

# EMODnet Ingestion and safe-keeping of marine data

2nd Annual Interim Report

Reporting Period: 19/05/2017 - 19/05/2018

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### 1. Executive summary (750 words max)

The 'EMODnet Ingestion and safe-keeping of marine data' project seeks to identify and reach out to organisations from research, public, and private sectors who are holding marine datasets and who are not yet connected and contributing to the existing marine data management infrastructures which are driving EMODnet. Those potential data providers should be motivated and supported to release their datasets for safekeeping and subsequent freely distribution and publication through EMODnet.

The new project started 19<sup>th</sup> May 2016 and is undertaken by a European consortium of 44 organisations from 29 coastal countries. Most partners are established data centres and the consortium also includes coordinators of the EMODnet thematic data portal projects.

The emphasis of activities in the first year has been put towards developing the EMODnet Data Ingestion portal and its services for ingesting and publishing data sets, developing the pathways for processing and elaborating of data submissions, laying a basis for promotion and marketing activities, and making an initial inventory of potential data sources and their providers.

The <u>EMODnet Data Ingestion portal</u> has been launched early February 2017. It encourages data providers to share marine data and provides a <u>submission service</u> and marine data management guidance information<u>https://www.emodnet-ingestion.eu/guidelines</u>. It aims at organisations not yet routinely submitting data sets to national data centres and not yet used to marine data management practices and standards.

A low threshold is offered by splitting the completion of the submission form in 2 parts, whereby a data submitter only completes a part of the metadata together with the uploading of a data package. Each data submission is assigned to a competent data centre for completing the metadata of the submission. Those complete submissions are then published with their data packages **'as is'** at the portal in the <u>View</u> <u>Submissions service</u>, where users can search, browse and download the data packages.

As a next step assigned data centres elaborate selected submissions further to make (subsets of) the data fit for population into national, European and EMODnet thematic portals. This includes activities like review, validation, conversions to local formats, and further population to the relevant European infrastructures such as SeaDataNet, EurOBIS, and others depending of the theme which feed into EMODnet data portals. This EMODnet Ingestion process is indicated in the following image.



EMODnet Ingestion is provided with a network of qualified data centres that are divided over many European countries and expert in EMODnet data themes. Currently this network comprises 49 data centres, recruited from the EMODnet Ingestion project consortium and the EMODnet thematic networks.

The portal, its range of services and procedures have been refined and tuned following increased use by submitters and data centres. Also good progress has been made with the Sensor web Enablement prototype for ingesting operational oceanography stations and their data strreams.

However in the second year most of the efforts was dedicated to marketing and outreach activities in order to promote the EMODnet Ingestion initiative and to gain momentum with the submission service and its processing chain of pathways. For that purpose promotional materials have been created such as leaflets, bookmarks, posters, stickers, roll-up infographic, standard presentations, and an excellent animation. EMODnet Ingestion has been presented at many European and international occasions, in particular by EMODnet Thematic coordinators, EMODnet Secretariate, EuroGOOS, and at meetings of relevant EU projects like SeaDataCloud, AtlantOS, EuroARGO, ODIP II, CMEMS, and promotional texts and web links have been integrated in each of the EMODnet portals.

This has been complemented with national promotion and outreach activities by each of the EMODnet Ingestion consortium members which act as EMODnet ambassadors. They have given a follow up to the earlier inventory of potential sources by actively approaching and motivating potential data holders and giving them support for making data submissions. And they have organised or planned national meetings in order to make more organisations in their countries aware of EMODnet and ready for EMODnet Ingestion. This campaign is ongoing and has so far resulted in a substantial number of portal visitors (monthly average of **8.000 – 9.000** unique visitors), more than 1250 views of the Ingestion animation, and a increasing population of the Submission service and the View Submissions service. At 1st September 2017 there were only **11** submissions and none published. At the end of the 2nd year, 19th May 2018, there were already **175** submissions of which **163** published 'as is' and of these **13** also ingested into European portals. There is now excellent pace because at 15th June 2018 there are **204** submissions with **182** published '*as is*' and of these already **24** ingested into European portals. With the



coming summer holiday period this might slow down, but gives good promises for the rest of the 3rd year.



Image: EMODnet Data Ingestion movie on a mobile phone.



### 2. Highlights of the reporting period

- The first annual progress report was prepared by the project coordination team and accepted by EASME and EU DG MARE. As a follow up all consortium members have received their financial share of the 1<sup>st</sup> payment tranche.
- The **Data Wanted service** has been launched at the portal in September 2017 allowing any user to formulate and post requests for data sets they are looking for. So far this has resulted in **7** post-its.
- The View Submissions service (aka Summary Records service) has been publicly launched at the portal early October 2017 with the first three submission metadata forms and their data sets which can be downloaded 'as is'. From that point onwards there has been a steady increase of the number of published submissions. At the end of the second reporting period, 19 May 2018, there are 163 submissions published and available for discovery and downloading by users. Almost one month later this has increased to 182 published submissions.
- The network of qualified data centres has been expanded and currently counts 49 data centres from EU countries and for the different EMODnet themes. They have been recruited from the EMODnet Ingestion consortium and from the EMODnet thematic consortia with support of the Thematic coordinators. These data centres and their experts have been entered into the Data Centre matrix table in the Submission service, from which MARIS and HCMR as 'masters' can select and assign data centres to submissions considering country and theme.
- The **Submission service** has been fine tuned, following the use experiences by data submitters and assigned data centres, and has been made ready in November 2017 for phase 2 which concerns entering the URLs of portals where elaborated data sets might be found and entering DOIs for submitted scientific data sets, where available.
- The View Submissions service and its exchange mechanism with the Submission service have also been upgraded to handle the extra information from phase 2 submissions. The first phase 2 submissions were completed by assigned data centres during March 2018. At the end of the second reporting period, 19 May 2018, data sets from 13 submissions have been elaborated, included in national data repositories, and populated into the European data infrastructures that feed into EMODnet portals. Almost one month later this has increased to 24 completed phase 2 submissions.



- The EMODnet Ingestion portal has been maintained and upgraded, integrating the 2 new services (View Submissions and Data Wanted) and adopting the new EMODnet styling instructions as received from the EMODnet Secretariate. The section on ingesting operational oceanography has been updated in dialogue with the Copernicus CMEMS-INSTAC, EuroGOOS and EMODnet Physics. As a result the CMEMS-INSTAC portal now also promotes using the EMODnet Ingestion service at its <u>Submit data section</u>.
- The technical set-up of the Sensor Web Enablement (SWE) pilot of EMODnet Ingestion and EMODnet Physics concerning real time oceanographic monitoring systems, allowing direct standardised access to selected data types from selected monitoring instruments, has been finalised end March 2018. SWE profiles (SensorML and O&M templates) for selected platforms and sensors have been formulated in synergy with other projects such as 'AtlantOS', 'BRIDGES', 'ODIP II', and 'SeaDataCloud'. The (N)RT oceanographic data streams from a number of operators can now be discovered and viewed through a <u>Pilot Viewing Service</u> which is hosted at the EMODnet Physics portal and advertised at the EMODnet Ingestion and EMODnet Physics portals. Using the SWE pilot and SWE standards promotion is being made for uptake of SWE by operators for real time data exchange. In this frame dedicated workshops were held for the Irish and UK observing community in February 2018 in Ireland and for the Polish observing community in April 2018 in Poland.
- The EMODnet Ingestion animation movie 'Wake up your data' has been finalised and with great success publicly launched in a cooperation with the EMODnet Secretariat early November 2017. The movie is posted on YouTube and prominent links can be found at the EMODnet Central and EMODnet Ingestion portals. So far more than 1250 views have been registered.
- EMODnet Ingestion was promoted at several events, such as the Oceanology International 2018
   exhibition in London United Kingdom, both at stands of MARIS and of the EMODnet
   Secretariate, and as part of presentations for Ocean-ICT-Expo, the EMODnet Bathymetry
   Workshop, and the SWE Workshop.
- The 3rd EMODnet Ingestion project plenary meeting was held 16 17 April 2018 in Barcelona, Spain, hosted by CSIC, and was devoted largely to presenting and discussing progress, success factors, and plans by each of the EMODnet 'ambassadors' for marketing EMODnet and reaching out to potential data providers for joining the EMODnet Ingestion process.



### 3. Challenges encountered

The following challenges have been encountered in the second year of the project. These have been discussed between partners and solved as can be seen in the table below.

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Partner	Challenges encountered	Short description	Measures to address challenges
MARIS - HCMR	Organising engagement of all EMODnet Data Centres	Data will be submitted for various countries and data themes. The aim is that the pathways involve qualified national data centres for all themes.	Engagement of all data centres as involved in the EMODnet thematic networks is pursued. This has been promoted at the plenary meetings of each of the EMODnet thematic lots. Follow-up for registration and instructions has taken place between coordinators and individual data centres. This has so far resulted in 49 data centres that are engaged in the pathways of the submission service. Representatives from all thematic networks are involved. The test submission service facilitates data centres to practise with the submission process and how to treat submissions. More activity is planned to enlarge the network.
All data centres	Handling and elaborating ingested data sets at phase II	Data sets will be ingested by various organisations that are not used to prevailing standards and this will most likely complicate elaboration.	Data submitters are coupled to qualified data centres that already have experience and various internal tools for processing and digesting a range of formats. The data centres will be in dialogue with data submitters. The portal gives guidance information about common standards and practices. It is aimed for that data providers become more educated over time in order to streamline the pathway process. In the 2nd year several data centres have been activated for handling and elaborating submissions. At first there were many questions about the process, roles, and required handling. Overtime a routine is establishing and also better understanding, both at the data centres and the masters. Also it has led to revisions in the submission service in order to make it smoother and overcoming early bugs.



### 4. Allocation of project resources

The following tables give the expenditure per partner per task and per work package over the second year. From the tables it appears that the coordinating team of MARIS and HCMR have spent somewhat the same in the second year as in the first year. The first year the focus was most on the technical developments, while in the second year it was more on driving the marketing and gaining momentum with submissions. The spending of the other consortium members has geared up considerably in the second year, dedicated to the marketing and outreach activities and operating the pathways for incoming data sets.

The spending in the 2nd year is given in the table below:

												TOTAL EXP 2 <sup>nd</sup>	TOTAL
		WP0			v	VP1		WF	22	WP3	WP4	year	BUDGET
	Task 7. Tuning with EMODn et commu nity	Task 10. Servic e contin uity	Task 11. Projec t Mana geme nt	Task 1. Web- portal	Task 5. Data Submi ssion and Tracki ng servic e	Task 6. Data Wante d service	Task 8. Summa ry Record s service	Task 2. Pathway s for deliverin g data to final reposito ries	Task 4. Help- service	Task 3. Machine -to- machine transfers	Task 9. Outrea ch activiti es		
MARIS	0.26	0.07	0.40	0.15	0.15	0.60	0.10	0.40	0.10	0.25	0.30	2.78	6.19
HCMR	0.12	0.07	0.20	0.00	0.60	0.00	0.05	0.95	0.00	0.00	0.19	2.18	6.19
IFREMER					0.12	0.20	0.00	0.69	0.20	0.30	0.27	1.78	4.34
NERC- BODC					0.12			0.65		0.50	0.19	1.45	2.97
NERC-BGS					0.12			0.94			0.47	1.53	3.09
BSH					0.12			1.01			0.43	1.56	2.97
SMHI					0.12			0.68			0.37	1.17	2.47
IEO					0.12			0.76		0.20	0.20	1.28	2.47
OGS - NODC					0.12			0.86		0.40	0.23	1.61	3.09
OGS-IRI								0.51			0.20	0.71	1.24
RIHMI- WDC								0.73			0.13	0.86	1.48
ENEA								0.66			0.19	0.85	1.48
INGV					0.12			0.44			0.20	0.76	1.48
METU- IMS								0.77			0.10	0.87	1.48
AWI					0.12			0.82			0.21	1.15	2.47
ULG					0.12			0.66			0.10	0.88	1.48
IMR					0.12			0.84			0.27	1.23	2.47
AU-DCE					0.12			0.94			0.26	1.31	2.47
ICES					0.12			1.00			0.39	1.51	2.97



												TOTAL EXP 2 <sup>nd</sup>	TOTAL
		WP0		WP1				w	2	WP3	WP4	year	BUDGET
	Task 7. Tuning with EMODn et commu	Task 10. Servic e contin uity	Task 11. Projec t Mana geme	Task 1. Web- portal	Task 5. Data Submi ssion and	Task 6. Data Wante d service	Task 8. Summa ry Record s service	Task 2. Pathway s for deliverin g data to final	Task 4. Help- service	Task 3. Machine -to- machine transfers	Task 9. Outrea ch activiti es		
	nity		nt		Tracki ng servic e			reposito ries					
МІ								0.61			0.24	0.84	1.48
IHPT								0.73			0.14	0.86	1.48
NIOZ								0.59			0.25	0.84	1.48
RBINS					0.12			0.79			0.72	1.63	3.22
VLIZ					0.12			1.29			0.23	1.64	3.09
MRI								0.70			0.16	0.86	1.48
FMI								0.64			0.21	0.85	1.48
MSI								0.61			0.12	0.72	1.24
LHEI								0.61			0.11	0.72	1.24
SIO-RAS								0.63			0.10	0.73	1.24
IO-BAS								0.70			0.16	0.86	1.48
NIMRD								0.74			0.13	0.86	1.48
TSU-DNA								0.64			0.09	0.73	1.24
IOF								0.71			0.15	0.86	1.48
NIB								0.54		0.10	0.16	0.80	1.48
IOI-MOC								0.37			0.31	0.68	1.24
ORION								0.71			0.15	0.86	1.48
IOLR								0.67			0.18	0.85	1.48
CNR								0.37		0.20	0.17	0.74	1.48
CSIC								0.42		0.15	0.23	0.80	1.48
SHOM					0.12			0.98			0.36	1.46	3.09
Deltares					0.12			0.79			0.17	1.08	1.98
COGEA					0.12			0.83			0.40	1.34	3.09
ETT					0.12			0.29		1.00	0.27	1.68	3.09
GTK								0.58			0.26	0.84	1.48
GEUS								0.55			0.28	0.83	1.48
RWS								0.46			0.24	0.70	1.24
TOTALS	0.38	0.14	0.60	0.15	3.03	0.80	0.15	31.88	0.30	3.10	10.58	51.10	100.00
		WP0			WP1				2	WP3	WP4	TOTAL EXP	TOTAL BUDGET
	1.12				4	1.13		32.	18	3.10	10.58	51.10	100.00



The next table gives the overall expenditure in the second year per Work Package.

	Ехр	Budget
WPO: Project Management	1.12	3.14
WP1: Construct and operate central Data		
Ingestion portal with services	4.13	14.81
WP2: Implement pathways to forward submitted		
data to the appropriate repository	32.18	54.33
WP3: Facilitate machine-to-machine transfers	3.10	6.49
WP4: Marketing and outreach activities	10.58	21.23
TOTALS	51.11	100

The next table gives the overall expenditure after two years per Work Package.

												TOTAL EXP AFTER	
		WP0			WP	1		w	2	WP3	WP4	2 YEARS	TOTAL BUDGET
	Task 7. Tuning with EMODn et commu nity	Task 10. Service continu ity	Task 11. Project Manag ement	Task 1. Web- portal	Task 5. Data Submissi on and Tracking service	Task 6. Data Want ed servic e	Task 8. Summa ry Record s service	Task 2. Pathway s for deliverin g data to final reposito ries	Task 4. Help- service	Task 3. Machin e-to- machin e transfe rs	Task 9. Outrea ch activiti es		
MARIS	0.52	0.07	0.90	0.90	0.65	0.60	0.30	0.55	0.10	0.50	0.45	5.54	6.19
HCMR	0.24	0.07	0.45	0.10	2.40	0.00	0.10	1.10	0.00	0.00	0.34	4.80	6.19
IFREMER					0.24	0.20	0.00	0.79	0.55	0.40	0.37	2.55	4.34
NERC- BODC					0.24			0.85		1.00	0.44	2.52	2.97
NERC-BGS					0.24			1.04			0.57	1.85	3.09
BSH					0.24			1.06			0.53	1.83	2.97
SMHI					0.24			0.73			0.47	1.44	2.47
IEO					0.24			0.81		0.25	0.30	1.60	2.47
OGS - NODC					0.24			0.91		0.45	0.33	1.93	3.09
OGS-IRI								0.56			0.30	0.86	1.24
RIHMI- WDC								0.78			0.23	1.01	1.48
ENEA								0.71			0.29	1.00	1.48
INGV					0.24			0.49			0.30	1.03	1.48
METU- IMS								0.82			0.20	1.02	1.48
AWI					0.24			0.87			0.31	1.42	2.47



												TOTAL EXP	
												2	TOTAL
	Task 7	WP0 Task	Task	Task 1	WP Task 5	1 Task	Task 8	WI Task 2	72 Task 4	WP3 Task 3	WP4 Task 9	YEARS	BUDGET
	Tuning with EMODn et commu nity	10. Service continu ity	11. Project Manag ement	Web- portal	Data Submissi on and Tracking service	6. Data Want ed servic e	Summa ry Record s service	Pathway s for deliverin g data to final reposito ries	Help- service	Machin e-to- machin e transfe rs	Outrea ch activiti es		
ULG					0.24			0.71			0.20	1.15	1.48
IMR					0.24			0.89			0.37	1.50	2.47
AU-DCE					0.24			0.99			0.36	1.58	2.47
ICES					0.24			1.05			0.49	1.78	2.97
мі								0.66			0.34	0.99	1.48
IHPT								0.78			0.24	1.01	1.48
NIOZ								0.64			0.35	0.99	1.48
RBINS					0.24			0.84			1.52	2.60	3.22
VLIZ					0.24			1.39			0.33	1.96	3.09
MRI								0.75			0.26	1.01	1.48
FMI								0.69			0.31	1.00	1.48
MSI								0.66			0.22	0.87	1.24
LHEI								0.66			0.21	0.87	1.24
SIO-RAS								0.68			0.20	0.88	1.24
IO-BAS								0.75			0.26	1.01	1.48
NIMRD								0.79			0.23	1.01	1.48
TSU-DNA								0.69			0.19	0.88	1.24
IOF								0.76			0.25	1.01	1.48
NIB								0.59		0.10	0.26	0.95	1.48
IOI-MOC								0.42			0.41	0.83	1.24
ORION								0.76			0.25	1.01	1.48
IOLR								0.72			0.28	1.00	1.48
CNR								0.42		0.25	0.27	0.94	1.48
CSIC								0.47		0.20	0.33	1.00	1.48
SHOM					0.24			1.08			0.46	1.78	3.09
Deltares					0.24			0.99			0.42	1.65	1.98
COGEA					0.24			0.93			0.50	1.66	3.09
ETT					0.24			0.39		1.40	0.37	2.40	3.09
GTK								0.68			0.36	1.04	1.48
GEUS								0.60			0.38	0.98	1.48
RWS								0.51			0.34	0.85	1.24
TOTALS	0.76	0.14	1.35	1.00	7.61	0.80	0.40	35.03	0.65	4.55	16.28	68.56	100.00



	WP0	_		WP	1	_	wi	P2	WP3	WP4	TOTAL EXP AFTER 2 YEARS	TOTAL BUDGET
Task 7. Tuning with EMODn et commu nity	Task 10. Service continu ity	Task 11. Project Manag ement	Task 1. Web- portal	Task 5. Data Submissi on and Tracking service	Task 6. Data Want ed servic e	Task 8. Summa ry Record s service	Task 2. Pathway s for deliverin g data to final reposito ries	Task 4. Help- service	Task 3. Machin e-to- machin e transfe rs	Task 9. Outrea ch activiti es		
WPO			WP1			w	P2	WP3	WP4	TOTAL EXP	TOTAL BUDGET	
	2.25			9.8	1		35.	68	4.55	16.28	68.56	100.00

The next table gives the overall expenditure after two years per Work Package.

	Ехр	Budget
WP0: Project Management	2.25	3.14
WP1: Construct and operate central Data		
Ingestion portal with services	9.81	14.81
WP2: Implement pathways to forward submitted		
data to the appropriate repository	35.68	54.33
WP3: Facilitate machine-to-machine transfers	4.55	6.49
WP4: Marketing and outreach activities	16.28	21.23
TOTALS	68.56	100



# 5. Progress in work packages and related tasks

#### Introduction:

The EU Tender specifications requested the following Tasks:

Task 1	Construct a web-portal
Task 2	Implement pathways for delivering data to final repositories
Task 3	Facilitate machine-to-machine transfers
Task 4	Operate a help-service for users to provide their data in the most appropriate
	format
Task 5	Allow providers of data to track the progress of their data from submission
	through to their storage in a repository
Task 6	Include a 'data wanted' function that allows users seeking certain types of
	information to specify their needs
Task 7	Participate in discussions with EMODnet partners in order to improve the
	efficiency of the whole collection, assembly and dissemination process
Task 8	Maintain a summary record of data delivered
Task 9	Engage in outreach activities towards significant holders of marine data whose
	data are not yet already available
Task 10	Service continuity
Task 11	Project Management

The EMODnet Ingestion consortium proposed a Work Plan that groups specific tasks, comparable in nature, under the same Work Packages (WP), also to make the execution with the large consortium easier and more effective.

Work Package No.	Work Package title	Covering tasks	WP leader
WP0	Project Management	Task 7 – EMODnet tuning Task 10 – service continuity	MARIS
		, Task 11 – Project Management	



Work	Work Package title	Covering tasks	WP leader	
Package				
No.				
WP1	Construct and operate central	Task 1 - web-portal	HCMR	
	Data Ingestion portal with	Task 5 – tracking service		
	services	Task 6 – data wanted service		
		Task 8 – summary service		
WP2	Implement and operate	Task 2 – pathways	IFREMER	
	pathways	Task 4 – help service		
WP3	Facilitate machine-to-machine	Task 3 – machine-to-machine	ETT	
	transfers			
WP4	Marketing and outreach	Task 9 - outreach	RBINS	

Progress on the Work packages and related tasks are described in the following pages.



#### WP0 – Project Management:

The EMODNet Data Ingestion project is undertaken by a European network of 44 organisations (governmental departments, marine research institutes and SME's) from 29 coastal countries, comprising 32 full partners and 12 sub-contractors, including 1 international organisation (ICES). Geographically the network has nodes in the countries around all European marine basins and it covers also all EMODnet data themes. Most partners are data centres and can be qualified as National Oceanographic Data Centres (NODC) or as National Geological Surveys or as National Hydrographic Agencies. Moreover the consortium includes the coordinators of the EMODnet thematic data portal projects for Bathymetry, Geology, Biology, Physics, Chemistry and Human Activities.

WPO aims at managing and coordinating all project activities, ensuring timely delivery and high quality of results and products, and at maintaining collaboration and tuning with the overall EMODnet project organization.

An extranet had been set up in the first year and is used to manage all project documents concerning contractual affairs, project activities and minutes and presentations of project meetings. The extranet can be reached through the EMODnet Ingestion portal (<u>http://www.emodnet-ingestion.eu</u>) and all consortium members have logon details for their account.

Furthermore mailing lists are in use to support internal communication:

- <u>cg@emodnet-ingestion.eu</u> for all consortium members
- <u>twg@emodnet-ingestion.eu</u> for TWG members

In particular the consortium mailing list has been used regularly by the Coordination team to give guidance and suggestions to consortium partners about the ongoing and planned activities and to clear up any questions.

The 3rd EMODnet Ingestion project plenary meeting was held 16 – 17 April 2018 in Barcelona, Spain, hosted by CSIC, and was devoted largely to presenting and discussing progress, success factors, and plans by each of the EMODnet 'ambassadors' for marketing EMODnet and reaching out to potential data providers for joining the EMODnet Ingestion process. All presentations of the meeting as well as minutes and list of actions have been made available at the extranet.

A progress meeting took place 14th February 2018 between EMODnet and Copernicus CMEMS with participation of EMODnet Ingestion partners MARIS, OGS, IFREMER, EuroGOOS and ETT, representatives of EU EASME, DG-MARE, and DG GROW, EMODnet Secretariat, and representatives of CMEMS to discuss cooperation and synergy options between EMODnet and CMEMS. This also included a discussion how CMEMS INSTAC might make use of EMODnet Ingestion and not promoting their own ingestion service.



Later a follow-up was given by MARIS, IFREMER, EuroGOOS, and ETT which has resulted in adoption of EMODnet Ingestion by CMEMS INSTAC as channel for data submissions. This is now promoted at the <u>CMEMS INSTAC portal</u>.

MARIS participated in 2 EMODnet Steering Committee meetings where presentations were given of the project progress and discussions took place about tuning with the EMODnet Thematic portals. A further follow up was given by EMODnet Thematic projects for Geology, Physics and Seabed Habitats for advertising the EMODnet Ingestion portal at their portals and at their project meetings to recruit members of their thematic networks as qualified data centres for handling ingested data sets. This has been successful and the ingestion data centres matrix now counts 49 data centres qualified for the different EMODnet themes.

RBINS and VLIZ participated in the preparatory meeting and actual workshop of the EMODnet's Open Sea Lab Kickoff Event (hackaton) representing also EMODnet Ingestion.

The following table gives a summary overview of the meetings in the second year which are relevant for the management and coordination of the EMODnet Ingestion project and its synergy and tuning of its activities with EMODnet overall and other EMODnet thematic projects.

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Date	Location	Торіс	Short Description
14 February	Brussels -	EMODnet - CMEMS	Discussing synergy between CMEMS INSTAC and
2018	Belgium	meeting	EMODnet Physics, Chemistry, and Ingestion with
			participation of partners MARIS, IFREMER, OGS, ETT
			and EuroGOOS
21 – 23	Majorca -	EMODnet Steering	Participation and presentation of progress.
March 2018	Spain	Committee meeting	
16 – 17 April	Barcelona -	2nd EMODnet	Presentations and discussions on progress with
2018	Spain	Ingestion	project activities, in particular with marketing,
		Projectgroup	outreach and submissions. Planning further activities.
		meeting	
		-	

As part of the contract there are several reporting obligations, which are fulfilled by MARIS. In the second year the following reports have been prepared, submitted and accepted by the EU (EASME and DG MARE) and the EMODnet Secretariat:

- First Annual progress report for the period of 19 May 2017 to 19 May 2017. Also a complete follow-up has been given to the payment received by the EU for the 1st year, gathering bank details and arranging bank transfers to all partners and subcontractors.
- Quarterly progress reports for the following time periods:
  - Report 4: 1/04/2017 30/06/2017
  - Report 5: 1/07/2017 30/09/2017
  - Report 6: 1/10/2017 31/12/2017
  - Report 7: 1/01/2018 31/03/2018



# *WP1 – Construct and operate central Data Ingestion portal with services:*

WP1 aims at developing and operating the EMODnet Data Ingestion portal with services that facilitate data holders from public and private sectors to submit marine data sets and provide data management guidance, generating indicators about the performance, and upgrading the portal and services gradually on the basis of user feedback. In the first year of the project major progress has been made with developing and launching the EMODnet Data Ingestion portal and most of its planned services. The initial portal was launched in February 2017.

The **Data Submission service** is a core service of the EMODnet Ingestion portal. This was launched together with the portal in February 2017 as part of the overall portal launch. Distinction is made between 2 phases in the life cycle of a data submission:

- **Phase I**: from data submission to publishing 'as is'
- **Phase II**: further elaboration and integration (of subsets) in national, European and EMODnet thematic portals

At the start the Submision service was ready for phase I submissions. In May 2017 a TEST Submission service has been developed and released as a complete copy of the system in order to facilitate training by the Data Centres in the operation of the system and to get used to the roles of Data Submitter and Data Centre. Otherwise the production system would have to handle a lot of test submissions which would 'pollute' the actual contents. The test system is available at: <u>http://submission-test.emodnet-ingestion.eu</u>

The use of the test system was intensified by several Data Centres and this brought forward a number of feedbacks. This concerned feedback about bugs, unclear instructions, and suggestions for improvements. An upgrading of the service has been undertaken where possible and useful, following the use experiences by data submitters and assigned data centres. The Submission service has also been made ready in November 2017 for phase 2 which concerns entering the URLs of portals where elaborated data sets might be found and entering DOIs for submitted scientific data sets, where available.



EMODnet DATA ING Wake up your date Data Submission	ESTION PORTAL	22	$\langle 0 \rangle \rangle$				
A DASHBOARD   BACK TO LIST			WELCOME	DICK M.A. SCHAAP (M)   LOGOUT			
Process Info Orga	Dataset Identification	Data Types	Locations & Dates	Data Links & Finish			
				* = Required			
Title of dataset * ()	2011-GEMS, Zone 8 - Bristol Channel Atlar	ntic Array, Metocean asse	essment				
Narrative summary of dataset * • GEMS Survey Ltd. (GEMS) was awarded a contract by Channel Energy Limited to undertake metocean data collection in the Bristol Channel as part of the Atlantic Array wind farm development project. The scope of work includes the deployment of two acoustic wave and current (AWAC) units and one Directional Waverider Buoy. Ancillary work includes water and sediment sampling and water profiling. Following non-recovery of AWAC devices, TRIAXYS Directional Wave buoys were utilised for the rest of the survey. This series contains both reports and datasets associated with the Metocean Assessment.							
L							
DATASET FORMATS Dataset format * 0	Text or Plaintext						

Image: Screenshot from the online Submission service

Following the ToR the resulting metadata forms and associated data packages of phase 1 and 2 are to be made publicly available by means of the Summary Records service. For that purpose the **View Submissions service** (aka Summary Records service) has been developed and publicly launched at the portal early October 2017 with a first 'harvest' of three submission metadata forms and their data sets which can be downloaded '*as is*'. From that point onwards there has been a steady increase of the number of published submissions as will be reported under key indicators.

The **View Submissions service** as developed and operated by MARIS is regularly fed by harvesting JSON output from the **Submission service** as technically developed and operated by HCMR. In February 2018 the View Submission service has been upgraded to handle the extra information from phase 2 submissions. The first phase 2 submissions were completed by assigned data centres during March 2018. The service works with a facet search and the latest submissionms are displayed on top of the list. The facet search makes it easy to oversee the contents of the database by a number of facets such as sea area, observation type, parameters, instrument type, platform type, project/programme, data originator, data holder, and country. In addition users can search for time period, geographical lat-lon box, and full free search. Each facet indicates its number of hits. Clicking on a facet gives downdrilling



whereby the number of hits of all other facets are refreshed dynamically. This way a user can oversee what is in the database and can make his/her searches efficiently.

	DATA	INGESTION I	Search		Q				
ЕМОС	Wake up yo	Wake up your data - set them free for Blue Society						CONTACT US	
ABOUT	DATA SUBMISSION	OPERATIONAL DATA	SUBMISSIONS	GUIDELINES	DATA WANTED	HELP	PROMOTION	CENTRAL POR	TAL

Home / Submissions

#### View submissions

This service allows users to search and download the datasets that have been submitted via the Submission service and that have been reviewed and completed in metadata by assigned data centers. These datasets are published "as-is" and will be further inspected and elaborated, where possible, for uptake in the national and European infrastructures supporting EMODnet.

Filter Search		Found 182 Show (1 - 20) < Prev Next >							
Free search		Results							
Input string	Q	Swedish marine beach litter monitoring data from Kattegat, the Sound and the Baltic Sea 2							
Date [yyyymmdd]		Period: 2012-01-01 - 2017-12-31 Observation type: Pollution							
Date from			31, 4-22						
Date to	Q	Swedish OSPAR data of marine beach litter 2	) alon trans and -						
Geobox North		Period: 2001-01-01 - 2017-12-31 Observation type: Pollution	Goteborg						
West South	East D	Chl_MARE_part1 Period: 2005-04-28 - 2008-03-07 Observation type: Pigments	Portugal Rabat						
Sea areas		Chlorophyll MARE part2							
Black Sea Adriatic Sea Norwegian Sea Alboran Sea	(40) (13) (11) (10)	<ul> <li>Period: 2009-06-15 - 2010-03-18</li> <li>Observation type: Pigments</li> <li>)</li> </ul>	España						
Tyrrhenian Sea	(10)	) Marine Litter in the Croatian Coastal Waters – Sea surface Microplastics	Hrvarska						

Image: Screenshot from the online View Submissions service

Public users can search for submitted data and download these '*as is*'. Moreover it gives users the URLs for phase 2 completed submissions, where the elaborated datasets can be found, if applicable.

Another new service, the **Data Wanted service**, was developed by MARIS and launched at the portal in September 2017. The format for the Data Wanted service is extracted from the format of the View Submissions service. This service facilitates any user to formulate and post requests for data sets they are looking for. Those requests are managed in an online CMS and published as post-its. A registered user can submit multiple posts and, if needed, can disband its posts. All submitted posts are validated by the webmasters before publishing.





Image: Screenshot from the online Data Wanted service

The post-its might challenge potential owners of matching datasets to come forward and as follow-up to ingest their datasets. Also it gives direction to the operators of the Ingestion portal in their searches for additional datasets as they will try to match the posted data requests. The first post-its were completed by EMODnet Thematic coordinators with their requests for additional data sets. Visitors of the service can browse the post-its and can respond. These responses are also managed in the online CMS.

The 2 new services have been integrated by MARIS in the EMODnet Ingestion portal, which required an upgrade of the homepage and menu. Moreover upgrading was done on the portal for adopting the new styling that was developed by TRUST-IT in assignment by the EU for better harmonising the look & feel of the EMODnet portals. Changes included inter alia an updated logo, new topbar and menu design, and adoption of 'open-sans' as font. Moreover in discussion with EuroGOOS and CMEMS INSTAC the pages with information about how to join the European marine data exchange for operational oceanography



were updated. And the position of ingesting operational data in the site map was prioritized to second position after submitting data files. Moreover a banner has been included in the homepage to promote the animation movie 'Wake up your data'.



#### Welcome to the EMODnet Data Ingestion portal

The European Marine Observation and Data Network (EMODnet) consists of more than 160 organisations that together work on assembling, harmonising and making marine data, products and metadata more available to public and private users. This Data Ingestion portal facilitates additional data managers to ingest their marine datasets for further processing, publishing as open data and contributing to applications for society.

#### READ MORE





Submit your data files The online Data Submission service facilitates you to submit marine datasets by completing a form and uploading your data as a file package. The service



Ingest operational data

We are also interested in (Near) Real-Time ((N)RT) data streams from fixed and autonomous ocean observing platforms. This section explains how you



View submissions

View, search and download datasets that have been submitted by data providers using the Data Submission service.

#### Image: impression of the upgraded EMODnet Ingestion portal with banner to the animation

Still remaining as part of Task 6 is the development of an alert function in the **Data Wanted service** to notify users that have posted a request when relevant data has been submitted and published. This requires developing and implementing a 'matching algorithm' between entries in the **Data Wanted service** and those in the **View Submissions service**. This will be developed before the end of 2018.



# WP2 – Implement pathways to forward submitted data to the appropriate repository:

WP2 aims at specifying and implementing pathways for delivering data using the Data Ingestion portal to safe repositories, making use of and streamlining existing pathways where possible, and developing and operating a help service.

As explained in WP1 a distinction is made between 2 phases in the life cycle of a data submission:

- Phase I: from data submission to publishing of the submitted datasets package 'as is'
- **Phase II**: further elaboration of the datasets package and integration (of subsets) in national, European and EMODnet thematic portals.

The related processing steps to go from submission to publishing in EMODnet portals are considered '**pathways**'. Part 1 submission forms with data packages as received through the Data Submission service are assigned by the masters MARIS and HCMR to one of the members of the EMODnet Ingestion network of qualified data centres depending on the country of the data provider and the type of EMODnet theme of the data. For the pathways the principle is applied, where possible, that data from originators should be managed by data centres in their own country. This contributes to a greater acceptance, increased opportunity of success and encourages a longer term perspective for the ingestion service. Assigned data centres will first of all give a follow-up, if needed in dialogue with the data providers, for reviewing part 1 and completing part 2 of the submission form in order to achieve phase I publishing in the View Submissions service. Where possible this will be followed by validating and processing the received data packages to common standards for uptake and long term storage in their data centres. From there the elaborated data sets will also be populated in relevant European infrastructures that are feeding into the EMODnet Data portals.



Image: EMODnet Ingestion workflow from submission to availability in EMODnet

As part of the operation for phase II the assigned data centres will undertake the following steps:



- Retrieve a copy of the new submitted data package with its package metadata from the ingestion service
- First evaluation of type of data, data provider, status of package
- Inclusion in local workflow for validating and processing the data package
- Maintaining status information about workflow in the central Data Tracking service
- Contacting data providers by email or phone in case of questions
- Including the data sets if ok in the local database system
- Making the metadata and data part of their local data discovery and access system, possibly registering a Data Object Identifier (DOI) to a data set or to a group of data sets from the same data provider in case of a scientific data collection as extra encouragement to researchers
- Preparing the metadata and data sets for population into the appropriate European infrastructure such as SeaDataNet, EurOBIS or others
- Undertake final actions for publishing through the appropriate European infrastructure and feeding the related EMODnet portals
- Include the phase II publishing URLs in the submission forms in the Submission Service and the Summary Records service.

Involving only the EMODnet Ingestion consortium is not sufficient to cover most countries and EMODnet themes. Therefore also the groups of Data Centres which are involved in each of the EMODnet Thematic portals have been approached. This way the network of capable data centres can be expanded to cover all themes and a majority of European countries.



Image: involving all EMODnet thematic networks in the Ingestion pathways



As a follow-up MARIS had asked all thematic coordinators to engage their networks in the pathways for EMODnet Ingestion and to bring this forward to their consortium members at their kick-off meetings. The idea received a positive response and it was agreed that each of the EMODnet Thematic lots would include an EMODnet Ingestion presentation at its kick-off meeting to inform their network members and to request cooperation for the pathway tasks. In the first year this was already performed for EMODnet HRSM, EMODnet Physics, EMODnet Chemistry, and EMODnet Human Activities. In the second year this was followed up by EMODnet Geology, and EMODnet Seabed Habitats. The coordinator of Seabed Habitats, JNCC, has even held a training workshop at its project meeting using the test submission service in order to train its members.

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	Search Organization	Search Country			
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	IFREMER / IDM / SISMER - Scientific Information Systems for the SEA	France		EDIT	VIEW
	British Oceanographic Data Centre	United Kingdom		EDIT	VIEW
	British Geological Survey, Edinburgh	United Kingdom		EDIT	VIEW
	Federal Maritime and Hydrographic Agency	Germany		EDIT	VIEW
	Swedish Meteorological and Hydrological Institute	Sweden		EDIT	VIEW
	IEO/Spanish Oceanographic Institute	Spain		EDIT	VIEW
	OGS (Istituto Nazionale di Oceanografia e di Geofisica Sperimentale), Division of Oceanography	Italy		EDIT	VIEW
	OGS (Istituto Nazionale di Oceanografia e di Geofisica Sperimentale), Division of Geophysics	Italy		EDIT	VIEW
	ENEA Centro Ricerche Ambiente Marino - La Spezia	Italy		EDIT	VIEW
Show	ing 1 to 10 of 49 entries		Previo	us 1 2 3	4 5 Next

#### Image: screenshot of the Data Centre Matrix in the Submission service

As a follow-up MARIS has received details of individual data centres with their contacts and has entered these into the Data Centre Matrix of the Submission service. They will be actively involved in the processing of data submissions that are relevant for their expertise and country. It also includes giving



instructions and training in the submission procedures. For that purpose HCMR has drafted concise manuals for Data Submitters and Data Centres for using the Data Submission service. These manuals are posted at the EMODnet Ingestion portal and are very useful as instruction material to users of the Submission service. The Data Centre Matrix of engaged data centres currently counts **49** qualified data centres. All relevant EMODnet themes are covered. Some centres can stand-in for multiple countries.

On behalf of the European Geological Data Infrastructure (EGDI) as being developed and operated by the network of marine geological surveys in Europe, it has been decided that partner GEUS (Denmark) will function as EMODnet Ingestion data centre for completing and processing marine geology data set submissions and if possible, making these fit for publishing in EGDI. This in complement to capabilities at national data centres for handling marine geological data sets.

Comparable 'safety nets' have been agreed for marine biological data whereby VLIZ on behalf of EurOBIS will complement national capabilities of the EMODnet Ingestion data centres network, for bathymetric data whereby Shom will play this role, and for seabed habitats data whereby this role is divided over regions with each region having a leading data centre.

#### **Optimising pathways:**

In France there is a national science ingestion portal active: 'SEANOE - Sea scientific open data publication' at <u>www.seanoe.org</u>, which is operated by IFREMER. It started in 2015 and now has > 300 entries. It has been agreed with IFREMER to work on a (semi-)automatic coupling of SEANOE and EMODnet Ingestion, so that (selected) scientific submissions from SEANOE will be harvested by EMODnet Ingestion for further metadata completion, publishing 'as-is', and elaboration of data sets for inclusion and publishing in national and European portals. There can be cooperation with the SeaDataCloud project where it is considered how SEANOE can be applied for generating DOI landing pages for scientific papers and associated data collections.

A comparable initiative has been earlier agreed with the United Kingdom where Crown Estate has set up and operates the portal <u>www.marinedataexchange.co.uk</u>. In deliberation with BODC and Crown Estate further analysis is planned for a (semi-)automatic harvesting from the UK portal to EMODnet Ingestion.

In the meantime both IFREMER and BODC have made some manual selections and submissions from these portals. Further analysis for improving these pathways is planned in the third year.

#### Help desk:

The Help desk service was already launched in the first reporting year and it has operated without issues in the second year. Only a limited number of requests was received and answered. Chapter 9 gives an overview of these communications.



#### Activities for processing submissions and elaborating submitted data sets:

During the second reporting year excellent momentum has been gained with achieving data submissions and with completing these by assigned data centres to be published 'as is' in the View Submissions service. Moreover already many submitted data packages have been elaborated and populated into European data infrastructures driving EMODnet portals. The momentum has been gained under influence of the considerable marketing and outreach activities that have been undertaken by the EMODnet Ingestion consortium members. These activities will be reported under WP4 while the achieved submissions will be reported in the chapter on key indicators.



#### WP3 – Facilitate machine-to-machine transfers:

WP3 aims at facilitating faster availability of data by establishing direct connections between monitoring stations and repositories and towards EMODnet by machine-to-machine transfers and at working out a scenario whereby monitoring data remain at the source repository and are available to EMODnet by services.

The EMODnet Ingestion consortium has proposed to focus this at developments for operational oceanography and for the EMODnet Physics portal. It concerns two separate tasks:

- Establishing new connections to the existing EuroGOOS Copernicus INSTAC Near Real Time (NRT) exchange progress
- Pilot for Real Time (RT) exchange using Sensor Web Enablement (SWE).

#### Near Real Time (NRT) oceanographic data exchange:

The NRT machine-to-machine ingestion aims at identifying and arranging additional NRT data stations for EMODnet Physics. These can originate from additional operators that are willing to get connected and share their NRT data freely in EMODnet Physics. The portal explains how the NRT exchange is organised between operators of observing stations and EuroGOOS – Copernicus and it gives a link to the EMODnet Physics portal to show how NRT stations can be displayed and used.

At the launch of the Ingestion portal in February 2017 already standards and procedure for NRT data and a list of receiving repositories for NRT data had been published at the portal. The portal explained how the NRT exchange is organised between operators of observing stations and EuroGOOS – Copernicus (CMEMS INSTAC) and it gives a link to the EMODnet Physics portal to show how NRT stations can be displayed and used. Moreover a set of stepwise instructions was included in the Ingestion portal explaining how to connect in practice and also a list of EuroGOOS – Copernicus contact persons who to contact depending on region.

In the second reporting year these guidelines and stepwise instructions for observing platform operators have been reviewed and amended in direct communication with CMEMS-INSTAC (Copernicus) and EuroGOOS. The workflow diagram has been amended, whereby it has been agreed that interested operators should contact theCMEMS INSTAC contact at <u>cmems-sevice@ifremer.fr</u> who will then bring the interested operator in contact with the right EuroGOOS – Copernicus contact person. This amendment was needed because it happened that interested operators contacted the wrong contacts which led to complications in the data flows. The amended workflow is given in the image above. It has also been included in the CMEMS INSTAC portal at their data submit page which now promotes the EMODnet Ingestion portal.





Image: amended workflow as published at the EMODnet Ingestion portal

This promotion and invitation has been quite successful and through the collaboration of EMODnet Ingestion and EMODnet Physics the following new NRT stations and operators have come forward and been included by partner ETT in the EMODnet Physics portal.

NRT stations	Operator
30 tide gauge stations of the Italian TideGauge network	ISPRA, Italy
4 fixed stations, 2 gliders, 2 turtles	SOCIB, Spain
High Frequency Radar data at Brest bay: Pointe de	Shom – France
Brézellec- Pointe de Garchine	
23 FerryBox lines (Stenalines)	SMHI - Sweden
10 fixed wind station, 2 HFR	IMR - Norway

In addition several historical datasets for physics have been identified by ETT as coordinator of EMODnet Physics and these have been ingested in the Data Submission service for further processing.

Historical physics datasets	Origin
>1100 sea mammals data, 2004 – 2015,	MEOP group



3 fixed buoys (Civitavecchia, Gaeta), 2012 -2017	University of Tuscia - Italy
HFR data (Naples, Manfredonia, Trieste), RITMARE	CNR ISMAR - Italy
project	
HFR data (MESA, VADE), 2014-2015	SMH - Sweden
Repeated CTD (Galway Bay), 2016-2018	MI - Ireland

These submissions have been assigned to Data Centres and most of the submissions have been completed for phases I and II and can be found in the View Submissions service.

Further promotion towards potential operators is ongoing and implemented as a cooperation between EMODnet Ingestion and EMODnet Physics. For example the following meetings were organised in the framework of this cooperation:

- EuroGOOS and EMODNet Physics Data Workshop, 12 16 February 2018, Galway Ireland, bringing together EMODnet partners EuroGOOS, ETT, BODC and MI with invited UK and Irish oceanography community of CIL, OPW, NUIG, UCC, MaREI, AFBI, MSS, SAMS, MEDIN, SmartBay, and MI;
- SWE Colloquium how to join European operational oceanography, 26 April 2018, Sopot Poland, bringing together EMODnet partners MARIS, BODC, EuroGOOS, ETT, and MI with invited Polish oceanographic community of IMGW, PIG, IO PAN, and MIG. The programme and presentations of this SWE colloquium can be found at the <u>EMODnet Ingestion portal</u>.

More of these Workshops are planned and It is expected it will deliver new NRT operators and/or new NRT stations for EuroGOOS and CMEMS INSTAC, which then become available automatically on the EMODnet physics portal through the existing pathways. In parallel it will deliver new historical oceanography data sets that will go through the Submission service and as part of phase II be populated into SeaDataNet, which then automatically will make these historic data sets also available on the EMODnet physics portal through the existing pathway.

#### Real Time (RT) oceanography data exchange by means of a Sensor Web Enablement pilot:

The **Sensor Web Enablement (SWE) pilot** concerns real time monitoring systems, allowing direct standardised access to selected data types from selected monitoring instruments. There are several subtasks. This activity is led by BODC with contributions from ETT, OGS, IFREMER, MARIS, and 52North. As part of the pilot four SOS servers are connected in a Viewing service:

- **OGS-NODC**: http://nodc.ogs.trieste.it/sos/api/v1/
- IFREMER Oceanotron:

http://151.1.245.87/ifremerproxy/api/services/?expanded=true&locale=en&valueTypes=all



- NeXOS SOS Server: http://nexos.demo.52north.org/52n-sos-nexos-test/api/
- **BODC**: <u>http://linkedsystems.uk/52n-sos-webapp/api/v1/</u> fixed observatory data from historic ANIMATE project.

OGS-NODC provides data and metadata from six fixed monitoring stations located in the Adriatic Sea that provides information on sea physical parameters. The Oceanotron SOS provides data from IFREMER and, in particular, the ArgoNetCDFToProfile dataset that comprises temperature, salinity and conductivity vertical profiles acquired by floats related to the ARGO network. The NeXOS SOS Server offers data acquired by different mobile platforms. BODC offers access to datasets in the form of links. However currently these cannot be displayed in the Client, but will be included in future updates.

The formulating of SWE profiles for the related platforms and sensors has been finalised. This builds on work on-going in related EU projects to define SensorML and O&M templates such as 'AtlantOS', 'BRIDGES', 'ODIP' and "the Marine SWE profiles wiki" as well as in USA for IOOS. The resulting marine SWE profiles for selected platforms and instruments are shared with the SWE marine community using GitHub: <u>https://odip.github.io/MarineProfilesForSWE/</u>

Four types of profiles have been formulated for Version SWE 2.0. Distinction is made in platforms and sensors. Additional distinction is made on models and instances of platforms and sensors. The GitHub site includes a story that narrates how projects, people, technologies and vocabularies were brought together to formulate meaningful and semantically rich profiles for the marine domain. Two of the partners, i.e. OGS and BODC have implemented demonstrators that implement the SWE marine profiles. These demonstrators can be found at:

http://nodc.ogs.trieste.it/sos/client, where OGS publish marine observatories acquiring meteooceanographic data in (near) real time

and

http://linkedsystems.uk/52n-sos-webapp/, where BODC publish historic ANIMATE project data as a demonstrator from placing fixed observatory data on an SOS server.

In order to support new and existing partners to implement the above mentioned profiles, BODC and OGS have also created specific URLs with working examples of sensors described with SensorML following the SWE Marine profiles and can be found at:

- A model of an Aanderaa oxygen optode: http://linkedsystems.uk/system/prototype/TOOL0969 /current/
- An instance of an oxygen optode:
  - http://linkedsystems.uk/system/instance/TOOL0969\_prospect/current/
- An instance of a Wind Monitor-JR: http://europa.ogs.trieste.it/OGS\_SOS/SensorML\_3\_0/Sensor\_V3\_E2M3A\_WIND.xml
- An instance of SBE 37-SMP-ODO MicroCAT high-accuracy conductivity and temperature recorder: http://europa.ogs.trieste.it/OGS\_SOS/SensorML\_3\_0/Sensor\_V3\_E2M3A\_CT.xml



Building upon the SOS servers ETT with support of the other partners has developed the **EMODnet Real Time Oceanographic Data Client:** <u>www.emodnet-physics.eu/RealTime</u>

This is 'advertised' at the EMODnet Physics and EMODnet Ingestion portals. It is a web application that is able to provide (N)RT data and metadata from marine data centers that offer a machine to machine interface based on the Sensor Observation Service (SOS) standard of the Open Geospatial Consortium (OGC). Its goal is to offer a simple point of access to distributed (N)RT data in a transparent way: users can add and/or remove available sensor systems to/from the portal and thus access their data. The following figure shows the logical architecture behind the portal:



Image: EMODnet Real Time System Architecture

EMODnet Real Time is based on Helgoland client that is freely available on Github at https://github.com/52North/js-sensorweb-client.

#### Helgoland SOS viewer:

Helgoland is a software client for visual exploration and analysis of sensor web data developed by 52° North (https://52north.org). It is a lightweight web application that enables the exploration, analysis and visualization of sensor web data in various fields of use, e.g. hydrology, meteorology, environmental



monitoring, traffic management. Using this application, users can easily explore stations or mobile sensor platforms in a map, select time series data by a list selection, visualize time series, trajectory or profile data and explore their metadata. The application is based on HTML, JavaScript and CSS and can connect to different Sensor Web endpoints (REST-APIs). These Sensor Web REST-APIs provide a thin access layer to sensor data via RESTful Web binding with different output formats (e.g. proxy solution is available that allows to encapsulate existing XML-based SOS severs for integration into the Helgoland client). The main features provide by Helgoland are:

- Access to SOS instances (through the proxy solution SOS 1.0.0 and 2.0 as well as specific extensions such as those required by the INSPIRE technical guidance on Download Services are supported)
- Diagram view of multiple time series, profiles, temporal zooming and panning, etc.
- Data export (PDF, Excel, CSV).

#### Sensor Observation Service:

The Helgoland client gives users simple access to SOS instances. SOS – Sensor Observation Service, provides a standardized interface for managing and retrieving metadata and observations from heterogeneous sensor systems. The OGC SOS standard defines a Web service interface that allows querying observations, sensor metadata, as well as representations of observed features. For connecting the Helgoland client to SOS servers, usually these servers need to provide some basic "core" operations.

#### The Pilot RT viewing service:

The main window menu of the **EMODnet Real Time Oceanographic Data Client** allows the user to select the features of interest, in particular different kind of data (time series, profiles, and trajectories), favourites and settings. Selecting a "data type" item, opens a second menu that provides tools for loading, harvesting and browsing data from different data providers (i.e. SOS servers)

EMODnet RealTime	×					A - 1		X
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Image: EMODnet Real Time Menu

#### **Timeseries**

The timeseries item opens the custom menu for browsing timeseries data types with different features such as *diagram, map, ListSelection, permalink.* 





Image: Time Series - Diagram page



Image: Time Series - Map page

#### **Profiles**

The profile section provides features to harvest and view profile data. In the current version of EMODnet Real Time data from the Argo network are available through the OCEANOTRON SOS provided by IFREMER. The submenu offers: *Diagram, Selection.*




#### Image: Profiles – Diagram

## **Trajectories**

The trajectories item opens the custom menu for browsing trajectories data types with different features: *View, Selection.* 



Image: Trajectories – View Page



A detailed guideline has been prepared and published to guide users through the pilot Viewer. These activities have been finalised in March 2018. The demonstrator is open for inserting additional platforms and sensors from other operators.



## WP4 – Marketing and outreach activities:

The aim of WP4 is to market and promote the Data Ingestion service and its function in the overall EMODnet scheme, to identify and reach out to potential data sources and data providers, and to motivate data providers to participate with their data submissions. The first year was mostly devoted to the technical development of the portal and its services and preparing for the wider marketing by the consortium members. Therefore in the first year a dissemination and promotion plan was drafted, detailing target groups of potential data holders, which data types to chase up, and formulating a mix of promotional activities to support the marketing and outreach. In addition a set of promotional items were designed and delivered. Furthermore an inventory was compiled with input of all partners of potential data sources and data providers in each country. This inventory counted a total of 466 potential new data sources from 26 countries. This resulting inventory has been considered as a 'shopping list'.

The second year marked the start and implementation of an extensive promotion and marketing campaign involving all the EMODnet Ingestion members. This has been done in synergy with the central promotion as undertaken by the EMODnet Secretariat and making also use of the EMODnet Thematic networks which are deeply involved in the pathways of processing and uptake of submitted data sets.

The rationale of the marketing and promotion is to engage different communities by understanding their needs and establishing win – win situations. Outreach activities are pointed towards significant holders of marine data whose data are not already available. This is done by central promotion activities and by network activities whereby individual members approach and have dialogues with potential data holders. Also they should give guidance and if needed might help data providers doing submissions on their behalf in order to create low thresholds and to overcome the risk that data providers are made interested but then cannot find time or give priority to the actual submission.

The promotion has been done through presence at various conferences and events such as recently Oceanology International 2018, by Twitter, by the EMODnet portals, by the Ingestion animation, and otherwise. This is resulting in very good web statistics after quite a short period of circa 8.000 - 9.000 portal visitors per month with an average clickrate of 6 pages, while the animation has passed 1.250 views. The network marketing is performed by the EMODnet Ingestion 'ambassadors' with quite some success as can be seen from the scores of of the Submission service which reached more than 160 submissions in May 2018 of which 140 have been published in the View Submissions service. More about these results will be given in the Chapter 8 on performance indicators, while the marketing activities per country will be described at the end of this WP4 paragraph.

## Dissemination and promotion tools:



The dissemination uses a variety of media included promotional items which were designed and produced by partner RBINS. A number were prepared in the first year. Several were added in the second year.

### • Leaflet

The first leaflet was produced by RBINS. It is an A4 (two sided) paper containing information on the project as a whole but also on specific use cases. In the first leaflet this concerns the Netherlands and United Kingdom use cases for marine renewable energy developments. The use case has a data description, an analysis of the problems/obstacles and a solution. This formula can be repeated for future leaflets with different use cases. 4,000 leaflets were printed on a high quality paper and sent to all partners in October 2017 for wider distribution to interested parties at events and meetings. The leaflet is also available as PDF at the portal.



Image: A first leaflet

## • Roll-up infographic

A roll-up infographic has been designed. It is posted as PDF in the promotion section of the portal. Two roll-up banners have been printed and are used by partners when hosting or attending a workshop, an event or a conference. One roll-up banner is hosted at the EMODnet Secretariat



office. The roll up banner is 2 meters high by 70 centimeters wide. This has been used for conferences, workshops and other similar events.



Image: EMODnet Data Ingestion roll up banner

• Animation



The animation movie was finalized and launched on the EMODnet Secretariat YouTube channel on November 7, 2017. The tweet by @EMODnet (> 2,300 followers) announcing the movie (https://twitter.com/EMODnet/status/927801926057709569) was picked up very well and has been retweeted by oa. EASME, ICES, MARS, EuroGOOS, PrimeFish Project, CETAF & AORA. A retweet by @RBINSmuseum (> 10,500 followers) was again retweeted by BELSPO. In the first two weeks after the launch, the movie had over 400 views, after this big surge, the movie currently has achieved more than 1,250 views.

The animation movie has been integrated in the homepages of the EMODnet Ingestion portal and central EMODnet portal.



Image: EMODnet Data Ingestion movie on a mobile phone.

The movie had some pre-screenings before the official launch at following events:

- SeaDataCloud 1st Annual Meeting, 15-19 October 2017, Athens Greece
- o PANACeA, 23-25 October 2017, Barcelona Spain
- o JPI Oceans 2nd conference, 26 October 2017, Lisbon Portugal
- EMODnet Bathymetry Meeting October 2017

The official screening was held during the introduction of the EMODnet Open Sea Lab Bootcamp in Antwerp (Belgium) on 15-17 November 2017.



### • Presentations at external events & conferences

Conferences are a means of developing national and international connections with governmental, non-governmental, industry or academic leaders, and engaging in a direct, face-to-face communications and discourse. In the second year EMODnet partners have presented the EMODnet Data Ingestion service at a large number of relevant events and conferences targeting the marine scientific community at large and specific scientific and industrial sectors. This also includes relevant EU meetings, such as e.g. WG-DIKE (Marine Strategy Framework Directive WG on Data and Information Knowledge Exchange) and the MSP Member States Expert Group. The events and conferences are listed in **Chapter 6** together with Workshops and other types of meetings, organised or joined by EMODnet Ingestion partners and giving opportunities for promoting and marketing EMODnet Ingestion and identifying potential leads.

#### • Workshops

Several EMODnet partners used workshops to discuss, present and help a target audience with the EMODnet Data Ingestion Portal. Workshops were set up at the national level to engage multiple stakeholders, to demonstrate EMODnet thematic portals and the EMODnet Ingestion portal and solicit feedback. Workshops also provide different stakeholders with an opportunity to get together. The held Workshops are listed in **Chapter 6**.

#### • EMODnet Ingestion portal

The portal at <u>https://www.emodnet-ingestion.eu</u> has been upgraded for its homepage and menu. Moreover, upgrading was done on the portal for adopting the new styling that was developed by TRUST-IT in assignment by the EU for better harmonising the look & feel of the EMODnet portals. Changes included inter alia an updated logo, new topbar and menu. The website is continually updated throughout the course of the project, and thus will act as a dynamic and up-to-date source of information for stakeholders interested in open access to research data.





#### Home

#### Welcome to the EMODnet Data Ingestion portal

The European Marine Observation and Data Network (EMODnet) consists of more than 160 organisations that together work on assembling, harmonising and making marine data, products and metadata more available to public and private users. This Data Ingestion portal facilitates additional data managers to ingest their marine datasets for further processing, publishing as open data and contributing to applications for society.

#### READ MORE



*Image: impression of the upgrade of the EMODnet Data Ingestion portal* 

#### Guidance rules and tips:

A number of guidance rules and tips were formulated over time and suggested to the consortium members as ways to take up their marketing and outreach activities. The members should identify potential data providers as organisations that are not yet involved in regular data exchanges with the EMODnet data centres. The overview of thematic data priorities should be taken as a checklist for the searches and identification of potential providers. The consortium members should try to cover input for each theme; however the quality of the inventory of potential data providers is more important than the quantity i.e. number of identified data providers. Quality is depending on judgement of the consortium members concerning the data resources that might be managed, the willingness to cooperate, the possible leverage that might be exercised, the existing contacts through joint projects and networks, and any other relevant criteria. Concerning industry it is not easy to achieve cooperation in releasing data; therefore it is advised to focus and identify for this group data providers and related projects in which the national government might have a form of leverage. For instance various industrial activities at sea require licenses which obligate parties to perform environmental monitoring and to make these data available for public release. Also governmental and controlling bodies often have rights



on all or most of the data collected in the frame of the preparation of licensed activities (*e.g.* geotechnical investigations). However these monitoring and preparatory investigation data might not be published by the related authorities or at their own websites without exchange to your data centres. Concerning research communities there might be research programmes with data acquisition which are funded by the government and for which data management is not yet arranged, but again some form of leverage might be exercised for releasing the data. Or again the data might be published at their websites but not yet shared with your data centres. Concerning government there might be several regional and local bodies that are collecting and managing marine and coastal data sets which are public but not yet exchanged with the data centres.

To gather entries and prepare the national lists it is suggested to brainstorm with colleagues in the organisation as there might be various projects, programmes and networks in which their organisation is involved with potential data providers and through which already established contacts exist. Also colleagues might give suggestions which can be followed up with google searches to get more insight in the potential. Therefore Ingestion members are strongly encouraged to involve colleagues from their wider organisation and not only from their data centre division in the brainstorming and identification process.

To lower the threshold it is recommended that consortium members as 'EMODnet ambassadors' help data providers to undertake the submissions; it even can be that the consortium members make the submissions themselves, of course in full understanding with the data providers as originator and/or data holding organisation.

If it is expected that a data provider will have more and regular data submissions, then effort should be directed towards making the data provider a regular and direct supplier to the data centre of the consortium member or even connect the data provider directly to the European data infrastructure such as node for SeaDataNet, EurOBIS etc. This includes educating and instructing the data providers in standards to be applied and how to get connected. This implicates that a new data provider at first might submit through the Submission Service, to be followed by becoming a direct connected data node. Both achievements are relevant as both result in more data sets available for the community through EMODnet.

The latter also applies to the operational oceanography exchange, whereby the NRT connection through CMEMS INSTAC and EuroGOOS will be direct, while historical time series can be submitted in first instance through the Submission Service.

## Activities per country



## Belgium:

Belgium is represented in EMODnet Ingestion by RBINS and VLIZ. RBINS leads WP4 while VLIZ is coordinating the EMODnet Biology project and operating the EurOBIS infrastructure. Different data providers from industry, academia, research institutions, navy and public sector have been approached to be informed about the EMODnet project and the Ingestion facilities, with different degrees of success.

- International Marine & Dredging Consultants (IMDC) is a partner in the CREST project in which VLIZ also participates. IMDC is a regular user of EMODnet data and has expressed their willingness to collaborate despite there are many difficulties due to data ownership.
- Dredging, Environmental and Marine Engineering NV (DEME) is an EMODnet Associated Partner. An option is data gathered for a beach nourishment project in Nieuwpoort (near-shore hydrographic survey). Follow-up is planned.
- Freshwater Aquaculture (Aqua4C / Omega Baars): It took several attempts and has resulted in release of data for Ingestion.
- The identified Waterbirds Database from **Instituut voor Natuur- en Bosonderzoek (INBO)** is a long term monitoring project on the Belgian Continental Shelf since 1992. Discussions with NBO direct towards a favorable decision. Follow-up is planned.
- The STARESO project by **Université de Liege (Ulg)** and the according RACE database was a possible additional data source. However partial funding was requested for their efforts.
- A successful meeting took place with EGUERMIN (Belgian-Netherlands Naval Mine Warfare School). Possible data submissions concern REMUS100 data, Multi-Beam Echosounder (MBES) data and water column data concerning North Sea, Baltic Sea and Mediterranean Sea. Follow-up is planned because of complexity of dividing between open and restricted.
- VLIZ is collaborating with **CEFAS** to ingest in the EMODnet Biology portal a large dataset of benthic species that originates from over 700 surveys from multiple sources in industry and government spanning over 50 years. This will by-pass the Submission service and be ingested directly into EMODnet Biology..
- EMODnet Biology actively looks for new data providers and for the ingestion of new datasets and has established a data grant programme. This facilitates data delivery from new data providers to EMODnet Biology. This will facilitate a considerable direct ingestion into EMODnet Biology.

EMODnet Ingestion has been promoted in several events with a focus on both the national and international marine community. Since Brussels hosts the official seats of the European Union, they are also well placed to keep promoting EMODnet Ingestion at several international events, in tandem with the EMODnet Secretariat. The events are included in the list in Chapter 6.

## Bulgaria:



Bulgaria is represented in EMODnet Ingestion by IO-BAS. Different data providers have been approached to be informed about the EMODnet project and to cooperate with the Ingestion initiative.

- **Bulgarian Ports Infrastructure (BPI Co.)** manages the infrastructure of the public transport ports of national importance.
- Bulgarian Ship Hydrodynamics Centre (BSHC), Varna. BSHC performs wide spectrum of fundamental and applied research in the fields of ship hydrodynamics, aerodynamics, water transport and energy saving, ocean engineering, sea and river crises and disasters, marine ecology and coastal protection, facilities for fisheries and aquacultures, marine renewable energy sources, technology transfer, national security and defense
- **Marine Sound** is a non-profit organization, which carries out its activity in the public interest. This has resulted in submission of Ferrybox data sets for 2015 and 2016 of which the 2015 data already have been were elaborated by IO-BAS to phase II and are now available in SeaDataNet and EMODnet Physics. The 2016 data processing is underway.
- **Black Sea NGO Network (BSNN)** is a regional association of NGOs from all Black Sea countries. The BSNN members, currently over 60, are brought together by the common concern for the decreasing environmental quality of the Black Sea. They have submitted Marine Litter data from Bulgarian Black Sea beaches which is published.
- **GeoMarine** is leading Bulgarian environmental and sustainability consultant company with more than 20 years of experience in the fields of environmental, health, safety, social and sustainability consulting services. They have submitted data from environmental monitoring activities in Bulgarian waters for a gas pipeline project (South Stream). The data has been processed by IO-BAS to phase II and are now available in SeaDataNet.
- Basin Directorate for Water Management in the Black Sea Region was established by the Minister of Environment and Water in 2002, in accordance with Directive 60/2000 of the European Union and national legislation and regional division of the Ministry.
- Black Sea Danube Association of Research and Development (BDCA) an independent non-profit research organisation a grouping of universities, consultancy, other organisations, and individuals engaged in research, training, engineering and advisory activities in coastal protection against flooding and erosion, construction of harbour and coastal structures, and environmental protection on the western Black sea coast and lower Danube.

EMODnet Ingestion has been promoted in national and European events such as the European Maritime Day 2018 in Burgas – Bulgaria. The events are included in the list in Chapter 6.

## Croatia:

Croatia is represented in EMODnet Ingestion by IOF. Different data providers have been approached to be informed about the EMODnet project and to cooperate with the Ingestion initiative.

• HAOP representatives to discuss possibilities to open MSFD monitoring data for public.



- Centre for Marine Research to discuss submission of their marine data.
- **DVODKUT firm Zagreb** to discuss possible exchange of their data collection in Pelješac Channel
- Institute Rugjer Boskovic and CAEN to discuss possibilities to open MSFD monitoring data for public.
- University of Zagreb to discuss possible exchange of their sea level data sets.

Activities have resulted in submissions for HF radars sea-surface and waves data directly to EMODnet Physics, Phytoplankton, Zooplankton and Benthic data directly to EMODnet Biology, and Underwater noise data sets and Marine litter data to the Submission service. The latter have been published recently.

EMODnet Ingestion has been promoted in national events which are included in the list in Chapter 6.

#### Cyprus:

Cyprus is represented in EMODnet Ingestion by ORION. The activities of ORION have focused on the Cyprus government, in particular:

- Cyprus Ministry of Agriculture, Rural Development and Environment that is involved in the recent offshore energy developments. International Oil & Gas companies are exploring the Cyprus waters for oil & gas resources, and bidding started in 2016. Companies have to submit an Environmental Impact Assessment including performing Environmental Baseline Surveys (EBSs). All data for the EBSs are to be collected by large international consultancies such as Fugro, Gardlines etc in assignment by the Oil & Gas companies. Copies of all data collected have to be submitted by law to the Cyprus Government (Ministry of the Environment). This data collection over 4 years will generate large volumes of data sets (seawater profiles (CTD), sediment sampling (chemical analyses, benthos, etc.), bathymetry, current data, metocean data, etc.). This might represent Terabytes of data. However there are no standards prescribed yet and there is no systematic data management in place for handling and reusing the data sets. Meetings of ORION and MARIS with the Ministry have resulted in interest of Cyprus government for a dedicated Cyprus Offshore Data Management Plan (CODMP) to secure the long term stewardship and availability of the collected data sets in a standardised way for potential user groups. This should use SeaDataNet standards and have synergy with EMODnet Ingestion. A 2-step approach has been proposed of a definition study followed by actual development of an integrated system. Early July 2018 a meeting with all governmental stakeholders is planned to discuss the Terms of Reference for a Cyprus Offshore Data Management System (CODMS) and its development plan.
- **Department of Fishery and Marine Research** that is involved in the national MSFD monitoring. A meeting is planned, following the CODMP meeting where representatives of the Department will be present as stakeholders.



## Denmark:

Denmark is represented in EMODnet Ingestion by Aarhus University (AU-DCE) and GEUS. The latter is technical coordinator of the European Geological Data Infrastructure (EGDI). Different data providers have been approached to be informed about the EMODnet project and to cooperate with the Ingestion initiative.

- Femern A/S is positive towards releasing the large data set from the Femern belt EEA. However they are involved in a legal process in Germany, which delays release. Regular contact is planned.
- **Rambøl A/S**, the consulting company that collected the data for the North Stream pipeline project in the Baltic sea has been contacted without success. Other contacts will be tried. DONG Energy Wind power concerning offshore wind farms
- Danish Coastal Authority concerning beach nourishment
- Vejdirektoratet concerning construction work and bridges
- **ORBICON/NCC/De Cloed** concerning aggregate mapping
- Danish Environmental Agency concerning aggregate mapping.

Activities have resulted so far in data sets from the **COCOA project** of the BONUS program B "Viable ecosystems", funded jointly by the EU and the Danish Research Council that were submitted and processed. It concerns high-frequency measurements of dissolved oxygen, water temperature and salinity of three sites in Roskilde Fjord (Denmark) in 2015. The second set concerns eelgrass campaign oxygen dynamics from the same location and time period. Additional submissions concern **COCOA\_EMB77** nutrients data and **HYPER** hypoxia data of the Baltic. EMODnet Ingestion has been promoted in national events which are included in the list in Chapter 6.

## Estonia:

Estonia is represented in EMODnet Ingestion by TUT Department of Marine Systems (MSI). Different data providers have been approached to be informed about the EMODnet project and to cooperate with the Ingestion initiative. However from the contacts it appeared that most Estonian institutes are already engaged in data submissions to EMODnet through MSI:

- **Maritime Administration** which has bathymetry data sets which are included in EMODnet Bathymetry
- Estonian Environmental Research Centre which has data on dangerous substances and chemistry. MSI is already submitting collected litter data to EMODnet Chemistry
- Estonian Ornithological Society with bird observations. MSI is already sending collected data to EMODnet Biology
- **Pro Mare MTÜ** has seal observations. MSI is already sending collected data to EMODnet Biology
- Environmental Inspectorate has dangerous substances, chemistry, radioactivity data. However no response to MSI requests



• Hoia Eesti Merd MTÜ has litter in coastal areas. MSI is already sending collected litter data to EMODnet Chemistry.

Most are direct submissions and on a regular basis, which is a good thing. Together with the **Estonian Research Centre** a project data set was identified for heavy metals and dioxins that was not yet included. This submission has been completed and published.

## Finland:

Finland is represented in EMODnet Ingestion by GTK and FMI. Different data providers have been approached to be informed about the EMODnet project and to cooperate with the Ingestion initiative.

- LuTU- Baltic Sea group is a team of national experts from the universities, research institutes and authorities who are setting up the assessment of marine habitat types in Finland (2016-2018). Marketing was done in the expert group meetings (2017-2018), also by an EMODnet Data Ingestion presentation.
- Finnish Marine Research Infrastructure (FINMARI) is a cross-institutional consortium of research institutes, universities and a state-owned company, all with a strong interest in marine research. Marketing was done in management group meetings (2017).
- Helsinki University. A lecture on EMODnet was given at the Department of Environmental Sciences.
- **EuroGeoSurveys Marine Geology Expert Group.** Marketing in EGS expert group meeting by means of a presentation.
- Other potential data providers have been contacted via email, phone, and personally in meetings such as Metsähallitus, Parks & Wildlife Finland; Centre for Economic Development, Transport and Environment; Alleco Ltd; Finnish Naval Academy, Research Centre; City of Helsinki; University of Helsinki, Tvärminne Zoological station; Turku University of Applied Sciences.

So far this has resulted in a number of data submissions, such as datasets of the FINMARI infrastructure for the UTO platform (water column temperature and salinity data) and geological data Metsähallitus, Parks & Wildlife Finland, and from Centre for Economic Development, Transport and Environment Finland. Geological data have been submitted directly to GTK, by passing the Submission service. GTK has submitted data to EMODnet Geology. In addition seabed substrate and bathymetry data was submitted. Metsähallitus, Parks & Wildlife Finland, provided this again directly to GTK. These data will be used in scientific projects, but not to EMODnet as the data is restricted. EMODnet Ingestion has been promoted in national events which are included in the list in Chapter 6.

The earlier contact with the BONUS programme secretariate, based in Helsinki – Finland, was activated again and it is considered how several data collections as acquired during BONUS might be ingested in the Data Submission service and worked up to be included in the Data Centres and EMODnet portals.



The BONUS sectretariate has been asked to identify which BONUS datasets might not have been incorporated yet in established Data Centres and thus would have a value as new datasets for the community. An extra difficulty is that the BONUS secretariate only has metadata, while for the data submission support will be required from the data owners in the Baltic region. The first follow-up is expected from BONUS.

## France:

France is represented in EMODnet Ingestion by IFREMER and Shom. In France, most of organizations conducting regularly observations at sea are directly or indirectly involved in EMODNet thematic lots: bathymetry, biology, habitats, physics, chemistry, geology. Data flows are well established, and data from research and hydrographic sectors are already part of EMODnet datasets. That includes data that are collected by monitoring facilities in the scope of Environmental European Directives such as the Water Framework directive and the Marine Strategy Framework Directive. As a consequence, in order to enlarge data sources, specific data providers have been targeted by marketing actions. That are:

- **Major Oil and Gas companies.** However, these companies already report, when public, the marine monitoring data collected by their offshore implementations, using others initiatives such as SIMORC, or alternatively, in some cases, via Copernicus Marine Services.
- **Consultant SME's** that are contracted by national and regional agencies to perform observation at sea for local studies. In this case, data policies and licenses are regulated by the contracts and are not, up to now, in general, released in public domain. However, data policies will certainly evolve in the coming months, as new regulations about data are entering in force.
- **Public bodies** such as Brittany region that drive a lot of local bathymetric and hydrographic surveys in French harbors. However, they are not (yet) willing to make the required effort to submit their data as it has no priority.

The most positive feedback was coming from researchers that are producing data that are not already part of existing data flows, for example:

- Observations that are conducted for specific research objectives and are not part of national or international observation programs,
- Observations that are performed as part on student training sessions at sea,
- Observations using specific instruments and, by the way, specific data formats, that cannot be ingested directly without extra effort in EMODNet thematic lots.

In these cases, the motivation of researchers comes from the obligation, prescribed by the publishers of leading scientific journals, to make available in a permanent archive all data related to a scientific paper. It includes the minting of a DOI (Digital Object Identifier) to cite and to retrieve the related datasets. As a consequence, France has proposed to build a link between some permanent archives and the Ingestion portal. This is described in more detail under WP3.



So far data submissions have been achieved for subsurface currents in the Atlantic, observed using sub surface floats, which is really a unique and valuable datasets; biochemical analyses made in water sampling done during sea cruises in the framework of the GeoTraces international program; CTD data coming from Spain/France vessel shared time and that were not properly incorporated in France or Spain data flows; and bathymetric data that are acquired in routine about French Research Vessel Pourquoi Pas? EMODnet Ingestion has been promoted in national and European events which are included in the list in Chapter 6.

## Georgia:

Georgia is represented in EMODnet Ingestion by TSU-DNA. Different data providers have been approached to be informed about the EMODnet project and to cooperate with the Ingestion initiative.

- **GAMMA Consulting Ltd** that have been conducting long term observations on dynamics of Georgian seashore area of the Black Sea and holds corresponding data in bathymetry. After discussions they have submitted 14 coastal bathymetry data sets which are published.
- Laboratory Research Centre Ltd. located in Port of Poti. After discussions they have submitted 17 nutrients data sets which are published.
- NAPIRDACVA Ltd that holds bathymetric data, has been contacted and negotiations are underway.

## Germany:

Germany is represented in EMODnet Ingestion by BSH - DOD. As the German focal point for oceanographic data, the DOD is in contact with a variety of scientific institutions, who report data of ongoing research and monitoring programs on a regular basis. The DOD uses this standing to follow-up on regular data submissions with all of its frequent contacts and points out the possibility of the low-threshold submission through the EMODnet Ingestion Portal. On the new website of the BSH, which is about to be launched, the EMODnet Ingestion Portal is represented by the EMODnet Logo and a brief description in German as one of the DOD's project activities and also referenced with a direct link to the portal. Different data providers have been approached to be informed about the EMODnet project and to cooperate with the Ingestion initiative.

- Baltic Sea Research Institute Warnemünde (IOW) indicates it is willing to make a large number of datasets available, that are not yet part of any European data infrastructure. Follow-up is planned.
- Biogeochemistry and Marine Chemistry Group at the Hamburg University wants to release data from prof **Uwe Brockmann** which is mainly nutrient data from the North Sea. Follow-up is planned.
- **GEOMAR** considers processing and ingesting monitoring data from the years 1997 2014 from the Labrador Sea. This will require technical assistance by DOD. Follow-up is planned.
- **BSH Offshore Department** is newly formed and deals with biological and geological data from



investigations of designated areas for wind energy parks. A major obstacle is that nearly all data from the official investigations is classified, since this information is a fundamental economic factor in the auctioning process for wind energy licenses within the German Exclusive Economic Zone. Data from the official preliminary investigations for areas that will not be further developed might be declassified at some point and will then be considered for submission.

So far work on data submissions is still in the early stages and a number of submissions have been achieved concerning CTD and nutrient data from Baltic Sea research projects in cooperation with Sweden. EMODnet Ingestion has been promoted in national events which are included in the list in Chapter 6.

## Greece:

Greece is represented in EMODnet Ingestion by HCMR. HCMR contacted several potential data providers. Positive response was received so far from:

• University of Aegean and University of Patras that have agreed to submit unique vector data about seagrass meadows in Greek waters, orthophotomaps of coastal areas, at resolution 30-50 cm, CTD, current meter data and drifters, and bathymetric data. Both providers have been introduced with the procedure and submissions are expected soon.

So far a number of submissions have been achieved concerning CTD and bottle data from national HCMR research projects that were not yet included in the HCMR Data Centre. These submissions have recently been published and are being worked up for inclusion in SeaDataNet. EMODnet Ingestion has been promoted in national and European events which are included in the list in Chapter 6.

## Iceland:

Iceland is represented in EMODnet Ingestion by MFRI. MFRI is leading in marine and freshwater resources in Icelandic waters and the arctic. MFRI has arranged with EMODnet Physics to include real time monitoring stations with coastal temperature thermometers at Reykjavík harbor and Grímsey harbor through Arctic ROOS. Work is now ongoing for publishing more data from coastal thermometers around Iceland through the Submission service and SeaDataNet. These concern time series of some decades which are updated every six months. Icelandic companies and researchers were approached that could have marine data. This will be given a follow-up.

## Ireland:

Ireland is represented in EMODnet Ingestion by MI. They contacted several potential data providers.

- **IDA** which is a Public Sector Bodies Data Collaboration Group with EPA, Met Eireann, CSO, OPW, GSI and NPWS
- Departments within MI
- **NUIG** that manage historic data sets of interest



The activities have resulted so far in a number of submissions for the SmartBay's Galway Bay Observatory CTD data, EPA's eutrophication data, and Kinvara Bay time-series. These have been submitted, published and elaborated for inclusion in SeaDataNet. Moreover agreement was reached about submitting MI's phytoplankton data set, and NUIG's long-term Galway Bay time-series. EMODnet Ingestion has been promoted in national and European events which are included in the list in Chapter 6. This includes the **EuroGOOS and EMODNet Physics Data Workshop**, which was hosted by MI in Galway – Ireland, bringing together EMODnet partners EuroGOOS, ETT, BODC and MI with invited UK and Irish oceanography community of CIL, OPW, NUIG, UCC, MaREI, AFBI, MSS, SAMS, MEDIN, SmartBay, and MI.

## Italy:

Italy is well represented in EMODnet Ingestion by OGS, ETT, ENEA, CNR, INGV and COGEA. ETT is coordinator EMODnet Physics, OGS is coordinator EMODnet Chemistry, and COGEA is coordinator EMODnet Human Activities. They have approached various data providers to inform them about the EMODnet project and to cooperate with the Ingestion initiative.

- EMSO (European Multidisciplinary Seafloor and water column Observatory) ERIC. EMSO consists in a system of regional facilities placed at key sites around Europe, from North East to the Atlantic, through the Mediterranean, to the Black Sea. Observatories are platforms equipped with multiple sensors, placed along the the water column and on the seafloor. They constantly measure different biogeochemical and physical parameters, that address natural hazards, climate change and marine ecosystems. EMSO ERIC is interested in facilitating the integration of EMSO data within EMODnet.
- Environmental Science Department of the University of Bologna, working on different topics (Pollutants data in the Adriatic, Progetto CAMP-Italy, Monitoring Mediterranean Marine Protected Areas, Reef Check Foundation, <u>https://www.reefcheckmed.org/</u>), where informed about EMODnet and the Data Ingestion service.
- **Castalia Consorzio** Stabile S.C.p.A. brings together 33 shipbuilders and companies operating in the territorial and offshore sea, specialised in maritime activities, marine antipollution and emergency services.
- Institutes leading in Italian Marine Strategy project, such as CNR ISMAR and CNR IAMC, and CONISMa, commissioned by the Italian Ministry of Environment MATTM
- Stazione Zoologica di Napoli (SZN) "Anton Dohrn" research community. However they responded that SZN does not release data for portals such as EMODNET, because of the Institution's internal data policy.
- **CNR ISMAR** stated they are willing to provide physical data which will be given a follow-up.
- **CNR IAMC** has provided physical (CTD) data, dedicated to marine pollutant investigation. The data has been submitted and published.



- **Regional Environmental Protection Agency of Emilia Romagna** region (ARPA E-R)
- Università di Roma "Tor Vergata" has released the 2017 monthly global marine phytoplankton production maps, obtained with a neural network model. This has been submitted and is published.
- **University of Pavia** proposes to provide marine mammal beaching data. A NRT connection might be fit as this data is continuously updated.
- ARPA-ER is willing to ingest hydrology data (e.g. river discharge, water levels, precipitation and temperature parameters collected by fixed stations in the Emilia Romagna region). Preferred is an NRT connection with EMODnet Physics. ETT will give a follow-up as part of WP3.
- JRC will collate data on location and production of algae aquaculture establishments in Europe, which was agreed at a workshop organised by the FAO and the COST Association.
  JRC has agreed to submit the data via the Data Ingestion portal for uptake by COGEA for EMODnet Human Activities.

The Italian activities have resulted so far in 28 submissions for a variety of data types such as sea level stations, nutrients observations, and HFR radar stations. These submissions have been processed and are published. Several are also being elaborated for phase II for inclusion in SeaDataNet.

EMODnet Ingestion has been promoted in a range of national and European events which are included in the list in Chapter 6. The Italian partners together are actively planning the EMODnet Italy Day which will take place in June 2018.

## Latvia:

Latvia is represented in EMODnet Ingestion by LHEI. A "round table" meeting was organised at LHEI in September 2017 when plans about the marine habitats monitoring were discussed. It was decided to publish LHEI dataset about marine habitats on Latvian - Lithuanian border in EMODnet Ingestion portal. It will be the first step of LHEI to meet the requirements of EMODnet Sea Habitats and to develop the best approach how to build a database regarding the sea habitat observations. So far 2 datasets were submitted, namely the seabed habitats data set and marine beach litter survey results 2012-2017 for Latvia. The data holder of the latter is **NGO Foundation for Environmental Education — Latvia**. This database is quite extensive and additional information was required as part of the elaboration. The template of beach and waste description as prescribed by EMODnet Chemistry will be completed soon by NGO with LHEI for inclusion in EMODnet Chemistry. LHEI has offered support to other potential data providers in Latvia. As new data provider the **Food and Veterinary Service** was identified. Their data contain information about dioxins and furans, PCB, Hg, Cd and Pb in local fish used for food. This information might be submitted for use by EMODnet Chemistry portal, although first an agreement is



required with the Ministry of Agriculture. EMODnet Ingestion has been promoted in a range of national events which are included in the list in Chapter 6.

## Malta:

Malta is represented in EMODnet Ingestion by the University of Malta (UoM). They have approached various data providers to inform them about the EMODnet project and to cooperate with the Ingestion initiative.

- Environment Resource Authority
- Transport Malta
- Water Services Corporation

These organisations have agreed to provide data for submission. This require support by UoM to convert data to standard data transport formats. So far 4 submissions have been completed and are included in SeaDataNet. EMODnet Ingestion has been promoted in a range of national events which are included in the list in Chapter 6.

## Netherlands:

Netherlands is represented in EMODnet Ingestion by Deltares, NIOZ and Rijkswaterstaat (RWS), while MARIS is EMODnet Ingestion coordinator. Deltares and RWS have focused their activities on the use case of delivering Dutch national monitoring data (Wozep) to EMODnet by means of the Ingestion Service. The licensing process for the planning, construction and operation of offshore wind parks need data and knowledge on the effects on ecology. Rather than performing a monitoring and evaluation for each individual offshore wind park, the Dutch government has set up an integrated monitoring and research program in cooperation with other North Sea countries for all wind parks. The Dutch contribution is the Offshore Wind Ecological Program (Wozep). The monitoring and research is performed by research institutes and commercial consultancy companies. The monitoring data from this Dutch program, and from the other countries are extremely valuable to reuse and it has been agreed to ingest these into the relevant EMODnet portals. RWS and Deltares, together with Wageningen Marine Research, work together on this. RWS as the contractor ensures that data will become available as open data after the monitoring projects are finished. Deltares and Wageningen Marine Research have set up data management processes to facilitate the curation and distribution of monitoring data and to arrange the ingestion to EMODnet via SeaDataNet and EurOBIS.

In practice monitoring data are delivered to Wageningen Marine Research (biological data) or Deltares (biological data and other data). Datasets are standardized to the Dutch AQUO standard, and published as web services. For assimilation into EMODnet, these datasets are submitted to the EMODnet ingestion



portal. After submission, the datasets are elaborated by Deltares for further transformation to a suitable EMODnet format. At the moment, two different work flows are being mobilized for this purpose:

- An AQUO2OBIS transformation will be implemented by VLIZ and Deltares to make the biological data fit for inclusion in EMODnet biology. Data and metadata will be submitted using the EMODnet ingestion portal.
- A SeaDataNet NetCDF file server is developed for other data (concentrations of substances, other observations) at Deltares. Currently, a workflow from regular monitoring data is implemented. Workflows which publish project monitoring data will have to be implemented when required depending on the availability of such data.



Image: Planned pathways for the Wozep data streams

The international cooperation of knowledge and data-exchange related to wind park developments (inclusive ecological effectstudies) started as an informal network (2016/2017) initiated by the Danish government, the so-called Copenhagen-Initiative". In this informal network RWS promoted the use of and delivery of data to EMODnet. At that time also the CEAF working group (*Cumulative Effects Assessment Framework*) started its activities. During this period this informal network transformed to a more regular/formal network under the umbrella of a political declaration. International cooperation (by national funding) on research on the effects of wind parks starting as "The Copenhagen initiative is now, through the Dutch initiative, part of a larger network according to the accomplished "Political declaration on energy cooperation between the North Sea Countries" as a work package in support group I (SG-1). SG-I deals with the development of a common Cumulative Effects Assessment Framework (CEAF) and the data needed for these analyses. The work program of SG-1 contains an explicit reference



to EMODnet and the EMODnet Ingestion project for ingestion, delivery, and interoperability of marine data.

Recently a EMFF-funded MSP project SEANSE was started to develop methodologies to quantify cumulative effects in support to the coordination task of the political declaration (see above). The goals of SEANSE are in short:

- 1. Develop a coherent approach to SEAs (Strategic Environmental Assessment).
- 2. Create a coherent understanding of how and when to use SEA as a support tool for decision making in MSP through knowledge transfer and information exchange between North Sea countries.
- 3. Demonstrate the benefits of the implementation of a coherent SEA approach for the preparation of national MSPs.
- 4. Facilitate the efficient implementation of the "Political Declaration on energy cooperation between the North Seas Countries.

Within SEANSE, case studies are planned for "East-Anglia" and "IJmuiden ver", "Dogger Bank", "German Bight" plus a few smaller cross-boundary areas. To support the use of international data, EMODnet is mentioned specifically as an important source of data in the SEANSE Description of Work. Moreover, it is mentioned that any data generated during the project may be delivered to EMODnet (through the Ingestion portal). There is also a large overlap of partners/institutes between SEANSE and EMODnet Ingestion. SEANSE started in February 2018, and will operate until January 2020. Similar projects as SEANSE operate in other European Marine Regions.

A number of data submissions from Wozep have been completed to the Ingestion portal and are published 'as-is'. These data sets concern bi-valves, pelac fish, demersal fish and gillnets. Deltares is underway with elaborating the metadata and data from the national AQUO standards to the EurOBIS and SeaDataNet standards for inclusion in the EMODnet portals. The AQUO - SeaDataNet conversion procedure will be used for additional Wozep submissions as well as from the nationaal Rijkswaterstaat marine database.

In addition to the use case other potential data sets have been identified, such as project monitoring data from beach nourishment and Rotterdam harbor extension projects. These are mostly ecological data. EMODnet Ingestion has been promoted in a range of national and European events which are included in the list in Chapter 6.

Norway:



Norway is represented in EMODnet Ingestion by IMR. The partners in the Norwegian infrastructure project **NMDC** were contacted and asked for any data that could be submitted to EMODnet Data Ingestion. Four partners so far have replied that their data can be used.

- The plan was to start with **NIVA** chemical data sets. However it appeared that their NMDC data lacked latitude and longitude, which is now being completed.
- **Gabriel** is a measuring station in Store Lungegårdsvann, Bergen. The station is located next to a **Norwegian high school**, who uses the data in Physics lectures. The station measures temperature, wind speed and air pressure. A confirmation is awaited
- Anderaa is a Norwegian company who creates instrument solutions for oceanographic and other environmental measurements. Aanderaa has been contacted and asked for potential data that might be shared.
- The Norwegian Public Roads Administration (NPRA) have wave and current measurements in Bjørnafjorden, Hordaland, Norway. The NPRA plans to build a fixed link carrying the road E39 across Bjørnafjorden in Hordaland, Norway. The fixed link shall cross the 5km wide and up to 600m deep Bjørnafjorden. NPRA has requested information on the hydrographical conditions at the fjord crossing location. Waves, currents, wind, temperature and salinity at multiple locations were measured across the fjord, while tidal measurements were acquired at two locations north and south of the fjord. The data is measured during the period from deployment on 6<sup>th</sup> of January 2015 to 15<sup>th</sup> of April 2017. NPRA has been contacted for their permission.

So far a number of data submissions have been achieved. These concern temperature measurements from the Norwegian aquaculture industry from 2005 to 2017. The Norwegian aquaculture industry is the second biggest export industry in Norway and it consists of more than 1000 fish farms spread out along the coastline of Norway. Another concerns HF radar data and wind mast data from the Norwegian Meteorological Institute. The HF radar data is measurement of ocean velocity that are radial in direction relative to the radar location and representative of the upper 0.3-2.5 meters of the ocean. The data is owned by the Norwegian Metorological Institute (MET), who is a member of the Norwegian national infrastructure NMDC. In the near future, MET will make the data available for download through the NMDC.no portal. Another potential submission concerns CTD data from the company Petroleum Geo-Services ASA (PGS) covering the last 10 years. PGS deliver services to companies in the oil and gas industry worldwide. They provide a broad range of reservoir and seismic services. The CTD data is used for a better sound velocity in the water when shooting seismics. Unfortunately the license PGS has set on the data is Creative Commons – Attribution – NonCommercial – ShareAlike (BY-NC-SA). This license is not supported by EMODnet Data Ingestion. Currently, IMR is discussing with PGS to use a more open license, which they hopefully will agree on. PGS have more data including other data types, that might be interesting and could be submitted to EMODnet Data Ingestion. EMODnet Ingestion has been



promoted at the annual meeting of NMDC which includes 16 institutes from Norway. The event is included in the list in Chapter 6.

## Portugal:

Portugal is represented in EMODnet Ingestion by IHPT. IHPT at first did a mailshot to 38 identified contacts. However this appeared not to be successful at all. Therefore a more personal approach was adopted. Contact was made with 2 Navy departments:

- **Submarines squadron** which manage CTD data. There are some confidentiality issues which have not been solved yet.
- Information Analysis Department which manages AIS data. They are positive but need help for the actual submission. Follow-up is planned.
- The **CoResyf Coastal Waters Research Synergy Framework project** was positive towards submitting **s**ome satellite based bathymetry. Follow-up is planned.

So far two submissions have been achieved and published. These concern chlorophyll-A data from the University of Lisbon. Currently it is explored who in the network can assist for the phase II elaboration as IHPT has no chlorophyll experience. EMODnet Ingestion has been promoted at a national event which is included in the list in Chapter 6.

## Romania:

Romania is represented in EMODnet Ingestion by NIMRD. They contacted a number of potential data providers.

- **Maritime Hydrographic Directorate** who manage temperature, salinity, and currents data sets. There seems a low probability of releasing the data.
- **NGO Mare Nostrum** who has data about Cetaceans (dolphins) and Beach Litter. They are positive and follow-up is planned.
- **NIMRD researchers** who manage T & S sets which are not yet included in the NIMRD NODC. These data sets have been submitted and are published.

EMODnet Ingestion has been promoted at national events which are included in the list in Chapter 6.

## Russia:

Russia is represented in EMODnet Ingestion by RIHMI-WDC and SIO-RAS. They have approached nearly 50 organizations, such as 12 organizations of Roshydromet, 5 organizations of RAS, 3 organization of Russian Navy, 4 organizations of Fisheries Agency, and 17 potential data providers in the field of oceanography within the framework of the operation of the National ESIMO system. These contacts have so far resulted in 9 submissions concerning pollution data, hydrometeo data, and chemistry data. The submissions have been published and a number of been elaborated to phase II for inclusion in



SeaDataNet. EMODnet Ingestion has been promoted at a national event which are included in the list in Chapter 6.

### Slovenia:

Slovenia is represented in EMODnet Ingestion by NIB. They contacted a number of potential data providers.

- **Geodetic Institute of Slovenia** (bathymetry, coastal mapping). This was positive and submissions have been achieved.
- Geological\_Survey of Slovenia (sedimentological data, drills) no information received so far
- **DeFishGear project** (microplastics). Positive and working on gathering data for submission.
- **Slovenian Environmental Agency** (T,S, Silicate, Phosphate, Nitrite, Nitrate, Ammonium, DO). SEA is still deciding on submission mode.
- Institute for Water of the Republic of Slovenia (beach litter) This was positive and submission has been achieved.
- Fisheries Research Institute of Slovenia (socio-economic data on marine fisheries). Needs to be discussed.
- Slovenian Environmental Agency (aquaculture). This was positive and submission has been achieved.
- **Port of Koper** (dredged areas, dredged material amount). Positive and working on gathering data for submission.
- **Port of Koper** (transhipment, maritime cargo, passengers). Positive and working on gathering data for submission.
- The **Institute for the Protection of Cultural Heritage of Slovenia** (ship wrecks, submerged archaeology and landscapes) Positive and has agreed to prepare a submission soon.
- National Institute of Biology (seabed habitats) Has agreed to submit at the end of summer 2018.

So far submissions have been achieved and published for beach Litter in the Slovenia Coastal Waters and Marine Aquaculture Areas in Slovenian Territorial Waters. EMODnet Ingestion has been promoted at 2 national events which are included in the list in Chapter 6.

#### Spain:

Spain is represented in EMODnet Ingestion by CSIC and IEO. They approached several potential data providers in the research and industry sectors to inform them about the EMODnet project and to cooperate with the Ingestion initiative. Following the response there were dialogues with:

• **ESGEMAR S.A**. It is an SMR dedicated to marine geological studies and it operates in a diverse range of areas and sectors from marine technical assistance, support, training and research.



- CSIC- Spanish national Research Council. CSIC comprises different institutes and scientific groups distributed throughout Spain. Contacts were with the Continental Margins Group-GMC and Renewable Marine Resources Resources Department from ICM-CSIC; Marine Geoscience department from IACT-CSIC; the Faculty of Geology and CEAMA from University of Granada; Faculty of Marine Sciences from the University of Vigo; and Faculty of Marine Sciences from University of Cádiz.
- **IEO departments** that are managing a wide range of marine science, although many are already organised through the Spanish NODC at IEO.

Several submissions have been achieved and most concern bathymetry data sets from ESGEMAR; GMC-ICM; IACT-CSIC and CEAMA; and University of Granada. The others have confirmed their contribution and are preparing data for submission (University of Cádiz and Vigo). Currently 19 submissions have been published for bathymetry, physical oceanography and marine geology data sets. Follow up to phase II is underway for inclusion in EMODnet Bathymetry and other relevant EMODnet portals. EMODnet Ingestion has been promoted at national events which are included in the list in Chapter 6.

#### Sweden:

Sweden is represented in EMODnet Ingestion by SMHI. They initially collated an inventory with 25 potential new data suppliers/data sets of which 18 were prioritized considering EMODnet. SMHI has approached the data providers, although with varying success. In addition new potential data sources were identified at the **County Administration Boards** along the coast (~20) and **universities.** A number of national events were organized to inform about EMODnet and to encourage data holders to share their marine data through the Ingestion initiative. These events are included in the list in Chapter 6.

So far 8 submissions have been achieved and published concerning physical (HFR), biological, and chemical data sets. More submissions are planned following the marketing and meeting with County Administration Boards.

#### Turkey:

Turkey is represented in EMODnet Ingestion by METU-IMS. They have approached a number of potential data holders in Turkey to discuss sharing marine data through EMODnet Ingestion.

- Marine Research Centre (MTA), who collect and manage data about Marine Geology, Geophysics, Bathymetry, and Physical Oceanography. A cooperation protocol will be signed between METU-MTA and as follow-up submissions are planned, starting with CTD data.
- Ministry of Environment and Urbanisation, who are in charge of pollution, eutrophication and ecological quality monitoring and assessment (M&A) in all Turkish Seas (including coastal and marine waters) compliant with the requirements of Regional Seas Conventions, national needs and related EU Directives (WFD & MSFD). They conduct bi-annual monitoring surveys in winter and summer at > 250 stations. The actual monitoring is performed by TÜBİTAK MAM, METU, and İU. METU is now working on a cooperation protocol for publishing data.



- TR Research & Development, is a company developing AUV & Gliders for geophysical (e.g. Multibeam Bathymetry, Side Scan Sonar) and oceanographic (CTD, Dissolved Oxygen, pH, Redox) data acquisition. There exists a collaboration between TR and METU for common scientific projects. A start will be made with T & S data.
- **Kyrenia University and Near East University**, who have a partnership with METU in scientific projects in the Cilician Basin and Levantine sea region. The first submission has been achieved and published for Kyrenia Time Series with CTDs in 2015.

## United Kingdom:

United Kingdom is represented in EMODnet Ingestion by NERC-BGS and NERC-BODC. Both are closely involved in the Marine Environmental Data and Information Network (MEDIN), which continues to act as a central hub for UK marine data. MEDIN has a network of Data Archive Centres (DACs); in addition to BGS and BODC, this includes DASSH (species and habitats) and the Met Office (marine meteorology) amongst others. BGS is also liaison to EMODnet Geology and has extended its marketing to the European marine geology community by means of several presentations at European events. There were events with MAREMAP, Marine Alliance for Science and Technology for Scotland (MASTS) and Scottish Alliance for Geoscience, Environment and Society (SAGES) communities. The MAREMAP network comprises a large number of research, governments and industry organisations. Through the presentations, e-mails and direct marketing contacts a large community was reached. As a follow-up dialogues have started with:

- **Peel Ports**: BODC and OceanWise met to explore providing NRT tide gauge data from Peel Ports Liverpool sites to EMODnet Physics, and delayed-mode data via BODC. OceanWise handles these data on behalf of Peel Ports at several UK locations and Peel Ports are willing to make data more easily available to the scientific community. Some further investigation is required to check that the data are of sufficient quality and include all of the recommended metadata. Some of these sites are long time series, and BODC already holds some of the historical data.
- Marine Scotland Science (MSS): there is a possibility of data from coastal monitoring stations and CTD sections being made available, subject to resource being available at MSS, Aberdeen. Further discussions will clarify this.
- Western Channel Observatory (WCO): Initial discussions with the operators of the Western Channel Observatory have been quite positive. This should result in near real time physical data from the long term E1 and L4 sites, offshore from Plymouth in the English Channel, becoming available to EMODnet Physics. The delayed-mode quality controlled data are already archived at BODC. Further discussions are planned.





- Channel Coastal Observatory (CCO): Initial discussions with the operator took place. CCO is responsible for 14 tide gauges and is willing to share the historical data and to continue to supply quality controlled data in the future. Real time data from a few sites is already available from the EMODnet Physics site. Further discussions with CCO will determine whether data from other sites can be made available. Initial discussions have also taken place regarding backscatter and seismic data.
- Agri-Food and Biosciences Institute (AFBI): Several coastal monitoring time series may be available in the coming year. AFBI are leading a recently launched EU INTERREG project, COMPASS (Collaborative Oceanography and Monitoring for Protected Areas and SpecieS), which includes data management. Thus onward supply of AFBI data to recognised data centres (e.g. BODC, BGS and DASSH), potentially via EMODnet Data Ingestion, is anticipated.
- **Crown Estate Scotland**: initial discussions about Scottish renewables data took place and further dialogue is planned.
- Scottish marine environmental data: discussions with Joint Nature Conservation Committee (JNCC), Scottish Natural Heritage (SNH) and Marine Scotland have taken place regarding MPA (Marine Protected Area) and other data. BGS plan to follow up these initial discussions.
- Hartley Anderson: initial discussion held with this potential data supplier.

Progress was made with the use case for the **Marine Data Exchange (MDE)** which has been set-up by the Crown Estate (TCE). As part of its active management of the UK seabed, offshore renewable energy developers provide data to The Crown Estate and this is freely available through the Marine Data Exchange (MDE). MDE was developed in 2012 and provides a platform to store, manage and share the data collected during the planning, building and operation of offshore renewable energy projects. BODC has been working with TCE to make a sample of these data available through EMODnet Data Ingestion as a proof of concept, but in the longer term a strategy is required to provide a machine to machine link between the MDE metadata and the Ingestion Portal. Progress so far has seen one dataset, from the Bristol Channel Atlantic Array currently being progressed through both Phase 1 and Phase 2, with 12 CDIs now available from the SeaDataNet data portal. Metadata and data for several more MDE metadata for data sets relevant to DASSH and BGS will soon be added to the Data Ingestion Portal. In addition, at the request of TCE, BODC have assisted with the submission of five shapefiles through Phase 1, for onward transmission to EMODnet Human Activities. As indicated a number of national and European events have been joined to inform participants about EMODnet and to encourage data holders to share their marine data through the Ingestion initiative. These events are included in the list in Chapter 6.

## **Overview of data providers**

The second year reporting period runs till 19 May 2018 and at that time there were **175** submissions achieved of which **163** were completed and published in the View Submissions service (aka Summary



service). Chapter 8 'Updates on performance indicators' gives a detailed analysis and evaluation of the submissions. The table below gives a summary table of the actual data providers of the 163 completed and published data submissions.

									Hum	Seab
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	EDMO-			Phy	mist	Biol	hym	Geo	Activ	Habit
Name	code	Sector	Country	sics	ry	ogy	etry	logy	ities	ats
GeoMarine Ltd.	4730	Company	Bulgaria	1						
Black Sea NGO Network	1165	NGO	Bulgaria		1					
NGO MARINE SOUND	4727	NGO	Bulgaria	2						
Aarhus University,										
Department of Bioscience,			Denmar							
Marine Ecology Roskilde	729	University	k		3	1				
Estonian Environmental		Research								
Research Centre	3979	Institute	Estonia		1					
Finnish Meteorological		Research								
Institute	1725	Institute	Finland	1						
Finnish Environment		Research								
Institute	1104	Institute	Finland	(1)						
CNRS Paris Institute of										
Earth Physics, Marine		Research								
Geoscience Laboratory	3187	Institute	France				1			
Ocean Physics and										
Satellite oceanography										
laboratory (LOPS) - UMR										
6523 CNRS-Ifremer-IRD-	4526	Research	<b>F</b>	2						
OBO	4536	Institute	France	2						
LABORATORY OF										
SCIENCES OF MARINE	1010	Research	<b>F</b>							
	1046	Institute	France	(1)						
Scientific - Research Firm	4965		· ·				_			
"GAMIMA"	1265	Company	Georgia				5	9		
Laboratory research	4077	Research	· ·		47					
centre LID	4877	Institute	Georgia		1/					
Baltic Sea Research			_							
Institute Warnemuende		Research	German							
(IOW), Marine Geology	116	Institute	У		(1)					
Baltic Sea Research		Desserveb	Company							
	100	Research	German		(1)					
	100	institute	y German		(1)					
University Bayreuth	3453	University	v		2					
	5.55		, German		-					
University of Leipzig	3324	University	y		1					



									Hum	Seab
					Che		Bat		an	ed
	EDMO-			Phy	mist	Biol	hym	Geo	Activ	Habit
Name	code	Sector	Country	sics	ry	ogy	etry	logy	ities	ats
Hellenic Centre for Marine										
Research, Institute of		Research								
Oceanography (HCMR/IO)	164	Institute	Greece	4						
		Research								
Marine Institute	396	Institute	Ireland	2	1					
University of Rome Tor										
Vergata	4881	University	Italv			1				
ENFA Centro Ricerche										
Ambiente Marino - La		Research								
Spezia	136	Institute	Italy	3	1					
CNR Institute of Marine		Research		-						
Sciences S S of Lerici (SP)	134	Institute	Italy	3						
	134	motitute	reary	5						
ISPRA-Institute for		Desserveb								
Environmental Protection	2000	Research	It also	10						
And Research	3009	Institute	Italy	10						
National Research Council										
of Italy - Institute for										
Finite and Coastal		Desserveb								
(Seriese Care Cresitele)	4000	Research	It also	1						
(Sezione Capo Granitola)	4809	Institute	Italy							
Vitorbo	1621	University	Italy	2						
Foundation for	1021	University	ιταιγ	5						
Environmental Education		Covernme								
	1762	Governme	Latvia		1					
	4702	nu Daaaanah	Latvia		1					
Latvian Institute of	<b>CO0</b>	Research	Latula							1
Aquatic Ecology	698	Institute	Latvia							T
Water Services	4750	Company	Malta	2						
Corporation	4750	Company	ivialta	3						
Transport Malta -		-								
Maritime Division (ex.		Governme	_							
Malta Maritime Authority)	706	nt	Malta						1	
Malta Environment and										
Planning Authority -										
Environment Protection		Governme								
Directorate	179	nt	Malta	1						
International Ocean										
Institute - Malta										
Operational Centre										
(University Of Malta) /										
Physical Oceanography		Research								
Unit	708	Institute	Malta	(4)					(1)	



									Hum	Seab
	EDMO			Dhy	Che	Biol	Bat	Gaa	an Activ	ed Habit
Name	code	Sector	Country	sics	rv	Ogy	etry	logy	ities	ats
			Netherl		• ,	-01				
NoordzeeWind BV	1357	Company	ands			4				
Rijkswaterstaat Water,		Governme	Netherl							
Traffic and Environment	1526	nt	ands			(4)				
		Research	Netherl							
Deltares	1528	Institute	ands			(4)				
Norwegian Meteorological		Research								
Institute	1212	Institute	Norway	28						
Institute of Marine										
Marine Data Centre		Research								
(NMD)	612	Institute	Norway	1						
National Institute for				-						
Marine Research and										
Development "Grigore		Research	Romani							
Antipa"	697	Institute	а	5						
All-Russia Research										
Institute of										
Hydrometeorological										
Information - World Data			Bussian							
National Oceanographic		Pesearch	Fodorati							
Data Centre (NODC)	681	Institute	on	4	2					
Arctic and Antarctic	001	mstitute	011	-	2					
Research Institute.			Russian							
Roshydromet (Saint-		Research	Federati							
Petersburg)	684	Institute	on	1						
P.P.Shirshov Institute of			Russian							
Oceanology, Southern		Research	Federati							
branch	686	Institute	on		2					
Ministry of Agriculture,										
Forestry and Food of		Governme								
Republic of Slovenia	4879	nt	Slovenia			1				
Institute for Water of the	4070	Governme								
Republic of Slovenia	4878	nt	Slovenia		1					
Andalusian Institute of										
Earth Sciences (IACI). CSIC	1200	Research	Casia				2 (1)	1		
	1320	Desseret	Shaili				∠ (⊥)	1		
Marine Sciences	200	Instituto	Snain				3 (1)			
Institute of Marine	200	Pocoarah	Shairi				J (1)			
Sciences Barcelona	2550	Institute	Snain				2			
Sciences, Darcelond	2550	institute	Spaili	1	1	1	<b>_</b>	1	1	1



Name	EDMO- code	Sector	Country	Phy sics	Che mist ry	Biol ogy	Bat hym etry	Geo logy	Hum an Activ ities	Seab ed Habit ats
IEO/ Malaga		Research								
Oceanographic Centre	1405	Institute	Spain				(1)			
IEO/Spanish		Research								
Oceanographic Institute	353	Institute	Spain				3			
IEO/ Santander										
Experimental Aquaculture		Research								
Facilities	1402	Institute	Spain	1						
Swedish Meteorological		Research								
and Hydrological Institute	545	Institute	Sweden	2	2	2				
Institute of Marine										
Sciences, Middle East		Research								
Technical University	696	Institute	Turkey	(1)						
University of Kyrenia	4748	University	Turkey	1						
			United							
			Kingdo							
GEMS Survey Ltd	2657	Company	m	1						
			United							
		Governme	Kingdo							
The Crown Estate	1604	nt	m	(1)					5	
TOTALS PER DATA THEME				86	35	9	16	10	6	1

## Table: Overview of data providers of published data submissions

Notes: (..) indicates multiple relations for same submission; full details of an organisation can be found in the SeaDataNet EDMO catalogue using the EDMO-code



## 6. Meetings held since last report

A number of project meetings took place to monitor the project progress. Also meetings took place with the EU, EMODnet Steering Committee and other EMODnet lots for tuning developments. In addition a large number of events were organised or joined by EMODnet Ingestion partners to market and promote EMODnet overall and in particular EMODnet Ingestion.

Date	Location	Торіс	Short Description
18 – 19 May	Poole –	European Maritime	Presentations and promotion of EMODnet overall and
2017	United	Day	EMODnet Ingestion by partners MARIS and COGEA
	Kingdom		and EMODnet Secretariat.
20 May	Aarhus -	Opening of new	Presentation of EMODnet Geology and Ingestion to
2017	Denmark	marine geological	Danish marine geology stakeholders by partner GEUS.
		facilities at Aarhus	
		University	
30 – 31 May	Ostend -	Marine Science	Presentation of EMODnet Ingestion project by partner
2017	Belgium	meets Maritime	VLIZ and RBINS to Belgian maritime companies and
		Industry	marine scientists.
30 – 31 May	Espoo –	EMODnet Geology	Introducing EMODnet Ingestion and its planned
2017	Finland	kick-off meeting	cooperation with the Geology project and network by
			partners BGS, GEUS and GTK
10 June	Varna -	IO-BAS seminar	Meeting with IO-BAS staff to present EMODnet
2017	Bulgaria		Ingestion and to brainstorm about potential data
			holders and sources
21 – 29 June	Paris –	29th Session of the	EMODnet Data Ingestion was presented to a number
2017	France	IOC Assembly	of delegates, among them GOOS Africa, Morocco,
			Canada, US, India
5 – 6 July	Genua - Italy	EMODnet Technical	Introducing EMODnet Ingestion and its planned
2017		Working Group	cooperation with the overall EMODnet network
29 - 31	Bergen -	NMDC Annual	Meeting with Norwegian research institutes and their
August 2017	Norway	Meeting	data managers. EMODnet Ingestion was presented
			and promoted by partner IMR.
5 – 7	Singapore -	GOOS Regional	Presentation of EMODnet Physics and EMODnet
September	Singapore	Alliance Forum VIII	Ingestion project by partner EuroGOOS
2017			
6 – 7	Skiathos =	Underwater Acoustic	Presentation of EMODnet Physics and EMODnet
September	Greece	Conference Europe	Ingestion project by partner ETT
2017		2017	



Date	Location	Торіс	Short Description
7 - 9	Constanta -	ProMare 2017	Presentation of EMODnet Ingestion project to Black
September	Romania	Symposium	Sea research community by partner NIMRD
2017			
11 – 15	Ostend -	IODE's Quality	Promotion of EMODnet Ingestion by partner SMHI to
September	Belgium	Management System	internatioal course participants.
2017		Essentials for NODCs	
		and ADUs training	
		course 2017	
13 – 15	Rome - Italy	EMODnet Steering	Presenting progress on the project and contributing to
September		Committee meeting	discussions by MARIS
2017			
17	Gothenburg -	Big data workshop at	Presentations of EMODnet and EMODnet Ingestion
September	Sweden	Gothenburg	projects by partner SMHI.
2017		University, Dep of	
		Marine Sciences	
22	Antwerp-	EMODnet's Open Sea	Presentation of EMODnet Ingestion project by partner
September	Belgium	Lab Kickoff Event	RBINS
2017			
25	Riga - Latvia	LHEI seminar	Meeting with LHEI staff to present EMODnet Ingestion
September			and to brainstorm about potential data holders and
2017			sources
25 – 28	Brussels -	Copernicus Marine	Presentations of EMODnet Physics and EMODnet
September	Belgium	Week	Ingestion project by partners MARIS, ETT and
2017			EuroGOOS
29	Varna -	European Night of	Promotion of EMODnet Ingestion at IO-Bas stand.
September	Bulgaria	Scientists- FRESH EU	
2017		project	
3 – 5	Bergen -	EuroGOOS	Presentation of EMODnet Ingestion project by
October	Norway	International	partners EuroGOOS and ETT
2017		Conference	
3 – 6	Athens -	EMODnet Seabed	Introducing EMODnet Ingestion and its planned
October	Greece	Habitats kick-off	cooperation with the Seabed Habitats project and
2017		meeting	network by partner HCMR and JNCC
5-6	Brussels -	FAO-COST Workshop	Presentation of EMODnet Human Activities and
October	Belgium	on European Algae	EMODnet Ingestion by partner COGEA
2017		Production	
5 – 6	Den Helder -	North Sea Days	Promotion of EMODnet Ingestion to Dutch marine
October	Netherlands		government and research community by partners
2017			RWS and Deltares



Date	Location	Торіс	Short Description
9-11	Rome - Italy	EMSO ERIC All	Promoting EMODnet Ingestion by partner ENEA to
October		Regions Workshop	members of the marine science and industry
2017			community
11 October	Halmstad -	Coastal waters	Promoting EMODnet Ingestion by partner SMHI to
2017	Sweden	workshop	Swedish county Administration boards
12 October	La Spezia -	ENEA Workshop	Introducing European marine data management
2017	Italy		infrastructures, EMODnet and EMODnet Ingestion by
			partner ENEA to researchers and members of ENEA,
			CNR-ISMAR, ISPRA Environment
18 October	Gothenburg -	SMHI seminar	Meeting with SMHI staff to present EMODnet
2017	Sweden		Ingestion and to brainstorm about potential data
			holders and sources
24 October	Barcelona -	PANACeA's	Presentation of EMODnet, EMODnet Med Checkpoint
2017	Spain	Knowledge Sharing	and EMODnet Ingestion by partner INGV and
		Event	EMODnet Secretariat at this Interreg event
25 October	Sopot -	HELCOM State &	Presentations of EMODnet Physics and EMODnet
2017	Poland	Conservation	Ingestion by partners EuroGOOS and ET
		meeting	
25 - 27	Bucharest -	Romanian Research	Presentation of EMODnet and EMODnet Ingestion by
October	Romania	Salon	partner NIMRD at this national event. Promotion of
2017			EMODnet Ingestion via NIMRD stand.
2 November	Karlskrona -	Coastal waters	Promoting EMODnet Ingestion by partner SMHI to
2017	Sweden	workshop	Swedish county Administration boards
14 – 16	Athens -	MONGOOS Annual	Presentations of EMODnet Physics and EMODnet
November	Greece	Meeting	Ingestion project by partners INGV, HCMR, ETT and
2017	<b>A</b> . <b>I</b>		
15-17	Antwerp –	ENODNET Open Sea	Presentation of ENIODnet Ingestion by partner VLIZ in
November	Belgium	Lab nackaton	workshop on marine open data and industry as data
2017			user and provider.
20	Galway -	Data management	Introducing data management best practices and
November	Ireland	seminar at NUIG,	European marine data management infrastructures
2017		Ocean and Earth	and data flows to 4th year students by partner MI.
		Sciences	
20	London –	NOOS annual	Presentations of EMODnet Physics and EMODnet
November	United	meeting	Ingestion project by partner EuroGOOS
2017	Kingdom		



Date	Location	Торіс	Short Description
20	Online	MED Working	Presentation of EMODnet Ingestion by partner INGV
November		Webinar on	to Interreg project partners
2017		Integrating Data	
21-23	Geneva -	WMO, TT-eWIS	Presentation of EMODnet Ingestion project by partner
November	Switzerland	(WMO Task Team)	EuroGOOS
2017		meeting	
21 – 23	Obninsk –	"Modern information	Presentation of EMODnet Ingestion project by partner
November	Russian	technologies in	RIHMI-WDC
2017	Federation	hydrometeorology	
		and related fields"	
		Conference	
27 29	Dorgon	Arotic DOOS Appual	Procentation of EMODuct Insection project by partner
27 - 20	Norway	Mooting	Furse COS
2017	NOTWAY	wieeting	
2017			
29 – 30	Naples - Italy	UfM (Union for	Promoting EMODnet Ingestion to UfM network of
November		Mediterranean)	public, research and private organisations from 28
2017		Regional Stakeholder	countries of the European Union and 15 countries of
		Conference	the Southern and Eastern Mediterranean.
30	Umea -	Coastal waters	Promoting EMODnet Ingestion by partner SMHI to
November	Sweden	workshop	Swedish county Administration boards
2017			
-			
6 December	Daugavpils,	Scientific meeting in	Presentation of EMODnet Ingestion project by partner
2017	Latvia	Daugavpils University	LHEI
10 - 12	Lyngby -	Nordic Geological	Prmotion of EMODnet Ingestion by partner GEUS to
January	Denmark	Winter Meeting 2018	members of the Geological Society of Denmark
2018			
23 January	Oporto -	EUDAT –	Presentations on EMODnet Ingestion and the SWE
, 2018	Portugal	SeaDataCloud	pilot by MARIS, BODC and ETT
		Workshop	
23 – 25	Athens -	CMEMS INSTAC	Presentations of EMODnet Physics and EMODnet
January	Greece	meeting	Ingestion projects by partners ETT and EuroGOOS and
2018			discussion on cooperation


Date	Location	Торіс	Short Description
31 January	Ostend -	IODE ODIS meeting	Presentations of EMODnet Ingestion and possible
2018	Belgium		synergy with ODIS by partners MARIS and EuroGOOS
31 January –	Hamburg -	WOZEP meeting	WOZEP deals with offshore wind energy
1 February	Germany		developments. EMODnet Ingestion was presented by
2018			partner RWS.
12 – 16	Galway -	EuroGOOS and	Presentation of EMODnet Physics and EMODnet
February	Ireland	EMODnet Physics	Ingestion project by partners EuroGOOS, ETT, BODC,
2018		Data Workshop	and MI to Irish and invited UK oceanography
			community of CIL, OPW, NUIG, UCC, MaREI, AFBI,
			MSS, SAMS, MEDIN, SmartBay, and MI
12 – 14	Brussels -	WG DIKE and TG	Promotion of EMODnet Ingestion by partners RWS,
February	Belgium	DATA meetings	MARIS and OGS
2018			
14 February	Brussels -	EMODnet – CMEMS	Discussing synergy between CMEMS INSTAC and
2018	Belgium	meeting	EMODnet Physics, Chemistry and Ingestion with
			participation of partners MARIS, IFREMER, OGS, ETT
			and EuroGOOS
26 – 28	Edinburgh –	MAREMap and MIM	Presentation of EMODnet Ingestion project by partner
February	United	(MAREANO-	BGS
2018	Kingdom	INFOMAR-	
		MAREMAP) meetings	
1 March	The Hague –	SEANSE kick-off	Strategic Environmental Assessment North Seas
2018	The	meeting	Energy (SEANSE) project meeting with several
	Netherlands		partners (RWS, Shom, BSH, RBINS). Use of EMODnet
			and EMODet Ingestion for data manangent of MSPs is
			promoted.
7 March	London –	Civil Hydrography	Presentation of EMODnet Ingestion project by partner
2018	United	Annual Seminar	BGS
	Kingdom		
9 March	Riga - Latvia	National 'Fish Fund'	Prsenting EMODnet Ingestion and discussing potential
2018	_	stakeholder meeting	data sources for MFSD descriptor D9 – Chemical data
			for seafood by partner LHEI.



Date	Location	Торіс	Short Description
15 March	Utrecht –	WOZEP Mid Term	WOZEP deals with offshore wind energy
2018	The	Evaluation Workshop	developments. Importance of sharing data through
	Netherlands		EMODnet Ingestion is promoted by partner RWS to
			stakeholders from Netherlands, Denmark and Belgium
13 – 15	London –	Oceanology	Promotion of EMODnet Ingestion at stands of MARIS
March 2018	United	International 2018	and EMODnet secretariate. Presentations by partners
	Kingdom		MARIS, ETT and EuroGOOS as part of Ocean-ICT-Expo,
			EMODnet Bathymetry Workshop, and SWE Workshop.
14 – 15	Portorož -	14th meeting of the	Presentation of EMODnet Human Activities and
March 2018	Slovenia	Member States	EMODnet Ingestion by partner COGEA
		Expert Group on	
		Maritime Spatial	
		Planning	
20 – 22	Aix-en-	MERIGEO conference	Presentations on EMODnet portals and EMODnet
March 2018	Provence -		Ingestion by partners Shom and IFREMER to French
	France		governmental and regionals agencies (spatial planning
			) and researchers.
21 March	Bredene -	VLIZ Marine Science	Presentation of EMODnet Ingestion and promotion at
2018	Belgium	Day (VMSD) 2018	EMODnet stand by VLIZ and RBINS to over 300 marine
			and coastal scientists in Flanders and its neighboring
			regions
21 – 23	Majorca -	EMODnet Steering	Participation and presentation of progress.
March 2018	Spain	Committee meeting	
22 March	Domo Italy	Monting with Adriatic	Procenting and discussing untake of EMODnot
25 March	Rome - Italy		Insection for onvironmental monitoring data by
2018			narthors OGS and ISPRA
27 March	Galway -	Workshop Chemical	Presentation of EMODnet and EMODnet Ingestion
2018	Ireland	Oceanography:	project by partner MI to Irish scientists from EPA,
		Coastal, Shelf and	Trinity College Dublin, NUIG, DIM, WIT, Sligo IT, MSS,
		Ocean	AFBI, SAMS and MI
		Biogeochemistry	
		Research in Ireland at	
		Marine Institute	



Date	Location	Торіс	Short Description
10 – 12 April	Vienna -	EGU 2018	Presentations and promotion of EMODnet and
2018	Austria		EMODnet Ingestion at several sessions by ETT,
			EuroGOOS, MARIS, and INGV
11	A the sure	Manina Littan dav	Descentation of EMODest in particular by postance UCMD
11 April	Atnens -	Marine Litter day	Presentation of EMODnet Ingestion by partner HCMR
2018	Greece	with Greek NGO's	to Greek NGO'S.
16 – 17 April	Barcelona -	2nd EMODnet	Presentations and discussions on progress with
2018	Spain	Ingestion	project activities, in particular with marketing,
		Projectgroup	outreach and submissions. Planning further activities.
		meeting	
10 April	St. Doul's Dov	Marina Intelligence	A half day cominar related to the CALVECO South
18 April	SL. Paul S Bay	the value of data for	A hall-day seminar related to the CALYPSO-South
2018	- Malta	the value of data for	project aimed at highlighting the importance
		sea-based	networking between data scientists to share data with
		applications	prmotion of EMODnet Ingestion by partner UoM.
21 April	Hamburg -	BSH Open Day	Promotion of EMODnet and EMODnet ingestion by
2018	Germany		posters and leaflets to general audience, scientists
			from other departments and neighboring institutions.
26 April	Sopot -	SWE Workshop	Presentations and promotion of EMODnet Physics,
2018	Poland		EMODnet Ingestion and SWE to Polish oceanographic
			community of IMGW, PIG, IO PAN, and MIG by
			partners MARIS, BODC, MI, ETT and EuroGOOS
9 – 10 May	La Spezia -	Maritime Big Data	Promotion of EMODnet Human Activities and
2018	Italy	Workshop	EMODnet ingestion by partner COGEA at Workshop
			organised by NATO CMRE.

In addition participation with marketing and promotion actions by EMODnet Ingestion partners are already planned for quite a number of events as listed below.

Date	Location	Торіс	Short Description
May 2018	Daugavpils,	Scientific meeting in	Presentation of EMODnet Ingestion project by partner
	Latvia	Daugavpils University	LHEI to colleagues from Latvian ministries and
			research sector
24 May	Ostend -	Marine Science	To present EMODnet Ingestion project by partner VLIZ
2018	Belgium	meets Maritime	and RBINS to Belgian maritime companies and marine
		Industry	scientists.



Date	Location	Торіс	Short Description	
30 May – 3	Corfu Island -	12th Panhellenic	To present and promote EMODnet and EMODnet	
June 2018	Greece	Symposium of	Ingestion by a dedicated session to Greek data	
		Oceanography &	producers and providers and researchers by partner	
		Fisheries	HCMR	
31 May – 01	Burgas -	European Maritime	To promote EMODnet Ingestion by partners IO-BAS	
June 2018	Bulgaria	Day	and COGEA and EMODnet Secretariate in	
			presentations and stand.	
1 June 2018	Brussels -	Conference on	To present EMODnet Ingestion by partner RBINS at	
	Belgium	Marine Sands	the final meeting of the BRAIN Tiles project. RBINS will	
			organise a Data Sharing Side Event.	
6 – 7 June	Herrsching -	SDB Day 2018	To present and promote EMODnet Bathymetry and	
2018	Germany		EMODnet Ingestion to internationa bathymetry	
			community by partners MARIS and Shom.	
8 June 2018	Helsinki -	"Maailman Merien	To present and promote EMODnet Ingestion to	
	Finland	Päivä" (World Ocean	national data producers and providers, and data users	
		Day) seminar	by partners GTK and FMI.	
8 June 2018	Trieste - Italy	EMODnet Day Italy	To present and promote EMODnet overall and	
			EMODnet Ingestion to Italian marine community by	
			partners OGS, INGV, ETT, ENEA and CNR and	
			EMODnet Secretariat	
19 –21 June	Lissabon -	IHPT Hydrographic	Partner IHPT will organise this scientific conference fo	
2018	Portugal	Engineering	hydrographic engineering, oceanographic science,	
		Conference	marine geology, marine chemistry and marine data	
			management for the Portugues marine community.	
			EMODnet Ingestion will be presented and promoted.	
10 22 1000		Cap Future 2010	Destage FTT will accept and are mate FMODest	
19 – 23 June	La Spezia -	Sea Future 2018	Partner ETT will present and promote EMODNEL	
2018	italy	Exhibition and	Physics and EWODnet Ingestion to the Italian maritime	
		Convention	community.	
20 – 22 June	Vigo - Spain	International	To present and promote EMODnet Human Activities	
2018	<b>C</b> 1	Symposium on	and EMODnet Ingestion by AZTI	
		Marine Science 2018		
Last week	Zagreb,	National Committee	To present the EMODnet network and Data Ingestion	
June 2018	Croatia	for the Development	to the members of the Croatian National Marine	
		and Implementation	Committee by partner IOF.	
		of the Marine and		
		Coastal Management		
		Strategy		



Date	Location	Торіс	Short Description
June 2018	Constanta -	4 <sup>th</sup> International	NIMRD will present EMODnet Ingestion.
	Romania	Conference 'WATER	
		2018'	
6 July 2018	Nicosia -	Offshore Data	The Workshop is planned by Cyprus government
	Cyprus	Management	(Ministry of Environment) for national stakeholders to
		Workshop	discuss development of a national Offshore Data
			Management System (ODMS) considering recent oil &
			gas findings. ORION and MARIS will present how
			EMODnet can contribute to the ODMS in a win – win
			situation.
4 – 6 July	Toulouse -	Blue Planet	To present and promote EMODnet Human Activities
2018	France	Symposium	and EMODnet Ingestion by AZTI
9 – 14 July	Msida -	Summer school	A week long course focusing on oceanographic data
2018	Malta	'Operational	exploration, elaboration and product creation for Blue
		Oceanography for	Growth with promotion of EMODnet Ingestion by
		Blue Growth'	partner UoM
4 – 5	Texel – The	North Sea Days 2018	This event is focused on Dutch marine government
October	Netherlands		and research community. Partners NIOZ, MARIS,
2018			Deltares and RWS will organise a dedicated EMODnet
			session.
April 2019	Split, Croatia	Open day University	T0 present MSFD and WFD directives and EMODnet,
		of Split	Croatian monitoring and MEDAS database by partner
			IOF.



## 7. Outreach and communication activities

The outreach and communication activities are undertaken as WP4 and have been reported in Chapter 5 in the section concerning WP4.



### 8. Updates on performance indicators

The intensive marketing campaign for EMODnet Ingestion in the second year by all consortium members as reported under WP4 has resulted in increasing awareness in marine and maritime communities in Europe. Supportive of the campaign is that all EMODnet Thematic portals and the Central EMODnet portal have included references and links to the EMODnet Ingestion portal.

#### Web Statistics

The visitor statistics are given below. The visiting statistics are considerable with circa 8.000 - 9.000 visitors per Month and an average number of 6 - 10 browsed pages.

Month	Unique visitors	Number of visits	Pages	Hits
Feb-17	703	1,092	15,816	38,669
Mar-17	668	1,035	4,388	13,698
Apr-17	5,617	6,128	9,846	19,068
May-17	5 <i>,</i> 935	6,424	15,824	25,282
Jun-17	5,754	6,206	49,675	53,944
Jul-17	5,789	6,175	51,582	57,601
Aug-17	7,121	7,563	53,292	59,510
Sep-17	8,404	9,048	56,856	71,498
Oct-17	8,260	9,150	60,049	80,101
Nov-17	9,271	10,409	58,818	76,237
Dec-17	8,460	9,370	57,147	64,709
Jan-18	9,207	10,342	62,154	73,552
Feb-18	7,653	8,569	60,311	70,556
Mar-18	8,318	9,279	58,554	71,636
Apr-18	7,889	9,054	58,163	75,463
May-18	7,803	9,044	58,264	72,124

Table: web statistics of Ingestion portal

#### Submission statistics

The number of submissions in the Submission service has steadily increased over time. And the number of submissions that have been completed and published by assigned data centres in the View Submissions service have been kept in good pace with the submissions. Promising is also that quite a number of submissions have already been elaborated to phase II and populated into European



infrastructures such as SeaDataNet and EurOBIS through which data sets are now available in EMODnet portals. The following graphics and table gives the increase in time.



		Published 'as	
Date	Submissions	is'	Elaborated phase II
1-Jul-17	0	0	0
1-Aug-17	1	0	0
1-Sep-17	11	0	0
1-Oct-17	18	10	0
1-Nov-17	34	18	0
1-Dec-17	61	32	0
1-Jan-18	93	55	0
1-Feb-18	121	63	0
1-Mar-18	133	75	0
1-Apr-18	150	106	6
1-May-18	163	140	10
19-May-18	175	163	13
1-Jun-18	181	165	20
15-Jun-18	204	182	24

Image: submissions in time

Table: submissions in time



The second year reporting period runs till 19 May 2018 and at that time there were **175** submissions achieved of which **163** were published 'as is' and of those **13** elaborated to phase II. The table and graphics also give the recent results at 15 June 2018 which show a further increase to **204** submissions with **182** published of which **24** as phase II.

The 163 published submissions till 19 May 2018 can be classified by data theme, country of submission, assigned data centre, data originator and/or data holding centre.



Graphics: submissions per Data Theme



Graphics: submissions per Country





#### Graphics: submissions per Assigned Data Centre

			No
Name	Sector	Country	submissions
GeoMarine Ltd.	Company	Bulgaria	1
Scientific - Research Firm "GAMMA"	Company	Georgia	14
Water Services Corporation	Company	Malta	3
NoordzeeWind BV	Company	Netherlands	4
		United	
GEMS Survey Ltd	Company	Kingdom	1
Foundation for Environmental Education —			
Latvia	Government	Latvia	1
Transport Malta - Maritime Division (ex.			
Malta Maritime Authority)	Government	Malta	1
Malta Environment and Planning Authority -			
Environment Protection Directorate	Government	Malta	1
Ministry of Agriculture, Forestry and Food of			
Republic of Slovenia	Government	Slovenia	1
Institute for Water of the Republic of			
Slovenia	Government	Slovenia	1
		United	
The Crown Estate	Government	Kingdom	5
Black Sea NGO Network	NGO	Bulgaria	1
NGO MARINE SOUND	NGO	Bulgaria	2
	Research		
Estonian Environmental Research Centre	Institute	Estonia	1
	Research		
Finnish Meteorological Institute	Institute	Finland	1



			No
Name	Sector	Country	submissions
CNRS Paris Institute of Earth Physics, Marine	Research		
Geoscience Laboratory	Institute	France	1
Ocean Physics and Satellite oceanography			
laboratory (LOPS) - UMR 6523 CNRS-	Research		
lfremer-IRD-UBO	Institute	France	2
	Research		
Laboratory research centre LTD	Institute	Georgia	17
Hellenic Centre for Marine Research,	Research		
Institute of Oceanography (HCMR/IO)	Institute	Greece	4
	Research		
Marine Institute	Institute	Ireland	3
ENEA Centro Ricerche Ambiente Marino - La	Research		
Spezia	Institute	Italy	4
CNR, Institute of Marine Sciences S.S. of	Research		
Lerici (SP)	Institute	Italy	3
ISPRA-Institute for Environmental	Research		
Protection and Research	Institute	Italy	16
National Research Council of Italy - Institute			
for Marine and Coastal Environment (IAMC)	Research		
(Sezione Capo Granitola)	Institute	Italy	1
	Research		
Latvian Institute of Aquatic Ecology	Institute	Latvia	1
	Research		
Norwegian Meteorological Institute	Institute	Norway	28
Institute of Marine Research - Norwegian	Research		
Marine Data Centre (NMD)	Institute	Norway	1
National Institute for Marine Research and	Research		
Development "Grigore Antipa"	Institute	Romania	5
All-Russia Research Institute of			
Hydrometeorological Information - World			
Data Centre (RIHMI-WDC) National	Research	Russian	
Oceanographic Data Centre (NODC)	Institute	Federation	6
Arctic and Antarctic Research Institute,	Research	Russian	
Roshydromet (Saint-Petersburg)	Institute	Federation	1
P.P.Shirshov Institute of Oceanology,	Research	Russian	
Southern branch	Institute	Federation	2
Andalusian Institute of Earth Sciences	Research		
(IACT). CSIC and University of Granada	Institute	Spain	3
	Research		
ICM-CSIC/ Institute of Marine Sciences	Institute	Spain	3
	Research		
Institute of Marine Sciences, Barcelona	Institute	Spain	2



Name	Sector	Country	No submissions
	Research		
IEO/Spanish Oceanographic Institute	Institute	Spain	3
IEO/ Santander Experimental Aquaculture Facilities	Research Institute	Spain	1
Swedish Meteorological and Hydrological Institute	Research Institute	Sweden	6
Aarhus University, Department of			
Bioscience, Marine Ecology Roskilde	University	Denmark	4
University Bayreuth	University	Germany	2
University of Leipzig	University	Germany	1
University of Rome Tor Vergata	University	Italy	1
University of Tuscia-Viterbo	University	Italy	3
University of Kyrenia	University	Turkey	1
TOTAL SUBMISSIONS			163

Table: submissions per data submitter - originator organisation



Graphics: submissions by organisation type

The above reported Ingestions all concern submissions of data sets made to the Submission service and then completed for publishing at the View Submission service. As earlier indicated there are also direct ingestions which by-pass the Submission service. This is the case for ingestions by oceanography operators to the European operational oceanography data exchange as described in WP3. Also there is a mission in EMODnet Ingestion to educate data providers and to arrange that regular submissions will go directly to the appropriate data centres and no longer through the Submission service.



#### **Evaluation of submissions:**

The 'data theme' key indicator of the published submissions shows that nearly 52% of the submissions concern data for physics, followed by chemistry (circa 21%), bathymetry (circa 10%), geology and biology (circa 6%), human activities (circa 4%) and seabed habitats (circa 1%). This might look like an unbalance; however one should realise that in practice most marine data acquisition efforts concern physics data, followed by chemistry, biology and geology, while data acquisition efforts for bathymetry and seabed habitats are much less. This overall image can also be demonstrated by the data resources as managed by SeaDataNet and resulting from more than 110 data centres from 34 countries around European seas. The overview below gives a comparison of the division of data per theme in the Ingestion service and the SeaDataNet CDI service. This implicates that in practice it is easier to achieve submissions for physics compared to e.g. bathymetry because there are far less data sets and data holders around for bathymetry than for physics.



Graphics: comparison of division per data theme of data sets enlisted in the SeaDataNet CDI service and the EMODnet Ingestion Submission service

The 'country' key indicator of the published submissions shows that Italy, Georgia and Norway are leading with each circa 30 submissions for data from their country, followed by Spain with 12 submissions, and then other countries from the consortium with each only a few submissions. This illustrates differences in achievements between the consortium members. However one has to be careful in comparing absolute numbers as submissions can concern quite different types of data and might be organised in one large file or a number of smaller subfiles. For instance the circa 30 submissions



for Norway include monthly time series for a few HF radar stations which are submitted individually per month. The same pattern can be seen for the submissions of Georgia, which for a large part concern water quality data sets from the same data originator for different time periods. For Italy a comparable pattern can be seen whereby multiple submissions relate to different stations from the same monitoring network. Moreover the consortium has multiple partners from Italy which implicates that more acquisition efforts have been undertaken in Italy compared to other countries. Harmonising ingestion submissions between countries for specific data types is not feasible as data sets are resulting from different external originators. It should be noted that such differences in data handling also exist between the SeaDataNet data centres, whereby one data centre might exchange for example sea level data as monthly timeseries while another data centre offers annual timeseries. In the marine data management community there is a great variety in types of data and parameters as well as practices for managing data sets. SeaDataNet provides standards for formats and vocabularies and as such contributes to harmonised discovery and access. However harmonisation and standardisation of the full process from acquisition to distribution, involving a large number of mutually independent players and with different roles, is a major challenge which will take much more years and developments.

In Chapter 5 - WP4 a detailed overview is given of the efforts undertaken by each of the countries and their consortium members for promotion, marketing and outreach to potential data providers. The achieved submissions are the result of those efforts, whereby some countries appear to be more effective in their approach than other countries. The WP4 detailed overview has been compiled based upon reports made by each of the consortium partners at the latest plenay project meeting also with the objective to let partners learn from each other and to give them more insight how potential data providers might be best identified and approached.

The 'organisation type' key indicator of the published submissions shows that most data sets are originating from research organisations (circa 70%), while private industry only provides a limited number of data sets (circa 14%). This can be explained by the fact that the consortium partners in practice are well known within the scientific data community and their organisations have established relations with external parties, mostly scientific, through various projects and other activities. This makes it easier to identify and approach potential data providers in those scientific circles than reaching out to parties that are further away from their community. Moreover it is well known that motivating private industry to share data is a tough challenge. Therefore most efforts so far have been directed towards research communities in order to achieve submissions and this way to give momentum to the EMODnet Ingestion initiative. At the same time actions directed at private industry have been successful as 14% of the data submissions originate from private industry sources which indicates that it is possible.

In the third year the promotion and marketing activities will be continued and the consortium partners will be urged to take good notice of the WP4 detailed report of country activities. Countries will be challenged even more to compete with each other in results and thereby it will be communicated that



private industry scores will have a higher weight as it has become a priority. However one should be realistic that achievements are not only dependent on the efforts and approach of the consortium members but for a major part also depend upon the willingness and cooperation of potential data providers. Overcoming their existing reservations is a major challenge as the experiences in the second year have demonstrated.



### 9. Feedback from users

The feedback is arranged through the Help desk which is promoted at the home page of the EMODnet Data Ingestion portal and this provides means to give feedback by email and/or to ask to be called back by telephone. In the second year 13 helpdesk questions have been received, related to the following subjects:

- 1. How to use the system?
- 2. Which metadata should be input?
- 3. Some actions give an error help needed
- 4. Problem with the connection
- 5. Data wanted : user looking for specific data
- 6. Which license to put on the data?
- 7. Addition to EMODnet-ingestion mailing list

Most of the questions received a direct reply, except for 3 questions which needed some further discussion and were answered some days later.

Derived from the received questions an **FAQ page** has been opened at the EMODnet-ingestion portal at the helpdesk section. Curently it contains 4 FAQs:

- 1. What are the data requirements for data providers?
- 2. What kind of license is applicable to a dataset?
- 3. Do I need to register to submit data?
- 4. I don't manage to connect with Marine-ID

It will be enriched, if necessary, depending on the questions received by the helpdesk.



### **10. Lessons learned**

From the marketing and outreach activities a number of lessons have been learned:

- 1. In principle almost everybody is in favor of the ingestion initiative and is willing to cooperate for sharing data that are not restricted in a way;
- 2. However going from intention to action is quite an effort for most data providers as they do not give it a high priority and are busy with other activities;
- 3. In those cases it is welcomed if the EMODnet ambassadors provide the necessary support to submit the data sets on behalf of the data providers. This will save the providers time for learning the system, while the data is ingested. However this is not a solution for regular returning submissions of a data providers as they need to be educated for better structuring their data;
- 4. Contacting and convincing potential data providers can be time consuming. It helps if there are already links with the target data providers, e.g. through colleagues in projects;
- 5. Small businesses tend to be too busy for providing any information;
- 6. It is more effective to contact and convince high-level management than the work floor as the high-level managers might see wider perspectives of the cooperation;
- 7. Several potential providers have expressed interest in rather connecting their existing portals to EMODnet Ingestion than 'wasting' time on manually preparing and submitting data sets. At the same time they realise that connecting can be quite a development project;
- 8. A relatively small number of submissions so far are relevant for EMODnet Human Activities or Seabed Habitats. This might be caused by the fact that most consortium members are more familiar with domains like bathymetry, physics, chemistry, etc.);
- 9. Researchers can be quite reluctant to share data also because they consider that holding on to data may give more chances to participate in funded projects;
- 10. There is still a lot of promotion needed to make everybody aware about EMODnet and its potential benefits.



### **11. Objectives for next reporting period**

The following objectives will be followed-up in the next reporting period:

- Further marketing and outreach to increase the number of submissions and submitters Each data centre consortium member will continue to give a follow-up to the earlier inventory, undertake actions towards identified data providers. This is aimed at informing and engaging more data providers and achieving more submissions.
- Elaborating more submitted data sets to phase II

Currently 24 of the published 182 submissions have reached phase II, which implicates that the data sets have been validated, processed, converted, and documented for inclusion in national repositories and from there populated into the European infrastructires that drive EMODnet. More submissions must and will be elaborated so that more data sets will become available in structured ways for EMODnet and its users.

• Further expanding the EMODnet Ingestion network of qualified data centres

The present EMODnet Ingestion network of quaified data centres counts 49 organisations. There is potential in the EMODnet Thematic networks for more data centres joining the matrix. This will enrich the capabilities and geographic coverage for processing submitted data sets and for coupling data submitters to data centres in their area.

#### • Promoting further uptake of the Sensor Web Enablement (SWE) demonstrator

The SWE Real Time demonstrator has been launched end March 2018 in a cooperation between EMODnet Ingestion and EMODnet Physics. It demonstrates and explans how SWE standards and services can be adopted by observatory operators for streamlining their data distribution and sharing. More Workshops and promotion will be arranged for informing, encouraging and supporting operators for inserting their platforms and sensors.

• Progressing use cases, leading to data submissions and possible 'pipelines'

BODC and MARIS will analyse further establishing a potential metadata exchange from the Marine Data Exchange (MDE) portal of Crown Estate towards EMODnet Ingestion by machine-to-machine service as part of Phase I. A comparable exchange will be explored with IFREMER for linking the SEANOE portal for scientific papers and related data. The use case 'offshore wind park data in the Netherlands' will be progressed by Deltares concerning developing exchange mechanisms from OpenEarth towards EurOBIS and SeaDataNet CDI services and more data ingestions.



• Establishment of an alert function in the **Data Wanted service** to notify users that have posted a request when relevant data has been submitted and published. This requires developing and implementing a 'matching algorithm' between entries in the **Data Wanted service** and those in the **View Submissions service**. This will be developed before the end of 2018.



### **12. Suggestions for follow-up projects**

From the experiences so far with EMODnet Ingestion it can be concluded that there are still a lot of data providers that are not aware of the international standards and infrastructures for making their data interoperable and reuseable for other applications.

This strengthens the need for continuing the EMODnet Ingestion mission and operation. The mission should be aimed at making more stakeholders in the marine data community, both users and providers, aware and informed about European marine data management and the larger benefits of sharing data. This can be implemented by continuing the marketing and outreach campaign activities that are undertaken in the current project. Thereby there should be sufficient resources for elaborating submitted data sets as these can have many formats, lacking quality indications or quality control, and having limited metadata.

Another activity should be aimed at exploring, finding and implementing ways for connecting more providers by means of direct exchanges with their portals and systems. This includes an evolution of the Ingestion portal with more machine-to-machine exchanges. Although it should be realised that setting up such exchanges largely will depend on the question in how far data providers already are using standards, both for IT services and for the formatting and documenting of their data sets.

More ideas and suggestions are expected to come to light in the third year and these will be reported in the quarterly reports.