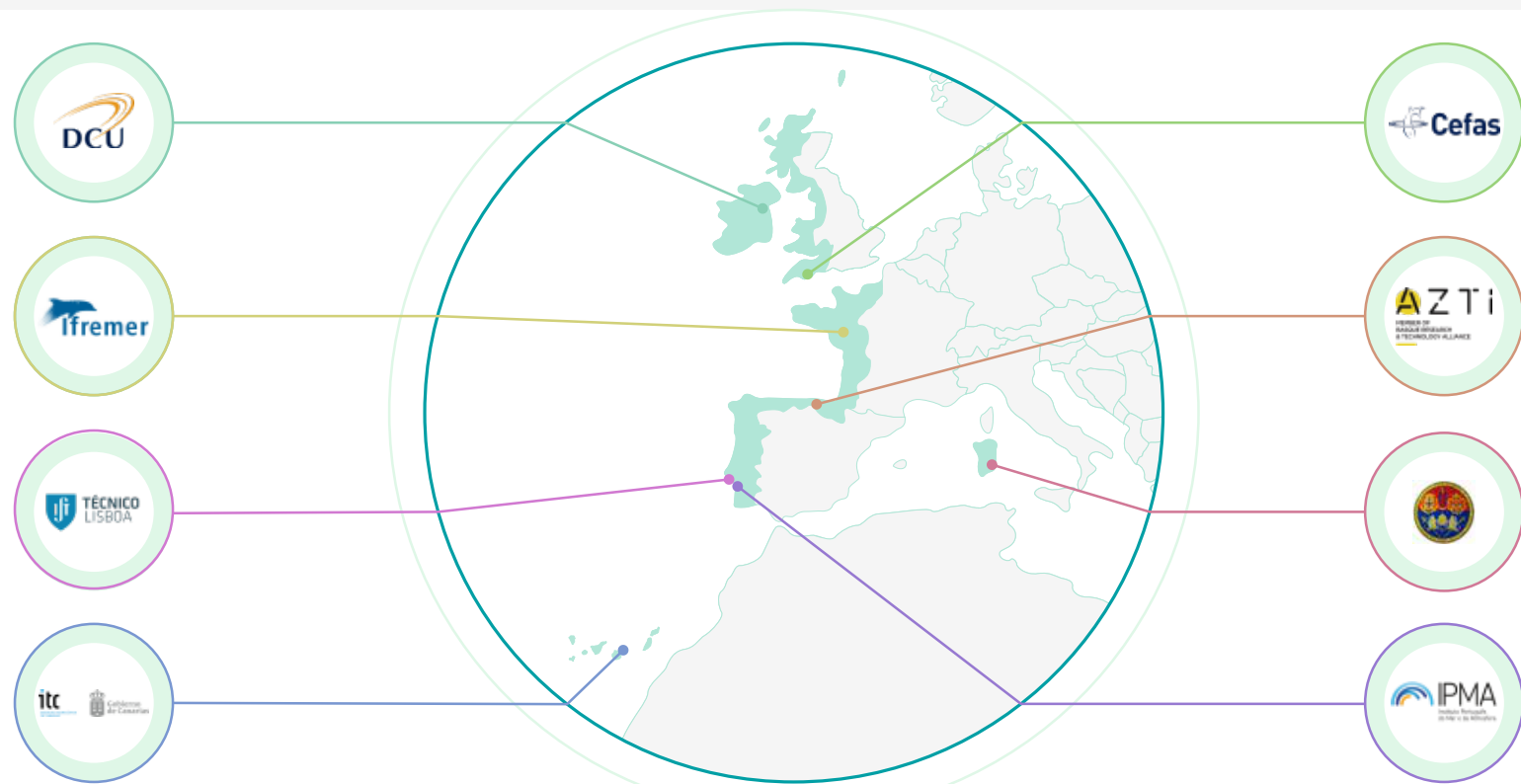


### Background:

Passive sampling devices (PSDs), such as DGT (Diffusive Gradients in Thin films), have many advantages compared to conventional monitoring methods. In particular, the labile concentrations determined by PSDs are recognised as a better proxy to the potential bioavailable fraction than total/dissolved concentrations measured by conventional analytical techniques, providing a better scientific basis for risk assessment.

### Objective:

MONITOOL Project aims to provide a robust database of dissolved and labile metal concentrations in transitional and coastal waters for adapting the existing water Environmental Quality Standards (EQS) for passive sampling devices (EQS<sub>DGT</sub>) in order to improve and facilitate the chemical status assessment of waters under the WFD.



MONITOOL (July 2017 - June 2023), with a total cost of €2.48 million, was co-funded (75%) by Interreg Atlantic Area Transnational Cooperation Programme 2014-2020 (EAPA\_565/2016).





## Field campaigns and analysis:

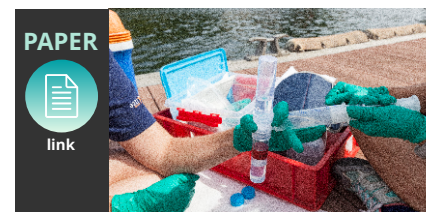
- **3 successful sampling campaigns** in coastal and transitional waters with **co-deployment of DGTs and spot water sampling**:

- Wet season (Jan-Mar 2018).
- Dry season (Aug-Oct 2018).
- Highly contaminated sites (June-July 2022).
- Over 600 water samples collected and analysed.
- Over 350 DGT deployed, retrieved and analysed.
- Physico-chemical parameters recorded.

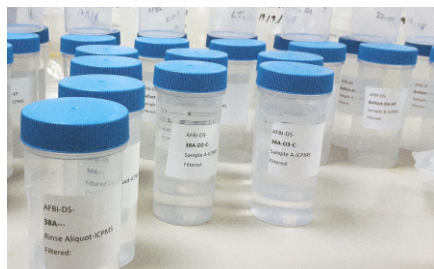
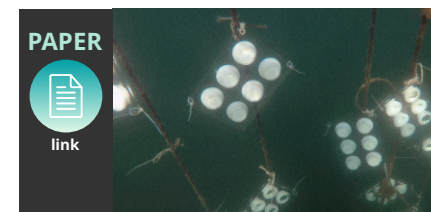
- **First broad geographical scale study** where the DGT technique has been used in different marine regions (from Canary Islands to the Scottish Highlands and Islands).



- **Common protocols** for the sampling, sample processing and analysis to avoid operational variability in field and in laboratory works.



- **DGT interlaboratory exercise**: organised by Ifremer and each partner accepting DGTs for analysis in their institutions.



## Database management and correlation studies:

**DGT sampling/Spot sampling ratios:** were independent of physico-chemical parameters and sampling season.

**(DGT-sampling /Spot-sampling) log-log linear observed relationships were:**



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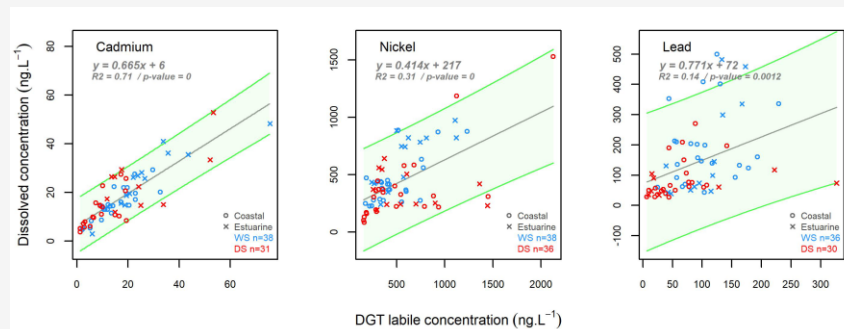


## EQS adaptation for priority metals Cd, Ni and Pb:

2 approaches were considered:

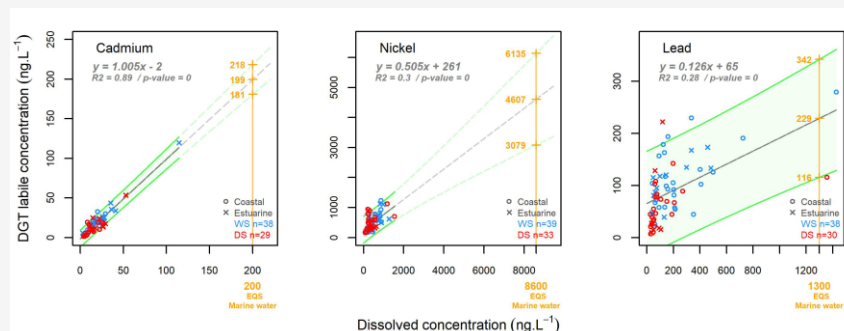
### Compare DGT results to EQS

marine water : to predict metal concentrations in dissolved fraction from DGT results.



### Compare DGT results to EQS

DGT: to adapt EQS marine water into EQS<sub>DGT</sub>



Substance	EQS (μg.L <sup>-1</sup> ) Annual Average	EQS <sub>DGT</sub> (μg.L <sup>-1</sup> ) Proposal 1	EQS <sub>DGT</sub> (μg.L <sup>-1</sup> ) Proposal 2
Cd	0.2	0.20	0.18
Ni	8.6	4.60	3.08
Pb	1.3	0.23	0.12

**Proposal 1:** Linear model regression.

**Proposal 2:** Linear model regression minus low Prediction interval (PI 95%).

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In addition, **marine water threshold adaptation to DGT** is also provided for other metals: **Co, Cu, Mn** (WP6-action 2 - deliverable).



## Two more published scientific papers:

### High Frequency Measurement of Metals: Steps Towards the Acceptance of Passive Samplers for Regulatory Monitoring

Imad Isikiche <sup>1</sup> | Youssef Menchaca | Maria Jesús Reñe | Mohammed Ezziyan

Conference paper | First Online: 10 February 2022

810 Accesses | 2 Citations

Part of the *Advances in Intelligent Systems and Computing* book series (AISC volume 1418)



### Inputs of Total and Labile Dissolved Metals from Six Facilities Continuously Discharging Treated Wastewaters to the Marine Environment of Gran Canaria Island (Canary Islands, Spain)

by Marta Rodrigo Sanz <sup>1</sup> | Vanessa Millán Gabet <sup>1</sup> | and Jean-Louis Gonzalez <sup>2</sup>

<sup>1</sup> Water Department, Instituto Tecnológico de Canarias (ITC), Pozo Izquierdo, s/n, 35019 Santa Lucía, Spain

<sup>2</sup> Unit of Biogeochemistry and Ecotoxicology, Institut Français de Recherche pour l'Exploitation de la Mer (IFREMER), 83507 La Seyne-sur-Mer, France

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## Support:



### A Good Practice Guide for the Use of DGTs

Sampling of metals in transitional and coastal waters by Diffusive Gradient in Thin Films (DGT) technique



A Good Practice Guide for the Use of DGTs



Video tutorials



FAQ



Newsletters and brochures



Project Final-Conferences 2021 and 2023

For more details, all the results, deliverables and outputs of the project are available in:

[www.monitoolproject.es](http://www.monitoolproject.es)

