



HarmoNIA



**Harmonization and Networking for
contaminant assessment in the Ionian and
Adriatic Seas**

Deliverable T2.1.1 - Collection of datasets focused on contaminants in the Adriatic - Ionian Region - V2

Work Package T2 - Data collection and definition of common data outputs focused on contamination

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1. Objective

The Deliverable summarizes the activity required to assemble marine data, focussing on contaminants, from national monitoring agencies and research institutes in a uniform way and to make these resources more available to public and private users, according to the appropriate access conditions, relying on quality-assured, standardised and harmonised protocols. A project Data Policy has been defined (Annex 1), which encourages open-access conditions to align with EU indications concerning access to information on environmental matter. Data access conditions have been defined by HarmoNIA consortium, in order to respect copyright but, at the same time, facilitate data availability. Due to the heterogeneous and complex nature of data on contaminants, to the different matrices, taxa, target tissues, size classes, measurement units, ... descriptive information on the data made available to HarmoNIA by the different partners have been collected through a detailed Questionnaire (Annex 2).

In order to assemble data according to standard procedures already developed within consolidated EU initiatives (eg. SeaDataNet, EMODnet Chemistry) and to collect metadata considered useful to assist the implementation of the Marine Strategy Framework Directive and, more in general, the assessment of environmental status, guidelines have been produced to adopt a shared and harmonized approach (Annex 3).

The gathered data sets will be used in the following phase of the project, in agreement with data providers and according to access conditions defined within the project, to create, in selected key areas, examples of common data outputs useful for management of contamination at transnational scale.

2. Approach

The activity has been organized in the following steps.

- Definition of HarmoNIA Data Policy (Annex 1) to set up the rules for data managed by HarmoNIA partners and the conditions for accessing HarmoNIA data, information and products. The policy aims to strike a balance between the rights of data originators and the need for widespread access through the free and unrestricted sharing and exchange of data, metadata and data products.
- Definition of dedicated questionnaires (Annex 2) used to collect information on the types of data that will be made available through the project and on the data and information that is considered relevant regarding the sampling sites in order to face the task T.2.2.1 related to the prototype of GIS layer of sampling sites for contaminant monitoring.
- Sharing of the already consolidated approach for data and metadata collection implemented by previous initiatives and definition of specific new Guidelines to consider requirements raised within HarmoNIA community (Annex 3).



- Dedicated training online sessions have been organized to share the expertise on data management. Standard procedures and tools developed in the framework of long term European initiatives, such as SeaDataNet and EMODnet Chemistry, have been used for the instruction.

3. Synthesis of data made available

Data gathered and made available within HarmoNIA (see Annex 2) are quite heterogeneous. They have been collected for different purposes such as in the framework of research activities, monitoring according to WFD, MSFD, MEDPOL activities and for monitoring of environmental impact of offshore activities. They refer to different matrices, measurement weight basis, groups of parameters and access conditions.

Sediment sieving and normalization factors also require proper standardization to improve the comparability of monitoring data in sediments.

Standardization is also required to harmonize parameters measured in different weight basis (dry weight or wet weight). This type of normalization requires additional sample data though not all authors agree about standard values to perform it.

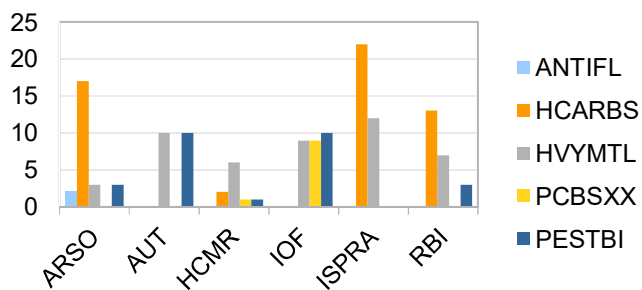
Variables have been grouped according to standard vocabularies prosed in the framework of SeaDataNet (SDN) infrastructure. The characteristics of the data gathered by HarmoNIA are summarised in the following tables and plots:

Matrix	P36-SDN Parameter code	group	P36-SDN group name	Parameter	PP1- OGS	PP2- ISPRA	PP3- IOF	PP4- HCMR	PP5- NIB	PP6- RBI	PP7- UoM	PP9- ARSO	PP10- AUT
Sediment	ANTIFL		Antifoulants						x			x	
	HCARBS		Hydrocarbons		x	x		x	x	x		x	
	HVYMTL		Heavy metals		x	x	x	x	x	x	x	x	x
	PCBSXX		PCBs		x		x		x	x			
	PESTBI		Pesticides & Biocides		x		x			x		x	x
			others		x								
Matrix	P36-SDN Parameter code	group	P36-SDN group name	Parameter	PP1- OGS	PP2- ISPRA	PP3- IOF	PP4- HCMR	PP5- NIB	PP6- RBI	PP7- UoM	PP9- ARSO	PP10- AUT
Biota	ANTIFL		Antifoulants									x	
	HCARBS		Hydrocarbons			x		x		x		x	
	HVYMTL		Heavy metals			x	x	x		x		x	x
	PCBSXX		PCBs				x	x					
	PESTBI		Pesticides & Biocides				x	x		x		x	x
Matrix	P36-SDN Parameter code	group	P36-SDN group name	Parameter	PP1- OGS	PP2- ISPRA	PP3- IOF	PP4- HCMR	PP5- NIB	PP6- RBI	PP7- UoM	PP9- ARSO	PP10- AUT
Water	ANTIFL		Antifoulants									x	
	HCARBS		Hydrocarbons			x		x	x	x		x	
	HVYMTL		Heavy metals					x				x	x
	PCBSXX		PCBs										
	PESTBI		Pesticides & Biocides									x	x
			others		x							x	

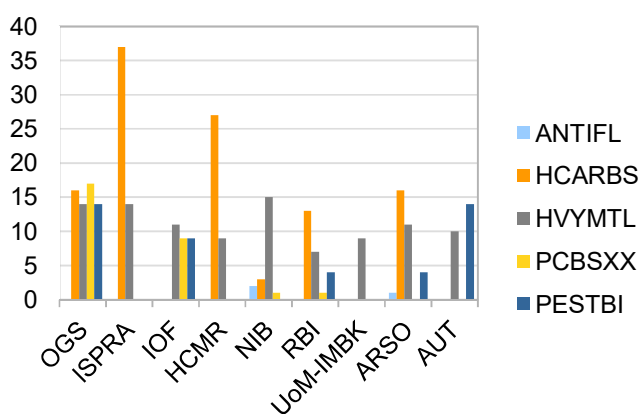


Overview of parameter groups made available by partner:

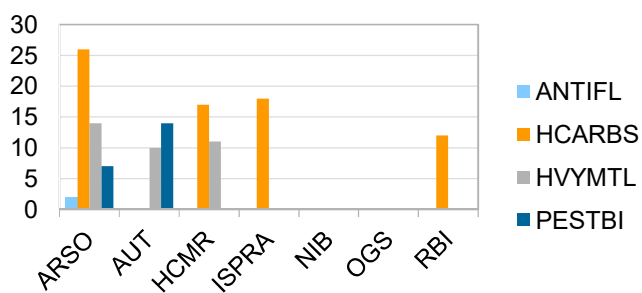
Biota



Sediment

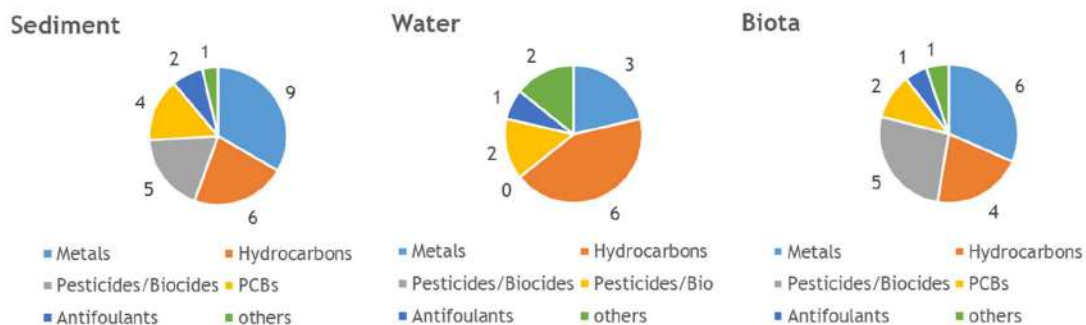


Water

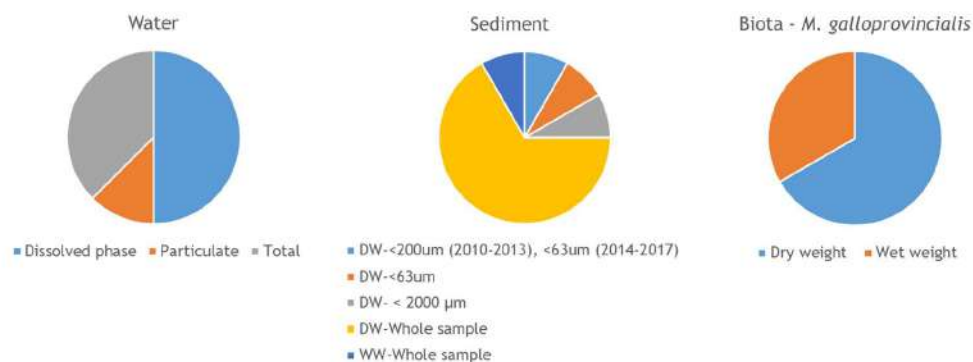




Parameter availability by matrix (numbers indicate partners providing data for the specific group of chemical variables):



Per matrix characteristics:



Datasets collected through HarmonIA project will contribute to increase data availability in the already consolidated ingestion system from EMODnet-Chemistry.



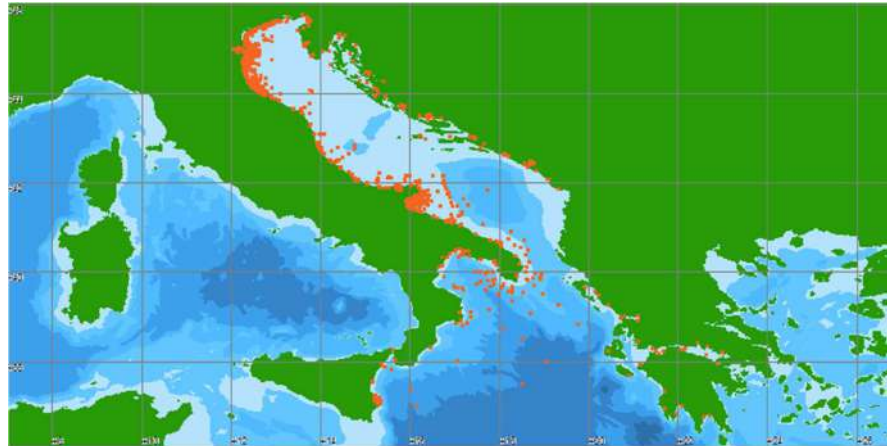
The distribution of data on contaminants available within the Adriatic region provided by the Data Discovery and access service from HarmoNIA Data Access system is the following (<http://harmonia.maris2.nl/search>):



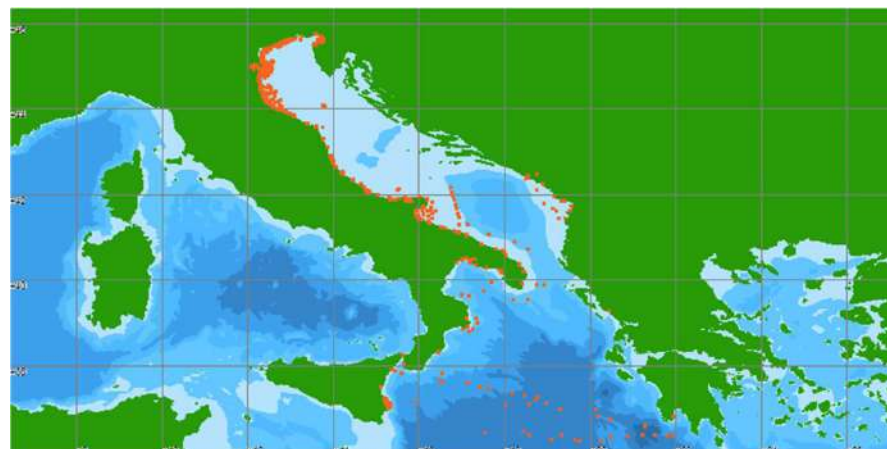
Considering the different groups of variables (P36) for contaminants the distribution is shown below:



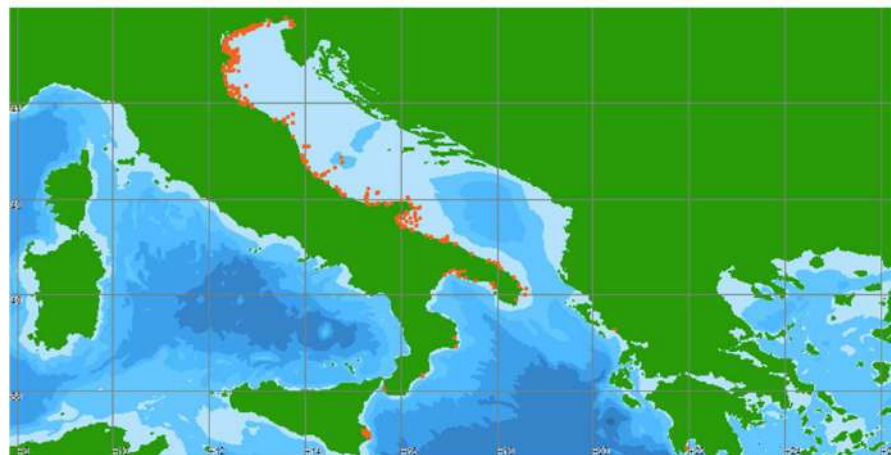
Antifoulants



Heavy metals



Hydrocarbons

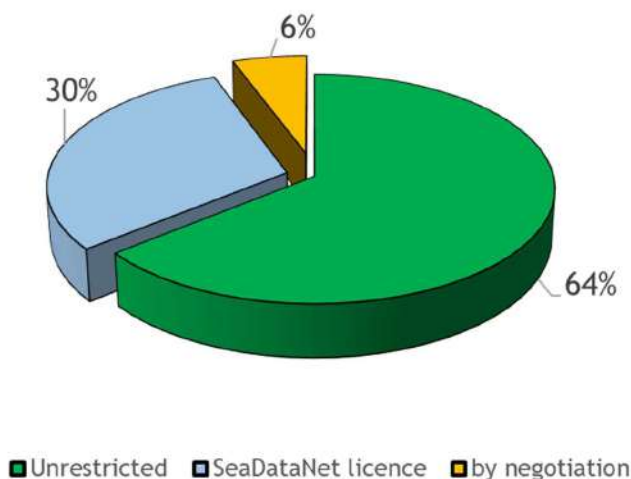


Polychlorinated biphenyls



Pesticides and biocides

A total of 5.642 datasets on marine contaminants are currently available through HarmonIA data access system and 1.235 datasets were made available as a direct contribution of HarmonIA project. As monitoring activities in the region are continuously ongoing, as soon as new data are made available from the partnership, more datasets are being processed in order to be harmonized and standardized to be accessible through HarmonIA data access portal. According to the Data access restrictions, more than 60% of the data are unrestricted, meaning that they are ready to be downloaded, 30% require the acceptance of the licence defined by SeaDataNet (<https://www.seadatanet.org/Data-Access/License/1.0>), while only 6% require negotiation, which means that data originator is asked for permission to use data.





4. Substances considered under relevant EU legislation and Barcelona Convention

A first analysis based on the data inventory was performed to find out if data gathered through HarmoNIA are considered relevant for EU legislation and Barcelona Convention. Two basic bibliography sources were used: Chemical contaminants entering the marine environment from sea-based sources: A review with a focus on European seas (JRC, 2016) and Potential chemical contaminants in the marine environment. An overview of main contaminant lists (JRC, 2017).

Among the substances collected within HarmoNIA, a large majority are significant either for UE legislation or for Barcelona convention or for both. It is important to note that some of the substances are already considered as emerging Chemicals in the Mediterranean Sea, and included in the chemicals candidate list by the UNEP MAP (UNEP(DEPI)/MED WG.439/Inf.11).

An interesting and more accurate analysis will be performed once the collection of datasets is finished. The deliverable will be updated as a second version to include the above-mentioned information.

A summary table is shown below:

Name of substance	UNEP_considered	UE_legislation	HarmoNIA	JRC sea_based
137Cs				X
Acenaphthene			X	X
Acenaphthylene			X	X
Aldrin	UNEP/MAP MEDPOL monitoring program, LBS protocol	WFD other pollutants	X	
Aluminium			X	X
Anthracene		WFD PS, WFD PHS	X	X
Arsenic	Candidate chemical for Barcelona Convention		X	X
Barium	Candidate chemical for Barcelona Convention		X	X
Benz(a)anthracene			X	X
Benzo(a)pyrene (marker of all PAH)		WFD PS, WFD PHS		X
Benzo(b)fluoranthene		WFD PS, WFD PHS	X	X
Benzo(g,h,i)-perylene		WFD PS, WFD PHS	X	X
Benzo(k)fluoranthene		WFD PS, WFD PHS	X	X
Brominated diphenylethers (sum of the concentrations of congener numbers 28, 47, 99, 100, 153 and 154) (PBDE)	LBS protocol	WFD PS, WFD PHS	X	X
Cadmium and its compounds (depending on water hardness classes) ⁷	UNEP/MAP MEDPOL monitoring program, LBS protocol	WFD PS, WFD PHS	X	X
Chlordane	LBS protocol		X	
Chrysene			X	X
Cobalt			X	X



Name of substance	UNEP_considered	UE_legislation	HarmoNIA	JRC sea_based
Copper	LBS protocol	BPD	X	X
Cromium	LBS protocol		X	X
DDT total	UNEP/MAP MEDPOL monitoring program, LBS protocol	WFD other pollutants	X	X
Di(2-ethylhexyl)-phthalate (DEHP)	Candidate chemical for Barcelona Convention	WFD PS, WFD PHS	X	X
Dibenzo(a,h)anthracene			X	X
Dibenzothiophene			X	X
Dibutyltin (DBT)		WFD PS	X	X
Dieldrin	UNEP/MAP MEDPOL monitoring program, LBS protocol	WFD otherpollutants	X	
Dioxins and dioxin-like compounds		WFD PS, WFD PHS	X	X
Ethylbenzene			X	X
Fluoranthene		WFD PS	X	X
Fluorene			X	X
Hexachloro-benzene	UNEP/MAP MEDPOL monitoring program, LBS protocol	WFD PS, WFD PHS	X	X
HCH (isomers)	Candidate chemical for Barcelona Convention	WFD PS	X	
Gamma-HCH (lindane)	UNEP/MAP MEDPOL monitoring program, LBS protocol			
Indeno(1,2,3-cd)-pyrene		WFD PS, WFD PHS	X	X
Iron	Candidate chemical for Barcelona Convention		X	X
Lead and its compounds (bioavailable concentrations)	UNEP/MAP MEDPOL monitoring program, LBS protocol	WFD PS	X	X
Manganese	Candidate chemical for Barcelona Convention		X	X
Mercury and its compounds	UNEP/MAP MEDPOL monitoring program, LBS protocol	WFD PS, WFD PHS	X	X
Methoxychlor	Candidate chemical for Barcelona Convention			
Metylphenols (cresols)			X	X
Molibdenum	Candidate chemical for Barcelona Convention		X	X
Monobutyltin (MBT)		WFD PS		X
Naphthalene		WFD PS	X	X
Nickel and its compounds (bioavailable concentrations)	Candidate chemical for Barcelona Convention		X	X
Para-para-DDD			X?	X
Para-para-DDE			X?	X
para-para-DDT		WFD otherpollutants	X	X
PCB101	UNEP/MAP MEDPOL monitoring program		X	X
PCB105	UNEP/MAP MEDPOL monitoring program		X	X
PCB118	UNEP/MAP MEDPOL monitoring program		X	X
PCB138	UNEP/MAP MEDPOL monitoring program		X	X
PCB153	UNEP/MAP MEDPOL monitoring program		X	X
PCB180	UNEP/MAP MEDPOL monitoring program		X	X
PCB28	UNEP/MAP MEDPOL monitoring program		X	X
PCB52	UNEP/MAP MEDPOL monitoring program		X	X



Name of substance	UNEP_considered	UE_legislation	HarmoNIA	JRC sea_based
PCBs	UNEP/MAP MEDPOL monitoring program		X	X
PCDDs	LBS protocol	WFD PS	X	X
PCDFs	LBS protocol	WFD PS	X	X
Pentachlorophenol	Candidate chemical for Barcelona Convention	WFD PS	X	
phenanthrene			X	X
Phenol			X	X
Polyaromatic hydrocarbons (PAH)	UNEP/MAP MEDPOL monitoring program, LBS protocol	WFD PS	X	X
Pyrene			X	X
Selenium			X	X
Toluene			X	X
TPT			X	X
Tributyltin compounds (Tributyltin-cation)		WFD PS, WFD PHS, BPD	X	X
Vanadium	Candidate chemical for Barcelona Convention		X	X
Zinc			X	X

Data on Detection Limits (From WPT1) as specifically required by UNEP MAP Implementation of Decision IG 22/7 on IMA and Articles 7 and 8 of the LBS Protocol Meta Data Templates for Pollution and Marine Litter IMA Indicators UNEP/MAP. UNEP/MAP, Athens, 2017

Annex 1: HarmoNIA Data Policy

Annex 2: Guidelines for Data and Metadata

Annex 3: HarmoNIA Partnership Data contribution



HarmoNIA

**Harmonization and Networking for contaminant
assessment in the Ionian and Adriatic Seas**

HarmoNIA Data Policy

Authors:

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Project acronym: HarmoNIA

Project full title: Harmonization and Networking for contaminant assessment
in the Ionian and Adriatic Seas

Start date of project: 1st February 2018



Coordinator:

Istituto Nazionale di Oceanografia e di Geofisica Sperimentale - Italy



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1 Objective and Framework for Data Policy

This document sets the policy for data managed by HarmoNIA partners and the conditions for accessing HarmoNIA data, information and products.

The policy aims to strike a balance between the rights of data originators and the need for widespread access through the free and unrestricted sharing and exchange of data, metadata and data products. The final goal of this policy is to serve the scientific community, public and private organizations, and environmental agencies.

In agreement with overall EU policy goals, HarmoNIA Data Policy goals include:

- 1 Sharing and use of data on the basis of Open Data: fully, freely, openly and timely;
- 2 Citizen participation in governance and civil society / transparency;
- 3 Access to quality data;
- 4 Facilitation of re-use for economic growth (private value-adding activities);
- 5 Ensuring reproducibility of accessible data;
- 6 Contribution to implementation of the relevant policies of the European Union;
- 7 Continuously support evidence-based decision making and research

By maximizing the availability of data to the community at large, HarmoNIA promotes the use of these data, thereby ensuring that their maximum value can be realized and thus contribute to an increased understanding of the marine environment.

The HarmoNIA data policy originates from SeaDataNet data policy [1], and takes into account more recent documents such as EEA Data Policy [2], JRC Data Policy [3], ICES Data Policy [4] and LifeWatchGreece Research Infrastructure Data Policy [5]. It is consistent with, and in the spirit of, national and international policies and laws. Applicable policies or laws are those related to UN conventions, policies of international bodies often within the UN, policies and laws of the European Union. HarmoNIA data policy is intended to be fully compatible with the Directive of the European Parliament and of the Council on public access to environmental information [6], the INSPIRE Directive [7], IOC [8], ICES[9], WMO[10], GCOS [11], GEOSS [12] and CLIVAR [13] data principles.



1.1. Definition of terms

- **Data source** may be the originator of the data, metadata, images or products, for example, persons responsible for the scientific work that produce them; or an intermediary such as the data sources' associated institute(s), the agency that commissioned or funded the work, or even the information technology group responsible for preparing the data for submission to HarmoNIA. The data source must precisely specify any access restrictions that it wishes to uphold. Some cases that call for restrictions include data which is protected by law and data submitted during a prescribed period of exclusive use.
- **Observation data:** these are measurements or observations (in situ and remote sensing) of marine environmental variables. In order to interpret and process these data, related attribute data such as type of data, location, time and unit of measurement are also required.
- **Data points** are individual numerical data
- **Data sets** are sets of data points grouped by any kind of pertinent criteria: vertical profiles, trajectories, time series, cruises or experiments.
- **Quality Flags** are alphanumeric indicators added to each numerical data at the end of the quality checks procedures.
- **Model data:** these are estimates of marine environmental variables from model outputs (including analyses).
- **Image data:** these are images providing information on various aspects of the marine environment (e.g. map of Posidonia meadows)
- **Metadata:** these are data about data sets: information about observation, model or image data sets, the related attribute data such as type of data, location, date/time and unit of measurement, accuracy, precision or method of measurement, structure or ownership of the data.
- **Data products:** these are aggregated or combined sets of observation data, model data, images or metadata (including web services).
- **Distributed database.** A distributed database or system is where data can be located at various geographically distributed nodes but still be accessible through one unique portal.
- **NODC:** National Oceanographic Data Centre or Designated National Agency for International Oceanographic Data and Information Exchange (Intergovernmental



Oceanographic Commission of UNESCO programme). Each NODC is in charge of coordinating the oceanographic data exchange in its country and of the long term preservation of the national data assets (*in-situ* data), within SeaDataNet network.

- **Role.** A role is a property of a user that determines the criteria that must be satisfied before access to an asset is granted. In many ways it can be thought of as a key that a user possesses.
- **Policy.** A policy is a set of rules that determine access to an asset. Policies may be thought of as locks that are put in place to protect assets.
- **Licence** means permission to use data under specific conditions, such as under a proprietary license scheme or under an open license scheme.

2 Policy for Use of Data

2.1 General conditions

In order to maximize the usability of data and thereby their value, HarmoNIA supplies metadata and, if available, data quality indicators. All data, including metadata and quality indicators, are made available by using standard coding formats and protocols to the greatest extent possible.

HarmoNIA makes data available freely and without restriction. “Freely” means at no more than the cost of reproduction and delivery, without charge for the data itself. “Without restriction” means without discrimination against, for example, individuals, research groups, or nationality.

HarmoNIA makes data available in a timely and easy way to users, but HarmoNIA remains dependent on data contributions.

HarmoNIA adopts and adapts SeaDataNet infrastructure to ensure widespread access to data collected under auspices of the programme through already existing channels.

Regardless of whether the data are quality controlled or not, HarmoNIA and the data source do not accept any liability for the correctness and/or appropriate interpretation of the data. Interpretation should follow scientific rules and is always the user’s responsibility. Correct and appropriate data interpretation is solely the responsibility of data users.

Data Users should not give to third parties any HarmoNIA data or product without prior consent from the source Data Centre.



Data Users must respect any and all restrictions on the use or reproduction of data. The use or reproduction of data for commercial purpose might require prior written permission from the data source.

All the data submitted to HarmoNIA can be subject to an embargo period determined by the data owner/provider, requested for exploiting the data and publishing the results before making them publicly available.

According to the different types of information made available, the access conditions vary:

- 1) metadata are freely accessible without any condition.
- 2) data and products require:
 - a. registration
 - b. acceptance of additional conditions that may be requested by the different nodes of the distributed database. The access rights are granted according to the “role” of the user.
 - c. acceptance of a user license.

2.2 Acknowledgment of HarmoNIA data

A user shall acknowledge the source of the data and HarmoNIA contribution for data archiving. It is not ethical to publish data without proper attribution or co-authorship. Any person making substantial use of data must communicate with the data source prior to publication, and should possibly consider the data source(s) for co-authorship of published results.

To support proper attribution and credit of data originators, Datacite DOI® (Digital Object Identifiers) can be attributed to datasets to permanently identify a set of data for the purpose of its publication on-line and for its quotation in the scientific literature. The dataset to which a DOI has been assigned is consistently available and remains static. As stated in the Ocean Data Publication Cookbook of IOC [14], publishing a dataset also implies a commitment to persistence of the data and allows data producers to obtain academic credit for their work in creating the datasets.



2.3 Roles of users

The user roles are attributed by the SeaDataNet National Oceanographic Data Centers of the user's country (or user-desk by default) after on line registration. Name, email and professional references are mandatory.

The list of roles recognized by SeaDataNet data infrastructure roles may be found on the following link: http://seadatanet.maris2.nl/v_bodc_vocab_v2/search.asp?lib=C86 .

In April 2018, the role list content includes the following:

Entry Term	Abbreviated Term	Definition
Administrator	administrator	A user who is able to bypass any access control created by SeaDataNet data infrastructure but with no bypass rights for local access controls.
Public	public	Any authenticated individual with sufficient credentials to satisfy SeaDataNet access logging requirements.
Academic	academic	A user who accesses data for purposes of education or bona fide non-profit academic research.
Commercial	commercial	A user who accesses data with the objective of making a financial profit from its use.
National and Local Government	national_gov	A user who accesses data for administrative or legislative purposes within the boundaries of a nation.
Pan-national Government	pan-national_gov	A user who accesses data for international administrative or legislative purposes. Generally, but not exclusively, the European Union
Partner	partner	A person employed by an organisation participating to the project. This gives the right to access, create and (with ownership rights) maintain project documents and metadatabase entries.

2.4 License agreement

Licenses are legally binding texts that define what can be done with a work by a third party and they can change the content of the work from “all rights reserved” (copyright) to “some rights reserved”.

2.4.1 Open license scheme for unrestricted data



Code	Label	Definition
UN	unrestricted	The data are freely available to anybody and may be used for any purpose. Usage acknowledgement may be required.

For unrestricted (open access) data HarmoNIA will adopt [Creative Commons](#) (CC) as a legal instrument to define the usage rights of the data. Creative Commons is legally binding, simple to use, globally accepted and its licenses are both human and machine-readable, the latter being especially important in the digital era. Kinds of CC licenses available:

- 1) [CC-Attribution](#) (CC-BY): *“You must give appropriate credit, provide a link to the license, and indicate if changes were made. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use”;*
- 2) CC BY-SA 4.0 Beside the conditions indicated in CC BY, if you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original.
- 3) CC BY-NC 4.0 you may not use the material for commercial purposes.
- 4) CC BY-ND 4.0 If you remix, transform, or build upon the material, you may not distribute the modified material.
- 5) 2) [CC-Zero](#) (CC0, waiver): *“The person who associates a work with this deed has dedicated the work to the public domain by waiving all of his/her rights to the work worldwide under copyright law, including all related and neighboring rights, to the extent allowed by law. You can copy, modify, distribute and perform the work, even for commercial purposes, all without asking permission.”*

In any case, the users of CC0 data should make the appropriate attribution to the data donor for the work done and released as free to be used by the society.

2.4.2 Proprietary license scheme

In case data are not directly accessible, several levels of restrictions can be proposed by the data source/data originator, and data may become available through a negotiation process managed by SeaDataNet infrastructure.

Several levels of data access conditions are proposed by SeaDataNet management systems (L08 - SEADATANET DATA ACCESS RESTRICTION POLICIES, http://seadatanet.maris2.nl/v_bodc_vocab_v2/search.asp?lib=L08).



For HarmonIA we propose the following:

Code	Label	Definition
LI	licence	Conditions of supply and usage of the data are specified in a formal agreement.
LS	SeaDataNet licence	Access to the data and usage are as specified in the SeaDataNet data policy and licence agreement
MO	moratorium	Data are initially restricted, but the access condition relaxes to academic or unrestricted once a specified period of time after an event (such as collection, publication, completion of QC procedures or project cessation) has elapsed.
NA	no access	Access to the data cannot be negotiated.
OG	organisation	The data are unrestricted to members of an organisation or a virtual organisation (such as project or cruise participants) but restricted to anybody else.
RS	by negotiation	The data are withheld from general circulation and disclosure but access may be obtained on a case-by-case basis through negotiation.
SR	academic	The data are freely available for research and education purposes. Usage acknowledgement is usually expected.

2.5 Preservation of data

For HarmonIA to succeed, the SeaDataNet and EMODnet data centres must assure archival systems, so that the collected data, images, products and metadata may be safeguarded for future analysis. Inventories of data, images and products and related metadata should be readily accessible and updated as needed on a routine basis. Long-term survival, integrity, and access to HarmonIA data will be preserved for future generations by the SeaDataNet and EMODnet data centres

3 References

- [1] SeaDataNet Project Office, 2007 SeaDataNet Data Policy, SDN-PO07
- [2] European Environment Agency, 2013 EEA data policy,
- [3] European Commission. 2015 JRC Data Policy. C. Doldirina, A. Friis-Christensen, N. Ostlaender, A. Perego, A. Annoni, I. Kanellopoulos, M. Craglia, L. Vaccari, G. Tartaglia, F. Bonato, J-P. Triaille, S. Gentile. Publications Office of the European Union, 9 pp., EUR 27163 EN - Scientific and Technical Research series - ISSN 1831-9424, doi:10.2788/607378



- [4] ICES Data Policy 2016, <http://www.ices.dk/marine-data/Documents/ICES-Data-policy.pdf>
- [5] Chatzinikolaou E, Faulwetter S, Mavraki D, Bourtzis T, Arvanitidis C. Data Policy and Data Sharing Agreement in the LifeWatchGreece Research Infrastructure. Biodiversity Data Journal. 2016;(4):e10849. doi:10.3897/BDJ.4.e10849
- [6] Directive 2003/4/EC of the European Parliament and of the Council of 28 January 2003 on public access to environmental information and repealing Council Directive 90/313/EEC (<http://ec.europa.eu/environment/aarhus/index.htm>).
- [7] INSPIRE Directive for spatial information in the Community (<http://inspire.jrc.it/home.html>)
- [8] IOC Data Policy (<http://ioc3.unesco.org/iode/contents.php?id=200>)
- [9] ICES Data Policy 2006 (https://www.ices.dk/Datacentre/Data_Policy_2006.pdf)
- [10] WMO Resolution 40 (Cg-XII; see <http://www.nws.noaa.gov/im/wmor40.htm>)
- [11] Implementation plan for the Global Observing System for Climate in support of the UNFCCC, 2004; GCOS - 92, WMO/TD No.1219.
- [12] Global Earth Observation System of Systems GEOSS 10-Year Implementation Plan Reference Document (Final Draft) 2005. GEO 204. February 2005.
- [13] CLIVAR Initial Implementation Plan, 1998; WCRP No. 103, WMO/TS No. 869, ICPO No. 14. June 1998.
- [14] Leadbetter, A., Raymond, L., Chandler, C., Pikula, L., Pissierssens, P., Urban, E. (2013) Ocean Data Publication Cookbook. Paris: UNESCO, 41 pp. & annexes. (Manuals and Guides. Intergovernmental Oceanographic Commission, 64), (IOC/MG/64) □ UNESCO 2013



Harmonization and Networking for
contaminant assessment in the Ionian and
Adriatic Seas

Guidelines for metadata and dataset preparation

Annex to Deliverable T2.1.1- Collection of
datasets focused on contaminants in the Adriatic
- Ionian Region

**Work Package T2 - Data collection
and definition of common data
outputs focused on contamination**

Authors:

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August 2018



1. Purpose

In order to collect and archive with a common and harmonized approach the set of metadata (i.e. data about data sets: information about observation, model or image data sets, the related attribute data such as type of data, location, date/time and unit of measurement, accuracy, precision or method of measurement, structure or ownership of the data) needed for HarmonIA, these Guidelines are proposed to adopt a common and standardized approach within the network.

These guidelines derive from those implemented in the framework of previous European initiatives, namely EMODnet Chemistry Phase III (Schaap et al., 2017¹; Lipizer et al., 2018²) and refer to tools, formats and common vocabularies developed within the SeaDataNet initiative (SeaDataNet, <https://www.seadatanet.org/>, EMODnet Chemistry, <http://www.emodnet-chemistry.eu/welcome>).

2. Metadata

In order to include metadata considered useful to allow discovery and access to data related to specific monitoring activities and to allow the preparation of the GIS layer of sampling stations agreed by HarmonIA partnership, it is necessary to insert in the metadata following information, in addition to mandatory fields:

Station type; Purpose of monitoring; Time resolution.

Using MIKADO software (<https://www.seadatanet.org/Software/MIKADO>) to produce metadata entries, it is recommended to insert the additional information in the Common Data Index (CDI) fields indicated below. The Common Data Index (CDI) metadata format is based upon the ISO19115 content standard and both its content and XML coding have been upgraded in September 2013 to the ISO19139 schema and made INSPIRE compliant. Further documentation can be found at: <https://www.seadatanet.org/Standards/Metadata-formats/CDI>

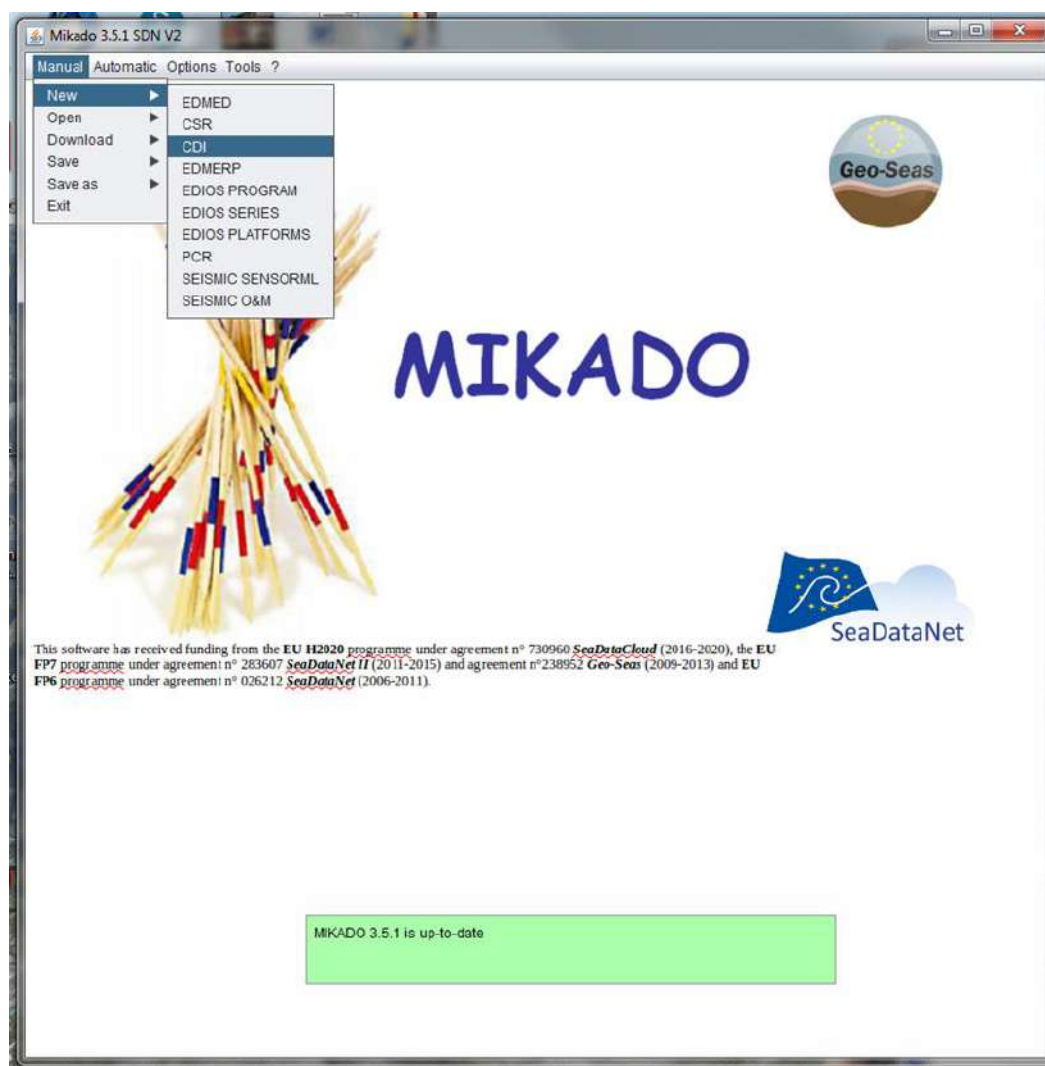
¹ D. Schaap, A. Giorgetti, E. Partescano, A. Altenburger, M. Fichault, 2017, EMODnet Phase III - How to include information in the CDIs - guidelines, 29/06/2017, 12 pp. DOI: 10.6092/E25B219F-B17D-411E-A0EE-E12DB5685E23

² M. Lipizer, M. Vinci, A. Giorgetti, L. Buga, M. Fichault, J. Gatti, S. Iona, M. Larsen, R. Schlitzer, D. Schaap, M. Wenzer, E. Molina, 2018, EMODnet Phase III - Updated guidelines for SeaDataNet ODV production, 12/04/2018, 23 pp., DOI: 10.6092/259c43eb-4ba4-419b-bb38-df00e189bd35



Recommendations:

Use MIKADO to prepare CDI (see below):



Station type: insert this in “Abstract”, section “Parameters (see below)” and select one of the following options: hotspot (H), reference (R), coastal (C), unknown (U). **As a rule**, please insert **ALWAYS** the information as (capital letter) and then the world (see example below).

Example TO BE FOLLOWED: (H) hotspot

Purpose of monitoring: insert this in “Abstract”, possibly using SDN vocabulary C36* http://seadatanet.maris2.nl/v_bodc_vocab_v2/search.asp?lib=C36. In case the purpose of monitoring is not already included in the vocabulary the partner should ask OGS or BODC for the creation of a new term. For scientific research activities indicate “Research”.



Station type Purpose of monitoring (C36 vocabulary)

Furthermore, the information regarding the type of activity (or purpose of monitoring) can be also inserted in the CDIs by including project references by means of EDMERP entries in the tag PROJECTS. See figure below (National Monitoring Program in Slovenia):

The EDMERP project should describe whether it concerns a structured monitoring activity whereby data are collected for long time series in a systematic way OR a scientific research project whereby data are collected more randomly and by individual scientists applying different techniques and methods (Schaap et al., 2017).



Sampling interval : fill CDI field “Sampling interval” and use SDN vocabulary L03**

http://seadatanet.maris2.nl/v_bodc_vocab_v2/search.asp?lib=L03

Mikado 3.5.1 SDN V2 Manual / New CDI

Manual Automatic Options Tools ?

Identification Where **When** What How Who Where to find the data Cruise/Station Documentation Quality Others

Period

Start date * dd/mm/yyyy hh:mm:ss -24 hr (25/01/2007 15:05:00)

End date * dd/mm/yyyy hh:mm:ss -24 hr (25/02/2007 12:00:00)

Time resolution

Value

Unit

Additional suggestions:

Add HarmonIA in the project field (together with projects financing data acquisition) with EDMERP code 1987 (see below):

Mikado 3.5.1 SDN V2 Manual / New CDI

Manual Automatic Options Tools ?

Identification Where When What How Who Where to find the data Cruise/Station Documentation Quality Others

EDMED Reference

EDMED Identifier

code list value

Projects

project code list value

project

Country

Name * on of Oceanography" country="Italy"

Code EDMERP * 12307

7684 - Harmful Algal Bloom Initiation in Large European Marine Ecosystems {acronym="HABILE" organisation="HABES" country="Italy"}

4260 - Harmful Algal Blooms Expert System {acronym="HABES" organisation="Deltares" country="Italy"}

12199 - Harmful Impact of TBT (Dutch participation) {acronym="HIC-TBT - NL" organisation="NIOZ"}

12307 - Harmonization and Networking for contaminant assessment in the Ionian and Adriatic Sea

8150 - Harmonized International Early Warning Reporting System on Abnormal Events in the Baltic Sea

7903 - Health and disease in clams, *Ruditapes philippinarum*, in Ireland, with particular reference to

8875 - Health of Coastal Envs

10423 - Healthy and Biologically Diverse Evidence Group {acronym="HBDSEG" organisation="Enviro"}

11425 - Heavy metal amounts in zooplankton and some commercial teleost fish and water samples at

12307 - Heavy metal levels of sediment, Demersal Fishes and some Molluscs at the Gipe Peninsula



*Some examples from C36 MONITORING ACTIVITY LEGISLATIVE DRIVERS:

Conceptid	Preflabel	Definition
LEGL0001	Dangerous Substances Directive	The Directive 76/464/EEC of 4 May 1976 on pollution caused by certain dangerous substances discharged into the aquatic environment of the European Community
LEGL0010	Water Framework Directive	Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy
LEGL0011	Bathing Waters Directive	Directive 2006/7/EC of the European Parliament and of the Council of 15 February 2006 concerning the management of bathing water quality and repealing Directive 76/160/EEC
LEGL0015	Environmental Impact Assessment Directive	Council Directive on the assessment of the effects of certain public and private projects on the environment 85/337/EEC.
LEGL0016	Strategic Environment Assessment Directive	Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment
LEGL0073	Marine Strategy Framework Directive	Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive).
LEGL0074	Environmental Quality Standards Directive	Agreement on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council.



**List of L03 terms: for not regular sampling we suggest to use “0” = indeterminate.

Conceptid	Preflabel	Definition
0	indeterminate	No regular sampling interval exists because measurements are made at irregular and unpredictable times.
1	sub-second	Sampling interval is less than a second. Sampling frequency is greater than one hertz.
13	year to sub-decade	Sampling interval is one year or longer, but shorter than ten years. Sampling frequency is yearly or less, but greater than decadal.
15	decadal	Sampling interval is 10 years or more. Sampling frequency is less than or equal to decadal.
2	second to sub-minute	Sampling interval is one second or longer, but shorter than one minute. Sampling frequency is 1 hertz or less, but greater than 1/60 hertz.
3	minute to sub-hour	Sampling interval is one minute or longer, but shorter than one hour. Sampling frequency is 1/60 hertz or less, but greater than 1/3600 hertz.
4	hour to sub-day	Sampling interval is one hour or longer, but shorter than one day. Sampling frequency is hourly or less, but greater than daily.
5	day to sub-week	Sampling interval is one day or longer, but shorter than one week. Sampling frequency is daily or less, but greater than weekly.
6	week to sub-month	Sampling interval is one week or longer, but shorter than one month. Sampling frequency is weekly or less, but greater than monthly.
7	month to sub-year	Sampling interval is one month or longer, but shorter than one year. Sampling frequency is monthly or less, but greater than yearly.
98	inapplicable	There is no meaningful sampling interval either because measurements have not been repeated (e.g. sediment core measurements) or measurements have been averaged along a spatial axis (e.g. binned CTD data).
99	unknown	A regular sampling interval probably exists but is not known to, or computable by, the information provider.

In case of need, additional C36 and L03 entries can be requested.



3. Data

In order to prepare datasets, please follow the Guidelines: EMODnet Phase III - Updated guidelines for SeaDataNet ODV production³ (and further references inside) and, if possible, use the software NEMO (<https://www.seadatanet.org/Software/NEMO>). NEMO was developed by SeaDataNet initiative and enables conversion from any type of ASCII format to standard formats such as the SeaDataNet ODV and Medatlas ASCII formats as well as the SeaDataNet NetCDF. In order to harmonize input data, it is strongly suggested to adopt measurement units which are indicated and required by current EU directives.

We propose to adopt the units indicated for Good Environmental Status assessment in the recent EU directives (2013/39/UE; Comm. Dec. EU 2017/848) for the following matrices:

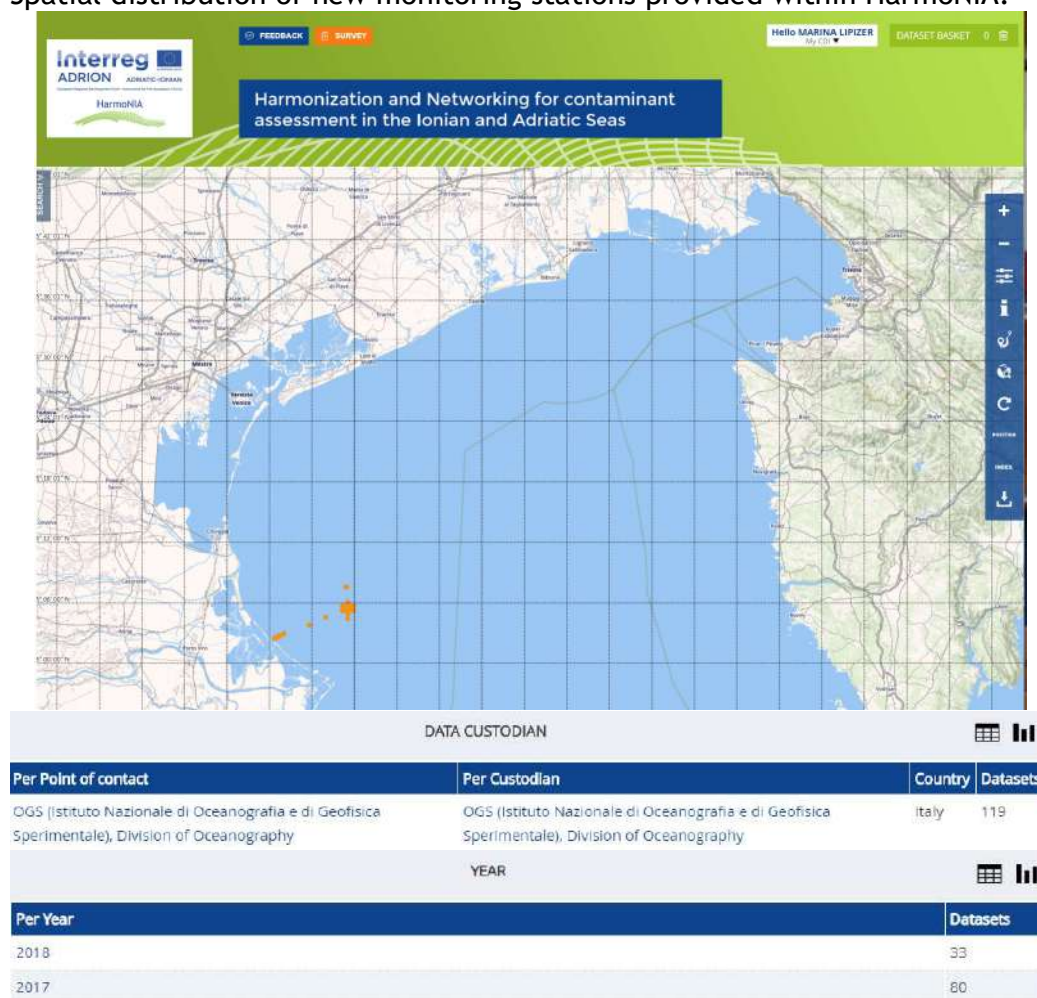
- Water: all data expressed as µg/l
- Sediment: all data expressed as µg/kg of dry weight
- Biota: all data expressed as µg/kg of fresh weight for biota following RSC guidelines (**BUT: mussel in dry weight**).

³ M. Lipizer, M. Vinci, A. Giorgetti, L. Buga, M. Fichault, J. Gatti, S. Iona, M. Larsen, R. Schlitzer, D. Shaap, M. Wenzer, 2017, EMODnet Phase III - Updated guidelines for SeaDataNet ODV production, 27/06/2017, 21 pp., DOI: 10.6092/259c43eb-4ba4-419b-bb38-df00e189bd35



Annex 3: HarmoNIA Partnership Data contribution



LP: OGS



Spatial distribution of new monitoring stations provided within HarmoNIA:



T2.1.1 - Collection of datasets focused on contaminants in the Adriatic - Ionian Region

MATRIX CATEGORIES				
Per Matrix Categories	Datasets			
sediment	80			
water body	39			

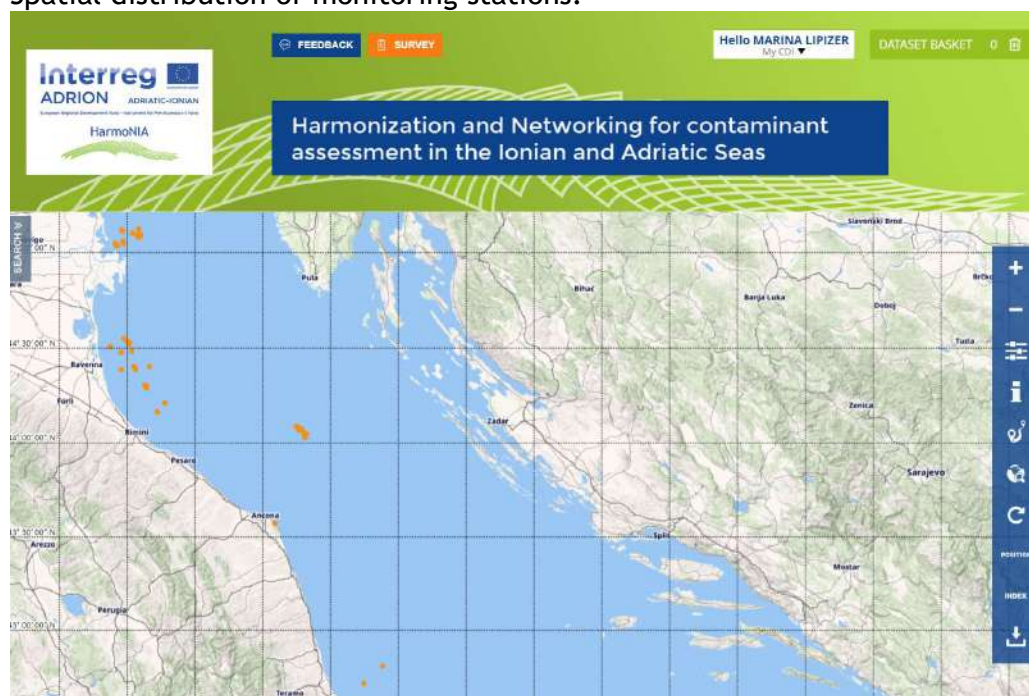
GROUPS OF VARIABLES				
Per Parameter group	Datasets			
Pesticides and biocides	61			
Heavy metals	50			
Fertilisers	44			
Organic matter	44			
Hydrocarbons	42			
Polychlorinated biphenyls	36			
Antifoulants	22			

DISCOVERY PARAMETER				
Per Discovery parameter	Datasets	Per Discovery parameter		
Carbon concentrations in sediment	44	Carbon concentrations in sediment		
Nitrogen concentrations in sediment	44	Nitrogen concentrations in sediment		
Inorganic chemical composition of sediment or rocks	44	Inorganic chemical composition of sediment or rocks		
Concentration of organic matter in sediments	44	Concentration of organic matter in sediments		
Pesticide concentrations in water bodies	39	Pesticide concentrations in water bodies		
Concentration of other organic contaminants in sediment samples	36	Concentration of other organic contaminants in sediment samples		
Concentration of polychlorobiphenyls (PCBs) in sediment samples	36	Concentration of polychlorobiphenyls (PCBs) in sediment samples		
Organometallic and organometalloid species concentration parameters in sediments	22	Organometallic and organometalloid species concentration parameters in sediments		
Pesticide concentrations in sediment	22	Pesticide concentrations in sediment		
Concentration of aliphatic hydrocarbons in sediment samples	22	Concentration of aliphatic hydrocarbons in sediment samples		
Concentration of polycyclic aromatic hydrocarbons (PAHs) in sediment samples	22	Concentration of polycyclic aromatic hydrocarbons (PAHs) in sediment samples		
Dissolved metal concentrations in the water column	6	Dissolved metal concentrations in the water column		
Particulate metal concentrations in the water column	6	Particulate metal concentrations in the water column		
Total metal concentrations in water bodies	6	Total metal concentrations in water bodies		
Concentration of other organic contaminants in the water column	6	Concentration of other organic contaminants in the water column		

T2.1.1 - Collection of datasets focused on contaminants in the Adriatic - Ionian Region

PP2: ISPRA

Spatial distribution of monitoring stations:



SUMMARY

PER CDI PARTNER			+ -
Per CDI Partner	Country	Datasets	
ISPRA-Institute for Environmental Protection and Research	Italy	466	
PER ORIGINATOR			+ -
Per Originator	Country	Datasets	
ISPRA-Institute for Environmental Protection and Research	Italy	466	
PER INSTRUMENT/TYPE			+ -
PER YEAR			+ -
Per Year		Datasets	
2009		64	
2008		153	
2007		99	
2006		150	

T2.1.1 - Collection of datasets focused on contaminants in the Adriatic - Ionian Region

PER MATRIX CATEGORIES + -	
Per Matrix Categories	Datasets
sediment	263
biota	125
water body	78

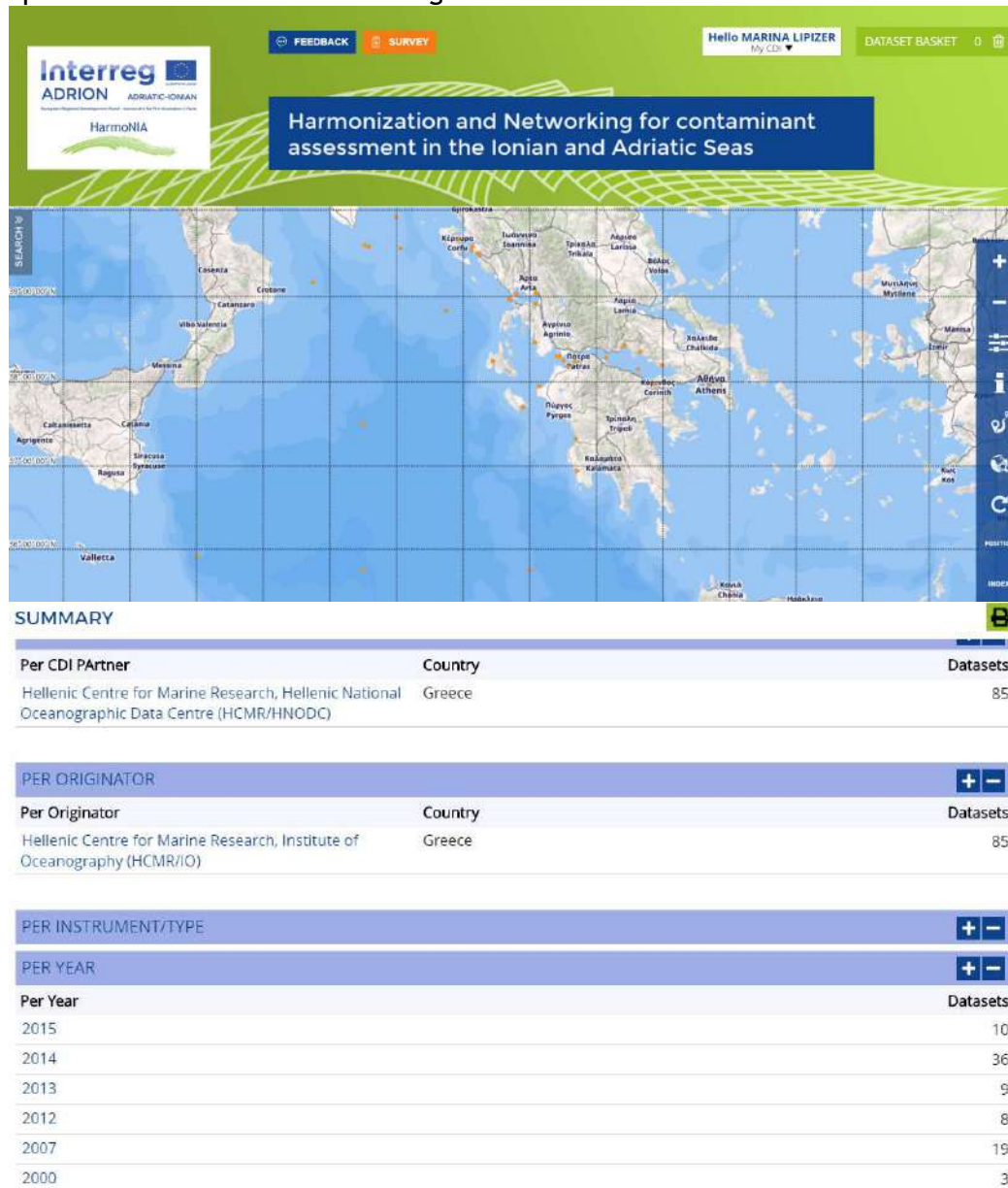
PER GROUPS OF VARIABLES + -	
Per Groups of variables	Datasets
Heavy metals	381
Hydrocarbons	322
Pesticides and biocides	216
Polychlorinated biphenyls	130
Antifoulants	91

Per Discovery Parameter	Datasets
Inorganic chemical composition of sediment or rocks	263
Concentration of polycyclic aromatic hydrocarbons (PAHs) in sediment samples	168
Trace metalloid concentrations in biota	118
Metal concentrations in biota	87
Concentration of other hydrocarbons in the water column	78
Pesticide concentrations in water bodies	78
Concentration of polycyclic aromatic hydrocarbons (PAHs) in biota	76
Concentration of polychlorobiphenyls (PCBs) in sediment samples	73
Organometallic and organometalloid species concentration parameters in sediments	73
Pesticide concentrations in sediment	73
Concentration of other organic contaminants in sediment samples	72
Pesticide concentrations in biota	65
Concentration of polychlorobiphenyls (PCBs) in biota	57
Organometallic species concentration parameters in	18

T2.1.1 - Collection of datasets focused on contaminants in the Adriatic - Ionian Region

PP4: HCMR

Spatial distribution of monitoring stations:



T2.1.1 - Collection of datasets focused on contaminants in the Adriatic - Ionian Region

PER MATRIX CATEGORIES		+ -
Per Matrix Categories		Datasets
water body		60
sediment		17
biota		8

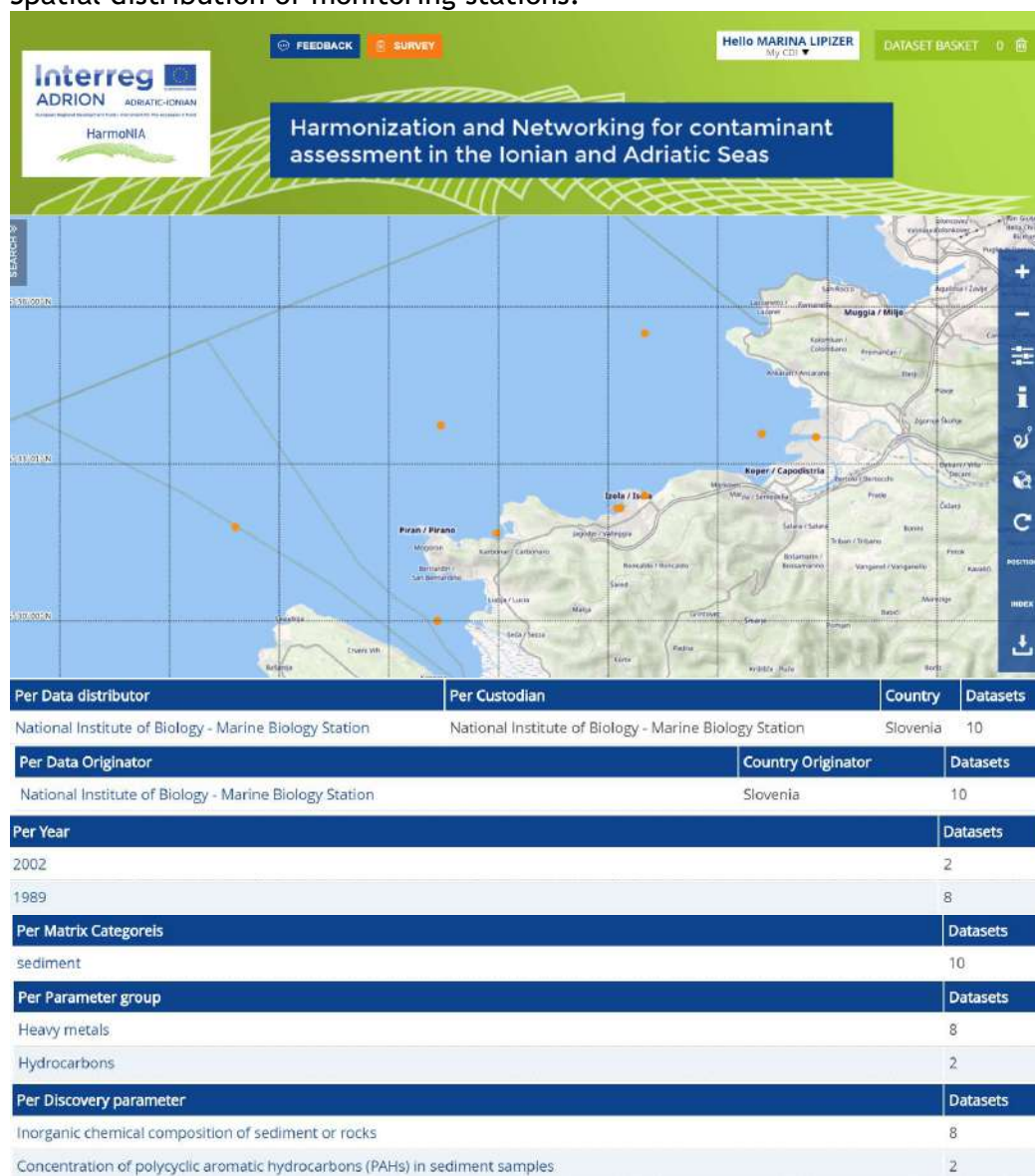
PER GROUPS OF VARIABLES		+ -
Per Groups of variables		Datasets
Heavy metals		70
Hydrocarbons		15
Pesticides and biocides		4
Polychlorinated biphenyls		4

PER DISCOVERY PARAMETER		+ -
Per Discovery Parameter		Datasets
Dissolved metal concentrations in the water column		55
Inorganic chemical composition of sediment or rocks		11
Concentration of aliphatic hydrocarbons in sediment samples		6
Concentration of polycyclic aromatic hydrocarbons (PAHs) in sediment samples		6
Concentration of polycyclic aromatic hydrocarbons (PAHs) in the water column		5
Concentration of polychlorobiphenyls (PCBs) in biota		4
Concentration of polycyclic aromatic hydrocarbons (PAHs) in biota		4
Metal concentrations in biota		4
Pesticide concentrations in biota		4

T2.1.1 - Collection of datasets focused on contaminants in the Adriatic - Ionian Region

PP5: NIB

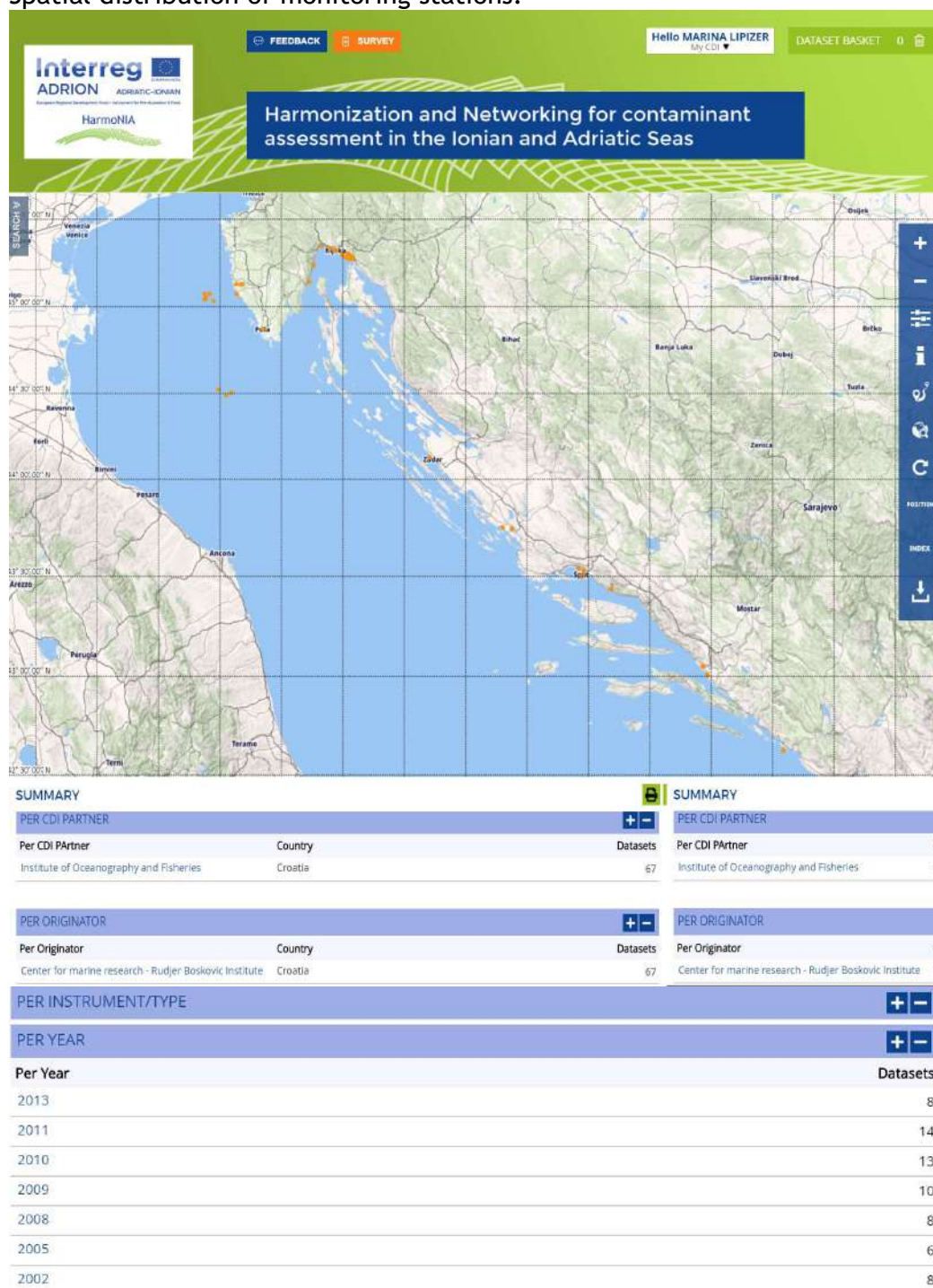
Spatial distribution of monitoring stations:




T2.1.1 - Collection of datasets focused on contaminants in the Adriatic - Ionian Region


PP 6: RBI


Spatial distribution of monitoring stations:



T2.1.1 - Collection of datasets focused on contaminants in the Adriatic - Ionian Region

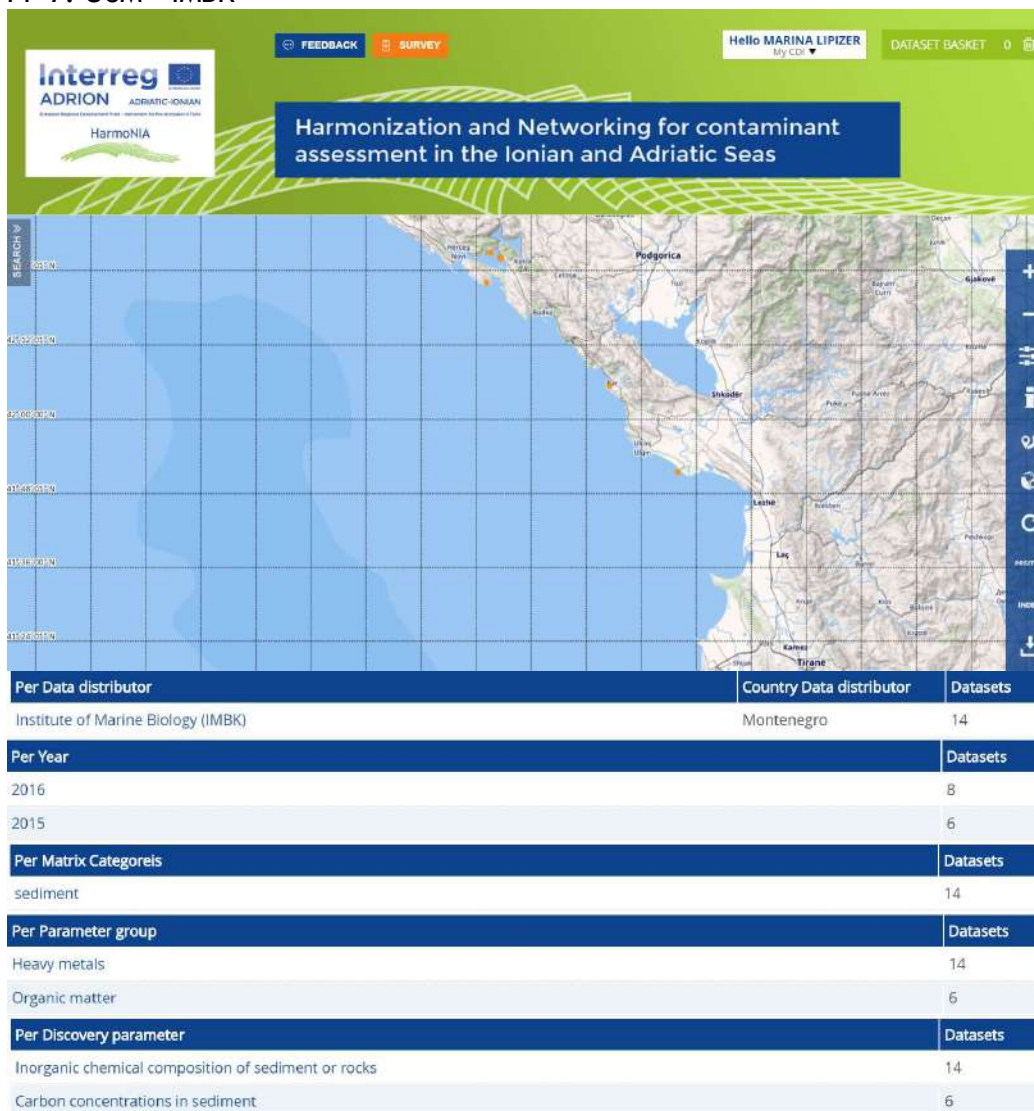
PER MATRIX CATEGORIES 	
Per Matrix Categories	Datasets
biota	50
sediment	26
water body	6

PER GROUPS OF VARIABLES 	
Per Groups of variables	Datasets
Antifoulants	35
Hydrocarbons	29
Heavy metals	19
Pesticides and biocides	10

PER DISCOVERY PARAMETER 	
Per Discovery Parameter	Datasets
Organometallic species concentration parameters in biota	35
Concentration of polycyclic aromatic hydrocarbons (PAHs) in sediment samples	24
Concentration of polycyclic aromatic hydrocarbons (PAHs) in biota	12
Inorganic chemical composition of sediment or rocks	12
Metal concentrations in sediment pore waters	12
Pesticide concentrations in sediment	10
Metal concentrations in biota	9
Concentration of polycyclic aromatic hydrocarbons (PAHs) in the water column	6

T2.1.1 - Collection of datasets focused on contaminants in the Adriatic - Ionian Region

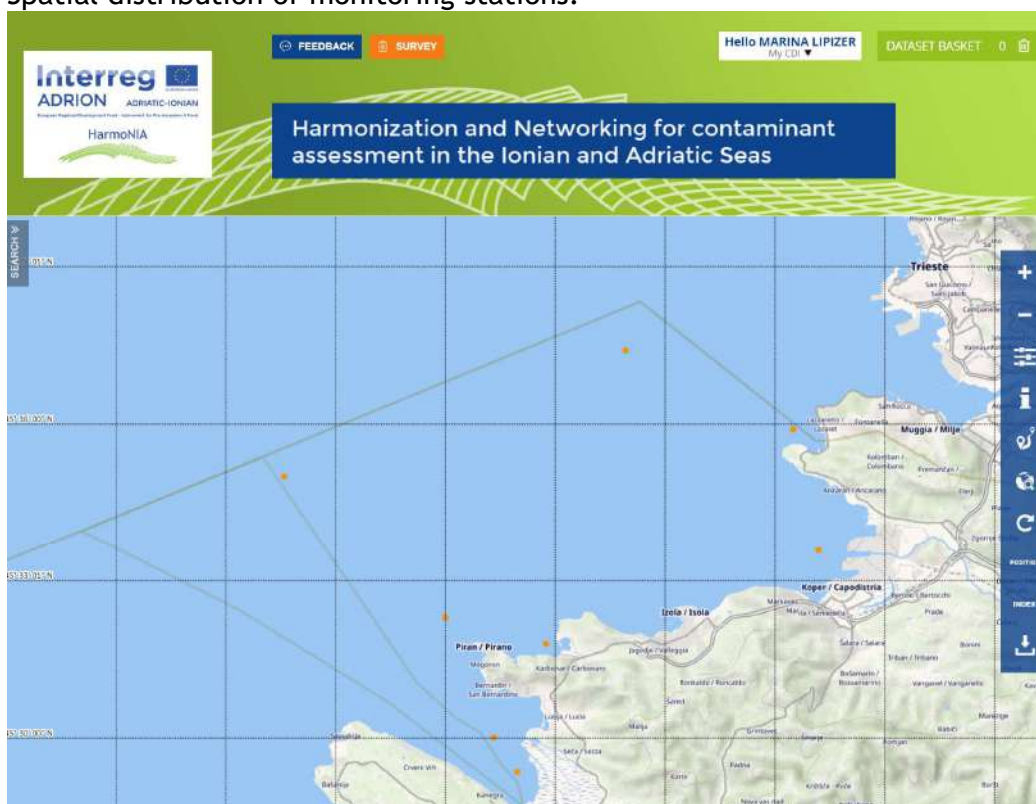
PP 7: UoM - IMBK



T2.1.1 - Collection of datasets focused on contaminants in the Adriatic - Ionian Region

PP9: ARSO

Spatial distribution of monitoring stations:



T2.1.1 - Collection of datasets focused on contaminants in the Adriatic - Ionian Region

SUMMARY



Per CDI Partner	Country	Datasets
National Institute of Biology - Marine Biology Station	Slovenia	513

PER ORIGINATOR



Per Originator	Country	Datasets
Environmental Agency of the Republic of Slovenia	Slovenia	513

PER INSTRUMENT/TYPE



PER YEAR



Per Year	Datasets
2017	75
2016	75
2015	57
2014	78
2013	54
2012	18
2011	78
2010	78

PER MATRIX CATEGORIES



Per Matrix Categories	Datasets
water body	432
sediment	42
biota	39

PER GROUPS OF VARIABLES



Per Groups of variables	Datasets
Heavy metals	429
Antifoulants	281
Hydrocarbons	92
Pesticides and biocides	49
Polychlorinated biphenyls	24

PER DISCOVERY PARAMETER

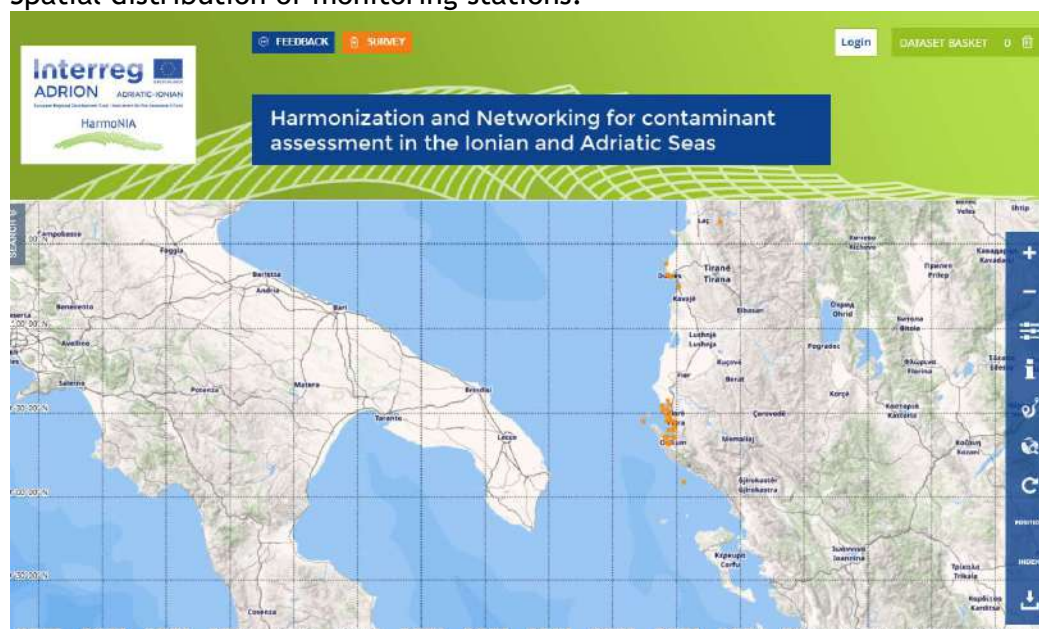


Per Discovery Parameter	Datasets
Dissolved metal concentrations in the water column	360
Organometallic and organometalloid species concentration parameters in water bodies	252
Concentration of polycyclic aromatic hydrocarbons (PAHs) in sediment samples	42
Metal concentrations in biota	39
Concentration of polycyclic aromatic hydrocarbons (PAHs) in the water column	32
Inorganic chemical composition of sediment or rocks	30
Pesticide concentrations in water bodies	28
Concentration of other hydrocarbons in the water column	24
Concentration of other organic contaminants in the water column	24
Concentration of polychlorobiphenyls (PCBs) in the water column	24
Concentration of polycyclic aromatic hydrocarbons (PAHs) in biota	18
Organometallic and organometalloid species concentration parameters in sediments	17
Pesticide concentrations in biota	15
Concentration of other organic contaminants in biota	12
Organometallic species concentration parameters in biota	12
Pesticide concentrations in sediment	6

T2.1.1 - Collection of datasets focused on contaminants in the Adriatic - Ionian Region

PP10: AUT

Spatial distribution of monitoring stations:



Per Data Originator	Country Originator	Datasets
University of Tirana, Faculty of natural Sciences	Albania	32
Agriculture University of Tirana	Albania	28
University of Vlora	Albania	18

Per Year	Datasets
2015	10
2014	8
2012	6
2011	28
2009	5
2008	6
2005	1
2004	10
2002	4

MATRIX CATEGORIES





Per Matrix Categories	Datasets
water body	40
sediment	38

GROUPS OF VARIABLES



Per Parameter group	Datasets
Heavy metals	78
Hydrocarbons	40
Pesticides and biocides	40

T2.1.1 - Collection of datasets focused on contaminants in the Adriatic - Ionian Region

DISCOVERY PARAMETER  	
Per Discovery parameter	Datasets
Dissolved metal concentrations in the water column	40
Particulate metal concentrations in the water column	40
Total metal concentrations in water bodies	40
Pesticide concentrations in water bodies	40
Concentration of other organic contaminants in the water column	40
Inorganic chemical composition of sediment or rocks	38