MONITOOL

new tools for water quality monitoring

Sampling Protocol

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Cefas

Report/Deliverable by

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Disclaimer

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1. Introduction

The Monitool project aimed to provide a robust database of dissolved and labile metal concentrations in transitional and coastal waters for adapting existing Environmental Quality Standards (EQS; 0.45 µm-filtered) for DGT (Diffusive Gradient in Thin-films) passive sampling devices (EQS-DGT) in order to evaluate the chemical status of the waters under the WFD. To this end, a survey programme consisting of simultaneous deployment of passive sampling devices and collection of spot samples was performed by eight Partners, covering the Atlantic region from Canary Islands to the Scottish Highlands & Islands, as well as the Mediterranean area.
Under an extension to the project an additional sampling is to be undertaken in five Partner regions to focus on sites with suspected high metals contamination for cadmium, nickel and lead. The five Partners involved in sampling are AZTI, Cefas, DCU, Ifremer and UNICA.

2. Scope

The objective is to review and adapt the existing Monitool sampling protocol, for sample collection and handling, that must be followed by all sampling Partners for the delivery of Monitool extension. The protocol is an adaptation of a series of guidelines/methodologies that guarantees the comparability and reproducibility of data obtained from each Partner region. This protocol describes the guidelines for DGT deployment, spot sampling and sample processing prior to analysis.

The sampling overview is described in Figure 1 for each participating Partner and per sampling site.

3. Sampling timeline

One field campaign aiming at a 7 days DGT deployment will be carried out by each sampling Partner in June 2022.

4. Sampling location

Each Partner undertaking field sampling will target two sampling sites with, ideally high contamination levels within the Partner region. The selection of the sites must take into account the level of pollution present (particularly for Cd, Ni and Pb) at those sites to obtain a representative sampling area displaying concentrations from heavily contaminated sites. In order to target contaminated sites, closed seawater sites could also be targeted.
Each sampling Partner will record and provide details on the sampling locations and all the relevant information that is available relating to that sampling site (e.g. level of contamination, morphology, anthropogenic pressure, etc.). The template for this record (Sampling Site Information) can be found in Annex 1.
Each sampling Partner will also provide photos taken during the field campaigns, e.g. DGT at deployment or retrieval, during the spot sampling and photos of the moorings/fixed structure where the passive sampler is attached to.

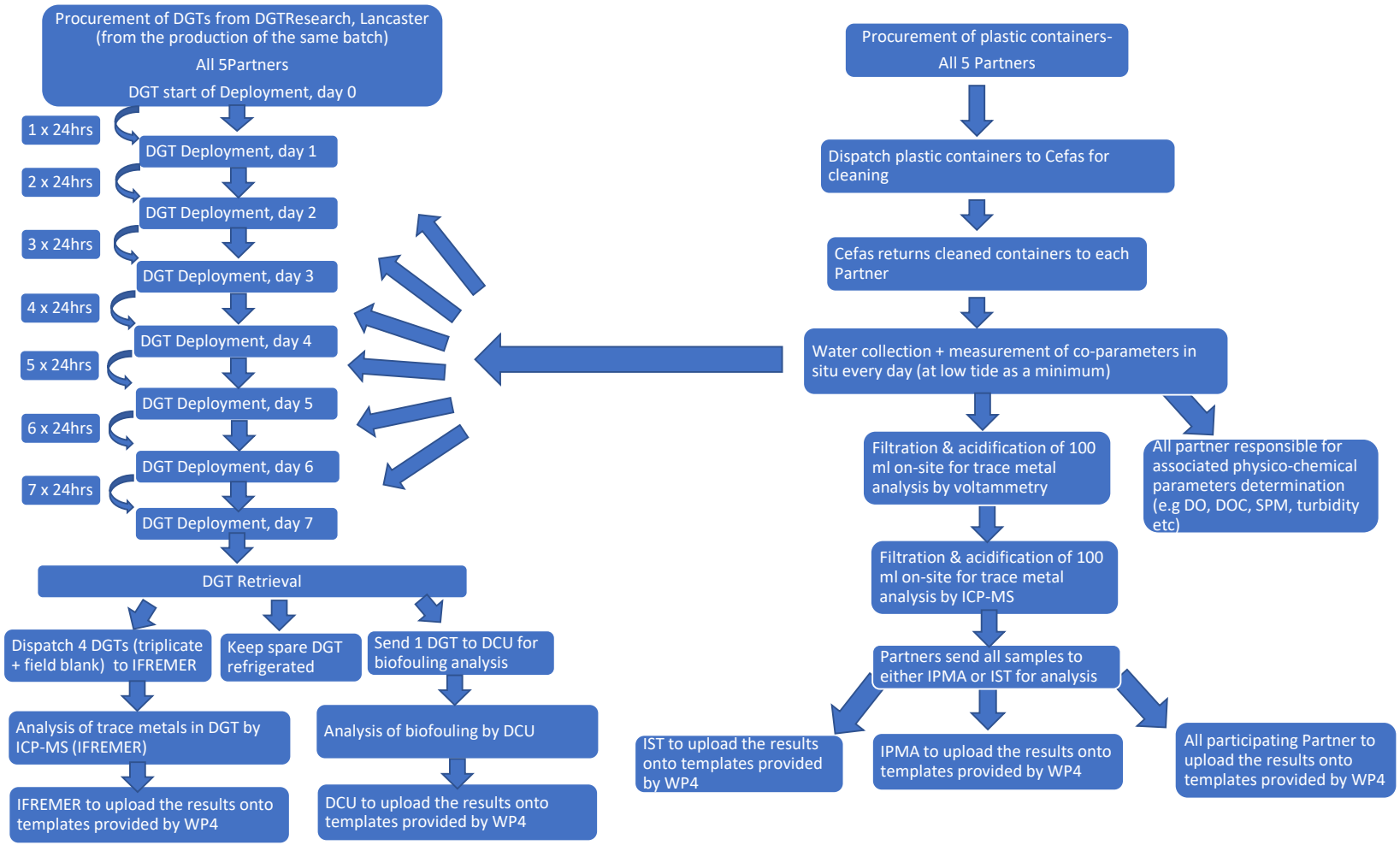

Figure 1. Monitool sampling overview

5. Sampling reagents, materials and equipment

5.1 DGT selection and procurement

The passive sampler selected for this project is the open pore Diffusion Gradient in Thin Film (DGT), with a 0.8 mm agarose cross-linked polyacrylamide (APA) diffusive gel, polyethersulphone (PES) 0.45 µm pore size filter membrane and Chelex-100 binding gel layer. This DGT can be used to measure up to thirty metals, including priority metals (Cd, Ni and Pb) as well as Co, Cu, Fe, Mn and Zn.

In order to minimise variability, DGT Research Ltd (Lancaster, UK) will supply the passive samplers to all participating Partners. Moreover, the DGTs used for each survey will be from the same batch. DGT Research Ltd will be requested to send the quality control data for each batch.

Each participating Partner will quote "Monitool Project" when placing their order for DGTs.

Product number: LSNM-NP For metals (cationic) in solution using a Chelex BL (https://www.dgtresearch.com/product/lsnm-loaded-dgt-device-for-metals-a-in-solution/)

In order to minimise variability of the study, all sampling Partners should use the DGT holder design as provided by UNICA (Figure 2) and to prevent damage to DGTs from side impact and accelerated degradation by fish and other organisms in the deployment zone, some Partner might wish to protect the DGTs by covering the holder with the net (Figure 2) before deployment. Pre-assembly of nets can be performed to speed up DGT deployments and to limit air exposure of devices. All DGTs should be mounted onto the holder in the laboratory and the whole assemblage (with or without the net) must be stored as described below, in sealed plastic bag and refrigerated before deployment. Laboratory blank DGTs, field blank DGTs and DGT-mounted holders must be kept in separate bags

The DGT holder and netting must be cleaned using 10% HNO_3 then rinsed with nanopore or Milli-Q water before use.

For note, Ifremer will purchase and analyse all the DGT Laboratory Blanks for this campaign and other sampling partners do not need to do so themselves.

Below is the guidance on the storage and handling of the DGTs provided by DGT Research Ltd:

Storage

- Store the DGT units in a refrigerator (4°C), avoiding freezing as performance could be affected. The DGT units provided are kept in the sealed clean plastic bags containing ca 0.5ml a few drops of trace metal clean 0.01M $NaNO_3$ (or 0.01M NaCl) solution if necessary. Do not open them until immediately prior to deployment.
- Check the units about once a week to make sure they are under moist conditions. Add a few more drops of trace metal clean 0.01M $NaNO_3$ (or 0.01M NaCl, ultrapure grade) solution if it is necessary.

Handling

- Store DGT units in a refrigerator prior to use.
- Do not open or remove DGT units from the sealed plastic bag until deployment time.

- Always wear powder-free, preferably uncoloured gloves when handling DGT units to avoid contamination.
- Do not touch or let anything come into contact with the white filter membrane present in the exposition window of the DGT device.

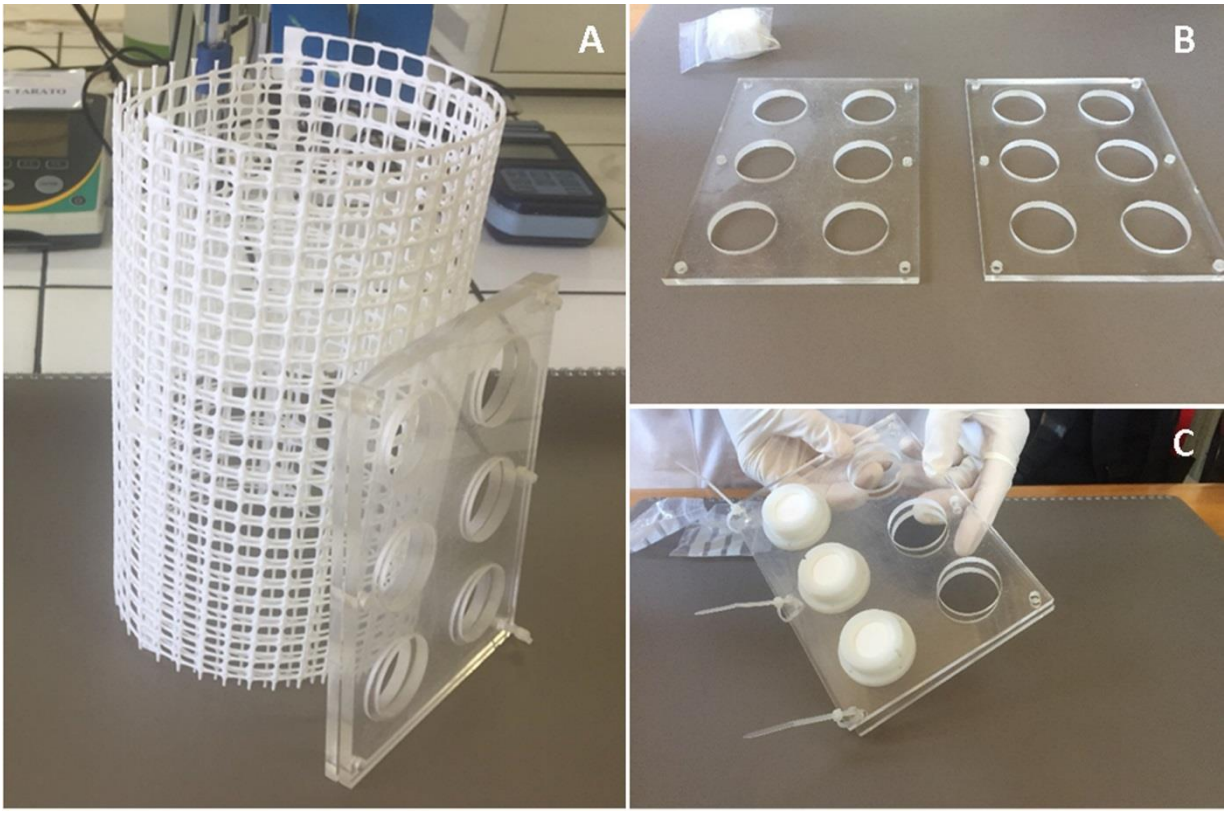

Figure 2. Structure for the deployment of DGTs: (A) DGT holder and netting; (B) detailed photograph of the DGT holder; (C) placing of DGTs in the DGT holder (Source: UNICA).

5.2 Seawater sampling and storage equipment

This section provides details on the equipment to be used for the collection of discrete subsurface seawater samples as well as materials required for sample treatment and subsequent storage. Great care must be taken when sampling to avoid contamination of the sample. Contamination can arise from a number of sources including the sampling platform, the sampling equipment and the sea surface microlayer. It is essential that sample contamination from the atmosphere and other local sources of contamination (e.g. engine exhausts) is minimised.

5.2.1 Seawater sampling equipment

In order to prevent contamination, direct sampling with HDPE bottles should be done as best practice. This can be done using grab-samplers

https://www.benmeadows.com/sludge-nabber-sampler-6-12l-extended_s_28972/

https://www.benmeadows.com/subsurface-grab-samplers_36816457/

If this is not possible, discrete subsurface seawater samples can be collected using devices such as Niskin bottles, handheld water samplers or remote automatic samplers (Fig 3).

All the water samplers (including HDPE bottles) must be thoroughly cleaned with 10% nitric acid and rinsed with deionised water (18.2 megohm resistivity) before sampling.

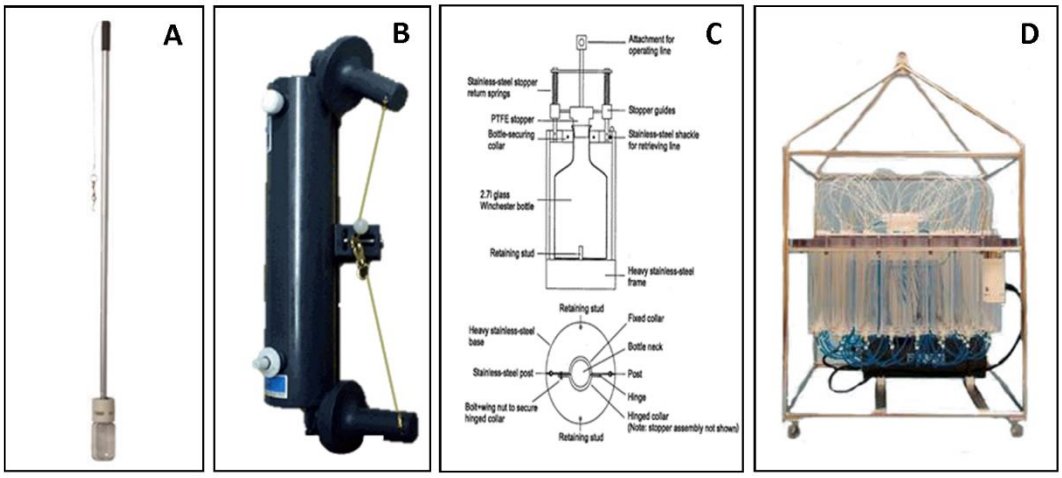

Figure 3. Grab sampler (A), Niskin bottle (B), handheld water sampler (C) and RAS (remote automatic sampler) (D)

5.2.2 Water container

High performance bottles (volume of 500 ml), HDPE, translucent, narrow neck, with screw cap will be used to store the seawater (or bottles of similar or better specifications such as PTFE) for Voltammetry/ICP-MS, SPM and turbidity. An example of HDPE bottles can be procured through VWR https://uk.vwr.com/store/catalog/product.jsp?catalog_number=215-3407 or similar suppliers.

Clear glass bottles, 250ml (DURAN type with PTFE sealed lid, or equivalent) will be used to store the seawater for DOC. An example of DURAN bottles can be procured through VWR https://uk.vwr.com/store/catalog/product.jsp?product_id=15263818 or similar suppliers.

Each partner will procure sufficient water bottles and send them to Cefas for cleaning. Cefas will clean bottles as per procedure outlined below and return them to the original Partner to collect and store the seawater for further analysis.

Procedure for cleaning bottles (by Cefas):

Bottles will be immersed in a bath containing 10% HNO_3 and soaked for at least 4 hours, and up to overnight. The bottles are then rinsed with ultrapure water, partially dried and stored in a sealed plastic bag.

5.2.3 Water filtration device (for trace metals determination by Voltammetry, ICP-MS and for SPM)

5.2.3.1 For trace metals determination by Voltammetry and ICP-MS

Note: Water samples are filtered and acidified following the same procedure whether for ICP-MS or voltammetry analysis. The minimum sample volume for SeaFast ICP-MS is 80 mL which can be stored in 2 x 50ml Digitubes (or 1 x 100ml Digitube)

For the preparation of samples for trace metals analysis by voltammetry and ICP-MS, DigiFILTER™ and DigiTUBEs™ are used (figure 4):

*Digi*FILTER™, 0.45 µm, Teflon® membrane https://www.scpscience.com/en/products/details?id=010-500-070 (see figure 2)

*Digi*TUBEs™ 50 ml Non RackLock w/caps https://www.scpscience.com/en/products/details?id=010-500-263&name=digitubes-50ml-non-racklock-wcaps-750)

Syringes, plastic, 50 mL (to request SCPS at the time of order)

SCPS Science also offers a Field filtration kit which is composed of 25 DigiFILTERs, 30 of 50 ml DigiTUBEs, foam rack and syringes (http://www.scpscience.com/ContentPages/PDF/MK-MKG003-DFFK-2.0-E.pdf)

All the DigiTUBEs and DigiFILTERs must be thoroughly cleaned with 10% nitric acid before filtration: both lids and DigiTUBES will be immersed in a bath containing 10% HNO_3 and soaked for 4 hours or overnight. The lids and DigiTUBES and DigiFILTERs are then rinsed with ultrapure water and stored together in a sealed plastic bag).

Note: it is not recommended to carry out the cleaning of the DigiTUBEs and DigiFILTERs more than 3 months in advance due to the residual acid remaining in the tubes/filters that might have an effect on them.

Figure 4. DigiFILTER and DigiTube

5.2.3.2 For SPM determination

Polycarbonate filters 0.4µm will be used to obtain the filtrate for SPM determination.
(e.g. Whatman® Cyclopore® membrane, pore size 0.4 µm, polycarbonate, diam. 47 mm)
(http://www.sigmaaldrich.com/catalog/product/aldrich/wha70604704?lang=es&region=ES)

5.3 Reagent

Analytical grade (or better) nitric acid (69%) will be used to make up 10% (v/v) HNO_3 for the cleaning of the equipment and bottles.

5.4 Sensors

Sensors will be used to detect the following physico-chemical parameters:

- Salinity
- Temperature (°C)
- Depth (m)
- pH
  - at a minimum resolution of 0.1 (or better) and
  - a minimum accuracy of ±0.2 pH (or better)
- Dissolved Oxygen (DO, mg/L)) -if the DO probe is suitably calibrated (i.e. to the Winkler method), then DO measurement by sensor is an acceptable method. Alternatively, the titration method is provided for discrete water sample and Partner must follow the instructions for the collection of sample for DO, Annex 6 of the *Sample processing and analysis* Protocol.
- Turbidity (NTU)- if the turbidity sensor is suitably calibrated, then turbidity measurement by sensor is an acceptable method. Alternatively, the analytical method for turbidity determination is provided for discrete water sample in Annex 7 of the *Sample processing and analysis* Protocol. Note that if turbidity is not measured by sensor then turbidity analysis must be carried out within 48h from sampling due to its instability.

All sensor equipment used for the sampling must be calibrated accordingly (see Table 1).

All sensors should be put at the same water depth than the DGT's when measurements are taken and recorded.

Table 1. Frequency of calibration for sensor equipment

Parameter to be measured	Frequency
Dissolved Oxygen, 100% Saturation	Each Day of Use
Depth Zero	Each Day of Use
pH	Each Day of Use
Salinity	Monthly
Temperature	Annual
Turbidity	Each Day of Use

6. Sampling duration, frequency and sample preservation

It is important to note that the water spot sampling is performed prior to the measurement of physico-chemical parameters (temperature, salinity, dissolved oxygen, pH) and to the deployment of DGT passive samplers.

6.1. Holder and DGT assembly (laboratory)

All DGTs should be mounted onto the holder in the laboratory, preferably under a laminar flow cabinet or in a plastic bag to avoid contamination from air exposure of the DGTs. The whole assemblage (with or without the net) must be stored as described in section 5, in previously acid-washed sealed plastic bags and refrigerated before deployment.

Open the individual bags and expose the DGT field blank on a clean surface for the entire duration of the holder/DGT assembly (i.e. simultaneously expose the DGT blank while manipulating the field DGTs before deployment. If this is not practical due to weather conditions, space limitations etc., the DGT blank should be exposed for the equivalent amount of time). After this, put the field blank back in its original plastic bag and store it in a refrigerator. This field blank DGT will be exposed in the field during the DGTs deployment and retrieval processes, and in the laboratory during the holder/DGT disassembly. Clearly label each plastic bag as per Annex 2 for identification.

6.2. Sampling duration and frequency

6.2.1 DGT deployment and retrieval

DGTs will be deployed for seven (7) days for the sampling survey (i.e. ideally, DGTs to be submerged in the water for at least 6 x 24h although deployment time will vary on the survey planning).

A total of six DGTs will be required per site: a minimum of 1 x field blank and 5 x DGTs for deployment (3 x DGTs for the analysis of trace metals by ICP-MS, 1 x DGT for biofouling analysis and 1 x DGT as “reserve”).

As the analytical laboratory for DGTs, IFREMER will provide 6 x laboratory blank DGTs per sampling campaign.

The template to record details of the DGT deployment/retrieval can be found in Annex 2.

6.2.1.1 DGT Deployment

- Wearing powder free gloves, remove the DGT assemblages from their plastic bags and attach the DGT holder onto the designated structure. For example, the DGT holder can be attached to a rope which has got a weight at the end. The rope is then secured onto the mooring buoy or fixed structure (away, as much as possible, from any metallic structure).
- Ensure that the DGTs are deployed in flowing (or moving) water, but avoid excessive turbulence, particularly bubbles.
- Deploy the DGT devices immediately, ideally at a depth of 1-1.5 m from the surface and at least 1 m above the seabed. In shallow areas, ensure that the DGT devices are fully immersed if depth is <1 m and at least 0.3-0.5 m above the seabed. However, sampling site characteristics must be considered for the selection of the most suitable sampling depth (e.g., in harbours, choosing a greater depth might guarantee a reduction in potential high variability associated to shipping).
- Ensure that the sampling windows of DGTs will remain fully immersed during the deployment period.
- Simultaneously, expose the DGT Field Blank on a clean surface until the DGTs assemblage is submerged in the water. Immediately after deployment of the DGT holder, put the DGT Field Blank back in its original plastic bag and store refrigerated until the DGT retrieval day.
- **Record accurately the time of deployment to the nearest minute**.
- Record the depth of deployment. Keep the original plastic bags (clearly labelled and sealed) to store the DGT assemblages at the retrieval stage.
- Record water temperature during the deployment time. If the temperature variation during the deployment period is within ± 2°C, a mean value (or start and end temperature) will suffice. If the variation is greater, ideally the mean temperature should be obtained from an integrated record of temperatures (e.g., using data loggers).

6.2.1.2 DGT retrieval and transport

- Field Blank exposure: simultaneously to DGT retrieval, expose the DGT Field Blank (previously exposed during the deployment) on a clean surface for the entire duration of the retrieval process. DGT Field Blanks are returned to their original plastic bags and kept in a cool box with ice packs for transport to the laboratory.
- Remove the DGT holder unit from the deployment structure and take it out of the water wearing gloves (powder free, uncoloured if possible), taking care not to touch the DGTs' filter membrane. **Record the retrieval time to the nearest minute**.
- Rinse the DGT holder immediately after recovery with water from the site by direct immersion of the device (e.g., from the boat, from the dock, …) and by shaking the device underwater several times (can be done manually or without detaching the holder from the mooring). Alternatively, rinse the DGT holder and DGT units with a stream of uncontaminated distilled/deionised water from a clean wash bottle.
- Shake off obvious surface water (do not dry).
- Place the DGT holder and DGT devices in their original plastic bag and seal with minimum air space. Label the bag with the sampling location and store in a cool box with ice packs to transport back to the laboratory.
- Record the temperature of the water at the retrieval time.

6.2.1.3 DGT dismantling and preservation

- .Double bag the three exposed DGTs, the field blank and the 3 laboratory blank DGTs and send them in a cooler box (with ice packs) to IFREMER as soon as possible after the recovery for analysis.
- Send the 4th exposed DGT to DCU for biofouling testing (refrigerated) and store the last DGT in a refrigerator as reserve sample. Put it in its original plastic bag.
- Send a copy of the sampling records to IFREMER and WP4 leader.

6.3 Water sampling, filtration and preservation

This involves collecting discrete subsurface water samples for dissolved metals in coastal and estuarine waters including the priority metals Pb, Ni, Cd, as well as Co, Cu, Fe, Mn and Zn.

The procedure detailed is essential to avoid contamination for subsequent analysis of metals by voltammetry and ICP-MS.

6.3.1 Sampling frequency

Water sampling will be done at least once a day at low tide (where relevant) but ideally twice a day at high tide and low tide for each day of the deployment. Ideally, sampling during neap tides (when there is least difference between high and low water) is preferred so that variations in the physico-chemical parameters (particularly salinity) remains small.

6.3.2 Water sampling procedure

- Gloves must be worn during sampling
- Partners shall report the technique used for water sampling and record the information in Annex 3.
- Deploy the water sampler at the same depth as planned for the installation of the DGTs and fill up the water sampler (e.g. Niskin bottle). Discard the water from the bottle and repeat this activity one more time.

- Once the water sampler has been rinsed twice, collect the water sample sequentially for:
    - Dissolved oxygen (if DO is not analysed *in-situ*, i.e. measured by sensor). Note that sample for DO must be collected and treated first due to rapid loss of integrity with time. Follow carefully the specific instructions procedure as described in the "Sample processing and analysis" protocol (Annex 6). The preservation of the samples before analysis can take place in the laboratory as this requires special bottles (i.e. Winkler bottles or calibrated glass stoppered bottles) to store the samples.
      Record the *in-situ* temperature & salinity at the time of sampling for DO calculation.
    - Trace metals by voltammetry and ICP-MS: follow the procedure below for sample preservation. :
        - Rinse the 500 mL HDPE bottles (with closed bottle cap) 3 times with the seawater collected in the water sampler and fill it up.
        - Rinse DigiTUBE no.1 twice with an aliquot of seawater from the HDPE bottle and discard the water. Fill in DigiTUBE no. 1 again with 50 ml (or 100 ml depending on DigiTUBE volume size) of seawater from the HDPE bottle.
        - *In situ* filtration: Assemble DigiTUBE™ no. 1 with the DigiFILTER™ and screw in DigiTUBE™ no. 2 at the other side. Ensure that the entire assembly has a firm seal.
        - Invert the DigiTUBE™-DigiFILTER™ assembly so that the water sample is on top. Connect the syringe into the hole of the DigiFILTER™, remove the red insert from the DigiFilter™ and start the filtration (see "Sample processing and analysis" protocol for this procedure under Annex 1). Discard the first 10 mL of filtrate. Filter 50 mL/100 mL of seawater sample into DigiTUBE™ no. 2, remove it and close it tight with its respective lid. Repeat steps 5 and 6 with DigiTUBE™ no. 3. If filtration is too slow, then the DigiFILTER™ might need to be replaced.
        - Acidify *in situ* (as soon as possible) the filtrates to pH 2 by adding 0.035 mL of HNO3 (69%, ultrapure grade) to each 50 mL of seawater sample (or 0.070 mL of HNO3 to 100 mL of seawater) just after filtration.
        - After capping the DigiTUBEs™ - if necessary, seal the tubes with parafilm to avoid leakage during transportation.
        - Ensure that DiGiTUBEs are clearly labelled with the sample information Keep the acidified samples upright and refrigerated (4°C). Under these conditions, the samples are stable for several weeks.
        - Sample filtrates can be stored until the end of the DGT sampling campaign and sent in a cool box with ice packs to the analytical laboratory for the determination of trace metals by voltammetry as soon as practicable.

        - **Sample blanks for voltammetry**: for each site, on days 0 and 7, prepare blanks for voltammetry by filtering 2 x 50 mL ultrapure water (or 100 mL depending on DigiTUBE™ volume size) through a pre-cleaned DigiFILTER™ and acidify the nanopure water with 0.035ml HNO3 in each 50ml.
        - **Sample blank for ICP-MS**: for each site, at days 0 and 7, bring one empty acid-rinsed 50 ml (or 100ml) DigiTUBE to the field and expose the blank DigiTUBE to the ambient air by opening it during the time of collection and filtration of water samples. The bottle for the sample blank can be kept empty to facilitate transport to the analytical laboratory. Close the bottles after the spot sampling is completed and transfer the empty DigiTUBE along with the seawater samples to the analytical laboratory in a cool box. If filtration is carried out in the analytical laboratory, the DigiTUBE is opened during the sample filtration procedure and closed after finishing. Bottles will be sent to IPMA empty and labelled.

- Send all the DigiTUBEs as soon as possible/practical at the end of the survey to either IST or IPMA for analysis of trace metals by voltammetry and ICP-MS in a cooler box/polystyrene box with ice packs although the samples are stable for several weeks after being acidified

Filtration must be carried out as soon as possible, preferably on-site, and high-quality powder free gloves must be worn for the whole filtration process: If on-site filtration is not practical due to the weather conditions, sampling space limitations, etc., then store the sample in a cool box with ice packs and filter the sample as soon as possible (i.e., preferably within 4 hours of sampling). Precautions should be taken to minimize ambient contamination, and these steps should be done under a protective bag or a laminar flow hood if in the laboratory.)

- Dissolved Organic Carbon (DOC):
  - Direct sampling into pre-cleaned DURAN® PURE glass bottle (250 ml; clear glass) should be done in priority. In case of sampling using other water sampler device such as Niskin bottle, then sampling should be done using clean silicon tubing; under no circumstances should Tygon tubing be used as it is a source of contamination.
  - Gloves must be worn during sampling. Every effort must be made not to touch the sample nipple. Any grease should never be allowed to come in contact with the sample nipple.
  - The sample bottle should be rinsed 3 times with the water collected from water sampler before filling up the bottle.
  - Collect ~250ml of sample into pre-cleaned DURAN bottles and fill it up to the brim (with no head space).
  - Cap the bottle tightly, clearly label it and store it cool and in the dark until analysis (see Protocol "Sample processing and analysis, Annex 8)
  - Blank sample for DOC will be the deionised water from the laboratory.

- Turbidity: if turbidity is not directly measured by *in-situ* sensor, collect 100 ml of seawater for turbidity analysis and refrigerate until analysis. Note that if turbidity is not measured by sensor then turbidity analysis must be carried out within 48hrs from sampling due to loss of integrity.

  The blank sample for turbidity will be deionised water from the laboratory.

- Suspended Particulate Matter (SPM): collect 500 ml of seawater sample and follow the in Annex 5 from protocol "sample processing and analysis" for the determination of SPM.

  The blank sample for SPM will be deionised water from the laboratory.

- Chlorophyll a (optional)

- Nutrients (optional)

Note that depending on the type and therefore the volume size of the water sampler, several deployments of the water sampler might be required to obtain enough sample for all the required analyses.

7. Physico-chemical data recording

In-situ physico-chemical parameters of water must be recorded with a calibrated instrument at the DGT sampling depth at each site visited and at each sampling time.

The physico-chemical parameters to be measured are: Depth (m), Temperature (°C), salinity, Dissolved oxygen (% and mg/L respectively) and pH.

Water samples are to be taken for the testing of other physico-chemical factors; SPM, DOC and nephelometry turbidity determination, although DO and turbidity can also be measured *in-situ* by sensors.

The template to record physicochemical data can be found in Annex 3.

8. Sample labelling convention

The samples (DGTs or seawater) will be sent to either IFREMER (DGTs analysis) or IST (water samples for voltammetry analysis) or IPMA for ICP-MS analysis). Therefore, it is essential that correct and clear labelling is done to avoid confusion or sample mix-up.

Therefore, each partner must label the samples as follows:

- For DGTs (on plastic bag or cover):
  Institute- Site Name-Retrieval Day-Rep number (or field blank)
  e.g. *Cefas-WS -Liverpool-D7 Rep1*

- For Seawater
  Institute- -Site Name-Day 1 (or 2 or 3 etc)-High/Low tide (if applicable-)-Voltammetry
  e.g. Cefas- Dart-D2-LT-Volt

  Institute- Site Name-Day 1 (or 2 or 3 etc)-High/Low tide (if applicable)-ICP-MS.
  e.g. Cefas- Liverpool-D5-C-ICPMS

Note:

Day 0 (D0) = Deployment day

Day 1 (D1) = 24h after D0

Day 2 (D2) = 48h after D0

Etc…

Day 7 (D7): retrieval day

Before sending the bottles for cleaning or samples for analysis, it is recommended that the sender contact the receiving laboratory to inform them of the incoming bottles/samples. Electronic details of the samples (forms from annexes 1-4) should be attached to the email and a copy of those forms should be printed and sent along with the samples.

See Annex 4 for the Sample Catalog and Annex 5 for all the Partners contact details.

ANNEX 1: Sampling Site Information

Sampling Site Information

Institute Name	
Site Name	
Coordinates of site (in decimal degrees or degrees/minutes/fractions format)	
Anthropogenic inputs	
Other site characteristics (morphology, hydrology, shallow or deep water etc)	

MONITOOL new tools for water quality monitoring
Interreg Atlantic Area European Regional Development Fund

ANNEX 2: DGT

DGT	Retrieval Day 7
Institute Name	
Site Name	
Sample Name	
Tide (low or high)	
Tidal height	
Date of deployment	
Time of deployment	
Temp at deployment (°C)	
Depth of deployment (m)	
Total depth (m)- if available	
Date of retrieval	
Time of retrieval	
Temp at retrieval (°C)	
Name of Sampler	
Name of Boat	

ANNEX 3: In-situ Physicochemical data

In-situ Physicochemical data

Institute Name	Low Tide*	High Tide*
Site Name		
Sample Name		
Date of sampling		
Time of sampling		
Sampler used (Niskin or handheld or others)		
Tidal coefficient		
Sampling Depth (m)		
Temperature (°C)		
Dissolved Oxygen (% and mg/L)		
Conductivity (mS/cm)		
Salinity		
pH		
Weather conditions: Wind Direction, Wind speed and observations e.g. sunny, rain, flooding.		
Comments- Any unusual observations such as water discolouration. Field blanks (for ICP-MS and Voltammetry) provided?		
Visible presence or absence of hydrocarbons.		
Name of Sampler		
Name of Boat.		

ID or Serial Number of instrumentation used.	
ID or Serial Number of instrumentation used.	
ID or Serial Number of instrumentation used.	
ID or Serial Number of instrumentation used.	
ID or Serial Number of instrumentation used.	

* if applicable

ANNEX 4: Sample Inventory

Sample Inventory

Institute Name	
Sample Name	**Type (DGT/Spot)**

Sample Name	**Type (DGT/Spot)**

ANNEX 5: Partner Contact Details

Partner	Contact Name	Address
AZTI	María Jesús Belzunce Segarra (jbelzunce@azti.es) Tel: +34 667174438 Iratxe Menchaca (imenchaca@azti.es) Natalia Montero (nmontero@azti.es) Germán Rodríguez (grodriguez@azti.es) Joana Larreta (jlarreta@azti.es)	AZTI María Jesús Belzunce Segarra Investigación Marina. Marine Research. Gestión Ambiental de Mares y Costas. Herrera Kaia. Portualdea, z/g. 20110, Pasaia Spain
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