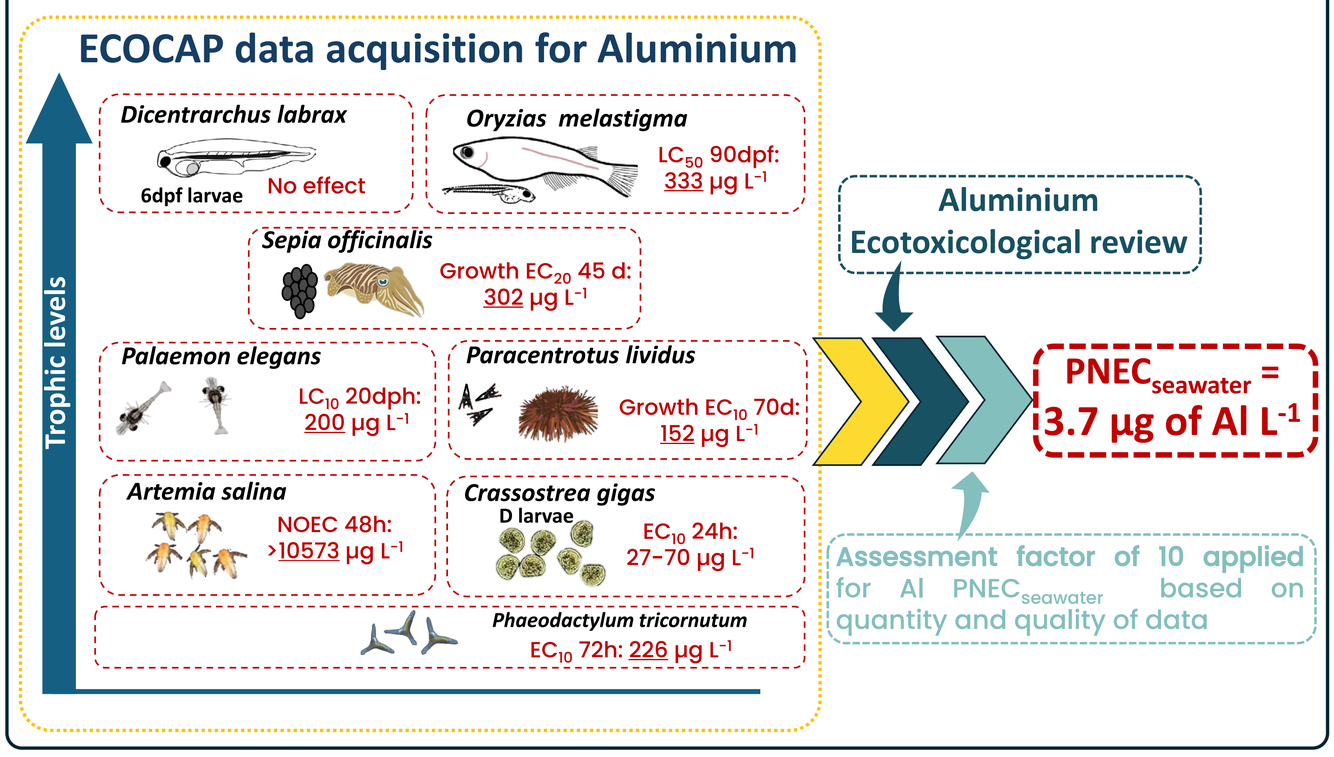
The development of Offshore Wind Farms (OWFs) in Europe raises environmental concerns, particularly regarding the chronic release of chemicals from cathodic protection systems used to prevent corrosion. The ECOCAP project addressed this issue by assessing the chemical risk associated with aluminium (Al) released from Galvanic Anode Cathodic Protections (GACP). In parallel, the project investigated the chemical species generated by Impressed Current Cathodic Protections (ICCP).

Key objectives

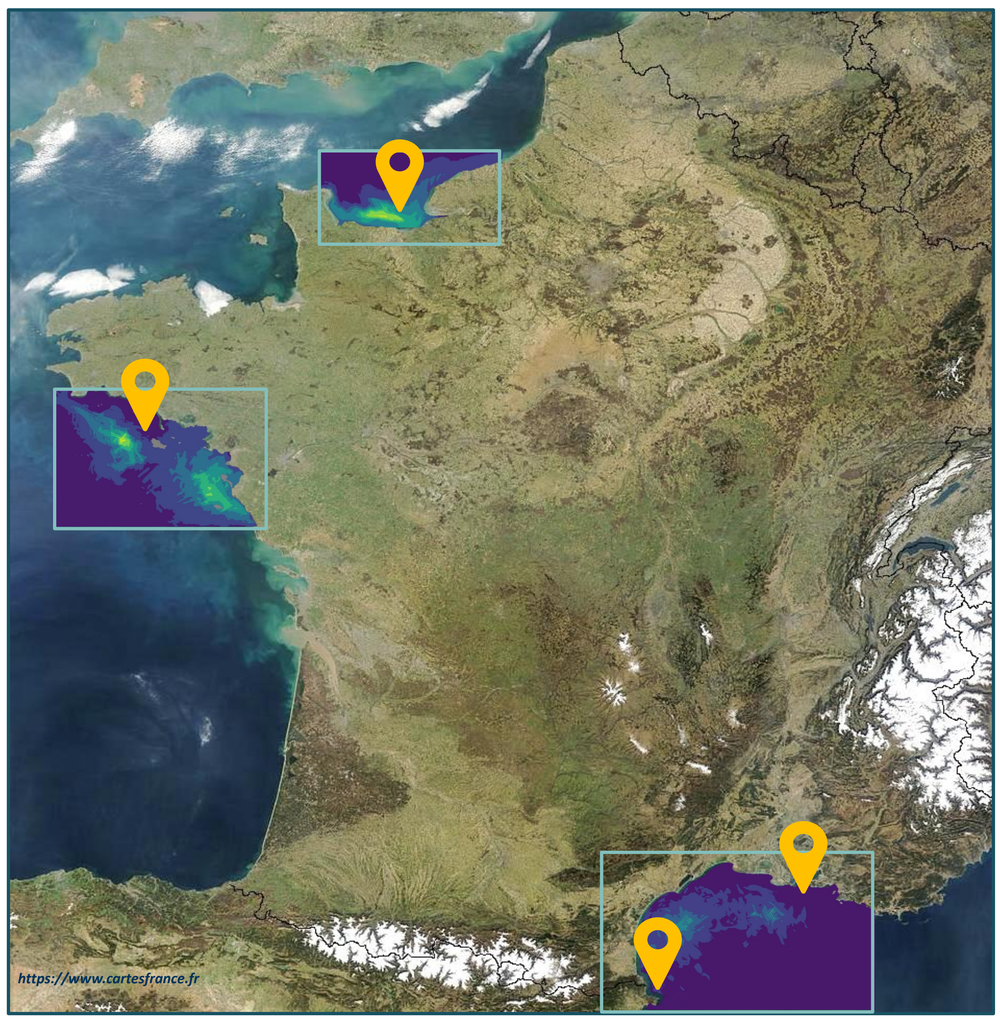
- Determining a **Predicted No Effect Concentration (PNEC)** for aluminium in seawater.
- Estimating **Predicted Environmental Concentrations (PECs)** by combining: *In situ* measurements, river inputs, a 3D hydro-numerical model simulating Al dispersion from OWFs.
- Assessing **molecules that can be generated by ICCP.**

Results

Hazard assessment of GACP and Aluminium

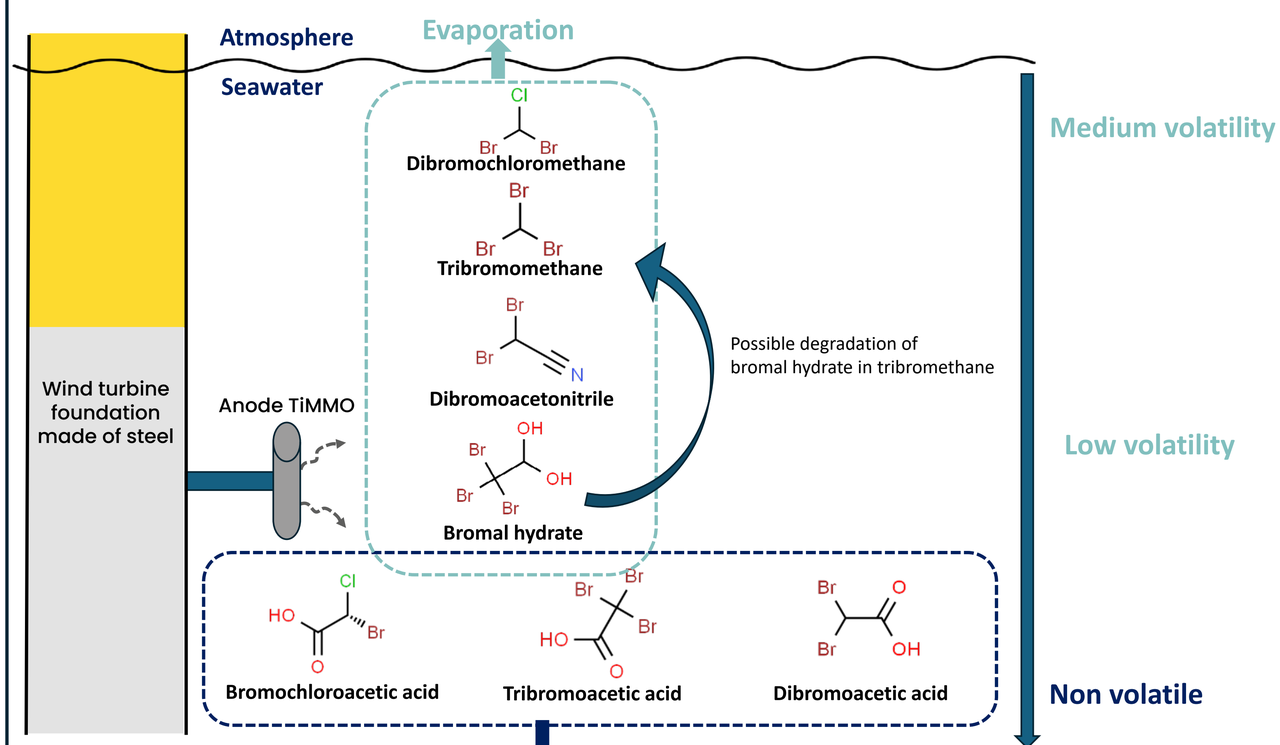


Exposure assessment of GACP and Aluminium



Average concentrations (*in situ* and modelled) of aluminium in offshore wind development areas in the Channel, Atlantic and Mediterranean

Production of molecules during ICCP operation and their future in seawater environment



Conclusion

- Ecotoxicological Al threshold from ECOCAP lab experiments are all higher than concentrations from ECOCAP modelling approaches in the water column considering only OWF inputs
- Considering only OWF inputs: no expected risk for Al in water column in ECOCAP scenario (REACH directive). Some risk could appear considering other Al inputs (river, atmospheric…)
- Definition of environmental pressure from ICCCP systems has to be fully addressed

Perspectives

1. Refine the environmental pressure and the scale of assessments
   - Characterization and quantification of releases induced (cathodic protection, coatings, synthetic mooring lines…)
   - Understanding of their behaviour and fate in the marine environment (water column, sediment and biota)
2. Define environmental survey in OWF
   - Identify existing chemical elements within OWF
   - Estimate levels and differentiate inputs

ECOCAP partnership :

Financial support:

Contact: matthieu.dussauze@france-energies-marines.org