MONITOOL PROJECT

Passive sampling: cost/benefits

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AZTI

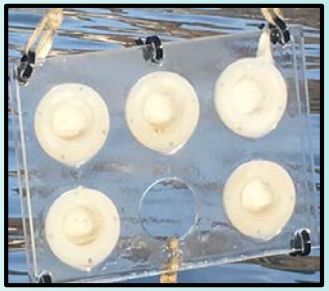
MONITOOL
new tools for water quality monitoring

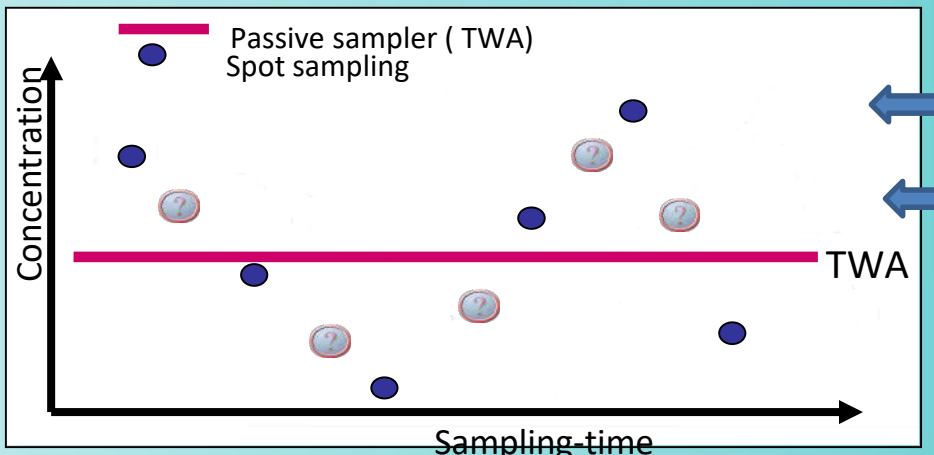
Presentation content

- Brief review: *passive sampling advantages*
- Spot sampling / passive sampling (DGTs):
  Field and laboratory steps
- Costs:
  - *Case 1. Operative / Investigative monitoring*
  - *Case 2. Surveillance monitoring*

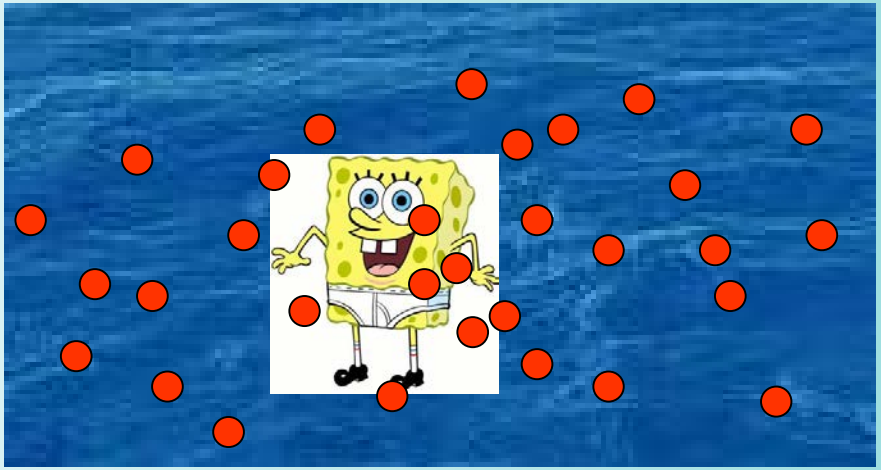
Advantages of PS techniques

1. Time integrated concentration





2. Representativeness



3. Toxicologically relevant

The contaminant labile concentration – related with bioavalilabiliy and toxicity effects

Advantages of PS techniques

It is equivalent to:
- Sampling hundreds of liters of water
- Extraction and concentration in the lab

Spot sampling. Field/lab steps

The dissolved concentration of the contaminant

- Ultra clean techniques in the field and in the lab

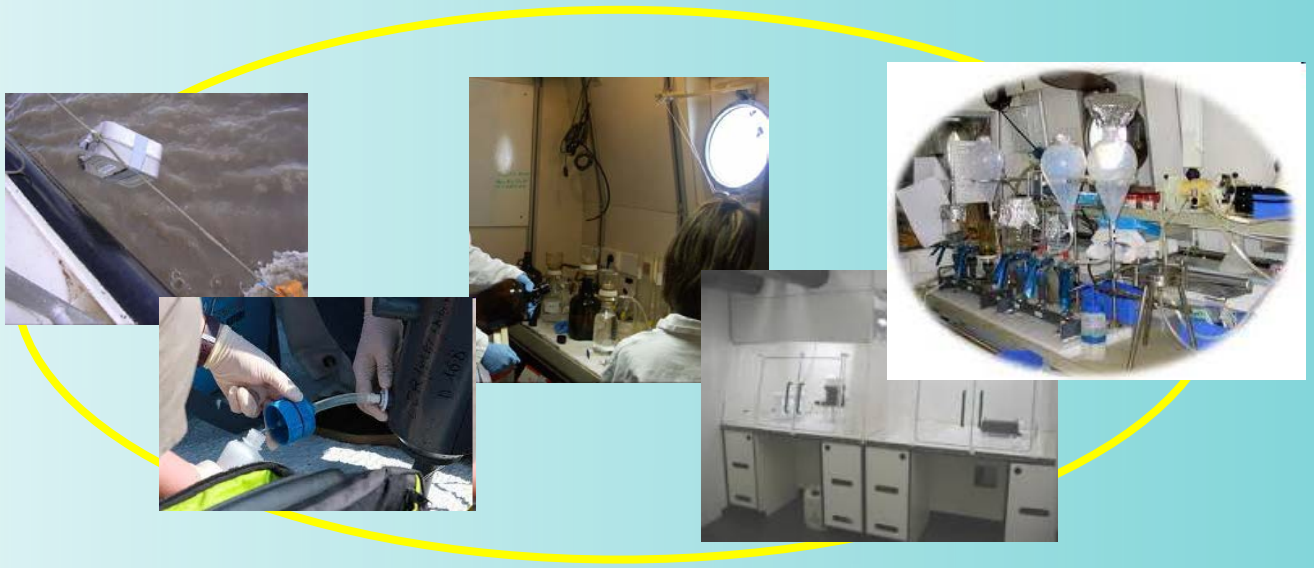
In the field:
- Special Niskin bottle teflon covered, for trace metals
- Transfer of liters of water from the Niskin to the sampling bottles = Samples manipulation
- Before sampling: cleaning of the Niskin and all sampling bottles and material

In the lab
- Water filtration - needs ultra clean techniques
- Extraction /concentration process: to eliminate the “matrix effect” and to lower the LOQs.

Passive sampler

Passive sampling. Field/lab steps

Passive sampler is a field technique that allows to extract and concentrate *in situ* a wide range of contaminants in very simple way



1. **Simple**
2. **Robust**
3. **Easy**
4. **Less manipulation**
5. **Efficient**
6. **Cheap**

WE SAVE MONEY

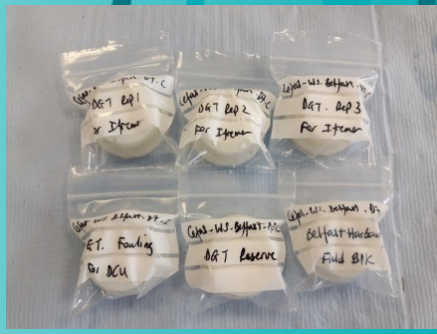
In one step by passive sampling

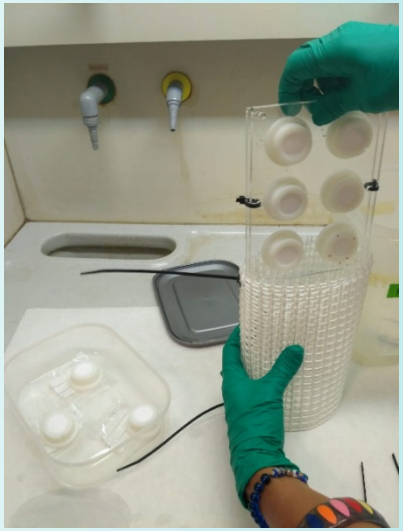
Passive sampling in the field

1. Easy to deploy in everywhere
2. Easy to handle
3. Easy to transport
4. Less manipulation
5. Efficient
6. Cheap

WE SAVE MONEY

Passive sampling (DGTs). Lab steps





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Interreg
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EUROPEAN UNION

Cost: Case 1. Operative/ Investigative monitoring in contaminated (metals) estuary

	Passive sampling (DGT)	Spot Sampling
Time	10 days deployment (10 days immersion in the water)	10 days sampling
Field work	2 days sampling: 1 day DGTs deployment +1 day of DGTs retrieval	10 days sampling: 2 times per day (low and high tide) = 20 sampling times
Material	3 DGTs + 1 DGT field blank + 3 DGTs lab blanks	NISKIN bottle, 20 sampling bottles 1 L; 20 samples = 20 L water
Price	7 DGTs, (6 € - 13 € each) = 42€ (or 91 €)	NISKIN + plastic bottles = 1,500 € + 55€
Lab work	2 hours work	2 -3 days work

Open 7 DGTs ⇒ Resin recovery

⇓

Resin elution by HNO_3 for metals extraction

⇓

Resin removal ⇒ Eluates ready to analyze

20 L water filtration

⇓

extraction /concentration

⇓

matrix effect elimination

⇓

lower the LOQs

With passive sampling = we save time, personnel, material, transport….

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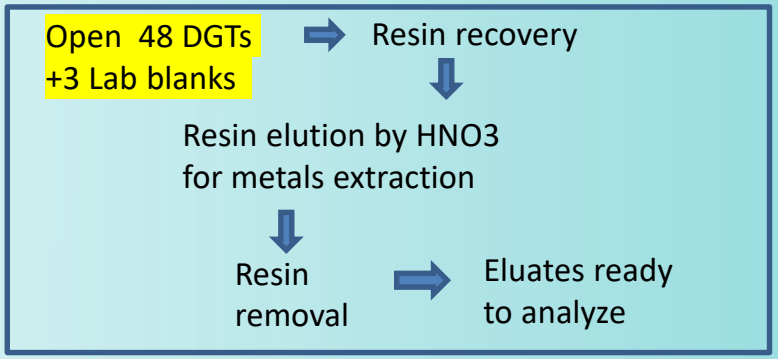
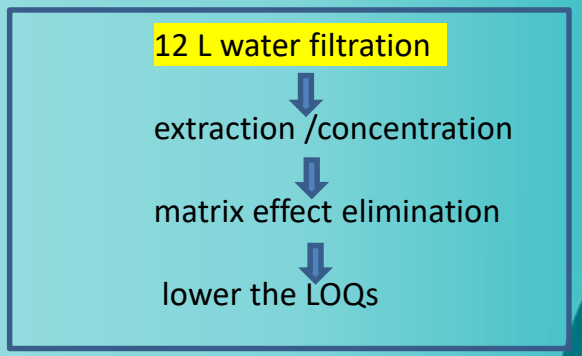
Cost: Case 2. Surveillance monitoring in contaminated (metals) estuary

	Passive sampling (DGT)	Spot Sampling
Time	Monthly sampling for 1 year	Monthly sampling for 1 year
Field work	24 sampling days: every month 2 times: 1 day DGTs deployment +1 day of DGTs retrieval	12 sampling days: once per month
Material	3 DGTs + 1 DGT field blank x 12 months= 48 DGTs	NISKIN bottle, 12 sampling bottles 1 L; 12 samples = 12 L water
Price	48 DGTs + 3 Lab blanks (6 -13 € each) = 306 € (663 €)	NISKIN + plastic bottles = 1,500 € + 25 €
Lab work	1 day work	1 day and half (or 2 days)work

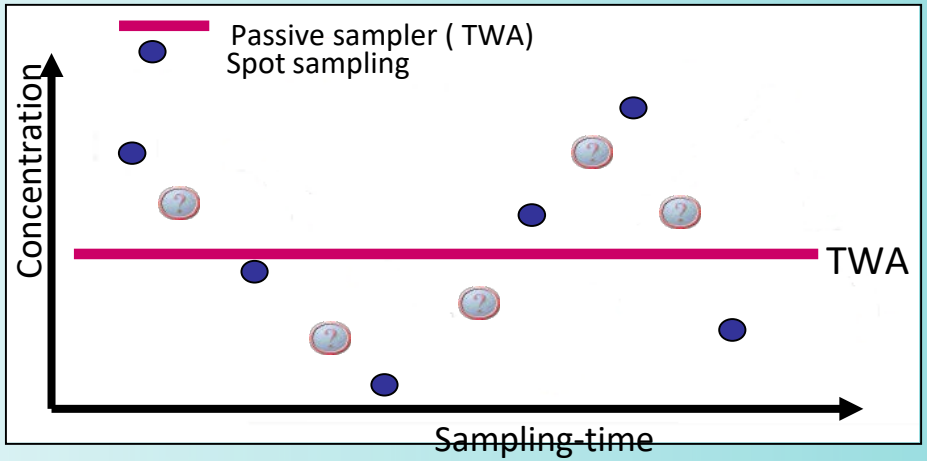




With PS we need double of sampling days, more personnel, more transport,
Less work in the lab.
Less sample manipulation, less additional contamination,……

We gain in data quality

Cost / benefits conclussions



SPOT SAMPLING:

Over /sub estimates concentration
No representative
No speciation information
No ecotoxicological relevance

PASSIVE SAMPLING

Lead Partner

DCU

Partners

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Gobierno de Canarias

IPMA Instituto Português do Mar e da Atmosfera

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