INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION

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Twenty-eighth Session of the IOC Committee on International Oceanographic Data and Information Exchange (IODE-28)

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Review of NODC health status within the IODE network

By Lesley Rickards and Peter Pissierssens

1. Background

IODE-XXV (2019) and IODE Management Group (2020)

The IODE Committee, through the Decision IODE-XXV.3.2.4 (February 2019), established an Inter-sessional working group (IWG) on the review of NODC health status within the IODE network. According to the Annex A of the Decision IODE-XXV.3.2.4 the objectives of the WG were:

- *(i)* propose metrics and processes for determining the health status of NODCs in the IODE network
- *(ii)* propose a process to assist NODCs in improving their health status
- *(iii)* recommend updates to the IOC Manuals and Guides No. 5 as appropriate
- *(iv)* submit an intermediate report to the 2020 meeting of the IODE Management Group
- *(v)* implement a provisional health status check of all NODCs
- *(vi)* submit its final report including the provisional health check report to IODE-XXVI (April 2021).

During the January 2020 meeting of the IODE Management Group it was recommended that the IWG will propose the changes to IOC M&G 5 taking into account the following circumstances:

- (i) disbandment of JCOMM
- (ii) NODC and ADU relations
- (iii) WDC system superseded by WDS
- (iv) ODISCat and other data & information related IODE activities and projects

It was also proposed the following sample categories for the NODC metrics:

- (i) amount of data received/processed/archived
- (ii) data available online

(iii)   metadata availability
(iv)   QA/QC implemented
(v)   long term preservation
(vi)   interlinkages established with ADUs (if any)
(vii) IODE QMF
(viii) contribution of data to OBIS/ODP
(ix)   contribution of information to ODISCat
(x)   publications to OBPS
(xi)   capacity development plans and activities
(xii) funding
(xiii) participation in the international projects
(xiv) sustainable operations strategy (if any)

IODE Management Group (2021)
As no action had taken place on this issue since IODE-XXV, the IODE Management Group, at its January 2021 meeting decided to establish a pre-committee Working Group (Group 1) on this subject.

The Group met on 18 February 2021. It discussed necessary changes to IOC Manuals and Guides No. 5 and 67 and also recommended the drafting of IODE data centre health check procedures. Taking into account information and the checklist used by the OBIS Steering Group to check the health of OBIS nodes, the pre-committee working group suggested that it is valuable to be able to check the status independently and consider the full range of data management tasks of an NODC (see IOC M&G 5, page 5). Dr Lesley Rickards offered to prepare a short document with a preliminary checklist for the health status of NODCs for use by the inter-sessional working group. Some of the items require input from the NODC, but other items can be checked by IODE. Further work was needed to determine the NODC health check process, how frequently it should be carried out, precisely which checks need to be met for an NODC to be considered active and how inactive NODCs can be assisted to become active.

IODE-XXVI (2021)
IODE-XXVI (April 2021), noting with regret the lack of progress, decided to extend the Inter-sessional working group on the review of NODC health status within the IODE network and instructed it to provide:

(i)   a revision of IOC Manuals and Guides No. 5 (Guide for Establishing a National Oceanographic Data Centre);
(ii)   a revision of IOC Manuals and Guides No. 67 (IODE Quality Management Framework for National Oceanographic Data Centres and Associate Data Units (Revised edition)); and
(iii) finalise IODE data centre health check procedures, for submission to the IODE Management Group for its January 2022 meeting.

IODE-XXVI instructed the Secretariat to publish and circulate the documents subsequent to their approval by the IODE Management Group. Dr Lesley Rickards (UK) informed the Committee at IODE-XXVI that the brief document referred to above was available to the IWG.

During the intersessional period between IODE-XXVI and IODE-XXVII (March 2023) the following work had been carried out:

- a revised version of <u>IOC Manuals and Guides No. 5</u> (Guide for Establishing an IODE National Oceanographic Data Centre, IODE Associate Data Unit or IODE Associate Information Unit (3rd revised edition)) was published on https://oceanexpert.org/document/30863

- the revision of <u>IOC Manuals and Guides No. 67</u> (IODE Quality Management Framework for National Oceanographic Data Centres and Associate Data Units (Revised edition)) was published in 2019 on https://oceanexpert.org/document/12661

- a revision of <u>IOC Manuals and Guides No. 73</u> (Guidelines for a Data Management Plan) was published in 2022 on https://oceanexpert.org/document/31418.

However, the IODE data centre health check procedures was not finalized as planned and was not submitted to the IODE Management Group held in March 2022.

IODE-XXVII (2023)

At IODE-XVII it was noted that for a number of IODE NODCs and ADUs no response had been received to requests to update contact information (e.g. through IOC Circular Letter 2892 of 2 June 2022 and follow-up emails of 18 August 2022). In some cases, no contact had been made for over four years.

IODE-XXVII noted the slow progress on the IODE data centre health check procedures, although a short progress report was made available just prior to the meeting, decided to extend the "Inter-sessional working group on the review of NODC health status within the IODE network" for another inter-sessional period and instructed the working group to (i) provide a status report on the procedures to the IODE Management Group (2024); and (ii) finalize the procedures for submission to the 28th Session of the IODE Committee (2025).

IODE-XXVII:

(i)   instructed the IODE Management Group to take into account the procedures used by the SG-OBIS as a possible model in their deliberations.

(ii)   invited experts to join the working group and welcomed Sissy Iona (Greece), Sheldon Carter (OBIS ADU ISA, Jamaica), Lotta Fyrberg (Sweden), Lennert Tyberghein (OBIS SG), Yang Jinkun (China) and Mark Hebden (UK) as members of the group. (Existing members were Ms Clousa Maueua (Mozambique), Ms Michèle Fichaut (France), Ms Lesley Rickards (UK) and Ms Susanne Tamm (Germany)).

(iii) decided that, once a year, the IODE Secretariat should send out an IOC Circular Letter to all IOC Member States, inviting them to designate or update information on IODE national coordinators (data management and information management) and update the list on the IODE web site.

(iv)   noted the revision of IOC Manuals and Guides No. 5 (Guide for Establishing an IODE National Oceanographic Data Centre, IODE Associate Data Unit or IODE Associate Information Unit) and thanked contributors for their work.

(v) noted the revision of IOC Manuals and Guides No. 67 (IODE Quality Management Framework for National Oceanographic Data Centres and Associate Data Units (Revised edition)) and thanked contributors for their work.

(vi) noted the revision of IOC Manuals and Guides No. 73 (Guidelines for a Data Management Plan) and thanked contributors for their work.

IWG meeting (2023)

The IWG met online on 29 September 2023 and discussed and carried out revisions of the preliminary health status checks. The brief document, referred to above by Dr Lesley Rickards, was updated by Dr Rickards in July 2023 and the IWG was invited to take this document into consideration during its discussions.

IODE Management Group (February 2024)

The Management Group:

(i) Instructed the Secretariat to undertake a first provisional health status check of all NODCs by IODE-28 and based on the criteria documented in Document IOC/IODE-MG-2024/2.2.3;

(ii) Instructed the Secretariat, taking into account the experiences with the first provisional health status check preparations, to submit a revised version of Document IOC/IODE-MG-2024/2.2.3 to IODE-28 for approval.

(iii) Invited Secretariats of RSBs to collaborate in ensuring continued communication and participation with IODE after staff changes at NODCs, ADUs or AIUs.

2. Methodology of the First NODC Health Check

Dr Lesley Rickards and Mr Pissierssens further finetuned the criteria discussed and agreed upon by the IWG. This resulted in Table 1.

There are 8 checks which can be independently verified. Points are allocated to each check.

The IWG had suggested that if an NODC has fewer than 40% it is considered inactive and remedial measures need to be taken; these will vary from NODC to NODC depending on the local situation.

It is stressed that this first NODC health check is intended to be an indication for NODCs that are not active in the work of IODE as a partnership of data centres (its international activities). It does not measure the level of activity of the NODC for its national activities or its level of activity in sharing data. That can be considered for the next health check.

Table 1: Preliminary NODC health status checklist (Version 5, September 2024)

Item	NODC Status Check	Rationale	Comments
1.	The NODC contact point does not respond to e-mails/CLs/other communications, etc. Followed up by IODE Secretariat contacting the NODC host institution or IOC Action Address.	No response from the NODC contact point may indicate that the NODC is not active. If no reply from the host institution or Action Address, then NODC is considered inactive. A reply clarifies whether the NODC is active or inactive, and whether capacity development is required.	Currently the IODE Secretariat sends a Circular Letter every year to the IOC focal points and for cases where there was no answer this is followed up with emails to the IODE contacts concerned. This provides an independent check with the IODE secretariat holding the information. Failure to respond to the Circular Letter and subsequent communications within the past 2 years means that the NODC is inactive. **6 points** for response from NODC or host institution/IOC Action Address 2024: 3 points per response to email or CL.
2.	Has the NODC participated in IODE Committee meetings?	Can be checked independently from IODE Committee list of participants/meeting report. An NODC could be considered active if a representative has attended the past meetings.	Give 3 point/session attended (either online, when available, or in-person) going back 10 years max (so the NODC could gain a **max of 15 points**). 2024: check attendance in 2015, 2017, 2019, 2021, 2023
3	Has the NODC participated in inter-sessional group activities including surveys	Can be checked independently through lists of participants in online meetings and associated reports	Give 1 point per event/survey in which the NODC participated within the past 2 years with a maximum of **5 points**. 2024: only participation in the 11/2023 online survey was considered
4.	Does the NODC have a website with information about the NODC, contact points and services provided?	Request website address if not already known. Active website indicates an active NODC. Can be checked independently.	As part of the IOC circular letter and contacting NODCs the URL of the NODC will be requested (and checked by the IODE Secretariat) and included in the IODE web site. **3 points** for an <u>active</u> website/up to date 2024: existence of NODC web site checked
5.	Does the NODC website mention its role as an NODC in	Check NODC web site for reference and link.	**3 points** for a reference to IODE and link to IODE in the NODC web site

	the IODE programme (with link to the IODE website)		2024: does web site mention IODE role?
6.	Does the NODC contribute to/participate in IODE programme components, programme activities or projects.	Can be checked independently with the project leaders/steering groups and IODE Secretariat.	Give points if the NODC has participated in one or more IODE Programme Components, Activities or Projects **within the past 2 years**. Participation is defined as: membership of a steering group, providing data or information on a regular basis (and can be verified), providing training during a training course or hosting an intern, etc. Each "participation" results in **3 points, with a maximum of 24 points.** 2024: is an NODC staff member a member of a steering group of OBIS, ODIS/OIH, OTGA, GOSUD, GTSPP, ICAN, IQuOD, OBPS, QMF as indicator of involvement in IODE programme. GODAR and WOD are not currently included as they do not have steering groups, but will be included in future assessments.
7.	Capacity development plans and activities – has the NODC attended any IODE training courses (OTGA).	Can be checked independently through OTGA.	Assign **2 points/course within the past 2 years with a maximum of 6 points.** 2024: Has NODC completed OTGA courses (2 pts/course max 6 points)
8.	Does the NODC have accreditation (IODE or other)?	Certificate should be requested (for non-IODE accreditation) Examples: CTS, Nestor Seal, ISO,… For CTS, a list of certified repositories is available from their website (https://amt.coretrustseal.org/certificates)	Assign **6 points** 2024: Does NODC have IODE accredited NODC status?

Following placement on the "inactive" list by the IODE Committee, NODCs will be invited to take remedial action during the next inter-sessional period.

Table 2 below lists the possible remedial action which could be taken – as with the OBIS checks the local situation will be taken into account in aiding inactive NODCs back to a more active status. Other possible additional tools to assist an NODC "back to life" include IOC Manuals and Guides, OTGA training courses, twinning with an active NODC, internship at an active NODC, regional cooperation. Prior to the next Session of the IODE Committee they will be invited to be removed from the "inactive" list. Their progress will be evaluated by

the IODE Committee which may make a decision to remove the NODC from the list or to leave them on the list.

3. Results

The full table of results is included as Annex I.

Results have been summarized as follows:

Countries with score 0:   4   Cameroon, Comoros, DR Congo, Senegal

Countries with score 1 to 10:   10   Benin, Côte d'Ivoire, Guinée, Indonesia, Kazakhstan, Madagascar, Mauritania, Nigeria, Togo, Tunisia

65.5% of the NODCs obtained a score of less than 40% and 34.5% obtained a score of more than 40%. This indicates that the majority of NODCs requires attention in terms of their involvement in international IODE activities.

It is noted with concern that all but two of the low-scoring NODCs are located in Africa.

When analyzing the results it was remarked that the current set of health checks does not take into account whether NODCs share data internationally and does not report on data usage by users. It also does not include participation in groups other than Steering Groups, e.g. technical groups, task teams, regional groups, which can be included in future assessments.

It is important for the next iteration of the health check that NODC data sharing internationally is included, although it may not be straightforward to obtain this information for some projects where there may be multiple incoming data streams and data may also be harvested possibly leading to duplication of data and loss of association of with the relevant NODC may occur. Steering Groups could assist in providing this information.

4. Recommendations

4.1 Remedial actions for low-scoring NODCs

The IWG had recommended remedial actions for low scores in each of the 8 checks. These are listed in Table 2 below.

Table 2: Possible remedial actions to be taken by criteria.

Item	NODC Status Check	Action to be taken
1.	The NODC contact point does not respond to e-mails/CLs/other communications, etc. Followed up by IODE Secretariat contacting	• IODE Secretariat to contact head of the host organization to seek clarification and attempt to resolve the problem, possibly involving the IOC contact point.

	the NODC host institution or IOC Action Address.	
2.	Has the NODC participated in IODE Committee meetings?	• IODE Secretariat to contact the head of the host organization to promote IODE. • IODE to consider sponsoring participants through relevant extra-budgetary projects or through IOC CD travel grants. • IODE to consider making available on-line participation.
3	Has the NODC participated in inter-sessional group activities including surveys?	• IODE Secretariat to send multiple reminders.
4.	Does the NODC have a website with information about the NODC, contact points and services provided?	• Seek assistance from other NODCs. • Seek training on web site development.
5.	Does the NODC website mention its role as an NODC in the IODE programme (with link to the IODE website)?	• IODE Secretariat to urge NODCs to mention their role in IODE. • IODE Committee to urge IOC Member States to clearly mention IODE in their NODC web sites.
6.	Does the NODC contribute to/participate in IODE programme components, programme activities or projects?	• NODCs to identify activities for which they have expertise and participate.
7.	Capacity development plans and activities – has the NODC attended any IODE training courses (OTGA)?	• NODCs to check the OTGA web site for relevant courses and apply.
8.	Does the NODC have accreditation (IODE or other)?	• NODCs to study requirements for accreditation and apply. • IODE Secretariat to provide guidance upon request. • Accredited NODCs to provide assistance upon request.

4.1.1 Actions taken

Countries with score 0: Cameroon, Comoros, DR Congo, Senegal

24 September 2024: an email was sent to the NODC contact points informing them of their low score on the health test and offering a discussion to identify remedial action.

Responses received: None received by 3 October.

Countries with score 1 to 10: Benin, Côte d'Ivoire, Guinée, Indonesia, Kazakhstan, Madagascar, Mauritania, Nigeria, Togo, Tunisia

25 September 2024: an email was sent to the NODC contact points informing them of their low score on the health test and offering a discussion to identify remedial action. We could not send an email to Nigeria as the new NODC contact point had not been designated since May 2024.

<u>Responses received</u>:

Kazakhstan (26/9/2024):

Email communication: the past Kazakhstan NODC Coordinator, Mrs Natalya Ivkina retired after which we have lost contact with IODE. The new coordinator is Aizat Eltai. Communication can therefore resume.

Website: Kazakhstan's NODC - RSE "Kazhydromet" has its own website, where all information on the activities of enterprises in the field of hydrometeorological and environmental monitoring is presented: https://www.kazhydromet.kz/en/ . Also on the Caspian Sea page, you can get information about the Caspian Sea https://www.kazhydromet.kz/en/kaspiyskoe-more/kaspiyskoe-more

Mentioning IODE: Yes, here we have provided information about IODE activities: https://www.kazhydromet.kz/en/kaspiyskoe-more/mezhdunarodnyy-obmen-okeanograficheskimi-dannymi-i-informaciey-mood

Kazakhstan NODC does not contribute to/participate in IODE programme components, programme activities or projects.

Kazakhstan participated in - Training Course on the Implementation of Satellite Altimetry Data for Operational Metocean Services: Wave Height and Sea Surface Height [Blended], 17-21 September 2024

Kazakhstan NODC does not have accreditation.

Madagascar (27/9/2024: video call with Aina Le Don)

Mr Le Don took over as head of the NODC in 2022 and also moved abroad for studies. Also, the majority of messages were surveys or invitations to participate in meetings and he was unable to respond or was unable to attend because no funding was available. He was unable to respond to some of the surveys because he did not have the information. He would like to get more involved in IODE activities. He has returned to Madagascar recently. There will be 8 additional staff at the NODC (one recently attended an ACMA training in Mombasa; several funded by projects). A server is being established to store metadata (https://macmatlas.net/). Some further training on IODE matters will be welcome.

4.1.2 Recommendations to improve the overall participation of NODCs in international IODE activities

As reported under 3, 65.5% of the NODC obtained a score of less than 40% and 34.5% obtained a score of more than 40%. This indicates that the majority of NODCs requires attention in terms of their involvement in international IODE activities.

The following actions are recommended to improve the situation:
-   <u>Overall</u>: Consult with NODCs to assess their interest in participation in IODE and identify reasons if that interest is low;
-   <u>Criteria 1</u>: Consult with NODCs why they are not responding to emails or Circular Letters. Consult with NODCs if they have a good relationship with their IOC focal point(s);
-   <u>Criteria 2</u>: Consult with NODCs what are the reasons for low participation in sessions of the IODE Committee. In this regard it has been stated that the cost of participation in such 1-week events (including the IODC and IODE Session) is too high for most

developing countries. Their lack in participation then excludes them in the co-design and decision process of the IODE programme;

- Criteria 3: Consult with NODCs what are the reasons for low participation in inter-sessional activities such as working groups or online surveys;
- Criteria 4: Consult with NODCs what are the reasons for the lack of an NODC web site and discuss ways to assist;
- Criteria 5: Consult with NODCs what are the reasons for the lack of mentioning of IODE in their NODC web site;
- Criteria 6: Consult with NODCs what are the reasons for low participation in IODE programme components or programme activities;
- Criteria 7: Consult with NODCs what are the reasons for low participation in IODE training courses (OTGA);
- Criteria 8: Consult with NODCs what are the reasons for not applying for NODC accreditation.

It is recommended to undertake the above consultations as needed, based on the detailed results of the health check report in Annex 1.

4.2 Recommendations to improve health check criteria

As mentioned above, for this preliminary assessment, the current set of health checks does not take into account whether NODCs share data nationally, regionally or internationally and does not report on data usage by users. International data sharing through IODE components and activities will be included in future health checks. Additionally, we refer to the NODC metrics criteria mentioned under 1 above, identified in 2019 and 2020 which could enhance future NODC health checks (whilst noting that the health checks are intended to be independent assessments):

(i)   amount of data received/processed/archived
(ii)   data available online
(iii) metadata availability
(iv)   QA/QC implemented
(v)   long term preservation
(vi)   interlinkages established with ADUs (if any)
(vii) IODE QMF
(viii) contribution of data to OBIS/ODIS
(ix)   contribution of information to ODISCat
(x)   publications to OBPS
(xi)   capacity development plans and activities
(xii) funding
(xiii) participation in the international projects
(xiv) sustainable operations strategy (if any)

A number of these metrics mentioned are collected through the biennial NODC/ADU survey but more qualitatively and quantitatively. This is the case for (ii), (iii), (iv), (v), (vii), (viii), (ix), (xii). Note that some of these metrics are already included in the health checks (ii, iii, vii, viii, ix, xiii). Others are included as part of the IODE accreditation (ii, iii, iv, v, xi, xii, xiv), so it is important to encourage NODCs to become accredited.

To complement the information collected through the biennial survey It is therefore recommended to:

(i)   Consider the development of a data flow chart showing which NODCs share data with OBIS[1], ODIS, GTSPP, IQuOD, GOSUD, WOD, GODAR possibly with indication of data volume shared;

(ii)   Request usage data from NODCs (online services)

(iii)   Consolidate the information collected into NODC "NODC health report cards"

[end of document]

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[1] It is noted that most OBIS nodes are ADUs.

Annex I: NODC Health Check Report 2024

		Item 1		Item 2					Item 3	item 4	Item 5	Item 6									Item 7	Item 8	max score	
Country	Current contact	Response to comms. (6 pts)		Participation in IODE Sessions (15 points)					NODC participation in intersessional activities incl surveys (5 pts)	Is there NODC website. (4 pts)	Does website mention IODE NODC role (4 pts)	Participation in IODE programmes (3pts/particip, max 24 points) - membership in SG									Has NODC completed OTGA courses (2 pts/course max 6 points)	Does NODC have accreditation. (6 pts)	total score	% score
		CL 2269	email 2/7/24	2023	2021 (online)	2019	2017	2015	only 1: IODE user survey 11/23	Q in email 2/7/24	Q in email 2/7/24	>>>	OBIS	ODIS/ OIH	OTGA	GOSUD	GTSPP	ICAN	IQuOD	OBPS	2023-2024			
		3	3	3	3	3	3	3	1	4	4		3	3	3	3	3	3	3	3	6	6	66	100.0
Argentina	Scardilli Alvaro / Servicio de Hdrografía Naval	3	3	3	3	3	3	3	1	4	0		0	3	3	0	0	0	0	0	6		38	57.6
Australia	Rehbein Mark / Australian Ocean Data Network	3	3	3	3	3	3	0	1	4	0		0	0	0	0	0	0	0	0	0	6	29	43.9
Belgium BMDC	Lagring Ruth / Royal Belgian Institute of Natural Sciences, Operational Directorate Natural Environment, Belgian Marine Data Centre	0	3	3	3	3	3	3	1	4	4		3	0	0	0	0	0	0	0	6	6	42	63.6

Belgium VLIZ	Tyberghein Lennert	3	3	3	3	0	3	3	1	4	4		3	3	0	0	0	0	0	0	6	6	45	68.2
	Vlaams Instituut voor de Zee																							
Benin	DEGBE Cossi Georges Epiphane	0		0	0	0	0	0	1				0	0	0	0	0	0	0	0	4		5	7.6
	Centre de Recherches Halieutiques et Océanologiques du Bénin																							
Brazil	MALUF VLADIMIR	0		3	3	3	0	3	1				0	0	0	0	0	0	0	0	6		19	28.8
	Brazilian Navy Hydrographic Center, Directorate of Hydrography and Navigation																							
Bulgaria	Marinova Veselka	3	3	0	3	3	3	3	1	4	4		0	0	0	0	0	0	0	0	0		27	40.9
	Bulgarian Academy of Sciences, Institute of Oceanology																							
Cameroon	Ondo Ntyam Sylvie	0		0	0	0	0	0	0				0	0	0	0	0	0	0	0	0		0	0.0
	Ministère des Sciences et Innovation, Institut de Recherche Agricole pour le Développement. Centre de Recherche pour Ecosystèmes Marin (CERECOMA).																							
Canada	new name : Turnbull	3	3	0	3	3	3	3	1	4	0		3	0	0	0	3	0	0	0	6		35	53.0
	Marine Environmental Data Section (MEDS), Oceans Science Branch (DFO - OSB), Fisheries and Oceans Canada																							

Country	Name / Institution	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	Total	%
Chile	Calvete Teresa	3	3	0	3	0	0	3	1	4	4		0	0	0	0	0	0	0	0	0			21	31.8
China	SHI Suixiang / National Marine Data and Information Service	0	3	3	0	3	3	3	0	4	0		0	0	3	0	3	0	0	0	6		6	37	56.1
Colombia	Ortiz Martínez Ruby / Dirección General Marítima Colombia	3	3	0	3	0	0	0	1	4	4		0	3	0	0	0	0	0	0	4			25	37.9
Comoros	Abdoulkarim Ahmed / Centre National de Documentation et de Recherches Scientifiques	0		0	0	0	0	0	0				0	0	0	0	0	0	0	0	0			0	0.0
Côte d'Ivoire	N'GUESSAN Benjamin / Centre National de Recherches Océanologiques Abidjan	3	3	0	0	0	0	0	1	0	0		0	0	0	0	0	0	0	0	0			7	10.6
Croatia	Ivankovic Damir / Institute of Oceanography and Fisheries Croatia	0	3	3	3	3	3	3	0	3	0		0	0	0	0	0	0	0	0	2			23	34.8
Cyprus	Hayes Daniel / Oceanography Centre, University of Cyprus	3	3	0	0	0	0	0	1	0	0		0	0	0	0	0	0	0	0	0			7	10.6
DR Congo	Bope Lapwong Bope / Centre de Controle et Surveillance de	0		0	0	0	0	0	0				0	0	0	0	0	0	0	0	0			0	0.0

Country	Name / Institution																							
	la Pollution Marine																							
Ecuador	Bravo Manuel (profile not active!)	3		3	3	0	0	3	0			0	0	0	0	0	0	0	0	4		16	24.2
	Instituto Oceanográfico y Antártico de la Armada del Ecuador																						
France	Harscoat Valerie	3	3	3	3	3	3	3	1	4	4	0	0	0	3	3	0	0	0	2	6	44	66.7
	Institut Français de Recherche pour l'Exploitation de la Mer, Ifremer, Centre de Bretagne																						
Germany	Tamm Susanne	3	3	3	3	3	3	3	1	4	0	0	0	0	3	0	0	0	0	0		29	43.9
	Bundesamt fuer Seeschifffahrt und Hydrographie (Federal Maritime and Hydrographic Agency)																						
Ghana	Ofoli-Anum Eunice	0	3	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	6		13	19.7
	Ministry of Fisheries and Aquaculture Development, Fisheries Commission																						
Greece	Iona Athanasia	0	3	3	3	3	0	3	1	4	4	3	0	0	0	0	0	0	3	0		30	45.5
	Hellenic Centre for Marine Research (HCMR), Hellenic National Oceanographic Data Centre (HNODC)																						

Country	Name / Institution																							
Guinea	Bangoura Kandè / Centre de Recherche Scientifique de Conakry Rogbanè	0	3	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		3	4.5
India	VS Udaya Bhaskar Tata / Indian National Centre for Ocean Information Services	0	3	3	3	3	3	3	1	4	4		0	0	3	0	0	0	0	0	6		36	54.5
Indonesia	RIZA Hammam / Badan Pengkajian dan Penerapan Teknologi, Agency for the Assessment & Application of Technology	0			0	0	3	0	0	0			0	0	0	0	0	0	0	0	0		3	4.5
Iran (Islamic Republic of)	Tavakoli Mortaza / Iranian National Institute for Oceanography and Atmospheric Science	3	3	3	3	3	3	0	1	4	4		3	0	0	0	0	0	0	0	6	6	42	63.6
Ireland	O'Grady Eoin / Marine Institute Headquarters, Galway	0	3	3	3	3	0	3	1	4	9		0	0	0	0	0	0	0	0	6	6	41	62.1
Israel	Gertman Isaac / Israel Oceanographic & Limnological Research	3			0	3	3	0	3	1			0	0	0	0	0	0	0	0	0		13	19.7
Italy	Giorgetti Alessandra / Istituto Nazionale di	0	3	3	3	3	3	0	1	4	4		0	0	0	0	0	0	0	0	4	6	34	51.5

Country	Institution																									
	Oceanografia e di Geofisica Sperimentale, Trieste																									
Japan	Komori Tatsuo Japan Oceanographic Data Center	0	3	3	3	3	3	3	0	4	4		0	0	0	0	0	0	0	0	0		6	32	48.5
Kazakhstan	Ivkina Natalya РГП "Казгидромет"	0		0	3	0	0	0	0				0	0	0	0	0	0	0	0	0			3	4.5
Kenya	ONGANDA Harrison Kenya Marine and Fisheries Research Institute, Headquarter & Mombasa Station	0		0	3	0	0	3	1				3	3	3	0	0	0	0	0	4			20	30.3
Madagascar	NOMENISOA Aina Le Don Institut Halieutique et de Sciences Marines	3	3	0	0	0	0	0	1	0	0		0	0	0	0	0	0	0	0	0			7	10.6
Mauritania	Ould Hamady Bambaye Institut Mauritanien de Recherche Océanographique et des Pêches	0		0	0	0	0	0	1				0	0	0	0	0	0	0	0	0			1	1.5
Mauritius	Runghen Hemanaden Department for Continental Shelf, Maritime Zones Administration and Exploration	3	3	0	0	0	0	0	0	4	4		0	0	0	0	0	0	0	0	2			16	24.2
Mexico	Hernandez Ayon Jose Universidad Autónoma de Baja California	0	3	0	3	0	3	0	0	0	0		0	0	0	0	0	3	0	0	0			12	18.2

Country	Name / Institute																					Total	%
Mozambique	Maueua Clousa Insituto Nacional de Hidrografia e Navegaco	3		0	3	0	3	0	1			0	0	3	0	0	0	0	0	6		19	28.8
Netherlands	De Bruin Taco Koninklijk Nederlands Instituut voor Onderzoek der Zee	0		3	3	3	3	3	1			0	3	0	0	0	0	0	0	0		19	28.8
Nigeria	FOLORUNSHO REGINA Nigerian Institute for Oceanography and Marine Research	0		0	3	0	0	3	1			0	0	0	0	0	0	0	0	0		7	10.6
Norway	Sagen Helge Institute of Marine Research (IMR), Bergen	0	3	3	3	3	3	0	1	4	0	0	0	0	0	0	0	0	0	4	6	30	45.5
Pakistan	Lodhi Uzair National Institute of Oceanography, Karachi	3	3	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0		10	15.2
Panama	López Yolanda Universidad de Panama - Instituto de Geociencias	0	3	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	6		10	15.2
Peru	Morote Somontes Giacomo Marina de Guerra del Perú, Dirección de Hidrografía y Navegación	0		0	0	0	0	3	1			0	0	0	0	0	0	0	0	6		10	15.2

Country	Name / Institution																								Total	%
Portugal	Dias Telmo Instituto Hidrográfico Lisboa and Silveira Tanya Instituto Português do Mar e da Atmosfera, I. P.	0	3	3	3	3	0	0		1	4	4		0	0	0	0	0	0	0	0	4		25	37.9
Republic of Korea	Lee Joon-Soo Ministry of Oceans and Fisheries (MOF), National Institute of Fisheries Science (NIFS)	0	3	3	3	3	3	3		1	4	4		0	0	0	0	0	0	0	0	2	6	35	53.0
Romania	Buga Luminita National Institute for Marine Research and Development "Grigore Antipa"	0	3	3	3	0	0	0		1	4	4		0	0	0	0	0	0	0	0	0		18	27.3
Russian Federation	Vorontsov Alexander All-Russian Research Institute Hydrometeorological Information - World Data Center, Obninsk	3			3	3	3	3	3		1			0	0	0	0	0	0	0	0	0		19	28.8
Senegal	Faye Saliou Centre de Recherche Océanographique de Dakar Thiaroye (CRODT-ISRA)/ LPAOSF-ESP-UCAD	0			0	0	0	0	0		0			0	0	0	0	0	0	0	0	0		0	0.0

Country	Name / Institution																						Total	%
Slovenia	Cermelj Branko — National Institute of Biology, Marine Biology Station, Piran	0	3	0	3	0	0	0	1	4	4		0	0	0	0	0	0	0	0	0		15	22.7
Spain	Tel Elena — Instituto Español de Oceanografía	0	3	0	3	3	3	3	1	4	0		0	0	0	0	0	0	0	0	0		20	30.3
Sweden	Fyrberg Katarina Lotta — Sveriges meteorologiska och hydrologiska institut	3	3	3	3	3	3	3	1	4	4		0	0	0	3	0	0	0	0	4		37	56.1
Togo	ADJOUSSI Pessièzoum — Université de Lomé, Centre De Gestion Integrée du Littoral et de Environnement	0	3	0	0	0	0	3	0	0	0		0	0	0	0	0	0	0	0	0		6	9.1
Tunisia	Bel Hassen-Abid Malika — Institut National des Sciences et Technologies de la Mer, Salambo	0		0	0	0	0	0	0				0	0	0	0	0	0	0	0	2		2	3.0
Türkiye	KALEM Eray — Turkish Naval Forces, Office of Navigation, Hydrography and Oceanography	0	3	0	3	0	0	0	0	4	4		0	0	0	0	0	0	0	0	0		14	21.2
Ukraine	Komorin Viktor — Ukrainian Scientific Centre of Ecology of the Sea	0	3	0	3	0	0	0	1	4	4		3	0	0	0	0	0	0	0	0		18	27.3

United Kingdom	Hebden Mark	3	3	3	3	3	3	3	1	4	4		0	0	0	0	0	0	0	0	6		6	42	63.6
	British Oceanographic Data Centre																								
Tanzania (United Republic of)	MASALU Desiderius	0	3	0	3	0	0	0	1	4	4		0	0	0	0	0	0	0	0	2			17	25.8
	University of Dar es Salaam, Institute of Marine Sciences																								
United States	Garcia Hernan	3	3	3	3	3	3	3	1	0	0		0	3	0	3	3	0	0	0	0			31	47.0
	NOAA NESDIS National Centers for Environmental Information (NCEI)																								

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