EUROpean quality Controlled Harmonization Assuring Reproducible Monitoring and assessment of plastic pollution

Bert van Bavel Project Coordinator
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- H2020-SC5-2018-2019-2020
  - Greening the economy in line with the Sustainable Development Goals (SDGs)
- H2020-CESC5-2019-2020
  - A common European framework to harmonise procedures for plastics pollution monitoring and assessments.

Horizon 2020 Call: H2020-CESC5-29-2020
Type of call: Coordination and Support Action (CSA)
Project number: 101000805
Total budget: 2 045 000 €
Project hours: 198.5 PM total
Societal Challenge 5:
Climate action, environment, resource efficiency and raw materials
Partners: 8 Research Institutes, 2 SMEs, 2 Research Council, 2 University, 1 Standardization Agency

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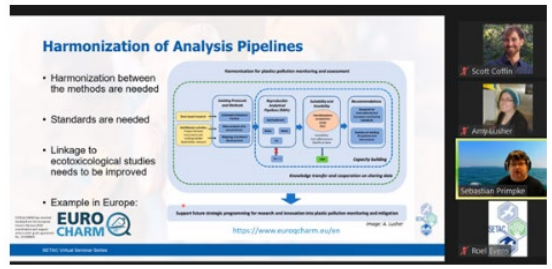
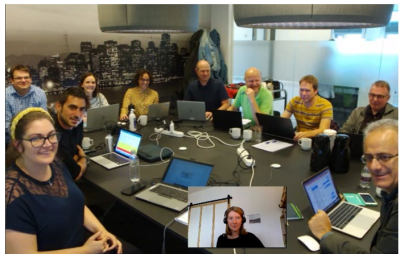
- Application date: 13 February 2020

- Decision date: June 2020
- Start date: 1 November 2020



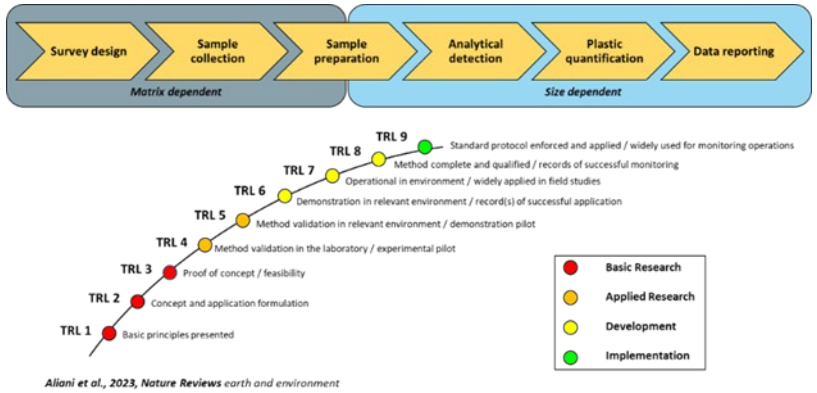
- End date: 31 October 2023



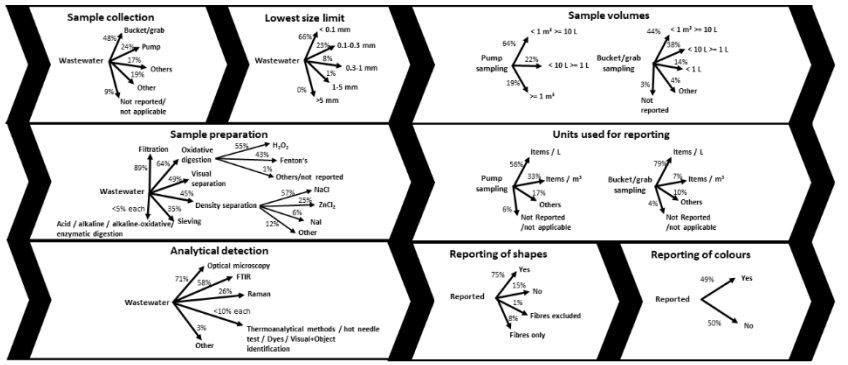
State of the art

- EUROqCHARM has developed a new concept to access analytical methods.
- By using Reproducible analytical pipelines (RAPs) and SWOT Analysis the Technical Readiness Level (TRL) was established of analytical methods.

	TRL	Survey design	Sample collection	Sample preparation	Analytical detection	Plastic quantification	QA/QC	Data reporting
Basic research	1							
	2							
	3							
Applied research	4			Acid digestion	NIR imaging			
	5		Composite sampling		Thermoanalytical (TED GC-MS, PY-GC-MS) Unaided visual/Object identification		Field blanks Positive controls	International databases
Develop-ment	6	Sea water Terrestrial water Wastewater			Fluorometric techniques		Air blanks	
	7			Alkaline digestion Enzymatic digestion	SEM-(EDX) Hot needle/melt point assessment		Air filtrations systems	Raw data in publications
Implemen-tation	8		Net sampling Pump sampling Bucket/Grab sampling		Chemical ID with RAMAN (including microscopy)	items/km²	Procedure blanks	
	9			Oxidative Digestion, Filtration/sieving, Visual Separation, Density separation	Optical microscopy Chemical ID with FTIR (ATR, general and microscopy)	items/m³ items/L		



Aliani et al., 2023, Nature Reviews earth and environment



State of the art

- Key paper on concept
  - Nature Reviews Earth and Environment
- Four reports TRL methods
  - Water
  - Biota
  - Soil/Sediment/Sand
  - Air
- Database > 3000 papers
  - To be published
- Concept recently used for plastic sea floor litter

nature reviews earth & environment

https://doi.org/10.1038/s43017-023-00405-0

Reproducible pipelines and readiness levels in plastic monitoring

Stefano Aliani, Amy Lusher, Francois Galgani, Dorte Herzke, Vladimir Nikiforov, Sebastian Primpke, Lisa Roscher, Vitor Hugo da Silva, Jakob Strand, Giuseppe Suaria, David Vanavermaete, Katrien Verlé, Bavo De Witte & Bert van Bavel

Check for updates

Flexible decision-making tools are needed to support action plans for plastics and other pollutants. Reproducible Analytical Pipelines (RAPs) and technological readiness levels (TRLs) will enable systematic validation and global harmonization of plastic pollution monitoring methods.

separately. For instance, scientists or policymakers can decide if a single step in the RAP (such as the use of analytical instruments to confirm the polymeric identity of particles) is mature enough to be implemented in all monitoring guidelines that share it. If the method is not mature, further testing and validation can be recommended.

To support this decision-making, it is important to use a robust and synthetic approach to assess the maturity of each step of a plastic monitoring RAP (that is, how much a technology is ready to fulfil the expected tasks). Although rarely applied to environmental science[8], we suggest using TRLs – developed by NASA to evaluate if a space technology was ready for deployment or needed further development[9] – for

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Review Article

A systematic review of state-of-the-art technologies for monitoring plastic seafloor litter

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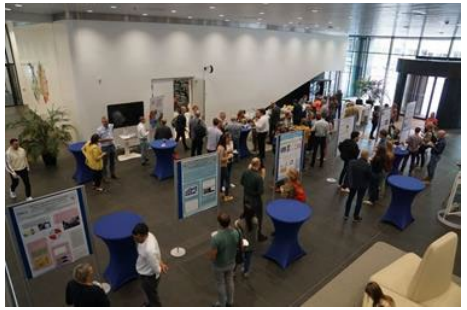
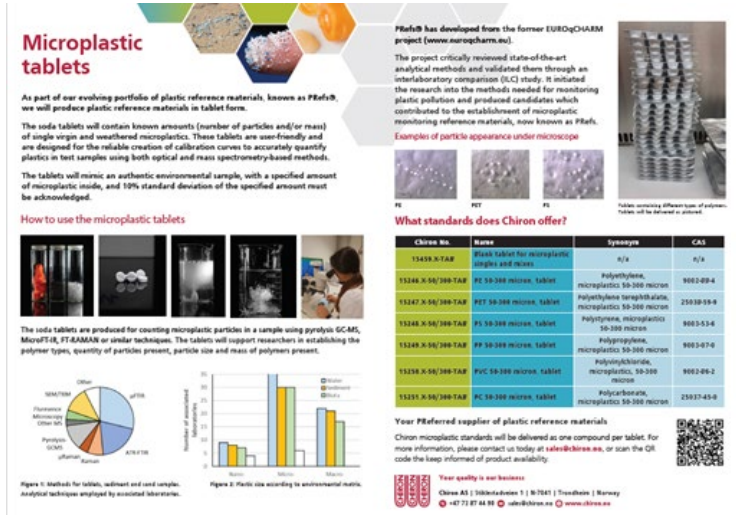
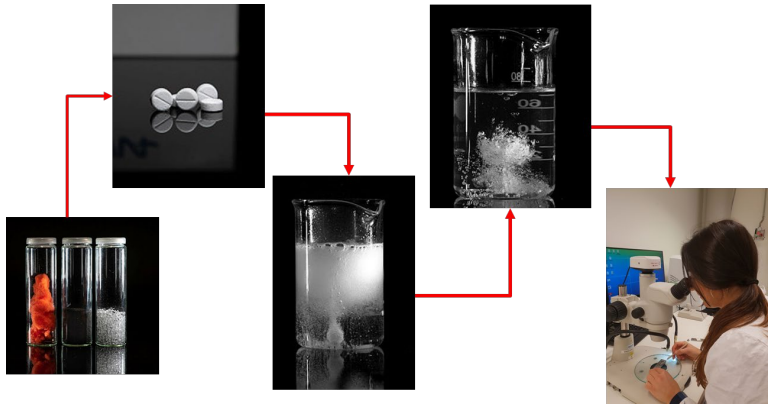
[i] Instituto de Investigação em Ciências do Mar – OKEANOS, Universidade dos Açores, Horta, Portugal

Validation

- EUROqCHARM has developed reference materials and used these materials in an international inter laboratory comparison study (ILC)
  - Reference material will be commercially available
  - ILC will be continued through QUASIMEME and the NORMAN network







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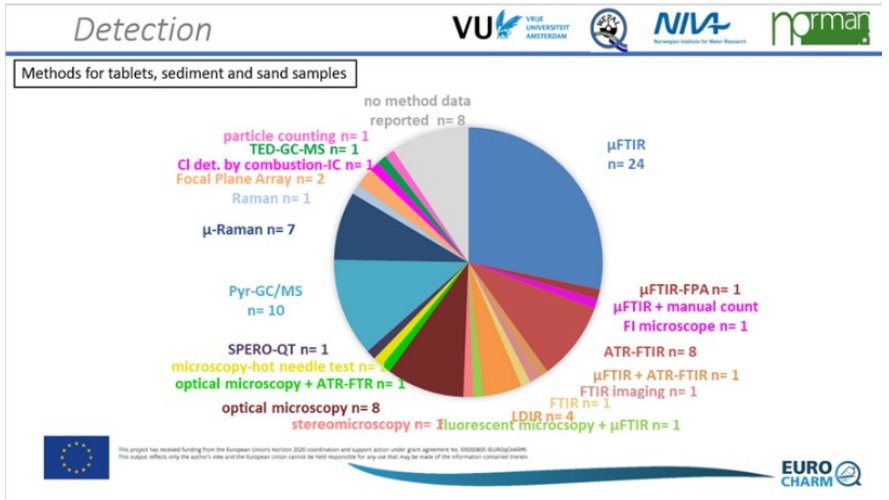

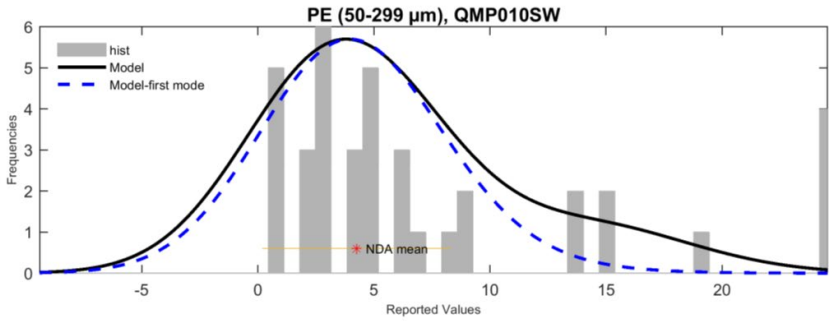

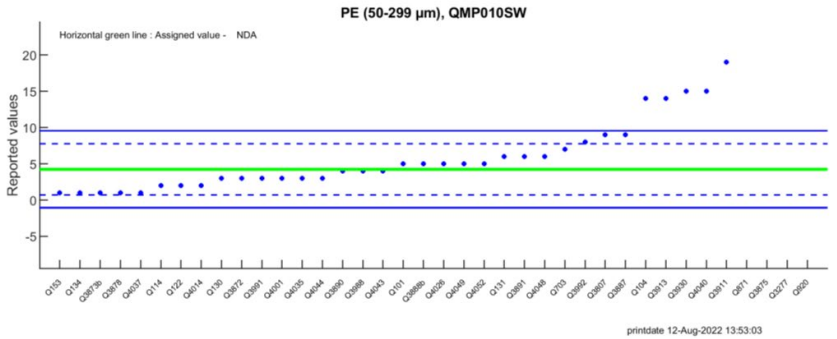

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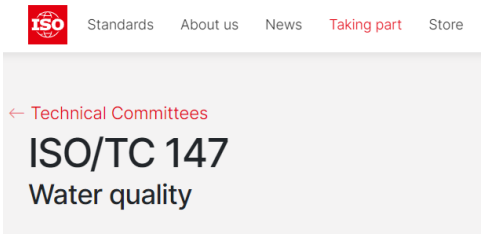
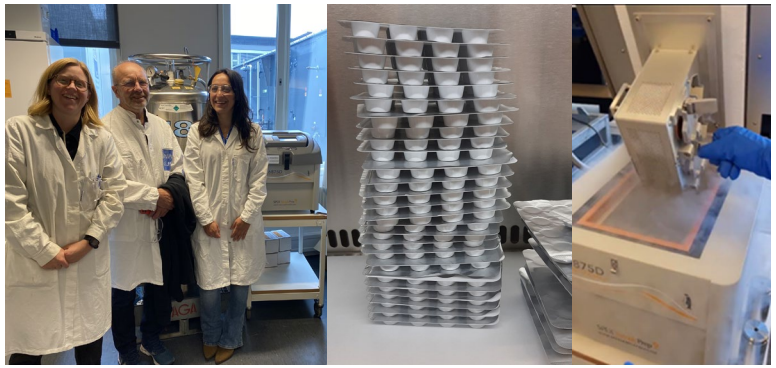
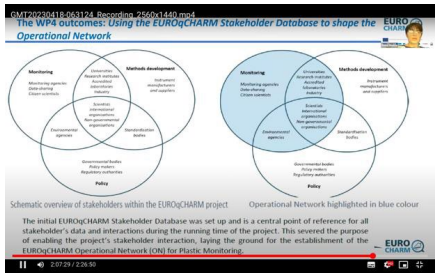
Harmonisation

- EUROqCHARM has worked closely with standardisation organisations (ISO/CEN) and monitoring initiatives (within MSFD-TGML, OSPAR, ICES, AMAP) to harmonise methods for plastic litter.
- EUROqCHARM's reference material will be used for ISO-NP-16094 Microplastics in water and related matrices.







Capacity Building

- EUROqCHARM has put significant effort on capacity building including both online and hands-on workshops.
- EUROqCHARM is working on a handbook with containing information on more than 60 organizations and 30 projects / activities related monitoring efforts of plastic litter.

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D4.2 Handbook of relevant European plastic monitoring entities, projects and initiatives

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Twitter account @EUROqCHARM

NEWSLETTER Subscribe to the newsletter on our website www.euroqcharm.eu

nature portfolio > 15 publications

zenodo > 20 publications, > 16 presentations, 3 videos

Dissemination >100 activities, on-line and on-site all from 1-1000 attendees

Impact

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ILVO Flanders Research Institute for Agriculture, Fisheries and Food · AWI · Aarhus University · Chiron Your quality is our business · eawag aquatic research · OGS · afnor Normalisation