IIOE-2

2nd International Indian Ocean Expedition

2015-2030

Eighth meeting of the International Steering Committee of the Second International Indian Ocean Expedition 2015-30

IIOE-2 SC8

REPORT

By

IIOE-2 Project Office, India (INCOIS, Hyderabad)

6th and 7th May 2025

Labourdonnais Waterfront Hotel
Port Louis, Mauritius

Contents

1. Preamble

The Second International Indian Ocean Expedition (IIOE-2) is a major global scientific program that engages the international scientific community in collaborative oceanographic and atmospheric research from coastal environments to the deep sea revealing new information on the Indian Ocean (e.g. its currents, its influence upon the climate, its marine ecosystems) which is fundamental for future sustainable development and expansion of the Indian Ocean's blue economy. The program was initially formulated for a period of five years (2015-2020) which was subsequently extended for another five years (till 2025) considering its importance. A large number of scientists from research institutions from around the Indian Ocean and beyond planned their involvement in IIOE-2 in accordance with the IIOE-2 Science Plan and its overarching six scientific themes of the program. IIOE-2 activities also include a significant focus on the capacity building of nations around the Indian Ocean to understand and apply observational data or research outputs for their own socio-economic requirements and decisions. In addition, an Early Career Scientists Network (ECSN) was also formed to facilitate the exchange of knowledge, translation of the science and information outputs for societal benefit, and the training of early career constituents from surrounding nations in these areas. Details on the IIOE-2's program, including its the governance structure, Steering Committee (SC), National committees, working groups and science themes are available at https://iioe-2.incois.gov.in/IIOE-2/index.jsp.

The eighth meeting of the IIOE-2 International Steering Committee (IIOE-2 SC8) was held at Labourdonnais Waterfront Hotel, Port Louis, Mauritius during 6th to 7th May 2025. As customary since 2015, IIOE-2 meeting was held as part of an integrated set of meetings (spanning 5th to 9th May 2025 at the same venue) including - Sustained Indian Ocean Biogeochemistry and Ecosystem Research of IMBeR and IOGOOS (SIBER: 17th major meeting), Indian Ocean Region Panel of CLIVAR/IOC-GOOS (IORP: 21st major meeting), Indian Ocean Observing System Resources Forum of IOGOOS (IRF: 17th major meeting) and Indian Ocean Global Ocean Observing System (IOGOOS: 20th major meeting) along with the workshop of Korea-US Indian Ocean Science (KUDOS) and Early Career Scientist Network (ECSN). The meeting was hosted by Department for Continental Shelf, Maritime Zones Administration & Exploration of Prime Minister's Office, Republic of Mauritius.

The Information Booklet is available at https://iioe-2.incois.gov.in/documents/IOGOOS20/IOGOOSXX_Meeting_InformationBooklet_2025.pdf

The agenda of the eighth meeting of the International Steering Committee of Second International Indian Ocean Expedition (IIOE-2 SC8) is available at https://iioe-2.incois.gov.in/documents/IOGOOS20/ProvisionalAgenda_IOGOOS20.pdf

2. Proceedings of the meeting

This report acts as the minutes meeting in the form of a report style record to the meeting's agenda items and related actions thereof. The meeting of the IIOE-2 SC8 included report by the representatives of the National Committee, Working Groups and Science Themes. Further business proceedings were carried out as outlined in the agenda.

3. IIOE-2 National Committee reports

In this session, representatives from 10 countries (India, Australia, France, Japan, South Africa, Germany, United States of America, United Kingdom, Indonesia and Korea) presented the national activities under IIOE-2. Dr T M Balakrishnan Nair presented the National Committee Report for India. Intan Suci Nurhati presented for Indonesia on behalf of Ocky Karna Radjasa. There was no presentation from China, so it was not included in the report. The highlights are as follows:

3.1. India: Dr. T.M. Balakrishnan Nair

Dr T.M. Balakrishnan Nair presented the national committee report for India at the IIOE-2 SC8 meeting. The report highlighted India's active contributions to Indian Ocean research through MoES institutions, research cruises, and IIOE-2 project office India activities. The report covered the multiple cruises conducted in 2024-2025, which included EKAMSAT and glider deployment and recovery across the Arabian Sea, the coast of Mauritius, the central Indian Ocean, and the Southern Ocean. Coastal expeditions addressed jellyfish aggregations in the Bay of Bengal and sensor validation for water quality observatories off Kochi. The report also provided details about the number of upcoming cruises under EKAMSAT and the deep ocean mission. The IIOE-2 Project Office India maintained the active IIOE-2 website, metadata portal and endorsed project that align with IIOE-2. The office is also involved in active outreach activities through the Indian Ocean Bubble and the monthly newsletter. The presentation emphasized that these efforts strengthen India's capacity in observational oceanography and contribute significantly to the objectives of IIOE-2.

3.2. Indonesia: Intan Suci Nurhati

Dr Intan Suci Nurhati presented Indonesia's report on the International Indian Ocean Expedition-2 (IIOE-2) on behalf of Ocky Karna Radjasa. It covered the updates on Ocean observation, ocean literacy and various research on biogeochemistry. Key highlights include Indonesia Cable-Based Tsunameter (INACBT), Strategic Maritime Observing System and Ocean Literacy Program to Strengthen Socio-Economic Resilience in Coastal Areas. Presentation detailed about three scientific cruises carried out in 2024, including Java Trench Expedition (IDSSE) for deep-sea biodiversity and geology, Indonesian Mission (OCEANX) for Multidisciplinary studies, and southern Java upwelling and TRIUMP (FIO, UMD) for studies on Indonesian Throughflow. The report discussed the Indonesia Marine Biogeochemistry Forum, a collaborative platform for advancing marine biogeochemistry research in Indonesia, which acts as a bridge for SIBER activities. Additionally, the recent publication and ongoing work on sources of oxygen-depleted waters and upwelling-induced oxygen-depleted waters in the Sumatra-Java coasts are also covered. A Pan-CLIVAR meeting will be held from 22-26 September 2025 in Bali, Indonesia, bringing together CLIVAR members from all panels, Research Foci, and SSG, as well as representatives from WCRP core-projects and external partners.

3.3. Australia: Lynnath Beckley

Prof Lynnath Beckley presented Australia's contributions to the Second International Indian Ocean Expedition (IIOE-2). Dr. Beckley highlights the status of seven endorsed projects and their outcomes in terms of conference talks and publications showcasing Australia's significant involvement in IIOE-2. She mentioned the changes in the Australian IIOE-2 committee, which comprises about 21 representatives from diverse institutions nationwide. Notable miscellaneous other contributions include the Monaco expedition in the western Indian Ocean and the BLOOFINZ project are briefed. Dr. Beckley also noted the supporting services and infrastructure for IIO-2 activities from the Bureau of Meteorology, the Marine National Facility and Marine Parks. The significance of Geoscience Australia and event-based sampling strategies is discussed. Dr. Beckley concluded the report by highlighting updates on integrated marine observing systems (IMOS)

3.4. France: Jean-François Ternon

Dr Jean Francois Ternon presented the IIOE-2 National Committee report from France, highlighting the updates of diverse French projects covered under six scientific themes of the IIOE-2. The project, Vulnerability of Kenyan Coastal Ecosystems under climate and non-climatic stress (IRP VOKCE), contributes to ST-1 and ST-6. While Bio-physical coupling at sub-mesoscale in the Southwest Indian Ocean: the RESILIENCE project is included in ST-2. The report also provided information on other projects such as OISO (carbon observations since 1997), THEMISTO (mesozooplankton and micronekton ecology), and HOA-GEODAMS (hydroacoustic and geophysical monitoring of ridge dynamics near Amsterdam Island). The REVOSIMA observatory is now fully operating for monitoring of volcanic and seismic activity. The report concluded by detailing future endeavours such as the Deep-Sea Research Special Issue, articles on all 8 scientific projects of the Monaco Exploration, and the Final Science to Policy Workshop planned in Mauritius (November 2025).

3.5. Germany: Hermann Bange

The German National Committee Report presented by Dr Birgit Gaye, summarises ongoing and planned research initiatives and cruises. The committee was established in 2016 by the German SCOR committee, which comprises distinguished members from various institutions. Notable projects include EASI, focusing on East Antarctic Ice Sheet Instabilities, and BIOGIN-IIOE2, investigating biochemistry in the equatorial Indian Ocean. Funded projects like INDOCRISIS and SAMOVAR aim to understand oceanic responses to climate change and monsoon variability. The Bengal shelf cruise investigated the interplay of monsoon, tectonics, and subsidence of anthropogenic impact. Biogeochemistry-Atmosphere Processes in the Bay of Bengal: A contribution to the International Indian Ocean Expedition 2 (BIOCAT-IIOE-2) aim to understand the nitrogen cycling and atmospheric interactions of trace gases. The other completed cruises include Emerging pollutants and microplastic abundance in surface waters of the Indian Ocean (EPOLIO), CoWIO: Cold Water Corals in the

West Indian Ocean and GEOTRACES GIO7– South Indian Ocean. Additionally, the report discussed the collaborations between institutions and publications, including the IO Book and articles by prominent researchers.

3.6. Japan: Yukio Masumoto

The third term of the IIOE-2 National committee, chaired by Prof Yukio Masumoto, started in October 2023 for another 3 years to cover the period of IIOE-2. The committee was established in 2017 and has actively promoted Indian Ocean research. The committee aims to advance IIOE-2 within Japan, facilitate outreach activities, and discuss future research directions. The recent activities include R/V Hakuho-Maru cruise, research promotion using existing data and numerical models, and organisation of Indian Ocean Sessions at JpGU and OSJ Fall Meeting. The committee also conducted an expedition in collaboration with the Mauritius government under the MOU between AORI and CSMZAE. The report highlighted various research activities and publications. The notable research work includes Interdecadal modulation of Ningaloo Nino/ Nina strength by the AMO, Oceanic processes for interannual SST variability in the Somali Current region, and Modulation of Surface Seawater CO_2 System at 80°E: Impacts of the Positive IOD in 2019. Through its initiatives, the committee drives progress in Indian Ocean science and nurtures partnerships across the global oceanographic community.

3.7. Korea – Dong-Jin Kang

Dr Dong-Jin Kang presented the IIOE-2 National Committee report for Korea. The IIOE-2 activities through the KIOS project are led by the Korean Institute of Ocean Science & Technology (KIOST). The report highlighted recent cruises, the status of the RAMA mooring, and project updates. Notable other endeavours include underwater gliders and high-resolution nutrient observations. Publications cover diverse topics, such as Particulate Organic Carbon Export Fluxes, acoustic characterisation of fish and macroplankton, marine heatwaves, and microplastics. The report also emphasized active involvement in capacity building and public outreach through YouTube, the IIOE-2 Newsletter, and a seminar organised by the Korea Science Journalists Association. The conclusion outlined future plans, including scientific expeditions, financial support for KIOS, and international collaboration and workshops.

3.8. South Africa: Jenny Huggett

The South African Initiatives in support of IIOE-2, presented by Dr Jenny Huggett, highlighted the South African-led /co-led Endorsed Projects and collaborations. Project EP-56, A Regional Marine Spatial Plan for the Western Indian Ocean (WIO MSP), aim to create an inclusive and holistic MSP process that produces a regional marine spatial plan to support the sustainable management of ocean and coastal ecosystems for all. While the project EP-57, The role of the Agulhas Current on the Coastal Environment, aims to investigate the influence of the Agulhas Current, and in particular processes and anomalous physical events (such as meanders, trapped

cyclonic eddies and upwelling), on the adjacent coastal region and downstream in Algoa Bay. Multiple cruises and deployment of the Seatrec Argo float and Uncrewed Surface Vehicle are carried out as part of this project. Further regional research cruises in the WIO by a possible joint exercise between 3 Departments, including Forestry, Fisheries & Environment (DFFE), Science and Innovation (DSI) and Higher Education & Training (DHET). The United Nations Ocean Decade framework (2021-2030) endorsed an action programme called The OceanX and OceanQuest 'Around Africa Expedition' contributes to the capacity building and scientific understanding of the ocean. Additionally, different levels of microplastic monitoring projects and SGD reporting contribute comprehensive understanding of the region's marine environment. The report also discussed Pelagic High Seas Ocean eCoregionalisation in the Indian Subantarctic (PHOCIS) project, which aims to develop a spatial understanding of the pelagic ecosystem in the epi- and mesopelagic zones across the CCAMLR subantarctic Indian Ocean region. The report concluded with a briefing on the 13th WIOMSA Scientific Symposium, which will be held at Mombasa, Kenya, from 28th September – 3rd October 2025.

3.9. United States of America: Raleigh Hood

Prof Raleigh Hood presented the national committee report for the United States, highlighting US IIOE-2 Steering Committee activities, Korea–US Bilateral activities, and RAMA 2.0 activities. The Steering Committee aims to track US research activities in the Indian Ocean and submit proposals to ONR, NSF, NOAA, and NASA to conduct research in the Indian Ocean. The report provides the details of the IIOE-2 website hosted by the US Ocean Carbon Biogeochemistry Program and the Science plan of the steering committee. The US has 10 endorsed projects and discussed the update of completed and upcoming projects. The presentation further briefed the updates of KUDOS, which has institutionalised KUDOS cruises into 2026 and is supporting RAMA and other international collaborative efforts. The report concluded with details on RAMA.2, in which seven deployments in 2024 were conducted with support from India and Korea, and more than 15 moorings are now functioning.

3.10. United Kingdom: Greg Cowie

Dr Greg Cowie presented the national committee report for United Kingdom. The University of Plymouth led the United Kingdom in the Indian Ocean research, and the national committee report highlighted the progress and outcome of four projects in the Indian Ocean. As part of the Oceanographic drivers of ecosystem variability in the Chagos Archipelago, three research cruises were conducted with extensive physical oceanography, mesophotic coral, fisheries acoustics, and multibeam surveys. Another project on multi-scale numeric modelling aims to explain how physical oceanography drives ecosystem response and species behaviour throughout the Indian Ocean. The report also discussed the other notable projects, such as Mesophotic bleaching during the 2024-2025 El Niño event, and Vulnerability and resilience of mesophotic coral ecosystems (MCEs) to climate change. The report

concluded with an emphasis on capacity building, including cost-effective observational methods and training programs in Ghana and Kenya.

4. IIOE-2 Working group reports.

In this session, the latest updates of three working groups (WG) were presented, and the significant updates are highlighted below

4.1. WG-1: Science and Research – Raleigh Hood

The IIOE-2 WG-1 report outlined the progress in international participation and research initiatives, the status of working groups, scientific themes and Cruises/ RAMA activities, and the products associated with IIOE-2. The research initiative consists of 52 endorsed projects involving 20 countries and focuses on the Indian Ocean upwelling, maritime continents, and KUDOS. A new initiative called Coastal Observation Lab in a Box (COLaB) was introduced to provide low-cost instruments for training for physical, biological and biogeochemical coastal observations in the region. According to the IPO website, 16 Official IIOE-2 research cruises have been completed thus far, and more than 75 Official Cruises are completed, ongoing and planned. Seven deployments in 2024 with support from India and Korea were carried out as part of RAMA.2, and more than 15 moorings are functioning now. More than 80 papers have been published in special issues on IIOE-2 in DSR II, and also published an interdisciplinary Elsevier book of synthesis chapters on the Indian Ocean. The report concluded with details on the IIOE-2 Science Plan Addendum, which was presented to SCOR at their annual meeting in Shanghai in October 2024.

4.2. WG-2: Data and Information Management – E. Pattabhi Rama Rao

The Co-Chair of IIOE-2 WG-2, Pattabhi Ramarao, highlighted Terms of Reference on Data and Information Management, progress of working group II activities, details on the Metadata portal, and future plans on Data and Information Management. As part of working group 2 activities, the Regional Coordination Unit for IIOE-2 Data and Information Management was established at ESSO-INCOIS, Hyderabad. Data Policy reviewed and finalised in consultation with Raleigh, IODE Co-Chair and Head, IODE, Nick and Satya and presented to SC-4 in Apr 2021. Data Policy was approved in the SC-5 Meeting in Mar 2022. Metadata portal developed and posted metadata of 12 cruises, and Metadata format, user guide, along with Login Credentials have been sent to all the PIs of the Cruises endorsed by IIOE-2 and requested to submit the Metadata as per the data policy of IIOE-2. PIs of the endorsed project are requested to follow up on the status of projects and Metadata submission with a few questionnaires. The report detailed the 12 of 57 endorsed projects, which submitted the Metadata to the portal. Modification of the IIOE-2 Metadata Portal to include support for JSON-LD (JavaScript Object Notation for Linked Data) is completed. The report also discussed the list of core measurements with units for the IIOE-2 scientific activities. The report concluded with the plans, including continuing the collection of metadata and data from the endorsed projects, developing quality

control/quality assurance procedures and developing and updating data and information management capacity.

4.3. WG-3: Operational Coordination – N. Kiran Kumar

The WG-3 report of IIOE-2 was presented by N. Kiran Kumar on behalf of Rajan Sivaramakrishnan. The report highlighted the detailed Terms of Reference of WG-3 Operational Coordination. Additionally report focused on the activities carried out as part of operational and coordination. Management of the central web-based expedition planning and progress utility linked to the IIOE-2 website. Development of a WebGIS application for endorsed projects along with the Buoy Observations Network. WG-3 & Project Office has developed a webpage to publish all the IIOE-2 endorsed projects with respect to science themes, endorsement form, etc. A new website has been operational for the Early Career Scientist Network (ECSN) and shared with all the members of ECSN. A new Website has been operational for Coastal Observation Lab in a Box (COLaB) and shared with all the members of SIBER. The Indian Ocean Bubble Issue and online newsletter highlighting IIOE-2 events contribute to the outreach activities. The report also discussed the major constraints, like non-submission of plans/ progress of studies by many of the PIs and non-availability of bathymetric data collected during the cruises. The report concluded with the details of IIOSC- 2025, which will be held at INCOIS, Hyderabad, India, from 1st to 5th of December, 2025.

5. IIOE-2 Science Theme reports

In this session, the co-chairs of the six science themes (ST) presented the latest updates. The details of the endorsed projects under various science themes are available at https://iioe-2.incois.gov.in/IIOE-2/Endorsed_Projects.jsp. The significant updates are highlighted below

5.1. Theme-1: Human Impacts and Benefits – Halina Kobryn

The ST-1 of the IIOE-2 initiative encompasses a diverse array of research endeavours to understand how human-induced ocean stressors impact the biogeochemistry and ecology of the Indian Ocean and how this affects human populations. The report highlighted the status of the endorsed project under this theme. 16 projects that list the human benefits and impacts component, six are completed, five are ongoing, and two are new. However, CIs of three projects did not respond to requests for updates. Completed projects have yielded valuable insights into marine ecosystems, while ongoing projects continue to expand our understanding and support conservation efforts. The future task includes cross-checking the outcomes of all endorsed projects against the research questions embedded in the science plan to identify any remaining gaps. Understanding additional research questions embedded in the research plan will further guide efforts to ensure the sustainability of the marine environment

5.2. Theme-2: Boundary current dynamics, upwelling variability and ecosystem impacts – P. N. Vinayachandran

The ST-2 focused on boundary current dynamics, upwelling variability, and ecosystem impacts in the Indian Ocean, and the report covered the recent cruises and research highlights. The cruise SO305 - BIOCAT-IIOE-2 with RV Sonne took place in April/May 2024 with an interdisciplinary measurement program that combined physical, chemical, biogeochemical and biological measurements in the Bay of Bengal. The main goal is to improve our understanding of the physical processes that impact the development and maintenance of the Oxygen Minimum Zone (OMZ) in the Bay of Bengal. R/V Hakuho-maru cruises were conducted with interdisciplinary observations in the Eastern Indian Ocean. Other research highlights included studies on submesoscale processes associated with the East India coastal current, the role of submesoscale dynamics on phytoplankton distributions, and river plume cyclone interaction. The report also discussed the other relevant publications which contribute to ST-2 of IIOE-2

5.3. Theme-3: Monsoon variability and ecosystem response – Adrian Matthews

The ST-3 focused on the Monsoon variability and ecosystem response. This theme aims to understand the factors controlling. monsoon variability, impact on ocean physics, chemistry and biogeochemistry in the Indian Ocean, and its effects on ecosystems, fisheries and human populations. The report highlighted the endorsed projects, recent cruises, and significant scientific findings associated with ST-3. The progress of work includes the INDO-US collaborative study, EKAMSAT, and BoBBLE were discussed. Other notable projects and scientific work, such as observations over the Tropical Western Indian Ocean, Recent and Future Trends in the Arabian Sea Oxygen Minimum Zone, and BIOSCape - Mapping of phytoplankton functional types (PFTs) from space in support of coastal resource management and decision support activities, are briefed. The report also emphasized the establishment of the International Joint Laboratory on estuarine and coastal research between China & Pakistan, the scientific studies in the Marginal Sea – the Arabian Gulf, and the contribution of Oman to monsoonal variability and ecosystem responses. Monsoonal variability and fisheries are also discussed in the ST-3 report, in which the ongoing activities are highlighted. Establishment of Arabian Sea Fisheries Management Coordination Committee, collection of databases on fishermen, fishing fleet, size, fishing type, gears and technology adopted, and health camps are a few activities that come under monsoon variability and fisheries. Overall, the activities under ST-3 contribute to understanding the complex dynamic nature of monsoon variabilities and their impacts on ecosystems as well as on human life.

5.4. Theme-4: Circulation, climate variability and change – Helen Phillips

The report highlighted the project and science updates on ST-4, co-chaired by Dr Helen Phillips and Prof. Amit Tandon. The ST-4 focuses on circulation, climate variability and change in the Indian Ocean. There are 31 endorsed projects aligned with ST4, well distributed across countries, 7 projects endorsed since 2020 and two projects since SC 7 of IIOE-2. Project updates feature ongoing investigations, such as the role of the Agulhas Current on coastal ecosystems, and the KIOST Indian

Ocean Study. The report discussed the project Hydrodynamics and biogeochemistry of the Indian Ocean sector of the Southern Ocean, and also the achievements of Indian Scientific Expeditions to the Southern Ocean. Scientific updates delve into topics like Mixed Rossby Gravity (MRG) waves at the equatorial Indian Ocean, Measurements and Modelling of the Indonesian Throughflow, and Enhancing Knowledge of the Arabian Sea Marine environment through Science and Advanced Training (EKAMSAT). The report detailed the status of EKAMSAT cruises and scientific work. The outlook emphasises rejuvenating the committee, reviewing endorsed projects and encouraging new ones and broad sharing of works

5.5. Theme-5: Extreme events and their impacts on ecosystems and human populations – Roxy Mathew Koll

The ST-5, Extreme events and their impacts on ecosystems and human populations, presented by Roxy Mathew Koll from the Indian Institute of Tropical Meteorology, highlighted the status of the endorsed project under ST-5. There are 8 projects endorsed under ST-5, and all 58 endorsed projects under IIOE-2 are contacted for relevant inputs for ST-5. A total of 7 relevant inputs were received out of 30 total responses. The project EP13 on Eastern Indian Ocean Upwelling Research Initiative provides insights into extreme events like the extreme 2019 IOD and marine heatwave over the eastern Indian Ocean. The project EP23, The influence of the Indian Ocean sector of the Southern Ocean dynamics and biogeochemistry on the tropical weather and climate, also provides insights into extreme events like warming and acidification, with their impacts on the ecosystem and human life. The report overviewed the different endorsed projects' insights on extreme events and their consequences, which include projects EP26, EP32, E42, EP43, and EP55. The presentation emphasized the significance of sustained ocean observations and regional partnerships in understanding and mitigating the impacts of extreme events

5.6. Theme-6: Unique geological, physical, biogeochemical and ecological characteristics of the Indian Ocean – Lynnath Beckley

The ST-6 focused on the Unique geological, physical, biogeochemical and ecological characteristics of the Indian Ocean. More than 50% of the endorsed projects under IIOE-2 contributed to the ST-6. Three additional projects were added since SC-7 of IIOE-2 to make a total of 31 endorsed projects for the ST-6. The report highlighted the status, progress, key results & publications of the endorsed projects. These projects are highly variable, from small modelling projects to large ones like SOLSTICE, NEKTON & Monaco Expedition. The new project EP56 focuses on the regional Marine Spatial Plan for the WIO. EP55 investigate on vulnerability of Kenyan coastal ecosystems under climatic stress (VOKCE), which includes climate science using paleo-reconstruction and assessing non-climate stressors. The EP53, EXPAND, aims to quantitatively understand the impact of the IO subtropical gyre expansion on biological N fixation & subsequent productivity. Many projects covering the unique biodiversity of canyons, seamounts, ridges & banks in the IO and biogeochemistry projects are often linked with GO-SHIP or GEOTRACES.

Overall, these projects contribute crucial insights into the complex dynamics and biodiversity of the Indian Ocean, addressing key scientific and environmental challenges.

6. IIOE-2 Steering Committee Business Meeting

6.1. IIOE-2 Project Office Report and Endorsement of New Projects

Dr Aneesh Lotliker presented the report from IIOE-2 Project Office (PO), India hosted by Indian National centre for Ocean Information Services (INCOIS), Ministry of Earth Sciences (MoES), Hyderabad, India. Dr Lotliker presented the roles and responsibility of the IIOE-2 PO followed by action taken report from the previous SC7 meeting. The report highlights are as follows:

- All the actions from the previous SC7 meeting were completed
- Maintained the IIOE-2 website (https://iioe-2.incois.gov.in/IIOE-2/index.jsp) with the latest updates including metadata portal (https://iioe-2.incois.gov.in/IIOE-2/data.jsp), endorsed scientific projects (https://iioe-2.incois.gov.in/IIOE-2/Endorsed_Projects.jsp) and dedicated web page for Early Career Scientist Network (ECSN) (https://iioe-2.incois.gov.in/ecsn/index.html). Website usage has grown significantly, reaching ~26,000 visitors in 2024, supported by cybersecurity audits and SSL implementation.
- The monthly newsletters were continued to update the Indian Ocean community on the recent IIOE-2 activities and upcoming events, meetings, conferences etc. Total 99 newsletters have been published and are available online (https://iioe-2.incois.gov.in/IIOE-2/Publications.jsp?mode_pub_id=NL). The bi-annual IIOE-2 Bubble has been continued and 19 issues have been published (https://iioe-2.incois.gov.in/IIOE-2/Bubble.jsp).
- A new draft Prototype for Website design has been developed for Early Career Scientist Network (ECSN) and shared with all the members of ECSN. The webpage also includes a form to join the IIOE-2 ECSN Network.
- Endorsed six projects during year 2025 with the total reaching to 63. The details of the endorsed project can be viewed at https://iioe-2.incois.gov.in/IIOE-2/Endorsed_Projects.jsp.

Continue with the IIOE-2 newsletter and Ocean Bubble

ECSN website should be given wide publicity through IIOE-2 newsletter and other possible modes.

Endorsement of the projects should be continued in consultation with IIOE-2 SC.

The IIOE-2 SC-7 recommended that the Working Group and Science Themes leads should put effort into getting articles for the newsletter and Indian Ocean Bubble.

6.2. ECSN status and progress report

The Early Career Scientists Network (ECSN) of IIOE-2 is a collaborative and supportive community that aims to foster professional development, knowledge exchange, and collaborations among emerging scientists, including graduate students, postdoctoral researchers, junior faculty members or researchers within the first decade of their research career. Encompassing diverse domains of ocean sciences, the network facilitates the sharing of expertise and methodologies, to bridge early career researchers (ECRs) working on the Indian Ocean and promote interdisciplinary research. We are dedicated to nurturing the new generation of scientists from the Indian Ocean-rimmed countries to advance the understanding of the Indian Ocean's diverse and interconnected marine systems. The core committee visualizes and develops agenda, takes decisions, executes activities, empowers ECRs, provides opportunities, and maintains the vibrancy of the ECSN (https://iioe-2.incois.gov.in/ecsn/corecomittee.jsp). The Advisory Committee Establishes the core committee, mentors and supports the progress, reviews activities, and provides specialized knowledge and input (https://iioe-2.incois.gov.in/ecsn/advisory.jsp).

Dr Aditi Modi, co-chair of IIOE-2 ECSN presented the status report during IIOE-2 SC-8 meeting. The presentation was focussed on the objectives of the ECSN followed by the membership status. As of now, total 203 members are enrolled in ECSN with each member with the unique ID. The IIOE-2 project office is supporting ECSN with a dedicated web page to disseminate the information

The members of ECSN continues with the monthly seminar series on Indian Ocean featuring Theme: Ocean insights - Indian Ocean Seminar Series, co-authored book chapters on Indian Ocean observing systems, contributed to the Second International Indian Ocean Expedition (IIOE-2) Science Plan Addendum and also participated in several cruises in the Indian Ocean. In addition, the members of the ECSN contributed to IIOE-2 and EGU special synthesis reports, conducted IPCC and Ocean Decade review, executing Indo-French collaborative project endorsed by IIOE-2 and contributed to online course on Fishery Oceanography for Future Professionals. The details on the ECSN and their activities are available at https://iioe-2.incois.gov.in/ecsn/index.html

The members of the IIOE-2 ECSN should engage in the activities related to the Working Groups and Science Themes

6.3. Status Update on IIOE-2 extension till 2030: Addendum to Science Plan & Revised Implementation Strategy

An addendum to IIOE-2 science plan and revised implementation strategy has been drafted by Raleigh Hood and Nick D'Adamo, respectively, in association with the SC members to extend the tenure till 2030. This Addendum to the Second International Indian Ocean Expedition (IIOE-2) Science Plan is motivated by several factors. These include the impacts of the COVID-19 pandemic that resulted in a three-year hiatus in in-person meetings and research cruises, and the loss of key IIOE-2 personnel. Moreover, although IIOE-2 has been highly successful, it has not yet achieved all of its stated objectives. In particular, there is still work that needs to be done to fully examine the biogeochemical and

ecological impacts of anthropogenic influences on the ocean and how these will, in turn, impact coastal marine environments and human populations. There is also a need to focus more on coastal monitoring and management, data sharing, scientific engagement of Indian Ocean rim countries, and capacity development. This Addendum to the IIOE-2 Science Plan builds upon concepts and strategies formulated and discussed at three SCOR and IOC-sponsored meetings (convened in Perth, Western Australia, February 6-7, 2023; in Hyderabad, India, November 28-30, 2023; and in Lombok, Indonesia, March 4-5, 2024). These meetings included scientists from Indian Ocean rim nations, eastern Asia, Europe and North America. The meeting in Hyderabad was dedicated to the development of this Addendum, providing several key presentations, discussion notes and an outline for this document.

The IIOE-2 Science Plan places considerable emphasis on the biogeochemical and ecological impacts of anthropogenic influences on the ocean and how these will, in turn, impact coastal marine environments and human populations. The plan also emphasizes the need for coastal monitoring, data sharing, scientific engagement of Indian Ocean rim countries, and capacity development. Knowledge gaps and challenges articulated here include the need for more coastal monitoring and metadata sharing in exclusive economic zones (EEZs) of Indian Ocean rim nations; the need to engage with and promote marine spatial planning (MSP) efforts in the Indian Ocean and promote early career scientists.

This Addendum also highlights four new initiatives that will greatly facilitate addressing these needs: the Sustained Indian Ocean Biogeochemistry and Ecosystem Research (SIBER) program, the Korea-US Indian Ocean Scientific Imperatives (KUDOS) program, the emerging Coastal Observations in a Box (COLaB) project, and a new Marginal Seas Research Initiative (MSRI).

The outlines of these documents were presented at the SCOR annual meeting in Qingdao, October 2024. The comments received against the proposals were addressed during the IIOE-2 SC-8 meeting.

6.4. Update on chairing and membership of existing STs and WGs

The IIOE-2 PO periodically reviews the membership of the Working Groups (WG) and the Science Themes (ST). The PO has communicated to co-chairs and members of the each WG and ST to provide willingness to continue the membership. The status of the membership is available at https://iioe-2.incois.gov.in/documents/IIOE-2/IIOSC2024/IIOE2_ST_WG-MembershipStatus.pdf. The IIOE-2 SC-8 asked the co-chairs to identify the new members, in the place of one who are not willing to continue and communicate to the PO. The PO will then compile the information and forward to the IIOE-2 co-chairs for the approval and further implementation.

The co-chairs of the respective working groups and science themes to nominate the members along with their bio-sketch. Also explore the possibility of including the members of ECSN into WG and ST.

6.5. Indian Ocean Science Conference to celebrate 10 years since launch of IIOE-2

The IIOE-2 was formally launched in December 2015 at the culmination of the Indian Ocean conference at Goa to mark the anniversary of 50 years since the first International Indian Ocean Expedition. The IIOE-2 program was initially formulated for a period of five years (2015-2020) but was subsequently extended for another five years until 2025. Over the past decade, the IIOE-2 community has contributed significantly to the understanding of the Indian Ocean in terms of observation, research and capacity development through 60 endorsed projects across the six defined scientific themes. There have been many international collaborations, and, in addition, the Early Career Scientist Network (ECSN) has gained momentum with exchange of ideas and capacity development.

International Indian Ocean Science Conference 2025 (IIOSC-2025) aims to showcase the progress and scientific knowledge gained during the past decade of IIOE-2 (2015-2025). The IIOE-2 SC-8 identified nine defined themes which include the six themes of the IIOE-2 science plan and additional themes based on the proposed addendum.

- Theme 1: Human benefits and impacts
- Theme 2: Boundary current dynamics, upwelling variability and ecosystem impacts
- Theme 3: Monsoon variability and ecosystem response
- Theme 4: Circulation, climate variability
- Theme 5: Extreme events and their impacts on ecosystems and human populations
- Theme 6: Unique geological, physical, biogeochemical, and ecological features of the Indian Ocean
- Theme 7: IIOE-2 contribution to sustainable development: toward the UN Decade of Ocean Science
- Theme 8: Marginal seas of the Indian Ocean
- Theme 9: Indian Ocean seabed and habitat mapping

In addition, a dedicated Industry Session is planned with theme Technological innovation for harnessing blue economy potential along with the workshop of ECSN.

INCOIS to host IIOSC-2025 with support from MoES, IOC, IOGOOS and SCOR. Explore the possibility of funding ECSN through MoES, IOGOOS and SCOR.

The Co-Chairs of the WG and ST should act as session conveners. Also identify additional session conveners is require.

6.6. IIOE-2 SC 9: Host, Location/venue & date

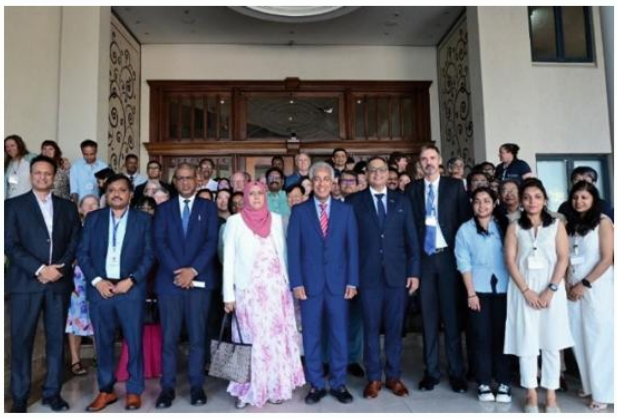
The SC 8 discussed that the next meeting of the IIOE-2 SC (SC 9) to be convened along with the integrated meetings of the IOGOOS, IRF, IORP and SIBER. It was also advised to conduct KUDOS and ECSN workshops along with these meetings.

Convene IIOE-2 SC 9 meeting in consultation with IOGOOS secretariat.

7. Summary of the Recommendations and actions

Recommendations	Action
Continue with the IIOE-2 newsletter and Ocean Bubble	Completed
ECSN website should be given wide publicity through IIOE-2 newsletter and other possible modes	Completed
Endorsement of the projects should be continued in consultation with IIOE-2 SC.	Completed
The IIOE-2 SC-7 recommended that the Working Group and Science Themes leads should put effort into getting articles for the newsletter and Indian Ocean Bubble	PO is in contact with Co-Chairs of WG and ST
The members of the IIOE-2 ECSN should engage in the activities related to the Working Groups and Science Themes	To be discussed in the SC-9
The co-chairs of the respective working groups and science themes to nominate the members along with their bio-sketch. Also explore the possibility of including the members of ECSN into WG and ST.	To be discussed and finalized during SC-9
INCOIS to host IIOSC-2025 with support from MoES, IOC, IOGOOS and SCOR. Explore the possibility of funding ECSN through MoES, IOGOOS and SCOR.	Completed
The Co-Chairs of the WG and ST should act as session conveners. Also identify additional session conveners is require	Completed

8. Group Photo



@IIOE2

@iioe_2

Enroll yourself with IIOE-2 Community

https://iioe-2.incois.gov.in/IIOE-2/Signup.jsp