Intergovernmental Oceanographic Commission
Reports of Meetings of Experts and Equivalent Bodies

IOC Group of Experts on Capacity Development

First Session

Paris, France
21–23 March 2018

UNESCO

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IOC/GE-CD-I/3
Paris, 27 March 2018
English only

View of the room

Mr Ariel Troisi, Chair and Mr Vladimir Ryabinin, IOC Executive Secretary

For bibliographic purposes this document should be cited as follows:
IOC. 2018. *Group of Experts on Capacity Development (GE-CD), First Session, Paris, France, 21-23 March 2018.* Paris: UNESCO, 83 pp. 2018. Reports of Meetings of Experts and Equivalent Bodies.

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ANNEXES

1. OPENING OF THE MEETING

1.1 ADDRESS BY THE IOC EXECUTIVE SECRETARY

The First Meeting of the Group of Experts on Capacity Development was held in Paris from 21 to 23 March 2018. The meeting was addressed by Mr Vladimir Ryabinin, Executive Secretary of the Intergovernmental Oceanographic Commission (IOC). Mr Ryabinin recalled the IOC Medium-Term Strategy 2014-2021 (IOC/INF-1314) that comprises: healthy ocean ecosystems; effective early warning systems (e.g. tsunami); resilience to climate change and variability by science-based services, and adaptation and mitigation strategies; and emerging ocean science issues. He also recalled the six IOC functions including ocean research, observing system/data management, early warning and services, assessment information for policy, sustainable management and governance and also, in the middle, serving all, capacity development. Mr Ryabinin noted that IOC is active at the global level but also at the regional level with three regional Sub-Commissions (IOCAFRICA, IOCARIBE and WESTPAC) and one regional committee (IOCINDIO). During the past two decades, the IOC has developed a powerful Global Ocean Observing System (GOOS) and four regional tsunami warning systems. IOC also has an active capacity development range of activities.

Mr Ryabinin then proceeded to consider the Ocean ("Blue") Economy and Ocean Management domains, noting that the oceans related economy represents $2.5 tn. IOC is involved in Marine Spatial Planning. He further recalled the publication of the first Global Ocean Science Report. This revealed considerable differences in capacity amongst IOC Member States. He then introduced the United Nations Decade of Ocean Science for Sustainable Development (2021–2030) and identified the following potential breakthroughs:

- Complete ocean bottom mapping,
- Knowledge of deep sea and ocean floor,
- Ocean literacy take to schools,
- Comprehensive genetic picture of ocean – eDNA,
- Guided adaptation of ocean ecosystems – esp. coral reef ecosystems,
- New level in marine informatics and data/information services – Portal,
- Ocean prediction – also for life in the ocean and fisheries,
- Ocean science for climate services,
- Ocean observations and science fit and recognised for informed ocean governance.

The initial objectives (foci) of the Decade will include:

- Knowledge of the ocean for Sustainable Development,
- Cumulative stressors and ecosystems-based management,
- Ocean-related hazards,
- Oceanographic infrastructure, technology,
- Scientific and technical capacity and education, ocean literacy,
- Partnership, cooperation, coordination, and communication.

The Decade will have a strong Capacity Development (CD) component with the following targets of the IOC CD strategy:

- Human Resources, Infrastructure,
- Global, regional, sub-regional (national) mechanisms,
- Research policies for sustainable development,
- Visibility and awareness,
- Sustained resource mobilization.

1.2 ADOPTION OF AGENDA AND TIMETABLE

This agenda item was introduced by Mr Peter Pissierssens, IOC CD coordinator. He referred to the IOC Capacity Development web page

(http://ioc-cd.org/index.php?option=com_oe&task=viewEventAgenda&eventID=2166), which includes the Agenda, List of Documents and List of Participants. Regarding the List of Participants, Mr Pissierssens invited all participants to check their information and to make any corrections online through the OceanExpert web site prior to the end of the meeting so a corrected version of the List can be included in the summary report of the meeting.

He explained that the first day would be composed of presentations to review progress since the adoption of the Strategy. He recalled that members of the Group had been grouped by region (IOCAFRICA, IOCARIBE, IOC/WESTPAC and IOCINDIO) and invited to revise the input provided for Document IOC Capacity Development Strategy, 2015–2021 and its Implementation Plan: Status Report (IOC-XXIX/2 Annex 17). This exercise has resulted in the documents listed under Agenda Items 3.1 to 3.4. Representatives of each of the four regions would be invited to provide a brief presentation on their document. Next, representatives of the IOC global programmes would be invited to make similar presentations. An additional presentation would also be provided on Transfer of Marine Technology. Finally, presentations would be provided by representatives of current IOC CD projects or methodologies as well as from partner organizations.

Mr Pissierssens further introduced the Provisional Timetable of the meeting. He recalled that Mr Ariel Troisi had kindly volunteered to Chair this Session of the Group. He noted that, if there were other candidates to take over as Chair for the next inter-sessional period (until IOC-XXX) they should inform the Secretariat during the Session. Mr Troisi had informed the Secretariat that he was willing to continue as Chair, if the Group so desired.

The Group **adopted** the Agenda and Timetable for the meeting.

Mr Pissierssens informed the Group that all PowerPoint presentations were available from the IOC Capacity Development webpage (documents preceded by “PPT:”).

Mr Pissierssens further informed the Group that the report on discussions of day 1 would be circulated during the evening of day 1 and the same for day 2. Participants were invited to send any edits (factual only) to p.pissierssens@unesco.org to make corrections to the draft report.

Regarding the membership of the Group, Mr Pissierssens informed the Group that the full list of members is available from the Directory of the Ocean Expert website at https://www.oceanexpert.net/group/372.

2. THE IOC CD STRATEGY AND TMT GUIDELINES

2.1 PRESENTATION ON THE IOC CAPACITY DEVELOPMENT STRATEGY AND TRANSFER MARINE TECHNOLOGY GUIDELINES

This agenda item was introduced by Mr Ariel Troisi, Chair of the Group. He referred to documents *IOC Capacity Development Strategy 2015-2021* (IOC/INF-1332) and *IOC Criteria and Guidelines on the Transfer of Marine Technology* (IOC/INF-1203).

Mr Troisi recalled that CD is a key component of IOC's programme. He recalled the adoption by the IOC Assembly in 2015 of the Resolution IOC-XXVIII-2 on IOC Capacity Development Strategy, noting the Vision Statement of IOC's CD Strategy:

[…] Through international cooperation, IOC aspires to help its Member States to collectively achieve the IOC'S high-level objectives (HLOs), with particular attention to ensuring that all Member States have the capacity to meet them.

And the Mission Statement:

The IOC will undertake relevant actions to assist Member States with developing and sustaining the necessary capacity to undertake activities necessary to achieve the IOC vision at the national level as well as at the international cooperation level.

He recalled the 6 outputs and 13 activities of the Strategy (see Figure 1):

Output	Activity
1. Human resources developed	1.1 Academic (higher) education
	1.2 Continuous professional development
	1.3 Sharing of knowledge and expertise/ community building
	1.4 Gender balance
2. Access to physical infrastructure established or improved	2.1 Facilitating access to infrastructure (facilities, instruments, vessels)
3. Global, regional and sub-regional mechanisms strengthened	3.1 Further strengthening and supporting secretariats of regional commissions
	3.2 Enhance effective communication between regional sub-commission secretariats and global programmes as well as other communities of practice (incl. other organisations)
4. Development of ocean research policies in support of sustainable development objectives promoted	4.1 Sharing of information on ocean research priorities
	4.2 Developing national marine science management procedures and national policies
5. Visibility and awareness increased	5.1 Public Information
	5.2 Ocean Literacy
6. Sustained (long-term) resource mobilization reinforced	6.1 In-kind opportunities
	6.2 Financial support by Member States to IOC activities

Figure 1. IOC CD strategy outputs and activities.

Mr Troisi noted that the outputs are all inter-related and essential. He demonstrated that the IOC already has a very extensive range of CD activities responding to most of the outputs. He recalled that a gap analysis had been prepared for the 2017 Assembly (agenda item 2.2).

Mr Troisi then recalled the document of the *IOC Criteria and Guidelines on the Transfer of Marine Technology* published in 2005. In that context Marine Technology was defined as […] *instruments, equipment, vessels, processes and methodologies required to produce and use knowledge to improve the study and understanding of the nature and resources of the ocean and coastal areas*.

He noted that the requirement for a CD Implementation Plan was an excellent opportunity to also address the follow-up to the IOC Criteria and Guidelines on TMT.

He then introduced the different mechanisms for TMT (Figure 2), noting that most are already available. Exceptions are: List of donors and Rules/Regulations/Case Law Studies on TMT& MSR.

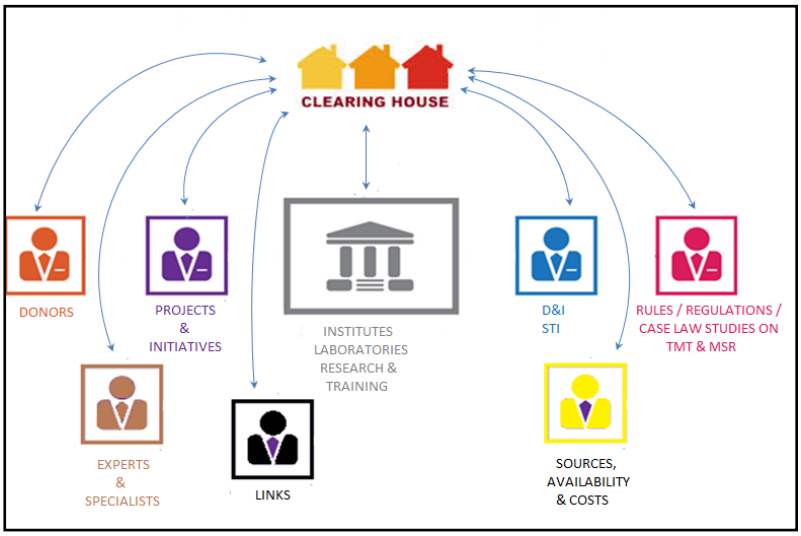

Figure 2. Mechanisms for TMT

Finally, it is important to embed TMT at national level through relevant focal points. It was noted that the current strategy will cover 2015–2021 and that a new strategy will be needed beyond 2021. This will enable taking into account the UN Decade of Ocean Science for Sustainable Development.

Mr Barbière, Chief of the Marine Policy and Regional Coordination Section (IOC/MPR), noted that the UN Decade on Ocean Science for Sustainable Development will need to address capacity development on marine technology. The IOC CD Strategy will need to deal with this. He also informed the Group that during the next two years there will be extensive consultations with Member States, scientific community, users etc. on the Decade planning. As a mechanism for such consultation, the IOC may organize workshops (global and/or regional) during 2018 and 2019. Also, CD needs and actions will need to be discussed at those occasions and the IOC Group of Experts on CD may be needed for advice.

Mr Troisi recalled that there will be discussions between regions and global programmes so discussions can be held with MPR on this matter. The results of the work of the Group will be reported to the 2019 Assembly and will be an important input for the Decade. However, he highlighted that it is a UN decade and not an IOC Decade.

Mr Ryabinin asked about the meaning of the term “clearing”. He explained the importance of using understandable language in order to do not take time to get engaged in these discussions.

Ms Lescrauwaet referred to the 2013 IOC CD baseline survey and requested that this document would be made available for the discussions. The document was added to the List of Documents.

2.1.1 Ocean Literacy

Ms Francesca Santoro, IOC Ocean Literacy Programme Specialist, introduced this item. She started by introducing the concept and definition of ocean literacy (OL). Ocean literacy is defined as the understanding of the ocean's influence on humans and the humans' influence on the ocean. An ocean literate person is able to understand the importance of the ocean to humankind, can communicate about the ocean in a meaningful way, and is able to make informed and responsible decisions regarding the ocean and its resources. While education and traditional advertising can be effective in creating awareness, numerous studies document that behaviour change rarely occurs as a result of simply providing information, but through initiatives delivered at the community level focusing on removing barriers to an activity and therefore enhancing the activity's benefits.

In more detail, ocean literacy is more than just educating or informing the public and the marine and maritime stakeholders about the importance of oceans. Ocean literacy, through the use of behavioural change methods and by adopting a system approach, aims at facilitating the creation of an ocean literate society.

The ocean literacy framework is based on 7 essential principles that, by design, are overarching ideas that do not neatly fall within a particular ocean science discipline.

Increased Visibility and Awareness is one of the foreseen outputs of the Intergovernmental Oceanographic Commission (IOC) Capacity Development Strategy. This output should be achieved through two main activities: (i) Promotion and development of public information (communication) departments in ocean research institutions; (ii) Development and enhancement of an IOC ocean literacy programme as a community of practice for sharing experiences within and across regions.

Ms Santoro further presented the main objectives of ocean literacy in the framework of the IOC CD Strategy. Increasing ocean literacy at all levels of national, regional and local leadership will build the capacity for adaptation, enhance the resilience of vulnerable communities, promote best practices in resource management and encourage innovative solutions for a sustainable economy and disaster risk management. Leaders and citizens that have an understanding of ocean and climate science, and who can access information, will be better prepared to respond effectively to future ocean challenges.

The current IOC Ocean Literacy activities have been developed accordingly by identifying the major target groups, e.g. scientists, policy-makers, educators, media, and the private sector. Furthermore, the activities have been implemented at different levels.

On a global level, an international initiative called Ocean Literacy for All has been initiated at the occasion of the UN Ocean Conference that was held in New York in June 2017. Building on existing national, regional, and international ocean education initiatives, this initiative has three main goals:

1. Encourage cooperation and exchange on ocean education to improve ocean literacy;

2. Raise awareness of the two-way interactions between the ocean and people's daily lives, and empower citizens to adjust their everyday behaviour; and

3. Seek and apply innovative ways to make our current and future citizens ocean literate, so that they recognize environmental challenges and can make informed and responsible decisions related to ocean stewardship and the use of ocean resources.

In order to support the implementation of this initiative, an international ocean literacy conference was held in Venice on 4 and 5 December 2017, and an IOC ocean literacy platform to share resources, information on projects and people on ocean literacy for sustainable development will be launched in April 2018.

The IOC is supporting the development of ocean literacy activities at regional level, by cooperating with regional marine science educators associations, such as the ones in Europe and Asia, as well as by supporting the creation of national ocean literacy networks, such as the one established in Italy in 2017, Conoscere il mare, Ocean Literacy Italia (OLI).

Ms Santoro concluded highlighting the potential and strategic role of ocean literacy in the implementation of the 2030 Agenda for Sustainable Development. Ocean literacy can contribute, not only to the implementation of the Sustainable Development Goal 14, but also to SDG 4 on Quality Education for all. Furthermore, in the context of the of the upcoming UN Decade of Ocean Science for Sustainable Development, ocean literacy can be seen as an approach to contribute to the transformation of the way in which governments, citizens, and other stakeholders perceive the ocean, and the role of ocean science and ocean research for sustainable development.

Mr Sakya suggested that OL is deemed necessary to targeting those the most impacted by ocean hazards that is coastal community, in addition to major target group above mentioned.

2.2 PROGRESS STATUS REPORT

This agenda item was introduced by Mr Peter Pissierssens. He referred to document IOC Capacity Development Strategy, 2015–2021, and its Implementation Plan: Status Report (IOC-XXIX/2 Annex 17).

He recalled that the 27th Session of the IOC Assembly (IOC-XXVII), held in Paris from 26 June to 5 July 2013, established an Intersessional Working Group for Developing a Draft Strategic Plan for Capacity Development. The work of the Group resulted in the adoption of Resolution IOC-XXVIII-2 on the IOC Capacity Development Strategy (2015-2021) by the 28th Session of the IOC Assembly (IOC-XXVIII) in 2015, which was published the same year. The Strategy identifies 6 outputs that all need to be addressed on a long-term and sustained basis.

Within the same Resolution, the Assembly also agreed that the IOC global and regional programmes needed to develop programmatic and regionally relevant capacity development work plans based on this strategy and related needs assessments conducted in a consistent manner, building on ongoing activities and making use of existing training and education facilities.

This resulted in a comprehensive document submitted to the 29th Session of the Assembly (IOC-XXIX), held in Paris from 21 to 29 June 2017(referred to above), that includes mappings between the six outputs and relevant actions of all IOC programmes. This revealed a number of gaps that need to be addressed. The document also compares the IOC CD Strategy outputs with the IOC Criteria and Guidelines on the Transfer of Marine Technology defined in 2005 noting that a number of required tools have already been developed.

However the document submitted to the Assembly was only a draft because the timing of meetings of the four regional bodies was too close to the deadline date for submission of Assembly documents.

2.3 INSTRUCTIONS FROM THE IOC ASSEMBLY

This agenda item was introduced by Mr Ariel Troisi, Chair of the IOC Assembly.

Mr Troisi recalled that, in order to continue the work that should lead to a detailed implementation plan, the Assembly at its 29th Session had established the IOC Group of Experts on Capacity Development.

The tasks assigned to the Group are:

- Assist global and regional programmes with the implementation of capacity development needs assessments in a consistent manner;
- Assist global and regional programmes with the development of programmatic and regionally relevant capacity development work plans based on the IOC CD Strategy and related needs assessments, building on ongoing activities and making use of existing training and education facilities;
- Assist with the mobilization of financial and in-kind resources to enable the implementation of global and regional capacity development work plans;
- Provide advice to global and regional programmes on relevant methods and tools to improve the quality and impact of CD efforts;
- Advise the Assembly on, and start implementation of the Transfer of Marine Technology Clearing House Mechanism (CHM) as requested by the *IOC Criteria and Guidelines on the Transfer of Marine Technology* making use, to the largest extent possible, of existing data and information systems already available at IOC.

The Group will need to submit its work to the upcoming 30th Session of the IOC Assembly that will take place in 2019. Mr Troisi then recalled that all programmes would be invited to present progress with revising the mapping and gap analysis under agenda items 3 and 4.

In response to a question on follow-up actions, Mr Troisi informed the Group that additional work of the Group would probably need to be undertaken by e-mail as funds for CD coordination are very limited and the 2018 budget has been used for the current meeting. The planning for the work that should be undertaken inter-sessionally will depend on the outcome of the current meeting. He expected that the work done on Thursday during the break-out group meetings would determine the work plan for the coming year, taking into account that the working document for the 30th Session of the IOC Assembly in 2019 would need to be ready by March or April 2019.

3. PRESENTATIONS ON REGIONAL PROGRAMMES AND THEIR CAPACITY DEVELOPMENT WORK PLANS

3.1 IOCAFRICA

This agenda item was introduced by Mr Mika Odido, IOC Coordinator in Africa. He referred to the document Review of IOCAFRICA Capacity Development Requirements (IOC/GE-CD-I/Ag3.1).

Mr Odido recalled that the IOCAFRICA Sub-Commission was established in July 2011 with the mission to:

[…] *Promote regional and international cooperation for the understanding and management of the African oceans and coastal ecosystems, in order to ensure sustainable development and safety of the coastal populations, taking into account the priorities of Member States from Africa*.

And the following Vision Statement:

[…] to be the voice of Africa on matters related to ocean science and the science base for ocean management, providing a unique Africa-wide platform, bringing together Member States, UN agencies and other stakeholders, to drive research, observations, and disaster preparedness and mitigation for the sustainable management of the African oceans and coastal areas.

IOCAFRICA identified the following expected results:

- Understanding of the ocean and coastal processes around Africa,
- Monitoring early warning systems for coastal and oceanic natural hazards,
- Understanding of how African oceans and coastal areas will be impacted by changing climates,
- Managing and mitigating the impacts of coastal hazards and climate change,
- Strengthening of marine and oceanographic training and research institutions,
- Creation of critical mass of marine science professionals.

These will be under the following themes:

- Ocean Observations and Monitoring,
- Ocean Sciences and Assessments,
- Ocean Data and Information Management,
- Capacity Development in Marine Science and Technology,
- Public Awareness and Science-Policy Interface.

We refer to the slides for details on each of the themes. For Capacity Development the following priorities were identified:

- Development of an IOCAFRICA Capacity Development portal,
- Continuous professional development for marine scientists from the region,
- Strengthening and development of regional training centres,
- Strengthening ocean science programmes in African Universities,
- Mentorship and programmes targeting youth and female scientists,
- Organize training courses and workshops on the following topics: operational oceanography, ocean modeling and forecasting, marine biodiversity, marine spatial planning, and Identification of HABs.

Mr Odido proceeded to clarify how IOCAFRICA responds to each of the 6 IOC CD Strategy outputs and what are the gaps:

OCEAN OBSERVATIONS AND MONITORING	
HUMAN RESOURCES	Critical mass of experts in ocean observations and monitoring has not been achieved by most member states from the region.
PHYSICAL INFRASTRUCTURE	– Sea level stations installed by ODINAFRICA, tsunami programme, and national institutions are the most wide spread equipment for ocean observations/monitoring. – Few member states from the region have ocean going research vessels, unmanned vehicles, or moorings. – Most of the work done off small boats. – New assessment of availability of equipment and platforms important.
GLOBAL, REG. & SUBREGIONAL MECHANISMS	– GOOS regional network needs to be re-activated and strengthened.
OCEAN RESEARCH POLICIES	
VISIBILITY AND AWARENESS	– The cruises by the SA Agulhas and the RV Dr Fridjhof Nansen have provided opportunities for awareness and visibility for ocean observations. However, these opportunities were not optimally exploited.
RESOURCE MOBILIZATION	– This is an area in direct need of resources. – South Africa and Kenya have provided their research vessels for surveys and training.
OCEAN SCIENCES & ASSESSMENTS	
HUMAN RESOURCES	– Good progress in developing capacities in marine biodiversity and HAB studies as well as climate change. – Topics such as ocean acidification, oxygen depletion need more attention. – Participation in WOA-1 was limited.
PHYSICAL INFRASTRUCTURE	– Insufficient equipment and platforms.
GLOBAL, REGIONAL AND SUBREGIONAL MECHANISMS	– Regional networks for HAB and OBIS have been set-up. – Climate change and variability work with IGAD Climate Predication and Application Centre
OCEAN RESEARCH POLICIES	
VISIBILITY AND AWARENESS	– Relevant global programmes could assist in awareness on ocean sciences and assessments. – Proposal to link ocean science and marine archaeology programme (UCH/STAB
RESOURCE MOBILIZATION	

OCEAN DATA & INFORMATION MANAGEMENT	
HUMAN RESOURCES	– The four phases of ODINAFRICA provided useful training for core group of experts. This is now supported by the OTGA regional training centres which organize an average of 5 courses/year.
PHYSICAL INFRASTRUCTURE	– ODINAFRICA provided equipment, some of which may now be outdated. Some of the active NODCs have continued to renew the equipment with resources from the host institutions.
GLOBAL, REGIONAL & SUBREGIONAL MECHANISMS	– The ODINAFRICA network should be re-activated through joint activities and products development. Examples include the Atlases, African register of marine species, and the African Ocean data portal.
OCEAN RESEARCH POLICIES	– Some of the institutions now have data policies. – However few (maybe none?) of the countries have data policies governing access to and exchange of ocean data, or even research data in general.
VISIBILITY AND AWARENESS	– Relatively good visibility and awareness compared to other IOCAFRICA priority areas. However, there is room for improvement.
RESOURCE MOBILIZATION	– Follow-up project should be developed to build on the achievements of ODINAFRICA.
CAPACITY DEVELOPMENT	
HUMAN RESOURCES	– The number of trainers available in the Member States from the region has increased in recent years. Trainers with higher level qualifications (MSc and PhD) still required for some of the priority areas.
PHYSICAL INFRASTRUCTURE	– Most of the Member States in the region now have institutions offering training in marine sciences. However, many of them are not well equipped for this purpose.
GLOBAL, REGIONAL & SUBREGIONAL MECHANISMS	– The Forum for Academic and Research Institutions has provided a useful mechanism for collaboration in Eastern Africa. – The Early Career Scientists Network is also developing into a useful network that could cover the whole continent. – The Western Indian Ocean Marine Sciences Association is another active network in Eastern Africa. – The marine science institutions in the region should also utilize existing science and technology networks in Africa (e;g. African Network of Scientific and Technological Institutions -ANSTI and the Conference of Vice-Chancellors, Deans of Science, Engineering and Technology - COVIDSET).

OCEAN RESEARCH POLICIES	
VISIBILITY AND AWARENESS	
RESOURCE MOBILIZATION	– Support for capacity development has been provided by Flanders-Belgium, China and Korea. – South Africa and Kenya have provided their research vessels for surveys and training.
PUBLIC AWARENESS & SCIENCE-POLICY (including GOVERNANCE)	
HUMAN RESOURCES	– Some training on communications for marine sciences (including websites development and use of social networks) has been provided in the framework of ODINAFRICA and OTGA. – This is an important priority area for which capacity development should be implemented.
PHYSICAL INFRASTRUCTURE	– Internet access in Africa has improved significantly in recent years, providing an excellent platform for awareness creation through the use of websites, social media and blogs. – However, this opportunity is still not utilized optimally due to limitation of bandwidths in some institutions, lack of terminal equipment and the skills required for this.
GLOBAL, REGIONAL & SUBREGIONAL MECHANISMS	– Collaboration with regional organizations and projects is crucial for this.
PUBLIC AWARENESS & SCIENCE-POLICY (including GOVERNANCE) cont….	
OCEAN RESEARCH POLICIES	– Several countries have established ministries responsible for ocean issues, which have focused on development of ocean policies. A new survey on existing ocean and research policies should be undertaken.
VISIBILITY AND AWARENESS	– African day of oceans and seas for ocean literacy programme. – World Oceans Day: examples Artwork and Ocean Essays competition for -hildren and youth. – Technical/media and policy briefs should be prepared for targeted groups. – Follow-up to IOCAFRICA mission to Africa Union and UNECA. – Linkages between regional programmes of IOC/WMO/IHO. – Participation in relevant AU and its ministerial meetings as well as that of regional economic commissions.

	– Involvement of landlocked countries in ocean literacy activities.
RESOURCE MOBILIZATION	

Figure 3. IOCAFRICA response to each of the 6 IOC CD Strategy outputs and what are the gaps.

He then showed the elements of the IOCAFRICA CD Programme:

- Strengthening marine science laboratories to be engaged in marine science observations, monitoring and applications.
- Strengthening existing or creating new university programmes to educate the next generation of leaders.
- Strengthen UNESCO Chairs as a tool for capacity development and establishing centres of excellence and Regional Training Centres (OTGA).
- Organisation of focussed training, such as workshops and "summer schools', addressing specific needs identified by Member States.
- Continuous professional development to ensure that scientists and technical staff keep up to date with new developments in their fields (including fellowships/scholarships, participation in conferences, researcher mobility programmes).
- Ensuring equitable participation of African marine scientists in IOC programmes and other global ocean research and observation programmes.
- Collaboration with other IOC Sub Commissions (IOC-WESTPAC and IOCARIBE) in capacity development.

Following a question from POGO about the most adapted method of human resources development in Africa, Mr Odido responded that this had been discussed by IOCAFRICA and the conclusion was that locally embedded training was preferred. Mr Odido noted that the number of Universities in Africa offering marine science training has increased considerable in recent years.

Mr Blivi noted the continuing lack of equipment in Africa, rather than a lack of trained staff. He also stressed the need to transfer IOC programmes into national policies. This will avoid the lack of sustainability of project-based activities that shut down once the donor funding ends.

Mr Barbière added that the lack of a linkage between research and policy is creating a risk when policies are formulated without scientific underpinning. In this regard, he asked for special attention to output 4 of the CD Strategy.

Mr Ryabinin noted that we need innovative and ambitious ideas to achieve progress. One is a campaign for equipment. Another need is to aim at getting research into national ocean policies. We need to go to the highest echelons of power in Africa. The African Union should be involved. Mr Ryabinin also referred to a large conference on Blue Economy that will be organized by the United Nations Environment Programme (UNEP).

3.2 IOCARIBE

This agenda item was introduced by Mr Cesar Toro, IOC Secretary for IOCARIBE. He referred to the document Review of IOCARIBE Capacity Development Requirements (IOC/GE-CD-I/Ag3.2).

Mr Toro explained that Capacity Development has always been a major element of IOCARIBE's programmes and activities. IOCARIBE has a series of delivery mechanisms that have been used to achieve its Capacity Development among them mentioned IOCARIBE Medium-Term Strategic Science Plan (2017–2026), a draft CD Strategy; a number of programmes and projects such as IOCARIBE-GOOS, CARIBE-EWS, ODINCARSA, CLME, OTGA, HAB-ANCA. He also mentioned the work with their partner organizations such as the World Meteorological Organization (WMO), UNEP, the Division for Ocean Affairs and the Law of the Sea (UN-DOALOS), the International Atomic Energy Agency (IAEA), the Food and Agriculture Organization of the United Nations (FAO), the European Commission, Regional organizations and Non-Governmental Organizations (NGOs). He explained that in most of the cases, they have their own capacity development strategies and programmes, and that some national initiatives, and bilateral and multilateral projects of Member States are not linked to IOCARIBE.

The Recommendation SC-IOCARIBE-XIV.1 on Capacity Development Strategy recognizes the importance of enhanced IOCARIBE capacity development; and requests the development of a Capacity Development implementation plan in accordance with the IOC Capacity Development Strategy.

In response to this Recommendation and based on the IOCARIBE Medium-Term Strategic Science Plan (2017–2026) (IOCARIBE SSP), a IOCARIBE CD is being developed.

The IOCARIBE SSP has been developed to fulfil IOC Resolution XXVIII-2 on IOC Capacity Building Strategy 2015–2021, adopted by the 28th Session of the IOC Assembly held in Paris from 18 to 25 June 2015. The Strategic Science Plan takes into consideration the IOCARIBE Medium-Term Strategic Science Plan 2006–2015 (IOCARIBE 2006), the IOC Medium-Term Strategy 2014–2021 (defined in Decision EC-XLV/Dec.5.2 and adopted through Resolution XXVII-2 of the IOC 27th Assembly 2013), and the IOC Capacity Development Strategy 2015-–2021 (adopted by the 28th Session of the Assembly in 2015).

The objectives of the IOCARIBE Medium-Term Strategic Science Plan are to:

- Support strategic planning of IOCARIBE Member States in relation to the development of marine sciences, oceanic observations and associated services.
- Facilitate a coherent management of regional programmes related to the marine-coastal environment and its resources.
- Strengthen scientific basis supporting regional programmes.

Main Lines of Action of the Plan are:

- Oceans and Climate,
- Ocean Ecosystem Science, including Science for Large Marine Ecosystem Management,
- Marine Science for Integrated Coastal Area Management, and
- Extreme Natural Hazards.

The IOCARIBE CD Implementation Plan (February 2018) states: *Today CD must be specific to the needs of the region, the institutions in the region and the individual scientists in the*

region. CD must be done with the viewpoint that individuals not only gain knowledge and skills but effectively apply it to the needs of the region strengthening the institutions in the region i.e. Capacity must not only be developed but must be empowered to use that knowledge.

The IOCARIBE region has been increasing its capabilities in the marine sciences in recent years. Governmental structures have also strengthened. Looking at the its Member States, the IOCARIBE Secretariat identified 141 academic higher education institutions in the Americas that offer 777 Ocean Sciences programmes, including 239 B.Sc., 191 M.Sc., and 185 Ph.D. programmes in Latin American Countries (LAC). In the United States, there are 30 institutions with 69 Ph.D., 65 M.Sc. and 63 B.Sc. Students and scientists have also other opportunities in Canada that offers 14 Ph.D., 19 M.Sc. and 18 B.Sc. However, 70% of that capacity is concentrated in only five Latin American countries (Brazil, Mexico, Chile, Argentina, and Colombia) and USA. Mr Toro stressed that the major challenge in the ocean sciences was the asymmetrical development and capacity of Member States.

Referring to the development of national policies and MS commitments and participation in global and regional conventions and protocols, Mr Toro noted an overview of countries that have signed Major Conventions and Protocols (Fanning, L., Robin, M., & Patrick, M. (2013) (Figure 4). The IOCARIBE Member States have implemented some 60 legal instruments related to ocean and coastal issues management as national policies, strategies, laws, plans, decrees, resolutions and diagnostic analyses and assessments for the management and sustainable development of the ocean, addressing coastal management, risk management and climate change (C. Toro et al., 2017). There are few regional and subregional policy instruments developed for the ocean and in force in the region, with the Cartagena Convention as one of the most comprehensive instruments available. The Organization of Eastern Caribbean States (OECS) developed Eastern Caribbean Regional Ocean Policy, an example of a sub-regional policy. The Caribbean Community (CARICOM) fisheries have worked with the Central American Fisheries and Aquaculture Organization (OSPESCA) on management actions. The Caribbean Large Marine Ecosystem (CLME) Project is working on developing regional management linkages.

Countries	CBD	UNFCC	UNCLOS	UN Fish Stocks Agreement	FAO Compliance Agreement	MARPOL 73/78 (Annex I/II)	MARPOL 73/78 (Annex III)	MARPOL 73/78 (Annex IV)	MARPOL 73/78 (Annex V)	MARPOL Protocol 97 (Annex VI)	Cartagena Convention	SPAW Protocol	LBS Protocol
Antigua & Barbuda	x	x	x			x	x	x	x	x	x		x
Aruba													
Bahamas	x	x	x	x		x	x		x	x	x		x
Barbados	x	x	x	x	x	x	x	x	x	x	x	x	
Belize	x	x	x	x	x	x	x	x	x	x	x	x	x
Colombia	x	x	s			x	x	x	x		x	x	
Costa Rica	x	x	x	x							x		
Cuba	x	x	x			x			x		x	x	
Curacao													
Dominica	x	as	x			x	x		x		x		
Dominican Republic	x	x	x			x	x	x	x		x	x	
France	x	x	x	x		x	x	x	x	x	x	x	x
Grenada	x	x	x								x		
Guatemala	x	x	x			x	x	x	x		x		
Guyana	x	x	x			x	x	x	x		x	x	x
Haiti	x	x	x										
Honduras	x	x	x			x			x				
Jamaica	x	x	x			x	x	x	x	x	x		
Mexico	x	x	x		x	x			x		x		
Netherlands	as	x	x	x		x	x	x	x	x	x	x	
Nicaragua	x	x	x			x	x	x	x		x		
Panama	x	x	x	x		x	x	x	x	x	x	x	x
Saint Kitts & Nevis	x	x	x		x	x	x	x	x	x	x		
Saint Lucia	as	x	x	x	x	x	x	x	x		x	x	x
St. Vincent & the Grenadines	as	as	x	x		x	x	x	x	x	x	x	
Suriname	x	x	x			x	x	x	x				
Trinidad & Tobago	x	x	x	x		x	x	x	x		x	x	x
United Kingdom	x	x	as	x		x	x	x	x	x	x		
United States of America	s	x		x	x	x	x		x	x	x	x	x
Venezuela	x	x					x	x	x	x		x	x

Figure 4. Overview of IOCARIBE countries that signed conventions and protocols (Fanning, L., Robin, M., & Patrick, M. (2013)

Capacity Development in IOCARIBE has been focusing mainly on large multimillion projects such as Caribbean Marine Atlas (CMA2), CARIBE-EWS CLME, leading to strengthening Institutions' capacity. IOCARIBE CD is also including continuous professional development via Ocean Teacher Global Academy Programmes' and Projects' training plans.

Mr Toro concluded by outlining the CD recommendations for IOCARIBE and referred to the document Review of IOCARIBE Capacity Development Requirement (IOC/GE-CD-I/Ag3.2). IOCARIBE MS highlighted the importance of establishing a strong link with National Councils of Sciences, which are the main actors in designing and implementing capacity development strategies, as well as financing projects and activities.

	IOCARIBE	Remedial Actions
1.1.1 Promote and assist with the establishment of consortia of higher education at the appropriate geographical scale	□	The region has a large ocean sciences higher education base. A pilot consortium might be established among 7-10 countries institutions.
1.1.2 Promote collaboration between UNESCO Chairs and IOC	√	
1.2.1 Promote and assist with the organization of training courses, workshops and "summer schools" relevant to the IOC mandate	√	
1.2.2 Establish, or collaborate with other organizations on an internship/fellowship programme (including on-board training)	√	
1.2.3 Establish and collaborate with other organisations on a visiting lecturer programme	√	
1.2.4 Promote and assist with the establishment of regional training (and research) centres relevant to the IOC mandate	√□	Promote the establishment of national research centres networking
1.2.5 Promote the sharing of training materials	√	
1.3.1 Establish a travel grant "fund"	√□	Explore obtaining the support of National Councils of Sciences for this purpose.
1.3.2 Establish or collaborate with other organizations on a mentoring programme	√	
1.3.3 Promote and assist with the development of IOC alumni networks	√	
1.3.4 Promote and support "young scientist" awards	□	Besides the IOCARIBE Conference award, establish a "young scientist" award with the collaboration of regional Ocean Sciences Congresses and Conferences.
1.4.1 Promoting participation of women in ocean research	√	
2.1.1 Establishing and maintaining a register of infrastructure to facilitate access	√	
2.1.2 Promoting the development of, and expand access to, regional sustainable scientific infrastructure	√	
3.1.1 Improve staffing of secretariat of regional sub-commissions	□	Member States to support IOCARIBE by seconding professionals to the Secretariat. Encourage senior professionals to have their sabbatical year working at IOCARIBE Secretariat
3.1.2 Reinforcing budgeting of regional sub-commissions	□	In addition of increasing the core budget, Member States to provide financial support by hosting CD

	IOCARIBE	Remedial Actions
		activities.
3.2.1 Establishing an effective coordination and communication mechanism between the secretariats of the regional sub-commissions and the global programmes	√	
4.1.1 Compare and compile information on existing ocean research priorities among government and other organizations	√	
4.2.1 Assist Member States with the development of marine science management procedures and national policies	√	
5.1.1 Promote the development of public information (communication) departments in ocean research institutions	√	
5.2.1 Foster development of an IOC ocean literacy programme as a community of practice to share experience within and across regions	√	
6.1.1 Fostering partnerships to increase in-kind support opportunities	√	
6.2.1 Resource mobilisation from Member States, Institutional and Private Sector Partners		Coordinate with National Councils of Sciences for supporting IOC programmes and projects via national initiatives. Alignment of national initiatives with IOC goals. Promote IOCARIVBE participation in national programmes, projects funded by a third party.

Figure 5. Capacity Development Recommendations for IOCARIBE.

Regarding Travel grants, Mr Toro noted that it is recommended to work with the National Councils for Science and universities to enable these grants.

It was noted that human capacity also needs to fit into national strategies and programmes. Too often people are trained but do not find opportunities to put their new expertise into practice.

In terms of success of large projects, Mr Toro informed the Group that the Caribbean Large Marine Ecosystem and Adjacent Regions (CLME) project was established in 2001 as an IOC project. The IOC, as the technical implementing agency, works with UNDP, UNEP, FAO and UNOPS and several regional, national organizations and NGOs. The CLME is one of the most complex LMEs that GEF has ever funded as it involves 25 countries. Several regional organizations and NGOs are involved as well. A key for success of the project is that Member States in the region have requested the project to improve ocean governance. The tsunami warning system was also established upon request from the Member States and that makes it successful as they are investing in it.

Ms Santoro expressed the hope to discuss how more Ocean Literacy activities can be started in the regions. She mentioned an Ocean Teacher Global Academy course held at INVEMAR, Colombia, as an excellent example where the CMA2 project was linked with Ocean Literacy. She suggested that this could be a model for other training activities.

3.3 WESTPAC

This agenda item was introduced by Mr Yafeng Yang. He referred to the document WESTPAC gap filling actions and required resources (IOC/GE-CD-I/Ag3.3).

He referred to the question of how to integrate IOC activities into national programmes posed by Mr Blivi. All regional bodies should serve as a strategic link between IOC global objectives and national priorities or actions, an essential driver to forge joint actions of scientific communities in addressing development challenges; an indigenous clearing house for transfer of marine technology; and a locally-rooted capacity developer to empower MS to enhance their research capacity.

He noted that many WESTPAC activities are in line with IOC global priorities. He referred to Figure 6 below that illustrates the WESTPAC Programme Structure.

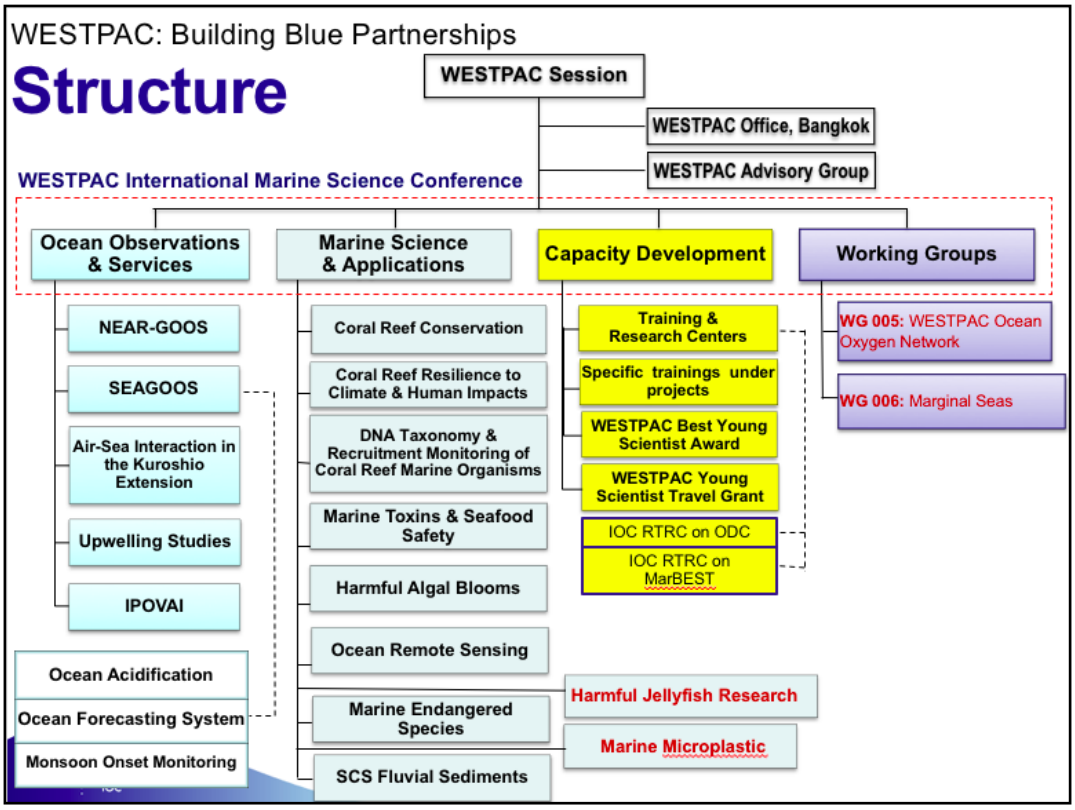

Figure 6. WESTPAC Programme Structure.

WESTPAC identified the following priority programmes:

- Ocean processes and climate,
- Marine biodiversity and seafood safety,
- Ocean ecosystem health,
- Enhanced ocean knowledge on emerging concerns (i.e., ocean acidification, microplastics).

This translates into the following action areas with a wide range of activities conducted:

- Strengthen science-policy interface for ocean governance

  WESTPAC has been engaged in the UN Regional Coordination Mechanism and formulation of cooperation agreements between UN and ASEAN (Association of South-East Asian Nations), UNESCO and ASEAN, and ensured ocean and ocean research is listed among strategic priorities; WESTPAC actively engaged in the United Nations World Ocean Assessment (WOA), including its initial phase on the Assessment of Assessments, by encouraging WESTPAC experts to the UN Pool of

Experts, organizing regional workshop on WOA and trainings on integrated assessment tools, together with its Member States and other regional partners.

UN started the new cycle of assessment (2016–2020) with the IOC Sub-Commission for the Western Pacific (WESTPAC) having hosted and co-organized the regional workshop for the North Pacific in November 2017. The triennial WESTPAC International Marine Science Conference has evolved into the largest gathering for marine scientists in the region, demonstrated as an effective platform to develop multinational and multidisciplinary cooperation among Member States.

- Develop sustained ocean observations and services for maritime safety

  In view of the need for a forecast system generating crucial forecast information, to serve a variety of users, WESTPAC has been spearheading the SEAGOOS Ocean Forecasting system development with 3 days' forecast products via the website including surface wind, wave height, temperature and current. Within this framework, technical assistance was provided to countries in the region upon their requests.

  To improve the understanding and forecasting of Asia monsoon and its multi-scale variability at a regional scale, WESTPAC develops and carries out air-sea observations over the Andaman Sea and analyzing the preconditioning role of ocean in the monsoon onsets, in order to improve the understanding and forecasting of Asia monsoon and its multi-scale variability at a regional scale. Given limited understanding about ecosystem responses to ocean acidification, against a critical need of Member States to develop meaningful projections on the future impacts of ocean acidification on marine ecosystems, especially on coral reefs, WESTPAC developed a simple, consistent/systematic, cost-effective set of Standard Operating Procedures (SOPs), respectively on seawater collection and handling for chemistry, Total Alkalinity (TA) and pH measurement, Autonomous Reef Monitoring Structures (ARMS) and Calcification Accretion Units (CAUs) recovery and processing. These regional activities were conducted in close cooperation with the Global Ocean Acidification Observing Network (GOA-ON) and the National Oceanic and Atmospheric Administration (NOAA). In view of the mounting concerns over microplastics in ocean environment and its potential effects on human health, WESTPAC takes the initiative to advance cooperation among institutions and countries in the region, with aims to establish marine microplastics monitoring and research network(s); and develop a joint-monitoring and research plan for MP in the region.

- Safeguarding marine biodiversity and ecosystem health for green development

  Needless to highlight the importance of marine biodiversity to the region, as the region is home to the largest marine biodiversity concentration in the world. Serving the needs of its Member States, WESTPAC has various programmes, respectively on marine alien species, coral reef restoration, marine toxin and seafood safety, coastal habitat mapping, Harmful Algal Blooms. In response to the recent outbreak of HABs in Cambodia and Vietnam, and upon the request of its members, WESTPAC sent a Group of Experts to join the national technical team in the efforts to identify the cause.

In particular, Mr Yang highlighted WESTPAC actions in terms of capacity development: Bolster institutional capacity for the Future We Want.

WESTPAC considers that capacity could be only more effective and sustained over the long term if people are best empowered to realize their full potential with a combination of capacity building tools that are sustainable. To this end, WESTPAC formulated its guiding

principle for capacity development as inclusive, adaptive and empowerment, and employs following approaches to its capacity development: Suit national and regional needs, while closely following global emerging issues; link training to the attainment of research goals by integrating CD into program development; co-design and co-development with Member States; and promote North-South and South-South Cooperation.

Mr Yang then proceed with an overview of integrated capacity development tools.

Regional Network of Training and Research Centres (RTRCs): WESTPAC has been endeavoring to develop the IOC Regional Network of Training and Research Centers on Marine Sciences. The RTRC initiative provides a self-driven approach tailored to the regional needs by building upon existing scientific specializations and expertise of national oceanographic institutes and universities in the region, as demonstrated by the renewed commitment of the IOC Regional Training and Research Center on Ocean Dynamics and Climate (RTRC ODC) for the next six years (2015–2020), and the strong commitments made by Indonesia to hosting a Regional Training and Research Center on Marine Taxonomy and Ecosystem Health. The level of backing to this initiative was indicated by the strong willingness expressed by a wealth of delegates at the Session. Several Member States, including Thailand, Philippines, Malaysia and Japan expressed their willingness to establish RTRCs within their countries. Mr Khokiattiwong will give more information.

IOC Regional Training and Research Center on Ocean Dynamics and Climate (RTRC ODC): Since its inauguration in 2011, the ODC Centre has been organizing regular training annually with a total of 312 young scientists from 33 countries having participated in. The regular training at the ODC Centre attracts great interests of young researchers on ocean dynamics, and numerical modeling, which could be demonstrated by the ever-increasing number of applicants from wider geographical coverage.

IOC Regional Training and Research Center on Marine Biodiversity and Ecosystem Health (RTRC MarBEST): Inspired by the unwavering commitments of the Indonesian Institute of Sciences (LIPI), 17 October 2016 was another important day to witness the inauguration of another Regional Training and Research Center on Marine Biodiversity and Ecosystem Health (RTRC-MarBEST) in LIPI. Shortly after the inauguration ceremony, a two-week long training course on Crustacean Taxonomy was conducted at the MarBEST Centre Building on Pari Island, Jakarta, Indonesia, from 17 to 29 October 2016. More than 30 trainees from 10 countries. A training course on Crustacean Taxonomy was conducted from 17 to 29 October 2016. From 25 September to 5 October 2017, a training on molecular taxonomy was organized in MarBEST Center.

National/regional tailored trainings/summer schools: In addition to the regular training opportunities provided in the IOC Regional Training and Research Centres, a series of tailor regional and national training courses/summer schools were designed and conducted in WESTPAC Member States on a rotational basis, which include: Harmful Algal Bloom, Marine toxin analysis, Coral reef restoration, and MOMSEI Summer. It is worth mentioning that, in response to the emerging issues like microplastics and ocean acidification, WESTPAC integrates capacity development into programme development, by organizing training workshops on a regular basis at both regional and national level.

WESTPAC Best Young Scientist Award and Young Scientist Travel Grant: We selected five recipients for the WESTPAC Best Young Scientist Award in order to nurture young scientists in the region, and further encouraged every Member State to spare no effort in supporting and engaging their young scientists in the future conferences and cooperation.

Bringing marine science into schools: We also conducted the trial outreach activity “Bringing marine science into schools”, in order to advocate marine science in elementary schools with more than 1,200 students joining in this activity.

Despite the achievements made, Mr Yang expressed the concerns of WESTPAC countries over the understaffed situation at the WESTPAC Secretariat and limited financial support of IOC to its regions. He further requested the IOC Executive Secretary to strengthen the regional secretariats and to provide more financial support.

Mr Troisi then inquired about the lack of data and information component in the WESTPAC programme. Mr Khokkiatiwong responded that, data and information is an integral part of WESTPAC programme development, and it is subject to the agreements and national policies of participating institutions. Furthermore, he added that WESTPAC does not wish to make duplicated efforts in developing MS's capacity for data and information exchange and management, as IODE has been working in the region on data and information exchange through National Oceanographic Data Centres (NODCs) and Associate Data Units (ADUs), and developing MS's capacity for data and information management through the Ocean Data and Information Network for the Western Pacific Region (ODINWESTPAC).

Mr Troisi also referred to the OceanTeacher Global Academy (OTGA) which was also not mentioned and deserved mapping into the WESTPAC architecture.

Mr Troisi concluded by referring to the small island developing States (SIDS) in the WESTPAC region and he noted that their capacities deserve attention as well. (Note: this point was already reflected in the WESTPAC gap analysis)

3.4 IOCINDIO

This agenda item was presented by Mr Justin Ahanhanzo. He explained that in response to the call by the IOC Secretariat through the IOCINDIO Complementary Additional Programme, the Government of Kuwait generously hosted the IOCINDIO Strategic Revitalisation Scoping Workshop the 22 and 23 May 2017 which developed a number of regional programmes contributing to the reinforcement of the Committee. Following the Scoping Workshop, the Sixth Session of the IOC Regional Committee for Central Indian Ocean (IOCINDIO-VI) was organized back to back in Kuwait City, Kuwait, the 24 and 25 May 2017, and endorsed a work plan composed of project proposals supported with a number of Recommendations.

He explained that the IOCINDIO Work plan, thus includes national priority areas, regional crosscutting topics coupled with national priorities and regional programmes as follows.

- Regional Crosscutting topics coupled with national priorities:
    - Effects of human induced changes: Ocean acidification, eutrophication, hypoxia, harmful algal blooms (HABs) in coastal waters of the Northwestern Indian Ocean,
    - Natural Disasters,
    - Ocean observations, coastal zone, ocean and coastal circulation,
    - Blue Economy- Ocean Economics and Governance.
- Detailed national priority areas:
    - IOCINDIO Capacity Building,
    - Regional Collaboration,

- Ecosystem services valuation (Blue carbon),
- Blue governance,
- Marine renewable energy,
- Marine structures,
- Food-web modelling,
- Marine biodiversity.

Member States as follows showing common challenges and opportunities for regional cooperation under the umbrella of IOCINDIO identified specific national priorities including:

- Bangladesh: Climate change, economic opportunities, business opportunities in the conservation and management of seaweeds or/mangrove ecosystems.
- India: Observations, acidification, sea lever rise, coastal zone management, modelling, storm surge.
- Iran: Capacity building, ocean observations, ecosystem modelling, HABs and coastal zone management, climate change effects.
- Kuwait: Climate change, coastal zone management, microplastics, ocean acidification, harmful algal blooms (HABs) and fish kill eutrophication, hypoxia, oil spills, ocean circulation, and extreme events like tsunami, winds, and waves.
- Pakistan: IIOE-2, ocean acidification, Marine Protected Areas under SDG14, micro plastics, coastal erosion, seawater intrusion.

The following project proposals are aimed at addressing the above issues:

- Effects of human induced changes: Ocean acidification, eutrophication, hypoxia, harmful algal blooms (HABs) in coastal waters of the Northwestern Indian Ocean.
- Coastal vulnerability assessment for sea level rise and storm surges.
- Ocean observations, coastal zone management, circulations and fisheries.
- Monitoring with Responsible Response of Oil Spill in inner ROPME Sea Area.
- 2050 Integrated Ocean Policy Advice for Proactive Planning and Managements for IOCINCIO Member States.
- Blue Economy Business opportunities in the context of climate change adaptation and Disaster Risk Reduction.
- IOCINDIO Networking Research Infrastructures, Facilities and Human Resources.

In particular, the IOCINDIO project on Networking Research Infrastructures, Facilities and Human Resources is aimed at bringing IOCINDIO Member States into a dynamic mode of communications and cooperation in a very simple and concrete manner with available resources in each relevant national and regional institutions dealing with ocean, atmospheric and climate related sciences and technology. This CD project is based on the understanding that successful cooperation and joint project development require a good knowledge of own's facilities and those available in each Member States of IOCINDIO towards resources sharing and mutual assistance in the region.

- This project derived from the factual lessons learned at the two recent IOCINDIO-V and IOCINDIO-VI Sessions when it appeared that there is no baseline documentation on research Infrastructures, facilities and human resources in several countries. This information is also lacking at regional level while most of the countries in the region are countries with economies in transition with increased investments in scientific

development with building of related infrastructures and training of high-level national experts over the last two decades.

- A cost effective methodology with ICT with internet-based approach will be used to record national information, which will serve to develop the regional baseline.
- A validation workshop will be organized.
- The results of the project will provide a clear updated picture on existing facilities in the region and will foster pooling of resources to avoid duplication in effective cost sharing in project implementation and reinforcement regional institutional capacity and expertise.
- This baseline information will attract interests of partners willing to invest in the region.

The Executive Summary Report of the Sixth Session of the IOC Regional Committee for the Central Indian Ocean (IOCINDIO-VI) contains the full list with project proposal documents.

It was noted that regrettably no Member States from the IOCINDIO region attended the current Group of Expert meeting. For this reason, the Group was not able to address CD gaps of IOCINDIO under agenda Item 6 and could not revise the IOCINDIO CD work plan under agenda Item 7.

Mr Barbière noted that IOCINDIO has two Category II Centres (India and Islamic Republic of Iran) which create considerable CD potential. He added that these are the only two such Centres at the disposal of IOC. Mr Ahanhanzo noted that the Centre in India is committing resources (financial and human) to re-invigorate the IOCINDIO region by organizing courses. There is currently no information available on the planned activities of the Centre in Iran. The Executive Secretary reported that he has recently met with the new Director of INOAS. A conference on Oceanography was organized recently and there is potential for substantial developments in the region.

4. PRESENTATIONS ON GLOBAL PROGRAMMES AND THEIR CD WORK PLANS

4.1 OCEAN SCIENCES

This agenda item was introduced by Ms Beatriz Reguera. She referred to the document Review of Ocean Science Portfolio Capacity Development Requirements (IOC/GE-CD-I/Ag4.1).

In her presentation, Ms Reguera explained that the first Global Ocean Science Report shows the mismatch between where science is generated (papers) and the countries with maybe the largest need to apply knowledge for improved management – the size of each country corresponds relatively to the number of citations of papers from authors in that country.

She explained that there are 4 focus areas under IOC Ocean Science:

- Ocean Acidification
- Deoxygenation in the Ocean
- Coastal Blue Carbon
- SDG's
- Harmful Algal Blooms

There is a difference between Ocean Science "overall" and the Intergovernmental Panel on Harmful Algal Blooms (IPHAB). This may be explained by IPHAB being a mature and somewhat self-contained programme that serves a particular community and has, therefore, been able to focus very specifically on the CD requirements of that community. The overall OSS portfolio is quite diversified: by the nature of the OSS programme, several of the science issues dealt with are emerging, and the issues dealt with in the OSS portfolio may express themselves differently in different regions, also in light of the often significant capacities of those regions.

Ocean Acidification (OA):

- Needs:
  - Increased OA scientific capacities to observe OA,
  - Increased OA technical capacities,
  - Increased data management capacities, data storage capacities,
  - Improved/Aligned guidelines to measure and report OA.
- Activities:
  - Planning of and teaching at +10 OA workshops, e.g. CPPS, WIOMSA, WESTPAC, GOA-ON.
  - SDG 14.3 methodology development,
  - Part of the Pier2Peer Advisory Council: Connects scientist to scientist, provides training opportunities, strengthens relationships across countries and continents.
- Challenges:
  - OA data/measurement quality control, data repositories,
  - OA standards (only one place in the world), sample fixation (mercury chloride),
  - Costly equipment,
  - OA research capacities very different around the world,
  - 14.3.1 reporting

Deoxygenation in the Ocean

- Needs:
  - Increased collaboration and communication among ocean oxygen scientists, coastal and open ocean.
  - Increased awareness that deoxygenation is part of the 'multi-stressor' world.
  - Increased scientific capacities to improve models in coastal areas.
  - Improved/Aligned guidelines to measure and report deoxygenation.
  - Increased data sharing.
- Activities:
  - Planning of SummerSchool in Xiamen 2019.
  - Regional networks – WESTPAC O2NE.
  - Support to scientific conference Ocean Deoxygenation Conference, September 2018.

- Plans to establish mentor programme.

- Challenges:
  - Oxygen data/measurement quality control, data repositories.
  - Collaboration with 'practitioners', deoxygenation awareness.

Coastal Blue Carbon (BC)

- Needs:
  - Increased scientific capacities in countries to map, assess the carbon sequestration potential, to assess the risks of degradation and destruction of Coastal BC Ecosystems.
  - Increased awareness of climate mitigation potential.
  - Improved IPCC (Intergovernmental Panel on Climate Change) wetland supplement guidelines to measure and report the potential emissions of BC, aligned scientific methodologies.
- Activities:
  - Planning of teaching at annual meetings at 'BC' hot spots around the world, 2018 China.
  - BC Ocean Teacher course in planning in collaboration with the Blue Carbon Initiative Scientific Working Group – annotated outline including description of contents prepared.
- Challenges:
  - Mapping of Blue Carbon ecosystems – partly still don't know where.
  - Concept of Blue Carbon – long term storage of Carbon.
  - No direct activities with SBSTA UNFCCC and related wetland supplement guidelines.

SDG Reporting

- Needs:
  - IOC custodian agency for 14.3.1 and 14.a.1 reporting.
  - Data repositories for both indicators.
  - Regular reporting.
  - Development and refinement of methodologies.
- Activities:
  - 14.3.1 – related to OA work, but in addition there are additional WG meetings, data repository development and methodology, possibly 14.3.1 OceanTeacher
  - 14.a.1 – CD activities reduced to methodology, data repository
- Challenges:
  - More than 200 indicators for each country
  - Identifying the 'reporter' – focal points in the country – no regular data collection/ measurement in the majority of countries (14.a.1, 14.3.1).
  - Scientific methodology for 14.3.1 needs scientific capacity building, far more than what is currently done within GOA-ON and related activities.

- Scientific and 'reporting' challenges at the same time for 14.3.1

SDG methodology development

- Needs:
  - IOC providing scientific and technical support to UN Environment for development of the indicator for 14.1.1 on nutrient pollution .
  - Development of the indicator and methodology (ICEP).
- Activities:
  - CD activities on data gathering and transformation of data into ICEP as the indicator.
- Challenges:
  - Same as for 14.a.1, 14.3.1.

Capacity for improved monitoring and management of harmful algal events

- Needs:
  - Improve managerial capacity,
  - Improve scientific capacity to support management,
  - Improve training/education to deliver suitable candidates for jobs.
- Activities:
  - We have for 20 years worked with the recognition of that capacity is composed of capacity at different levels and that capacity development interventions are diverse and case specific:
    1. The individual researcher or manager
    2. Institution/national level
    3. Regional level
    4. Global level
- Challenges:
  - Measuring impact – we lack the tools / resources.
  - IOC announcement mechanism (circular letters) for CD opportunities is not reaching target audiences.
  - Funding for long term CD efforts and funding to ensure developing Member State opportunities to benefit from CD activities.

Ms Reguera noted the over 25 years of experience in HAB related training. Over the past 26 years, the IOC has by itself or with partners organized more than 90 training courses in species identification, toxicity testing and monitoring and management strategies. She showed the geographical distribution of the approximately 1,000 trainees. Emphasis has been in the regions most unprepared to meet HAB impacts, such as South East Asia and Latin America, but the need for upgraded skills has been global and systematic.

1. IOC HAB courses are characterized by:
   - Basic to advanced level
   - Long term (recurrent)

- Combination of E-learning (OceanTeacher) and hands-on
- Examination
- Certificates
- Intercalibration excercises (IPI)
- Often joint with other organizations (IAEA, SCOR)
- Demand driven
- Partially self-funded by the participants

Courses held in-country or in regions are adapted to their specific needs.

2. Enhancing capacity of Institutions

- Cooperative research projects: We have with targeted countries done institutional capacity enhancement where national institutions have been strengthened through enhanced:
    - Research facilities
    - Teaching facilities & curriculum
    - Literature access
    - Individual competences
    - Public reach-out
- Medium to long term and substantial funding to have impact
- Staff demanding and a challenge to address multiple Member States at the same time.

3. Enhancing capacity at the region level:

- IOC HAB expert and managers networks (5)
- Regional training workshops
- Region specific publications
- Regional subject-specific and educational internet portals

Regional activities underpin and provides a framework for institutional and individual competencies.

4. Global

- Research programmes (GlobalHAB)
- Working groups
- Manuals and Guides
- Data products and data access (HAEDAT and OBIS)
- Intergovernmental fora (IPHAB)
- NGO ISSHA was fostered by the IOC

Ms Reguera then showed the gap analysis for IOC Ocean Science CD:

Output	Ocean Science overall	IPHAB
1.1.1 Promote and assist with the establishment of consortia of higher education at the appropriate geographical scale	√	√
1.1.2 Promote collaboration between UNESCO Chairs and IOC	√	X
1.2.1 Promote and assist with the organization of training courses, workshops and “summer schools” relevant to the IOC mandate	√	√
1.2.2 Establish, or collaborate with other organizations on an internship/fellowship programme (including on-board training)	√	√
1.2.3 Establish and collaborate with other organizations on a visiting lecturer programme	√	√
1.2.4 Promote and assist with the establishment of regional training (and research) centres relevant to the IOC mandate	√	√
1.2.5 Promote the sharing of training materials	√	√
1.3.1 Establish a travel grant “fund”	X	√
1.3.2 Establish or collaborate with other organizations on a mentoring programme	√	X
1.3.3 Promote and assist with the development of IOC alumni networks	X	√
1.3.4 Promote and support “young scientist” awards	X	√
1.4.1 Promoting participation of women in ocean research	√	√
2.1.1 Establishing and maintaining a register of infrastructure to facilitate access	√	X
2.1.2 Promoting the development of, and expand access to, regional sustainable scientific infrastructure	√	X
3.1.1 Improve staffing of secretariat of regional sub-commissions	X	X
3.1.2 Reinforcing budgeting of regional sub-commissions	X	X
3.2.1 Establishing an effective coordination and communication mechanism between the secretariats of the regional sub-commissions and the global programmes	√	√
4.1.1 Compare and compile information on existing ocean research priorities among government and other organizations	√	√
4.2.1 Assist Member States with the development of marine science management procedures and national policies	√	√
5.1.1 Promote the development of public information (communication) departments in ocean research institutions	√	√
5.2.1 Foster development of an IOC ocean literacy programme as a community of practice to share experience within and across regions	X	√
6.1.1 Fostering partnerships to increase in-kind support opportunities	√	√
6.2.1 Resource mobilisation from Member States, Institutional and Private Sector Partners	√	√
	6 gaps	6 gaps

Figure 7. IOC Ocean Science CD gap analysis

In response to a question on the possibility to track career progression of former students, Mr Troisi noted that the IODE alumni system could be used for other programmes besides IODE.

4.2 GLOBAL OCEAN OBSERVING SYSTEM (GOOS)

This agenda item was introduced by Mr Glenn Nolan, Director of the European Global Ocean Observing System (EuroGOOS). He referred to the document Review of GOOS Capacity Development Activities (IOC/GE-CD-I/Ag4.2).

In September 2017, the Global Ocean Observing System (GOOS) established a new Task Team on Capacity Development to ensure that capacity development is adequately reflected in the evolving GOOS strategy, to ensure that there are strong links to existing CD programmes focused on ocean observation, to identify potential funding sources to create a step change in GOOS CD activity, and to provide input to the development of the IOC CD Implementation Plan.

Specific GOOS contributions under the IOC Capacity Development plan topic areas are discussed briefly below.

Human resources

GOOS affiliated scientists have contributed to several training activities in recent months. Members of the GOOS panels were active at the 2017 GODAE Ocean View International School. GRA representatives will contribution to JERICO-NEXT and ODYSSEA project funded summer schools in Europe (July–September 2018). GOOS also co-funded IOCCP summer schools on biogeochemical sensors. GOOS contributed online to the IODE/JCOMM Ocean Best practices activity.

Access to physical infrastructure established or improved

The GOOS Regional Alliances (GRAS) have an ongoing activity to map the ocean observing assets within GRAs including all ocean observing platforms in operation (global geographic scope).

GRAs plan to work with GOA-ON to support the development of standard methods in regional nodes for ocean acidification monitoring. The GOOS Physics panel has been instrumental in establishing an open access to GTS pilot project to improve data ingestion and download outside of national meteorological agencies.

Global, regional and sub-regional mechanisms strengthened

GOOS has a workshop planned for June 2018 to enhance cooperation among South American GRAs (GRASP, OCEATLAN, IOCARIBE). GOOS also ensures regular communication between the GRAs through periodic (quarterly) teleconferences.

Development of ocean research policies in support of sustainable development objectives promoted

EuroGOOS is assisting the European Commission in formulating a Strategic Research and Innovation Agenda (SRIA) for the Black Sea.

Visibility and awareness increased

The GOOS Biology and Ecosystem Panel (BioEco Panel) is leading the production of a scientific paper summarising global initiatives in capacity development relevant to GOOS and

opportunities for expansion of such activity (Miloslavich et al.). Links have also been established between EuroGOOS and IOC Community of Practice on ocean literacy. Collaborative activity is in the planning phase.

Sustained (long-term) resource mobilization reinforced

Discussions are open with the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) on possible use of aids to navigation for oceanography. There are also ongoing discussions with EC funding institutions on GOOS pilot projects including MESCAT (North Africa sea level network). The GRAs also seek opportunities to promote the Multipurpose Marine Monitoring Mechanism (4M) project (IOCARIBE) and to further develop potential pilot project(s) in the Pacific (PI-GOOS, U.S.IOOS-PacIOOS, IMOS, WESTPAC/SEAGOOS), New Zealand and France. GOOS suggests that linking capacity development to existing sustained observation capabilities may be a mechanism to ensure longer term support for CD activities.

Mr Nolan then recalled the overview of current CD actions implemented by GOOS as well as gaps (in orange) (Figure 8).

Output	Activity	Action	Relevant actions taken by GOOS
1. Human resources developed	1.1 Academic (higher) education	1.1.1 Promote and assist with the establishment of consortia of higher education at the appropriate geographical scale	GOOS affiliated scientists (panel members in particular) at the 2017 GODAE International School
		1.1.2 Promote collaboration between UNESCO Chairs and IOC	
	1.2 Continuous professional development	1.2.1 Promote and assist with the organization of training courses, workshops and “summer schools” relevant to the IOC mandate	Contribution to JERICO and ODYSSEA project funded summer schools in Europe (July-Sept 2018). GOOS co-funded IOCCP summer schools on sensors
		1.2.2 Establish, or collaborate with other organizations on an internship/fellowship programme (including on-board training)	
		1.2.3 Establish and collaborate with other organisations on a visiting lecturer programme	
		1.2.4 Promote and assist with the	

Output	Activity	Action	Relevant actions taken by GOOS
		establishment of regional training (and research) centres relevant to the IOC mandate	
		1.2.5 Promote the sharing of training materials	Involvement in IODE/JCOMM Ocean Best practices activity (GOOS contribution to online repository)
	1.3 Sharing of knowledge and expertise/community building	1.3.1 Establish a travel grant “fund”	
		1.3.2 Establish or collaborate with other organizations on a mentoring programme	
		1.3.3 Promote and assist with the development of IOC alumni networks	
		1.3.4 Promote and support “young scientist” awards	
	1.4 Gender balance	1.4.1 Promoting participation of women in ocean research	
2. Access to physical infrastructure established or improved	2.1 Facilitating access to infrastructure (facilities, instruments, vessels)	2.1.1 Establishing and maintaining a register of infrastructure to facilitate access	Asset mapping process underway within GOOS Regional Alliances (GRAs) for all ocean observing platforms in operation (global geographic scope)
		2.1.2 Promoting the development of, and expand access to, regional sustainable scientific infrastructure	GRAs to work with GOA-ON to support the development of standard methods in regional nodes for ocean acidification monitoring. Open Access to GTS pilot projects to improve data ingestion and download outside of national met agencies

Output	Activity	Action	Relevant actions taken by GOOS
3. Global, regional and sub-regional mechanisms strengthened	3.1 Further strengthening and supporting secretariats of regional commissions	3.1.1 Improve staffing of secretariat of regional sub-commissions	
		3.1.2 Reinforcing budgeting of regional sub-commissions	
	3.2 Enhance effective communication between regional sub-commission secretariats and global programmes as well as other communities of practice (incl. other organisations)	3.2.1 Establishing an effective coordination and communication mechanism between the secretariats of the regional sub-commissions and the global programmes	Workshop planned for June 2018 to enhance cooperation among South American GRAs (GRASP, OCEATLAN, IOCARIBE).
4. Development of ocean research policies in support of sustainable development objectives promoted	4.1 Sharing of information on ocean research priorities	4.1.1 Compare and compile information on existing ocean research priorities among government and other organizations	Assisting the European Commission in formulating a Strategic Research and Innovation Agenda (SRIA) for the Black Sea
	4.2 Developing national marine science management procedures and national policies	4.2.1 Assist Member States with the development of marine science management procedures and national policies	
5. Visibility and awareness increased	5.1 Public Information	5.1.1 Promote the development of public information (communication) departments in ocean research institutions	Production of a scientific paper summarising global initiatives in capacity development relevant to GOOS and opportunities for expansion of such activity (Miloslavich et al)
	5.2 Ocean Literacy	5.2.1 Foster development of an IOC ocean literacy programme as a community of practice to share experience within and across regions	Links established between EuroGOOS and IOC CoP on ocean literacy. Collaborative activity in planning phase.
6. Sustained (long-term) resource mobilization	6.1 In-kind opportunities	6.1.1 Fostering partnerships to increase in-kind support opportunities	Discussions open with IALA (International Association of

Output	Activity	Action	Relevant actions taken by GOOS
reinforced			Marine Aids to Navigation and Lighthouse Authorities) on possible use of aids to navigation for oceanography. Discussions with EC funding institutions on GOOS pilot projects including MESCAT (N.Africa sea level network) Discussions with potential funders on 4M project (IOCARIBE) Futher develop potential pilot project in the Pacific – (PI-GOOS, US-IOOS/PacIOOS, IMOS, WESTPAC/SEA-GOOS) NZ, France.
	6.2 Financial support by Member States to IOC activities	6.2.1 Resource mobilisation from Member States, Institutional and Private Sector Partners	

Figure 8. Overview of current CD actions implemented by GOOS

Mr Toro stressed the need to look beyond the observing systems but also consider the services and products that will benefit Member States. In the case of SIDS, 38% of the GDP comes from tourism in coastal areas and they require services and products based on observations. So it is important to link all observation systems information to development plans of countries so they understand the added value of observation.

4.3 INTERNATIONAL OCEANOGRAPHIC DATA AND INFORMATION EXCHANGE (IODE)

This agenda item was introduced by Mr Aidy M. Muslim on behalf of the IODE OceanTeacher Global Academy Steering Group. He referred to the document Review of IODE Capacity Development Requirements (IOC/GE-CD-I/Ag4.3).

Mr Muslim recalled that the International Oceanographic Data and Information Exchange (IODE) was established in 1961. It strives to enhance marine research, exploitation, and development through exchange of data and information between Member States. It supports a variety of programs including standards development, technology, data access, capacity

building (education) and adheres to the IOC data policy – Free and open access to data and information.

IODE developed a worldwide service-oriented network over 80 oceanographic data centres consisting of NODCs (National Oceanographic Data Centres) and ADUs (Associate Data Units). This network has been able to collect, control the quality of, and archive millions of ocean observations, and makes these available to Member States.

Capacity Development has been a cornerstone activity of IODE since its inception in 1961. One of the major objectives of the IODE Programme is to assist Member States to acquire the necessary capacity to manage marine data and information and become partners in the IODE network. The training promotes the use of "standards" amongst all IODE centres and thus achieve interoperability between these centres.

IODE follows and contributes to the wider IOC Capacity Development Strategy (2015–2021). The OTGA Steering Group meetings are held yearly together with Regional Offices and international Experts. IODE and its OTGA perform regularly training needs surveys in order to decide on the workplan for training courses. The last training needs survey was done in August/September 2017.

The OceanTeacher Academy (OTA) Project (2009–2014) established a facility to provide an annual teaching programme of courses related to oceanographic data and information management. OTA developed a structured online Learning Management System (LMS). The web-based training system supports face-to-face training as well as online self-learning. The open source Moodle software is used as the LMS.

The OceanTeacher Global Academy Project (since 2014) aims at building equitable capacity related to ocean research, observations and services in all IOC Member States. Develop a global training centre network to increase national capacity in coastal and marine knowledge and management. OTGA moves training from a North-South culture to North-South, South-South and South-North model training traditionally based on experts from developed regions visiting and teaching developing country students. OTGA promotes use of expertise available in developing regions. Twenty-two courses were given from 2015 to 2016, 22 in 2017 and 17 are planned for 2018.

More information on OTGA is given under agenda item 5.1.

Gap analysis:

- Promote collaboration between UNESCO Chairs and IOC.
    - Currently there is no UNESCO Chairs directly related to ocean data and information management.
- Establishing and maintaining a register of infrastructure to facilitate access.
    - While all IODE data centres are expected to have their own IT infrastructure there may be some opportunities to share certain software (e.g. data quality control, modelling,..).
- Establish a travel grant “fund”.
    - Travel grant fund to enable secondments to other experienced data centres, as well as to participate in international conferences.
- Establish or collaborate with other organizations on a mentoring programme.
    - Mentoring programme to allow longer-term twinning of data/information managers.

- Promote and support “young scientist” awards.
    - Stimulate young professionals to consider a career in ocean data/information management.
- Improve staffing of Secretariat of regional Sub-Commissions.
    - Additional human resources will increase effectiveness and ability to respond to opportunities of IODE activities.
- Reinforcing budgeting of regional Sub-Commissions.
    - Stable funding base for the Sub-Commissions would enable more complementarity between IOC and regional offices

Moving forward:

- OTGA website and e-Learning platform were completely redesigned, as well as the application process, which is now fully online.
- OTGA modules can be included in University curricula, and that efforts are being made to get universities to include (data and information management) course modules in their curricula.
- Become a certified “Learning Services Provider” (LSP) under the ISO 29990 standard, which includes the type of training provided by IODE/OTGA, i.e. non-formal education and training.
- OTGA is building a worldwide training facility to provide training courses related to IOC programmes, contributing to the sustainable management of oceans and coastal areas.
- OTGA moves the focus of capacity development to regional training centres (RTC).
- OTGA invites collaboration with other program to conduct training at RTCs.
- RTCs organize and host courses in regionally languages with focus on regionally relevant topics, using mainly local trainers.

Mr Pissierssens recalled that in the past IODE had focused on Oceanographic Data and Information Networks (ODINs) that combined training, equipment and operational support but this has been somewhat reduced. ODINAFRICA was successful but this was possible because of a generous donor. Other ODINs have been less successful due to the lack of donors. It was noted that IODE also adopted a communication strategy.

4.4 TSUNAMI UNIT

This agenda item was introduced by Mr Thorkild Aarup, Head Tsunami Unit, Technical Secretary of the Global Sea-Level Observing System (GLOSS). He referred to the document Review of Tsunami Programme Capacity Development Requirements (IOC/GE-CD-I/Ag4.4).

Mr Aarup recalled that 2004 event triggered a new era for the IOC’s Tsunami Programme: Intergovernmental Coordination, Group meeting reports, Technical Working Groups, Training reports... Since 2004 there have been 11 deadly tsunamis. The Pacific Tsunami Warning and Mitigation System (PTWS) was established in 1965.

Tsunami warning systems have 3 essential elements:

1. Intergovernmental Coordination including Technical Working Groups.
2. Detection, Warning & Dissemination (Alert centres, monitoring network, communication, data exchange)

3. Awareness & Response: Public education, emergency planning and response (training, hazard assessment, SOPs, inundation mapping, evacuation planning, TWS exercises).

The role of the Tsunami Information Centres (TIC) is to increase the awareness and preparedness of different target groups with (e.g. local communities, schools, civil protection authorities, …). TICs work in tandem with the Tsunami Early Warning Systems.

In terms of achievements and results Mr Aarup highlighted that:

- Intergovernmental process since 2005 (ICG meetings, TOWS-WG) was reinforced and sustained.
- More than 115 Technical Working Group and Workshops on hazard management, Standard Operating Procedures, coastal inundation modelling…were organized
- Twenty Tsunami Wave Exercises were organized.
- Manuals and Technical documents in various languages were published.
- Three additional regional TWS were established.

In regards to Disaster Risk Reduction, Mr Aarup highlighted the contributions that UNESCO is making in the field of Disaster Risk Reduction for example in the assessment and mitigation of natural hazards – earthquakes, volcanic eruptions, tsunamis, floods and landslides – and through various programmes that are part of the UN International Strategy for Disaster Reduction.

For IOC this does offer an opportunity to also link and build on DRR efforts and networks within the Education, Culture, Science, Social Science and Information sectors of UNESCO.

Mr Aarup recalled the CD actions Tsunami global and regional shown below in Figure 9. (Green= implemented; yellow=partially implemented; orange=not implemented).

Output	Activity	Action	Action taken by PTWS	Action taken by CARIBE WS	Action taken by IOTWMS	Action taken by NEAMTWS
1. Human resources developed	1.1 Academic (higher) education	1.1.1 Promote and assist with the establishment of consortia of higher education at the appropriate geographical scale	Put in place with UNESCO funding in 2013, a Diploma on scientific basis for tsunami preparedness has been in place for +4 years at the Catholic University of Valparaiso	University of Guadaloupe has coordinated Waves workshops in partnership with the ICG/CARIBE EWS in 2012 and 2014.	Some academic institutions are participating in ICG/IOTWMS working groups and training activities	Some academic institutions are participating in ICG/NEAMTWS working groups and training activities funded by EU projects
		1.1.2 Promote collaboration between UNESCO Chairs and IOC	The UNESCO IOC Chair in Oceanography at University of Concepción, Chile, hosted at its XI Summer School, in 2010, in coordination with TSU the theme “From tsunamis to water pathogens: Understanding ocean hazards in the XXI Century”	N/A	N/A	N/A
	1.2 Continuous professional development	1.2.1 Promote and assist with the organization of training courses, workshops and “summer schools” relevant to the IOC mandate	The Tsunami Unit (TSU) organizes regularly regional and national workshops/trainings on development of SOPs for tsunami warning & response, coastal hazard assessments. Altogether in 2016-2017 a total of 441 and 862 participants	TSU organizes regularly regional and national workshops/trainings on development of SOPs for tsunami warning & response, coastal hazard assessments. Altogether in 2016-2017 a total of 441 and 862 participants registered for TSU	TSU organizes regularly regional and national workshops/trainings on development of SOPs for tsunami warning & response, coastal hazard assessments. Altogether in 2016-2017 a total of 441 and 862 participants registered for TSU	TSU organizes regularly regional and national workshops/trainings on development of SOPs for tsunami warning & response, coastal hazard assessments. Altogether in 2016-2017 a total of 441 and 862 participants registered for TSU

Output	Activity	Action	Action taken by PTWS	Action taken by CARIBE WS	Action taken by IOTWMS	Action taken by NEAMTWS
			registered for TSU trainings and workshops	trainings and workshops	trainings and workshops	trainings and workshops
		1.2.2 Establish, or collaborate with other organizations on an internship/fellowship programme (including on-board training)	PTWS Secretariat has been receiving regularly interns from the International Meteorological Expert Training Program of the KMA (Korea Meteorological Agency) and the International Tsunami Information Center (ITIC) receives secondees from the Japanese Meteorological Agency (JMA)	The Caribbean Tsunami Information Center (CTIC) was reinforced in 2014-2015 by interns supported by the Government of Barbados	The Indian Ocean Tsunami Information Centre (IOTIC) hosts interns to work on fostering tsunami awareness and preparedness	N/A
		1.2.3 Establish and collaborate with other organisations on a visiting lecturer programme	N/A	N/A	N/A	N/A
		1.2.4 Promote and assist with the establishment of regional training (and research) centres relevant to the IOC mandate	ITIC and PTWC host every year a 3 weeks dedicated training for PTWS members on tsunami response and preparedness, in the framework of ICG/PTWS	The Puerto Rico Seismic Network (PRSN) and the Caribbean Tsunami Warning programme (NWS/CTWP) have actively hosted several 1-week regional trainings for Sea Level and Seismic Network Operators, in the framework of	INCOIS (India) and BMKG (Indonesia) have hosted several regional trainings and have also hosted on-the-job training for operators of Tsunami Warning Centers of other IOC Member tates	Technical exchange visits have been arranged. Several Tsunami Service Providers participate in EU funded projects where there are built in trainings and/or summer schools.

Output	Activity	Action	Action taken by PTWS	Action taken by CARIBE WS	Action taken by IOTWMS	Action taken by NEAMTWS
				ICG/CARIBE EWS		
		1.2.5 Promote the sharing of training materials	ICG/PTWS through the International Tsunami Information Center (ITIC) hosted by NOAA (US) pioneered in developing specialized training modules that are used for training of representatives from regional and national tsunami warning centres, disaster management offices, media and communities. ITIC website is a hub for tsunami related training resources.	ICG/CARIBE EWS through the Caribbean Tsunami Information Center (CTIC) hosted by the Government of Barbados tailored and adapted ITIC training modules that are used for training of representatives from national tsunami warning centres, disaster management offices, media and communities. CTIC website is planned to be a hub for tsunami related training resources in the Caribbean.	ICG/IOTWMS and IOTIC developed specialized training modules that are used for training of representatives from national tsunami warning centres, disaster management offices and media. IOTIC website is used as a platform for sharing training resources.	ICG/NEAMTWMS and NEAMTIC have developed specialized training materials and products. NEAMTIC website is used as a platform for sharing training resources.
	1.3 Sharing of knowledge and expertise/community building	1.3.1 Establish a travel grant “fund”	N/A	N/A	N/A	N/A
		1.3.2 Establish or collaborate with other organizations on a mentoring programme	N/A	N/A	N/A	N/A
		1.3.3 Promote and assist with the development of IOC alumni networks	N/A	N/A	N/A	N/A
		1.3.4 Promote and support “young scientist” awards	N/A	N/A	N/A	N/A
	1.4 Gender balance	1.4.1 Promoting	ICG/PTWS and ITIC	ICG/CARIBE EWS	ICG/IOTWMS and	ICG/NEAMTWS and

Output	Activity	Action	Action taken by PTWS	Action taken by CARIBE WS	Action taken by IOTWMS	Action taken by NEAMTWS
		participation of women in ocean research	encourage gender balance in their activities.	and ITIC encourage gender balance in their activities.	IOTIC encourage gender balance in their activities.	NEAMTIC encourage gender balance in their activities.
2. Access to physical infrastructure established or improved	2.1 Facilitating access to infrastructure (facilities, instruments, vessels)	2.1.1 Establishing and maintaining a register of infrastructure to facilitate access	ICG/PTWS maintains databases of seismic and sea-level stations that are used for tsunami warning in the Pacific Ocean.	ICG/CARIBE EWS maintains databases of seismic and sea-level stations that are used for tsunami warning in the Pacific Ocean.	ICG/IOTWMS maintains databases of seismic and sea-level stations that are used for tsunami warning in the Indian Ocean.	ICG/NEAMTWS maintains databases of seismic and sea-level stations that are used for tsunami warning in the NEAM region.
		2.1.2 Promoting the development of, and expand access to, regional sustainable scientific infrastructure	ICG/PTWS promotes and facilitates data sharing from all contributing Member States for provision of tsunami warning in the Pacific Ocean.	ICG/CARIBE EWS promotes and facilitates data sharing from all contributing Member States for provision of tsunami warning in the Caribbean and its adjacent areas.	ICG/IOTWMS promotes and facilitates data sharing from all contributing Member States for provision of tsunami warning in the Indian Ocean.	ICG/NEAMTWS promotes and facilitates data sharing from all contributing Member States for provision of tsunami warning in the NEAM region.
3. Global, regional and sub-regional mechanisms strengthened	3.1 Further strengthening and supporting secretariats of regional commissions	3.1.1 Improve staffing of secretariat of regional sub-commissions	TSU has contributed to reinforce the presence of IOC in Field Offices, in Jakarta and Apia, and occasionally in Doha (Oman Project), Haiti, San Jose, Rabat and Santiago.	TSU has contributed to reinforce the presence of IOC in Field Offices, in Jakarta and Apia, and occasionally in Doha (Oman Project), Haiti, San Jose, Rabat and Santiago.	TSU has contributed to reinforce the presence of IOC in Field Offices, in Jakarta and Apia, and occasionally in Doha (Oman Project), Haiti, San Jose, Rabat and Santiago.	TSU has contributed to reinforce the presence of IOC in Field Offices, in Jakarta and Apia, and occasionally in Doha (Oman Project), Haiti, San Jose, Rabat and Santiago.
		3.1.2 Reinforcing budgeting of regional sub-commissions	Regular Budget of IOC/TSU is implemented through Field Offices in Jakarta and Apia	Regular Budget of IOC/TSU is implemented through Field Offices in Jakarta and Apia	Regular Budget of IOC/TSU is implemented through Field Offices in Jakarta and Apia	Regular Budget of IOC/TSU is implemented through Field Office in Rabat
	3.2 Enhance effective communication	3.2.1 Establishing an effective coordination and	ICG/PTWS collaborates with other ICGs through	ICG/CARIBE EWS collaborates with other ICGs through	ICG/IOTWMS collaborates with other ICGs through	ICG/NEAMTWS collaborates with other ICGs through

Output	Activity	Action	Action taken by PTWS	Action taken by CARIBE WS	Action taken by IOTWMS	Action taken by NEAMTWS
	between regional sub-commission secretariats and global programmes as well as other communities of practice (incl. other organisations)	communication mechanism between the secretariats of the regional sub-commissions and the global programmes	the UNESCO-IOC TOWS WG, closely with IOCARIBE for Central America, and also with programmes such as GLOSS, WMO, JCOMM, GOOS, and the Emergency Management communities including through ESCAP, CEPREDENAC, SPC, UNISDR etc.	the UNESCO-IOC TOWS WG, closely with IOCARIBE, and also with programmes such as GLOSS, WMO, JCOMM, GOOS, the Caribbean Tsunami Warning Programme (CTWP) of United States and the Emergency Management communities including through CDEMA, CEPREDENAC, UNISDR etc.	the UNESCO-IOC TOWG WG and also with programmes such as GLOSS, WMO, JCOMM, ESCAP, etc.	the UNESCO-IOC TOWS WG and also with programmes such as GLOSS, WMO, JCOMM, GOOS, GRAs, ESCAP, UNISDR etc.
4. Development of ocean research policies in support of sustainable development objectives promoted	4.1 Sharing of information on ocean research priorities	4.1.1 Compare and compile information on existing ocean research priorities among government and other organizations			ICG/IOTWMS undertook a capacity assessment survey of the IOTWMS Member States in 2005.	There is no systematic comparison and/or compilation, however. Member States share information and publications on ocean, tsunami, geophysics etc.
	4.2 Developing national marine science management procedures and national policies	4.2.1 Assist Member States with the development of marine science management procedures and national policies	TSU and ICGs facilitate policy Support for Tsunami Disaster Risk Reduction and Tsunami Exercises in Member States. In 2016 and 2017 TSU mobilized over 1	TSU and ICGs facilitate policy Support for Tsunami Disaster Risk Reduction and Tsunami Exercises in Member States. In 2016 and 2017 TSU mobilized over 1	TSU and ICGs facilitate policy Support for Tsunami Disaster Risk Reduction and Tsunami Exercises in Member States. In 2016 and 2017 TSU mobilized over 1	TSU and ICGs facilitate policy Support for Tsunami Disaster Risk Reduction and Tsunami Exercises in Member States. In 2016 and 2017 TSU mobilized over 1

Output	Activity	Action	Action taken by PTWS	Action taken by CARIBE WS	Action taken by IOTWMS	Action taken by NEAMTWS
			million of participants to Wave Exercises.	million of participants to Wave Exercises.	million of participants to Wave Exercises.	million of participants to Wave Exercises.
5. Visibility and awareness increased	5.1 Public Information	5.1.1 Promote the development of public information (communication) departments in ocean research institutions	PTWS and its International Tsunami Information Center (ITIC) actively promote public awareness and tsunami information through several platforms. All ICGs are taking an important role in promoting the UN World Tsunami Awareness Day (WTAD - 5 November).	CARIBE EWS and its Caribbean Tsunami Information Center (CTIC) actively promote public awareness and tsunami information through several platforms. All ICGs are taking an important role in promoting the UN World Tsunami Awareness Day (WTAD).	The IOTIC has been set in UNESCO Jakarta as the information hub for the region on tsunami-related issues. All ICGs are taking an important role in promoting the UN World Tsunami Awareness Day (WTAD).	The Secretariat publishes news article on the tsunami programme and activities in the NEAM region. All ICGs are taking an important role in promoting the UN World Tsunami Awareness Day (WTAD).
	5.2 Ocean Literacy	5.2.1 Foster development of an IOC ocean literacy programme as a community of practice to share experience within and across regions	PTWS and ITIC published several guidelines and several other publications as resources for wider reference on disaster risk reduction policy, tsunami exercises, tsunami education and awareness materials, including videos, brochures and comics, many of them addressing children and school teachers and students.	CARIBE EWS and CTIC published several guidelines and several other publications as resources for wider reference on disaster risk reduction policy, tsunami exercises, tsunami education and awareness materials, including videos, brochures and comics, many of them addressing children and school teachers and students.	Published accounts of past tsunamis (Makran-1945, Ambon-1950), tsunami risk assessment guidelines and several other publications as resources for wider reference.	NEAMTWS have published guidelines and other publications as resources for wider reference on tsunami exercises, tsunami education and awareness materials, including videos, brochures and comics, many of them addressing children and school teachers and students.
6. Sustained	6.1 In-kind	6.1.1 Fostering	Tsunami Service	The Caribbean	Tsunami Service	Tsunami Service

Output	Activity	Action	Action taken by PTWS	Action taken by CARIBE WS	Action taken by IOTWMS	Action taken by NEAMTWS
(long-term) resource mobilization reinforced	opportunities	partnerships to increase in-kind support opportunities	Providers (TSPs) are set up and sustained by United States and Japan. China and Nicaragua are working to become TSPs. Several other Member States contribute to maintaining observing networks and National Tsunami Warning Centers (NTWCs) that contribute to PTWS.	Tsunami Service Provider (TSP) is set up and sustained by United States and Nicaragua is working to become TSP. Several other Member States contribute to maintaining observing networks and National Tsunami Warning Centers (NTWCs) that contribute to CARIBE EWS.	Providers are set up and sustained by national programmes of Australia, India and Indonesia. Several other Member States contribute to maintaining observing networks. All these contribute to the IOTWMS.	Providers are set up and sustained by national programmes of France, Greece, Italy, Portugal and Turkey. Several other Member States contribute to maintaining observing networks. NEAMTWS is rooted in research community and several institutions collaborate through EU funded research projects and consortia.
	6.2 Financial support by Member States to IOC activities	6.2.1 Resource mobilisation from Member States, Institutional and Private Sector Partners	USAID in Latin America and JICA in the South West Pacific support PTWS activities, China and Korea contribute regularly to IOC for PTWS activities.	USAID supports CARIBE EWS activities, Monaco contributes regularly to IOC for CARIBE EWS activities. Netherlands provided funding support towards the Caribbean Tsunami Information Center (CTIC).	The Government of Australia and IOC UNESCO support the ICG/IOTWMS Secretariat and Programme. Government of Indonesia hosts the IOTIC.	Two EU funded projects and Germany have provide some support the Secretariat for implementing activities in the region. No sustained regular support is provided.

Figure 9. CD actions Tsunami global and regional

Mr Aarup also recalled the gap analysis (Figure 10).

	GLOSS	PTWS	CARIBE	IOTWMS	NEAMTWS	GAP FREQUENCY
1.1.1 Promote and assist with the establishment of consortia of higher education at the appropriate geographical scale	□	√□	√□	√□	√□	1/5
1.1.2 Promote collaboration between UNESCO Chairs and IOC	□	√□	□	□	□	4/5
1.2.1 Promote and assist with the organization of training courses, workshops and “summer schools” relevant to the IOC mandate	√	√	√	√	√	0/5
1.2.2 Establish, or collaborate with other organizations on an internship/fellowship programme (including on-board training)	√	√	√	√	□	1/5
1.2.3 Establish and collaborate with other organisations on a visiting lecturer programme	□	□	□	□	□	5/5
1.2.4 Promote and assist with the establishment of regional training (and research) centres relevant to the IOC mandate	□	√□	√□	√□	√□	1/5
1.2.5 Promote the sharing of training materials	√	√	√	√	√	0/5
1.3.1 Establish a travel grant “fund”	□	□	□	□	□	5/5
1.3.2 Establish or collaborate with other organizations on a mentoring programme	□	□	□	□	□	5/5
1.3.3 Promote and assist with the development of IOC alumni networks	□	□	□	□	□	5/5
1.3.4 Promote and support “young scientist” awards	□	□	□	□	□	5/5
1.4.1 Promoting participation of women in ocean research	√	√	√	√	√	0/5
2.1.1 Establishing and maintaining a register of infrastructure to facilitate access	√	√	√	√	√	0/5
2.1.2 Promoting the development of, and expand access to, regional sustainable scientific infrastructure	□	□	□	□	□	5/5
3.1.1 Improve staffing of secretariat of regional sub-commissions	□	√□	√□	√□	√□	1/5
3.1.2 Reinforcing budgeting of regional sub-commissions	□	√□	√□	√□	√□	1/5

	GLOSS	PTWS	CARIBE	IOTWMS	NEAMTWS	GAP FREQUENCY
3.2.1 Establishing an effective coordination and communication mechanism between the secretariats of the regional sub-commissions and the global programmes	√	√	√	√	√	0/5
4.1.1 Compare and compile information on existing ocean research priorities among government and other organizations				√		4/5
4.2.1 Assist Member States with the development of marine science management procedures and national policies	√	√	√	√	√	0/5
5.1.1 Promote the development of public information (communication) departments in ocean research institutions	√	√	√	√	√	0/5
5.2.1 Foster development of an IOC ocean literacy programme as a community of practice to share experience within and across regions	√	√	√	√	√	0/5
6.1.1 Fostering partnerships to increase in-kind support opportunities	√	√	√	√	√	0/5
6.2.1 Resource mobilisation from Member States, Institutional and Private Sector Partners	√	√	√	√	√	0/5
	12 gaps	7 gaps	8 gaps	7 gaps	9 gaps	43 gaps

Figure 10. GLOSS and tsunami regional programme CD gap analysis

Mr Aarup concluded that there is a high level of CD activities in TSU (Full summary statistics for Tsunami Regional Trainings, Workshops, Meetings [ICGs & WGs] and Exercises for 2016-2017 [are available as a separate document]). Activities reach a significant number of people and representatives from national operational disaster management authorities, seismic/sea level/hydro-met institutions, and local community. Activities are focused and in line with priorities set by the governing bodies of the Tsunami Warning Systems. Gaps mainly fall in area of “Sharing of knowledge and expertise/community building”, though this may be due to a restricted interpretation of specific modalities under this CD activity.

Mr Aarup stressed the need to keep in mind the expected lifespan of equipment that was installed after the 2004 tsunami and the equipment would need to be replaced, requiring substantial financial resources.

4.5 MARINE POLICY AND REGIONAL COORDINATION (ICAM, MSP)

This agenda item was introduced by Mr Julian Barbière, Head of the Marine Policy and Regional Coordination (IOC/MPR) Section. He referred to document Review of Capacity Development Requirements (IOC/GE-CD-I/Ag4.5)

Mr Barbiere explained that MPR is not a programme but a coordination activity.

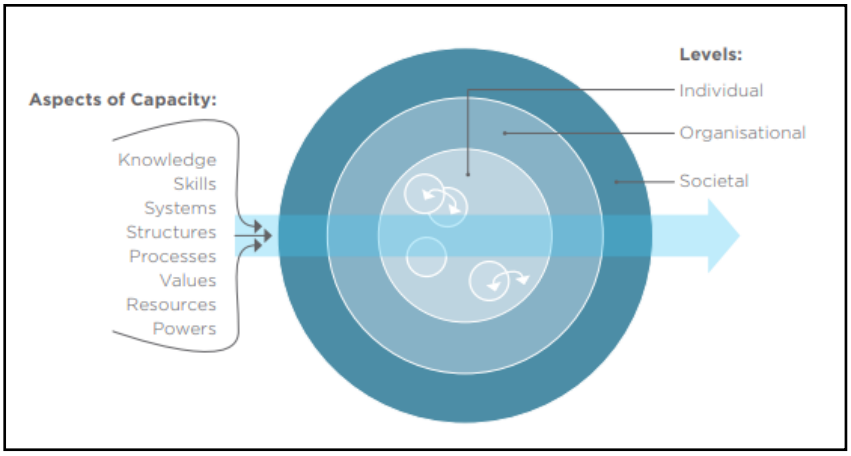

Figure 11. What is capacity development (IASS, 2016)

Mr Barbière asked about the meaning of capacity development in the context of the Agenda 2030. He explained that he has borrowed the illustration (Figure 11) from a recent report on CD issued by the Institute for Advances Sustainability Studies (IASS), as this is also their vision.

Components of capacity development include knowledge, skills, systems, structures, processes, values, resources and powers that, taken together, confer a range of political, managerial and technical capabilities. Capacity development interventions need to happen at 3 levels: individual, organizational and societal. The point is that CD needs to address the 3 levels to be effective and to trigger real change.

4.5.1 Integrated Coastal Area Management

Mr Barbière then elaborated on the Integrated Coastal Area management (ICAM) strategy and CD cuts across all three of the below objectives.

Theme 1: Coastal and Marine Ecosystem-Based Management and Planning

Objective 1: Build collective capacities to respond to emerging ocean issues through ecosystem and area-based management tools such as Integrated Coastal Area Management, Marine Spatial Planning (MSP) and Sustainable Blue Growth initiatives, including transboundary and Large-Marine Ecosystem (LME) approaches for the sustainable use of marine resources and with a view to achieve a healthy and a productive ocean.

Theme 2: Coastal and Marine Hazards Adaptation and Preparedness Through EBM/Area-Based Management Tools

Objective 2: Promote the integration of ocean-related hazards and climate change adaptation within coastal and marine management and planning tools in order to improve preparedness and resilience of coastal communities

Theme 3: Coastal and Marine Data, Information and Decision Support Tools

Objective 3: Increase collective knowledge supporting management actions on the status and change of coastal and marine ecosystems and sustained services through use and dissemination of data, information and decision support tools.

The three components and objectives of the ICAM strategy are also aimed at supporting the implementation of SDG 14 (Conserve and sustainably use the oceans, seas and marine resources for sustainable development) of the Agenda 2030 and specifically the targets identified in the table below:

GOAL 14 TARGETS	
14.2	By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans.
14.7	By 2030, increase the economic benefits to Small Island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism.
14.a	Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries.

4.5.2. Marine Spatial Planning

It is the same for Marine Spatial Planning (MSP) which has emerged in the last 10 years as a key tool to implement ecosystem based management in national waters, more than 40 countries around the world are implementing MSP plans. IOC has plaid a leading role in codifying this approach and we also believe that MSP is a prerequisite to develop sustainable, harmonised blue growth policies.

Over the next decade another 30 countries will develop and approve marine spatial plans that will cover about a third of the surface area of the world's Exclusive Economic Zones (EEZs). IOC has provided guidance and training to most of these MSP initiatives and is recognized as a leading international organization on MSP issues.

During the Second International Conference on MSP that we jointly organized with the European Commission in Paris from 15 to 17 March 2017, we had the participation of many of the MSP authorities at national and regional scale sharing experiences and the strategic objective to accelerate MSP processes worldwide.

Mr Barbière then presented the joint roadmap to accelerate MSP worldwide (Figure 12).

Figure 12. Joint roadmap to accelerate MSP worldwide

He explained that a new project will start in April 2018 that covers 5 of the actions included in our MSP Joint Roadmap: (i) Developing transboundary guidance; (ii) the pilot case studies in the Southeast Pacific and the West Mediterranean; (iii) the International Forum on MSP starting in May 2019.

Mr Barbiere briefly provided information on projects such as SPINCAM, LME:Learn, UN World Ocean Assessment (2016–2020).

Mr Barbiere then recalled the table of MPR CD actions (Figure 13) below

Output	Activity	Action	Relevant actions taken by MPR until December 2016	Contributing global programmes	Possible actions/programmes to fill gap or to optimize for the biennium 2017-2019	Required resources	Workplan 2018
1. Human resources developed	1.1 Academic (higher) education	1.1.1 Promote and assist with the establishment of consortia of higher education at the appropriate geographical scale	IOC/MPR is member of the Erasmus Mundus Consortium for Marine Spatial Planning led by the Universities of IUAV-Venezia (Italy), Sevilla (Spain) and Azores (Portugal) which beneficiaries are mainly non-European students IOC/MPR is cooperating with the Ibero-American Network of Universities to promote coastal and ocean ecosystem-based management studies.		IOC/MPR supported the project PADDLE (Planning in a liquid world with tropical stakes) due to the urgent and critical need for research on the application of MSP in tropical areas having the case studies of Cape Verde, Senegal and Brazil as pilot projects in which the academic and higher education institutions of the three countries and the European Union are involved.	Human and financial resources 20.000 USD	Active participation in the first workshop on coastal and marine governance for local communities in Mindelo, Cape Verde with the support of IOCAFRICA and the OceanTeacher Global Academy.
		1.1.2 Promote collaboration between UNESCO Chairs and IOC	IOC/MPR has invited IOC Chairs to major regional events in Asia, Africa and Latin America		IOC/MPR will continue inviting IOC Chairs to major regional events in Asia, Africa, Latin America and the Caribbean	Financial resources to cover the IOC Chairs participation 20.000 USD	Linked with regional activities and extrabudgetary projects.
	1.2 Continuous professional development	1.2.1 Promote and assist with the organization of training courses, workshops and “summer schools” relevant to the IOC mandate	During the last biennium, IOC/MPR coordinated/contributed the organization of 20 training events in support of ecosystem-based management tools, integrated coastal area management, marine spatial planning, data and information management (including electronic repositories),	CD Strategy and ICAM Strategy	IOC/MPR includes in all activities and project initiatives a CD component. In cooperation with the Regional Sub-Commissions of IOC, IOC/MPR will implement during this biennium trainings at regional scale and in different languages taking advantage the	Financial and human resources 30.000 USD	MPR Trainings expected in 2018: MSP Training in French, Regular Programme and IOCAFRICA, Madagascar, May 2018 MSP International Forum, MSPglobal context, Brussels,

Output	Activity	Action	Relevant actions taken by MPR until December 2016	Contributing global programmes	Possible actions/programmes to fill gap or to optimize for the biennium 2017-2019	Required resources	Workplan 2018
			decision support tools and atlases. Training initiatives have been designed in close collaboration with IODE, OceanTeacher Global Academy. Summer courses were organized in collaboration with the International University of Andalusia (Spain) and INVEMAR (Colombia).		availability of resources, mainly from extra-budgetary sources.		May 2018 MSP Training in English, Regular Programme and IOCAFRICA, Mombasa, Kenya, September 2018. IOC/MPR will support PADDLE Project for the summer course week in Brest, France, in September 2018. MSP International Forum, MSPglobal context, Reunion, October 2018. MSP Training in Spanish, SPINCAM, MSPglobal and LME:Learn context, Lima, Peru, October 2018. MSP Training in French, MSPglobal, LME:Learn context, Morocco, November 2018.

Output	Activity	Action	Relevant actions taken by MPR until December 2016	Contributing global programmes	Possible actions/programmes to fill gap or to optimize for the biennium 2017-2019	Required resources	Workplan 2018
							Blue Economy in English at the Global Conference on Blue Economy, Nairobi, Kenya, November 2018.
		1.2.2 Establish, or collaborate with other organizations on an internship/fellowship programme (including on-board training)	IOC/MPR has established an agreement for Master/PhD students and young researchers to do their internship in Paris, or in the premises of the Regional Sub-Commissions or Project Offices in close collaboration with them. The most relevant agreements are the Erasmus Mundus, the Foreign Department of the Government of Flanders (Belgium) and the Ministry of High Education of Quebec (Canada)	CD Strategy and ICAM Strategy	In the context of the Joint Roadmap to accelerate marine spatial planning processes in the world of IOC-UNESCO and the European Commission (MARE), IOC-MPR has established ocean governance oriented trainings at global scale and at regional scale in the context of the Western Mediterranean and the Southeast Pacific. In the context of the Erasmus Mundus Programme dedicated to Marine Spatial Planning, IOC/MPR is promoting the internships of Erasmus students in HQ, the	Human and financial resources. 10.000 USD	In the context of the PADDLE Project, IOC-UNESCO has already established collaboration frameworks to facilitate internships and fellowships of Master/PhD students. IOC/MPR will host 3 different interns of the Erasmus Mundus on Marine Spatial Planning

Output	Activity	Action	Relevant actions taken by MPR until December 2016	Contributing global programmes	Possible actions/programmes to fill gap or to optimize for the biennium 2017-2019	Required resources	Workplan 2018
					premises of the regional sub-commissions and project offices.		
		1.2.3 Establish and collaborate with other organisations on a visiting lecturer programme	IOC/MPR has promoted this type of collaboration with the Permanent Commission for the Southeast Pacific (CPPS), INVEMAR (Colombia) and the Government of Andalusia (Spain) which experts have been visiting our premises in order to understand and know better our contribution to the ocean.		The support of IOC/MPR to the PADDLE Project initiative is linked with this specific action to promote visiting lecturer programmes in our premises and facilitate the visit of lectures to regional subcommissions. In the context of the Erasmus Mundus Programme dedicated to Marine Spatial Planning, IOC/MPR staff are participating on visiting lecturer programmes.	Human resources 10.000 USD	IOC/MPR invited Dr. Juan Luis Suárez de Vivero (Spain), recognized expert from the PADDLE Consortium, to support the Capacity Development Plan of IOC/MPR and join the expert group.
		1.2.4 Promote and assist with the establishment of regional training (and research) centres relevant to the IOC mandate	IOC/MPR has assisted the OceanTeacher Global Academy during the establishment of the regional training centre for Latin America and the Caribbean located in Colombia. IOC/MPR has assisted OceanTeacher and the RTCs in the	CD Strategy and ICAM Strategy	IOC/MPR is developing joint initiatives with the different regional training centres in Africa (Mombasa and Dakar), in Latin America (Santa Marta) and with the IODE Project Office for those trainings linked with the	Human and financial resources. 5.000 USD	Training courses are under preparation in close cooperation with the OTGA and the RTCs in Mombasa and Dakar. In the context of

Output	Activity	Action	Relevant actions taken by MPR until December 2016	Contributing global programmes	Possible actions/programmes to fill gap or to optimize for the biennium 2017-2019	Required resources	Workplan 2018
			preparation of trainings related to IOC mandate in general and specifically those aspects directly linked with the MPR section.		mandate of the MPR section in Europe. In the context of extra budgetary projects, IOC/MPR is also promoting and assisting the establishment of regional training networks.		extra budgetary projects, IOC/MPR is assisting the establishment of regional training networks (e.g. LME:Learn, SPINCAM, AQUACROSS).
		1.2.5 Promote the sharing of training materials	YES: systematically for all courses organized through the OTGA e-learning platform. Including the translation of existing training materials to other official languages of our institution.	ICAM Strategy and CD Strategy	IOC/MPR is using the online learning platform of OTGA to share training materials and guidance documents for all training courses. IOC/MPR is currently updating the website dedicated to marine spatial planning in order to have a new section dedicated to share training materials in all available languages.	Human and financial resources 5.000 USD	All training courses led or participated by IOC/MPR will produce and share training materials to be published in the online platform of OTGA, in collaboration with the different RTCs and in the IOC MSP website.
	1.3 Sharing of knowledge and expertise/community building	1.3.1 Establish a travel grant “fund”	YES: through the implementation of current projects focusing to young researchers and civil servants of our Member states.	UNESCO Youth	New project proposals in the current biennium will include travel grant fund to facilitate the participation of young researchers and junior civil servants in those training activities organised by IOC/MPR	Human and financial resources 20.000 USD	Training activities jointly organized by IOC/MPR in the context of the MSPglobal and LME:Learn projects.
		1.3.2 Establish or collaborate with other	Yes, IOC/MPR is a partner of the Erasmus	UNESCO Youth	In the context of the Erasmus Mundus	Human and financial	An intern of the Erasmus Mundus

Output	Activity	Action	Relevant actions taken by MPR until December 2016	Contributing global programmes	Possible actions/programmes to fill gap or to optimize for the biennium 2017-2019	Required resources	Workplan 2018
		organizations on a mentoring programme	Mundus mentoring programme.		dedicated to Marine Spatial Planning, IOC/MPR is mentoring the research work of all interns.	resources 11.000 USD	Programme is developing a research on stakeholder participation in marine spatial planning processes under the direction of Dr. Juan Luis Suárez de Vivero (University of Seville) and Dr. Alexander Turra (University of Sao Paulo) and supervision by IOC/MPR staff.
		1.3.3 Promote and assist with the development of IOC alumni networks	YES: IODE maintains an alumni database (needs update for IOC/MPR Courses).		IOC/MPR keeps track of its participants and engages them into relevant IOC/MPR programme and activities.		Part of the day to day operations
		1.3.4 Promote and support “young scientist” awards	Yes. Actively through the organization of trainings in the context of projects under implementation and institutional initiatives led by IOC/MPR.		IOC/MPR will continue supporting the promotion of young scientists in the context of the implementation of regional projects and initiatives		Part of the day to day operations
	1.4 Gender balance	1.4.1 Promoting participation of women in ocean research	YES: IOC/MPR seeks gender balance when organizing training courses (typically female dominance)	Gender Actions	IOC/MPR will continue promoting the participation of women in all activities and events.		Part of the day to day operations

Output	Activity	Action	Relevant actions taken by MPR until December 2016	Contributing global programmes	Possible actions/programmes to fill gap or to optimize for the biennium 2017-2019	Required resources	Workplan 2018
2. Access to physical infrastructure established or improved	2.1 Facilitating access to infrastructure (facilities, instruments, vessels)	2.1.1 Establishing and maintaining a register of infrastructure to facilitate access	YES: IOC/MPR has improved the access to the Marine Spatial Planning website, contents have been updated and all information accessible in 3 languages (English, French, Spain).		IOC/MPR will continue supporting the improvement of existing infrastructures developed.	Human and financial resources 15.000 USD	Update of the Marine Spatial Planning website in the three available languages.
		2.1.2 Promoting the development of, and expand access to, regional sustainable scientific infrastructure	YES: IOC/MPR promotes the development of regional scientific infrastructure and the exchange of good practices and experiences in those topics directly linked with the mandate of this section.		IOC/MPR will continue promoting the development of regional scientific infrastructure and decision support tools in collaboration with our Member States and regional bodies.	Human and financial resources 15.000 USD	SPINCAM: Coastal and marine atlas as decision support tool to support marine spatial planning and sustainable blue growth initiatives in the Southeast Pacific.
3. Global, regional and sub-regional mechanisms strengthened	3.1 Further strengthening and supporting secretariats of regional sub-commissions	3.1.1 Improve staffing of secretariat of regional sub-commissions	Co-designed acitivities developed in the context of the GEF LME:Learn project will strengthen the technical capacity of Sub-Commissions.		IOC/MPR is coordinating efforts with the regional sub-commissions to develop regional networks supporting ocean governance and the creation of synergies for financial opportunities.	Human and financial resources 30.000 USD	IOC/MPR through project initiatives such as SPINCAM, MSPglobal and LME:Learn is improving the capacities of the staff at the regional sub-commissions secretariats.
		3.1.2 Reinforcing budgeting of regional sub-commissions	YES: IOC/MPR has contributed with additional funds to training activities and informative events jointly organized or in cooperation with regional sub-commissions.		IOC/MPR will continue supporting with contents and additional funding activities led by the regional sub-commissions in aspects related to the mandate of IOC/MPR	Human and financial resources 30.000 USD	IOC/MPR is currently preparing different trainings in Africa and Latin America / Caribbean as part of the workplan 2018.

Output	Activity	Action	Relevant actions taken by MPR until December 2016	Contributing global programmes	Possible actions/programmes to fill gap or to optimize for the biennium 2017-2019	Required resources	Workplan 2018
	3.2 Enhance effective communication between regional sub-commission secretariats and global programmes as well as other communities of practice (incl. other organisations)	3.2.1 Establishing an effective coordination and communication mechanism between the secretariats of the regional sub-commissions and the global programmes	Organisation of annual meeting with regional/global programmes aimed a developing a co-designed programme of new activities.		IOC/MPR will continue strengthening effective coordination and communication actions with the secretariats of the regional-subcommissions.	Human resources	Day to day operations.
4. Development of ocean research policies in support of sustainable development objectives promoted	4.1 Sharing of information on ocean research priorities	4.1.1 Compare and compile information on existing ocean research priorities among government and other organizations	YES: IOC/MPR includes in all project initiatives a specific component on data, information and sharing mechanisms amongst our member states and research institutions. E.g: TWAP-LME Project, SPINCAM, AQUACROSS.		IOC/MPR will continue sharing information on ocean research priorities in the context of the extra-budgetary projects.	Human and financial resources 100.000 USD	In 2018, the following actions are expected: LME:Learn will launch the specific toolkits on Ecosystem valuation, Marine Spatial Planning, Ocean Governance, etc. AQUACROSS Project will launch the aquatic and biodiversity information platform led by IOC/MPR AQUACROSS Project will launch the storytelling map for the Intercontinental Biosphere Reserve of the

Output	Activity	Action	Relevant actions taken by MPR until December 2016	Contributing global programmes	Possible actions/programmes to fill gap or to optimize for the biennium 2017-2019	Required resources	Workplan 2018
							Mediterranean: Andalusia (Spain)-Morocco which will be distributed to all municipalities of the Biosphere Reserve in Spain and Morocco and it will be hosted by the Environmental Information Network of Andalusia. MSPglobal project will establish information platforms to share data and information to support marine spatial planning processes in the Western Mediterranean and the Southeast Pacific.
	4.2 Developing national marine science management procedures and national policies	4.2.1 Assist Member States with the development of marine science management procedures and national policies	YES: IOC/MPR supports Member States in strengthening marine science management procedures to be applied to national and regional policies. E.g: SPINCAM, ACCC Africa.		IOC/MPR will continue assisting member states with the development of national, transboundary and regional marine policy actions.	Human and financial resources 500.000 USD	SPINCAM will assist member states in the Southeast Pacific to develop the pre-planning for Marine Spatial Planning and recommendations at regional scale towards a regional

Output	Activity	Action	Relevant actions taken by MPR until December 2016	Contributing global programmes	Possible actions/programmes to fill gap or to optimize for the biennium 2017-2019	Required resources	Workplan 2018
							strategy on sustainable blue growth. MSPglobal will develop recommendations for transboundary Marine Spatial Planning in the context of the Western Mediterranean and the Southeast Pacific. LME:Learn will support member states to jointly develop regional policy actions in the context of the large marine ecosystems.
5. Visibility and awareness increased	5.1 Public Information	5.1.1 Promote the development of public information (communication) departments in ocean research institutions	YES: IOC/MPR promotes the development of public information and communication products to support the dissemination of good practices in relation to ecosystem-based management, ocean policy and regional coordination. The promotion is done through the launching of		IOC/MPR will promote during this biennium the development of public information and communication products in relation to the mandate of this section, in line with Agenda 2030, the UN Decade of Ocean Sciences and the Joint Roadmap of Marine Spatial Planning with the European	Human and financial resources 100.000 USD	The visibility and awareness actions will be executed as part of the ICAM Strategy activities and in the context of the different extra-budgetary projects led by IOC/MPR.

Output	Activity	Action	Relevant actions taken by MPR until December 2016	Contributing global programmes	Possible actions/programmes to fill gap or to optimize for the biennium 2017-2019	Required resources	Workplan 2018
			manuals and guidelines, technical reports, regional and global conferences and dedicated websites (e.g: MSP).		Commission.		
	5.2 Ocean Literacy	5.2.1 Foster development of an IOC ocean literacy programme as a community of practice to share experience within and across regions	YES: Participating in project development and implementation (e.g: TWAP, LME:Learn, SPINCAM, AQUACROSS).	Ocean Literacy for all	IOC/MPR will continue supporting the Ocean Literacy for all initiative. In 2017, a specific workshop on Ocean Literacy and Story Telling Tools was organized by IOC/MPR in Santa Marta, Colombia with the compromise to share experiences and lessons learnt amongst the different regions.	Human and financial resources. 50.000 USD.	The actions will include the launching of new web applications, storytelling tools in support of Ocean Literacy for all, leaflets, brochures, new guidelines, etc.
6. Sustained (long-term) resource mobilization reinforced	6.1 In-kind opportunities	6.1.1 Fostering partnerships to increase in-kind support opportunities	YES: IOC/MPR is continuously reinforcing partnerships and networks to increase in-kind support to specific projects and initiatives to be implemented at binational and/or regional level. n future activities at regional and global level. (E.g.: EurOcean, Horizon 2020 Initiatives, GEF Project initiatives, Flemish Scientist Network, etc).		IOC/MPR will continue reinforcing partnerships and networks to increase in-kind support to specific project and initiatives implemented at regional and global level.	Human and financial resources 20.000 USD	During this year, IOC/MPR will strengthen the existing partnership and create synergies with new donors, public and private partners, to increase in-kind opportunities for this section.

Output	Activity	Action	Relevant actions taken by MPR until December 2016	Contributing global programmes	Possible actions/programmes to fill gap or to optimize for the biennium 2017-2019	Required resources	Workplan 2018
	6.2 Financial support by Member States to IOC activities	6.2.1 Resource mobilisation from Member States, Institutional and Private Sector Partners	YES: e.g. Flanders (Belgium), France, Horizon 2020 (European Union), SUEZ (France), Betty and Moore Foundation (USA).		IOC/MPR will continue mobilising resources from public and private partners creating new opportunities to develop joint initiatives in line with the activities of this section and in support of the implementation of Agenda 2030, the UN Decade on Ocean Sciences and the Joint Roadmap on Marine Spatial Planning.	Human and financial resouces	Strategic planning part of the day to day operations.

Figure 13. MPR CD actions

Mr Barbière concluded with the gap analysis (Figure 14).

	ICAM	WOA	SDG	GAP FREQUENCY
1.1.1 Promote and assist with the establishment of consortia of higher education at the appropriate geographical scale	√	√	√	0/3
1.1.2 Promote collaboration between UNESCO Chairs and IOC	√	√	√	0/3
1.2.1 Promote and assist with the organization of training courses, workshops and “summer schools” relevant to the IOC mandate	√	√	√	0/3
1.2.2 Establish, or collaborate with other organizations on an internship/fellowship programme (including on-board training)	√	√	√	0/3
1.2.3 Establish and collaborate with other organisations on a visiting lecturer programme	√	√	√	0/3
1.2.4 Promote and assist with the establishment of regional training (and research) centres relevant to the IOC mandate	√	√	√	0/3
1.2.5 Promote the sharing of training materials	√	√	√	0/3
1.3.1 Establish a travel grant “fund”	√	√	√	0/3
1.3.2 Establish or collaborate with other organizations on a mentoring programme	√	□	□	2/3
1.3.3 Promote and assist with the development of IOC alumni networks	√	□	□	2/3
1.3.4 Promote and support “young scientist” awards	√	□	□	2/3
1.4.1 Promoting participation of women in ocean research	√	√	√	0/3
2.1.1 Establishing and maintaining a register of infrastructure to facilitate access	√	√	√	0/3
2.1.2 Promoting the development of, and expand access to, regional sustainable scientific infrastructure	√	√	√	0/3
3.1.1 Improve staffing of secretariat of regional sub-commissions	□	□	□	3/3
3.1.2 Reinforcing budgeting of regional sub-commissions	√	√	√	0/3
3.2.1 Establishing an effective coordination and communication mechanism between the secretariats of the regional sub-commissions and the global programmes	√	√	√	0/3
4.1.1 Compare and compile information on existing ocean research priorities among government and other organizations	√	√	√	0/3
4.2.1 Assist Member States with the development of marine science management procedures and national policies	√	√	√	0/3
5.1.1 Promote the development of public information (communication) departments in ocean research institutions	√	√	√	0/3
5.2.1 Foster development of an IOC ocean literacy programme as a community of practice to share experience within and across regions	√	√	√	0/3
6.1.1 Fostering partnerships to increase in-kind support opportunities	√	√	√	0/3
6.2.1 Resource mobilisation from Member States, Institutional and Private Sector Partners	√	√	√	0/3
	1 gaps	**4 gaps**	**4 gaps**	9 gaps

Figure 14. MPR CD gap analysis

4.6 TRANSFER OF MARINE TECHNOLOGY (TMT)

This agenda item was introduced by Ms Harriet Harden-Davies. She referred to document Concept for operationalising the IOC Criteria and Guidelines on the Transfer of Marine Technology through the establishment of a Clearing House Mechanism (IOC/GE-CD-I/Ag4.6)

Marine technology includes information, data, knowledge, equipment, infrastructure, and expertise. The IOC Criteria and Guidelines on the Transfer of Marine Technology (CGTMT) aim to support the implementation of the development and transfer of marine technology as per Part XIV of the United Nations Convention on the Law of the Sea (UNCLOS) by providing a tool to promote capacity building through international cooperation. A clearinghouse mechanism (CHM) was proposed as a principal tool for implementing the CGTMT, by enabling access to expertise and sharing information, and by facilitating cooperation. A confluence of policy initiatives relating to the sustainable use of the ocean are bringing growing attention to the establishment of a CHM (including the 2030 Agenda for Sustainable Development Goal 14, the United Nations Decade of Ocean Science for Sustainable Development 2021–2030, and the development of a new international legally binding instrument for the conservation and sustainable use of marine biological diversity in areas beyond national jurisdiction under UNCLOS [IOC/INF-1347]). By strengthening the international framework for technology development, exchange and uptake, a CHM could support capacity development. To further develop and implement the concept of a CHM, consideration could be given to identifying: users (and their needs), providers, elements and functions, governance models, technical architecture, partnerships.

Within the context of TMT, she defined “technology” as:

- Information and data.
- Manuals, guidelines, criteria, standards, reference materials.
- Sampling and methodology equipment.
- Observation facilities and equipment.
- Equipment for in situ and laboratory observations, analysis and experimentation.
- Computer and computer software, including models and modelling techniques.
- Expertise, knowledge, skills, technical/scientific/legal know-how and analytical methods relating to marine scientific research and observation.

The Clearinghouse mechanism, IOC CGTMT concept (2003): *Provide interested users in Member States with direct and rapid access to relevant sources of information, practical expertise in the transfer of marine technology, as well as to facilitate effective scientific, technical and financial cooperation to that end*.

She identified the following types of information for the CHM:

1. List of governmental, non-governmental or private entities interested in participating as donors.
2. Opportunities for projects or initiatives.
3. Sources, availability and cost of marine scientific and technological information and data.
4. Directory of marine research institutes which offer laboratory facilities, equipment and opportunities for research and training.
5. Offers of cruise studies at global, regional and sub-regional level.
6. List of experts/specialists for scientific and technical assistance.

7. Universities and other organizations offering study grants and facilities in marine science.
8. Workshops, seminars and training courses at global, regional and sub-regional level, in particular those offering financial support.
9. Studies on rules and regulations concerning technology transfer and marine scientific research.
10. Links with national, sub-regional and/or regional agreements, institutions and centres holding information, experience and technical expertise of scientific relevance.

Progress so far has been made by IOC: OceanTeacher, OceanExpert, Data standards, practices, access (IODE, OBIS) Ocean Knowledge Platform, Ocean Data and Information System, Capacity development website, Regional training centres, information centres, etc, and by other organizations as the Convention on Biological Diversity (CBD), the Pacific Regional Environment Programme (SPREP),…

Mapping CHM vs CD strategy:

Clearinghouse mechanism (IOC CGTMT, 2005)	Potential capacity development outputs under IOC CD Strategy 2015–2021
List of possible donors	6 (Sustained resource mobilisation reinforced)
Opportunities for projects or initiatives	1 (Human resources developed) 3 (Global, regional and sub-regional mechanisms strengthened) 5 (Visibility and awareness increased)
Sources, availability and cost of marine scientific and technological information and data	3 (Global, regional and sub-regional mechanisms strengthened)
Directory of marine research institutes	2 (Access to physical infrastructure established or improved) 1 (Human resources developed)
Offers of cruise studies	1 (Human resources developed)
List of experts/specialists	1 (Human resources developed)
Universities and other organisations	1 (Human resources developed)
Workshops, seminars and training courses	1 (Human resources developed)
Studies on rules and regulations concerning technology transfer and marine scientific research	4 (Development of ocean research policies in support of sustainable development objectives)
Links with national, sub-regional and/or regional agreements, institutions	3 (Global, regional and sub-regional mechanisms strengthened) 6 (Sustained resources mobilisation reinforced)

Figure 15. Mapping CHM vs CD strategy

Some of the key questions that were asked:

What type of clearinghouse mechanism is needed?

- Objective?
- Users and needs?
- Functions and elements?

How could a clearinghouse mechanism be designed and mobilised?

- Contributors and partnership options?
- Governance models and technical architecture?
- Evaluation?

Who would use the CHM?

- National government agencies, research organizations?
- Regional organizations?
- International intergovernmental organizations?
- Non-state actors, including private sector and international non-governmental organizations?
- Others?

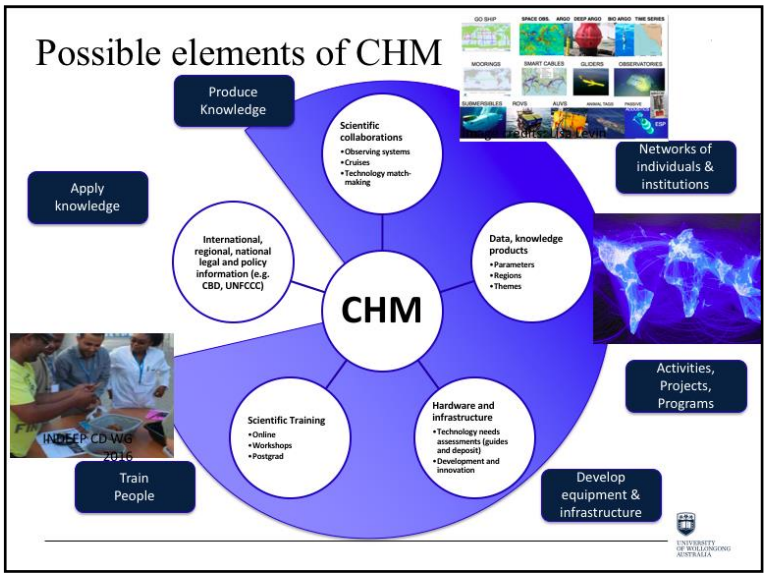

Figure 16. Possible elements of CHM

Ms Harden-Davies proposed two models which will each have a different cost. One would be a CHM for IOC, while another would be a CHM for Oceans.

She concluded with the following summary:

1. Marine technology transfer can support capacity development
    - Technology development, diffusion and uptake.
    - Drive scientific advancement, knowledge production, innovation.
    - Access, utilise and apply knowledge & tools.
    - Trained people.
    - Equipment, infrastructure.
    - Collaboration opportunities and financing.
    - Global, regional and national scale.
2. A CHM can be a tool, but key questions still to be addressed
    - Static information portal? Or dynamic collaboration system?

- Objective? Users? Needs? Partners? Governance models? Technical architecture?

The Group decided to create a sessional working group on TMT/CHM to work on Thursday morning to address specific actions related to TMTM/CHM.

5. CURRENT IOC CAPACITY DEVELOPMENT METHODOLOGIES AND TOOLS

5.1 OCEANTEACHER GLOBAL ACADEMY

This agenda item was introduced by Ms Claudia Delgado, IODE Training Coordinator.

Ms Delgado noted that the general aspects of OceanTeacher Global Academy were already addressed by Mr Aidy Muslim under agenda item 4.3.

She noted that IODE has a long history of providing vocational training and continuous professional development. OceanTeacher started in 2001, followed by OceanTeacher Academy in 2009, and OceanTeacher Global Academy in 2014.

The new OceanTeacher Global Academy builds upon and expands the existing OceanTeacher Academy based at the IOC Project Office for IODE in Oostende, Belgium, to a truly worldwide training facility.

It provides a programme of training courses related to IOC programmes, contributing to the sustainable management of oceans and coastal areas worldwide, and relevant to Member States in the regions. In 2015 OTGA went “global”:

OTGA Concept:

- At least 1 RTC for each region and language group,
- Complementary to existing regional training centres,
- Self-driven, based on locally available expertise,
- Should be co-located with other ongoing and funded programmes/projects,
- Sharing of courses with other RTCs using video conferencing technology,
- Inviting of specific expert lectures through video conferencing,
- Use of common OceanTeacher e-Learning Platform,

OTGA Project funded by FUST (Government of Flanders, Belgium),

Since its start OTGA trained more than 2,500 trainees (face-to-face courses) during 130 courses from 120 countries and in 4 languages (English, French, Spanish and Portuguese). There are over 4,200 registered users on the OceanTeacher e-learning platform.

In terms of technology OTGA uses Moodle. Moodle (Modular Object-Oriented Dynamic Learning Environment) is a learning platform designed to provide educators, administrators and learners with a single robust, secure and integrated system to create personalised learning environments. You can download the software onto your own web server or ask one of our knowledgeable Moodle Partners to assist you. Moodle is built by the Moodle project which is led and coordinated by Moodle HQ, which is financially supported by a network of over 80 Moodle Partner service companies worldwide. OTGA has the following course categories:

- IODE: marine data and information management, inc. OBIS.
- MPR / ICAM: Coastal Marine Management and Planning.
- HAB: Harmful Algal Bloom and Advanced Phytoplankton (APC) Training.
- Tsunami.
- MSR/DOALOS: Marine Scientific Research.

In addition to course outlines and course content, the system also allows assignment, questionnaires, quiz, polls, survey, essay, etc. Assessment reports can be extracted in real-time and remotely (Internet). OTGA also has an online application form ensuring that all necessary information on candidates is received.

Ms Delgado asked whether IOC wants to address training with 19th or 21st century tools and methods. In this regard, she referred to the Qingdao Declaration (2015).

The Qingdao Declaration is the first global declaration on ICT in education. The text, approved unanimously by participants, highlights the different ways in which technology can support the global agenda for education which was suggested at the World Education Forum, 2015.

It states that *[…] the remarkable advances in Information and Communication Technologies (ICT) and the rapid expansion of internet connectivity have made today's world increasingly interconnected and made the knowledge more accessible for every girl and boy, woman and man. To achieve the goal of inclusive and equitable quality education and lifelong learning by 2030, ICT- including mobile learning- must be harnessed to strengthen education systems, knowledge dissemination, information access, quality and effective learning, and more efficient service provision.*

The Declaration is a clear statement in favour of the use of ICT to foster access and equity in education as well as to promote the effective pedagogical use of ICT. It highlights in particular the paramount role that teacher development and support will have to play. It stresses that increasing efforts have to be made to promote the culture of open educational resources and the need to ensure quality assurance and recognition of online learning. Finally, it encourages governments, industry partners and all other education stakeholders to join forces and share resources to create equitable, dynamic, accountable, and sustainable learner-centered digital learning ecosystems.

In relation to the IOC CD strategy, Ms Delgado noted that OTGA responds to 5 actions:

Output	Activity	Action
1. Human Resources Developed	1.2. Continuous Professional Development	**1.2.1. Promote and assist with the organization of training courses, workshops and 'summer schools' relevant to the IOC mandate.**
		1.2.2 Establish, or collaborate with other organizations on, an internship/fellowship programme (including on-board training).
		1.2.3 Establish and collaborate with other organizations on, a visiting lecturer programme.
		1.2.4 Promote and assist with the establishment of regional training (and research) centres relevant to the IOC mandate.
		1.2.5 Promote the sharing of the training materials.

Figure 17. IOC CD strategy actions addressed by OTGA

Ms Delgado stated that OTGA is in a very good position to support the SDGs.

Mr Troisi stated that the OTGA platform has been used for programmes other than IODE. One of the challenges has been to get the content. We have the platform but getting the content has remained a challenge.

Mr Nolan commented that we have many of the system elements for MOOCs and he asked whether we have considered this expansion. Ms Delgado responded that we do have the infrastructure and we will launch a MOOC on Research Data Management in collaboration with University of Gent, Belgium. MOOCs can reach large audiences but it is not a solution for all training requirements.

Mr Bax noted that an important component is practical work and he asked about the way of fitting this into OTGA. Ms Delgado responded that practical training is already often included in the courses, especially for data and information related training.

Mr Yang inquired about content of the courses, in other words, he asked how OTGA decide on the topics for the training. Ms Delgado noted that IODE promotes the use of standards so certain concepts are universal across regions. Regarding topics selection the surveying of needed topics is done by the RTCs.

Mr Troisi noted that there are regular surveys where regions can identify required training topics.

5.2 REGIONAL TRAINING AND RESEARCH CENTRES (WESTPAC)

This agenda item was introduced by Mr Somkiat Khokiattiwong. He referred to the presentation on WESTPAC under Agenda item 3.3, which gave a clear introduction on WESTPAC Guiding principle for, and approach to capacity development.

While emphasizing that WESTPAC takes integrated capacity development tools to serve the needs of its Member States, he drew particular attention to the WESTPAC Initiated regional network of training and research centers (RTRCs) on marine sciences. The RTRC network was initiated in 2008 by Member States in the region and subsequently adopted by IOC/UNESCO, aiming to improve national and regional capability and capacity on marine science in a sustainable and systematic manner, through the establishment of IOC Regional Training and Research Centers (RTRCs) in national oceanographic institutes or universities, and regular provision of training and research opportunities in RTRCs on their specialized areas to young scientists mainly from developing countries within and outside the region.

Objectives:

- Improve regional research capacity in a sustainable and systematic manner,
- Establish and strengthen the Centers of Excellence in the region.

Approaches:

- Building on countries' strong ownerships (national ocean research institutes and universities),
- Host institutions' specialized areas and international recognition,
- Cross-fertilize the knowledge and expertise across the region,
- Regular provision of training and research opportunities on their specialized areas,
- Co-design and co-development with Member States and relevant international/national research programmes,

Methods/tool:

- Expert lectures, hands-on practices, group discussions, field trips, sharing of research experience, engagement into relevant research programmes, if needed, ICT technology.

Establishment:

- Host institutions' specialized areas and international recognition,
- An open and transparent development process of multi-disciplinary and multi-nation representation.

Financial resources:

- Self-sustaining.

Regional Training and Research Center on Ocean Dynamics and Climate (RTRC- ODC) – China

Established in 2011. A total of 312 early career scientists from 33 countries from 2011 to 2017. Meanwhile, RTRC has been contributing to international research program development such as WESTPAC SEAGOOS/Ocean Forecasting System.

Regional Training and Research Center on Marine Biodiversity and Ecosystem Health RTRC-MarBEST – Indonesia

Mission:

- Strengthen the capability of human resources, especially students/young scientists/lecturers of UNESCO/IOC Member States in the Western Pacific region;
- Network on marine biodiversity among scientists/lecturers in the Western Pacific region;
- Promote the data and information exchange of marine biodiversity among institutions at Western Pacific region;
- Contribute to the sustainable development and conservation of marine and coastal resources through training and research.

Shortly after its inauguration in 2016, a two-week long Training Course on Crustacean Taxonomy was conducted at the MarBEST Centre from 17 to 29 October 2016 in Jakarta, Indonesia, and a Training Course on Molecular Taxonomy was organized from 25 September to 6 October 2017 in Jakarta, Indonesia. These trainings were well aligned with national and regional research programs such as WESTPAC programs, respectively on monitoring the ecological impacts of ocean acidification on coral reef systems, and DNA Taxonomy and Recruitment Monitoring of the Coral Reef Marine Organisms.

Mr Khokiattiwong informed that there are also other 2–3 RTRCs are under development with different research focus. He expressed his appreciation for the strong willingness expressed by a wealth of countries in the region at the 11th Intergovernmental Session of the IOC Sub-Commission for the Western Pacific (WESTPAC-XI), held in Qingdao, China, from 21 to 23 April 2017, and the recent workshop on Future RTRC Networking in the Western Pacific organized in Tokyo, Japan, the 23 and 24 January 2018. Several countries, including Thailand, Vietnam, Philippines and Japan are preparing for the establishment of RTRCs.

He finally informed the meeting that the RTRCs network has been accepted as an voluntary commitment that WESTPAC made to the UN Ocean Conference Call for Action, which was entitled "Develop research capacity and transfer of marine technology through the

UNESCO/IOC Regional Network of Training and Research Centers (RTRCs) on Marine Science in the Western Pacific and adjacent regions in support of the SDG 14.a" (#OceanAction15266).

5.3 OTHER PARTNERS ORGANIZATIONS

Under this agenda item, IOC programmes and partner organizations or projects were invited to provide brief presentations on their CD methodologies.

5.3.1 Marine Training Platform

This agenda item was introduced by Mr Tim Deprez, Master Programme Coordinator / Doctoral Programme coordinator, University of Gent, Belgium.

The Marine Training platform (www.marinetraining.org) is an initiative developed under the umbrella of the Belgian node of the European Marine Biological Resource Centre, a distributed European Research Infrastructure Cluster (EMBRC-ERIC) since 2013. In the past five years, the platform evolved into the key resource for blue training initiatives in Europe and beyond. The Marine Training platform focusses on three main pillars: (i) grouping information about training, (ii) providing services for training organizers, and (iii) providing reliable insights in training needs and training offers.

For the first goal of the platform, a comprehensive database using the XCRI-Cap data standard, a standard for describing and exchanging training related information, was developed. The dataset focuses on higher education institutes (both universities and university colleges) and collects marine training initiatives ranging from master and doctoral programmes, to expert trainings and specialist courses. The dataset is expanding gradually by including also non-accredited training initiatives and via involvements in several projects and networks. With over 600 programmes from more than 50 countries the dataset offers the most complete regional view on the current training offer.

Services for training organizers in the Marine Training Platform include advertising possibilities, practical services to trainees and training organizers (application and registration) and the support of marine dedicated e-learning initiatives. In the past year, the platform also provides support tools for internship and thesis placements and helps in developing new joint degree initiatives or thematic courses based on thorough needs analysis.

Finally, the portal allows to give reliable insights in the current state of blue training initiatives. Via the dataset and via targeted surveys it allows to identify the training gaps for the rapidly evolving blue economy.

In the near future, Marine Training wishes to enlarge its focus by extending the regional and thematic scope. From a regional point of view, Marine Training paid in the past five years mainly attention to Europe. However, more and more, via collaborations with global marine projects and networks, also trainings from outside Europe were taken up in the dataset. Moreover, the majority of end users of the portal seem to come from outside Europe. As such a more global coverage, via collaborations with specific projects and networks, and via a distributed model of data-delivery is now being developed. From a thematic point of view there is a need to broaden the current scope (mainly academic and accredited trainings) to also technical trainings and vocational initiatives.

The Marine Training Platform hopes to become the global one-stop-shop:

- For trainees in search of Marine and Maritime training initiatives,

- For trainers in search of assistance for organizing Marine and Maritime training,
- For stakeholders in search of reliable insights into Marine and Maritime training and to help taking the right decisions in development of new human capacity for the blue sectors.

For more information: www.marinetraining.eu

In response to a question, Mr Deprez informed the Group that registered users can submit information on training programmes, but in addition he informed the Group that marinetraining.eu annually checks University web sites to identify training opportunities.

Mr Deprez further informed the Group that this team is composed of one full-time IT person and 3 to 4 people working on content quality control.

5.3.2 Partnership for Observation of the Global Oceans (POGO)

This agenda item was introduced by Ms Sophie Seeyave, Executive Director of POGO.

Ms Seeyave provided an overview of its capacity development programmes, partnerships and impacts. POGO is a consortium of 38 oceanographic research institutions from 20 countries. One of the pillars of its mission is to identify and contribute to the development of the key skills, capacities and capabilities needed to achieve its vision of a state-of-the-art ocean observing system that serves the needs of science and society.

POGO's capacity development programme consists of a Visiting Fellowship programme (initially co-sponsored by IOC and SCOR), support for the Austral Summer Institute at the University of Concepcion, Chile, a partnership with the Nippon Foundation (NF-POGO) Visiting Professorships followed by a Centre of Excellence in Observational Oceanography and Regional Training Programmes. In total, POGO has provided training to around 800 early-career scientists from 77 countries.

With the NF, POGO has also developed an alumni network, which provides further support to the alumni, through regional and global research and outreach projects, as well as keeping track of their careers progression and involving them as instructors on training programmes. In recent years, POGO has started to evaluate the impacts of its capacity development programme, through surveys sent to former trainees, instructors and institutes that have benefited from the training.

5.3.3 IOI and EU initiatives

This agenda item was introduced by Mr Werner Ekau, Head of Department in the Leibniz Centre for Tropical Marine Research in Bremen, Germany, and the Director of the International Ocean Institute (IOI) Germany. He provided a brief overview of Capacity Development of the International Ocean Institute (IOI) and the new South Atlantic Initiative Brazil-South Africa- EU.

The International Ocean Institute is an independent, international, non-profit and non-governmental organization, founded in 1974. IOI is a knowledge-based institution that conducts training and capacity building to meet the crucial demand for knowledgeable future leaders in ocean governance. It accesses and produces publications of the most current scientific, legal and policy developments and participates in the development of national and international oceans governance agendas. One major goal is Capacity Development in Ocean Governance, provided by five different centres on a global (Canada) and regional level (Malta for the Mediterranean and Black Sea, South Africa for the Sub-Saharan Africa, Brazil for Latin America, Thailand for South East Asia).

The signing of the Belém Statement on Atlantic Research and Innovation Cooperation (in the Belém Tower in Lisbon, Portugal, on 13 July 2017) has been the final act of a process initiated in a workshop in 2015 to stimulate a better scientific cooperation among European and South Atlantic states. Signed by representatives of Brazil, South Africa and the EU, it is aimed to bring together all countries around the Tropical and South Atlantic to achieve:

- Better monitoring and forecasting capacities,
- Improved safety at sea, human health and well-being,
- Sustainable use of marine resources,
- New and emerging technologies to service societal needs and new value chains, and
- Ocean-engaged citizens through enhanced ocean literacy activities.

A special Blue Growth call (H2020-BG-2018-2020) has been launched in 2017 to support this initiative on three important fields: (i) Coordination of marine and maritime research and innovation activities in the Atlantic Ocean, (ii) Assessing the status of Atlantic marine ecosystems and (iii) New value chains for aquaculture production.

6 GAP ANALYSIS FOR EXISTING CD WORK PLANS: INTRODUCTION

This agenda item was introduced by the Chair. He explained that the objective of this agenda item was to integrate, into the regional CD work plans, contributions that could be made by the global programmes and partner organizations present at the meeting.

He invited the 3 regional groupings (IOCAFRICA, IOCARIBE and WESTPAC – noting that there were no representatives of the IOCINDIO region at the meeting) to review their mapping/gap analysis taking into consideration possible contributions from regional programmes and partner organizations to fill gaps. For this purpose the plenary meeting was then suspended until the afternoon session.

He further recalled the decision to establish a fourth group dealing with TMT/CHM.

The 4 groups were invited to meet in Rooms XV and XVI and to call on representatives of the global programmes (Ocean Sciences, GOOS, IODE, Tsunami, MPR and TMT) and partner organizations/projects (POGO, IOI, MTP,…) for discussion and advice, as needed. Other participants not included in the regional groups, global programmes or partner organizations were invited to provide advice based on their expertise and interest.

The 4 groups were invited to designate a Chair/spokesperson to make a brief presentation on the work achieved under agenda item 7.

7 REVISION OF (REGIONAL) CD WORK PLANS ACCORDINGTO IOC CD STRATEGY AND TMT GUIDELINES

In order to facilitate the discussions of the 3 Regional Groups and the additional group on TMT/CHM the following questions/issues were submitted to the groups for consideration and discussion:

Within the framework of the IOC Capacity Development Strategy:

1. What are the priority capacity development needs in your region, including for Least Developed Countries and Small Island Developing States?

2. What should global and regional programmes (IOC as well as others) capacity development work plans include to effectively contribute to addressing your regional needs?
3. What specific support can what IOC global programmes provide to your region to contribute to your CD requirements?
4. Describe the methods, tools and best practices currently applied in your region to improve the quality and impact of capacity development efforts.
5. What existing IOC or partner information tools and methods can be of use in your region (e.g. OceanExpert, CD portal, training opportunities, research vessels, large infrastructure, GOSR, research cruise information, POGO portal, Marine Training Platform…) ?

In keeping with the IOC Criteria and Guidelines for the Transfer of Marine Technology:

6. What should the objective and functions of a clearinghouse mechanism be?
7. Who would the users of a clearinghouse mechanism be? What are their needs?
8. What elements would a clearinghouse mechanism include?

7.1 IOCAFRICA

The following experts participated in the deliberations of the group: Prof. Adote Blivi (Chair), Mr Dismore Siko (Secretary), Mrs Arame Keita, Mr Werner Ekau, Mr Juan Luis Suarez De Viveros, Mr Glenn Nolan, Mr Denis Chang Seng, Ms Francesca Santoro, Mr Justin Ahanhanzo, Mr Mika Odido.

Within the framework of the IOC Capacity Development Strategy:

1. What are the priority capacity development needs in your region, including for Least Developed Countries and Small Island Developing States?
    a. Research infrastructure and maintenance.
    b. Financial and human mobilization.
    c. Knowledge and skills development.
    d. Data and information management capacity.
    e. Ocean literacy.
    f. Development and coordination of ocean science projects and networks.
2. What should global and regional programmes (IOC as well as others) capacity development work plans include to effectively contribute to addressing your regional needs?
    a. Research infrastructure and maintenance.
        - Tsunami programme contributions
        - GOOS: provision of a platform for capacity development on data collection to services.
        - Other non-IOC global programmes/organizations can contribute (bilateral & multilateral) to capacity development through IOC alignment.
        - Other non-IOC regional programmes/organizations can to capacity development through joint programmes, implementation, information sharing and engaging with higher level national and regional leadership.

b. Financial and human mobilization.

- Global programmes help through endorsing project proposals.
- Other non-IOC global programmes/organizations can contribute (bilateral & multilateral) to capacity development through IOC alignment.
- Other non-IOC regional programmes/organizations can to capacity development through joint programmes, implementation, information sharing and engaging with higher level national and regional leadership.

c. Knowledge and skills development

- POGO: provision of training in oceans observations.
- Other non-IOC global programmes/organizations can contribute (bilateral & multilateral) to capacity development through IOC alignment.
- Other non-IOC regional programmes/organizations can to capacity development through joint programmes, implementation, information sharing and engaging with higher level national and regional leadership.

d. Data and information management capacity

- IODE: provision of regional training centres.
- Other non-IOC global programmes/organizations can contribute (bilateral & multilateral) to capacity development through IOC alignment.
- Other non-IOC regional programmes/organizations can to capacity development through joint programmes, implementation, information sharing and engaging with higher level national and regional leadership.

e. Ocean literacy

- Ocean literacy contributes to the development of skills for scientists and community thereby enabling them to participate in decision making processes.
- Other non-IOC global programmes/organizations can contribute (bilateral & multilateral) to capacity development through IOC alignment.
- Other non-IOC regional programmes/organizations can to capacity development through joint programmes, implementation, information sharing and engaging with higher level national and regional leadership.

f. Development and coordination of ocean science projects and networks

- POGO: provision of funding and oversight for regional and global research projects for its alumni network.
- Other non-IOC global programmes/organizations can contribute (bilateral & multilateral) to capacity development through IOC alignment.
- Other non-IOC regional programmes/organizations can to capacity development through joint programmes, implementation, information sharing and engaging with higher level national and regional leadership.

3. What specific support can IOC global programmes provide to your region to contribute to your CD requirements?

a. Research infrastructure and maintenance

- IOC global programmes need to raise visibility and awareness to national governments about IOC mandate, missions and its programmes.

- Each IOC programme assist and facilitate the mapping of the status of existing regional infrastructure programmes.

b. Financial and human mobilisation

- IOC global programmes need to raise visibility and awareness to national governments about IOC mandate, missions and its programmes.
- Each IOC programme assist and facilitate the mapping of the status of existing regional financial support programmes.

c. Knowledge and skills development

- IOC global programmes need to raise visibility and awareness to national governments about IOC mandate, missions and its programmes.
- Each IOC programme assist and facilitate the mapping of the status of existing regional skills development programmes.
- Each IOC global programme should facilitate the sharing of knowledge and best practices amongst the IOC regions.

d. Data and information management capacity

- IOC global programmes need to raise visibility and awareness to national governments about IOC mandate, missions and its programmes.
- Each IOC programme assist and facilitate the mapping of the status of existing regional data management and information programmes and capacities.

e. Ocean literacy

- IOC global programmes need to raise visibility and awareness to national governments about IOC mandate, missions and its programmes.
- Each IOC programme assist and facilitate the mapping of the status of existing regional ocean literacy programmes and capacities.
- Each IOC programme should showcase societal benefits and the importance of investment in research and ocean observations.

f. Development and coordination of ocean science projects and networks

- IOC global programmes need to raise visibility and awareness to national governments about IOC mandate, missions and its programmes.
- Each IOC programme assist and facilitate the mapping of the status of existing regional projects and coordination instruments.

4. Describe the methods, tools and best practices currently applied in your region to improve the quality and impact of capacity development effort.

a. Best practices: Joint capacity development (with other programmes such as IMO, UN Environment, WMO, WIOMSA, FAO, ECA, etc.); Regional masters and Ph.D. programmes (joint master & Ph.D. programmes in oceanography; co-badging of masters and PhD qualifications with overseas academic institutions); and Science mobility initiatives (doctoral students and lecturers).

b. Tools: Online platforms, e-learning platforms, workshops, summer schools, technical exchange, science forums, conferences, oceans research and development policies/strategies, and MSP (governance tool).

c. Methods: modular training; internship; mentoring; and coaching.

5. What existing IOC or partner information tools and methods can be of use in your region (e.g. OceanExpert, CD portal, training opportunities, research vessels, large infrastructure, GOSR, research cruise information, POGO portal, Marine Training Platform…) ?

OceanExpert, CD portal, training opportunities, research vessels, large infrastructure, GOSR, research cruise information, POGO portal, Marine Training Platform, IHO portal, WMO portal.

6. What can the African and regional authorities contribute to improve the quality and impact of capacity development efforts in the region

   a. Human mobilisation,

   b. Financial mobilisation,

   c. Development of ocean policies,

   d. Improvement of basic ocean science education,

   e. Ocean literacy (25 July as African day used to promote the oceans).

7.2 IOCARIBE

Ms Lorraine Barrow provided the results of the work of the IOCARIBE Working Group.

The membership of the group was: Dr Bradford Brown (IOCARIBE, USA), Prof. Danilo Calazans (Brazil), Ms Lorraine Barrow (Trinidad & Tobago), Ms Beatriz Reguera (Spain) / HAB, Ms Michelle Quesada (IOC MPR), Mr Cesar TORO (IOC / IOCARIBE).

1. What are the priority capacity development needs in your region, including for Least Developed Countries and Small Island Developing States?

   a. The IOCARIBE region (Caribbean Sea, Gulf of Mexico and Adjacent Areas) consists of 32 independent States and 15 depending territories, from USA to Brazil. The territories and depending departments are represented by 4 independent States, three of which have their capital located outside the region in Europe and each country in the region has varied capacity development needs, there is no ‘one-size fit’ solution to the varying capacity challenges.

   b. Identification of the capacity needs to be categorized as:

      – Environmental Management and Planning,

      – Marine (coastal) and Ocean Management and Planning,

      – Policy Formulation,

      – Operational – Conducting research,

      – Ocean Ecosystem Science, including Science for Large Marine Ecosystem Management,

      – Extreme Natural Hazards and Disaster Risk Reduction (DRR).

   c. Access to higher education (undergraduate and masters levels) and relevant higher education:

      – As there is only one main university with 3 campuses (Barbados, Jamaica and Trinidad and Tobago) in the English-speaking Caribbean, there are limited opportunities for ocean and marine sciences for thousands of potential students in this sub-region of IOCARIBE.

- The degree programmes offered in the University of West Indies at the undergraduate and masters levels does not include advanced management and planning to equip students to formulate policies and to foster detailed planning, which is required at the macro level, etc.
- There are numerous degree programmes offered at the undergraduate and masters levels within the Latin American region. However, several universities in this region do not always provide degrees that cover all the categories mentioned at point 1.b (environmental management and planning; marine (coastal) and ocean management and planning; policy formulation; operational; ecosystems, DRR) for capacity development.
- The degrees offered at the undergraduate and especially the masters level in the Latin American and Caribbean region, focus on matriculated students to be professors, lecturers and researchers but not equipping students to be trained at the operational level or to formulate relevant policies – gap in the capacity development.
- The ocean programmes offered in Brazil are mainly inside public universities, which are free. This is not the reality in most of the other countries.
- Accreditation issues – are the degrees offered in the entire region recognized within the region itself, e.g. should a graduate with a degree received at UWI be recognized as a researcher in another Member State of the region and vice versa.
- There is a brain drain in the Caribbean region, when recipients of scholarships and exchange student programmes, leave the region to emigrate, thus there is no building or developing of capacity (Major problem as the recipient has received and continues to receive plenty assistance and technical cooperation).

d. Revision and subsequent updating of the quality of the degrees (undergraduate, postgraduate, etc.) offered in the English-speaking region; emphasis is placed on text-based curriculum and not much emphasis is placed on hands-on training and exposure, etc. Students enrolled in the Natural Sciences Degree Programme at UWI are not offered hands-on experience or on board-ship training as is the case in Brazil, where it is mandatory for the students to complete a 120-hour on-board training to supplement the oceanography degree programme.

e. Continuous professional development in ocean and marine sciences.
Lecturers, experts should be continually trained in emerging issues regarding marine and ocean sciences and management; lecturers, experts, senior public functionaries and servants must be continually trained in emerging issues – access to new portals of information and new techniques regarding data management (IODE).

f. Public education and awareness – There is a need to raise awareness on the significance of the SDGs and on the ocean as a main component of the Planet.

2. What should global and regional programmes (IOC as well as others) capacity development work plans include to effectively contribute to addressing your regional needs?

The IOC and other global agencies/organizations should include current issues that adversely affect the region, into the capacity development programmes – disaster preparedness and management, climate change issues.

a. Workshop Training specific in the following areas:

   – Tsunami: Improve capacity development related to operational skills for disaster preparedness and management.

   – GOOS - Ocean observation monitoring programmes.

   – MPR: ICAM has developed a lot of trainings in the area. But there is the need to improve for official public servants (professional) and mainly university students (improve curriculum to not focus only in academia and basic science, to also involve management, policy development and maritime activities, as well as include the social dimension). Disaster management. The Member States chose 5 countries as pilots for MPR policies, but the idea is to increase or enhance this programme.

   – HAB: Need to improve the programme in order to involve more the Ministry of Healthy and not only Ministry of Environment and research centres.

   – IODE: Improve capacity development related to operational skills.

b. UNESCO Chairs: a suggestion is to encourage some universities in the region to cooperate and maybe join UNESCO Chairs.

c. Better communication and planning of the Global programmes when they go to IOCARIBE: In order to tell earlier that they are going to Caribe, thus IOCARIBE will be able to take advantage of the experts and plan other activities. It is important to implement the global actions via the IOC Sub-commissions.

d. Financial Support from Member States: Encourage Member States to financially support the participation of students, and experts for training and for exchange in Latin American and Caribbean projects. Organize parallel courses during conferences to take advantage of the fact that the students are already there (e.g. COLACMAR).

e. Internship: Improve the network with the regional universities.

f. Visiting lecturer programme: Encourage professors during sabbatical year to work at IOCARIBE.

g. Sharing of training materials: Improve the exchange of documents between the national universities and institutions and IOCARIBE. There is the need to open channels of communication with national initiatives. Suggestion: focal points in each Member States. Then IOCARIBE need to share the material with the other Member States through their website.

h. Travel grants: There is not for students. Encourage Member States and National Councils of Sciences to collaborate.

3. What specific support can the IOC Global Programmes provide to your region regarding capacity development requirements?

Refer to question no. 2

More robust planning and coordination of projects and programmes for IOCARIBE and regions.

4. Describe the methods, tools and best practices currently applied in your region to improve the quality and impact of capacity development efforts.

a. OTGA – provides training in various languages,

b. Face-to-face training,

c. Visiting Lecturer Programme,

d. Online training,

e. Partnerships – joined workshops with other global, regional organizations,

f. Agreements with other global organizations to gain access to other training workshops,

g. Access to web-based portals.

5. What existing IOC or partner information tools and methods can be of use in your region (e.g. OceanExpert, CD portal, training opportunities, research vessels, large infrastructure, GOSR, research cruise information, POGO portal, Marine Training Platform…) ?

a. OTGA,

b. Visiting Lecturer Programme.

7.3 WESTPAC

Mr Wenxi Zhu provided the results of the work of the WESTPAC Working Group. He explained that the WESTPAC group had started by updating the gap analysis.

Members of the group included: Mr Somkiat Khokiattiwong, Mr Andi Eka Sakya, Mr Nic Bax, Mr Aidy Muslim, Mr Thorkild Aarup, Mr Tatsuya Watanabe, Ms Xuan Zhu, Mr Wenxi Zhu.

Discussions were held on suggestions actions:

- Cooperation with Tsunami Section; Ocean Science Section, IODE, Observation and Services Section, MRP,
- Intensify CD efforts in SIDS, including the sharing of experience of Tsunami unit, Indonesia, China and Australia,
- Development of A register of infrastructure;
- Ocean literacy.

1. What are the priority capacity development needs in your region, including for Least Developed Countries and Small Island Developing States?

Professional Development, with due consideration to specific requirements of SIDS countries

2. What should global and regional programmes (IOC as well as others) capacity development work plans include to effectively contribute to addressing your regional needs?

a. Secondment of technical expertise;

b. Development of joint research programs addressing development challenges;

c. More RTRCs and tailored trainings;

d. Travel grant/finance resources;

e. Strengthening the WESTPAC office,

f. GOA-ON mentoring program

3. What specific support can what IOC global programmes provide to your region to contribute to your CD requirements?

   a. Financial support;

   b. More access to the cutting-edge science and training opportunities.

4. Describe the methods, tools and best practices currently applied in your region to improve the quality and impact of capacity development efforts

Training through research; inclusion of CD into programme development; RTRCs building on strong ownership. Young scientist award and travel grant.

5. What existing IOC or partner information tools and methods can be of use in your region (e.g. OceanExpert, CD portal (training opportunities, research vessels, large infrastructure), GOSR, research cruise information, POGO portal,…) ?

N/a.

7.4 TMT/CHM

Ms Harriet Harden-Davies provided the preliminary results of the work of the TMT/CHM Working Group. Members of the group included: Mr Alan Evans (UK), Ms Ann-Katrien Lescrauwaet (Belgium), Mr Tetsushi Komatsu (JAMSTEC & IOC MPR), Mr Yafeng Yang (China), Ms Tatsuya Watanabe (Japan), Mr Nic Bax (Australia), Mr Victor Komorin (Ukraine), Ms Pauhla McGrane (Ireland), Ms Alison Reed (US), Ms Sophie Seeyave (Pogo), Mr Glenn Nolan (GOOS), Mr Julian Barbiere (IOC), Mr Albert Fischer (GOOS) and Ms Harriet Harden-Davies.

Q.6–What should the objective and functions of a clearinghouse mechanism be?

<u>Objective of CHM</u>

- Part XIV as overarching framework
- Promote development and transfer of marine technology, by creating an enabling framework to empower States to identify technological needs and request support.
- *More than a static information platform, in fact an evolving process that supports the development of a community of ocean professionals.*
- The term CHM

<u>Why IOC</u>

- Information for Member States, forum for Member States.
- Quality.
- Keep in mind role of IOC: convening role, linkages with partners (Decade).
- Responsibility of States.

<u>Guiding approach for CHM</u>

- Responsive to request from Member States.
- Recognise relationship between TMT and CD – TMT CHM is a tool to enable CD at individual, national, regional and global levels.
- Needs driven.

Concept

- Web-based portal – directory of information, maintained and sustained by IOC.
    - Raise awareness about existing initiatives.
- Identify needs and gaps where new initiatives could be established.
- Interactive, dynamic collaboration tool – broker service perhaps with identified regional and/or national or thematic focal points.
- Two levels: 'top down' and 'bottom-up'.
- Incentivise and empower stakeholders including industry, NGOs and others to invest.

Q.7–Who would the users of a clearinghouse mechanism be? What are their needs?

Users of a CHM

- Target audience – ocean professionals/expert.
- Anyone could be a beneficiary or a donor?
- Important to identify users and ask them what their needs are: keen to hear from regional groups.
- Potential users:
    - Governments – national agencies
    - Regional organizations
    - International organizations
    - Private sector
    - NGOs
    - Academia and research organizations
    - Individual
- Needs? Needs analysis required (particularly at regional level)

QUESTION 8: What elements would a clearinghouse mechanism include?

Elements

- Portal for implementing the CHM as established in the CGTMT, including websites of existing initiatives under IOC, under individual States (e.g. international projects).
- Needs assessment analysis - individual needs for countries.
    - Technology needs assessment. Template and handbook. Assistance to undertake.
    - Online questionnaire – needs, what is there. (traffic light).
- Brokering service – human element
    - Matchmaking, responsibility of State? Role for IOC Secretariat? Role for Regional Groups?
- Example of building blocks to include:
    - Training opportunities
    - Equipment and infrastructure

- Research participation e.g. research cruises
- Registry of national ocean research policies and ocean policies, guidance on policy development
- Technology needs assessments
- Request mechanism
- Funding opportunities

How to establish?

- Consultation or scoping exercise including a needs assessment based on discussions.
  - Link with Global ocean science report.
- Horizon scan:
  - Begin with IOC related information, utilise CD IOC platform and portal.
  - Organizations and initiatives and projects.
- Pilot project: by technology (e.g. equipment? Or scholarship program?) Start somewhere, with a catalyst, work gradually, measure success, iterative process whereby some point like GOSR can be used as a focus.
- Scoping study - resource requirements.

Operational consideration

- Review of information – quality control, ensuring information still up to date?
- Governance:
  - Forum for Member States
  - Circular letters
  - Register of private sector actors?
- Inclusion of private sector and commercial technologies.
- IOC accreditation, development of standards.

Additional points from regional break-out groups:

IOCARIBE:

- Recognition of importance of regional scale capacity – identifying needs and promoting skills.
- Enable IOC to proactively promote capabilities – current lack of strategic direction of IOC programs (siloes).
- Promote information sharing between countries and regional organizations.
- Access funding opportunities.

IOCAFRICA:

- Can have a CHM – can give it a different name!
- Involvement of regional Sub-Commissions, including to assist with needs assessment and scoping of CHM.
- Needs could include: immediate security needs and strategic perspectives on future planning.
- Importance of human element – facilitators.

WESTPAC:

- Avoid 'donor' and 'recipient' terminology – focus on building partnerships and creating an enabling environment for exchange.
- Terminology – change 'broker' to 'facilitator'.
- Feasibility study.
- Questions of scope must be addressed.

7.5 COMPARISON OF THE 4 SESSIONAL GROUPS

The Group then proceeded with a comparison of the reports of the 4 Sessional Groups. The first results of such analysis are reflected in the below slides, indicating with blue solid lines the commonalities, and with red dotted lines the similarities between the reports of the regions:

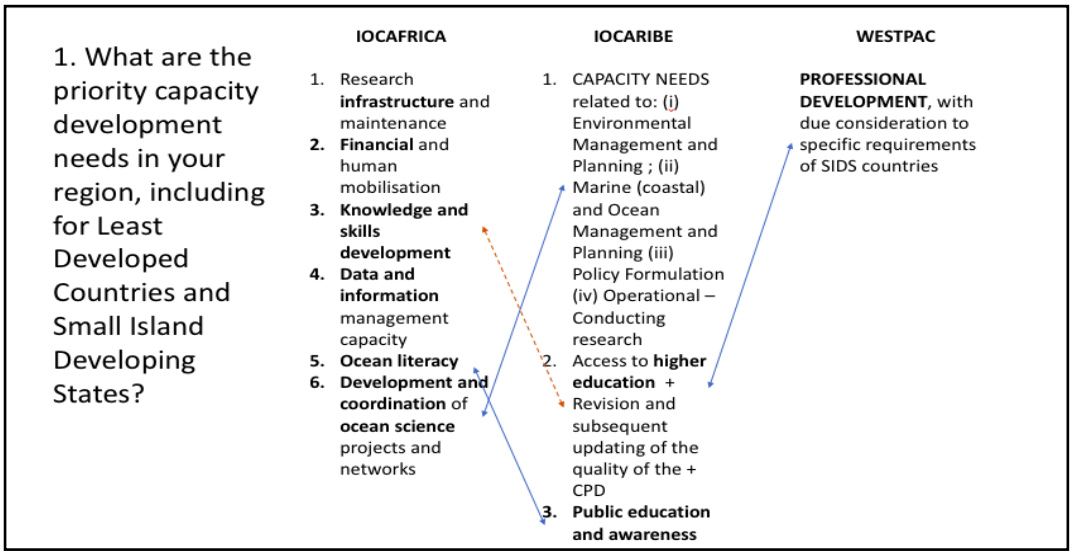

Figure 18. Question 1

Mr Troisi noted similarities between IOCAFRICA and IOCARIBE regarding science planning and coordination and ocean literacy, as well as similarity between all three regions regarding education and skills development.

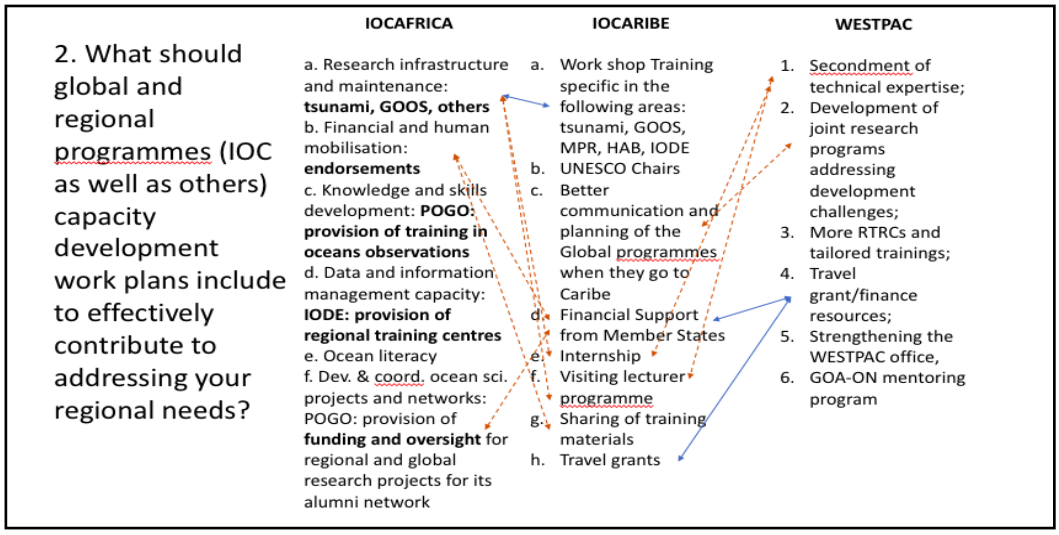

Figure 19. Question 2

Mr Troisi noted that, in the case of IOCAFRICA, several of the points raised by the discussion group where linked to some of those presented by IOCARIBE. It should be noted that the tables presented on the slides are an abstract of the reports, and that those should be consulted in order to further clarify those links.

He noted similarities between IOCARIBE and WESTPAC regarding expert mobility (grants, visiting lecturers etc), as well as in the communication and planning of research programs and activities.

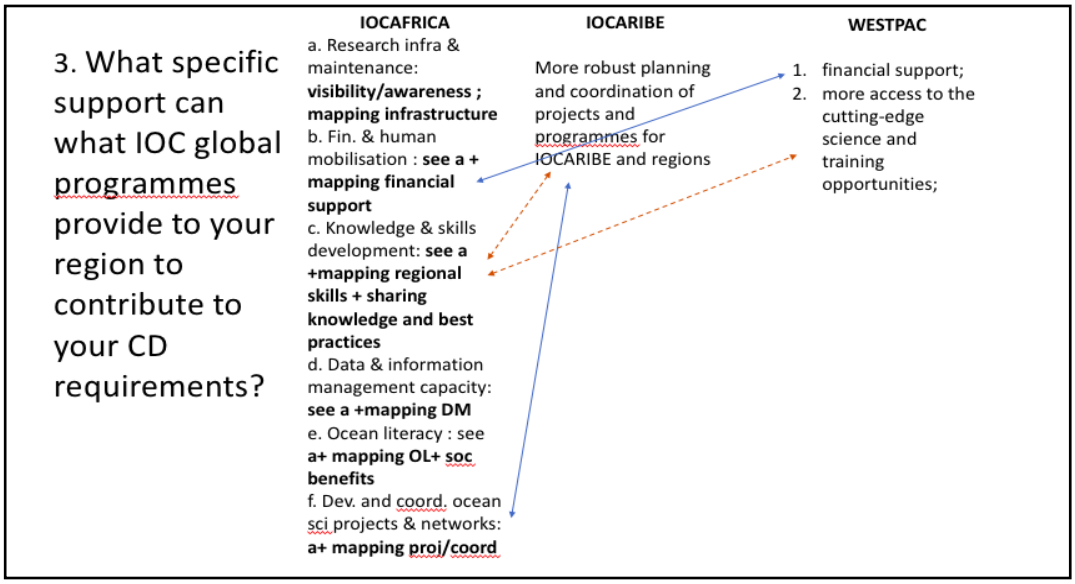

Figure 20. Question 3

Mr Troisi noted a direct link between the comments from the IOCAFRICA discussion group and the one corresponding to WESTPAC in terms of financial support for CD efforts, as well as between the first group and IOCARIBE with regards to robust planning and coordination at regional level. It was further noted the similarities between IOCAFRICA and WESTPAC in terms of knowledge and skills development.

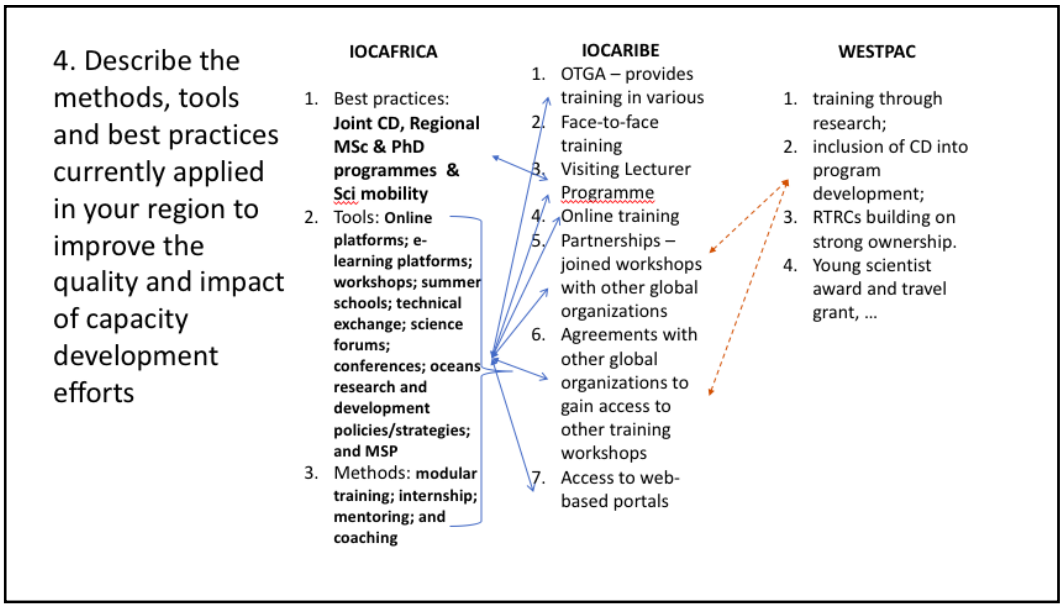

Figure 21. Question 4

Mr Troisi noted that IOCAFRICA was very specific in terms if using existing IOC methods and tools whilst, at the same time, IOCARIBE provided both opportunities and requirements.

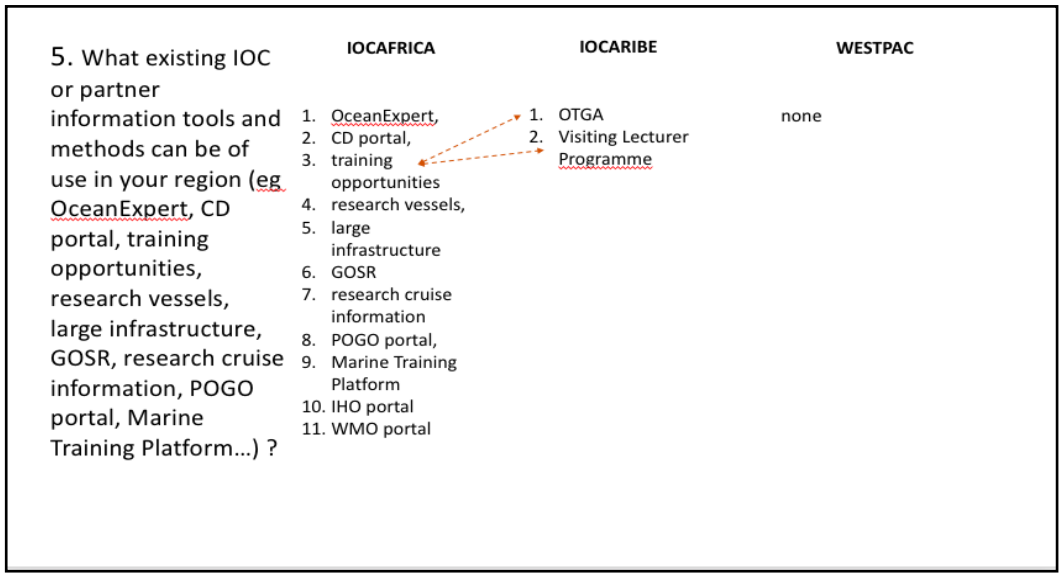

Figure 22. Question 5

Mr Troisi called on the Group to capture the needs of SIDS, LDCs and the Member States that are currently not member of any of the 3 Sub-Commissions and IOCINDIO Regional Committee as we need to address the CD needs of all IOC Member States. Perhaps an online survey could be organized to collect this information.

Mr Ryabinin recalled that he met with Electoral Group I the previous day that meet to prepare sessions of the IOC Assembly but increasingly they discuss programmatic issues. Electoral Group I is moving into becoming a regional group. When considering IOCARIBE Argentina is not a member of IOCARIBE but Argentina does participate in some activities of IOCARIBE. So the question is how to organize ourselves better. WESTPAC has huge interest in capacity and is ahead of the rest of IOC in several areas which is excellent but the global programmes are often unable to provide funding to regions. We need global standards everywhere because we need to report globally on global issues. We will need to move differently in different regions but based upon the global standards. Regarding a survey, Mr Ryabinin recommended that we should take the Decade into account when designing such a survey. Mr Ahanhanzo noted that we also have the Black Sea regional committee which is dormant. We need to also address the needs of that region.

The Group then considered TMT/CHM. Reference was made to the outcome of the group discussions already reported under agenda item 7.4.

Mr Troisi wondered if we can start implementing the CHM if we have not yet agreed on the meaning of CHM. If this definition or understanding is not addressed, this could be an issue at the time of reporting to the IOC Assembly.

The Group considered that the term “clearing house mechanism” is not very clear and the initiative might benefit from a different name. The Secretariat clarified that the term has two meanings: one related to financial institutions and one as an agency or organization which collects and distributes something, especially information. It was noted that the term has been used extensively for a few decades and changing it now might create more confusion. Nevertheless the service that we plan to develop might carry a more “catchy” name.

The Group decided to take the following actions:

ACTION: The Group agreed to establish an Inter-sessional Task Team on the implementation of a TMT/CHM portal and related activities, to further seek answers on the questions and issues formulated by the sessional working group on TMT/CHM and taking into account the Decade preparations. The task team will report back to the GE-CD.

ToR: based on the recommendations of the GE-CD, to develop the scoping and needs assessment of the CHM (which should be developed, as much as possible, using existing information systems and sources), and (if possible) develop a proof of concept to be demonstrated at IOC-XXX.

Deadline: November 2018

Membership: GOSR representative, IOC Secretariat, Ms Xuan Zhu, Ms Arame Keita, Ms Allison Reed, Mr Viktor Komorin, Mr Ariel Troisi, Ms Paula McGrane, Ms Harriet Harden-Davies, Mr Tatsuya Watanabe and Mr Werner Ekau

The Task Team will identify a Chair.

ACTION: The Group agreed to start work to identify CD requirements of Member States in relation to the IOC CD strategy (taking into account the work already done and focusing on SIDS, LDCs and the Member States that are currently not member of any of the 3 Sub-Commissions and IOCINDIO and Black Sea regional committees) and taking into account the Decade preparations.

The task team will report back to the GE-CD.

Deadline: November 2018

Action by: IOC Secretariat, Ms McGrane, Mr Nic Bax, Mr Alan Evans, Mr Andi Sakya, Ms Ann-Katrien Lescrauwaet and Ms Lorraine Barrow.

The task team will identify a Chair.

The Group instructed the two Task Teams to liaise closely through the respective Chairs.

Regarding the GOSR, it was noted that a meeting of the Editorial Board for GOSR2 will meet in Paris between 24 and 26 April 2018.

The Group requested the Secretariat to make the report of the IOC GE-CD-I available to the members of the GOSR Editorial Board.

The Group requested to report to the GOSR-2 Editorial Board on the proceedings of the GE-CD-I related to TMT/CHM and to seek collaboration.

8 WORK PLAN AND TIMETABLE

This agenda item was introduced by the Chair. He recalled the tasks assigned to the Group and the status of progress as a result of the work of the Group at its first Session:

- **Assist** with the CD **needs assessments**	**STARTED**
- **Assist** with the **development of** relevant CD **work plans**	**NEEDS DEVELOPMENT**
- **Assist with the mobilization of resources**	**NEEDS DEVELOPMENT**

- **Provide advice methods and tools to improve the quality and impact** of CD efforts; - **Advise the Assembly on, and start implementation of**, the **(CHM)**	**STARTED** **STARTED**

He then listed the actions required between April 2018 and the 30th Session of the IOC Assembly that will be held in June/July 2019:

- Report of findings and preliminary results from the first IOC GE-CD Meeting to be presented at the IOC EC-LI (July 2018),
- IOC GE-CD work to continue via electronic means,
- IOC GE-CD Draft report to IOC Assembly-XXX by December 2018,
- Report to IOC Assembly-XXX (26 June–4 July 2019), including CHM concept.

Mr Troisi noted that taking into account the financial and human resources available to the IOC Secretariat, financial and in-kind support by its Member States is essential. It was recalled that IOC is not a funding agency. IOC spends 25% of its UNESCO Regular Programme Funds for programme activities and 75% for staff. He further recalled that, under the current financial situation, the work of the Group of Experts is expected to continue via electronic means.

9 ADOPTION OF THE REPORT

This agenda item was introduced by the Chair. He recalled that the report parts for day 1 and day 2 had been circulated each evening and that submitted factual edits had been made into the report.

Taking into account the limited time available the Group requested the Secretariat to finalize the report and to post it on the IOC CD web site as soon as possible (by 30 March 2018).

10 ELECTION OF THE CHAIR

This agenda item was introduced by Mr Pissierssens. Taking into account that no candidates came forward during the Session, the Group re-elected Mr Ariel Troisi as Chair of the Group.

11 CLOSING OF THE MEETING

Mr Vladimir Ryabinin, IOC Executive Secretary, briefly addressed the meeting. He expressed his great appreciation for the commitment of Mr Troisi to IOC in general and to the Group in particular. Mr Ryabinin also thanked the Secretariat for their contributions.

Mr Ryabinin called for close cooperation between all members of the Group and he thanked the members for their active participation.

Mr Troisi expressed his appreciation for the active participation of all members, the heads of the regional offices and members of the Secretariat dealing with global programmes, as well as the IOC coordinator for CD.

The Chair closed the meeting at 12h40 and thanked the members of the Group for their active participation. He invited the members of the Group and the members of the two new Task Teams to actively participate in further discussions in preparation for the 30th Session of the IOC Assembly in 2019.

ANNEX I

AGENDA

1. OPENING OF THE MEETING

1.1 ADDRESS BY THE IOC EXECUTIVE SECRETARY

1.2 ADOPTION OF AGENDA AND TIMETABLE

2. THE IOC CD STRATEGY AND TMT GUIDELINES

2.1 PRESENTATION ON THE IOC CD STRATEGY AND TMT GUIDELINES

2.1.1. Ocean Literacy

2.2 PROGRESS STATUS REPORT

2.3 INSTRUCTIONS FROM THE IOC ASSEMBLY

3. PRESENTATIONS ON REGIONAL PROGRAMMES AND THEIR CD WORK PLANS

3.1 IOCAFRICA

3.2 IOCARIBE

3.3 IOC/WESTPAC

3.4 IOCINDIO

4. PRESENTATIONS ON GLOBAL PROGRAMMES AND THEIR CD WORK PLANS

4.1 OCEAN SCIENCES

4.2 GOOS

4.3 IODE

4.4 TSUNAMI

4.5 MPR (ICAM, MSP,...)

4.6 TRANSFER OF MARINE TECHNOLOGY (TMT)

5. CURRENT IOC CD METHODOLOGIES AND TOOLS

5.1 OCEANTEACHER GLOBAL ACADEMY

5.2 REGIONAL TRAINING AND RESEARCH CENTRES (WESTPAC)

5.3 OTHER (INCLUDING PARTNER ORGANIZATIONS)

5.3.1. Marine Training Platform

5.3.2. POGO

5.3.3. IOI and EU initiatives

6. GAP ANALYSIS FOR EXISTING CD WORK PLANS: INTRODUCTION

7. REVISION OF GLOBAL AND REGIONAL CD WORK PLANS ACCORDING TO IOC CD STRATEGY AND TMTM GUIDELINES

7.1 IOCAFRICA

7.2 IOCARIBE

7.3 WESTPAC

7.4 IOCINDIO

7.5 COMPARISON OF THE 4 SESSIONAL GROUPS

8. WORK PLAN AND TIMETABLE

9. ADOPTION OF THE REPORT

10. ELECTION OF THE CHAI

11. CLOSING OF THE MEETING

ANNEX II

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ANNEX III

LIST OF ACRONYMS

ADUs	Associate Data Units
ASEAN	Association of South-East Asian Nations),
BC	Blue Carbon
CARIBE-EWS	Tsunami and other Coastal Hazards Warning System for the Caribbean and Adjacent Regions
CARICOM	Caribbean Community
CBD	Convention on Biological Diversity
CD	strong Capacity Development
CGTMT	Criteria and Guidelines on the Transfer of Marine Technology
CHM	Clearing House Mechanism
CLME	Caribbean Large Marine Ecosystem
DRR	Disaster Risk Reduction
EMBRC	European Marine Biological Resource Centre
ERIC	European Research Infrastructure Cluster
EuroGOOS	European Global Ocean Observing System
FAO	Food and Agriculture Organization of the United Nations
GLOSS	Global Sea-Level Observing System
GOA-ON	Global Ocean Acidification Observing Network
GOOS	Global Ocean Observing System
GRA	GOOS Regional Alliances
HABs	harmful algal blooms
IAEA	International Atomic Energy Agency
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IASS	Institute for Advances Sustainability Studies
ICAM	Integrated Coastal Area management
IOC	Intergovernmental Oceanographic Commission (UNESCO)

IOCAFRICA	IOC Sub-Commission for Africa and the Adjacent Island States
IOCARIBE	IOC Sub-Commission for the Caribbean and Adjacent Regions
IOCINDIO	IOC Regional Committee for the Central Indian Ocean
IODE	International Oceanographic Data and Information Exchange
IOI	International Ocean Institute
IOTWMS	Indian Ocean Tsunami Warning and Mitigation System
IPCC	Intergovernmental Panel on Climate Change
IPHAB	Intergovernmental Panel on Harmful Algal Blooms
LSP	Learning Services Provider
MOOC	Massive Open Online Course
MPR	Marine Policy and Regional Coordination Section
MSP	Marine Spatial Planning
NEAMTWS	Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas
NOAA	National Oceanic and Atmospheric Administration
NODC	National Oceanographic Data Centre
OA	Ocean Acidification
OBIS	Ocean Biogeographic Information System
ODIN	Oceanographic Data and Information Networks
ODINWESTPAC	Ocean Data and Information Network for the Western Pacific Region
OECS	Organization of Eastern Caribbean States
OL	Ocean Literacy
OLI	Ocean Literacy Italia
OSPESCA	Central American Fisheries and Aquaculture Organization
OTA	OceanTeacher Academy
OTGA	Ocean Teacher Global Academy
POGO	Partnership for Observation of the Global Oceans
PTWS	Pacific Tsunami Warning and Mitigation System

RTC	Regional Training Centre
RTRC MarBEST	Regional Training and Research Center on Marine Biodiversity and Ecosystem Health
RTRC ODC	IOC Regional Training and Research Center on Ocean Dynamics and Climate
RTRC	Regional Network of Training and Research Centre
SDG	Sustainable Development Goal
SIDS	small island developing States
SOP	Standard Operating Procedure
SPREP	Pacific Regional Environment Programme
SRIA	Strategic Research and Innovation Agenda
TIC	Tsunami Information Centres
TMT	Transfer of Marine Technology
TSU	Tsunami Unit
UNCLOS	United Nations Convention on the Law of the Sea
UN-DOALOS	Division for Ocean Affairs and the Law of the Sea
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
WESTPAC	IOC Regional Secretariat for the Sub-Commission for the Western Pacific
WMO	World Meteorological Organization
WOA	World Ocean Assessment

In this Series, entitled

Reports of Meetings of Experts and Equivalent Bodies, which was initiated in 1984 and which is published in English only, unless otherwise specified, the reports of the following meetings have already been issued:

1. Third Meeting of the Central Editorial Board for the Geological/Geophysical Atlases of the Atlantic and Pacific Oceans
2. Fourth Meeting of the Central Editorial Board for the Geological/Geophysical Atlases of the Atlantic and Pacific Oceans S. Fourth Session of the Joint IOC-WMO-CPPS Working Group on the Investigations of 'El Niño' ***(Also printed in Spanish)***
4. First Session of the IOC-FAO Guiding Group of Experts on the Programme of Ocean Science in Relation to Living Resources
5. First Session of the IOC-UN(OETB) Guiding Group of Experts on the Programme of Ocean Science in Relation to Non-Living Resources
6. First Session of the Editorial Board for the International Bathymetric Chart of the Mediterranean and Overlay Sheets
7. First Session of the Joint CCOP(SOPAC)-IOC Working Group on South Pacific Tectonics and Resources
8. First Session of the IODE Group of Experts on Marine Information Management
9. Tenth Session of the Joint CCOP-IOC Working Group on Post-IDOE Studies in East Asian Tectonics and Resources
10. Sixth Session of the IOC-UNEP Group of Experts on Methods, Standards and Intercalibration
11. First Session of the IOC Consultative Group on Ocean Mapping ***(Also printed in French and Spanish)***
12. Joint 100-WMO Meeting for Implementation of IGOSS XBT Ships-of-Opportunity Programmes
13. Second Session of the Joint CCOP/SOPAC-IOC Working Group on South Pacific Tectonics and Resources
14. Third Session of the Group of Experts on Format Development
15. Eleventh Session of the Joint CCOP-IOC Working Group on Post-IDOE Studies of South-East Asian Tectonics and Resources
16. Second Session of the IOC Editorial Board for the International Bathymetric Chart of the Mediterranean and Overlay Sheets
17. Seventh Session of the IOC-UNEP Group of Experts on Methods, Standards and lntercalibration
18. Second Session of the IOC Group of Experts on Effects of Pollutants
19. Primera Reunión del Comité Editorial de la COI para la Carta Batimétrica lnternacional del Mar Caribe y Parte del Océano Pacífico frente a Centroamérica ***(Spanish only)***
20. Third Session of the Joint CCOP/SOPAC-IOC Working Group on South Pacific Tectonics and Resources
21. Twelfth Session of the Joint CCOP-IOC Working Group on Post-IDOE Studies of South-East Asian Tectonics and Resources
22. Second Session of the IODE Group of Experts on Marine Information Management
23. First Session of the IOC Group of Experts on Marine Geology and Geophysics in the Western Pacific
24. Second Session of the IOC-UN(OETB) Guiding Group of Experts on the Programme of Ocean Science in Relation to Non-Living Resources ***(Also printed in French and Spanish)***
25. Third Session of the IOC Group of Experts on Effects of Pollutants
26. Eighth Session of the IOC-UNEP Group of Experts on Methods, Standards and lntercalibration
27. Eleventh Session of the Joint IOC-IHO Guiding Committee for the General Bathymetric Chart of the Oceans ***(Also printed in French)***
28. Second Session of the IOC-FAO Guiding Group of Experts on the Programme of Ocean Science in Relation to Living Resources
29. First Session of the IOC-IAEA-UNEP Group of Experts on Standards and Reference Materials
30. First Session of the IOCARIBE Group of Experts on Recruitment in Tropical Coastal Demersal Communities ***(Also printed in Spanish)***
31. Second IOC-WMO Meeting for Implementation of IGOSS XBT Ship-of-Opportunity Programmes
32. Thirteenth Session of the Joint CCOP-IOC Working Group on Post-IDOE Studies of East Asia Tectonics and Resources
33. Second Session of the IOC Task Team on the Global Sea-Level Observing System
34. Third Session of the IOC Editorial Board for the International Bathymetric Chart of the Mediterranean and Overlay Sheets
35. Fourth Session of the IOC-UNEP-IMO Group of Experts on Effects of Pollutants
36. First Consultative Meeting on RNODCs and Climate Data Services
37. Second Joint IOC-WMO Meeting of Experts on IGOSS-IODE Data Flow
38. Fourth Session of the Joint CCOP/SOPAC-IOC Working Group on South Pacific Tectonics and Resources
39. Fourth Session of the IODE Group of Experts on Technical Aspects of Data Exchange
40. Fourteenth Session of the Joint CCOP-IOC Working Group on Post-IDOE Studies of East Asian Tectonics and Resources
41. Third Session of the IOC Consultative Group on Ocean Mapping
42. Sixth Session of the Joint IOC-WMO-CCPS Working Group on the Investigations of 'El Niño' (***Also printed in Spanish)***
43. First Session of the IOC Editorial Board for the International Bathymetric Chart of the Western Indian Ocean
44. Third Session of the IOC-UN(OALOS) Guiding Group of Experts on the Programme of Ocean Science in Relation to Non-Living Resources
45. Ninth Session of the IOC-UNEP Group of Experts on Methods, Standards and lntercalibration
46. Second Session of the IOC Editorial Board for the International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico
47. Cancelled
48. Twelfth Session of the Joint IOC-IHO Guiding Committee for the General Bathymetric Chart of the Oceans
49. Fifteenth Session of the Joint CCOP-IOC Working Group on Post-IDOE Studies of East Asian Tectonics and Resources
50. Third Joint IOC-WMO Meeting for Implementation of IGOSS XBT Ship-of-Opportunity Programmes
51. First Session of the IOC Group of Experts on the Global Sea-Level Observing System
52. Fourth Session of the IOC Editorial Board for the International Bathymetric Chart of the Mediterranean
53. First Session of the IOC Editorial Board for the International Chart of the Central Eastern Atlantic ***(Also printed in French)***
54. Third Session of the IOC Editorial Board for the International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico ***(Also printed in Spanish)***
55. Fifth Session of the IOC-UNEP-IMO Group of Experts on Effects of Pollutants
56. Second Session of the IOC Editorial Board for the International Bathymetric Chart of the Western Indian Ocean
57. First Meeting of the IOC *ad hoc* Group of Experts on Ocean Mapping in the WESTPAC Area
58. Fourth Session of the IOC Consultative Group on Ocean Mapping
59. Second Session of the IOC-WMO/IGOSS Group of Experts on Operations and Technical Applications

60. Second Session of the IOC Group of Experts on the Global Sea-Level Observing System
61. UNEP-IOC-WMO Meeting of Experts on Long-Term Global Monitoring System of Coastal and Near-Shore Phenomena Related to Climate Change
62. Third Session of the IOC-FAO Group of Experts on the Programme of Ocean Science in Relation to Living Resources
63. Second Session of the IOC-IAEA-UNEP Group of Experts on Standards and Reference Materials
64. Joint Meeting of the Group of Experts on Pollutants and the Group of Experts on Methods, Standards and Intercalibration
65. First Meeting of the Working Group on Oceanographic Co-operation in the ROPME Sea Area
66. Fifth Session of the Editorial Board for the International Bathymetric and its Geological/Geophysical Series
67. Thirteenth Session of the IOC-IHO Joint Guiding Committee for the General Bathymetric Chart of the Oceans ***(Also printed in French)***
68. International Meeting of Scientific and Technical Experts on Climate Change and Oceans
69. UNEP-IOC-WMO-IUCN Meeting of Experts on a Long-Term Global Monitoring System
70. Fourth Joint IOC-WMO Meeting for Implementation of IGOSS XBT Ship-of-Opportunity Programmes
71. ROPME-IOC Meeting of the Steering Committee on Oceanographic Co-operation in the ROPME Sea Area
72. Seventh Session of the Joint IOC-WMO-CPPS Working Group on the Investigations of 'El Niño' ***(Spanish only)***
73. Fourth Session of the IOC Editorial Board for the International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico ***(Also printed in Spanish)***
74. UNEP-IOC-ASPEI Global Task Team on the Implications of Climate Change on Coral Reefs
75. Third Session of the IODE Group of Experts on Marine Information Management
76. Fifth Session of the IODE Group of Experts on Technical Aspects of Data Exchange
77. ROPME-IOC Meeting of the Steering Committee for the Integrated Project Plan for the Coastal and Marine Environment of the ROPME Sea Area
78. Third Session of the IOC Group of Experts on the Global Sea-level Observing System
79. Third Session of the IOC-IAEA-UNEP Group of Experts on Standards and Reference Materials
80. Fourteenth Session of the Joint IOC-IHO Guiding Committee for the General Bathymetric Chart of the Oceans
81. Fifth Joint IOG-WMO Meeting for Implementation of IGOSS XBT Ship-of-Opportunity Programmes
82. Second Meeting of the UNEP-IOC-ASPEI Global Task Team on the Implications of climate Change on Coral Reefs
83. Seventh Session of the JSC Ocean Observing System Development Panel
84. Fourth Session of the IODE Group of Experts on Marine Information Management
85. Sixth Session of the IOC Editorial Board for the International Bathymetric chart of the Mediterranean and its Geological/Geophysical Series
86. Fourth Session of the Joint IOC-JGOFS Panel on Carbon Dioxide
87. First Session of the IOC Editorial Board for the International Bathymetric Chart of the Western Pacific
88. Eighth Session of the JSC Ocean Observing System Development Panel
89. Ninth Session of the JSC Ocean Observing System Development Panel
90. Sixth Session of the IODE Group of Experts on Technical Aspects of Data Exchange
91. First Session of the IOC-FAO Group of Experts on OSLR for the IOCINCWIO Region
92. Fifth Session of the Joint IOC-JGOFS CO, Advisory Panel Meeting
93. Tenth Session of the JSC Ocean Observing System Development Panel
94. First Session of the Joint CMM-IGOSS-IODE Sub-group on Ocean Satellites and Remote Sensing
95. Third Session of the IOC Editorial Board for the International Chart of the Western Indian Ocean
96. Fourth Session of the IOC Group of Experts on the Global Sea Level Observing System
97. Joint Meeting of GEMSI and GEEP Core Groups
98. First Session of the Joint Scientific and Technical Committee for Global Ocean Observing System
99. Second International Meeting of Scientific and Technical Experts on Climate Change and the Oceans
100. First Meeting of the Officers of the Editorial Board for the International Bathymetric Chart of the Western Pacific
101. Fifth Session of the IOC Editorial Board for the International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico
102. Second Session of the Joint Scientific and Technical Committee for Global Ocean Observing System
103. Fifteenth Session of the Joint IOC-IHO Committee for the General Bathymetric Chart of the Oceans
104. Fifth Session of the IOC Consultative Group on Ocean Mapping
105. Fifth Session of the IODE Group of Experts on Marine Information Management
106. IOC-NOAA *Ad hoc* Consultation on Marine Biodiversity
107. Sixth Joint IOC-WMO Meeting for Implementation of IGOSS XBT Ship-of-Opportunity Programmes
108. Third Session of the Health of the Oceans (HOTO) Panel of the Joint Scientific and Technical Committee for GLOSS
109. Second Session of the Strategy Subcommittee (SSC) of the IOC-WMO-UNEP Intergovernmental Committee for the Global Ocean Observing System
110. Third Session of the Joint Scientific and Technical Committee for Global Ocean Observing System
111. First Session of the Joint GCOS-GOOS-WCRP Ocean Observations Panel for Climate
112. Sixth Session of the Joint IOC-JGOFS C02 Advisory Panel Meeting
113. First Meeting of the IOC/WESTPAC Co-ordinating Committee for the North-East Asian Regional - Global Ocean Observing System (NEAR-GOOS)
114. Eighth Session of the Joint IOC-WMO-CPPS Working Group on the Investigations of "El Niño" ***(Spanish only)***
115. Second Session of the IOC Editorial Board of the International Bathymetric Chart of the Central Eastern Atlantic ***(Also printed in French)***
116. Tenth Session of the Officers Committee for the Joint IOC-IHO General Bathymetric Chart of the Oceans (GEBCO), USA, 1996
117. IOC Group of Experts on the Global Sea Level Observing System (GLOSS), Fifth Session, USA, 1997
118. Joint Scientific Technical Committee for Global Ocean Observing System (J-GOOS), Fourth Session, USA, 1997
199 First Session of the Joint 100-WMO IGOSS Ship-of-Opportunity Programme Implementation Panel, South Africa, 1997
120. Report of Ocean Climate Time-Series Workshop, Joint GCOS-GOOS-WCRP Ocean Observations Panel for Climate, USA, 1997
121. IOC/WESTPAC Co-ordinating Committee for the North-East Asian Regional Global Ocean Observing System (NEAR-GOOS), Second Session, Thailand, 1997

122. First Session of the IOC-IUCN-NOAA *Ad hoc* Consultative Meeting on Large Marine Ecosystems (LME), France, 1997

123. Second Session of the Joint GCOS-GOOS-WCRP Ocean Observations Panel for Climate (OOPC), South Africa, 1997

124. Sixth Session of the IOC Editorial Board for the International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico, Colombia, 1996 ***(also printed in Spanish)***

125. Seventh Session of the IODE Group of Experts on Technical Aspects of Data Exchange, Ireland, 1997

126. IOC-WMO-UNEP-ICSU Coastal Panel of the Global Ocean Observing System (GOOS), First Session, France, 1997

127. Second Session of the IOC-IUCN-NOAA Consultative Meeting on Large Marine Ecosystems (LME), France, 1998

128. Sixth Session of the IOC Consultative Group on Ocean Mapping (CGOM), Monaco, 1997

129. Sixth Session of the Tropical Atmosphere - Ocean Array (TAO) Implementation Panel, United Kingdom, 1997

130. First Session of the IOC-WMO-UNEP-ICSU Steering Committee of the Global Ocean Observing System (GOOS), France, 1998

131. Fourth Session of the Health of the Oceans (HOTO) Panel of the Global Ocean Observing System (GOOS), Singapore, 1997

132. Sixteenth Session of the Joint IOC-IHO Guiding Committee for the General Bathymetric Chart of the Oceans (GEBCO), United Kingdom, 1997

133. First Session of the IOC-WMO-UNEP-ICSU-FAO Living Marine Resources Panel of the Global Ocean Observing System (GOOS), France, 1998

134. Fourth Session of the IOC Editorial Board for the International Bathymetric Chart of the Western Indian Ocean (IOC/EB-IBCWIO-IW3), South Africa, 1997

135. Third Session of the Joint GCOS-GOOS-WCRP Ocean Observations Panel for Climate (OOPC), France, 1998

136. Seventh Session of the Joint IOC-JGOFS C02 Advisory Panel Meeting, Germany, 1997

137. Implementation of Global Ocean Observations for GOOS/GCOS, First Session, Australia, 1998

138. Implementation of Global Ocean Observations for GOOS/GCOS, Second Session, France, 1998

139. Second Session of the IOC-WMO-UNEP-ICSU Coastal Panel of the Global Ocean Observing System (GOOS), Brazil, 1998

140. Third Session of IOC/WESTPAC Co-ordinating Committee for the North-East Asian Regional - Global Ocean Observing System (NEAR-GOOS), China, 1998

141. Ninth Session of the Joint IOC-WMO-CPPS Working Group on the Investigations of 'El Niño', Ecuador, 1998 ***(Spanish only)***

142. Seventh Session of the IOC Editorial Board for the International Bathymetric Chart of the Mediterranean and its Geological/Geophysical Series, Croatia, 1998

143. Seventh Session of the Tropical Atmosphere-Ocean Array (TAO) Implementation Panel, Abidjan, Côte d'Ivoire, 1998

144. Sixth Session of the IODE Group of Experts on Marine Information Management (GEMIM), USA, 1999

145. Second Session of the IOC-WMO-UNEP-ICSU Steering Committee of the Global Ocean Observing System (GOOS), China, 1999

146. Third Session of the IOC-WMO-UNEP-ICSU Coastal Panel of the Global Ocean Observing System (GOOS), Ghana, 1999

147. Fourth Session of the GCOS-GOOS-WCRP Ocean Observations Panel for Climate (OOPC); Fourth Session of the WCRP CLIVAR Upper Ocean Panel (UOP); Special Joint Session of OOPC and UOP, USA, 1999

148. Second Session of the IOC-WMO-UNEP-ICSU-FAO Living Marine Resources Panel of the Global Ocean Observing System (GOOS), France, 1999

149. Eighth Session of the Joint IOC-JGOFS CO2 Advisory Panel Meeting, Japan, 1999

150. Fourth Session of the IOC/WESTPAC Co-ordinating Committee for the North-East Asian Regional – Global Ocean Observing System (NEAR-GOOS), Japan, 1999

151. Seventh Session of the IOC Consultative Group on Ocean Mapping (CGOM), Monaco, 1999

152. Sixth Session of the IOC Group of Experts on the Global Sea level Observing System (GLOSS), France, 1999

153. Seventeenth Session of the Joint IOC-IHO Guiding Committee for the General Bathymetric Chart of the Oceans (GEBCO), Canada, 1999

154. Comité Editorial de la COI para la Carta Batimétrica Internacional del Mar Caribe y el Golfo de Mexico (IBCCA), Septima Reunión, Mexico, 1998

IOC Editorial Board for the International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico (IBCCA), Seventh Session, Mexico, 1998

155. Initial Global Ocean Observing System (GOOS) Commitments Meeting, IOC-WMO-UNEP-ICSU/Impl-III/3, France, 1999

156. First Session of the *ad hoc* Advisory Group for IOCARIBE-GOOS, Venezuela, 1999 ***(also printed in Spanish and French)***

157. Fourth Session of the IOC-WMO-UNEP-ICSU Coastal Panel of the Global Ocean Observing System (GOOS), China, 1999

158. Eighth Session of the IOC Editorial Board for the International Bathymetric Chart of the Mediterranean and its Geological/Geophysical Series, Russian Federation, 1999

159. Third Session of the IOC-WMO-UNEP-ICSU-FAO Living Marine Resources Panel of the Global Ocean Observing System (GOOS), Chile, 1999

160. Fourth Session of the IOC-WMO-UNEP-ICSU-FAO Living Marine Resources Panel of the Global Ocean Observing System (GOOS). Hawaii, 2000

161. Eighth Session of the IODE Group of Experts on Technical Aspects of Data Exchange, USA, 2000

162. Third Session of the IOC-IUCN-NOAA Consultative Meeting on Large Marine Ecosystems (LME), France, 2000

163. Fifth Session of the IOC-WMO-UNEP-ICSU Coastal Panel of the Global Ocean Observing System (GOOS), Poland, 2000

164. Third Session of the IOC-WMO-UNEP-ICSU Steering Committee of the Global Ocean Observing System (GOOS), France, 2000

165. Second Session of the *ad hoc* Advisory Group for IOCARIBE-GOOS, Cuba, 2000 ***(also printed in Spanish and French)***

166. First Session of the Coastal Ocean Observations Panel, Costa Rica, 2000

167. First GOOS Users' Forum, 2000

168. Seventh Session of the Group of Experts on the Global Sea Level Observing System, Honolulu, 2001

169. First Session of the Advisory Body of Experts on the Law of the Sea (ABE-LOS), France, 2001 ***(also printed in French)***

170. Fourth Session of the IOC-WMO-UNEP-ICSU Steering Committee of the Global Ocean Observing System, Chile, 2001

171. First Session of the IOC-SCOR Ocean CO_2 Advisory Panel, France, 2000

172. Fifth Session of the GCOS-GOOS-WCRP Ocean Observations Panel for Climate (OOPC), Norway, 2000 ***(electronic copy only)***

173. Third Session of the *ad hoc* Advisory Group for IOCARIBE-GOOS, USA, 2001 ***(also printed in Spanish and French)***

174. Second Session of the Coastal Ocean Observations Panel and GOOS Users' Forum, Italy, 2001

175. Second Session of the Black Sea GOOS Workshop, Georgia, 2001

176. Fifth Session of the IOC/WESTPAC Co-ordinating Committee for the North-East Asian Regional – Global Ocean Observing System (NEAR-GOOS), Republic of Korea, 2000

177. Second Session of the Advisory Body of Experts on the Law of the Sea (IOC/ABE-LOS), Morocco, 2002 ***(also printed in French)***

178. Sixth Session of the Joint GCOS-GOOS-WCRP Ocean Observations Panel for Climate (OOPC), Australia, 2001 ***(electronic copy only)***

179. *Cancelled*

180. Second Session of the IOC-SCOR Ocean CO_2 Advisory Panel, Honolulu, Hawaii, U.S.A, 2002 ***(electronic copy only)***

181. IOC Workshop on the Establishment of SEAGOOS in the Wider Southeast Asian Region, Seoul, Republic of Korea, 2001 (SEAGOOS preparatory workshop) ***(electronic copy only)***

182. First Session of the IODE Steering Group for the Resource Kit, USA, 19–21 March 2001

183. Fourth Session of the IOC-IUCN-NOAA Consultative Meeting on Large Marine Ecosystems (LMEs), France, 2002

184. Seventh Session of the IODE Group of Experts on Marine Information Management (GEMIM), France, 2002 ***(electronic copy only)***

185. Sixth Session of IOC/WESTPAC Coordinating Committee for the North-East Asian Regional - Global Ocean Observing System (NEAR-GOOS), Republic of Korea, 2001 ***(electronic copy only)***

186. First Session of the Global Ocean Observing System (GOOS) Capacity Building Panel, Switzerland, 2002 ***(electronic copy only)***

187. Fourth Session of the ad hoc Advisory Group for IOCARIBE-GOOS, 2002, Mexico ***(also printed in French and Spanish)***

188. Fifth Session of the IOC Editorial Board for the International Bathymetric Chart of the Western Indian Ocean (IBCWIO), Mauritius, 2000

189. Third session of the Editorial Board for the International Bathymetric Chart of the Western Pacific, Chine, 2000

190. Third Session of the Coastal Ocean Observations Panel and GOOS Users' Forum, Vietnam, 2002

191. Eighth Session of the IOC Consultative Group on Ocean Mapping, Russian Federation, 2001

192. Third Session of the Advisory Body of Experts on the Law of the Sea (IOC/ABE-LOS), Lisbon, 2003 ***(also printed in French)***

193. Extraordinary Session of the Joint IOC-WMO-CPPS Working Group on the Investigations of 'El Niño', Chile, 1999 ***(Spanish only; electronic copy only)***

194. Fifth Session of the IOC-WMO-UNEP-ICSU Steering Committee of the Global Ocean Observing System, France, 2002

195. Sixth Session of the IOC-WMO-UNEP-ICSU Steering Committee of the Global Ocean Observing System, South Africa, 2003

196. Fourth Session of the Coastal Ocean Observations Panel, South Africa, 2002 ***(electronic copy only)***

197. First Session of the JCOMM/IODE Expert Team On Data Management Practices, Belgium, 2003 *(also JCOMM Meeting Report No. 25)*

198. Fifth Session of the IOC-IUCN-NOAA Consultative Meeting on Large Marine Ecosystems (LMEs), Paris, 2003

199. Ninth Session of the IOC Consultative Group on Ocean Mapping, Monaco, 2003 ***(Recommendations in English, French, Russian and Spanish included)***

200. Eighth Session of the IOC Group of Experts on the Global Sea level Observing System (GLOSS), France, 2003 ***(electronic copy only)***

201. Fourth Session of the Advisory Body of Experts on the Law of the Sea (IOC/ABE-LOS), Greece, 2004 ***(also printed in French)***

202. Sixth Session of the IOC-IUCN-NOAA Consultative Meeting on Large Marine Ecosystems (LMEs), Paris, 2004 ***(electronic copy only)***

203. Fifth Session of the Advisory Body of Experts on the Law of the Sea (IOC/ABE-LOS), Argentina, 2005 ***(also printed in French)***

204. Ninth Session of the IOC Group of Experts on the Global Sea level Observing System (GLOSS), France, 2005 ***(electronic copy only)***

205. Eighth Session of the IOC/WESTPAC Co-ordinating Committee for the North-East Asian Regional – Global Ocean Observing System (NEAR-GOOS), China, 2003 ***(electronic copy only)***

206. Sixth Meeting of the Advisory Body of Experts on the Law of the Sea (IOC/ABE-LOS), Spain, 2006 ***(also printed in French)***

207. Third Session of the Regional Forum of the Global Ocean Observing System, South Africa, 2006 ***(electronic copy only)***

208. Seventh Session of the IOC-UNEP-IUCN-NOAA Consultative Meeting on Large Marine Ecosystems (LMEs), Paris, 2005 ***(electronic copy only)***

209. Eighth Session of the IOC-UNEP-IUCN-NOAA Consultative Meeting on Large Marine Ecosystems (LMEs), Paris, 2006 ***(electronic copy only)***

210. Seventh Meeting of the IOC Advisory Body of Experts on the Law of the Sea (IOC/ABE-LOS), Gabon, 2007 ***(bilingual English/French)***

211. First Meeting of the IOC Working Group on the Future of IOC, Paris, 2008 ***(Executive Summary in English, French, Russian and Spanish included)***

212. First meeting of the Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (TOWS-WG), Paris, 3–4 April 2008 ***(Executive Summary in English, French, Russian and Spanish included)***

213. First Session of the Panel for Integrated Coastal Observation (PICO-I), Paris, 10–11 April 2008 ***(electronic copy only)***

214. Tenth Session of the IOC Group of Experts on the Global Sea level Observing System (GLOSS), Paris, 6–8 June 2007 ***(electronic copy only)***

215. Eighth Meeting of the IOC Advisory Body of Experts on the Law of the Sea (IOC/ABE-LOS), Paris, 21–25 April 2008 ***(bilingual English/French)***

216. Fourth Session of the Global Ocean Observing System (GOOS) Regional Alliances Forum (GRF), Guayaquil, Ecuador, 25–27 November 2008 ***(electronic copy only)***

217. Second Session of the Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (TOWS-WG), Paris, 27 March 2009 ***(Executive Summary in English, French, Russian and Spanish included)***

218. Ninth Meeting of the IOC Advisory Body of Experts on the Law of the Sea (IOC/ABE-LOS), Paris, 30 March–3 April 2009 ***(bilingual English/French)***

219. First Session of the IOC-SCOR International Ocean Carbon Coordination Project (IOCCP) Scientific Steering Group (also IOCCP Reports, 3), Broomfield, Colorado, U.S.A., 1 October 2005 ***(electronic copy only)***

220. Second Session of the IOC-SCOR International Ocean Carbon Coordination Project (IOCCP) Scientific Steering Group (also IOCCP Reports, 6), Paris, France, 20 April 2007 ***(electronic copy only)***

221. Third Session of the IOC-SCOR International Ocean Carbon Coordination Project (IOCCP) Scientific Steering Group (also IOCCP Reports, 10), Villefranche-sur-mer, France, 3–4 October 2008 ***(electronic copy only)***

222. Fourth Session of the IOC-SCOR International Ocean Carbon Coordination Project (IOCCP) Scientific Steering Group (also IOCCP Reports, 15), Jena, Germany, 14 September 2009 ***(electronic copy only)***

223. First Meeting of the joint IOC-ICES Study Group on Nutrient Standards (SGONS) (also IOCCP Reports, 20), Paris, France, 23–24 March 2010 *(Executive Summary in E, F, R, S included)*

224. Third Session of the Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (TOWS-WG), Lisbon, Portugal, 5–6 May 2010 ***(Executive Summary in English, French, Russian and Spanish included)***

225. Eleventh Session of the IOC Group of Experts on the Global Sea level Observing System (GLOSS), Paris, 13–15 May 2009 ***(electronic copy only)***

226. Second Session of the Panel for Integrated Coastal Observation (PICO-II), Paris, 24–26 February 2009 ***(electronic copy only)***

227. First meeting of the Task Team on Seismic Data Exchange in the South West Pacific of the ICG/PTWS Regional Working Group for the Southwest Pacific, Port Vila, Vanuatu, 19–20 October 2009 ***(electronic copy only)***

228. Fourth Session of the Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (TOWS-WG), Paris, France, 20–21 March 2011 ***(Executive Summary in English, French, Russian and Spanish included)***

229. Second Session of the IODE Steering Group for Ocean Teacher (SG-OT), Miami, Florida, 11–15 April 2011

230. First Meeting of the Inter-ICG Task Team 1 on Sea Level Monitoring for Tsunami (Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (TOWS-WG), Seattle, USA, 29 November–1 December 2010

231. First Meeting of the Inter-ICG Task Team 2 on Disaster Management and Preparedness (Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (TOWS-WG), Seattle, USA, 29 November–1 December 2010

232. First Meeting of the Inter-ICG Task Team 3 on Tsunami Watch Operations (Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (TOWS-WG), Seattle, USA, 29 November–1 December 2010

233. Primera Reunión del Grupo de Trabajo Regional para América Central del Grupo Intergubernamental de Coordinación del Sistema de Alerta contra los Tsunamis y Atenuación de sus Efectos en el Pacífico (ICG/PTWS), Managua (Nicaragua) del 4 al 6 de noviembre de 2009 ***(Resumen dispositivo en español e inglés)***

234. Segunda Reunión del Grupo de Trabajo Regional para América Central del Grupo Intergubernamental de Coordinación del Sistema de Alerta contra los Tsunamis y Atenuación de sus Efectos en el Pacífico (ICG/PTWS), San Salvador (El Salvador) del 28 al 30 de septiembre de 2011 ***(Resumen dispositivo en español e inglés)***

235. First Session of the Joint IODE-JCOMM Steering Group for the Global Temperature-Salinity Profile Programme (SG-GTSPP), 16–20 April 2012, Ostend, Belgium

236. Ad hoc Session of the Joint JCOMM-IODE Steering Group for the Ocean Data Standards Pilot Project (SG-ODSPP), 23–25 April 2012, Ostend, Belgium

237. First Meeting of the Regional Working Group on Tsunami Warning and Mitigation System for the South China Sea Region (SCS-WG), Sanya, China, 12–14 December 2011

238. First Meeting of the IODE Steering Group for OceanDocs (SG-OceanDocs), 24–27 January 2012, Ostend, Belgium

239. Fifth Session of the Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (TOWS-WG), Tokyo, Japan, 15 February 2012 ***(Executive Summary in English, French, Russian and Spanish included)***

240. Ad hoc Session of the IODE Group of Experts on Biological and Chemical Data Management and Exchange Practices (GE-BICH), Ostend, Belgium, 25 October 2012

241. Twelfth Session of the IODE Group of Experts on Marine Information Management (GE-MIM), Miami, USA, 22–25 January 2013

242. Twelfth Session of the IOC Group of Experts on the Global Sea level Observing System (GLOSS), Paris, 9–11 November 2011 ***(electronic copy only)***

243. Meeting of the Pacific Tsunami Warning System Working Group 2 on Detection, Warning and Dissemination Task Team on PacWave11, Honolulu, USA, 21 May 2012 ***(electronic copy only)***

244. Sixth Session of the Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (TOWS-WG), Paris, 20–21 February 2013 ***(Executive Summary in English, French, Russian and Spanish included)***

245. Second Meeting of the Regional Working Group on Tsunami Warning and Mitigation System for the South China Sea Region (SCS-WG), Petaling Jaya, Malaysia, 16–18 October 2012 ***(electronic copy only)***

246. Seventh Meeting of the Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems, UNESCO, Paris, 12–13 February 2014 ***(Executive Summary in English, French, Russian and Spanish included)***

247. Third Meeting of the Regional Working Group on Tsunami Warning and Mitigation System for the South China Sea Region (SCS-WG), Hong-Kong, China, 6–7 April 2014 ***(electronic copy only)***

248. Tercera Reunión del Grupo de Trabajo Regional para América Central del Grupo Intergubernamental de Coordinación del Sistema de Alerta contra los Tsunamis y Atenuación de sus Efectos en el Pacífico (ICG/PTWS), Managua, Nicaragua, del 29 al 30 de septiembre de 2014 ***(Resumen dispositivo en español e inglés)***

249. Workshop on Tsunami Modelling and Mitigation of the ICG/CARIBE-EWS Working Group 2: Tsunami Hazard Assessment, 1–3 December 2014, Cartagena de Indias, Colombia ***(electronic copy only)***

250. Fourth meeting of the Regional Working Group on Tsunami Warning and Mitigation System for the South China Sea Region (SCS-WG), Jakarta, Indonesia, 11–12 February 2015 ***(electronic copy only)***

251. Eighth Session of the Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (TOWS-WG), Paris, 12–13 March 2015 ***(Executive Summary in English, French, Russian and Spanish included)***

252. Ninth Meeting of the Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems, UNESCO, Paris, 25-26 February 2016 ***(Executive Summary in English, French, Russian and Spanish included)***

253. Fifth Meeting of the Regional Working Group on Tsunami Warning and Mitigation System for the South China Sea Region (SCS-WG), Manila, Philippines, 2–3 March 2016 ***(electronic copy only)***

254. Second Meeting of the Regional Working Group for the North West Indian Ocean (WG-NWIO), Tehran, Islamic Republic of, 27–28 February 2017 ***(electronic copy only)***

255. Sixth Meeting of the Regional Working Group on Tsunami Warning and Mitigation System for the South China Sea Region (SCS-WG), Shanghai, China, 1–3 March 2017 ***(electronic copy only)***

256- Ninth Session of the Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (TOWS-WG), Paris, 23–24 February 2017 ***(Executive Summary in English, French, Russian and Spanish included)***

257. First Meeting of the Group of Experts on Capacity Development (GE-CD), Paris, 21–23 March 2018 ***(electronic copy only)***