The Second International Indian Ocean Expedition (IIOE-2) (2015-20) was launched under the joint leadership of UNESCO-IOC, the Indian Ocean Global Ocean Observing System Regional Alliance, and the Scientific Committee on Oceanic Research on 4 December 2015. The underpinning governance structure for IIOE-2, being the IIOE-2 Steering Committee, has met annually as has its sub-structure of science theme and working group teams driving IIOE-2, facilitating its objectives. These are highly relevant to IOC’s portfolio of interests across science for ocean and coupled climate systems, knowledge transfer and societal relevancy, GOOS, data and information management. The IIOE-2 is now positioned to contribute tangibly to the UN Decade of Ocean Science for Sustainable Development (2021–2030) under the IIOE-2 Steering Committee’s unanimous agreement to extend IIOE-2’s tenure well into the next decade (to at least 2025).

This Information Document presents a summary of progress by the IIOE-2 Steering Committee, its Joint Project Office and Member States through IOC Regional Sub-commissions and IIOE-2 National Committees under the six science themes, as an update since June 2018.

The IIOE-2 website is the recommended source for more detailed complementary information to this Document: www.iioe-2.incois.gov.in.
IIOE-2 Governance

The Second International Indian Ocean Expedition (2015-20) continued successfully in respect to its implementation, with support from a fully established international Steering Committee, which has grown in its constituency, and has continued to facilitate its Early Career Scientists Network (ECSN) and supporting scientific and operational teams.

The Committee is supported by an IIOE-2 Joint Project Office (JPO) with nodes in Australia and India. The JPO nodes are underpinned and resourced by their respective host governments and associated sponsors. The Committee continued to be supported by its three ‘co-chairs’ (in an oversight role) deriving from the IIOE-2’s co-sponsors, being IOC, SCOR and IOGOOS, and represented by Vladimir Ryabinin, Peter Burkill and Satheesh Shenoi, respectively.

The Committee has now met three times in full (Perth, February 2017; Jakarta, March 2018; and Port Elizabeth, March 2019) resulting in the facilitation of engagement over much of the overall Indian Ocean domain via focusses in the western, central and eastern Indian Ocean regions. These respective meetings were generously resourced and co-hosted by Australian, Indonesian and South African national government agencies and research and academic institutions, the IIOE-2’s JPO nodes (underpinned by their own hosts), SCOR, IOGOOS, IOC, WAGOOS and other sponsors. These Committee meetings continue to be held, as is annual practice, in an integrated manner and in conjunction with the collegially aligned groups of IOGOOS, IORP, SIBER and IRF, and in 2018 and 2019 along with side meetings of IOCINDIO stakeholders under the banner of the International Indian Ocean Science Conference (IIOSC) for 2017, 2018 and 2019, respectively. The most recent IIOE-2 SC3 meeting (as part of IIOSC 2019 – see http://www.iioe-2.incois.gov.in/IIOE-2/IIOSC2019.jsp) was strongly supported by co-host Nelson Mandela University of Port Elizabeth, South Africa. This included specific engagement of South African and other West Indian Ocean science stakeholders, including from SIDS and IOC Africa constituents, as well as engaging with the IIOE-2 endorsed project known as SOLSTICE. This brought with it resulting connections with SOLSTICE’s two underpinning national sponsors via South Africa (Nelson Mandela University) and UK (National Oceanography Centre, Southampton), and a special evening themed on ‘marine robotics’ hosted by the British High Commissioner.

The IIOE-2 SC3 meeting of March 2019 highlighted the growing number of IIOE-2 ‘Endorsed Projects’ having either been completed, underway or planned for not only the period out to 2020, but also into the next decade, including significant resulting scientific analyses, publications and collaborative opportunities for stakeholders from across all scientific levels relating to the Indian Ocean and adjoining oceans in respect to coupled ocean/climate interests. Some months before IIOSC 2019, the leaderships of the IIOE-2’s six science theme teams met under SCOR support and hosted by GEOMAR in Kiel Germany to take stock of the science achieved to that point and identify future science achievements and outputs via IIOE-2. This resulted in a substantive expose of science both produced and in preparation, including dedicated special journal editions, papers, conference inputs, etc. The Steering Committee at its March 2019 meeting then discussed and confirmed what had been an earlier implicit but now emergent explicit appreciation and acknowledgement that the IIOE-2 is achieving important progress and relevancy to observing and understanding the Indian Ocean at the oceanic and coupled climate science levels with contemporary relevancy for society across many important facets. It agreed that the future is bright in terms of the now well harmonised IIOE-2 community being able to take advantage of its momentum and collaborative constituency to enter into the next decade as a scientific alliance that can make further advances in terms of the IIOE-2’s mission. Furthermore, it importantly emphasised how it can make a material contribution to the UN Decade given its now highly developed governance and operating framework (under the structure of the Steering Committee), continuing to be supported by the commitments offered by the two Nodes of the IIOE-2 Joint Project Office respectively out of UNESCO IOC Perth Programme.

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1 IOGOOS = Indian Ocean Global Ocean Observing System ‘Regional Alliance’; IORP = Indian Ocean Region Panel of IOC-GOOS/CLIVAR; SIBER = Sustained Indian Ocean Biogeochemistry and Ecosystem research of IOGOOS/IMBER; IRF = Indian Ocean Observing System Resources Forum of IOGOOS.
Office (Australia) and Indian National Centre for Ocean Information Services (Hyderabad, India). The Committee recorded its agreed aspiration for IIOE-2 to be continued under its auspices as follows (quote from IIOE-2 Steering Committee No 3, 12-13 March 2019):

“The IIOE-2 International Steering Committee, chaired by representatives of IOC, SCOR and IOGOOS, and comprising a diverse multi-national constituency, agreed to continue the mission of the IIOE-2 out to at least 2025, in order to build on the significant scientific achievements of IIOE-2 to date, the extension that will occur of many current and imminent major IIOE-2 research initiatives into the next decade, the expected emergence of many new major scientific initiatives well into the next decade strongly aligning with the IIOE-2 Science Plan, and in light of IIOE-2’s clear alignment, relevancy and potential to make an important and substantive contribution to the UN Decade of Marine Science for Sustainable Development 2021-30.”

Plans have now also consolidated for the International Indian Ocean Science Symposium 2020 (https://iiosc2020.incois.gov.in/) which will hosted by the Ministry of Earth Sciences of the Indian Government, in Goa. This will include a major dedicated scientific conference running on 16–20 March 2020, which will then be immediately followed by the annual meetings IIOE-2 SC, IOGOOS, IORP, SIBER and IRF also under the same Indian Government hosting but with the exact integrated scheduling still under development. The 16–20 March 2020 dedicated science conference will include a strong focus and explicit links to the IIOE-2 science objectives – including reference to the IIOE-2 Science Plan’s six scientific themes. The Symposium has respective national and international organising committees established, with the international committee including high level representatives of the three IIOE-2 co-sponsors (i.e. from IOC, SCOR and IOGOOS). The event will detail IIOE-2’s achievements (across science and societal benefit). It is now clear that it will be a formative motivational event, or platform, for a continued IIOE-2 into the next decade. A continuance that is being regarded as essential for reasons such as: scientific continuity; facilitating expected endorsed IIOE-2 projects that will begin over the coming few years and reaching well into the next decade; the capacity to engage an ever-growing scientific and user constituency; and facilitation of the IIOE-2’s legacy (e.g. in terms of science outputs and advances, scientific infrastructure developments, and capacity development). And of course, the now clear motivational factor that the IIOE-2 is prepared and ready to assume a natural and important contribution to the UN Decade of Ocean Science for Sustainable Development (2021–2030).

The IOC’s own key conduits into the IIOE-2 Steering Committee is maintained through its role as one of the three principal co-sponsors, represented through the Executive Secretary of IOC. It also includes representation in the Executive of the Committee through the IOC IIOE-2 Coordinator of the IIOE-2 Australia Node of the Joint Project Office, and through IOC related constituents representing the IOC’s regional bodies of IOCINDIO, IOCAFIRICA and IOC WESTPAC.
The IOC Regional Committee for the Central Indian Ocean (IOCINDIO) again held an opportunistic meeting of IOCINDIO constituents that were present at IIOSC 2019 (Port Elizabeth) and again discussed strategies and objectives going forward with strong links to the IIOE-2, as expressed in IOCINDIO’s sessional reports and especially through IOCINDIO’s North-West Indian Ocean (IO) members.

The IOC Sub-Commission for Africa and the Adjacent Island States (IOCAFRIA) continued to be proactive in IIOE-2, as presented through a briefing at IIOE-2 SC3 via Mika Odido of the IOC Africa Secretariat, Nairobi. The ECSN aspect of IIOE-2 also highlighted its West Indian Ocean early career researcher constituency and work relating to IIOE-2.

The IOC Sub-Commission for the Western Pacific (WESTPAC) continues to address IIOE-2 in its advisory group meetings, in respect to how to engage in the IIOE-2 at the WESTPAC level. Furthermore, and notwithstanding this WESTPAC-wide consideration, there continued to also be significant engagement emanating from countries that are members of WESTPAC, at the scientist/institutional levels, such as through specific endorsed IIOE-2 activities, including cruises and related research activities under the endorsed Eastern Indian Ocean Upwelling Research Initiative and through IIOE-2 National Committees such as those of Japan and Australia. Republic of Korea also had a strong presence this year at the IIOE-2 SC3 in Port Elizabeth. France added to the IIOE-2 National Committee list and Indonesian constituents have reiterated that the formation of an Indonesian IIOE-2 National Committee is now under strong consideration.

**Activities and Data**

The IIOE-2 highlights brochure produced for the IIOE-2 Steering Committee No 3 meeting of 12–13 March 2019 presents information on activities and is available at www.iioe-2.incois.gov.in or [IOC/INF-1351 Part 3 – page 4](#)
directly via the JPO Node offices in Australia and India. It has also been added to the Assembly’s set of documents for reference. As an update and in brief however: the number of functional IIOE-2 National Committees (South Africa, Germany, UK, India, USA, Australia, France and Japan) and endorsed IIOE-2 research activities has now grown to 8 and over 35, respectively. The endorsed research activities have been submitted to the Steering Committee via representatives under the auspices of a growing list of countries, which to date include Australia, Austria, Belgium, Canada, Chile, China, Denmark, France, Germany, India, Indonesia, I.R. Iran, Israel, Japan, Kenya, Mauritius, New Zealand, Norway, Pakistan, Republic of Korea, Russian Federation, Saudi Arabia, Singapore, South Africa, Tanzania, UK and USA. The number of endorsed activities will continue to increase. The engagement in the IIOE-2 continues to cut across all six of the IIOE-2 science plan themes (human impacts and benefits; boundary current dynamics, upwelling variability and ecosystem impacts; monsoon variability and ecosystem response; circulation, climate variability and change; extreme events and their impacts on ecosystems and human populations; unique geological, physical, biogeochemical, and ecological features of the Indian Ocean).

The feature of most of these endorsed activities involving major research cruises has been maintained. They continue to undertake research across the breadth and width of the Indian Ocean and many have and will continue make provision for external participants from all IOC Member States, including from the SIDS of the Indian Ocean region. For example, the most recent endorsed project cruise, being the so referred to 110E cruise of the eastern Indian Ocean under the overall leadership of Professor Lynnath Beckley of Australia, involved some 10 other senior principal investigators from a wide international community and engaged many other senior and early career researchers – aboard the Australian RV Investigator. Some of the IIOE-2’s endorsed activities continue to make explicit and tangible contributions to GOOS, specifically through supporting and enhancing the Indian Ocean Observing System (IndOOS), for which the IndOOS Decadal Review is now almost ready for publication. When the Review is released the community will note its strong linkages and alliances with the IIOE-2, whereby the IndOOS and IIOE-2 communities will be seen to overlap significantly both thematically and in terms of personnel.

The range of research being tackled by IIOE-2 continues to be relevant not only to the Indian Ocean and its immediate continental surrounds per se, but also to far away countries and to global Earth ocean/climate cycles.

A Data and Information Management Plan has been taken to final checking phase written in alignment with IOC’s IODE. An IIOE-2 Metadata Portal at the Indian Node of the JPO operates under the framework of the IIOE-2 Regional Coordination Unit for Data and Information Management. The Indian JPO oversees the IIOE-2 website and other key communication products (monthly newsletters, Indian Ocean Bubble, etc.) which communicate the IIOE-2 regularly and widely. The IIOE-2 continued to be represented by JPO and Steering Committee members at multiple national and international forums around the Indian Ocean region and globally, including major science forums. The IIOE-2’s science activities continue to be represented in the form of scientific publications, including representations at major international conferences and through the publication of science papers and through special journal editions (e.g. Deep Sea Research). The value of the full set of endorsed IIOE-2 projects (valuing their cruises, personnel efforts, and project fund allocations) is well into the $10s millions.

Further information on IIOE-2 status and progress can be sought from the IIOE-2 website (www.iioe-2.incois.gov.in), or via the Joint Project Office nodes (India – satyap@incois.gov.in and Australia – nick.dadamo@bom.gov.au and n.d-adamo@unesco.org).


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