March 2023

NORMAN Joint Programme of Activities (JPA 2023)

List of scientific activities organised by the NORMAN network in 2023

We are proud to present the scientific programme which will be promoted by the NORMAN network in 2023.

The *NORMAN Joint Programme of Activities* (JPA) is defined every year by the Steering Committee, after consultation with the membership (General Assembly meeting and e-mail survey).

The final JPA and the associated budget are approved by the Steering Committee, using the following criteria:

- the level of interest of the members (results of the survey);
- the relevance of the research topic to European environmental policies;
- the balance between different sectors / fields of interest;
- the relative value of the proposed in-kind contribution *vs* amount of resources required.

For this JPA the Steering Committee has approved a budget of € 289,200, based on the expected income from membership fees of the Founding and Ordinary members. These resources will be allocated for scientific and coordination activities and regular updating and maintenance of the NORMAN Database System.

The JPA of the NORMAN network is financed by the contributions of its members (membership fees and members' in-kind contributions), always with a view to maximising synergies between research teams in the field of contaminants of emerging concern (CECs) and improving the science-to-policy interface at national, European and international level.

A summary description of each activity is presented in the following sections.

Contents

NORMAN NDS – maintenance and upgrading 3
NORMAN Suspect List Exchange (SLE) 4
NORMAN Substance Database (SusDat) 4
MassBank Europe and RMassBank 5
NORMAN DSFP: upscale - Phase III 5
NORMAN BioActivity Database 6
Modes of biological action for monitored chemicals 7
WG-1 Prioritisation of CECs 7
WG-2 Bioassays 9
WG-3 Effect-directed analysis 10
WG-4 Nano- and micro-scale particulate contaminants 11
WG-5 Water reuse and policy support 12
WG-6 CECs in the indoor environment 13
WG-7 CECs in soil and terrestrial environment 13
WG-7 Non-target screening in soils 13
WG-8 Marine environment 14
Monitoring, trends and effects of substances in the marine environment of the North-East Atlantic (OSPAR Commission) 15
CWG-NTS Non-target Screening Cross-Working Group Activity 15
CWG-PS Passive Sampling Cross-Working Group Activity 16
CWG-NTS: Collaborative Trial for the intercomparison of Ion mobility separation data. Development of open-access CCS databases for IMS 18
NTS-CWG: Expanding and validating the chemical space of non-target screening workflows 18
Workshop on Effect-based methods as tools for characterisation and hazard assessment of contaminated soil 19
PFAS suspect HRMS lists and PFAS-containing products (follow-up from JPA 2022) 19
PFAS - Intercomparison study on passive sampling and NTS for PFASs (follow-up from JPA 2022) 20
PFAS Workshop 21
ILS on pharmaceuticals and alkylphenols in DW 22

NORMAN NDS – maintenance and upgrading

NORMAN Database System (Activity coordinated by EI, slobodnik@ei.sk)

The NORMAN Database System (NDS) is a joint activity of all NORMAN members and at the core of the NORMAN activities, providing data and tools to fulfil its goals and visions. The NDS consists nowadays of 13 integrated databases modules:

1. Suspect List Exchange - https://www.norman-network.com/nds/SLE/
2. Substance Database - https://www.norman-network.com/nds/susdat/
3. Chemical Occurrence Data (EMPODAT) - https://www.norman-network.com/nds/empodat/
4. Ecotoxicology Database - https://www.norman-network.com/nds/ecotox/
5. Digital Sample Freezing Platform (DSFP) - https://norman-data.net/Verification/
6. Substance Factsheets - https://www.norman-network.com/nds/factsheets/
7. NORMAN MassBank - https://massbank.eu//MassBank/
8. Passive Sampling - https://www.norman-network.com/nds/passive/
9. Antibiotic Resistance Bacteria/Genes - https://www.norman-network.com/nds/bacteria/
10. SARS-CoV-2 in sewage - https://www.norman-network.com/nds/sars_cov_2/
11. Bioassays Monitoring Data - https://www.norman-network.com/nds/bioassays/
12. Indoor Environment - https://www.norman-network.com/nds/indoor/
13. Prioritisation - https://www.norman-network.com/nds/prioritisation/

All NDS modules can be searched either individually or starting from the module 'Search All Databases' (https://www.norman-network.com/nds/common/), where any substance from SusDat can be searched and displayed with all available data for this substance in any of the database modules.

A new module EMPODAT-SUSPECT (https://www.norman-network.com/nds/suspect/) was developed in 2021 in support of the WG1 Prioritisation. First testing has been performed in 2022 with more than 25 million data entries. Attempts to speed up the data search queries are on-going. Further work will be done in 2023 in collaboration with WG-1 to improve the current prototype.

A new module BIOACTIVITY Database has been developed in 2022. This prototype needs to be revised and optimised according to the requirements of the experts who will supply datasets and those of the future users of the database. This work will be carried out in 2023 in collaboration with the KWR and the team involved in the development of this database (see "Bioactivity Database").

An automated prioritisation module in the NDS is available for the target substances archived in EMPODAT. More recently, a prototype of such prioritisation module for suspect substances archived in EMPODAT-SUSPECT has been developed and tested.

However, the prototype does not reflect yet the latest algorithm for categorisation of substances and its upgrade is expected in 2023 following the instructions and guidance from the WG-1 (see WG-1 Prioritisation).

A database fully compatible with the NDS and a parallel automated prioritisation module for top predators and their prey has been developed within the EU LIFE APEX project (https://lifeapex.eu/; https://www.norman-network.com/apex/).

Additional data have been generated within OSPAR CONNECT, HELCOM, PreEMPT and UBA-HELCOM projects. Altogether ca. 1.1 million data entries for more than 3,250 substances in biota samples started to be integrated in the NDS in 2022; the process will be finalised in 2023.

Each of the NDS modules is continuously updated, both in terms of the required structure of the data (Data Collection Templates – DCTs) and uploading of new data. The EMPODAT database grew from ca. 20 million to ca. 38 million data entries in 2022 while additional ca. 45 million data are being curated.

The capacity of SusDat to support suspect screening has been increased from ca. 65,000 substances to ca. 95.000 substances in each sample stored in DSFP (>3,200). Predicted ecotoxicological threshold values in freshwater (fw), marine water (mw), biota (fw/mw) and sediments (fw/mw) are now available for ca. 93,000 compounds. SusDat contains information on the preferable analytical separation and mass spectrometry detection methods for each compound (i.e. GC-EI/APCI-MS, LC-(+/)ESI-MS, etc.). The Substance Factsheet database is updated on a three-month basis to reflect latest changes in the US EPA CompTox Chemicals Dashboard database. A procedure of harmonising quality checks of the target analyses data between EMPODAT and IPCHEM has been agreed at the meeting in September 2022. The data stored in EMPODAT are exchanged with IPCHEM on an annual basis.

Regarding the maintenance of the NDS and its continuous upgrade, the tasks for 2023 include:

- Continuous upgrade of all NDS modules;
- NDS Chemical Occurrence Data (EMPODAT): maintenance, upgrading and feeding of new data into the

database; sharing the data with IPCHEM;
- Continuous upgrade of all DCTs for an extended list of NORMAN substances (SusDat), drop-down lists and definitions of obligatory parameters;
- Further upgrade of quality control tools for automated quality check of all input data, harmonisation of quality check procedures with IPCHEM;
- Further development of data mining tools to extract raw data from external database systems (e.g. database of Norwegian EPA, UBA Germany, ICES, etc.) and establishment of workflows/APIs for their conversion into the 'NORMAN format;
- Further development of the EMPODAT-SUSPECT module (upgrading and testing of the current prototype);
- Enhancement of features for data analysis (batch search, statistical evaluations) and data visualisation (maps, trends) capabilities of the NDS;
- Upgrade of the Passive Sampling module, with a focus on datasets obtained from dynamic passive sampling techniques; design of Passive Sampling – SUSPECT module and upload of the test set of NTS data in cooperation with the PS-CWG;
- Upload of new data into the ARB&ARGs (WG5), bioassays (WG2 and 3), indoor environment (WG6), and SARS-CoV-2 in sewage (WG5) modules; upload of test water reuse datasets into EMPODAT;
- Upgrade of Substance Factsheets module – systematic collection of all data needed for prioritisation and further improvement of data download functions;
- Upload of data from wide-scope target screening and suspect screening of chemicals in top predators and their prey carried out in the LIFE APEX project;
- Upload of data from OSPAR CONNECT, UBA-HELCOM and PreEMPT projects.

NORMAN Databases Workshop (autumn 2023)
The tasks in 2023 will also include the organisation of a two-day NORMAN Database Workshop to discuss strategies for further development and technical discussions among IT experts.
The workshop will be organised most likely in Berlin. The programme should allow space for data science experts to discuss transition to next generation data science (AI, machine learning, etc.). An important issue on the agenda will be how NORMAN can ensure long-term sustainability and resilience of the NDS. The preparation of a proposal for inclusion of NDS as part of European environmental infrastructures should be discussed.

NORMAN Suspect List Exchange (SLE)

NORMAN Suspect List Exchange (Leader: LCSB, Luxembourg emma.schymanski@uni.lu) and **SusDat** (Leader: EI slobodnik@ei.sk and Nikiforos Alygizakis alygizakis@ei.sk in collaboration with NKUA Nikolaos Thomaidis ntho@chem.uoa.gr and Reza Aalizadeh raalizadeh@chem.uoa.gr)

NORMAN-SLE is gaining increasing attention as an expert knowledgebase with high potential for greater impact (publication of the NORMAN-SLE, with 97 co-authors from 58 institutions (DOI: 10.1186/s12302-022-00680-6). Resources will be devoted to help curate and add necessary lists already identified as critical gaps, as well as supporting cooperation with PubChem and the InChI Trust on UVCB, mixture and transformation product data management. Activities in 2023 will focus on:

- Website maintenance and development;
- Addition of new lists from contributors + lists strategically selected to fill identified knowledge gaps;
- Addition of lists to specifically save/register/link transformation product information;
- Archiving of all datasets on Zenodo (https://zenodo.org/communities/norman-sle);
- Deposition of all substances in PubChem;
- Integration of lists into PubChem [integration of lists into CompTox Chemicals Dashboard is on hold indefinitely]
- Progressive addition of annotation content to PubChem to fill information gaps;
- Extension and development of Transformations functionality with PubChem, both in terms of datasets and integration into workflows;
- Continuing development of new strategies to deal with UVCBs;
- Further development of strategies to deal with tentative/unknown/related structures;
- Publication(s) on ideas and methods behind Suspect List Exchange (biannual, proposed revisit in 2024);
- Open software/packages/approaches for curation/merging once appropriate (in close collaboration with SusDat).

NORMAN Substance Database (SusDat)

Maintenance and improvement of NORMAN Substance Database (SusDat) (Leader: EI slobodnik@ei.sk and Nikiforos Alygizakis alygizakis@ei.sk in collaboration with NKUA Nikolaos Thomaidis ntho@chem.uoa.gr and Reza Aalizadeh raalizadeh@chem.uoa.gr)

SusDat is at the core of many other database modules in the NORMAN Database System (NDS). As of December 2022, it contains 106,660 compounds accompanied with essential information on their unique chemical identifiers, chemical curation level, adduct forms, chemical properties, retention time index (RTI), in-silico predicted no-effect concentrations (P-PNECs), use category information, etc.

Activities in 2023 will pursue the work done in the previous years, focusing on:

- Addition of predicted physico-chemical properties (using VEGA platform and other tools) in the database;
- Improvement of classification of compounds in use categories (connection with PARC and PubChem cooperation);
- Addition of *in-silico* predicted RTI values for electrospray ionisation (both positive and negative) and P-PNECs for new substances in SusDat;
- Update of RTI and P-PNECs for substances with an updated chemical structure;
- Application of the automated curation workflow developed in previous years to update the validation level for all substances;
- Addition of missing validation level information for newly added substances;
- Addition of any missing information for existing compounds;
- Addition of preferable analytical methods for each compound (i.e. GC-EI, LC-(+/-)ESI etc.);
- Addition of toxicity threshold data for terrestrial environment and human health.

MassBank Europe and RMassBank

MassBank Europe and RMassBank - Continuous development and upgrade of MassBank Europe and related activities (Activity coordinated by UFZ tobias.schulze@ufz.de **;** LCSB - Luxembourg emma.schymanski@uni.lu; and Eawag, Michele Stravs michael.stravs@eawag.ch in co-operation with Steffen Neumann (IPB Halle) and NFDI4Chem).

- Upload of mass spectra to MassBank (all NORMAN members are welcome to contribute);
- Further development of RMassBank;
- Upgrading of MassBank server platform (e.g. database and applications programming interface, curation of records, import and export of records, standardisation of curation rules);
- Integration of MassBank with other mass spectral and metadata platforms (e.g., MoNA, PubChem, GNPS, US EPA CompTox, NORMAN SusDat);
- Fostering the discussion with vendors for better integration of vendors' software with MassBank;
- Continuing the discussion on prioritised compounds missing in MassBank (matches to SLE, priority mixtures etc.);
- Establishment of a chemicals' exchange platform to share neat standards for the creation of MassBank records and confirmation of identified compounds;
- Making MassBank more FAIR (e.g. better integration of ontologies, linked to NFDI4chem);
- Integration of MassBank in NFDI4chem as central repository (2020-2025);
- Evaluation of MassBank data with regards to 1) chemical space covered; 2) reproducibility of spectra between groups and instrument types;
- MassBank training workshop in Q1/2023.

Added value and links with other NORMAN activities and / or other projects:

- Enhancement of non-target identification tools and workflows;
- NORMAN Digital Sample Freezing Platform relies on the fragment information;
- Cross-Action Working Group NTS;
- Interaction with NFDI4chem, PubChem and other global partners;
- Bridging to WG1 Prioritisation.

NORMAN DSFP: upscale - Phase III

DSFP development and upscale - Phase III (Leader: EI alygizakis@ei.sk)

DSFP has proven to be useful for various activities of the NORMAN network, especially the prioritisation of CECs and as an early-warning system for environmental chemical risks. DSFP, as part of the NORMAN Database System (NDS),

is a valuable asset for the future activities of the NORMAN network. It is also expected to play an important role in PARC, considering that its functionalities will be expanded to human biomonitoring.

As of September 2022, the platform contained HRMS data from more than 3,196 unique environmental samples around Europe and beyond. Despite the upscale activity, a steady increase in numbers of samples was achieved in 2022. The number of samples is expected to increase exponentially during the next years due to the created facility and the increasing participation of NORMAN Association members in significant projects such as the PARC project. The samples covered water (36.87%), biota (30.49%), wastewater (20.75%), sediment (4.53%), groundwater (3.88%), soil (2.47%) and other matrices (1.01%).

DSFP has been used in a series of sampling campaigns and collaborative trials of NORMAN Association, providing satisfactory results in terms of identifying substances usually overlooked by target and non-target screening. DSFP is nowadays frequently used in various large-scale monitoring campaigns and acting as a safety-net for the detection of potentially hazardous substances. DSFP has proven to be useful for various activities of the NORMAN network, especially at the prioritisation of CECs and as an early-warning system for environmental chemical risks. DSFP, as part of NORMAN Database System (NDS), is a valuable asset for the future activities of NORMAN Association.

The continuous development of functionalities of DSFP is crucial to expand its use and further enrich the database. Changes that would make DSFP more efficient and that would stimulate the interest of researchers to upload their data and thus increase the collection of the HRMS data remain still a very important objective.

For this reason, the JPA proposal aims to maintain and improve the functionalities of DSFP. It is worth noting that a roadmap for DSFP has already been set.

The following major elements of the roadmap will critically improve the infrastructure:

- Creation of a data exploration tool. The tools that have been previously developed within projects such as LIFE APEX (spatial distribution visualisation, time-trend analysis and co-occurrence analysis) will be migrated;
- Incorporation of the IP scoring to DSFP for reproducible and transparent reporting of the results;
- Integration of DOI system to the repository;
- Possibility to import compounds that are currently not part of SusDat;
- Improvement of the API infrastructure and its documentation
- Programmatic contribution of collections via a batch contribution mechanism;
- Creation of a ready product for scientific projects;
- Support for 4D-HRMS data;
- Establishment of the DSFP early-warning system (aligns with the goals of PARC project): Connection of laboratory instruments with DSFP web services, event broadcasting and trigger mechanisms for event handling;
- Expansion to multiple analytical platforms;
- Creation of a data marketplace;
- Better integration with internet search engines (Google, Bing etc.) that will increase the findability of the collections.

NORMAN BioActivity Database

NORMAN BioActivity Database (Leader: KWR Water Research Institute Tessa.Pronk@kwrwater.nl Astrid.Reus@kwrwater.nl; Miina.Yanagihara@kwrwater.nl in collaboration with UBA Peter.VonderOhe@uba.de ; EI slobodnik@ei.sk)

Knowing the induced response of individually tested compounds in bioassays is important for the validation and interpretation of responses of those bioassays to environmental samples or deriving trigger values. In 2020, NORMAN initiated the development of the BioActivity Database which can receive and host such data and make it searchable.

The BioActivity Database is a means to collect all required data from single-substance bioassay experiments. A prototype was delivered in 2020. This prototype needs to be revised and optimised according to the practice of datasets that are added.

At the end of the activities, a campaign will be launched towards NORMAN members and beyond to stimulate submitting data to the database. As a seed, and as a test case, data from two large scale experiments were added by the project team in 2022. The aim is to have at least 1000 entries (chemicals with bioactivity) in total at the end of the 2023 campaign. The campaign will be deemed very successful if there are >2000 entries. This will be a number that makes the BioActivity Database a relevant source of data.

The activities planned for 2023 include:

Task 1: Revise the data collection template;

Task 2: Revise the user interface;

Task 3: Construct controlled vocabulary for the data collection template;

Task 4: Programme automatically-generated information based on entries;

Task 5: Launch campaign to solicit data entry.

Modes of biological action for monitored chemicals

Modes of biological action for monitored chemicals *(*Leader: UFZ Wibke.Busch@ufz.de martin.kraus@ufz.de tobias.schulze@ufz.de jorge.hackermuller@ufz.de in collaboration with UBA peter.vonderohe@uba.de; BFG Buchinger@bafg.de; INERIS Selim.AIT-AISSA@ineris.fr; RECETOX klara.hilscherova@recetox.muni.cz; EI slobodnik@ei.sk)

The aim of this activity is to provide a list of modes of biological action for about 3,000 compounds that are considered in scientific monitoring studies and within NORMAN as potential freshwater contaminants. Grouping of chemicals with similar MoAs is one key approach for mixture risk assessment but requires the respective knowledge. Currently, no database is available combining environmental contaminants and their MoAs. Individual databases, such as e.g. drug-bank for pharmaceuticals, or the IRAC database for insecticides are available and provide MoA information, while it is more difficult to find MoA information for industrial chemicals or transformation products.

The study will be based on a paper published in 2016 (Busch et al. 2016, doi.org/10.1002/etc.3460) where biological modes of action were researched for about 430 chemicals monitored in European freshwaters. One important finding of the mentioned study was that a large number of environmental freshwater contaminants has a neuroactive mode of action (MoA), which triggered the development of NAMs to detect such MoAs.

In this study, we will use the existing databases, collect information, perform individual literature research, and build a database for about 3,000 potentially most common freshwater chemicals. We aim to provide this knowledge for regulators and as integrative part in NORMAN as a MoA-database that should be published in 2023.

The aim is to investigate the literature beyond the well-known modes of action, with a focus on under-investigated compounds, such as neurotoxic compounds.

The team will consider information on target and non-target species, on whether or not a compound is a transformation product of another compound and what the usual usage scenarios for all compounds are. This information will enable potential later connections to information on sources, on AOPs, as well as on measured or predicted effects.

The data will be provided in a data publication fulfilling the FAIR principles and the final goal will be to ensure that at the end of the project the data will find their place in one of the modules of NDS. Possible further development could be the development of a model to predict MoA for all SusDat compounds.

WG-1 Prioritisation of CECs

Working Group N°1: Prioritisation of CECs (Activity coordinated by INERIS valeria.dulio@ineris.fr in collaboration with EI slobodnik@ei.sk, alygizakis@ei.sk and UBA peter.vonderohe@uba.de).

Better chemical management in line with the goals of the EU Chemicals Strategy and Zero Pollution Action Plan strongly relies on identification and control of pressures through efficient monitoring and knowledge of the properties and use patterns of chemicals. Given the high number of chemicals present in our environment, prioritisation of chemical contaminants is highly demanded by regulators and decision-makers in order to identify and justify the most urgent actions necessary to achieve these goals.

The tasks of WG-1 are aimed to:

- Ensuring that all relevant information for assessment of chemical risks is maintained and regularly updated in a timely manner
- Integrating and exploiting all this information for identification of lists of chemicals in need of priority actions (each priority list corresponds to an action).

In 2021, the new version of the NORMAN prioritisation framework, combining target and suspect-screening data, has been proposed, and subsequently been tested on a large-scale case study on wastewater in 2022. In this context, a number of tools: e.g. IP score (Alygizakis et al. 2023), semi-quantified data approach, EMPODAT-Suspect Database, have especially been created and tested to support the new workflow and enable its integration in the NORMAN

Database System (NDS). Further development in the implementation of the new workflow and upgrading of the on-line prioritisation will be pursued (Task 6, 7 and 8), taking in mind considerations of the EU PARC project - Task 4.2 (mechanism for identification of priority actions for environmental monitoring, and EDC and PFAS monitoring campaign) and Task 8.2 (European Early Warning System), as well as the EEA indicators for Zero Pollution Action Plan (set of indicators which are currently being developed within the remit of EEA work to support future reporting under the ZPAP, and in particular to inform the 2024 ZPMR) and Green Deal research projects.

The NDS Ecotoxicity Database module has been improved, with now almost 90,000 substances covered by predicted PNECs and more than 5,000 compounds for which experimental toxicity studies are available. The Ecotoxicity module has also gained in performance, thanks to the implementation of new functionalities. However, most of the data are related to the water compartment and it is now necessary to put more effort to extend the scope to new compartments and also to cover new prioritisation objectives in 2023. For example, protection values for reuse of reclaimed water in agriculture will be derived (collaboration with WG 5 on water re-use), which will support prioritisation of the compounds to be monitored and controlled in the water resource before use in agriculture.

In 2022, the EcotoxCentre adapted their national database to enable direct export of PNECs and raw data to the NORMAN ECOTOX Database using the newly harmonised DCTs. The workflow applied to the whole database in 2022, and the exported PNEC files from EcotoxCentre are currently being uploaded to the revised ECOTOX database module. This initiative will be pursued in 2023.

Another important step for improvement of the prioritisation activities will be the systematic collection and classification of information about the uses of compounds and the development of approaches to group the compounds based on these use(s), on functional groups or modes of action, etc. (see Task 5).

It is also important to consider mixture risks and to identify the compounds which – even if they are not exceeding threshold values individually – contribute to mixture risks (see Task 4).

In 2023, WG-1 Prioritisation will pursue the work started in the previous JPAs focusing on the following objectives:

Task 1: Support prioritisation work of the Commission services at European level, PARC, where relevant)

Task 2: Collection and compilation of compound-specific information in support of prioritisation: compilation of experimental ecotoxicity data from existing ecotox databases; compilation of regulatory quality targets for reused matrices

Task 3: Improvement of the PNEC derivation module, including prediction of P-PNECs for compounds recently added to SUSDAT; extension of the existing QSAR models to cover additional species (3 additional fish species and 2 insects) and additional species sensitivities and MOAs; compilation of a set of about 10,000 experimental rat toxicity endpoints, as commonly available from HH risk assessments, to derive a new ecotox threshold for the protection of birds and mammals; development of a QSAR model based on the above-mentioned experimental datasets (rat PNEC prediction using VEGA is also being considered for comparison).

Task 4: Integration of a Mixture Risk Indicator in the Prioritisation Tool: based on the proposal developed within NORMAN WG-1, two sets of mixture indicators addressing: i) the contribution of individual chemicals to mixture risks; ii) the overall mixture risk at site level, were proposed for use by EEA in the context of the Zero Pollution Action Plan. (activity started in JPA 2022, to be pursued in 2023 with the implementation of the two above-mentioned indicators in the NDS).

Task 5: Compilation of data / information regarding 'Use categories' and 'Chemical Functional Use' for all SusDat compounds (activity started in JPA 2022 to be pursued in 2023)

Task 6: Prioritisation scheme beyond the freshwater compartment and across compartments and for specific chemical groups:

- Design and development of the online prioritisation tool linking target and suspect screening data
- Initiate the development of a multi-compartment, integrated prioritisation framework
- EDCs, PFAS and PMT compounds (in support of T4.2 PARC and Green Deal projects)
- Prioritisation of contaminants in soil (in collaboration with WG-7)
- Prioritisation of contaminants in reused matrices (in collaboration with WG-5)
- Identification of list of ranked SusDat chemicals relevant for acquisition of their chemical standards or MS(MS) information (collaboration with NTS-CWG and MassBank)

Task 7: Prepare input to the Early Warning System for Europe (EWS PARC)

Task 8: Lessons learnt from the case studies: improving the features of the prioritisation tool (consultation and programming activities) (this task planned in JPA 2022, was not started and it will therefore be postponed to 2023)

WG-2 Bioassays

Working Group N°2: The value of bioassays and biomarkers in water quality monitoring programmes (Activity coordinated by Goethe University Frankfurt Hollert@bio.uni-frankfurt.de).

Task 1: NORMAN Workshop on Innovative Approaches for Environmental Monitoring of Chemical Pollution and Biodiversity – Linking Biodiversity Loss and Chemical Pollution (Leader: Goethe University Frankfurt, Hollert@bio.uni-frankfurt.de & Francisco Sylvester; UBA, Jan Koschorreck; INERIS, Valeria Dulio**)**

Organisation of a 1.5- or 2-day in-person workshop to build bridges between NORMAN and the biodiversity community to: (i) discuss the linkage between chemical pollution and biodiversity loss and the implication of the new role of chemical pollution within the theoretical framework of the planetary boundaries, and, (ii) to bring together existing expertise on chemical pollution and biodiversity, promote cooperation, combination of existing databases on both fields, and joint studies that may be published.

This activity stems from awareness of the **global importance of chemicals as significant drivers of biodiversity decline**. For the first time, Persson et al (2022) quantified the safe operating space of the planetary boundary of novel entities (i.e., entities that are novel in a geological sense, like chemicals and other new types of engineered materials or organisms, including pathogens and invasive species (Steffens et al. 2015)). The results were alarming and suggest that **humanity is already outside the safe operating space of the planetary boundary for novel entities** (Persson et al. 2022). Not much later, scientists highlighted the potentially massive link between biodiversity loss and chemical pollution — both phenomena were often studied within subdisciplines but have rarely been studied jointly and across subdisciplines (Groh et al. 2022). Most recently, 50 renowned scientists from all over the world supported the demand of the initiative of the International Panel on Chemical Pollution (IPCP) and several countries to establish a "World Chemicals Council" (Brack et al. 2022). Sigmund et al (2022) strongly warned that **chemical pollutants can cause undesired shifts in biological communities and/or ecosystem function**, which can affect ecosystem services, but **their interlinkages are still little understood**. To comprehensively address these complex interactions, joint efforts by interdisciplinary teams of researchers are essential.

In the last decade, **methods to assess chemical pollution and biodiversity in different ecosystem types have greatly evolved**. For instances, target and non-target screening allow the detection of very large numbers of contaminants and complex mixtures in environment samples. Organism and eDNA Metabarcoding complement traditional taxonomic identifications and allow much faster and comprehensive biodiversity assessments. A major advantage of these new methods is that the use of **material from environmental specimen banks also enables the comparative study of recent and historical samples and thus the investigation of temporal trends**. While advanced and innovative screening methods become more and more available, integrative approaches that make use of data on the spatial and temporal changes of both chemical pollution and biodiversity have only just started. The **European Green Deal and the Zero Pollution Ambition** set ambitious goals for 2050, where innovation is key. Both, chemical and biodiversity research communities are working on the implementation of the suitable **indicators and monitoring methods** for the various environmental, nature protection and chemical regulations. Effective progress in these fields require interdisciplinary and innovative approaches that overcome the “silosisation” of research, regulatory efforts and legislation and bring together monitoring of chemicals and biodiversity.

Task 2: BioActivity Database (Leader: KRW Water Research Institute Tessa.Pronk@kwrwater.nl Astrid.Reus@kwrwater.nl; Miina.Yanagihara@kwrwater.nl in collaboration with UBA Peter.VonderOhe@uba.de ; EI slobodnik@ei.sk)
Further to the work done by KWR and VU under JPA2020 (Pronk et al. 2020) to define the requirements for a NORMAN Bioactivity Database and the development of a first interface prototype by EI in 2021-2022, this task will be pursued under JPA 2023. The functionalities of the database will be improved and at the end of the activities, a campaign will be launched towards NORMAN members and beyond to stimulate submitting data to the database. (see “BioActivity Database” for further details).

Task 3: Follow-up of activities started in previous JPAs

The work of WG-2 Bioassays in 2023 will also cover the following ongoing actions from previous JPAs:

- **Remobilisation of pollutants during extreme flood events** (Leader: Goethe University Frankfurt Hollert@bio.uni-frankfurt.de) ten selected sediment and suspended sediment samples were collected in the Eifel region further to the summer 2021 flood event. The extracts were distributed to the 13 labs participating in this ring study for detailed and comprehensive toxicological and chemical profiling to evaluate the impact of such an

extreme flood event in respect to the goals of the European Water Framework Directive. The data will be evaluated at the Goethe University and statistical analysis will be carried out. In addition to a virtual meeting in late summer, a workshop to be organised back-to-back to the General Assembly meeting will take place at the end of 2023 to discuss the results and develop a manuscript for an international publication as well as proposals for consideration into the implementation of the WFD.

- **Ecosystem level effects of CECs on aquatic ecosystems (database / WG)** (Leader: Wageningen Environmental Research paul.vandenbrink@wur.nl in collaboration with IMDEA andreu.rico@imdea.org). A paper will be produced in 2023 which presents the outcomes of the online workshop that was organised on the 21-22nd November of 2022. The outcomes will also be presented at SETAC Dublin 2023: "*NORMAN workshop: Improving the use of (semi-)field data for the risk assessment of chemicals*".
- Development of ***in vivo*** **workflows to support explorative EDA studies** - solving bottlenecks using zebrafish (*Danio rerio*) and marine medaka (Leader: Goethe University Frankfurt Hollert@bio.uni-frankfurt.de and UFZ riccardo.massei@ufz.de) The Goethe University and UFZ teams could achieve the main goals described in the JPA 2020. In particular:
    - The experiment on the effects of different sample preparation were completed. The data were presented at SETAC Copenhagen 2022. (Poster presentation: "Effect of different sample preparation techniques on the fish embryo test (FET) - A comparative study using Danio rerio and Oryzias melastigma". The work was highly appreciated by the scientific community);
    - A new set of experiments to test the effect of pH shift on sample toxicity was finalised in July/August 2022 (Goethe University);
    - A new set of experiments to further reduce the exposure volume in the FET with zebrafish (~50 µL) and check SPE blank toxicity was finalised in July 2022 (UFZ);
    - Unfortunately, chemical analysis of internal concentration and exposure media will not be performed due to a lack of personnel. Anyway, this was an additional task not planned in the original JPA;
    - Considering the successful outputs of the JPA, it is planned to submit joint manuscript in autumn 2023.
- CT on **Bioassays for the evaluation of neuroactive and neurotoxic emerging contaminants (**Leader: Goethe University Frankfurt Hollert@bio.uni-frankfurt.de). a report (NORMAN internal use) with the results of the ILS has been submitted. A joint manuscript about the outcomes of the study, with a view to the integration of neurotoxicity as an emerging mode of action (MOA) in a battery of EBMs relevant for water quality monitoring, is in preparation (to be completed by autumn 2023).

Task 4: Support the work of the Commission (EBM – CIS WFD Activity) (Leader: Goethe University Frankfurt Hollert@bio.uni-frankfurt.de)

NORMAN WG-2 will continue its activities in support of the EBM – CIS WFD Activity (DG ENV - WG Chemicals), in particular as regards the strategic plan for the implementation of estrogenicity assays organised by JRC as a follow-up to the workshop on Effect-based Method (EBM) Trigger Values for Chemical Status (January 2023). Several partner of the NORMAN WG-2 will participate in this interlab exercise.

WG-3 Effect-directed analysis

Working Group N°3: Effect-directed analysis for hazardous pollutant identification (Activity coordinated by UFZ melis.muz@ufz.de and VU Frederic Béen, f.m.been@vu.nl)

Task 1: Contamination patterns, toxicity fingerprints and toxicity drivers of source-related effluents – Phase III (Leader: UFZ melis.muz@ufz.de)

In 2023 we will pursue and finalise the work started in the previous 2021 and 2022 JPAs for identification of source-related chemical and toxicological footprints. During the first phase of the study, 120 samples (including blanks) were collected and extracted by NORMAN partners. Further to preliminary chemical characterisation, a limited number of samples that reflected high contamination were distributed among partners to perform bioassays. Additionally, target and non-target screening of the samples were conducted. Based on the results of this broad chemical screening phase, in the second phase, all samples were distributed among partners to get the complete picture of the toxicological profiling of the samples. Partners tested the samples with the bioassays available in their facilities covering 13 modes of actions. The complete set of final results were delivered to UFZ (March 2023). After harmonising the data, the partners will upload the results to NORMAN Bioassay database.

In order to fulfil the objectives of the study and to identify main risk drivers and mixtures from specific sources, phase III of this collaborative study will involve high-throughput EDA for endpoints with high and unexplained toxicity. By combining high-throughput fractionation, *in-vitro* & *in-vivo* bioassays with non-target screening and multivariate data evaluation, we aim to identify source-specific risk drivers and mixtures.

The activities in 2023 will include:

Activity 1: Source prioritisation for EDA studies – For endpoints where single chemical toxicity data or prediction models available, mass balance/iceberg modelling will be conducted to identify discrepancies between observed effects and explainable effects based on detected target compounds. For endpoints without such availability, the level of toxicity according to the harmonised results will be taken into account in order to prioritise endpoints and sources for high-throughput EDA studies.

Activity 2: High-throughput fractionation – After selecting the priority sources, more samples will be collected and extracted with the same protocol from the previous JPA. The samples will be fractionated directly into 96 well plates using FractioMate, high-throughput fractionation instrument developed by VU Amsterdam. The fractions will be evaporated until dryness and will be distributed to the partners to perform their bioassays directly in the distributed well plates.

Activity 3: Risk Driver Identification – The fractions showing effects will be subjected to structure elucidation efforts to identify the risk drivers causing the observed effects.

The project will not only help prioritise sources and take further steps for management but will also provide valuable information about priority endpoints for specific sources and risk drivers. The fruitful collaborations that were established within the partners contributing mainly in WG2 and 3 will be enhanced to further WGs dealing with non-target screening and prioritisation efforts. The study will be also used as a common activity within PARC Task 4.3 Project E01 in the High-throughput EDA and NTS activities for prioritisation of features and pattern analysis to unravel sources of risk drivers.

WG-4 Nano- and micro-scale particulate contaminants

Working Group N°4: Nano- and micro-scale particulate contaminants (Activity coordinated by Eawag – Ralf.Kaegi@eawag.ch and NIVA Bert.vanBavel@niva.no

Task 1: Sandwich Filters for the Comparison of Microplastic Measurements (Leader: Eawag – Ralf.Kaegi@eawag.ch and NIVA Bert.vanBavel@niva.no in collaboration with Vrije Universiteit Amsterdam, AWI, SINTEF, Agroscope.

Despite considerable efforts to harmonise and standardise methods for the analysis of microplastic particles (MP), results from recent inter laboratory studies (ILS) still do not reach targeted quality criteria. In the ILS, MP particles contained in matrices of different complexities ranging from water soluble tablets to dried sediments were sent to the participants for sample preparation and MP analysis. This approach does not allow a decoupling of the uncertainties related to sample preparation from the uncertainties related to the actual measurements.

The goal of the present JPA is to disentangle the uncertainties related to sample preparation and measurement. For that we will fabricate filters loaded with different types of well-characterised MP that can be sent from lab to lab. We will enclose the MP-loaded filters between two IR transparent windows to immobilise the MP particles and we will construct a dedicated sample holder for our sandwich filter design.

Different types of well-characterised MP particles, such as polystyrene (PS) and Polymethylmethacrylat (PMMA) spheres, and polyvinylchloride (PVC) fragments, will be deposited on Anodisc filters (0.45 µm pore size, 25 mm diameter). The filters will then be gently pressed between two IR-transparent calcium fluoride (CaF_2) windows and imaged using both an optical microscope and an automated focal plane array (FPA)-u-FT-IR system. CaF_2 window with a thickness of 1 mm provided sufficient stability and individual MP particle were successfully identified after the sandwich filter was carried around the Eawag campus. However, the sandwich design also reduced the signal intensity and thus the quality of the FT-IR spectra. We will, thus, assess the performance of thinner (0.5 mm) windows to further improve the quality of the IR spectra.

Our current sample holder for the sandwich filter essentially consists of two hollow plastic cylinders that are pressed together by means of a thread. In a next version, we aim for a modified and flatter design, exactly matching the stage dimensions of the FT-IR instrument. The optimised design for the sandwich sample holder will be evaluated at Eawag by performing measurements of MP loaded filters (with and without IR windows). In addition, sandwich filters will be imaged before sending them to and after receiving them back from other locations within Switzerland. Should this test be successful, sandwich filters will be sent to NIVA for FT-IR measurements and sent back again to Eawag for repeated FT-IR and optical microscopy measurements. Comparison of the results from these feasibility experiments will allow us to assess whether our sandwich filter design is robust enough for sending MP-loaded filters to other labs with the MP particles remaining in place. If this is the case, we will plan a next ILS study in 2024 using our sandwich filter design.

Task 2: Follow-up of activities started in 2021-2022

The work of WG-4 in 2022 will also cover the following ongoing actions from previous JPAs:

- **Reference material and standards for micro- and nano-plastic research** (Leader: NIVA Bert.vanBavel@niva.no and Eawag – Ralf.Kaegi@eawag.ch)

  This activity addressed the development of small sized micro- and nano-polymer reference materials. Several small MPs (< 10 µm) of the most commonly used polymer types (polyethylene (PE), polypropylene (PP), polyamide or nylon (PA), polyethylene terephthalate (PET), PS (polystyrene) and PVC (polyvinylchloride) were produced in 2021 by fragmentation at NIVA and further separated into (nano-size) fractions. A report will be submitted to NORMAN on the results of this activity. Based on the results of the JPA, PP and PET were selected for a further evaluation of the production of a reference material at NIVA.

WG-5 Water reuse and policy support

Working Group N°5: Water reuse and policy support (Activity coordinated by DERAC, France genevieve.deviller@derac.eu in collaboration with LTU, Sweden lian.lundy@ltu.se).

A growing interest for data on CECs linked to reuse practices (i.e., the reuse of environmental matrices for different purposes like agriculture, aquifer recharge, urban and recreational activities, construction, land restoration) has emerged with the new Circular Economy Action Plan, the recent adoption of the new EU regulation on water reuse for agricultural irrigation and revision of the EU Directive regulating the reuse of sewage sludge in agricultural fertilisation.

Task 1: Antibiotic Resistance Bacteria and Genes Database: further improvement of the database; preparation of a peer-reviewed paper

The database has been created in 2020. It is officially part of the NORMAN Database System since 2021. In total, 1859 data points (25 datasets) have been introduced in the database. The data cover eight countries and five different matrices. A publication describing the database and its population with the initial dataset is in preparation. During 2023, the following actions will be performed:

- A self-contribution system to allow researchers to upload their data without external support
- Data exploration tools will be deployed in the database
- DCT completion to enrich the database with a critical amount of data points by aggregating the data of relevant publications
- Publication of a peer-reviewed study

Task 2: NORMAN SCORE SARS-CoV-2 in sewage (SC2S) Database

Following its launch in 2020, the SARS-CoV-2 in sewage database contained as of the end of 2022, 1148 datasets from 22 partners in 11 countries. The database was created at the time of the COVID crisis to respond to an urgent demand. NORMAN could demonstrate its capability to address quickly such a demand. The monitoring of SARS-CoV-2 in sewage is now taken in charge under national infrastructures. However, the added value of this initiative remains as this is the only open access database sharing basic catchment/wastewater data alongside SARS-CoV-2 data. The maintenance of the database and uploading of new datasets will ensured by EI as an in-kind contribution.

Task 3: Water reuse quality database (in close collaboration with WG-1)

The upgrade of the NORMAN existing databases, EMPODAT (occurrence data) and Ecotoxicology (quality targets/ hazards data), has been identified as the most relevant approach to collect data related to chemical contaminants in reused matrices and to characterise their risk according to the WG1 prioritisation framework. In 2021, a survey was launched to identify the available data in reused matrices and practices. In 2022, EMPODAT DCTs (i.e. WWTP, surface water, groundwater, sediment, soil, biota) were updated with new matrices/use categories and tested via a pilot study to confirm their practicality for regular submission. Regulatory quality targets for water reused in agriculture and for soil (in order to convert them in quality targets for sewage sludge reused in soil fertilisation) were also collected and a preliminary risk characterisation with existing EMPODAT datasets was performed. The activities planned for 2023 will include:

- Make the new EMPODAT DCTs available on NORMAN website and DCTs completion to enrich the database with occurrence data on reused matrices.
- Continue the collection of regulatory quality targets for reused matrices and DCT completion to enrich the Ecotoxicology database.
- Continue the risk characterisation and support the prioritisation of chemicals in environmental matrices reused for various practices
- Publication of a peer-review study.

WG-6 CECs in the indoor environment

Working Group N°6: CECs in the indoor environment (Activity coordinated by RECETOX lisa.melymuk@recetox.muni.cz in collaboration with NILU Pernilla.Bohlin.Nizzetto@nilu.no; VU pim.leonards@vu.nl and University of Antwerp adrian.covaci@uantwerpen.be).

In 2023 RECETOX will be the new leader of WG-6.

The activities of WG-6 will be focused on finalising the tasks started in the previous JPA 2019-2022, as listed below.

- **CT on Passive air sampling and wide-scope suspect/non-target screening for organic substances in indoor and outdoor air (in collaboration with PS-CWG)**
  A preparatory workshop and deployment of the selected passive sampler adsorbents are planned for autumn 2023. The reason for delayed initiation is because the team identified the need for additional validation of the selected sampler adsorbents. Exposed samplers will be distributed to the participants in the end of 2023. Extraction and analyses to be done by labs first half of 2024.
- **2nd CT on non-target and suspect screening methods for organic substances in European indoor dust**: Data analysis of GC-MS results has been completed and evaluation of LC-MS is on-going. A report/paper is planned for autumn 2023 (Action leader: peter.haglund@chem.umu.se Umeå University)
- **Geographical distribution of organic substances in European indoor dust**: Extracts of house dust have been distributed among laboratories that have volunteered for analysis. Most of the analyses have been completed and a meeting will be organised during spring 2023 to discuss and agree on how to evaluate and report the results. One or more scientific papers will be written during autumn 2023 (Action leader: peter.haglund@chem.umu.se Umeå University).
- **Intercomparison study of dust sampling methods**: In 2021, two datasets have been finalised – chlorinated paraffins and POPs. A report including recommendations on sampling strategies for CPs and POPs (early 2023) to be expanded with plasticisers and OPFRs will be finalised in spring 2023. Scientific publication in autumn 2023 (Action leader: pim.leonards@vu.nl VU).
- **Collection and uploading of indoor data in NORMAN Indoor Environment database**. JPA 2021 activity postponed to 2023, including allocated budget (Action leader: EI alygizakis@ei.sk).

WG-7 CECs in soil and terrestrial environment

Working Group N°7: CECs in the terrestrial environment (Activity coordinated by UBA Annegret.Biegel-Engler@uba.de and NILU Linda Hanssen lha@nilu.no)

In 2023 the work of WG-7 will focus mainly on the project:

Task 1: Non-target screening in soils – towards harmonised methods and a priority list (UBA)

(see activity “Non-target screening in soils”)

WG-7 Non-target screening in soils

WG-7: Non-target screening in soils – towards harmonised methods and a priority list (Activity coordinated by UBA Annegret.Biegel-Engler@uba.de and Tatjana.Schneckenburger@uba.de

Numerous substances reach soils from various sources and applications. Effects of single substances and (unknown) mixtures are of high concern and not much is known about chemicals in soil so far. Target monitoring programmes usually include a small number of compounds only, such as heavy metals and selected organic compounds. In support of national soil legislation and EU soil strategy, NTS can be a helpful tool, if refined and improved. Prioritisation lists for CECs hazardous to soil are still missing.

Non-target screening has the potential to identify substances that had not been looked for so far and thereby close regulatory gaps. However, contrary to water, sediment and biota samples where NTS techniques are methodologically well developed, NTS in soil has been less frequently applied so far and faces several challenges in respect to extraction and matrix effects caused by humic substances. Moreover, in comparison to target analysis, the sensitivity of the method might be lower for some substances. The data obtained by suspect screening are semi-quantitative, using the structure similarity model assessing the concentrations on the basis of a wide range of internal standards.

The project will involve interested NORMAN laboratories to tackle the above challenges with the following objectives:

- A semi-quantitative NTS-method for organic compounds in soil samples is developed which is suitable to measure soil pollution. This includes a proof of concept and improvement of existing methods for NTS. Different methods for NTS in soils are tested and a suitable method is refined and improved with regard to sensitivity, matrix effects and semi-quantification. The method shall include a broad spectrum of chemicals from various applications that are identified by suspect screening.
- Substances identified and, as appropriate, broadly quantified in the course of method development and measurements of further samples give a broad picture of substances present in soils across Germany and in other countries.
- A list of prioritised contaminant candidates in EU soils is derived from the project data. The evaluation includes compound properties such as toxicity, persistence and CMR (cancerogenic, mutagenic and toxic for reproduction) and addresses soil specific prioritisation criteria such as sorptive properties, e.g. by K_{oc}.

The project is relevant for WG-7, NTS-CWG and WG-1 activities.

WG-8 Marine environment

Working Group N°8: Marine environment (Leader: DCU fiona.regan@dcu.ie in collaboration with Marine Institute Brendan.McHugh@Marine.ie and EI slobodnik@ei.sk)

The European Green Deal and emphasis on Zero Pollution, relevant to the marine environment, is of urgent concern and an area that can be greatly facilitated by the NORMAN network activities. The zero-pollution vision for 2050 is for air, water and soil pollution to be reduced to levels no longer considered harmful to health and natural ecosystems, that respect the boundaries with which our planet can cope, thereby creating a toxic-free environment. This is highly ambitious and requires the initiatives such as WG-8 activities for success.

Several large-scale marine environment specific projects were carried out in past years, which demonstrated the feasibility of the use of many NORMAN-developed tools in support of the implementation of the Marine Strategy Framework Directive (MSFD), including NTS, passive sampling, prioritisation, setting up marine ecotoxicity threshold values and monitoring of microplastics.

The creation of WG-8 on Marine environment has been proposed and approved in 2021 and several activities were performed in connection with, e.g., EU-funded LIFE APEX and EU/UNDP-funded EMBLAS-Plus and EU4EMBLAS projects. The developed methodology was used for analysis of samples from polar regions – Antarctica, Arctic region (see JPA 2019/2020). As a part of the EU4EMBLAS, The Cruise of Three European Seas had been carried out in the end of 2021, with involvement of the EC JRC.

Three European Regional Sea Conventions have already successfully applied various NORMAN tools and approaches: OSPAR (North-East Atlantic) within the CONNECT project; HELCOM (Baltic Sea) within PreEMPT and UBA-HELCOM projects; and the Black Sea Commission within the EMBLAS projects. NORMAN is being regularly invited to the MSFD Expert Network on Contaminants meetings organised by the EC. However, the official kick-off of the Working Group was unfortunately postponed due to difficulties to identify a WG leading team. In November 2022, Fiona Regan agreed to chair the group with assistance from Marine Institute and EI.

A 5-year roadmap starting in 2023 is proposed here, where the first year will be to identify some achievable yet impactful tasks while developing the roadmap of activities through the following tasks:

Task 1: Organisation of the WG-8 meeting.

- The kick-off meeting took place in November 2022. The follow up meeting of all interested members will take place in the first half of 2023 with the aim of prioritising the activities for the next 5 years.

Task 2: Prioritisation of sea specific contaminants for the four European Sea Regions ((EI, INERIS, UBA, all).

- The first step will be to identify marine environment-relevant protocols from the NORMAN Prioritisation Framework. Then, data on the occurrence of contaminants in European seas will be compiled from various databases and uploaded into the NDS. A list of candidate sea specific contaminants based on the data available in the NDS will be provided for each Regional Sea Convention.

Task 3: Systematic sharing of published and proposed marine biota, water and sediment ecotoxicity threshold values for inclusion in the NORMAN Ecotoxicology Database (EI, UBA, all).

- The focus will be on “How” members can share their data and “Why” members should share the data. Examples will be provided in Q2 2023 and invitation for data submissions will be launched in Q3 2023.

Task 4: Scoping of new activities, with a particular focus on:

- NORMAN data on antibiotic resistance and last resort antibiotics in European seas;
- Investigation of data relating to occurrence of chemicals and disappearance of species;
- Scoping the influence of climate on future risks in the marine environment;

- Microplastics in marine samples – a database check;
- Success stories.

This task will involve working with the existing databases and literature to develop these topics with members. The outcome will be summary of available resources and identification of gaps to define the activities in Task 5.

Task 5: Completion of the strategy for development of the 5-year roadmap.

- This task will involve clearly outlining the priorities for WG-8 with specific outputs, including the science-to-policy interface impact assessment. A strategy will be developed that will be reviewed at each GA. This task will enable the establishment and formalisation of WG-8 and development of the 5-year roadmap.

Task 6: Collaboration of NORMAN network with OSPAR (see activity "OSPAR Monitoring, trends and effects of substances in the marine environment of the North-East Atlantic")

Monitoring, trends and effects of substances in the marine environment of the North-East Atlantic (OSPAR Commission)

Monitoring, trends and effects of substances in the marine environment of the North-East Atlantic (Leader: OSPAR Commission; contact person Brendan.McHugh@Marine.ie, Marine Institute)

Based upon the initial discussions at MIME 2019 and the list of identified areas for collaboration between OSPAR and the NORMAN Association, HASEC agreed to collaborate with NORMAN inter-sessionally, to prevent pollution by hazardous substances, by eliminating their emissions, discharges and losses, to achieve levels that do not give rise to adverse effects on human health or the marine environment, with the ultimate aim of achieving and maintaining concentrations in the marine environment at near background values for naturally occurring hazardous substances and close to zero for human made hazardous substances.

With this task, OSPAR's Working Group on Monitoring and on Trends and Effects of Substances in the Marine Environment (MIME) would ensure an effective collaboration with NORMAN linked with the following actions:

- CONNECT project and other project initiatives
- Ecotoxicology
- Passive sampling
- List of chemicals for priority action and its annex
- Wide-scope target and suspect screening
- Chemicals in top predators and in polar regions

The institutional collaboration in between OSPAR and NORMAN supports the implementation of the Northeast Atlantic Environmental Strategy 2030, specifically:

- S2.O1: By 2022 OSPAR will introduce a revised approach to managing the OSPAR Lists of Chemicals for Priority Action and Substances of Possible Concern (LCPA and LSPC). By 2022 and regularly thereafter, OSPAR will identify contaminants of emerging concern for the marine environment and prioritise them for action, including promoting and where necessary supplementing measures under relevant EU legislation and international organisations.
- S2.O2: OSPAR will develop and identify marine-relevant assessment criteria for hazardous substances, for use in the Quality Status Report 2023 and subsequently further develop these, including for emerging contaminants, working closely with relevant experts, particularly in the Working Group Chemicals under the Water Framework Directive Common Implementation Strategy.

CWG-NTS Non-target Screening Cross-Working Group Activity

CWG-NTS: Cross-Working Group Activity on Non-target Screening (Activity coordinated by Eawag juliane.hollender@eawag.ch in collaboration with EI slobodnik@ei.sk, University of Athens Nikolaos Thomaidis, ntho@chem.uoa.gr, LCSB - Luxembourg emma.schymanski@uni.lu).

The following actions will be carried out as part of the CWG-NTS Activity in 2023:

- NORMAN Suspect Lists Exchange (LCSB) (see "Suspect List Exchange");
- NORMAN SusDat database: Database development and maintenance (EI, NKUA) (see "SusDat");
- MassBank Europe - Continuous development and upgrade (UFZ, LCSB, Eawag and IPB Halle) (see "MassBank Europe");
- Digital Sample Freezing Platform upgrading (EI) (see "NORMAN DSFP");

- Development and upgrade of EMPODAT – SUSPECT database - a new NDS module to host suspect screening results (EI) (see “NORMAN NDS”);
- Collaborative Trial for the intercomparison of Ion mobility separation data (SLU) (see “Collaborative Trial for the intercomparison of Ion mobility separation data. Development of open-access CCS databases for IMS)
- Expanding and validating the chemical space of non-target screening workflows (NKUA) (see “Expanding and validating the chemical space of non-target screening workflows)
- NORMAN Knowledgebase (UFZ, SLU, NKUA, EI): the aim for JPA 2023 is to discuss the concept and evaluate the usefulness of such platform for information exchange and the willingness of the NORMAN members to contribute to such a platform. An example of content could be for example a chapter on best instrumental acquisition methods for NTS. Since this activity is similar to the “One-stop shop for passive sampling” proposed under PS-CWG, the PS-CWG experts will be invited to discuss with NTS-CWG in order to design the PS portal as a prototype for a future integrated “NORMAN Knowlegdebase” to foster communication on best practices in different fields.

Follow-up of activities started in JPA 2019-2022:

NORMAN CT on Passive air sampling and wide-scope, suspect and non-target screening for organic substances in indoor and outdoor air (SU / NILU / AU / NIVA / INRAE) (follow-up from JPA 2022) A preparatory workshop and deployment of the selected passive sampler adsorbents are planned for autumn 2023. The reason for delayed initiation is because the team identified the need for additional validation of the selected sampler adsorbents. Exposed samplers will be distributed to the participants in the end of 2023. Extraction and analyses to be done by labs first half of 2024;

- **Intercomparison study on PS and suspect and NTS for PFASs** (QAEHS / RECETOX / VU) (see “PFAS - Intercomparison study on passive sampling and NTS - follow-up from JPA 2022”);
- **PFAS suspect HRMS lists and lists of PFAS-containing products** (QAEHS / CNR-IRSA, University of Amsterdam) (see “PFAS – Consolidation of PFAS suspect HRMS lists and lists of PFAS-containing products - follow-up from JPA 2022”);
- **Collaborative trial on (semi-)quantitative non-target analysis with LC/ESI/HRMS** (SU and NKUA) (see “CT NTS semi-quantification” JPA 2020); In October 2021, nine water samples were sent to 46 laboratories around the world. Progress of the work (as of March 2023): the leaders of the activity performed quality check of the contributed data. There is an ongoing effort to process the HRMS data in an automatic and unbiased way. The results of the activity and a peer-reviewed publication are planned for 2023-2024.
- **NORMAN Non-target screening guidance paper** (Eawag) (see “NTS Guidance document” JPA 2020); in 2023 the leadership of this task was taken over by Eawag. Finalisation of the guidance document and submission to a peer-reviewed journal is expected in 2023;
- **Development of the NORMAN GC-HRMS workflows** (NKUA, NILU and EI) (see “NORMAN GC-HRMS workflows” JPA 2020): Prioritisation of GC-amenable compounds was finalised in 2022: a reproducible prioritisation of GC compounds based on real occurrence data was achieved and the prioritised substances were supplemented with additional substances based on the literature. Acquisition and distribution of reference standards is ongoing. GC functionality for DSFP was programmed and successfully tested. Further validation will be achieved using the data from the reference standards by the participating laboratories;
- **ILS on suspect and non-target screening in biota** (SLU): draft manuscript already circulated among the co-authors, submission expected in 2023;
- **Target / suspect screening of indoor dust samples to investigate the geographical distribution** of organic substances in European indoor dust (Umeå University) (see “WG-6 Task 1” JPA 2021): Data analysis of GC-MS results has been completed and evaluation of LC-MS is on-going. A report/paper is planned for autumn 2023;
- **ILS on non-target screening and suspect screening methods for organic substances in European indoor dust** (Umeå University) (see “WG-6 Task 1” JPA 2021) (Umeå University): Extracts of house dust have been distributed among laboratories that have volunteered for analysis. Most of the analyses have been completed and a meeting will be organised during spring 2023 to discuss and agree on how to evaluate and report the results. One or more scientific papers will be written during autumn 2023;
- The extracts were distributed in 2022 and have been analysed by the participating laboratories. The laboratories have to provide their findings to Umea University for evaluation and discussion (work in progress).

CWG-PS Passive Sampling Cross-Working Group Activity

CWG-PS - Passive Sampling Cross-Working Group Activity (Activity coordinated by NIVA Ian.Allan@niva.no and INRAE cecile.miege@inrae.fr)

The following actions will be carried out as part of the CWG-PS Activity in 2023:

Task 1: One-stop shop for passive sampling (DCU fiona.regan@dcu.ie; Marine Institute Brendan.McHugh@Marine.ie) (updated from previous proposal in JPA 2022)

While high interest levels exist in various passive sampling methodologies for measurement of contaminants in the aquatic environment, individual research institutes and monitoring agencies often work on one-off or specific projects independent of similar initiatives taking place within the research community. As a consequence, much of the monitoring and research data can remain hidden within the "grey" literature and thus can either be lost or underutilised in supporting the applicability of passive sampling as a monitoring tool.

This activity seeks to develop a "one-stop shop" approach to collate relevant passive sampling study information into a central repository. The idea is that the work should not overly focus on the collation of analytical data itself but more so on key validation / modelling information underpinning these studies (e.g. scope of analysis, robustness, the influence of biofouling, Kp_W etc) for a wide range of passive sampling techniques.

The one-stop-shop is expected to fulfil the following demands:

- Provide a template for collection of passive sampling key performance criteria
- Assemble relevant information, linked to papers, to potentially promote PS – identifying for example suitable case studies
- Create a repository for this information compatible with the requirements of existing data management systems so that sharing is somewhat seamless
- Critically assess key performance criteria in relation to passive sampling
- Promote the reporting of PS information
- Increase the visibility of PS
- Create synergies with RSC and ICES working group activities
- Identify research gaps and needs

It is important to stress that the ambition is that this one-stop-shop for PS should in the medium term become part of an integrated NORMAN Knowledgebase to foster best practices communication. The one-stop shop will therefore be designed and tested as a pilot initiative in collaboration with partners from other disciplines / NORMAN WGs, and in particular the NTS-CWG experts (see proposal for NORMAN NTS Knowledgebase (UFZ, SLU, NKUA, EI). The leading team will proceed according to the following work plan:

- Establish a template for gathering PS data/ methods etc with some examples to show how the data can be gathered and what is required; (short term)
- Ask what are the potential user queries – how can we make the database searchable?
- The one-stop-shop will have an area where protocols/SOPs/methodologies (PRCs, spiking, cleaning materials, coefficients etc) can be stored while being easily accessible for practical use; (medium-term)
- The one-stop-shop will have a section showing examples of the use of PS for policy/stakeholder value examples from UK, France, Ireland etc. (medium-term)
- Scope a paper giving recommendations for potential users on how PS might be implemented. (medium-long-term) which can be written in the next phase.

Task 2: Intercomparison study on passive sampling and NTS for PFASs (Leader: QAEHS k.sarit@uq.edu.au in collaboration with RECETOX branislav.vrana@recetox.muni.cz, NIVA Ian.Allan@niva.no and University of Amsterdam s.samanipour@uva.nl)

(see "PFAS - Intercomparison study on passive sampling and NTS - follow-up from JPA 2022")

Follow-up of activities started in JPA 2020/2021

- Position paper on "Passive sampling in support of chemical monitoring in biota under the WFD (ongoing).

CWG-NTS: Collaborative Trial for the intercomparison of Ion mobility separation data. Development of open-access CCS databases for IMS

NORMAN Collaborative Trial for the intercomparison of Ion mobility separation data. Development of open-access CCS databases for IMS (Leader: SLU, alberto.celma.tirado@slu.se in collaboration with NKUA, Konstantina Diamanti kdiamanti@chem.uoa.gr and Nikolaos S. Thomaidis ntho@chem.uoa.gr ; EI, Nikiforos Alygizakis alygizakis@ei.sk and Jaroslav Slobodnik slobodnik@ei.sk; UJI, Lubertus Bijlsma bijlsma@uji.es; BOKU, teresa.mairinger@boku.ac.at)

The hyphenation of ion mobility separation (IMS) to high resolution mass spectrometry (HRMS) has shown clear benefits for the identification of contaminants of emerging concern in complex environmental samples. IMS separates ions based on their charge, shape and size. The time taken for an ion to travel through a mobility device i.e. drift time can be translated into its collision cross section (CCS). This value gives an overall estimation of the size of the sphere created by the ion when moving across a gas phase. IMS enhances the performance characteristics of LC-HRMS screening workflows by providing a new separation dimension (termed as 4D identification) and it results in cleaner spectra, the reduction of false positive identifications, enhanced identifications, and potential separation of isomeric/isobaric compounds. IMS-HRMS provides many unexplored opportunities, and it is expected to become mainstream in the next years. Therefore, there is a need to develop open-access databases for sharing IMS data among laboratories.

To this purpose, the inter-instrument comparability of CCS values should be carefully assessed both for the obtained values and the instrument calibrants used. Special focus will be put on the selection of calibrants, since recent data indicates, that CCS values do depend on the ion mobility instrument as well as on the set of compounds used for calibration, Additionally, the development of universal QSIR approaches with large applicability domain is pivotal for the implementation of IMS-HRMS. This proposal aims to evaluate the comparability of CCS values between different instrumental configurations, enrich the NORMAN Database System with CCS values to support the suspect screening workflow integrated in Digital Sample Freezing Platform (DSFP) and develop a universal model for CCS values estimation. The proposal also includes the aggregation of experimental CCS values from participant laboratories, analysis of standards and creation of robust QSIR models to predict CCS values for all NORMAN SusDat compounds.

The planned activities for 2023 (and to be completed in 2024) include:

Task 1: Collection of experimental CCS values from NORMAN participating laboratories both from already available data and also newly acquired data;

Task 2: Evaluation of the comparability of CCS values at both intra- and inter-instrument scale;

Task 3: Incorporation of the collected CCS in MassBank text records and in the Suspect List Exchange (SLE);

Task 4: Based on the literature review, use of already existing models or creation of new models to predict CCS values for all SusDat compounds;

Task 5: Creation of an API and a standalone web-based application for CCS value prediction to assure sustainability of SusDat. Incorporation of CCS to SusDat;

Task 6: Integration of CCS in the NORMAN Database System and upgrade of screening functionality of DSFP.

NTS-CWG: Expanding and validating the chemical space of non-target screening workflows

Expanding and validating the chemical space of non-target screening workflows (Leader: NKUA, Nikolaos S. Thomaidis ntho@chem.uoa.gr in collaboration with UFZ, NILU, EAWAG

This activity aims to evaluate the models at the interlaboratory level, assess their predictions in improving the NTS workflows, and improve the models by the provided feedback. To achieve these objectives, we will provide NORMAN members end user application to make chemical space predictions. We will prepare and execute a carefully designed experiment to cover different extraction methods. We will then distribute the extracts to NORMAN members with the appropriate instrumental setups. The aim is to cover RPLC-ESI-HRMS, HILIC-ESI-HRMS, GC-EI-HRMS, GC-APCI-HRMS, where HRMS can be QTOF or Orbitrap instruments. Analysis will be conducted in positive and negative ionisations. Other novel analytical platforms (e.g., SFC chromatography, APPI ion source etc.) will be tested if appropriate instrumentation is available at the NORMAN laboratories. Complementary, we will attempt to reuse existing data from previous NORMAN trials.

The laboratories will use the software to their generated data to evaluate

- The overall accuracy of the models
- The most appropriate chromatography (RP, HILIC, GC)
- The most appropriate ionisation type (ESI, EI, APCI)
- The most appropriate ionisation source (positive or negative ionisation)

We aim to create a scientific publication and to develop a guideline to address the analytical gaps for various chemical classes. We also believe that the data will be enough to provide guidance for the most favourable adduct formation.

Rationale: In 2020, an activity to study the coverage of the chemical domain by the non-target screening workflows was launched. The objective of the activity was to develop models able to answer whether a compound is amendable to an analytical method by having individual predictions for sample extraction, chromatography and ionisation source. The models allow the investigation of the expansion of the chemical space that is achieved by the employment of new analytical platforms e.g., hydrophilic interaction liquid chromatography (HILIC) and novel ionisation techniques e.g., atmospheric pressure chemical ionisation (APCI). The developed methods can provide critical information on the covered chemical space and the limitations introduced by the sample extraction methods and instrumental methods. Understanding these gaps can help the NTS community to design new analytical methods and NTS workflows. For example, the analysis of polar compounds requires specific sample preparation methods and chromatography, which if not applied properly create “blind spots” in the determination of suspect and unknown compounds. The models were used to predict the most appropriate instrumental analytical platform and the information is already available in the NORMAN SusDat. The activity allows better exploitation of the enormous capabilities of modern instrumental analysis for the detection of emerging pollutants (EPs) by non-target HRMS screening. Moreover, these efforts will be communicated to the researchers with a high-impact peer-reviewed scientific publication.

Workshop on Effect-based methods as tools for characterisation and hazard assessment of contaminated soil

Workshop on Effect-based methods as tools for characterization and hazard assessment of contaminated soil (Leader: Örebro University, Magnus.Engwall@oru.se).

The goal of the seminar is to present findings from effect-based characterisation, iceberg modelling and EDA studies of contaminated soil and discuss ways forward to implement this approach as a complementary tool in hazard and risk assessment and as a guidance for remediation of contaminated terrestrial areas. The possibility to develop effect-based trigger values for soil will also be discussed. Development of a toolbox for effect-based characterisation of soil is a projected future outcome. This could be used for monitoring, hazard assessment and as a guidance in remediation actions in preparation for safe societal use of the areas.

The initiative was triggered by a survey of soil contamination made by the Swedish Environmental Protection Agency which has revealed there are over 80000 contaminated areas. These areas have often been locations of various industrial activities like gas production, wood impregnation, manufacturing industries etc. The chemical contamination is generally very complex with various combinations of heavy metals, PAHs, dioxins, pesticides and PFAS. The effect-based approach is therefore a promising tool to achieve a much more comprehensive characterisation and hazard assessment.

PFAS suspect HRMS lists and PFAS-containing products (follow-up from JPA 2022)

CWG-NTS: PFAS suspect HRMS lists and lists of PFAS-containing products (Leader: University of Queensland, Pradeep Dewapriya p.dewapriya@uq.edu.au and Sarit Kaserzon k.sarit@uq.edu.au in collaboration with CNR-IRSA sara.valsecchi@irsa.cnr.it and University of Amsterdam Saer Samanipour s.samanipour@uva.nl)

The main objectives of this activity are to foster knowledge exchange of PFAS suspect screening and NTS on PFAS-containing products and consolidate and harmonise suspect lists to facilitate screening of consumer and industrial products for PFAS. A curated PFAS suspect list generated via this joint effort will be used to investigate their occurrence in a range of products through joint analysis, data processing and reporting exchanges. The knowledge and expertise of PFAS identification and reporting will be shared among participating laboratories and are expected to contribute to shaping and consolidating the reporting of PFAS analysis using HRMS methods for better harmonisation and confidence.

This activity started under JPA 2022. An update of the work done in 2022 and workplan for 2023 is described below.

Task 1: Consolidate available PFAS suspect lists, curated data including PFAS MS/MS libraries and information on PFAS-containing products

A comprehensive search of the scientific literature on PFAS-containing products, suspect lists and HRMS libraries was performed as a part of Task 01 activities. In parallel, an excel template was shared among interested research groups to collect information on current activity related to PFAS-containing products, in-house suspect lists and HRMS libraries, expertise, and resources available.

A summary of the literature review and the participants' survey were presented during the first Participants'/kick-off meeting held on December 9, 2022.

Based on the participants' survey, a suspect list from NORMAN SLE will be selected as a starting point. The information and resources in that list will be expanded to improve the identification confidence of PFAS in suspect screening.

- We will invite submissions from laboratories and agree on the following.
- The analytical methods and workflows for screening PFAS in products
- The products that will be screened
- The data repository to share HRMS data
- The reporting template.

Expected outcomes: Dec 2022 completion of literature review, participants' survey, and first participants' meeting (virtual). March 2023, finalising the consolidated suspect list, sample selection, analytical and processing methods and reporting template, Mar/Apr 2023 second participants' meeting to commence inter-lab study.

Task 2: Use the information and knowledge generated in task 01 to analyse, identify and report different PFASs in products and contaminated matrices

The activity will be based on the agreements in the March 2023 workshop. Participating laboratories will receive a set of samples to analyse and process based on the agreed analytical and processing methods. A subset of selected products will be shared (Apr to June 2023) among participating laboratories to perform an interlaboratory suspect screening analysis.

The submitted data will be (i) assessed for compatibility between laboratories' identifications and reporting and (ii) used to investigate the identification and occurrence of PFAS in selected consumer products.

Expected outcomes: Mar-Jun 2023 distribution of selected samples, June-Sept 2023 submission of data. Results processing and evaluation are expected by Jan 2024, Mar 2024 distribution of the draft report to the participants, and May 2024 final report and workshop.

This project will link to other NORMAN activities, including NTA Cross-Working Group Activity (CWG-NTS); Norman NDS; NORMAN EMPODAT Suspect; NORMAN PFAS Suspect List Exchange (SLE) and Substance Database (SusDat); PFAS analytical exchange.

PFAS - Intercomparison study on passive sampling and NTS for PFASs (follow-up from JPA 2022)

Intercomparison study on passive sampling and NTS for PFASs (Leader: QAEHS k.sarit@uq.edu.au in collaboration with RECETOX branislav.vrana@recetox.muni.cz, NIVA Ian.Allan@niva.no and University of Amsterdam s.samanipour@uva.nl)

The combination of passive sampling and NTS techniques is of great interest for characterising sources and fate of PFAS in the environment and from contaminated source zones. However, interlaboratory comparisons of the use and interpretation of data with these tools is necessary to increase confidence in their use and application.

This activity will aim to address and identify some of the limitations and opportunities with the passive sampling and broad scale NTS analysis of PFASs.

This activity started under JPA 2022. An update of the work done in 2022 and follow-up in 2023 is described below.

Phase 1: Intercomparison of analytical methodologies

One type of passive sampler will be deployed at two highly contaminated sites in Australia along with grab sample collection. A surface water site and wastewater effluent site with diverse range of PFAS sources have been selected to represent different matrices and PFAS profiles.

Homogenised passive sampler and grab sample extracts, along with reference standards and blanks will be sent to participating laboratories for analysis.

The aim is to examine the (i) analysis (i.e. chromatography methods) and (ii) processing methods for these compounds using set list of target and spiked PFAS as well as use of NTA reporting from each participating laboratory.

Expected outcomes: Dec 2022 deployment of passive samplers, Jan 2023 distribution of sample extracts to participants, Mar/Apr 2023 compilation of targeted analysis data from participants, Jun 2023 compilation of NTS data from participants. Data processing and evaluation expected end of 2023.

Phase 2: Intercomparison of passive sampling technologies

Several different passive sampler configurations will be co-deployed at surface water and/or drinking water sites in EU. Site selection will represent a range of PFAS sources and profiles.

Homogenised passive sampler extracts and passive sampler devices, along with reference standards and blanks will be sent to participating laboratories for analysis. Participants will analyse sampler extracts as well as conduct passive sampler extractions themselves.

The aim is to examine the (i) extraction techniques, (ii) analysis (i.e. chromatography methods), (ii) processing methods for these compounds using set list of target and spiked PFAS as well as use of NTA reporting from each participating laboratory, (iii) passive sampler comparisons based on performance criteria.

Expected outcomes: May or Sept 2023 deploy passive samplers, Jan 2024 distribution of sample extracts and passive samplers to participants, Mar/Apr 2024 compilation of targeted analysis data from participants, Jun 2024 compilation of NTS data from participants. Data processing and evaluation expected end of 2024.

This project will link to other NORMAN activities including the passive sampling WG as well as WG-1 Prioritisation and potentially the 'interlaboratory comparison of (semi) quantitative LC/HRMS non-targeted screening' WG.

Other potential collaborations include links to The European Partnership for the Assessment of Risks from Chemicals (PARC).

PFAS Workshop

NORMAN Workshop: Monitoring PFAS in support of the EU Chemical Strategy for a PFAS-free environment

(Leader: NILU, Pawel Rostkowski pawel.rostkowski@nilu.no; INERIS, valeria.dulio@ineris.fr, UBA, jan.koschorreck@uba.de; Norwegian EPA audun.heggelund@miljodir.no; Aarhus University, Katrin Vorkamp kvo@envs.au.dk and NORMAN Steering Committee)

Organisation of a 1.5-days interdisciplinary workshop (Brussels, June 2023) to discuss NORMAN contribution to PFAS EU policy, with a specific focus on:

- Monitoring PFAS across compartments and legislation;
- Using state-of-the-art methods (target, sum parameters, NTS, effect-based methods);
- Support better chemical management in the context of circular economy.

Target audience: authorities, international organisations, NGOs, PFAS appliers, PFAS suppliers, remediation companies, research institutes.

Close link with PARC activities.

Added value: a PFAS restriction proposal was prepared by authorities in Denmark, Germany, the Netherlands, Norway and Sweden and submitted to ECHA on 13 January 2023. It aims to reduce PFAS emissions into the environment and make products and processes safer for people. Following years of controversy, the proposal sets out the pathway for the EU to ban the production and import of a chemical family of over 10,000 persistent chemicals. To date, it is still a challenge to detect PFAS in the environment and other media, with estimates of up to ten thousand compounds. It is also not known yet how many of these substances are relevant to the market and the environment. Analytical

chemists are working to develop new methods to fill in these gaps. Current challenges include not only the technical difficulties related to instrumentation techniques but also the lack of pure standard materials.

The EU Partnership for Chemical Risk Assessment (PARC) aims to support chemical management with new approaches to environmental monitoring. The NORMAN network is an important cornerstone of PARC. We want to discuss together which analytical methods are already fit for environmental monitoring, where the challenges lie in assessing the current status of contamination and monitoring the effectiveness of PFAS restriction measures and how in Europe we can join forces for a PFAS-free environment.

ILS on pharmaceuticals and alkylphenols in DW

Interlaboratory studies on pharmaceuticals and alkylphenols in drinking water (Leader: IWW, Gerhard Schertzinger g.schertzinger@iww-online.de)

There are increasing reports about the occurrence of these substances in the aqueous environment: in surface water, groundwater and for some of them even in drinking water. Reliable analytical methods are needed in order to better assess the current situation and to investigate the effectiveness of several measures (such as advanced wastewater treatment) to reduce emission of these substances into surface waters. However, for these substance groups there are no European or internationally harmonised or standardised analytical methods available so far, and a thorough assessment of the suitability of different analytical methods used is still lacking.

Together with AQS BW, IWW Water Centre will organise interlaboratory studies on these compounds in drinking water.

- ILS on pharmaceuticals for spring 2023
- ILS on alkylphenols 2023.

Parameters will be announced later.

The studies will combine proficiency testing of laboratories and evaluation of the suitability of methods used.

Dissemination of information about the ILS (announcement/invitation, registration form etc) through the NORMAN website and other dissemination channels.

For more technical details and the dispatch dates www.iswa.uni-stuttgart.de/ch/aqs/index.en.html

The proposed budget for this JPA may be revised by the Steering Committee in May 2023. All approved scientific activities will be implemented, independently of the revision of the budget.