



## **EMODnet Thematic Lot n° 4 - Chemistry**

### **Proposal for gathering and managing data sets on marine micro-litter on a European scale**

F. Galgani, A. Giorgetti, M. Vinci, M. Le Moigne, G. Moncoiffe, A. Brosich, E. Molina, M. Lipizer, N. Holdsworth, R. Schlitzer, G. Hanke, D. Schaap

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## Background

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As part of the 3<sup>rd</sup> phase of EMODnet Chemistry the scope of attention has been expanded with gathering data and developing access to data and data products for Marine Litter. This document gives background information about EMODnet, its synergy with SeaDataNet and achievements of EMODnet Chemistry so far. Thereafter it gives the scope of the EMODnet Chemistry 3 project and in particular a proposal for gathering and managing data sets on **micro-litter** by EMODnet Chemistry partners on a European scale.

The Technical Subgroup on Marine Litter (TSG ML) reviewed the proposal and provided feedback for refinement that were followed to update the present document.

### EMODnet

The European Marine Observation and Data Network ([EMODnet](#)) is a long term marine data initiative from EU DG MARE as part of the Marine Knowledge 2020 strategy. The EMODnet data infrastructure is developed since 2008 through a stepwise approach in three major phases. Currently EMODnet has started the 3<sup>rd</sup> phase of development and more than 160 organisations work together to assemble marine data from diverse sources and resources in order to make them more accessible and more interoperable. Part of their work involves building gateways to national, regional or thematic repositories and creating products based on these data.

The EMODnet members are national and regional marine and oceanographic data repositories and data management experts from Europe. They have arrangements and infrastructures in place at national, international and European level for providing long term stewardship and access to marine and oceanographic data as collected by research, monitoring and survey programmes from more than a thousand data originators from public, research and private sectors.

EMODnet provides access to European marine data across seven discipline-based themes: bathymetry, geology, physics, chemistry, biology, seabed habitats and human activities. For each of these themes, EMODnet has created a portal giving users access to standardised observations, data quality indicators and processed data products, such as basin-scale maps. These data products are free to access and use. The EMODnet development is a dynamic process so new data, products and functionality are added regularly while portals are continuously improved to make the service more fit for purpose and user friendly with the help of users and stakeholders.

### Synergy EMODnet with SeaDataNet

The first steps for developing a pan-European infrastructure for marine and ocean data management were undertaken with support of the EU DG RTD since early 2000 in a range of consecutive projects (Sea-Search, SeaDataNet, SeaDataNet II, and currently SeaDataCloud). Through these projects a consortium of oceanographic data centers in Europe has been actively developing the [SeaDataNet pan-European infrastructure](#) for managing, indexing and providing access to ocean and marine data sets and data products, acquired from research cruises and other observational activities in European marine waters and global oceans.



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The core partners of SeaDataNet are National Oceanographic Data Centres (NODCs), and marine information services of major research institutes, from 35 coastal states bordering the European seas, complemented with IT experts, and a number of international organisations (IOC-IODE, ICES and EU JRC). SeaDataNet develops and maintains standards, tools and services for ocean and

marine data management which are promoted widely and taken up by many projects and initiatives.

SeaDataNet works closely together with EuroGOOS and Copernicus Marine Environmental Monitoring Service (CMEMS) for operational oceanography, EurOBIS for marine biology, and several other leading marine data infrastructures in Europe. Moreover SeaDataNet promotes international adoption and interoperability through the IOC-IODE and ICES networks and the Ocean Data Interoperability Platform (ODIP) project with leading USA and Australia marine data infrastructures.

From the start of EMODnet in 2008 a close cooperation and synergy was established between SeaDataNet and EMODnet and several EMODnet thematic portals have adopted and adapted SeaDataNet standards and services. This has given EMODnet instant momentum and driven wider uptake of SeaDataNet standards and services by a range of marine data centers.

A core SeaDataNet service is the **Common Data Index (CDI) Data Discovery and Access service**. The CDI metadata model is based upon the ISO 19115 – 19139 metadata standards, supported by SeaDataNet Controlled Vocabularies, and INSPIRE compliant. The CDI service gives users a highly detailed insight in the availability and geographical spreading of measurement data sets that are acquired and managed by an increasing group of data providers. The CDI service has a central catalogue service, while access to the linked data sets is facilitated for users by a shopping basket mechanism. To populate the CDI service data centres have to prepare CDI metadata entries and convert their data local files to the SeaDataNet ODV standard format. This way all marine data sets can be delivered to users in a homogeneous way with syntax standards for metadata and data formats, and semantic standards for attributes such as parameters, platforms, sea regions, research vessels, etc. The ODV data files also include SeaDataNet quality flags as all engaged data centres perform QA-QC on incoming data as part of their regular process of curation and long term storage. At present more than 100 data centers from countries around the European seas are connected and more than 1.9 million CDI entries are included.

### EMODnet Chemistry achievements so far

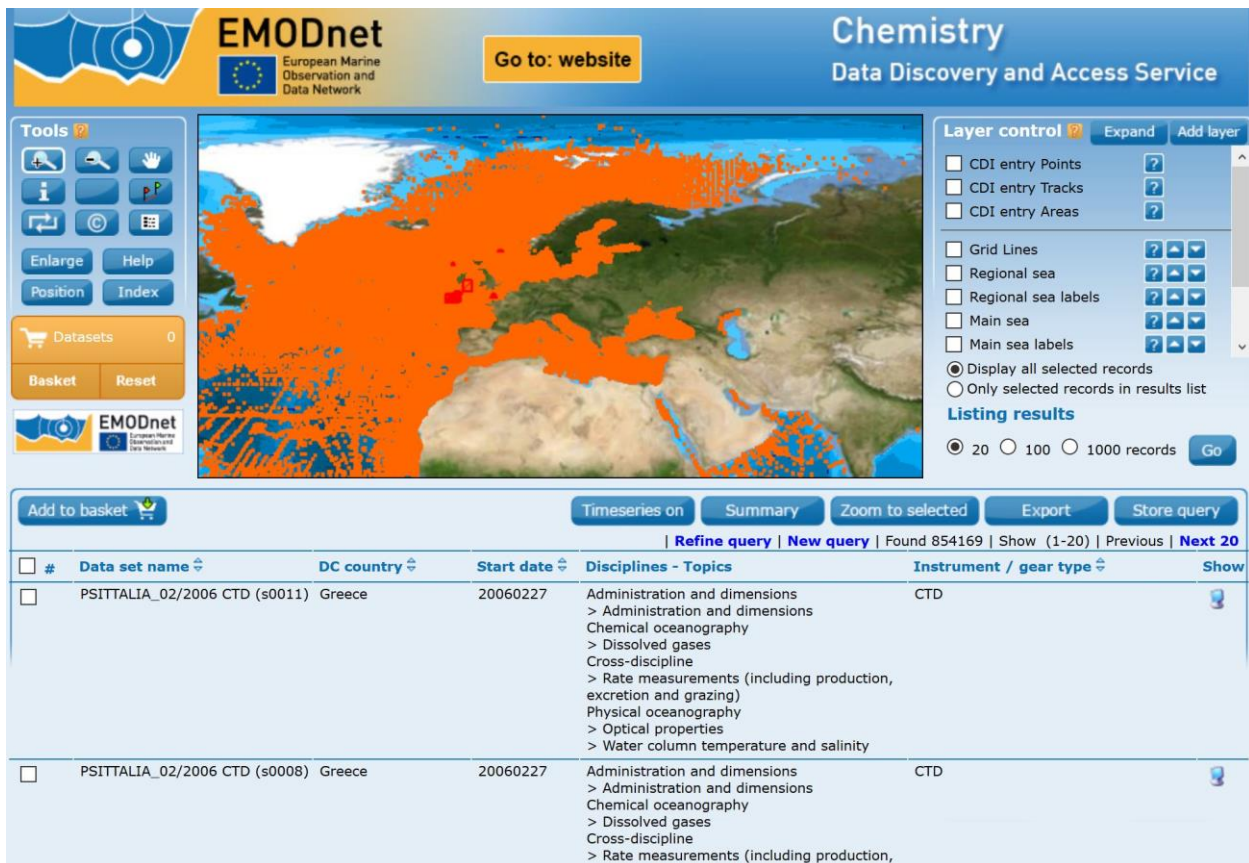
The [EMODnet Chemistry](#) consortium started in 2008 and successfully worked on gathering data sets, and developing and providing access to harmonised data collections and spatially interpolated maps concerning measurements of concentration of chemicals in seawater, sediments and biota. A major challenge has been to manage the heterogeneity, complexity and large volume of the gathered datasets and to process these into harmonised data products for all European sea regions.

All partners gathered relevant marine chemistry data sets (with a focus on eutrophication and contaminants), collected by marine environmental monitoring activities and by scientific research

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activities, and populated these in the SeaDataNet Common Data Index (CDI) Data Discovery and Access service. At the start in 2009 the CDI service contained already circa 250.000 CDI entries for chemistry data sets for European marine waters. Over the duration of the 2 consecutive EMODnet Chemistry projects and by concentrated efforts this has increased to more than 700.000 CDI entries by mid-2016. These are derived from 64 connected data centres, from 311 originators and from 32 countries, with data spanning from 1868 to 2016.



The screenshot displays the EMODnet Chemistry Data Discovery and Access Service interface. At the top, there is a navigation bar with the EMODnet logo, a 'Go to: website' button, and the title 'Chemistry Data Discovery and Access Service'. Below the navigation bar is a map of Europe with orange data points overlaid. To the left of the map is a 'Tools' panel with various navigation and map controls. To the right is a 'Layer control' panel with checkboxes for 'CDI entry Points', 'CDI entry Tracks', and 'CDI entry Areas', along with other map settings. Below the map is a 'Listing results' section with radio buttons for '20', '100', and '1000 records'. At the bottom, there is a table of data sets with columns for '#', 'Data set name', 'DC country', 'Start date', 'Disciplines - Topics', and 'Instrument / gear type'.



#	Data set name	DC country	Start date	Disciplines - Topics	Instrument / gear type	Show
<input type="checkbox"/>	PSITTALIA_02/2006 CTD (s0011)	Greece	20060227	Administration and dimensions > Administration and dimensions Chemical oceanography > Dissolved gases Cross-discipline > Rate measurements (including production, excretion and grazing) Physical oceanography > Optical properties > Water column temperature and salinity	CTD	
<input type="checkbox"/>	PSITTALIA_02/2006 CTD (s0008)	Greece	20060227	Administration and dimensions > Administration and dimensions Chemical oceanography > Dissolved gases Cross-discipline > Rate measurements (including production,	CTD	

Image 1: EMODnet Chemistry CDI Data Discovery and Access service – user interface

Automated robot harvesting has taken place to deliver regional data collections for nutrients, oxygen, chlorophyll, and contaminants to regional coordinators. Using a common methodology, they have produced **harmonised, aggregated and validated regional data collections** for the 5 major European sea regions. As part of this process, a Data Validation loop has been introduced to identify and correct errors at their local sources. As a next step, **spatially interpolated regional map products** have been computed from the harmonised data collections. Depending on sufficient spatial and temporal data coverage for the regions, maps have been produced for: **Dissolved Oxygen, Nitrate, Phosphate, Nitrate\_plus\_Nitrite, Silicate, Ammonium, Total Nitrogen, Total Phosphorus, Chlorophyll - a and pH.**

Contaminant data (**antifoulants, heavy metals, hydrocarbons, pesticides and biocides, polychlorinated biphenyls, and radionuclides**) cover mainly coastal waters as part of national monitoring and are visualised as harmonised validated timeseries.

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All data products (data collections and spatially interpolated maps) have been ingested in dedicated viewing services on the [EMODnet Chemistry portal](#) where users can browse and visualise observation densities and (animated) maps of temporal and spatial evolution (also in depth).

Priority was given to those parameters that are relevant for Member States, Regional Sea Conventions, and EU for assessing the state of the European waters under the Marine Strategy Framework Directive. For that purpose, experts from Regional Sea Conventions, EU (DG MARE, DG Env and EEA) and a number of Member States were engaged in dedicated workshops organised by EMODnet Chemistry for tuning products and discussing their fitness for purpose.

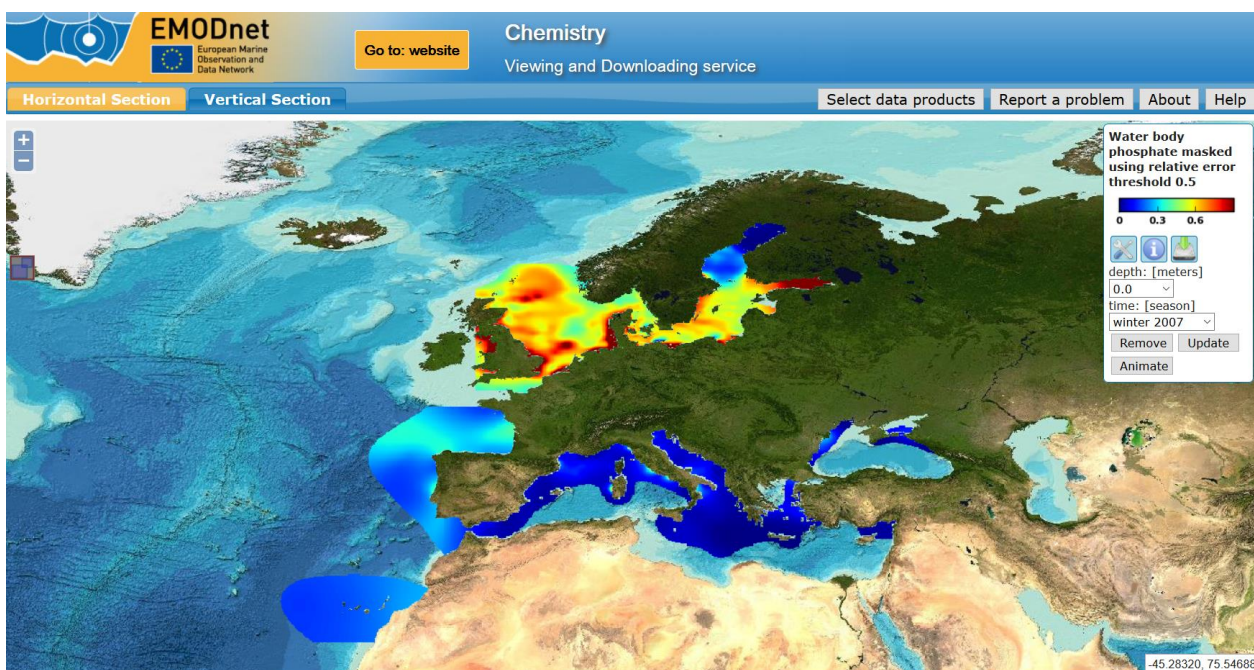


Image 2: EMODnet Chemistry Products Viewing and Downloading service - Spatial distribution of phosphate concentration in the European basins in winter for the decade 2003-2012

### EMODnet Chemistry 3 scope and approach

The EMODnet Chemistry 3 successor project has started early March 2017 and it will continue the earlier successful approach. The consortium has been expanded somewhat and brings together 45 participants from 27 countries (20 EU member states) along European seas, mostly national marine monitoring agencies and major marine research institutes (see Annex 3). They combine long standing expertise and experiences of collecting, processing, quality controlling and managing of marine chemistry data and data products together with expertise in distributed data infrastructure development and operation and provision of discovery, access and viewing services following INSPIRE implementation rules and international standards (ISO, OGC). In addition, many participants are actively involved in the MSFD implementation process. Furthermore, the consortium includes 3 international organisations, ICES – International Council for the Exploration of the Sea, BSCS - Black Sea Commission Secretariat, and UNEP/MAP - United Nation



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Environment Programme / Coordinating Unit for the Mediterranean Action Plan. The latter two organisations are representing the interests of the Regional Sea Conventions (RSCs) for the Black

Sea (Bucharest Convention) and Mediterranean Sea (Barcelona Convention), while OSPAR and HELCOM RSCs are also contributing. RSCs together with EU and appointed national experts will join the dedicated '**Board of MSFD experts**' set up for giving advice and monitor development of products that are planned for MSFD indicators D5, D8, D9 and D10.

The earlier focus on gathering data and developing data products for the European sea basins concerning eutrophication and contaminants will be continued. This involves further population of the EMODnet Chemistry CDI Data Discovery and Access service as well as updating and refining of the data products (validated data collections, spatially interpolated maps and station time series) and their visualisations in a dialogue with the board of MSFD experts. Extra efforts will be dedicated to including quality information about QA/QC procedures applied for sampling and

laboratory analysis and about origin of observations from monitoring or research, following earlier recommendations from MSFD stakeholders.

**Marine litter** has been added to the scope of chemical substances as requested from EMODnet Chemistry 3. It is an important subject on the international political agendas such as of G7 and G20. It is very relevant for the MSFD agenda and is managed under the descriptor D10. This aims to provide instruments to assess, monitor, set targets and finally reach a good environmental status (GES) with regard to marine litter. GES should be achieved only when "properties and quantities of marine litter do not cause harm to the coastal and marine environment".

EMODnet Chemistry 3 will focus on gathering data, generating data products on a European scale, and publishing the data and data products for the following marine litter categories:

- **Beach litter (nets, bottles etc.)**
- **Seafloor Litter (i.e. litter collected by fish trawl surveys)**
- **Micro-litter (micro plastics)**

For beach litter and seafloor litter there are already a number of ongoing initiatives, such as undertaken or planned by: Technical Support Group – Marine Litter (TSG ML), JRC Project on Marine Litter baselines, Regional Sea Conventions (OSPAR, HELCOM, UNEP/MAP, BSCS), ICES, MEDITS, EU research projects (DeFishGear, PERSEUS, EMBLAS, ...) and possible others. Considering this existing European landscape and ongoing discussions with stakeholders, including the chair and vice-chair of TSG ML, EMODnet Chemistry opts for developing two European EMODnet internet databases, one for **beach litter**, modelled after the OSPAR-MCS approach, and one for **seafloor litter**, modelled after the ICES-DATRAS approach. These European databases should be primarily populated by harvesting from relevant regional systems, while central submission facilities should be operated for covering submissions by organisations in regions that fall outside existing systems. Discussions are ongoing with the relevant regional systems, their responsible managers and related networks in order to get their support and to arrange formal cooperation and set up of data exchange mechanisms. TSG ML will be kept informed about progress of these deliberations.





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For **micro-litter** the situation is different and there are not yet coordinated efforts at regional or European scale. Considering this situation EMODnet Chemistry proposes to adopt the data gathering and data management approach as generally applied for marine data, i.e. populating metadata and data in the CDI Data Discovery and Access service. This proposal is detailed in the following section.

## Marine micro-litter

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The amount, distribution and composition of micro particles establish baseline quantities, properties and potential impacts of these elements. Micro plastic is likely to be the most significant part of this. Micro particles of a range of common material types including glass, metal, plastic and paper litter are undoubtedly present in the environment but relative proportions of material types will be influenced by the physical conditions of the habitat sampled. For example, metal and glass micro-litter is not likely to be found at the sea surface.

When first described the term micro plastic was used to refer to truly microscopic particles in the region of 20 µm (micrometres 1 µm = 1 × 10<sup>-6</sup> m) diameter (Thompson et al. 2004). Afterwards, the definition has been broadened to include all particles < 5 mm (Arthur et al. 2009). (Guidance on Monitoring of Marine Litter in European Seas, Francois et al, 2013).

The Technical Sub Group on Marine Litter provides in the Guidance a summary table to describe the elements used to manage the micro-litter information.

		CATEGORIES FOR MICROPARTICLES	
		Material	Description
<b>Size</b>	Record size of each item. Minimum resolution is to allocate in to bin sizes of 100 µm	<b>Plastic</b>	Plastic fragments rounded
			Plastic fragments subrounded
			Plastic fragments subangular
<b>Type</b>	Plastic fragments, pellets, filaments, plastic films, foamed plastic, granules, and styrofoam		Plastic fragments angular
			cylindrical pellets
			disks pellets
<b>Shape</b>	For pellets: cylindrical, disks, flat, ovoid, spheruloids; For fragments: rounded, subrounded, subangular, angular; For general- irregular, elongated, degraded, rough, and broken edges		flat pellets
			ovoid pellets
			spheruloids pellets
			filaments
			plastic films
<b>Colour</b>	Transparent, crystalline, white, clear-white-cream, red, orange, blue, opaque, black, grey, brown, green, pink, tan, yellow		foamed plastic
			granules
			styrofoam
		<b>Other</b>	Other (glass, metal, tar)

**Table 9:** Categories used to describe microplastics appearance



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## How to fit marine micro-litter data in the SeaDataNet CDI and ODV formats

Based upon a series of examples provided by Ifremer, CEFAS and the Italian regional environmental agency, an exercise of analysis and potential mapping of micro-litter information to SeaDataNet CDI (**Common Data Index**) metadata format and to ODV (**Ocean Data View**) data format has been done. The SeaDataNet CDI metadata format provides an ISO19115 - ISO19139 based index (metadatabase) to individual data sets (such as samples, timeseries, profiles, trajectories, etc), making use of the SeaDataNet Common Vocabularies and the EDMO directory (European Directory of Marine Organisations). The CDI format is INSPIRE compliant. The SeaDataNet ODV ASCII data format can be used directly in the Ocean Data View (ODV) fundamental data analysis and visualisation software.

As a result of the initial analysis, EMODnet Chemistry concluded that it is possible to fit the micro plastics observation data sets in the SeaDataNet CDI/ODV formats. This implicates that EMODnet Chemistry and additional SeaDataNet data providers can be requested to gather and populate their already available micro plastics data in the CDI Data Discovery and Access service, this way building a European collection of metadata and data sets.

Annexes 1 and 2 give examples illustrating how micro-litter observations can be described in the CDI metadata format and ODV data format.

## ANNEX 1: CDI example for marine micro-litter

### SeaDataNet Common Data Index (CDI)

<tagname> = <Tag  
from ISO-19139>

Level 1 of the Tags  
is  
<gmd:MD\_Metadata  
>

CDI FIELD **in bold** = Mandatory field, In UPPERCASE = Referenced in the CDI format, in Lowercase = added for unification and ISO compliancy, fulfilled in most cases by the Web Services

CDI FIELD	Example	MIKADO var	M = mandator y	Comment	Occurrenc e	Field type and length
			O = Optionnal			
<b>cdi-identifier</b>	<b>XXX</b>	\$	<b>M</b>	The CDI creator gives a local identifier, provided as urn:SDN:CDI:LOCAL: <i>local identifier</i> . The 'local identifier' must be identical to the identifier as in use locally by the Data Centre (= DATASET_ID). The CDI authority (MARIS web service) will store both the local identifier as a central CDI identifier. The local identifier will be used to recognise updates for CDI records, that already are present in the central CDI directory.	1	<= 80 varchars

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<b>ISO 19139 header xml header</b>	<b>eng</b>	<b>not availabl e</b>	<b>M</b>	Language used in the metadata, Mandatory value is 'eng' for English language. (fixed) Charset : utf8 (fixed) CDI deals with a 'dataset' description (fixed) Common vocabulary list <b>L23</b> used for HierarchyLevelName (only one entry) (fixed) HierarchyLevelName: Common Data Index record (fixed)	1	
<b>METADATA CREATING ORGANISATION</b> Phone Fax Address City Zip Code Country Email Web site	<b>486</b>	<b>var01</b>	<b>M</b>	Data Centre, responsible for the CDI metadata creation: Use <b>EDMO</b> Code (only one entry) All other information is retrieved from EDMO and not typed again (via EDMO web service or local copy); it is provided for ISO compliancy and human reading of the CDI XML. For missing info, tags are left out.  Role = pointOfContact (fixed)	1	CENTRE ID = Int Phone <= 60 varchars Fax <=60 varchars Address <= 255 varchars City <= 80 varchars Zip Code <= 15 varchars Country <= 80 varchars Email <= 80 varchars Website <= 160 varchars, start with http or https
<b>METADATA CREATION-DATE</b>	<b>2017-05-23</b>	<b>not availabl e</b>	<b>M</b>	Date that the CDI metadata record was created; date in ISO 8601, format YYYY-MM-DD	1	<=21 varchars
<b>Metadata Standard Name</b>	<b>ISO 19115/SeaDataNet profile</b>	<b>not availabl e</b>	<b>M</b>	"ISO 19115/SeaDataNet profile" (fixed)	1	
<b>Metadata Standard Version</b>	<b>1.0</b>	<b>not availabl e</b>	<b>M</b>	"1.0" (fixed)	1	

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<b>MEASURING AREA TYPE</b>	<b>curve</b>	<b>var02</b>	<b>M</b>	Use of ISO codelist B.5.15: (value= "point", or "curve" or "surface"). See Vocab L02 (SeaDataNet Geospatial Feature Types)	1	<=10 varchars
SPATIAL REPRESENTATION			O	Number of dimensions = set to 1, 2 or 3		value/Decimal: real
HORIZONTAL RESOLUTION		var47, var48		Name of the dimension: "track" (resolution) (fixed) Value of the resolution (decimal number) Unit of the resolution (use common vocabulary list <b>P06</b> ), usually in meters	0-1	
VERTICAL RESOLUTION		var45, var 46		Name of the dimension: "vertical" (resolution) (fixed) Value of the resolution (decimal number) Unit of the resolution (use common vocabulary list <b>P06</b> ), usually in meters	0-1	
TIME RESOLUTION		var21, var22		Name of the dimension: "time" (resolution) (fixed) Value of the resolution (decimal number) Unit of the resolution (use common vocabulary list <b>P06</b> )	0-1	
DATUM OF COORDINATE SYSTEM		var03	O	Use Vocab <b>L10</b> , derived from European Petroleum Survey Group (EPSG) <gmd:Title> <i>SeaDataNet geographic co-ordinate reference frames</i> <gmd:AlternateTitle> <i>L10</i> <gmd:Date> revision date in ISO 8601 of the used version of the list <gmd:edition> used version of the list <gmd:identifier> URL of the SeaDataNet URNURL resolver for all vocabs and directories: <i>http://www.seadatanet.org/urnurl/ SDN:L10</i> <gmd:code>: <sdn:SDN_CRSCode codeSpace="SeaDataNet" codeListValue="4326" codeList="http://vocab.nerc.ac.uk/isoCodelists/sdnCodelists/cdicrCodeList.xml#SDN_CRSCode">W orld Geodetic System 84</sdn:SDN_CRSCode> (only one entry)	1	<=10 varchars
<b>Metadata Extension info</b>		<b>not available</b>	<b>M</b>	This xml file contains machine readable information about the extensions included in the CDI profile; ISO19139 clients can take advantage of this information to correctly edit/visualize CDI metadata CSR profile Extension Information (XML) (fixed)		
<b>NAME/ALTERNATIVE NAME OF THE</b>	<b>Micro-litter sampled at sea surface</b>	<b>var04</b>	<b>M</b>	Free text : Name by which the dataset is locally known. If not present in the partner's database, then set default values in the mapping properties, like e.g. 'Not specified'.	1	<=160 varchars

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<b>DATASET</b>						
<b>DATASET-ID</b>	ZZZZZZZZZZZZ	var05	M	Unique local ID for the dataset (= cdi_identifier)	1	<= 80 varchars
<b>REVISION-DATE OF DATASET</b>	2017-05-23	var06	M	Date of last revision of the data set; date in ISO 8601, format YYYY-MM-DD	1	<= 21 varchars
<b>IDENTIFIER</b>	XXX	var05	M	cdi_identifier	1	
<b>ORIGINATORS OF THE DATASET</b> Phone Fax Address City Zip Code Country Email Web site	819	var07	M	Originator(s) of the dataset: Use <b>EDMO</b> Code. All other information is retrieved from EDMO and not typed again (via EDMO web service or local copy); it is provided for ISO compliancy and human reading of the CDI XML. For missing info, tags are left out. (Multiple entries are possible by repeating the XML code block).  Role = originator (fixed)	1-many	CENTRE ID = Int Phone <= 60 varchars Fax <=60 varchars Address <= 255 varchars City <= 80 varchars Zip Code <= 15 varchars Country <= 80 varchars Email <= 80 varchars Website <= 160 varchars, start with http or https
<b>ABSTRACT ON DATASET</b>	Micro-litter sampled at sea surface	var08	M	<= 4000 characters, character set = utf8 and english language. Abstract describing the dataset. If not present in the partner's database, then set default values in the mapping properties, like e.g. 'Not specified'.	1	<= 4000 varchars

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<b>ORGANISATION MANAGING THE DATASET</b> Phone Fax Address City Zip Code Country Email Web site	1838	var09	M	Data center, managing the data set: Use <b>EDMO</b> Code. All other information is retrieved from EDMO and not typed again (via EDMO web service or local copy); it is provided for ISO compliancy and human reading of the CDI XML. For missing info, tags are left out. (only one entry).  Role =custodian (fixed)	1	CENTRE ID = Int Phone <= 60 varchar Fax <=60 varchar Address <= 255 varchar City <= 80 varchar Zip Code <= 15 varchar Country <= 80 varchar Email <= 80 varchar Website <= 160 varchar, start with http or https
<b>RESOURCE MAINTENANCE</b>		not available	O	Provides information about the frequency of resource updates and the scope of those updates	0-1	
<b>INSPIRE reference</b>	<b>Oceanographic geographical features</b>	not availabl e	M	"Oceanographic geographical features" (fixed) "theme" (fixed)  "GEMET - INSPIRE themes, version 1.0" (fixed) "2008-06-01" (fixed) Date type = "publication" (fixed)	1	



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<b>PARAMETERS</b>	<b>“Codes for “Micro-litter in water bodies” and Micro-litter in the sediment”</b>	<b>var10</b>	<b>M</b>	Use common vocabulary list <b>P02</b> (multiple entries are possible by repeating this tag) Keyword = <sdn:SDN_ParameterDiscoveryCode codeSpace=...> Type = parameter <thesaurusName> <Title> <i>BODC Parameter Discovery Vocabulary</i> <AlternateTitle>P02 <Date> revision date in ISO 8601 of used version of the list <edition> used version of the list <code> URL of the SeaDataNet URNURL resolver for all vocabs and directories: <a href="http://www.seadatanet.org/urnurl/SDN:P02">http://www.seadatanet.org/urnurl/SDN:P02</a>	1-many	<= 5 varchars
<b>INSTRUMENT and POSITIONING SYSTEM</b>	<b>Codes for Manta or Bongo to be added in L05 vocabulary</b>	<b>var11</b>	<b>O</b>	Use common vocabulary list <b>L05</b> (multiple entries are possible by repeating this tag) Keyword = <sdn:SDN_DeviceCategoryCode codeSpace=> Type = instrument <thesaurusName> <Title> SeaDataNet device categories <AlternateTitle>L05 <Date> revision date in ISO 8601 of used version of the list <edition> used version of the list <code> URL of the SeaDataNet URNURL resolver for all vocabs and directories: <a href="http://www.seadatanet.org/urnurl/SDN:L05">http://www.seadatanet.org/urnurl/SDN:L05</a>	0-many	<= 10 varchars
<b>PLATFORM</b>	<b>31</b>	<b>var12</b>	<b>M</b>	Use common vocabulary list <b>L06</b> (only one entry) Keyword = <sdn:SDN_PlatformCategoryCode codeSpace=...> Type = platform_class <thesaurusName> <Title> SeaDataNet Platform Classes <AlternateTitle>L06 <Date> revision date in ISO 8601 of used version of the list <edition> used version of the list <code> URL of the SeaDataNet URNURL resolver for all vocabs and directories: <a href="http://www.seadatanet.org/urnurl/SDN:L06">http://www.seadatanet.org/urnurl/SDN:L06</a>	1	<= 10 varchars

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PROJECTS		var13	O	Use of <b>EDMERP</b> directory (multiple entries are possible by repeating this tag) Keyword = <sdn:SDN_EDMERPCode codeSpace=...> Type = project <thesaurusName> <Title> European Directory of Marine Environmental Research Projects <AlternateTitle>EDMERP <Date> revision date in ISO 8601 of used version of the list <code> URL of the SeaDataNet URNURL resolver for all vocabs and directories: <a href="http://www.seadatanet.org/urnurl/SDN:EDMERP">http://www.seadatanet.org/urnurl/SDN:EDMERP</a>	0-many	int
Use Limitation		not available	M	limitation affecting the fitness for use of the resource or metadata	1	
DATASET ACCESS RESTRICTIONS	<b>UN</b>	var14	M	Use common vocabulary list <b>L08</b> MD_RestrictionCode = "otherRestrictions" xlink : SDN:L08:version:entryKey (multiple entries are possible by repeating this tag)	1-many	<= 3 varchars
STATION NAME and/or CRUISE NAME	var15 (cruise) : DCE 3-2(Cruise name) var16 (cruise): 12060060 (Local cruise ID) var17 (cruise):2012-03-28	var15 (cruise), var18 (station) var16 (cruise), var19 (station) var17 (cruise), var20 (station)	M	Station and/or Cruise name are specified by: <Title> name <AlternateTitle> alternative / short name <Date> start date of cruise / station observations Station and Cruise info make use of the same XML coding (repeating the XML block). For Station use: DS_InitiativeTypeCode = "operation" and DS_AssociationTypeCode = "source" from ISO lists B.5.7 and B.5.8 For Cruise use: DS_InitiativeTypeCode = "campaign" and DS_AssociationTypeCode = "largerworkcitation" from ISO lists B.5.7 and B.5.8	1	Cruise name <= 160 varchars Cruise Alt name <= 80 varchars Cruise start date <= 21 varchars Station name <= 160 varchars Station Alt name <=80 varchars Station start date <= 21 varchars

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EDMED REFERENCE		var80	O	Use <b>EDMED</b> code  DS_InitiativeTypeCode = "campaign" (fixed)  DS_AssociationTypeCode = "largerworkcitation" (fixed)	0-1	int
CSR Reference		var81	O	Use <b>CSR</b> code  DS_InitiativeTypeCode = "campaign" (fixed)  DS_AssociationTypeCode = "largerworkcitation" (fixed)	0-1	int
SPATIAL RESOLUTION		var45, var46	O	Value of the Horizontal Resolution (decimal number) Unit of the Resolution (use common vocabulary list P06)	0-1	real
Language used within the dataset	<b>eng</b>	not available	M	Language used in the dataset: "eng" for English (fixed)	1	<= 3 varchars
Characterset	<b>utf8</b>	not available	M	Characterset used in the dataset: "utf8" (fixed)	1	
Main theme of the dataset	<b>oceans</b>	not available	M	Use ISO list B.5.27 for describing the theme of the data set. Mandatory value: "oceans". (fixed)	1	<= 10 varchars

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<b>GEOGRAPHICAL COVERAGE WEST</b>	<b>6.373199</b>	var24	<b>M</b>	<p>Geographical coverage is described by one or more bounding boxes. Use Geographical coordinates (Mercator projection). For point observations only &lt;westBoundLongitude&gt; and &lt;southBoundLatitude&gt; are filled in. For tracks and areas the bounding boxes are filled as a rectangle covering the track or area of the measurement.</p> <p>In those cases the uttermost latitude and longitudes of the bounding box are filled in, entering first the most left and lower point (&lt;westBoundLongitude&gt; and &lt;southBoundLatitude&gt;) and as second the most right and upper point (&lt;eastBoundLongitude&gt; and &lt;northBoundLatitude&gt;). Northern latitudes and eastern longitudes are entered as positive and southern latitudes and western longitude are entered as negative.</p> <p>&lt;westBoundLongitude&gt; = Longitude 1:Decimal degrees. -180.0000 &gt; Maximum &lt; +180.0000(decimal[4,4])</p> <p>Individual tracks or polygon-shaped areas (non rectangular) may be described using a MultiCurve or a MultiSurface. Only one of the two may appear in a CDI record, occurrence 0-1. If used, a MultiCurve contains 1-many LineStrings; a MultiSurface 1-many Polygons.</p>	1-many	real
EAST	<b>8.608065</b>	var25	O	<eastBoundLongitude> = Longitude 2:Decimal degrees. -180.0000 > Maximum < +180.0000(decimal [4,4])	0-many	real
<b>SOUTH</b>	<b>42.526562</b>	var26	<b>M</b>	<southBoundLatitude> = Latitude 1:Decimal degrees. -90.0000 > Maximum < +90.0000 (decimal [3,4])	1-many	real
NORTH	<b>43.060040</b>	var27	O	<northBoundLatitude> = Latitude 2:Decimal degrees. -90.0000 > Maximum < +90.0000 (decimal [3,4])	0-many	real

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<p>TRACKS (Curves) Description Name Coordinates</p>	<p><b>var60: track description</b> <b>var62: track 123 (track name)</b></p> <p><b>var63: 8.612333 42.745833</b> <b>8.415833 42.745123</b> <b>8.409500 42.723333</b> <b>8.249333 42.531167</b> <b>8.209333 42.441167</b> <b>8.109423 42.401277</b></p>	<p>var60 var62 var63</p>	<p>O</p>	<p>Each MultiCurve and LineString must contain an ID (gml:id) that is unique within the XML-document. This ID will not be visible to users. Each LineString (track) may have a name and description. Format of &lt;gml:posList&gt; is Longitude1 Latitude1 Longitude2 Latitude2 ... (coordinates separated by spaces, no commas). Eastern longitudes (from 0.0000 to 180.0000 (decimal [4.4]) and Northern latitudes (from 0.0000 to 90.0000 (decimal [3.4]) are entered as positive and Western longitudes (from 0.0000 to -180.0000 (decimal [4.4]) and Southern latitudes (from 0.0000 to -90.0000 (decimal [3.4]) are entered as negative.</p>	<p>0-many</p>	<p>description &lt;= 160 varchars name &lt;= 160 varchars position list &lt; 10000 points</p>
<p>AREAS (Surfaces) Description Name Coordinates</p>		<p>var70 var72 var73</p>	<p>O</p>	<p>Each MultiSurface and Polygon must contain an ID (gml:id) that is unique within the XML-document. This ID will not be visible to users. Each Polygon (bounding polygon) may have a name and description. Format of &lt;gml:posList&gt; is Longitude1 Latitude1 Longitude2 Latitude2 ... (coordinates separated by spaces, no commas). Eastern longitudes (from 0.0000 to 180.0000 (decimal [4.4]) and Northern latitudes (from 0.0000 to 90.0000 (decimal [3.4]) are entered as positive and Western longitudes (from 0.0000 to -180.0000 (decimal [4.4]) and Southern latitudes (from 0.0000 to -90.0000 (decimal [3.4]) are entered as negative. The coordinate pairs should describe the polygon in a direction against the clock and the first coordinate pair must be repeated as last coordinate pair! Only convex polygons are to be described, which is indicated by the tag &lt;gml:exterior&gt; .</p>	<p>0-many</p>	<p>description &lt;= 160 varchars name &lt;= 160 varchars</p>
<p><b>START AND END DATE (AND TIME)</b></p>	<p><b>var28:2012-05-28T10:50:00</b> <b>var29:2012-05-28T11:10:00</b></p>	<p>var28 var29</p>	<p><b>M</b> <b>M</b></p>	<p>Start and end date (and time) of the data set using ISO 8601, format YYYY-MM-DDThh:mm:ss</p>	<p>1</p>	<p>&lt;=21 varchars &lt;=21 varchars</p>

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<p>MINIMUM DEPTH OF OBSERVATION</p> <p>MAXIMUM DEPTH OF OBSERVATION</p> <p>WATER DEPTH</p> <p>VERTICAL DATUM</p>		<p>var30</p> <p>var31</p> <p>var35</p> <p>var34</p>	O	<p>Minimum and Maximum observation or data depth (use "metres" as unit). <sup>2</sup>. Depth in metres in respect to the specified vertical datum. If not available (unknown), use -9999.</p> <p>For Vertical datum, Use Vocab <b>L11</b></p>	0-1	<p>Min Instr Depth = real</p> <p>Max Instr Depth = real</p> <p>Unit &lt;= 10</p> <p>vartchars (metres)</p> <p>Reference datum &lt;= 10</p> <p>vartchars</p> <p>Water depth = real</p>
<p>ADDITIONAL DOCUMENTATION (PUBLICATION)</p>		var90	O	<p>Every CDI record can reference any number of publications. These publications must be referenced in the form of permanent URL. For the sake of homogeneity and stability, the publications included in the CDI must be stored and identified in a central catalogue of publications managed by MARIS,</p>	0-many	int
<p><b>ORGANISATION DISTRIBUTING THE DATASET</b></p> <p>Phone</p> <p>Fax</p> <p>Address</p> <p>City</p> <p>Zip Code</p> <p>Country</p> <p>Email</p> <p>Website</p>	<b>486</b>	var36	M	<p>Data center, distributing the data set: Use <b>EDMO</b> Code</p> <p>All other information is retrieved from EDMO and not typed again (via EDMO web service or local copy); it is provided for ISO compliancy and human reading of the CDI XML. For missing info, tags are left out. (only one entry)</p> <p>Role ="distributor" (fixed)</p>	1	<p>CENTRE ID = Int</p> <p>Phone &lt;= 60 vartchars</p> <p>Fax &lt;=60 vartchars</p> <p>Address &lt;= 255 vartchars</p> <p>City &lt;= 80 vartchars</p> <p>Zip Code &lt;= 15 vartchars</p> <p>Country &lt;= 80 vartchars</p> <p>Email &lt;= 80 vartchars</p> <p>Website &lt;= 160 vartchars, start with http or https</p>

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<b>Dataformat Version</b>	<b>ODV 0.4</b>	<b>var37 var38</b>	<b>M</b>	Name of the format used for the transferred data. Use of Vocabulary List <b>L24</b> Version of the SeaDataNet dataformats in use (at present ODV version 0.4 / CFPOINT 1.0 / CF 3.5 / MEDATLAS 2.0 / TIFF 6.0 / PNG 1.0/ SEGY -99)	1-many	<=10 varchars <=10 varchars
<b>DISTRIBUTION INFO / SERVICE BINDINGS</b> Data size Distribution website Distribution protocol Database reference Distribution Method	<b>var40: <a href="http://www.sdn-taskmanager.org/">http://www.sdn-taskmanager.org/</a> var42: HTTP-DOWNLOAD var43: downloadRegistration</b>	<b>var39 var40 var42 var41 var43</b>	<b>M O M O M</b>	<p>Service bindings are links (urls) to online services that allow a user or machine to download the data or get more information on it. The first binding (first occurrence of &lt;TransfertOptions&gt;) is mandatory and is always the "standard" referral to the SDN portal. Further bindings are optional.</p> <p><b>Datasize:</b> Estimated size of the transferred data expressed in Megabytes. Optional, but when used: Value can not be NULL, but &gt; 0.0</p> <p><b>Data website:</b> url to the online resource. For the first, "default" binding, this points to the SeaDataNet Portal URL, that manages the data request and delivery process in communication with the partner sites: <a href="http://www.sdn-taskmanager.org/">http://www.sdn-taskmanager.org/</a></p> <p><b>Protocol:</b> protocol to be used to retrieve the data, according to <a href="http://www.opengeospatial.org/ogcUrnPolicy">http://www.opengeospatial.org/ogcUrnPolicy</a>. For the first, "default" binding to the SDN portal, the value must be "HTTP-DOWNLOAD".</p> <p><b>Database reference:</b> Description of the resource. For the first, "default" binding to the SDN portal, this is an identification of the database holding the dataset record at the CDI partner (optional).</p> <p><b>Distribution Method :</b> Use vocab <b>L07</b>, extension of ISO codelist B.5.3.. For the first binding to the SDN portal, the value should be "downloadRegistration". Note: Access is depending on the indicated Data access policy of this data set and the registered role of the user. For additional bindings, the value could be "URL", but other values from L07 are supported.</p> <p><b>Important!</b> In MIKADO automatic, the query for Distribution Information (var 40, 42, 43) must return at least default binding to the SeaDataNet portal: var40 : <a href="http://www.sdn-taskmanager.org/">http://www.sdn-taskmanager.org/</a> var42: HTTP-DOWNLOAD var43: downloadRegistration</p> <p>If your CDI files contains twice the default binding block, it means that you have certainly made a mistake in your query for var 40, 42 or 43. In all cases, if MIKADO does not find the var40=<a href="http://www.sdn-taskmanager.org/">http://www.sdn-taskmanager.org/</a>, var42=HTTP-DOWNLOAD, var43=downloadRegistration, it creates automatically a record corresponding to this values. (See MIKADO FAQ for examples of errors)</p>	1-many	DISTRIBUTION INFO Data size = real Distribution website <= 160 varchars with http or https Protocol <= 160 varchars Database reference <= 100 varchars Distribution Method <= 50 varchars

Data Quality Information	<b>protocols if available</b>		O	<p>Quality information for the data specified by a data quality scope, describes how the dataset was tested for conformance to a published standard and whether the dataset passed the test</p> <p>Scope = "dataset" (fixed)</p> <ul style="list-style-type: none"> <li>- Name: name of the QC standards applied to the data</li> <li>- Date: reference date of the cited QC standards (YYYY-MM-DD)</li> <li>- Comment: comment or explanation about the QC evaluation and its result</li> <li>- Status: indication of the conformance result (true/false)</li> </ul> <p>Lineage/ Statement = "The data centres apply standard data quality control procedures on all data that the centres manage. Ask the data centre for details" (fixed)</p> <p>For example, the data quality information could refer to the Manual of Quality Control Procedures for Validation of Oceanographic Data, IOC Manuals and guides No. 26, published on 01/01/1993:</p> <ul style="list-style-type: none"> <li>• Name = Manual of Quality Control Procedures for Validation of Oceanographic Data, IOC Manuals and guides No. 26</li> <li>• Date = 01/01/1993</li> <li>• Comment = See the referenced specification</li> <li>• Status = true</li> </ul> <p>For compliancy with INSPIRE, the following reference must appear in the CDI XML file in Data Quality Information section (hard coded in MIKADO):</p> <p>Name="COMMISSION REGULATION (EC) No 1205/2008 of 3 December 2008 implementing Directive 2007/2/EC of the European Parliament and of the Council as regards "</p> <p>Date="2008-12-04"</p> <p>Comment="See the referenced specification"</p> <p>Status="True"</p>	0-many	<p>Name &lt;= 160 vartchars Date ISO Comment &lt;= 2000 vartchars Status = true or false</p>
Scope		not available				
Report - Name		var95				
Report - Date		var96				
Report - Comment		var97				
Report - Status		var98				
Lineage		not available				



## ANNEX 2: How to fit marine micro-litter data in the SeaDataNet ODV data format

ODV is an ASCII format to handle profile, time series and trajectory data. The file is built with the following elements:

- Metadata columns
- Primary variable data columns (one column for the value plus one for the qualifying flag)
- Data columns — two columns per variable (value and flag)

A “bio-ODV like” template should be used to manage the litter information. This kind of ODV files is specifically built to be able to manage some parameters as rows instead of columns. The file will have the following features:

- A set of **ODV mandatory (ODV default)** fields like: cruise, station, type, position...(green fields)
- A set of **ODV additional fields** (Guidance on Monitoring of Marine Litter in European Seas 2013, CEFAS, IFREMER, ARPA FVG) to describe marine micro-litter (orange fields):
  - **additional mandatory:** fields will be always present in ODV file and always filled
  - **additional optional:** fields will be always present in ODV file but could be empty

List of fields for the proposed micro-litter ODV file:

Label/column header in datafile	Use	comment
Cruise	mandatory (ODV Default)	
Station	mandatory (ODV Default)	
Type	mandatory (ODV Default)	The suggestion is to use type "B". From manual: 'B' for bottle profile data. For time series and trajectories set to 'B' for small (<250) row groups
yyyy-mm-ddThh:mm:ss.sss	mandatory (ODV Default)	start date/time.
Longitude [degrees_east]	mandatory (ODV Default)	start point coordinates.
Latitude [degrees_north]	mandatory (ODV Default)	start point coordinates.
LOCAL_CDI_ID	mandatory (ODV Default)	
EDMO_code	mandatory (ODV Default)	
Bot. Depth [m]	mandatory (ODV Default)	

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Depth [m]	additional	depth of the sampling that for marine micro-litter could be often 0 m
Type	additional	type of the item
Count [#]	additional	number of items collected. It's the official mandate from MSFD to provide the count of collected microplastics
Size	additional	size classes
Distance [Km]	additional	survey distance from the beginning point in km .
Shape	additional/optional	shape of the item
Color	additional/optional	colour classes
End_Longitude [degrees_east]	additional/optional	end point coordinates. Either End Lat/Lon or distance are mandatory.
End_Latitude [degrees_north]	additional/optional	end point coordinates. Either End Lat/Lon or distance are mandatory.
End_yyyy-mm-ddThh:mm:ss.sss	additional/optional	end date/time.
Weight [g]	additional/optional	weight of the collected items, not mandatory information in grams
WMO Sea State Code - sea conditions [Dmnless]	additional/optional	sea conditions following the Douglas scale
Wind direction [deg T]	additional/optional	Direction relative to true north from which the wind is blowing
Wind speed [m/s]	additional/optional	Sustained speed of the wind (distance moved per unit time by a parcel of air) parallel to the ground at a given place and time.
Net_opening [cm]	additional/optional	bongo or manta net opening information for the calculation of the covered surface in cm
Mesh_size [ $\mu\text{m}$ ]	additional/optional	mesh size for manta or bongo net in $\mu\text{m}$
Polymer type	additional/optional	Polymer type of the micro-litter



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#### *New terms proposed*

For P02 vocabulary:

- Micro-litter in water bodies
- Micro-litter in the sediment

For P01 vocabulary:

- Type of micro-litter particles (H01)
- Count of micro-litter particles in the sediment
- Count of micro-litter particles in the water column
- Size class of micro-litter particles (H03)
- Shape of micro-litter particles (H02)
- Colour class of micro-litter particles (H04)
- Micro-litter polymer types (H05)

Needed to map to ODV header for:

- Micro-litter shape class (controlled vocabularies H02)
- Needed to map to ODV header for Micro-litter size classes (controlled vocabularies H03)
- Needed to map to ODV header for Micro-litter type (controlled vocabularies H01)
- Needed to map to ODV header for Micro-litter colour classes (controlled vocabularies H04)
- Needed to map to ODV header for Micro-litter polymer types (controlled vocabularies H05)

#### *New vocabularies*

#### *P02 Terms*

TN	TITLE	SHORT_NAME	DEFINITION
UMLS	Micro-litter in sediments	Sed_Microlitter	Parameters describing the abundance and nature of microscopic particles of man-made materials and in particular microplastics present in the sediment
UMLW	Micro-litter in water bodies	WC_Microlitter	Parameters describing the abundance and nature of microscopic particles of man-made materials and in particular microplastics present in any body of fresh or salt water.

#### *P01 Terms*

TN	TITLE	SHORT_NAME	DEFINITION
MLITTPS	Type class of micro-litter particles in the sediment by categorisation using EMODnet chemistry reporting protocol	Microlitter_type_sediment	Text categorisation of the type of micro-litter particles observed in a sediment sample within categories defined in the EMODnet chemistry micro-litter reporting protocol
MLITTPW	Type class of micro-litter particles in the water body by categorisation using EMODnet chemistry reporting protocol	Microlitter_type_water	Text categorisation of the type of micro-litter particles observed in a water sample within categories defined in the EMODnet chemistry micro-litter reporting protocol
MLITCNTS	Count of micro-litter particles in the sediment by categorisation using EMODnet chemistry reporting protocol	Microlitter_count_sediment	Number of items classified as micro-litter counted in a sediment sample within categories defined in the EMODnet chemistry micro-litter reporting protocol
MLITCNTW	Count of micro-litter particles in the water body by categorisation using EMODnet chemistry reporting protocol	Microlitter_count_water	Number of items classified as micro-litter counted in a water sample within categories defined in the EMODnet chemistry micro-litter reporting protocol
MLITSIZS	Size class of micro-litter particles in the sediment by categorisation using EMODnet chemistry reporting protocol	Microlitter_size_class_sediment	Text categorisation of the size class of micro-litter particles observed in a sediment sample within categories defined in the EMODnet chemistry micro-litter reporting protocol
MLITSIZW	Size class of micro-litter particles in the water body by categorisation using EMODnet chemistry reporting protocol	Microlitter_size_class_water	Text categorisation of the size class of micro-litter particles observed in a water sample within categories defined in the EMODnet chemistry micro-litter reporting protocol

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MLITSHPS	Shape class of micro-litter particles in the sediment by categorisation using EMODnet chemistry reporting protocol	Microlitter_shape_class_sediment	Controlled vocabulary defining the terms that may be used for micro-litter polymer types in the EMODnet Chemistry data reporting system
MLITSHPW	Shape class of micro-litter particles in the water body by categorisation using EMODnet chemistry reporting protocol	Microlitter_shape_class_water	Text categorisation of the shape of micro-litter particles observed in a water sample within categories defined in the EMODnet chemistry micro-litter reporting protocol
MLITCOLS	Colour class of micro-litter particles in the sediment by categorisation using EMODnet chemistry reporting protocol	Microlitter_colour_class_sediment	Text categorisation of the colour of micro-litter particles observed in a sediment sample within categories defined in the EMODnet chemistry micro-litter reporting protocol
MLITCOLW	Colour class of micro-litter particles in the water body by categorisation using EMODnet chemistry reporting protocol	Microlitter_colour_class_water	Text categorisation of the colour of micro-litter particles observed in a water sample within categories defined in the EMODnet chemistry micro-litter reporting protocol
MLITPOLS	Polymer type of micro-litter particles in the sediment by categorisation using EMODnet chemistry reporting protocol	Microlitter_polymer_type_sediment	Text categorisation of the type of plastic polymer of micro-litter particles observed in a sediment sample within categories defined in the EMODnet chemistry micro-litter reporting protocol
MLITPOLW	Polymer type of micro-litter particles in the water body by categorisation using EMODnet chemistry reporting protocol	Microlitter_polymer_type_water	Text categorisation of the type of plastic polymer of micro-litter particles observed in a water sample within categories defined in the EMODnet chemistry micro-litter reporting protocol

TN	TITLE	SHORT_NAME	DEFINITION
H01	EMODnet micro-litter types	Micro-litter_type	Controlled vocabulary defining the terms that may be used for micro-litter types in the EMODnet Chemistry data reporting system.
H02	EMODnet micro-litter shapes	Micro-litter_shape	Controlled vocabulary defining the terms that may be used for micro-litter shape in the EMODnet Chemistry data reporting system.
H03	EMODnet micro-litter size classes	Micro-litter_size-class	Controlled vocabulary defining the terms that may be used for micro-litter size classes in the EMODnet Chemistry data reporting system.
H04	EMODnet micro-litter colour classes	Micro-litter_colour-class	Controlled vocabulary defining the terms that may be used for micro-litter colour classes in the EMODnet Chemistry data reporting system.

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H05	EMODnet micro-litter polymer type	Micro-litter_polymer_type	Controlled vocabulary defining the terms that may be used for micro-litter polymer types in the EMODnet Chemistry data reporting system.
C39	World Meteorological Organisation sea states	WMO sea states	International sea state scale classifying the state of the sea (wind sea) based on visual observations; also referred to as the Douglas sea state scale.

#### *EMODnet Micro-litter type H01:*

ConceptID	Preferred label	Definition
H0100001	microplastic items	A generic term for any kind of micro-litter item made of any kind of plastic material
H0100002	microplastic fragments	Irregularly-shaped plastic micro-litter particles with broken off edges that may be rounded or angular
H0100003	microplastic pellets	Regularly-shaped particles of plastic micro-litter
H0100004	microplastic filaments	Slender thread-like plastic micro-litter particles
H0100005	microplastic films	Micro-litter particles derived from plastic sheets or thin films
H0100006	microplastic styrofoam	foam or styrofoam Micro-litter particles
H0100007	non-plastic man-made micro-particles (e.g. glass, metal, tar)	A generic term for any kind of micro-litter item that is not made of plastic

#### *EMODnet Micro-litter shape H02:*

ConceptID	Preferred label	Definition
H0200001	Rounded	Irregularly-shaped plastic micro-litter particles with broken off edges that have been rounded off (e.g. by erosion).
H0200002	Subrounded	Irregularly-shaped plastic micro-litter particles partly rounded
H0200003	subangular	Irregularly-shaped plastic micro-litter particles with broken off edges that have smooth angles.
H0200004	angular	Irregularly-shaped plastic micro-litter particles with broken off edges that have sharp angles.
H0200005	flat	Plastic micro-litter particles with a sheet like shape
H0200006	cylindrical	Plastic micro-litter particles with a regular cylinder-like shape.
H0200007	discoid	Plastic micro-litter particles with a regular disc-like shape.
H0200008	ovoid	Plastic micro-litter particles with a regular oval-like shape
H0200009	spheroid	Plastic micro-litter particles with a regular sphere-like shape.
H0200010	Other/unclassified	Plastic micro-litter particles with unclassified shape.

***EMODnet Micro-litter size-class H03:***

ConceptID	Preferred label	Alt label	Definition
H0300001	less than 20 microns	<20um	Micro-litter particles that pass through a 20 micrometre mesh screen.
H0300002	20 to 200 microns	20um-200um	Micro-litter particles that pass through a 200 micrometre mesh screen but are retained by a 20 micrometre mesh.
H0300003	less than 200 microns	<200um	Micro-litter particles that pass through a 200 micrometre mesh screen.
H0300004	200 to 300 microns	200um-300um	Micro-litter particles that pass through a 300 micrometre mesh screen but are retained by a 200 micrometre mesh.
H0300005	300 microns to 1 millimetres	300um-1mm	Micro-litter particles that pass through a 1 millimetre mesh screen but are retained by a 300 micrometre mesh.
H0300006	1 to 2 millimetres	1-2mm	Micro-litter particles that pass through a 2 millimetre mesh screen but are retained by a 1 millimetre mesh (e.g. Manta net mesh size).
H0300007	2 to 5 millimetres	2-5mm	Micro-litter particles that pass through a 5 millimetre mesh screen but are retained by a 2 millimetre mesh.
H0300008	1 to 5 millimetres	1-5mm	Micro-litter particles that pass through a 5 millimetre mesh screen but are retained by a 1 millimetre mesh (e.g. Manta net mesh size); the size of the particles makes visual inspection possible.
H0300009	5 to 25 millimetres	5mm-25mm	Particles greater than the micro-litter upper size range of 5 millimetre and up to 25 millimetres that are counted alongside micro-litter particles.

***EMODnet Micro-litter colour-class H04:***

ConceptID	Preferred label	Alt label	Definition
H0400001	BLACK/GREY	black_grey	Color class BLACK/GREY for describing micro-litter items.
H0400002	BLUE/GREEN	blue_green	Color class BLUE/GREEN for describing micro-litter items.
H0400003	BROWN/TAN	brown_tan	Color class BROWN/TAN for describing micro-litter items.
H0400004	WHITE/CREAM	white_cream	Color class WHITE/CREAM for describing micro-litter items.
H0400005	YELLOW	yellow	Color class YELLOW for describing micro-litter items.
H0400006	ORANGE/PINK/RED	orange_pink_red	Color class ORANGE/PINK/RED for describing micro-litter items.
H0400007	TRANSPARENT	transparent	Color class TRANSPARENT for describing micro-litter items.
TBC	OPAQUE	opaque	Color class OPAQUE for describing micro-litter items.

***EMODnet Micro-litter polymer types H05:***

ConceptID	Preferred label	Alt label	Definition
H0500001	Polyethylene		
H0500002	Polypropylene		
H0500003	polystyrene		
H0500004	polyamide (nylon)		
H0500005	polyester		
H0500006	acrylic		
H0500007	polyoximethylene		
H0500008	polyvinyl alcohol		
H0500009	polyvinylchloride		
H0500010	poly methylacrylate		
H0500011	polyethylene terephthalate		
H0500012	alkyd		
H0500013	polyurethane		

***C39 Vocabulary: World Meteorological Organisation sea states***

ConceptID	Preferred label	Definition
0	calm (glassy)	The surface of the water body is absolutely flat corresponding to a significant wave height of zero
1	calm (rippled)	The surface of the water body has undulations corresponding to a significant wave height of 0 - 0.10 metres
2	smooth	The surface of the water body has undulations corresponding to a significant wave height of 0.10 - 0.50 metres
3	slight	The surface of the water body has undulations corresponding to a significant wave height of 0.50 - 1.25 metres
4	moderate	The surface of the water body has undulations corresponding to a significant wave height of 1.25 - 2.50 metres
5	rough	The surface of the water body has undulations corresponding to a significant wave height of 2.50 - 4.00 metres
6	very rough	The surface of the water body has undulations corresponding to a significant wave height of 4.00 - 6.00 metres
7	high	The surface of the water body has undulations corresponding to a significant wave height of 6.00 - 9.00 metres
8	very high	The surface of the water body has undulations corresponding to a significant wave height of 9.00 - 14.00 metres
9	phenomenal	The surface of the water body has undulations corresponding to a significant wave height in excess of 14.00 metres





**A “micro litter ODV” example: ODV additional fields**

Dep th [m]	QV:SEADATA NET	Type:INDEXED_ TEXT	QV:SEADATA NET	Count [#]	QV:SEADATA NET	Size:INDEXED_ TEXT	QV:SEADATA NET	Distance [m]	QV:SEADATA NET	Shape:INDEXED_ TEXT	QV:SEADATA NET	Color:INDEXED_ TEXT	QV:SEADATA NET	End_Longitude [degrees_east]	QV:SEADATA NET
0		microplastic items		10		<20um		300		rounded		BLACK/GREY			
0		microplastic items		20		20um-200um		300		rounded		BLACK/GREY			
0		microplastic items		10		20um-200um		300		rounded		BLUE/GREEN			
0		microplastic items		10		<20um		300		rounded		BLUE/GREEN			
0		microplastic items		10		20um-200um		300		rounded		TRANSPARENT			
0		microplastic items		10		20um-200um		300		Subrounded		TRANSPARENT			
0		microplastic items		10		<200um		300		rounded		OPAQUE			
0		microplastic items		10		<200um		300		Subrounded		OPAQUE			
0		microplastic items		10		20um-200um		300		rounded		WHITE/CREAM			
0		microplastic fragments		10		<20um		300		rounded		TRANSPARENT			
0		microplastic fragments		10		20um-200um		300		rounded		BLACK/GREY			
0		microplastic fragments		10		20um-200um		300		rounded		BLUE/GREEN			
0		microplastic fragments		10		20um-200um		300		Subrounded		BLUE/GREEN			
0		microplastic fragments		10		<200um		300		Subrounded		TRANSPARENT			
0		microplastic fragments		10		<200um		300		rounded		OPAQUE			



## ANNEX 3: Composition of EMODnet Chemistry 3 consortium

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<b>Participant Number *</b>	<b>Participant organisation name</b>	<b>Used short name</b>	<b>Country</b>
1 (project coordinator)	Istituto Nazionale di Oceanografia e di Geofisica Sperimentale	OGS	Italy
2 (technical coordinator)	Mariene Informatie Service 'MARIS' BV	MARIS	Netherlands
3	Institut Français de Recherche pour l'Exploitation de la Mer	IFREMER	France
4	Institute of Marine Research	IMR	Norway
5	Aarhus University – Danish Centre for Environment and Energy	AU-DCE	Denmark
6	Flanders Marine Institute	VLIZ	Belgium
7	Royal Belgian Institute of Natural Sciences	RBINS	Belgium
8	NIOZ Royal Netherlands Institute for Sea Research	NIOZ	Netherlands
9	Sveriges Meteorologiska och Hydrologiska Institut	SMHI	Sweden
10	Hellenic Centre for Marine Research	HCMR	Greece
11	Institute of Oceanology Bulgarian Academy of Science	IO-BAS	Bulgaria
12	National Institute for Marine Research and Development "Grigore Antipa"	NIMRD	Romania
13	International Council for the Exploration of the Sea	ICES	International
14	Alfred Wegener Institute for Polar and Marine Research	AWI	Germany



## EMODnet Thematic Lot n° 4 - Chemistry

### Proposal for gathering and managing data sets on marine micro-litter on a European scale

15	University of Liege - GeoHydrodynamics and Environment Research	ULg	Belgium
16	Instituto Español de Oceanografía	IEO	Spain
17	Istituto Superiore per la Protezione e la Ricerca Ambientale	ISPRA	Italy
18	Marine Institute	MI	Ireland
19	Consiglio Nazionale delle Ricerche	CNR	Italy
20	Instituto Hidrografico	IHPT	Portugal
21	Institute of Oceanography and Fisheries	IOF	Croatia
22	Latvijas HidroEkoloģijas Instituts	LHEI	Latvia
23	Tallinna Tehnikaukool	TUT	Estonia
24	Finnish Meteorological Institute	FMI	Finland
25	Nacionalni Institut za Biologijo	NIB	Slovenia
26	Israel Oceanographic and Limnological Research	IOLR	Israel
27	Finnish Environment Institute	SYKE	Finland
28	NERC British Oceanographic Data Centre	NERC-BODC	United Kingdom
29	ORION - Joint research and development centre	ORION	Cyprus
30	Institute of Marine Biology	IMBK	Montenegro
31	All Russian Research Institute of Hydro-meteorological Information – WDC	RIHMI-WDC	Russian Federation
32	Iv. Javakhishvili Tbilisi State University	TSU-DNA	Georgia
33	Ukrainian Scientific Center of Ecology of the Sea	UkrSCES	Ukraine
34	State Oceanographic Institute	SOI	Russian Federation

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Proposal for gathering and managing data sets on marine  
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35	Istanbul University, Institute of Marine Sciences & Management	IU-IMSM	Turkey
36	National Environmental Agency of the Ministry of Environmental Protection	NEA	Georgia
37	Institute of Marine Sciences, Middle East Technical University	IMS-METU	Turkey
38	Black Sea Commission Secretariate	BSCS	International
39	United Nation Environment Programme / Coordinating Unit for the Mediterranean Action Plan	UNEP/MAP	International
40	Rijkswaterstaat	RWS	The Netherlands
41	Deltares	Deltares	The Netherlands
42	P.P. Shirshov Institute of Oceanology Russian Academy of Science	SIO-RAS	Russian Federation
43	Marine Hydro-physical Institute	MHI	Russian Federation
44	A. O. Kovalevsky Institute of Marine Biological Research of RAS	IMBR	Russian Federation
45	Ukrainian Hydrometeorological Institute - Marine Branch	UHI-MB	Ukraine