

IIOE-2 Steering Committee Meeting No 1

2-4 February 2017

Venue: Indian Ocean Marine Research Centre (IOMRC)

University of Western Australia, Perth

Minutes

Final

24 April 2017

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Minutes in italics.

These minutes present an account of the meeting, reflecting significant and substantive points or issues interpreted to have arisen from associated questions and discussions on the agenda items, including the presentations.

The JPO has developed short precis' of each of the respective presentations and provided those in Appendix 1, for reference and as a record. Copies of the full presentations are available through the JPO.

The minutes include a listing of action items, throughout the minutes and consolidated into Appendix 2.

Agenda Item time	Minutes (in italics) corresponding to agenda items	Action Items
0900-0915	<p>Prior to the formal commencement of the meeting as whole: Joint meeting of the Co-Chairs of SC + Science; Theme and Working Group team leaders; Briefing by Peter Burkill - context and guidance for the parallel mini-workshops.</p> <p><i>An overview of the aim of the meeting and a contextual background was given by Peter Burkill to a joint meeting of SC Executive members.</i></p> <p><i>Present:</i></p> <ul style="list-style-type: none"><i>• IIOE-2 SC Co-Chairs (Peter Burkill, Vladimir Ryabinin, Satheesh Shenoi).</i><i>• IIOE-2 JPO (Nick D'Adamo, Rajan Sivaramakrishnan).</i><i>• ST Leaders (P N Vinayachandran, Adrian Matthews, Amit Tandon, Charitha Pattiaratchi).</i><i>• WG Leaders (Hermann Bange, Cyndy Chandler, Zainal Arifin, Shailesh Nayak, Nick D'Adamo, Rajan Sivaramakrishnan).</i>	

	<ul style="list-style-type: none"> • IOC WESTPAC (Somkiat Khokiattiwong); IOCINDIO (Satheesh Shenoj representing M Atmanand). • Apologies noted from Executive Members not present. 	
<p>0915-1030</p>	<p>Break-out into 2 X Parallel Mini-workshops (comprising only Science Theme and Working Group team leaders).</p> <p>(i) Science Themes Chairs/Co-Chairs of STs 1,2,3,4,5,6 + WG1 Chair –discuss joint progress, planning, integration and identification of common issues, led by WG1 Chair, Hermann Bange (HB).</p> <p>(ii) Working Groups Chairs/Co-Chairs of WGs 2,3,4,5,6,7 – discuss joint progress, planning, integration and identification of common issues, led by WG4 Chair, Shailesh Nayak.</p> <p><i>It was decided that the Science Theme and Working Group team leaders would remain as one group for this initial session, rather than split into two groups as previously planned for this session of the Agenda.</i></p> <p><i>Following is a summary of the key discussion points made in plenary in response to Peter Burkill’s earlier introduction and then in the general discussion of the group, given herewith without specific reference to individuals.</i></p> <ul style="list-style-type: none"> • Need to resolve and finalise membership of respective STs and WGs, through considerations of the ST and WG leaders as an integrated group. • Note the new UN/IOC initiative advocating for an ‘International Decade of Ocean Science (2021-30)’ at UN level in response to UN SDG14. Note the potential links and relevance to IIOE-2 and ensure that IIOE-2 is represented as relevant and as appropriate in that prospective initiative. This may be facilitated for the SC as whole through IOC’s IIOE-2 roles on the SC and through the JPO. • ST and WG leaders need to develop their respective teams’ <u>plans</u> and associated <u>deliverables</u> as a priority in the coming months. • Note IIOE-2’s linkages to other high level multi-national / intergovernmental processes that encompass the Indian Ocean as initiatives that IIOE-2 can input to (e.g. Seychelles Debt and Swap, Areas Beyond National Jurisdiction). • As an Executive group, there is a need to focus on the issue of how to overcome impediments to research that requires coordinated, integrated research across sovereign areas (EEZs) [e.g. tracking and characterising boundary currents, eg around the Bay of Bengal as a case in point]. Noted that high level associations can potentially be used to try to resolve 	<p><i>Action. JPO with SC Co-Chairs support, as required. Liaise with governmental level bodies (eg IORA, UNESCO IOC), in their capacities as high level inter-governmentally framed alliances, to seek their advocacy and help in overcoming difficulties in achieving IIOE-2 multi-national research collaborations due to restrictions encountered due to sovereignty in waters within national jurisdictions (e.g. for permits, collaborative agreements etc.).</i></p> <p><i>Action. Executive to work with ST and WG leaders to: finalise assessment of ST and WG ‘membership’ applications; settle on memberships; and develop team plans and associated deliverables.</i></p> <p><i>Action. In respect to the IOC’s current initiative in advocating at the UN level for an ‘International Decade of Ocean Science (2021-30)’ in response to SDG14, and recognizing related potential links and relevancies to IIOE-2, ensure that IIOE-2 is represented as relevant and as appropriate in that prospective initiative. This may be facilitated for the SC as whole through IOC’s IIOE-2 roles on the SC and through the JPO.</i></p>

	<p><i>permission issues (e.g. Indian Ocean Rim Association, UNESCO IOC). Need to co-opt such support through advocacy and relationship building.</i></p> <ul style="list-style-type: none"> • <i>Focus is needed by STs and WGs on improving the stock of long-term records in the Indian Ocean (IO).</i> • <i>Focus is needed by STs and WGs on implementing (to practical completion) IndOOS (Indian Ocean Observing System, e.g. including RAMA). Links with other programmes (e.g. Go-Ship) noted as critical in this context.</i> • <i>With respect to ST5 (Extremes) there is a need to define key priorities to focus on, given the broad scope that this subject area can entail.</i> <p><i>A discussion led by Hermann Bange (HB) on of how best to form the membership of ST1, which at present is projecting to be relatively large.</i></p> <ul style="list-style-type: none"> • <i>HB suggested that the membership for ST1 comprise (a) a core group being the ST leaders plus (b) associate members.</i> • <i>No disagreement on HB's proposal.</i> • <i>However, finalisation of ST1 is pending, as membership will be the subject of considerations by the ST and WG leaders later in the meeting, based on assessing the approx. 80 membership applications received across all STs and WGs.</i> <p><i>A similar suggestion was made (and agreed to) by Shailesh Nayak on behalf of the WGs that the membership of WG4 (Operational Coordination) shall also comprise (a) a core group being the WG leaders plus (b) associate members.</i></p>	
<p>1100-1200</p>	<p>Formal commencement of meeting for all delegates:</p> <ol style="list-style-type: none"> 1. Welcome by hosts and JPO. Charitha Pattiaratchi UWA, for Indian Ocean Marine Research Centre; Nick D'Adamo IOC PPO, for JPO Australia; Rajan Sivaramakrishnan INCOIS, for JPO India 2. Keynote scene-setting talks by IIOE-2 SC Co-Chairs - providing the overall context for the meeting. Peter Burkill (SCOR); Vladimir Ryabinin (IOC); Satheesh Shenoi (IOGOOS) 3. Plenary to consider and add 'any other business' items and make any final adjustments to agenda. <p><i>The opening welcomes and talks were presented as planned.</i></p> <p><i>Associated PPT summaries are in Appendix 1.</i></p> <p><i>Reference was made to the International Indian Ocean science conference opening and reception of Monday</i></p>	

	<p><i>evening (30 January 2017), with the relevant PPT available via the JPO, and noting the dedication of the opening to the late Professor Gary Meyers for his formative contributions to the Indian Ocean Global Ocean Observing System (IOGOOS), the Indian Ocean Panel of IOC-GOOS/CLIVAR (IORP) and related entities since the early 2000s.</i></p> <p><i>No other items were added to the agenda.</i></p>	
<p>1300-1400</p>	<p>Break-out into 2 X Parallel Mini-workshops (comprising Science Theme and Working Group team leaders and all other Steering Committee members).</p> <p>(i) Science Themes Chairs of STs 1, 2, 3, 4, 5, 6 + WG1 Chair – discuss joint progress, planning, integration and identification of common issues, led by WG1 Chair, Hermann Bange.</p> <p>(ii) Working Groups Chairs of WGs 2, 3, 4, 5, 6, 7 – discuss joint progress, planning, integration and identification of common issues, led by WG4 Chair, Shailesh Nayak.</p> <p><i>The two groups met and returned to plenary.</i></p>	
<p>1400-1500</p>	<p>Mini-workshop reports.</p> <p>(i) Report 1: Science Themes. On joint progress, planning, integration and identification of common issues, led by WG1 Chair, Hermann Bange.</p> <p>(i) Report 2: Working Groups. On joint progress, planning, integration and identification of common issues, led by WG4 Chair, Shailesh Nayak.</p> <p><i>Report 1: Hermann Bange</i></p> <ul style="list-style-type: none"> • <i>In respect to membership issues: it was recommended that in addition to existing nominations, and further colleagues interested in joining STs should contact ST leaders directly.</i> • <i>A weak response/coverage was identified for the areas of</i> <ul style="list-style-type: none"> - <i>Geology; and</i> - <i>Atmospheric chemistry.</i> • <i>It was decided that it would be appropriate to modify the titles of some STs to broaden their thematic coverages. Specifically;</i> <ul style="list-style-type: none"> • <i>ST1 to “Human benefits and impacts”;</i> • <i>ST3 to “Atmospheric and monsoon variability and ecosystem response”;</i> and • <i>ST4 to “Circulation, climate variability and ecosystem change”.</i> • <i>high priority tasks for the STs were defined as:</i> 	<p><i>Action. IIOE-2 is to contact (via WG2: Data and Information Management) national IODE focal points, data centers etc to negotiate for data exchange as relevant to IIOE-2 and vice versa. For example, this liaison should include relevant bodies such as JCOMM, satellite data centers etc.</i></p> <p><i>Action. As a priority, WG2 is to lead the development of guiding documents and associated activities in response to the IIOE-2 Implementation Plan’s guidance starting with, as an urgent task, the development of an IIOE-2 data management plan, to include a data policy to address issues such as data sharing and release protocols, aiming as much as possible to align with the IOC data policy. This action will include, but not be limited to items such as:</i></p> <ul style="list-style-type: none"> • <i>Developing a standard text to be used in IIOE-2 relevant publications for making reference to the nature and</i>

	<ul style="list-style-type: none"> - <i>bringing people together;</i> - <i>campaigning;</i> - <i>initiating/facilitating proposal writing;</i> - <i>using social media to (i) keep information flowing, and (ii) reach as many colleagues as possible; and</i> - <i>Focusing on deliverables such as reports, etc.</i> <p><i>Report 2: Shailesh Nayak.</i></p> <ul style="list-style-type: none"> • <i>It was noted that WGs provide support to the STs.</i> • <i>It was noted that WG2 (Data and Information Management) is a 'most important' WG and that in undertaking its role, consideration needs to be given to ensuring linkages and collaboration with established data management systems, including their data and associated polices, protocols and resource such as IODE, and also including for example GEBCO, national polices, and specific program data polices (e.g. GEOTRACES).</i> • <i>It was noted that apart from IIOE-2 specific data, even data that do not necessarily derive from IIOE-2 endorsed initiatives but that are relevant to the IIOE-2 Science Plan need to be identified and incorporated as and where possible into the IIOE-2 framework, in a complementary fashion.</i> • <i>It was generally accepted that much of the IIOE-2 data will necessarily only be available in delayed mode, however where possible real time data should be made available. Emphasis needs to be assigned to this issue.</i> • <i>It was pointed out that in addition to new data that is to come from IIOE-2 endorsed initiatives; data (past and prospective) from IndOOS should be accessed and incorporated into an IIOE-2 data portal.</i> • <i>IIOE-2 contact (via WG2) needs to be made with relevant national data centers to negotiate for data exchange as relevant to IIOE-2 and vice versa. This liaison should include JCOMM, satellite data centers etc.</i> • <i>There is a strong view that an IIOE-2 data release policy needs to be established, in terms of specifying an agreed data time embargo where required (e.g. 2 years?).</i> • <i>In respect to publications that use IIOE-2, it was agreed that a standard text should be developed for making reference to the nature and amount of data in a particular publication attributable to IIOE-2.</i> • <i>It was reported that the IIOE-2 Metadata Portal will soon (in ~ 1-2 months) be ready (to be located within INCOIS at the Indian Node of the JPO, Hyderabad).</i> • <i>Another key issue profiled as relevant to WG2 was that of capacity development, with an emphasis on data that relate to how to observe the ocean. In this</i> 	<p><i>amount of data in those publications that is attributable to IIOE-2;</i></p> <ul style="list-style-type: none"> • <i>organizing and leading a data and information management workshop involving, to the extent possible, SC Executive members, in order to identify and address data and information management issues, including those highlighted in the minutes from this meeting, and seeking the engagement of and taking into account existing relevant data management bodies and their frameworks as may be advised and recommended by IIOE-2 SC members (eg IODE).</i> <p><i>Action. WG5 (Outreach and Communication) is to seek the support of stakeholders in identifying and making available to IIOE-2 an expert science communicator to assist in WG5's mission.</i></p> <p><i>Action. WG7 (Resources and Sponsorship) is to develop a resources and sponsorship strategic plan.</i></p> <p><i>Action. In addition to meeting as a part of annual full SC meetings, the Executive is to consider and if required undertake to meet inter-sessionally at least once per year.</i></p>
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	<p><i>context reference was made to existing individual, institutional, national programs and capacities that can assist in this objective (e.g. IOTWMS, JCOMM). It was suggested that WG 3 (Capacity Development) contact the ST chairs to promote and progress this CD objective.</i></p> <ul style="list-style-type: none"> • <i>A data and information management workshop was proposed involving, as possible, Executive members in order to identify and resolve data issues as per the above.</i> • <i>In respect to WG4 (Operational Coordination) it was noted that it should take the lead, with the support of the JPO, in receiving and assessing on behalf of the SC, proposals for IIOE-2 endorsement, cruise planning and related operational aspects, including facilitation of capacity development in operational initiatives.</i> • <i>In respect to WG5 (Outreach and Communication) it was noted that the IIOE-2 website provides a forum for this purpose. Furthermore, there would also be benefit if an expert science communicator could be found to assist in the WG’s mission and to that end the WG should seek the support of stakeholder organisations that may be able to assist (e.g. IOC).</i> • <i>In respect to WG6 (Translating Science for Society), reference was made to the importance of the current emerging Blue Economy theme for many stakeholders and the merit of the proposal on the socio-economic impact of IIOE-2 (as per the current IIOE-2 endorsed proposal, ref: Sumaila and Costopulos, 2016).</i> • <i>In respect to WG7 (Sponsorship and Resources) it was noted that the JPO will continue to take the day to day running on this, but that the IIOE-2 community as whole has a responsibility to seek resources and funds, working with and through the JPO and the IIOE-2 co-sponsoring institutions (IOC, SCOR and IOGOOS).</i> • <i>It was felt that a strategic plan for resources and sponsorship needs to be developed in order to provide overall guidance and coordination to progress this aspect of IIOE-2. Such a plan should take note of opportunities that may exist through existing foundations and schemes</i> • <i>In respect to overall integration between STs and WGs: it was emphasized that although e-communications (relatively regularly) are required, a face to face meeting at least once per year, is essential for ST and WG leaders (with other members of the Executive implied as being part of such a meeting, such as at this current meeting).</i> 	
<p>1530-1730</p>	<p>Science Theme progress reports - delivered by ST Chairs.</p> <p>ST1 Human Impacts. Presented by Ben Milligan.</p>	

	<ul style="list-style-type: none"> • ST2 Boundary current dynamics, upwelling variability and ecosystem impacts <i>Presented by P N Vinayachandran.</i> • ST3 Monsoon variability and ecosystem response <i>Presented by Adrian Matthews.</i> • ST4 Circulation, climate variability and change <i>Presented by Amit Tandon.</i> • ST5 Extreme events and their impacts on ecosystems and human populations <i>Presented by Charitha Pattiaratchi.</i> • ST6 Unique geological, physical, biogeochemical and ecological features of the Indian Ocean- <i>Greg Cowie gave some perspective on this Theme in light of his close involvement in writing the ST6 section of the IIOE-2 Science Plan. In discussion, reference was made to GEBCO as a key program to link with.</i> 	
<p>Friday 3 Feb 2017</p>		
<p>0900-1100</p>	<p>Working Group progress reports - delivered by WG Chairs.</p> <ul style="list-style-type: none"> • WG1 Science and Research <i>Presented by Hermann Bange.</i> <i>The issue of holding a mid-term science symposium for IIOE-2 science was raised. Early 2019 was the time that was favored. Key objectives of such a symposium would be to examine achievements to that point and to identify key priorities to be pursued through to the end of IIOE-2. Furthermore, it was felt that the symposium should consider exploring the merits, need and feasibility of any extension for IIOE-2 (say out to a 10 year time frame i.e. out to 2025).</i> • WG2 Data and Information Management <i>Presented Cynthia Chandler.</i> • WG3 Capacity Development <i>Presented by Zainal Arifin.</i> • WG4 Operational Coordination <i>Presented by Shailesh Nayak. A corresponding set of notes was provided to the JPO.</i> • WG5 Outreach and Communication <i>No presentation.</i> <i>Discussion referred to importance of the IIOE2- website and Indian Ocean Bubble 2 (IOB-2) Newsletter. It was noted that more could be done to promote the IOB-2, such as through IMBER, CLIVAR, US National Science Foundation programs etc.</i> 	<p><i>Action. The JPO is to begin scoping and undertake early planning with the Executive for what is to be an IIOE-2 major mid-term science symposium, aiming at early 2019.</i></p>

	<p><i>Reference was again made (see above) to the need for an expert science communicator for IIOE-2 under this WG.</i></p> <p><i>Research Gate was mentioned as a good additional communications forum for IIOE-2.</i></p> <ul style="list-style-type: none"> • WG6 Translating Science for Society <i>Rezah Badal was unable to present in person, but provided a PPT for this item.</i> <p><i>A comment was made in reference to the National Geographic Society as providing a potentially good forum to help support this objective.</i></p>	
<p>1130-1300</p>	<p>Working Group progress reports (continued).</p> <ul style="list-style-type: none"> • WG 7 Resources and Sponsorship <p><i>Nick D’Adamo presented on behalf of Dr Sivaramakrishnan and both Nodes of the JPO, giving a verbal overview of progress to date in resources and sponsorship, noting the underpinning hosting and funding support for the two JPO Nodes, funding sponsorship and in-kind support garnered for this conference (e.g. DFAT, CSIRO, SCOR, IUGG) and other forms of cash and in-kind support so far provided for IIOE-2 in general by IOC, SCOR and IOGOOS.</i></p> <p>IOC Regional Bodies/Committees progress reports – delivered by IOC Regional Body/Committee representatives.</p> <ul style="list-style-type: none"> • IOC AFRICA – Johnson Kazungu <i>Notes on this item were provided by Mika Odido (IOC Africa Secretariat) and are available via the JPO. They were read by Nick D’Adamo on IOC Africa’s behalf.</i> • IOC WESTPAC <i>Presented by Somkiat Khokiattiwong.</i> • IOCINDIO <i>Presented on behalf of IOCINDIO by Satheesh Sheno.</i> <p>Introduced presentation – Sidney Thurston and Mike McPhaden: NOAA-Bilateral agreements – IndOOS related & IIOE-2 aligned. <i>Presented by Sidney Thurston.</i></p>	
<p>1400-1530</p>	<p>IIOE-2 National Committee progress reports</p> <ul style="list-style-type: none"> • India <i>Presented by Satheesh Sheno.</i> • South Africa <i>A PPT presentation sent to the JPO was read by N D’Adamo on Ashley Johnson’s behalf.</i> • USA <i>Presented by Raleigh Hood.</i> 	

	<ul style="list-style-type: none"> • Australia <i>Presented by Lynnath Beckley. This talk also covered research initiatives that were listed to have been presented in the next session of the agenda.</i> • Germany <i>Presented by Hermann Bange, as a combined talk for both the German National Committee and German research initiatives (that would otherwise have been presented in the next session of the agenda). A reference for German IIOE-2 plans was given as http://oceanrep.geomar.de/33146/</i> • UK <i>Presented by Greg Cowie.</i> • Korea <i>Presented by Tae Keun Rho. This talk was brought into this session, rather than as originally programmed for the next Agenda Session.</i> <p>Plenary open discussion on IIOE-2 National Committee reports</p> <ul style="list-style-type: none"> • Identification of synergies and collaborative opportunities 	
<p>1600-1730</p>	<p>Research initiatives and cruises (existing and emerging) reports.</p> <ul style="list-style-type: none"> • First IIOE-2 Research Cruise, Goa to Mauritius, RV Sagar Nidhi, 4-22 Dec 2015. <i>Presented by P Vinayachandran.</i> • Eastern Indian Ocean Upwelling Research Initiative (EIOURI) <i>Presented by Raleigh Hood.</i> • Western Indian Ocean Upwelling Research Initiative (WIOURI) <i>Presented by Mike Roberts.</i> • SIBER <i>Presented by Raleigh Hood.</i> • IORP <i>Presented by Jerome Vialard.</i> • Challenger Glider Mission <i>Presented by Charitha Pattiaratchi.</i> • IMOS <i>Presented by Charitha Pattiaratchi.</i> • IBPIO of JCOMM/DBCP <i>Presented by Boris Kelly-Gerreyn.</i> • Red Sea <i>Presented by Burt Jones.</i> • Korea for RAMA <i>Covered earlier (in the preceding agenda session) by Tae Keun Rho.</i> • BMBF Germany <i>Covered earlier (in the preceding agenda session) by Hermann Bange.</i> 	

	<ul style="list-style-type: none"> • HYBOB <p><i>Presented by Greg Cowie.</i></p> <ul style="list-style-type: none"> • Australia (2 projects) <p><i>Covered earlier (in the preceding agenda session) by Lynnath Beckley.</i></p> <ul style="list-style-type: none"> • Russia <p><i>Presented by Vladimir Ryabinin, on behalf of Sergey Shapovalov, based on a submitted PPT.</i></p> <p>Plenary open discussion on research initiatives and cruises</p> <ul style="list-style-type: none"> • Identification of synergies and collaborative opportunities 	
<p>Saturday 4 Feb 2017</p>		
<p>0900-0930</p>	<p>IIOE-2 National Committee progress reports</p> <ul style="list-style-type: none"> • Continued from Friday <p>Plenary open discussion on IIOE-2 National Committee reports</p> <ul style="list-style-type: none"> • Identification of synergies and collaborative opportunities <p><i>Jerome Valiard submitted that IIOE-2 needs to now progress to the development of big picture ideas, to be tackled holistically by the IIOE-2 community (i.e. that cross the various scientific themes).</i></p> <ul style="list-style-type: none"> - <i>In this context, reference was made to relevant SD14 objectives, which should be considered.</i> - <i>Furthermore, it was considered that the forthcoming IOC Assembly Session No. 29 (June 2017) may be a good opportunity to profile any big picture ideas that come forth, say as part of the Executive Secretary's report to the Assembly in which IIOE-2 would be referenced.</i> - <i>It was suggested that a 1-page statement on big picture ideas for IIOE-2 be produced and given to IOC Executive Secretary Vladimir Ryabinin, for consideration as input to the IOC Assembly Session 29 (June 2017).</i> - <i>To action the development of this 1-page document, it was felt appropriate for Hermann Bange and Shailesh Nayak to lead the process, with the support of Jerome Vialard, Raleigh Hood and the JPO.</i> 	<p><i>Action. Hermann Bange and Shailesh Nayak to lead a process, with the support of Jerome Vialard, Raleigh Hood and the JPO, to develop a 1-page statement identifying big picture ideas for IIOE-2, to be given to IOC Executive Secretary Vladimir Ryabinin, for consideration as input to the IOC Assembly Session No. 29 (June 2017).</i></p>
<p>0930-1000</p>	<p>Early Career Scientists Network (ECSN). Plenary.</p> <ul style="list-style-type: none"> • Overview on ECSN development, progress and plans by ECSN representative. <p><i>Presented by Danielle Su, University of Western Australia, Perth</i></p> <ul style="list-style-type: none"> • ECSN News flashes 	<p><i>Action. STs and WGs, through their leaders, should seek to enlist at least one ECSN researcher in their respective teams as a contribution to the objective of fostering emerging young scientists under IIOE-2.</i></p> <p><i>Action. ECSN to self-organize,</i></p>

	<p>ECSN News Flash 1: Model-based design of the overturning circulation observation strategies. <i>Presented by Jie Ma, CSIRO, Perth, Australia.</i></p> <p>ECSN News Flash 2: Transport mechanisms and accumulation zones of buoyant marine plastic debris in IO. <i>Presented by Mirjam van der Mheen, University of Western Australia, Perth</i></p> <p>ECSN News Flash 3: Interhemispheric gradient trends in IO SST. <i>Presented by Ying Zhang, CSIRO Perth, Australia and South China Sea Institute of Technology, Chinese Academy of Sciences, Guangzhou, China.</i></p> <p><i>In plenary, referring to the ECSN talks and ECSN in general, it was agreed that every ST and WG, through their leaders, should seek to enlist at least one ECSN researcher in their respective teams as a contribution to the objective of fostering emerging young scientists under IIOE-2.</i></p>	<p><i>under the leadership of Danielle Su and facilitated by the JPO, with a focus on ECSN communication and integration, and on showcasing its own IIOE-2 related research.</i></p>
<p>1000-1100</p>	<p>IIOE-2 SC Co-Chairs observations and responses to ST, WG, National Committee, Research Initiatives/Cruises and ECSN sessions.</p> <ul style="list-style-type: none"> • <i>There was reference again (see above) to the need to develop big picture issues for IIOE-2 to address holistically under the Science Plan. In that context, it was noted that ocean reanalysis has been less developed / less successful in the Indian Ocean (IO) compared to the Atlantic and Pacific Oceans, and that this therefore makes an IIOE-2 data and information management policy even more important, as a means to supporting reanalysis in the IO.</i> • <i>In advance of where the following may have arisen in the agenda, a question was asked at this point on how the set of STs and WGs, and in fact the Executive as a whole, is to work together from here on and how the STs and WGs are to be led by the collective of Co-Chairs and JPO. This was in part motivated by the appreciation that it will be complex to manage communications and meetings of such a large and geographically disparate group, considering differing time zones and personnel availabilities etc. A pragmatic modality was sought by the discussion.</i> • <i>The discussion converged on the following mode:</i> <ol style="list-style-type: none"> 1. <i>Hermann Bange (for the STs) and Shailesh Nayak (for the WGs) will coordinate/lead communications and meetings of their respective collectives of ST teams and WG</i> 	<p><i>Action. Hermann Bange (for the STs) and Shailesh Nayak (for the WGs) are to coordinate/lead communications and meetings of their respective collectives of ST teams and WG teams by e-communications or face-to-face, at a frequency as deemed necessary and feasible by themselves and their own respective constituencies, and with relevant liaison and linkage to the Executive, Regional Coordination and Science Delivery SC members, and with relevant facilitation by the JPO.</i></p> <p><i>Action. The IIOE-2 Steering Committee Co-Chairs (Peter Burkill, Vladimir Ryabinin, Satheesh Shenoi) plus Hermann Bange (for the STs) plus Shailesh Nayak (for the WGs) plus Nick D’Adamo (Australia JPO Node) and Rajan Sivaramakrishnan (Indian JPO Node) are to meet regularly as a core group and on behalf of the Executive to consider and discuss cross-cutting matters.</i></p>

	<p>teams.</p> <ol style="list-style-type: none">2. <i>Hermann Bange and Shailesh Nayak are to arrange, manage and lead meetings of their respective groups by e-communications or face-to-face, at a frequency as deemed necessary and logistically feasible by themselves and their own respective constituencies.</i>3. <i>As far as communications and liaison between the SC members from the respective Regional Coordination and Science Delivery levels with the Executive and across the IIOE-2 Steering Committee as whole:</i><ol style="list-style-type: none">I. <i>Science initiative-related liaison would be principally undertaken through Hermann Bange as a coordinating focal point;</i>II. <i>Operationally-related liaison would be principally undertaken through Shailesh Nayak as a coordinating focal point;</i>III. <i>Cross-cutting issues for science and regional coordination could then be managed between Hermann and Shailesh;</i>IV. <i>Furthermore, the JPO would continue to provide facilitation for this purpose;</i>V. <i>Notwithstanding the above modalities, of course all members may communicate with any other SC members as and when required, directly;</i>VI. <i>All SC members would also attend annual full SC meetings - the next of which is to be held in early 2018, prospectively in Indonesia.</i>4. <i>The IOC Regional Body/Committees would link with the SC's IOC focal points: Vladimir Ryabinin and Nick D'Adamo.</i>5. <i>The IIOE-2 Steering Committee Co-Chairs (Peter Burkill, Vladimir Ryabinin, Satheesh Sheno) plus Hermann Bange (for the STs) plus Shailesh Nayak (for the WGs) plus Nick D'Adamo (Australia JPO Node) and Rajan Sivaramakrishnan (for Indian JPO Node) would meet regularly as a core group and on behalf of the Executive to consider and discuss cross-cutting matters.</i>6. <i>In respect to the issue of how often the full Executive should meet face to face inter-sessionally (i.e. in between annual SC meetings), it was felt that the above mode be trialed first, to determine if and when extra face to face full Executive meetings might be required. There was an appreciation of the cost and logistics that would be involved in running any full face to face meetings inter-sessionally (ie between annual full Steering Committee meetings).</i>7. <i>This issue of general communications and workability across the entire SC should be kept</i>	
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	<p><i>open and under continual assessment and revision, to ensure effective integration and communications.</i></p>	
<p>1130-1300</p>	<p>Led by one or more of three IIOE-2 SC Co-Chairs (V Ryabinin / P Burkill / S Sheno), inviting plenary discussion.</p> <p>Business and governance issues.</p> <p>With respect to IIOE-2 SC meetings:</p> <ul style="list-style-type: none"> • Integration with IOGOOS/IORP/SIBER/IRF annual meetings. • <i>It was felt that the mode of the four groups (IOGOOS/IORP/SIBER/IRF) and IIOE-2 SC meeting together, as was the case this year, be maintained to promote and facilitate collaboration, integration, collegiality etc.</i> • <i>It was also agreed that the integrated meetings (comprising all five groups) run for four days, or if absolutely necessary, five days at the most.</i> • <i>The IIOE-2 SC meetings should aim for a maximum duration of two days, notwithstanding that future IIOE-2 SC meetings should incorporate a science presentation aspect, in order to highlight the progress in IIOE-2 science, for example such as a 1-day series of science talks complemented by posters.</i> • Scheduling of likely and preferred dates (may be notional for preliminary planning purposes at this stage). <p><i>Aim for one full SC meeting per year, preferably in the 1st quarter of each year of IIOE-2.</i></p> <ul style="list-style-type: none"> • Preferred meeting locations. <i>Addressed in the next Agenda Session</i> • Known hosting offers. <i>Addressed in the next Agenda Session</i> • JPO support. <i>Joint Project Nodes will continue, resources permitting, as support nodes for the SC for the duration of IIOE-2.</i> • Budgeting and funding of meetings – commitments, opportunities, strategies to improve sponsorship <ul style="list-style-type: none"> • IOC; SCOR; IOGOOS • Other sources (known or prospective) <i>An ongoing objective.</i> <p>ST and WG team meetings</p> <ul style="list-style-type: none"> • Frequency and scheduling of meetings. • Mode (e-meetings and face to face). • JPO support 	<p><i>Action. JPO to continue facilitating and coordinating annual full SC meetings, aiming for early in each calendar year (i.e. January to March).</i></p> <p><i>Action. JPO to undertake early liaison and planning with Satheesh Sheno on the prospect of India hosting a closing IIOE-2 conference, akin to the IIOE-2 launch/conference event that was held in Goa, Dec 2015.</i></p>

	<ul style="list-style-type: none">- <i>Addressed earlier.</i>- <i>In brief: full face to face SC meetings once per year (early in each year of IIOE-2). The respective ST and WG collectives to meet as required and at least by e-comms, under Hermann Bange and Shailesh Nayak's respective coordination. JPO to provide administrative and logistical support to these meetings, as resources permit.</i> <p>IIOE-2 Science Symposia</p> <ul style="list-style-type: none">• Scheduling – how many during IIOE-2 (out to 2020)?• Discussion on any preferred opportunities / locations (e.g. the IIOE-2 symposium within the IAPSO-IAGA-IAMAS meeting during 27 Aug – 1 Sep 2017 in Cape Town)• Identification of any offers (known or prospective) for hosting.• Scope of respective symposia (workshops Vs mini-symposium Vs open science conference etc.)?<ul style="list-style-type: none">- <i>We should aim to embed IIOE-2 science talks (either as embedded symposia or general talks) in as many national and international conventional science forums as possible.</i>- <i>The concept of holding a dedicated mid-term stand-alone IIOE-2 science symposium was addressed earlier. However, it was re-affirmed to be a worthy pursuit; that it be held within the Indian Ocean region; and that it occur during 2019 and not before in order to ensure that there was sufficient new IIOE-2 related science to showcase.</i>- <i>Satheesh Shenoi indicated, for noting, that India would be interested in considering hosting a closing IIOE-2 conference, akin to the IIOE-2 launch/conference event held in Goa, Dec 2015. The JPO will liaise with India on this prospect.</i> <p>Governance of IIOE-2 SC high level leadership</p> <ul style="list-style-type: none">• Rotation policy for IIOE-2 SC Co-Chairs• <i>It was felt that while a phased rotation was a good policy, IIOE-2 was a short programme and this may be impractical at the IIOE-2 SC Co-chair level. Ultimately this would depend on the views of the three Sponsors who appoint the Co-chairs</i> <p>Governance of ST and WG leadership</p> <ul style="list-style-type: none">• Rotation policy for IIOE-2 ST and WG Chairs/Co-Chairs• Consideration of rotation policy for members of ST and WG teams.<ul style="list-style-type: none">• <i>One suggestion was that rotation should be undertaken at least once within the 5 years,</i>	
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	<p><i>with the policy based on an ‘opportunity for rotation’ rather than a fixed compulsory policy, and noting that Chairs at all levels be given the opportunity to self-nominate for rotation at any stage.</i></p> <ul style="list-style-type: none"> • <i>Furthermore, to ensure continuity, chairs in the respective levels and groupings should be encouraged to rotate, if they wish to, but on a staggered basis, to avoid too many changes at the one time.</i> • <i>Preferable for any rotations not to occur until after 2018.</i> • <i>One final model was suggested: where ST and WG co-chairs are considered for rotation after 2 years (that would be practically in 2019, but that they can stay in their roles if re-elected).</i> • <i>ST and WG members may stay within their groups for the 5 year duration, subject to the agreement of their respective chairs/co-chairs.</i> <p><i>Notwithstanding the above ideas, the final consensus was that: for all elements of the Steering Committee: rotation is not to be formally enforced; a wait and see approach is to be adopted; and the SC should re-visit the rotation issue in 2019.</i></p>	
<p>1400-1530</p>	<p>Led by one or more of the three IIOE-2 SC Co-Chairs (V Ryabinin / P Burkill / S Shenoi), inviting plenary discussion.</p> <p>IIOE-2 Legacy</p> <ul style="list-style-type: none"> • Products from IIOE-2 – accessibility, curation for the long-term. <i>This is a task to be considered by WG2 Data and Information Management.</i> • Opportunities for establishment of new research foci (recall birth of NIO as a result of IIOE). <i>This should remain a strong focus of IIOE-2. It was noted, in this context, that South Africa has mooted 3 planned new research foci aligned with IIOE-2.</i> <p>Life beyond the IIOE-2 of 2015-20</p> <ul style="list-style-type: none"> • Early strategic considerations of likelihood / sense of considering the prospect of an extension, of some nature, to IIOE-2 beyond 2020 <i>Re-visit in 2019, subject to the 2019 IIOE-2 science symposium, in respect to: what has been achieved; what is likely to be achieved; and then thereby allowing full consideration of the scientifically and intuitionally based merits of extending IIOE-2 beyond the five year time frame.</i> <p>Allowance for other agenda items <i>No items.</i></p>	

<p>1600-1700</p>	<p>Led by one or more of the three IIOE-2 SC Co-Chairs (V Ryabinin / P Burkill / S Shenoi), inviting plenary discussion.</p> <p>Next meeting</p> <ul style="list-style-type: none"> - Consideration, if possible, of approximate date, location - <i>There was a general consensus that the next meeting should again consist of an integrated program of five groups comprising IOGOOS-14, IORP-14, SIBER-8, IRF-8, IIOE-2 SC2, and that the meeting should be held in the Indian Ocean Region and sometime in Feb/Mar 2017.</i> - <i>One offer for 2018 was forthcoming:</i> <ul style="list-style-type: none"> - <i>Indonesia (through Zainal Arifin) offered to host the 2018 meeting. Three possible locations were suggested: Jakarta, Jogjakarta and Lombok.</i> - <i>Appreciation at the offer was expressed to Dr Arifin and Indonesia from IOGOOS, IORP, SIBER, IRF and IIOE-2, and by other SC members in general.</i> - <i>Early 2018 was considered as the appropriate period for the next meeting, subject to avoiding date clashes with other major marine/climate meetings; with members to advise of any forthcoming meetings that are to occur in 1st quarter of 2018.</i> - <i>JPO to coordinate a formal letter of request to Dr Arifin for Indonesia to host the next integrated set of meetings (IOGOOS-14, IORP-14, SIBER-8, IRF-8, IIOE-2 SC2), for Feb/Mar 2018. That request is to outline the estimated number of participants, draft multi-group meeting schedule and essential logistical requirement, in order to enable the potential hosts to assess the request.</i> - <i>There was a general feeling that a meeting in the following year (i.e. 2019) should, if possible, be held in the Western Indian Ocean area.</i> - <i>It was agreed that early considerations be sought by potential West Indian Ocean host countries for the 2019 meeting, with members of the five groups to advise of any possibilities (through liaison with the JPO).</i> <p>Open opportunity for closing comments, observations, issues by all in plenary.</p> <p><i>There was a general open forum for all to contribute any comments, thoughts, concerns on any aspect of IIOE-2:</i></p> <ul style="list-style-type: none"> • <i>We need to maintain an open invitation to other science communities and programs to take advantage of IIOE-2 cruises.</i> • <i>Need to connect more with the following</i> 	<p><i>Action. JPO to coordinate a formal letter of request to Dr Zainal Arifin for Indonesia to host the next integrated set of meetings (IOGOOS-14, IORP-14, SIBER-8, IRF-8, IIOE-2 SC2), for Feb/Mar 2018, with the request to include an outline of the estimated number of participants, a draft multi-group meeting schedule and essential logistical requirements, in order to enable the potential hosts to assess the request.</i></p> <p><i>Action. JPO to scope and negotiate on potential West Indian Ocean host countries for the 2019 SC meeting, focusing on identifying any possibilities through liaison with members of IOGOOS, IORP, SIBER, IRF and IIOE-2 SC.</i></p> <p><i>Action. JPO to draft the minutes from the meeting and liaise with participants to finalise the minutes, including collating and making available all PPTs from the meeting.</i></p>
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	<p><i>communities:</i></p> <ul style="list-style-type: none">- <i>Deep drilling;</i>- <i>Atmospheric chemistry;</i>- <i>Marine environmental economics;</i>- <i>Ecology based policy;</i>- <i>Offshore infrastructure development;</i>- <i>Maritime law;</i>- <i>Marine technology;</i>- <i>Hydrography (IHO).</i> <p>Closing comments by the JPO and IIOE-2 SC Co-Chairs on the IIOE Steering Committee's 1st full meeting. Facilitated by JPO.</p> <ul style="list-style-type: none">• Australia JPO• India JPO• SCOR• IOC• IOGOOS <p><i>The Co-Chairs and JPO thanked all, including hosts and assistants, for the effort and spirit in coming together for the first time, and all expressed their belief that the meeting was worthwhile, successful and provided a good platform for forthcoming meetings. The JPO is to draft the minutes from the meeting and liaise with participants in order to finalise the minutes, including collating and making available all PPTs from the meeting.</i></p>	
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Appendix 1. PPPT summaries

Thursday 2 Feb 2017		
1100-1200	Welcome by hosts & JPO	
	Nick D'Adamo – IOC PPO and Australian JPO	<ul style="list-style-type: none"> - Reflected on multi-national membership of IOGOOS, IORP, SIBER, IRF, Bio-Argo and IIOE-2 SC
	Rajan Sivaramakrishnan – INCOIS and Indian JPO	<ul style="list-style-type: none"> - Significant progress has been made by SC. - 11 science projects and 1 activity already endorsed under IIOE-2 - Chairs/Co-chairs for all ST and WGs in place and selection of membership to each progressing - INCOIS hosting the website and has developed IIOE-2 Metadata portal - Advocacy inc. presentations at key meetings, IO Bubble, numerous publications, formation of IIOE-2 community grouping for correspondence.
	Keynote scene-setting talks by IIOE-2 Co-Chairs	
	Peter Burkill (SCOR)	<ul style="list-style-type: none"> - Outlined the underpinning science themes and governance arrangements, including mapping the anticipated interactions between the WG and ST's. - Proposed a series of guiding principles to keep the program on track and shared the ToR for the Co-chairs and WG and STs. - Articulated the sources of funding for various activities. - Put forward likely extension of 5-yr timeframe if the programme performance warrants it.
	Vladimir Ryabinin (IOC)	<ul style="list-style-type: none"> - Outlined the important role and functions of the IOC and how the IOC contributes to major global frameworks (i.e. Agenda 2030, UNCLOS, Samoa Pathway) - Introduced International Decade of Ocean Science for Sustainable Development (2021-2030) and how IIOE-2 could be a precursor.
	Satheesh Shenoi (IOGOOS)	No ppt. Please see SC draft minutes for summary of discussion.
1400-1500	Mini-workshop reports.	
	WG1 Chair, Hermann Bange on behalf ST	<ul style="list-style-type: none"> - ST chairs/co-chairs all in place and all 'filling' their groups. - Weak representation – geology & atmospheric chemistry - Some modifications to ST names proposed: ST1 – Human benefits & impacts; ST3 – Atmospheric and monsoon variability and ecosystem response; ST4 – Circulation, climate variability & ecosystem change - Focus of bringing people together (campaigning, joint proposal writing, use social media to inform widely) - Be creative!
	WG4 Chair, Shailesh Nayak on behalf WGs	No ppt. Please see SC draft minutes for summary of discussion.
1530-1730	Science Theme progress reports	

	<p>ST1 Human Impacts –Ben Milligan</p>	<ul style="list-style-type: none"> - Sphere of human interest in IO is large when one looks at EEZs. Sovereign rights to resources however differ in different zones. - Humans dependent upon ocean’s abiotic assets and ecosystem assets. Balance required to ‘sustain’ use (SDGs). Different governance responses at play to achieve balance. - ST1 priorities inc. finalizing membership of group, scope & focus of work (inc. connecting IIOE-2 with key policy fora) and document in working plan for 2017.
	<p>ST2 Boundary current dynamics, upwelling variability and ecosystem impacts –P Vinayachandran</p>	<ul style="list-style-type: none"> - A broad scientific picture of circulation in the IO and the ecosystems response (SST via satellite data) exists, but modelling of the whole system (Arabian Sea, Bay of Bengal and equatorial IO – ref leaky wave-guide) must be undertaken to simulate the seasonal circulation of its parts. - WIOURI and EIOURI will study in detail circulation and upwelling on the western side and eastern side respectively. - Several pilot cruises under EIOURI have been conducted. Several funded proposals by Indonesia, China & Japan are next, with further proposals by USA & Australia pending funding. - Group to consider project management, data management plan structures; and simple/effective procedures for observations in EEZs.
	<p>ST3 Monsoon variability and ecosystem response –Adrian Mathews</p>	<ul style="list-style-type: none"> - New large-domain, high-resolution, coupled models exist (“convection permitting modelling”) - ST3 focus on targeted (in situ) observations at small scales as part process studies. Observations via new autonomous technology (i.e. ocean & wave gliders, Bio-Argo). - To pick up ecosystem response to monsoon variability “modes” process studies need to inc. physical + biogeochemical (BGC) aspects at design level, instrumentation on same platform, and interactive BGC modelling - ST3 modelling strategy – process based with validation against in situ IIOE-2 observation data; forecast ensembles of convection permitting atmospheric models coupled to high resolution ocean models (objective to assess role of specific physical processes on forecast skill over range time scales) - Need to seek specific modelling expertise onto ST3 - Try to link with YMC and S2S - Proactively encouraging research proposals
	<p>ST4 Circulation, climate variability and change –Amit Tandon</p>	<ul style="list-style-type: none"> - Many ongoing programs inform the work of ST4 (i.e. RAMA 2.0, ARGO, Go-Ship, ASIRI-OMM, BoBBLE, NASCAR) - WIOURI, EIOURI and MISO-BOB will contribute - Will look to hold sessions on ST4 activities at International Conferences - Many challenges – short timeframes, collaborative work in EEZs.

	ST5 Extreme events and their impacts on ecosystems and human populations – Charitha Pattiaratchi	<ul style="list-style-type: none"> - IO subject to many extreme's: cyclones, tsunami, storm surge - ST5 will address questions: How do extreme events impact coastal & open-ocean ecosystems?; How will climate change impact frequency and/or severity of extreme weather/oceanic events?; what are combined threats of extreme weather events and sea level rise on human populations in low-lying coastal zones and SIDS.?
	ST6 Unique geological, physical, biogeochemical and ecological features of the Indian Ocean –Jerome Dymont	No ppt. Please see SC draft minutes for summary of discussion.
Friday 3 Feb 2017		
0900-1100	Working Group progress reports	
	WG1 Science and Research –Hermann Bange	<ul style="list-style-type: none"> - Membership for ST1 could comprise a core group being ST leaders plus associate members - Need good information flow - Review/assess ongoing IO science in context IIOE-2 Science Plan. Id new topics, research questions and cross-cutting initiatives. - Meetings, networks – active methods - Mid-term status check/update – symposium/conference
	WG2 Data and Information Management –Cynthia Chandler	<ul style="list-style-type: none"> - Implementation Plan sets out objectives (i.e. FAIR data principles) and actionable recommendations (i.e. published data policy for IIOE2) - Initiatives of relevance: SCHOLOX.org; IODE – data management & capacity development; OBIS - IODE IIOE2 WG – meeting in Malaysia, March 2017 - Model good 'global research citizenship'
	WG3 Capacity Development –Zainal Arifin	<ul style="list-style-type: none"> - Proposed activities 2017: <ul style="list-style-type: none"> o enhancement Regional Training & Research Centers (RTRC) in Iran (Regional & Education Research Centre on Oceanography for West Asia – ROCWA) & Indonesia (RTRC on Marine Biodiversity & Ecosystem Health at LIPI + field stations); o joint conference (Oct 2017 in Tehran); joint workshop
	WG4 Operational Coordination –Shailesh Nayak	<ul style="list-style-type: none"> - Completed tasks include project endorsement template; website developed as central portal of information with further functionality to be added. - Close alignment with WG3 needed to align capacity and resources with research needs - To do: establish opportunity/volunteer database of commercial ships/fixed platforms; est. database in-kind support; evaluate certified reference materials & standard analytical methods (GoSHIP, GEOTRACES etc.) and recommend for use where appropriate; use of JCOMMOPS for maintenance of observation systems
	WG5 Outreach and Communication – Faiza Al	No ppt. Please see SC draft minutes for summary of discussion.

	Yamani	
	WG6 Translating Science for Society –Rezah Badal	<ul style="list-style-type: none"> - ToR to be defined - A strategic approach (plan & timeframe) will be developed - Baseline assessments - will seek to utilise existing data platforms, tools & info. - Will map science out of IIOE-2 to societal needs (i.e. African Outlook defines priorities for the continent) - Utilise existing communication channels for information sharing.
1130-1300	WG 7 Resources and Sponsorship – by or on behalf of Nick D’Adamo / Rajan Sivaramakrishnan	No ppt. Please see SC draft minutes for summary of discussion.
	IOC Regional Bodies/Committees progress reports	
	IOC AFRICA – Johnson Kazungi via notes to M Odido	<ul style="list-style-type: none"> - Draft regional IIOE2 plan for WIO to be discussed IOCAFICA session - Kenyan and South African joint survey Q3 2017. Vessels both countries involved. Preceded by workshop on operational oceanography in Cape Town. - New RV Fridjhof Nansen likely in IO whole of 2018. Need to start discussions with FAO/NANSEN regarding collaboration (WIO & EIO) in IIOE2.
	IOC WESTPAC – Somkiat Khokiattiwong / Kentaro Ando	<ul style="list-style-type: none"> - WESTPAC has engaged MS in IIOE-2 across a number of fora, including discussions at Advisory Group meetings (Jan 2016) at a side meeting at the IOC Assembly (June 2016). - WESTPAC MS sought clarification on issues such as communication, transition of Implementation Strategy into operational plans and how countries can engage. - Potential WESTPAC IIOE-2 aligned activities – MOMSEI, OFS, OA, RTRC-ODC, RTRC-BestMar.
	IOCINDIO –SSC Sheno on behalf Chair IOCINDIO	<ul style="list-style-type: none"> - IOCINDIO-VI to be held in Kuwait, 15-16 April 2017 - Areas engagement: WIOURI, data sharing, capacity development, stakeholder communication & awareness plan
	Introduced presentation – NOAA-Bilateral agreements – IndoOS related & IIOE-2 aligned – Sidney Thurston	<ul style="list-style-type: none"> - New prospects under IIOE2 favorable for full implementation of RAMA. - IndoOS Review will guide RAMA design and implementation - EIO – close partnership with Indonesian BMKG - Central/WIO – Korean KIOST partnership on RV Isabu - WIO – piracy no longer a concern - Prospect – FY 2018 – NOAA RV Ronald H. Brown multidisciplinary deployment in IO
1400-1530	IIOE-2 National Committee progress reports	
	India – Satheesh Sheno	<ul style="list-style-type: none"> - Dr M. Rajeevan, Secretary, MoES – Chair - Issues of interest: <ul style="list-style-type: none"> o Understanding details of air-sea interactions in Arabian Sea and BoB

		<ul style="list-style-type: none"> ○ Understanding biogeochemical processes in Arabian Sea and BoB ○ Hydrodynamics and biogeochemistry of the southern subtropical IO ○ Boundary currents and biogeochemistry of coastal waters around India - Major collaborations inc. BoB boundary layer experiment, ocean mixing & monsoon, RAMA - Several cruises already completed
	South Africa –on behalf of Ashley Johnson	<ul style="list-style-type: none"> - IIOE-2 South Africa activities embedded in regional/IOCAFRICA plans - Focus on moorings & est. regional centers of competence (Cape Town – Operational Oceanography, Mauritius – Remote sensing, Zanzibar – Biodiversity) - Links to POGO to attract scientists - SA Agulhas II to become floating training facility
	USA – Raleigh Hood	<ul style="list-style-type: none"> - Ad hoc unfunded committee. Defined ToR. - Website active, hosted by SCOR - ASLO Bulletin article - Newsletter - US email distribution - IO cruise/research spreadsheet - US research planning workshop – Sept 2017 @ Scripps Inst. Oceanography
	Australia – Lynnath Beckley	<ul style="list-style-type: none"> - Ad hoc unfunded committee. Defined ToR - Collated IO research spreadsheet - Aust. Implementation Plan under development - Much ongoing & proposed research aligns with IIOE2 themes - Some specific IIOE2 projects have been developed - Welcome collaborative multi-national opportunities
	Germany – Hermann Bange	<ul style="list-style-type: none"> - Active. Co-convened sessions on IO at EGU, published ‘Science Prospectus’, articles. - Prospectus initiatives inc: BIOCAN-IIOE2; GEOTRACES – South IO; MASCARA; CAHOL; ARAKAN; BIOCAT-IIOE2; UNION; + many more - Opportunity int. symposium as retrospective & quintessence of 5yrs IIOE2 along with 50th anniversary Kiel meeting – April 2021? - Legacy opportunities: flyers, fact sheets, books, report series, IIOE2 exhibition. - Communication – develop ppt slides to introduce IIOE2 (downloadable website)
	UK – Greg Cowie	<ul style="list-style-type: none"> - Committee established - Several activities, funded plans and submitted proposals for science contributing to IIOE-2 - Examples: ocean glider campaign off Oman, BoBBLE, CHAGOS 15/16 pelagic expeditions, GOGO:GADGET, HotHouse proposal via YMC, HYBOB
	Korea – Tae Keon Rho	<ul style="list-style-type: none"> - KIOST study - IO variability and biogeochemical cycle (2017-2019) - Contribution to RAMA, Go-SHIP, CLIVAR repeat Hydrography, GCOs and GOOS, GEOTRACES - Contribution to IIOE-2 – Themes 2,3,4

		<ul style="list-style-type: none"> - Provided international nutrient intercalibration (onboard) on RV Investigator voyage IN2017_V2
1600-1730	Research initiatives and cruises (existing and emerging) reports.	
	First IIOE-2 Research Cruise. RV Sagar Nidhi cruise – P. N. Vinayachandran	<ul style="list-style-type: none"> - Multi-national cruise from Goa to Mauritius - Presented on range observations undertaken (i.e. atmospheric & aerosols, multi-beam bathymetry, planktonic gastropods, mesozooplankton, ambient noise, FRRF, CTDs) and some preliminary results.
	Eastern Indian Ocean Upwelling Research Initiative (EIOURI) –Raleigh Hood	<ul style="list-style-type: none"> - Website. Inc. research activities and planned cruises - Project will inc. observations, numerical modelling, data management, capacity building and outreach activities - Research interests: dynamics of ocean/climate variations, nitrogen cycle in BoB, mapping of biogeography and biogeochemistry, bio-physical relations in upwelling regions - Several cruises: Oct/Nov 2017, 2018 Fall – 2018/19 Winter, 2019 summer - China has several proposed activities, inc. continuous support for 2 RAMA moorings, new moorings & extensive survey tuna spawning ground (Sept-Oct 2017). - Several SIBER EIOURI proposals submitted/pending
	Western Indian Ocean Upwelling Research Initiative (WIOURI) – Mike Roberts	<ul style="list-style-type: none"> - Concept document exists, but no Science Plan. Propose write SIBER review paper – highlighting knowledge and gaps – publish. Aug 2017. - Limiting factors to getting started: funding for meetings/communication/coordination; full-time secretariat/coordination center - A UK-SA Bilateral Research Chair position has been established (Mike Roberts). Small budget. Working on NOC-NMU-WIOMSA Innovation Bridge – capacity building between world-class marine centers in developed countries and regional ‘grounded’ nodes in WIO. - No national funding. Reliant international funding. Funding decision pending – UK GCRF (ODA) – SOLSTICE-WIO bid (£8M) - Activities – Agulhas Current (ongoing); Mascarene Plateau (workshop May 2016 NOC); MADRidge (Seamount); EACC (part GCRF bid). Activities skewed SWIO at present.
	SIBER – Raleigh Hood	<ul style="list-style-type: none"> - Assets and Activities: SIBER website; Int. project office @ INCOIS in Hyderabad; Indian National SIBER program sponsored by MoES; India MOSAIC program; SIBER publishes review papers; exploration of ‘Hot Topics’ as possible new research themes/proposals; active in IndoOS Review; support capacity development (IOP-SIBER winter school at NIO 2018?) - Deployed BGC sensors in IO at 3 flux reference sites so far. - Work on quantifying nutrient fluxes through ITF - Intimately engaged in IIOE-2

		<ul style="list-style-type: none"> - Coordinating Deep-Sea Research special issue on IIOE-2
	IORP –Jerome Vialard	<ul style="list-style-type: none"> - IndoOS Review: Review the design & propose way forward in context of new scientific frontiers and observing technologies. - Draft proposal by Sept. 2017; Final report late 2018 - Sustained observations – key objective - IndoOS helps IIOE-2: background for process experiments; review provides input to IIOE-2 frontier science questions - IIOE-2 helps IndoOS: IIOE-2 cruises could help maintain/complete IndoOS array - Strong interaction between IORP & IIOE-2. Keep meeting together. IORP needs 2 days min to conduct their business.
	Challenger Glider Mission – Charitha Pattiaratchi	<ul style="list-style-type: none"> - Glider departed Perth on Perth to Sri Lanka transect - Data from glider to date presented - Challenges ahead - crossing some high-traffic shipping lanes
	IMOS – Charitha Pattiaratchi	<ul style="list-style-type: none"> - IMOS is research focused (role of ocean in the climate system, interactions between major boundary currents, shelf environments and ecosystems, preservation biodiversity) - Incorporates many facilities nationally, i.e. gliders, HF radar, Argo floats - Presented on WA oceanography
	IBPIO of JCOMM/DBCP – Boris Kelly-Gerreyn	<ul style="list-style-type: none"> - Buoy platforms measuring meteorological and oceanographic data for both real-time operational requirements and research purposes - Voluntary, multi-national collaboration - IBPIO aligns with themes 2 & 4 IIOE-2. Also relevant to themes 1,5,& 3 - Many gaps in IO. Need more in Arabian Sea and EIO - Looking to inc. collaboration with Indonesia & Mauritius and to seek out/start new collaborations with Madagascar, Mozambique, Oman & Somalia
	Red Sea – Burt Jones	<ul style="list-style-type: none"> - Presented oceanographic characteristics of the Red Sea and its connection to IO - Observing technology inc. remote sensing, wave gliders, AUVs, HF radar – inputs to meteorological & physical models - Joint KAUST-KAU research - Complexities with other national territories prevent system wide approach
	BMBF Germany – Hermann Bange	No ppt. Please see SC draft minutes for summary of discussion.
	HYBOB – Greg Cowie	<ul style="list-style-type: none"> - Prediction BoB will become fully hypoxic – huge socio-economic issue - UK-US project (NERC/NSF) – “HYBOB: Biogeochemical cycling and hypoxia in the Bay of Bengal coastal zone; the role of sediment discharge” - Monthly sampling 3 rivers & up/downstream sites on delta channels, seasonal comparison pelagic & benthic processes on continental shelf, manipulative experiments to assess mineral and O2

		<p>effects on OM cycling.</p> <ul style="list-style-type: none"> - Funding pending decision
	Australia (2 projects) - Lynnath Beckley)	No ppt. Please see SC draft minutes for summary of discussion.
	Russia – Sergey Shapovalov Presentation given by Vladimir Ryabinin	<ul style="list-style-type: none"> - RV Academician Boris Petrov cruise Jan-March 2017 - Ninety East Indian Ocean Ridge, equatorial undercurrent, ecosystem surveys - New project for ST6 – Geology & Geophysics of EIO (geodynamics, tectonics and evolution of unique intra-plate features). Russian PIs
	Global Oceans Indo-Pacific CD initiative - <i>submitted but not presented at the meeting.</i>	<ul style="list-style-type: none"> - MARVs – Modular Adaptive Research Vessels - MARVs integrate chartered offshore supply vessels (OSVs), adapted modular labs and a regional project office network for logistics - Organisational framework: institutional consortia lead research planning and utilization, collaborative cost sharing & expedition scheduling - Concept paper – Global Oceans: Indo-Pacific capacity development initiative working strategy and collaborative framework
Saturday 4 Feb 2017		
0930-1000	Early Career Scientists Network (ECSN).	
	ECSN overview – Danielle Su	<ul style="list-style-type: none"> - Overview of the network and membership – new active members being sought - Several communications tools – website (under development), Facebook page and monthly newsletter (under development); and several publications - Keen for stronger involvement across all WGs and STs of IIOE-2 & a mentoring program (i.e. GOAN Pier-2-Peer Program) - Looking to establish relationships with other regional/research ECSN (i.e. PICES, APECS)
	Model-based design of the overturning circulation observation strategies – Jie Ma	<ul style="list-style-type: none"> - CSIRO work that aligns with Theme 4 - Investigating best array design to monitor meridional overturning circulation in IO – est. inter annual and decadal variability of volume and heat transport - Preliminary results – mass transport has good agreement with model data (OFAM)
	Transport mechanisms and accumulation zones of buoyant marine plastic debris in IO – Mirjam van der Mheen	<ul style="list-style-type: none"> - Aligns to Theme 1 - Investigating which forcing mechanisms (surface currents, wind, vertical motion, stokes drift) influence the transport of buoyant marine plastic debris & how different transport mechanisms influence where they accumulate. - Analysis statistical model of drifter spread - Released home-made drifters – analysed & simulated drifter tracks using HF radar surface currents, wind and wave measurements, modelled current, wind & wave fields - Little IO research to date – filling gap.
	Interhemispheric gradient trends in IO SST – Ying Zhang	<ul style="list-style-type: none"> - CSIRO & South China Sea Institute of Oceanography collaboration - Investigating: heat budget of NIO and SIO,

		understanding dynamic and thermodynamic process, understanding multi-decadal variability and long-term trend of IO SST.
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Appendix 2. List of Action items.

No	Action	Responsible Members (principal focal point(s) shown, to combine an share action with co-chairs where applicable)
1	JPO with SC Co-Chairs support, as required. Liaise with governmental level bodies (eg IORA, UNESCO IOC), in their capacities as high level inter-governmentally framed alliances, to seek their advocacy and help in overcoming difficulties in achieving IIOE-2 multi-national research collaborations due to restrictions encountered due to sovereignty in waters within national jurisdictions (e.g. for permits, collaborative agreements etc.).	JPO: Nick D'Adamo (with Rajan Sivaramakrishnan).
2	Executive to work with ST and WG leaders to: finalise assessment of ST and WG 'membership' applications; settle on memberships; and develop team plans and associated deliverables.	SC Co-Chairs: plus ST leaders through Hermann Bange and WG leaders through Shailesh Nayak.
3	In respect to the IOC's current initiative in advocating at the UN level for an 'International Decade of Ocean Science (2021-30)' in response to SDG14, and recognizing related potential links and relevancies to IIOE-2, ensure that IIOE-2 is represented as relevant and as appropriate in that prospective initiative. This may be facilitated for the SC as whole through IOC's IIOE-2 roles on the SC and through the JPO.	Vladimir Ryabinin with support from JPO Australia (Nick D'Adamo)
4	IIOE-2 is to contact (via WG2: Data and Information Management) national IODE focal points, data centers etc to negotiate for data exchange as relevant to IIOE-2 and vice versa. For example, this liaison should include relevant bodies such as JCOMM, satellite data centers etc.	WG2: Cyndy Chandler.
5	As a priority, WG2 is to lead the development of guiding documents and associated activities in response to the IIOE-2 Implementation Plan's guidance starting with, as an urgent task, the development of an IIOE-2 data management plan, to include a data policy to address issues such as data sharing and release protocols, aiming as much as possible to align with the IOC data policy. This action will include, but not be limited to items such as: <ul style="list-style-type: none"> • Developing a standard text to be used in IIOE-2 relevant publications for making reference to the nature and amount of data in those publications that is attributable to IIOE-2; • organizing and leading a data and information management workshop involving, to the extent possible, SC Executive members, in order to identify and address data and information management issues, including those highlighted in the minutes from this meeting, and seeking the engagement of and taking into account existing relevant data management bodies and their frameworks as may be advised and recommended by IIOE-2 SC members (eg IODE). 	WG2: Cyndy Chandler.
6	WG5 (Outreach and Communication) is to seek the support of stakeholders in identifying and making available to IIOE-2 an expert science communicator to assist in WG5's mission.	WG5: Faiza Al-Yamani.
7	WG7 (Resources and Sponsorship) is to develop a resources and sponsorship strategic plan.	JPO: Nick D'Adamo and Rajan Sivaramakrishnan.
8	In addition to meeting as a part of annual full SC meetings, the Executive is to consider and if required undertake to meet inter-sessionally at least once per year.	Executive. JPO to facilitate.

9	The JPO is to begin scoping and undertake early planning with the Executive for what is to be an IIOE-2 major mid-term science symposium, aiming at early 2019.	JPO
10	Hermann Bange and Shailesh Nayak to lead a process, with the support of Jerome Vialard, Raleigh Hood and the JPO, to develop a 1-page statement identifying big picture ideas for IIOE-2, to be given to IOC Executive Secretary Vladimir Ryabinin, for consideration as input to the IOC Assembly Session No. 29 (June 2017).	Hermann Bange & Shailesh Nayak, Jerome Vialard and Raleigh Hood to support.
11	STs and WGs, through their leaders, should seek to enlist at least one ECSN researcher in their respective teams as a contribution to the objective of fostering emerging young scientists under IIOE-2.	ST and WG chairs.
12	<i>ECSN to self-organize, under the leadership of Danielle Su and facilitated by the JPO, with a focus on ECSN communication and integration, and on showcasing its own IIOE-2 related research.</i>	Danielle Su with ECSN members
13	Hermann Bange (for the STs) and Shailesh Nayak (for the WGs) are to coordinate/lead communications and meetings of their respective collectives of ST teams and WG teams by e-communications or face-to-face, at a frequency as deemed necessary and feasible by themselves and their own respective constituencies, and with relevant liaison and linkage to the Executive, Regional Coordination and Science Delivery SC members, and with relevant facilitation by the JPO.	Hermann Bange (for and with ST chairs) and Shailesh Nayak (for and with WG chairs).
14	The IIOE-2 Steering Committee Co-Chairs (Peter Burkill, Vladimir Ryabinin, Satheesh Shenoi) plus Hermann Bange (for the STs) plus Shailesh Nayak (for the WGs) plus Nick D'Adamo (Australia JPO Node) and Rajan Sivaramakrishnan (Indian JPO Node) are to meet regularly as a core group and on behalf of the Executive to consider and discuss cross-cutting matters.	Peter Burkill, Vladimir Ryabinin, Satheesh Shenoi, Rajan Sivaramakrishnan, Hermann Bange, Shailesh Nayak.
15	JPO to continue facilitating and coordinating annual full SC meetings, aiming for early in each calendar year (i.e. January to March).	JPO (Nick D'Adamo and Rajan Sivaramakrishnan) for and with full SC membership.
16	JPO to undertake early liaison and planning with Satheesh Shenoi on the prospect of India hosting a closing IIOE-2 conference, akin to the IIOE-2 launch/conference event that was held in Goa, Dec 2015.	JPO (Rajan Sivaramakrishnan and Nick D'Adamo), Satheesh Shenoi.
17	JPO to coordinate a formal letter of request to Dr Zainal Arifin for Indonesia to host the next integrated set of meetings (IOGOOS-14, IORP-14, SIBER-8, IRF-8, IIOE-2 SC2), for Feb/Mar 2018, with the request to include an outline of the estimated number of participants, a draft multi-group meeting schedule and essential logistical requirements, in order to enable the potential hosts to assess the request.	JPO (Nick D'Adamo & Rajan Sivaramakrishnan) in liaison with SC Co-Chairs plus IOGOOS, IORP, SIBER and IRF chairs, plus Zainal Arifin.
18	JPO to scope and negotiate on potential West Indian Ocean host countries for the 2019 SC meeting, focusing on identifying any possibilities through liaison with members of IOGOOS, IORP, SIBER, IRF and IIOE-2 SC.	JPO (Nick D'Adamo & Rajan Sivaramakrishnan) in liaison with SC Co-Chairs plus IOGOOS, IORP, SIBER and IRF chairs.
19	JPO to draft the minutes from the meeting and liaise with participants to finalise the minutes, including collating and making available all PPTs from the meeting.	JPO (Nick D'Adamo & Rajan Sivaramakrishnan) in liaison with IIOE-2 SC1 members.