

International Indian Ocean Expedition 50th Anniversary Initiative (IIOE-2)

**Report of the Western Indian Ocean Regional Focus Group
Meeting to help plan the International Indian Ocean
Expedition 50th Anniversary Initiative (IIOE-2), Quatre
Bornes, Mauritius, 6 and 7 March 2014**

Nick D'Adamo

12 June 2014



This report has been prepared on behalf of all participants. It constitutes an executive summary of the results and outcomes of the meeting and complementary detailed reporting on the presentations and related discussions held during the meeting.

This report can be referred to as:

D'Adamo N (2014). *Report of the Western Indian Ocean Regional Focus Group Meeting to help plan the International Indian Ocean Expedition 50th Anniversary Initiative (IIOE-2), Quatre Bornes, Mauritius, 6 and 7 March 2014. Perth Programme Office in support of UNESCO IOC, Perth, Western Australia, www.iocperth.org.*

CONTENTS

1 Executive Summary

2 Presentations and related discussions

2.1 Welcome statements and opening addresses

2.2 Background and direction setting session

2.3 Research updates

2.4 Stakeholder presentations

3 Ongoing and planned activities relevant to an IIOE-2

4 Identification of missing stakeholders

5 Closing discussions, follow-up and next steps

Appendix 1 Copy of Information Document including final adopted Agenda

Appendix 2 Opening address delivered by Ashley Johnson on behalf of Monde Mayekiso (Chair, IOC Sub-Commission for Africa and the Adjacent Island States)

Appendix 3 Opening address delivered by M Rezah Badal (Acting Head, Office for Oceans Affairs and Development, Prime Minister's Office; Officer, IOGOOS)

Appendix 4 Participants Statement (finalized by agreement with all participants on 25 March 2014), including a listing of participants and observers at the meeting.

1 Executive Summary

The *Western Indian Ocean Focus Group Meeting to help plan the International Indian Ocean Expedition 50th Anniversary Initiative (IIOE-2)* was held in Quatre Bornes, Mauritius, during 6 and 7 March 2014. The meeting was hosted by the Mauritius Government through the Office for Ocean Affairs and Development, Prime Minister's Office and chaired by Nick D'Adamo, Officer in Charge, Perth Programme Office in support of UNESCO IOC.

The meeting was widely advertised on an open invitation basis, to all IOC Member States through formal IOC communication channels, as well as through direct advocacy by the meeting's organisers via IOC regional offices and their communication networks.

The meeting included presentations from stakeholders deriving from Togo, Mauritius, Australia, United Kingdom, I.R. Iran, Seychelles, South Africa, Kenya, Tanzania, Japan, Mozambique, Cameroun, Madagascar, Republic of South Africa and China, as well presentations and perspectives deriving from a member of the IOC Officer's group, and representatives from SCOR, WIOMSA, IOC Perth Programme Office and the IOC Sub-Commission for Africa and the Adjacent Island States.

The meeting reviewed the results and recommendations from the previous two Reference Group meetings (Hyderabad, India, 14-15 May 2013 (RG1); and Qingdao, China, 20-21 November 2013 (RG2)) (ref: RG1 and RG2 meeting reports, as available through www.iocperth.org).

There was general agreement with RG1 and RG2 in respect to their consolidated recommended science and societal drivers and also in respect to their consolidated recommended governance and program management structure for IIOE-2. The Mauritius meeting (RG3) added some new recommendations. Furthermore, participants made specific emphases on a number of key issues.

The following consolidates the respective RG1, RG2 and RG3 results in the form of singular updated frameworks for (i) science and related societal drivers and (ii) governance and program management (including secretariat support). The nuances and emphases introduced by RG3 are embedded in these updated frameworks.

Updated Science and Societal Drivers for IIOE-2 (based on RG1, RG2 and RG3)

- ***Physical Oceanography, Geology, Geophysics and Atmospheric Science Drivers – the Indian Ocean's and its marginal seas' links to marine and terrestrial natural phenomena, including extremes:***
 - *Upwelling dynamics and variability (understanding and predicting the role and natural influences of processes that bring physical and bio-geochemical substances towards the ocean's surface);*
 - *Monsoon variability and predictability (links to severe marine and terrestrial weather, including droughts, floods etc);*
 - *Extreme events (links to dangerous and catastrophic oceanic and terrestrial climatic responses to the Indian ocean);*
 - *Climate variability and change (understanding and predictability of the coupled ocean-climatic characteristics related to the Indian Ocean);*
 - *Benthic characterization (paleo-oceanography, bathymetry; bio-physical habitat; geological; and geophysical inventories).*
 - *Sea-bed characterisation (linking with IODP).*
 - *Planetary waves – cross basin, and deep ocean currents;*
 - *Modelling for ocean forecasting and process studies.*
- ***Biogeochemical and Ecosystem Science Drivers – advancing the ecological mysteries of the Indian Ocean's and its marginal seas' ecosystems:***
 - *Ocean stressors (warming, de-oxygenation, acidification, eutrophication, atmospheric pollution);*
 - *3D carbon related anatomy and dynamics of the Indian Ocean;*
 - *Atmospherically derived stressors (from land based sources) (eg in dust);*
 - *Biodiversity loss, changes in phenology and biogeography;*

- *The Indian Ocean's role in its own and in the globe's climate and nitrogen cycles, including its function as a source or sink of temperature energy and as a central conduit of flows and contained substances with its neighbouring Pacific, Atlantic and Southern Oceans;*
- *Fisheries: recruitment, productivity and links to biogeochemistry and physics.*
- **Societal Drivers – improving societal links derived from and influenced by natural behaviours of the Indian Ocean and its marginal seas:**
 - *Natural Resource Management: eg food sources (commercial and artisanal fisheries), ecotourism, energy and other industry-related derivations of wealth from the ocean at coastal, shelf and open water ecosystem scales;*
 - *Sustainability of wealth from the oceans (the 'Blue Economy') – EEZs;*
 - *Change in coastal and open ocean environments (eg sea level rise, coastal erosion, loss of mangroves);*
 - *Human impacts of climate change, extreme events and monsoon variability;*
 - *Biodiversity loss and ecosystem conservation for tourism and fisheries.*
- **Capacity Building Drivers – a better skilled population in developing rim and small island developing states of the Indian Ocean and its marginal seas from the data, information and learning opportunities to be gained from the IIOE-2:**
 - *Cruises as experiential and learning platforms for young, emerging scientists and marine managers;*
 - *IIOE-2 data sets as bases for research projects at under- and post-graduate levels;*
 - *Symposia;*
 - *Summer schools;*
 - *Mentoring and exchange programs engaging experts and trainees.*
- **Data and Information Management**
 - *The legacy of the IIOE-2 - ensuring the longevity and societal utility of products and outputs of the IIOE-2, through integration with the IOC's International Oceanographic Data and Information Exchange (IODE) programme; and*
 - *The proper management, curation and easy accessibility of data and information to the broad community - under the GOOS principles (www.ioc-goos.org).*

Updated Governance and Program Management Framework for IIOE-2 (based on RG1, RG2 and RG3)

- **Steerage:** through respective institutional and scientific entities (including IOC, SCOR, IOGOOS [linking with IOP, SIBER, IRF]).
- **Guidance:** for the science and societal benefit areas of IIOE-2, and this might include:
 - Scientific Reference Group;
 - Societal Benefit / Capacity Building / Knowledge Transfer Reference Group.
- **The creation of specific operational components:** such as thematic 'sub-committees', in order to provide foci for operational components and specific stakeholder categories of the IIOE-2, including:
 - Integration – to ensure collegial integration, collaboration and joint planning amongst stakeholders with varying respective levels of capacity and expertise in observational oceanography, field capacity and related marine scientific capacity in the formative stages of planning in IIOE-2.
 - Cruise coordination (planning, integration, collaboration, regular review, reporting, standardisation of methodologies, cross-cruise communications etc);
 - Special events (such as the Indian NIO 50th Anniversary celebration symposium, planned for 2015 [noting NIO's birth during the original IIOE]);
 - Scientific symposia and conferences (such as IIOE-2 annual conferences, and related meetings);
 - Data and information management under the IODE framework (the legacy of longevity and utility of data and information and products/outcomes/outputs from IIOE-2);
 - High level institutional partnerships (eg IORA, COI, IOC Regional Subsidiary Bodies and Decentralised Offices, AMCOMET, AMESD, LMEs etc);

- Capacity Building (CB) through education, in-situ – such as on-board training on cruises, ‘laboratories/universities of the sea’, CB workshops, up-skilling, mentorship, studentships, exchange programs, utilisation of the IIOE-2 data in CB;
 - Communication & Outreach (building a constituency, dissemination of the results, engaging the broader community);
 - Knowledge Transfer (translating science into policy, management, applied utility, including the Blue Economy theme);
 - National IIOE-2 Committees (coordinated national approaches to IIOE-2 engagement, inter-committee integration);
 - Research initiatives (eg EIOURI, LOCO);
 - Scientific association partners (eg WIOMSA; AMSA; GEOTRACES, CORDIO, IMOS Australia, SANCOR, integration with UNESCO Category 2 and RSB training centres and similar entities (eg ITCOcean India)).
 - Sponsorship (to garner resources, including cash and in-kind) to support the IIOE-2.
- **Secretariat support:** with this being regarded as a critical underpinning necessity for a successful IIOE-2.
 - The overall model emerging included a regional operational base, for example as has been provided so far through the IOC Perth Programme Office, working collaboratively with what would hopefully be the formation of sub-regional operational foci, and under the overall auspices of global coordination through the IOC HQ Secretariat via something akin to say an IIOE-2 Secretariat ‘Project Office’.
 - The IOTWS, GOOS SC and SOOS coordination models were noted as potential case studies from which to draw experience from in this regard.

Participants prepared a draft *Participants Statement*, which was finalised out of session and dated 25 March 2014. Participants agreed to use the Participants Statement to underpin their own advocacy for the IIOE-2. This advocacy would be via (i) direct representations to their respective national marine science constituents (including at government levels) and (ii) via direct communications with their own national IOC focal points and delegations. The latter imperative is in order to promote advocacy for maximum national support for the IIOE-2 when it is considered during forthcoming IOC Executive Council and Assembly meetings, beginning with the critical 47th IOC Executive Council 1-4 July 2014, at which the IIOE-2 will be considered for creation as a new IOC initiative through a Draft Resolution.

Participants Statement

Western Indian Ocean Regional Focus Group Meeting to help plan the International Indian Ocean Expedition 50th Anniversary Initiative (IIOE-2), Quatre Bornes, Mauritius, 6 and 7 March 2014.

The participants of the IIOE-2 Western Indian Ocean Regional Focus Group Meeting held during 6 & 7 March 2014 at Quatre Bornes in Mauritius, after recognizing the frank and successful work done so far, are pleased to thank the organizers, the sponsors and the host, the Mauritius Prime Minister’s Office through the Head of the Office for Ocean Affairs and Development.

We strongly support the establishment of an IIOE-2 for 2015-20, as a unique opportunity for regional collaboration in marine research, training, capacity-building and societal application, in alignment with the Decision of the 27th meeting of the 146 Member States of the Assembly of the IOC of UNESCO in 2013. That Decision called for an IIOE-2 proposal to be addressed at the 47th meeting of the Executive Council of the IOC of UNESCO in 2014.

We reaffirm our commitment to undertake the IIOE-2 under a spirit of mutual cooperation and partnership and we support this important scientific endeavor to enhance our understanding of the Indian Ocean for the betterment of the environment per se and of the human communities that rely on and are influenced by the Ocean.

We urge and will endeavor to work with our own national Governments, relevant institutions and scientific communities to support IIOE-2 through opportunities available to them, including the 47th Meeting of the Executive Council of the IOC of UNESCO.

To this end, we will endeavor to catalyze and harness national coordination in our countries to promote coherent and integrated engagement in the IIOE-2.

We urge prospective stakeholders in IIOE-2 from countries that will bring ocean observing, associated infrastructure, research and related capacities to the Indian Ocean under the IIOE-2, to facilitate the collaborative engagement of those stakeholders that may not be able to engage in that same manner.

This should be realized through facilitation of collegial interactions, collaborative working relationships, and mutual and synergistic engagement in planning exercises, at both strategic and tactical levels, both in advance of the establishment of the IIOE-2 and, thence, under the framework of governance and administration during the IIOE-2.

Statement finalised on 25 March 2014

Participant List

Western Indian Ocean Regional Focus Group Meeting to help plan the International Indian Ocean Expedition 50th Anniversary Initiative (IIOE-2), Quatre Bornes, Mauritius, 6 and 7 March 2014.

Participant's name		Country or organisation of origin
Blivi	Adote	Togo; Vice-Chair IOC/UNESCO
Rezah	Badal	Mauritius
Lynnath	Beckley	Australia
Peter	Burkill	SCOR; United Kingdom
Vahid	Chegini	I.R. Iran
Nick	D'Adamo	Meeting Chair; IOC Perth Programme Office
Julius	Francis	WIOMSA
Calvin	Gerry	Seychelles
Ashley	Johnson	South Africa
Johnson	Kazungu	Kenya
Desiderius	Masalu	Tanzania
Yukio	Masumoto	Japan
Fialho	Nahema	Mozambique
Njike	Ngaha	Cameroun
Mika	Odido	Secretariat, IOC Sub-Commission for Africa and the Adjacent Island States
Man Wai	Rabenevanana	Madagascar
M	Ramana	Mauritius
Mike	Roberts	Republic of South Africa
Alakendra	Roychoudhury	Republic of South Africa

Jun	Sun	China
Observers		
Sam Bateman		University of Wollongong, Australia
B. Rajahbalee-Cader)		Mauritius
R. Virasamy		Mauritius
P. Mussai		Mauritius
R. S. Mungra		Mauritius
J. I. Mosaheb		Mauritius
S. Facknath		Mauritius
R. Bhagooli		Mauritius
K. Narrain		Mauritius
M. Singh		Mauritius
R. MoothienPillay		Mauritius
D. Bissessur		Mauritius
S. D. Jowahir		Mauritius
I. I. Ashraf		Mauritius
B. Motah		Mauritius
B. Lalljee		Mauritius
N.Dussooa		Mauritius

2 Presentations and related discussions

All PPTs from the meeting have been collated by the Chair and held as one consolidated set at the IOC Perth Programme Office (PPO). They are accessible through direct request to IOC PPO or the authors.

Detailed summaries of many of the PPTs will not be made in this report as they are available for reference at www.iocperth.org. Rather, précis summaries are given, with a focus on salient points that introduced nuances compared to the outcomes of the IIOE-2 Reference Group meetings 1 and 2 (Hyderabad, May 2013; Qingdao, November 2013), with associated reports and PPTs. These are also available on www.iocperth.org.

Furthermore, some of the PPTs are very similar to those given at previous Reference Group meetings, in which case reference is made back to the relevant reports of the IIOE-2 RG1 and IIOE-2 RG2 meetings and to the associated PPTs of the presentations involved (www.iocperth.org).

2.1 Welcome statements and opening addresses

Welcoming statements were delivered by Peter Burkill (for SCOR), Adote Blivi (for IOC Officers' group), Mika Odido (for IOC AFRICA Secretariat) and Mike Roberts (for SIBER).

Rezah Badal delivered an opening address, in his capacity both as IOGOOS Officer and representative of the local host, Office for Ocean Affairs and Development, Mauritius Prime Minister's Office.

Ashley Johnson delivered an opening address on behalf of Monde Mayekiso (Chair, IOC AFRICA).

2.2 Background and direction setting session

Presentation 1. Nick D'Adamo. Background; Context; IIOE to IIOE-2; Governance; and Secretariat issues.

Nick D'Adamo provided the background to the IIOE-2 planning process that has been undertaken since 2011, led institutionally through IOC, IOGOOS and SCOR. He overviewed the goals of the workshop, which focussed on it being a forum whereby West Indian Ocean (W IO) stakeholders had another explicit and focussed opportunity to consider and express their own interests, aspirations, suggestions and objectives for an IIOE-2. The timeliness of the workshop was emphasised, with it having been specifically planned to occur ahead of the imminent IOC Executive Council meeting (1-4 July 2014) when the IIOE-2 will be considered as a prospective new program under and through the inter-governmental level of the IOC, in association with SCOR and IOGOOS.

Noting that an IIOE-2 would be a regional, integrated and collaborative exercise, where national efforts can be encouraged, but under the spirit of a shared vision for societal benefit and shared information under the IOC / GOOS principles (free, timely, open access), the workshop goals were given as

- Identify and promote the objectives of IOC Member States of the Western Indian Ocean (W IO) sub-region in the IIOE-2 initiative;
- Facilitate W IO active participation in IIOE-2 and develop in principle working relationships with IOC, SCOR & IOGOOS for IIOE-2;
- Define a focused set of overarching science and societal drivers with specific reference to the W IO, examining the related question of how W IO constituents could contribute to IIOE-2 and in turn how can/should IIOE-2 benefit W IO constituents;

- Identify planned and potential availability of research vessels for scientific research cruises and complementary capacities for IIOE-2 (eg capacity building, outreach etc);
- Identify planned and potential engagement of W IO individuals, institutions and organisations in IIOE-2; and
- Consolidate W IO stakeholders as advocates for IIOE-2 at the IOC Assembly / Executive Council levels, noting the forthcoming IIOE-2 item at IOC Executive Council Meeting 47 (1-4 July 2014).

The science and societal motivations for undertaking an IIOE-2 were overviewed, in the context of the many institutional and scientific alliances now existing for the IO and which can act as vehicles for collaboration and mutual engagement (eg IOGOOS, SAPPHIRE, WIOMSA, CORDIO, IOC AFRICA, IOGOOS, SCOR, IOC, IOCINDIO, SEAGOOS, WAGOOS etc). In that context, some of the major scientific projects and alliances currently in existence and with relevance to IIOE-2 objectives in the W IO region were described. The original IIOE was overviewed. A chronological summary was then given of the many events and planning activities already undertaken (since 2011) as part of bringing together the concept of an IIOE-2 for presentation to IOC in mid-2014. This included the important positive recognition given to the IIOE-2 prospect by the IOC Assembly in mid-2013 and by the Indian Ocean Rim Association (IORA) at its 1 November 2013 Council of Ministers meeting in Perth, Western Australia, with reference to the support expressed through the IORA Perth Meeting's communique.

It was emphasised that prior IIOE-2 planning events sought the engagement of all IO stakeholders, W IO included, through a wide ranging variety of broadcasts, including dissemination via IOGOOS networks and its associated IOP, SIBER and IRF alliances. Furthermore, notices have been sent as a matter of routine via formal IOC Circular Letter invitations to all 147 IOC Member State IOC focal points. Notwithstanding this, it had been recognised at the recent IIOE-2 Qingdao Reference Group No 2 meeting, that added opportunity needed to be created in order to facilitate further engagement of W IO stakeholders; hence the advent of this meeting in Mauritius.

Reference was made to the large constituency already established for an IIOE-2, stemming from the early formative interest derived in 2011 via the advocacy of SCOR, SIBER, IMBER, IOC Secretariat and IOGOOS, and thence encouragement formally through a Decision (on IIOE-2) by the IOC Assembly in 2013. With the IOC's encouragement, but with no substantive IIOE-2 planning budget achievable, this then led to an essentially informal and largely self-funded IIOE-2 community of practice developed under the facilitation of IOC (through the IOC's Perth Programme Office [PPO], central Secretariat and regional networks of RSBs and decentralised offices), SCOR and IOGOOS. It has harnessed interest and planned for a prospective IIOE-2.

Major formative gatherings were run first in India and then in China during 2013 (referred to as 'reference groups'); followed by this 2014 Mauritius 'focus group' meeting for WIO stakeholders. These have brought together a net complement of some 60 high level scientists, deriving from over 20 countries. Overall, the planning meetings have engaged over 50 major marine scientific institutions from within the region and around the globe in general, and involved over 20 key organisational global and national alliances at intergovernmental and institutional levels themselves having large and diverse constituencies. Reference materials stemming from this 3-year evolution are available at www.iocperth.org. Much of this has come under the facilitation and auspices of entities involving, for example, IOC, SCOR, IOGOOS, SIBER, IOP, IRF, IMBER, CLIVAR and others.

As was aforementioned, invitations for each event were open and widely disseminated (e.g. via IOC Circular Letters, direct contact, electronic notices, www.iocperth.org etc.).

Many news articles and newsletters have been written, interviews given and presentations made at a variety of forums - providing updates and reporting on the planning actions that have taken place.

Nick D'Adamo then provided a summary of his interpretation of the results of presentations and associated discussions from the past planning meetings for IIOE-2, in terms of what constitutes a convergence to date by stakeholders for a framework of science and related societal drivers, with a view to the Mauritius meeting participants starting with and reviewing these as unifying science

themes for an IIOE-2 with specific reference to their own interests, priorities and objectives. The summary comprised the following.

- **Physical Oceanography and Atmospheric Science Drivers – the Indian Ocean’s link to marine and terrestrial natural phenomena, including extremes:**
 - *Upwelling dynamics and variability (understanding and predicting the role and natural influences of processes that bring physical and bio-geochemical substances to the ocean’s surface);*
 - *Monsoon variability and predictability (links to severe marine and terrestrial weather, including droughts, floods etc);*
 - *Extreme events (links to dangerous and catastrophic oceanic and terrestrial climatic responses to the Indian ocean);*
 - *Climate variability and change (understanding and predictability of the coupled ocean-climatic characteristics related to the Indian Ocean);*
 - *Benthic characterization (paleo-oceanography, bathymetry; bio-physical habitat inventories).*
 - *Planetary waves – cross basin, and deep ocean currents;*
 - *Modelling for ocean forecasting and process studies.*
- **Biogeochemical and Ecosystem Science Drivers – advancing the ecological mysteries of the Indian Ocean’s ecosystems:**
 - *Ocean stressors (warming, de-oxygenation, acidification, eutrophication, atmospheric pollution);*
 - *3D carbon related anatomy and dynamics of the Indian Ocean;*
 - *Atmospherically derived stressors (from land based sources) (eg in dust);*
 - *Biodiversity loss, changes in phenology and biogeography;*
 - *The Indian Ocean’s role in its own and in the globe’s climate and nitrogen cycles, including its function as a source or sink of temperature energy and as a central conduit of flows and contained substances with its neighbouring Pacific, Atlantic and Southern Oceans;*
 - *Fisheries: recruitment, productivity and links to biogeochemistry and physics.*
- **Societal Drivers – improving societal links derived from and influenced by natural behaviours of the Indian Ocean:**
 - *Natural Resource Management: eg food sources (commercial and artisanal fisheries), ecotourism, energy and other industry-related derivations of wealth from the ocean at coastal, shelf and open water ecosystem scales;*
 - *Sustainability of wealth from the oceans (the ‘Blue Economy’) – EEZs;*
 - *Change in coastal and open ocean environments (sea level rise, coastal erosion, loss of mangroves);*
 - *Human impacts of climate change, extreme events and monsoon variability;*
 - *Biodiversity loss and ecosystem conservation for tourism and fisheries.*
- **Capacity Building Drivers – a better skilled population in developing rim and small island developing states of the Indian Ocean from the data, information and learning opportunities to be gained from the IIOE-2:**
 - *Cruises as experiential and learning platforms for young, emerging scientists and marine managers;*
 - *IIOE-2 data sets as bases for research projects at under- and post-graduate levels;*
 - *Symposia;*
 - *Summer schools;*
 - *Mentoring programs engaging experts and trainees.*
- **Data and Information Management**
 - *The legacy of the IIOE-2 - through ensuring the products and outputs of the IIOE-2 are integrated with the IOC’s International Oceanographic Data and Information Exchange (IODE) programme; and*

- *The proper management, curation and easy accessibility of data and information to the broad community - under the GOOS principles (www.ioc-goos.org).*

The additional specific point was then made that the E IO science community has advanced its plans for focused research work, such as through East Indian Ocean Upwelling Research Initiative (EIOURI) under IOP and SIBER, and the question was then posed as to whether the W IO community wished to also develop such focussed research pursuits under the IIOE-2.

In respect to governance and program management, Nick D'Adamo then provided a summary of his interpretation of the results of presentations and associated discussions of the past planning meetings for IIOE-2, in terms of what constitutes a convergence by stakeholders for an IIOE-2 governance and program management framework. There has been general acceptance in principle with maintaining this structure for further discussion under the IIOE-2 planning process, and hence it was presented to participants for further examination, discussion and review in respect to their own contexts, as follows.

- **Steerage:** through respective institutional and scientific entities (including IOC, SCOR, IOGOOS [linking with IOP, SIBER, IRF]).
- **Guidance:** for the science and societal benefit areas of IIOE-2, and this might include:
 - Scientific Reference Group;
 - Societal Benefit / Capacity Building / Knowledge Transfer Reference Group.
- **The creation of specific operational components:** perhaps to be referred to as thematic 'divisions' or 'chapters' or 'sub-committees', in order to provide foci for operational components and specific stakeholder categories of the IIOE-2, including:
 - Cruise coordination (planning, coordination, regular review, reporting, standardisation of methodologies, cross-cruise communications etc);
 - Special events (such as the Indian NIO 50th Anniversary celebration symposium, planned for 2015 [noting NIO's birth during the original IIOE]);
 - Scientific symposia and conferences (such as IIOE-2 annual conferences, and related meetings);
 - Data and information management under the IODE framework (the legacy of longevity and utility of data and information and products/outcomes/outputs from IIOE-2);
 - High level institutional partnerships (eg IORA, COI, IOC Regional Subsidiary Bodies and Decentralised Offices, AMCOMET, AMESD, LMEs etc);
 - Capacity Building (CB) through education, in-situ – such as on-board training on cruises, 'laboratories/universities of the sea', CB workshops, up-skilling, mentorship, studentships, exchange programs, utilisation of the IIOE-2 data in CB;
 - Communication & Outreach (building a constituency, dissemination of the results, engaging the broader community);
 - Knowledge Transfer (translating science into policy, management, applied utility, including the Blue Economy theme);
 - National IIOE-2 Committees (coordinated national approaches to IIOE-2 engagement, inter-committee integration);
 - Research initiatives (eg EIOURI, LOCO);
 - Scientific association partners (eg WIOMSA; AMSA; GEOTRACES, CORDIO, IMOS Australia, SANCOR, integration with UNESCO Category 2 and RSB training centres and similar entities (eg ITCOcean India)).
- **Secretariat support:** with this being regarded as a critical underpinning necessity for a successful IIOE-2.
 - The overall model emerging included a regional operational base, for example as has been provided so far through the IOC Perth Programme Office, working collaboratively with what would hopefully be the formation of sub-regional operational foci, and under the overall auspices of global coordination through the IOC HQ Secretariat via something akin to say an IIOE-2 Secretariat 'Project Office'.
 - The IOTWS, GOOS SC and SOOS coordination models were noted as potential case studies from which to draw experience from in this regard.

2.3 Research updates

Presentation 2. Yukio Masumoto. IOP/SIBER Indian Ocean research summary.

Yukio Masumoto presented updates on (i) research underway in the IO through the auspices of the Indian Ocean Panel (IOP) of IOGOOS/CLIVAR, focussing on physical oceanography and coupled climatic issues and (ii) the state of planning for the East Indian Ocean Upwelling Research Initiative. Relevant PPTs from these two talks are at www.iocperth.org, and hence only a brief summary of these is given herewith.

The IOP works in harmony and collegially with SIBER which focusses on complementary biogeochemistry issues. IOP is coordinating the implementation of the Indian Ocean Observing System (IndOOS), covering all aspects of GOOS, but with its flagship component being RAMA (~45 deep ocean tropical moorings in the IO). IOP links the observational aspects with process studies, addressing, for example, monsoons, severe weather (eg cyclones), intra-seasonal (30-60d – eg Madden Julian Oscillation), inter-annual phenomena (eg Indian Ocean Dipole, ENSO influences), decadal variability and trends (eg warming), ocean circulation and, as mentioned, biogeochemistry with SIBER. YM emphasised the strong influence of these IO processes on African weather and climate and the need to complete IndOOS for the W IO in that context. He further suggested the need for the establishment of W IO specific process studies to complement IndOOS and addressing what W IO stakeholders believed is necessary to support societal objectives in the region.

Discussion. Presentation 2.

Discussion ensued on the need for IndOOS to extend more comprehensively into the W IO, and for alternatives to ship based work (in recognition of piracy as an impediment) to be used (eg gliders and other robotics). The latter issue was also discussed in reference to there still being the need to have fixed surface infrastructure to monitor aspects such as air-sea fluxes.

It was also clarified that IOP engages in modelling, employing a variety of available tools.

There was a general agreed need to ensure that the specific objectives relevant to W IO stakeholders formed an integral part of an IIOE-2, especially in terms of integrated bio-physical understanding, supported by required enhancement in the Indian Ocean Observing System and related process, modelling and capacity building research and applications.

Presentation 3. Yukio Masumoto. Update on planning for the East Indian Ocean Upwelling Research Initiative (EIOURI) of IOP/SIBER.

EIOURI was conceived at the Asia Oceania Geosciences Society (AOGS) - AGU (WPGM) Joint Assembly (Singapore, 17 August 2012) and is now well advanced in terms of its planning through the efforts of a research community of practice (deriving from IOP and SIBER). The EIOURI stakeholders met twice in science workshop mode (Yokohama, April 2013 and Qingdao, November 2013) to develop a strategic science and implementation plan. YM referred to a forthcoming workshop, to begin the process of writing a science plan for EIOURI (April 2014, Phuket, Thailand). The third and final major planning meeting will be held as part of the IMBER Open Science Conference, Bergen, Norway, through a special symposium on Monday 23 June 2014. Furthermore, there will be a poster presentation on EIOURI at the spring meeting of the Oceanographic Society of Japan (27-29 March 2014).

EIOURI is being developed as a prospective key 'research' project under the spirit of an IIOE-2.

As it stands, EIOURI is to focus on the NE IO and E IO areas, in response to the interests and geographical domains of interest of the scientific community that has so far formed under EIOURI (focussing on the east Bay of Bengal / Sumatra-Java upwelling areas, the (tuna spawning) region

between Indonesia and NW Australia, and the region off Western Australia, all of which have idiosyncratic upwelling behaviours).

The key science areas underpinning the EIOURI development are: multi-scale variability of upwelling in response to local and remote forcing; linkage between the coastal upwelling and open ocean (eg via circulation and eddy processes), and physical-biological connections.

In the context of the current meeting, a key issue was posed by YM: being the merits of considering the local interests, capacities and needs for a similar initiative to cover the W IO, either as a separate but aligned complementary WIOURI or in conjunction with the EIOURI as an IO wide integrated initiative.

Discussion. Presentation 3.

MR added that doming of the sub-sea structure should also be considered in upwelling research, pointing to the potential importance of this behaviour in the W IO and added that a lack of ship based resources limited upwelling research in the W IO. PB suggested gliders as an alternative to cruises. VC noted that many available vessels in the W IO are most suitable for marginal seas and shelf/coastal work rather than deep ocean work.

General discussion converged on the need and merits of developing an upwelling research strategy for the W IO, as one that could be used to garner resources for the research. VC supported the concept and development of a West Indian Ocean Upwelling Research Initiative (WIOURI), adding that Iran, with an RV imminent, would be interested in participating in a WIOURI.

On further prompting in respect to the notion of a WIOURI, there evolved through general interventions an agreed spirit that developing a WIOURI objective under IIOE-2 had strong merit and relevance for W IO stakeholders and could also be a theme that helps bring W IO stakeholders more closely engaged collaboratively for the IIOE-2. DB suggested it would be optimal for any upwelling initiative in the W IO to be multi-disciplinary, and this was generally agreed.

DM emphasised the importance of the IIOE-2 including themes that invoke the interest of W IO stakeholders (eg fisheries, petroleum/gas exploration, EEZ characterisation, marine tourism (including marine mammals) etc).

ND summarised the discussion.

It was generally agreed that upwelling in the W IO should form a major plank of the IIOE-2, complementary and in collaboration with the EIOURI and that W IO stakeholders should actively contribute this and other objectives of relevance to the W IO region as part of (i) future detailed planning for the IIOE-2 and (ii) related specification of the science and implementation priorities for the IIOE-2.

2.4 Stakeholder presentations

Presentation 4. Peter Burkill (and on behalf of Ed Urban). SCOR and IIOE-2.

SCOR's original role and relationship with IOC in the first IIOE of 1959-65 was overviewed.

The role of IOC in providing a top down context (involving inter-governmental and related spheres) and meeting 'in the middle' with SCOR in providing a bottom up context (involving scientific and related spheres) was presented as an excellent opportunity to facilitate the designation of the framework and strategies for an IIOE-2 that would truly result in meaningful connection and integration between science and societal relevancy/uptake/benefit.

Furthermore, the virtues of an IIOE-2 were also presented in terms of providing the framework for countries with relatively large ocean science resources and expansive geographical and thematic

aspirations harmonising with countries with more limited ocean science resources and more local, nationalistic aspirations. It was emphasised that SCOR considered the IIOE-2 to have the greatest chance of success and utility if:

- A philosophy of ownership by all was created;
- The IIOE-2 science resulted in the building of bridges (societally and scientifically);
- Capacity Building was a key plank for the IIOE-2;
- There was a common data policy across IIOE-2, with common data portals; and
- IIOE-2 was a program that was based on integration and collaboration – ie more than the “sum of the parts”.

The point was made that whatever science questions are designated for the IIOE-2, they must have broad cross-cutting appeal to scientists, stakeholders and policy makers alike.

A note on relevant existing SCOR programs was given, such as GEOTRACES and SIBER of IMBER/IOGOOS.

A chronology of SCOR’s substantive engagement since 2011 in the planning phase for IIOE-2 was then presented, indicating that there will be a SCOR sponsored workshop to facilitate the development of IIOE-2 science objectives (Bremen, September 2014).

PB ended by adding that SCOR and IOC are working together to plan for a celebration event for the IIOE 50th Anniversary and to plan for the IIOE-2 per se. Furthermore, SCOR is actively pursuing IIOE-2 through its National Committees (eg India, Netherlands, UK and USA to date).

Presentation 5. Peter Burkill. UK and IIOE-2.

This presentation pointed out that the amount of UK vessel time engaging in science cruises in the IO had declined over the past few years, with practically no cruises having been assigned to the IO since 2006, with the exception of 2012. However, the prospects are better for the immediate future, with the following points noted:

- The Royal Society is sponsoring UK SCOR to host 27 UK Scientists, 2 stakeholders, and a UK-IOC member to meet during 17th-19th March in Dartington to discuss IIOE-2.
- All disciplines will be involved: meteorology, physics, biology, chemistry & palaeoscience, geology.
- The main funder of the meeting will be the Natural Environment Research Council.
- Workshop outputs will constitute (a) a report with recommendations, and (b) a “town hall meeting” open to all.
- Future actions will include: (a) PIs submitting proposals for “blue skies” funding, and (b) UK-SCOR feeding into the September 2014 SCOR meeting to discuss integration and generation for an international ship programme.
- The eventual outcome will be a series of multidisciplinary research proposals involving ship-time in the Indian Ocean for 2016/2017.

PB ended by giving brief specifications and science capabilities of the UK’s RV James Cook and RV Discovery.

Discussion. Presentation 5.

There was an important issue introduced by RMP during the discussion, referring to the need for stakeholders (countries) with limited ocean observation infrastructure (vessels and/or observing instruments) to be able to integrate with more advanced countries in this regard, ahead of IIOE-2 planning phases. This was raised in terms of enabling maximal engagement in field activities, where feasible, of less ‘equipped’ countries with those that are more equipped. RB suggested this was an

issue that could be addressed through the establishment of formal relationships between countries, and MR added that plans by countries to work in other than their own EEZs (as would be common in an IIOE-2), would necessarily require collaboration for approvals to operate in sovereign waters, whereby stakeholders could collaboratively address the aspiration mentioned above.

It was generally agreed that IIOE-2 cruise planning and associated ocean observation frameworks should include mechanisms to promote integration, in both planning and implementation, between advanced and less advanced countries, in respect to on-water and ocean observational capacities. A key pro-active mechanism raised to address this aspiration was the incorporation of representatives from less operationally advanced countries within the planning phases of more advanced countries to facilitate integrated and collaborative in-situ IIOE-2 activities.

Presentation 6. Lynnath Beckley. Australian led 110°E IIOE-2 proposal.

LB's presentation was similar to that from IIOE-2 RG2. In summary, LB outlined plans to lead a collaborative group for a 'revisitation' of the IIOE '110°E' study lines/region, but with a contemporary process-oriented ecological approach, using modern equipment, advanced technologies, contemporary science questions, and attempting to:

- Quantify changes in physical, chemical and biological properties of the water column;
- Characterise bio-physical N sources and their ecological impacts;
- Determine trophic relationships across N-fuelled primary production and zooplankton (including mesopelagic fish larvae).
- Along a line from Fremantle to 110°E SW of WA, north along 110°E to Indonesia and back SSE-ward to Exmouth.
- Including CTD profiling and plankton sampling, and microbial studies.
- With scientific links to SIBER, IMBER, IOGOOS, EIOURI, IIOE-2 interests etc.

PB's collaborating Principal Investigators in the proposal derive from Australia, Spain, USA.

LB outlined the IMOS infrastructure network, a newly initiated Bio-Argo project, the Western Australian Marine Science Institution (WAMSI) Kimberley program and information on potential voyages by the imminent new Australian RV Investigator.

LB ended by again emphasising out that two ideal mid-ocean staging post bases exist and could well be considered in IIOE-2 operational planning, being Christmas and Cocos Islands, respectively. These have Australian Government presence (Parks Australia) and are sited as ideal locations for IO marine research, being in the ITF zone of influence (including the Southern Equatorial Current).

A fuller précis of LB's presentation is available in the IIOE-2 RG2 report.

Presentation 7. Vahid Chegini. Persian Gulf GOOS, I.R. Iran and IIOE-2.

A detailed overview was given of ocean observations and related research underway in the Persian Gulf, with specific reference also to Iran's ocean observation capacities (including vessels), activities and interests (across BGC, physics (geo and ocean) and meteorology). Reference was given to the Journal of the Persian Gulf as a good source of information for the area.

Discussion. Presentation 7.

A key issue to arise from the discussion was the need to include the marginal seas (eg Persian Gulf) in the IIOE-2.

There was general agreement that IIOE-2 should include the marginal seas of the IO.

Presentation 8. Rezah Badal. Mauritius and IIOE-2.

RB described the recently expanded respective sovereign EEZs of Mauritius and Seychelles, and then the nearby zone under joint Mauritius/Seychelles management. He used this as the setting to refer to the New Economic Pillar for the ocean, relating to resources (living and non-living), energy (eg from winds, waves, currents), transport (involving shipping, navigation and safety) and climate (involving disasters and extreme events). A recent national assessment conducted in Mauritius of 38 institutes sought priorities for key interests in the ocean, and included the following as highlights: port manoeuvrings, offshore activities, seafood, environment, renewable energy, living and non-living resources. Mauritius has a number of public entities with a strong interest in seeing an improved characterisation of the EEZ (eg from the PM's Office, fisheries, academia, Mauritius Research Council, environment). In that context RB listed a number of relevant current major programs.

The presentation then highlighted the types of ocean related activities needed to support those aspirations, in the context of a potential IIOE-2, and relating to satellite acquired information, food security and sustainable fisheries, marine health indicators, physical oceanography and related monitoring (ocean observations), related data management and ocean modelling/forecasting.

Discussion. Presentation 8.

Noted with relevance to IIOE-2.

Presentation 9. Mika Odido. IOC Sub-Commission for Africa and the Adjacent Island States and IIOE-2.

MO overviewed the history of IOC engagement in Africa, including African member States as they have progressively joined IOC, the former IOC Regional Committees for the Western Indian Ocean (IOCWIO) and Central Eastern Atlantic (IOCEA), respectively, culminating in the establishment in 2011 of the IOC Sub-Commission for Africa and the Adjacent Island States (IOC Africa). MO also described related marine institutions and activities in the region.

MO referred to IOC Africa as being fundamentally interested in IIOE-2, referring to the IOC Africa 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*".

The talk also covered related IOC Africa interests, such as: sea level networks, adaptation to climate change, the need for decision support tools, improving access to written resources, improving access to data and related skills for interpretation/analysis, the need for coastal and marine atlases, context for IOC Africa provided by UNESCO at the highest levels (peace, sustainable development, poverty eradication), context provided by IOC's own Medium Term Strategy, aspirations to see Member States' institutional capacities reinforced through IIOE-2, and finally how the IIOE-2 can contribute to IOC Africa achieving its own strategic objectives in the areas of:

- *Knowledge generation and management;*
- *Capacity development;*
- *Development of partnerships;*
- *Advocacy and public awareness; and*
- *Resource mobilization.*

Discussion. Presentation 9.

Noted with relevancy to IIOE-2.

Presentation 10. Mike Roberts. SAPPHERE, South Africa and IIOE-2.

MR presented essentially similar information to that presented and reported upon from the IIOE-2 RG2 meeting (Qingdao, 2013). This comprised an overview of ongoing and planned (South African) research projects in the SW IO, on behalf of South African groups: Oceans and Coasts of DEA;

Agulhas Somali Current Large Marine Ecosystem (ASCLME) program (under the auspices of GEF/UNDP); African Coelacanth Ecosystem Program (ACEP) (under the auspices of NRF) and plans for further work following on from ASCLME during its next 5-year phase (under the title SAPPHIRE).

Recalling, MR emphasised that:

- Present and near-future observational studies in the SWIO will be strongly driven by priorities and operational/research programs in LME programs and they will be multi-disciplinary;
- The W IO research community is very much still in a phase of discovering circulation features, dynamics and variability;
- Notwithstanding funding, strong emphasis will be assigned to biogeochemical coupling/productivity;
- There appear to be few WIO ocean-atmosphere coupling studies on the horizon, although these are important imperatives;
- IIOE-2 engagement for the W IO community will focus more on contemporarily relevant cruise paths, and less on straight repeats of surveys along original IIOE lines;
- One likely imminent priority, building on emerging research currently underway, will be to focus on the East African Coastal Current and the Somali Current.

Discussion. Presentation 10.

Noted with relevancy to IIOE-2.

Presentation 11. Julius Francis. WIOMSA and IIOE-2.

JF described WIOMSA's major geographical focus (east Africa and the adjacent W IO region). He added:

WIOMSA objectives:

- Fostering research excellence;
- Developing expertise for effective management;
- Raising awareness and enhancing access to knowledge and information;
- Promoting networking, cooperation and exchange; and
- Promoting and advocating appropriate policies and practices

Main Activities:

- Linking science to governance processes;
- Capacity and professional development to conduct quality research and for improved management;
- Enhancing access to relevant knowledge and information;
- Strengthening networks and partnerships; and
- Outreach and resource mobilization.

WIOMSA can contribute to IIOE-2 through facilitating the involvement of regional scientists, helping to disseminate IIOE-2 results, outputs (writing workshops, publication of research, symposia) and assisting with the transfer of science to policy / public uptake. JF ended by emphasising the value of developing 'unifying themes' for IIOE-2, further referring to the success of the Coelacanth work.

Discussion. Presentation 11.

It was generally agreed that a strong relationship and engagement be forged between WIOMSA and IIOE-2.

Presentation 12. Ashley Johnson. Research priorities within the oceans around South Africa and relevancies to IIOE-2.

AJ pointed to the EEZ of South Africa as providing new economic opportunities, with a focus on job creation, poverty alleviation and human safety.

He then outlined some key priorities and motivations for research in South African waters, both current and as might be prospective under an IIOE-2:

- Large Marine Ecosystems and the need to characterise social, economic and environmental characteristics;
- Ocean based hazards (storm surge, dangerous waves, floods, spills);
- African Coelacanth Ecosystem Programme (ACEP);
- Agulhas Current dynamics (mesoscale eddies, primary production, current regimes as they are changing, warming, etc);
- Bio-regions (biodiversity conservation, natural resource management, protected species);
- Climate and climate change (the South Atlantic Meridional Overturning Circulation and role of Indian Ocean connectivity);
- Ocean observing network off South Africa (Agulhas System Climate Array (ASCA), related moorings etc);
- Prince Edward Islands, Gough Islands and the Antarctic Base (SANAE) as prospective bases for ocean research under IIOE-2;
- The RV Algoa 2, as a prospective platform for IIOE-2 field work and learning; and
- The need to ensure the use of contemporary technologies in IIOE-2 (eg gliders).

Discussion. Presentation 12.

Noted with relevancy to IIOE-2.

Presentation 13. Alakendra Roychoudhury. GEOTRACES and IIOE-2.

AR described the GEOTRACES program, its organisational details as a SCOR program, its three major themes (fluxes and processes at ocean interfaces, internal cycling and development of proxies for past change). He then presented the cruise patterns under which GEOTRACES field work is pursued, highlighting the IO lines, dissolved and soluble Fe sampling sites, along with complementary process studies. GEOTRACES places emphasis on data and its management, inter-calibration, sampling protocols, methods and standards.

The potential for GEOTRACES to contribute to capacity building objectives under an IIOE-2 was outlined.

The GEOTRACES program specific to South Africa, out of Stellenbosch University (Centre for Trace and Experimental Biogeochemistry) was overviewed, noting the potential for mobilisation of GEOTRACES infrastructure and research on RVs in an IIOE-2. The talk ended with examples of the types of research and scientific results gained by the GEOTRACES program in the region.

Discussion. Presentation 13.

Noted with relevancy to IIOE-2.

It was generally agreed that a strong relationship and engagement be forged between GEOTRACES and IIOE-2.

Presentation 14. Man Wai Rabenevanana. Madagascar and IIOE-2.

MW presented on Madagascar's prospective interests in IIOE-2, mainly through the perspective of the Institut Halieutique & des Sciences Marines (IH.SM), University of Toliara, covering areas including: Marine Museums, Aquariums, Oceanography Data Centre, marine farming, environmental research, seafood intoxication observatory issues, and biotechnology.

MW also outlined recent cruises and associated measurements completed in and around Madagascar's waters, including by the RV Dr Fridtjof Nansen and RV Algoa under the ASCLME program. References were also made to programs under the names of: WIOSEA, MESO-BIO,

A number of potential Madagascar based priorities for an IIOE-2 were then presented, as follows:

- South East upwelling which generates a climate barrier that causes drought in the southern region with negative impacts on agriculture and livestock, the source of starvation threat for 2million people, but paradoxically the East Coast is the source of the installation of a permanent food chain, a source of protein for Madagascar and income for traditional fishermen of the region.
- Opportunity to update and complete data sets on marine ecosystems and fisheries resources in the context of climate change in Madagascar's EEZ.
- The environmental issues (threats, management) that accompany emerging fossil fuel exploration and extraction in the region, in the context of Madagascar's fisheries and marine ecosystems in general.

MW ended by indicating Madagascar is likely to be a supporter of IIOE-2 at the forthcoming IOC meetings.

Discussion. Presentation 14.

ND asked MW to offer his views on how Madagascar could best engage and support and IIOE-2?

In this context, MW advised that Madagascar has a limited national marine research budget, with over 80% of research derived externally, for example with reference to: Africa Development Bank funds; regional programs (eg ASCLME).

MW pointed to the merits of creating joint institutional relationships between Madagascar institutions and those of other IIOE-2 stakeholders and also engaging Madagascar's students in IIOE-2 programs.

Furthermore, ND submitted that developing countries generally have well established links with global and regional funding agencies and that this presented opportunities for developing countries to facilitate funding for science and capacity building initiatives under IIOE-2.

It was generally agreed that IIOE-2 should have an explicit 'sponsorship' theme (or sub-committee) under which countries with well-established relationships and access to key funding sources could facilitate proposals to support programs of priority for developing countries under an IIOE-2.

Presentation 15. Calvin Gerry. Seychelles Fishing Authority and IIOE-2.

CG presented an assessment of Seychelles' interests in IIOE-2, mainly through the perspective of the Seychelles Fishing Authority and the Seychelles National Oceanographic Data Centre, and with reference to Seychelles' 1.4 million km² EEZ. The critical importance of the following sectors was highlighted: pelagic and demersal fisheries; mariculture; conservation, protected areas (for conservation, diversity, and ecological importance), marine tourism, gas/oil, maritime transport.

Characterisation of the influence and impacts of climate change on the economic characteristics of Seychelles' maritime domain was also emphasised, with reference to the influence of climate related oscillations on the tuna related economics of the Seychelles.

Aspects of Seychelles' nationally supported observational network were described, including the temperature logging network, and the RV L'Amitai as an important platform for observations.

The relevance and importance of ASCLME to Seychelles was also highlighted.

The limitations imposed by the piracy issue on expanding oceanic research and observing networks in Seychelles' domain were emphasised.

CG ended by highlighting that at a national level Seychelles seeks that IIOE-2 be designed and implemented to fit and support its national priority needs.

Discussion. Presentation 15.

Noted with relevancy to IIOE-2.

Presentation 16. Fialho Nehema. Mozambique and IIOE-2.

FN emphasised the importance of characterising Mozambique's marine environment as an underpinning to sustainable usage in support of natural resource exploitation and associated management, with relevancy to ensuring food security and maximising the potential of Mozambique's natural resources for poverty alleviation. In this context, emphasis was also given to the conservation of habitats for coastal and estuarine fisheries. Both fundamental and applied research imperatives were discussed, with applied research to address current problems associated with sustainability pursuits given priority for developing country objectives.

In associated reference to IIOE-2, operational oceanography was also discussed.

An overview was then given on the marine scientific programs, operational resources utilised and initiatives underway off Mozambique in the context of providing motivation for enhancements under IIOE-2.

Discussion. Presentation 16.

Noted with relevancy to IIOE-2.

Presentation 17. Johnson Kazungu. Kenya and IIOE-2.

JK presented through the perspective of the Kenya Marine and Fisheries Research Institute (KMFRI), describing its institutional context, mandate and key programs and capacities across:

- Marine and Freshwater Fisheries;
- Aquaculture;
- Limnology & Aquatic Biology;
- Environmental Chemistry;
- Physical and Geological Oceanography.

KMFRI has poverty alleviation and related food security as two key guiding drivers. It links programmatically with aligned national universities, research institutions and government agencies and entities, facilitating its activities under a multi-disciplinary approach. KMFRI carries out many of its programs in partnership with international collaborators (eg from Belgium, Netherlands, EU, GEF, UNDP). In the marine sphere it focuses heavily on climate change, pollution, shoreline stability/change, habitats, fisheries (wild and aquaculture).

Specifically relating to IIOE-2, emphases were suggested including:

- W IO upwelling;
- Biogeochemistry;
- Coupled ocean-climate phenomena (eg IOD).

Some major past offshore observational programs (since 1975) were overviewed (relating to RV Dr Fridtjof Nansen (Norway); Tyro Expedition (Netherlands), SWIOFP and ASCLME cruises; and general seismic survey work.

In ending, JK pointed to the recent acquisition by Kenya, from Belgium, of the RV Mtafiti, available for regional collaboration, including under the auspices of an IIOE-2.

Discussion. Presentation 17.

Noted with relevancy to IIOE-2.

Presentation 18. Desiderius Masalu. Tanzania and IIOE-2.

DM presented through the perspective of the University of Dar es Salam, Institute of Marine Sciences (IMS)

He outlined the history of establishment of IMS and its key disciplines of teaching and research, and personnel complement. Its stated mission is:

- To engage in the creation, transmission and application of knowledge in marine sciences and technology through research, training and provision of advisory and public services for the exploration and sustainable exploitation of marine living and non-living resources.
- To build capacity of sector organisations, knowledge centres and other institutions active in various fields.

Its foci include:

- Marine biology and resources management;
- Physical and environmental marine sciences; and
- Information and communication technology.

Its recent marine related work has involved:

- Marine research;
- Post-graduate courses;
- Decision making advice on natural resource management; pollution control, coastal processes; marine protected areas; marine policy support; coral reef research; international collaborations in research.

There are plans for growth and expansion, with the following challenges identified:

Need for extra space and facilities for teaching and research;

- A research vessel is needed;
- Enhanced expertise is needed in the areas of: coastal and marine engineering; aquaculture.

In ending and in respect to an IIOE-2, the following points of emphases were made by DM:

- Tanzania (through IMS) is highly supportive and optimistic in respect to IIOE-2, with a focus on:
 - Capacity Building; and
 - Building of institutional/scientific collaborations in research and teaching.
- Countries such as Tanzania and their national scientists should be actively involved in the planning and implementation of IIOE-2 activities. Measures could/should include:
 - IIOE-2 stakeholders to provide spaces and/or provide ship-time for local regional scientists on IIOE-2 cruises in the IO;
 - Partners to provide a pool of ship-time for IO countries.

Discussion. Presentation 18.

There was general discussion on how best a country such as Tanzania could broker regional support for the IIOE-2. It was agreed that IOC Member State support at the Executive Council meeting in July 2014 provided the optimal forum for MSs to express support through interventions in response to the IIOE-2 Draft Resolution. Furthermore, stakeholders should actively raise awareness on IIOE-2 within their own countries. There was even a suggestion that some countries could consider levies on marine industry as a means to garner resources in support of IIOE-2. Finally, it was re-emphasised that countries with capacity for in-field operations (in marine science under an IIOE-2) should do their best to engage less resourced countries in the own early planning stages for IIOE-2 activities (be these related to observations, process studies, data/information management or capacity building).

JF suggested two generic levels at which regional stakeholders could engage and support IIOE-2: first, through advocacy to their IOC delegations in relation to IOC formal meetings (eg for the IIOE-2 agenda item(s) at forthcoming Executive Council and Assembly meetings); and second, through establishment of partnerships for IIOE-2 at the respective intra-country and inter-country institution/scientist level).

It was generally agreed that participants would (i) brief their own IOC delegations to garner support for IIOE-2 at the IOC Executive Council / Assembly levels and (ii) actively mobilise local national interest in IIOE-2 through their own national institutional/scientific contacts.

Presentation 19. Nick D'Adamo. Australian update for IIOE-2.

ND presented an overview of the many IOC related alliances in the region that have and continue to provide vehicles for the IOC Perth Programme Office to raise awareness in the region and beyond on IIOE-2, such as IOGOOS; IOCINDIO; IOC Africa; WAGOOS; SEAGOOS, IOC WESTPAC).

The important role of IOGOOS programs was highlighted, with reference to the efforts of SIBER, IOP and IRF in facilitating and contributing to IIOE-2 planning over the past 3 years, across the physical and biogeochemical ocean science and coupled weather/climate spheres, and related capacity building programs.

ND then listed some of the key actions undertaken in Australia per se in support of IIOE-2 planning, covering:

- Direct advocacy to Australian marine science and climate stakeholders, at agency, institutional and political levels (presentations, meetings, seminars, briefing notes etc);
- Sponsoring a special IIOE-2 symposium as part of the forthcoming annual Australian Marine Sciences Association (July 2014) conference, Canberra, Australia.
- Linking Australia to IOGOOS programmes (as above); eg through links with the Integrated Marine Observing System, Australia; Oceans Policy Science Advisory Group, Australia.

Discussion. Presentation 19.

Noted with relevancy to IIOE-2.

Presentation 20. Nick D'Adamo on behalf of Jim Costopolous. Global Oceans and IIOE-2.

ND presented on behalf of Jim Costopolous (CEO, Global Oceans), who had provided a PPT for the presentation.

ND recommended that participants consult www.global-oceans.org as an effective means of gaining a thorough understanding of GO's potential and relevancy for IIOE-2.

The presentation was essentially a summary of that presented on Global Oceans by JC at IIOE-2 RG2, Qingdao, November 2013. Participants were referred to the IIOE-2 RG2 report for further detail. Furthermore, since the time of the RG2 meeting, JC prepared a detailed briefing paper on how GO

could assist IIOE-2, and that paper has been included in the archived presentation materials for this Mauritius meeting.

In respect to summarising how GO could engage and assist IIOE-2, JC's paper describes Global Oceans as a US-based, internationally focused non-profit organization with an operational model for dynamically extending oceanographic research capacity globally, including in remote and understudied regions, that can help address the cruise and research infrastructure operational and resourcing limitations that IIOE-2 will experience. GO is also developing a new collaborative expedition planning tool (GO-CEPT: Global Oceans - Collaborative Expedition Planning Tool) that would enable cooperative, collaborative and operationally integrated planning among scientists internationally, across multiple discrete expeditions, which could contribute to the project integration challenges that a program of the logistical complexity and magnitude of IIOE-2. GO-CEPT would be tailored by Global Oceans to support the organizational and expedition needs of IIOE-2. As a central planning tool, GO-CEPT could facilitate in the areas of:

- Operational support requirements;
- Scheduling technical crews & shared resources;
- Collaborative/optimized cruise track planning;
- Documenting/submitted individual research plans;
- Posting ship specifications & operating capacities; and
- Providing and facilitating collaborative access to all IIOE-2 expeditions (in planning, both complete & underway)

Discussion. Presentation 20.

PB queried the not-for-profit reference to GO and sought clarification.

ND clarified that GO was a philanthropically supported organisation (ref: GO website for details www.global-oceans.org) that harnessed resources for in-field research programs, but did not derive any profits above the basal costs of harnessing those resources.

Presentation 21. Jun Sun. Indian Ocean investigations by China and IIOE-2.

JS presented an overview of recent field based activities in the IO undertaken by China, both solely and in collaboration with other programs. In summary:

- Characterising primary productivity has been a key driving objective, with remote sensing being one of the key observational tools used in conjunction with cruise-based field surveys;
- China has strong links and active engagement with SIBER's programs;
- China plays an important role in the IndOOS RAMA array, also with reference to implementing BGC sensors on RAMA moorings;
- China has mounted some major NE IO cruises (bio-physical / climate) during the past 2-3 years, with future work planned.

Discussion. Presentation 21.

Noted with relevancy to IIOE-2.

Presentation 22. Lynnath Beckley. SW Indian Ocean Fisheries Project (SWIOFP) and IIOE-2.

LB overviewed the SWIOFP in the context of it providing a theme of societal relevance for an IIOE-2.

Fish and fisheries were critical to the economies and well-being of WIO countries. The WIO supports 15% of global fish diversity.

Food security, in the context of fisheries sustainability, is a key issue. Over 60 million people live near the coast of the WIO, with some countries deriving over 50% of its protein needs from WIO fisheries,

from both artisanal and commercial fisheries takes. FAO and other data show stock status to be under pressure: many reef species are overfished with low spawning biomass.

The SWIOFP is funded by World Bank, and is aligned with the IO Tuna Commission, Nairobi Convention and NEPAD, SADC and the Indian Ocean Commission. SWIOFP provides a framework for evaluating and scoring artisanal fisheries in the WIO, addressing:

- Availability of information and data;
- Conservation status;
- Management systems;
- Level of research
- Monitoring; and
- User conflicts.

The results to date show that >50% of the 168 fisheries in the region lack basic information needed to underpin sustainable fishing. In conclusion, LB emphasised:

- Coastal and island States face enormous socio-economic and development challenges;
- Availability of fish is vital as it provides essential protein for millions of people;
- Population growth and low employment rates place even greater pressure on dwindling fish resources;
- Collection of data & statistics on WIO fisheries is inadequate;
- There is under-reporting of artisanal fisheries; and
- The 168 fisheries of the region provide the socio-economic fabric of life in coastal areas of the WIO.

In light of the facts that every country in the IO rim (and distant countries) harvests tuna and that tuna are essential for food security and national economies, LB suggested that 'Environment for Tuna' be considered as one potential unifying theme for IIOE-2.

Discussion. Presentation 22.

Noted with relevancy to IIOE-2.

Presentation 23. Mika Odido on behalf of P Pissierssens. Data and information management (IODE) and IIOE-2.

MO outlined IOC's MT Strategy and major programmes, including IODE.

MO then presented what was essentially the presentation of PP from IIOE-2 RG2. Qingdao, November 2013.

There is a comprehensive and detailed summary of PP's RG2 presentation in the relevant IIOE-2 RG2 report, which is accessible via the IIOE-2 portal of www.iocperth.org.

As such, this talk will not be further overviewed herewith.

Discussion. Presentation 23.

A general discussion ensued on data and information management, leading to the following generally agreed priority for IIOE-2.

It was re-affirmed that data and information management be a high priority component of the IIOE-2.

Presentations 24 and 25. Nick D'Adamo and Peter Burkill, respectively. Summaries of presentations 1-23 and related discussions.

ND and PB provided their respective overviews of the key points stemming from the preceding presentations and discussions.

ND's overview essentially listed the highlights shown in bold italics throughout the preceding sections of this report, as follows:

There was a general agreed need to ensure that the specific objectives relevant to W IO stakeholders formed an integral part of an IIOE-2, especially in terms of integrated bio-physical understanding, supported by required enhancement in the Indian Ocean Observing System and related process, modelling and capacity building research and applications.

It was generally agreed that upwelling in the W IO should form a major plank of the IIOE-2, complementary and in collaboration with the EIOURI and that W IO stakeholders should actively contribute this and other objectives of relevance to the SW IO region as part of (i) future detailed planning for the IIOE-2 and (ii) related specification of the science and implementation priorities for the IIOE-2.

It was generally agreed that IIOE-2 cruise planning and associated ocean observation frameworks should include mechanisms to promote integration, in both planning and implementation, between advanced and less advanced countries, in respect to on-water and ocean observational capacities. A key pro-active mechanism raised to address this aspiration was the incorporation of representatives from less operationally advanced countries within the planning phases of more advanced countries to facilitate integrated and collaborative in-situ IIOE-2 activities.

There was general agreement that IIOE-2 should include the marginal seas of the IO.

It was generally agreed that a strong relationship and engagement be forged between WIOMSA and IIOE-2.

It was generally agreed that a strong relationship and engagement be forged between GEOTRACES and IIOE-2.

It was generally agreed that IIOE-2 should have an explicit 'sponsorship' theme (or sub-committee) under which countries with well-established relationships and access to key funding sources could facilitate proposals to support programs of priority for developing countries under an IIOE-2.

It was generally agreed that participants would (i) brief their own IOC delegations to garner support for IIOE-2 at the IOC Executive Council / Assembly levels and (ii) actively mobilise local national interest in IIOE-2 through their own national institutional/scientific contacts.

It was re-affirmed that data and information management be a high priority component of the IIOE-2.

PB emphasised some further highlights to have come from the meeting to this point:

The need for IIOE-2 to focus on societal relevance, with drivers including: food security; resource management.

Furthermore, PB pointed out that the science community would be looking for 'exciting science' to help motivate their engagement in the IIOE-2, including science drivers such as: monsoons, fisheries (eg, referring back to 'Environment for Tuna, as suggested by LB), sea level rise, climate change etc.

PB then suggested the group try to develop a 'one liner' to headline the IIOE-2.

Discussion. Presentations 24 and 25.

In response to PB's suggestion for the group to consider developing possible headlines for the IIOE-2, the related plenary discussion converged on some common themes and related ideas for headline statements, as follows.

Theme – climate change: *Climate change and its impact on the Indian Ocean and its people.*

Theme – change in general: *Life in a changing Indian ocean.*

Theme – exploration: *Exploring change and opportunity in the Indian Ocean.*

3 Ongoing and planned activities relevant to an IIOE-2

A preliminary listing was made of the vessels and laboratories from the W IO that participants felt could engage in an IIOE-2, (noting that this was not regarded as exhaustive, with participants willing to provide further input when required under the IIOE-2 planning phase):

Vessels from:

- RSA
- Kenya
- Seychelles
- Mauritius
- Iran
- Mozambique
- Iraq

Laboratories from:

- Mauritius
- Seychelles
- Zanzibar
- RSA
- Mozambique
- Madagascar
- Kenya
- Maldives

A number of conferences due to occur in 2014/15 and potentially relevant to IIOE-2 were then listed (again, with the list not regarded as exhaustive):

2014: Oceanographic Society, Japan; IMBER Open Science Conference, Norway; 15th South African Marine Science Symposium, Stellenbosch, RSA; Australian Marine Sciences Association annual conference, Canberra, Australia

For 2015, references were made to events in Muscat (Oman) and Goa (India) and to the annual WIOMSA meeting.

It was agreed that closer engagement in the IIOE-2 planning phase was needed with the International Ocean Drilling Program (IODP).

Various participants agreed to directly advocate for IODP in this context (eg JS and RB).

It was generally agreed that IODP should be made aware of the IIOE-2 through dissemination of IIOE-2 RG meeting outputs, including through the agency of IOC PPO.

4 Identification of missing stakeholders

Notwithstanding that some of the following suggested countries had either directly or implicitly been engaged or have already been introduced to IIOE-2, the following suggestions were offered in respect to W IO stakeholders that should receive additional encouragement and invitation to engage in IIOE-2:

- Pakistan
- Oman
- Somalia
- Comoros
- Maldives.

It was generally agreed that WIOMSA and AMESD are effective and appropriate vehicles for wider advocacy to W IO countries yet to be directly engaged in IIOE-2.

5 Closing discussions, follow-up and next steps

Closing discussions

Participants re-affirmed their acceptance and agreement to the elements contained in (i) the science and societal drivers, and (ii) the governance/program management framework that have emerged from the RG1 and RG2 processes, as summarised in ND's opening presentation, above.

In addition, the following new or re-emphasised priorities resulted from the Mauritius meeting, with participants wishing to see them added to the eventual underpinning information accompanying IIOE-2 agenda items at forthcoming IOC meetings and considerations.

For the IIOE-2 framework of science and related societal drivers, participants agreed that the following aspects should be included or represented within existing priorities:

Characterisation of the seabed and sub-seabed through links with the IODP.

Characterisation of the physical oceanography, biogeochemistry and related climate of the Indian Ocean's marginal seas.

Characterisation of upwelling in the W IO, with alignment and association to the East Indian Ocean Upwelling Research Initiative of IOP/SIBER.

Enhancement of IndOOS and related research, applications and capacity building in the W IO.

In terms of ensuring the effective implementation and relevancy of an IIOE-2 to their own constituents, participants agreed on the following recommendations.

The governance/administrative structure so far suggested by RG1 and RG2, be supported, but with the addition of a 'sponsorship' sub-committee. This is in light of the recommendation that:

- *IIOE-2 should have an explicit 'sponsorship' theme (or sub-committee) under which countries with well-established relationships and access to key funding sources could facilitate proposals to support programs of priority for developing countries under an IIOE-2.*

The governance/administrative structure so far suggested by RG1 and RG2, should take heed of the following recommendation:

- *IIOE-2 cruise planning and associated ocean observation frameworks should include mechanisms to promote integration, in both planning and implementation, between advanced and less advanced countries, in respect to on-water and ocean observational capacities. A key pro-active mechanism raised to address this aspiration was the incorporation of representatives from less operationally advanced countries within the planning phases of more advanced countries to facilitate integrated and collaborative in-situ IIOE-2 activities.*

A strong relationship and engagement should be ensured between WIOMSA and IIOE-2.

A strong relationship and engagement should be ensured between GEOTRACES and IIOE-2.

A strong relationship and engagement should be ensured between IODP and IIOE-2.

Data and information management should clearly be a high priority component of the IIOE-2.

Participants are to (i) brief their own IOC delegations to garner support for IIOE-2 at the IOC Executive Council / Assembly levels and (ii) actively mobilise local national interest in IIOE-2 through their own national institutional/scientific contacts. To that end, a Participants Statement was drafted at the Mauritius Meeting and finalised out of session. It was agreed that the finalised Participants Statement should form the basis of participants' advocacy to stakeholders' governments, institutions and related communities.

The finalised Participants Statement (25 March 2014) is presented in Appendix4.

Follow-up and next steps

The following key items were agreed to in terms of follow-up and next steps:

- ND agreed to draft the meeting report and distribute to participants for review and finalisation, in time for consideration as underpinning material for the 47th IOC Executive Council meeting and associated deliberations on IIOE-2, 1-4 July 2014.
- The draft Participant Statement is to be finalised out of session, through ND's coordination, in time for IIOE-2 advocacy by participants and consideration as underpinning material for the 47th IOC Executive Council meeting and associated deliberations on IIOE-2, 1-4 July 2014.
- Participants to actively promote and advocate for IIOE-2 in their own countries, and through representation to their own national IOC focal points / delegations, with a view to garnering national support of the IIOE-2 Draft Resolution to be discussed at the forthcoming 47th IOC Executive Council meeting, 1-4 July 2014.
- PPTs from the meeting to be collated and made available via the IIOE-2 portal of the IOC PPO website (www.iocperth.org)

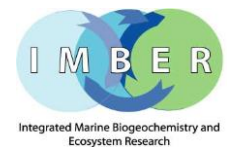
The meeting was then closed.

Appendix 1 Copy of Information Document including final adopted Agenda

English only



Intergovernmental
Oceanographic
Commission



International Indian Ocean Expedition 50th Anniversary (IIOE-2)

Western Indian Ocean Regional Focus Group Meeting to help plan the International Indian Ocean Expedition 50th Anniversary Initiative

(IIOE-2), Quatre Bornes, Mauritius, 6 and 7 March 2014

INFORMATION DOCUMENT

Version dated 1700hrs 7 March 2014, finally updated by Nick D'Adamo based on adopted agenda.

Background to the proposed meeting

IOC, SCOR and IOGOOS

The IOC Assembly at its twenty-seventh Session adopted Decision IOC-XXVII/Dec.5.1.2 in support of further planning for an International Indian Ocean Expedition 50th Anniversary Initiative (IIOE-2).

SCOR strongly supported the IOC Decision and subsequently re-affirmed that support through its recent 15th SCOR Executive Committee meeting, Wellington, New Zealand, November 2013.

Similarly, Indian Ocean GOOS (IOGOOS) and its scientific project alliances in IOP, SIBER and IRF (see www.iocperth.org) have strongly supported the IIOE-2 concept through their annual meetings of 2012 and 2013.

IOP = Indian Ocean Panel of GOOS/CLIVAR

SIBER – Scientific Steering Committee of Sustained Indian Ocean Biogeochemistry and Ecosystem Research of IOGOOS/IMBER

IRF = Indian Ocean Observing System Resources Forum of IOGOOS

An IIOE-2 Reference Group has been formed, under the initial auspices of SCOR, IOGOOS and the IOC (including through its supporting Perth Programme Office) to explore and plan for the possibility of a second such international expedition (IIOE-2) to coincide with the 50th anniversary of the original IIOE of the 1960s, and especially to further significantly advance the understanding of the Indian Ocean and in its role in the oceanic and climatic systems of the global ocean and atmosphere. The IIOE-2 is being considered and planned as a much broader initiative than the original of the 1960s, with this time a greater degree of complementary capacity building, education, training, outreach and related knowledge transfer for societal benefit also being incorporated.

IIOE-2 Reference Group meetings to date (India May 2013 and China November 2013)

The IIOE-2 planning effort started with the first meeting of the IIOE-2 Reference Group in Hyderabad, India, 14-15 May 2013, under the auspices of IOC (through the Secretariat of the IOC in conjunction with the IOC/UNESCO Perth Program Office), Indian Ocean Global Ocean Observing System Regional Alliance (IOGOOS) and Scientific Committee on Ocean Research (SCOR), with support from the Integrated Marine Biogeochemistry and Ecosystem Research programme (IMBER) and the Indian National Centre for Ocean Information Services (INCOIS) (Ministry of Earth Sciences, India).

The second meeting of the IIOE-2 Reference Group was held in Qingdao, China during 20-21 November 2013, under the same supporting framework as the first meeting, and hosted locally by the First Institute of Oceanography, State Oceanic Administration, China. Reports from this meeting are currently under preparation.

Reports of the meetings are made available through an IIOE-2 portal on the front page of the www.iocperth.org website.

IOC Decision IOC-XXVII/Dec.5.1.2 on IIOE-2

The IOC Assembly decided (through Decision IOC-XXVII/Dec.5.1.2) that it is appropriate for the IOC in collaboration with SCOR and IOGOOS, to further develop a proposal for the second International Indian Ocean Expedition in commemoration of the 50th anniversary of the original IIOE of the 1960s. Accordingly, it further decided to add the IIOE-2 to the agenda of the IOC Executive Council at its 47th Session in 2014 in order to formalize, through a Draft Resolution, IOC's involvement in an IIOE-2, implemented for the period 2015–2020. In conjunction with this, the Assembly called on Member States to support the planning effort to the best of their capacities, in order to facilitate the work of the IIOE-2 Reference Group and IOC Executive Secretary in preparing relevant documentation, timeline, organizational and financial implications for the IOC of a prospective IIOE-2.

For further reference, a copy of the IOC Decision can also be found at www.iocperth.org, along with other IIOE-2 related documents as they have and will continue to evolve.

Further and specific engagement of Western Indian Ocean constituents in planning for IIOE-2

At the Qingdao meeting of the IIOE-2 Reference Group, it was noted that while all IOC Member States bordering the Indian Ocean had been invited to participate in the meetings of the Reference Group, few countries from the Western Indian Ocean had so far responded to the invitations. It was therefore recommended to organize a meeting with sub-regional focus to promote the IIOE-2 initiative and to mobilize WIO countries.

Mauritius is providing local hosting support for the IIOE-2 Western Indian Ocean Regional Focus Group Meeting, to be held 6-7 March 2014.

Invitation for the IIOE-2 Western Indian Ocean Regional Focus Group Meeting

IOC through its Perth Programme Office and the IOC AFRICA Secretariat cordially invites participation in the IIOE-2 Western Indian Ocean Regional Focus Group Meeting, to be held in Quatre Bornes, Mauritius (Gold Crest Hotel), during 6 and 7 March 2014, under local hosting and kindly supported through the Prime Minister's *Office for Ocean Affairs and Development*. The selection of these specific dates resulted from the constraints associated with logistical issues, hosting offers, required lead times for announcements and planning of the meeting, as well as then allowing sufficient time to prepare resulting IIOE-2 item documents and inputs to the processes leading up to the IOC's 47th Executive Council meeting (including preliminary IIOE-2 agenda paper designation and supporting documentation)

Facilitation and support will be through the IOC Perth Programme Office, IOC Secretariat HQ Paris, SCOR, the Secretariat of the IOC Sub-Commission for Africa and the Adjacent Island States, Mauritius Prime Minister's Office, IOGOOS, Sustained Indian Ocean Biogeochemistry and Ecosystem Research of IOGOOS/IMBER (SIBER), IMBER, and WIO SAPPHIRE (Western Indian Ocean Strategic Action Programme Policy Harmonisation and Institutional Reform).

Overall objective of the IIOE-2 Western Indian Ocean Regional Focus Group Meeting

The IIOE-2 Western Indian Ocean Regional Focus Group Meeting will aim specifically to identify and promote the objectives of IOC Member States of the Western Indian Ocean sub-region in the IIOE-2 initiative and facilitate their active participation in IIOE-2. Participation could include firstly defining a focused set of overarching science and societal drivers with specific reference to the Western Indian Ocean for the IIOE-2 and secondly making available research vessels for scientific research cruises and complementary capacities for the other aspects of the IIOE-2 (eg capacity building, outreach etc). It would also make available local researchers for cruises organized by other Member States, participating in pre-cruise and post-cruise activities, etc. It will also provide opportunity for Western Indian Ocean constituents to identify benefits that the IIOE-2 initiative could offer them.

Practical Information

General

- The IOC has established a dedicated website for the meeting at: http://ioc-unesco.org/index.php?option=com_oe&task=viewEventRecord&eventID=1455
- As for the IIOE-2 Reference Group meetings 1 and 2, the meeting will be chaired by Dr Nick D'Adamo (Head, IOC/UNESCO PPO). A co-chair may be appointed.
- SCOR will provide support and facilitation at the meeting.
- IOGOOS will provide support and facilitation at the meeting.
- IOC facilitation and regional stakeholder liaison is being further provided through the Secretariat of the IOC Sub-Commission for Africa and the Adjacent Island States (Ref: Mr Mika Odido, Head of Secretariat, Nairobi).
- IOC is also providing coordination on the issue of data management for IIOE-2 through the auspices of its Oostende Office (Ref: Head of the IOC Project Office for IODE, Mr Peter Pissierssens).
- The www.iocperth.org website provides a link to materials leading up to and resulting from IIOE-2 RG1 and RG2, for background and reference, including details of the discussions and considerations from the meetings.
- The local host and coordinator of the meeting, on behalf of the Mauritius Prime Minister's Office, is Dr Rezah Badal (Head – Office for Ocean Affairs and Development).

The websites provide further background to the IIOE-2, including logistical information for the Mauritius meeting. However, please note the following:

Extent of support provided for the meeting

- Participation will be on a self-funded basis. There has been no substantive budget for the IIOE-2 planning meetings, and again in this instance no financial support will be available for participants for travel or accommodation.
- However, there will be no registration fee.
- Morning teas, lunches and afternoon teas will be supplied by the local host.
- Two-way airport/hotel transport will be provided by the local host.
- A reception dinner will be hosted by the Office for Ocean Affairs and Development, Government of Mauritius, on the evening of 6 March 2014.

Actions required by participants and related information

For registration, invitation letter, airport-hotel transport

- **ASAP.**
 - Please email local host focal point, Dr Rezah Badal, Head, Office for Ocean Affairs and Development, Mauritius, at rezahmb@moi.intnet.mu with the following information, in order for an invitation letter to be sent to you for visa purposes if required and also in order for transport pick-up and drop-off (airport – hotel) to be arranged.
 1. Full name as in passport and full contact details
 2. Scanned copy of passport ID page.
 3. Air travel details
 - 3.1 Flight number, arrival time, date
 - 3.2 Flight number, departure time, date

For hotel room booking

- **ASAP. Rooms cannot be guaranteed for late bookings.**
 - Participants will be required to make their own bookings for accommodation directly with the hotel, by emailing:

resa@goldgroup.mu

Attn: Ms Saradah or Dorinne Lam

Quoting: **“IIOE meeting by Prime Minister’s Office”**

Gold Crest Hotel
St. Jean Road
Quatre Bornes
MAURITIUS

Tel : +230 454 5945
Fax : +230 454 9599

www.goldgroups.com

- Room rates for the conference are (Note: Rs 30 ~ \$US 1):
 - Single room (bed & breakfast) Rs1715
 - Single room (bed & breakfast & dinner) Rs2115
- Note:
 - Rates are quoted per night per room and inclusive of all taxes
 - The hotel is ISO Certified 9001:2008 since 2009
 - Check-in time 1200hrs
 - Check-out time 1100hrs
- Cancellation Policy / Annulation:
 - From 7 days to 3 days – 25% cancellation / de 7 a 3 jours – 25% d’annulation
 - From 3 days to no-show – 50% cancellation for the whole stay / De 3 a no-show – 50% d’annulation du sejour
 - Cancellation after arrival – 50% cancellation on remaining nights / Annulation après arrive – 50% sur le nombre de nuit restant

For participants wishing to make a presentation at the workshop

- **ASAP**

- If you wish to make a presentation at the workshop on your country’s or institution’s interests in the IIOE-2, then please request a slot in the agenda by emailing both Mika Odido (IOC AFRICA Secretariat) and Nick D’Adamo (IOC Perth Programme Office) at m.odido@unesco.org and nick.dadamo@bom.gov.au.
- Please provide the title of your presentation, the names of the person presenting and any co-authors to the presentation. It would also be appreciated if you were able to provide, in advance, a short abstract of your presentation.
 - Please note that presentations will be strictly limited to 10 minutes, in order to allow for all participants to be equally heard.
 - PPT projector facilities will be provided.

AGENDA

Western Indian Ocean Regional Focus Group Meeting to help plan the International Indian Ocean Expedition 50th Anniversary Initiative (IIOE-2), Quatre Bornes, Mauritius, 6 and 7 March 2014.

Finalized as the adopted agenda: 1700 7 March 2014

Chair: Nick D'Adamo (UNESCO/IOC Perth Programme Office)

IOC Representative: Mika Odido (Head of Secretariat, IOC Sub-Commission for Africa and the Adjacent Island States)

IOC Sub-Commission for Africa and the Adjacent Island States: Monde Mayekiso (Chair) or delegate

SCOR Representative: Peter Burkill (President)

IOGOOS Representative: Rezah Badal (IOC Officer)

SIBER Representatives: Mike Roberts (Co-Chair); Lynnath Beckley (Scientific Steering Committee Member)

IOP of IOGOOS/CLIVAR Representative: Yukio Masumoto (Member)

Local Host: Office for Ocean Affairs and Development, Prime Minister's Office, Mauritius (Focal point: Head - Rezah Badal)

Sponsors: Office for Ocean Affairs and Development, Prime Minister's Office (Mauritius); SCOR; SAPPHIRE; IOC Perth Programme Office; Secretariat IOC Sub-Commission for Africa and the Adjacent Island States).

Participants: see the IOC calendar meeting site established for this meeting and which includes the latest participants list, at :

http://ioc-unesco.org/index.php?option=com_oe&task=viewEventRecord&eventID=1455

Day 1 (08:30 – 17:00)

08:30 Registration

09:00 – 10:30

Welcome and opening comments (30 mins)

- Rezah Badal – opening address (as IOGOOS representative and representing the local host – Prime Minister's Office, Mauritius)
- Peter Burkill, SCOR – opening comments
- Adote Blivi, IOC Officer – opening comments
- Mika Odido, Secretariat - IOC Sub-Commission for Africa and the Adjacent Island States – opening comments
- Delivered by Ashley Johnson, South Africa for Monde Mayekiso (IOC Sub-Commission for Africa and the Adjacent Island States) – opening address
- Mike Roberts (SAPPHIRE) – opening comments

Introductory presentation (Nick D'Adamo) (45 mins)

- Part 1: Background, context

- Part 2: From IIOE to “IIOE-2” - update
- Part 3: Governance, secretariat support

Plenary discussion (15 mins)

10:30 – 11:00 Morning Tea

11:00 – 12:00

Western Indian Ocean physical oceanography update in the context of the Indian Ocean Observing System and related research under the Indian Ocean Panel of IOGOOS/CLIVAR (Yukio Masumoto) (15 mins)

Update on the Eastern Indian Ocean Upwelling Research Initiative (EIOURI) planning efforts & consideration of potential for a similar concept for the West Indian Ocean (Yukio Masumoto) (15 mins)

Plenary discussion (30 mins)

12:00 – 13:30 Lunch

13:30 – 15:00 Country / stakeholder presentations (10 mins maximum each).

Presentations focussing on on:

- Summaries of ongoing and planned national or collaborative multi-national research activities in the WIO as relevant to IIOE-2 for the 2015 to 2020 time frame; and/or
- Summarising concisely what the country or stakeholder believes could be achieved through the IIOE-2 as a regionally coordinated initiative, in the specific context of either pure scientific pursuit of generic importance or highest order societal needs specifically for the communities represented by the participant.

Peter Burkill (presenter) and Ed Urban (representing SCOR). *SCOR and IIOE.*

Peter Burkill (representing UK, Plymouth Uni). *The UK and IIOE-2.*

Lynnath Beckley (Murdoch University, Australia; SIBER Scientific Steering Committee member). *Repeating the International Indian Ocean Expedition 110°E line with a process orientated ecosystem approach.*

Vahid Chegini (INIOAS, I.R.Iran). *INIOAS's Regional Experience to collaborate on the IIOE world plan.*

Question and answer session on session presentations.

15:00 – 15:30 Afternoon Tea

15:30 – 17:00 Country / stakeholder presentations (10 mins maximum each) (continued)

Rezah Badal (IOGOOS, Mauritius).

Mika Odido (Secretariat, IOC Africa and the Adjacent Island States, Nairobi).

Mike Roberts (Department of Water and Environmental Affairs, South Africa) (SAPPHIRE, Grahamstown).

Julius Francis (WIOMSA, Tanzania).

Question and answer session on session presentations (10 mins)

Ashley Johnson (Department of Water and Environmental Affairs, South Africa).

Alakendra Roychoudry (Stellenbosch University, South Africa).

Question and answer session on session presentations (10 mins)

17:00 Adjourn

Evening Reception dinner. Host : Office for Ocean Affairs and Development, Prime Minister's Office, Mauritius. Further details to be advised.

Day 2 (09:00 – 17:00)

09:00 – 10:30 Country / stakeholder presentations (10 mins maximum each) (continued)

Manwai Rabenevanana (Fisheries and Marine Sciences Institute, Madagascar).

Calvin Gerry (Seychelles Fishing Authority, Seychelles)

Fialho Nehema (Eduardo Mondlane University, Mozambique).

Question and answer session on session presentations (10 mins)

Johnson Kazungu (Kenya Marine and Fisheries Research Institute, Kenya)

Desiderius Masalu (University of Dar es Salam, Tanzania)

Question and answer session on session presentations (10 mins)

10:30 – 11:00 Morning Tea

11:00 – 12:00 Country / stakeholder presentations (10 mins maximum each) (continued)

Nick D'Adamo (Australia / IOC PPO)

Nick D'Adamo on behalf of Jim Costopolous of Global Oceans (Global Oceans)

Jun Sun (Tianjin Uni Sci & Tech, China)

Lynnath Beckley on behalf of Rudi van der Elst of Oceanographic Research Institute, South Africa (SWIOFP and IIOE-2)

Provision for other 10 min presentations

Question and answer session on session presentations (10 mins)

12:00 – 13:30 Lunch

13:30- 15:00

Data issues : Where are the data? Making oceanographic data from the IIOE-2 (and the Indian Ocean in general) accessible both to discovery and re-use with a spotlight on the availability of IIOE data. (Mika Odido, on behalf of Peter Pissierssons, IOC IODE, Oostende) (15 mins)

Plenary discussion on data issues. (15 mins)

Plenary discussion: Assessment of ongoing and planned research activities as relevant to IIOE-2 in the Western Indian Ocean in the 2015 to 2020 time frame, with the goal of embracing and organizing these activities as part of a larger coordinated 50th Anniversary research initiative. (led by Nick D'Adamo) (30 mins)

Identification of known and prospective IIOE-2 'activities' (planned cruises, new cruises, events, advocacy etc) (led by Nick D'Adamo) (30 mins)

15:00 – 15:30 Afternoon Tea

15:30 – 17:00

Identification of missing stakeholders and countries and how to engage them including strategies to motivate the formation of IIOE-2 national planning committees (led by Nick D'Adamo) (30 mins)

Wrap-up summary presentation (Peter Burkill)

Wrap-up summary presentation (Nick D'Adamo)

Plenary development of draft Participants' Statement (led by Nick D'Adamo)

Discussion of next steps, including meeting report development. (led by Nick D'Adamo) (15 mins)

Summation and final reflections – including discussion in plenary (led by Mika Odido) (30 mins)

Closing remarks by Nick D'Adamo (15 mins)

17:00 Adjourn and close of meeting

Appendix 2 Opening address delivered by Ashley Johnson on behalf of Monde Mayekiso (Chair, IOC Sub-Commission for Africa and the Adjacent Island States)

Opening address delivered by Ashley Johnson on behalf of Monde Mayekiso (Chair, IOC Sub-Commission for Africa and the Adjacent Island States)

Western Indian Ocean Regional Focus Group Meeting to help plan the International Indian Ocean Expedition 50th Anniversary Initiative (IIOE-2), Quatre Bornes, Mauritius, 6 and 7 March 2014

Good morning

The IOCAFRICA Sub-Commission welcomes you to the Western Indian Ocean region for the Regional Focus Group Meeting intended to enhance efforts and capture the needs of East Africa and its adjacent Island States within the planning for the Second International Indian Ocean Expedition.

In order to mark the 50th anniversary of the Indian Ocean Expedition, the Intergovernmental Oceanographic Commission of UNESCO expressed its full support for further planning and development of a proposal for this initiative as it will significantly advance our understanding of the Indian Ocean.

The Second International Indian Ocean Expedition comes at a time when ocean sciences have advanced tremendously and the use of new technologies will support many new discoveries. However, it also comes at a time when the world and the Western Indian Ocean region face a reality that looks to the ocean for conservation and protection of our ecosystems as well as potential economic opportunities in support of growing socio-economic pressures. Our oceans are mostly unexplored and such opportunities should guide our scientific planning. The science we do should have a direct link and respond to societal needs.

IOCAFRICA has also identified capacity development as a priority for this region and would hope that our participation within the second International Indian Ocean Expedition will result in growing a new cadre of marine scientists for Africa and her Adjacent Island States.

In conclusion, the IOCAFRICA Sub-Commission wants to thank the Mauritius Office for Ocean Affairs and Development for hosting us and showing its commitment to the region and recognising the importance of enhancing our understanding of the oceans and its role in economic development of our countries.

Appendix 3 Opening address delivered by M Rezah Badal (Acting Head, Office for Oceans Affairs and Development, Prime Minister's Office; Officer, IOGOOS)

Opening address delivered by M Rezah Badal (Acting Head, Office for Oceans Affairs and Development, Prime Minister's Office; Officer, IOGOOS)

Western Indian Ocean Regional Focus Group Meeting to help plan the International Indian Ocean Expedition 50th Anniversary Initiative (IIOE-2), Quatre Bornes, Mauritius, 6 and 7 March 2014

Dr Nick D'Adamo: (UNESCO/IOC Perth Programme Office): Prof Adote Blivi:

Mr Mika Odido: IOC Representative: (Head of Secretariat, IOC Sub-Commission for Africa and the Adjacent Island States)

Dr Monde Mayekiso: IOC Sub-Commission for Africa and the Adjacent Island States

Dr Peter Burkill:(President SCOR Representative):

IOGOOS Representatives

IMBER Representatives

SIBER Representatives: Prof Mike Roberts (Co-Chair); Dr Lynnath Beckley (Scientific Steering Committee Member)

IOP of IOGOOS/CLIVAR Representative: Dr Yukio Masumoto (Member)

Distinguished Scientists

Ladies and Gentlemen

It gives me an immense pleasure, on behalf of the Prime Minister's Office for Ocean Affairs & Development, on behalf IOGOOS and in my own name, to welcome you all to Mauritius for this very important Sub-Regional Focus Group meeting which is being organised in the context of the planning for the Second International Indian Ocean Expedition (IIOE-2).

I wish to mention that our presence today at this very venue, testify the unconditional support of Mauritius, as an IOC Member State, in the planning effort that all of us are now engaged into, in order to facilitate the undertaking of an IIOE-2.

My Dear Colleagues

It is befitted at this stage to commend, the initiatives taken by some of our colleagues, present here today, that have allowed ideas to be transformed into concrete plan and actions. I have in mind, the IIOE-2 Reference Group which was formed, under the initial auspices of SCOR, Indian Ocean GOOS and the IOC Perth Programme Office. The credit to actually start exploring and plan for the possibility

for a second International Expedition, IIOE-2, and to make it coincide with the 50th anniversary of the original IIOE goes undoubtedly them.

Most of us are aware of the tremendous work that has been completed through the Reference group meetings. These working sessions have now resulted in a formal multi-disciplinary examination of the potential scope and depth of an IIOE-2, where a wide range of potential 'big-picture' science questions, issues and related activities especially to advance significantly the understanding of the Indian Ocean have been identified.

At its very first meeting in Hyderabad, I understand that the Reference Group brought up numerous science questions that needed to be answered in order for us to improve our knowledge of Oceanic processes in the Indian Ocean. Questions like;

1. What are the connections and correlations between large scale ocean-climate processes between the Indian Ocean and the other oceans? E.g El Nino and IOD.
2. What would be the role of the Indian Ocean in the global nitrogen cycle and its relation to global warming and its impact on the marine ecosystem?
3. What are the ecological impacts of dusts that are deposited in the Indian Ocean and their correlation with nutrient limitation?
4. What are the contributions of Indonesian throughflow in the IO basin in terms of nutrient and salinity flux?
5. What are the biogeochemical impacts of planetary waves which have been observed in the IO basin, and their relations with thermocline and mixed layer depths. Eg. The Seychelles Dome.

These are but a few questions that were brought during the meeting in Hyderabad. During the second meeting of the Reference Group in Qingdao, a similar exercise was conducted and pertinent questions were also brought up.

In Qingdao, the case of the East Indian Ocean Upwelling Research Initiative (EIOURI) was presented as a unifying theme that could link ocean wide science and societal benefit. This research initiative has grouped under one umbrella, i.e upwelling, numerous research undertaking ranging from equatorial upwelling, ML Dynamics, boundary currents to ecosystem dynamics. It was thought that a complementary initiative could be mirrored for the western Indian Ocean.

Dear Colleagues,

This provoked in a sense the need for a more engaged discussion to be held between ocean experts from the Western Indian Ocean region. The idea to bring together the concerned players on a common platform thus germinated. In my view, this is how I will justify our presence today and will call upon each and every of you to put heads together in order to prepare us for this great adventure we shall be undertaking in the new future, i.e IIOE-2.

At the meeting in China, we were also called upon to undertake discussion on some other major issues. One of which was to do with the governance structure for the IIOE-2. I must say that we have

fairly advanced on a conceptual structure, which would provide the basis for a coordinated approach to our undertaking. I am sure later during the day our colleague Dr Nick D'Adamo will give us a further insight into the governance structure and together we could discuss it and agree upon it.

My dear Colleagues

The IOGOOS, has been a key actor in promoting the observation of the ocean. Without a capable system to observe the ocean, it would be unthinkable for us to watch and predict the dynamics of our ocean. Their processes, in my understanding, are very much intertwined with links that control the environment. I understand that a number of such systems have been put in place in the Indian Ocean like the Research Moored Array for African-Asian-Australian Monsoon Analysis and Prediction, also known as RAMA. These systems are now contributing in a regional network that provides information on oceanic parameters.

Still our systems of ocean observation need to be improved and expanded for larger coverage. Simple oceanic measurements, for example of the water column physico-chemical properties, are still sparsely made. IIOE-2, I believe, will come in to bridge such gap. But even more than that, we are to think on how best we can develop our local capacity which would feed in the required information on our Ocean State at the required moment. IIOE-2 will, in my understanding, bring this element to foster the growth our human capital in addition to collecting vital information on the ocean.

With these words, I would sincerely wish to thank each and every one of you who has made the effort to be present among us today and let me reiterate again a warm welcome to our distinguished colleagues from overseas and wish for a very successful and fruitful meeting.

M. Rezah Badal

Appendix 4 Participants Statement (finalized by agreement with all participants on 25 March 2014), including a listing of participants and observers at the meeting.

Participants Statement

Western Indian Ocean Regional Focus Group Meeting to help plan the International Indian Ocean Expedition 50th Anniversary Initiative (IIOE-2), Quatre Bornes, Mauritius, 6 and 7 March 2014.

The participants of the IIOE-2 Western Indian Ocean Regional Focus Group Meeting held during 6 & 7 March 2014 at Quatre Bornes in Mauritius, after recognizing the frank and successful work done so far, are pleased to thank the organizers, the sponsors and the host, the Mauritius Prime Minister's Office through the Head of the Office for Ocean Affairs and Development.

We strongly support the establishment of an IIOE-2 for 2015-20, as a unique opportunity for regional collaboration in marine research, training, capacity-building and societal application, in alignment with the Decision of the 27th meeting of the 146 Member States of the Assembly of the IOC of UNESCO in 2013. That Decision called for an IIOE-2 proposal to be addressed at the 47th meeting of the Executive Council of the IOC of UNESCO in 2014.

We reaffirm our commitment to undertake the IIOE-2 under a spirit of mutual cooperation and partnership and we support this important scientific endeavor to enhance our understanding of the Indian Ocean for the betterment of the environment per se and of the human communities that rely on and are influenced by the Ocean.

We urge and will endeavor to work with our own national Governments, relevant institutions and scientific communities to support IIOE-2 through opportunities available to them, including the 47th Meeting of the Executive Council of the IOC of UNESCO.

To this end, we will endeavor to catalyze and harness national coordination in our countries to promote coherent and integrated engagement in the IIOE-2.

We urge prospective stakeholders in IIOE-2 from countries that will bring ocean observing, associated infrastructure, research and related capacities to the Indian Ocean under the IIOE-2, to facilitate the collaborative engagement of those stakeholders that may not be able to engage in that same manner.

This should be realized through facilitation of collegial interactions, collaborative working relationships, and mutual and synergistic engagement in planning exercises, at both strategic and tactical levels, both in advance of the establishment of the IIOE-2 and, thence, under the framework of governance and administration during the IIOE-2.

Statement finalised on 25 March 2014

Participant List

Western Indian Ocean Regional Focus Group Meeting to help plan the International Indian Ocean Expedition 50th Anniversary Initiative (IIOE-2), Quatre Bornes, Mauritius, 6 and 7 March 2014.

Participant's name		Country or organisation of origin
Blivi	Adote	Togo; Vice-Chair IOC/UNESCO
Rezah	Badal	Mauritius
Lynnath	Beckley	Australia
Peter	Burkill	SCOR; United Kingdom
Vahid	Chegini	I.R. Iran
Nick	D'Adamo	Meeting Chair; IOC Perth Programme Office
Julius	Francis	WIOMSA
Calvin	Gerry	Seychelles
Ashley	Johnson	South Africa
Johnson	Kazungu	Kenya
Desiderius	Masalu	Tanzania
Yukio	Masumoto	Japan
Fialho	Nahema	Mozambique
Njike	Ngaha	Cameroun
Mika	Odido	Secretariat, IOC Sub-Commission for Africa and the Adjacent Island States
Man Wai	Rabenevanana	Madagascar
M	Ramana	Mauritius
Mike	Roberts	Republic of South Africa
Alakendra	Roychoudhury	Republic of South Africa
Jun	Sun	China
Observers		
Sam Bateman		University of Wollongong, Australia
B. Rajahbalee-Cader)		Mauritius
R. Virasamy		Mauritius
P. Mussai		Mauritius
R. S. Mungra		Mauritius

J. I. Mosaheb	Mauritius
S. Facknath	Mauritius
R. Bhagooli	Mauritius
K. Narrain	Mauritius
M. Singh	Mauritius
R. MoothienPillay	Mauritius
D. Bissessur	Mauritius
S. D. Jowahir	Mauritius
I. I. Ashraf	Mauritius
B. Motah	Mauritius
B. Laljee	Mauritius
N.Dussooa	Mauritius