



Generating impact: Highlights from a three-year journey

Joan Fabres & Vilde Solbakken (SALT)

EUROqCHARM Final Conference

11-12 October 2023 – Brussels



Overall EUROqCHARM objective

- Develop optimised, validated and harmonised methods for monitoring of plastics in the environment, as well as blueprints for standards and recommendations for policy and legislation.

Dissemination objectives

- Ensure awareness of the project, objectives and activities by stakeholders
- Allow stakeholder engagement in activities relying on stakeholder engagement and provide legitimation for advancing in the project strategy
- Disseminate project results

Overall EUROqCHARM objective ✓

Dissemination objectives ✗

Impact potential 👎

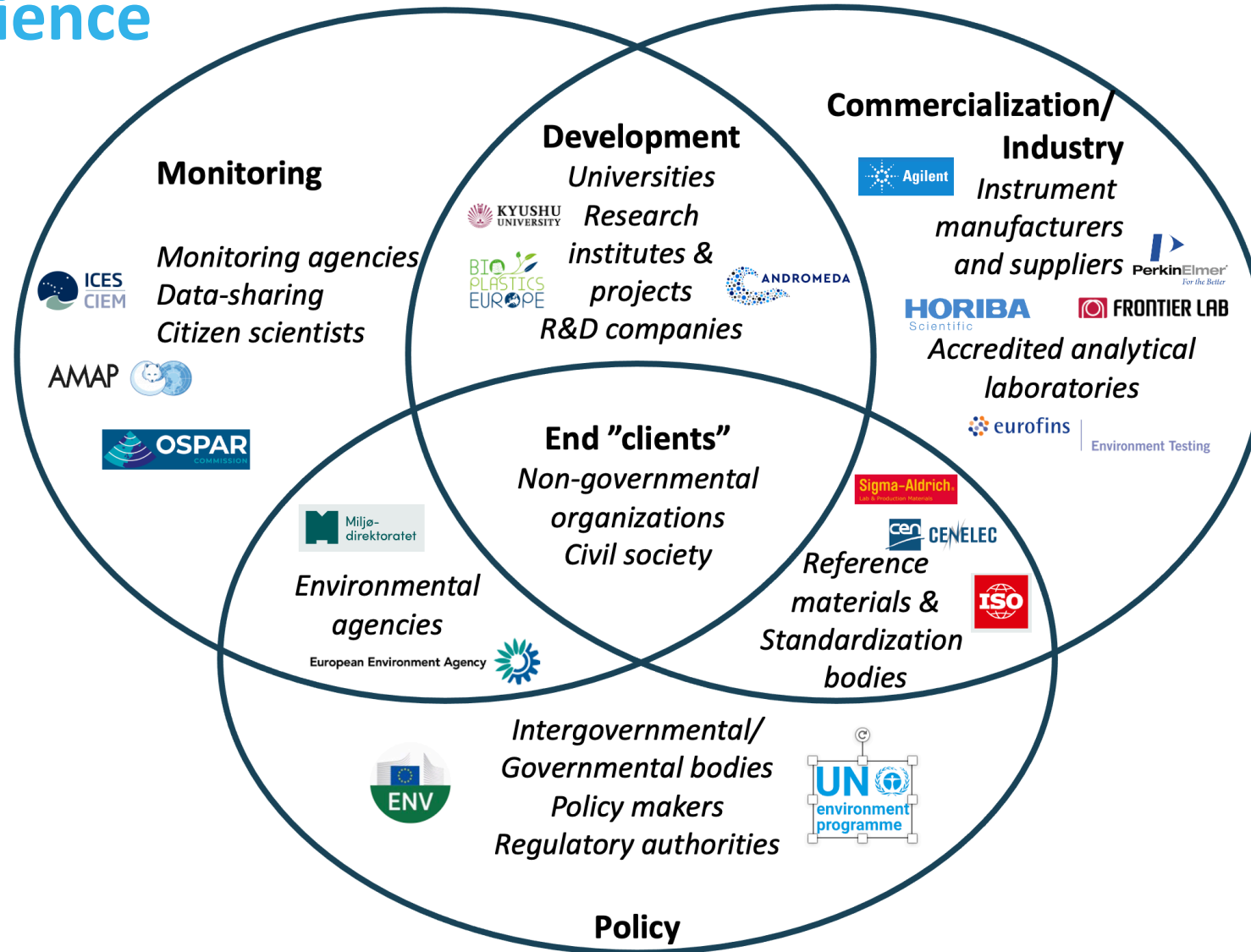
Overall EUROqCHARM objective ✓

Dissemination objectives ✓

Impact potential 👍

Stakeholder analysis – define audience

Methodological community



Brand Identity & EC support



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



DELIVERABLE TITLE

Date: dd.mm.yyyy
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Document Version: xx



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



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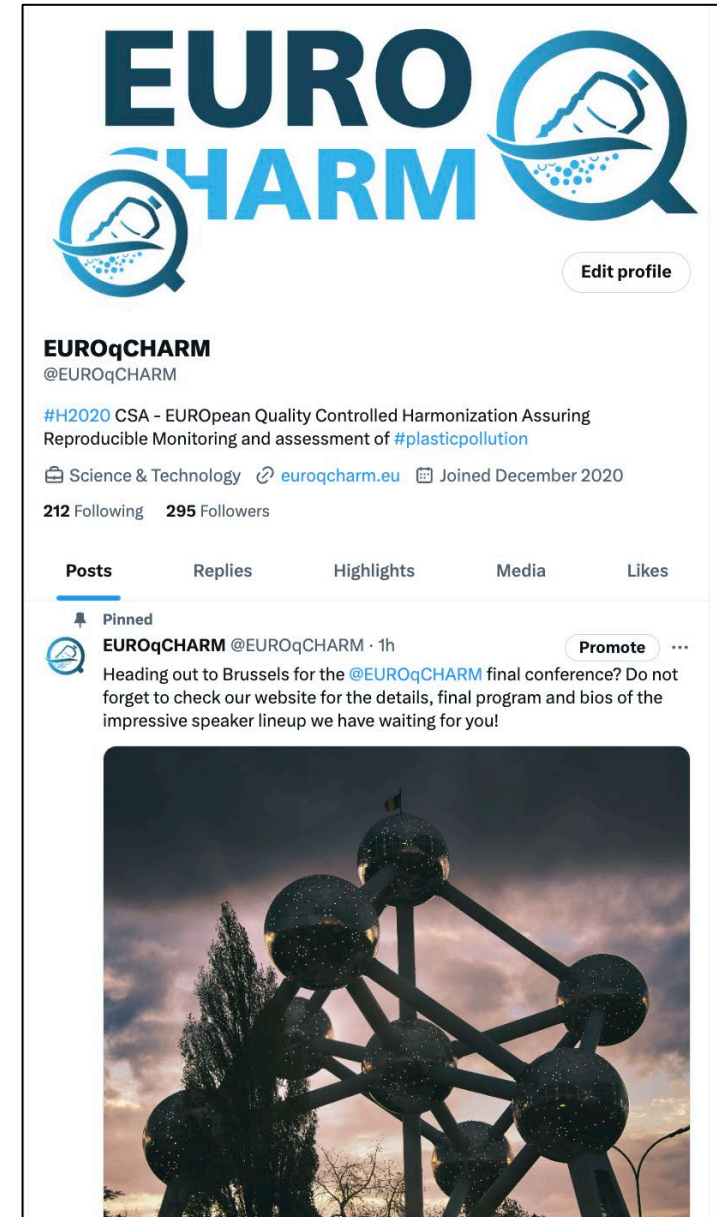
Dissemination tools & activities



The screenshot shows the website's header with the EUROqCHARM logo, navigation links for 'About EUROqCHARM', 'Menu', and 'EN'. The main heading reads 'Plastic pollution assessment and monitoring - standardising the methods EUROqCHARM'. Below the text is a large image of plastic debris on a beach. At the bottom, a section titled 'WHAT is the EUROqCHARM project's aim?' is partially visible, with the text 'The EUROqCHARM consortium wants to analyze and evaluate existing'.



The screenshot shows the 'Newsletter 5: June 2023' cover. It features the EUROqCHARM logo and the title 'EUROqCHARM news'. The main text is 'Harmonisation for plastic pollution monitoring and assessment'. Below this is a 'Welcome!' section with a photo of two people standing next to a white van. The text in the welcome section reads: 'Hi! We are Matteo Vinci and Maria Eugenia Molina Jack from the Italian National Institute of Oceanography and Applied Geophysics - OGS. Within EUROqCHARM, we are mainly involved in data management tasks; we wrote the Data Management Plan and its update, we curate the Zenodo Open Repository, and we are task leaders for the Global Synchronisation task within the WPS. Matteo: I graduated in Natural Sciences, and I initially worked in the field of air quality monitoring in northern Italy. Since the end of 2007, I have been working at the NDDC research unit of National Institute of Oceanography and Applied Geophysics, section of Oceanography which mainly deals with the management, validation and processing of oceanographic data at European level, participating in various national and international'.



The screenshot shows the Twitter profile for EUROqCHARM (@EUROqCHARM). The profile picture is the EUROqCHARM logo. The bio reads: '#H2020 CSA - EUROpean Quality Controlled Harmonization Assuring Reproducible Monitoring and assessment of #plasticpollution'. It also lists 'Science & Technology', the website 'euroqcharm.eu', and 'Joined December 2020'. There are '212 Following' and '295 Followers'. A pinned tweet from 1 hour ago says: 'Heading out to Brussels for the @EUROqCHARM final conference? Do not forget to check our website for the details, final program and bios of the impressive speaker lineup we have waiting for you!'. Below the tweet is a photo of a large sculpture made of black spheres and rods against a sunset sky.

Website

About EUROqCHARM ▾ Partners

Menu ☰

EN ▾

“Reproducible Analytical Pipelines (RAPs) and Technological Readiness Levels (TRLs) enable systematic validation and global harmonization of plastic pollution monitoring methods. The use of these approaches is intended to provide a framework for discussion and eventually support action plans..”

— Stefano Aliani, “Screening and analysis of methods” work package leader and Senior Scientist at CNR

The combination of TRLs and RAPs is applied to the science of plastic pollution for the first time and the publication showcases the potential of this integration as a tool for systematic description of analytical procedures for plastics in the environment. **This framework is a fundamental decision-making support tool, and the application of this logic potentially extends far beyond the issue of plastic pollution.**

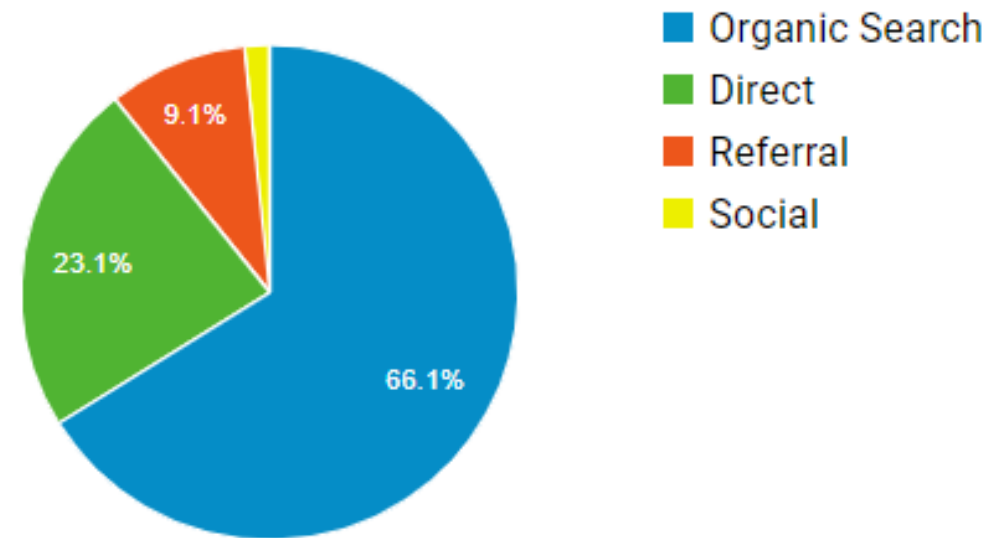
a

b

TRL	Key Milestones
TRL 1	Basic principles presented
TRL 2	Concept and application formulation
TRL 3	Proof of concept, Feasibility
TRL 4	Method validation in the laboratory, Experimental pilot
TRL 5	Method validation in relevant environment, Demonstration pilot
TRL 6	Demonstration in relevant environment, Record(s) of successful application
TRL 7	Operational in environment, Widely applied in field studies
TRL 8	Method complete and qualified, Records of successful monitoring
TRL 9	Standard protocol enforced and applied, Widely used for monitoring operations

RAPs and TRLs in plastic monitoring. a, The six fundamental steps common for every size and matrix identified as the Reproducible Analytical Pipeline (RAP) for plastic analysis and monitoring. b, The status of a RAP can be assessed against the nine technological readiness levels (TRLs).

Users: 1298
 Sessions: 2442
 Session length: 2 minutes



114 posts



Edit profile

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#H2020 CSA - EUROpean Quality Controlled Harmonization Assuring Reproducible Monitoring and assessment of #plasticpollution

Science & Technology | euroqcharm.eu | Joined December 2020

212 Following | 295 Followers

Posts | Replies | Highlights | Media | Likes

EUROqCHARM @EUROqCHARM · 12h Promote

We are excited to hold the EUROqCHARM final conference at the heart of the EU! Delighted to count with the participation and/or attendance of representatives of many EU institutions and bodies @EU_ENV @EU_MARE @EUEnvironment @SfEP @REA_research @EU_ScienceHub @CORDIS_EU @EU_H2020



Twitter

EUROqCHARM @EUROqCHARM Promote

How do you tackle a big problem 🤖? Break it into smaller problems! 😊
 @EUROqCHARM is not generating 🚀 science but is focused on well-grounded recommendations for improved #plasticpollution monitoring for 🇪🇺 #MSFD & 🌍 #PlasticsTreaty! Good research is 🔭 for #zeropollution

Fig. 1 | RAPs and TRIs in plastic monitoring. a. The six fundamental steps common for every size and matrix that form the Reproducible Analytical Pipelines (RAPs) for plastic monitoring are: Survey design, sample collection and preparation dependent on sampling matrix, Analytical detection, quantification and data reporting are particle-size-dependent. b. The status of a RAP can be assessed against the nine technological readiness levels (TRIs). If the TRI of a module is ≤ 6 the step is mature for large-scale deployment. A step with a TRI <math>< 3</math> is not suitable for monitoring plans and needs further work in research and development.

11:14 AM · Mar 23, 2023 · 2,876 Views

30 Likes | 12 Retweets | 2 Replies

Impressions 2,873 | Engagements 191 | Detail expands 45

New followers 1 | Profile visits 8

Nature Portfolio @NaturePortfolio

A Comment article in @NatRevEarthEnv proposes the application of reproducible analytical pipelines and technological readiness levels as a tool to support policy and technical decisions about plastic monitoring.
go.nature.com/3zhVpJL

5:29 PM · Apr 1, 2023 · 28.1K Views

1 Comment | 7 Retweets | 12 Likes | 1 Bookmark

5:29 PM · Apr 1, 2023 · 28.1K Views



EUROqCHARM project updates

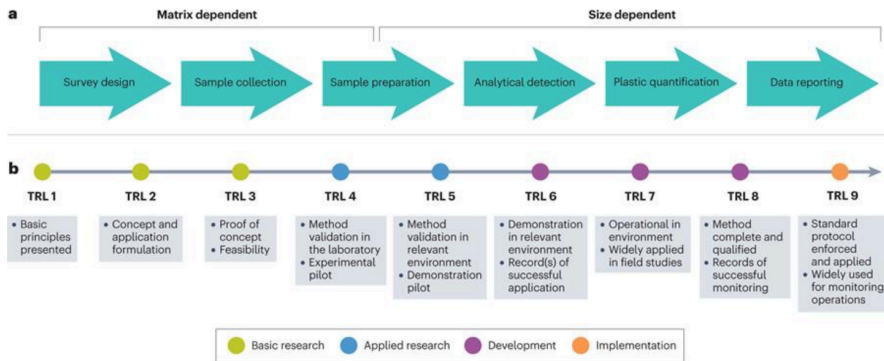


EUROqCHARM communication <communicatie@ilvo.vlaander...>

Friday, 9 June 2023 at 12:39

To: Joan Fabres

EUROqCHARM advances featured in Nature reviews earth & environment



EUROqCHARM researchers [published an article in Nature Reviews Earth & Environment](#) titled "Reproducible pipelines and readiness levels in plastic monitoring". They show in their results that flexible methodology evaluation approaches can accelerate validation and harmonisation of methodologies for plastic monitoring.

Plastic pollution is everywhere around the world. So how do you count plastics and observe changes or trends over time? Research is awash with many different methods and approaches to quantify and characterize plastic occurrence globally. But this has resulted in an overwhelming diversity of approaches: urgently requiring a system to validate their use. Some level of organisation is needed to gather comparable data. As the world works towards [negotiating The Global Plastic Treaty](#), the international community will benefit from simple and adaptable ways to address this complex problem.

Newsletter

Issue	Date	Subscribers	Open rate	Click rate
#1	End May 2021	102	60%	22%
#2	End Dec. 2021	138	54%	21%
#3	End April 2022	174	48%	24%
#4	End Oct. 2022	206	55%	16%
#5	June 2023	242	48%	15%
#6	October 2023			

Data and output repository

The screenshot shows the Zenodo website interface. At the top, there is a search bar with the text 'Search Plastic pollution' and a search icon. To the right of the search bar are buttons for 'Upload', 'Communities', 'Log in', and 'Sign up'. Below the search bar, a message states: 'Zenodo.org will be unavailable for 2 hours on October 13 from 06:00-08:00 UTC - see announcement and learn what's new and what's changed.'

Plastic pollution assessment and monitoring – harmonization and standardization of methods- EUROqCHARM

Found 23 results. Sort by: Most viewed asc.

February 1, 2022 (v1) Journal article Open Access View

A review of the use of microplastics in reconstructing dated sedimentary archives

Martin, Jake; Lusher, Amy L.; Nixon, F. Chantel;

In this review, the global deposition of microplastics across a variety of sedimentary environments is presented. Available literature was critically reviewed to investigate microplastic loading inventories in dated sediment and soil profiles. Even though field studies investigating microplastics in

Uploaded on April 27, 2022
Published in Science of The Total Environment, vol. 806, issue 4.

March 16, 2023 (v1) Journal article Open Access View

Reproducible pipelines and readiness levels in plastic monitoring

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

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. To promote

Uploaded on April 26, 2023
Published in Nature Reviews Earth & Environment.

June 30, 2022 (v1) Journal article Open Access View

Current State of Microplastic Pollution Research Data: Trends in Availability and Sources of Open Data

Jenkins, Tia; Persaud, Bhaleka D.; Cowger, Win; Sziget, Kathy; Roche, Dominique G.; Clary, Erin; Slowinski, Stephanie; Lei, Benjamin; Abeynayaka, Amila; Nyadjro, Ebenezer S.; Maes, Thomas; Hampton, Leah Thornton; Bergmann, Melanie; Aherne, Julian; Mason, Sherri A.; Honek, John F.; Rezanezhad, Fereidoun; Lusher, Amy L.; Booth, Andy M.; Smith, Rodney D. L.; Van Cappellen, Philippe;

The rapid growth in microplastic pollution research is influencing funding priorities, environmental policy, and public perceptions of risks to water quality and environmental and human health. Ensuring that environmental microplastics research data are findable, accessible, interoperable, and reusable

Access Right

- Open (41)
- Restricted (2)

File Type

- Pdf (40)
- Mp4 (2)

Keywords

- Microplastics (5)
- Microplastic (3)
- Plastic (3)
- Arctic (2)
- Assessment (2)
- Debris (2)
- Harmonization (2)
- Marine Litter (2)
- Microplastic Reference Material (2)
- Microplastics (2)

Type

- Publication (23)
 - Article (16)

Comment

<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 fulfill the expected tasks). Although rarely applied to environmental science¹, we suggest using TRLs – developed by NASA to evaluate if a space technology was ready for deployment or needed further development² – for this assessment.

Technological readiness level

The TRL scale classifies technology or methods into basic research (TRLs 1–3), applied research (TRLs 4–5), in development (TRLs 6–8) and implementation (TRL 9) phases (Fig. 1b). Where a technology falls on the scale is usually assessed by experts' opinions. In plastic research and monitoring, TRL can be based on the functionality, reliability, usability, efficiency, maintainability, accessibility, cost, and portability of a method. These aspects could be ranked and assessed using a SWOT (strengths, weaknesses, opportunities, and threats) approach. The outputs of these systematic assessments should be freely available to relevant stakeholders, deposited in suitable open-access repositories (such as the [GPML digital platform](#)), and repeated and updated on a regular basis. This information will support informed decision-making, but before implementation, scientific, technical, logistical, environmental, and ethical constraints must be considered³⁰.

Merging RAPs and TRLs

The TRL approach could be simply applied to entire full plastics monitoring guidelines; however, we argue that if applied singularly to each step in a RAP, it has the potential to greatly improve and accelerate the selection, evaluation, and adoption of large-scale plastic monitoring programmes.

For instance, no methodological standards exist for microplastic sampling in the air (for example, using active versus passive samplers, measuring dry versus wet deposition, and appropriate sampling volume and duration). Therefore, air sampling-related modules would have a TRL <3, as they are still at a basic research level and not yet ready for monitoring recommendation. Conversely, analysis of samples with Fourier transform infrared (FTIR) spectroscopy is not dependent on the sampling method or matrix, and is commonly used for plastic polymer identification. FTIR would have a TRL of 9 and could be recommended for air monitoring guidelines. Overall, the low TRL of the sampling module prevents the definition of a full standard pipeline for monitoring microplastics in the air, but breaking the method down into the

Plastic pollution is a wicked problem¹ that spans all environmental compartments, with different magnitudes in space and time. A Global Plastic Treaty is under preparation² with the ambitious goal of producing a set of legally binding tools aimed at stopping or reducing the flow of plastics into the environment. Policymakers and scientists are looking forward to endorsing monitoring plans based upon ready-to-deploy methods for different analytical scenarios. However, plastic monitoring is facing a reproducibility crisis³. Despite attempts to define monitoring guidelines, there are still no widely accepted monitoring frameworks. Tools and protocols have been developed to quantify plastic pollution, but these methods often provide incomparable results, even if applied to the same environmental matrix⁴.

To promote and accelerate the adoption of best monitoring practices, a flexible method-validation framework based on reproducibility, replicability, and repeatability⁵ is urgently required. In this Comment, we propose the application of RAPs and TRLs as a tool to support policy and technical decisions about plastic monitoring.

Reproducible analytical pipelines

RAPs are a set of automated processes used to identify best practices needed to assure that coding pipelines and data processing are standardized, quality controlled and reproducible. The concept was first introduced to manage workflows in software engineering and it is now widely applied to streamline industrial processes⁶. RAPs are especially helpful for multilevel workflows (like many plastic monitoring methods), providing modularity as a possible solution⁷.

At present, each plastic monitoring guideline is traditionally considered a unique, solid and complete path dedicated to a single matrix and particle size. Moving forwards, we advocate framing these workflows as modular RAPs, where any methodological step is separately evaluated and then implemented, saving money and time compared with evaluating a full pipeline.

Plastic monitoring can be divided into six modules in the RAP: survey design, sample collection, sample preparation, analytical detection, quantification, and data reporting (Fig. 1a). Important information can be extracted when every step in a RAP is investigated

nature reviews earth & environment

Volume 4 | May 2023 | 290–291 | 290

Direct engagement events

- Stakeholder virtual engagement events (corona and post-corona)

- Stakeholder webinar
09 Nov. 2021



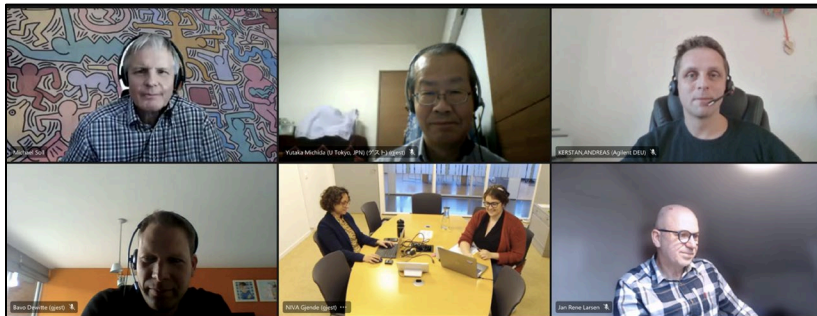
- WP1 Results Workshop
21-22 April 2022



- WP3 MSFD TGML Workshop
1-2 March 2023



- WP3 Global Sync. Workshop
18 April 2023



- Stakeholder physical events

- WP2 Workshop Interlaboratory Comparison Study
14 Sept. 2022



- Annual meeting
15-16 Sept. 2022



- EUROqCHARM Final Conference
11-12 Oct. 2023



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



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Coordination and Support Action under
the Grant Agreement No 101003805.



Potential impact summary

Platform/Tool	Audience size
Website	Ca. 1300
X	Ca. 300 followers
Newsletter	Ca. 250 subscribers
Zenodo	> 100 Downloads
Events	Ca. 300 participants

From potential impact to actual impact

- Increased awareness on the importance of harmonization and standardization:
“Harmonized monitoring will be, regardless the results of the negotiations, a central part of the Global Plastics Treaty”
- Project results have influenced process on updating "Guidance on Monitoring Marine Litter in European Seas"
- Further impact of EUROqCHARM work to be recorded in the future but outputs already used, referenced in other work and exploitation already planned by stakeholders
- Is there an opportunity for more actual impact?



EUROqCHARM created a harmonic (non-standard 😊) plastic pollution harmonisation and standardisation community



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 Twitter account @EUROqCHARM

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



This project has received funding from the European Union's Horizon 2020 coordination and support action under grant agreement No. 101000805 (EUROqCHARM). This output reflects only the author's view and the European Union cannot be held responsible for any use that may be made of the information contained therein.

